3GPP TSG CN Plenary Meeting #16 5th - 7th June 2002. Marco Island, USA.

Source:	TSG CN WG 1
Title:	CRs to R99 (with mirror CRs) on Work Item GSM/UMTS interworking towards 24.008
Agenda item:	7.6
Document for:	APPROVAL

Introduction:

This document contains 9 CRs on R99 including mirror CRs to Work Item "GSM/UMTS interworking", that have been agreed by TSG CN WG1, and are forwarded to TSG CN Plenary meeting #16 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Version- Current	Versi on- New	Meeting- 2nd- Level	Doc-2nd- Level
24.008	579	1	R99	Correction to CS domain specific system information	F	3.11.0	3.12.0	N1-23	N1-020881
24.008	580	1	Rel-4	Correction to CS domain specific system information	A	4.6.0	4.7.0	N1-23	N1-020882
24.008	581	1	Rel-5	Correction to CS domain specific system information	A	5.3.0	5.4.0	N1-23	N1-020883
24.008	592	2	Rel-5	Impact of regional roaming restrictions on the MM state	A	5.3.0	5.4.0	N1-24	N1-021388
24.008	599	1	R99	R97 and R99 Compatibility	F	3.11.0	3.12.0	N1-23	N1-020889
24.008	611		Rel-4	R97 and R99 Compatibility	А	4.6.0	4.7.0	N1-23	N1-020890
24.008	612		Rel-5	R97 and R99 Compatibility	А	5.3.0	5.4.0	N1-23	N1-020891
24.008	627	1	R99	Impact of regional roaming restrictions on the MM state	F	3.11.0	3.12.0	N1-24	N1-021386
24.008	628	1	Rel-4	Impact of regional roaming restrictions on the MM state	A	4.6.0	4.7.0	N1-24	N1-021387

3GPP TSG-CN1 Meeting #23 Fort Lauderdale, Florida, USA 08. - 12. April 2002

Tdoc N1-020881

Revision of N1-020706

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Proposed change affects: # (U)SIM ME/UE X Radio Access Network X Core Network												
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How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. Below is a brief summary:

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- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

10.5.1.12.2 CS domain specific system information

The purpose of the *CN domain specific GSM-MAP NAS system information* element, when used for the CS domain, is to provide the MS with actual parameter settings of parameters relevant only for MM functionality. The coding of the information element identifier and length information is defined in the 3GPP TS 25.331. Only the coding of the content is in the scope of the present document.

For CS domain, the content of the *CN domain specific GSM-MAP NAS system information* element is coded as shown in figure 10.5.1.12.2/3GPP TS 24.008 and table 10.5.1.12.2/3GPP TS 24.008. The length of this element content is two octets. The MS shall ignore any additional octets received.





Table 10.5.1.12.2/3GPP TS 24.008: CS domain specific system information element

 T3212 timeout value (1 octet field)

 The T3212 timeout field is coded as the binary representation of the timeout value for periodic updating in decihours. Bit 8 in octet 13 is the most significant bit and bit 1 in octet 13 is the least significant bit. Range: 1 to 255

 The value 0 is used for infinite timeout value i.e. periodic updating shall not be used

 ATT, Attach-detach allowed (1 bit field):

 Bit 1
 0
 MSs shall not apply IMSI attach and detach procedure.

 1
 MSs shall apply IMSI attach and detach procedure

 The bits 2 – 8 of octet 24 are spare and shall be coded all zeros.

3GPP TSG-CN1 Meeting #23 Fort Lauderdale, Florida, USA 08. - 12. April 2002

Tdoc N1-020882

Revision of N1-020707

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Tdoc N1-020883

Revision of N1-020708

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CR-Form-v5 CHANGE REQUEST ж Current version: 24.008 CR 592 жrev 5.3.0 For **HELP** on using this form, see bottom of this page or look at the pop-up text over the **#** symbols. ME/UE X Radio Access Network Proposed change affects: # (U)SIM Core Network Title: Impact of regional roaming restrictions on the MM state æ Siemens AG Source: æ Date: # 02.05.02 Work item code: # GSM/UMTS interworking ж Α Release: # REL-5 Category: Use one of the following releases: Use one of the following categories: F (correction) 2 (GSM Phase 2) A (corresponds to a correction in an earlier release) R96 (Release 1996) B (addition of feature), (Release 1997) R97 **C** (functional modification of feature) R98 (Release 1998) **D** (editorial modification) (Release 1999) R99 Detailed explanations of the above categories can REL-4 (Release 4) be found in 3GPP TR 21.900. REL-5 (Release 5)

Reason for change: # 1) In R99 and Rel-4, regional roaming restrictions can be realized in shared network scenarios by means of the "equivalent PLMN list" and the (G)MM reject causes #11, #12, #13 and #15. These features, however, only allow to influence the cell and PLMN selection in idle mode. RAN3 and SA2 only recently started to study for Rel-5 the enhancements necessary to enforce regional roaming restrictions also in the connected mode. Enhancements to GERAN will not be possible before Rel-6. Therefore, in a R99/Rel-4/Rel-5 network it may happen that an MS in MS operation mode A or B, with an ongoing CS call, is handed over to a cell in which it is rejected by the SGSN, when it tries to perform a GPRS attach, routing area update or service request procedure. (Note that an MS in MS operation mode B in GSM will change to operation mode A in UMTS, see TS 24.008, subclause 4.7.1.7 c.) In the current version of TS 24.008 it is stated that in case of a GPRS attach, a network initiated GPRS detach, a normal or periodic routing area update, or a service request procedure, if the MS receives reject cause #11, #12, #13 or #15, it shall (among other things) perform the following actions: If the MS is IMSI attached via MM procedures, the MS shall set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE. Furthermore, the MS shall perform a PLMN selection (causes #11 and #13) or a cell selection (cause #12), or it shall search for a suitable cell in another location area in the same PLMN (cause #15). That means that an MS in MS operation mode A has to drop the ongoing circuit switched call. Furthermore, an MS that is only IMSI attached for non-GPRS services will drop the ongoing circuit switched call when the subscriber tries to change to MS operation mode A and attach for GPRS services. 2) In case of receipt of a Service Reject with reject cause #15 the new GMM state should be GMM-REGISTERED.LIMITED-SERVICE instead of GMM-

	REGISTERED.ATTEMPTING-TO-UPDATE.
Summary of change: #	 In case of a GPRS attach, a network initiated GPRS detach, a normal or periodic routing area update, or a service request procedure: if the MS is in MS operation mode A and an RR connection exists, the MS shall after receipt of one of the reject causes #11, #12, #13 and #15 postpone the actions specified for the MM entity until the RR connection is released.
	The new GMM state after receipt of a Service Reject with reject cause #15 is changed to GMM-REGISTERED.LIMITED-SERVICE.
	 A clarification is added that the new GMM state after receipt of a network initiated Detach REQUEST message with reject cause #11 is GMM- REGISTERED.
	4) After receipt of GMM reject cause #3, #6 or #8, the MS shall abort an existing RR connection, unless an emergency call is ongoing.
• • • • •	
not approved:	The MS will loose ongoing circuit-switched calls, if it is operating in MS operation mode A or B and handed over to a cell in which the MS is operating in MS operation mode A and for which regional roaming restrictions apply.
	This seems is a supposed to be non-frequently ordinates following seems
	Operators X and Y have separate 3G networks. There is a roaming agreement allowing subcribers of operator Y to roam in the 2G network of operator X, but not in his 3G network.
	If a subscriber of operator Y, while roaming in the 2G network, requests for a service which is only provided by the 3G network (e.g. a CS multimedia call), the network is expected to initiate a service bandouer to the 3C network of expected.
	X (Note that the serving BSC does not have the necessary information to
	determine that the subscriber should be handed over to the 3G network of operator Y.)
Clauses affected: #	4.7.3.1.4, 4.7.4.2.2, 4.7.5.1.4, 4.7.13.4

Other specs	% Other core specifications %
anecieu.	O&M Specifications
Other comments:	# If the MS behaves as proposed in this CR and a further handover to another location area or PLMN happens during the lifetime of the RR connection, the MS
	will
	- in GMM state GMM-DEREGISTERED.LIMITED-SERVICE (after Attach
	Reject) perform a new GPK5 attach;
	- IN GIVINI STATE GIVINI-REGISTERED.LIMITED-SERVICE (after RAU Reject or
	Service Reject) perform another RAU
	if the location area and the PLMN ID is not on one of the forbidden lists. That
	means that PS services can be used again as soon as possible.

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First modified section

4.7.3.1.4 GPRS attach not accepted by the network

If the attach request cannot be accepted by the network, an ATTACH REJECT message is transferred to the MS. The MS receiving the ATTACH REJECT message, stops timer T3310 and for all causes except #12, #14 and #15 deletes the list of "equivalent PLMNs".

The MS shall then take one of the following actions depending upon the reject cause:

- # 3 (Illegal MS);
- # 6 (Illegal ME);

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed.

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall 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. The new MM state is MM IDLE. The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.

7 (GPRS services not allowed);

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.

8 (GPRS services and non-GPRS services not allowed);

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED. The new MM state is MM IDLE.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, shall 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. The SIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM is removed.

11 (PLMN not allowed);

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2), shall reset the GPRS attach attempt counter and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMN list".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the PLMN identity in the "forbidden PLMN list".

-____The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].

12 (Location area not allowed);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

 If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

-____The MS shall perform a cell selection according to 3GPP TS 43.022 [82] and 3GPP TS 25.304.

#13 (Roaming not allowed in this location area);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE or optionally to GMM-DEREGISTERED.PLMN-SEARCH.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].

14 (GPRS services not allowed in this PLMN);

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list. A GPRS MS operating in MS operation mode C shall perform a PLMN selection instead of a cell selection.

A GPRS MS operating in MS operation mode A or B in network operation mode II or III, is still IMSI attached for CS services in the network.

15 (No Suitable Cells In Location Area);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED(and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

 If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 43.022 [82] and 3GPP TS 25.304.

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is specified in subclause 4.7.3.1.5.

Next modified section

4.7.4.2.2 Network initiated GPRS detach procedure completion by the MS

When receiving the DETACH REQUEST message and the detach type IE indicates "re-attach required", the MS shall deactivate the PDP contexts and deactivate the logical link(s), if any. The MS shall then send a DETACH ACCEPT message to the network and shall change state to GMM-DEREGISTERED. The MS shall, after the completion of the GPRS detach procedure, initiate a GPRS attach procedure. The MS should also activate PDP context(s) to replace any previously active PDP contexts.

NOTE: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.

A GPRS MS operating in MS operation mode A or B in network operation mode I, which receives an DETACH REQUEST message with detach type indicating "re-attach required" or "re-attach not required" and no cause code, is only detached for GPRS services in the network.

When receiving the DETACH REQUEST message and the detach type IE indicates "IMSI detach", the MS shall not deactivate the PDP contexts. The MS shall set the MM update status to U2 NOT UPDATED. A MS in operation mode A or B in network operation mode I may send a DETACH ACCEPT message to the network, and shall re-attach to non-GPRS service by performing the combined routing area updating procedure according to subclause 4.7.5.2, sending a ROUTING AREA UPDATE REQUEST message with Update type IE indicating "combined RA/LA updating with IMSI attach". A MS in operation mode C, or in MS operation mode A or B in network operation mode II or III, shall send a DETACH ACCEPT message to the network.

If the detach type IE indicates "IMSI detach", or "re-attach required" then the MS shall ignore the cause code if received.

If the detach type information element value indicates "re-attach required" or "re-attach not required" and the MS is attached for GPRS and non-GPRS services and the network operates in network operation mode I, then if in the MS the timer T3212 is not already running, the timer T3212 shall be set to its initial value and restarted.

When receiving the DETACH REQUEST message and the detach type IE indicates "re-attach not required" and the cause code is not "#2 (IMSI unknown in HLR)", the MS shall deactivate the PDP contexts and deactivate the logical link(s), if any. The MS shall then send a DETACH ACCEPT message to the network and shall change state to GMM-DEREGISTERED.

If the detach type IE indicates "re-attach not required", then, depending on the received cause code, the MS shall act as follows:

2 (IMSI unknown in HLR);

The MS shall set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE. The SIM shall be considered as invalid for non-GPRS services until switching off or the SIM is removed.

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for GPRS services in the network.

3 (Illegal MS);

6 (Illegal ME);

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed.

A GPRS MS operating in MS operation mode A or B shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. <u>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. The new MM state is MM idle.</u> The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.

7 (GPRS services not allowed);

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.

A GPRS MS operating in MS operation mode A or B in network operation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for CS services in the network.

8 (GPRS services and non-GPRS services not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED and the update status to U3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2). Furthermore, it shall delete any P TMSI, P TMSI signature, TMSI, RAI, LAI, ciphering key sequence number and GPRS ciphering key sequence number and shall consider the SIM as invalid for GPRS and non GPRS services until switching off or the SIM is removed.

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, shall 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. The SIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM is removed.

11 (PLMN not allowed);

The MS shall delete any RAI or LAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2). The new GMM state is GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMN list".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

A GPRS MS operating in MS operation mode A or B shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE.

The MS shall store the PLMN identity in the "forbidden PLMN list".

- The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].

12 (Location area not allowed);

The MS shall delete any RAI, P-TMSI, P-TMSI signature GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED(and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for regional provision of service".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for regional provision of service".

- -____The MS shall perform a cell selection according to 3GPP TS 43.022 [82] and 3GPP TS 25.304.
- #13 (Roaming not allowed in this location area);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE or optionally to GMM-DEREGISTERED.PLMN-SEARCH.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

- If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

-___The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].

14 (GPRS services not allowed in this PLMN);

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list.

A GPRS MS operating in MS operation mode A or B in network operation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

A GPRS MS operating in MS operation mode A or B, is still IMSI attached for CS services in the network.

15 (No Suitable Cells In Location Area);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED(and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

- If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 43.022 [82] and 3GPP TS 25.304.

Other cause values shall not impact the update status. Further actions of the MS are implementation dependent.

Next modified section

4.7.5.1.4 Normal and periodic routing area updating procedure not accepted by the network

If the routing area updating cannot be accepted, the network sends a ROUTING AREA UPDATE REJECT message to the MS. An MS that receives a ROUTING AREA UPDATE REJECT message, stops timer T3330, and for all causes except #12, #14 and #15 deletes the list of "equivalent PLMNs".

The MS shall then take different actions depending on the received reject cause value:

3 (Illegal MS);

6 (Illegal ME);

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 enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and shall consider the SIM as invalid for GPRS services until switching off or the SIM is removed.

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall 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. The new MM state is MM IDLE. The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.

7 (GPRS services not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2.9) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.

If the update type is "periodic updating" a GPRS MS operating in MS operation mode A or B in networkoperation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

9 (MS identity cannot be derived by the network);

The MS shall set the GPRS update status to GU2 NOT UPDATED (and shall store it according to subclause 4.1.3.2), enter the state GMM-DEREGISTERED, and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. Subsequently, the MS may automatically initiate the GPRS attach procedure.

10 (Implicitly detached);

The MS shall change to state GMM-DEREGISTERED.NORMAL-SERVICE. The MS shall then perform a new attach procedure. The MS should also activate PDP context(s) to replace any previously active PDP contexts.

- NOTE: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.
- # 11 (PLMN not allowed);

- The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and enter the state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMN list".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

- If the MS is IMSI attached-via MM procedures, the MS shall in addition-set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.
- The MS shall store the PLMN identity in the "forbidden PLMN list".
 - -____The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].
- # 12 (Location area not allowed);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2), shall reset the routing area updating attempt counter and shall change to state GMM-DEREGISTERED.LIMITED-SERVICE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

- -____The MS shall perform a cell selection according to 3GPP TS 43.022 [82] and 3GPP TS 25.304.
- #13 (Roaming not allowed in this location area);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) shall reset the routing area updating attempt counter and shall change to state GMM-REGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

 If the MS is IMSI attached-via MM procedures, the MS shall in addition-set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].

14 (GPRS services not allowed in this PLMN);

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list. A GPRS MS operating in MS operation mode C shall perform a PLMN selection instead of a cell selection.

If the update type is "periodic updating" a GPRS MS operating in MS operation mode A or B in network operation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

A GPRS MS operating in MS operation mode A or B in network operation mode II or III, is still IMSI attached for CS services in the network.

15 (No Suitable Cells In Location Area);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) shall reset the routing area updating attempt counter and shall change to state GMM-REGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached-via MM procedures, the MS shall in addition-set the update status to U3
 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 43.022 [82] and 3GPP TS 25.304.

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is described in subclause 4.7.5.1.5.

Next modified section

4.7.13.4 Service request procedure not accepted by the network

—If the Service request cannot be accepted, the network returns a SERVICE REJECT message to the mobile station. An MS that receives a SERVICE REJECT message stops timer T3317. The MS shall then take different actions depending on the received reject cause value:

3 (Illegal MS); or

6 (Illegal ME);

- 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 enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and shall consider the SIM as invalid for GPRS services until switching off or the SIM is removed.
- A GPRS MS operating in MS operation mode A shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. <u>If the MS is operating in MS</u> operation mode A and an RR connection exists, the MS shall abort the RR connection, unless an emergency call is ongoing. <u>The new MM state is MM IDLE</u>. The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.
- # 7 (GPRS services not allowed);
- The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2.9) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.

- # 9 (MS identity cannot be derived by the network);
- The MS shall set the GPRS update status to GU2 NOT UPDATED (and shall store it according to subclause 4.1.3.2), enter the state GMM-DEREGISTERED, and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. Subsequently, the MS may automatically initiate the GPRS attach procedure.
- # 10 (Implicitly detached);
- The MS shall change to state GMM-DEREGISTERED.NORMAL-SERVICE. The MS shall then perform a new attach procedure. The MS should also activate PDP context(s) to replace any previously active PDP contexts.
- NOTE: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.
- # 11 (PLMN not allowed);
- The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and enter the state GMM-DEREGISTERED.
- The MS shall store the PLMN identity in the "forbidden PLMN list".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:
 - A GPRS MS operating in MS operation mode A shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE.

-The MS shall store the PLMN identity in the "forbidden PLMN list".

- -____The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].
- # 12 (Location area not allowed);
- The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall change to state GMM-DEREGISTERED.LIMITED-SERVICE.
- The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:
 - If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.
- The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".
 - The MS shall perform a cell selection according to 3GPP TS 43.022 [82] and 3GPP TS 25.304.
- #13 (Roaming not allowed in this location area);
- The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) attempt counter and shall change to state GMM-REGISTERED.LIMITED-SERVICE.
- The MS shall store the LAI in the list of "forbidden location areas for roaming".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

- If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.
- The MS shall store the LAI in the list of "forbidden location areas for roaming".
 - -___The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].
- # 15 (No Suitable Cells In Location Area);

- 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 change to state GMM-REGISTERED.<u>LIMITED-SERVICE</u>ATTEMPTING TO-UPDATE.
- The MS shall store the LAI in the list of "forbidden location areas for roaming".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:
 - If the MS is IMSI attached-via MM procedures, the MS shall in addition-set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.

-The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 43.022 [82] and 3GPP TS 25.304.

- # 40 (No PDP context activated)
- The MS shall deactivate locally all active PDP contexts and the MS shall enter the state GMM-REGISTERED.NORMAL-SERVICE. The MS may also activate PDP context(s) to replace any previously active PDP contexts.
- NOTE: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is described in subclause 4.7.13.5.

3GPP TSG-CN1 Meeting #23 Fort Lauderdale, Florida, USA 08. - 12. April 2002

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How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked **#** contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <u>ftp://ftp.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8 Handling of unknown, unforeseen, and erroneous protocol data

8.1 General

The procedures specified in 3GPP TS 24.008 and call-related supplementary service handling in 3GPP TS 24.010 apply to those messages which pass the checks described in this clause.

This clause also specifies procedures for the handling of unknown, unforeseen, and erroneous protocol data by the receiving entity. These procedures are called "error handling procedures", but in addition to providing recovery mechanisms for error situations they define a compatibility mechanism for future extensions of the protocols.

Error handling concerning the value part of the Facility IE and of the SS Version Indicator IE are not in the scope of the present document. It is defined in 3GPP TS 24.010 and the GSM 04.8x series.

Clauses 8.1 to 8.8 shall be applied in order of precedence.

Most error handling procedures are mandatory for the mobile station.

Detailed error handling procedures in the network are implementation dependent and may vary from PLMN to PLMN. However, when extensions of this protocol are developed, networks will be assumed to have the error handling that is indicated in this clause as mandatory ("shall") and that is indicated as strongly recommended ("should"). Clauses 8.2, 8.3, 8.4, 8.5 and 8.7.2 do not apply to the error handling in the network applied to the receipt of initial layer 3 message: If the network diagnoses an error described in one of these clauses in the initial layer 3 message received from the mobile station, it shall either:

- try to recognize the classmark and then take further implementation dependent actions; or
- release the RR-connection.

Also, the error handling of the network is only considered as mandatory or strongly recommended when certain thresholds for errors are not reached during a dedicated connection.

For definition of semantical and syntactical errors see 3GPP TS 24.007 [20], subclause 11.4.2.

In this clause the following terminology is used:

- An IE is defined to be syntactically incorrect in a message if it contains at least one value defined as "reserved" in clause 10, or if its value part violates rules of clause 10. However it is not a syntactical error that a type 4 IE specifies in its length indicator a greater length than defined in clause 10.
- A message is defined to have semantically incorrect contents if it contains information which, possibly dependent on the state of the receiver, is in contradiction to the resources of the receiver and/or to the procedural part (i.e. clauses 3, 4, 5) of 3GPP TS 24.008, 3GPP TS 24.010, or relevant GSM 04.8X series.

10.5.6.5 Quality of service

The purpose of the quality of service information element is to specify the QoS parameters for a PDP context.

The QoS IE is defined to allow backward compatibility to earlier version of Session Management Protocol.

The *quality of service* is a type 4 information element with a length of 13_octets. The QoS requested by the MS shall be encoded both in the QoS attributes specified in octets 3-5 and in the QoS attributes specified in octets 6-13.

A QoS IE received without octets 6-13 shall be accepted by a receiving entity.

NOTE: This behavior is required for interworking with entities supporting an earlier version of the protocol.

The *quality of service* information element is coded as shown in figure 10.5.138/3GPP TS 24.008 and table 10.5.156/3GPP TS 24.008.

8	7	6	5	4	3	2	1				
		C	uality of	service II	El			octet 1			
		Lengt	h of quali	ty of serv	vice IE			Octet 2			
0	0		Delay			Reliabilit	у	octet 3			
spa	spare class class										
	Pe	eak		0	F	receden	се	octet 4			
	throughput spare class										
	0 0 0 Mean										
	spare throughput										
T	raffic Clas	SS	Deliver	y order	Delive	ery of erro	oneous	Octet 6			
						SDU					
		Ν	/laximum	SDU siz	е			Octet 7			
		Maxi	mum bit	rate for u	plink			Octet 8			
		Maxim	num bit ra	ate for do	wnlink			Octet 9			
	Residu	al BER			SDU er	rror ratio		Octet 10			
		Transfe	er delay			Traffic I	Handling	Octet 11			
	priority										
		Guara	anteed bit	t rate for	uplink						
		Guarar	nteed bit i	rate for d	ownlink			Octet 13			

Figure 10.5.138/3GPP TS 24.008: Quality of service information element

3GPP TSG-CN1 Meeting #23 Fort Lauderdale, Florida, USA 08. - 12. April 2002

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		CR-Form-v5
	CHANGE REQUEST	
H	24.008 CR 611 # rev - [#] Current version:	<mark>4.6.0</mark> [⋇]
For <u>HELP</u> on u	using this form, see bottom of this page or look at the pop-up text over the	he ¥ symbols.
Proposed change a	e affects: ೫ (U)SIM ME/UE X Radio Access Network	Core Network X
Title: %	R97 and R99 compatibility	
Source: ೫	R Nortel Networks	
Work item code: Ж	く GSM-UMTS interworking Date: 第 09.0	4.2002
Category:	A Release: % Rel- Use one of the following categories: Use one of the following categories: Use one of the following categories: F (correction) 2 (GSM A (corresponds to a correction in an earlier release) R96 (Release) B (addition of feature), R97 (Release) C (functional modification of feature) R98 (Release) D (editorial modification) R99 (Release) Detailed explanations of the above categories can REL-4 (Release) be found in 3GPP TR 21.900. REL-5 (Release) ge: % In R99, the QoS IE increased in length. There are no requirement support a shorter length QoS IE Release in length. There are no requirement support a shorter length QoS IE	4 owing releases: Phase 2) ise 1996) ise 1997) ise 1998) ise 1999) ise 4) ise 5)
Summary of chang	 Also, semantical and syntactical error definitions are already spectand therefore should not be included in 24.008. Also, semantical and syntactical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. Also, semantical error definitions are already spectand therefore should not be included in 24.008. 	cified in 24.007 in 8.1 with a eception of a
Consequences if not approved:	# Interoperability problem between some R97 mobiles in R99 network	works.
Clauses affected.	*	
Other specs affected:	# Other core specifications # Test specifications O&M Specifications	
Other comments:	* ¥	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked **#** contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <u>ftp://ftp.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

8 Handling of unknown, unforeseen, and erroneous protocol data

8.1 General

The procedures specified in 3GPP TS 24.008 and call-related supplementary service handling in 3GPP TS 24.010 [21] apply to those messages which pass the checks described in this subclause.

This subclause also specifies procedures for the handling of unknown, unforeseen, and erroneous protocol data by the receiving entity. These procedures are called "error handling procedures", but in addition to providing recovery mechanisms for error situations they define a compatibility mechanism for future extensions of the protocols.

Error handling concerning the value part of the Facility IE and of the SS Version Indicator IE are not in the scope of the present document. It is defined in 3GPP TS 24.010 [21] and the 3GPP TS 04.8x series.

Sub subclauses 8.1 to 8.8 shall be applied in order of precedence.

Most error handling procedures are mandatory for the mobile station.

Detailed error handling procedures in the network are implementation dependent and may vary from PLMN to PLMN. However, when extensions of this protocol are developed, networks will be assumed to have the error handling that is indicated in this subclause as mandatory ("shall") and that is indicated as strongly recommended ("should"). Subclauses 8.2, 8.3, 8.4, 8.5 and 8.7.2 do not apply to the error handling in the network applied to the receipt of initial layer 3 message: If the network diagnoses an error described in one of these subclause s in the initial layer 3 message received from the mobile station, it shall either:

- try to recognize the classmark and then take further implementation dependent actions; or
- release the RR-connection.

Also, the error handling of the network is only considered as mandatory or strongly recommended when certain thresholds for errors are not reached during a dedicated connection.

For definition of semantical and syntactical errors see 3GPP TS 24.007 [20], subclause 11.4.2.

In this subclause the following terminology is used:

- An IE is defined to be syntactically incorrect in a message if it contains at least one value defined as "reserved" in clause 10, or if its value part violates rules of clause 10. However it is not a syntactical error that a type 4 IE specifies in its length indicator a greater length than defined in clause 10.
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10.5.6.5 Quality of service

The purpose of the quality of service information element is to specify the QoS parameters for a PDP context.

The QoS IE is defined to allow backward compatibility to earlier version of Session Management Protocol.

The *quality of service* is a type 4 information element with a length of 13_octets. The QoS requested by the MS shall be encoded both in the QoS attributes specified in octets 3-5 and in the QoS attributes specified in octets 6-13.

A QoS IE received without octets 6-13 shall be accepted by a receiving entity.

NOTE: This behavior is required for interworking with entities supporting an earlier version of the protocol.

The *quality of service* information element is coded as shown in figure 10.5.138/3GPP TS 24.008 and table 10.5.156/3GPP TS 24.008.

Quality of service IEI												
Length of quality of service IE	Octet 2											
0 0 Delay Reliability	octet 3											
spare class class												
Peak 0 Precedence	octet 4											
throughput spare class												
0 0 0 Mean	octet 5											
spare throughput												
Traffic Class Delivery order Delivery of erroneous	Octet 6											
SDU												
Maximum SDU size	Octet 7											
Maximum bit rate for uplink	Octet 8											
Maximum bit rate for downlink	Octet 9											
Residual BER SDU error ratio	Octet 10											
Transfer delay Traffic Handling	Octet 11											
priority												
Guaranteed bit rate for uplink												
Guaranteed bit rate for downlink	Octet 13											

Figure 10.5.138/3GPP TS 24.008: Quality of service information element

3GPP TSG-CN1 Meeting #23 Fort Lauderdale, Florida, USA 08. - 12. April 2002

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		CHAN	GE RE	OUEST			CR-Form-v5
		UIAN		QULUI			
¥	24.008	CR <mark>612</mark>	ж re\	۳ – ^ж	Current vers	sion: 5.3.0	ж
For <u>HELP</u> on us	ing this for	m, see bottom o	of this page of	or look at th	e pop-up text	over the X syn	nbols.
Proposed change a	ffects:	(U)SIM	ME/UE X	Radio Ad	ccess Networl	k Core Ne	twork X
Title: ೫	R97 and	R99 compatibilit	ty				
Source: ೫	Nortel Ne	tworks					
Work item code: %	GSM-UM	TS interworking			Date: ೫	09.04.2002	
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Summary of change	e: # - R re - Ei Q	eplacement of t ference to 24.0 ntities supportin oS IE of length	he text on sy 07. g this versio 5, 13 or 14 c	ntactical an n of the prot ctets.	d semantical tocol shall sup	errors in 8.1 wi	th a of a
Consequences if not approved:	# Inter	operability prob	lem betweer	some R97	mobiles in R	99 networks.	
Clauses affected:	ж						
Other specs affected:	# 01 Te	ther core specifiest specification &M Specification	cations s ns	¥			
Other comments:	ж						

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8.1 General

The procedures specified in 3GPP TS 24.008 and call-related supplementary service handling in 3GPP TS 24.010 [21] apply to those messages which pass the checks described in this subclause.

This subclause also specifies procedures for the handling of unknown, unforeseen, and erroneous protocol data by the receiving entity. These procedures are called "error handling procedures", but in addition to providing recovery mechanisms for error situations they define a compatibility mechanism for future extensions of the protocols.

Error handling concerning the value part of the Facility IE and of the SS Version Indicator IE are not in the scope of the present document. It is defined in 3GPP TS 24.010 [21] and the 3GPP TS 04.8x series.

Sub subclauses 8.1 to 8.8 shall be applied in order of precedence.

Most error handling procedures are mandatory for the mobile station.

Detailed error handling procedures in the network are implementation dependent and may vary from PLMN to PLMN. However, when extensions of this protocol are developed, networks will be assumed to have the error handling that is indicated in this subclause as mandatory ("shall") and that is indicated as strongly recommended ("should"). Subclauses 8.2, 8.3, 8.4, 8.5 and 8.7.2 do not apply to the error handling in the network applied to the receipt of initial layer 3 message: If the network diagnoses an error described in one of these subclause s in the initial layer 3 message received from the mobile station, it shall either:

- try to recognize the classmark and then take further implementation dependent actions; or
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Also, the error handling of the network is only considered as mandatory or strongly recommended when certain thresholds for errors are not reached during a dedicated connection.

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10.5.6.5 Quality of service

The purpose of the quality of service information element is to specify the QoS parameters for a PDP context.

The QoS IE is defined to allow backward compatibility to earlier version of Session Management Protocol.

The *quality of service* is a type 4 information element with a length of 14 octets. The QoS requested by the MS shall be encoded both in the QoS attributes specified in octets 3-5 and in the QoS attributes specified in octets 6-143.

A QoS IE received without octets 6-14 or without octet 14 shall be accepted by a receiving entity.

NOTE: This behavior is required for interworking with entities supporting an earlier version of the protocol.

The *quality of service* information element is coded as shown in figure 10.5.138/3GPP TS 24.008 and table 10.5.156/3GPP TS 24.008.

8	7	6	5	4	3	2	1	_
	Quality of service IEI							octet 1
Length of quality of service IE								
0	0		Delay			Reliability	/	octet 3
sp	are		class			class		
	Pe	ak		0	P	recedend	e	octet 4
	throu	ghput		spare		class		
	0 0 0				Mean			octet 5
	spare			t	hroughpu	ut		
Т	raffic Cla	SS	Deliver	Delivery order Delivery of erroneous			neous	Octet 6
						SDU		-
			Maximum	kimum SDU size				
		Max	imum bit	um bit rate for uplink				
	Maximum bit rate for downlink							
	Residu	al BER			SDU er	ror ratio		Octet 10
		Transf	er delay			Traffic H	landling	Octet 11
						pric	лцу	Octot 12
Guaranteed bit rate for uplink								Octet 12
		Guara	nteed bit i	t rate for downlink				Octet 13
	0 0 0 0 Source Statistics Descriptor							Octet 14
	Sp	are						

Revision of N1-021273

		,									orm v5
CHANGE REQUEST											
¥	24	<mark>.008</mark>	CR <mark>627</mark>	<mark>,</mark> ж	rev	1	₩ C	urrent vers	ion: <mark>3.</mark>	<mark>11.0</mark> ^អ	
For HELP on using this form, see bottom of this page or look at the pop-up text over the # symbols.											
Proposed change affects: # (U)SIM ME/UE X Radio Access Network Core Network											
Title: ೫	<mark>ៃ Im</mark>	pact of	regional roa	ming restric	tions of	on the	MM s	tate			
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	beit		3GPP <u>IR 21.</u>	<u>900</u> .				REL-5	(Release	3 0/	
Reason for chang	e: #	1) In F netwo cause the ce study restric possib	R99 and Rel rk scenarios s #11, #12, Il and PLMN for Rel-5 the tions also in ble before R fore, in a RS	-4, regional by means #13 and #13 selection in e enhancem the connect el-6. 09/Rel-4/Rel	roamii of the 5. The n idle r ents n eted m	ng rest "equiva se feat mode. ecessa ode. E	riction alent f tures, RAN3 ary to nhanc may f	hs can be re PLMN list" a however, c and SA2 c enforce reg cements to happen tha	ealized i and the only allo only reco gional ro GERAN t an MS	in shared (G)MM reje w to influence ently started barning I will not be in MS	ect ce d to
		it is re update GSM c.) In the netwo	jected by th e or service will change current vers	e SGSN, where request pro to operation sion of TS 2- GPRS detac	men it t cedure mode 4.008 h, a n	ries to e. (Note A in U it is sta ormal	perfore that JMTS, ated the or per	rm a GPRS an MS in M , see TS 24 nat in case	attach, AS oper 008, su of a GP	routing are ation mode ubclause 4.7 RS attach, a update, or a	B in 7.1.7
		servic shall (e request pr among othe	r things) pe	the MS	S receiv the follo	ves re owing	eject cause actions:	#11, #1	2, #13 or #1	15, it
		•	If the MS update sta location u Furthermo #13) or a another lo	atus to U3 F pdate attem pre, the MS cell selectio pcation area	ched v OAMI pt cou shall p n (cau in the	NG NM NG NC Inter. T perform se #12 same	proce DT AL The ne n a PL 2), or i PLMN	edures, the LOWED an ew MM sta .MN selecti t shall sear N (cause #1	nd shall te is MM on (caus ch for a 15).	Ill set the reset the I IDLE. ses #11 and suitable ce	d II in
		That r switch servic chang	neans that a red call. Fur es will drop re to MS ope	an MS in MS thermore, and the ongoing eration mode	opera MS t circui e A an	ation m hat is o t switcl d attac	node A only IN hed ca ch for (A has to dro MSI attache all when the GPRS serv	op the or ed for no e subscr rices.	ngoing circu on-GPRS riber tries to	uit)
		2) In c should	ase of receind be GMM-F	pt of a Serv EGISTERE	ice Re D.LIM	ject wi	th reje SERV	ect cause # ICE instead	15 the r d of GM	new GMM s M-	tate

	REGISTERED.ATTEMPTING-TO-UPDATE.
Summary of change: #	1) In case of a GPRS attach, a network initiated GPRS detach, a normal or periodic routing area update, or a service request procedure: if the MS is in MS operation mode A and an RR connection exists, the MS shall after receipt of one of the reject causes #11, #12, #13 and #15 postpone the actions specified for the MM entity until the RR connection is released.
	The new GMM state after receipt of a Service Reject with reject cause #15 is changed to GMM-REGISTERED.LIMITED-SERVICE.
	 A clarification is added that the new GMM state after receipt of a network initiated Detach REQUEST message with reject cause #11 is GMM- REGISTERED.
	4) The statement "The new MM state is MM IDLE." is deleted for GMM reject causes #3, #6 and #8 to allow the MS to continue an ongoing emergency call.
Consequences if % not approved:	The MS will loose ongoing circuit-switched calls, if it is operating in MS operation mode A or B and handed over to a cell in which the MS is operating in MS operation mode A and for which regional roaming restrictions apply. This scenario is supposed to happen frequently e.g. in the following case: Operators X and Y have separate 3G networks. There is a roaming agreement allowing subcribers of operator Y to roam in the 2G network of operator X, but not in his 3G network. If a subscriber of operator Y, while roaming in the 2G network, requests for a service which is only provided by the 3G network (e.g. a CS multimedia call), the network is expected to initiate a service handover to the 3G network of operator X. (Note that the serving BSC does not have the necessary information to determine that the subscriber should be handed over to the 3G network of operator Y.)
Clauses affected: #	4.7.3.1.4, 4.7.4.2.2, 4.7.5.1.4, 4.7.13.4

Other specs affected:	% Other core specifications % Test specifications % O&M Specifications
Other comments:	If the MS behaves as proposed in this CR and a further handover to another location area or PLMN happens during the lifetime of the RR connection, the MS will
	 in GMM state GMM-DEREGISTERED.LIMITED-SERVICE (after Attach Reject) perform a new GPRS attach;
	 in GMM state GMM-REGISTERED.LIMITED-SERVICE (after RAU Reject or Service Reject) perform another RAU
	if the location area and the PLMN ID is not on one of the forbidden lists. That
	means that PS services can be used again as soon as possible.

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked **#** contain pop-up help information about the field that they are closest to.
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- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Error! No text of specified style in document.

First modified section

3

4.7.3.1.4 GPRS attach not accepted by the network

If the attach request cannot be accepted by the network, an ATTACH REJECT message is transferred to the MS. The MS receiving the ATTACH REJECT message, stops timer T3310 and for all causes except #12, #14 and #15 deletes the list of "equivalent PLMNs".

The MS shall then take one of the following actions depending upon the reject cause:

- # 3 (Illegal MS); or
- # 6 (Illegal ME)

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed.

If the MS is IMSI attached-via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE. The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.

7 (GPRS services not allowed)

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.

8 (GPRS services and non-GPRS services not allowed)

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED. The new MM state is MM IDLE.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The SIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM is removed.

11 (PLMN not allowed);

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2), shall reset the GPRS attach attempt counter and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMN list".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

- If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the PLMN identity in the "forbidden PLMN list".

-____The MS shall perform a PLMN selection according to 3GPP TS 23.122.

#12 (Location area not allowed)

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

____If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

- -____The MS shall perform a cell selection according to 3GPP TS 03.22 and 3GPP TS 25.304.
- #13 (Roaming not allowed in this location area).

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE or optionally to GMM-DEREGISTERED.PLMN-SEARCH

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

-____The MS shall perform a PLMN selection according to 3GPP TS 23.122.

14 (GPRS services not allowed in this PLMN)

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list. A GPRS MS operating in MS operation mode C shall perform a PLMN selection instead of a cell selection.

A GPRS MS operating in MS operation mode A or B in network operation mode II or III, is still IMSI attached for CS services in the network.

15 (No Suitable Cells In Location Area)

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition-set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE. The MS shall store the LAI in the list of "forbidden location areas for roaming".

The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 03.22 and 3GPP TS 25.304.

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is specified in clause 4.7.3.1.5.

Next modified section

4.7.4.2.2 Network initiated GPRS detach procedure completion by the MS

When receiving the DETACH REQUEST message and the detach type IE indicates "re-attach required", the MS shall deactivate the PDP contexts and deactivate the logical link(s), if any. The MS shall then send a DETACH ACCEPT message to the network and shall change state to GMM-DEREGISTERED. The MS shall, after the completion of the GPRS detach procedure, initiate a GPRS attach procedure. The MS should also activate PDP context(s) to replace any previously active PDP contexts.

NOTE: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.

A GPRS MS operating in MS operation mode A or B in network operation mode I, which receives an DETACH REQUEST message with detach type indicating "re-attach required" or "re-attach not required" and no cause code, is only detached for GPRS services in the network.

When receiving the DETACH REQUEST message and the detach type IE indicates "IMSI detach", the MS shall not deactivate the PDP contexts. The MS shall set the MM update status to U2 NOT UPDATED. A MS in operation mode A or B in network operation mode I may send a DETACH ACCEPT message to the network, and shall re-attach to non-GPRS service by performing the combined routing area updating procedure according to clause 4.7.5.2, sending a ROUTING AREA UPDATE REQUEST message with Update type IE indicating "combined RA/LA updating with IMSI attach". A MS in operation mode C, or in MS operation mode A or B in network operation mode II or III, shall send a DETACH ACCEPT message to the network.

If the detach type IE indicates "IMSI detach", or "re-attach required" then the MS shall ignore the cause code if received.

If the detach type information element value indicates "re-attach required" or "re-attach not required" and the MS is attached for GPRS and non-GPRS services and the network operates in network operation mode I, then if in the MS the timer T3212 is not already running, the timer T3212 shall be set to its initial value and restarted.

When receiving the DETACH REQUEST message and the detach type IE indicates "re-attach not required" and the cause code is not "#2 (IMSI unknown in HLR)", the MS shall deactivate the PDP contexts and deactivate the logical link(s), if any. The MS shall then send a DETACH ACCEPT message to the network and shall change state to GMM-DEREGISTERED.

If the detach type IE indicates "re-attach not required", then, depending on the received cause code, the MS shall act as follows:

2 (IMSI unknown in HLR)

The MS shall set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE. The SIM shall be considered as invalid for non-GPRS services until switching off or the SIM is removed.

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for GPRS services in the network.

- # 3 (Illegal MS);
- # 6 (Illegal ME);

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

The new GMM state is GMM-DEREGISTERED. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed.

6

A GPRS MS operating in MS operation mode A or B shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM idle. The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.

7 (GPRS services not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.

A GPRS MS operating in MS operation mode A or B in network operation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for CS services in the network.

8 (GPRS services and non-GPRS services not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED and the update status to U3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2). Furthermore, it shall delete any P-TMSI, P-TMSI signature, TMSI, RAI, LAI, ciphering key sequence number and GPRS ciphering key sequence number and shall consider the SIM as invalid for GPRS and non GPRS services until switching off or the SIM is removed.

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The SIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM is removed.

11 (PLMN not allowed);

The MS shall delete any RAI or LAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2). The new GMM state is GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMN list".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

____A GPRS MS operating in MS operation mode A or B shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE.

The MS shall store the PLMN identity in the "forbidden PLMN list".

-____The MS shall perform a PLMN selection according to 3GPP TS 23.122.

12 (Location area not allowed)

The MS shall delete any RAI, P-TMSI, P-TMSI signature GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for regional provision of service".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

7

 If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for regional provision of service".

-____The MS shall perform a cell selection according to 3GPP TS 03.22 and 3GPP TS 25.304.

13 (Roaming not allowed in this location area).

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE or optionally to GMM-DEREGISTERED.PLMN-SEARCH

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

-The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall perform a PLMN selection according to 3GPP TS 23.122.

14 (GPRS services not allowed in this PLMN)

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list.

A GPRS MS operating in MS operation mode A or B in network operation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

A GPRS MS operating in MS operation mode A or B, is still IMSI attached for CS services in the network.

15 (No Suitable Cells In Location Area)

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 03.22 and 3GPP TS 25.304.

Other cause values shall not impact the update status. Further actions of the MS are implementation dependent.

Next modified section

4.7.5.1.4 Normal and periodic routing area updating procedure not accepted by the network

If the routing area updating cannot be accepted, the network sends a ROUTING AREA UPDATE REJECT message to the MS. An MS that receives a ROUTING AREA UPDATE REJECT message stops timer T3330 and for all causes except #12, #14 and #15 deletes the list of "equivalent PLMNs".

The MS shall then take different actions depending on the received reject cause value:

- # 3 (Illegal MS);
- # 6 (Illegal ME);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and shall consider the SIM as invalid for GPRS services until switching off or the SIM is removed.

If the MS is IMSI attached-via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE. The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.

7 (GPRS services not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2.9) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.

If the update type is "periodic updating" a GPRS MS operating in MS operation mode A or B in network operation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

9 (MS identity cannot be derived by the network);

The MS shall set the GPRS update status to GU2 NOT UPDATED (and shall store it according to clause 4.1.3.2), enter the state GMM-DEREGISTERED, and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. Subsequently, the MS may automatically initiate the GPRS attach procedure.

10 (Implicitly detached);

The MS shall change to state GMM-DEREGISTERED.NORMAL-SERVICE. The MS shall then perform a new attach procedure. The MS should also activate PDP context(s) to replace any previously active PDP contexts.

- NOTE: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.
- #11 (PLMN not allowed);
- The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and enter the state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMN list".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3
 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the PLMN identity in the "forbidden PLMN list".

- -____The MS shall perform a PLMN selection according to 3GPP TS 23.122.
- # 12 (Location area not allowed)

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2), shall reset the routing area updating attempt counter and shall change to state GMM-DEREGISTERED.LIMITED-SERVICE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

- -____The MS shall perform a cell selection according to 3GPP TS 03.22 and 3GPP TS 25.304.
- #13 (Roaming not allowed in this location area).

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) shall reset the routing area updating attempt counter and shall change to state GMM-REGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

- If the MS is IMSI attached-via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.
- The MS shall store the LAI in the list of "forbidden location areas for roaming".
 - The MS shall perform a PLMN selection according to 3GPP TS 23.122.
- # 14 (GPRS services not allowed in this PLMN)

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list. A GPRS MS operating in MS operation mode C shall perform a PLMN selection instead of a cell selection.

If the update type is "periodic updating" a GPRS MS operating in MS operation mode A or B in network operation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

A GPRS MS operating in MS operation mode A or B in network operation mode II or III, is still IMSI attached for CS services in the network.

15 (No Suitable Cells In Location Area)

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) shall reset the routing area updating attempt counter and shall change to state GMM-REGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

 If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

 The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 03.22 and 3GPP TS 25.304.

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is described in clause 4.7.5.1.5.

Next modified section

4.7.13.4 Service request procedure not accepted by the network

—If the Service request cannot be accepted, the network returns a SERVICE REJECT message to the mobile station. An MS that receives a SERVICE REJECT message stops timer T3317. The MS shall then take different actions depending on the received reject cause value:

- # 3 (Illegal MS);
- # 6 (Illegal ME);
- The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and shall consider the SIM as invalid for GPRS services until switching off or the SIM is removed.
- A GPRS MS operating in MS operation mode A shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE. The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.
- # 7 (GPRS services not allowed);
- The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2.9) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.
- # 9 (MS identity cannot be derived by the network);
- The MS shall set the GPRS update status to GU2 NOT UPDATED (and shall store it according to clause 4.1.3.2), enter the state GMM-DEREGISTERED, and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. Subsequently, the MS may automatically initiate the GPRS attach procedure.
- # 10 (Implicitly detached);
- The MS shall change to state GMM-DEREGISTERED.NORMAL-SERVICE. The MS shall then perform a new attach procedure. The MS should also activate PDP context(s) to replace any previously active PDP contexts.

- NOTE 1: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.
- # 11 (PLMN not allowed);
- The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and enter the state GMM-DEREGISTERED.
- The MS shall store the PLMN identity in the "forbidden PLMN list".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:
 - A GPRS MS operating in MS operation mode A shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE.
- The MS shall store the PLMN identity in the "forbidden PLMN list".
 - The MS shall perform a PLMN selection according to 3GPP TS 23.122.
- # 12 (Location area not allowed)
- The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall change to state GMM-DEREGISTERED.LIMITED-SERVICE.
- The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is
 operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the
 RR connection is subsequently released:
 - If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

- The MS shall perform a cell selection according to 3GPP TS 03.22 and 3GPP TS 25.304.
- #13 (Roaming not allowed in this location area).
- The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2)-attempt counter and shall change to state GMM-REGISTERED.LIMITED-SERVICE.
- The MS shall store the LAI in the list of "forbidden location areas for roaming".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:
 - If the MS is IMSI attached-via MM procedures, the MS shall in addition-set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.
- The MS shall store the LAI in the list of "forbidden location areas for roaming".
 - The MS shall perform a PLMN selection according to 3GPP TS 23.122.
- # 15 (No Suitable Cells In Location Area)
- The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall change to state GMM-REGISTERED.LIMITED-SERVICEATTEMPTING TO-UPDATE.

- The MS shall store the LAI in the list of "forbidden location areas for roaming".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:
 - If the MS is IMSI attached-via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 03.22 and 3GPP TS 25.304.
- # 40 (No PDP context activated)
- The MS shall deactivate locally all active PDP contexts and the MS shall enter the state GMM-REGISTERED.NORMAL-SERVICE. The MS may also activate PDP context(s) to replace any previously active PDP contexts.
- NOTE 2: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is described in clause 4.7.13.5.

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2) In case of receipt of a Service Reject with reject cause #15 the new GMM state should be GMM-REGISTERED.LIMITED-SERVICE instead of GMM-

	REGISTERED.ATTEMPTING-TO-UPDATE.
Summary of change: #	1) In case of a GPRS attach, a network initiated GPRS detach, a normal or periodic routing area update, or a service request procedure: if the MS is in MS operation mode A and an RR connection exists, the MS shall after receipt of one of the reject causes #11, #12, #13 and #15 postpone the actions specified for the MM entity until the RR connection is released.
	The new GMM state after receipt of a Service Reject with reject cause #15 is changed to GMM-REGISTERED.LIMITED-SERVICE.
	 A clarification is added that the new GMM state after receipt of a network initiated Detach REQUEST message with reject cause #11 is GMM- REGISTERED.
	4) The statement "The new MM state is MM IDLE." is deleted for GMM reject causes #3, #6 and #8 to allow the MS to continue an ongoing emergency call.
Consequences if # not approved:	The MS will loose ongoing circuit-switched calls, if it is operating in MS operation mode A or B and handed over to a cell in which the MS is operating in MS operation mode A and for which regional roaming restrictions apply.
	Operators X and Y have separate 3G networks. There is a roaming agreement allowing subcribers of operator Y to roam in the 2G network of operator X, but not in his 3G network.
	service which is only provided by the 3G network (e.g. a CS multimedia call), the network is expected to initiate a service handover to the 3G network of operator X. (Note that the serving BSC does not have the necessary information to
	operator Y.)
Clauses affected: #	4,7,3,1,4, 4,7,4,2,2, 4,7,5,1,4, 4,7,13,4

Other specs affected:	% Other core specifications % Test specifications % O&M Specifications							
Other comments:	If the MS behaves as proposed in this CR and a further handover to another location area or PLMN happens during the lifetime of the RR connection, the M will							
	 in GMM state GMM-DEREGISTERED.LIMITED-SERVICE (after Attach Reject) perform a new GPRS attach; 							
	 in GMM state GMM-REGISTERED.LIMITED-SERVICE (after RAU Reject or Service Reject) perform another RAU 							
	if the location area and the PLMN ID is not on one of the forbidden lists. That							
	means that PS services can be used again as soon as possible.							

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: <u>http://www.3gpp.org/3G_Specs/CRs.htm</u>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked **#** contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <u>ftp://ftp.3gpp.org/specs/</u> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

First modified section

4.7.3.1.4 GPRS attach not accepted by the network

If the attach request cannot be accepted by the network, an ATTACH REJECT message is transferred to the MS. The MS receiving the ATTACH REJECT message, stops timer T3310 and for all causes except #12, #14 and #15 deletes the list of "equivalent PLMNs".

The MS shall then take one of the following actions depending upon the reject cause:

- # 3 (Illegal MS);
- # 6 (Illegal ME);

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed.

If the MS is IMSI attached-via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE. The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.

7 (GPRS services not allowed);

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.

8 (GPRS services and non-GPRS services not allowed);

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED. The new MM state is MM IDLE.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The SIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM is removed.

11 (PLMN not allowed);

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2), shall reset the GPRS attach attempt counter and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMN list".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

- The MS shall store the PLMN identity in the "forbidden PLMN list".

- The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].
- # 12 (Location area not allowed);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

- -____The MS shall perform a cell selection according to 3GPP TS 03.22 and 3GPP TS 25.304.
- #13 (Roaming not allowed in this location area);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE or optionally to GMM-DEREGISTERED.PLMN-SEARCH.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

-___The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].

14 (GPRS services not allowed in this PLMN);

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list. A GPRS MS operating in MS operation mode C shall perform a PLMN selection instead of a cell selection.

A GPRS MS operating in MS operation mode A or B in network operation mode II or III, is still IMSI attached for CS services in the network.

15 (No Suitable Cells In Location Area);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED(and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached-via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 03.22 and 3GPP TS 25.304.

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is specified in subclause 4.7.3.1.5.

Next modified section

4.7.4.2.2 Network initiated GPRS detach procedure completion by the MS

When receiving the DETACH REQUEST message and the detach type IE indicates "re-attach required", the MS shall deactivate the PDP contexts and deactivate the logical link(s), if any. The MS shall then send a DETACH ACCEPT message to the network and shall change state to GMM-DEREGISTERED. The MS shall, after the completion of the GPRS detach procedure, initiate a GPRS attach procedure. The MS should also activate PDP context(s) to replace any previously active PDP contexts.

NOTE: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.

A GPRS MS operating in MS operation mode A or B in network operation mode I, which receives an DETACH REQUEST message with detach type indicating "re-attach required" or "re-attach not required" and no cause code, is only detached for GPRS services in the network.

When receiving the DETACH REQUEST message and the detach type IE indicates "IMSI detach", the MS shall not deactivate the PDP contexts. The MS shall set the MM update status to U2 NOT UPDATED. A MS in operation mode A or B in network operation mode I may send a DETACH ACCEPT message to the network, and shall re-attach to non-GPRS service by performing the combined routing area updating procedure according to subclause 4.7.5.2, sending a ROUTING AREA UPDATE REQUEST message with Update type IE indicating "combined RA/LA updating with IMSI attach". A MS in operation mode C, or in MS operation mode A or B in network operation mode II or III, shall send a DETACH ACCEPT message to the network.

If the detach type IE indicates "IMSI detach", or "re-attach required" then the MS shall ignore the cause code if received.

If the detach type information element value indicates "re-attach required" or "re-attach not required" and the MS is attached for GPRS and non-GPRS services and the network operates in network operation mode I, then if in the MS the timer T3212 is not already running, the timer T3212 shall be set to its initial value and restarted.

When receiving the DETACH REQUEST message and the detach type IE indicates "re-attach not required" and the cause code is not "#2 (IMSI unknown in HLR)", the MS shall deactivate the PDP contexts and deactivate the logical link(s), if any. The MS shall then send a DETACH ACCEPT message to the network and shall change state to GMM-DEREGISTERED.

If the detach type IE indicates "re-attach not required", then, depending on the received cause code, the MS shall act as follows:

2 (IMSI unknown in HLR);

The MS shall set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE. The SIM shall be considered as invalid for non-GPRS services until switching off or the SIM is removed.

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for GPRS services in the network.

- # 3 (Illegal MS);
- # 6 (Illegal ME);

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence

number. The new GMM state is GMM-DEREGISTERED. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed.

A GPRS MS operating in MS operation mode A or B shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM idle. The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.

7 (GPRS services not allowed);

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.

A GPRS MS operating in MS operation mode A or B in network operation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for CS services in the network.

8 (GPRS services and non-GPRS services not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED and the update status to U3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2). Furthermore, it shall delete any P TMSI, P TMSI signature, TMSI, RAI, LAI, ciphering key sequence number and GPRS ciphering key sequence number and shall consider the SIM as invalid for GPRS and non GPRS services until switching off or the SIM is removed.

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 P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The new GMM state is GMM-DEREGISTERED.

The MS shall set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The SIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM is removed.

11 (PLMN not allowed);

The MS shall delete any RAI or LAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2). The new GMM state is GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMN list".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

____A GPRS MS operating in MS operation mode A or B shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE.

The MS shall store the PLMN identity in the "forbidden PLMN list".

-____The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].

12 (Location area not allowed);

The MS shall delete any RAI, P-TMSI, P-TMSI signature GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED(and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for regional provision of service".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

- If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for regional provision of service".

-____The MS shall perform a cell selection according to 3GPP TS 03.22 and 3GPP TS 25.304.

#13 (Roaming not allowed in this location area);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE or optionally to GMM-DEREGISTERED.PLMN-SEARCH.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].

14 (GPRS services not allowed in this PLMN);

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list.

A GPRS MS operating in MS operation mode A or B in network operation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

A GPRS MS operating in MS operation mode A or B, is still IMSI attached for CS services in the network.

15 (No Suitable Cells In Location Area);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED(and shall store it according to clause 4.1.3.2) and shall reset the attach attempt counter. The state is changed to GMM-DEREGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 03.22 and 3GPP TS 25.304.

Other cause values shall not impact the update status. Further actions of the MS are implementation dependent.

Next modified section

4.7.5.1.4 Normal and periodic routing area updating procedure not accepted by the network

If the routing area updating cannot be accepted, the network sends a ROUTING AREA UPDATE REJECT message to the MS. An MS that receives a ROUTING AREA UPDATE REJECT message, stops timer T3330, and for all causes except #12, #14 and #15 deletes the list of "equivalent PLMNs".

The MS shall then take different actions depending on the received reject cause value:

- # 3 (Illegal MS);
- # 6 (Illegal ME);

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 enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and shall consider the SIM as invalid for GPRS services until switching off or the SIM is removed.

If the MS is IMSI attached-via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE. The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.

7 (GPRS services not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2.9) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.

If the update type is "periodic updating" a GPRS MS operating in MS operation mode A or B in networkoperation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

9 (MS identity cannot be derived by the network);

The MS shall set the GPRS update status to GU2 NOT UPDATED (and shall store it according to subclause 4.1.3.2), enter the state GMM-DEREGISTERED, and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. Subsequently, the MS may automatically initiate the GPRS attach procedure.

10 (Implicitly detached);

The MS shall change to state GMM-DEREGISTERED.NORMAL-SERVICE. The MS shall then perform a new attach procedure. The MS should also activate PDP context(s) to replace any previously active PDP contexts.

- NOTE: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.
- # 11 (PLMN not allowed);
- The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and enter the state GMM-DEREGISTERED.
- The MS shall store the PLMN identity in the "forbidden PLMN list".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

- If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3
 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.
- The MS shall store the PLMN identity in the "forbidden PLMN list".
- -____The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].
- # 12 (Location area not allowed);

The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2), shall reset the routing area updating attempt counter and shall change to state GMM-DEREGISTERED.LIMITED-SERVICE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

- The MS shall perform a cell selection according to 3GPP TS 03.22 and 3GPP TS 25.304.
- #13 (Roaming not allowed in this location area);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) shall reset the routing area updating attempt counter and shall change to state GMM-REGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

- If the MS is IMSI attached-via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.
- The MS shall store the LAI in the list of "forbidden location areas for roaming".
 - The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].
- # 14 (GPRS services not allowed in this PLMN);

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall change to state GMM-DEREGISTERED.

The MS shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list. A GPRS MS operating in MS operation mode C shall perform a PLMN selection instead of a cell selection.

If the update type is "periodic updating" a GPRS MS operating in MS operation mode A or B in network operation mode I shall set the timer T3212 to its initial value and restart it, if it is not already running.

A GPRS MS operating in MS operation mode A or B in network operation mode II or III, is still IMSI attached for CS services in the network.

15 (No Suitable Cells In Location Area);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) shall reset the routing area updating attempt counter and shall change to state GMM-REGISTERED.LIMITED-SERVICE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:

 If the MS is IMSI attached-via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.

The MS shall store the LAI in the list of "forbidden location areas for roaming".

- The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 03.22 and 3GPP TS 25.304.

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is described in subclause 4.7.5.1.5.

Next modified section

4.7.13.4 Service request procedure not accepted by the network

If the Service request cannot be accepted, the network returns a SERVICE REJECT message to the mobile station. An MS that receives a SERVICE REJECT message stops timer T3317. The MS shall then take different actions depending on the received reject cause value:

- # 3 (Illegal MS); or
- # 6 (Illegal ME);
- 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 enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and shall consider the SIM as invalid for GPRS services until switching off or the SIM is removed.
- A GPRS MS operating in MS operation mode A shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE. The SIM shall be considered as invalid also for non-GPRS services until switching off or the SIM is removed.
- # 7 (GPRS services not allowed);
- The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2.9) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED.
- # 9 (MS identity cannot be derived by the network);
- The MS shall set the GPRS update status to GU2 NOT UPDATED (and shall store it according to subclause 4.1.3.2), enter the state GMM-DEREGISTERED, and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. Subsequently, the MS may automatically initiate the GPRS attach procedure.

- # 10 (Implicitly detached);
- The MS shall change to state GMM-DEREGISTERED.NORMAL-SERVICE. The MS shall then perform a new attach procedure. The MS should also activate PDP context(s) to replace any previously active PDP contexts.
- NOTE: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.
- # 11 (PLMN not allowed);
- The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and enter the state GMM-DEREGISTERED.
- The MS shall store the PLMN identity in the "forbidden PLMN list".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:
 - A GPRS MS operating in MS operation mode A shall in addition set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The new MM state is MM IDLE.

-The MS shall store the PLMN identity in the "forbidden PLMN list".

- The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].
- # 12 (Location area not allowed);
- The MS shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall change to state GMM-DEREGISTERED.LIMITED-SERVICE.
- The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:
 - If the MS is IMSI attached via MM procedures, the MS shall in addition set the update status to U3 ROAMING NOT ALLOWED, shall delete any TMSI, LAI and ciphering key sequence number and shall reset the location update attempt counter. The new MM state is MM IDLE.

- The mobile station shall store the LAI in the list of "forbidden location areas for regional provision of service".

- The MS shall perform a cell selection according to 3GPP TS 03.22 and 3GPP TS 25.304.
- #13 (Roaming not allowed in this location area);
- The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) attempt counter and shall change to state GMM-REGISTERED.LIMITED-SERVICE.
- The MS shall store the LAI in the list of "forbidden location areas for roaming".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:
 - If the MS is IMSI attached-via MM procedures, the MS shall in addition-set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.
- The MS shall store the LAI in the list of "forbidden location areas for roaming".
 - The MS shall perform a PLMN selection according to 3GPP TS 23.122 [14].

- # 15 (No Suitable Cells In Location Area);
- <u>-</u> The MS <u>shall</u> set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall change to state GMM-REGISTERED.<u>LIMITED-SERVICE</u><u>ATTEMPTING TO-UPDATE</u>.
- The MS shall store the LAI in the list of "forbidden location areas for roaming".
- If no RR connection exists, the MS shall perform the following additional actions immediately. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall perform these actions when the RR connection is subsequently released:
 - If the MS is IMSI attached-via MM procedures, the MS shall in addition-set the update status to U3 ROAMING NOT ALLOWED and shall reset the location update attempt counter. The new MM state is MM IDLE.
- -The MS shall store the LAI in the list of "forbidden location areas for roaming".
 - The MS shall search for a suitable cell in another location area in the same PLMN according to 3GPP TS 03.22 and 3GPP TS 25.304.
- # 40 (No PDP context activated)
- The MS shall deactivate locally all active PDP contexts and the MS shall enter the state GMM-REGISTERED.NORMAL-SERVICE. The MS may also activate PDP context(s) to replace any previously active PDP contexts.
- NOTE: In some cases, user interaction may be required and then the MS cannot activate the PDP context(s) automatically.

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is described in subclause 4.7.13.5.