3GPP TSG CN Meeting #27 **NP-050083**
9th - 11th March 2005. Tokyo, Japan.

Source: **TSG CN WG1**

Title: **CRs to Rel-6 WI "ACBOP" for TS 23.122 and TS 24.008**

Agenda item: **9.22**

Document for: **APPROVAL**

This document contains 3 **CRs on Rel-6 Work Item "ACBOP"**, that have been agreed by TSG CN WG1 CN#37 meeting and forwarded to TSG CN Plenary meeting #27 for approval.

TDoc #	Tdoc Title	Spec	CR #	Rev	CAT	C_Ver	WI	Rel
N1-050362	Addition of domain specific access control description	23.122	88	1	F	6.3.0	ACBOP	Rel-6
N1-050363	Addition of domain specific access control description	23.122	89		A	7.0.0	ACBOP	Rel-7
N1-050417	Addition of domain specific access control	24.008	939	3	F	6.7.0	ACBOP	Rel-6

3GPP TSG-CN1 Meeting #37 **Tdoc N1-050362**
Sydney, Australia, 14-18 February 2005

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.122** **CR** **088** ⌘ **rev** **1** ⌘ Current version: **6.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	Addition of domain specific access control decscription
Source:	⌘	NTT DoCoMo
Work item code:	⌘	ACBOP
Date:	⌘	07/02/2005
Category:	⌘	**F**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

Ph2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	SA2 have been working on the specification of domain specific access control mechansim, which enables the use of either the CS or PS domain while the other domain is restricted (details in TR 23.898). This CR introduces the domain specific access control.
Summary of change:	⌘	- Added text in subclause 3.4.1 to mention that a mechanism for domain specific access control is also needed.
Consequences if not approved:	⌘	- Incomplete specification of the domain specific access control and will not be aligned with the stage 2 requirement
Clauses affected:	⌘	3.4.1

	Y	N		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘

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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.

3 Requirements and technical solutions

The following clauses list the main requirements of idle mode operation and give an outline of the technical solution.

3.1 PLMN selection and roaming

The MS normally operates on its home PLMN (HPLMN). However a visited PLMN (VPLMN) may be selected, e.g., if the MS loses coverage. There are two modes for PLMN selection:

i) Automatic mode - This mode utilizes a list of PLMNs in priority order. The highest priority PLMN which is available and allowable is selected.

ii) Manual mode - Here the MS indicates to the user which PLMNs are available. Only when the user makes a manual selection does the MS try to obtain normal service on the VPLMN.

There are two cases:

- International Roaming - This is where the MS receives service on a PLMN of a different country than that of the HPLMN.

- National Roaming - This is where the MS receives service from a PLMN of the same country as that of the HPLMN, either anywhere or on a regional basis. The MS makes a periodic search for the HPLMN while national roaming.

To prevent repeated attempts to have roaming service on a not allowed LA, when the MS is informed that an LA is forbidden, the LA is added to a list of "forbidden LAs for roaming" which is stored in the MS. This list is deleted when the MS is switched off or when the SIM is removed. Such area restrictions are always valid for complete location areas independent of possible subdivision into GPRS routing areas. The structure of the routing area identifier (3GPP TS 23.003) supports area restriction on LA basis.

If a "No Suitable Cells In Location Area" message is received by an MS, that location area is added to the list of "forbidden LAs for roaming" which is stored in the MS. The MS shall then search for a suitable cell in the same PLMN but belonging to an LA which is not in the "forbidden LAs for roaming" list.

If a "PLMN not allowed" message is received by an MS in response to an LR request from a VPLMN, that VPLMN is added to a list of "forbidden PLMNs" in the SIM and thereafter that VPLMN will not be accessed by the MS when in automatic mode. A PLMN is removed from the "forbidden PLMNs" list if, after a subsequent manual selection of that PLMN, there is a successful LR. This list is retained when the MS is switched off or the SIM is removed. The HPLMN shall not be stored on the list of "forbidden PLMNs".

In A/Gb mode, an ME not supporting SoLSA may consider a cell with the escape PLMN code (see 3GPP TS 23.073) to be a part of a PLMN belonging to the list of "forbidden PLMNs".

Optionally the ME may store in its memory an extension of the "forbidden PLMNs" list. The contents of the extension of the list shall be deleted when the MS is switched off or the SIM is removed.

If a "GPRS services not allowed in this PLMN" message is received by an MS in response to an GPRS attach, GPRS detach or routing area update request from a VPLMN, that VPLMN is added to a list of "forbidden PLMNs for GPRS service" which is stored in the MS and thereafter that VPLMN will not be accessed by the MS for GPRS service when in automatic mode. This list is deleted when the MS is switched off or when the SIM is removed. A PLMN is removed from the list of "forbidden PLMNs for GPRS service" if, after a subsequent manual selection of that PLMN, there is a successful GPRS attach. The maximum number of possible entries in this list is implementation dependant, but must be at least one entry. The HPLMN shall not be stored on the list of "forbidden PLMNs for GPRS service".

3.2 Regional provision of service

An MS may have a "regionally restricted service" where it can only obtain service on certain LAs. If such an MS attempts to camp on a cell of an LA for which it does not have service entitlement, when it does an LR request, it will receive an "LA not allowed" message. In this case:

- The MS stores the forbidden LA identity (LAI) in a list of "forbidden LAs for regional provision of service", to prevent repeated access attempts on a cell of the forbidden LA. This list is deleted when the MS is switched off or the SIM is removed. The MS enters the limited service state.

In A/Gb mode, a cell may be reserved for SoLSA exclusive access (see 3GPP TS 24.008 and 3GPP TS 44.060). An MS is only allowed to camp normally on such a cell if it has a Localised Service Area subscription to the cell. Other MS may enter the limited service state.

NOTE: In A/Gb mode, in a SoLSA exclusive cell the MCC+MNC code is replaced by an unique escape PLMN code (see 3GPP TS 23.073), not assigned to any PLMN, in SI3 and SI4. An MS not supporting SoLSA may request for location update to an exclusive access cell. In this case the location attempt is rejected with the cause "PLMN not allowed" and the escape PLMN code is added to the list of the "forbidden PLMNs".

3.3 Borders between registration areas

If the MS is moving in a border area between registration areas, it might repeatedly change between cells of different registration areas. Each change of registration area would require an LR, which would cause a heavy signalling load and increase the risk of a paging message being lost. The access stratum shall provide a mechanism to limit this effect.

3.4 Access control

3.4.1 Access control

Due to problems in certain areas, Network Operators may decide to restrict access from some MSs (e.g., in case of congestion), and for this reason, mechanisms for common access control and domain specific access control ~~an access control mechanism shall be~~are provided (see 3GPP TS 43.022 and 3GPP TS 25.304).

3.4.2 Forbidden LA for regional provision of service

When the MS is camped on a cell, the LA of which belongs to the list of "forbidden LAs for regional provision of service", the MS is not allowed to initiate establishment of a CM connection except for an emergency call; it may respond to paging. Also, the MS is not allowed to request GPRS services when camped on a cell of a LA of which belongs to the list of "forbidden LAs for regional provision of service".

3GPP TSG-CN1 Meeting #37 **Tdoc N1-050363**
Sydney, Australia, 14-18 February 2005

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.122** **CR** **089** ⌘ **rev** **-** ⌘ Current version: **7.0.0** ⌘

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Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	Addition of domain specific access control decscription
Source:	⌘	NTT DoCoMo
Work item code:	⌘	ACBOP
Date:	⌘	17/02/2005
Category:	⌘	**A**
Release:	⌘	Rel-7

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
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	Y	N		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘

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3GPP TSG-CN1 Meeting #37
Sydney, Australia, 14-18 February 2005

Tdoc N1-050417
revision of N1-050365

CR-Form-v7.1

CHANGE REQUEST

⌘ **24.008** **CR** **939** ⌘ **rev** **3** ⌘ Current version: **6.7.0** ⌘

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Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	Addition of domain specific access control
Source:	⌘	NTT DoCoMo
Work item code:	⌘	ACBOP
Date:	⌘	07/02/2005
Category:	⌘	F
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
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R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*
Rel-7 *(Release 7)*

Reason for change: ⌘ SA2 have been working on the specification of domain specific access control mechansim, which enables the use of either the CS or PS domain while the other domain is restricted. When the RNC detects a failure/overload in the MSC/SGSN (eg. due to large-scale natural disasters like earthquakes), the RNC broadcasts system information which contains the necessary condition for the UE to recognize that the network has applied domain specific access control. SA2 have provided a UE based solution to resolve the case when domain access restriction is applied while the UE is operating under network mode I (details in TR 23.898 clause 6.1.4). This CR incorporates the necessary changes for the UE to stop accessing the blocked domain entirely and use the available (ie. non-blocked) domain for further processing.

Summary of change: ⌘ - Added text in subclause 4.1.1.2.1: When the CS/PS domain is barred due to domain specific access control, a GPRS MS in mode A or B operating in network mode of operation I, stops performing combined procedures and moves into domain specific MM/GMM procedures. In contrast, when the CS/PS domain becomes non-barred due to release of domain specific access control, the MS stops performing domain specific MM/GMM procedures and returns to perform combined procedures.

- Distinction is made between existing access class control (ie. common access control) and domain specific access control throughout the document to avoid any confusion between the two.

Consequences if not approved:	⌘	- Incomplete specification of the domain specific access control and will not be aligned with the stage 2 requirement

Clauses affected:	⌘	4.1.1.2.1, 4.1.2.1.2, 4.1.3.1.2.3, 4.4.4.9, 4.5.1.2, 4.7.3.1.5, 4.7.5.1.5, 4.7.13.5, 11.2			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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First proposed change

4.1.1.2 MM-GMM co-ordination for GPRS MS's

4.1.1.2.1 GPRS MS operating in mode A or B in a network that operates in mode I

If the network operates in mode I, GPRS MSs that operate in mode A or B and wish to be or are simultaneously IMSI attached for GPRS and non-GPRS services, shall use the combined GPRS attach and the combined and periodic routing area updating procedures instead of the corresponding MM specific procedures IMSI attach and normal and periodic location area updating.

NOTE: A GPRS MS operating in mode A or B in a network that operates in mode I, shall perform the combined GPRS attach or routing area update procedure regardless the value of the ATT flag.

If a GPRS MS is operating in mode A or B in a network that operates in mode I the IMSI detach shall be performed by the GMM using the combined GPRS detach procedure.

NOTE: A GPRS MS operating in mode A or B in a network that operates in mode I, shall perform the combined GPRS detach procedure regardless the value of the ATT flag.

A GPRS MS operating in mode A or B in network that operates in mode I, shall use the combined GMM specific procedures in place of the MM specific procedures unless the re-activation of the MM specific procedures is explicitly described, so all conditions describing when to trigger a MM specific procedure listed in subclauses 4.3 and 4.4 shall not apply.

A GPRS MS operating in mode A or B in a network that operates in mode I should not use any MM timers relating to MM specific procedures, (e.g T3210, T3211, T3212, T3213) unless the re-activation of the MM specific procedures is explicitly described. If the MM timers are already running, the MS should not react on the expiration of the timers.

NOTE: Whenever GMM performs a combined GMM procedure, a GPRS MS enters the MM state MM LOCATION UPDATING PENDING in order to prevent the MM to perform a location update procedure.

If the authentication procedure is performed by MM and the authentication is rejected by the network (i.e upon receive of AUTHENTICATION REJECT), the MS shall in addition set the GPRS update status to GU3 ROAMING NOT ALLOWED and shall, if available, delete the P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number stored. The SIM/USIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM/USIM is removed. The MS shall abort any GMM procedure and shall enter state GMM-DEREGISTERED.

If the PS or CS domain is barred because of domain specific access control, a GPRS MS operating in mode A or B in a network that operates in mode I shall act as if in network operation mode II or III (depending on whether a PCCCH is present in Gb-mode) and access to the barred domain shall be stopped entirely. If the MS detects that a domain is barred, this shall not trigger any MM or GMM specific procedure.

If the MS detects that the PS domain changes from unbarred to barred, a GPRS MS operating in mode A or B in a network that operates in mode I shall perform non-combined MM specific procedures. If the MS has been performing periodic routing area update, the remaining values of timer T3312 shall be copied to timer T3212, the MS shall stop all GMM specific timers, and start timer T3212. After the first expiry of timer T3212, the MS shall set the update status to U2 NOT UPDATED and shall start a normal location update procedure (in order to remove the Gs association in the MSC/VLR). If the mobile station is in other state than MM Idle on the first expiry of timer T3212, the location updating procedure is delayed until the MM Idle State is entered. On the other hand, if the MS was not performing periodic routing area update (ie. value of timer T3312 is zero) at start of PS domain barring, the MS shall not perform periodic location area updating.

If the MS detects that the CS domain changes from unbarred to barred, a GPRS MS operating in mode A or B in a network that operates in mode I shall perform non-combined GMM specific procedures whenever the next trigger for a routing area update occurs.

If the PS or CS domain becomes unbarred due to release of domain specific access control, a GPRS MS operating in mode A or B in a network that operates in mode I shall act as if in network operation mode I. If the MS detects that a domain is unbarred, this shall not trigger any MM or GMM specific procedure.

If the MS detects that the PS domain changes from barred to unbarred, a GPRS MS operating in mode A or B in a network that operates in mode I shall perform combined routing area updating procedure. If the MS has been

performing periodic location area update, the remaining values of timer T3212 shall be copied to timer T3312, the MS shall stop all MM specific timers, and start timer T3312. After the first expiry of timer T3312, the MS shall reset the routing area updating attempt counter and shall intiate the combined routing area updating procedure with IMSI attach (in order to establish the Gs association in the MSC/VLR). On the other hand, if the MS was not performing periodic location area update (ie. value of timer T3212 is zero) at end of PS domain barring, the MS shall not perform periodic routing area updating.

If the MS detects that the CS domain changes from barred to unbarred, a GPRS MS operating in mode A or B in a network that operates in mode I shall perform a combined routing area updating procedure with IMSI attach whenever the next trigger for a routing area update occurs.

4.1.1.2.2 GPRS MS operating in mode A or B in a network that operates in mode II or III

If the network operates in mode II or III, a GPRS MSs that operate in mode A or B and wish to be or are simultaneously IMSI attached for GPRS and non-GPRS services, shall use the MM specific procedures listed in subclauses 4.3 and 4.4 and the GMM specific procedures listed in subclauses 4.7.3, 4.7.4 and 4.7.5. The applicability of periodic location updating is further specified in subclause 4.4.2 and the periodic routing area updating is specified in subclause 4.7.2.2.

If the authentication procedure is performed by MM and the authentication is rejected by the network (i.e upon receive of AUTHENTICATION REJECT), the MS shall in addition set the GPRS update status to GU3 ROAMING NOT ALLOWED and shall, if available, delete the P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number stored. The SIM/USIM shall be considered as invalid for GPRS and non-GPRS services until switching off or the SIM/USIM is removed. The MS shall abort any GMM procedure and shall enter state GMM-DEREGISTERED.

If the PS or CS domain is barred because of domain specific access control, a GPRS MS operating in mode A or B in a network that operates in mode II or III shall use the MM specific procedures or GMM specific procedures, respectively, in the domain which is unbarred. If the MS detects that a domain changes from barred to unbarred, it shall behave as specified in subclauses 4.4.4.9, 4.5.1.2, 4.7.3.1.5, 4.7.5.1.5, and 4.7.13.5.

Second proposed change

4.1.2.1.2 Substates of the MM IDLE state

For the description of the behaviour of the MS the MM IDLE state is subdivided in several substates, also called the service states. The service state pertains to the whole MS (ME alone if no SIM/USIM is inserted, or ME plus SIM/USIM). The service state depends on the update status (see subclause 4.1.2.2) and on the selected cell.

19.1 NORMAL SERVICE

Valid subscriber data are available, update status is U1, a cell is selected that belongs to the LA where the subscriber is registered.

In this state, all requests from the CM layers are treated normally.

19.2 ATTEMPTING TO UPDATE

Valid subscriber data are available, update status is U2 and a cell is selected. Requests from upper layers are accepted. Emergency call requests are treated normally, otherwise the request triggers first a location updating attempt in the selected cell, and then triggers the needed procedure only in case of successful location updating, otherwise the request is rejected.

19.3 LIMITED SERVICE

Valid subscriber data are available, update status is U3, and a cell is selected, which is known not to be able to provide normal service. Only emergency services are offered.

19.4 NO IMSI

No valid subscriber data (no SIM/USIM, or the SIM/USIM is not considered valid by the ME), and a cell is selected. Only emergency services are offered.

19.5 NO CELL AVAILABLE

No cell can be selected. This state is entered after a first intensive search failed (state 19.7). Cells are searched at a low rhythm. No services are offered.

19.6 LOCATION UPDATE NEEDED

Valid subscriber data are available, and for some reason a location updating must be done as soon as possible (for instance update status is U1 but the selected cell is not in the registered LA, or the timer has expired, ...). This state is usually of no duration, but can last, e.g., ~~in the case of access class blocking~~ if the access class is blocked due to common access class control or CS domain specific access control (see subclause 4.1.1.2.1).

19.7 PLMN SEARCH

The mobile station is searching for PLMNs, and the conditions for state 19.8 are not met. This state is ended when either a cell is selected (the new state is 19.1, 19.3 or 19.6), or when it is concluded that no cell is available for the moment (the new state is 19.5).

19.8 PLMN SEARCH, NORMAL SERVICE

Valid subscriber data are available, update status is U1, a cell is selected which belongs to the LA where the subscriber is registered, and the mobile station is searching for PLMNs. This state is ended when either a cell is selected (the new state is 19.1, 19.3 or 19.6), or when it is concluded that no cell is available for the moment (the new state is 19.5).

19.9 RECEIVING GROUP CALL (NORMAL SERVICE)

Only applicable for mobile stations supporting VGCS listening or VBS listening. Valid subscriber data are available, update status is U1, a VGCS channel or VBS channel is received in a cell that belongs to the LA where the subscriber is registered.

In this state, only requests from the GCC or BCC layers are treated.

19.10 RECEIVING GROUP CALL (LIMITED SERVICE)

Only applicable for mobile stations supporting VGCS listening or VBS listening. Valid subscriber data are available, update status is U3, a VGCS channel or VBS channel is received in a cell which is known not to be able to provide normal service.

In this state, only requests from the GCC or BCC layers for the reception of VGCS or VBS calls are treated and group call emergency services are offered.

Third proposed change

4.1.3 GPRS mobility management (GMM) sublayer states

In this subclause, the GMM protocol of the MS and the network are described by means of two different state machines. In subclause 4.1.3.1, the states of the GMM entity in the MS are introduced. The behaviour of the MS depends on a GPRS update status that is described in subclause 4.1.3.2. The states for the network side are described in subclause 4.1.3.3.

4.1.3.1 GMM states in the MS

In this subclause, the possible GMM states are described of a GMM entity in the mobile station. subclause 4.1.3.1.1 summarises the main states of a GMM entity, see figure 4.1b of the present document. The substates that have been defined are described in subclause 4.1.3.1.2 and subclause 4.1.3.1.3.

However, it should be noted that this subclause does not include a description of the detailed behaviour of the MS in the single states and does not cover abnormal cases. Thus, figure 4.1b of the present document is rather intended to give an overview of the state transitions than to be a complete state transition diagram. A detailed description of the behaviour of the MS is given in subclause 4.2. Especially, with respect to the behaviour of the MS in abnormal cases it is referred to subclause 4.7.

4.1.3.1.1 Main states

4.1.3.1.1.1 GMM-NULL

The GPRS capability is disabled in the MS. No GPRS mobility management function shall be performed in this state.

4.1.3.1.1.2 GMM-DEREGISTERED

The GPRS capability has been enabled in the MS, but no GMM context has been established. In this state, the MS may establish a GMM context by starting the GPRS attach or combined GPRS attach procedure.

4.1.3.1.1.3 GMM-REGISTERED-INITIATED

A GPRS attach or combined GPRS attach procedure has been started and the MS is awaiting a response from the network.

4.1.3.1.1.4 GMM-REGISTERED

A GMM context has been established, i.e. the GPRS attach or combined GPRS attach procedure has been successfully performed. In this state, the MS may activate PDP contexts, MBMS contexts, may send and receive user data and signalling information and may reply to a page request. Furthermore, cell and routing area updating are performed.

4.1.3.1.1.5 GMM-DEREGISTERED-INITIATED

The MS has requested release of the GMM context by starting the GPRS detach or combined GPRS detach procedure. This state is only entered if the MS is not being switched off at detach request.

4.1.3.1.1.6 GMM-ROUTING-AREA-UPDATING-INITIATED

A routing area updating procedure has been started and the MS is awaiting a response from the network.

4.1.3.1.1.7 GMM-SERVICE-REQUEST-INITIATED (UMTS only)

A service request procedure has been started and the MS is awaiting a response from the network.

4.1.3.1.2 Substates of state GMM-DEREGISTERED

The GMM-DEREGISTERED state is subdivided into several substates as explained below. The substates pertain to the whole MS (ME alone if no SIM/USIM is inserted, or ME plus SIM/USIM). The selection of the appropriate substate depends on the GPRS update status, see subclause 4.1.3.2, and on the selected cell.

4.1.3.1.2.1 GMM-DEREGISTERED.NORMAL-SERVICE

Valid subscriber data is available, the GPRS update status is GU1 or GU2, a cell has been selected. In this state, a request for GPRS attach is performed using the stored temporary mobile subscriber identity for GPRS (P-TMSI), routing area identification (RAI) and GPRS ciphering key sequence number in case of GU1. If the GPRS update status is GU2, the IMSI shall be used to attach for GPRS services.

4.1.3.1.2.2 GMM-DEREGISTERED.LIMITED-SERVICE

Valid subscriber data is available, GPRS update status is GU3, and a cell is selected, which is known not to be able to provide normal service.

4.1.3.1.2.3 GMM-DEREGISTERED.ATTACH-NEEDED

Valid subscriber data is available and for some reason a GPRS attach must be performed as soon as possible. This state is usually of no duration, but can last, e.g. if the access class is blocked due to common access class control or PS domain specific access control (see subclause 4.1.1.2.1).

4.1.3.1.2.4 GMM-DEREGISTERED.ATTEMPTING-TO-ATTACH

The GPRS update status is GU2, a cell is selected, a previous GPRS attach was rejected. The execution of further attach procedures depends on the GPRS attach attempt counter. No GMM procedure except GPRS attach shall be initiated by the MS in this substate.

4.1.3.1.2.5 GMM-DEREGISTERED.NO-IMSI

No valid subscriber data is available (no SIM/USIM, or the SIM/USIM is not considered valid by the ME) and a cell has been selected.

4.1.3.1.2.6 GMM-DEREGISTERED.NO-CELL-AVAILABLE

No cell can be selected. This substate is entered after a first intensive search failed (substate PLMN SEARCH). Cells are searched for at a low rhythm. No services are offered.

4.1.3.1.2.7 GMM-DEREGISTERED.PLMN-SEARCH

The mobile station is searching for PLMNs. This substate is left either when a cell has been selected (the new substate is NORMAL-SERVICE or LIMITED-SERVICE) or when it has been concluded that no cell is available at the moment (the new substate is NO-CELL-AVAILABLE).

4.1.3.1.2.8 GMM-DEREGISTERED.SUSPENDED (A/Gb mode only)

The MS shall enter this substate when entering dedicated mode and the MS limitations make it unable to communicate on GPRS channels. The MS shall leave this substate when leaving dedicated mode.

4.1.3.1.3 Substates of state GMM-REGISTERED

The state GMM-REGISTERED is subdivided into several substate as explained below. The substates pertain to the whole MS (ME alone if no SIM/USIM is inserted, or ME plus SIM/USIM).

4.1.3.1.3.1 GMM-REGISTERED.NORMAL-SERVICE

User data and signalling information may be sent and received.

4.1.3.1.3.2 GMM-REGISTERED.SUSPENDED (A/Gb mode only)

The MS shall enter this substate when entering dedicated mode and when the MS limitations makes it unable to communicate on GPRS channels. In this substate, no user data should be sent and no signalling information shall be sent. The MS shall leave this substate when leaving dedicated mode.

4.1.3.1.3.3 GMM-REGISTERED.UPDATE-NEEDED

The MS has to perform a routing area updating procedure, but its access class is not allowed in the cell. The procedure will be initiated as soon as access is granted (this might be due to a cell-reselection or due to change of the access class of the current cell), except when timer T3312 is running on its first routing area updating attempt immediately after the PS domain change from barred to unbarred (see subclause 4.1.1.2.1). No GMM procedure except routing area updating shall be initiated by the MS in this substate. In this substate, no user data and no signalling information shall be sent.

4.1.3.1.3.4 GMM-REGISTERED.ATTEMPTING-TO-UPDATE

A routing area updating procedure failed due to a missing response from the network. The MS retries the procedure controlled by timers and a GPRS attempt counter. No GMM procedure except routing area updating shall be initiated by the MS in this substate. No data shall be sent or received.

4.1.3.1.3.5 GMM-REGISTERED.NO-CELL-AVAILABLE

GPRS coverage has been lost. In this substate, the MS shall not initiate any GMM procedures except of cell (and PLMN) reselection.

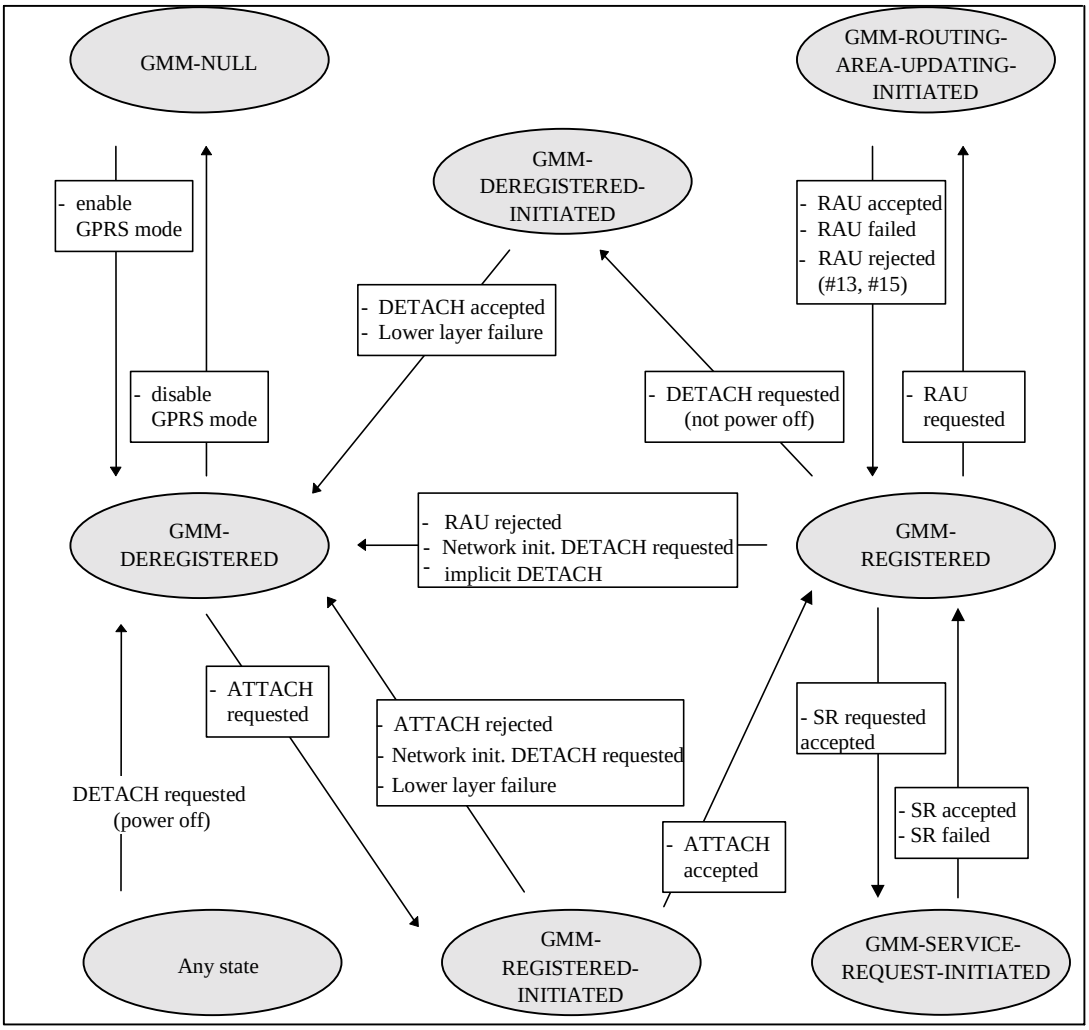

Figure 4.1b/3GPP TS 24.008:GMM main states in the MS

4.1.3.1.3.6 GMM-REGISTERED.LIMITED-SERVICE

A cell is selected, which is known not to be able to provide normal service. The MS will remain in this sub-state until a cell is selected which is able to provide normal service.

4.1.3.1.3.7 GMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM

A combined routing area updating procedure or a combined GPRS attach procedure was successful for GPRS services only. The MS retries the procedure controlled by timers and a GPRS attempt counter. User data and signalling information may be sent and received.

4.1.3.1.3.8 GMM-REGISTERED.IMSI-DETACH-INITIATED

The MS performs a combined GPRS detach procedure for non-GPRS services only (detach type "IMSI Detach"). This state is entered if the MS is attached for GPRS and non-GPRS services in a network that operates in network mode I and wants to detach for non-GPRS services only. User data and signalling information may be sent and received.

4.1.3.1.3.9 GMM-REGISTERED.PLMN-SEARCH

The mobile station is searching for PLMNs. This substate is left either when a cell has been selected (the new substate is NORMAL-SERVICE or LIMITED-SERVICE) or when it has been concluded that no cell is available at the moment (the new substate is NO-CELL-AVAILABLE).

Fourth proposed change

4.4 MM specific procedures

A MM specific procedure can only be started if no other MM specific procedure is running or no MM connection exists between the network and the mobile station. The end of the running MM specific procedure or the release of all MM connections have to be awaited before a new MM specific procedure can be started.

During the lifetime of a MM specific procedure, if a MM connection establishment is requested by a CM entity, this request will either be rejected or be delayed until the running MM specific procedure is terminated (this depends on the implementation).

Any MM common procedure (except IMSI detach) may be initiated during a MM specific procedure.

Unless it has specific permission from the network (follow-on proceed) the mobile station side should await the release of the RR connection used for a MM specific procedure before a new MM specific procedure or MM connection establishment is started.

NOTE: The network side may use the same RR connection for MM connection management.

********** MIDDLE SECTION NOT SHOWN HERE **********

4.4.4.9 Abnormal cases on the mobile station side

The different abnormal cases that can be identified are the following:

a) Access barred because of common access class control or CS domain specific access control

The location updating procedure is not started. The mobile station stays in the current serving cell and applies normal cell reselection process. The procedure is started as soon as possible and if still necessary (when the barred state is ended or because of a cell change).

b) The answer to random access is an IMMEDIATE ASSIGNMENT REJECT message (A/Gb mode only)

The location updating is not started. The mobile station stays in the chosen cell and applies normal cell selection process. The waiting timer T3122 is reset when a cell change occurs. The procedure is started as soon as possible after T3122 timeout if still necessary.

c) Random access failure (A/Gb mode only)

Timer T3213 is started. When it expires the procedure is attempted again if still necessary.

NOTE: As specified in 3GPP TS 45.008 [34], a cell reselection then takes place, with return to the cell inhibited for 5 seconds if there is at least one other suitable cell. Typically the selection process will take the mobile station back to the cell where the random access failed after 5 seconds.

If at the expiry of timer T3213 a new cell has not been selected due to the lack of valid information (see 3GPP TS 45.008 [34]), the mobile station may as an option delay the repeated attempt for up to 8 seconds to allow cell re-selection to take place. In this case the procedure is attempted as soon as a new cell has been selected or the mobile station has concluded that no other cell can be selected.

If random access failure occurs for two successive random access attempts for location updating the mobile station proceeds as specified below.

d) RR connection failure

The procedure is aborted and the mobile station proceeds as specified below.

e) T3210 timeout

The procedure is aborted, the RR connection is aborted and the MS proceeds as specified below.

f) RR release before the normal end of procedure

The procedure is aborted and the mobile station proceeds as specified below.

g) Location updating reject, other causes than those treated in subclause 4.4.4.7

Upon reception of the cause codes # 95, # 96, # 97, # 99 and # 111 the MS should set the attempt counter to 4. The MS waits for release of the RR connection as specified in subclause 4.4.4.8, and then proceeds as specified below.

h) RR connection establishment failure (Iu mode only)

The procedure is aborted and the mobile station proceeds as specified below.

NOTE: Case h) covers all cases when the signalling connection cannot be established, including random access failure and access reject. As the RRC protocol has error specific retransmission mechanisms (see 3GPP TS 25.331 [23c]), there is no need to distinguish between the different error cases within MM.

In cases d) to h) above and for repeated failures as defined in c) above the mobile station proceeds as follows. Timer T3210 is stopped if still running. The RR Connection is aborted in case of timer T3210 timeout. The attempt counter is incremented. The next actions depend on the Location Area Identities (stored and received from the BCCH of the current serving cell) and the value of the attempt counter.

– the update status is UPDATED, and the stored LAI is equal to the one received on the BCCH from the current serving cell and the attempt counter is smaller than 4:

The mobile station shall keep the update status to UPDATED, the MM IDLE sub-state after the RR connection release is NORMAL SERVICE. The mobile station shall memorize the location updating type used in the location updating procedure. It shall start timer T3211 when the RR connection is released. When timer T3211 expires the location updating procedure is triggered again with the memorized location updating type;

– either the update status is different from UPDATED, or the stored LAI is different from the one received on the BCCH from the current serving cell, or the attempt counter is greater or equal to 4:

When the RR connection is released the mobile station shall delete any LAI, TMSI, ciphering key sequence number stored in the SIM/USIM, and list of equivalent PLMNs, set the update status to NOT UPDATED and enter the MM IDLE sub-state ATTEMPTING TO UPDATE (see subclause 4.2.2.2 for the subsequent actions) or optionally the MM IDLE sub-state PLMN SEARCH (see subclause 4.2.1.2) in order to perform a PLMN selection according to 3GPP TS 23.122 [14]. If the attempt counter is smaller than 4, the mobile station shall memorize that timer T3211 is to be started when the RR connection is released, otherwise it shall memorize that timer T3212 is to be started when the RR connection is released.

Fifth proposed change

4.5 Connection management sublayer service provision

The concept of MM connection is introduced in this subclause. This concept is mainly a descriptive tool: The establishment of an MM connection by the network can be local (i.e. it is achieved by the transmission of the first CM layer message and without the transmission of any MM layer messages) or can be achieved by the transmission of a CM SERVICE PROMPT message (eg. in the case of certain ring back services). The release of an MM connection by the network or by the mobile station is always local, i.e. these purposes can be achieved without sending any MM messages over the radio interface. (On the contrary, establishment of an MM connection by the mobile station requires the sending of MM messages over the radio interface. An exception is VGCS, where an MM connection will be established as result of an uplink access procedure (see subclause 3.7.2.1.1in 3GPP TS 44.018 [84]).)

The Mobility Management (MM) sublayer is providing connection management services to the different entities of the upper Connection management (CM) sublayer (see 3GPP TS 24.007 [20]). It offers to a CM entity the possibility to use an MM connection for the exchange of information with its peer entity. An MM connection is established and released

on request from a CM entity. Different CM entities communicate with their peer entity using different MM connections. Several MM connections may be active at the same time.

An MM connection requires an RR connection. All simultaneous MM connections for a given mobile station use the same RR connection.

In the following subclause s, the procedures for establishing, re-establishing, maintaining, and releasing an MM connection are described, usually separately for the mobile station and the network side.

********** MIDDLE SECTION NOT SHOWN HERE **********

4.5.1.2 Abnormal cases

Mobile station side:

a) RR connection failure or IMSI deactivation

If an RR connection failure occurs or the IMSI is deactivated during the establishment of an MM connection, the MM connection establishment is aborted, timers T3230 is stopped, and an indication is given to the CM entity that requested the MM connection establishment. This shall be treated as a rejection for establishment of the new MM connection, and the MM sublayer shall release all active MM connections.

b) T3230 expiry

If T3230 expires (i.e. no response is given but a RR connection is available) the MM connection establishment is aborted and the requesting CM sublayer is informed. If no other MM connection exists then the mobile station shall proceed as described in subclause 4.5.3.1 for release of the RR connection. Otherwise the mobile station shall return to the MM sublayer state where the request of an MM connection was received, i.e. to MM sublayer state MM connection active. Other ongoing MM connections (if any) shall not be affected.

c) Reject cause values #95, #96, #97, #99, #100, #111 received

The same actions as on timer expiry shall be taken by the mobile station.

d) Random access failure or RR connection establishment failure

If the mobile station detects a random access failure or RR connection establishment failure during the establishment of an MM connection, it aborts the MM connection establishment and gives an indication to the CM entity that requested the MM connection establishment.

NOTE: Further actions of the mobile station depend on the RR procedures and MM specific procedures during which the abnormal situation has occurred and are described together with those procedures.

e) Access barred because of CS domain specific access control

The MM connection establishment shall not be initiated. The MS stays in the current serving cell and applies normal cell reselection process. The MM connection establishment may be initiated by CM layer if it is still necessary, i.e. when access is granted or because of a cell change.

Sixth proposed change

4.7.3 GPRS attach procedure

The GPRS attach procedure is used for two purposes:

- normal GPRS attach, performed by the MS to IMSI attach for GPRS services only. The normal GPRS attach procedure shall be used by GPRS MSs in MS operation mode C, independent of the network operation mode. It shall also be used by GPRS MSs in MS operation modes A or B if the network operates in network operation mode II or III;

- combined GPRS attach procedure, used by GPRS MSs in MS operation modes A or B to attach the IMSI for GPRS and non-GPRS services provided that the network operates in network operation mode I.

With a successful GPRS attach procedure a GMM context is established.

Subclause 4.7.3.1 describes the GPRS attach procedure to attach the IMSI only for GPRS services. The combined GPRS attach procedure used to attach the IMSI for both GPRS and non-GPRS services is described in subclause 4.7.3.2.

If an IMSI attach for non-GPRS services is requested and a GMM context exists, the routing area updating procedure shall be used as described in subclause 4.7.5.2.

To limit the number of subsequently rejected attach attempts, a GPRS attach attempt counter is introduced. The GPRS attach attempt counter shall be incremented as specified in subclause 4.7.3.1.5. Depending on the value of the GPRS attempt counter, specific actions shall be performed. The GPRS attach attempt counter shall be reset when:

- the MS is powered on;

- a SIM/USIM is inserted;

- a GPRS attach procedure is successfully completed;

- a combined GPRS attach procedure is completed for GPRS services only with cause #2, #16, #17 or #22; or

- a GPRS attach procedure is completed with cause #11, #12, #13 or #15,

and additionally when the MS is in substate ATTEMPTING-TO-ATTACH:

- expiry of timer T3302;

- a new routing area is entered; or

- an attach is triggered by CM sublayer requests.

The mobile equipment shall contain a list of "forbidden location areas for roaming", as well as a list of "forbidden location areas for regional provision of service". The handling of these lists is described in subclause 4.4.1; the same lists are used by GMM and MM procedures.

The Mobile Equipment shall contain a list of "equivalent PLMNs". The handling of this list is described in subclause 4.4.1, the same list is used by GMM and MM procedures.

In a shared network, the MS shall choose one of the PLMN identities as specified in 3GPP TS 23.122 [14]. The MS shall construct the Routing Area Identification of the cell from this chosen PLMN identity, and the LAC and the RAC received on the BCCH. The chosen PLMN identity shall be indicated to the RAN in the RRC INITIAL DIRECT TRANSFER message (see 3GPP TS 25.331 [23c]). Whenever an ATTACH REJECT message with the cause "PLMN not allowed" is received by the MS, the chosen PLMN indentity shall be stored in the "forbidden PLMN list". Whenever an ATTACH REJECT message is received by the MS with the cause "Roaming not allowed in this location area", "Location Area not allowed", or "No suitable cells in Location Area", the constructed RAI shall be stored in the suitable list.

The network informs the MS about the support of specific features, such as LCS-MOLR, in the “Network feature support” Information Element. The information is either explicitly given by sending the “Network feature support” IE or implicitly by not sending it. The handling in the network is described in subclause 9.4.2.9. The MS may use the indication to inform the user about the availability of the appropriate services and it shall not request services that have not been indicated as available.

********** MIDDLE SECTION NOT SHOWN HERE **********

4.7.3.1.5 Abnormal cases in the MS

The following abnormal cases can be identified:

a) Access barred because of common access class control or PS domain specific access control

The GPRS attach procedure shall not be started. The MS stays in the current serving cell and applies normal cell reselection process. The GPRS attach procedure is started as soon as possible, i.e. when access is granted or because of a cell change.

b) Lower layer failure before the ATTACH ACCEPT or ATTACH REJECT message is received

The procedure shall be aborted. The MS shall proceed as described below.

c) T3310 time-out

On the first expiry of the timer, the MS shall reset and restart timer T3310 and shall retransmit the ATTACH REQUEST message. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3310, the MS shall abort the GPRS attach procedure and, in Iu mode, release the PS signalling connection (see 3GPP TS 25.331 [23c]). The MS shall proceed as described below.

d) ATTACH REJECT, other causes than those treated in subclause 4.7.3.1.4

Upon reception of the cause codes # 95, # 96, # 97, # 99 and # 111 the MS should set the GPRS attach attempt counter to 5. The MS shall proceed as described below.

e) Change of cell within the same RA (A/Gb mode only)

If a cell change occurs within the same RA when the MS is in state GMM-REGISTERED-INITIATED, then the cell update procedure shall be performed before completion of the attach procedure.

f) Change of cell into a new routing area

If a cell change into a new routing area occurs before an ATTACH ACCEPT or ATTACH REJECT message has been received, the GPRS attach procedure shall be aborted and re-initiated immediately. If a routing area border is crossed when the ATTACH ACCEPT message is received but before an ATTACH COMPLETE message is sent, the GPRS attach procedure shall be aborted and the routing area updating procedure shall be initiated. If a P-TMSI was allocated during the GPRS attach procedure, this P-TMSI shall be used in the routing area updating procedure. If a P-TMSI signature was allocated together with the P-TMSI during the GPRS attach procedure, this P-TMSI signature shall be used in the routing area updating procedure.

g) Mobile originated detach required

If the MS is in state GMM-REGISTERED-INITIATED, the GPRS attach procedure shall be aborted and the GPRS detach procedure shall be performed (see subclause 4.7.4.1).

h) Procedure collision

If the MS receives a DETACH REQUEST message from the network in state GMM-REGISTERED-INITIATED with type of detach 're-attach not required, the GPRS detach procedure shall be progressed and the GPRS attach procedure shall be aborted. Otherwise the GPRS attach procedure shall be progressed and the DETACH REQUEST message shall be ignored.

In cases b, c and d the MS shall proceed as follows. Timer T3310 shall be stopped if still running. The GPRS attach attempt counter shall be incremented.

If the GPRS attach attempt counter is less than 5:

- timer T3311 is started and the state is changed to GMM-DEREGISTERED.ATTEMPTING-TO-ATTACH.

If the GPRS attach attempt counter is greater than or equal to 5:

- the MS shall delete any RAI, P-TMSI, P-TMSI signature, list of equivalent PLMNs, and GPRS ciphering key sequence number, shall set the GPRS update status to GU2 NOT UPDATED, shall start timer T3302. The state is changed to GMM-DEREGISTERED. ATTEMPTING-TO-ATTACH or optionally to GMM-DEREGISTERED.PLMN-SEARCH (see subclause 4.2.4.1.2) in order to perform a PLMN selection according to 3GPP TS 23.122 [14].

Seventh proposed change

4.7.5 Routing area updating procedure

This procedure is used for:

- normal routing area updating to update the registration of the actual routing area of an MS in the network. This procedure is used by GPRS MSs in MS operation mode C and by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS and non-GPRS services if the network operates in network operation mode II or III;

- combined routing area updating to update the registration of the actual routing and location area of an MS in the network. This procedure is used by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS and non-GPRS services provided that the network operates in network operation mode I;

- periodic routing area updating. This procedure is used by GPRS MSs in MS operation mode C and by GPRS MSs in MS operation modes A or B that are IMSI attached for GPRS or for GPRS and non-GPRS services independent of the network operation mode;

- IMSI attach for non-GPRS services when the MS is IMSI attached for GPRS services. This procedure is used by GPRS MSs in MS operation modes A or B, if the network operates in network operation mode I;

- in A/Gb mode, resuming GPRS services when the RR sublayer indicated a resumption failure after dedicated mode was left, see 3GPP TS 44.018 [84];

- in A/Gb mode, updating the network with the new MS Radio Access Capability IE when the content of the IE has changed;

- updating the network with the new DRX parameter IE when the content of the IE has changed;

NOTE 1: Such changes can be used e.g. when the MS activates a PDP context with service requirements that cannot be met with the current DRX parameter. As PDP context(s) are activated and deactivated, the GMM context will be updated with an appropriate DRX parameter;

- Iu mode to A/Gb mode and for A/Gb mode to Iu mode intersystem change, see subclause 4.7.1.7; or

- in Iu mode, to re-synchronize the PMM mode of MS and network after RRC connection release with cause "Directed signalling connection re-establishment", see subclause 4.7.2.5.

The routing area updating procedure shall also be used by a MS which is attached for GPRS services if a new PLMN is entered (see 3GPP TS 23.122 [14]).

Subclause 4.7.5.1 describes the routing area updating procedures for updating the routing area only. The combined routing area updating procedure used to update both the routing and location area is described in subclause 4.7.5.2.

The routing area updating procedure is always initiated by the MS. It is only invoked in state GMM-REGISTERED.

To limit the number of subsequently rejected routing area update attempts, a routing area updating attempt counter is introduced. The routing area updating attempt counter shall be incremented as specified in subclause 4.7.5.1.5. Depending on the value of the routing area updating attempt counter, specific actions shall be performed. The routing area updating attempt counter shall be reset when:

- a GPRS attach procedure is successfully completed; or

- a routing area updating procedure is successfully completed;

and additionally when the MS is in substate ATTEMPTING-TO-UPDATE:

- a new routing area is entered;
- expiry of timer T3302; or
- at request from registration function.

The mobile equipment shall contain a list of "forbidden location areas for roaming", as well as a list of "forbidden location areas for regional provision of service". The handling of these lists is described in subclause 4.4.1.

The Mobile Equipment shall contain a list of "equivalent PLMNs". The handling of this list is described in subclause 4.4.1.

In a shared network, the MS shall choose one of the PLMN identities as specified in 3GPP TS 23.122 [14]. The MS shall construct the Routing Area Identification of the cell from this chosen PLMN identity, and the LAC and the RAC received on the BCCH. If the constructed RAI is different from the stored RAI, the MS shall initiate the routing area updating procedure. The chosen PLMN identity shall be indicated to the RAN in the RRC INITIAL DIRECT TRANSFER message (see 3GPP TS 25.331 [23c]). Whenever a ROUTING AREA UPDATING REJECT message with the cause "PLMN not allowed" is received by the MS, the chosen PLMN identity shall be stored in the "forbidden PLMN list". Whenever a ROUTING AREA UPDATING REJECT message is received by the MS with the cause "Roaming not allowed in this location area", "Location Area not allowed", or "No suitable cells in Location Area", the constructed RAI which triggered the routing area updating procedure shall be stored in the suitable list.

In A/Gb mode, user data transmission in the MS shall be suspended during the routing area updating procedure; user data reception shall be possible. User data transmission in the network may be suspended during the routing area updating procedure.

In Iu mode, user data transmission and reception in the MS shall not be suspended during the routing area updating procedure. User data transmission in the network shall not be suspended during the routing area updating procedure.

In Iu mode, when a ROUTING AREA UPDATE REQUEST is received by the SGSN over a new PS signalling connection while there is an ongoing PS signalling connection (network is already in mode PMM-CONNECTED) for this UE, the network shall progress the routing area update procedure as normal and release the previous PS signalling connection when the routing area update procedure has been accepted by the network.

NOTE 2: The re-establishment of the radio bearers of active PDP contexts is done as described in subclause "Service Request procedure".

The network informs the MS about the support of specific features, such as LCS-MOLR, in the “Network feature support” Information Element. The information is either explicitly given by sending the “Network feature support” IE or implicitly by not sending it. The handling in the network is described in subclause 9.4.15.11. The MS may use the indication to inform the user about the availability of the appropriate services and it shall not request services that have not been indicated as available.

********** MIDDLE SECTION NOT SHOWN HERE **********

4.7.5.1.5 Abnormal cases in the MS

The following abnormal cases can be identified:

a) Access barred because of common access class control or PS domain specific access control

The routing area updating procedure shall not be started. The MS stays in the current serving cell and applies the normal cell reselection process. The procedure is started as soon as possible and if still necessary, i.e. when the barred state is removed or because of a cell change.

b) Lower layer failure before the ROUTING AREA UPDATE ACCEPT or ROUTING AREA UPDATE REJECT message is received

The procedure shall be aborted. The MS shall proceed as described below.

c) T3330 time-out

The procedure is restarted four times, i.e. on the fifth expiry of timer T3330, the MS shall abort the procedure and, in Iu mode, release the PS signalling connection (see 3GPP TS 25.331 [23c]). The MS shall proceed as described below.

d) ROUTING AREA UPDATE REJECT, other causes than those treated in subclause 4.7.5.1.4

Upon reception of the cause codes # 95, # 96, # 97, # 99 and # 111 the MS should set the routing area updating attempt counter to 5. The MS shall proceed as described below.

e) If a routing area border is crossed, when the MS is in state GMM-ROUTING-AREA-UPDATE-INITIATED, the routing area updating procedure shall be aborted and re-initiated immediately. The MS shall set the GPRS update status to GU2 NOT UPDATED.

f) In A/Gb mode, if a cell change occurs within the same RA, when the MS is in state GMM-ROUTING-AREA-UPDATE-INITIATED, the cell update procedure is performed, before completion of the routing area updating procedure.

g) Routing area updating and detach procedure collision

GPRS detach containing detach type"re-attach required" or "re-attach not required":

If the MS receives a DETACH REQUEST message before the routing area updating procedure has been completed, the routing area updating procedure shall be aborted and the GPRS detach procedure shall be progressed.

GPRS detach containing detach type "IMSI detach":

If the MS receives a DETACH REQUEST message before the routing area updating procedure has been completed, the routing area updating procedure shall be progressed, i.e. the DETACH REQUEST message shall be ignored.

h) Routing area updating and P-TMSI reallocation procedure collision

If the MS receives a P-TMSI REALLOCATION REQUEST message before the routing area updating procedure has been completed, the P-TMSI reallocation procedure shall be aborted and the routing area updating procedure shall be progressed.

In cases b, c and d the MS shall proceed as follows:

Timer T3330 shall be stopped if still running. The routing area updating attempt counter shall be incremented.

If the routing area updating attempt counter is less than 5, and the stored RAI is equal to the RAI of the current serving cell and the GMM update status is equal to GU1 UPDATED:

- the MS shall keep the GMM update status to GU1 UPDATED and changes state to GMM-REGISTERED.NORMAL-SERVICE. The MS shall start timer T3311. When timer T3311 expires the routing area updating procedure is triggered again.

If the routing area updating attempt counter is less than 5, and the stored RAI is different to the RAI of the current serving cell or the GMM update status is different to GU1 UPDATED:

- the MS shall start timer T3311, shall set the GPRS update status to GU2 NOT UPDATED and changes state to GMM-REGISTERED.ATTEMPTING-TO-UPDATE.

If the routing area updating attempt counter is greater than or equal to 5:

- the MS shall start timer T3302, shall delete the list of equivalent PLMNs, shall set the GPRS update status to GU2 NOT UPDATED and shall change to state GMM-REGISTERED.ATTEMPTING-TO-UPDATE or optionally to GMM-REGISTERED.PLMN-SEARCH(see subclause 4.2.5.1.8) in order to perform a PLMN selection according to 3GPP TS 23.122 [14].

Eighth change

4.7.13 Service Request procedure (Iu mode only)

The purpose of this procedure is to transfer the PMM mode from PMM-IDLE to PMM-CONNECTED mode, and/or to assign radio access bearer in case of PDP contexts are activated without radio access bearer assigned. In latter case, the PMM mode may be PMM-IDLE mode or may alternatively be the PMM-CONNECTED mode if the MS requires radio access bearer re-establishment. This procedure is used for;

- the initiation of CM layer service (e.g. SM or SMS) procedure from the MS in PMM-IDLE mode,
- the network to transfer down link signalling,
- uplink (in PMM-IDLE or PMM CONNECTED) and downlink (only in PMM-IDLE) user data,
- counting the number of mobile stations in a cell which are interested in a specific MBMS multicast service.

For downlink transfer of signalling or user data in PMM-IDLE mode, the trigger is given from the network by the paging request procedure, which is out of scope of the present document.

For pending downlink user data in PMM-CONNECTED mode, the re-establishment of radio access bearers for all active PDP contexts is done without paging.

For counting the number of mobile stations in PMM-IDLE mode interested in a specific MBMS service, the trigger is given from the network by the MBMS notification procedure (see 3GPP TS 25.331 [23c]).

Service type can take either of the following values; "signalling", "data", "paging response" or "MBMS notification response". Each of the values shall be selected according to the criteria to initiate the Service request procedure.

The criteria to invoke the Service request procedure are when;

a) the MS has any signalling messages except GMM messages (e.g. for SM or SMS) to be sent to the network in PMM-IDLE mode (i.e., no secure PS signalling connection has been established). In this case, the service type shall be set to "signalling".

b) the MS, either in PMM-IDLE or PMM-CONNECTED mode, has pending user data to be sent and no radio access bearer is established for the corresponding PDP context. The procedure is initiated by an indication from the lower layers (see 3GPP TS 24.007 [20]). In this case, the service type shall be set to "data". If in PMM-CONNECTED mode, a Service Request with service type "data" was already accepted by the network the MS shall not issue a second Service Request with service type "data" unless the PMM-IDLE state is entered again.

c) the MS receives a paging request for PS domain from the network in PMM-IDLE mode. In this case, the service type shall be set to "paging response".

d) the MS is in PMM-IDLE, receives an MBMS notification for an MBMS multicast service for which the MS has activated an MBMS context, and is prompted by the contents of the notification to establish a PS signalling connection (see 3GPP TS 25.346 [110]). In this case, the service type shall be set to "MBMS notification response".

If one of the above criteria to invoke the Service request procedure is fulfilled, then the Service request procedure may only be initiated by the MS when the following conditions are fulfilled:

- its GPRS update status is GU1 UPDATED; and
- no GMM specific procedure is ongoing (see subclause 4.1.1.1).

If a GMM specific procedure is ongoing at the time a request from CM sublayer, the RRC or the RABM (see 3GPP TS 24.007 [20]) is received and the ATTACH REQUEST or ROUTING AREA UPDATE REQUEST message has been sent, then, depending on implementation, the MS shall abort the received request or delay it until the GMM specific procedure is completed. If the ATTACH REQUEST or ROUTING AREA UPDATE REQUEST message has not been sent, the MS may indicate "follow-on request pending" in the message (i.e. the MS wishes to prolong the established PS signalling connection after the GMM specific procedure). Then, the MS shall delay the Service request procedure until the GMM specific procedure is completed.

If the network indicates "follow-on proceed" in the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message and the MS has a service request pending, the MS shall react depending on the service type. If the service type is:

- "signalling": the MS shall abort the Service request procedure and send the pending signalling messages immediately;

- "data": the MS shall immediately perform the pending Service request procedure using the current PS signalling connection;

- "paging response": the MS shall abort the Service request procedure. No further specific action is required from the MS.

If the network indicates "follow-on proceed" and the MS has no service request pending, then no specific action is required from the MS.

If the network indicates "no follow-on proceed" in the ATTACH ACCEPT or ROUTING AREA UPDATE ACCEPT message, the MS shall not initiate the pending Service request procedure until the current PS signalling connection is released.

NOTE: The "follow-on proceed" indication was not defined in earlier versions of the protocol. A network that is compliant with the earlier versions of the protocol will always encode the respective bit as zero, i.e. as "follow-on proceed", even if it does not prolong the PS signalling connection.

After completion of a Service request procedure but before re-establishment of radio access bearer, if the PDP context status information element is included, then the network shall deactivate all those PDP contexts locally (without peer to peer signalling between the MS and the network), which are not in SM state PDP-INACTIVE on network side but are indicated by the MS as being in state PDP-INACTIVE.

After completion of a Service request procedure, the pending service is resumed and uses then the connection established by the procedure. If the service type is indicating "data", then the radio access bearers for all activated PDP contexts are re-established by the network, except for those activated PDP contexts having maximum bit rate value set to 0 kbit/s for both uplink and downlink. The re-establishment of radio access bearers for those PDP contexts is specified in subclause 6.1.3.3.

The selective re-assignment capability is not supported for the simplicity of the function.

********** MIDDLE SECTION NOT SHOWN HERE **********

4.7.13.5 Abnormal cases in the MS

The following abnormal cases can be identified:

a) Access barred because of common access class control or PS domain specific access control

The Service request procedure shall not be started. The MS stays in the current serving cell and applies normal cell reselection process. The Service request procedure may be started by CM layer if it is still necessary, i.e. when access is granted or because of a cell change.

b) Lower layer failure before the security mode control procedure is completed, SERVICE ACCEPT or SERVICE REJECT message is received

The procedure shall be aborted.

c) T3317 expired

The MS shall enter GMM-REGISTERED state.

If the MS is in PMM-IDLE mode then the procedure shall be aborted and the MS shall release locally any resources allocated for the service request procedure.

If the MS is in PMM-CONNECTED mode, then the procedure shall be aborted.

d) SERVICE REJECT received, other causes than those treated in subclause 4.7.13.4

The procedure shall be aborted.

e) Routing area update procedure is triggered

If a cell change into a new routing area occurs and the necessity of routing area update procedure is determined before the security mode control procedure is completed, a SERVICE ACCEPT or SERVICE REJECT message has been received, the Service request procedure shall be aborted and the routing area updating procedure is started immediately. Follow-on request pending may be indicated in the ROUTING AREA UPDATE REQUEST for the service, which was the trigger of the aborted Service request procedure, to restart the pending service itself or the Service request procedure after the completion of the routing area updating procedure. If the Service type of the aborted SERVICE REQUEST was indicating "data", then the routing area update procedure may be followed by a re-initiated Service request procedure indicating "data", if it is still necessary. If the Service type was indicating "MBMS notification response", the Service request procedure shall be aborted.

f) Power off

If the MS is in state GMM-SERVICE-REQUEST-INITIATED at power off, the GPRS detach procedure shall be performed.

g) Procedure collision

If the MS receives a DETACH REQUEST message from the network in state GMM-SERVICE-REQUEST-INITIATED, the GPRS detach procedure shall be progressed and the Service request procedure shall be aborted. If the cause IE, in the DETACH REQUEST message, indicated a "reattach request", the GPRS attach procedure shall be performed.

Ninth and final change

11.2 Timers of mobility management

Table 11.1/3GPP TS 24.008: Mobility management timers - MS-side

TIMER NUM.	MM STAT	TIME OUT VAL.	CAUSE FOR START	NORMAL STOP	AT THE EXPIRY
T3210	3	20s	- LOC_UPD_REQ sent	- LOC_UPD_ACC - LOC_UPD_REJ - AUTH_REJ - Lower layer failure	Start T3211
T3211	1 2	15s	- LOC_UPD_REJ with cause#17 netw. failure - lower layer failure or RR conn. released after RR conn. abort during loc. updating	- Time out - cell change - request for MM connection establishment - change of LA	Restart the Location update proc.
T3212	1, 2	Note 1	- termination of MM service or MM signalling - If PS domain gets barred in network mode I	- initiation of MM service or MM signalling - When PS domain gets unbarred in network mode I	initiate periodic updating
T3213	1 2 11	4s	- location updating failure	- expiry - change of BCCH parameter	new random attempt
T3214	3 5 7	20s	AUTHENT FAILURE Cause = 'MAC failure' or 'GSM authentication unacceptable' sent	AUTHENT REQ received	Consider the network as 'false' (see 4.3.2.6.1)
T3216	3 5 7	15s	AUTHENT FAILURE Cause = Synch failure sent	AUTHENT REQ received	Consider the network as 'false' (see 4.3.2.6.1)
T3218	3 5 7	20s	RAND and RES stored as a result of of a UMTS authentication challenge	- Cipher mode setting (A/Gb mode only) - Security mode setting (Iu mode only) - CM_SERV_ACCEPT received - CM SERVICE REJECT received - LOCATION UPDATING ACCEPT received - AUTHENT REJ received - AUTHENT FAIL sent - enter MM IDLE or NULL	Delete the stored RAND and RES
T3220	7	5s	- IMSI DETACH	- release from RM-sublayer	enter Null or Idle, ATTEMPTING TO UPDATE
T3230	5	15s	- CM SERV REQ CM REEST REQ	- Cipher mode setting - CM SERV REJ - CM SERV ACC	provide release ind.
T3240	9 10	10s	see subclause 11.2.1	see subclause 11.2.1	abort the RR connection
T3241	25	300s	see subclause 11.2.1	see subclause 11.2.1	abort the RR connection

NOTE 1: The timeout value is broadcasted in a SYSTEM INFORMATION message

11.2.2 Timers of GPRS mobility management

Table 11.3/3GPP TS 24.008: GPRS Mobility management timers - MS side

TIMER NUM.	TIMER VALUE	STATE	CAUSE OF START	NORMAL STOP	ON THE 1st, 2nd, 3rd, 4th EXPIRY Note 3
T3310	15s	GMM-REG-INIT	ATTACH REQ sent	ATTACH ACCEPT received ATTACH REJECT received	Retransmission of ATTACH REQ
T3311	15s	GMM-DEREG ATTEMPTING TO ATTACH or GMM-REG ATTEMPTING TO UPDATE	ATTACH REJ with other cause values as described in chapter 'GPRS Attach' ROUTING AREA UPDATE REJ with other cause values as described in chapter 'Routing Area Update' Low layer failure	Change of the routing area	Restart of the Attach or the RAU procedure with updating of the relevant attempt counter
T3316	30s	GMM-REG-INIT GMM-REG GMM-DEREG-INIT GMM-RA-UPDATING-INT GMM-SERV-REQ-INIT (Iu mode only)	RAND and RES stored as a result of a UMTS authentication challenge	Security mode setting (Iu mode only) SERVICE ACCEPT received. (Iu mode only) SERVICE REJECT received (Iu mode only) ROUTING AREA UPDATE ACCEPT received AUTHENTICATION AND CIPHERING REJECT received AUTHENTICATION_AND_CIPHERING FAILURE sent Enter GMM-DEREG or GMM-NULL	Delete the stored RAND and RES
T3318	20s	GMM-REG-INIT GMM-REG GMM-DEREG-INIT GMM-RA-UPDATING-INT GMM-SERV-REQ-INIT (Iu mode only)	AUTHENTICATION & CIPHERING FAILURE (cause='MAC failure' or 'GSM authentication unacceptable') sent	AUTHENTICATION & CIPHERING REQUEST received	On first expiry, the MS should consider the network as false (see 4.7.7.6.1)

T3320	15s	GMM-REG-INIT GMM-REG GMM-DEREG-INIT GMM-RA-UPDATING-INT GMM-SERV-REQ-INIT (Iu mode only)	AUTHENTICATION & CIPHERING FAILURE (cause=synch failure) sent	AUTHENTICATION & CIPHERING REQUEST received	On first expiry, the MS should consider the network as false (see 4.7.7.6.1)
T3321	15s	GMM-DEREG-INIT	DETACH REQ sent	DETACH ACCEPT received	Retransmission of the DETACH REQ
T3330	15s	GMM-ROUTING-UPDATING-INITIATED	ROUTING AREA UPDATE REQUEST sent	ROUTING AREA UPDATE ACC received ROUTING AREA UPDATE REJ received	Retransmission of the ROUTING AREA UPDATE REQUEST message

Table 11.3a/3GPP TS 24.008: GPRS Mobility management timers – MS side

TIMER NUM.	TIMER VALUE	STATE	CAUSE OF START	NORMAL STOP	ON EXPIRY
T3302	Default 12 min Note 1	GMM-DEREG or GMM-REG	At attach failure and the attempt counter is greater than or equal to 5. At routing area updating failure and the attempt counter is greater than or equal to 5.	At successful attach At successful routing area updating	On every expiry, initiation of the GPRS attach procedure or RAU procedure
T3312	Default 54 min Note1	GMM-REG	In GSM, when READY state is left. In UMTS, when PMM-CONNECTED mode is left. If PS domain gets unbarred in network mode I	When entering state GMM-DEREG When PS domain gets barred in network mode I	Initiation of the Periodic RAU procedure
T3314 READY (A/Gb mode only)	Default 44 sec Note 2	All except GMM-DEREG	Transmission of a PTP PDU	Forced to Standby	No cell-updates are performed
T3317 (Iu mode only)	10s	GMM-SERVICE-REQUEST-INITIATED	SERVICE REQ sent	Security mode control procedure is completed, SERVICE ACCEPT received, or SERVICE REJECT received	Abort the procedure

NOTE 1: The value of this timer is used if the network does not indicate another value in a GMM signalling procedure.

NOTE 2: The default value of this timer is used if neither the MS nor the Network send another value, or if the Network sends this value, in a signalling procedure.

NOTE 3: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.

Table 11.4/3GPP TS 24.008: GPRS Mobility management timers - network side

TIMER NUM.	TIMER VALUE	STATE	CAUSE OF START	NORMAL STOP	ON THE 1st, 2nd, 3rd, 4th EXPIRY Note 3
T3322	6s	GMM-DEREG-INIT	DETACH REQ sent	DETACH ACCEPT received	Retransmission of DETACH REQUEST
T3350	6s	GMM-COMMON-PROC-INIT	ATTACH ACCEPT sent with P-TMSI and/or TMSI RAU ACCEPT sent with P-TMSI and/or TMSI P-TMSI REALLOC COMMAND sent	ATTACH COMPLETE received RAU COMPLETE received P-TMSI REALLOC COMPLETE received	Retransmission of the same message type, i.e. ATTACH ACCEPT, RAU ACCEPT or REALLOC COMMAND
T3360	6s	GMM-COMMON-PROC-INIT	AUTH AND CIPH REQUEST sent	AUTH AND CIPH RESPONSE received AUTHENT-AND CIPHER-FAILURE received	Retransmission of AUTH AND CIPH REQUEST
T3370	6s	GMM-COMMON-PROC-INIT	IDENTITY REQUEST sent	IDENTITY RESPONSE received	Retransmission of IDENTITY REQUEST

Table 11.4a/3GPP TS 24.008: GPRS Mobility management timers - network side

TIMER NUM.	TIMER VALUE	STATE	CAUSE OF START	NORMAL STOP	ON EXPIRY
T3313	Note1	GMM_REG	Paging procedure initiated	Paging procedure completed	Network dependent
T3314 READY (A/Gb mode only)	Default 44 sec Note 2	All except GMM-DEREG	Receipt of a PTP PDU	Forced to Standby	The network shall page the MS if a PTP PDU has to be sent to the MS
Mobile Reachable	Default 4 min greater than T3312	All except GMM-DEREG	In GSM, change from READY to STANDBY state In UMTS, change from PMM-CONNECTED mode to PMM-IDLE mode.	PTP PDU received	Network dependent but typically paging is halted on 1st expiry

NOTE 1: The value of this timer is network dependent.

NOTE 2: The default value of this timer is used if neither the MS nor the Network send another value, or if the Network sends this value, in a signalling procedure. The value of this timer should be slightly shorter in the network than in the MS, this is a network implementation issue.

NOTE 3: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.