3GPP TSG CN Plenary **Tdoc NP-010272**
Meeting #12, Stockholm, Sweden
13th - 15th June 2001

Source: **TSG CN WG 1**

Title: **CRs to R98 (with mirror CRs) on Work Item LCS towards 23.009**

Agenda item: **7.16**

Document for: **APPROVAL**

Introduction:

This document contains **3** CR s on **R98 (2 is mirror CRs) to** Work Item **"LCS"**, that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #12 for approval.

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Version-Current	Workitem
04.08	A1097	2	N1-010681	R98	Modification to MS's MM states to enable LCS signalling on RR layer	F	7.11.0	LCS
24.008	395	3	N1-010840	R99	Modification to MS's MM states to enable LCS	A	3.7.0	LCS
24.008	396	3	N1-010841	Rel-4	Modification to MS's MM states to enable LCS	A	4.2.0	LCS

CR-Form-v3

CHANGE REQUEST

⌘ **04.08** **CR** A1097 ⌘ rev **r2~~1~~** ⌘ Current version: **7.11.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network **X**

Title:	⌘	Modification to MS's MM states to enable LCS signalling on RR layer
Source:	⌘	Siemens AG, Nokia
Work item code:	⌘	LCS
Date:	⌘	08.05.01
Category:	⌘	**F**
Release:	⌘	R98

Use one of the following categories:
F *(essential 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:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	As the MM layer is currently not aware of any ongoing RRLP procedure, MM will abort the RR connection if the last CM connection is released and the MM timer T3240 expires(10 sec.). This will happen during a MT-LR/NI-LR LCS positioning procedure, were the RRLP procedure may take longer than 10 seconds. In order to avoid the MS trigger abortion of the RR connection during an RRLP procedure, it is proposed to introduce a new MM state RR CONNECTION RELEASE NOT ALLOWED which is entered if no CM connections are active, but an RRLP procedure is ongoing. This state is supervised by a new introduced MM timer T3241 which ensures, that the MS does not remains in this state forever.
Summary of change:	⌘	Introduction of the new MM state RR CONNECTION RELEASE NOT ALLOWED and the corresponding MM timer T3241.
Consequences if not approved:	⌘	A ongoing RRLP procedure could not be finalised correctly due to the MS initiated abortion of the RR connection, which leads to the risk that certain LCS positioning methods will not work.

Clauses affected:	⌘	4.1.2.1.1; 4.1.2.3; 4.5.1.1; 4.5.1.3.1; 4.5.3.1; 11.2; 11.2.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

********** First Modified Section **********

4.1.2.1.1 Main states

0 NULL

The mobile station is inactive (e.g. power down). Important parameters are stored. Only manual action by the user may transfer the MM sublayer to another state.

3 LOCATION UPDATING INITIATED

A location updating procedure has been started and the MM awaits a response from the network. The timer T3210 is running.

5 WAIT FOR OUTGOING MM CONNECTION

The MM connection establishment has been started, and the MM awaits a response from the network. The timer T3230 is running.

6 MM CONNECTION ACTIVE

The MM sublayer has a RR connection to its peer entity on the network side. One or more MM connections are active.

7 IMSI DETACH INITIATED

The IMSI detach procedure has been started. The timer T3220 is running.

8 PROCESS CM SERVICE PROMPT

The MM sublayer has a RR connection to its peer entity on the network side. The Mobile Station has received a CM SERVICE PROMPT message but has not yet responded $(CCBS)$.

9 WAIT FOR NETWORK COMMAND

The MM sublayer has a RR connection to its peer entity in the network, but no MM connection is established. The mobile station is passive, awaiting further commands from the network. The timer T3240 may be running.

10 LOCATION UPDATE REJECTED

A location updating procedure has been rejected and RR connection release is awaited. The timer T3240 is running.

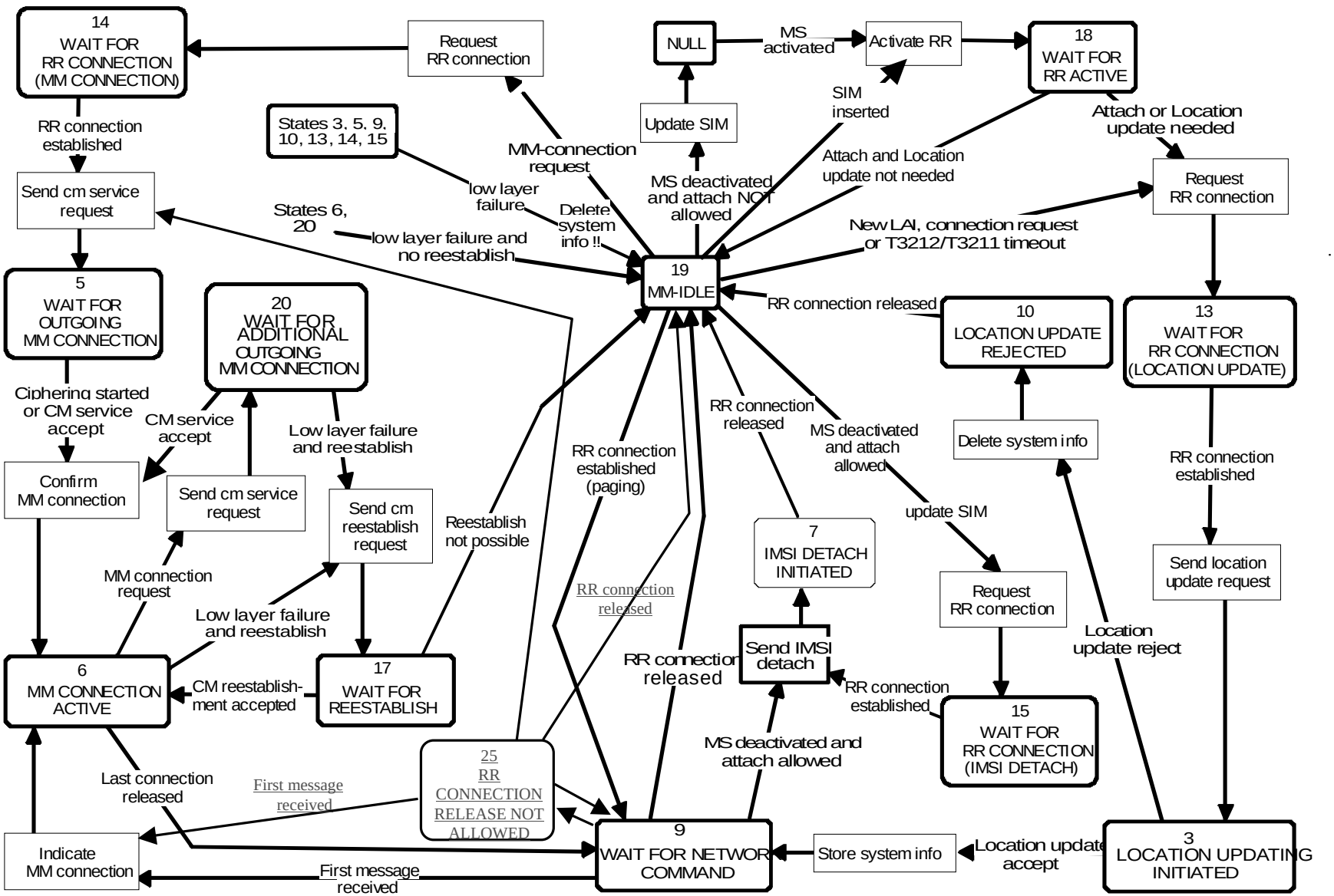
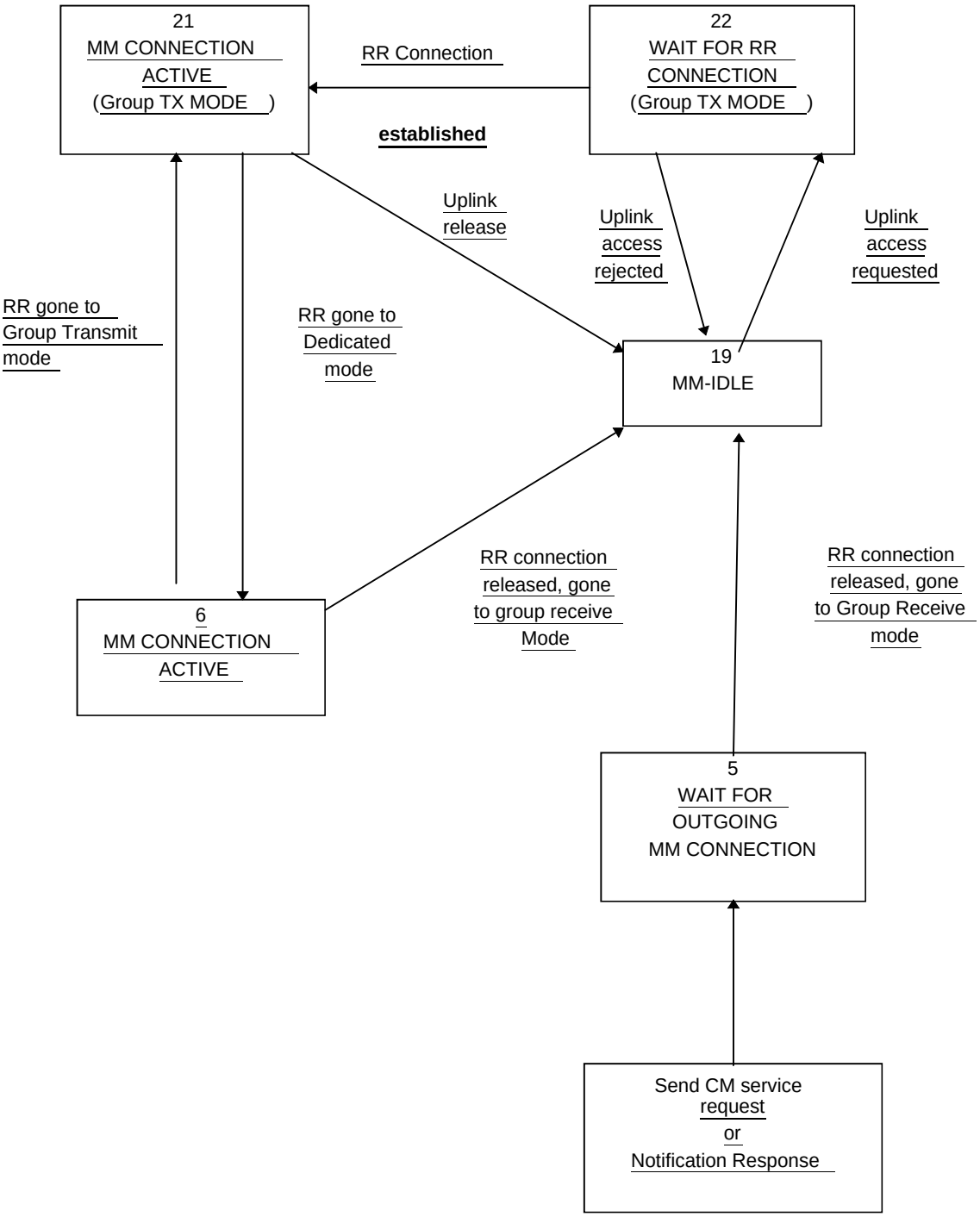


Figure 4.1a / GSM 04.08: Overview mobility management protocol / MS Side



Additions to Figure 4.1.a/GSM 04.08

13. WAIT FOR RR CONNECTION (LOCATION UPDATING)

    The MM sublayer has requested RR connection establishment for starting the location updating procedure.

14. WAIT FOR RR CONNECTION (MM CONNECTION)

    The MM sublayer has requested RR connection establishment for dedicated mode for starting the MM connection establishment.

15. WAIT FOR RR CONNECTION (IMSI DETACH)

    The MM sublayer has requested RR connection establishment for starting the IMSI detach procedure.

17. WAIT FOR REESTABLISH

A lower layer failure has occurred and re-establishment may be performed from the disturbed CM layer entities.

18. WAIT FOR RR ACTIVE

The MM sublayer has requested activation of the RR sublayer.

19. MM IDLE

There is no MM procedure running and no RR connection exists except that a local MM context may exist when the RR sublayer is in Group Receive mode. This is a compound state, and the actual behaviour of the mobile station to Connection Management requests is determined by the actual substate as described hereafter.

20. WAIT FOR ADDITIONAL OUTGOING MM CONNECTION.

The MM connection establishment for an additional MM connection has been started, and the MM awaits response from the network.

21. MM CONNECTION ACTIVE (GROUP TRANSMIT MODE)

(Only applicable for mobile stations supporting VGCS talking:) The MM sublayer has a RR connection on the VGCS channel to its peer entity on the network side. Only one MM connection is active.

22. WAIT FOR RR CONNECTION (GROUP TRANSMIT MODE)

(Only applicable for mobile stations supporting VGCS talking:) The MM sublayer has requested to perform an uplink access on the VGCS channel.

23. LOCATION UPDATING PENDING

(Only applicable for GPRS MS operation modes A and B; not shown in figure 4.1a) A location updating has been started using the combined GPRS routing area updating procedure.

24. IMSI DETACH PENDING

(Only applicable for GPRS MS operation modes A and B; not shown in figure 4.1a) An IMSI detach for non-GPRS services has been started using the combined GPRS detach procedure at not switching off.

25. RR CONNECTION RELEASE NOT ALLOWED

(Only applicable for mobile stations supporting RRLP procedures). All MM connections are released by their CM entities, but the RR connection is maintained by the network due to an ongoing RRLP procedure (see GSM ~~TS~~ 04.31 [23b]).

********** Next Modified Section **********

4.1.2.3 MM sublayer states on the network side

1. IDLE

The MM sublayer is not active except possibly when the RR sublayer is in Group Receive mode.

2. WAIT FOR RR CONNECTION

The MM sublayer has received a request for MM connection establishment from the CM layer. A RR connection to the mobile station is requested from the RR sublayer (i.e. paging is performed).

3. MM CONNECTION ACTIVE

The MM sublayer has a RR connection to a mobile station. One or more MM connections are active, or no MM connection is active but an RRLP procedure is ongoing.

4. IDENTIFICATION INITIATED

The identification procedure has been started by the network. The timer T3270 is running.

5. AUTHENTICATION INITIATED

The authentication procedure has been started by the network. The timer T3260 is running.

6. TMSI REALLOCATION INITIATED

The TMSI reallocation procedure has been started by the network. The timer T3250 is running.

7. SECURITY MODE INITIATED

In UMTS, the security mode setting procedure has been requested to the RR sublayer. In GSM, the cipher mode setting procedure has been requested to the RR sublayer.

8a. WAIT FOR MOBILE ORIGINATED MM CONNECTION

A CM SERVICE REQUEST message is received and processed, and the MM sublayer awaits the "opening message" of the MM connection.

8b. WAIT FOR NETWORK ORIGINATED MM CONNECTION

A CM SERVICE PROMPT message has been sent by the network and the MM sublayer awaits the "opening message" of the MM connection $(CCBS)$.

9. WAIT FOR REESTABLISHMENT

The RR connection to a mobile station with one or more active MM connection has been lost. The network awaits a possible re-establishment request from the mobile station.

10. WAIT OF A GROUP CALL

Only applicable in case for mobile station supporting VGCS talking. The MM sublayer has received a request for establishing a VGCS from the GCC sublayer. The request for establishing a VGCS channels is given to the RR sublayer.

11. GROUP CALL ACTIVE

Only applicable in case of mobile station supporting VGCS talking. A VGCS channel is established by the RR sublayer. An RR connection to the talking mobile station can be established by the RR sublayer on the VGCS channel. The MM sublayer is active but no sending of MM message between the network and the mobile station has occurred.

12. MM CONNECTION ACTIVE (GROUP CALL)

Only applicable in case of mobile station supporting VGCS talking. The MM sublayer has a RR connection to the talking mobile station on the VGCS channel. Only one MM connection is active.

13. WAIT FOR BROADCAST CALL

Only applicable in case of VBS. The MM sublayer has received a request for a VBS establishment from the BCC sublayer. The request for establishment of VBS channels is given to the RR sublayer.

14. BROADCAST CALL ACTIVE

Only applicable in case of VBS. A VBS channel is established by the RR sublayer. The MM sublayer is active but no explicit MM establishment between the Network and the mobile station has occurred.

********** Next Modified Section **********

4.5.1 MM connection establishment

4.5.1.1 MM connection establishment initiated by the mobile station

Upon request of a CM entity to establish an MM connection the MM sublayer first decides whether to accept, delay, or reject this request:

- An MM connection establishment may only be initiated by the mobile station when the following conditions are fulfilled:

  - Its update status is UPDATED.

  - The MM sublayer is in one of the states MM IDLE, RR CONNECTION RELEASE NOT ALLOWED or MM connection active but not in MM connection active (Group call).

  An exception from this general rule exists for emergency calls (see section 4.5.1.5). A further exception is defined in the following clause.

- If an MM specific procedure is running at the time the request from the CM sublayer is received, and the LOCATION UPDATING REQUEST message has been sent, the request will either be rejected or delayed, depending on implementation, until the MM specific procedure is finished and, provided that the network has not sent a "follow-on proceed" indication, the RR connection is released. If the LOCATION UPDATING REQUEST message has not been sent, the mobile station may include a "follow-on request" indicator in the message. The mobile station shall then delay the request until the MM specific procedure is completed, when it may be given the opportunity by the network to use the RR connection: see section 4.4.4.6.

In order to establish an MM connection, the mobile station proceeds as follows:

a) If no RR connection exists, the MM sublayer requests the RR sublayer to establish an RR connection and enters MM sublayer state WAIT FOR RR CONNECTION (MM CONNECTION). This request contains an establishment cause and a CM SERVICE REQUEST message. When the establishment of an RR connection is indicated by the RR sublayer (this indication implies that the CM SERVICE REQUEST message has been successfully transferred via the radio interface, see section 2.2), the MM sublayer of the mobile station starts timer T3230, gives an indication to the CM entity that requested the MM connection establishment, and enters MM sublayer state WAIT FOR OUTGOING MM CONNECTION.

b) If an RR connection is available, the MM sublayer of the mobile station sends a CM SERVICE REQUEST message to the network, starts timer T3230, stops and resets timer T3241, gives an indication to the CM entity that requested the MM connection establishment, and enters:

   - MM sublayer state WAIT FOR OUTGOING MM CONNECTION, if no MM connection is active;

   - MM sublayer state WAIT FOR ADDITIONAL OUTGOING MM CONNECTION, if at least one MM connection is active;

   - If an RR connection exists but the mobile station is in the state WAIT FOR NETWORK COMMAND then any requests from the CM layer that are received will either be rejected or delayed until this state is left.

c) Only applicable for mobile stations supporting VGCS talking:

If a mobile station which is in the MM sublayer state MM IDLE, service state RECEIVING GROUP CALL (NORMAL SERVICE), receives a request from the GCC sublayer to perform an uplink access, the MM sublayer requests the RR sublayer to perform an uplink access procedure and enters MM sublayer state WAIT FOR RR CONNECTION (GROUP TRANSMIT MODE).

When a successful uplink access is indicated by the RR sublayer, the MM sublayer of the mobile station gives an indication to the GCC sublayer and enters MM sublayer state MM CONNECTION ACTIVE (GROUP TRANSMIT MODE).

When an uplink access reject is indicated by the RR sublayer, the MM sublayer of the mobile station gives an indication to the GCC sublayer and enters the MM sublayer state MM IDLE, service state RECEIVING GROUP CALL (NORMAL SERVICE).

In the network, if an uplink access procedure is performed, the RR sublayer in the network provides an indication to the MM sublayer together with the mobile subscriber identity received in the TALKER INDICATION message. The network shall then enter the MM sublayer state MM CONNECTION ACTIVE (GROUP TRANSMIT MODE).

The CM SERVICE REQUEST message contains the

- mobile identity according to section 10.5.1.4;
- mobile station classmark 2;
- ciphering key sequence number; and
- CM service type identifying the requested type of transaction (e.g. mobile originating call establishment, emergency call establishment, short message service, supplementary service activation), location services)

A MS supporting eMLPP may optionally include a priority level in the CM SERVICE REQUEST message.
A collision may occur when a CM layer message is received by the mobile station in MM sublayer state WAIT FOR OUTGOING MM CONNECTION or in WAIT FOR ADDITIONAL OUTGOING MM CONNECTION. In this case the MM sublayer in the MS shall establish a new MM connection for the incoming CM message as specified in 4.5.1.3.
Upon receiving a CM SERVICE REQUEST message, the network shall analyse its content. The type of semantic analysis may depend on other on going MM connection(s). Depending on the type of request and the current status of the RR connection, the network may start any of the MM common procedures and RR procedures.
The network may initiate the classmark interrogation procedure, for example, to obtain further information on the mobile station's encryption capabilities.
The identification procedure (see section 4.3.3) may be invoked for instance if a TMSI provided by the mobile station is not recognized.
The network may invoke the authentication procedure (see section 4.3.2) depending on the CM service type.
The network decides also if the ciphering mode setting procedure shall be invoked (see section 3.4.7).

NOTE: If the CM_SERVICE_REQUEST message contains a priority level the network may use this to perform queuing and pre-emption as defined in GSM 03.67.

An indication from the RR sublayer that the ciphering mode setting procedure is completed, or reception of a CM SERVICE ACCEPT message, shall be treated as a service acceptance indication by the mobile station. The MM connection establishment is completed, timer T3230 shall be stopped, the CM entity that requested the MM connection shall be informed, and MM sublayer state MM CONNECTION ACTIVE is entered. The MM connection is considered to be active.
If the service request cannot be accepted, the network returns a CM SERVICE REJECT message to the mobile station.
The reject cause information element (see 10.5.3.6 and Annex G) indicates the reason for rejection. The following cause values may apply:

#4 : IMSI unknown in VLR

#6 : Illegal ME

#17 : Network failure

#22 : Congestion

#32 : Service option not supported

#33 : Requested service option not subscribed

#34 : Service option temporarily out of order

If no other MM connection is active, the network may start the RR connection release (see section 3.5) when the CM SERVICE REJECT message is sent.
If a CM SERVICE REJECT message is received by the mobile station, timer T3230 shall be stopped, the requesting CM sublayer entity informed. Then the mobile station shall proceed as follows:

- If the cause value is not #4 or #6 the MM sublayer returns to the previous state (the state where the request was received). Other MM connections shall not be affected by the CM SERVICE REJECT message.

- If cause value #4 is received, the mobile station aborts any MM connection, deletes any TMSI, LAI and ciphering key sequence number in the SIM, changes the update status to NOT UPDATED (and stores it in the SIM according to section 4.1.2.2), and enters the MM sublayer state WAIT FOR NETWORK COMMAND. If subsequently the RR connection is released or aborted, this will force the mobile station to initiate a normal location updating). Whether the CM request shall be memorized during the location updating procedure, is a choice of implementation.

- If cause value #6 is received, the mobile station aborts any MM connection, deletes any TMSI, LAI and ciphering key sequence number in the SIM, changes the update status to ROAMING NOT ALLOWED (and stores it in the SIM according to section 4.1.2.2), and enters the MM sublayer state WAIT FOR NETWORK COMMAND. The mobile station shall consider the SIM as invalid until switch-off or the SIM is removed.

********** Next Modified Section **********

4.5.1.3.1 Mobile Terminating CM Activity

When a CM sublayer entity in the network requests the MM sublayer to establish a MM connection, the MM sublayer will request the establishment of an RR connection to the RR sublayer if no RR connection to the desired mobile station exists. The MM sublayer is informed when the paging procedure is finished (see section 3.3.2) and the mobile station shall enter the MM state WAIT FOR NETWORK COMMAND.
When an RR connection is established (or if it already exists at the time the request is received), the MM sublayer may initiate any of the MM common procedures (except IMSI detach); it may request the RR sublayer to perform the RR classmark interrogation procedure, and/or the ciphering mode setting procedure.
When all MM and RR procedures are successfully completed which the network considers necessary, the MM sublayer will inform the requesting mobile terminating CM sublayer entity on the success of the MM connection establishment.
If an RR connection already exists and no MM specific procedure is running, the network may also establish a new mobile terminating MM connection by sending a CM message with a new PD/TI combination.
If the MS receives the first CM message in the MM states WAIT FOR NETWORK COMMAND or RR CONNECTION RELEASE NOT ALLOWED, the MS shall stop and reset the timers T3240 and T3241 and shall enter the MM state MM CONNECTION ACTIVE.
If the establishment of an RR connection is unsuccessful, or if any of the MM common procedures or the ciphering mode setting fail, this is indicated to the CM layer with an appropriate error cause.
If an RR connection used for a MM specific procedure exists to the mobile station, the CM request may be rejected or delayed depending on implementation. When the MM specific procedure has been completed, the network may use the same RR connection for the delayed CM request.
Only applicable in case of VGCS talking:
In the MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) the mobile station is in RR Group transmit mode. There shall be only one MM connection active.
When in MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) state, the MM sublayer in the network shall reject the request for the establishment of another MM connection by any CM layer.
If the RR sublayer in the network indicates a request to perform a transfer of the mobile station from RR connected mode to RR Group transmit mode which will result in a transition from MM CONNECTION ACTIVE state to MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) state in the MM sublayer, the MM sublayer shall not allow the transition if more than one MM connection is active with the mobile station.

4.5.1.3.2 Mobile Originating CM Activity $(CCBS)$

When a CM sublayer entity in the network requests the MM sublayer to establish a MM connection, the MM sublayer will request the establishment of an RR connection to the RR sublayer if no RR connection to the desired mobile station exists. The MM sublayer is informed when the paging procedure is finished (see section 3.3.2) and the mobile station shall enter the MM state WAIT FOR NETWORK COMMAND.
When an RR connection is established (or if it already exists at the time the request is received), the MM sublayer may initiate any of the MM common procedures (except IMSI detach), it may request the RR sublayer to perform the RR classmark interrogation procedure and/or the ciphering mode setting procedure.
The network should use the information contained in *the Mobile Station Classmark Type* 2 IE on the mobile station's support for "Network Initiated MO CM Connection Request" to determine whether to:

not start this procedure (eg if an RR connection already exists), or,

to continue this procedure, or,

to release the newly established RR connection.

In the case of a "Network Initiated MO CM Connection Request" the network shall use the established RR connection to send a CM SERVICE PROMPT message to the mobile station.
If the mobile station supports "Network Initiated MO CM Connection Request", the MM sublayer of the MS gives an indication to the CM entity identified by the CM SERVICE PROMPT message and enters the MM sublayer state PROCESS CM SERVICE PROMPT. In the state PROCESS CM SERVICE PROMPT the MM sublayer waits for either the rejection or confirmation of the recall by the identified CM entity. Any other requests from the CM entities shall either be rejected or delayed until this state is left.
When the identified CM entity informs the MM sublayer, that it has send the first CM message in order to start the CM recall procedure the MM sublayer enters the state MM CONNECTION ACTIVE.
If the identified CM entity indicates that it will not perform the CM recall procedure and all MM connections are released by their CM entities the MS shall proceed according to section. 4.5.3.1. ~~the MM sublayer starts timer T3240 and enter the state WAIT FOR NETWORK COMMAND, expecting the release of the RR connection.~~

If the CM SERVICE PROMPT message is received by the MS in MM sublayer states WAIT FOR OUTGOING MM CONNECTION or in WAIT FOR ADDITIONAL OUTGOING MM CONNECTION then the mobile station shall send an MM STATUS message with cause ” Message not compatible with protocol state”.
A mobile that does not support “Network Initiated MO CM Connection Request” shall return an MM STATUS message with cause #97 “message type non-existent or not implemented” to the network.
If the mobile station supports “Network Initiated MO CM Connection Request” but the identified CM entity in the mobile station does not provide the associated support, then the mobile station shall send an MM STATUS message with cause “Service option not supported”. In the case of a temporary CM problem (eg lack of transaction identifiers) then the mobile station shall send an MM STATUS message with cause “Service option temporarily out of order”.
If an RR connection already exists and no MM specific procedure is running, the network may use it to send the CM SERVICE PROMPT message.
If the establishment of an RR connection is unsuccessful, or if any of the MM common procedures or the ciphering mode setting fail, this is indicated to the CM layer in the network with an appropriate error cause.
If an RR connection used for a MM specific procedure exists to the mobile station, the “Network Initiated MO CM Connection Request” may be rejected or delayed depending on implementation. When the MM specific procedure has been completed, the network may use the same RR connection for the delayed “Network Initiated MO CM Connection Request”.

********** Next Modified Section **********

4.5.3 MM connection release

An established MM connection can be released by the local CM entity. The release of the CM connection will then be done locally in the MM sublayer, i.e. no MM message are sent over the radio interface for this purpose.

4.5.3.1 Release of associated RR connection

If all MM connections are released by their CM entities, and no RRLP procedure (see GSM~~TS~~ 04.31 [23b]) is ongoing, the mobile station shall set timer T3240 and enter the state WAIT FOR NETWORK COMMAND, expecting the release of the RR connection.

If all MM connections are released by their CM entities and an RRLP procedure is ongoing, the MS shall start the timer T3241 and enter the state RR CONNECTION RELEASE NOT ALLOWED.

If the MS is expecting the release of the RR connection in MM state WAIT FOR NETWORK COMMAND and an RRLP procedure is started, the MS shall stop the timer T3240, start the timer T3241 and enter the state RR CONNECTION RELEASE NOT ALLOWED.

If the MS is in MM state RR CONNECTION RELEASE NOT ALLOWED and the ongoing RRLP procedure is finished, the MS shall stop the timer T3241, reset and start the timer T3240 and shall enter the state WAIT FOR NETWORK COMMAND.

In the network, if the last MM connection is released by its user, the MM sublayer may decide to release the RR connection by requesting the RR sublayer according to section 3.5. The RR connection may be maintained by the network, e.g. in order to establish another MM connection.

If the RR connection is not released within a given time controlled by the timer T3240 or T3241, the mobile station shall abort the RR connection. In both cases, either after a RR connection release triggered from the network side or after a RR connection abort requested by the MS-side, the MS shall return to MM IDLE state; the service state depending upon the current update status as specified in section 4.2.3.

********** Next Modified Section **********

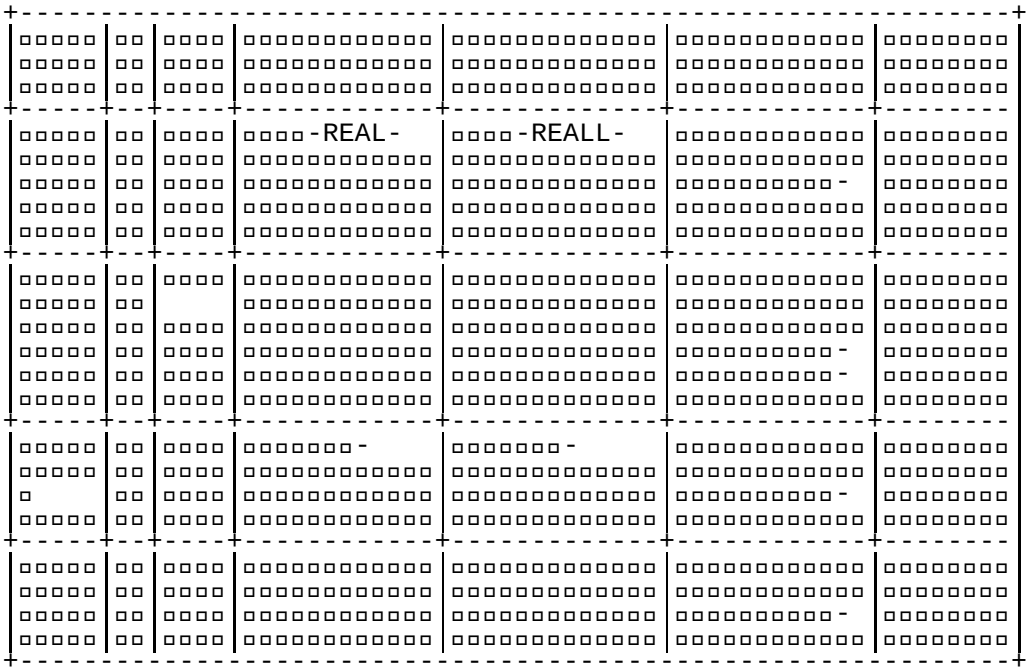
11.2 Timers of mobility management

Table 11.1/GSM 04.08: Mobility management timers - MS-side

			-LOC_UPD_REQ	- LOC_UPD_ACC	
				- LOC_UPD_REJ	
				- AUTH_REJ	
				- Lower layer	
			-LOC_UPD_REJ	- Time out	
				- cell change	
				- request for	
			-lower layer		
				- change of	
			after		
			-termination	-initiation	
			ng		
			-location up	- expiry	
				- change of	
			-IMSI DETACH	- release	
				blayer	
			-CM SERV REQ	- Cipher mode	
				- CM SERV REJ	
				- CM SERV ACC	
					abort the
					RR connec-
					tion

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

Table 11.2/GSM 04.08: Mobility management timers - network-side



NOTE 2: The value of this timer is not specified by this recommendation.

********** **Next Modified Section** **********

11.2.1 Timer T3240 and Timer T3241

Timer T3240 is started in the mobile station when:

- the mobile station receives a LOCATION UPDATING ACCEPT message completing a location updating procedure in the cases specified in section 4.4.4.6 and 4.4.4.8;

- the mobile station receives a LOCATION UPDATING REJECT message in the cases specified in section 4.4.4.7;

- the mobile station has sent a CM SERVICE ABORT message as specified in section 4.5.1.7;

- the mobile station has released or aborted all MM connections in the cases specified in 4.3.2.5, 4.3.5.2, 4.5.1.1, and 4.5.3.1.

Timer T3240 is stopped, reset, and started again at receipt of an MM message.
Timer T3240 is stopped and reset (but not started) at receipt of a CM message that initiates establishment of an CM connection (an appropriate SETUP, REGISTER, or CP-DATA message as defined in GSM 04.08, GSM 04.10 or GSM 04.11).
Timer T3241 is started in the mobile station when entering MM state RR CONNECTION RELEASE NOT ALLOWED.
Timer T3241 is stopped and reset (but not started) when the MM state RR CONNECTION RELEASE NOT ALLOWED is left.
If timer T3241 expires, the MS shall abort the RR connection and enter the MM state MM IDLE.

CR-Form-v3

CHANGE REQUEST

⌘ **24.008** **CR** 395 ⌘ rev **r3** ⌘ Current version: **3.7.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network **X**

Title:	⌘	Modification to MS's MM states to enable LCS signalling on RR layer
Source:	⌘	Siemens AG, Nokia
Work item code:	⌘	LCS
Date:	⌘	14.05.01
Category:	⌘	**A**
Release:	⌘	R99

Use one of the following categories:
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REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	As the MM layer is currently not aware of any ongoing RRLP procedure, MM will abort the RR connection if the last CM connection is released and the MM timer T3240 expires(10 sec.). This will happen during a MT-LR/NI-LR LCS positioning procedure, were the RRLP procedure may take longer than 10 seconds. In order to avoid the MS trigger abortion of the RR connection during an RRLP procedure, it is proposed to introduce a new MM state RR CONNECTION RELEASE NOT ALLOWED which is entered if no CM connections are active, but an RRLP procedure is ongoing. This state is supervised by a new introduced MM timer T3241 which ensures, that the MS does not remains in this state forever.
Summary of change:	⌘	Introduction of the new MM state RR CONNECTION RELEASE NOT ALLOWED and the corresponding MM timer T3241.
Consequences if not approved:	⌘	A ongoing RRLP procedure could not be finalised correctly due to the MS initiated abortion of the RR connection, which leads to the risk that certain LCS positioning methods will not work.

Clauses affected:	⌘	2; 4.1.2.1.1; 4.1.2.3; 4.5.1.1; 4.5.1.3.1; 4.5.3.1; 11.2; 11.2.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

********** First Modified Section **********

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] 3GPP TS 01.02: "Digital cellular telecommunications system (Phase 2+); General description of a GSM Public Land Mobile Network (PLMN)".

[2] 3GPP TS 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2a] 3GPP TS 21.905 "3G Vocabulary for 3GPP Specifications"

[3] 3GPP TS 22.002: "Digital cellular telecommunications system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[4] 3GPP TS 22.003: "Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[5] 3GPP TS 02.09: "Digital cellular telecommunications system (Phase 2+); Security aspects".

[6] 3GPP TS 22.011: "Digital cellular telecommunications system (Phase 2+); Service accessibility".

[7] 3GPP TS 02.17: "Digital cellular telecommunications system (Phase 2+); Subscriber identity modules Functional characteristics".

[8] 3GPP TS 02.40: "Digital cellular telecommunications system (Phase 2+); Procedures for call progress indications".

[9] 3GPP TS 03.01: "Digital cellular telecommunications system (Phase 2+); Network functions".

[10] 3GPP TS 23.003: "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".

[11] 3GPP TS 03.13: "Digital cellular telecommunications system (Phase 2+); Discontinuous Reception (DRX) in the GSM system".

[12] 3GPP TS 23.014: "Digital cellular telecommunications system (Phase 2+); Support of Dual Tone Multi-Frequency signalling (DTMF) via the GSM system".

[12a] 3GPP TS 23.071: "Digital cellular telecommunications system (Phase 2+); Location Services; Functional description – Stage 2".

[13] 3GPP TS 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".

[14] 3GPP TS 23.122: "NAS Functions related to Mobile Station (MS) in idle mode".

[15] 3GPP TS 24.002: "GSM-UMTS Public Land Mobile Network (PLMN) access reference configuration".

[16] 3GPP TS 04.03: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface Channel structures and access capabilities".

[17] 3GPP TS 04.04: "Digital cellular telecommunications system (Phase 2+); layer 1 General requirements".

[18] 3GPP TS 04.05: "Digital cellular telecommunications system (Phase 2+); Data Link (DL) layer General aspects".

[19] 3GPP TS 04.06: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".

[20] 3GPP TS 24.007: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3 General aspects".

[21] 3GPP TS 24.010: "Digital cellular telecommunications system ; Mobile radio interface layer 3 Supplementary services specification General aspects".

[22] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[23] 3GPP TS 24.012: "Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".

[23a] 3GPP TS 24.071: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 location services specification.

[23b] 3GPP TS 04.31 "Digital cellular telecommunication system (Phse 2+);Location Services;Mobile Station (MS) – Serving Mobile Location Centre (SMLC); Radio Resource LCS Protocol (RRLP)".

[23c] 3GPP TS 25.331 : "3rd Generation Partnership Project;Technical Specification Group Radio Access Network; RRC Protocol Specification"

[24] 3GPP TS 24.080: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 supplementary services specification Formats and coding".

[25] 3GPP TS 24.081: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 3".

[26] 3GPP TS 24.082: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 3".

[27] 3GPP TS 24.083: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3".

[28] 3GPP TS 24.084: "Digital cellular telecommunications system (Phase 2+); MultiParty (MPTY) supplementary services - Stage 3".

[29] 3GPP TS 24.085: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 3".

[30] 3GPP TS 24.086: "Digital cellular telecommunications system (Phase 2+); Advice of Charge (AoC) supplementary services - Stage 3".

[31] 3GPP TS 24.088: "Call Barring (CB) supplementary services - Stage 3".

[32] 3GPP TS 05.02: "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path".

[33] 3GPP TS 05.05: "Digital cellular telecommunications system (Phase 2+); Radio transmission and reception".

[34] 3GPP TS 05.08: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".

[35] 3GPP TS 05.10: "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronization".

[36] 3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[37] 3GPP TS 29.002: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[38] 3GPP TS 29.007: "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[39] GSM 11.10: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformity specification".

[40] GSM 11.21: "Digital cellular telecommunications system (Phase 2); The GSM Base Station System (BSS) equipment specification".

[41] ISO/IEC 646 (1991): "Information technology - ISO 7-bit coded character set for information interchange".

[42] ISO/IEC 6429: "Information technology - Control functions for coded character sets".

[43] ISO 8348 (1987): "Information processing systems - Data communications - Network service definition".

[44] ITU-T Recommendation E.163: "Numbering plan for the international telephone service".

[45] ITU-T Recommendation E.164: "Numbering plan for the ISDN era".

[46] ITU-T Recommendation E.212: "Identification plan for land mobile stations".

[47] ITU-T Recommendation F.69 (1993): "Plan for telex destination codes".

[48] ITU-T Recommendation I.330: "ISDN numbering and addressing principles".

[49] ITU-T Recommendation I.440 (1989): "ISDN user-network interface data link layer - General aspects".

[50] ITU-T Recommendation I.450 (1989): "ISDN user-network interface layer 3 General aspects".

[51] ITU-T Recommendation I.500 (1993): "General structure of the ISDN interworking recommendations".

[52] ITU-T Recommendation T.50: "International Alphabet No. 5".

[53] ITU Recommendation Q.931: ISDN user-network interface layer 3 specification for basic control".

[54] ITU-T Recommendation V.21: "300 bits per second duplex modem standardized for use in the general switched telephone network".

[55] ITU-T Recommendation V.22: "1200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[56] ITU-T Recommendation V.22bis: "2400 bits per second duplex modem using the frequency division technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[57] ITU-T Recommendation V.23: "600/1200-baud modem standardized for use in the general switched telephone network".

[58] ITU-T Recommendation V.26ter: "2400 bits per second duplex modem using the echo cancellation technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[59] ITU-T Recommendation V.32: "A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits".

[60] ITU-T Recommendation V.110: "Support of data terminal equipments (DTEs) with V-Series interfaces by an integrated services digital network".

[61] ITU-T Recommendation V.120: "Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing".

[62] ITU-T Recommendation X.21: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for synchronous operation on public data networks".

[63] ITU-T Recommendation X.25: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".

[64] ITU-T Recommendation X.28: "DTE/DCE interface for a start-stop mode data terminal equipment accessing the packet assembly/disassembly facility (PAD) in a public data network situated in the same country".

[65] ITU-T Recommendation X.30: "Support of X.21, X.21 bis and X.20 bis based data terminal equipments (DTEs) by an integrated services digital network (ISDN)".

[66] ITU-T Recommendation X.31: "Support of packet mode terminal equipment by an ISDN".

[67] ITU-T Recommendation X.32: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and accessing a packet switched public data network through a public switched telephone network or an integrated services digital network or a circuit switched public data network".

[68] ITU-T Recommendation X.75 (1988): "Packet-switched signalling system between public networks providing data transmission services".

[69] ITU-T Recommendation X.121: "International numbering plan for public data networks".

[70] ETS 300 102-1: "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[71] ETS 300 102-2: "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[72] ISO/IEC10646: "Universal Multiple-Octet Coded Character Set (UCS)"; UCS2, 16 bit coding.

[73] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service Description; Stage 1".

[74] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".

[75] 3GPP TS 03.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2".

[76] 3GPP TS 04.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station - Base Station System (MS-BSS) interface; Radio Link Control and Medium Access Control (RLC/MAC) layer specification".

[77] IETF RFC 1034: "Domain names - Concepts and Facilities " (STD 7).

[78] 3GPP TS 04.65: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Subnetwork Dependent Convergence Protocol (SNDCP)".

[79] ITU Recommendation I.460: "Multiplexing, rate adaption and support of existing services".

[80] 3GPP TS 26.111: "Codec for Circuit Switched Multimedia Telephony Service; Modifications to H.324"

[81] 3GPP TS 23.107: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; QoS Concept and Architecture"

[82] 3GPP TS 03.22: " Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode and group receive mode".

********** Next Modified Section **********

4.1.2.1.1 Main states

0 NULL

The mobile station is inactive (e.g. power down). Important parameters are stored. Only manual action by the user may transfer the MM sublayer to another state.

3 LOCATION UPDATING INITIATED

A location updating procedure has been started and the MM awaits a response from the network. The timer T3210 is running.

5 WAIT FOR OUTGOING MM CONNECTION

The MM connection establishment has been started, and the MM awaits a response from the network. The timer T3230 is running.

6 MM CONNECTION ACTIVE

The MM sublayer has a RR connection to its peer entity on the network side. One or more MM connections are active.

7 IMSI DETACH INITIATED

The IMSI detach procedure has been started. The timer T3220 is running.

8 PROCESS CM SERVICE PROMPT

The MM sublayer has a RR connection to its peer entity on the network side. The Mobile Station has received a CM SERVICE PROMPT message but has not yet responded $(CCBS)$.

9 WAIT FOR NETWORK COMMAND

The MM sublayer has a RR connection to its peer entity in the network, but no MM connection is established. The mobile station is passive, awaiting further commands from the network. The timer T3240 may be running.

10 LOCATION UPDATE REJECTED

A location updating procedure has been rejected and RR connection release is awaited. The timer T3240 is running.

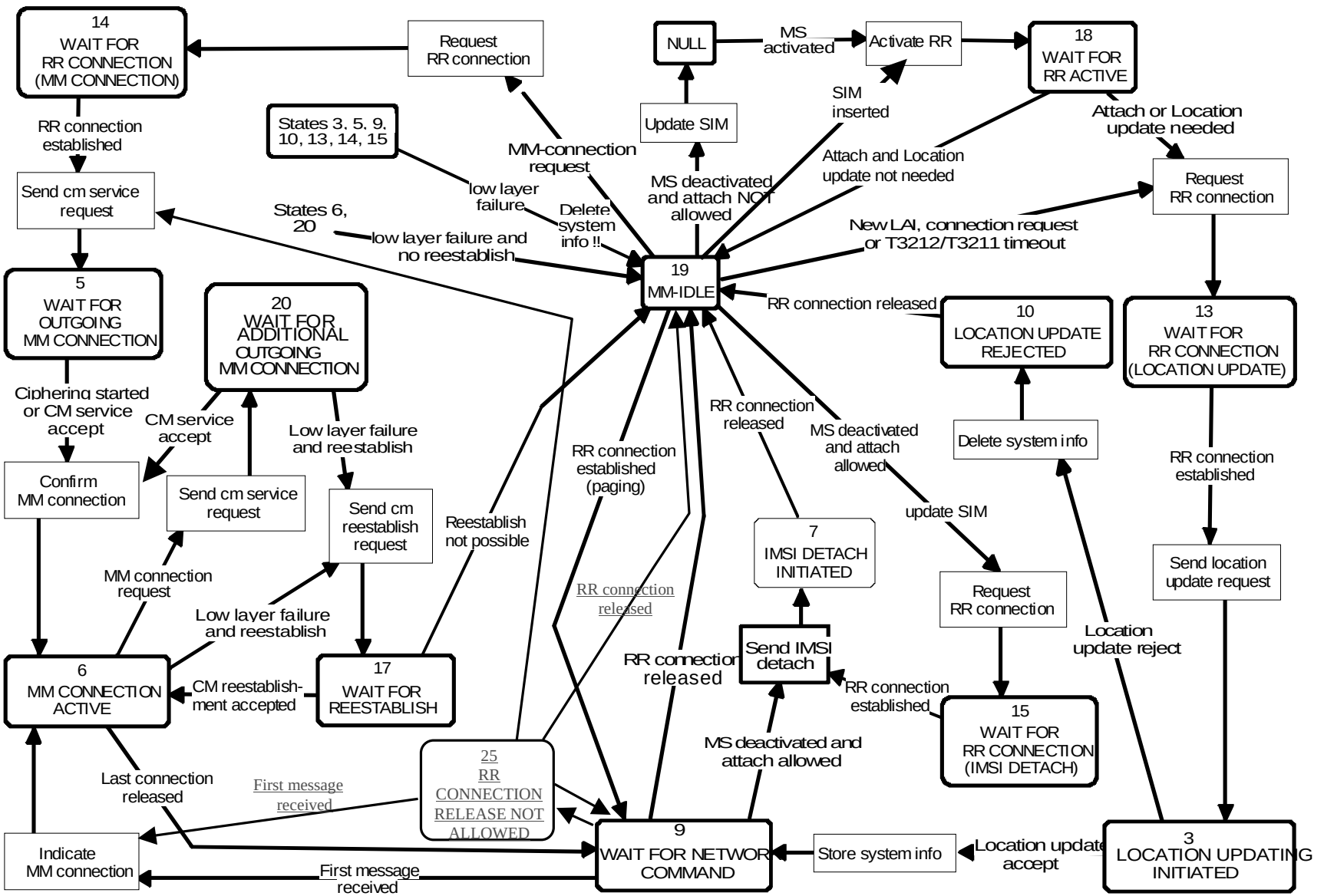
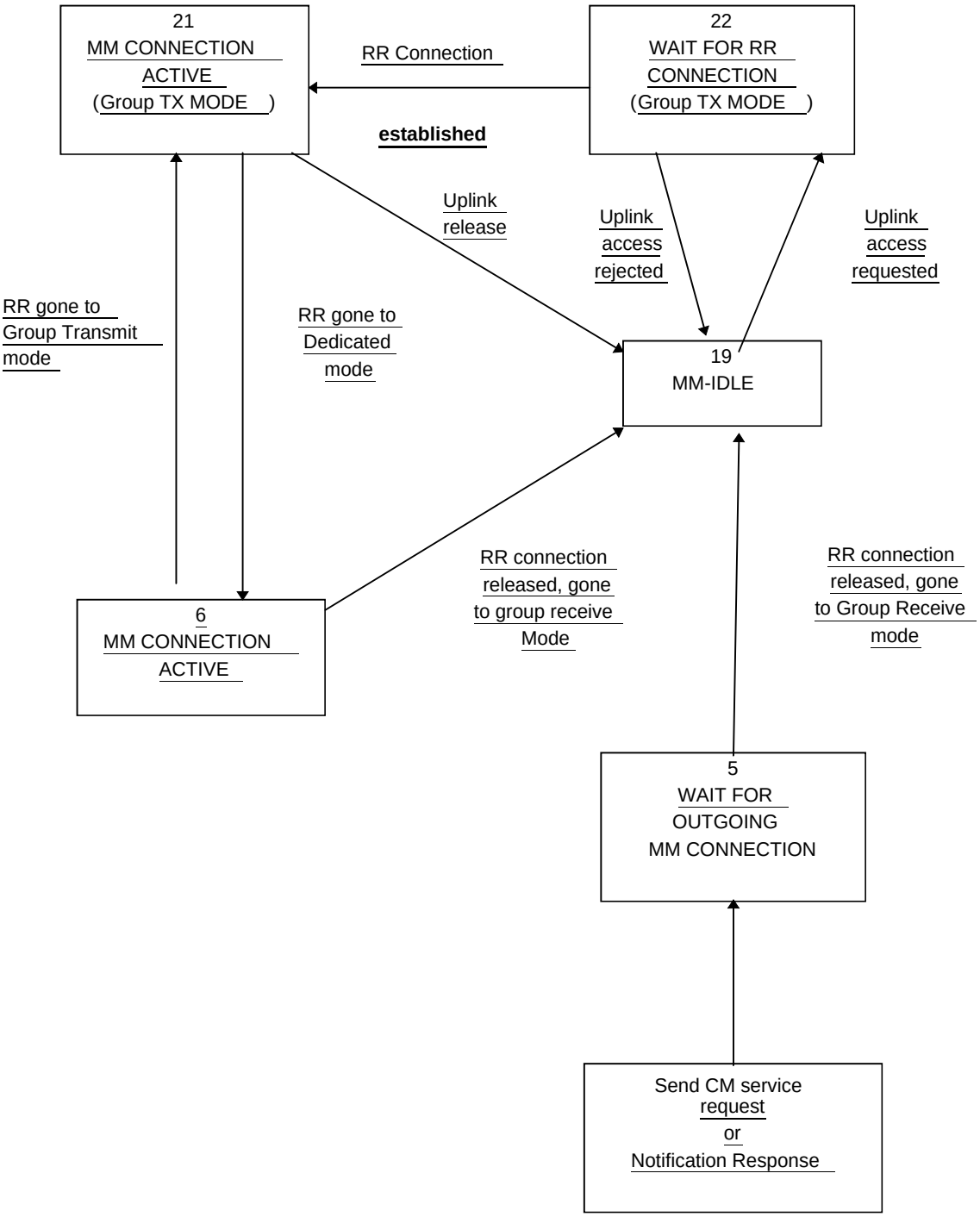


Figure 4.1a / GSM 24.008: Overview mobility management protocol / MS Side



Additions to Figure 4.1.a/GSM 24.008

13. WAIT FOR RR CONNECTION (LOCATION UPDATING)

    The MM sublayer has requested RR connection establishment for starting the location updating procedure.

14. WAIT FOR RR CONNECTION (MM CONNECTION)

    The MM sublayer has requested RR connection establishment for dedicated mode for starting the MM connection establishment.

15. WAIT FOR RR CONNECTION (IMSI DETACH)

    The MM sublayer has requested RR connection establishment for starting the IMSI detach procedure.

17. WAIT FOR REESTABLISH

A lower layer failure has occurred and re-establishment may be performed from the disturbed CM layer entities.

18. WAIT FOR RR ACTIVE

The MM sublayer has requested activation of the RR sublayer.

19. MM IDLE

There is no MM procedure running and no RR connection exists except that a local MM context may exist when the RR sublayer is in Group Receive mode. This is a compound state, and the actual behaviour of the mobile station to Connection Management requests is determined by the actual substate as described hereafter.

20. WAIT FOR ADDITIONAL OUTGOING MM CONNECTION.

The MM connection establishment for an additional MM connection has been started, and the MM awaits response from the network.

21. MM CONNECTION ACTIVE (GROUP TRANSMIT MODE)

(Only applicable for mobile stations supporting VGCS talking:) The MM sublayer has a RR connection on the VGCS channel to its peer entity on the network side. Only one MM connection is active.

22. WAIT FOR RR CONNECTION (GROUP TRANSMIT MODE)

(Only applicable for mobile stations supporting VGCS talking:) The MM sublayer has requested to perform an uplink access on the VGCS channel.

23. LOCATION UPDATING PENDING

(Only applicable for GPRS MS operation modes A and B; not shown in figure 4.1a) A location updating has been started using the combined GPRS routing area updating procedure.

24. IMSI DETACH PENDING

(Only applicable for GPRS MS operation modes A and B; not shown in figure 4.1a) An IMSI detach for non-GPRS services has been started using the combined GPRS detach procedure at not switching off.

25. RR CONNECTION RELEASE NOT ALLOWED

(Only applicable for mobile stations supporting RRLP procedures (see 3GPP TS 04.31 [23b]) or LCS procedures over RRC (see 3GPP TS 25.331 [23c])). All MM connections are released by their CM entities, but the RR connection is maintained by the network due to an ongoing RRLP procedure or LCS procedure over RRC.

********** Next Modified Section **********

4.1.2.3 MM sublayer states on the network side

1. IDLE

The MM sublayer is not active except possibly when the RR sublayer is in Group Receive mode.

2. WAIT FOR RR CONNECTION

The MM sublayer has received a request for MM connection establishment from the CM layer. A RR connection to the mobile station is requested from the RR sublayer (i.e. paging is performed).

3. MM CONNECTION ACTIVE

The MM sublayer has a RR connection to a mobile station. One or more MM connections are active, or no MM connection is active but an RRLP procedure or LCS procedure over RRC is ongoing.

4. IDENTIFICATION INITIATED

The identification procedure has been started by the network. The timer T3270 is running.

5. AUTHENTICATION INITIATED

The authentication procedure has been started by the network. The timer T3260 is running.

6. TMSI REALLOCATION INITIATED

The TMSI reallocation procedure has been started by the network. The timer T3250 is running.

7. SECURITY MODE INITIATED

In UMTS, the security mode setting procedure has been requested to the RR sublayer. In GSM, the cipher mode setting procedure has been requested to the RR sublayer.

8a. WAIT FOR MOBILE ORIGINATED MM CONNECTION

A CM SERVICE REQUEST message is received and processed, and the MM sublayer awaits the "opening message" of the MM connection.

8b. WAIT FOR NETWORK ORIGINATED MM CONNECTION

A CM SERVICE PROMPT message has been sent by the network and the MM sublayer awaits the "opening message" of the MM connection $(CCBS)$.

9. WAIT FOR REESTABLISHMENT

The RR connection to a mobile station with one or more active MM connection has been lost. The network awaits a possible re-establishment request from the mobile station.

10. WAIT OF A GROUP CALL

Only applicable in case for mobile station supporting VGCS talking. The MM sublayer has received a request for establishing a VGCS from the GCC sublayer. The request for establishing a VGCS channels is given to the RR sublayer.

11. GROUP CALL ACTIVE

Only applicable in case of mobile station supporting VGCS talking. A VGCS channel is established by the RR sublayer. An RR connection to the talking mobile station can be established by the RR sublayer on the VGCS channel. The MM sublayer is active but no sending of MM message between the network and the mobile station has occurred.

12. MM CONNECTION ACTIVE (GROUP CALL)

Only applicable in case of mobile station supporting VGCS talking. The MM sublayer has a RR connection to the talking mobile station on the VGCS channel. Only one MM connection is active.

13. WAIT FOR BROADCAST CALL

Only applicable in case of VBS. The MM sublayer has received a request for a VBS establishment from the BCC sublayer. The request for establishment of VBS channels is given to the RR sublayer.

14. BROADCAST CALL ACTIVE

Only applicable in case of VBS. A VBS channel is established by the RR sublayer. The MM sublayer is active but no explicit MM establishment between the Network and the mobile station has occurred.

********** Next Modified Section **********

4.5.1 MM connection establishment

4.5.1.1 MM connection establishment initiated by the mobile station

Upon request of a CM entity to establish an MM connection the MM sublayer first decides whether to accept, delay, or reject this request:

- An MM connection establishment may only be initiated by the mobile station when the following conditions are fulfilled:

  - Its update status is UPDATED.

  - The MM sublayer is in one of the states MM IDLE, RR CONNECTION RELEASE NOT ALLOWED or MM connection active but not in MM connection active (Group call).

  An exception from this general rule exists for emergency calls (see section 4.5.1.5). A further exception is defined in the following clause.

- If an MM specific procedure is running at the time the request from the CM sublayer is received, and the LOCATION UPDATING REQUEST message has been sent, the request will either be rejected or delayed, depending on implementation, until the MM specific procedure is finished and, provided that the network has not sent a "follow-on proceed" indication, the RR connection is released. If the LOCATION UPDATING REQUEST message has not been sent, the mobile station may include a "follow-on request" indicator in the message. The mobile station shall then delay the request until the MM specific procedure is completed, when it may be given the opportunity by the network to use the RR connection: see section 4.4.4.6.

In order to establish an MM connection, the mobile station proceeds as follows:

a) If no RR connection exists, the MM sublayer requests the RR sublayer to establish an RR connection and enters MM sublayer state WAIT FOR RR CONNECTION (MM CONNECTION). This request contains an establishment cause and a CM SERVICE REQUEST message. When the establishment of an RR connection is indicated by the RR sublayer (this indication implies that the CM SERVICE REQUEST message has been successfully transferred via the radio interface, see section 2.2), the MM sublayer of the mobile station starts timer T3230, gives an indication to the CM entity that requested the MM connection establishment, and enters MM sublayer state WAIT FOR OUTGOING MM CONNECTION.

b) If an RR connection is available, the MM sublayer of the mobile station sends a CM SERVICE REQUEST message to the network, starts timer T3230, stops and resets timer T3241, gives an indication to the CM entity that requested the MM connection establishment, and enters:

   - MM sublayer state WAIT FOR OUTGOING MM CONNECTION, if no MM connection is active;

   - MM sublayer state WAIT FOR ADDITIONAL OUTGOING MM CONNECTION, if at least one MM connection is active;

   - If an RR connection exists but the mobile station is in the state WAIT FOR NETWORK COMMAND then any requests from the CM layer that are received will either be rejected or delayed until this state is left.

c) Only applicable for mobile stations supporting VGCS talking:

If a mobile station which is in the MM sublayer state MM IDLE, service state RECEIVING GROUP CALL (NORMAL SERVICE), receives a request from the GCC sublayer to perform an uplink access, the MM sublayer requests the RR sublayer to perform an uplink access procedure and enters MM sublayer state WAIT FOR RR CONNECTION (GROUP TRANSMIT MODE).

When a successful uplink access is indicated by the RR sublayer, the MM sublayer of the mobile station gives an indication to the GCC sublayer and enters MM sublayer state MM CONNECTION ACTIVE (GROUP TRANSMIT MODE).

When an uplink access reject is indicated by the RR sublayer, the MM sublayer of the mobile station gives an indication to the GCC sublayer and enters the MM sublayer state MM IDLE, service state RECEIVING GROUP CALL (NORMAL SERVICE).

In the network, if an uplink access procedure is performed, the RR sublayer in the network provides an indication to the MM sublayer together with the mobile subscriber identity received in the TALKER INDICATION message. The network shall then enter the MM sublayer state MM CONNECTION ACTIVE (GROUP TRANSMIT MODE).

The CM SERVICE REQUEST message contains the

- mobile identity according to section 10.5.1.4;
- mobile station classmark 2;
- ciphering key sequence number; and
- CM service type identifying the requested type of transaction (e.g. mobile originating call establishment, emergency call establishment, short message service, supplementary service activation), location services)

A MS supporting eMLPP may optionally include a priority level in the CM SERVICE REQUEST message.
A collision may occur when a CM layer message is received by the mobile station in MM sublayer state WAIT FOR OUTGOING MM CONNECTION or in WAIT FOR ADDITIONAL OUTGOING MM CONNECTION. In this case the MM sublayer in the MS shall establish a new MM connection for the incoming CM message as specified in 4.5.1.3.
Upon receiving a CM SERVICE REQUEST message, the network shall analyse its content. The type of semantic analysis may depend on other on going MM connection(s). Depending on the type of request and the current status of the RR connection, the network may start any of the MM common procedures and RR procedures.
The network may initiate the classmark interrogation procedure, for example, to obtain further information on the mobile station's encryption capabilities.
The identification procedure (see section 4.3.3) may be invoked for instance if a TMSI provided by the mobile station is not recognized.
The network may invoke the authentication procedure (see section 4.3.2) depending on the CM service type.
The network decides also if the ciphering mode setting procedure shall be invoked (see section 3.4.7).

NOTE: If the CM_SERVICE_REQUEST message contains a priority level the network may use this to perform queuing and pre-emption as defined in GSM 03.67.

An indication from the RR sublayer that the ciphering mode setting procedure is completed, or reception of a CM SERVICE ACCEPT message, shall be treated as a service acceptance indication by the mobile station. The MM connection establishment is completed, timer T3230 shall be stopped, the CM entity that requested the MM connection shall be informed, and MM sublayer state MM CONNECTION ACTIVE is entered. The MM connection is considered to be active.
If the service request cannot be accepted, the network returns a CM SERVICE REJECT message to the mobile station.
The reject cause information element (see 10.5.3.6 and Annex G) indicates the reason for rejection. The following cause values may apply:

#4 : IMSI unknown in VLR

#6 : Illegal ME

#17 : Network failure

#22 : Congestion

#32 : Service option not supported

#33 : Requested service option not subscribed

#34 : Service option temporarily out of order

If no other MM connection is active, the network may start the RR connection release (see section 3.5) when the CM SERVICE REJECT message is sent.
If a CM SERVICE REJECT message is received by the mobile station, timer T3230 shall be stopped, the requesting CM sublayer entity informed. Then the mobile station shall proceed as follows:

- If the cause value is not #4 or #6 the MM sublayer returns to the previous state (the state where the request was received). Other MM connections shall not be affected by the CM SERVICE REJECT message.

- If cause value #4 is received, the mobile station aborts any MM connection, deletes any TMSI, LAI and ciphering key sequence number in the SIM, changes the update status to NOT UPDATED (and stores it in the SIM according to section 4.1.2.2), and enters the MM sublayer state WAIT FOR NETWORK COMMAND. If subsequently the RR connection is released or aborted, this will force the mobile station to initiate a normal location updating). Whether the CM request shall be memorized during the location updating procedure, is a choice of implementation.

- If cause value #6 is received, the mobile station aborts any MM connection, deletes any TMSI, LAI and ciphering key sequence number in the SIM, changes the update status to ROAMING NOT ALLOWED (and stores it in the SIM according to section 4.1.2.2), and enters the MM sublayer state WAIT FOR NETWORK COMMAND. The mobile station shall consider the SIM as invalid until switch-off or the SIM is removed.

********** Next Modified Section **********

4.5.1.3.1 Mobile Terminating CM Activity

When a CM sublayer entity in the network requests the MM sublayer to establish a MM connection, the MM sublayer will request the establishment of an RR connection to the RR sublayer if no RR connection to the desired mobile station exists. The MM sublayer is informed when the paging procedure is finished (see section 3.3.2) and the mobile station shall enter the MM state WAIT FOR NETWORK COMMAND.
When an RR connection is established (or if it already exists at the time the request is received), the MM sublayer may initiate any of the MM common procedures (except IMSI detach); it may request the RR sublayer to perform the RR classmark interrogation procedure, and/or the ciphering mode setting procedure.
When all MM and RR procedures are successfully completed which the network considers necessary, the MM sublayer will inform the requesting mobile terminating CM sublayer entity on the success of the MM connection establishment.
If an RR connection already exists and no MM specific procedure is running, the network may also establish a new mobile terminating MM connection by sending a CM message with a new PD/TI combination.
If the MS receives the first CM message in the MM states WAIT FOR NETWORK COMMAND or RR CONNECTION RELEASE NOT ALLOWED, the MS shall stop and reset the timers T3240 and T3241 and shall enter the MM state MM CONNECTION ACTIVE.
If the establishment of an RR connection is unsuccessful, or if any of the MM common procedures or the ciphering mode setting fail, this is indicated to the CM layer with an appropriate error cause.
If an RR connection used for a MM specific procedure exists to the mobile station, the CM request may be rejected or delayed depending on implementation. When the MM specific procedure has been completed, the network may use the same RR connection for the delayed CM request.
Only applicable in case of VGCS talking:
In the MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) the mobile station is in RR Group transmit mode. There shall be only one MM connection active.
When in MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) state, the MM sublayer in the network shall reject the request for the establishment of another MM connection by any CM layer.
If the RR sublayer in the network indicates a request to perform a transfer of the mobile station from RR connected mode to RR Group transmit mode which will result in a transition from MM CONNECTION ACTIVE state to MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) state in the MM sublayer, the MM sublayer shall not allow the transition if more than one MM connection is active with the mobile station.

4.5.1.3.2 Mobile Originating CM Activity $(CCBS)$

When a CM sublayer entity in the network requests the MM sublayer to establish a MM connection, the MM sublayer will request the establishment of an RR connection to the RR sublayer if no RR connection to the desired mobile station exists. The MM sublayer is informed when the paging procedure is finished (see section 3.3.2) and the mobile station shall enter the MM state WAIT FOR NETWORK COMMAND.
When an RR connection is established (or if it already exists at the time the request is received), the MM sublayer may initiate any of the MM common procedures (except IMSI detach), it may request the RR sublayer to perform the RR classmark interrogation procedure and/or the ciphering mode setting procedure.
The network should use the information contained in *the Mobile Station Classmark Type* 2 IE on the mobile station's support for "Network Initiated MO CM Connection Request" to determine whether to:

not start this procedure (eg if an RR connection already exists), or,

to continue this procedure, or,

to release the newly established RR connection.

In the case of a "Network Initiated MO CM Connection Request" the network shall use the established RR connection to send a CM SERVICE PROMPT message to the mobile station.
If the mobile station supports "Network Initiated MO CM Connection Request", the MM sublayer of the MS gives an indication to the CM entity identified by the CM SERVICE PROMPT message and enters the MM sublayer state PROCESS CM SERVICE PROMPT. In the state PROCESS CM SERVICE PROMPT the MM sublayer waits for either the rejection or confirmation of the recall by the identified CM entity. Any other requests from the CM entities shall either be rejected or delayed until this state is left.
When the identified CM entity informs the MM sublayer, that it has send the first CM message in order to start the CM recall procedure the MM sublayer enters the state MM CONNECTION ACTIVE.
If the identified CM entity indicates that it will not perform the CM recall procedure and all MM connections are released by their CM entities the MS shall proceed according to section. 4.5.3.1. ~~the MM sublayer starts timer T3240 and enter the state WAIT FOR NETWORK COMMAND, expecting the release of the RR connection.~~

If the CM SERVICE PROMPT message is received by the MS in MM sublayer states WAIT FOR OUTGOING MM CONNECTION or in WAIT FOR ADDITIONAL OUTGOING MM CONNECTION then the mobile station shall send an MM STATUS message with cause ” Message not compatible with protocol state”.
A mobile that does not support “Network Initiated MO CM Connection Request” shall return an MM STATUS message with cause #97 “message type non-existent or not implemented” to the network.
If the mobile station supports “Network Initiated MO CM Connection Request” but the identified CM entity in the mobile station does not provide the associated support, then the mobile station shall send an MM STATUS message with cause “Service option not supported”. In the case of a temporary CM problem (eg lack of transaction identifiers) then the mobile station shall send an MM STATUS message with cause “Service option temporarily out of order”.
If an RR connection already exists and no MM specific procedure is running, the network may use it to send the CM SERVICE PROMPT message.
If the establishment of an RR connection is unsuccessful, or if any of the MM common procedures or the ciphering mode setting fail, this is indicated to the CM layer in the network with an appropriate error cause.
If an RR connection used for a MM specific procedure exists to the mobile station, the “Network Initiated MO CM Connection Request” may be rejected or delayed depending on implementation. When the MM specific procedure has been completed, the network may use the same RR connection for the delayed “Network Initiated MO CM Connection Request”.

********** Next Modified Section **********

4.5.3 MM connection release

An established MM connection can be released by the local CM entity. The release of the CM connection will then be done locally in the MM sublayer, i.e. no MM message are sent over the radio interface for this purpose.

4.5.3.1 Release of associated RR connection

If all MM connections are released by their CM entities, and no RRLP procedure (see 3GPP TS 04.31 [23b]) ~~or no~~ and no LCS procedure over RRC (see 3GPP TS 25.331 [23c]) is ongoing, the mobile station shall set timer T3240 and enter the state WAIT FOR NETWORK COMMAND, expecting the release of the RR connection.

If all MM connections are released by their CM entities and an RRLP procedure or LCS procedure over RRC is ongoing, the MS shall start the timer T3241 and enter the state RR CONNECTION RELEASE NOT ALLOWED.

If the MS is expecting the release of the RR connection in MM state WAIT FOR NETWORK COMMAND and an RRLP procedure- or LCS procedure over RRC is started, the MS shall stop the timer T3240, start the timer T3241 and enter the state RR CONNECTION RELEASE NOT ALLOWED.

If the MS is in MM state RR CONNECTION RELEASE NOT ALLOWED and the ongoing RRLP procedure or LCS procedure over RRC is finished, the MS shall stop the timer T3241, reset and start the timer T3240 and shall enter the state WAIT FOR NETWORK COMMAND.

In the network, if the last MM connection is released by its user, the MM sublayer may decide to release the RR connection by requesting the RR sublayer according to section 3.5. The RR connection may be maintained by the network, e.g. in order to establish another MM connection.

If the RR connection is not released within a given time controlled by the timer T3240 or T3241, the mobile station shall abort the RR connection. In both cases, either after a RR connection release triggered from the network side or after a RR connection abort requested by the MS-side, the MS shall return to MM IDLE state; the service state depending upon the current update status as specified in section 4.2.3.

********** Next Modified Section **********

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	- initiation of MM service or MM signalling	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 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)
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 section 11.2.1	see section 11.2.1	abort the RR connection
T3241	25	300s	see section 11.2.1	See section 11.2.1	abort the RR connection

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

Table 11.2/3GPP TS 24.008: Mobility management timers - network-side

TIMER NUM.	MM ST AT	TIME OUT VAL.	CAUSE FOR START	NORMAL STOP	AT THE EXPIRY	AT THE SECOND EXPIRY
T3250	6	12s	TMSI-REAL-CMD or LOC UPD ACC with new TMSI sent	TMSI-REALL-COM received	Optionally Release RR connection	
T3255		Note	LOC UPD ACC sent with"Follow on Proceed"	CM SERVICE REQUEST	Release RR Connection or use for mobile station terminating call	
T3260	5	12s	AUTHENT-REQUEST sent	AUTHENT-RESPONSE received AUTHENT-FAILURE received	Optionally Release RR connection	
T3270	4	12s	IDENTITY REQUEST sent	IDENTITY RESPONSE received	Optionally Release RR connection	

NOTE 2: The value of this timer is not specified by this recommendation.

********** **Next Modified Section** **********

11.2.1 Timer T3240 and Timer T3241

Timer T3240 is started in the mobile station when:

- the mobile station receives a LOCATION UPDATING ACCEPT message completing a location updating procedure in the cases specified in section 4.4.4.6 and 4.4.4.8;

- the mobile station receives a LOCATION UPDATING REJECT message in the cases specified in section 4.4.4.7;

- the mobile station has sent a CM SERVICE ABORT message as specified in section 4.5.1.7;

- the mobile station has released or aborted all MM connections in the cases specified in 4.3.2.5, 4.3.5.2, 4.5.1.1, and 4.5.3.1.

Timer T3240 is stopped, reset, and started again at receipt of an MM message.
Timer T3240 is stopped and reset (but not started) at receipt of a CM message that initiates establishment of an CM connection (an appropriate SETUP, REGISTER, or CP-DATA message as defined in GSM 04.08, GSM 04.10 or GSM 04.11).
Timer T3241 is started in the mobile station when entering MM state RR CONNECTION RELEASE NOT ALLOWED.
Timer T3241 is stopped and reset (but not started) when the MM state RR CONNECTION RELEASE NOT ALLOWED is left.
If timer T3241 expires, the MS shall abort the RR connection and enter the MM state MM IDLE.

CR-Form-v3

CHANGE REQUEST

⌘ **24.008** **CR** 396 ⌘ rev **r3** ⌘ Current version: **4.2.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network **X**

Title:	⌘	Modification to MS's MM states to enable LCS signalling on RR layer
Source:	⌘	Siemens AG, Nokia
Work item code:	⌘	LCS
Date:	⌘	14.05.01
Category:	⌘	**A**
Release:	⌘	Rel-4

Use one of the following categories:
F *(essential 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:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	As the MM layer is currently not aware of any ongoing RRLP procedure, MM will abort the RR connection if the last CM connection is released and the MM timer T3240 expires(10 sec.). This will happen during a MT-LR/NI-LR LCS positioning procedure, were the RRLP procedure may take longer than 10 seconds. In order to avoid the MS trigger abortion of the RR connection during an RRLP procedure, it is proposed to introduce a new MM state RR CONNECTION RELEASE NOT ALLOWED which is entered if no CM connections are active, but an RRLP procedure is ongoing. This state is supervised by a new introduced MM timer T3241 which ensures, that the MS does not remains in this state forever.
Summary of change:	⌘	Introduction of the new MM state RR CONNECTION RELEASE NOT ALLOWED and the corresponding MM timer T3241.
Consequences if not approved:	⌘	A ongoing RRLP procedure could not be finalised correctly due to the MS initiated abortion of the RR connection, which leads to the risk that certain LCS positioning methods will not work.

Clauses affected:	⌘	2; 4.1.2.1.1; 4.1.2.3; 4.5.1.1; 4.5.1.3.1; 4.5.3.1; 11.2; 11.2.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

********** First Modified Section **********

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] 3GPP TS 01.02: "Digital cellular telecommunications system (Phase 2+); General description of a GSM Public Land Mobile Network (PLMN)".

[2] 3GPP TS 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2a] 3GPP TS 21.905 "3G Vocabulary for 3GPP Specifications"

[3] 3GPP TS 22.002: "Digital cellular telecommunications system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[4] 3GPP TS 22.003: "Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[5] 3GPP TS 02.09: "Digital cellular telecommunications system (Phase 2+); Security aspects".

[6] 3GPP TS 22.011: "Digital cellular telecommunications system (Phase 2+); Service accessibility".

[7] 3GPP TS 02.17: "Digital cellular telecommunications system (Phase 2+); Subscriber identity modules Functional characteristics".

[8] 3GPP TS 02.40: "Digital cellular telecommunications system (Phase 2+); Procedures for call progress indications".

[9] 3GPP TS 03.01: "Digital cellular telecommunications system (Phase 2+); Network functions".

[10] 3GPP TS 23.003: "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".

[11] 3GPP TS 03.13: "Digital cellular telecommunications system (Phase 2+); Discontinuous Reception (DRX) in the GSM system".

[12] 3GPP TS 23.014: "Digital cellular telecommunications system (Phase 2+); Support of Dual Tone Multi-Frequency signalling (DTMF) via the GSM system".

[12a] 3GPP TS 23.071: "Digital cellular telecommunications system (Phase 2+); Location Services; Functional description – Stage 2".

[13] 3GPP TS 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".

[14] 3GPP TS 23.122: "NAS Functions related to Mobile Station (MS) in idle mode".

[15] 3GPP TS 24.002: "GSM-UMTS Public Land Mobile Network (PLMN) access reference configuration".

[16] 3GPP TS 04.03: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface Channel structures and access capabilities".

[17] 3GPP TS 04.04: "Digital cellular telecommunications system (Phase 2+); layer 1 General requirements".

[18] 3GPP TS 04.05: "Digital cellular telecommunications system (Phase 2+); Data Link (DL) layer General aspects".

[19] 3GPP TS 04.06: "Digital cellular telecommunications system (Phase 2+); Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".

[20] 3GPP TS 24.007: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface signalling layer 3 General aspects".

[21] 3GPP TS 24.010: "Digital cellular telecommunications system ; Mobile radio interface layer 3 Supplementary services specification General aspects".

[22] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[23] 3GPP TS 24.012: "Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".

[23a] 3GPP TS 24.071: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 location services specification.

[23b] 3GPP TS 04.31 "Digital cellular telecommunication system (Phse 2+);Location Services;Mobile Station (MS) – Serving Mobile Location Centre (SMLC); Radio Resource LCS Protocol (RRLP)".

[23c] 3GPP TS 25.331 : "3rd Generation Partnership Project;Technical Specification Group Radio Access Network; RRC Protocol Specification"

[24] 3GPP TS 24.080: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 supplementary services specification Formats and coding".

[25] 3GPP TS 24.081: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 3".

[26] 3GPP TS 24.082: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 3".

[27] 3GPP TS 24.083: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3".

[28] 3GPP TS 24.084: "Digital cellular telecommunications system (Phase 2+); MultiParty (MPTY) supplementary services - Stage 3".

[29] 3GPP TS 24.085: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 3".

[30] 3GPP TS 24.086: "Digital cellular telecommunications system (Phase 2+); Advice of Charge (AoC) supplementary services - Stage 3".

[31] 3GPP TS 24.088: "Call Barring (CB) supplementary services - Stage 3".

[32] 3GPP TS 05.02: "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path".

[33] 3GPP TS 05.05: "Digital cellular telecommunications system (Phase 2+); Radio transmission and reception".

[34] 3GPP TS 05.08: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".

[35] 3GPP TS 05.10: "Digital cellular telecommunications system (Phase 2+); Radio subsystem synchronization".

[36] 3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[37] 3GPP TS 29.002: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[38] 3GPP TS 29.007: "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[39] GSM 11.10: "Digital cellular telecommunications system (Phase 2+); Mobile Station (MS) conformity specification".

[40] GSM 11.21: "Digital cellular telecommunications system (Phase 2); The GSM Base Station System (BSS) equipment specification".

[41] ISO/IEC 646 (1991): "Information technology - ISO 7-bit coded character set for information interchange".

[42] ISO/IEC 6429: "Information technology - Control functions for coded character sets".

[43] ISO 8348 (1987): "Information processing systems - Data communications - Network service definition".

[44] ITU-T Recommendation E.163: "Numbering plan for the international telephone service".

[45] ITU-T Recommendation E.164: "Numbering plan for the ISDN era".

[46] ITU-T Recommendation E.212: "Identification plan for land mobile stations".

[47] ITU-T Recommendation F.69 (1993): "Plan for telex destination codes".

[48] ITU-T Recommendation I.330: "ISDN numbering and addressing principles".

[49] ITU-T Recommendation I.440 (1989): "ISDN user-network interface data link layer - General aspects".

[50] ITU-T Recommendation I.450 (1989): "ISDN user-network interface layer 3 General aspects".

[51] ITU-T Recommendation I.500 (1993): "General structure of the ISDN interworking recommendations".

[52] ITU-T Recommendation T.50: "International Alphabet No. 5".

[53] ITU Recommendation Q.931: ISDN user-network interface layer 3 specification for basic control".

[54] ITU-T Recommendation V.21: "300 bits per second duplex modem standardized for use in the general switched telephone network".

[55] ITU-T Recommendation V.22: "1200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[56] ITU-T Recommendation V.22bis: "2400 bits per second duplex modem using the frequency division technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[57] ITU-T Recommendation V.23: "600/1200-baud modem standardized for use in the general switched telephone network".

[58] ITU-T Recommendation V.26ter: "2400 bits per second duplex modem using the echo cancellation technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[59] ITU-T Recommendation V.32: "A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits".

[60] ITU-T Recommendation V.110: "Support of data terminal equipments (DTEs) with V-Series interfaces by an integrated services digital network".

[61] ITU-T Recommendation V.120: "Support by an ISDN of data terminal equipment with V-Series type interfaces with provision for statistical multiplexing".

[62] ITU-T Recommendation X.21: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for synchronous operation on public data networks".

[63] ITU-T Recommendation X.25: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".

[64] ITU-T Recommendation X.28: "DTE/DCE interface for a start-stop mode data terminal equipment accessing the packet assembly/disassembly facility (PAD) in a public data network situated in the same country".

[65] ITU-T Recommendation X.30: "Support of X.21, X.21 bis and X.20 bis based data terminal equipments (DTEs) by an integrated services digital network (ISDN)".

[66] ITU-T Recommendation X.31: "Support of packet mode terminal equipment by an ISDN".

[67] ITU-T Recommendation X.32: "Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and accessing a packet switched public data network through a public switched telephone network or an integrated services digital network or a circuit switched public data network".

[68] ITU-T Recommendation X.75 (1988): "Packet-switched signalling system between public networks providing data transmission services".

[69] ITU-T Recommendation X.121: "International numbering plan for public data networks".

[70] ETS 300 102-1: "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[71] ETS 300 102-2: "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[72] ISO/IEC10646: "Universal Multiple-Octet Coded Character Set (UCS)"; UCS2, 16 bit coding.

[73] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service Description; Stage 1".

[74] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".

[75] 3GPP TS 03.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2".

[76] 3GPP TS 04.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station - Base Station System (MS-BSS) interface; Radio Link Control and Medium Access Control (RLC/MAC) layer specification".

[77] IETF RFC 1034: "Domain names - Concepts and Facilities " (STD 7).

[78] 3GPP TS 04.65: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Subnetwork Dependent Convergence Protocol (SNDCP)".

[79] ITU Recommendation I.460: "Multiplexing, rate adaption and support of existing services".

[80] 3GPP TS 26.111: "Codec for Circuit Switched Multimedia Telephony Service; Modifications to H.324"

[81] 3GPP TS 23.107: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; QoS Concept and Architecture"

[82] 3GPP TS 03.22: " Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode and group receive mode".

********** Next Modified Section **********

4.1.2.1.1 Main states

0 NULL

The mobile station is inactive (e.g. power down). Important parameters are stored. Only manual action by the user may transfer the MM sublayer to another state.

3 LOCATION UPDATING INITIATED

A location updating procedure has been started and the MM awaits a response from the network. The timer T3210 is running.

5 WAIT FOR OUTGOING MM CONNECTION

The MM connection establishment has been started, and the MM awaits a response from the network. The timer T3230 is running.

6 MM CONNECTION ACTIVE

The MM sublayer has a RR connection to its peer entity on the network side. One or more MM connections are active.

7 IMSI DETACH INITIATED

The IMSI detach procedure has been started. The timer T3220 is running.

8 PROCESS CM SERVICE PROMPT

The MM sublayer has a RR connection to its peer entity on the network side. The Mobile Station has received a CM SERVICE PROMPT message but has not yet responded $(CCBS)$.

9 WAIT FOR NETWORK COMMAND

The MM sublayer has a RR connection to its peer entity in the network, but no MM connection is established. The mobile station is passive, awaiting further commands from the network. The timer T3240 may be running.

10 LOCATION UPDATE REJECTED

A location updating procedure has been rejected and RR connection release is awaited. The timer T3240 is running.

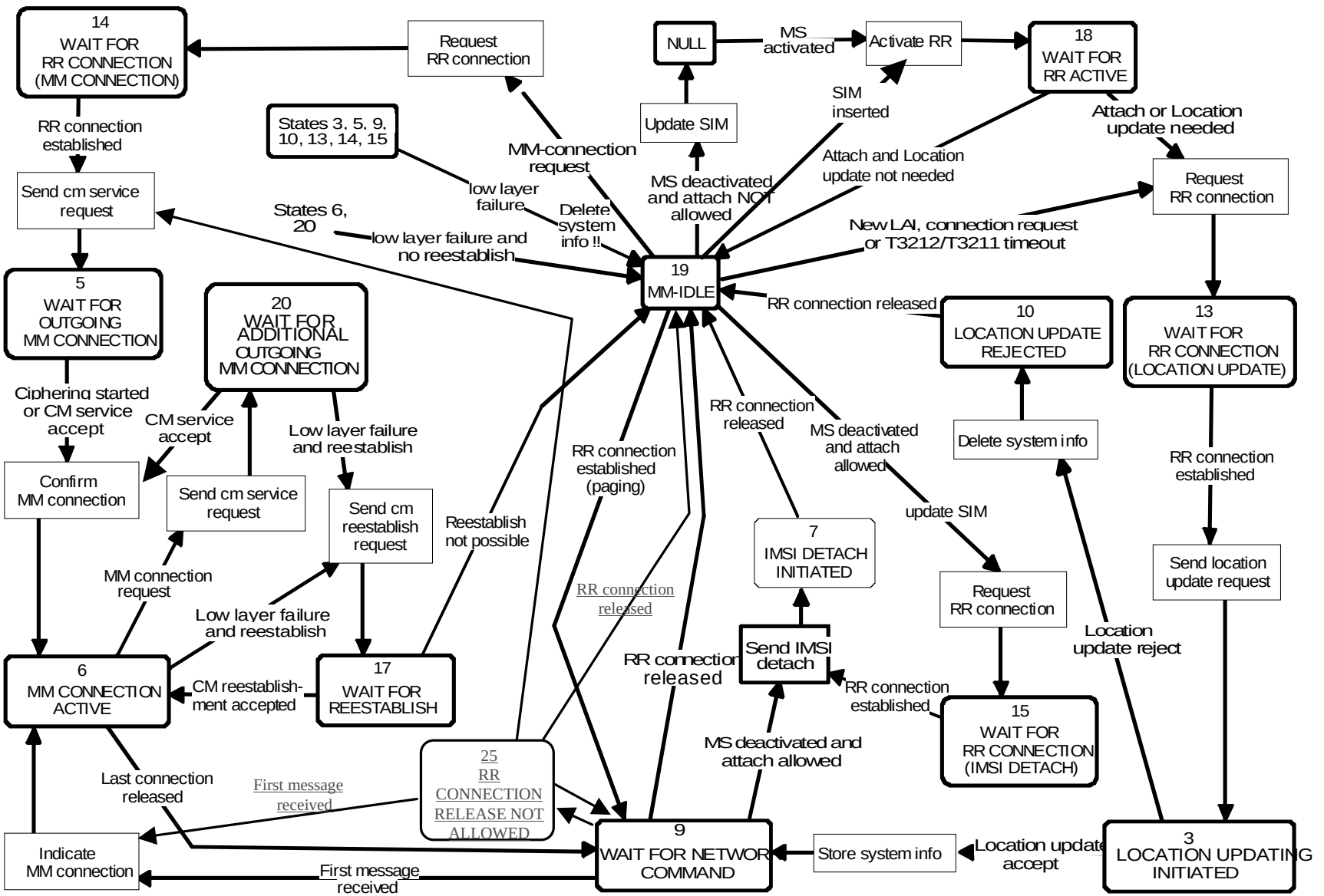
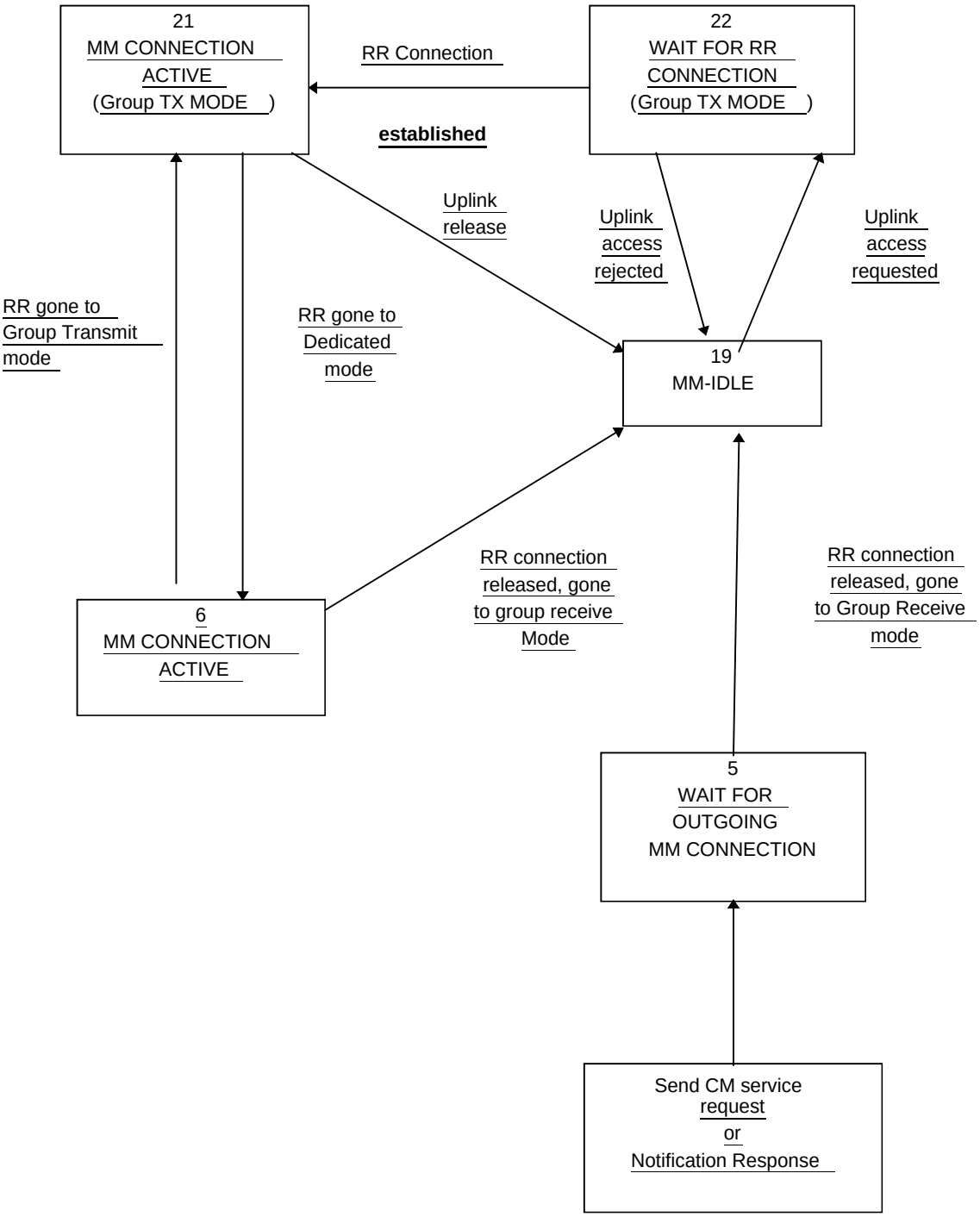


Figure 4.1a / GSM 24.008: Overview mobility management protocol / MS Side



Additions to Figure 4.1.a/GSM 24.008

13. WAIT FOR RR CONNECTION (LOCATION UPDATING)

    The MM sublayer has requested RR connection establishment for starting the location updating procedure.

14. WAIT FOR RR CONNECTION (MM CONNECTION)

    The MM sublayer has requested RR connection establishment for dedicated mode for starting the MM connection establishment.

15. WAIT FOR RR CONNECTION (IMSI DETACH)

    The MM sublayer has requested RR connection establishment for starting the IMSI detach procedure.

17. WAIT FOR REESTABLISH

A lower layer failure has occurred and re-establishment may be performed from the disturbed CM layer entities.

18. WAIT FOR RR ACTIVE

The MM sublayer has requested activation of the RR sublayer.

19. MM IDLE

There is no MM procedure running and no RR connection exists except that a local MM context may exist when the RR sublayer is in Group Receive mode. This is a compound state, and the actual behaviour of the mobile station to Connection Management requests is determined by the actual substate as described hereafter.

20. WAIT FOR ADDITIONAL OUTGOING MM CONNECTION.

The MM connection establishment for an additional MM connection has been started, and the MM awaits response from the network.

21. MM CONNECTION ACTIVE (GROUP TRANSMIT MODE)

(Only applicable for mobile stations supporting VGCS talking:) The MM sublayer has a RR connection on the VGCS channel to its peer entity on the network side. Only one MM connection is active.

22. WAIT FOR RR CONNECTION (GROUP TRANSMIT MODE)

(Only applicable for mobile stations supporting VGCS talking:) The MM sublayer has requested to perform an uplink access on the VGCS channel.

23. LOCATION UPDATING PENDING

(Only applicable for GPRS MS operation modes A and B; not shown in figure 4.1a) A location updating has been started using the combined GPRS routing area updating procedure.

24. IMSI DETACH PENDING

(Only applicable for GPRS MS operation modes A and B; not shown in figure 4.1a) An IMSI detach for non-GPRS services has been started using the combined GPRS detach procedure at not switching off.

25. RR CONNECTION RELEASE NOT ALLOWED

(Only applicable for mobile stations supporting RRLP procedures (see 3GPP TS 44.031 [23b]) or LCS procedures over RRC (see 3GPP TS 25.331 [23c])). All MM connections are released by their CM entities, but the RR connection is maintained by the network due to an ongoing RRLP procedure or LCS procedure over RRC.

********** Next Modified Section **********

4.1.2.3 MM sublayer states on the network side

1. IDLE

The MM sublayer is not active except possibly when the RR sublayer is in Group Receive mode.

2. WAIT FOR RR CONNECTION

The MM sublayer has received a request for MM connection establishment from the CM layer. A RR connection to the mobile station is requested from the RR sublayer (i.e. paging is performed).

3. MM CONNECTION ACTIVE

The MM sublayer has a RR connection to a mobile station. One or more MM connections are active, or no MM connection is active but an RRLP procedure or LCS procedure over RRC is ongoing.

4. IDENTIFICATION INITIATED

The identification procedure has been started by the network. The timer T3270 is running.

5. AUTHENTICATION INITIATED

The authentication procedure has been started by the network. The timer T3260 is running.

6. TMSI REALLOCATION INITIATED

The TMSI reallocation procedure has been started by the network. The timer T3250 is running.

7. SECURITY MODE INITIATED

In UMTS, the security mode setting procedure has been requested to the RR sublayer. In GSM, the cipher mode setting procedure has been requested to the RR sublayer.

8a. WAIT FOR MOBILE ORIGINATED MM CONNECTION

A CM SERVICE REQUEST message is received and processed, and the MM sublayer awaits the "opening message" of the MM connection.

8b. WAIT FOR NETWORK ORIGINATED MM CONNECTION

A CM SERVICE PROMPT message has been sent by the network and the MM sublayer awaits the "opening message" of the MM connection $(CCBS)$.

9. WAIT FOR REESTABLISHMENT

The RR connection to a mobile station with one or more active MM connection has been lost. The network awaits a possible re-establishment request from the mobile station.

10. WAIT OF A GROUP CALL

Only applicable in case for mobile station supporting VGCS talking. The MM sublayer has received a request for establishing a VGCS from the GCC sublayer. The request for establishing a VGCS channels is given to the RR sublayer.

11. GROUP CALL ACTIVE

Only applicable in case of mobile station supporting VGCS talking. A VGCS channel is established by the RR sublayer. An RR connection to the talking mobile station can be established by the RR sublayer on the VGCS channel. The MM sublayer is active but no sending of MM message between the network and the mobile station has occurred.

12. MM CONNECTION ACTIVE (GROUP CALL)

Only applicable in case of mobile station supporting VGCS talking. The MM sublayer has a RR connection to the talking mobile station on the VGCS channel. Only one MM connection is active.

13. WAIT FOR BROADCAST CALL

Only applicable in case of VBS. The MM sublayer has received a request for a VBS establishment from the BCC sublayer. The request for establishment of VBS channels is given to the RR sublayer.

14. BROADCAST CALL ACTIVE

Only applicable in case of VBS. A VBS channel is established by the RR sublayer. The MM sublayer is active but no explicit MM establishment between the Network and the mobile station has occurred.

********** Next Modified Section **********

4.5.1 MM connection establishment

4.5.1.1 MM connection establishment initiated by the mobile station

Upon request of a CM entity to establish an MM connection the MM sublayer first decides whether to accept, delay, or reject this request:

- An MM connection establishment may only be initiated by the mobile station when the following conditions are fulfilled:

  - Its update status is UPDATED.

  - The MM sublayer is in one of the states MM IDLE, RR CONNECTION RELEASE NOT ALLOWED or MM connection active but not in MM connection active (Group call).

  An exception from this general rule exists for emergency calls (see section 4.5.1.5). A further exception is defined in the following clause.

- If an MM specific procedure is running at the time the request from the CM sublayer is received, and the LOCATION UPDATING REQUEST message has been sent, the request will either be rejected or delayed, depending on implementation, until the MM specific procedure is finished and, provided that the network has not sent a "follow-on proceed" indication, the RR connection is released. If the LOCATION UPDATING REQUEST message has not been sent, the mobile station may include a "follow-on request" indicator in the message. The mobile station shall then delay the request until the MM specific procedure is completed, when it may be given the opportunity by the network to use the RR connection: see section 4.4.4.6.

In order to establish an MM connection, the mobile station proceeds as follows:

a) If no RR connection exists, the MM sublayer requests the RR sublayer to establish an RR connection and enters MM sublayer state WAIT FOR RR CONNECTION (MM CONNECTION). This request contains an establishment cause and a CM SERVICE REQUEST message. When the establishment of an RR connection is indicated by the RR sublayer (this indication implies that the CM SERVICE REQUEST message has been successfully transferred via the radio interface, see section 2.2), the MM sublayer of the mobile station starts timer T3230, gives an indication to the CM entity that requested the MM connection establishment, and enters MM sublayer state WAIT FOR OUTGOING MM CONNECTION.

b) If an RR connection is available, the MM sublayer of the mobile station sends a CM SERVICE REQUEST message to the network, starts timer T3230, stops and resets timer T3241, gives an indication to the CM entity that requested the MM connection establishment, and enters:

   - MM sublayer state WAIT FOR OUTGOING MM CONNECTION, if no MM connection is active;

   - MM sublayer state WAIT FOR ADDITIONAL OUTGOING MM CONNECTION, if at least one MM connection is active;

   - If an RR connection exists but the mobile station is in the state WAIT FOR NETWORK COMMAND then any requests from the CM layer that are received will either be rejected or delayed until this state is left.

c) Only applicable for mobile stations supporting VGCS talking:

If a mobile station which is in the MM sublayer state MM IDLE, service state RECEIVING GROUP CALL (NORMAL SERVICE), receives a request from the GCC sublayer to perform an uplink access, the MM sublayer requests the RR sublayer to perform an uplink access procedure and enters MM sublayer state WAIT FOR RR CONNECTION (GROUP TRANSMIT MODE).

When a successful uplink access is indicated by the RR sublayer, the MM sublayer of the mobile station gives an indication to the GCC sublayer and enters MM sublayer state MM CONNECTION ACTIVE (GROUP TRANSMIT MODE).

When an uplink access reject is indicated by the RR sublayer, the MM sublayer of the mobile station gives an indication to the GCC sublayer and enters the MM sublayer state MM IDLE, service state RECEIVING GROUP CALL (NORMAL SERVICE).

In the network, if an uplink access procedure is performed, the RR sublayer in the network provides an indication to the MM sublayer together with the mobile subscriber identity received in the TALKER INDICATION message. The network shall then enter the MM sublayer state MM CONNECTION ACTIVE (GROUP TRANSMIT MODE).

The CM SERVICE REQUEST message contains the

- mobile identity according to section 10.5.1.4;
- mobile station classmark 2;
- ciphering key sequence number; and
- CM service type identifying the requested type of transaction (e.g. mobile originating call establishment, emergency call establishment, short message service, supplementary service activation), location services)

A MS supporting eMLPP may optionally include a priority level in the CM SERVICE REQUEST message.
A collision may occur when a CM layer message is received by the mobile station in MM sublayer state WAIT FOR OUTGOING MM CONNECTION or in WAIT FOR ADDITIONAL OUTGOING MM CONNECTION. In this case the MM sublayer in the MS shall establish a new MM connection for the incoming CM message as specified in 4.5.1.3.
Upon receiving a CM SERVICE REQUEST message, the network shall analyse its content. The type of semantic analysis may depend on other on going MM connection(s). Depending on the type of request and the current status of the RR connection, the network may start any of the MM common procedures and RR procedures.
The network may initiate the classmark interrogation procedure, for example, to obtain further information on the mobile station's encryption capabilities.
The identification procedure (see section 4.3.3) may be invoked for instance if a TMSI provided by the mobile station is not recognized.
The network may invoke the authentication procedure (see section 4.3.2) depending on the CM service type.
The network decides also if the ciphering mode setting procedure shall be invoked (see section 3.4.7).

NOTE: If the CM_SERVICE_REQUEST message contains a priority level the network may use this to perform queuing and pre-emption as defined in GSM 03.67.

An indication from the RR sublayer that the ciphering mode setting procedure is completed, or reception of a CM SERVICE ACCEPT message, shall be treated as a service acceptance indication by the mobile station. The MM connection establishment is completed, timer T3230 shall be stopped, the CM entity that requested the MM connection shall be informed, and MM sublayer state MM CONNECTION ACTIVE is entered. The MM connection is considered to be active.
If the service request cannot be accepted, the network returns a CM SERVICE REJECT message to the mobile station.
The reject cause information element (see 10.5.3.6 and Annex G) indicates the reason for rejection. The following cause values may apply:

#4 : IMSI unknown in VLR

#6 : Illegal ME

#17 : Network failure

#22 : Congestion

#32 : Service option not supported

#33 : Requested service option not subscribed

#34 : Service option temporarily out of order

If no other MM connection is active, the network may start the RR connection release (see section 3.5) when the CM SERVICE REJECT message is sent.
If a CM SERVICE REJECT message is received by the mobile station, timer T3230 shall be stopped, the requesting CM sublayer entity informed. Then the mobile station shall proceed as follows:

- If the cause value is not #4 or #6 the MM sublayer returns to the previous state (the state where the request was received). Other MM connections shall not be affected by the CM SERVICE REJECT message.

- If cause value #4 is received, the mobile station aborts any MM connection, deletes any TMSI, LAI and ciphering key sequence number in the SIM, changes the update status to NOT UPDATED (and stores it in the SIM according to section 4.1.2.2), and enters the MM sublayer state WAIT FOR NETWORK COMMAND. If subsequently the RR connection is released or aborted, this will force the mobile station to initiate a normal location updating). Whether the CM request shall be memorized during the location updating procedure, is a choice of implementation.

- If cause value #6 is received, the mobile station aborts any MM connection, deletes any TMSI, LAI and ciphering key sequence number in the SIM, changes the update status to ROAMING NOT ALLOWED (and stores it in the SIM according to section 4.1.2.2), and enters the MM sublayer state WAIT FOR NETWORK COMMAND. The mobile station shall consider the SIM as invalid until switch-off or the SIM is removed.

********** Next Modified Section **********

4.5.1.3.1 Mobile Terminating CM Activity

When a CM sublayer entity in the network requests the MM sublayer to establish a MM connection, the MM sublayer will request the establishment of an RR connection to the RR sublayer if no RR connection to the desired mobile station exists. The MM sublayer is informed when the paging procedure is finished (see section 3.3.2) and the mobile station shall enter the MM state WAIT FOR NETWORK COMMAND.
When an RR connection is established (or if it already exists at the time the request is received), the MM sublayer may initiate any of the MM common procedures (except IMSI detach); it may request the RR sublayer to perform the RR classmark interrogation procedure, and/or the ciphering mode setting procedure.
When all MM and RR procedures are successfully completed which the network considers necessary, the MM sublayer will inform the requesting mobile terminating CM sublayer entity on the success of the MM connection establishment.
If an RR connection already exists and no MM specific procedure is running, the network may also establish a new mobile terminating MM connection by sending a CM message with a new PD/TI combination.
If the MS receives the first CM message in the MM states WAIT FOR NETWORK COMMAND or RR CONNECTION RELEASE NOT ALLOWED, the MS shall stop and reset the timers T3240 and T3241 and shall enter the MM state MM CONNECTION ACTIVE.
If the establishment of an RR connection is unsuccessful, or if any of the MM common procedures or the ciphering mode setting fail, this is indicated to the CM layer with an appropriate error cause.
If an RR connection used for a MM specific procedure exists to the mobile station, the CM request may be rejected or delayed depending on implementation. When the MM specific procedure has been completed, the network may use the same RR connection for the delayed CM request.
Only applicable in case of VGCS talking:
In the MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) the mobile station is in RR Group transmit mode. There shall be only one MM connection active.
When in MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) state, the MM sublayer in the network shall reject the request for the establishment of another MM connection by any CM layer.
If the RR sublayer in the network indicates a request to perform a transfer of the mobile station from RR connected mode to RR Group transmit mode which will result in a transition from MM CONNECTION ACTIVE state to MM CONNECTION ACTIVE (GROUP TRANSMIT MODE) state in the MM sublayer, the MM sublayer shall not allow the transition if more than one MM connection is active with the mobile station.

4.5.1.3.2 Mobile Originating CM Activity $(CCBS)$

When a CM sublayer entity in the network requests the MM sublayer to establish a MM connection, the MM sublayer will request the establishment of an RR connection to the RR sublayer if no RR connection to the desired mobile station exists. The MM sublayer is informed when the paging procedure is finished (see section 3.3.2) and the mobile station shall enter the MM state WAIT FOR NETWORK COMMAND.
When an RR connection is established (or if it already exists at the time the request is received), the MM sublayer may initiate any of the MM common procedures (except IMSI detach), it may request the RR sublayer to perform the RR classmark interrogation procedure and/or the ciphering mode setting procedure.
The network should use the information contained in *the Mobile Station Classmark Type* 2 IE on the mobile station's support for "Network Initiated MO CM Connection Request" to determine whether to:

not start this procedure (eg if an RR connection already exists), or,

to continue this procedure, or,

to release the newly established RR connection.

In the case of a "Network Initiated MO CM Connection Request" the network shall use the established RR connection to send a CM SERVICE PROMPT message to the mobile station.
If the mobile station supports "Network Initiated MO CM Connection Request", the MM sublayer of the MS gives an indication to the CM entity identified by the CM SERVICE PROMPT message and enters the MM sublayer state PROCESS CM SERVICE PROMPT. In the state PROCESS CM SERVICE PROMPT the MM sublayer waits for either the rejection or confirmation of the recall by the identified CM entity. Any other requests from the CM entities shall either be rejected or delayed until this state is left.
When the identified CM entity informs the MM sublayer, that it has send the first CM message in order to start the CM recall procedure the MM sublayer enters the state MM CONNECTION ACTIVE.
If the identified CM entity indicates that it will not perform the CM recall procedure and all MM connections are released by their CM entities the MS shall proceed according to section. 4.5.3.1. ~~the MM sublayer starts timer T3240 and enter the state WAIT FOR NETWORK COMMAND, expecting the release of the RR connection.~~

If the CM SERVICE PROMPT message is received by the MS in MM sublayer states WAIT FOR OUTGOING MM CONNECTION or in WAIT FOR ADDITIONAL OUTGOING MM CONNECTION then the mobile station shall send an MM STATUS message with cause ” Message not compatible with protocol state”.
A mobile that does not support “Network Initiated MO CM Connection Request” shall return an MM STATUS message with cause #97 “message type non-existent or not implemented” to the network.
If the mobile station supports “Network Initiated MO CM Connection Request” but the identified CM entity in the mobile station does not provide the associated support, then the mobile station shall send an MM STATUS message with cause “Service option not supported”. In the case of a temporary CM problem (eg lack of transaction identifiers) then the mobile station shall send an MM STATUS message with cause “Service option temporarily out of order”.
If an RR connection already exists and no MM specific procedure is running, the network may use it to send the CM SERVICE PROMPT message.
If the establishment of an RR connection is unsuccessful, or if any of the MM common procedures or the ciphering mode setting fail, this is indicated to the CM layer in the network with an appropriate error cause.
If an RR connection used for a MM specific procedure exists to the mobile station, the “Network Initiated MO CM Connection Request” may be rejected or delayed depending on implementation. When the MM specific procedure has been completed, the network may use the same RR connection for the delayed “Network Initiated MO CM Connection Request”.

********** Next Modified Section **********

4.5.3 MM connection release

An established MM connection can be released by the local CM entity. The release of the CM connection will then be done locally in the MM sublayer, i.e. no MM message are sent over the radio interface for this purpose.

4.5.3.1 Release of associated RR connection

If all MM connections are released by their CM entities, and no RRLP procedure (see 3GPP TS 44.031 [23b]) ~~or no~~ and no LCS procedure over RRC (see 3GPP TS 25.331 [23c]) is ongoing, the mobile station shall set timer T3240 and enter the state WAIT FOR NETWORK COMMAND, expecting the release of the RR connection.

If all MM connections are released by their CM entities and an RRLP procedure or LCS procedure over RRC is ongoing, the MS shall start the timer T3241 and enter the state RR CONNECTION RELEASE NOT ALLOWED.

If the MS is expecting the release of the RR connection in MM state WAIT FOR NETWORK COMMAND and an RRLP procedure- or LCS procedure over RRC is started, the MS shall stop the timer T3240, start the timer T3241 and enter the state RR CONNECTION RELEASE NOT ALLOWED.

If the MS is in MM state RR CONNECTION RELEASE NOT ALLOWED and the ongoing RRLP procedure or LCS procedure over RRC is finished, the MS shall stop the timer T3241, reset and start the timer T3240 and shall enter the state WAIT FOR NETWORK COMMAND.

In the network, if the last MM connection is released by its user, the MM sublayer may decide to release the RR connection by requesting the RR sublayer according to section 3.5. The RR connection may be maintained by the network, e.g. in order to establish another MM connection.

If the RR connection is not released within a given time controlled by the timer T3240 or T3241, the mobile station shall abort the RR connection. In both cases, either after a RR connection release triggered from the network side or after a RR connection abort requested by the MS-side, the MS shall return to MM IDLE state; the service state depending upon the current update status as specified in section 4.2.3.

********** Next Modified Section **********

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	- initiation of MM service or MM signalling	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 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)
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 section 11.2.1	see section 11.2.1	abort the RR connection
T3241	25	300s	see section 11.2.1	See section 11.2.1	abort the RR connection

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

Table 11.2/3GPP TS 24.008: Mobility management timers - network-side

TIMER NUM.	MM ST AT	TIME OUT VAL.	CAUSE FOR START	NORMAL STOP	AT THE EXPIRY	AT THE SECOND EXPIRY
T3250	6	12s	TMSI-REAL-CMD or LOC UPD ACC with new TMSI sent	TMSI-REALL-COM received	Optionally Release RR connection	
T3255		Note	LOC UPD ACC sent with"Follow on Proceed"	CM SERVICE REQUEST	Release RR Connection or use for mobile station terminating call	
T3260	5	12s	AUTHENT-REQUEST sent	AUTHENT-RESPONSE received AUTHENT-FAILURE received	Optionally Release RR connection	
T3270	4	12s	IDENTITY REQUEST sent	IDENTITY RESPONSE received	Optionally Release RR connection	

NOTE 2: The value of this timer is not specified by this recommendation.

********** **Next Modified Section** **********

11.2.1 Timer T3240 and Timer T3241

Timer T3240 is started in the mobile station when:

- the mobile station receives a LOCATION UPDATING ACCEPT message completing a location updating procedure in the cases specified in section 4.4.4.6 and 4.4.4.8;

- the mobile station receives a LOCATION UPDATING REJECT message in the cases specified in section 4.4.4.7;

- the mobile station has sent a CM SERVICE ABORT message as specified in section 4.5.1.7;

- the mobile station has released or aborted all MM connections in the cases specified in 4.3.2.5, 4.3.5.2, 4.5.1.1, and 4.5.3.1.

Timer T3240 is stopped, reset, and started again at receipt of an MM message.
Timer T3240 is stopped and reset (but not started) at receipt of a CM message that initiates establishment of an CM connection (an appropriate SETUP, REGISTER, or CP-DATA message as defined in GSM 04.08, GSM 04.10 or GSM 04.11).
Timer T3241 is started in the mobile station when entering MM state RR CONNECTION RELEASE NOT ALLOWED.
Timer T3241 is stopped and reset (but not started) when the MM state RR CONNECTION RELEASE NOT ALLOWED is left.
If timer T3241 expires, the MS shall abort the RR connection and enter the MM state MM IDLE.