Source: **TSG CN WG 1**

Title: **CRs to Rel-5 on Work Item TEI5 towards 24.008**

Agenda item: **8.8**

Document for: **APPROVAL**

Introduction:

This document contains **5** CRs on **Rel-5 to** Work Item **"TEI5"**, that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #17 for approval.

Spec	CR #	Rev	CAT	Rel	Tdoc Title	Meeting	TDoc #	C_Version
24.008	561	3	F	Rel-5	MM behaviour in case of a combined attach reject for the PS service	N1-25	N1-021640	5.4.0
24.008	652		F	Rel-5	MS behavior in case of change of network mode of operation	N1-25	N1-021638	5.4.0
24.008	653	1	F	Rel-5	MS behavior in case of T3312 expiry	N1-25	N1-021776	5.4.0
24.008	654	1	F	Rel-5	Ambiguous MM behavior in case of a failed combined Attach or RAU	N1-25	N1-021777	5.4.0
24.008	687		F	Rel-5	Precedence of different RAU	N1-25	N1-021741	5.4.0

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CHANGE REQUEST

| ⌘ | **24.008** CR **652** | ⌘**rev** | **-** | ⌘ | Current version: | **5.4.0** | ⌘ |

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Proposed change affects: UICC apps⌘ ☐ ME **X** Radio Access Network ☐ Core Network **X**

Title: ⌘	MS behavior in case of change of network mode of operation	
Source: ⌘	Siemens AG	
Work item code: ⌘	TEI5	***Date:*** ⌘ 17.07.2002
Category: ⌘ **F**		***Release:*** ⌘

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

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change: ⌘	In case of a GSM to UMTS inter-system change it is defined for the change from GSM II/III->UMTS II it is defined that a Normal Location Update shall be performed. Nevertheless this LU is not needed, if the MS doesn't enter a new LA.
Summary of change: ⌘	As the sec. 4.7.1.6.4 describes the change of network mode of operation at GSM to UMTS inter-system change the case GSM II/III->UMTS II must not be described at all in this section.
Consequences if not approved: ⌘	Unnecessary network load and MS power consumption as the MS is required to perform a LU even if the LA hasn't change and thus the LU would not be necessary at all.

Clauses affected: ⌘	4.7.1.6.3; 4.7.1.6.4

		Y	N		
Other specs affected:	⌘		X	Other core specifications ⌘	
		X		Test specifications	51.010
			X	O&M Specifications	

Other comments: ⌘	

4.7.1.6   Change of network mode of operation

In the following tables below the abbreviations 'GSM I', 'GSM II' and 'GSM III' are used for network operation mode I, II and III in GSM.

In the following tables below the abbreviations 'UMTS I' and 'UMTS II' are used for network operation modes I and II in UMTS.

4.7.1.6.1   Change of network mode of operation in GSM (GSM only)

Whenever an MS moves to a new RA, the procedures executed by the MS depend on the network mode of operation in the old and new routing area.

In case the MS is in state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED and is in operation mode:

a) A or B (with the exceptions in b and c below), the MS shall execute:

Table 4.7.1.6.1/3GPP TS 24.008: Mode A or B

Network operation mode change	Procedure to execute
I → II or I → III	Normal Location Update(*), followed by a Normal Routing Area Update
II → III or III → II	Normal Location Update (see subclause 4.2.2), followed by a Normal Routing Area Update
II → I or III → I	Combined Routing Area Update with IMSI attach

b) B which reverts to operation mode C in network operation mode III, the MS shall execute:

Table 4.7.1.6.2/3GPP TS 24.008: Mode B which reverts into mode C in network operation mode III

Network operation mode change	Procedure to execute
I → II	Normal Location Update(*), followed by a Normal Routing Area Update
I → III or II → III	IMSI Detach (see subclause 4.3.4), followed by a Normal Routing Area Update
II → I or III → I	Combined Routing Area Update with IMSI attach
III → II	IMSI attach (see subclause 4.4.3), followed by a Normal Routing Area Update

c) B which reverts to IMSI attached for CS services only in network operation mode III, the MS shall execute:

Table 4.7.1.6.3/3GPP TS 24.008: Mode B which reverts into IMSI attached for CS services only in network operation mode III

Network operation mode change	Procedure to execute
I → II	Normal Location Update(*), followed by a Normal Routing Area Update
I → III	Normal Location Update(*), followed by a GPRS Detach with type indicating "GPRS Detach"
II → III	Normal Location Update (see subclause 4.2.2), followed by a GPRS Detach with detach type indicating "GPRS Detach"
II → I	Combined Routing Area Update with IMSI attach
III → I	Combined GPRS Attach
III → II	Normal Location Update (see subclause 4.2.2), followed by a Normal GPRS Attach

(*) Intended to remove the Gs association in the MSC/VLR.

Further details are implementation issues.

4.7.1.6.2 Change of network mode of operation in UMTS (UMTS only)

Whenever an MS moves to a new RA, the procedures executed by the MS depend on the network mode of operation in the old and new routing area.

In case the MS is in state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED and is in operation mode A, the MS shall execute:

Table 4.7.1.6.4/3GPP TS 24.008: Mode A

Network operation mode change	Procedure to execute
I → II	Normal Location Update(*), followed by a Normal Routing Area Update
II → I	Combined Routing Area Update with IMSI attach

(*)   Intended to remove the Gs association in the MSC/VLR.

Further details are implementation issues.

4.7.1.6.3 Change of network mode of operation at UMTS to GSM inter-system change

Whenever an MS moves to a new RA supporting the GSM radio interface, the procedures executed by the MS depend on the network mode of operation in the old and new routing area.

In case the MS is in state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED and is in operation mode:

   a) A in UMTS, an MS that changes to GPRS operation mode A or B in GSM shall execute:

Table 4.7.1.6.5/3GPP TS 24.008: Mode A in UMTS changing to GPRS mode A or B in GSM

Network operation mode change	Procedure to execute
UMTS I → GSM I	Combined Routing Area Update
UMTS II → GSM I	Combined Routing Area Update with IMSI attach(**)
UMTS I → GSM II or UMTS I → GSM III	Normal Location Update(*), followed by a Normal Routing Area Update

   b) A in UMTS, an MS that changes due to MS specific characteristics to GPRS operation mode C in network operation mode III in GSM shall execute:

Table 4.7.1.6.6/3GPP TS 24.008: Mode A in UMTS changing to GPRS mode C in GSM

Network operation mode change	Procedure to execute
UMTS I → GSM III or UMTS II → GSM III	IMSI detach (see subclause 4.3.4), followed by a Normal Routing Area Update

   c) A in UMTS, an MS that changes due to MS specific characteristics to IMSI attached for CS services only in network operation mode III in GSM shall execute:

Table 4.7.1.6.7/3GPP TS 24.008: Mode A in UMTS changing to IMSI attached for CS services only in GSM

Network operation mode change	Procedure to execute
UMTS I → GSM III or UMTS II → GSM III	Normal Location Update (see subclause 4.4.1) if a new LA is entered, followed by a GPRS Detach with detach type indicating "GPRS Detach"

   d) C in UMTS, the MS shall change to GPRS operation mode C in GSM and shall execute the normal Routing Area Update procedure.

e) CS in UMTS, the MS shall execute the normal Location Update procedure.

(*)   Intended to remove the Gs association in the MSC/VLR.

(**)   Intended to establish the Gs association in the MSC/VLR.

Further details are implementation issues.

4.7.1.6.4   Change of network mode of operation at GSM to UMTS inter-system change

Whenever an MS moves to a new RA supporting the UMTS radio interface, the procedures executed by the MS depend on the network mode of operation in the old and new routing area.

In case the MS is in state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED and is in operation mode:

a) A or B in GSM, the MS shall change to operation mode A in UMTS and shall execute:

Table 4.7.1.6.8/3GPP TS 24.008: Mode A or B in GSM changing to mode A in UMTS

Network operation mode change	Procedure to execute
GSM I → UMTS I	Combined Routing Area Update
GSM II → UMTS I	Combined Routing Area Update with IMSI attach(**)
GSM I → UMTS II	Normal Location Update(*), followed by a Normal Routing Area Update
~~GSM II → UMTS II or~~ ~~GSM III → UMTS II~~	~~Normal Location Update, followed by a Normal Routing Area Update~~

b) C in GSM, an MS that changes to operation mode C in UMTS shall execute a Normal Routing Area Update.

c) C in GSM, an MS that, due to MS specific characteristics operated in GPRS operation mode C in network operation mode III in GSM changes to operation mode A in UMTS shall execute:

Table 4.7.1.6.9/3GPP TS 24.008: Mode C changing to mode A in UMTS

Network operation mode change	Procedure to execute
GSM III → UMTS I	Combined Routing Area Update with IMSI attach(**)
GSM III → UMTS II	IMSI attach (see subclause 4.4.3), ~~F~~followed by a Normal Routing Area Update

d) IMSI attached for non-GPRS services only, an MS that, due to MS specific characteristics, operated in network operation mode III in GSM and changes to operation mode A in UMTS shall execute:

Table 4.7.1.6.10/3GPP TS 24.008: IMSI attached for non-GPRS services only changing to mode A in UMTS

Network operation mode change	Procedure to execute
GSM III → UMTS I	Combined GPRS Attach for GPRS and non-GPRS services(**)
GSM III → UMTS II	GPRS Attach

(*)   Intended to remove the Gs association in the MSC/VLR.

(**)   Intended to establish the Gs association in the MSC/VLR.

Further details are implementation issues.

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CHANGE REQUEST

| ⌘ | **24.008** CR **561** | ⌘**rev** | **3** | ⌘ | Current version: | **5.4.0** | ⌘ |

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Proposed change affects: UICC apps⌘ ☐   ME **X** Radio Access Network ☐   Core Network ☐

Title: ⌘	MM behaviour in case of a combined attach reject for the PS service
Source: ⌘	Siemens AG
Work item code: ⌘ TEI5	***Date:*** ⌘ 15.07.02
Category: ⌘ **F**	***Release:*** ⌘ REI-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
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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)
Rel-6 (Release 6)

Reason for change: ⌘	The current definition of the MS reaction upon a on a the reject of the combined attach with cause #7 and #14 in sec. 4.7.3.2.4 could be misinterpreted in such a manner that a MM IMSI attach must be performed irrespective whether the MS was already attached for the CS service or not. "*... an IMSI attach for non-GPRS services by use of the MM IMSI attach procedure* " The IMSI attach procedure itself is described in 24.008 sec. 4.4.3, where it is clearly defined that a IMSI attach with explicit MM signalling shall only performed once after the MS is activated, the ATT flag is set and the MS was updated in the current LA. The intention of the current definition was a reference to the MM description of the IMSI attach procedure, where the conditions for a explicit MM signalling via a LU procedure are described. But unfortunately this wording has the risk of misinterpretation.
Summary of change: ⌘	In order to avoid misinterpretations it is proposed to distinguish between the case the MS is not already IMSI attached(typical for a MS with a 'auto attach for the PS service' option enabled) and the case where the PS service is activated after the MS is already IMSI attached for the CS service. For the first case the IMSI attach shall be performed according the conditions described in the MM section. For the second case no IMSI attach is needed and the MS shall only perform a LU if necessary.
Consequences if not approved: ⌘	Misinterpretations of the required MS behaviour due to an combined attach reject with cause #7 and #14 and in consequence additional network load due to unnecessary LU signalling. Further more the LU type "IMSI attach" may not be used once the MS is IMSI attached for the CS service, but this will be done if the

Clauses affected: ✂ 4.7.3.2.4

	Y	N		
Other specs ✂		X	Other core specifications ✂	
affected:	X		Test specifications	51.010
		X	O&M Specifications	

Other comments: ✂

4.7.3.2.4   Combined GPRS attach not accepted by the network

If the attach request can neither be accepted by the network for GPRS nor for non-GPRS services, an ATTACH REJECT message is transferred to the MS. The MS receiving the ATTACH REJECT message stops timer T3310, and for all causes except #12, #14 and #15 deletes the list of "equivalent PLMNs".

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

3   (Illegal MS);

6   (Illegal ME), or

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

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

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

7   (GPRS services not allowed);

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

A GPRS MS operating in MS operation mode A or B which is not yet IMSI attached for CS services in the network shall then perform an IMSI attach for non-GPRS services by use of according the conditions for the MM IMSI attach procedure (see 4.4.3).; a GPRS MS operating in MS operation mode B shall then perform an IMSI attach for non-GPRS services by use of the MM IMSI attach procedure.

A GPRS MS operating in MS operation mode A or B which is already IMSI attached for CS services in the network is still IMSI attached for CS services in the network and shall then proceed with the appropriate MM specific procedure according to the MM service state.

11   (PLMN not allowed);

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

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

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

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

12   (Location area not allowed);

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

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

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

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

13   (Roaming not allowed in this location area);

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

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

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

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

14   (GPRS services not allowed in this PLMN);

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

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

A GPRS MS operating in MS operation mode A or B which is not yet IMSI attached for CS services in the network shall then perform an IMSI attach for non-GPRS services by use of according the conditions for the MM IMSI attach procedure (see 4.4.3).

A GPRS MS operating in MS operation mode A or B which is already IMSI attached for CS services in the network is still IMSI attached for CS services in the network and shall then proceed with the appropriate MM specific procedure according to the MM service state.

15   (No Suitable Cells In Location Area);

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

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

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

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

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is specified in subclause 4.7.3.2.5.

*** following sections for information only ***

4.4.3 IMSI attach procedure

The IMSI attach procedure is the complement of the IMSI detach procedure (see clause 4.3.4). It is used to indicate the IMSI as active in the network.

In GSM, a flag (ATT) is broadcast in the L3-RR SYSTEM INFORMATION TYPE 3 message. It indicates whether the attach and detach procedures are required to be used or not.

In UMTS, a flag (ATT) is broadcast in the L3-RRC SYSTEM INFORMATION BLOCK 1 message. It indicates whether the attach and detach procedures are required to be used or not.

The IMSI attach procedure is invoked if the detach/attach procedures are required by the network and an IMSI is activated in a mobile station (i.e. activation of a mobile station with plug-in SIM, insertion of a card in a card-operated mobile station etc.) within coverage area from the network or a mobile station with an IMSI activated outside the coverage area enters the coverage area. The IMSI attach procedure is used only if the update status is UPDATED and if the stored Location Area Identification is the same as the one which is actually broadcasted on the BCCH of the current serving cell. Otherwise a normal location updating procedure (see clause 4.4.1) is invoked independently of the ATT flag indication.

IMSI attach is performed by using the location updating procedure. The location updating type information element in the LOCATION UPDATING REQUEST message shall in this case indicate IMSI attach.

*** next section ***

4.7.4.2 Network initiated GPRS detach procedure

4.7.4.2.1 Network initiated GPRS detach procedure initiation

The network initiates the GPRS detach procedure by sending a DETACH REQUEST message to the MS. The DETACH REQUEST message shall include a detach type IE. In addition, the network may include a cause IE to specify the reason for the detach request. The network shall start timer T3322. If the detach type IE indicates "re-attach not required" or "re-attach required", the network shall deactivate the PDP contexts and deactivate the logical link(s), if any, and shall change to state GMM-DEREGISTERED-INITIATED.

4.7.4.2.2 Network initiated GPRS detach procedure completion by the MS

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

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

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

When receiving the DETACH REQUEST message and the detach type IE indicates "IMSI detach", the MS shall not deactivate the PDP contexts. The MS shall set the MM update status to U2 NOT UPDATED. A MS in operation mode

A or B in network operation mode I may send a DETACH ACCEPT message to the network, and shall re-attach to non-GPRS service by performing the combined routing area updating procedure according to clause 4.7.5.2, sending a ROUTING AREA UPDATE REQUEST message with Update type IE indicating "combined RA/LA updating with IMSI attach". A MS in operation mode C, or in MS operation mode A or B in network operation mode II or III, shall send a DETACH ACCEPT message to the network.

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

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

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

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

2   (IMSI unknown in HLR)

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

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

3   (Illegal MS);

6   (Illegal ME);

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

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

7   (GPRS services not allowed);

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

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

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

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

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

11   (PLMN not allowed);

12   (Location area not allowed);

13   (Roaming not allowed in this location area), or

15   (No Suitable Cells In Location Area).

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

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

The MS shall store the LAI or the PLMN identity in the appropriate forbidden list, i.e. in the "forbidden PLMN list" for cause #11, in the list of "forbidden location areas for regional provision of service" for cause #12, or in the list of "forbidden location areas for roaming" for cause #13 and #15. If #11or #13 was received, the MS shall perform a PLMN selection instead of a cell selection. If cause #15 was received the MS shall search for a suitable cell in a different location area on the same PLMN.

14   (GPRS services not allowed in this PLMN)

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

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

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

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

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

*** next section ***

4.7.5.2.4   Combined routing area updating not accepted by the network

If the combined routing area updating cannot be accepted, the network sends a ROUTING AREA UPDATE REJECT message to the MS. An MS that receives a ROUTING AREA UPDATE REJECT message stops timer T3330, deletes the list of equivalent PLMNs, and enters state MM IDLE. The MS shall then take different actions depending on the received reject cause:

3   (Illegal MS);

6   (Illegal ME), or

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

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

7   (GPRS services not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED. If in the MS the timer T3212 is not already running, the timer shall be set to its initial value and restarted.

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for CS services in the network and shall then proceed with the appropriate MM specific procedure according to the MM service state.

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

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

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

10   (Implicitly detached);

A GPRS MS operating in MS operation mode A or B in network operation mode I, is IMSI detached for both GPRS and CS services in the network.

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

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

11   (PLMN not allowed);

12   (Location area not allowed);

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

15   (No Suitable Cells In Location Area).

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED and the update status to U3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, TMSI, RAI, LAI, ciphering key sequence number GPRS ciphering key sequence number, and reset the location update attempt counter.

The MS shall store the LAI or the PLMN identity in the appropriate forbidden list, i.e. in the "forbidden PLMN list" for cause #11, in the list of "forbidden location areas for regional provision of service" for cause #12, or in the list of "forbidden location areas for roaming" for cause #13 and #15. If #11 or #13 was received, the MS shall then perform a PLMN selection instead of a cell selection. If cause #15 was received the MS shall search for a suitable cell in a different location area on the same PLMN.

14   (GPRS services not allowed in this PLMN)

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to clause 4.1.3.2) and shall change to state GMM-DEREGISTERED. If in the MS the timer T3212 is not already running, the timer shall be set to its initial value and restarted.

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

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for CS services in the network and shall then proceed with the appropriate MM specific procedure according to the MM service state.

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is described in clause 4.7.5.2.5.

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CHANGE REQUEST

| ⌘ | **24.008** | CR | **687** | ⌘**rev** | **-** | ⌘ | Current version: | **5.4.0** | ⌘ |

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

Proposed change affects: UICC apps⌘ ☐   ME **X** Radio Access Network ☐   Core Network **X**

Title:	⌘	Precedence of different RAU
Source:	⌘	Siemens AG
Work item code: ⌘	TEI5	**Date:** ⌘ 10/07/2002
Category: ⌘	**F**	**Release:** ⌘ Rel-5

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

Use <u>one</u> 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)
Rel-6   (Release 6)

Reason for change:	⌘	There are two conflicting requirements at intersystem change from GSM to UMTS if the READY timer is not running and the GPRS service has been suspended. The "selective RAU" feature requires that no RAU is sent (section 4.7.1.7. paragraph b) but it is also required that the GPRS service is resumed (section 4.7.1.7. paragraph c).

The requirement that the traffic has to be resumed (see also 23.060 section 16.2.1.1.) preceeds the selective RAU which has to be reflected in the section 4.7.1.7. |
| **Summary of change:** ⌘ | | Send RAU always at intersystem change and ongoing CS connection |
| **Consequences if not approved:** | ⌘ | Different interpretation if RAU has to be sent immediately to resume the traffic at GSM to UMTS intersystem change which results in temporary unavailability of the MS for downlink traffic |

Clauses affected:	⌘	

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

Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm.
Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

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

4.7.1.7   Intersystem change between GSM and UMTS

For the UMTS to GSM and GSM to UMTS intersystem change the following cases can be distinguished:

a) Intersystem change between cells belonging to different RA's:

The procedures executed by the MS depends on the network mode of operation in the old and new RA. If a change of the network operation mode has occurred in the new RA, then the MS shall behave as specified in subclause 4.7.1.6. If no change of the network operation mode has occurred in the new RA, then the MS shall initiate the normal or combined RA update procedure depending on the network operation mode in the current RA.

b) Intersystem change between cells belonging to the same RA:

If the READY timer is running in the MS in GSM or the MS is in PMM-CONNECTED mode in UMTS, then the MS shall perform a normal or combined RA update procedure depending on the network mode of operation in the current RA.

If the READY timer is not running in the MS in GSM or the MS is in PMM-IDLE mode in UMTS, then the MS shall not perform a RA update procedure (as long as the MS stays within the same RA) until up-link user data or signalling information needs to be sent from the MS to the network,.except case c) is applicable.

- If the MS is in the same access network, GSM or UMTS, as when it last sent user data or signalling messages, the procedures defined for that access system shall be followed. This shall be sending of an LLC PDU in a GSM cell or initiating the SERVICE REQUEST procedure in a UMTS cell.

- If the MS is in a different access network, GSM or UMTS, as when it last sent user data or signalling messages, the normal or combined RA update procedure shall be performed depending on the network operation mode in the current RA, before the sending of user data or signalling messages. If the signalling message is a DETACH REQUEST containing cause "power off", the RA update procedure need not to be performed.

- If the periodic routing area update timer expires the MS shall initiate the periodic RA update procedure.

If the READY timer is not running in the network in GSM or the network is in PMM-IDLE mode in UMTS, then the network shall page the MS if down-link user data or signalling information needs to be sent from the network to the MS. This shall include both GSM and UMTS cells.

- If the MS receives the paging indication in the same access network, GSM or UMTS, as when it last sent user data or signalling information, the MS shall send any LLC PDU in a GSM cell or shall initiate the SERVICE REQUEST procedure indicating service type "paging response" in a UMTS cell.

- If the MS receives the paging indication in a different access network, GSM or UMTS, as when it last sent user data or signalling information, the normal or combined RA update procedure shall be performed depending on the network operation mode in the current RA.

c) Intersystem handover from GSM to UMTS during a CS connection:

After the successful completion of the handover from an GSM cell to an UMTS cell, an MS which has performed the GPRS suspension procedure in Gb mode (see TS 44.018 [84]) (i.e. an MS in MS operation mode B or an DTM MS in a GSM cell that does not support DTM) shall perform a normal RA update procedure in the UMTS cell in order to resume the GPRS services in the network, before sending any other signalling messages or user data.

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CHANGE REQUEST

⌘ **24.008** CR **653** ⌘ **rev** **1** ⌘ Current version: **5.4.0** ⌘

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Proposed change affects: UICC apps⌘ ☐ ME **X** Radio Access Network ☐ Core Network **X**

Title: ⌘	MS behavior in case of T3312 expiry	
Source: ⌘	Siemens AG	
Work item code: ⌘	TEI5	**Date:** ⌘ 30.07.02
Category: ⌘ **F**		**Release:** ⌘ Rel-5

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

Use *one* of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change: ⌘	Up to now in the description of the MS behaviour in the case T3312 expires out of coverage it is not distinguished between the case where a Gs association is established in network mode I and the network mode II/III case. In the network mode I case there are certain scenarios where a MM Location update procedure or a combined RAU with IMSI attach needs to be performed in order to establish or break the Gs association, which are not applicable in the network mode II/III case. Especially it is defined that a Location update shall be performed if the MS returns in a cell of the same RA in network mode II/III even if the Gs association was never established. Furthermore it is not specified how to treat a T3312 expiry during a ongoing CS connection.
Summary of change: ⌘	It is proposed to distinguish between the case where T3312 was started in network mode II and II/III. For the case of T3212 expiry during an ongoing CS connection it is clarified, that the event should be treated analogous to the out of coverage case once the connecting is release.
Consequences if not approved: ⌘	Missing definitions for the case of T3212 expiry out of coverage if the network is in network mode II/III with the risk of wrong MS implementation and especially unnecessary performed Location update procedures. Missing definitions for the case of T3212 expiry during an ongoing CS connection with the risk that the necessary RAU is skipped and in consequence the MS is detached locally by the network.
Clauses affected: ⌘	4.7.2.2
	Y N

Other specs affected:	⌘		**X**	Other core specifications	⌘	
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

4.7.2.2   Periodic routing area updating

Periodic routing area updating is used to periodically notify the availability of the MS to the network. The procedure is controlled in the MS by the periodic RA update timer, T3312. The value of timer T3312 is sent by the network to the MS in the messages ATTACH ACCEPT and ROUTING AREA UPDATE ACCEPT. The value of the timer T3312 shall be unique within a RA.

In GSM, the timer T3312 is reset and started with its initial value, when the READY timer is stopped or expires. The timer T3312 is stopped and shall be set to its initial value for the next start when the READY timer is started. If after a READY timer negotiation the READY timer value is set to zero, timer T3312 is reset and started with its initial value. If the initial READY timer value is zero, the timer T3312 is reset and started with its initial value, when the ROUTING AREA UPDATE REQUEST message is transmitted.

In UMTS, the timer T3312 is reset and started with its initial value, when the MS goes from PMM-CONNECTED to PMM-IDLE mode. The timer T3312 is stopped when the MS enters PMM-CONNECTED mode.

When timer T3312 expires, the periodic routing area updating procedure shall be started and the timer shall be set to its initial value for the next start.

If the MS is in other state than GMM-REGISTERED.NORMAL-SERVICE when the timer expires the periodic routing area updating procedure is delayed until the MS returns to GMM-REGISTERED.NORMAL-SERVICE.

In GSM, if the MS in MS operation mode B is in the state GMM-REGISTERED.SUSPENDED when the timer expires the periodic routing area updating procedure is delayed until the state is left.

The network supervises the periodic routing area updating procedure by means of the Mobile Reachable timer. The Mobile Reachable timer shall be longer than the periodic RA update timer. When the Mobile Reachable timer expires, typically the network stops sending paging messages to the mobile and may take other appropriate actions.

In GSM, the Mobile Reachable timer is reset and started with its initial value, when the READY timer is stopped or expires. The Mobile Reachable timer is stopped and shall be set to its initial value for the next start when the READY timer is started.

In GSM, if after a READY timer negotiation the READY timer value is set to zero the Mobile Reachable timer is reset and started with its initial value. If the initial READY timer value is zero, the Mobile Reachable is reset and started with its initial value, when the ROUTING AREA UPDATE REQUEST message is received.

In UMTS, the Mobile Reachable timer is reset and started with its initial value, when the MS goes from PMM-CONNECTED to PMM-IDLE mode. The Mobile Reachable timer is stopped when the MS enters PMM-CONNECTED mode.

If the MS is both IMSI attached for GPRS and non-GPRS services, and if the MS lost coverage of the registered PLMN and timer T3312 expires, then:

a) if the MS returns to coverage in a cell that supports GPRS and that indicates that the network is in network operation mode I, then the MS shall either perform the combined routing area update procedure indicating "combined RA/LA updating with IMSI attach"; or

b) if the MS returns to coverage in a cell in the same RA that supports GPRS and that indicates that the network is in network operation mode II or III, then the MS shall perform the periodic routing area updating procedure indicating "Periodic updating" and shall perform the periodic location updating procedure; or

c) If the MS was both IMSI attached for GPRS and non-GPRS services in network operation mode I and if the MS returns to coverage in a cell in the same LA that does not support GPRS, then, depending upon the LA of the cell, the MS shall either perform the periodic location updating procedure or a normal location updating procedure. In addition, the MS shall perform a combined routing area update procedure indicating "combined RA/LA updating with IMSI attach" when the MS enters a cell that supports GPRS and that indicates that the network is in network operation mode I; or

d) if the MS returns to coverage in a new RA the description given in subclause 4.7.5 applies.

If the MS is both IMSI attached for GPRS and non-GPRS services in a network that operates in network operation mode I, and if the MS has camped on a cell that does not support GPRS, and timer T3312 expires, then the MS shall start an MM location updating procedure. In addition, the MS shall perform a combined routing area update procedure

indicating "combined RA/LA updating with IMSI attach" when the MS enters a cell that supports GPRS and indicates that the network is in operation mode I.

If timer T3312 expires during an ongoing CS connection, then a MS operating in MS operation mode B shall treat the expiry of T3312 when the MM state MM-IDLE is entered analogous to the descriptions for the cases when the timer expires out of coverage or in a cell that does not support GPRS.

In GSM, timer T3312 shall not be stopped when a GPRS MS enters state GMM-REGISTERED.SUSPENDED.

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CHANGE REQUEST

| | ⌘ | **24.008** CR **654** | ⌘ **rev** **1** | ⌘ | Current version: | **5.4.0** | ⌘ |

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Proposed change affects: UICC apps⌘ ☐ ME **X** Radio Access Network ☐ Core Network ☐

Title:	⌘	Ambiguous MM behavior in case of a failed combined Attach or RAU
Source:	⌘	Siemens AG
Work item code:⌘	TEI5	***Date:*** ⌘ 30.07.2002
Category:	⌘ **F**	***Release:*** ⌘ REL-5

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

Use *one* of the following releases:
  2   (GSM Phase 2)
  R96 (Release 1996)
  R97 (Release 1997)
  R98 (Release 1998)
  R99 (Release 1999)
  Rel-4 (Release 4)
  Rel-5 (Release 5)
  Rel-6 (Release 6)

Reason for change:	⌘	If a combined RAU fails and the attach or RAU attempt counter is greater or equal to 5 it is ambiguous whether the MM specific procedures should be activated and the MS should behave as if the network mode is II/III or not. With a CR on 51.010(GP-021364). both options are allowed in the test specification. But as these two alternative lead to different MS behaviour which impacts the reach ability for MT CS services a clear definition should be achieved.
Summary of change:⌘		It is proposed to define, that the MS shall re-activate the MM specific procedure and act as in network mode II/III once the attach or RAU attempt counter is greater or equal to 5.
Consequences if not approved:	⌘	Risk of different MS implementations which directly impacts the reach ability for MT CS services.

Clauses affected:	⌘	4.1.1.2.1; 4.7.3.2.3.2; 4.7.3.2.5; 4.7.5.2.3.2; 4.7.5.2.5

	Y	N		
Other specs affected: ⌘			Other core specifications	⌘
	X		Test specifications	51.010
			O&M Specifications	

Other comments:	⌘	

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

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

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

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

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

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

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

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

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

4.7.3.2.3   Combined GPRS attach accepted by the network

Depending on the value of the attach result IE received in the ATTACH ACCEPT message, two different cases can be distinguished:

Case 1)   The attach result IE value indicates "combined GPRS attach": IMSI attach for GPRS and non-GPRS services have been successful.

Case 2)   The attach result IE value indicates "GPRS only": IMSI attach for GPRS services has been successful but IMSI attach for non-GPRS services has not been successful.

4.7.3.2.3.1   Combined attach successful for GPRS and non-GPRS services

The description for IMSI attach for GPRS services as specified in subclause 4.7.3.1.3 shall be followed. In addition, the following description for IMSI attach for non-GPRS services applies.

The TMSI reallocation may be part of the combined GPRS attach procedure. The TMSI allocated is then included in the ATTACH ACCEPT message together with the location area identification (LAI). The network shall, in this case, change to state GMM-COMMON-PROCEDURE-INITIATED and shall start timer T3350 as described in subclause 4.7.6.

The MS, receiving an ATTACH ACCEPT message, stores the received location area identification and, if supported by the SIM, the currently selected access technology, stops timer T3310, reset the location update attempt counter and sets the update status to U1 UPDATED. If the message contains an IMSI, the mobile station is not allocated any TMSI, and shall delete any TMSI accordingly. If the message contains a TMSI, the MS shall use this TMSI as the new temporary identity. The MS shall delete its old TMSI and shall store the new TMSI. In this case, an ATTACH COMPLETE message is returned to the network. If neither a TMSI nor an IMSI has been included by the network in the ATTACH ACCEPT message, the old TMSI, if any available, shall be kept. The new MM state is MM IDLE, the new GMM state is GMM-REGISTERED.

Any timer used for triggering the location update procedure (e.g T3211, T3212) shall be stopped if running.

The network receiving an ATTACH COMPLETE message stops timer T3350, changes to state GMM-REGISTERED and considers the new TMSI as valid.

4.7.3.2.3.2   Combined attach successful for GPRS services only

The description for IMSI attach for GPRS services as specified in subclause 4.7.3.1.3 shall be followed. In addition, the following description for IMSI attach for non-GPRS services applies.

The MS receiving the ATTACH ACCEPT message takes one of the following actions depending on the reject cause:

2   (IMSI unknown in HLR)

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

16   (MSC temporarily not reachable)

17   (Network failure); or

22   (Congestion)

The MS shall change to state GMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. Timer T3310 shall be stopped if still running. The routing area updating attempt counter shall be incremented.

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

-    the MS shall keep the GMM update status GU1 UPDATED and changes state to GMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. The MS shall start timer T3311. When timer T3311 expires the combined routing area update procedure indicating "combined RA/LA updating with IMSI attach" is triggered again.

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

- the MS shall start timer T3302 and shall change to state GMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM;

- a GPRS MS operating in MS operation mode A shall then proceed with appropriate MM specific procedure; a GPRS MS operating in MS operation mode B may then proceed with appropriate MM specific procedures. The MM sublayer shall act as in network operation mode II <u>or III (depending whether a PCCCH is present)</u> as long as the combined GMM procedures are not successful and no new RA is entered. The new MM state is <u>MM</u> IDLE.

Other values are considered as abnormal cases. The combined attach procedure shall be considered as failed for GPRS and non-GPRS services. The behaviour of the MS in those cases is specified in subclause 4.7.3.2.5.

4.7.5.2.4 Combined routing area updating not accepted by the network

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

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

3   (Illegal MS);

6   (Illegal ME), or

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

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

7   (GPRS services not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED. If in the MS the timer T3212 is not already running, the timer shall be set to its initial value and restarted.

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for CS services in the network. and shall then proceed with the appropriate MM specific procedure according to the MM service state.

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

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

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

10   (Implicitly detached);

A GPRS MS operating in MS operation mode A or B in network operation mode I, is IMSI detached for both GPRS and CS services in the network.

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

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

11   (PLMN not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED and the update status to U3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, TMSI, RAI, LAI, ciphering key sequence number GPRS ciphering key sequence number, and reset the location update attempt counter.

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

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

12   (Location area not allowed);

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

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

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

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

13   (Roaming not allowed in this location area);

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

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

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

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

14   (GPRS services not allowed in this PLMN);

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall change to state GMM-DEREGISTERED. If in the MS the timer T3212 is not already running, the timer shall be set to its initial value and restarted.

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

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for CS services in the network and shall then proceed with the appropriate MM specific procedure according to the MM service state.

15   (No Suitable Cells In Location Area);

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

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

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

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

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is described in subclause 4.7.5.2.5.

4.7.3.2.5   Abnormal cases in the MS

The abnormal cases specified in subclause 4.7.3.1.5 apply with the following modification:

~~If the GPRS attach attempt counter is less than 5, the MM state remains MM LOCATION UPDATING PENDING.~~

If the GPRS attach attempt counter is incremented according to subclause 4.7.3.1.5 the next actions depend on the Location Area Identities (stored on SIM and the one of the current serving cell) and the value of the attach attempt counter:

- if the update status is U1 UPDATED, and the stored LAI is equal to the one of the current serving cell and the attach attempt counter is smaller than 5, then the mobile station shall keep the update status to U1 UPDATED, the new MM state is MM IDLE substate NORMAL SERVICE; ~~or~~

- if the attach attempt counter is smaller than 5 and, additionally, if the update status is different from U1 UPDATED~~,~~ or the stored LAI is different from the one of the current serving cell~~, or the attach attempt counter is greater or equal to 5~~, then the mobile station shall delete any LAI, TMSI, ciphering key sequence number stored in the SIM and list of equivalent PLMNs and set the update status to U2 NOT UPDATED. The MM state remains MM LOCATION UPDATING PENDING; or

- if the attach attempt counter is greater or equal to 5, then the mobile station shall delete any LAI, TMSI, ciphering key sequence number stored in the SIM and list of equivalent PLMNs and set the update status to U2 NOT UPDATED.
  A GPRS MS operating in MS operation mode A shall then proceed with appropriate MM specific procedure; a GPRS MS operating in MS operation mode B may then proceed with appropriate MM specific procedures. The MM sublayer shall act as in network operation mode II or III (depending whether a PCCCH is present) as long as the combined GMM procedures are not successful and no new RA is entered. The new MM state is MM IDLE substate ATTEMPTING TO UPDATE.

*** routing are update sections ***

4.7.5.2.3.1 Combined routing area updating successful

The description for normal routing area update as specified in subclause 4.7.5.1.3 shall be followed. In addition, the following description for location area updating applies.

The handling at the receipt of the ROUTING AREA UPDATE ACCEPT depends on the value received in the update result IE as specified below.

The TMSI reallocation may be part of the combined routing area updating procedure. The TMSI allocated is then included in the ROUTING AREA UPDATE ACCEPT message together with the location area identification (LAI). The network shall, in this case, change to state GMM-COMMON-PROCEDURE-INITIATED and shall start the timer T3350 as described in subclause 4.7.6.

The MS, receiving a ROUTING AREA UPDATE ACCEPT message, stores the received location area identification and, if supported by the SIM, the currently selected access technology, stops timer T3330, enters state MM IDLE, reset the location update attempt counter and sets the update status to U1 UPDATED. If the ROUTING AREA UPDATE ACCEPT message contains an IMSI, the mobile station is not allocated any TMSI, and shall delete any TMSI accordingly. If the ROUTING AREA UPDATE ACCEPT message contains a TMSI, the MS shall use this TMSI as new temporary identity. The MS shall delete its old TMSI and shall store the new TMSI. In this case, an ROUTING AREA UPDATE COMPLETE message is returned to the network. If neither a TMSI nor an IMSI has been included by the network in the ROUTING AREA UPDATE ACCEPT message, the old TMSI, if any is available, shall be kept.

Any timer used for triggering the location updating procedure (e.g. T3211, T3212) shall be stopped if running.

The network receiving a ROUTING AREA UPDATE COMPLETE message stops timer T3350, changes to GMM-REGISTERED state and considers the new TMSI as valid.

4.7.5.2.3.2 Combined routing are updating successful for GPRS services only

The description for normal routing area update as specified in subclause 4.7.5.1.3 shall be followed. In addition, the following description for location area updating applies.

The MS receiving the ROUTING AREA UPDATE ACCEPT message takes one of the following actions depending on the reject cause:

> #2   (IMSI unknown in HLR);

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

> #16   (MSC temporarily not reachable);

> #17   (Network failure); or

> #22   (Congestion).

The MS shall change to state GMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. Timer T3330 shall be stopped if still running. The routing area updating attempt counter shall be incremented. If the routing area updating attempt counter is less than 5, and the stored RAI is equal to the RAI of the current serving cell and the GMM update status is equal to GU1 UPDATED:

-    the MS shall keep the GMM update status GU1 UPDATED and changes state to GMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. The MS shall start timer T3311. When timer T3311 expires the combined routing area update procedure indicating "combined RA/LA updating with IMSI attach" is triggered again.

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

- the MS shall start timer T3302 and shall change to state GMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM;

- a GPRS MS operating in MS operation mode A shall then proceed with appropriate MM specific procedure; a GPRS MS operating in MS operation mode B may then proceed with appropriate MM specific procedures. The MM sublayer shall act as in network operation mode II <u>or III (depending whether a PCCCH is present)</u> as long as the combined GMM procedures are not successful and no new RA is entered. The new MM state is IDLE.

Other values are considered as abnormal cases. The combined routing area updating shall be considered as failed for GPRS and non-GPRS services. The specification of the MS behaviour in those cases is specified in subclause 4.7.5.2.5.

4.7.5.2.4 Combined routing area updating not accepted by the network

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

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

   # 3   (Illegal MS);

   # 6   (Illegal ME), or

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

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

   # 7   (GPRS services not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall delete any P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number. The SIM shall be considered as invalid for GPRS services until switching off or the SIM is removed. The new state is GMM-DEREGISTERED. If in the MS the timer T3212 is not already running, the timer shall be set to its initial value and restarted.

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for CS services in the network. and shall then proceed with the appropriate MM specific procedure according to the MM service state.

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

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

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

   # 10   (Implicitly detached);

A GPRS MS operating in MS operation mode A or B in network operation mode I, is IMSI detached for both GPRS and CS services in the network.

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

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

11   (PLMN not allowed);

The MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED and the update status to U3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and enter the state GMM-DEREGISTERED. Furthermore, it shall delete any P-TMSI, P-TMSI signature, TMSI, RAI, LAI, ciphering key sequence number GPRS ciphering key sequence number, and reset the location update attempt counter.

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

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

12   (Location area not allowed);

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

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

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

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

13   (Roaming not allowed in this location area);

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

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

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

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

14   (GPRS services not allowed in this PLMN);

The MS shall delete any RAI, P-TMSI, P-TMSI signature, and GPRS ciphering key sequence number stored, shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall change to state GMM-DEREGISTERED. If in the MS the timer T3212 is not already running, the timer shall be set to its initial value and restarted.

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

A GPRS MS operating in MS operation mode A or B in network operation mode I, is still IMSI attached for CS services in the network and shall then proceed with the appropriate MM specific procedure according to the MM service state.

15   (No Suitable Cells In Location Area);

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

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

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

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

Other values are considered as abnormal cases. The specification of the MS behaviour in those cases is described in subclause 4.7.5.2.5.

4.7.5.2.5 Abnormal cases in the MS

The abnormal cases specified in subclause 4.7.5.1.5 apply with the following modification:

~~If the GPRS routing area updating counter is less than 5, the MM state remains MM LOCATION UPDATING PENDING.~~

If the GPRS routing area updating attempt counter is incremented according to subclause 4.7.5.1.5 the next actions depend on the Location Area Identities (stored on SIM and the one of the current serving cell) and the value of the routing area updating attempt counter.

- if the update status is U1 UPDATED, and the stored LAI is equal to the one of the current serving cell and the routing area updating attempt counter is smaller than 5, then the mobile station shall keep the update status to U1 UPDATED, the new MM state is MM IDLE substate NORMAL SERVICE~~,; or~~

- if the routing area updating attempt counter is smaller than 5 and, additionally,~~if~~ the update status is different from U1 UPDATED~~,~~ or the stored LAI is different from the one of the current serving cell, ~~or the routing area updating attempt counter is greater or equal to 5,~~ the mobile station shall delete any LAI, TMSI, ciphering key sequence number stored in the SIM and list of equivalent PLMNs and set the update status to U2 NOT UPDATED. The MM state remains MM LOCATION UPDATING PENDING; or

- if the routing area updating attempt counter is greater or equal to 5, the mobile station shall delete any LAI, TMSI, ciphering key sequence number stored in the SIM and list of equivalent PLMNs and set the update status to U2 NOT UPDATED.
  A GPRS MS operating in MS operation mode A shall then proceed with appropriate MM specific procedure; a GPRS MS operating in MS operation mode B may then proceed with appropriate MM specific procedures.
  The MM sublayer shall act as in network operation mode II or III (depending whether a PCCCH is present) as long as the combined GMM procedures are not successful and no new RA is entered. The new MM state is MM IDLE substate ATTEMPTING TO UPDATE.