3GPP TSG CN Plenary **Tdoc NP-010069**
Meeting #11, Palm Springs, U.S.A
14th - 16th March 2001

Source: **TSG CN WG4**

Title: **CRs to R97 on Work Item GPRS**

Agenda item: **7.13**

Document for: **APPROVAL**

Introduction:

This document contains **14** CRs on **R97** Work Item **"GPRS"**, that have been agreed by **TSG CN WG4**, and are forwarded to TSG CN Plenary meeting #11 for approval.

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
09.02	A315		N4-010055	R97	Failure of Update GPRS Location when HLR is not reachable	F	6.10.0
09.02	A316		N4-010056	R98	Failure of Update GPRS Location when HLR is not reachable	A	7.7.0
29.002	223		N4-010057	R99	Failure of Update GPRS Location when HLR is not reachable	A	3.7.2
29.002	224		N4-010058	Rel-4	Failure of Update GPRS Location when HLR is not reachable	A	4.2.1
09.10	A011		N4-010327	R97	Mapping of unknown HLR error to access interface cause code	F	6.1.0
09.10	A012		N4-010328	R98	Mapping of unknown HLR error to access interface cause code	A	7.1.0
29.010	011		N4-010329	R99	Mapping of unknown HLR error to access interface cause code	A	3.4.0
09.10	A013		N4-010369	R97	Roaming restrictions for GPRS service	F	6.1.0
09.10	A014		N4-010370	R98	Roaming restrictions for GPRS service	A	7.1.0
29.010	014		N4-010371	R99	Roaming restrictions for GPRS service	A	3.4.0
09.02	A317	1	N4-010443	R97	Failure of Authentication Parameter GPRS when HLR is not reachable	F	6.10.0
09.02	A318		N4-010444	R98	Failure of Authentication Parameter GPRS when HLR is not reachable	A	7.7.0
29.002	259		N4-010445	R99	Failure of Authentication Parameter GPRS when HLR is not reachable	A	3.7.2
29.002	260		N4-010446	Rel-4	Failure of Authentication Parameter GPRS when HLR is not reachable	A	4.2.1

3GPP TSG-CN4 Meeting #06 **Tdoc N4-010055**
BEIJING, CHINA 15th 19th January 2001

CR-Form-v3

CHANGE REQUEST

⌘ **09.02** **CR** **A315** ⌘ rev **-** ⌘ Current version: **6.10.0** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Failure of Update GPRS Location when HLR is not reachable
Source:	⌘	CN4
Work item code:	⌘	GPRS R97
Date:	⌘	5 Jan 2001
Category:	⌘	**F** (critical correction)
Release:	⌘	R97

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:	⌘	Returning "Roaming Not Allowed" if the HLR is not reachable can cause undesirable behaviour of the MS which tries to register in an SGSN when a GPRS roaming agreement has not been set up between the HPLMN and VPLMN operators
Summary of change:	⌘	Change the error reported to the application to "Unknown HLR"
Consequences if not approved:	⌘	Unnecessary denial of CS service to GPRS capable MSs

Clauses affected:	⌘	19.1.1.8		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	GSM 03.60
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/3G_Specs/CRs.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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

19.1.1.8 Detailed procedure in the SGSN

Figure 19.1.1/20 shows the MAP process for updating of the SGSN. The following general macros are used:

Receive_Open_Cnf	subclause 25.1;
Insert_Subscriber_Data_SGSN	subclause 25.7;
Activate_Tracing_SGSN	subclause 25.9;

The location updating process

The MAP process receives an « Update HLR request » from the relevant process in the SGSN (see GSM 03.60) to perform HLR updating. If the SGSN does not know the subscribers HLR (e.g. no IMSI translation exists as there are not yet any SS7 links to the subscribers HPLMN), the « Update HLR negative response » with error Unknown HLR ~~Roaming Not Allowed (cause PLMN Roaming Not Allowed)~~ is returned to the requesting process.

If the subscribers HLR can be reached, the SGSN opens a dialogue towards the HLR by sending a MAP_OPEN request without any user specific parameters, together with a MAP_UPDATE_GPRS_LOCATION request containing the parameters

- IMSI, identifying the subscriber;
- SGSN Address and SGSN number;

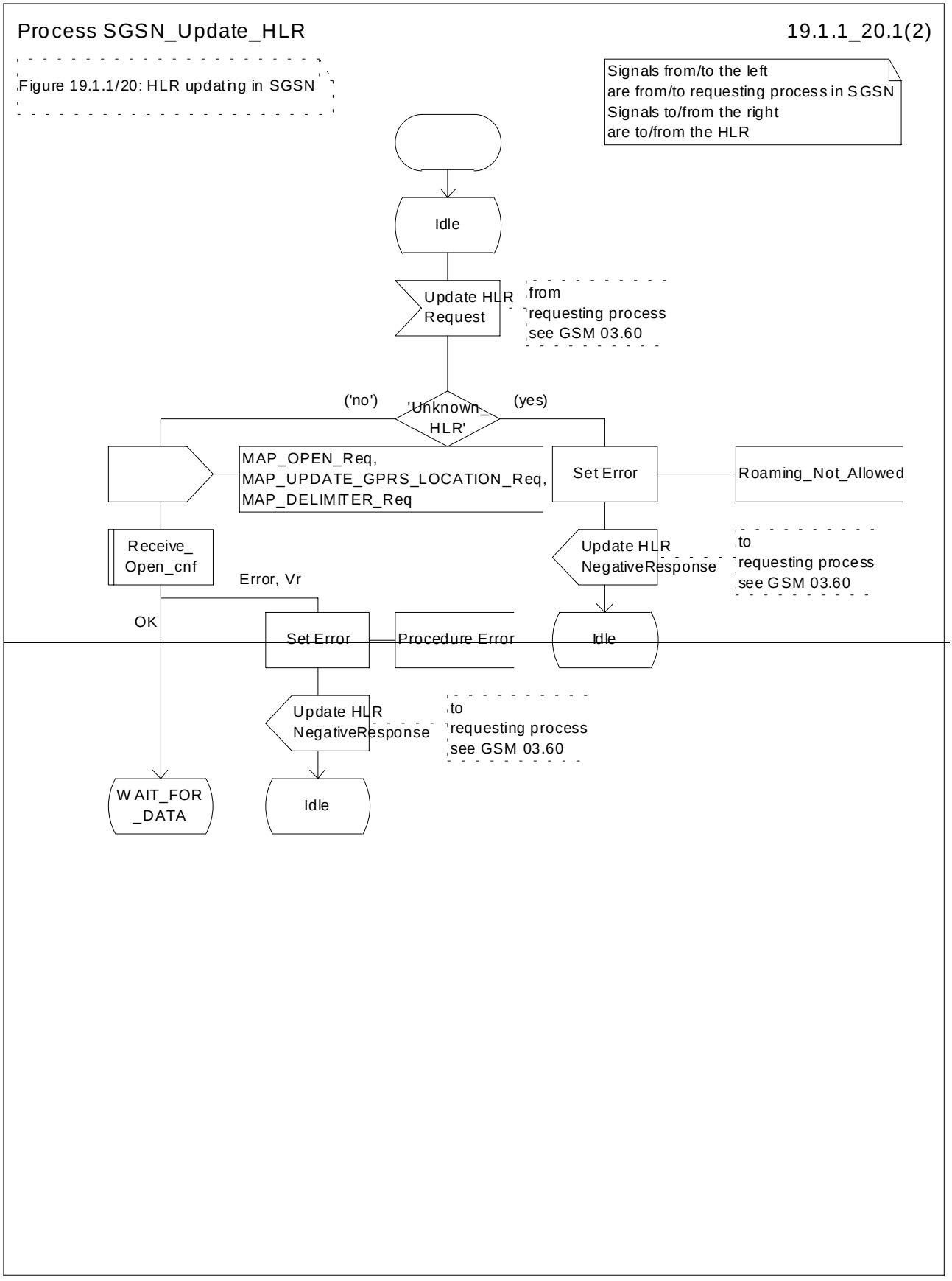
In case the HLR rejects dialogue opening (see subclause 25.1) or indicates version Vr protocol to be used, the SGSN will terminate the process indicating « Update HLR negative response » to the requesting process.

If the HLR accepts the dialogue, the HLR will respond with:

- a MAP_INSERT_SUBSCRIBER_DATA indication, handled by the macro Insert_Subs_Data_SGSN defined in subclause 25.7;

NOTE: The HLR may repeat this service several times depending on the amount of data to be transferred to the SGSN and to replace subscription data in case they are not supported by the SGSN.

- a MAP_ACTIVATE_TRACE_MODE indication, handled by the macro Activate_Tracing_SGSN defined in subclause 25.9;
- the MAP_UPDATE_GPRS_LOCATION confirmation:
  - if this confirmation contains the HLR Number, this indicates that the HLR has passed all information and that updating has been successfully completed. The « Update HLR response » message is returned to the requesting process for completion of the SGSN updating (see GSM 03.60).
  - if the confirmation contains an User error cause (Unknown Subscriber, Roaming Not Allowed or some other), the corresponding error is returned to the requesting process in the « Update HLR negative response ».
- a MAP_P_ABORT, MAP_U_ABORT, or MAP_CLOSE indication. In these cases, the corresponding error is returned to the requesting process in the « Update HLR negative response ».
- a MAP_NOTICE indication. Then, the dialogue towards the HLR is terminated, and the « HLR Update negative response » with the appropriate error is returned to the requesting process.


Process SGSN_Update_HLR
19.1.1_20.1(2)
Figure 19.1.1/20: HLR updating in SGSN
Signals from/to the left
are from/to requesting process in SGSN
Signals to/from the right
are to/from the HLR
Idle
Update HLR Request
from
requesting process
see GSM 03.60
('no')
'Unknown_ HLR'
(yes)
MAP_OPEN_Req,
MAP_UPDATE_GPRS_LOCATION_Req,
MAP_DELIMITER_Req
Set Error
Roaming_Not_Allowed
Receive_ Open_cnf
Update HLR NegativeResponse
to
requesting process
see GSM 03.60
Error, Vr
OK
Set Error
Procedure Error
Idle
Update HLR NegativeResponse
to
requesting process
see GSM 03.60
W AIT_FOR _DATA
Idle

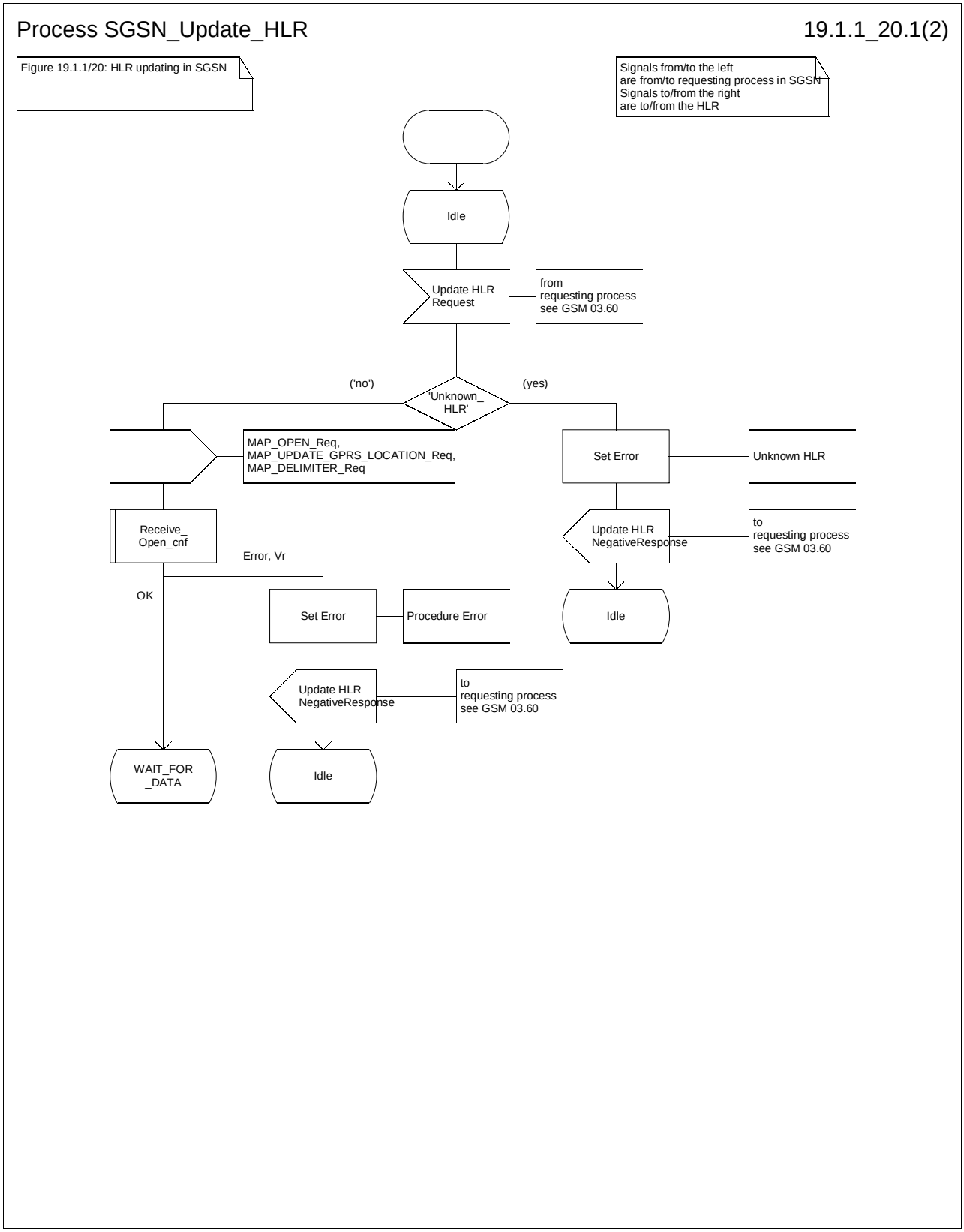


Figure 19.1.1/20 (sheet 1 of 2): Process SGSN_Update_HLR

3GPP TSG-CN4 Meeting #06 **Tdoc N4-010056**
BEIJING, CHINA 15th 19th January 2001

CR-Form-v3

CHANGE REQUEST

⌘ **09.02** **CR** **A316** ⌘ rev **-** ⌘ Current version: **7.7.0** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Failure of Update GPRS Location when HLR is not reachable
Source:	⌘	CN4
Work item code:	⌘	GPRS R97
Date:	⌘	5 Jan 2001
Category:	⌘	**A**
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)*
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R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Returning "Roaming Not Allowed" if the HLR is not reachable can cause undesirable behaviour of the MS which tries to register in an SGSN when a GPRS roaming agreement has not been set up between the HPLMN and VPLMN operators
Summary of change:	⌘	Change the error reported to the application to "Unknown HLR"
Consequences if not approved:	⌘	Unnecessary denial of CS service to GPRS capable MSs

Clauses affected:	⌘	19.1.1.8		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	GSM 03.60
Other comments:	⌘			

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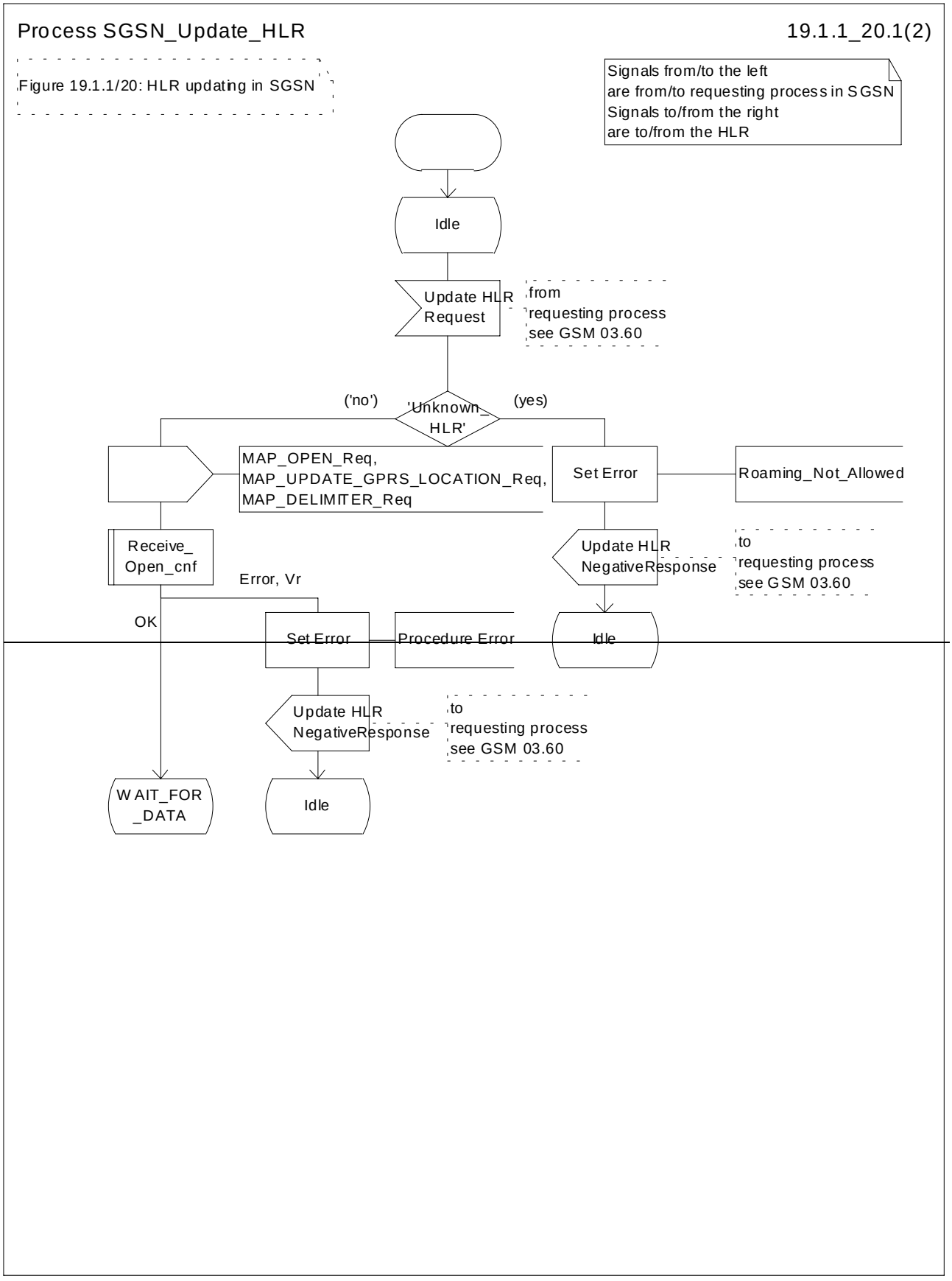
- a MAP_NOTICE indication. Then, the dialogue towards the HLR is terminated, and the « HLR Update negative response » with the appropriate error is returned to the requesting process.


Process SGSN_Update_HLR
19.1.1_20.1(2)
Figure 19.1.1/20: HLR updating in SGSN
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Update HLR Request
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Receive_ Open_cnf
Update HLR NegativeResponse
to
requesting process
see GSM 03.60
Error, Vr
OK
Set Error
Procedure Error
Idle
Update HLR NegativeResponse
to
requesting process
see GSM 03.60
W AIT_FOR _DATA
Idle

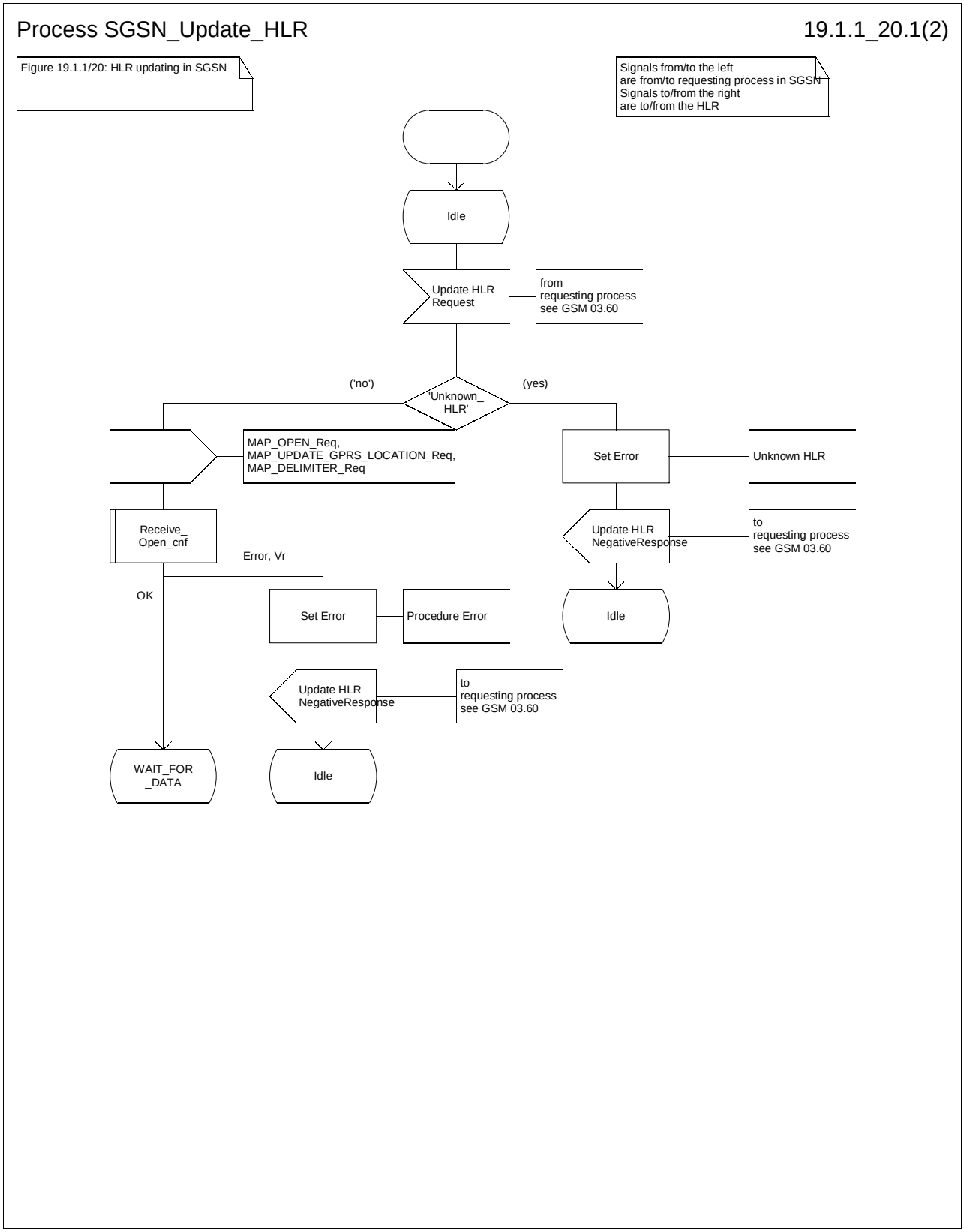

Figure 19.1.1/20 (sheet 1 of 2): Process SGSN_Update_HLR

3GPP TSG-CN4 Meeting #07 **Tdoc N4-010443**
Sophia Antipolis, France, 26th February 2nd March 2001

CR-Form-v3

CHANGE REQUEST

⌘ **09.02** **CR** **A317** ⌘ rev **1** ⌘ Current version: **6.10.0** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Failure of Authentication Parameter GPRS when HLR is not reachable
Source:	⌘	CN4
Work item code:	⌘	GPRS R97
Date:	⌘	21 Feb 2001
Category:	⌘	**F** (Essential Correction)
Release:	⌘	R97

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:	⌘	No Error case was described for the Obtain Authentication Parameter in the SGSN if the SGSN cannot address the subscribers HLR.
Summary of change:	⌘	Introduction of the error cause "Unknown HLR".
Consequences if not approved:	⌘	Risk of different implementations due to a lack of description

Clauses affected:	⌘	25.5.6		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	GSM 03.60 GSM 09.10
Other comments:	⌘			

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

25.5.6 Process Obtain_Authent_Para_SGSN

For authentication procedure description see GSM 03.60 and GSM 04.08.

This Process is used by the SGSN to request authentication triplets from the HLR.

If the SGSN does not know the subscriber's HLR ~~address~~ address (e.g. no IMSI translation exists ~~as there are not yet any SS7 links to the subscribers HPLMN~~), the ~~«~~Authentication Parameter negative response~~»~~ with error “Unknown HLR” is returned to the requesting process.

Otherwise, ~~The~~ the Process proceeds as follows:

- a connection is opened, and a MAP_SEND_AUTHENTICATION_INFO request sent to the HLR;
- if the HLR indicates that a MAP version 1 dialogue is to be used, the SGSN performs the equivalent MAP version 1 dialogue. which can return a positive result containing authentication sets, an empty positive result, or an error;
- if the dialogue opening fails, the Authentication Parameters negative response with appropriate error is sent to the requesting process. Otherwise, the SGSN waits for the response from the HLR;
- if a MAP_SEND_AUTHENTICATION_INFO confirmation is received from the HLR, the SGSN checks the received data.

One of the following positive responses may be received from a MAP version 1 or MAP version 2 dialogue with the HLR:

- Authentication triplets, in which case the outcome is successful;
- Empty response, in which case the SGSN may re-use old triplets, if allowed by the PLMN operator.

If the SGSN cannot re-use old triplets (or no such triplets are available) then the the Authentication Parameters negative response with appropriate error is sent to the requesting process.

If the outcome was successful or re-use of old parameters in the SGSN is allowed, then the Authentication Parameters response is sent to the requesting process

If an "Unknown Subscriber" error is included in the MAP_SEND_AUTHENTICATION_INFO confirm or is returned by the MAP version 1 dialogue, then the appropriate error is sent to the requesting process in the Authentication Parameters negative response

- if a MAP-U-ABORT, MAP_P_ABORT or unexpected MAP_CLOSE service indication is received from the HLR, then the SGSN checks whether old authentication parameters can be re-used. If old parameters cannot be re-used the Authentication Parameters negative response with appropriate error is sent to the requesting process.
- if a MAP_NOTICE service indication is received from the HLR, then the dialogue with the HLR is closed. The SGSN then checks whether old authentication parameters can be re-used. If old parameters cannot be re-used the process terminates and the Authentication Parameters negative response with appropriate error is sent to the requesting process; Otherwise the Authentication Parameters response is sent to requesting process.

The process is described in figure 25.5/6.

Process Obtain_Authent_Para_SGSN 25.5_6.1(2)

Figure 25.5/6: Process to obtain authentication parameters from the HLR to the SGSN

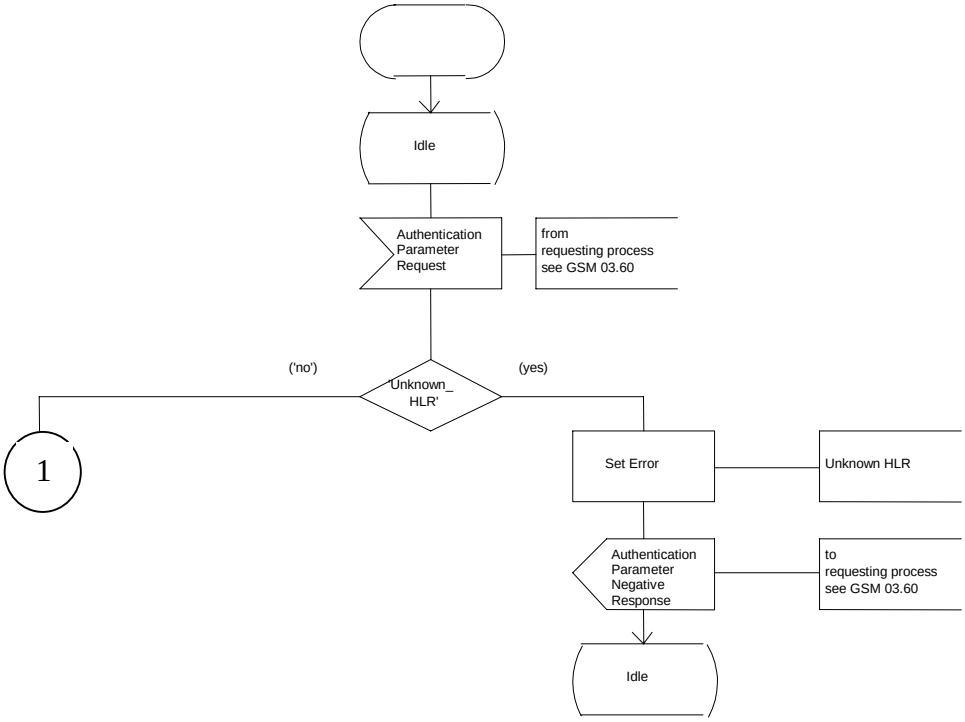
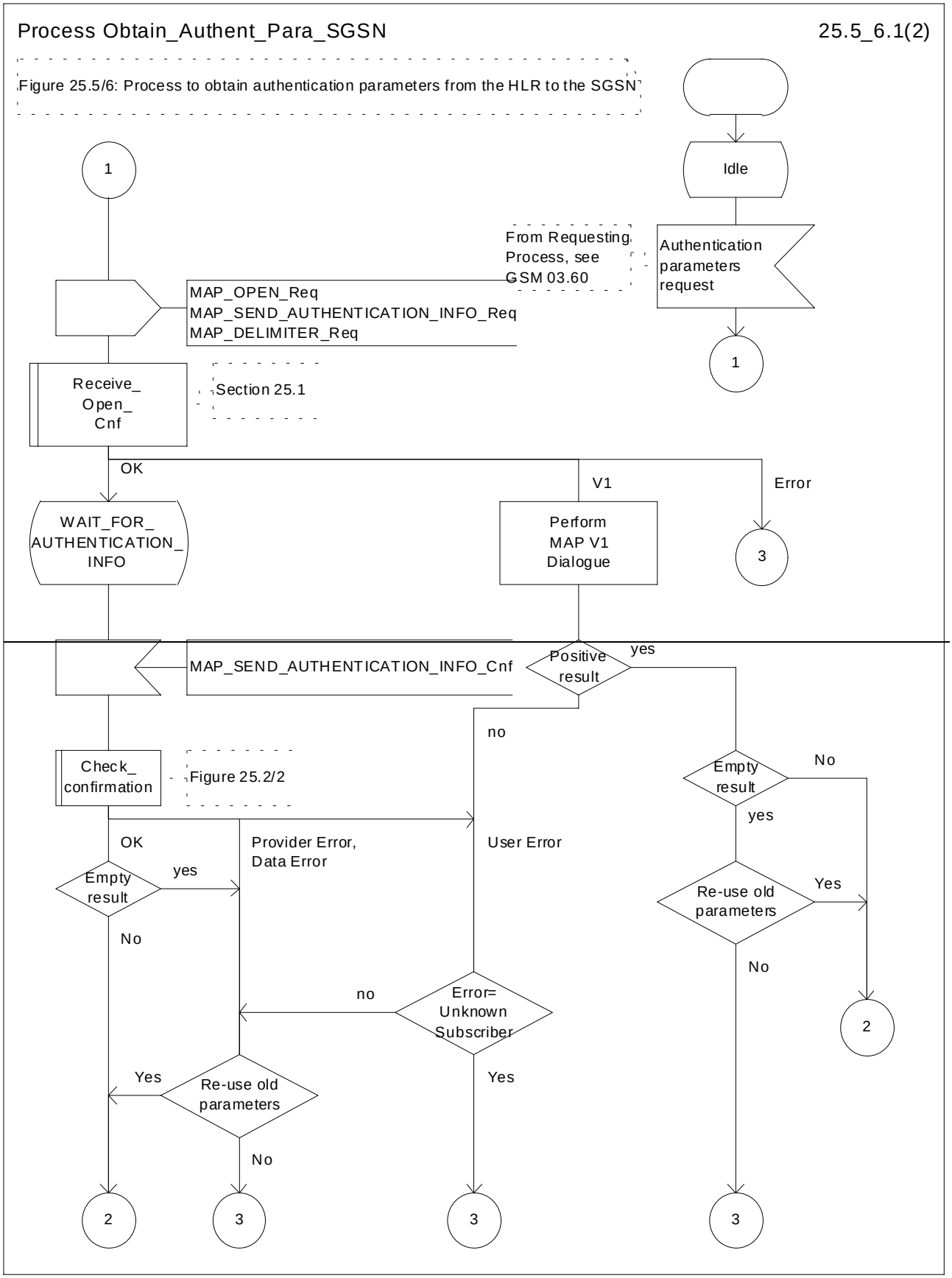


Figure 25.5/6 (sheet 1 of 3): Macro Obtain_Authen_Para_SGSN


Process Obtain_Authent_Para_SGSN
25.5_6.1(2)
Figure 25.5/6: Process to obtain authentication parameters from the HLR to the SGSN
Idle
1
From Requesting Process, see GSM 03.60
Authentication parameters request
1
MAP_OPEN_Req
MAP_SEND_AUTHENTICATION_INFO_Req
MAP_DELIMITER_Req
Receive_ Open_ Cnf
Section 25.1
OK
V1
Error
WAIT_FOR_ AUTHENTICATION_ INFO
Perform MAP V1 Dialogue
3
MAP_SEND_AUTHENTICATION_INFO_Cnf
Positive result
yes
no
Check_ confirmation
Figure 25.2/2
Empty result
No
yes
OK
Provider Error, Data Error
User Error
Empty result
yes
Re-use old parameters
Yes
No
no
Error= Unknown Subscriber
2
Yes
Re-use old parameters
Yes
No
2
3
3
3

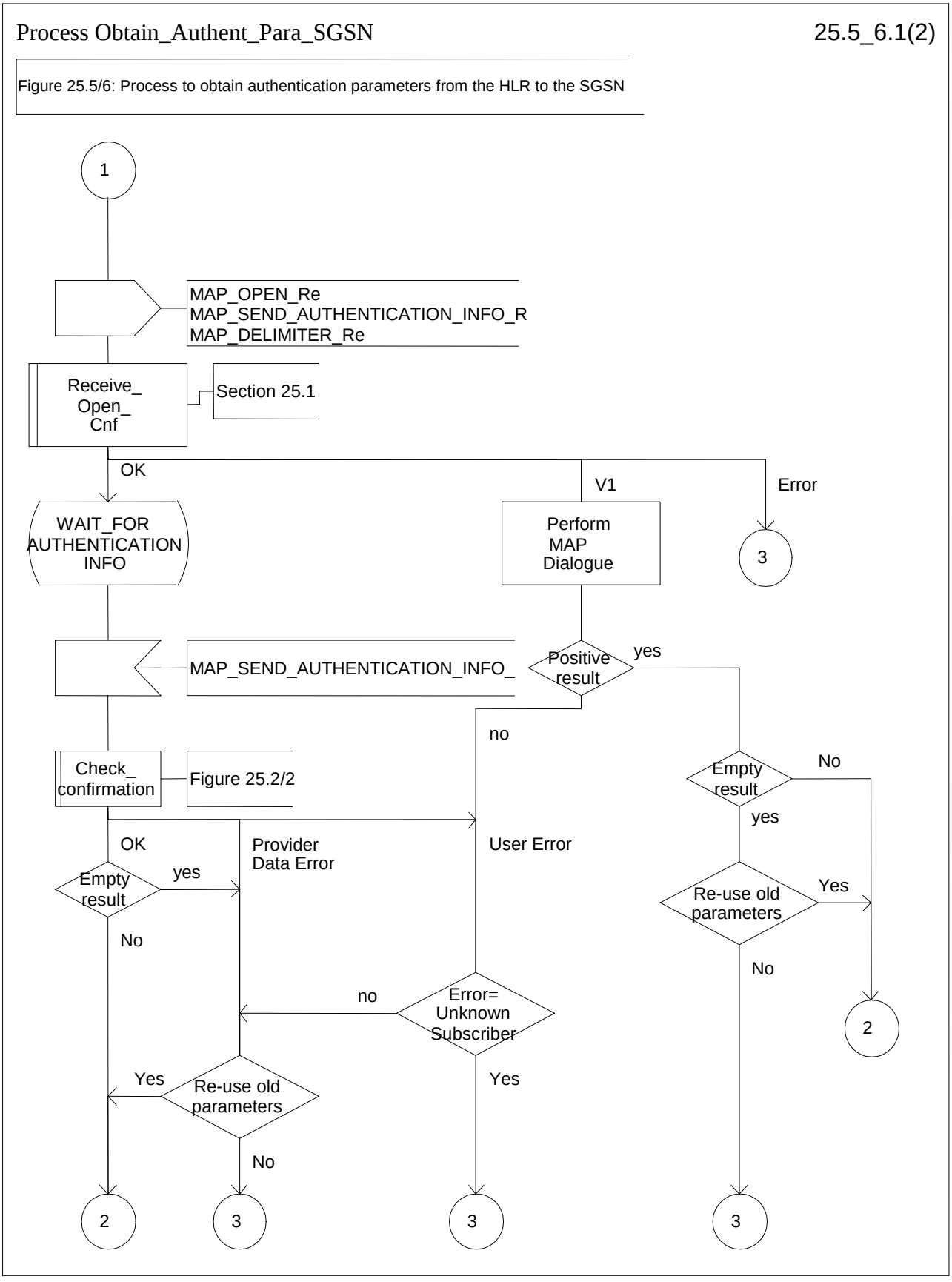


Figure 25.5/6 (sheet ~~1~~ 2 of ~~2~~3): Macro Obtain_Authen_Para_SGSN

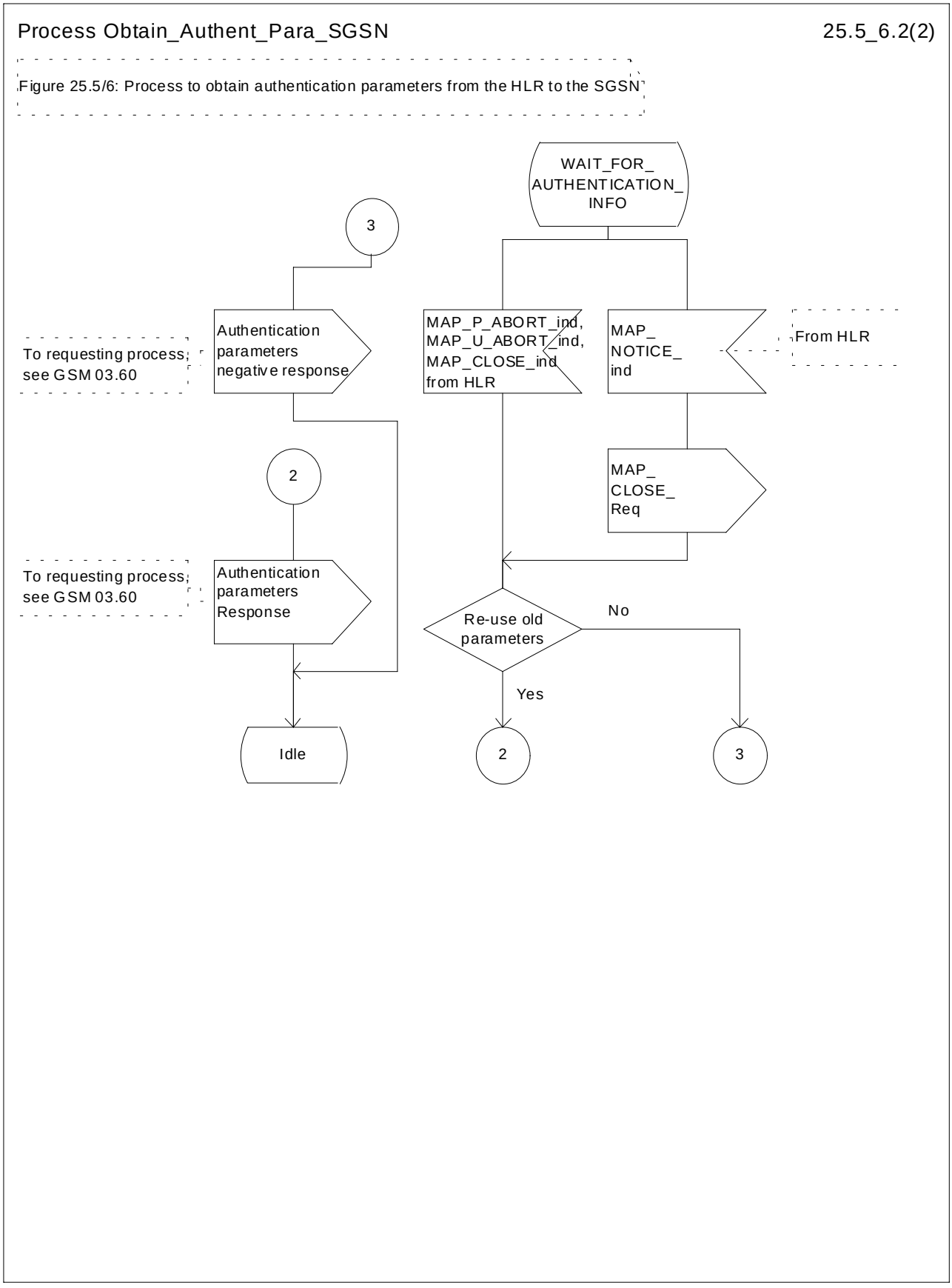


Figure 25.5/6 (sheet ~~2~~ 3 of ~~2~~3): Macro Obtain_Authen_Para_SGSN

3GPP TSG-CN4 Meeting #07 **Tdoc N4-010444**
Sophia Antipolis, France, 26th February 2nd March 2001

CR-Form-v3

CHANGE REQUEST

⌘ **09.02** **CR** **A318** ⌘ rev ⌘ Current version: **7.7.0** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Failure of Authentication Parameter GPRS when HLR is not reachable
Source:	⌘	CN4
Work item code:	⌘	GPRS R97
Date:	⌘	21 Feb 2001
Category:	⌘	**A**
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:
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R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	No Error case was described for the Obtain Authentication Parameter in the SGSN if the SGSN cannot address the subscribers HLR.
Summary of change:	⌘	Introduction of the error cause "Unknown HLR".
Consequences if not approved:	⌘	Risk of different implementations due to a lack of description

Clauses affected:	⌘	25.5.6		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	GSM 03.60 GSM 09.10
Other comments:	⌘			

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25.5.6 Process Obtain_Authent_Para_SGSN

For authentication procedure description see GSM 03.60 and GSM 04.08.

This Process is used by the SGSN to request authentication triplets from the HLR.

If the SGSN does not know the subscriber's HLR ~~address~~ address (e.g. no IMSI translation exists ~~as there are not yet any SS7 links to the subscribers HPLMN~~), the ~~«~~Authentication Parameter negative response~~»~~ with error “Unknown HLR” is returned to the requesting process.

Otherwise, ~~The~~ the Process proceeds as follows:

- a connection is opened, and a MAP_SEND_AUTHENTICATION_INFO request sent to the HLR;
- if the HLR indicates that a MAP version 1 dialogue is to be used, the SGSN performs the equivalent MAP version 1 dialogue. which can return a positive result containing authentication sets, an empty positive result, or an error;
- if the dialogue opening fails, the Authentication Parameters negative response with appropriate error is sent to the requesting process. Otherwise, the SGSN waits for the response from the HLR;
- if a MAP_SEND_AUTHENTICATION_INFO confirmation is received from the HLR, the SGSN checks the received data.

One of the following positive responses may be received from a MAP version 1 or MAP version 2 dialogue with the HLR:

- Authentication triplets, in which case the outcome is successful;
- Empty response, in which case the SGSN may re-use old triplets, if allowed by the PLMN operator.

If the SGSN cannot re-use old triplets (or no such triplets are available) then the the Authentication Parameters negative response with appropriate error is sent to the requesting process.

If the outcome was successful or re-use of old parameters in the SGSN is allowed, then the Authentication Parameters response is sent to the requesting process

If an "Unknown Subscriber" error is included in the MAP_SEND_AUTHENTICATION_INFO confirm or is returned by the MAP version 1 dialogue, then the appropriate error is sent to the requesting process in the Authentication Parameters negative response

- if a MAP-U-ABORT, MAP_P_ABORT or unexpected MAP_CLOSE service indication is received from the HLR, then the SGSN checks whether old authentication parameters can be re-used. If old parameters cannot be re-used the Authentication Parameters negative response with appropriate error is sent to the requesting process.
- if a MAP_NOTICE service indication is received from the HLR, then the dialogue with the HLR is closed. The SGSN then checks whether old authentication parameters can be re-used. If old parameters cannot be re-used the process terminates and the Authentication Parameters negative response with appropriate error is sent to the requesting process; Otherwise the Authentication Parameters response is sent to requesting process.

The process is described in figure 25.5/6.

Process Obtain_Authent_Para_SGSN 25.5_6.1(2)

Figure 25.5/6: Process to obtain authentication parameters from the HLR to the SGSN

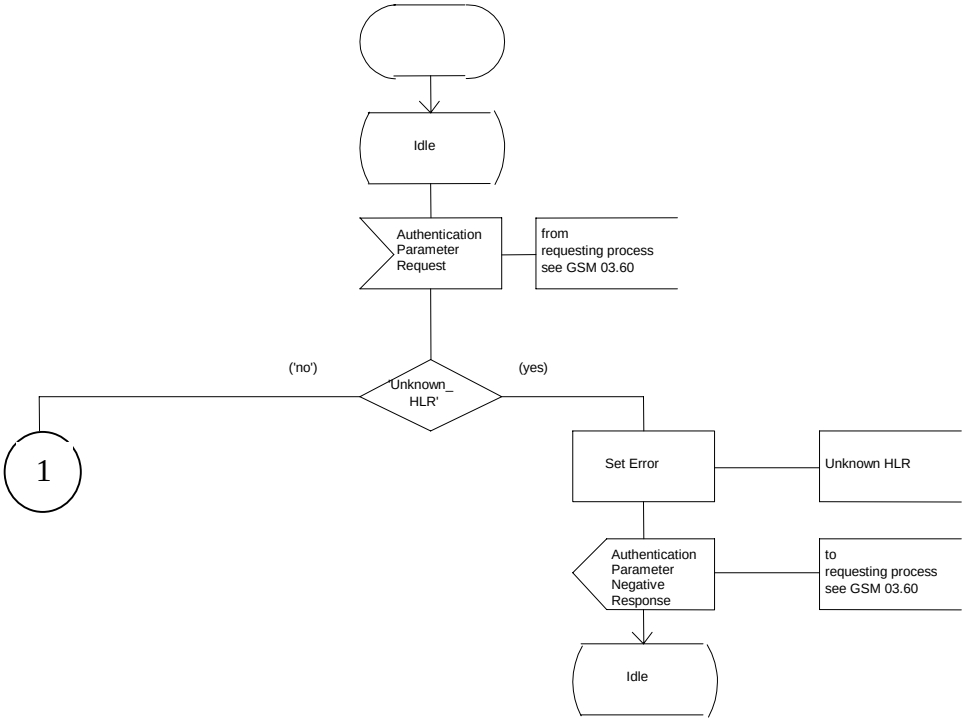
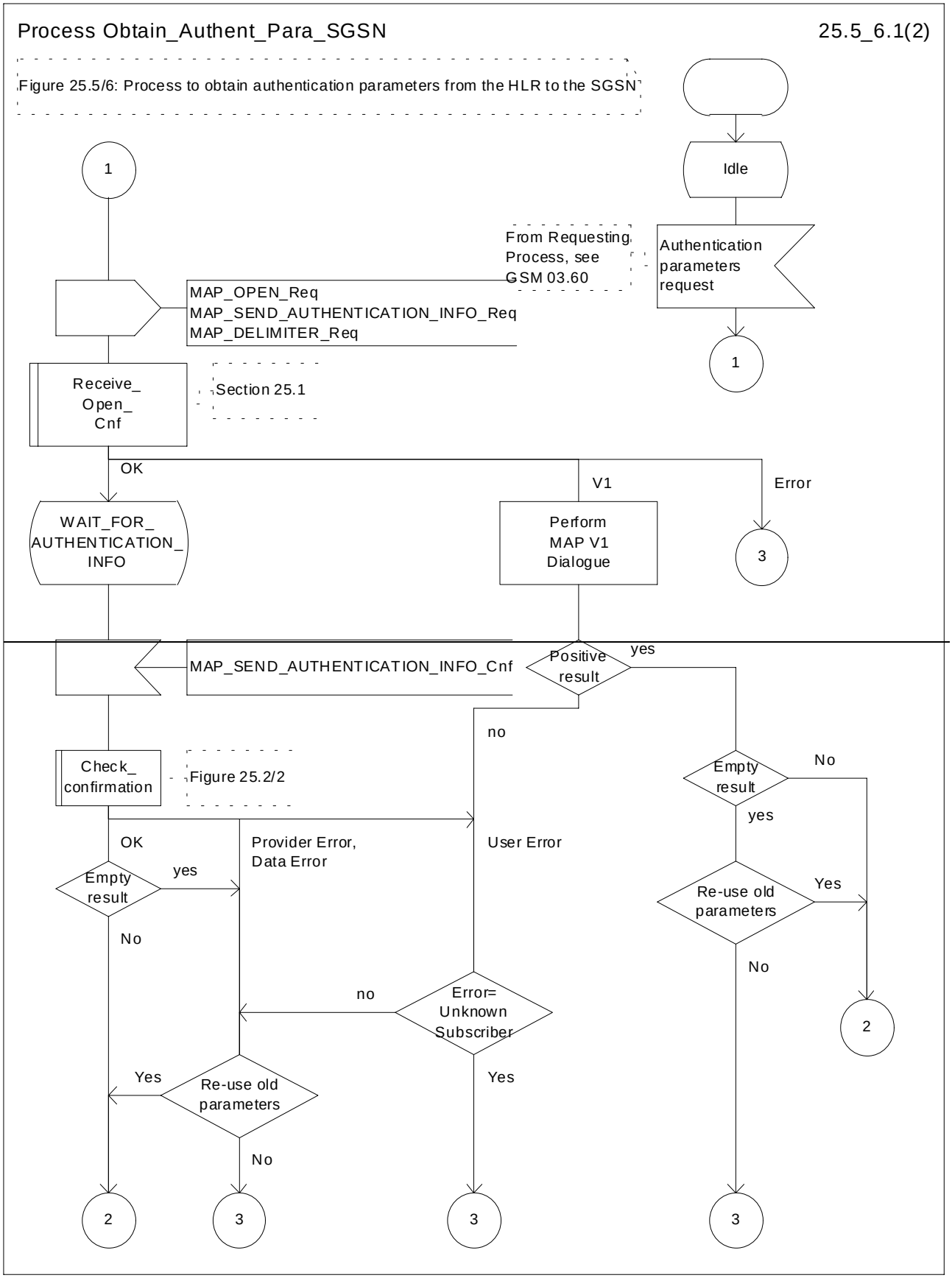


Figure 25.5/6 (sheet 1 of 3): Macro Obtain_Authen_Para_SGSN


Process Obtain_Authent_Para_SGSN
25.5_6.1(2)
Figure 25.5/6: Process to obtain authentication parameters from the HLR to the SGSN
Idle
1
From Requesting Process, see GSM 03.60
Authentication parameters request
1
MAP_OPEN_Req
MAP_SEND_AUTHENTICATION_INFO_Req
MAP_DELIMITER_Req
Receive_ Open_ Cnf
Section 25.1
OK
V1
Error
WAIT_FOR_ AUTHENTICATION_ INFO
Perform MAP V1 Dialogue
3
MAP_SEND_AUTHENTICATION_INFO_Cnf
Positive result
yes
no
Check_ confirmation
Figure 25.2/2
Empty result
No
yes
OK
Provider Error, Data Error
User Error
Empty result
yes
Re-use old parameters
Yes
No
no
Error= Unknown Subscriber
2
Yes
Re-use old parameters
Yes
No
2
3
3
3

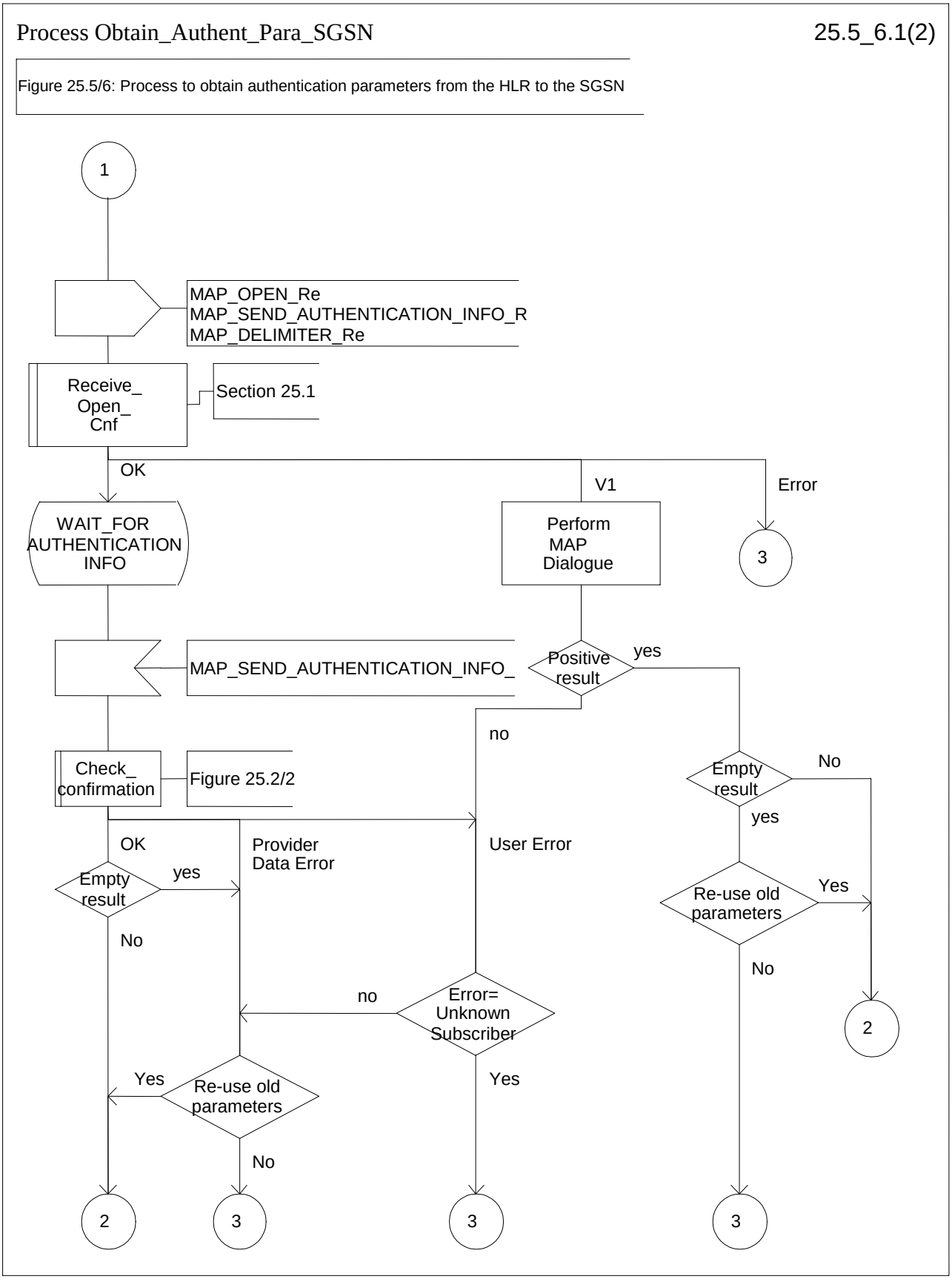


Figure 25.5/6 (sheet ~~1~~ 2 of ~~2~~3): Macro Obtain_Authen_Para_SGSN

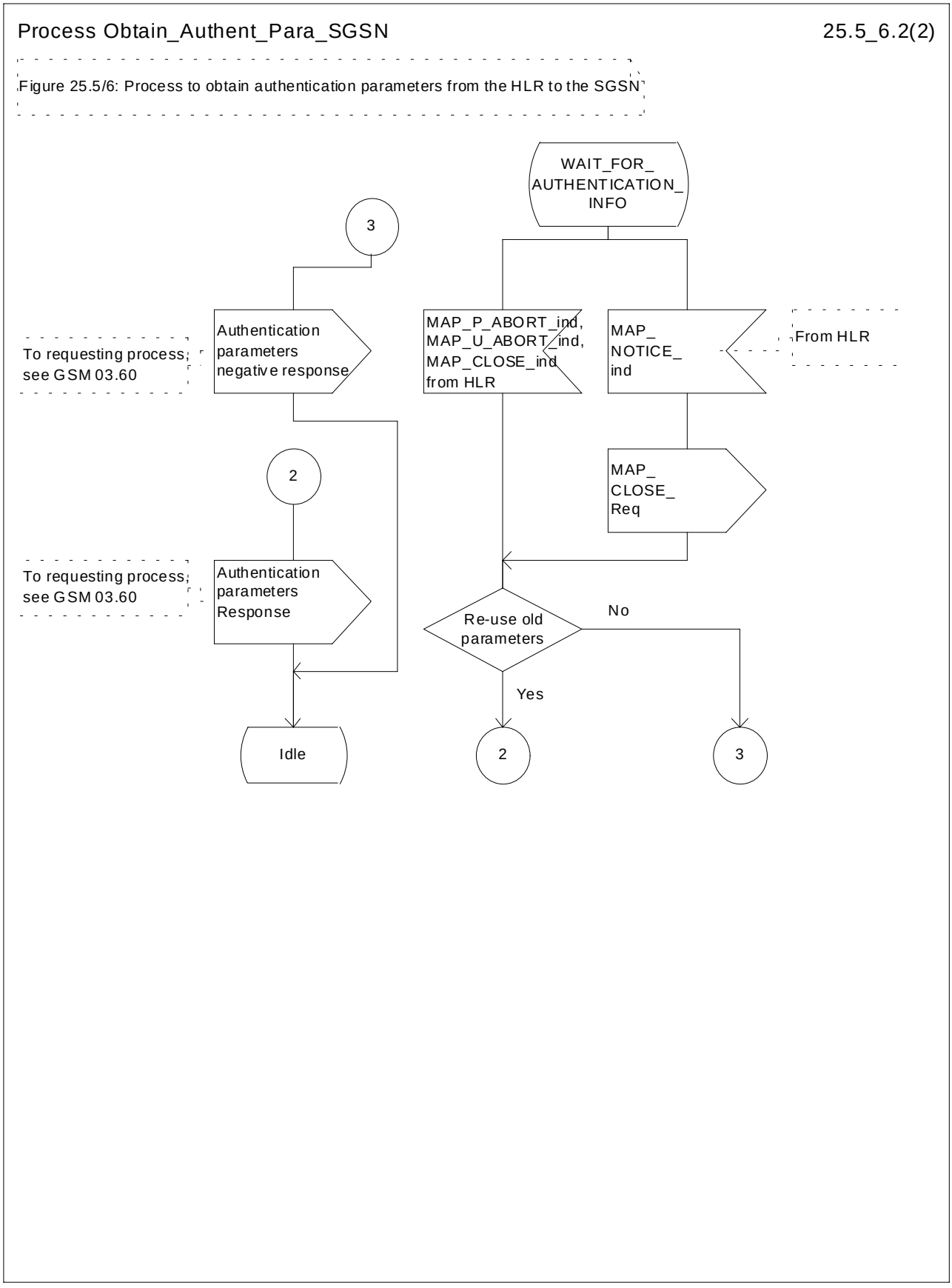


Figure 25.5/6 (sheet ~~2~~ 3 of ~~2~~3): Macro Obtain_Authen_Para_SGSN

3GPP TSG-CN4 Meeting #07
Sophia Antipolis, France, 26/2-2/3/01

Tdoc N4-010327

CR-Form-v3

CHANGE REQUEST

⌘ **09.10** **CR** **A011** ⌘ rev **-** ⌘ Current version: **6.1.0** ⌘

*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 ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Mapping of unknown HLR error to access interface cause code.
Source:	⌘	CN4
Work item code:	⌘	GPRS ***Date:*** ⌘ 9/2/01
Category:	⌘	**F** Essential correction ***Release:*** ⌘ R97

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:	⌘	To show the mapping between the SGSN application error "Unknown HLR" (as introduced and agreed in CN4, Beijing meeting) and the layer 3 access interface cause code "GPRS services not allowed in this PLMN" (as introduced and agreed in CN1, Beijing meeting).
Summary of change:	⌘	A new entry in the "Routeing area updating" table.
Consequences if not approved:	⌘	Unnecessary denial of CS service to GPRS capable MSs

Clauses affected:	⌘	3.4		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	GSM 03.60 (CR), GSM 09.02 (CR A315)
Other comments:	⌘			

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

3.4 Routeing area updating

	04.08	09.02	Notes
Forward message	GMM (ROUTEING AREA UPDATE REQUEST)	MAP_UPDATE_GPRS LOCATION request	
	MS classmark 1	-	
	MS classmark 4	-	
	GPRS Ciphering key seq number	-	
	Mobile station identity	IMSI	
	Old routeing area identification	-	
Positive results	GMM (ROUTEING AREA UPDATE ACCEPT)	MAP_UPDATE_GPRS LOCATION response	
	Routeing area identification	-	
	Mobile station identity	-	1
C	Mobile station	-	2
C	Reject: IMSI unknown in HLR	-	3
C	Reject: MSC temporarily not reacheable	-	4
Negative results	GMM (ROUTEING AREA UPDATE REJECT)	MAP_UPDATE_GPRS LOCATION response	
	Network failure	-	5
	GPRS services not allowed in this PLMN	Unknown HLR	
	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	6
	GPRS services and non GPRS services not allowed	Unknown subscriber (IMSI unknown)	7
C	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	8
C	GPRS services and non-GPRS services not allowed	Unknown subscriber (IMSI unknown)	9
	MS identity cannot be derived by the network	-	10
	PLMN not allowed	Roaming not allowed: PLMN not allowed	
	LA not allowed	-	
	Roaming not allowed in this LA	-	
	PLMN not allowed	Operator determined barring	
	Illegal MS	-	
	Illegal ME	-	
	Network failure	System Failure	
	Network failure	Unexpected data value	
	Network failure	MAP_U/P_ABORT	
	Network failure	MAP_NOTICE	
	Network failure	MAP_CLOSE	

****** End of Modifications ******

3GPP TSG-CN4 Meeting #07
Sophia Antipolis, France, 26/2-2/3/01

Tdoc N4-010328

CR-Form-v3

CHANGE REQUEST

⌘ **09.10** **CR** **A012** ⌘ rev **-** ⌘ Current version: **7.1.0** ⌘

*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 ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Mapping of unknown HLR error to access interface cause code.
Source:	⌘	CN4
Work item code:	⌘	GPRS
Date:	⌘	9/2/01
Category:	⌘	**A**
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:	⌘	To show the mapping between the SGSN application error "Unknown HLR" (as introduced and agreed in CN4, Beijing meeting) and the layer 3 access interface cause code "GPRS services not allowed in this PLMN" (as introduced and agreed in CN1, Beijing meeting).
Summary of change:	⌘	A new entry in the "Routeing area updating" table.
Consequences if not approved:	⌘	Unnecessary denial of CS service to GPRS capable MSs

Clauses affected:	⌘	3.4		
Other specs affected:	⌘	**X** Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	GSM 03.60 (CR), GSM 09.02 (CR 316)
Other comments:	⌘			

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

3.4 Routeing area updating

	04.08	09.02	Notes
Forward message	GMM (ROUTEING AREA UPDATE REQUEST)	MAP_UPDATE_GPRS LOCATION request	
	MS classmark 1	-	
	MS classmark 4	-	
	GPRS Ciphering key seq number	-	
	Mobile station identity	IMSI	
	Old routeing area identification	-	
Positive results	GMM (ROUTEING AREA UPDATE ACCEPT)	MAP_UPDATE_GPRS LOCATION response	
	Routeing area identification	-	
	Mobile station identity	-	1
	C Mobile station	-	2
	C Reject: IMSI unknown in HLR	-	3
	C Reject: MSC temporarily not reacheable	-	4
Negative results	GMM (ROUTEING AREA UPDATE REJECT)	MAP_UPDATE_GPRS LOCATION response	
	Network failure	-	5
	GPRS services not allowed in this PLMN	Unknown HLR	
	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	6
	GPRS services and non GPRS services not allowed	Unknown subscriber (IMSI unknown)	7
	C GPRS services not allowed	Unknown subscriber (no GPRS subscription)	8
	C GPRS services and non-GPRS services not allowed	Unknown subscriber (IMSI unknown)	9
	MS identity cannot be derived by the network	-	10
	PLMN not allowed	Roaming not allowed: PLMN not allowed	
	LA not allowed	-	
	Roaming not allowed in this LA	-	
	PLMN not allowed	Operator determined barring	
	Illegal MS	-	
	Illegal ME	-	
	Network failure	System Failure	
	Network failure	Unexpected data value	
	Network failure	MAP_U/P_ABORT	
	Network failure	MAP_NOTICE	
	Network failure	MAP_CLOSE	

****** End of Modifications ******

3GPP TSG-CN4 Meeting #7 ***Tdoc N4-010369***
Sophia Antipolis, FRANCE, 26th February - 2nd March 2001

CR-Form-v3

CHANGE REQUEST

⌘ **09.10** **CR** **A013** ⌘ rev **-** ⌘ Current version: **6.1.0** ⌘

*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 ☐ Core Network **X**

Title:	⌘	Roaming restrictions for GPRS service
Source:	⌘	CN4
Work item code:	⌘	GPRS
Date:	⌘	16 January 01
Category:	⌘	**F** (Essential correction)
Release:	⌘	R97

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:	⌘	Experience from the deployment of GPRS in live networks brought out that some existing roaming scenarios and configurations does not work. In the case when operator has only roaming agreement for CS services but not for PS service (GPRS) there is no suitable cause value with which PS attach can be rejected without impact on both the GSM roaming and the GPRS services in other networks. More detail description of the problem can be found from TSG CN Plenary #14 Tdoc NP-000697 and TSG SA Pleanary #10 Tdoc SP-000666.
Summary of change:	⌘	In order to solve the problem it is proposed to introduce a new rejection cause value "GPRS services not allowed in this PLMN"(#14) that could be indicated to the MS during GPRS attach, detach and RAU in a PLMN which does not offer GPRS roaming to that MS. When MS receives this cause code it shall not attempt new GPRS attach before entering a new PLMN on which it hasn't be rejected with the same cause after the last switch on. To limit the effect of changes to a frozen specification, and as the roaming restriction for GPRS services are considered to be of temporary nature, it is proposed not to introduce a new cause value on the MAP interface between HLR and SGSN.
Consequences if not approved:	⌘	If no roaming agreement is established for GPRS or the SGSN has no knowledge about the HLR of the roaming subscriber, depending on the SGSN implementation either #11 or #7 will probably be sent to the MS which disables in minimum the PS (in all networks) until the MS is switched off. The only other possibility would be that the network sends a cause code not listed explicitly, with the consequence that the MS will try to register "forever" (5 re-attempts after each T3302 expiry) which causes a considerable network load and results in a unacceptable behaviour from the users point of view(long term no service and battery consumption)

Clauses affected:	⌘	3.4		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

3.4 Routeing area updating

	04.08	09.02	Notes
Forward message	GMM (ROUTEING AREA UPDATE REQUEST)	MAP_UPDATE_GPRS_LOCATION_request	
	MS classmark 1	-	
	MS classmark 4	-	
	GPRS Ciphering key seq number	-	
	Mobile station identity	IMSI	
	Old routeing area identification	-	
Positive results	GMM (ROUTEING AREA UPDATE ACCEPT)	MAP_UPDATE_GPRS_LOCATION_response	
	Routeing area identification	-	
	Mobile station identity	-	1
C	Mobile station	-	2
C	Reject: IMSI unknown in HLR	-	3
C	Reject: MSC temporarily not reacheable	-	4
Negative results	GMM (ROUTEING AREA UPDATE REJECT)	MAP_UPDATE_GPRS_LOCATION_response	
	Network failure	-	5
	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	6
	GPRS services and non GPRS services not allowed	Unknown subscriber (IMSI unknowkn)	7
C	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	8
C	GPRS services and non-GPRS services not allowed	Unknown subscriber (IMSI unknown)	9
	MS identity cannot be derived by the network	-	10
	GPRS services not allowed in this PLMN	Roaming not allowed: ~~PLMN not allowed~~	PLMN not allowed
	LA not allowed	-	
	Roaming not allowed in this LA	-	
	GPRS services not allowed in this PLMN	~~PLMN not allowed~~ —	Operator determined barring
	Illegal MS	-	
	Illegal ME	-	
	Network failure	System Failure	
	Network failure	Unexpected data value	
	Network failure	MAP_U/P_ABORT	
	Network failure	MAP_NOTICE	
	Network failure	MAP_CLOSE	

NOTE 1: The mobile station identity is inserted by the SGSN if the SGSN wants to deallocate or re-allocate a P-TMSI. If the SGSN wants to deallocate the P-TMSI it shall include the IMSI. If the SGSN wants to re-allocate the P-TMSI it shall include the new P-TMSI. If a P-TMSI is included, the MS shall respond with a ROUTEING AREA UPDATE COMPLETE message.

NOTE 2: The mobile station identity is inserted by the SGSN if it is received in a BSSAP+ LOCATION UPDATE ACCEPT message from the VLR. If a TMSI is included, the MS shall respond with a ROUTEING AREA UPDATE COMPLETE message. Only used in the Combined Routeing and Location Area procedure.

NOTE 3: This reject cause is inserted on the positive response by the SGSN if the SGSN receives a BSSAP+ LOCATION UPDATE REJECT message from the VLR indicating in the reject cause IMSI unknown in HLR. Only used in the Combined Routeing and Location Area procedure.

NOTE 4: This reject cause is inserted on the positive response by the SGSN if the SGSN does not receive any response from the VLR to a previous BSSAP+ LOCATION UPDATE REQUEST message. Only used in the Combined Routeing and Location Area procedure.

NOTE 5: The Unknown RA error is only generated as a result of incorrect information being inserted by the BSS.

NOTE 6: The HLR shall send Unknown subscriber with diagnostic value No GPRS subscription if the HLR indicates that there is an error in the type of subscription (i.e. SGSN requests service for a non-GPRS only subscriber).

NOTE 7: The HLR shall send Unknown subscriber with diagnostic value IMSI unknown if the HLR indicates that the IMSI provided by the SGSN is unknown.

NOTE 8: The HLR shall send Unknown subscriber with diagnostic value No GPRS subscription if the HLR indicates that there is an error in the type of subscription (i.e. SGSN requests service for a non-GPRS only subscriber). Used in the Combined Routeing and Location Area procedure.

NOTE 9: This reject cause is inserted if the SGSN receives a MAP GPRS UPDATE LOCATION negative response message indicating IMSI unknown. Used in the Combined Routeing and Location Area procedure.

NOTE 10: This reject cause is inserted if the SGSN does not receive any response from the old SGSN to a previous SGSN CONTEXT REQUEST message.

3GPP TSG-CN4 Meeting #7 ***Tdoc N4-010370***
Sophia Antipolis, FRANCE, 26th February - 2nd March 2001

CR-Form-v3

CHANGE REQUEST

⌘ **09.10** **CR** **A014** ⌘ rev **-** ⌘ Current version: **7.1.0** ⌘

*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 ☐ Core Network **X**

Title:	⌘	Roaming restrictions for GPRS service
Source:	⌘	CN4
Work item code:	⌘	GPRS
Date:	⌘	16 January 01
Category:	⌘	**A**
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:	⌘	Experience from the deployment of GPRS in live networks brought out that some existing roaming scenarios and configurations does not work. In the case when operator has only roaming agreement for CS services but not for PS service (GPRS) there is no suitable cause value with which PS attach can be rejected without impact on both the GSM roaming and the GPRS services in other networks. More detail description of the problem can be found from TSG CN Plenary #14 Tdoc NP-000697 and TSG SA Pleanary #10 Tdoc SP-000666.
Summary of change:	⌘	In order to solve the problem it is proposed to introduce a new rejection cause value "GPRS services not allowed in this PLMN"(#14) that could be indicated to the MS during GPRS attach, detach and RAU in a PLMN which does not offer GPRS roaming to that MS. When MS receives this cause code it shall not attempt new GPRS attach before entering a new PLMN on which it hasn't be rejected with the same cause after the last switch on. To limit the effect of changes to a frozen specification, and as the roaming restriction for GPRS services are considered to be of temporary nature, it is proposed not to introduce a new cause value on the MAP interface between HLR and SGSN.
Consequences if not approved:	⌘	If no roaming agreement is established for GPRS or the SGSN has no knowledge about the HLR of the roaming subscriber, depending on the SGSN implementation either #11 or #7 will probably be sent to the MS which disables in minimum the PS (in all networks) until the MS is switched off. The only other possibility would be that the network sends a cause code not listed explicitly, with the consequence that the MS will try to register "forever" (5 re-attempts after each T3302 expiry) which causes a considerable network load and results in a unacceptable behaviour from the users point of view(long term no service and battery consumption)

Clauses affected:	⌘	3.4		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

3.4 Routeing area updating

	04.08	09.02	Notes
Forward message	GMM (ROUTEING AREA UPDATE REQUEST)	MAP_UPDATE_GPRS_LOCATION_request	
	MS classmark 1	-	
	MS classmark 4	-	
	GPRS Ciphering key seq number	-	
	Mobile station identity	IMSI	
	Old routeing area identification	-	
Positive results	GMM (ROUTEING AREA UPDATE ACCEPT)	MAP_UPDATE_GPRS_LOCATION_response	
	Routeing area identification	-	
	Mobile station identity	-	1
C	Mobile station	-	2
C	Reject: IMSI unknown in HLR	-	3
C	Reject: MSC temporarily not reacheable	-	4
Negative results	GMM (ROUTEING AREA UPDATE REJECT)	MAP_UPDATE_GPRS_LOCATION_response	
	Network failure	-	5
	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	6
	GPRS services and non GPRS services not allowed	Unknown subscriber (IMSI unknowkn)	7
C	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	8
C	GPRS services and non-GPRS services not allowed	Unknown subscriber (IMSI unknown)	9
	MS identity cannot be derived by the network	-	10
	GPRS services not allowed in this PLMN	Roaming not allowed: ~~PLMN not allowed~~	PLMN not allowed
	LA not allowed	-	
	Roaming not allowed in this LA	-	
	GPRS services not allowed in this PLMN	~~PLMN not allowed~~ —	Operator determined barring
	Illegal MS	-	
	Illegal ME	-	
	Network failure	System Failure	
	Network failure	Unexpected data value	
	Network failure	MAP_U/P_ABORT	
	Network failure	MAP_NOTICE	
	Network failure	MAP_CLOSE	

NOTE 1: The mobile station identity is inserted by the SGSN if the SGSN wants to deallocate or re-allocate a P-TMSI. If the SGSN wants to deallocate the P-TMSI it shall include the IMSI. If the SGSN wants to re-allocate the P-TMSI it shall include the new P-TMSI. If a P-TMSI is included, the MS shall respond with a ROUTEING AREA UPDATE COMPLETE message.

NOTE 2: The mobile station identity is inserted by the SGSN if it is received in a BSSAP+ LOCATION UPDATE ACCEPT message from the VLR. If a TMSI is included, the MS shall respond with a ROUTEING AREA UPDATE COMPLETE message. Only used in the Combined Routeing and Location Area procedure.

NOTE 3: This reject cause is inserted on the positive response by the SGSN if the SGSN receives a BSSAP+ LOCATION UPDATE REJECT message from the VLR indicating in the reject cause IMSI unknown in HLR. Only used in the Combined Routeing and Location Area procedure.

NOTE 4: This reject cause is inserted on the positive response by the SGSN if the SGSN does not receive any response from the VLR to a previous BSSAP+ LOCATION UPDATE REQUEST message. Only used in the Combined Routeing and Location Area procedure.

NOTE 5: The Unknown RA error is only generated as a result of incorrect information being inserted by the BSS.

NOTE 6: The HLR shall send Unknown subscriber with diagnostic value No GPRS subscription if the HLR indicates that there is an error in the type of subscription (i.e. SGSN requests service for a non-GPRS only subscriber).

NOTE 7: The HLR shall send Unknown subscriber with diagnostic value IMSI unknown if the HLR indicates that the IMSI provided by the SGSN is unknown.

NOTE 8: The HLR shall send Unknown subscriber with diagnostic value No GPRS subscription if the HLR indicates that there is an error in the type of subscription (i.e. SGSN requests service for a non-GPRS only subscriber). Used in the Combined Routeing and Location Area procedure.

NOTE 9: This reject cause is inserted if the SGSN receives a MAP GPRS UPDATE LOCATION negative response message indicating IMSI unknown. Used in the Combined Routeing and Location Area procedure.

NOTE 10: This reject cause is inserted if the SGSN does not receive any response from the old SGSN to a previous SGSN CONTEXT REQUEST message.

3GPP TSG-CN4 Meeting #06 **Tdoc N4-010057**
BEIJING, CHINA 15th 19th January 2001

CR-Form-v3

CHANGE REQUEST

⌘ **29.002** **CR** **223** ⌘ rev **-** ⌘ Current version: **3.7.2** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Failure of Update GPRS Location when HLR is not reachable
Source:	⌘	CN4
Work item code:	⌘	GPRS R97
Date:	⌘	5 Jan 2001
Category:	⌘	**A**
Release:	⌘	R99

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:	⌘	Returning "Roaming Not Allowed" if the HLR is not reachable can cause undesirable behaviour of the MS which tries to register in an SGSN when a GPRS roaming agreement has not been set up between the HPLMN and VPLMN operators
Summary of change:	⌘	Change the error reported to the application to "Unknown HLR"
Consequences if not approved:	⌘	Unnecessary denial of CS service to GPRS capable MSs

Clauses affected:	⌘	19.1.1.8		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	23.060
Other comments:	⌘	The reference to the GPRS stage 2 specification in the SDL diagram has been corrected from GSM 03.60 to 3GPP TS 23.060		

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

19.1.1.8 Detailed procedure in the SGSN

Figure 19.1.1/20 shows the MAP process for updating of the SGSN. The following general macros are used:

Receive_Open_Cnf	subclause 25.1;
Insert_Subscriber_Data_SGSN	subclause 25.7;
Activate_Tracing_SGSN	subclause 25.9;

Sheet 2: The procedure Check_User_Error_In_Serving_Network_Entity is specific to Super-Charger; it is specified in 3G TS 23.116 [110].

The location updating process

The MAP process receives an « Update HLR request » from the relevant process in the SGSN (see GSM 03.60) to perform HLR updating. If the SGSN does not know the subscribers HLR (e.g. no IMSI translation exists as there are not yet any SS7 links to the subscribers HPLMN), the « Update HLR negative response » with error Unknown HLR ~~Roaming Not Allowed (cause PLMN Roaming Not Allowed)~~ is returned to the requesting process.

If the subscribers HLR can be reached, the SGSN opens a dialogue towards the HLR by sending a MAP_OPEN request without any user specific parameters, together with a MAP_UPDATE_GPRS_LOCATION request containing the parameters

- IMSI, identifying the subscriber;
- SGSN Address and SGSN number.

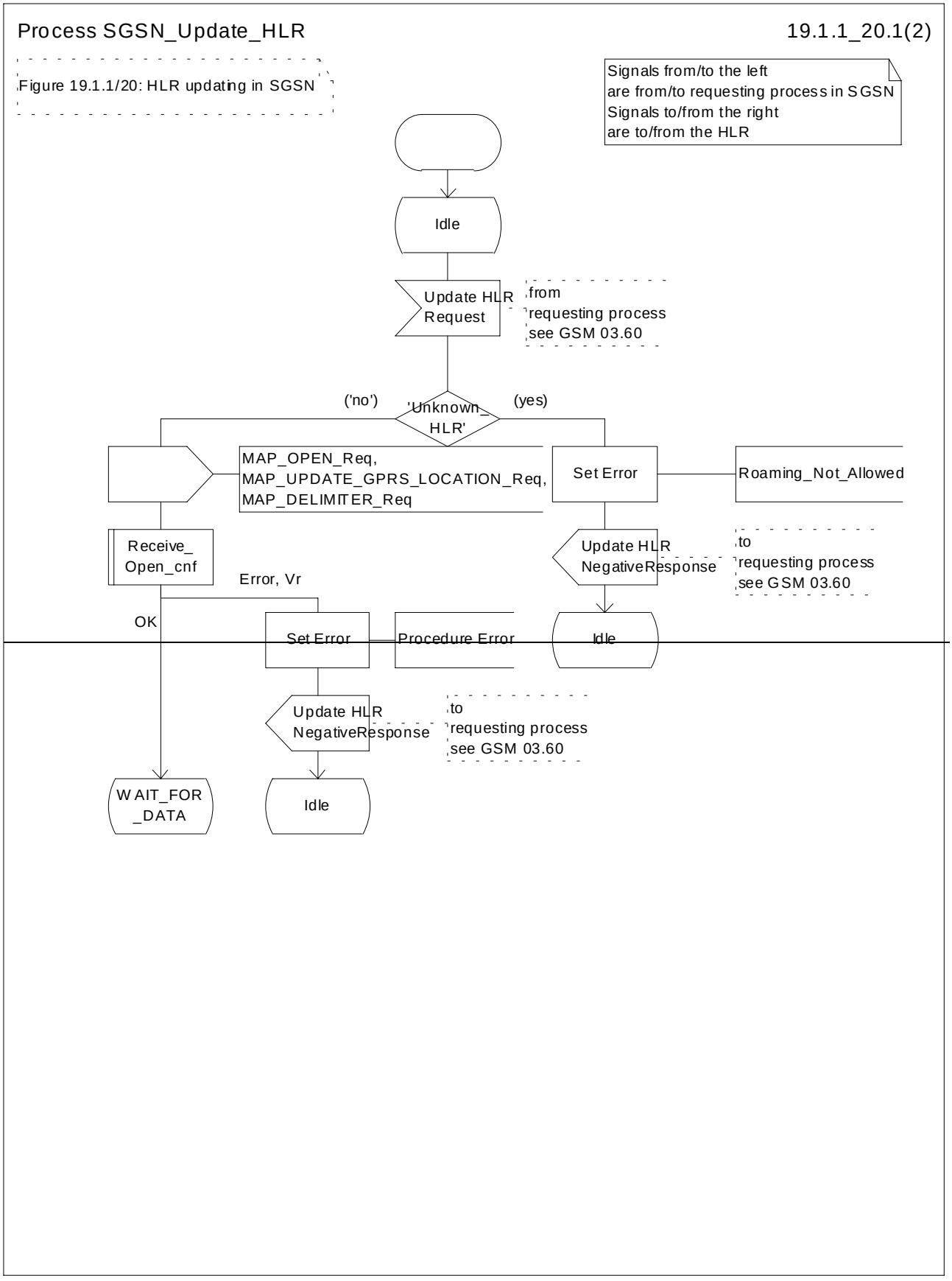
In case the HLR rejects dialogue opening (see subclause 25.1) or indicates version Vr protocol to be used, the SGSN will terminate the process indicating « Update HLR negative response » to the requesting process.

If the HLR accepts the dialogue, the HLR will respond with:

- a MAP_INSERT_SUBSCRIBER_DATA indication, handled by the macro Insert_Subs_Data_SGSN defined in subclause 25.7;

NOTE: The HLR may repeat this service several times depending on the amount of data to be transferred to the SGSN and to replace subscription data in case they are not supported by the SGSN.

- a MAP_ACTIVATE_TRACE_MODE indication, handled by the macro Activate_Tracing_SGSN defined in subclause 25.9;
- the MAP_UPDATE_GPRS_LOCATION confirmation:
  - if this confirmation contains the HLR Number, this indicates that the HLR has passed all information and that updating has been successfully completed. The « Update HLR response » message is returned to the requesting process for completion of the SGSN updating (see GSM 03.60).
  - if the confirmation contains an User error cause (Unknown Subscriber, Roaming Not Allowed or some other), the corresponding error is returned to the requesting process in the « Update HLR negative response ».
- a MAP_P_ABORT, MAP_U_ABORT, or MAP_CLOSE indication. In these cases, the corresponding error is returned to the requesting process in the « Update HLR negative response ».
- a MAP_NOTICE indication. Then, the dialogue towards the HLR is terminated, and the « HLR Update negative response » with the appropriate error is returned to the requesting process.


Process SGSN_Update_HLR
19.1.1_20.1(2)
Figure 19.1.1/20: HLR updating in SGSN
Signals from/to the left
are from/to requesting process in SGSN
Signals to/from the right
are to/from the HLR
Idle
Update HLR Request
from
requesting process
see GSM 03.60
('no')
'Unknown_ HLR'
(yes)
MAP_OPEN_Req,
MAP_UPDATE_GPRS_LOCATION_Req,
MAP_DELIMITER_Req
Set Error
Roaming_Not_Allowed
Receive_ Open_cnf
Update HLR NegativeResponse
to
requesting process
see GSM 03.60
Error, Vr
OK
Set Error
Procedure Error
Idle
Update HLR NegativeResponse
to
requesting process
see GSM 03.60
W AIT_FOR _DATA
Idle

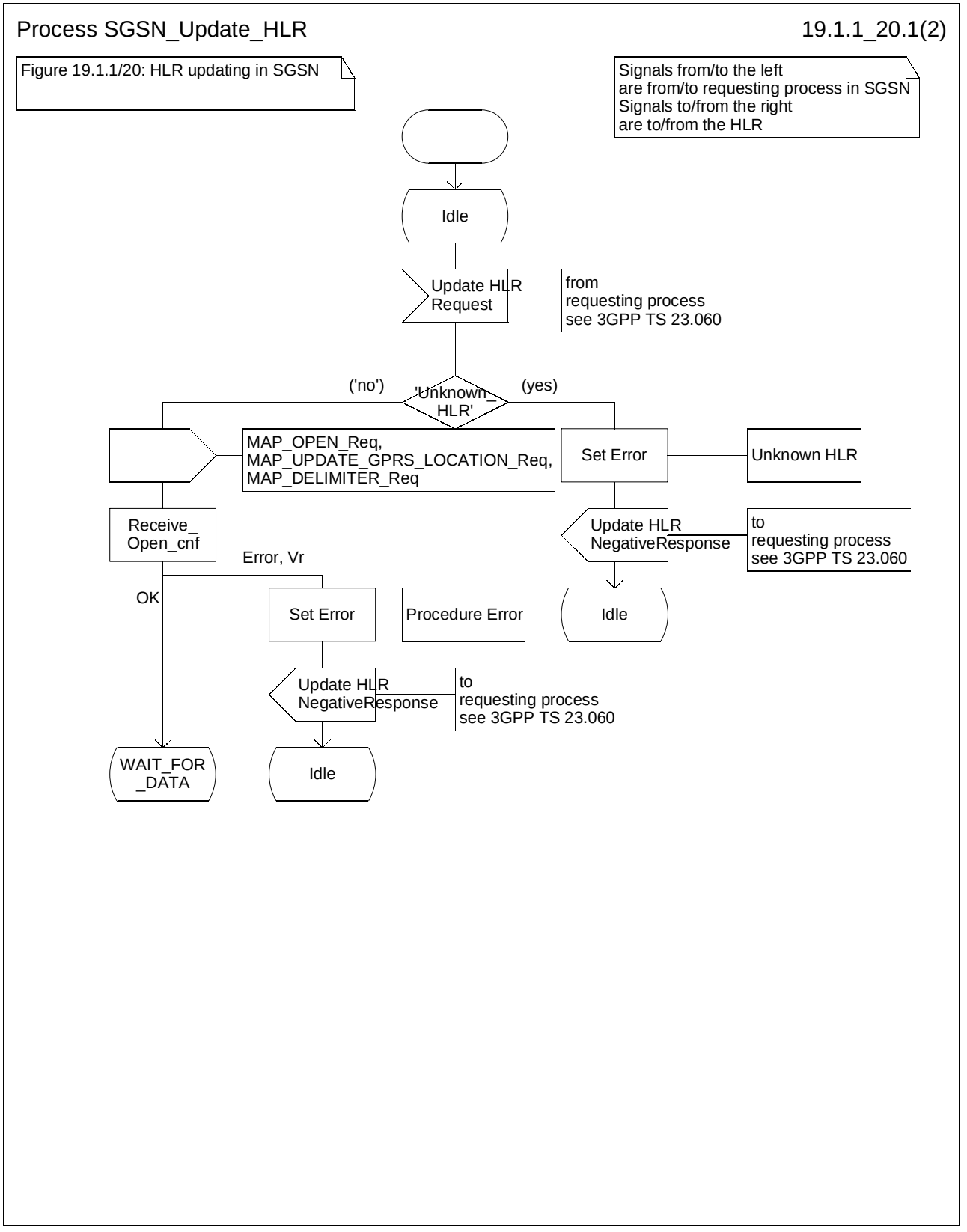


Figure 19.1.1/20 (sheet 1 of 2): Process SGSN_Update_HLR

3GPP TSG-CN4 Meeting #06 **Tdoc N4-010058**
BEIJING, CHINA 15th 19th January 2001

CR-Form-v3

CHANGE REQUEST

⌘ **29.002** **CR** **224** ⌘ rev **-** ⌘ Current version: **4.2.1** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Failure of Update GPRS Location when HLR is not reachable
Source:	⌘	CN4
Work item code:	⌘	GPRS R97
Date:	⌘	5 Jan 2001
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:	⌘	Returning "Roaming Not Allowed" if the HLR is not reachable can cause undesirable behaviour of the MS which tries to register in an SGSN when a GPRS roaming agreement has not been set up between the HPLMN and VPLMN operators
Summary of change:	⌘	Change the error reported to the application to "Unknown HLR"
Consequences if not approved:	⌘	Unnecessary denial of CS service to GPRS capable MSs

Clauses affected:	⌘	19.1.1.8		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	23.060
Other comments:	⌘	The reference to the GPRS stage 2 specification in the SDL diagram has been corrected from GSM 03.60 to 3GPP TS 23.060		

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.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://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

19.1.1.8 Detailed procedure in the SGSN

Figure 19.1.1/20 shows the MAP process for updating of the SGSN. The following general macros are used:

Receive_Open_Cnf	subclause 25.1;
Insert_Subscriber_Data_SGSN	subclause 25.7;
Activate_Tracing_SGSN	subclause 25.9;

Sheet 2: The procedure Check_User_Error_In_Serving_Network_Entity is specific to Super-Charger; it is specified in 3G TS 23.116 [110].

The location updating process

The MAP process receives an « Update HLR request » from the relevant process in the SGSN (see GSM 03.60) to perform HLR updating. If the SGSN does not know the subscribers HLR (e.g. no IMSI translation exists as there are not yet any SS7 links to the subscribers HPLMN), the « Update HLR negative response » with error Unknown HLR ~~Roaming Not Allowed (cause PLMN Roaming Not Allowed)~~ is returned to the requesting process.

If the subscribers HLR can be reached, the SGSN opens a dialogue towards the HLR by sending a MAP_OPEN request without any user specific parameters, together with a MAP_UPDATE_GPRS_LOCATION request containing the parameters

- IMSI, identifying the subscriber;
- SGSN Address and SGSN number.

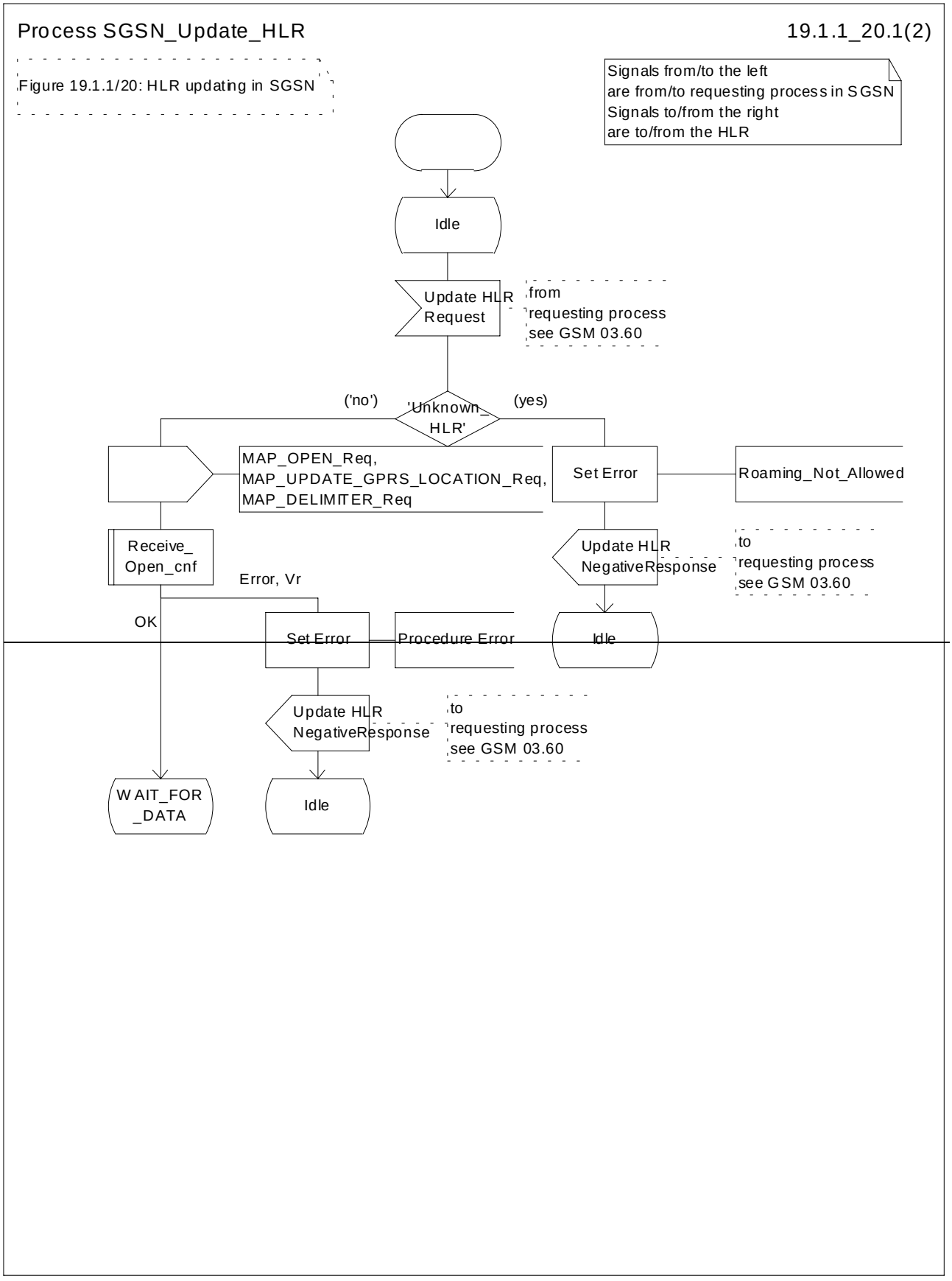
In case the HLR rejects dialogue opening (see subclause 25.1) or indicates version Vr protocol to be used, the SGSN will terminate the process indicating « Update HLR negative response » to the requesting process.

If the HLR accepts the dialogue, the HLR will respond with:

- a MAP_INSERT_SUBSCRIBER_DATA indication, handled by the macro Insert_Subs_Data_SGSN defined in subclause 25.7;

NOTE: The HLR may repeat this service several times depending on the amount of data to be transferred to the SGSN and to replace subscription data in case they are not supported by the SGSN.

- a MAP_ACTIVATE_TRACE_MODE indication, handled by the macro Activate_Tracing_SGSN defined in subclause 25.9;
- the MAP_UPDATE_GPRS_LOCATION confirmation:
  - if this confirmation contains the HLR Number, this indicates that the HLR has passed all information and that updating has been successfully completed. The « Update HLR response » message is returned to the requesting process for completion of the SGSN updating (see GSM 03.60).
  - if the confirmation contains an User error cause (Unknown Subscriber, Roaming Not Allowed or some other), the corresponding error is returned to the requesting process in the « Update HLR negative response ».
- a MAP_P_ABORT, MAP_U_ABORT, or MAP_CLOSE indication. In these cases, the corresponding error is returned to the requesting process in the « Update HLR negative response ».
- a MAP_NOTICE indication. Then, the dialogue towards the HLR is terminated, and the « HLR Update negative response » with the appropriate error is returned to the requesting process.


Process SGSN_Update_HLR
19.1.1_20.1(2)
Figure 19.1.1/20: HLR updating in SGSN
Signals from/to the left
are from/to requesting process in SGSN
Signals to/from the right
are to/from the HLR
Idle
Update HLR Request
from
requesting process
see GSM 03.60
('no')
'Unknown_ HLR'
(yes)
MAP_OPEN_Req,
MAP_UPDATE_GPRS_LOCATION_Req,
MAP_DELIMITER_Req
Set Error
Roaming_Not_Allowed
Receive_ Open_cnf
Update HLR NegativeResponse
to
requesting process
see GSM 03.60
Error, Vr
OK
Set Error
Procedure Error
Idle
Update HLR NegativeResponse
to
requesting process
see GSM 03.60
W AIT_FOR _DATA
Idle

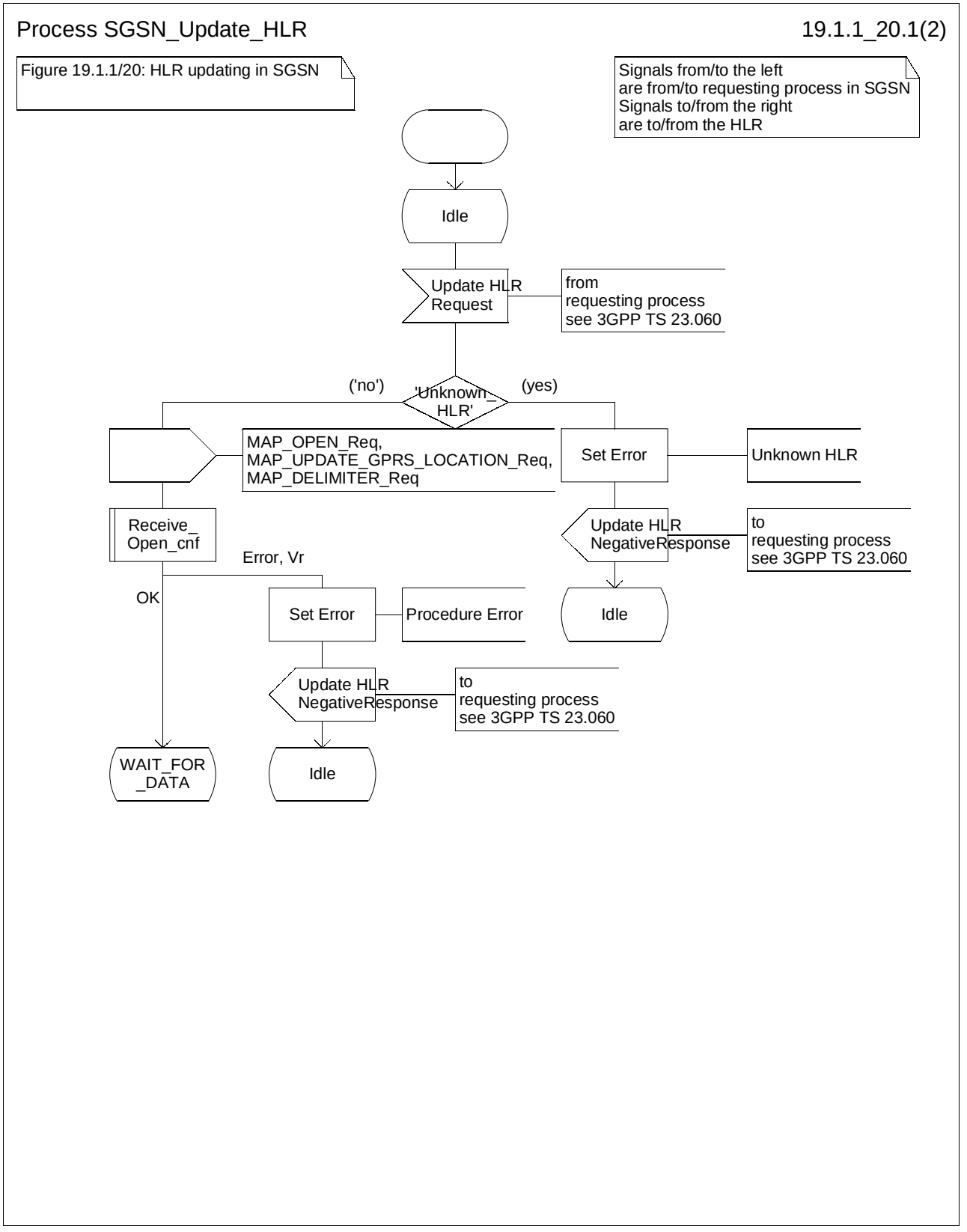


Figure 19.1.1/20 (sheet 1 of 2): Process SGSN_Update_HLR

3GPP TSG-CN4 Meeting #07 **Tdoc N4-010445**
Sophia Antipolis, France, 26th February 2nd March 2001

CR-Form-v3

CHANGE REQUEST

⌘ **29.002** **CR** **259** ⌘ rev ⌘ Current version: **3.7.1** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Failure of Authentication Parameter GPRS when HLR is not reachable
Source:	⌘	CN4
Work item code:	⌘	GPRS R97
Date:	⌘	26 Feb 2001
Category:	⌘	**A**
Release:	⌘	R99

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:	⌘	No Error case was described for the Obtain Authentication Parameter in the SGSN if the SGSN cannot address the subscribers HLR.
Summary of change:	⌘	Introduction of the error cause "Unknown HLR".
Consequences if not approved:	⌘	Risk of different implementations due to a lack of description

Clauses affected:	⌘	25.5.6		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	3GPP TS 23.060 3GPP TS 29.010
Other comments:	⌘			

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

25.5.6 Process Obtain_Authent_Para_SGSN

For authentication procedure description see GSM 03.60 and GSM 04.08.

This Process is used by the SGSN to request authentication vectors from the HLR.

If the SGSN does not know the subscriber's HLR ~~address~~ address (e.g. no IMSI translation exists ~~as there are not yet any SS7 links to the subscribers HPLMN~~), the ~~«~~Authentication Parameter negative response~~»~~ with error “Unknown HLR” is returned to the requesting process.

Otherwise, ~~The~~ the Process proceeds as follows:

- a connection is opened, and a MAP_SEND_AUTHENTICATION_INFO request sent to the HLR;
- if the HLR indicates that a MAP version 1 or 2dialogue is to be used, the SGSN performs the equivalent MAP version 1 or 2dialogue. which can return a positive result containing authentication sets, an empty positive result, or an error;
- if the dialogue opening fails, the Authentication Parameters negative response with appropriate error is sent to the requesting process. Otherwise, the SGSN waits for the response from the HLR;
- if a MAP_SEND_AUTHENTICATION_INFO confirmation is received from the HLR, the SGSN checks the received data.

One of the following positive responses may be received from a MAP version 1 or MAP version 2 dialogue with the HLR:

- Authentication triplets, in which case the outcome is successful;
- Empty response, in which case the SGSN may re-use old triplets, if allowed by the PLMN operator.

If the SGSN cannot re-use old triplets (or no such triplets are available) then the Authentication Parameters negative response with appropriate error is sent to the requesting process.

If the outcome was successful or re-use of old parameters in the SGSN is allowed, then the Authentication Parameters response is sent to the requesting process

If an "Unknown Subscriber" error is included in the MAP_SEND_AUTHENTICATION_INFO confirm or is returned by the MAP version 1 dialogue, then the appropriate error is sent to the requesting process in the Authentication Parameters negative response

In a MAP version 3 dialogue a (possibly empty) set of authentication vectors may be received from the HLR followed by a MAP_CLOSE_Indication or by a MAP_DELIMITER_Indication. If a MAP_DELIMITER_Indication is received, the SGSN may request additional authentication vectors from the HLR by sending a new MAP_SEND_AUTHENTIFICATION_INFO_Request. If a MAP_CLOSE_Indication is received, and authentication vectors have been received during the dialogue, then the "OK" exit is used. If no authentication vectors have been received during the dialogue, the SGSN checks whether old GSM Triplets are available and can be re-used. If so, the "OK" exit is used, otherwise the "Procedure Error" exit is used. Note that re-use of old UMTS Quintuplets is not allowed.

If in a MAP version 3 dialogue an "Unknown Subscriber" error is received, then the "Unknown Subscriber" exit is used. If other errors are received, the SGSN checks whether old GSM Triplets are available and can be re-used. If so, the "OK" exit is used, otherwise the "Procedure Error" exit is used. Note that re-use of old UMTS Quintuplets is not allowed.

- if a MAP-U-ABORT, MAP_P_ABORT or unexpected MAP_CLOSE service indication is received from the HLR, then the SGSN checks whether old authentication parameters can be re-used. If old parameters cannot be re-used the Authentication Parameters negative response with appropriate error is sent to the requesting process.
- if a MAP_NOTICE service indication is received from the HLR, then the dialogue with the HLR is closed. The SGSN then checks whether old authentication parameters can be re-used. If old parameters cannot be re-used the process terminates and the Authentication Parameters negative response with appropriate error is sent to the requesting process; Otherwise the Authentication Parameters response is sent to requesting process.

The process is described in figure 25.5/6.

Process Obtain_Authent_Para_SGSN 1(3)

Figure 25.5/6: Process to obtain authentication parameters from the HLR to the SGSN

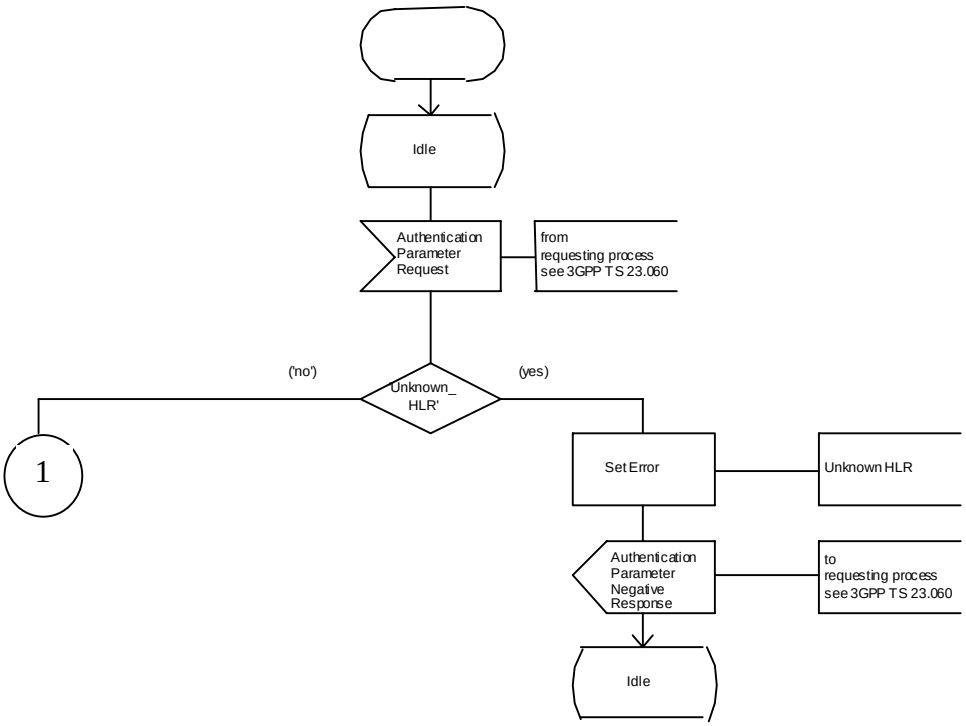
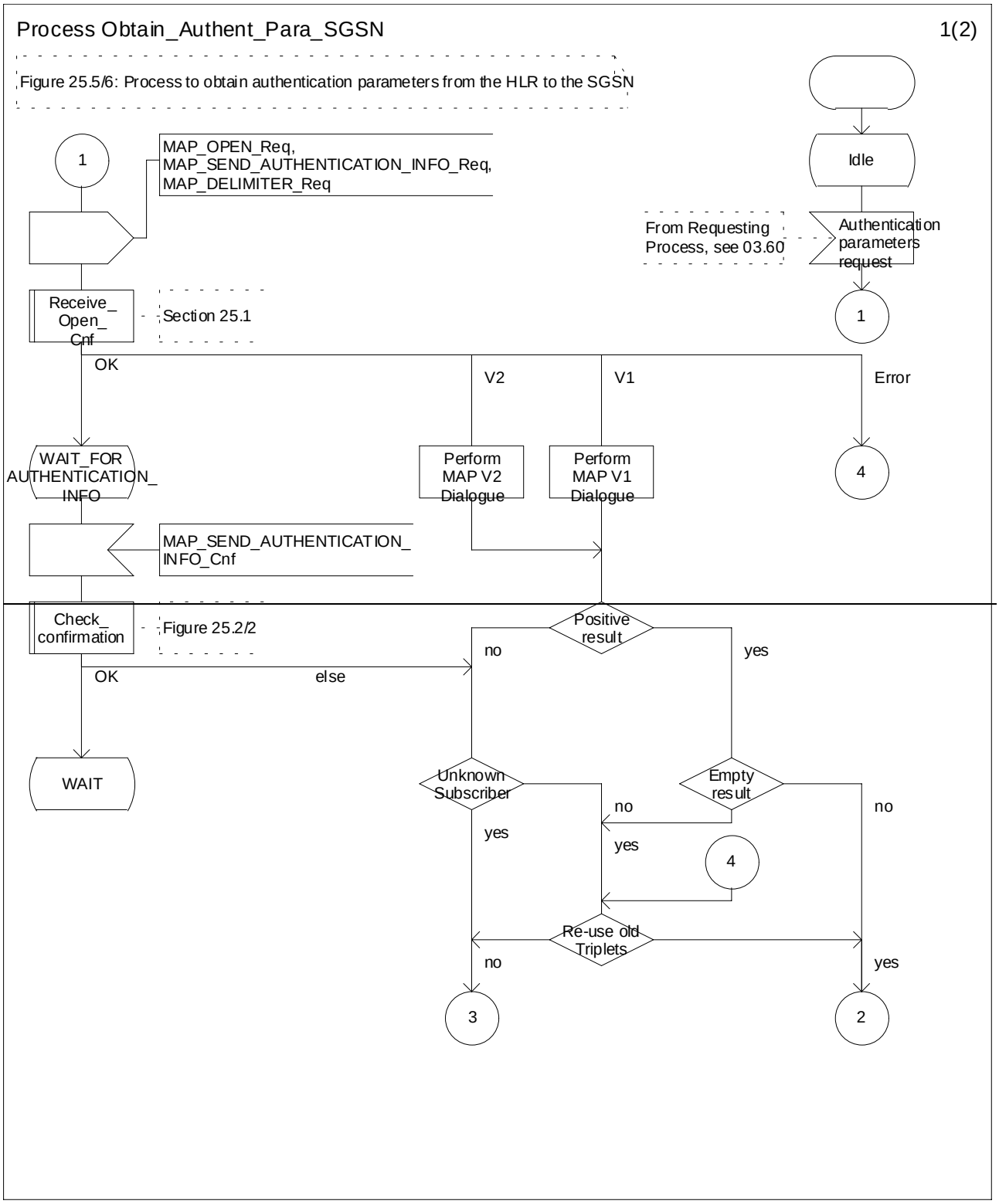


Figure 25.5/6 (sheet 1 of 3): Process Obtain_Authen_Para_SGSN


Process Obtain_Authent_Para_SGSN
1(2)
Figure 25.5/6: Process to obtain authentication parameters from the HLR to the SGSN
1
MAP_OPEN_Req,
MAP_SEND_AUTHENTICATION_INFO_Req,
MAP_DELIMITER_Req
Receive_
Open_
Cnf
Section 25.1
OK
WAIT_FOR
AUTHENTICATION_
INFO
MAP_SEND_AUTHENTICATION_
INFO_Cnf
Check_
confirmation
Figure 25.2/2
OK
else
WAIT
Idle
From Requesting
Process, see 03.60
Authentication
parameters
request
1
V2
V1
Error
Perform
MAP V2
Dialogue
Perform
MAP V1
Dialogue
4
Positive
result
no
yes
Unknown
Subscriber
yes
no
Empty
result
no
yes
4
Re-use old
Triplets
no
yes
3
2

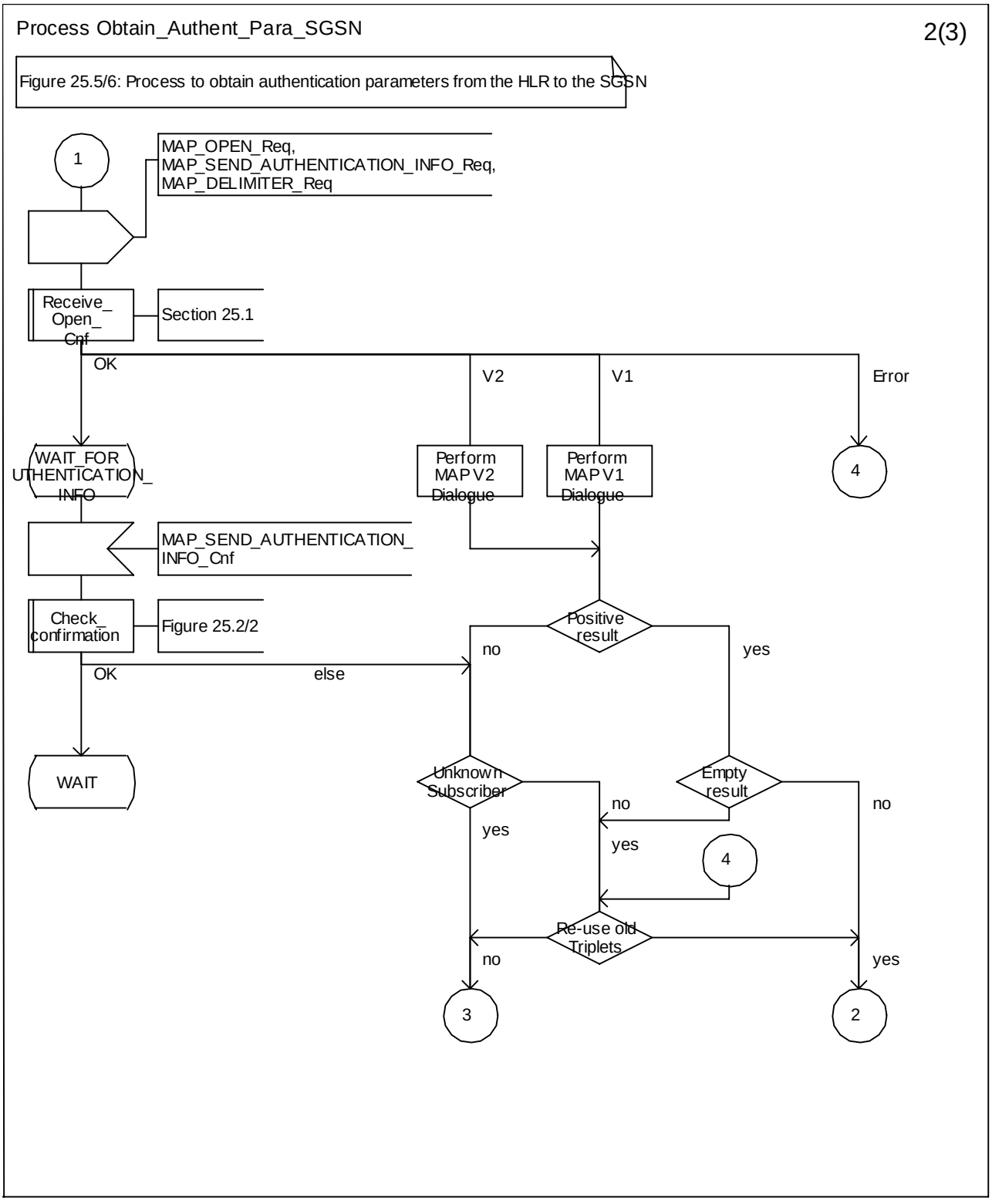
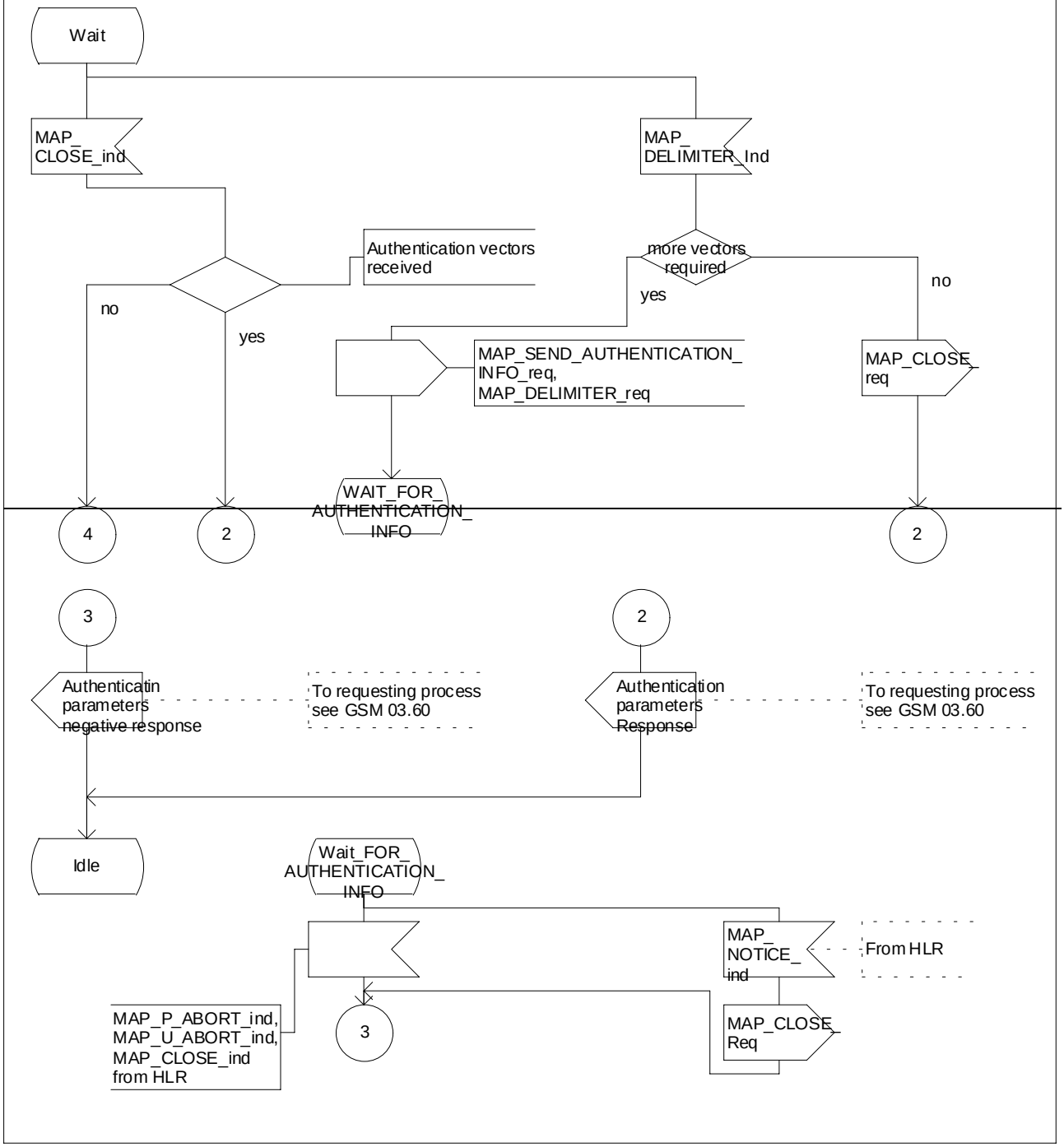


Figure 25.5/6 (sheet ~~1~~ 2 of ~~2~~3): Process Obtain_Authen_Para_SGSN

Process Obtain_Authent_Para_SGSN 2(2)

Figure 25.5/6: Process to obtain authentication parameters from the HLR to the SGSN



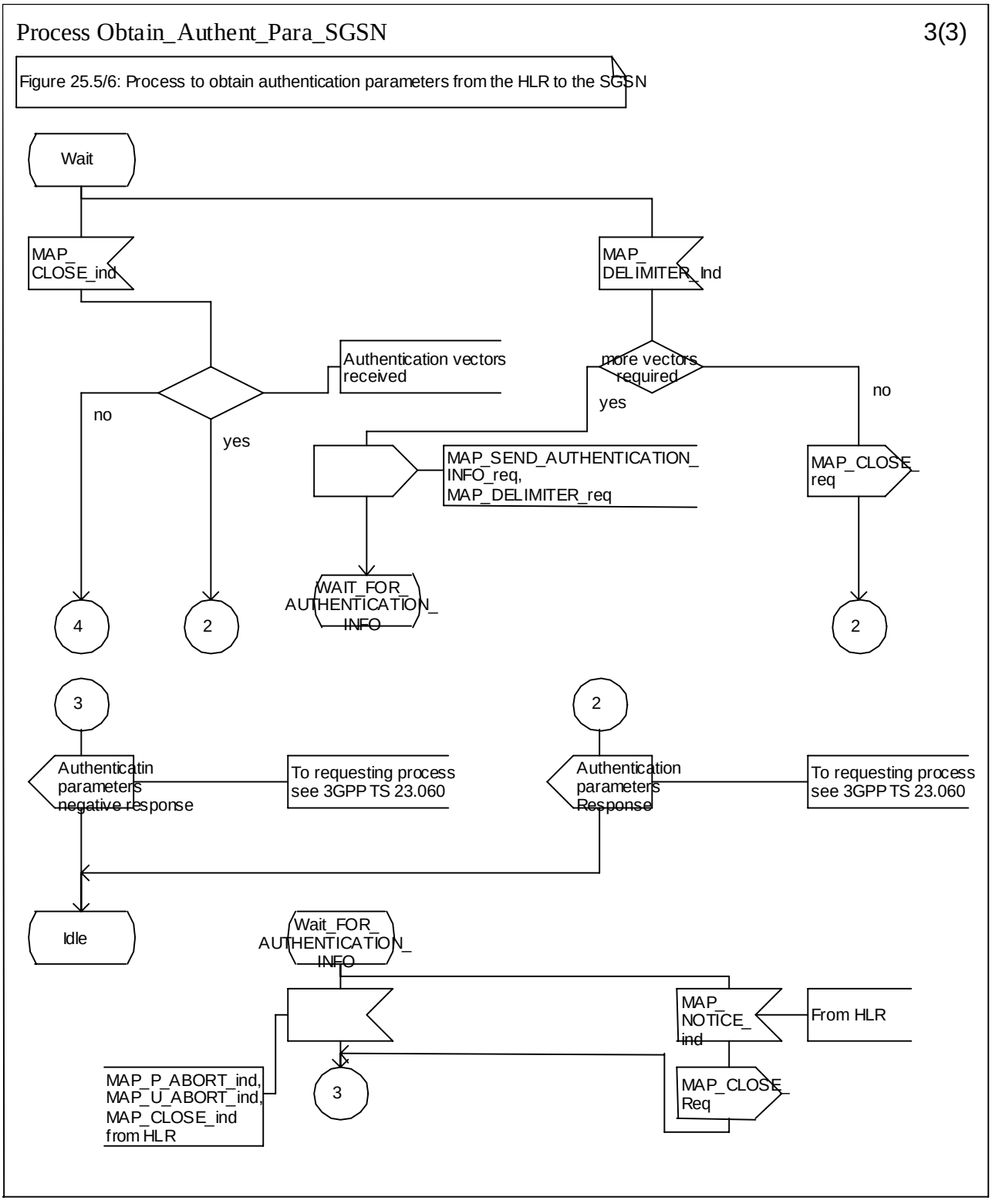


Figure 25.5/6 (sheet ~~2~~ 3 of ~~2~~3): Process Obtain_Authen_Para_SGSN

3GPP TSG-CN4 Meeting #07 **Tdoc N4-010446**
Sophia Antipolis, France, 26th February 2nd March 2001

CR-Form-v3

CHANGE REQUEST

⌘ **29.002** **CR** **260** ⌘ rev **-** ⌘ Current version: **4.2.1** ⌘

*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 ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Failure of Authentication Parameter GPRS when HLR is not reachable
Source:	⌘	CN4
Work item code:	⌘	GPRS R97 ***Date:*** ⌘ 26 Feb 2001
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:	⌘	No Error case was described for the Obtain Authentication Parameter in the SGSN if the SGSN cannot address the subscribers HLR.
Summary of change:	⌘	Introduction of the error cause "Unknown HLR".
Consequences if not approved:	⌘	Risk of different implementations due to a lack of description

Clauses affected:	⌘	25.5.6
Other specs affected:	⌘	☒ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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This Process is used by the SGSN to request authentication vectors from the HLR.

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Otherwise, ~~The~~ the Process proceeds as follows:

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- if the HLR indicates that a MAP version 1 or 2dialogue is to be used, the SGSN performs the equivalent MAP version 1 or 2dialogue. which can return a positive result containing authentication sets, an empty positive result, or an error;
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If the outcome was successful or re-use of old parameters in the SGSN is allowed, then the Authentication Parameters response is sent to the requesting process

If an "Unknown Subscriber" error is included in the MAP_SEND_AUTHENTICATION_INFO confirm or is returned by the MAP version 1 dialogue, then the appropriate error is sent to the requesting process in the Authentication Parameters negative response

In a MAP version 3 dialogue a (possibly empty) set of authentication vectors may be received from the HLR followed by a MAP_CLOSE_Indication or by a MAP_DELIMITER_Indication. If a MAP_DELIMITER_Indication is received, the SGSN may request additional authentication vectors from the HLR by sending a new MAP_SEND_AUTHENTIFICATION_INFO_Request. If a MAP_CLOSE_Indication is received, and authentication vectors have been received during the dialogue, then the "OK" exit is used. If no authentication vectors have been received during the dialogue, the SGSN checks whether old GSM Triplets are available and can be re-used. If so, the "OK" exit is used, otherwise the "Procedure Error" exit is used. Note that re-use of old UMTS Quintuplets is not allowed.

If in a MAP version 3 dialogue an "Unknown Subscriber" error is received, then the "Unknown Subscriber" exit is used. If other errors are received, the SGSN checks whether old GSM Triplets are available and can be re-used. If so, the "OK" exit is used, otherwise the "Procedure Error" exit is used. Note that re-use of old UMTS Quintuplets is not allowed.

- if a MAP-U-ABORT, MAP_P_ABORT or unexpected MAP_CLOSE service indication is received from the HLR, then the SGSN checks whether old authentication parameters can be re-used. If old parameters cannot be re-used the Authentication Parameters negative response with appropriate error is sent to the requesting process.
- if a MAP_NOTICE service indication is received from the HLR, then the dialogue with the HLR is closed. The SGSN then checks whether old authentication parameters can be re-used. If old parameters cannot be re-used the process terminates and the Authentication Parameters negative response with appropriate error is sent to the requesting process; Otherwise the Authentication Parameters response is sent to requesting process.

The process is described in figure 25.5/6.

Process Obtain_Authent_Para_SGSN 1(3)

Figure 25.5/6: Process to obtain authentication parameters from the HLR to the SGSN

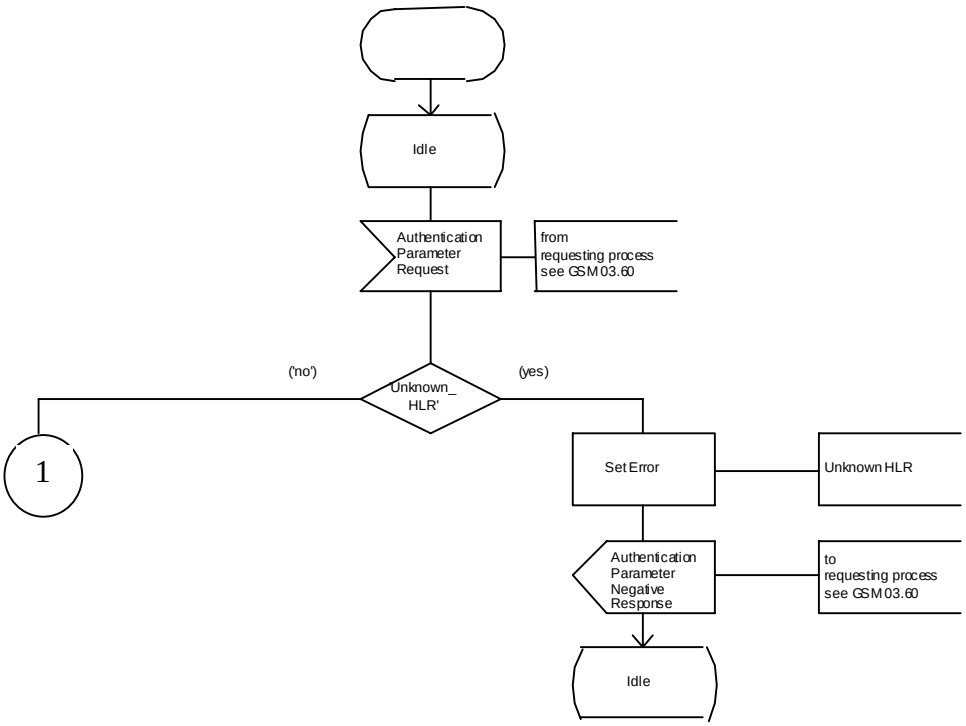
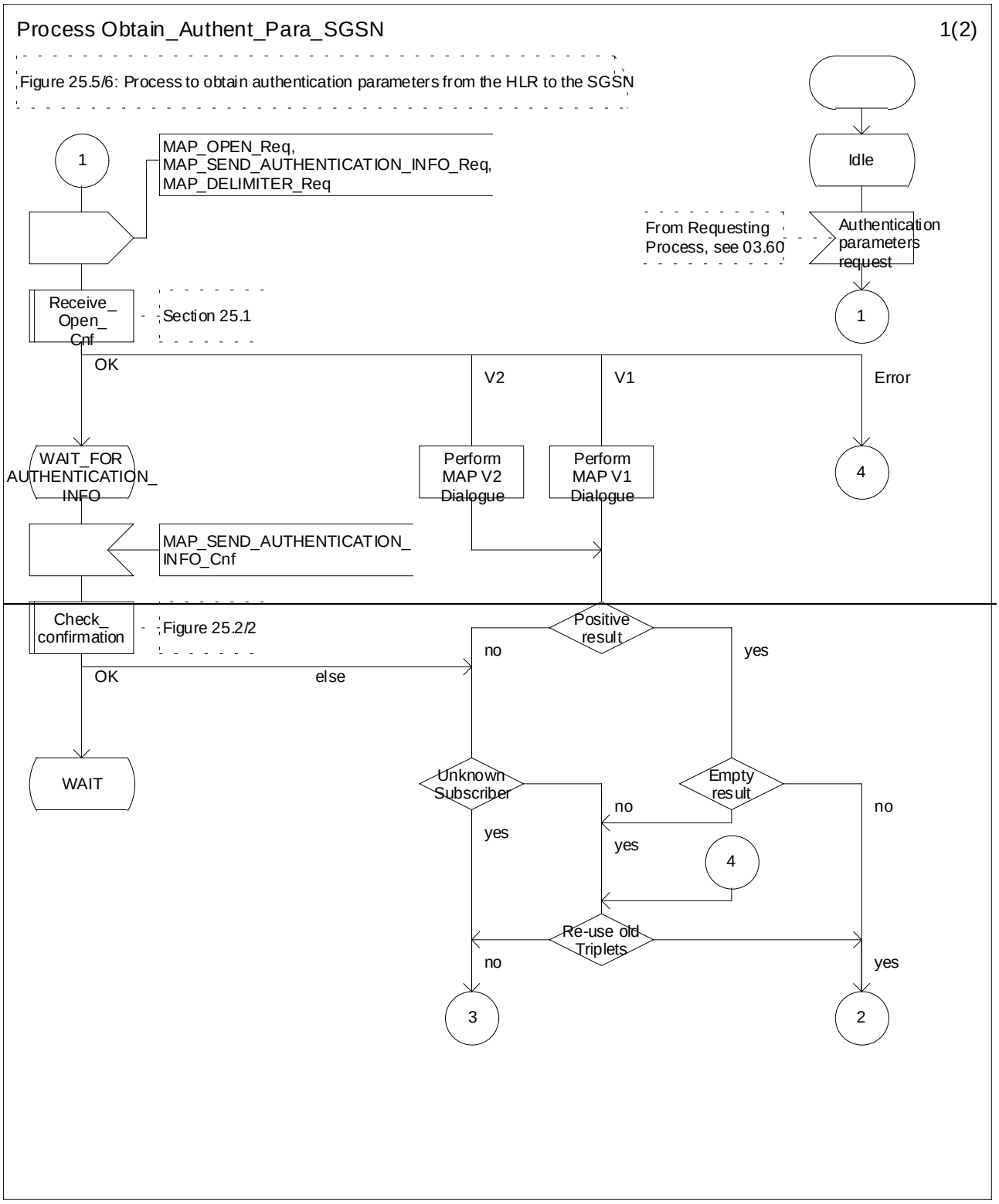


Figure 25.5/6 (sheet 1 of 3): Process Obtain_Authen_Para_SGSN


Process Obtain_Authent_Para_SGSN
1(2)
Figure 25.5/6: Process to obtain authentication parameters from the HLR to the SGSN
1
MAP_OPEN_Req,
MAP_SEND_AUTHENTICATION_INFO_Req,
MAP_DELIMITER_Req
Receive_
Open_
Cnf
Section 25.1
OK
WAIT_FOR
AUTHENTICATION_
INFO
MAP_SEND_AUTHENTICATION_
INFO_Cnf
Check_
confirmation
Figure 25.2/2
OK
else
WAIT
Idle
From Requesting
Process, see 03.60
Authentication
parameters
request
1
V2
V1
Error
Perform
MAP V2
Dialogue
Perform
MAP V1
Dialogue
4
Positive
result
no
yes
Unknown
Subscriber
yes
no
Empty
result
no
yes
4
Re-use old
Triplets
no
yes
3
2

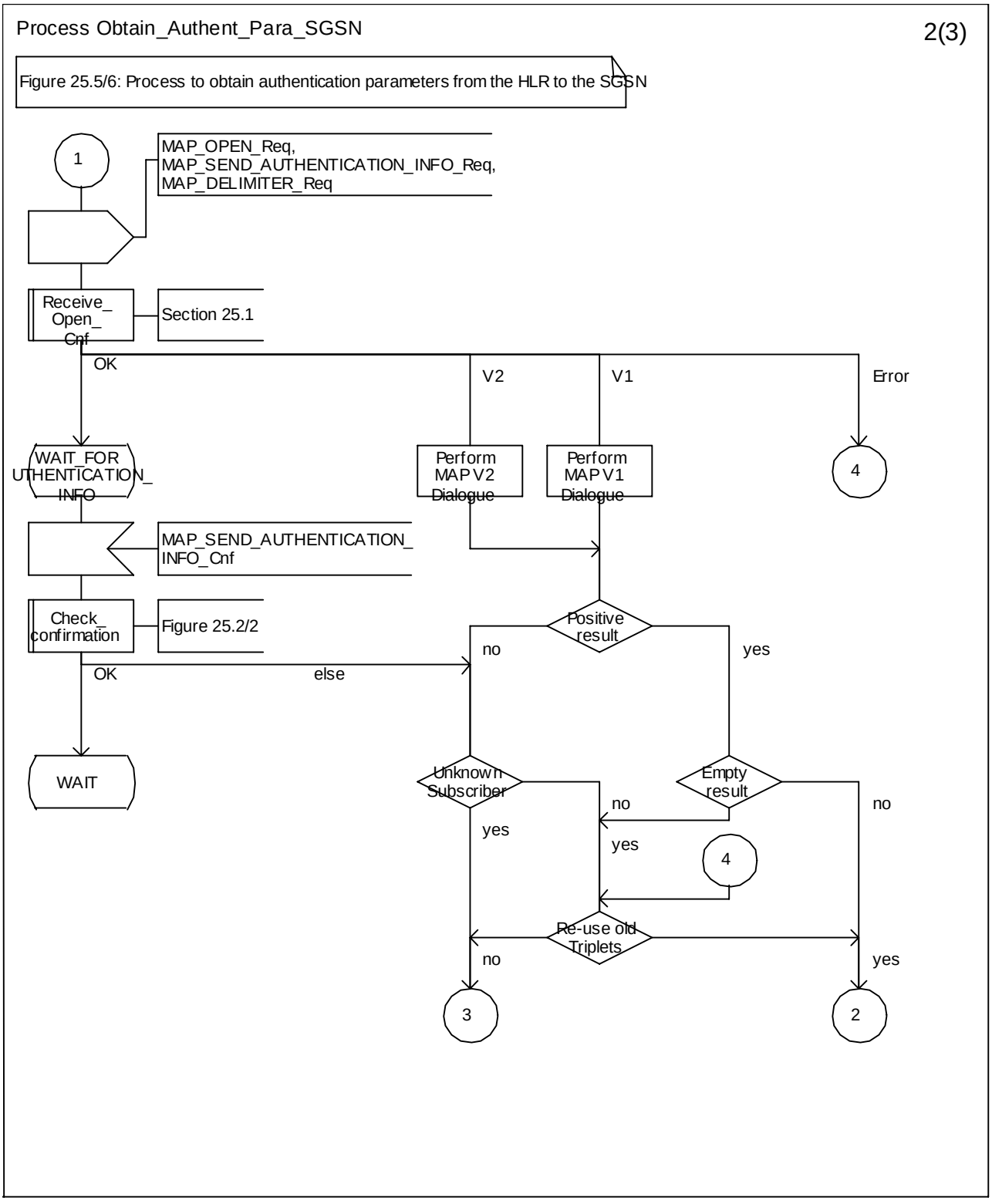
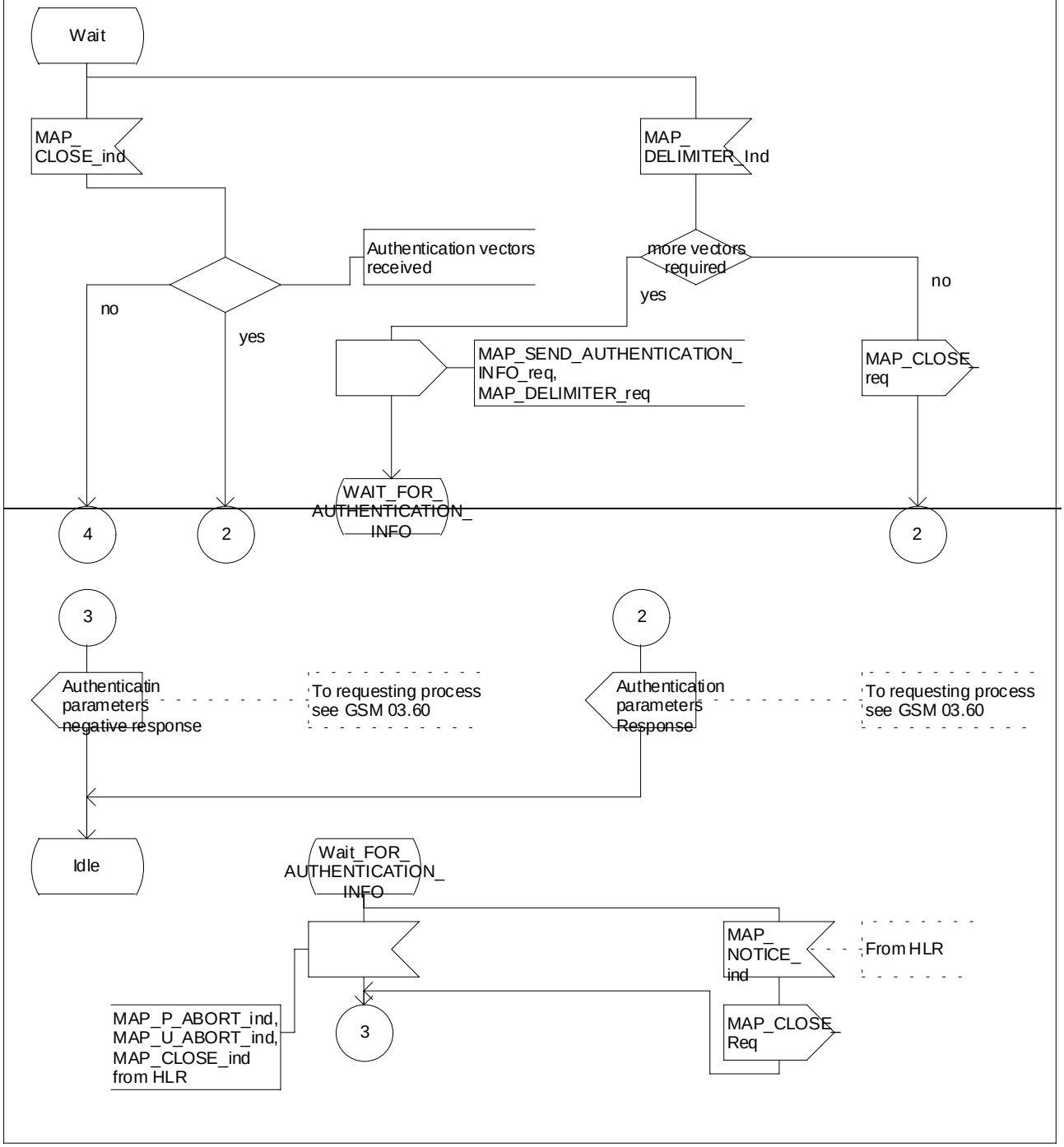


Figure 25.5/6 (sheet ~~1~~ 2 of ~~2~~3): Process Obtain_Authen_Para_SGSN

Process Obtain_Authent_Para_SGSN 2(2)

Figure 25.5/6: Process to obtain authentication parameters from the HLR to the SGSN



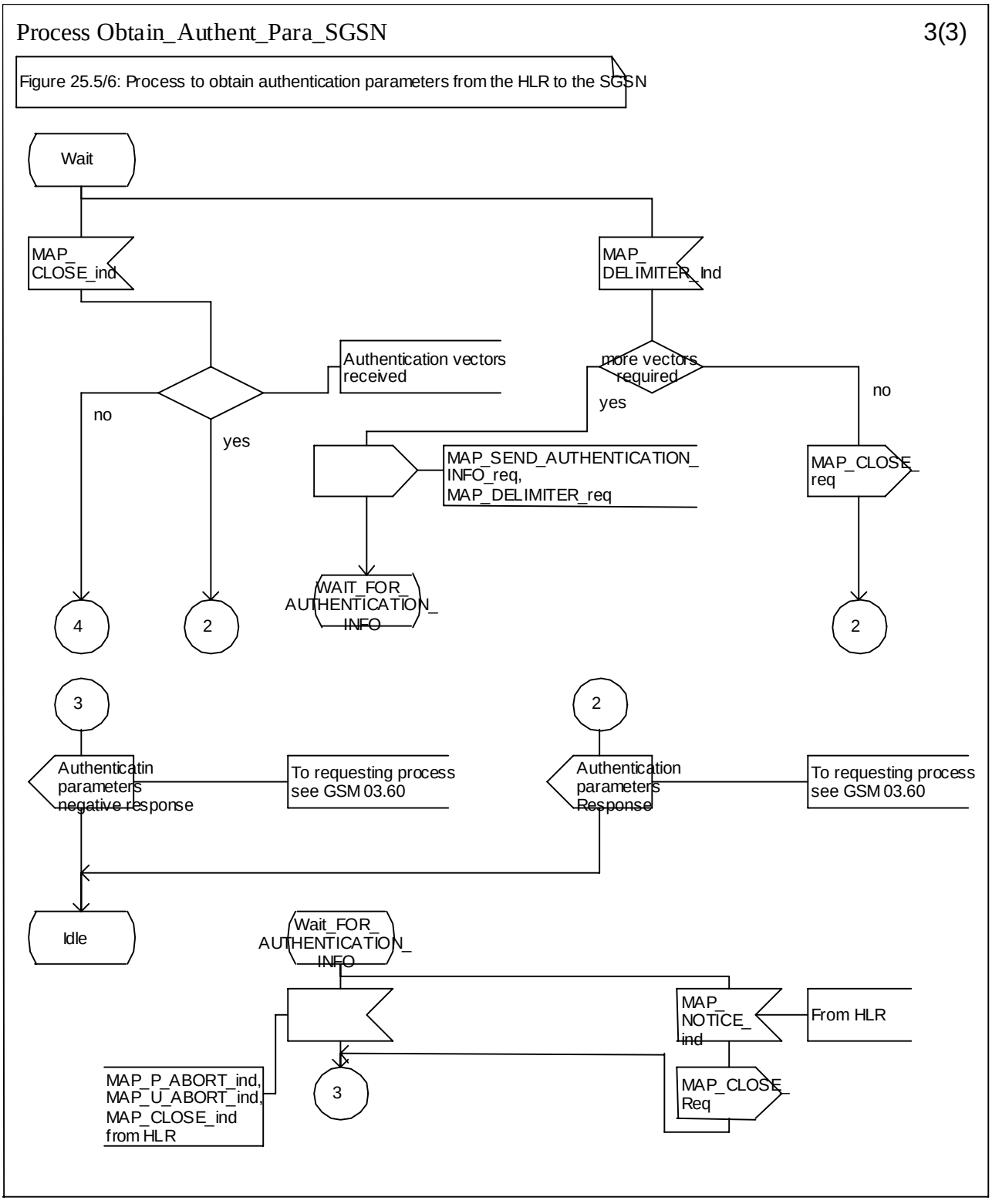


Figure 25.5/6 (sheet ~~2~~ 3 of ~~2~~3): Process Obtain_Authen_Para_SGSN

3GPP TSG-CN4 Meeting #07
Sophia Antipolis, France, 26/2-2/3/01

Tdoc N4-010329

CR-Form-v3

CHANGE REQUEST

⌘ **29.010** **CR** **011** ⌘ rev **-** ⌘ Current version: **3.4.0** ⌘

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

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

Title:	⌘	Mapping of unknown HLR error to access interface cause code.
Source:	⌘	CN4
Work item code:	⌘	GPRS 97
Date:	⌘	9/2/01
Category:	⌘	**A**
Release:	⌘	R99

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:	⌘	To show the mapping between the SGSN application error "Unknown HLR" (as introduced and agreed in CN4, Beijing meeting) and the layer 3 access interface cause code "GPRS services not allowed in this PLMN" (as introduced and agreed in CN1, Beijing meeting).
Summary of change:	⌘	A new entry in the "Routeing area updating" table.
Consequences if not approved:	⌘	Unnecessary denial of CS service to GPRS capable MSs

Clauses affected:	⌘	3.4		
Other specs affected:	⌘	**X** Other core specifications	⌘	3GPP TS 23.060 (CR), 3GPP TS 29.002 (CR 223)
		☐ Test specifications		
		☐ O&M Specifications		
Other comments:	⌘			

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

3.4 Routeing area updating

	04.08	09.02	Notes
Forward message	GMM (ROUTEING AREA UPDATE REQUEST)	MAP_UPDATE_GPRS LOCATION request	
	MS classmark 1	-	
	MS classmark 4	-	
	GPRS Ciphering key seq number	-	
	Mobile station identity	IMSI	
	Old routeing area identification	-	
Positive results	GMM (ROUTEING AREA UPDATE ACCEPT)	MAP_UPDATE_GPRS LOCATION response	
	Routeing area identification	-	
	Mobile station identity	-	1
C	Mobile station	-	2
C	Reject: IMSI unknown in HLR	-	3
C	Reject: MSC temporarily not reacheable	-	4
Negative results	GMM (ROUTEING AREA UPDATE REJECT)	MAP_UPDATE_GPRS LOCATION response	
	Network failure	-	5
	GPRS services not allowed in this PLMN	Unknown HLR	
	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	6
	GPRS services and non GPRS services not allowed	Unknown subscriber (IMSI unknown)	7
C	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	8
C	GPRS services and non-GPRS services not allowed	Unknown subscriber (IMSI unknown)	9
	MS identity cannot be derived by the network	-	10
	PLMN not allowed	Roaming not allowed: PLMN not allowed	
	LA not allowed	-	
	Roaming not allowed in this LA	-	
	PLMN not allowed	Operator determined barring	
	Illegal MS	-	
	Illegal ME	-	
	Network failure	System Failure	
	Network failure	Unexpected data value	
	Network failure	MAP_U/P_ABORT	
	Network failure	MAP_NOTICE	
	Network failure	MAP_CLOSE	

****** End of Modifications ******

3GPP TSG-CN4 Meeting #7 ***Tdoc N4-010371***
Sophia Antipolis, FRANCE, 26th February - 2nd March 2001

CR-Form-v3

CHANGE REQUEST

⌘ **29.010** **CR** **014** ⌘ rev **-** ⌘ Current version: **3.4.0** ⌘

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

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

Title:	⌘	Roaming restrictions for GPRS service
Source:	⌘	CN4
Work item code:	⌘	GPRS
Date:	⌘	16 January 01
Category:	⌘	**A**
Release:	⌘	R99

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:	⌘	Experience from the deployment of GPRS in live networks brought out that some existing roaming scenarios and configurations does not work. In the case when operator has only roaming agreement for CS services but not for PS service (GPRS) there is no suitable cause value with which PS attach can be rejected without impact on both the GSM roaming and the GPRS services in other networks. More detail description of the problem can be found from TSG CN Plenary #14 Tdoc NP-000697 and TSG SA Pleanary #10 Tdoc SP-000666.
Summary of change:	⌘	In order to solve the problem it is proposed to introduce a new rejection cause value "GPRS services not allowed in this PLMN"(#14) that could be indicated to the MS during GPRS attach, detach and RAU in a PLMN which does not offer GPRS roaming to that MS. When MS receives this cause code it shall not attempt new GPRS attach before entering a new PLMN on which it hasn't be rejected with the same cause after the last switch on. To limit the effect of changes to a frozen specification, and as the roaming restriction for GPRS services are considered to be of temporary nature, it is proposed not to introduce a new cause value on the MAP interface between HLR and SGSN.
Consequences if not approved:	⌘	If no roaming agreement is established for GPRS or the SGSN has no knowledge about the HLR of the roaming subscriber, depending on the SGSN implementation either #11 or #7 will probably be sent to the MS which disables in minimum the PS (in all networks) until the MS is switched off. The only other possibility would be that the network sends a cause code not listed explicitly, with the consequence that the MS will try to register "forever" (5 re-attempts after each T3302 expiry) which causes a considerable network load and results in a unacceptable behaviour from the users point of view(long term no service and battery consumption)

Clauses affected:	⌘	3.4		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

3.4 Routeing area updating

	04.08	09.02	Notes
Forward message	GMM (ROUTEING AREA UPDATE REQUEST)	MAP_UPDATE_GPRS_LOCATION_request	
	MS classmark 1	-	
	MS classmark 4	-	
	GPRS Ciphering key seq number	-	
	Mobile station identity	IMSI	
	Old routeing area identification	-	
Positive results	GMM (ROUTEING AREA UPDATE ACCEPT)	MAP_UPDATE_GPRS_LOCATION_response	
	Routeing area identification	-	
	Mobile station identity	-	1
C	Mobile station	-	2
C	Reject: IMSI unknown in HLR	-	3
C	Reject: MSC temporarily not reacheable	-	4
Negative results	GMM (ROUTEING AREA UPDATE REJECT)	MAP_UPDATE_GPRS_LOCATION_response	
	Network failure	-	5
	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	6
	GPRS services and non GPRS services not allowed	Unknown subscriber (IMSI unknowkn)	7
C	GPRS services not allowed	Unknown subscriber (no GPRS subscription)	8
C	GPRS services and non-GPRS services not allowed	Unknown subscriber (IMSI unknown)	9
	MS identity cannot be derived by the network	-	10
	GPRS services not allowed in this PLMN	Roaming not allowed: ~~PLMN not allowed~~	PLMN not allowed
	LA not allowed	-	
	Roaming not allowed in this LA	-	
	GPRS services not allowed in this PLMN	~~PLMN not allowed~~ —	Operator determined barring
	Illegal MS	-	
	Illegal ME	-	
	Network failure	System Failure	
	Network failure	Unexpected data value	
	Network failure	MAP_U/P_ABORT	
	Network failure	MAP_NOTICE	
	Network failure	MAP_CLOSE	

NOTE 1: The mobile station identity is inserted by the SGSN if the SGSN wants to deallocate or re-allocate a P-TMSI. If the SGSN wants to deallocate the P-TMSI it shall include the IMSI. If the SGSN wants to re-allocate the P-TMSI it shall include the new P-TMSI. If a P-TMSI is included, the MS shall respond with a ROUTEING AREA UPDATE COMPLETE message.

NOTE 2: The mobile station identity is inserted by the SGSN if it is received in a BSSAP+ LOCATION UPDATE ACCEPT message from the VLR. If a TMSI is included, the MS shall respond with a ROUTEING AREA UPDATE COMPLETE message. Only used in the Combined Routeing and Location Area procedure.

NOTE 3: This reject cause is inserted on the positive response by the SGSN if the SGSN receives a BSSAP+ LOCATION UPDATE REJECT message from the VLR indicating in the reject cause IMSI unknown in HLR. Only used in the Combined Routeing and Location Area procedure.

NOTE 4: This reject cause is inserted on the positive response by the SGSN if the SGSN does not receive any response from the VLR to a previous BSSAP+ LOCATION UPDATE REQUEST message. Only used in the Combined Routeing and Location Area procedure.

NOTE 5: The Unknown RA error is only generated as a result of incorrect information being inserted by the BSS.

NOTE 6: The HLR shall send Unknown subscriber with diagnostic value No GPRS subscription if the HLR indicates that there is an error in the type of subscription (i.e. SGSN requests service for a non-GPRS only subscriber).

NOTE 7: The HLR shall send Unknown subscriber with diagnostic value IMSI unknown if the HLR indicates that the IMSI provided by the SGSN is unknown.

NOTE 8: The HLR shall send Unknown subscriber with diagnostic value No GPRS subscription if the HLR indicates that there is an error in the type of subscription (i.e. SGSN requests service for a non-GPRS only subscriber). Used in the Combined Routeing and Location Area procedure.

NOTE 9: This reject cause is inserted if the SGSN receives a MAP GPRS UPDATE LOCATION negative response message indicating IMSI unknown. Used in the Combined Routeing and Location Area procedure.

NOTE 10: This reject cause is inserted if the SGSN does not receive any response from the old SGSN to a previous SGSN CONTEXT REQUEST message.