3GPP TSG_CN#6 **NP-99500**

Nice, France

13th – 15th December 1999

Agenda item:

Source: **TSG_N WG2**

Title: **CRs to 3G TS 23.008, 23.012, 23.016, 23.018, 29.002 (Work Item Super Charger)**

Introduction:

This document contains **6** CRs on **Work Item Super Charger** agreed by **TSG_N WG2** and forwarded to **TSG_N Plenary** meeting #6 for approval.

TDoc	Spec	CR	Rev	Ph.	Cat	Old v.	New v.	Subject
N2-99B06	23.008	003	1	R99	C	3.1.0	3.2.0	Introduction of the Super-Charger Concept in TS 23.008
N2-99G83	23.012	002		R99	D	3.0.0	3.1.0	Introduction of Super-Charger into TS 23.012
N2-99B05	23.016	004	3	R99	C	3.2.1	3.3.0	Introduction of the Super-Charger Concept in TS 23.016
N2-99G08	23.018	004	2	R99	C	3.2.0	3.3.0	Introduction of the Super-Charger Concept in TS 23.018
N2-99G06	29.002	033	3	R99	C	3.2.0	3.3.0	Introduction of the Super-Charger Concept in TS 29.002
N2-99J92	29.002	068		R99	B	3.2.0	3.3.0	Update of SDLs to support Super-Charger

3GPP TSG-CN 2 meeting #9 ***Document N2-99B06***

Abiko, Japan, 13-17 September 1999

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.008 **CR** **003r1** Current Version: 3.2.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submision to TSG CN#06 *list TSG meeting no. here ↑*

for approval [X]
for information [ ]

(only one box should be marked with an X)

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: *(at least one should be marked with an X)* USIM [ ] ME [ ] UTRAN [ ] Core Network [X]

Source: TSG N2 **Date:** 9.9.99

Subject: Introduction of the Super-Charger Concept in TS 23.008

3G Work item: Super-Charger

Category: *(only one category shall be marked with an X)*

F	Correction	[ ]
A	Corresponds to a correction in a 2G specification	[ ]
B	Addition of feature	[ ]
C	Functional modification of feature	[X]
D	Editorial modification	[ ]

Reason for change: The aim of this change request is to identify the modifications of TS 23.008 necessary to introduce the Super-Charger concept.

Clauses affected: New Section 2.16

Other specs affected:

Other 3G core specifications	[ ] → List of CRs:	29.002-A033r3, 23.016-A004r3, 23.018-A004r2, 23.012-A002
Other 2G core specifications	[ ] → List of CRs:	
MS test specifications	[ ] → List of CRs:	
BSS test specifications	[ ] → List of CRs:	
O&M specifications	[ ] → List of CRs:	

Other comments:

*** First Modified Section ***

0.1 Normative references

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

[1] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

....

[xxx] TS 23.116: "3GPP; Technical Specification Group Core Network; Super-Charger Technical Realisation; Stage 2."

....

*** New Section ***

2.16 Data related to Super-Charger

2.16.1 Age Indicator

This data indicates the age of the subscription data provided by the HLR e.g. the date and time at which the subscriber data was last modified in the HLR.

*** Next Modified Section ***

4 Accessing subscriber data

It shall be possible to retrieve or store subscriber data concerning a specific MS from the HLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Mobile Station ISDN Number (MSISDN)

It shall be possible to retrieve or store subscriber data concerning a specific MS from the VLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);

- Temporary Mobile Subscriber Identity (TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the SGSN by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);

Table a Packet Temporary Mobile Subscriber identity (P-TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the GGSN by use of each of the following references:

Table a International Mobile Subscriber Identity (IMSI);

See clause 3 for explanation of M, C, T and P in table 1 and table 2.

Table 1: Overview of data stored for non-GPRS Network Access Mode

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE	
IMSI	2.1.1.1	M	M	P	Note
Network Access Mode	2.1.1.2	M	-	P	Note
International MS ISDN number	2.1.2	M	M	P	
multinumbering MSISDNs	2.1.3	C	-	P	Note
Basic MSISDN indicator	2.1.3.1	C	-	P	
MSISDN-Alert indicator	2.1.3.2	C	-	P	
TMSI	2.1.4	-	C	T	
LMSI	2.1.8	C	C	T	Note
Mobile Station Category	2.2.1	M	M	P	
LMU Identifier	2.2.1	C	C	P	
RAND, SRES and Kc	2.3.1	M	M	T	
Ciphering Key Sequence Number	2.3.2	-	M	T	
MSRN	2.4.1	-	C	T	Note
Location Area Identity	2.4.2	-	M	T	
VLR number	2.4.5	M	-	T	Note
MSC number	2.4.6	M	C	T	
HLR number	2.4.7	-	C	T	
Subscription restriction	2.4.9	C	-	P	
RSZI lists	2.4.10.1	C	-	P	
Zone Code List	2.4.10.2	-	C	P	
MSC area restricted flag	2.4.11	M	-	T	
LA not allowed flag	2.4.12	-	M	T	
ODB-induced barring data	2.4.15.1	C	-	T	
Roaming restriction due to unsupported feature	2.4.15.2	M	M	T	
Cell ID	2.4.16	-	C	T	
LSA Identity	2.4.X.1	C	C	P	
LSA Priority	2.4.X.2	C	C	P	
LSA Only Access Indicator	2.4.X.3	C	C	P	
LSA Active Mode Indicator	2.4.X.4	C	C	P	
VPLMN Identifier	2.4.X.5	C	-	P	
Provision of bearer service	2.5.1	M	M	P	
Provision of teleservice	2.5.2	M	M	P	
BC allocation	2.5.3	C	C	P	
IMSI detached flag	2.7.1	-	C	T	
Confirmed by Radio Contact indicator	2.7.4.1	-	M	T	
Subscriber Data Confirmed by HLR indicator	2.7.4.2	-	M	T	
Location Information Confirmed in HLR indicator	2.7.4.3	-	M	T	
Check SS indicator	2.7.4.4	M	-	T	
MS purged for non-GPRS flag	2.7.5	M	-	T	
MNRR	2.7.7	C	-	T	
Subscriber status	2.8.1	C	C	P	
Barring of outgoing calls	2.8.2.1	C	C	P	
Barring of incoming calls	2.8.2.2	C	-	P	
Barring of roaming	2.8.2.3	C	-	P	
Barring of premium rate calls	2.8.2.4	C	C	P	
Barring of supplementary service management	2.8.2.5	C	C	P	
Barring of registration of call forwarding	2.8.2.6	C	-	P	
Barring of invocation of call transfer	2.8.2.7	C	C	P	
Operator determined barring PLMN-specific data	2.8.3	C	C	P	
Handover Number	2.9.1	-	C	T	
Messages Waiting Data	2.10.1	C	-	T	
Mobile Station Not Reachable Flag	2.10.2	C	M	T	
Memory Capacity Exceeded Flag	2.10.3	C	-	T	

(continued)

Table 1 (concluded): Overview of data stored for non-GPRS Network Access Mode

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE	
Trace Reference	2.11.1	C	C	P	
Trace Type	2.11.2	C	C	P	
Operations Systems Identity	2.11.3	C	C	P	
HLR Trace Type	2.11.4	C	-	P	
MAP Error On Trace	2.11.5	C	-	T	
Trace Activated in VLR	2.11.6	C	C	T	
Foreign Subscriber Registered in VLR	2.11.7	-	C	P	Note
VGCS Group Membership List	2.12.1	C	C	P	
VBS Group Membership List	2.12.2	C	C	P	
Broadcast Call Initiation Allowed List	2.12.2.1	C	C	P	
Originating CAMEL Subscription Information	2.14.1.1	C	C	P	
Terminating CAMEL Subscription Information	2.14.1.2	C	-	P	
Location Information/Subscriber state Information	2.14.1.3	C	-	P	
USSD CAMEL subscription information(U-CSI)	2.14.1.4	C	-	P	
SS invocation notification (SS-CSI)	2.14.1.5/3.2	C	C	P	
FTN translation information flag(TIF-CSI)	2.14.1.6	C	-	P	
USSD General CAMEL service information (UG-CSI)	2.14.2	C	-	P	
Negotiated CAMEL Capability Handling	2.14.2	C	-	T	
Privacy Exception List	2.15.1.1	C	C	P	
Home GMLC Numbers	2.15.1.2	C	C	P	
Age Indicator	2.16.1	C	C	T	

Table 2: Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE	
IMSI	2.1.1.1	M	M	M	M	P	Note
Network Access Mode	2.1.1.2	M	-	C (a)	-	P	Note
International MS ISDN number	2.1.2	M	M	M	-	T	
multinumbering MSISDNs	2.1.3	C	-	-	-	T	Note
Basic MSISDN indicator	2.1.3.1	C	-	-	-	T	.
MSISDN-Alert indicator	2.1.3.2	C	-	-	-	T	
P-TMSI	2.1.5	-	-	C	-	T	Note
TLLI	2.1.6	-	-	C	-	T	
Random TLLI	2.1.7	-	-	C	-	T	Note
IMEI	2.1.9	-	-	C	-	T	
RAND/SRES and Kc	2.3.1	M	-	M	-	T	
Ciphering Key Sequence Number	2.3.2	-	-	M	-	T	
Selected Ciphering Algorithm	2.3.3	-	-	M	-	T	
Current Kc	2.3.4	-	-	M	-	T	
P-TMSI Signature	2.3.5	-	-	C	-	T	
Routing Area Identity	2.4.3	-	-	M	-	T	
Cell Global Identification	2.4.4	-	-	C	-	T	
SGSN Number	2.4.8.1	M	C (Gs)	-	-	T	Note
GGSN Number	2.4.8.2	©	-	-	-	P	Note
VLR Number	2.4.5	M	-	C (Gs)	-	T	
RSZI Lists	2.4.10.1	C	-	-	-	P	
Zone Code List	2.4.10.2	-	-	C	-	P	
LA not allowed flag	2.4.12	-	-	M	-	T	
SGSN area restricted flag	2.4.13	M	-	-	-	T	
Roaming Restriction in the SGSN ..	2.4.15.2	M	-	M	-	T	
Cell ID	2.4.16	-	-	C	-	T	
LSA Identity	2.4.X.1	C	C	C	-	P	
LSA Priority	2.4.X.2	C	C	C	-	P	
LSA Only Access Indicator	2.4.X.3	C	C	C	-	P	
LSA Active Mode Indicator	2.4.X.4	C	C	C	-	P	
VPLMN Identifier	2.4.X.5	C	-	-	-	P	
Provision of teleservice	2.5.2	C	-	C	-	P	
Transfer of SM option	2.5.4	M	-	-	-	P	
Subscriber Status	2.8.1	C	-	C	-	P	
Barring of outgoing calls	2.8.2.1	C	-	C	-	P	
Barring of roaming	2.8.2.3	C	-	C	-	P	
ODB PLMN-specific data	2.8.3	C	-	C	-	P	
MM State	2.7.3	-	-	M	-	T	
Subscriber Data Confirmed by HLR Indicator	2.7.4.2	-	-	M	-	T	
Location Info Confirmed by HLR Indicator	2.7.4.3	-	-	M	-	T	
MS purged for GPRS flag	2.7.6	M	-	-	-	T	
MNRG	2.7.2	M	-	M	M	T	
MNRR	2.7.7	C	-	-	-	T	
Trace Activated in SGSN	2.11.7	C	-	C	-	P	
PDP Type	2.13.1	C	-	C	M	P	
PDP Address	2.13.2	C	-	C	M	P	
NSAPI	2.13.3	-	-	C	C	T	
PDP State	2.13.4	-	-	C	-	T	
New SGSN Address	2.13.5	-	-	C	-	T	
Access Point Name	2.13.6	C	-	C	C	P/T	Note
GGSN Address in Use	2.13.7	-	-	C	-	T	
VPLMN Address Allowed	2.13.8	C	-	C	-	P	
Dynamic Address	2.13.9	-	-	-	C	T	
SGSN Address	2.13.10	-	-	-	M	T	
GGSN-list	2.13.11	M	-	-	-	T	

(continued)

Table 2 (concluded): Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
Quality of Service Subscribed	2.13.12	C	-	C	-	P
Quality of Service Requested	2.13.13	-	-	C	-	T
Quality of Service Negotiated	2.13.14	-	-	C	M	T
SND	2.13.15	-	-	C	C	T
SNU	2.13.16	-	-	C	C	T
DRX Parameters	2.13.17	-	-	M	-	T
Compression	2.13.18	-	-	C	-	T
NGAF	2.13.19	-	-	C (Gs)	-	T
Classmark	2.13.20	-	-	M	-	T
TID	2.13.21	-	-	C	C	T
Radio Priority	2.13.22	-	-	C	-	T
Radio Priority SMS	2.13.23	-	-	C	-	T
Age Indicator	2.16.1	C	-	C	-	T

NOTE 1: The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.
(Gs): The VLR column is applicable if Gs interface is installed. It only indicates GPRS related data to be stored and is only relevant to GPRS subscribers registered in VLR.

a): This parameter is relevant in the SGSN only when the Gs interface is installed.

NOTE 2: For special condition of storage see in the clauses 2.x.y referred-to.
See clause 3 for explanation of M,C,T and P in table 2.

3GPP TSG-CN WG2
Phoenix, USA 15-19 November, 1999

Document N2-99G83
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.012	CR	002	Current Version:	3.0.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: CN#06 *list expected approval meeting # here ↑*

for approval [X] for information [ ]

strategic [ ] non-strategic [ ] *(for SMG use only)*

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: TSG N2 **Date:** 16 Nov. 1999

Subject: Introduction of Super-Charger into TS 23.012

Work item: Super-Charger

Category: *(only one category shall be marked with an X)*

F	Correction	
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	X

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: The aim of this change request is to identify the modifications of TS 23.012 necessary to introduce the Super-Charger concept.

Clauses affected: 1.1, 4.1.2.3, 4.1.3.1, 4.4.1.1

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	29.002-033r4, 23.008-A003r1, 23.016-A004r3, 23.018-A004r2
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

*** First Modified Section ***

1.1 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] GSM 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[2] GSM 03.02: "Digital cellular telecommunication system (Phase 2+); Network architecture".

[3] GSM 03.03: "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".

[4] GSM 03.07: "Digital cellular telecommunication system (Phase 2+); Restoration procedures".

[5] GSM 03.08: "Digital cellular telecommunication system (Phase 2+); Organization of subscriber data".

[6] GSM 03.20: "Digital cellular telecommunication system (Phase 2+); Security related network functions".

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

[8] GSM 09.02: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[9] GSM 09.07: "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[10] TS 23.116: "3GPP; Technical Specification Group Core Network; Super-Charger Technical Realisation; Stage 2."

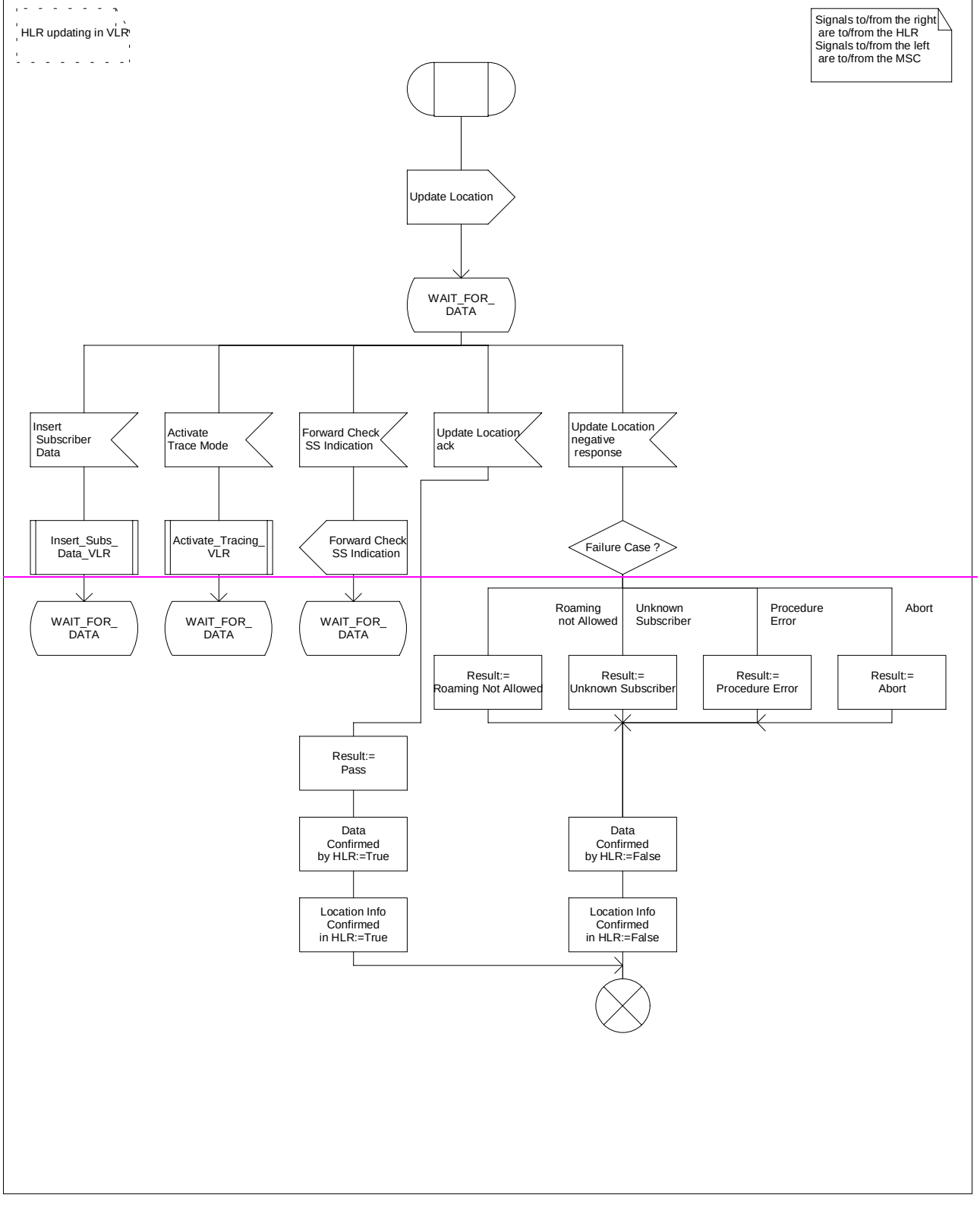
*** Next Modified Section ***

4.1.2.3 Process Update_HLR_VLR

Sheet 1: The procedure Check_User_Error_In_Serving_Network_Entity is specific to Super-Charger; it is specified in TS 23.116 [10].

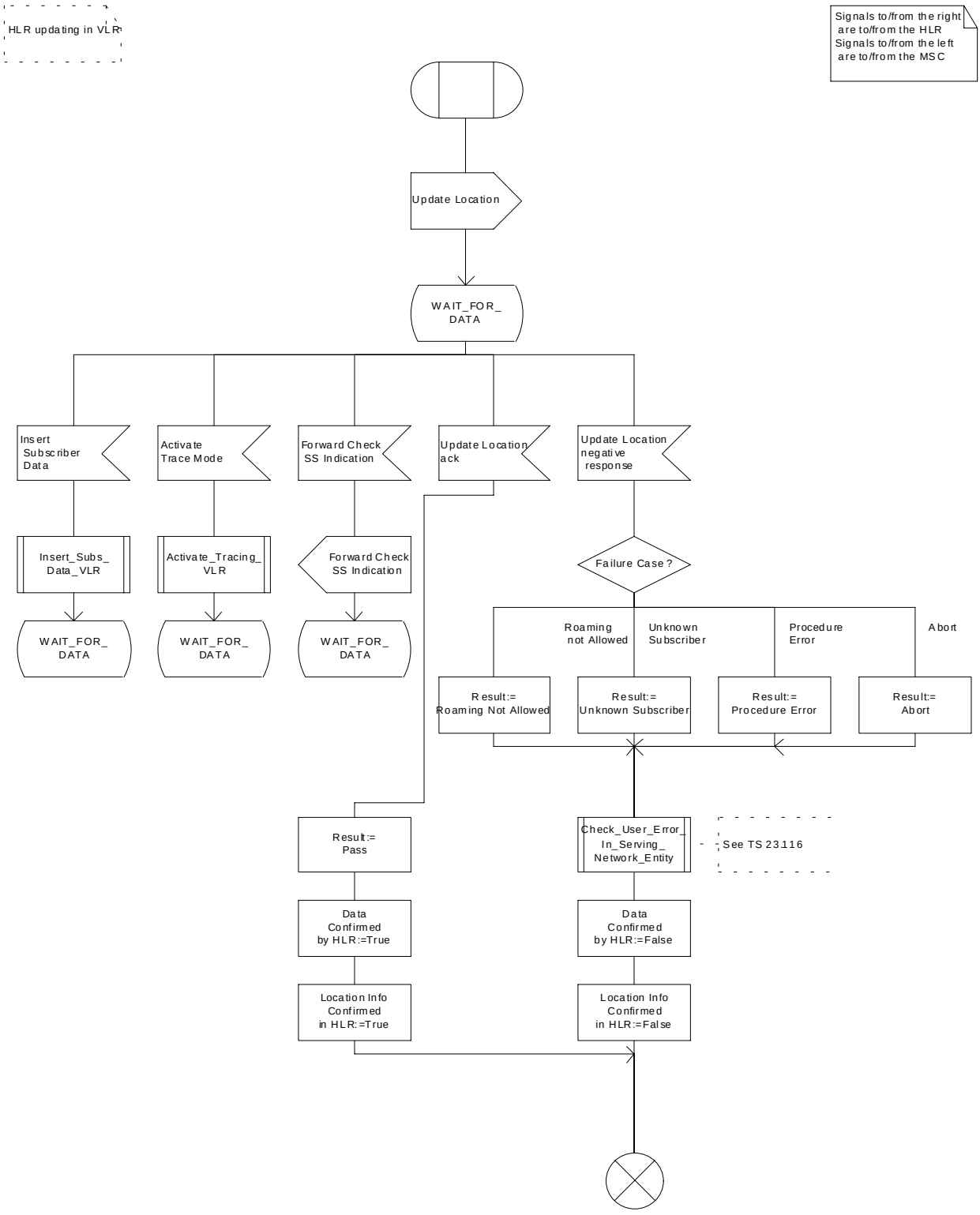
Procedure Update_HLR_VLR

U_HLR_VLR1(1)



Procedure Update_HLR_VLR

U_HLR_VLR1(1)



*** Next Modified Section ***

4.1.3.1 Process Update_Location_HLR

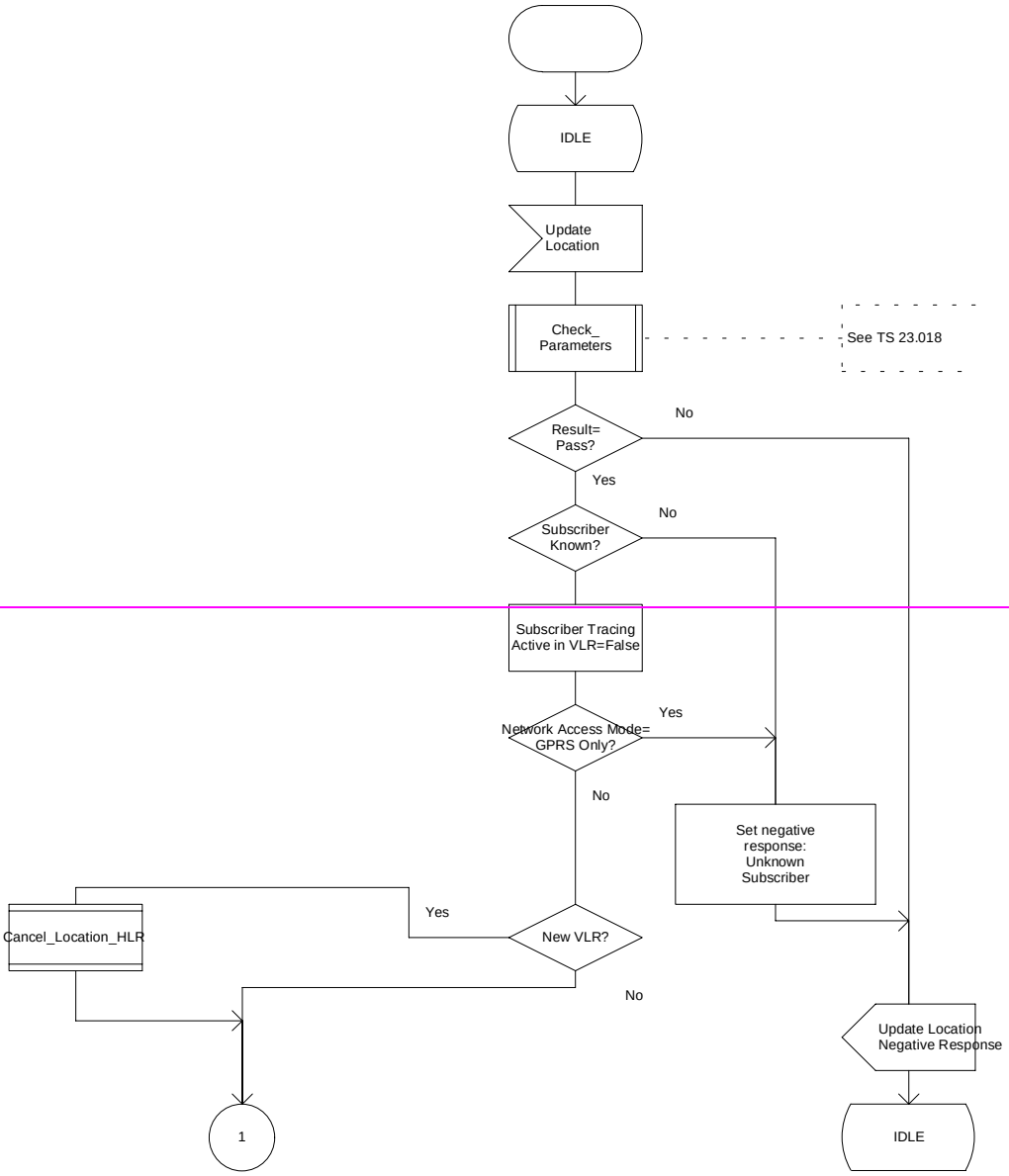
Sheet 1: The procedure Super_Charged_Cancel_Location_HLR is specific to Super-Charger; it is specified in TS 23.116 [10]. If the previous VLR and the originating HLR support the Super-Charger functionality, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 2: The procedure Super_Charged_Location_Updating_HLR is specific to Super-Charger; it is specified in TS 23.116 [10]. If subscription data needs to be sent to the VLR, processing continues from the "No" exit of the test "Result=Pass?".

Process Update_Location_HLR

Process In the HLR Application to handlle Location Updating

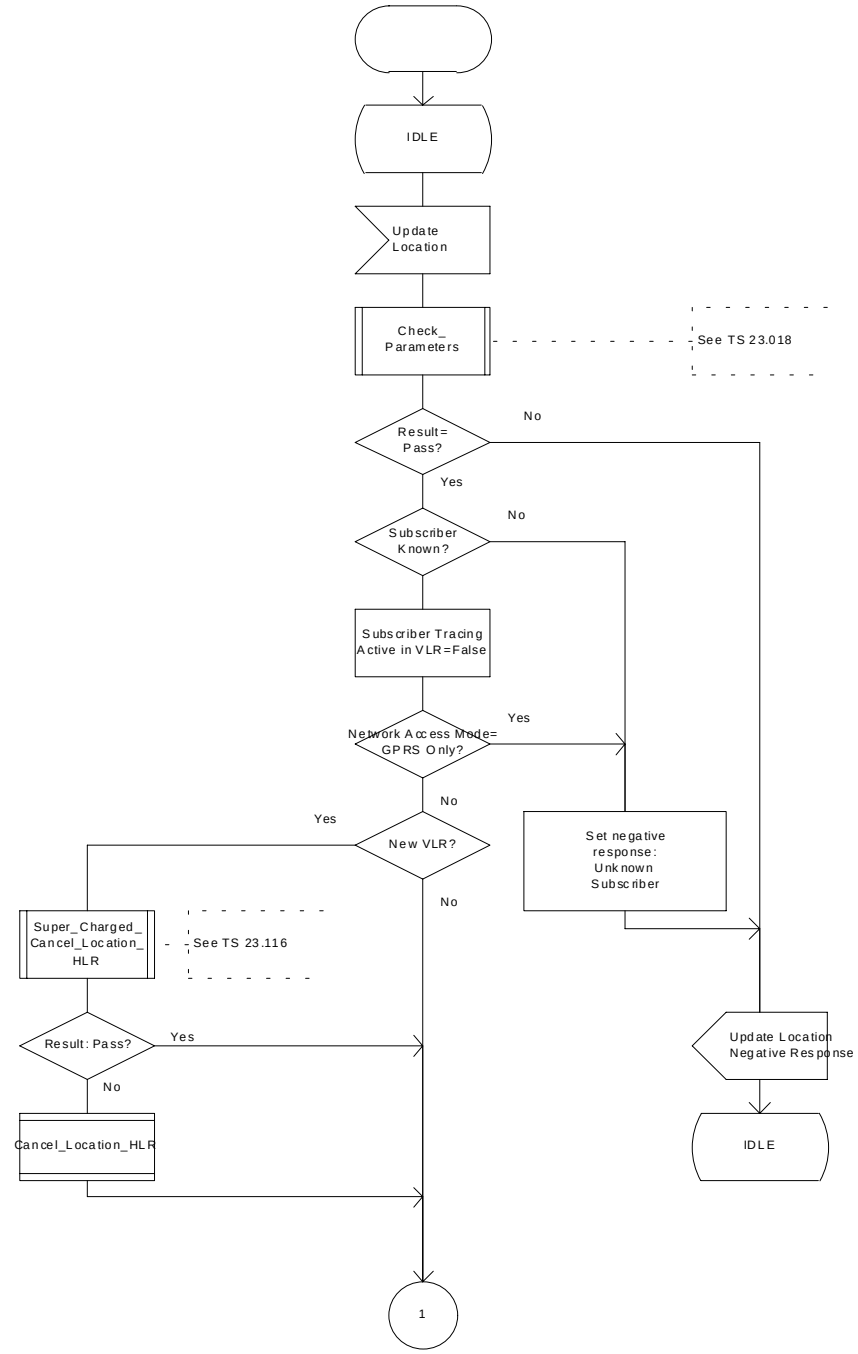
Signals to/from the left are to/from the VLR



Process Update_Location_HLR

Process In the HLR Application to handlle Location Updating

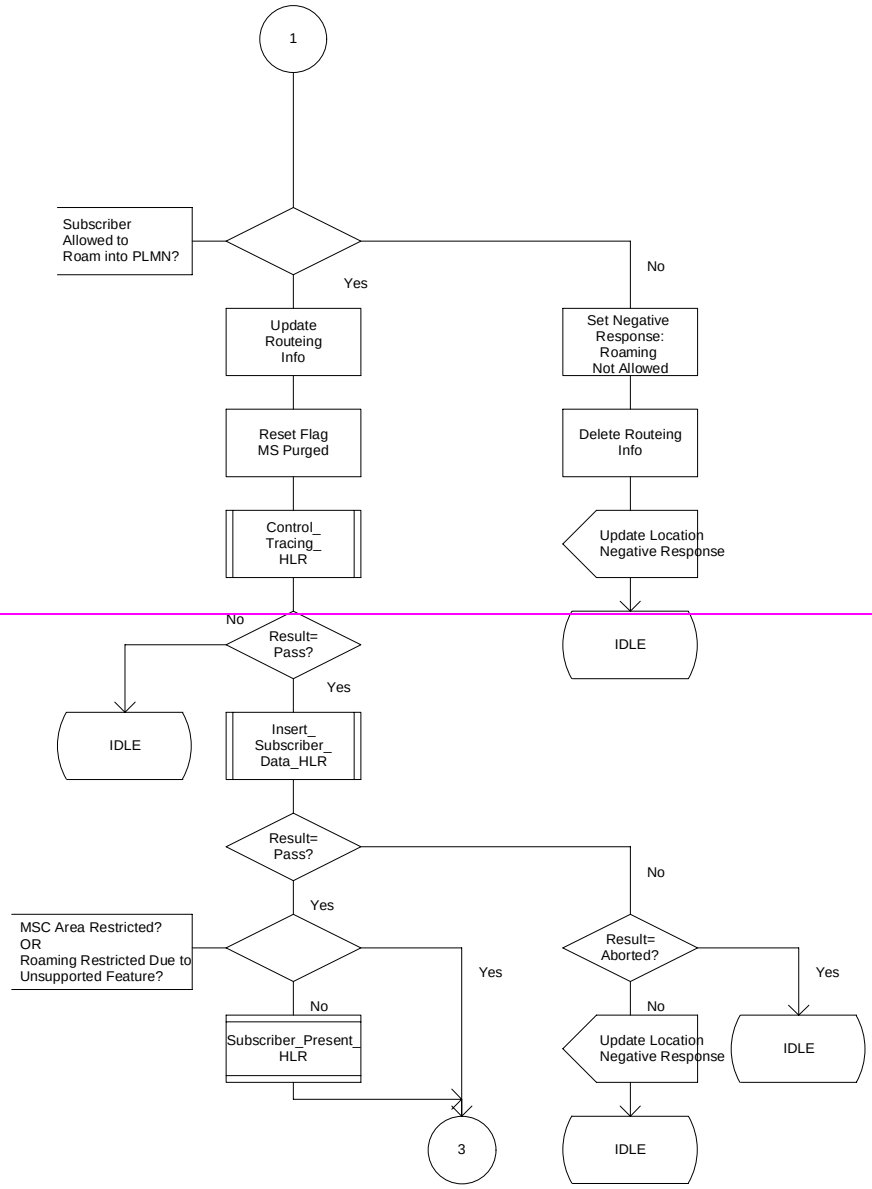
Signals to/from the left are to/from the VLR



Process Update_Location_HLR

Process In the HLR Application to handlle Location Updating

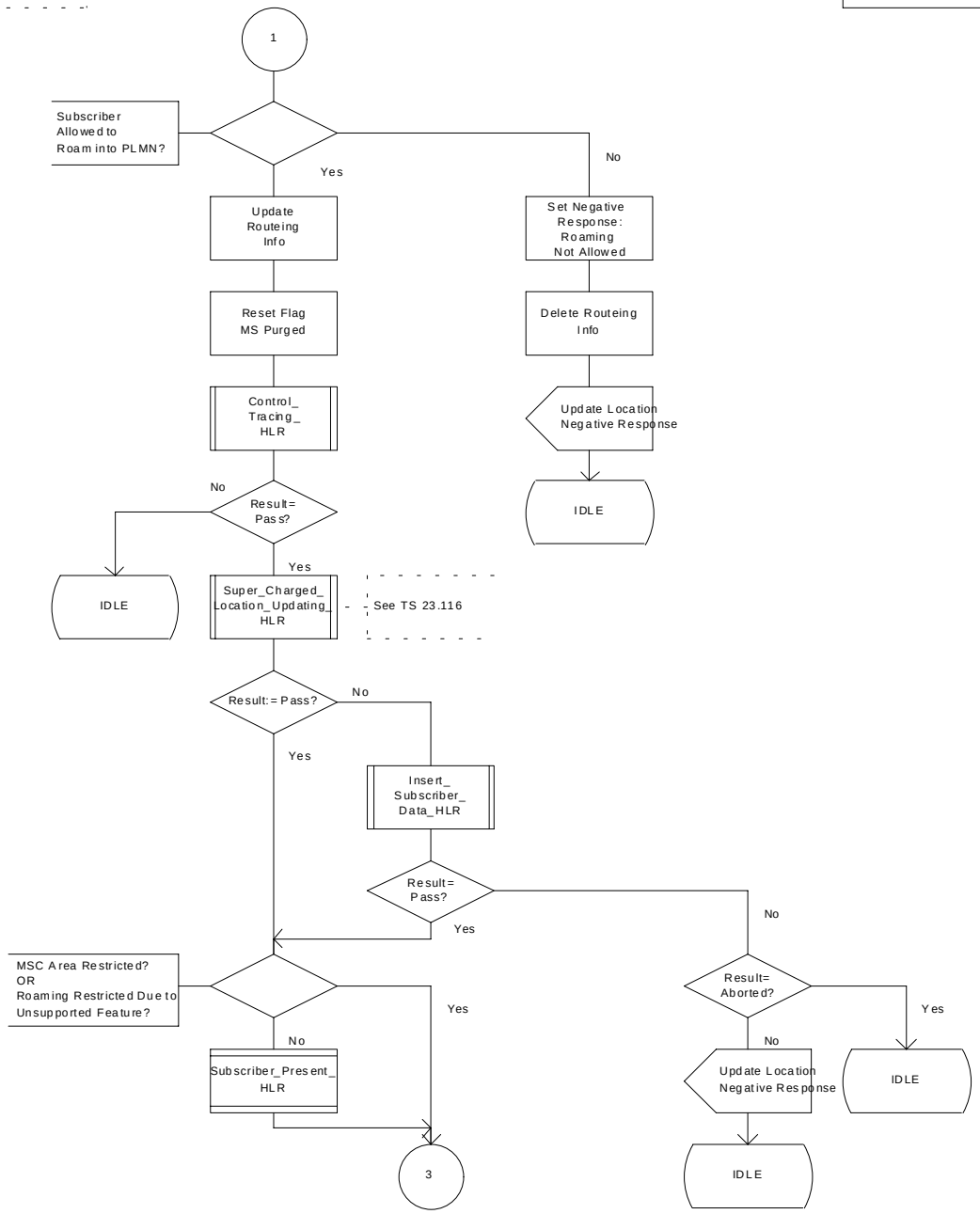
Signals to/from the left are to/from the VLR



Process Update_Location_HLR

Process in the HLR Application to handlle Location Updating

Signals to/from the left are to/from the VLR



*** Next Modified Section ***

4.4.1.1 Procedure Purge_MS_VLR

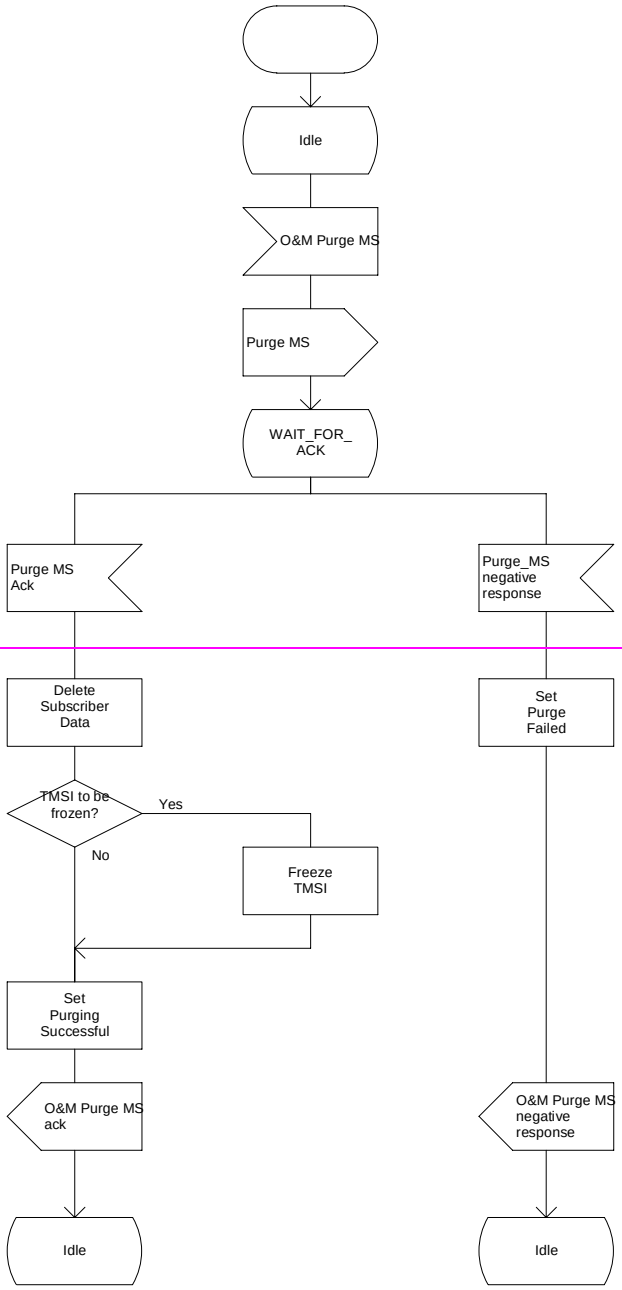
Sheet 1: The procedure Purge_MS_In_Serving_Network_Entity is specific to Super-Charger; it is specified in TS 23.116 [10]. If the VLR and the originating HLR support the Super-Charger functionality, processing continues from the "Yes" exit of the test "Result=Pass?".

Process Purge_MS_VLR

Process in the VLR to purge MS.

Signals to/from the right are to/from the HLR

Signals to/from the left are to/from the Operation & Maintenance Centre

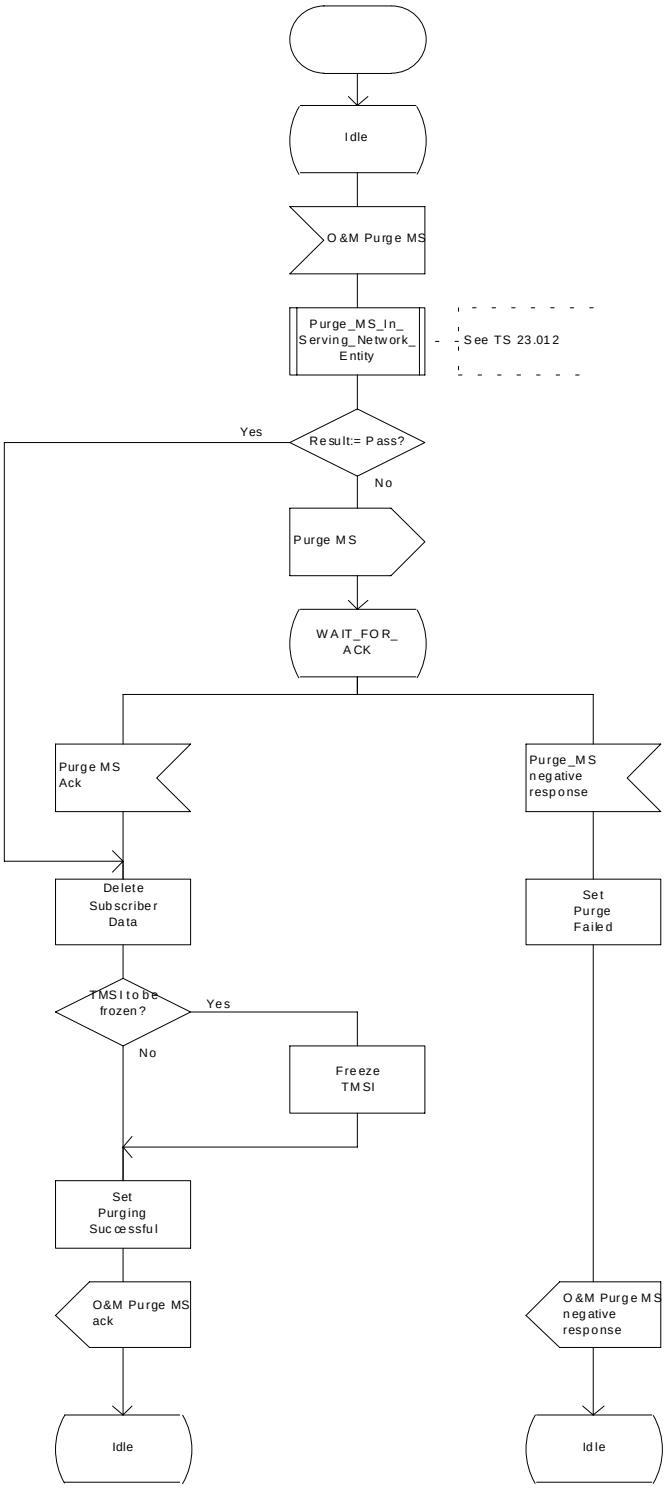


Process Purge_MS_VLR

Process in the VLR to purge MS.

Signals to/from the right are to/from the HLR

Signals to/from the left are to/from the Operation & Maintenance Centre



3GPP TSG-CN 2 meeting #9 ***Document*** ***N2-99B05***

Abiko, Japan, 13-17 September 1999

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.016 **CR** **004r3** Current Version: 3.1.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submision to TSG CN#06 *list TSG meeting no. here ↑*

for approval [X]
for information [ ]

(only one box should be marked with an X)

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: *(at least one should be marked with an X)* USIM [ ] ME [ ] UTRAN [ ] Core Network [X]

Source: TSG N2 **Date:** 9.9.99

Subject: Introduction of the Super-Charger Concept in TS 23.016

3G Work item: Super-Charger

Category: *(only one category shall be marked with an X)*

F	Correction	[ ]
A	Corresponds to a correction in a 2G specification	[ ]
B	Addition of feature	[ ]
C	Functional modification of feature	[X]
D	Editorial modification	[ ]

Reason for change: The aim of this change request is to identify the modifications of TS 23.016 necessary to introduce the Super-Charger concept.

Clauses affected: New Section 2.16

Other specs affected:

Other 3G core specifications	[ ] → List of CRs:	29.002-A033r3, 23.008-A003r1, 23.018-A004r2, 23.012-A002
Other 2G core specifications	[ ] → List of CRs:	
MS test specifications	[ ] → List of CRs:	
BSS test specifications	[ ] → List of CRs:	
O&M specifications	[ ] → List of CRs:	

Other comments:

*** First Modified Section ***

2 Normative references

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

[1] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

....

[xxx] TS 23.116: "3GPP; Technical Specification Group Core Network; Super-Charger Technical Realisation; Stage 2."

....

*** Next Modified Section ***

3.2 Definitions

Subscriber data to be stored in the HLR, VLR and SGSN are defined in GSM 03.08, and in GSM 03.6x, GSM 03.8x and GSM 03.9x-series of technical specifications.

Voice Broadcast Service (VBS), Voice Group Call Service (VGCS) and enhanced Multi Level Precedence and Pre-emption Service (eMLPP) Data related to group call area, cell or dispatcher attributes is only stored in the Group Call Register (GCR) which is linked to each MSC/VLR.

The GCR and it's stored data is out of scope of this specification.

Subscriber related VBS, VGCS and eMLPP Data only concerns entitlement data for these-services and is seen as shared non-GPRS subscriber data.

GPRS and non-GPRS subscriber data:

The HLR has to download data to the VLR and to the SGSN. In this specification those data sent to the VLR are called non-GPRS subscriber data and those data sent to the SGSN are called GPRS subscriber data.

Whenever the refining identifier non-GPRS or GPRS is missing a common rule is addressed which hold for both kinds of subscriber data.

Subscriber data specific to non-GPRS shall only be sent from the HLR to the VLR. Subscriber data specific to GPRS shall only be sent from the HLR to the SGSN.

Subscriber data common to both non-GPRS and GPRS (regional subscription information) are downloaded from the HLR to both entities.

Shared non-GPRS subscriber data:

Common subset of subscriber data defined to be stored in both the HLR and VLR. Subscriber data only stored in the HLR is not part of shared subscriber data. Shared subscriber data includes:

BS:	Bearer Service (see GSM 02.02);
TS:	Teleservice (see GSM 02.03);
BSG:	Basic Service Group (see GSM 02.01, GSM 02.04 and GSM 03.11);
EBSG:	Elementary Basic Service Group (see GSM 03.11);
CBSG:	Collective Basic Service Group (see GSM 03.11).
LSA Information:	Localised Service Area Information (see GSM 03.73);
SC Information:	Super-Charger Information (see TS 23.116).

Shared GPRS subscriber data:

Common subset of subscriber data defined to be stored in both the HLR and SGSN. Subscriber data only stored in the HLR is not part of shared subscriber data. Shared GPRS subscriber data includes:

TS:	Teleservice (see GSM 02.03);
PDP Context	(see GSM 03.60).
LSA Information:	Localised Service Area Information (see GSM 03.73);
SC Information:	Super-Charger Information (see TS 23.116).

Mandatory data:

Data required to form a self-consistent set of subscriber data. The context governs whether a specific parameter is mandatory, e.g. the data set for a specific service may be optional, however if data for this service is present, then parameters within this data set may be mandatory.

Mandatory data is defined by the service description (see e.g. GSM 03.6x, GSM 03.8x and GSM 03.9x-series of technical specifications and GSM 03.15) and by PLMN defined requirements.

NOTE 1: The above definition is seen from a semantic point of view. Semantically, mandatory parameters may be defined as syntactically optional or mandatory by the protocol.

Optional data:

Data which is defined as subscriber data, but which is not required to form a self-consistent set of subscriber data; the context governs whether a specific parameter is optional.

Optional data is data which is defined by the service description (see e.g. GSM 03.6x, GSM 03.8x and GSM 03.9x-series of technical specifications and GSM 03.15) or by PLMN defined requirements but is not defined as mandatory data.

NOTE 2: The above definition is seen from a semantic point of view. Semantically optional parameters are always defined as syntactically optional by the protocol.

Missing data:

Data which is mandatory in a given context but is not received nor is valid data available locally.

Unexpected data:

Data which is received and cannot be further processed. This may be either:

- optional data not required in a given context; or
- optional or mandatory data, required in this context but received with an unexpected value.

Overlapping data:

Two different cases of overlapping within subscriber data are possible:

- two or more parameters are to be stored at the same address in the data structure (see subclause 4.4);
- two or more BSGs within a BSG list include or are identical with one and the same EBSG.

The following **groups of non-GPRS subscriber information** are defined:

- subscriber information (Group A):
  - International Mobile Subscriber Identity (IMSI);
  - basic Mobile Station International ISDN Number (MSISDN);
  - category;
  - subscriber status;
- basic service information (Group B):
  - Bearer Service list;
  - Teleservice list.

NOTE 3: VBS and VGCS entitlement data are subsumed under Teleservices

- Supplementary Service (SS) information (Group C):
  - forwarding information;
  - call barring information;
  - Closed User Group (CUG) information;
  - eMLPP data;
  - SS Data;
- Operator Determined Barring (ODB) information (Group D):
  - ODB Data for non-GPRS services;
- roaming restriction information (Group E):
  - roaming restriction due to unsupported feature;
- regional subscription information (Group F):
  - regional subscription data.
- VBS/VGCS subscription information (Group G):
  - VBS subscription data;
  - VGCS subscription data.
- CAMEL subscription information (Group H):
  - Originating CAMEL Subscription Information.
- LSA Information (Group I):
  - LSA data.
- Super-Charger (SC) Information (Group K):
  - Age Indicator

The following **groups of GPRS subscriber information** are defined:

- subscriber information (Group P1):
  - International Mobile Subscriber Identity (IMSI);
  - basic Mobile Station International ISDN Number (MSISDN);
  - subscriber status;
- basic service information (Group P2):
  - Teleservice list.
- Operator Determined Barring (ODB) information (Group P3):
  - ODB Data for GPRS services;
- roaming restriction information (Group P4):
  - roaming restriction in SGSN due to unsupported feature;
- regional subscription information (Group P5):
  - regional subscription data.
- GPRS subscription information (Group P6):

- GPRS subscription data.

- LSA Information (Group P7):

  - LSA data.

- Super-Charger (SC) Information (Group P8):

  - Age Indicator.

*** Next Modified Section ***

4 General on handling of subscriber information

In general, the VLR and SGSN stores only a subset of the subscriber data available in the HLR. Similarly, the GGSN stores only a subset of the subscriber data available in the SGSN. Updating of subscriber information shall be done in a way to make available and to keep consistency of data shared between the HLR and the VLR, and between the HLR and the SGSN as appropriate.

Two different cases for the updating of subscriber data can be identified:

- framed operation: during location update or restoration a complete set of the shared subscriber data needs to be inserted in the VLR or the SGSN;

- stand-alone operation: whenever subscriber data are added, deleted or changed in the HLR, this may need partial insertion, deletion or change of shared subscriber data in the VLR or the SGSN.

Subclauses 4.1 to 4.4 explain the actions of the HLR and the VLR or the SGSN within a framed or stand-alone dialogue on subscriber data handling.

4.1 Updating of the VLR or the SGSN in framed operation

For some services the VLR or the SGSN shall indicate in the subscriber data request to the HLR whether it supports the service, or (in case of a service with multiple phases) which phases it supports. Whether or not this indication is required for the service is defined in service specification.

If requested by the framing operation, the HLR shall send all relevant stored shared subscriber data to the VLR or the SGSN. This may be done with one or more messages within a single dialogue.

For services for which the VLR or the SGSN is required to indicate support of the service, the HLR shall send subscriber data to the VLR or the SGSN only if corresponding indication was received from the VLR or the SGSN in the subscriber data request. If both the originating entity and the HLR support the Super-Charger functionality the HLR may provide no subscriber data as part of the location update procedure, see TS 23.116. For control of stand-alone operation the HLR shall store the information for which of these services the subscriber data was sent.

For services for which the VLR or the SGSN is required to indicate supported phases of the service, the HLR shall send subscriber data to the VLR for at most one of the supported phases of service indicated in the subscriber data request. In this case the HLR may send also no data at all if none of the supported phases is suitable. For the case of stand-alone operation the HLR shall store the information for which phase of service the data was sent.

The HLR may send all stored shared subscriber data to the VLR or the SGSN with one or more messages within a single dialogue.

The VLR or the SGSN shall check the received messages, and:

a) if mandatory data is missing in a message:

   - the VLR or the SGSN may immediately reject the message towards the HLR; or

   - the VLR or the SGSN may acknowledge the message towards the HLR and wait for further data from the HLR.

Which of the two options apply is either defined by the protocol specification or is an implementation option;

b) if unexpected data are received in a message:

- the VLR or the SGSN may reject the message towards the HLR; or
- in case of unexpected data not required in a given context, the VLR or the SGSN may acknowledge the message towards the HLR and ignore this unexpected data. All other data shall be stored by the VLR or the SGSN.

Which of the two possibilities apply is an implementation option;

c) if data for unsupported services or features is received:

- the VLR or the SGSN shall respond towards the HLR to the message indicating these features and shall ignore all received data related to them. All other subscriber data shall be stored;

d) if cases a), b) and c) do not apply for a message, the VLR or SGSN shall store all subscriber data received.

If during the entire dialogue none of the messages was rejected by the VLR or the SGSN and at termination of the dialogue no mandatory subscriber data are missing, the VLR or the SGSN shall erase all previously stored data and shall store the data received from the HLR and mark the subscriber data as "confirmed by HLR". Otherwise the subscriber data shall remain marked as "not confirmed by HLR" (see TS GSM 03.07).

The HLR shall check all responses from the VLR or the SGSN, and:

a) if a message is rejected, no further updating of the VLR or the SGSN shall occur. The further action on the framing operation is out of scope of this specification;

b) if one or more unsupported features are indicated by the VLR or the SGSN, the HLR may:

- store subscriber data including replacement feature(s) locally;
- store and send subscriber data including replacement feature(s);
- ignore this indication.

Which of the three options apply for which feature is out of scope of this specification;

c) if a message is acknowledged by the VLR or the SGSN, this shall be recognised by the HLR.

The further action on the framing operation after all shared subscriber and replacement data have been sent (e.g. closing of the dialogue) is out of scope of this specification.

*** Next Modified Section ***

4.3.1 Order of information sent by the HLR

The order of information is defined by the order in which the transfer syntax is generated by the HLR. This includes a sequence of messages as well as the syntax within a message (first to last message, component, operation, parameter, etc.).

With the above definitions, the following rules shall apply for non-GPRS subscriber data for the order of information within an HLR-VLR dialogue:

- Group A information (subscriber status) shall be sent first;
- Group B information shall be sent after Group A information and before any Group C, E, F, G or H information;
- Group D information shall be sent after Group A information and in any order with respect to Group B, C, E, F, G, H and ~~H~~K information.
- a specific order of Group C, E, F, G, ~~or~~ H or K information is not required.

There is no requirement for the sending of subscriber information groups in the same message.

With the above definitions, the following rules shall apply for GPRS subscriber data for the order of information within a dialogue:

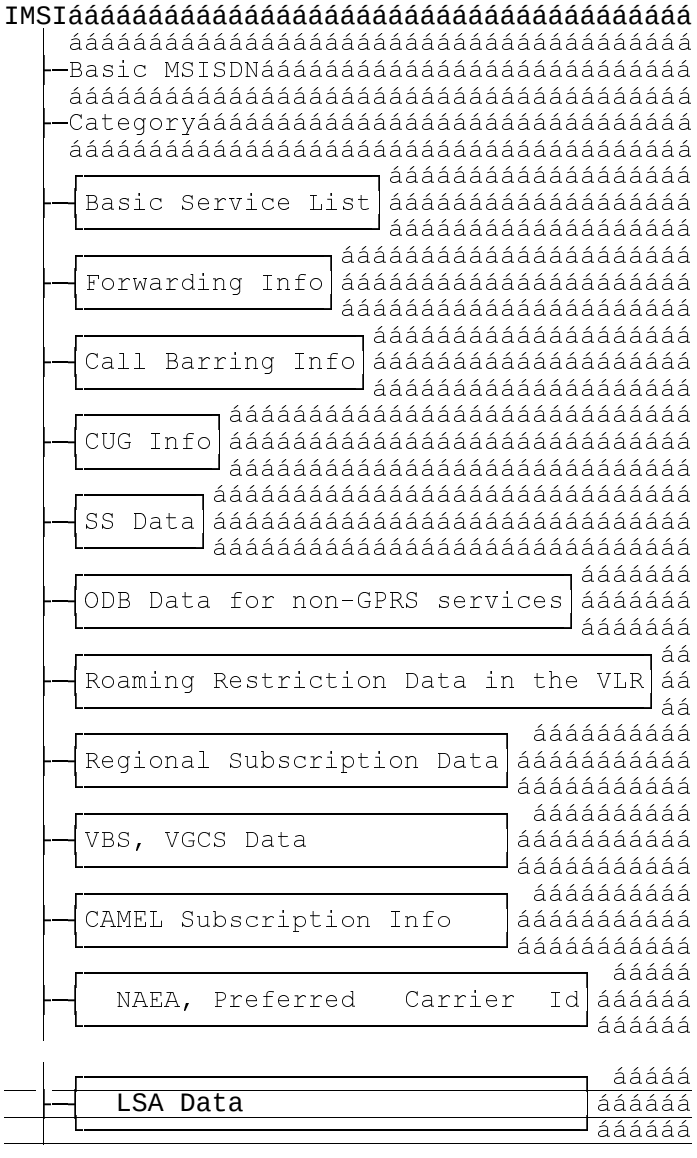
- Group P1 information (subscriber status) shall be sent first;
- Group P2 information shall be sent after P1 information and before P4 and P5 information
- Group P3 information shall be sent after Group P1 information and in any order with respect to Group P2, P4, P5, P6 and P8~~6~~ information.
- a specific order of Group P4, P5, P6 and P8~~6~~ information is not required.

*** Next Modified Section ***

4.5.4 Consistency of supplementary service data

In some cases, the protocol used between the HLR and VLR encodes some data that is not EBSG-related SS data with an EBSG qualifier. In this case, the HLR shall ensure that when this data is sent it is always the same for all EBSGs. If this data is modified, the HLR must send the supplementary service data to the VLR for all EBSGs which meet all the following criteria:

- at least one basic service in the EBSG is supported; and
- the supplementary service is applicable to at least one (possibly different) basic service in the EBSG; and
- the subscriber has a subscription to at least one (possibly different) basic service in the EBSG.



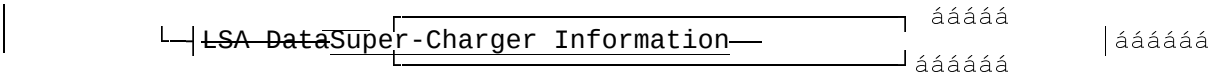


Figure 1: Abstract data structure of non-GPRS Subscriber Data (Data sent to the VLR)

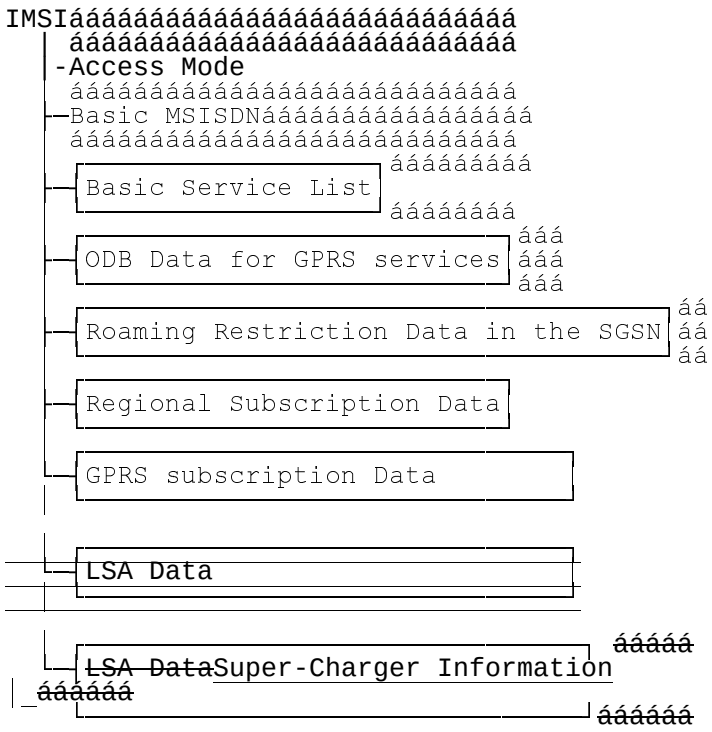


Figure 1a: Abstract data structure of GPRS Subscriber Data (Data sent to the SGSN)

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└─Age Indicator

NOTE: For detailed information see TS 23.116 and TS 29.002.

Figure xx: Super-Charger Information

3GPP TSG-CN 2B meeting #10 **Document** ***N2-99G08***

Eton, UK, 19 - 21 October 1999

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.018 **CR** **004r2** Current Version: 3.2.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submision to TSG CN#06 *list TSG meeting no. here ↑*

for approval [X]
for information [ ]

(only one box should be marked with an X)

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: *(at least one should be marked with an X)* USIM [ ] ME [ ] UTRAN [ ] Core Network [X]

Source: TSG N2 **Date:** 2.09.1999

Subject: Introduction of the Super-Charger Concept in TS 23.018

3G Work item: Super-Charger

Category: *(only one category shall be marked with an X)*

F	Correction	[ ]
A	Corresponds to a correction in a 2G specification	[ ]
B	Addition of feature	[ ]
C	Functional modification of feature	[X]
D	Editorial modification	[ ]

Reason for change: The aim of this change request is to specify the modifications of TS 23.018 necessary to introduce the Super-Charger concept. The changes are limited to the modification of the PRN absent subscriber diagnostic information and its mapping to the SRI-res.

Clauses affected: 2, 7.2.2.5 & 7.2.3.1

Other specs affected:

Other 3G core specifications	[X]	→ List of CRs:	23.008-A003r1, 23.016-A004r3 29.002-A033r3, 23.012-Axxx
Other 2G core specifications	[ ]	→ List of CRs:	
MS test specifications	[ ]	→ List of CRs:	
BSS test specifications	[ ]	→ List of CRs:	
O&M specifications	[ ]	→ List of CRs:	

Other comments:

*** First Modified Section ***

2 Normative references

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

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- For a specific reference, subsequent revisions do not apply.
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- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

[1] GSM 02.01: "Digital cellular telecommunications system (Phase 2+); Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN)".

….

[xxx] TS 23.116: "3GPP; Technical Specification Group Core Network; Super-Charger Technical Realisation; Stage 2."

….

*** Next Modified Section ***

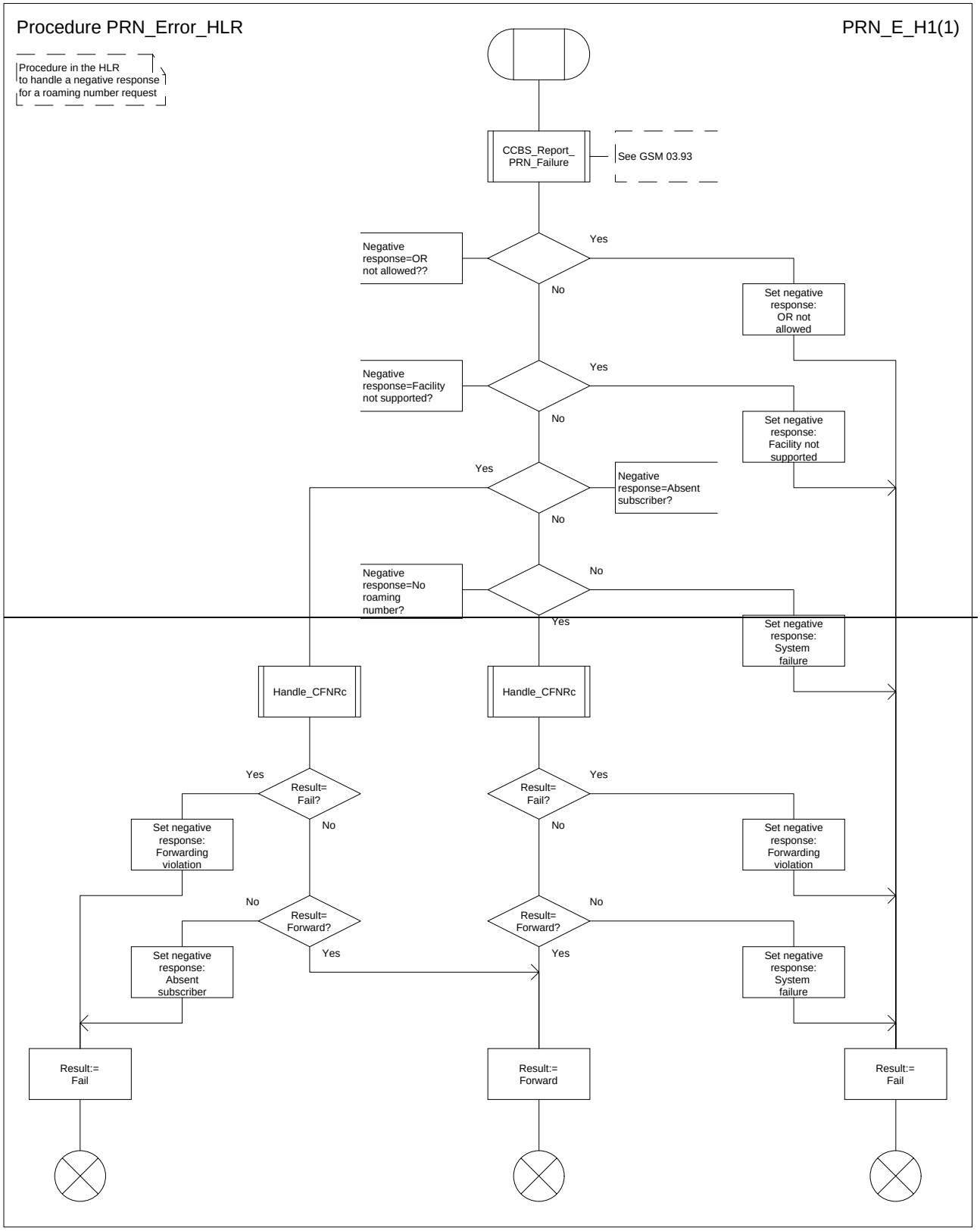
7.2.2.5 Procedure PRN_Error_HLR

The procedure CCBS_Report_PRN_Failure is specific to CCBS; it is specified in GSM 03.93 [19]. The procedure does not return a value; the following tests are on the value of the Provide Roaming Number negative response.

The procedure Super_Charged_SRI_Error_HLR is specific to Super-Charger; it is specified in TS 23.116 [xx]. If the subscription data was deleted as a consequence of the Super-Charger feature, processing continues from the "Yes" exit of the test "Result=Purged?".

If the HLR does not support Optimal Routeing, processing starts with the test "Negative response=Facility not supported?".

*** Next Modified Section ***


Procedure PRN_Error_HLR
PRN_E_H1(1)
Procedure in the HLR to handle a negative response for a roaming number request
CCBS_Report_ PRN_Failure
See GSM 03.93
Negative response=OR not allowed??
Yes
No
Set negative response: OR not allowed
Negative response=Facility not supported?
Yes
No
Set negative response: Facility not supported
Yes
Negative response=Absent subscriber?
No
Negative response=No roaming number?
No
Yes
Set negative response: System failure
Handle_CFNRc
Handle_CFNRc
Yes
Result= Fail?
No
Set negative response: Forwarding violation
No
Result= Forward?
Yes
Set negative response: Absent subscriber
Yes
Result= Fail?
No
Set negative response: Forwarding violation
No
Result= Forward?
Yes
Set negative response: System failure
Result:= Fail
Result:= Forward
Result:= Fail

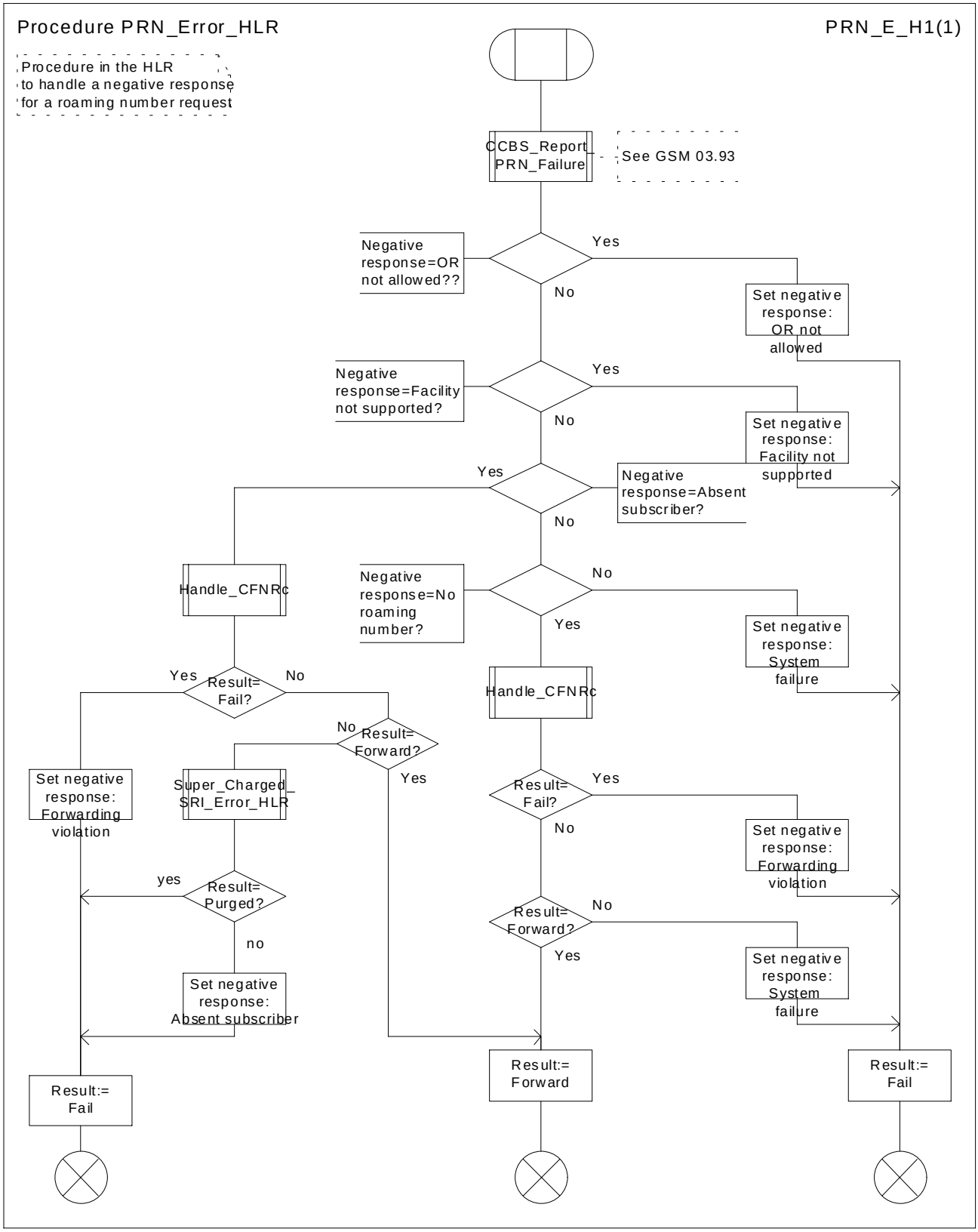


Figure 47: Procedure PRN_Error_HLR

*** Next Modified Section ***

7.2.3 Functional requirements of VLR

7.2.3.1 Process PRN_VLR

Sheet 1: the procedure Check_Parameters is specified in subclause 7.2.2.2.

Sheet 1, sheet 3: the procedure CAMEL_SET_SOA is specific to CAMEL; it is specified in GSM 03.78 for CAMEL Phase 1 [8] and GSM 03.78 for CAMEL Phase 2 [9].

The procedure Check_Reason_In_Serving_Network_Entity is specific to Super-Charger; it is specified in TS 23.116 [xx]. If the subscription data was deleted as a consequence of the Super-Charger feature, processing continues from the "Yes" exit of the test "Result=Purged?".

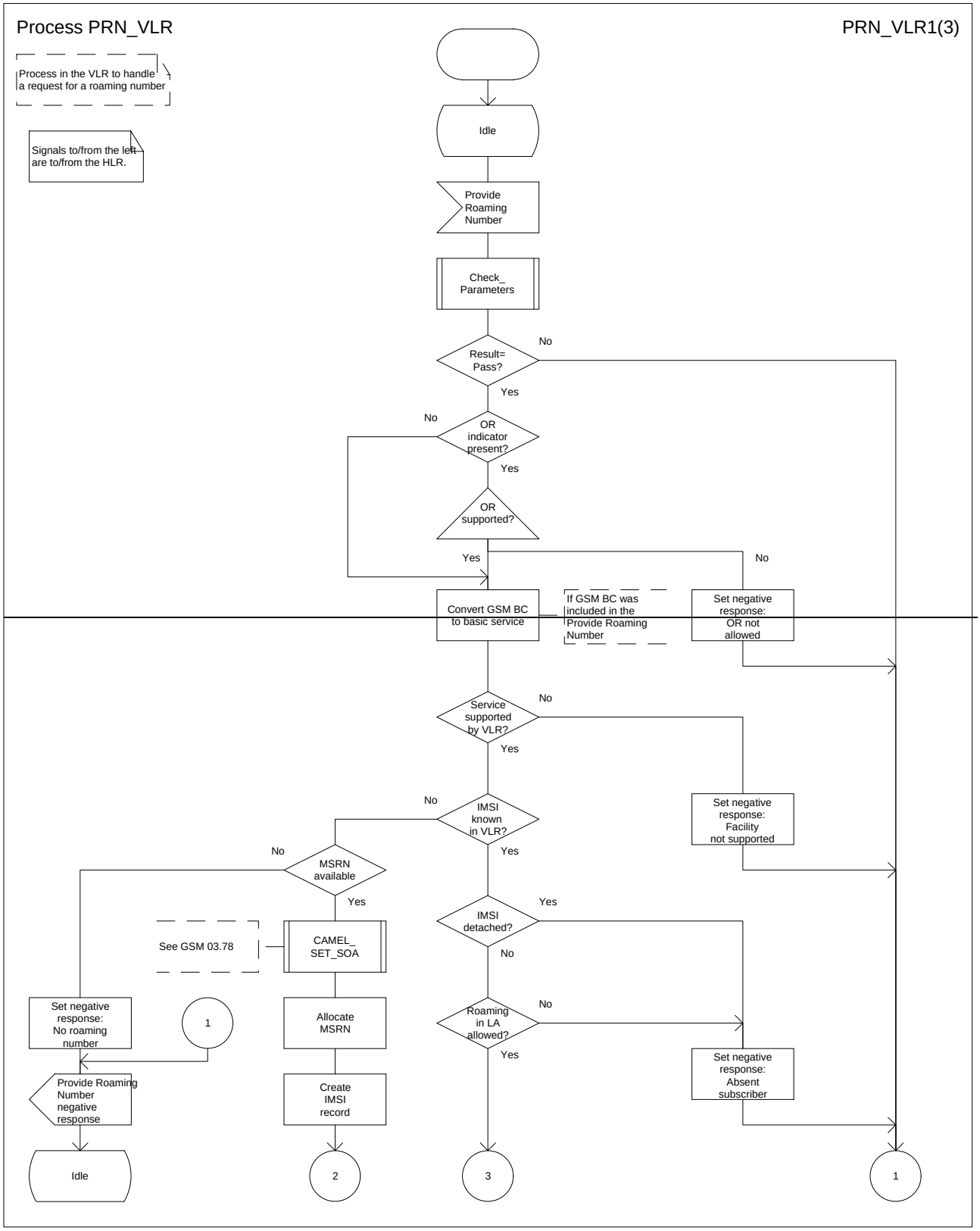
Sheet 2, sheet 3: the task "Store alerting pattern (if received)" is executed only if the VLR supports the feature Network Indication of Alerting.

Sheet 2, sheet 3: the procedure CLI_PRN_VLR is specific to Enhanced CLI Handling. It is specified in GSM 03.81 [11].

Sheet 2, sheet 3: the procedure CCBS_Handle_PRN is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 2: the number of unused authentication sets which triggers the VLR to request further authentication sets from the HLR is an operator option.

Sheet 2: the process Fetch_Authentication_Sets_VLR is specified in subclause 7.1.2.11.


Process PRN_VLR
PRN_VLR1(3)
Process in the VLR to handle a request for a roaming number
Signals to/from the left are to/from the HLR.
Idle
Provide Roaming Number
Check_ Parameters
Result= Pass?
No
Yes
OR indicator present?
No
Yes
OR supported?
Yes
No
Convert GSM BC to basic service
If GSM BC was included in the Provide Roaming Number
Set negative response: OR not allowed
Service supported by VLR?
No
Yes
IMSI known in VLR?
No
Yes
Set negative response: Facility not supported
MSRN available
No
Yes
IMSI detached?
Yes
No
See GSM 03.78
CAMEL_ SET_SOA
Set negative response: No roaming number
1
Allocate MSRN
Roaming in LA allowed?
No
Yes
Provide Roaming Number negative response
Create IMSI record
Set negative response: Absent subscriber
Idle
2
3
1

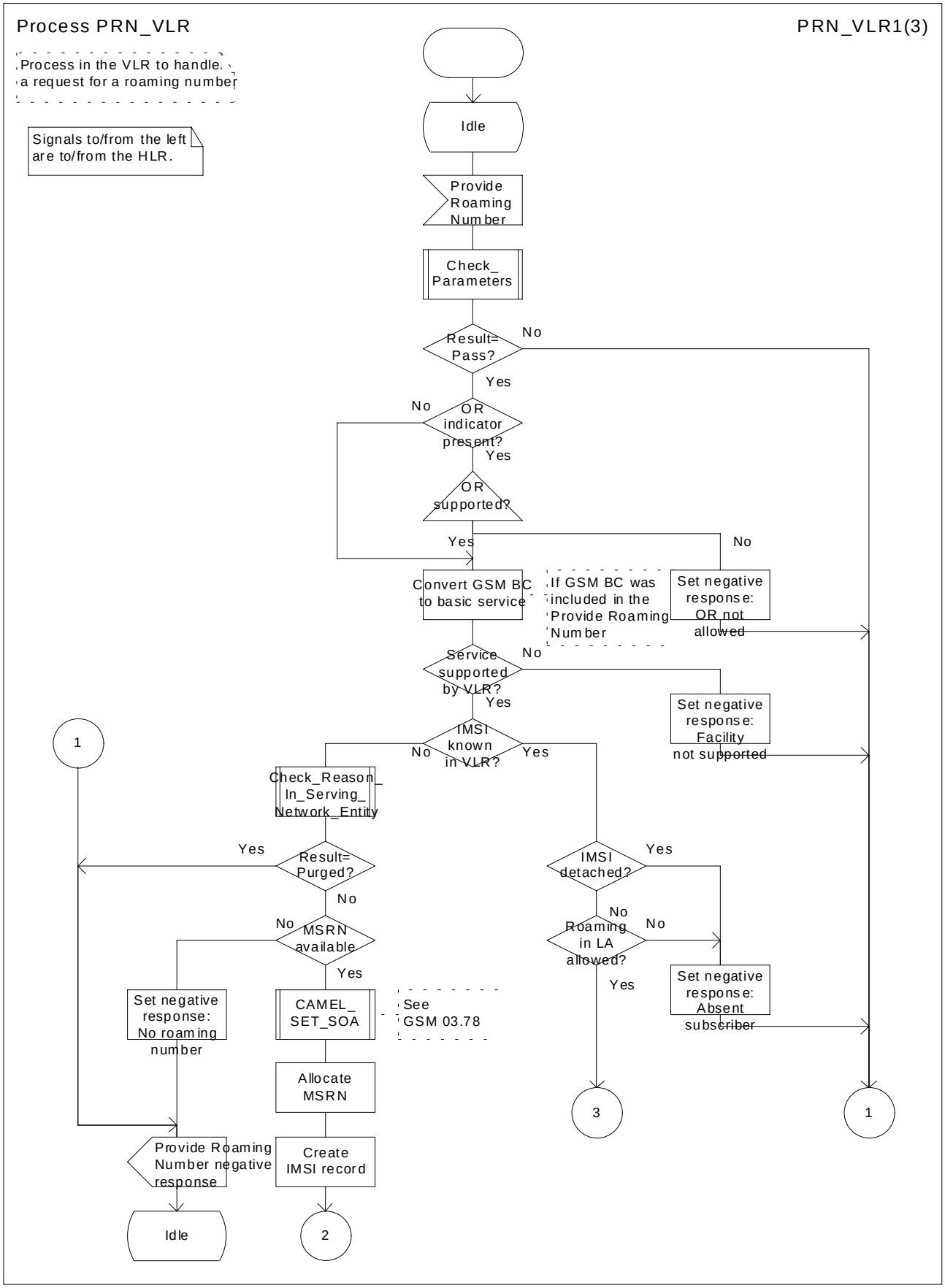


Figure 54a: Process PRN_VLR (sheet 1)

3GPP TSG-CN 2 meeting #9 ***Document N2-99G06***

Eton, UK, 19 - 21 October 1999

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

29.002 **CR** **033r3** Current Version: 3.2.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submision to TSG CN#06 *list TSG meeting no. here ↑*

for approval [X] for information [ ] *(only one box should be marked with an X)*

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: *(at least one should be marked with an X)* USIM [ ] ME [ ] UTRAN [ ] Core Network [X]

Source: TSG N2 **Date:** 9.9.99

Subject: Introduction of the Super-Charger Concept in TS 29.002

3G Work item: Super-Charger

Category: *(only one category shall be marked with an X)*

F	Correction	[ ]
A	Corresponds to a correction in a 2G specification	[ ]
B	Addition of feature	[ ]
C	Functional modification of feature	[X]
D	Editorial modification	[ ]

Reason for change: The aim of this change request is to identify the modifications of TS 29.002 necessary to introduce the Super-Charger concept.

Clauses affected: 7.6, 7.6.3, 8.1.2, 8.1.6, 8.1.7, 8.8.1, 17.7.1, 17.7.7

Other specs affected:

Other 3G core specifications	[ ] → List of CRs:	23.008-A003r1, 23.016-A004r3 23.018-A004r2, 23.012-A002
Other 2G core specifications	[ ] → List of CRs:	
MS test specifications	[ ] → List of CRs:	
BSS test specifications	[ ] → List of CRs:	
O&M specifications	[ ] → List of CRs:	

Other comments:

*** First Modified Section ***

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
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[1] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

....

[xxx] TS 23.116: "3GPP; Technical Specification Group Core Network; Super-Charger Technical Realisation; Stage 2."

....

*** Next Modified Section ***

7.6 Definition of parameters

Following is an alphabetic list of parameters used in the common MAP-services in subclause 7.3:

Application context name	7.3.1	Refuse reason	7.3.1
Destination address	7.3.1	Release method	7.3.2
Destination reference	7.3.1	Responding address	7.3.1
Diagnostic information	7.3.4	Result	7.3.1
Originating address	7.3.1	Source	7.3.5
Originating reference	7.3.1	Specific information	7.3.1/7.3.2/7.3.4
Problem diagnostic	7.3.6	User reason	7.3.4
Provider reason	7.3.5		

Following is an alphabetic list of parameters contained in this clause:

Forwarded-to number	7.6.2.22
Forwarded-to subaddress	7.6.2.23
Forwarding feature	7.6.4.16
Forwarding information	7.6.4.15
Forwarding Options	7.6.4.6
GGSN address	7.6.2.40
GGSN number	7.6.2.41
GMSC CAMEL Subscription Info	7.6.3.34
GPRS Node Indicator	7.6.8.14
GPRS Subscription Data	7.6.3.46
GPRS Subscription Data Withdraw	7.6.3.45
GPRS Support Indicator	7.6.8.15
Group Id	7.6.2.33
GSM bearer capability	7.6.3.6
Guidance information	7.6.4.22
Handover number	7.6.2.21
High Layer Compatibility	7.6.3.43
HLR Id	7.6.2.15
HLR number	7.6.2.13
HO-Number Not Required	7.6.6.7
IMEI	7.6.2.3
IMSI	7.6.2.1
Inter CUG options	7.6.3.27
Intra CUG restrictions	7.6.3.28
SS-Event-Data	7.6.4.43
SS-Info	7.6.4.24
SS-Status	7.6.4.2
Stored location area Id	7.6.2.5
Subscriber State	7.6.3.30
Subscriber Status	7.6.3.7
Super-Charger Supported in HLR	7.6.3.x
Super-Charger Supported in Serving Network Entity	7.6.3.x
Supported CAMEL Phases	7.6.3.36
Suppress T-CSI	7.6.3.33
Suppression of Announcement	7.6.3.32
Target cell Id	7.6.2.8
Target location area Id	7.6.2.7
Target MSC number	7.6.2.12
Teleservice	7.6.4.39
TMSI	7.6.2.2
Trace reference	7.6.10.2
Trace type	7.6.10.3
User error	7.6.1.4
USSD Data Coding Scheme	7.6.4.36
USSD String	7.6.4.37
UU Data	7.6.5.12
UUS CF Interaction	7.6.5.13
VBS Data	7.6.3.40
VGCS Data	7.6.3.39
VLR CAMEL Subscription Info	7.6.3.35
VLR number	7.6.2.14
VPLMN address allowed	7.6.3.48
Zone Code	7.6.2.28

*** Next Modified Section ***

....

7.6.3.x Super-Charger Supported In HLR

This parameter is used by the HLR to indicate support of the Super-Charger functionality and an indication of the age of the subscription data stored in the HLR.

7.6.3.x Super-Charger Supported In Serving Network Entity

This parameter is used to indicate support of the Super-Charger functionality by the originating entity and to indicate either that subscription data is required or the date and time of the last know subscriber data modification.

7.6.3.x Age Indicator

This parameter is used by the HLR to determine the validity of the subscription data retained by the serving network entity in a Super-Charged network.

....

*** Next Modified Section ***

8.1.2 MAP_UPDATE_LOCATION service

8.1.2.1 Definition

This service is used by the VLR to update the location information stored in the HLR.

The MAP_UPDATE_LOCATION service is a confirmed service using the service primitives given in table 6.1/2.

8.1.2.2 Service primitives

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
MSC Address	M	M(=)		
VLR number	M	M(=)		
LMSI	U	C(=)		
Supported CAMEL Phases	C	C(=)		
SoLSA Support Indicator	C	C(=)		
Super-Charger Supported in Serving Network Entity	C	C(=)		
HLR number			C	C(=)
User error			C	C(=)
Provider error				O

Table 8.1/2: MAP_UPDATE_LOCATION

8.1.2.3 Parameter definitions and use

Invoke Id

See definition in subclause 5.6.1.

IMSI

See definition in subclause 5.6.2.

MSC Address

See definition in subclause 5.6.2. The MSC address is used for short message delivery only and for each incoming call set-up attempt the MSRN will be requested from the VLR.

VLR number

See definition in subclause 5.6.2.

LMSI

See definition in subclause 5.6.2. It is an operator option to provide the LMSI from the VLR; it is mandatory for the HLR to support the LMSI handling procedures.

Supported CAMEL Phases

This parameter indicates which phases of CAMEL are supported. Must be present if a CAMEL phase different from phase 1 is supported. Otherwise may be absent.

HLR number

See definition in subclause 5.6.2. The presence of this parameter is mandatory in case of successful HLR updating.

SoLSA Support Indicator

This parameter is used by the VLR to indicate to the HLR in the Update Location indication that SoLSA is supported. If this parameter is not included in the Update Location indication and the Subscriber is marked as only allowed to roam in Subscribed LSAs, then the HLR shall reject the roaming and indicate to the VLR that roaming is not allowed to that Subscriber in the VLR.

This SoLSA Support Indicator shall be stored by the HLR per VLR where there are Subscribers roaming. If a Subscriber is marked as only allowed to roam in Subscribed LSAs while roaming in a VLR and no SoLSA Support indicator is stored for that VLR, the location status of that Subscriber shall be set to Restricted.

Super-Charger Supported in Serving Network Entity

This parameter is used by the VLR to indicate to the HLR that the VLR supports the Super-Charger functionality and whether subscription data has been retained by the VLR. If subscription data has been retained by the VLR the age indicator shall be included. Otherwise the VLR shall indicate that subscriber data is required.

If this parameter is absent then the VLR does not support the Super-Charger functionality.

User error

In case of unsuccessful updating, an error cause shall be returned by the HLR. The following error causes defined in subclause 5.6.1 may be used, depending on the nature of the fault:

- unknown subscriber;
- roaming not allowed;

  This cause will be sent if the MS is not allowed to roam into the PLMN indicated by the VLR number. The cause is qualified by the roaming restriction reason "PLMN Not Allowed" or "Operator Determined Barring". If no qualification is received (HLR with MAP Version 1), "PLMN Not Allowed" is taken as default.
- system failure;
- unexpected data value.

Provider error

For definition of provider errors see subclause 5.6.1.

*** Next Modified Section ***

8.1.6 MAP_PURGE_MS service

8.1.6.1 Definition

This service is used between the VLR and the HLR to cause the HLR to mark its data for an MS so that any request for routing information for a mobile terminated call or a mobile terminated short message will be treated as if the MS is not reachable. It is invoked when the subscriber record for the MS is to be deleted in the VLR, either by MMI interaction or automatically, e.g. because the MS has been inactive for several days. This service shall not be used if both the VLR and HLR support the Super-Charger functionality.

Also this service is used between the SGSN and the HLR to cause the HLR to mark its data for an MS so that any request for routing information for a mobile terminated short message or a network requested PDP-context activation will be treated as if the MS is not reachable. It is invoked when the subscriber record for the MS is to be deleted in the SGSN, either by MMI interaction or automatically, e.g. because the MS has been inactive for several days. This service shall not be used if both the SGSN and HLR support the Super-Charger functionality.

The MAP_PURGE_MS service is a confirmed service using the primitives defined in table 8.1/6.

8.1.6.2 Service primitives

Table 8.1/6: MAP_PURGE_MS

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
VLR number	C	C(=)		
Freeze TMSI			C	C(=)
Freeze P-TMSI			C	C(=)
SGSN number	C	C(=)		
User error			C	C(=)
Provider error				O

8.1.6.3 Parameter definitions and use

Invoke ID

See definition in subclause 7.6.1.

IMSI

See definition in subclause 7.6.2.

VLR number

Shall be present if the sender is VLR. See definition in subclause 7.6.2.

SGSN number

Shall be present if the sender is SGSN. See definition in subclause 7.6.2

Freeze TMSI

This parameter is sent to the VLR to indicate that the TMSI has to be frozen. It shall be present if the received VLR number matches the stored VLR number.

Freeze P-TMSI

This parameter is sent to the SGSN to indicate that the P-TMSI has to be frozen. It shall be present if the received SGSN number matches the stored SGSN number.

User error

This parameter is sent by the responder when an error is detected and if present, takes one of the following values:

- Data Missing;
- Unexpected Data Value;
- UnknownSubscriber.

Provider error

See definition of provider errors in subclause 7.6.1.

8.1.7 MAP_UPDATE_GPRS_LOCATION service

8.1.7.1 Definition

This service is used by the SGSN to update the location information stored in the HLR.

The MAP_UPDATE_GPRS_LOCATION service is a confirmed service using the service primitives given in table 8.1/7.

8.1.7.2 Service primitives

Table 8.1/7: MAP_UPDATE_GPRS_LOCATION

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
SGSN number	M	M(=)		
SGSN address	M	M(=)		
SoLSA Support Indicator	C	C(=)		
Super-Charger Supported in Serving Network Entity	C	C(=)		
HLR number			C	C(=)
User error			C	C(=)
Provider error				O

8.1.7.3 Parameter definitions and use

Invoke Id

See definition in subclause 7.6.1.

IMSI

See definition in subclause 7.6.2.

SGSN number

See definition in subclause 7.6.2.

SGSN address

See definition in subclause 7.6.2.

SoLSA Support Indicator

This parameter is used by the SGSN to indicate to the HLR in the Update GPRS Location indication that SoLSA is supported. If this parameter is not included in the Update GPRS Location indication and the Subscriber is marked as only allowed to roam in Subscribed LSAs, then the HLR shall reject the roaming and indicate to the SGSN that roaming is not allowed to that Subscriber in the SGSN.

This SoLSA Support Indicator shall be stored by the HLR per SGSN where there are Subscribers roaming. If a Subscriber is marked as only allowed to roam in Subscribed LSAs while roaming in a SGSN and no SoLSA Support indicator is stored for that SGSN, the location status of that Subscriber has to be set to Restricted.

Super-Charger Supported in Serving Network Entity

This parameter is used by the SGSN to indicate to the HLR that the SGSN supports the Super-Charger functionality and whether subscription data has been retained by the SGSN. If subscription data has been retained by the SGSN the age indicator shall be included. Otherwise the SGSN shall indicate that subscriber data is required.

If this parameter is absent then the SGSN does not support the Super-Charger functionality.

HLR number

See definition in subclause 7.6.2. The presence of this parameter is mandatory in case of successful HLR updating.

User error

In case of unsuccessful updating, an error cause shall be returned by the HLR. The following error causes defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- unknown subscriber;
- roaming not allowed;

  This cause will be sent if the MS is not allowed to roam into the PLMN indicated by the SGSN number. The cause is qualified by the roaming restriction reason "PLMN Not Allowed" or "Operator Determined Barring".

- system failure;
- unexpected data value.

The diagnostic in the Unknown Subscriber may indicate “Imsi Unknown” or “Gprs Subscription Unknown”.

Provider error

For definition of provider errors see subclause 7.6.1.

*** Next Modified Section ***

8.8.1 MAP-INSERT-SUBSCRIBER-DATA service

8.8.1.1 Definition

This service is used by an HLR to update a VLR with certain subscriber data in the following occasions:

- the operator has changed the subscription of one or more supplementary services, basic services or data of a subscriber. Note that in case of withdrawal of a Basic or Supplementary service this primitive shall not be used;
- the operator has applied, changed or removed Operator Determined Barring;
- the subscriber has changed data concerning one or more supplementary services by using a subscriber procedure;
- the HLR provides the VLR with subscriber parameters at location updating of a subscriber or at restoration. In this case, this service is used to indicate explicitly that a supplementary service is not provisioned, if the supplementary service specification requires it. The only supplementary services which have this requirement are the CLIR and COLR services. Network access mode is provided only in restoration. If the Super-Charger functionality is supported the HLR may not need to provide the VLR with subscriber parameters at location updating of a subscriber. See TS 23.116.

Also this service is used by an HLR to update a SGSN with certain subscriber data in the following occasions:

- if the GPRS subscription has changed;
- if the network access mode is changed;
- the operator has applied, changed or removed Operator Determined Barring;
- the HLR provides the SGSN with subscriber parameters at GPRS location updating of a subscriber. If the Super-Charger functionality is supported the HLR may not need to provide the SGSN with subscriber parameters. See TS 23.116.

It is a confirmed service and consists of the primitives shown in table 6.8/1.

8.8.1.2 Service primitives

Table 8.8/1: MAP-INSERT-SUBSCRIBER-DATA

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	C	C(=)		
MSISDN	C	C(=)		
Category	C	C(=)		
Subscriber Status	C	C(=)		
Bearer service List	C	C(=)	C	C(=)
Teleservice List	C	C(=)	C	C(=)
Forwarding information List	C	C(=)		
Call barring information List	C	C(=)		
CUG information List	C	C(=)		
SS-Data List	C	C(=)		
eMLPP Subscription Data	C	C(=)		
Operator Determined Barring General data	C	C(=)	C	C(=)
Operator Determined Barring HPLMN data	C	C(=)		
Roaming Restriction Due To Unsupported Feature	C	C(=)		
Regional Subscription Data	C	C(=)		
VLR CAMEL Subscription Info	C	C(=)		
Voice Broadcast Data	C	C(=)		
Voice Group Call Data	C	C(=)		
Network access mode	C	C(=)		
GPRS Subscription Data	C	C(=)		
Roaming Restricted In SGSN Due To Unsupported Feature	C	C(=)		
North American Equal Access preferred Carrier Id List	U	C(=)		
LSA Information	C	C(=)		
SS-Code List			C	C(=)
LMU Identifier	C	C(=)		
LCS Information	C	C(=)		
Super-Charger Supported In HLR	C	C(=)		
Regional Subscription Response			C	C(=)
Supported CAMEL Phases			C	C (=)
User error			U	C(=)
Provider error				O

8.8.1.3 Parameter use

....

LCS Information

This parameter provides the following LCS related information for an MS subscriber:

- list of GMLCs in the HPLMN
- privacy exception list

Super-Charger Supported In HLR

This parameter is used by the HLR to indicate support for the Super-Charger functionality. If this parameter is present it shall include an indication of the age of the subscription data stored in the HLR.

If this parameter is absent then the HLR does not support the Super-Charger functionality.

SS-Code List

The list of SS-Code parameters that are provided to a subscriber but are not supported/allocated by the VLR (SS-Code is defined in subclause 7.6). The list can only include individual SS-Codes that were sent in the service request. This parameter is used only by the VLR.

....

*** Next Modified Section ***

17.7.1 Mobile Service data type

```
MAP-MS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version5 (5)}

DEFINITIONS
```

….

```
-- location registration types

UpdateLocationArg ::= SEQUENCE {
     imsi                              IMSI,

     msc-Number                        [1] ISDN-AddressString,
     vlr-Number                        ISDN-AddressString,
     lmsi                              [10] LMSI OPTIONAL,
     extensionContainer                ExtensionContainer                OPTIONAL,
     ... ,
     vlr-Capability                    [6] VLR-Capability                OPTIONAL }

VLR-Capability ::= SEQUENCE{
     supportedCamelPhases              [0] SupportedCamelPhases          OPTIONAL,
     extensionContainer                ExtensionContainer                OPTIONAL,
     … ,
     superChargerSupportedInServingNetworkEntity   [1] SuperChargerInfo     OPTIONAL }

SuperChargerInfo ::= CHOICE {
     sendSubscriberData                [0] NULL,
     subscriberDataStored              [1] AgeIndicator }

AgeIndicator ::= OCTET STRING (SIZE (1..6))
     -- The internal structure of this parameter is implementation specific.

UpdateLocationRes ::= SEQUENCE {
     hlr-Number                        ISDN-AddressString,

     extensionContainer                ExtensionContainer                OPTIONAL,
     ... ,
     solsaSupportIndicator             [2]  NULL                         OPTIONAL }
```

….

```
-- gprs location registration types

UpdateGprsLocationArg ::= SEQUENCE {
     imsi                              IMSI,
     sgsn-Number                       ISDN-AddressString,
     sgsn-Address                      GSN-Address,
     extensionContainer                ExtensionContainer                OPTIONAL,
     ... ,
     sgsn-Capability                   [0] SGSN-Capability               OPTIONAL }

SGSN-Capability ::= SEQUENCE{
     solsaSupportIndicator             NULL                              OPTIONAL,
     extensionContainer                [1] ExtensionContainer            OPTIONAL,
     ...,
     superChargerSupportedInServingNetworkEntity   [2] SuperChargerInfo     OPTIONAL }

GSN-Address ::= OCTET STRING (SIZE (5..17))
     -- Octets are coded according to TS GSM 03.03

UpdateGprsLocationRes ::= SEQUENCE {
     hlr-Number                        ISDN-AddressString,
     extensionContainer                ExtensionContainer                OPTIONAL,
     ...}
```

```
-- handover types
```

….

```
-- subscriber management types
```

```
InsertSubscriberDataArg ::= SEQUENCE {
     imsi                                [0] IMSI                              OPTIONAL,
     COMPONENTS OF                       SubscriberData,
     extensionContainer                  [14] ExtensionContainer               OPTIONAL,
     ... ,
     naea-PreferredCI                    [15] NAEA-PreferredCI                 OPTIONAL,
     -- naea-PreferredCI is included at the discretion of the HLR operator.
     gprsSubscriptionData                [16] GPRSSubscriptionData             OPTIONAL,
     roamingRestrictedInSgsnDueToUnsupportedFeature [23]                       NULL
                                                                               OPTIONAL,
     networkAccessMode                   [24] NetworkAccessMode                OPTIONAL,
     lsaInformation                      [25] LSAInformation                   OPTIONAL,
     lmu-Indicator                       [21] NULL                             OPTIONAL,
     lcsInformation                      [22] LCSInformation                   OPTIONAL,
     superChargerSupportedInHLR          [26] AgeIndicator                     OPTIONAL
      }
     -- If the Network Access Mode parameter is sent, it shall be present only in
     -- the first sequence if the segmentation is used
```

```
LCSInformation ::= SEQUENCE {
     hplmn-GMLC-List                     [0]  HPLMN-GMLC-List                  OPTIONAL,
     lcs-PrivacyExceptionList            [1]  LCS-PrivacyExceptionList         OPTIONAL,
...}
```

```
HPLMN-GMLC-List ::= SEQUENCE SIZE (1..maxNumOfGMLC) OF
                                         ISDN-AddressString
```

```
maxNumOfGMLC  INTEGER ::= 5
```

```
NetworkAccessMode ::= ENUMERATED {
     bothMSCAndSGSN                      (0),
     onlyMSC                             (1),
     onlySGSN                            (2),
     ...}
     -- if unknown values are received in NetworkAccessMode
     -- they shall be discarded.
```

….

*** Next Modified Section ***

17.7.7 Error data types

```
MAP-ER-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ER-DataTypes (17) version5 (5)}

DEFINITIONS

....
```

```
AbsentSubscriberParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                    OPTIONAL,
     ...,
     absentSubscriberReason              [0] AbsentSubscriberReason            OPTIONAL}
```

```
AbsentSubscriberReason ::= ENUMERATED {
     imsiDetach (0),
     restrictedArea (1),
     noPageResponse (2),
     ...,
     purgedMS (3)}
-- exception handling: at reception of other values than the ones listed the
-- AbsentSubscriberReason shall be ignored
-- The AbsentSubscriberReason: purgedMS is defined for the Super-Charger feature
-- (see TS 23.116). If this value is received in a Provide Roaming Number response
-- it shall be mapped to the AbsentSubscriberReason: imsiDetach in the Send Routeing
-- Information response.
```

```
BusySubscriberParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...,
     ccbs-Possible                       [0] NULL                          OPTIONAL,
     ccbs-Busy [1] NULL                       OPTIONAL}
```

```
NoSubscriberReplyParam ::= SEQUENCE {
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

....

*** Next Modified Section ***

23.6 Common procedures for the short message clause

23.6.1 The macro Report_SM_Delivery_Stat_HLR

This macro is used when the HLR receives a MAP_REPORT_SM_DELIVERY_STATUS indication from the GMSC. The HLR responses to the indication as follows:

- if the flag « GPRS Support Indicator » is absent then if the subscriber is a GPRS subscriber and a non-GPRS susbcsriber with the option « transfer of SM via the SGSN when GPRS is not supported in the GMSC » or if the subscriber is a GPRS subscsriber only, the HLR shall interpret the delivery outcome as a GPRS delivery outcome.

- if invalid data content is detected, an unexpected data value error or a data missing error is returned to the GMSC;

- if the MSISDN number provided is not recognized by the HLR, an unknown subscriber error is returned to the GMSC;

- if the MAP_REPORT_SM_DELIVERY_STATUS indication reports a successful SM delivery, the Service Centres in the Message Waiting list are alerted as described in the subclause 25.10;

- if the SM Delivery Outcome reports unsuccessful delivery and the inclusion of the SC address in the MWD is not possible, a message waiting list full error is returned to the GMSC;

- if the SM Delivery Outcome reports unsuccessful delivery and the message waiting list is not full, the given Service Centre address is inserted and an acknowledgement is sent to the GMSC. If the MSISDN-Alert stored in the subscriber data is not the same as that received in the MAP_REPORT_SM_DELIVERY_STATUS indication, the MSISDN-Alert is sent in a response primitive to the GMSC;

  The SC address is only stored in the MWD if the unsuccessful SM Delivery Outcome is not received in combination with another successful SM Delivery Outcome

- if the SM Delivery Outcome is MS memory capacity exceeded for non GPRS, the HLR sets the memory capacity exceeded flag in the subscriber data and resets the MNRF;

- if the SM Delivery Outcome is MS memory capacity exceeded for GPRS the HLR sets the memory capacity exceeded flag in the subscriber data and resets the MNRG;

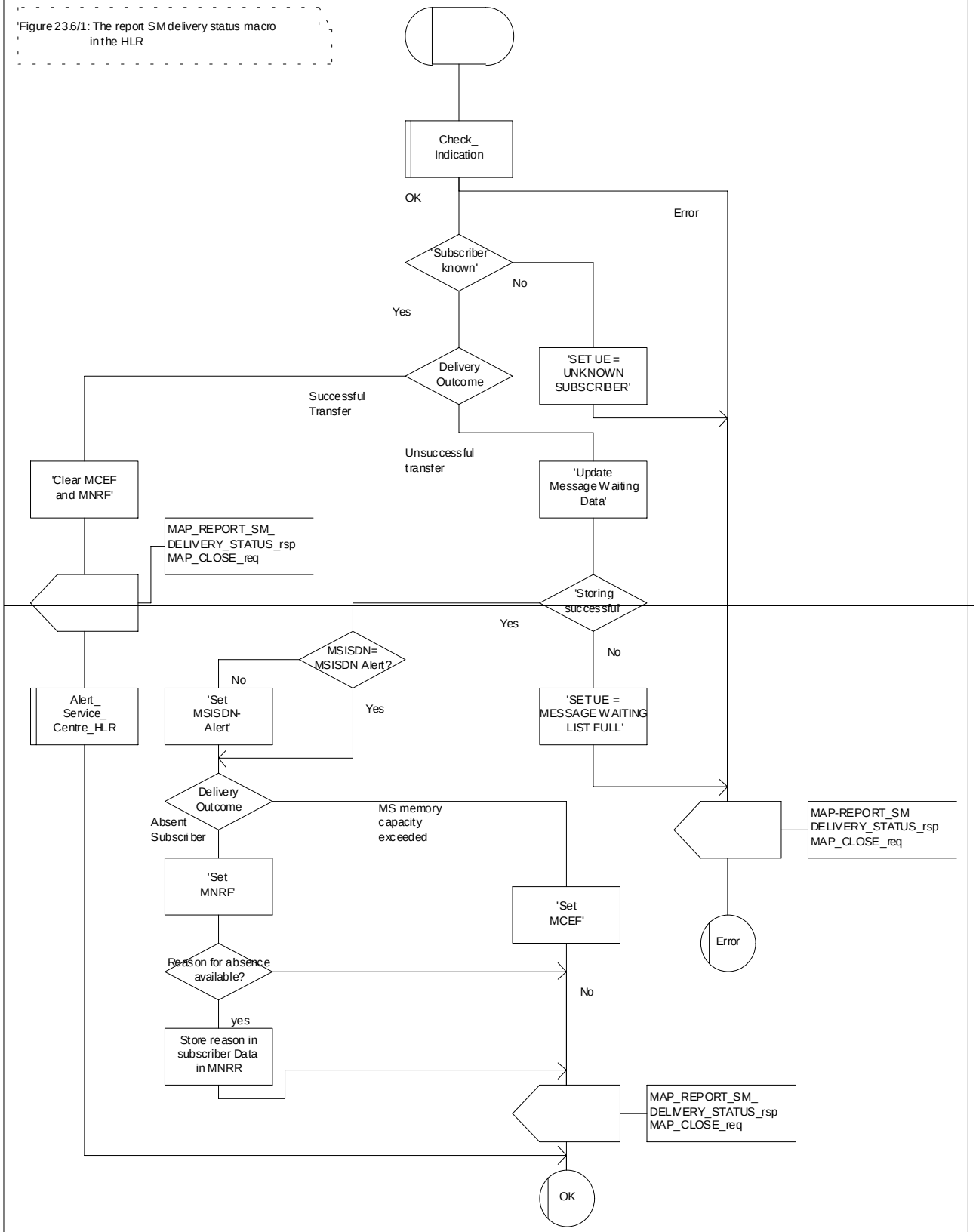
- if the SM Delivery Outcome is absent subscriber for non GPRS, the HLR sets the mobile station not reachable flag in the subscriber data. If a reason for absence is provided by the GMSC then this is stored in the mobile station not reachable reason (MNRR) in the subscriber data.

- if the SM Delivery Outcome is absent subscriber for GPRS, the HLR sets the mobile station not reachable for GPRS flag in the subscriber data. If a reason for absence is provided by the GMSC then this is stored in the mobile station not reachable reason (MNRR) in the subscriber data.

  Note that a combination of all the SM Delivery Outcome specified above may be provided to the HLR from the SMS-GMSC.

The short message delivery status report macro in the HLR is shown in figure 23.6/1.

'Figure 23.6/1: The report SM delivery status macro in the HLR



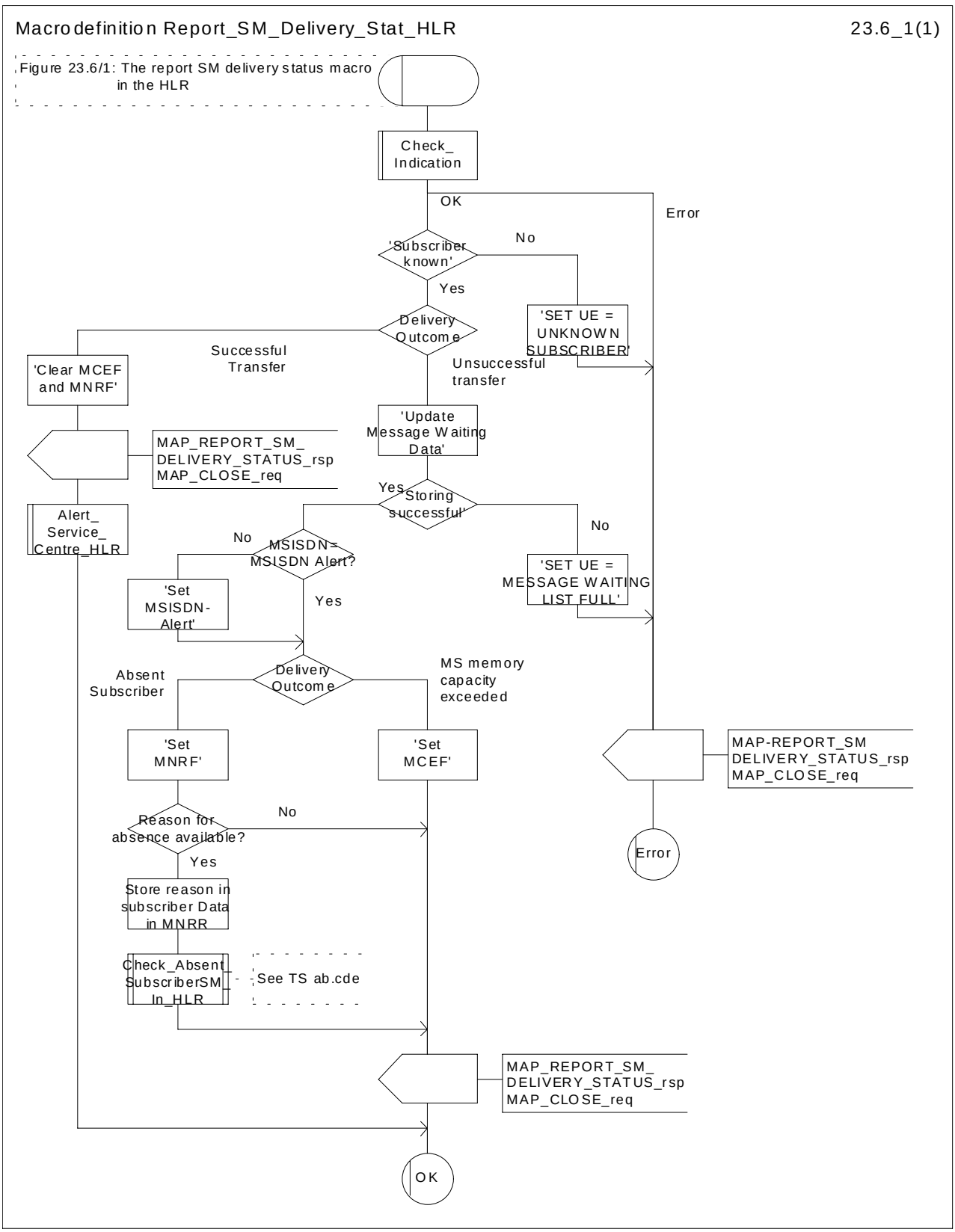


Figure 23.6/1: Macro Report_SM_Delivery_Stat_HLR

3GPP TSG-CN WG2
Phoenix, USA 15-19 November, 1999

Document N2-99J92
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

29.002	CR	068	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	CN#06	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]
(at least one should be marked with an X)

Source: TSG N2 **Date:** 16 Nov. 1999

Subject: Update of SDLs to support Super-Charger

Work item: Super-Charger

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature	X		Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: Super-Charger introduces specific procedure enhancements in the location management section of TS 29.002, which are specified in this change request. The intention is to add approved content of this CR to CR 29.002-033r4.

Clauses affected: 19.1.1.4, 19.1.1.8, 19.1.4.4

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	29.002-033r4, 23.008-A003r1, 23.016-A004r3, 23.018-A004r2
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments: This change request is based on TS 29.002 with the amendments of CR29.002-A065.

19.1.1.4 Detailed procedure in the HLR

When addressed by the SGSN, the following macros are used by the process Update_GPRS_Location_HLR:

- Receive_Open_indication, defined in subclause 25.1;
- Check_indication, defined in subclause 25.2;
- Insert_Subs_Data_In_SGSN_Framed_HLR, described in subclause 19.4.x;
- Control_Tracing_HLR_with_SGSN, described in subclause 25.9;

and the processes Cancel_Location_HLR (see subclause 19.1.2) and Subscriber_Present_HLR (see subclause 19.1.1.7) are invoked.

Sheet 1: The procedure Super_Charged_Cancel_Location_HLR is specific to Super-Charger; it is specified in TS 23.116 [xxx]. If the previous SGSN and the originating HLR support the Super-Charger functionality, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 2: The procedure Super_Charged_Location_Updating_HLR is specific to Super-Charger; it is specified in TS 23.116 [xxx]. If subscription data needs to be sent to the SGSN, processing continues from the "No" exit of the test "Result=Pass?".

The location updating process in the HLR is activated by receipt of a MAP_UPDATE_GPRS_LOCATION indication (see figure 19.1.1/19):

- if there is a parameter problem in the indication, the error Unexpected Data Value is returned in the MAP_UPDATE_LOCATION response (see Check_indication macro defined in subclause 25.2); if the subscriber is not known in the HLR, the error Unknown Subscriber (with diagnostic value set to “Imsi Unknown”) is returned in the response. In either case the process terminates;
- if Network Access Mode is set to “non-GPRS only” the error Unknown Subscriber (with diagnostic value set to “Gprs Subscription Unknown”) is returned in the response. The process terminates;
- tracing shall be set to deactive in the SGSN.
- if the SGSN number received in the MAP_UPDATE_GPRS_LOCATION indication differs from the one actually stored against the subscriber, the Cancel_Location_HLR process is started to cancel the subscriber data in the stored SGSN (see subclause 19.1.2).

The next action will be to check whether the subscriber is allowed to roam into the PLMN indicated by the SGSN Number given in the MAP_UPDATE_GPRS_LOCATION indication:

- if the subscriber is not allowed to roam into the PLMN, the error Roaming not Allowed with cause PLMN Roaming Not Allowed or 'Operator determined Barring', depending on the case, is returned in the MAP_UPDATE_GPRS_LOCATION response, and the routing information stored (SGSN number) is deleted (deregistration);
- otherwise the HLR database will be updated with information received in the indication. The HLR sets the "MS purged for GPRS" flag to False and checks whether tracing is required for that subscriber. This is handled by the macro Control_Tracing_HLR-with_SGSN described in subclause 25.9.

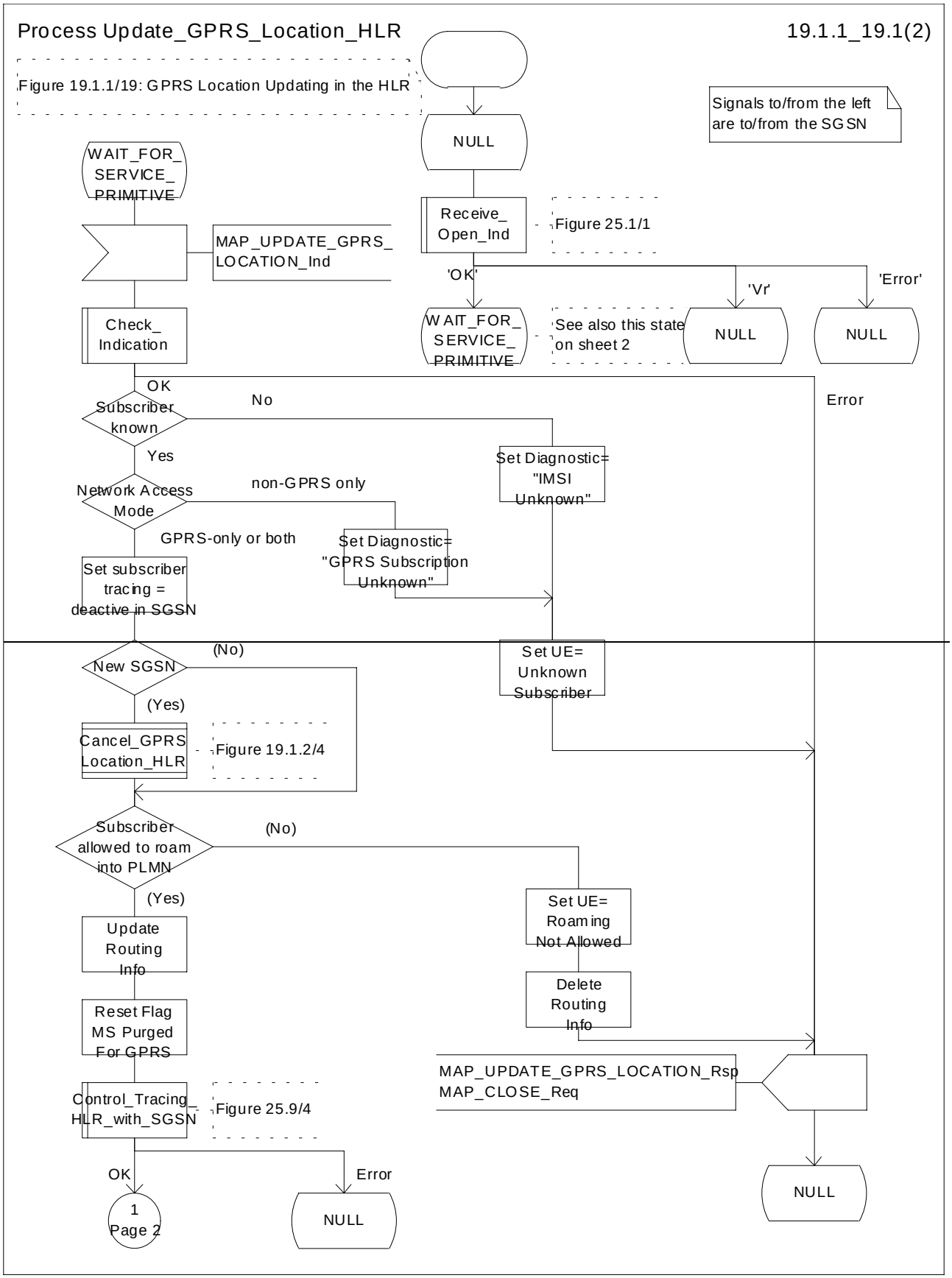
Thereafter, the macro Insert_Subs_Data_In_SGSN_Framed_HLR described in subclause 19.4.x is invoked. The outcome of this macro may be:

- aborted, in which case the process terminates;
- error, in which case the error System Failure is returned in the MAP_UPDATE_GPRS_LOCATION response and the process terminates;
- OK, indicating successful outcome of downloading the subscriber data to the SGSN.

The SUBSCRIBER_PRESENT_HLR process is then started to alert the Short Message Service Centre, if required (see subclause 19.1.7).

Finally the HLR number is returned in the MAP_UPDATE_GPRS_LOCATION response.

In all cases where the HLR sends a MAP_UPDATE_GPRS_LOCATION response to the SGSN, the dialogue towards the SGSN is terminated by a MAP_CLOSE request with parameter Release Method indicating Normal Release.


Process Update_GPRS_Location_HLR
19.1.1_19.1(2)
Figure 19.1.1/19: GPRS Location Updating in the HLR
Signals to/from the left are to/from the SGSN
NULL
WAIT_FOR_ SERVICE_ PRIMITIVE
Receive_ Open_Ind
Figure 25.1/1
MAP_UPDATE_GPRS_ LOCATION_Ind
'OK'
'Vr'
'Error'
Check_ Indication
WAIT_FOR_ SERVICE_ PRIMITIVE
See also this state on sheet 2
NULL
NULL
OK
No
Error
Subscriber known
Yes
Set Diagnostic= "IMSI Unknown"
Network Access Mode
non-GPRS only
GPRS-only or both
Set Diagnostic= "GPRS Subscription Unknown"
Set subscriber tracing = deactive in SGSN
Set UE= Unknown Subscriber
New SGSN
(No)
(Yes)
Cancel_GPRS Location_HLR
Figure 19.1.2/4
Subscriber allowed to roam into PLMN
(No)
(Yes)
Set UE= Roaming Not Allowed
Update Routing Info
Delete Routing Info
Reset Flag MS Purged For GPRS
MAP_UPDATE_GPRS_LOCATION_Rsp
MAP_CLOSE_Req
Control_Tracing_ HLR_with_SGSN
Figure 25.9/4
OK
Error
1
Page 2
NULL
NULL

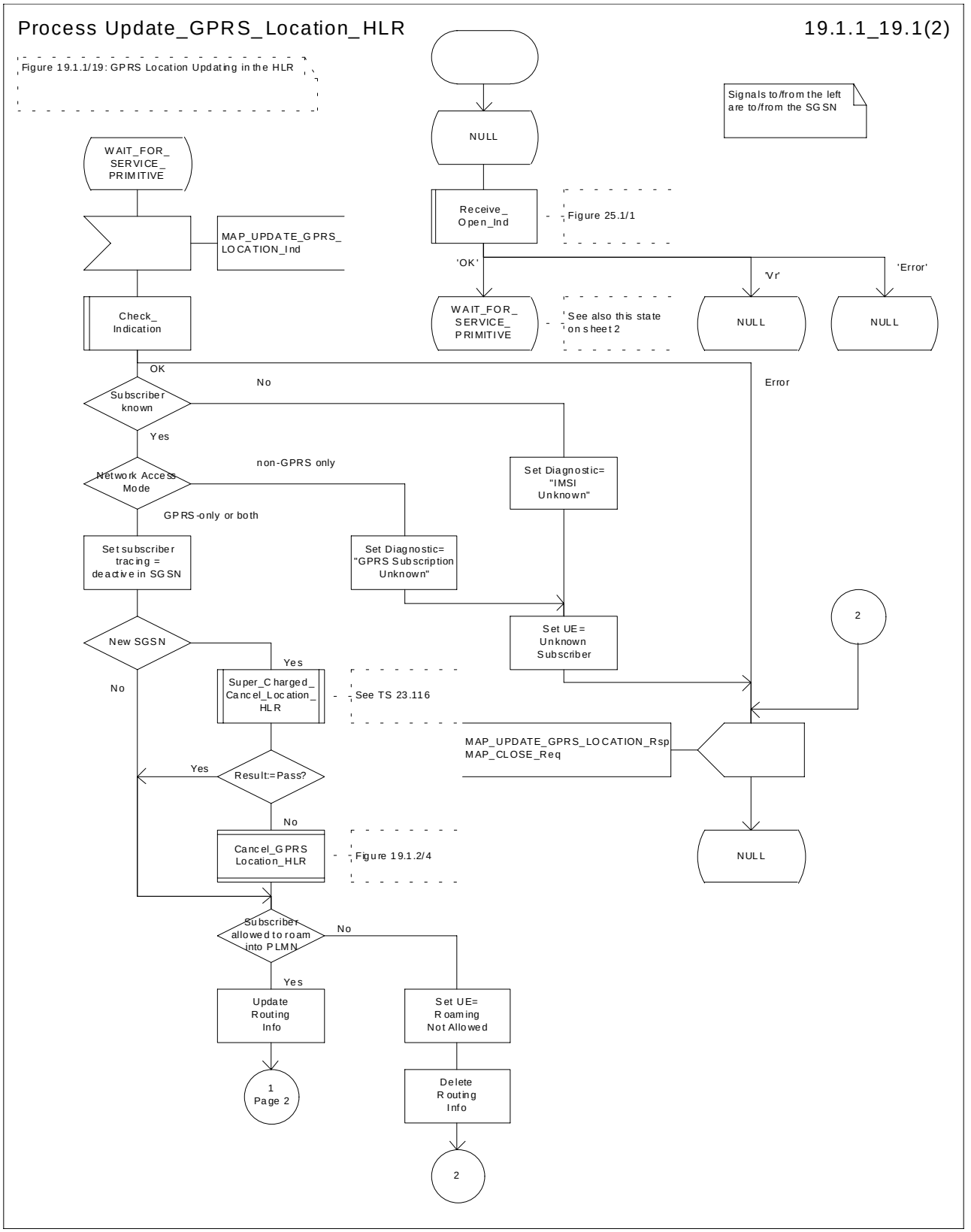
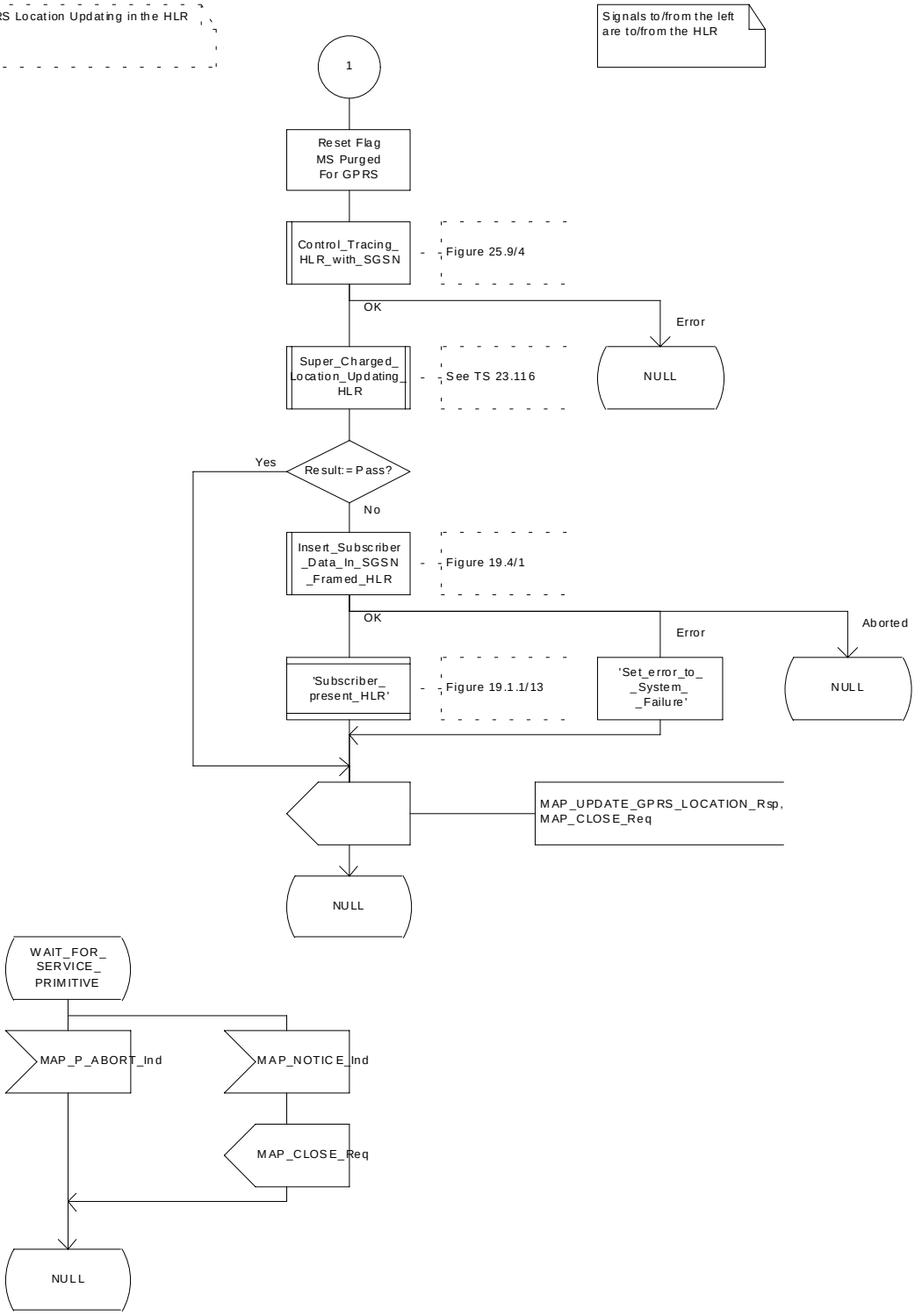


Figure 19.1.1/19 (sheet 1 of 2): Process Update_GPRS_Location_HLR

Figure 19.1.1/19: GPRS Location Updating in the HLR



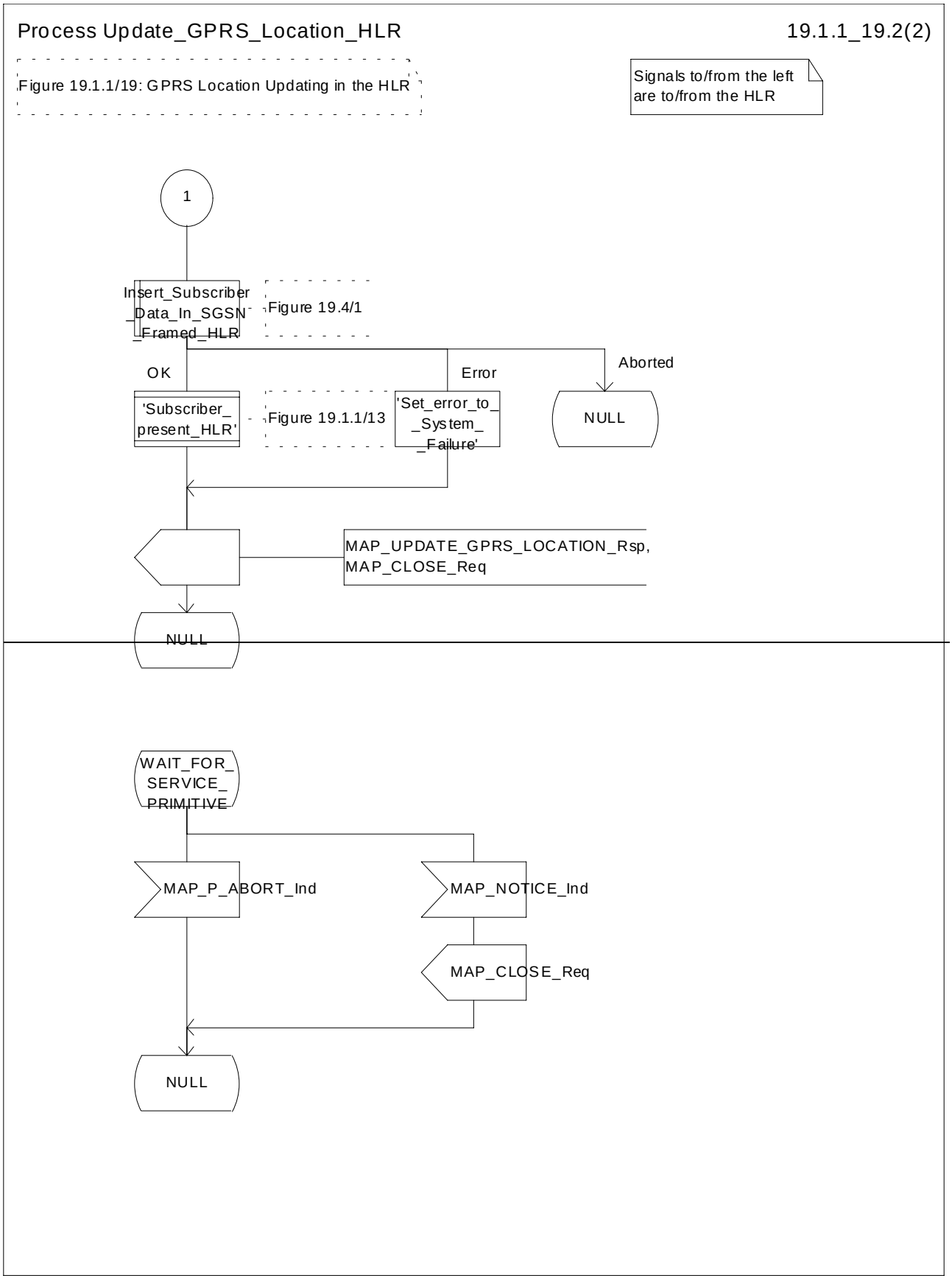


Figure 19.1.1/19 (sheet 2 of 2): Process Update_GPRS_Location_HLR

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 TS 23.116 [xxx].

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 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.

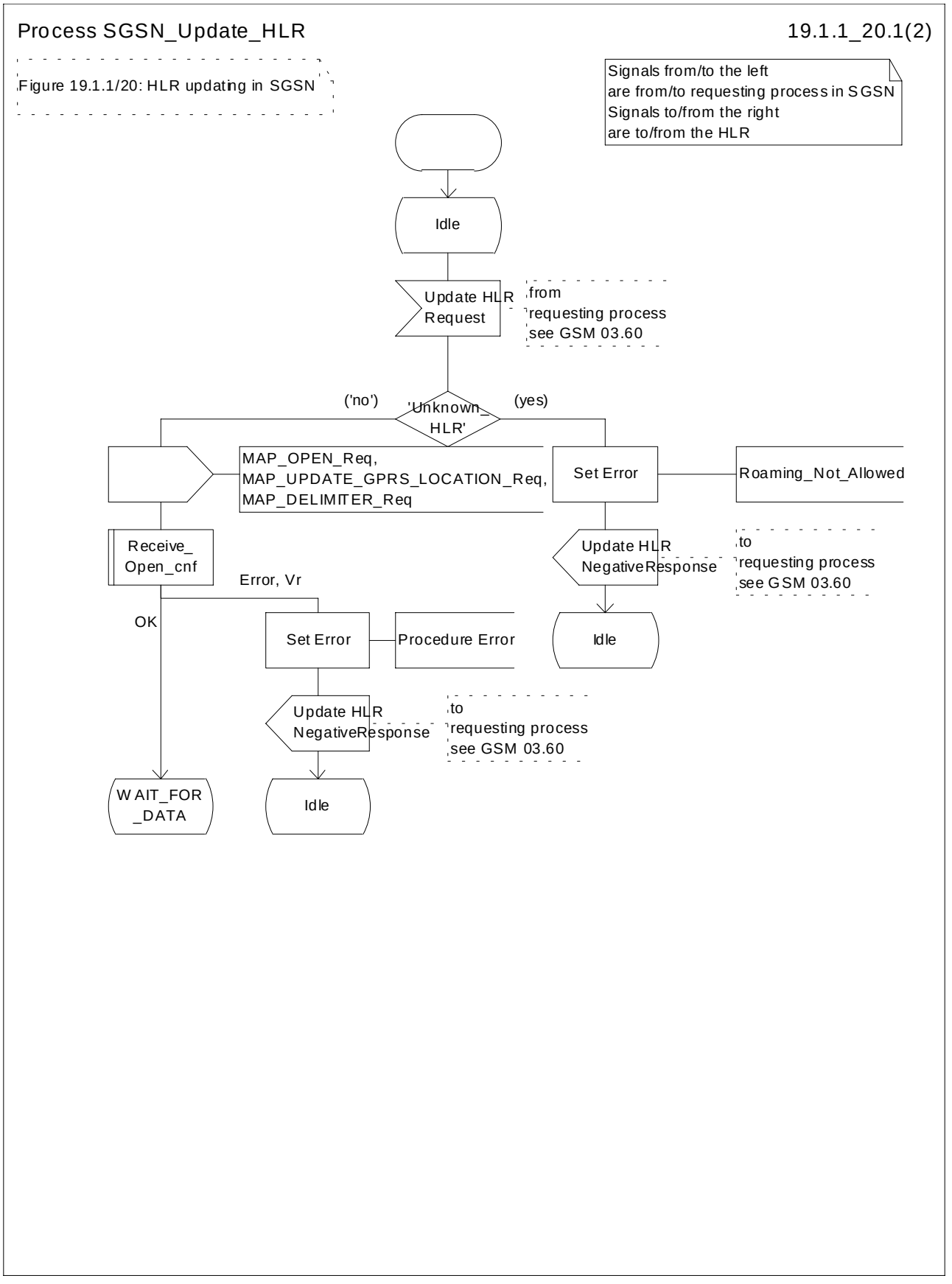
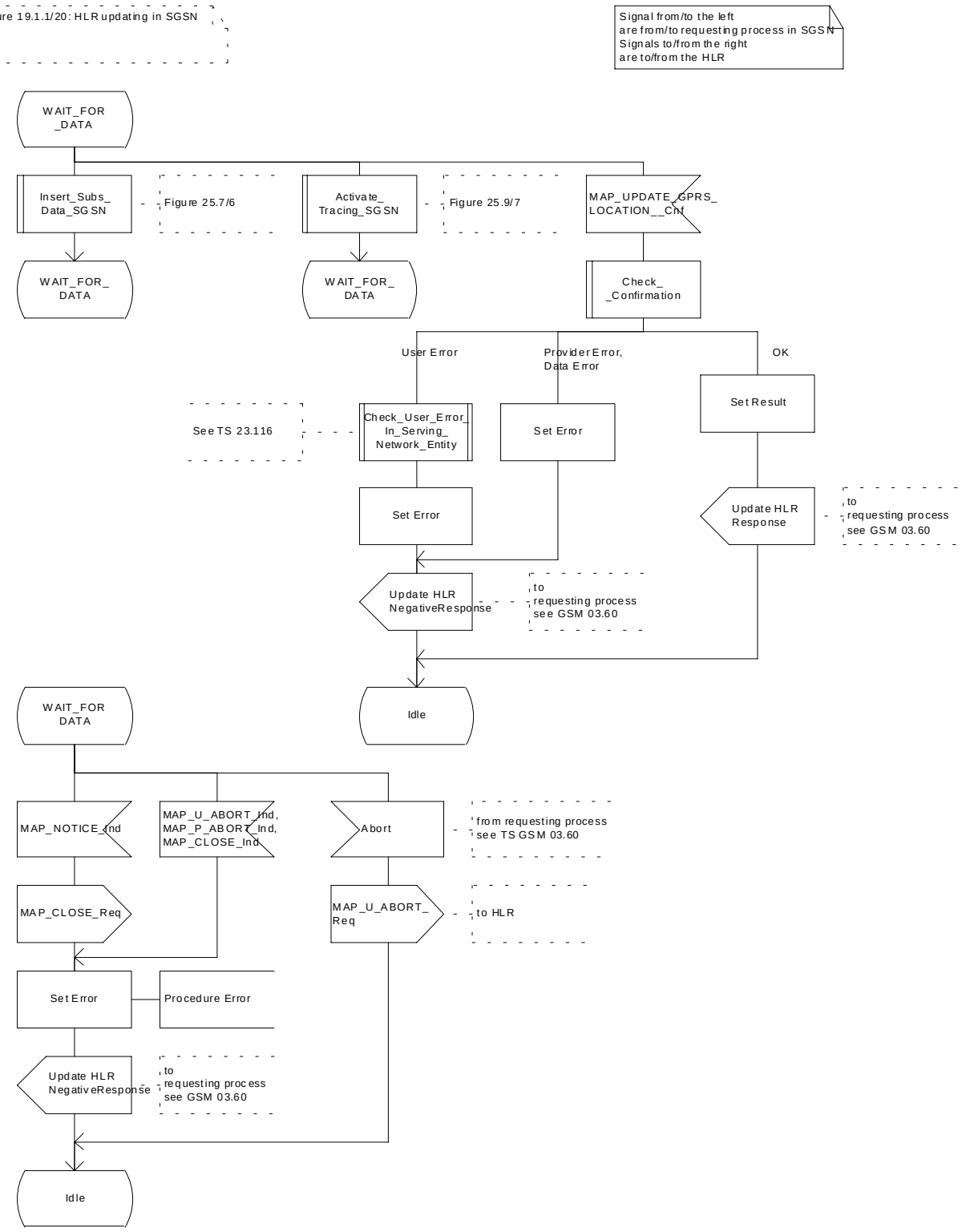


Figure 19.1.1/20 (sheet 1 of 2): Process SGSN_Update_HLR

Figure 19.1.1/20: HLR updating in SGSN



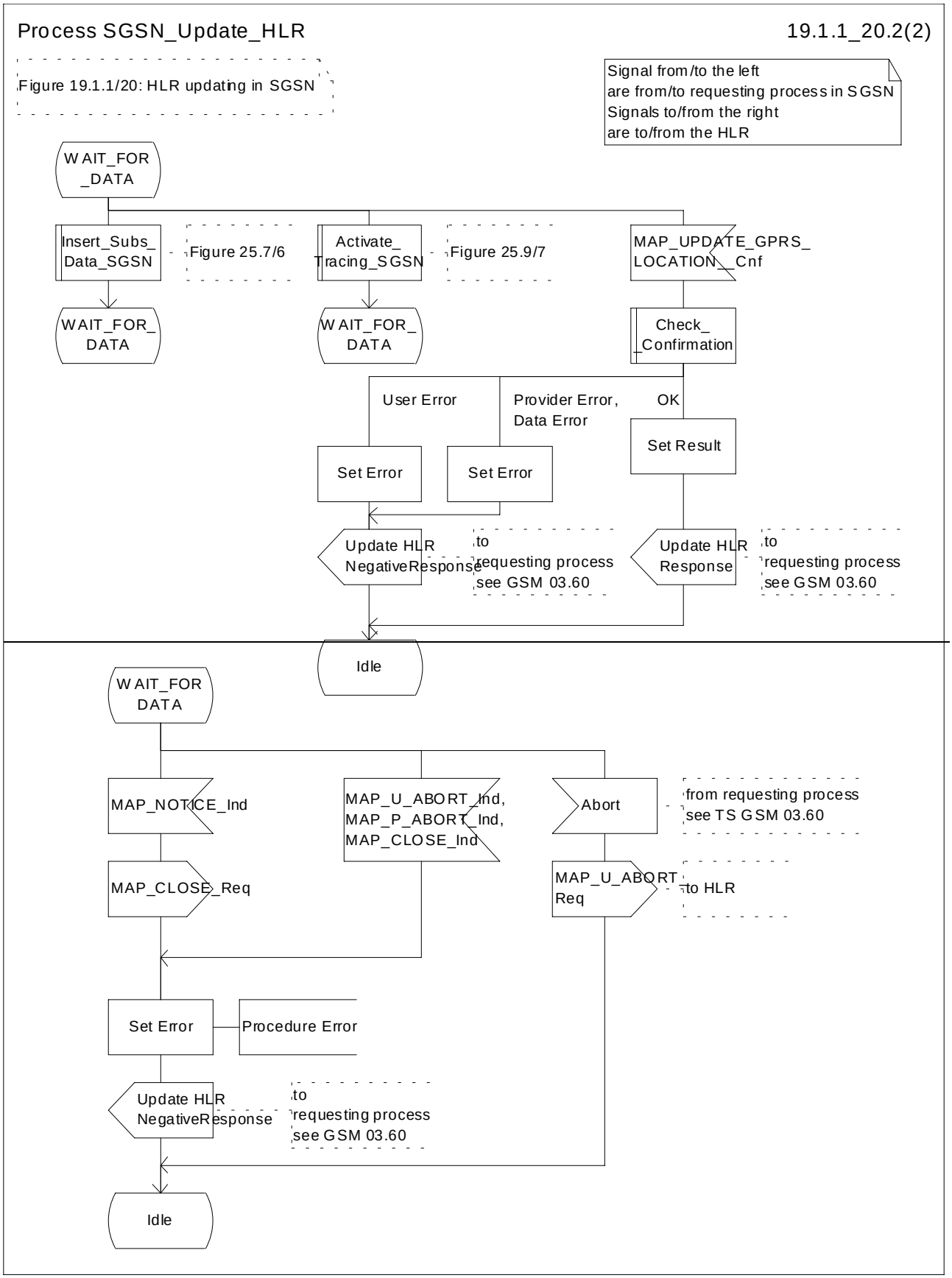


Figure 19.1.1/20 (sheet 2 of 2): Process SGSN_Update_HLR

19.1.4.4 Detailed procedure in the SGSN

Figure 19.1.4/4 shows the MAP process in the SGSN to notify the HLR that an MS record has been purged. The following general macro is used:

Receive_Open_Cnf subclause 25.1;

Sheet 1: The procedure Purge_MS_In_Serving_Network_Entity is specific to Super-Charger; it is specified in TS 23.116 [xxx]. If the SGSN and the originating HLR support the Super-Charger functionality, processing continues from the "Yes" exit of the test "Result=Pass?".

When the SGSN receives an indication from O&M that an MS record is to be purged, it invokes the MAP_PURGE_MS service. ~~(see figure 19.1.4/4).~~

The SGSN opens the dialogue to the HLR with a MAP_OPEN request containing no user specific parameters. The MAP_PURGE_MS request contains the IMSI of the MS which is to be purged and the SGSN number.

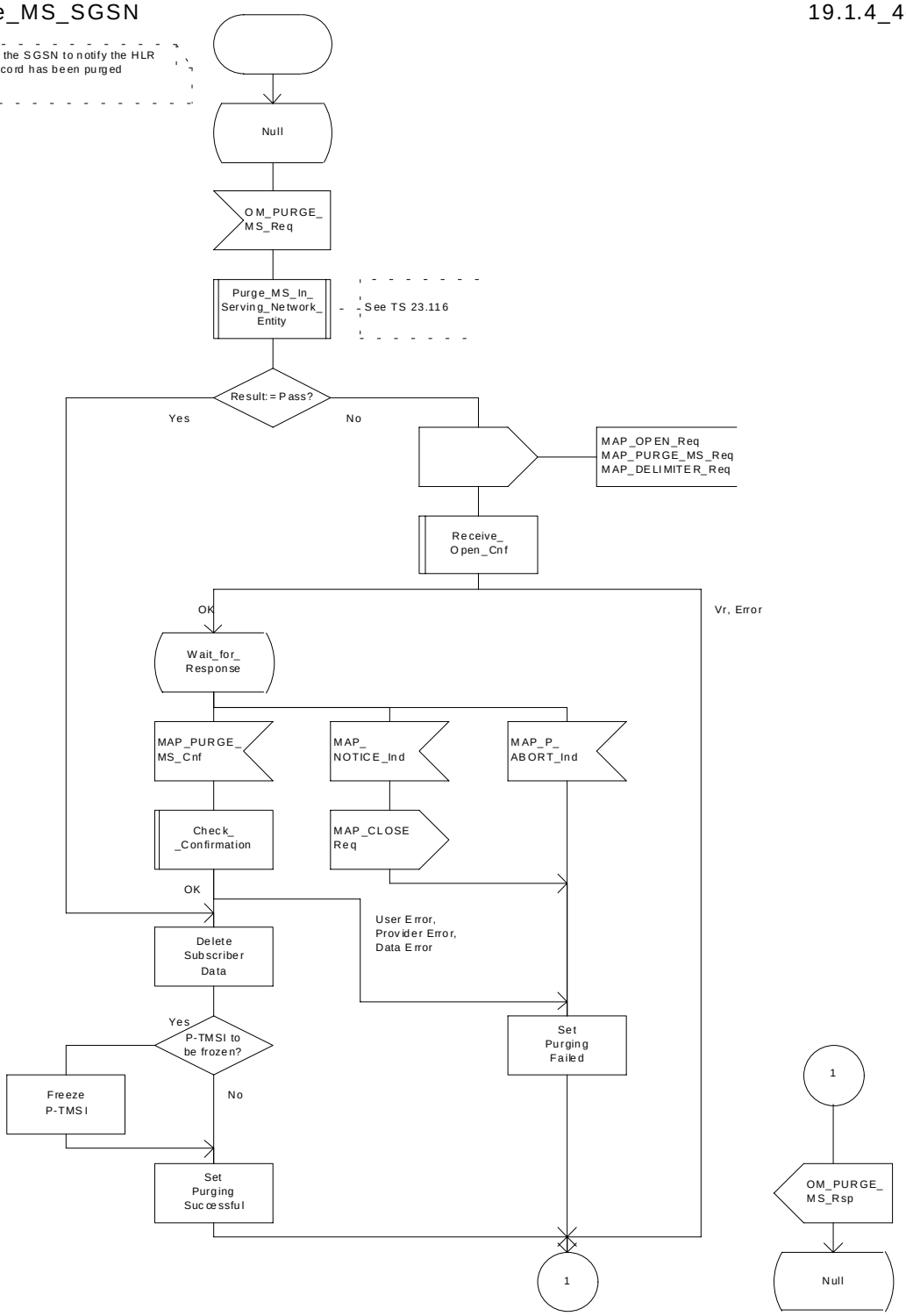
The SGSN then waits for the MAP_OPEN confirmation ~~(see macro Receive_Open_Cnf, subclause 25.1),~~ indicating one of:

- rejection of the dialogue (process terminates);
- reversion to Vr (process terminates);
- dialogue acceptance.

If the HLR accepts the dialogue it returns a MAP_PURGE_MS confirmation, containing no parameter, indicating successful outcome of the procedure.

If a MAP_PURGE_MS confirmation containing a provider error, data error or user error, or a MAP_P_ABORT, MAP_NOTICE or premature MAP_CLOSE indication, has been received, the failure is reported to the O&M interface. Successful outcome of the procedure leads to deletion of the subscriber data and freezing of the P-TMSI if so requested by the HLR, and is reported to the O&M interface.

Figure 19.1.4/4: Process in the SGSN to notify the HLR that an MS record has been purged



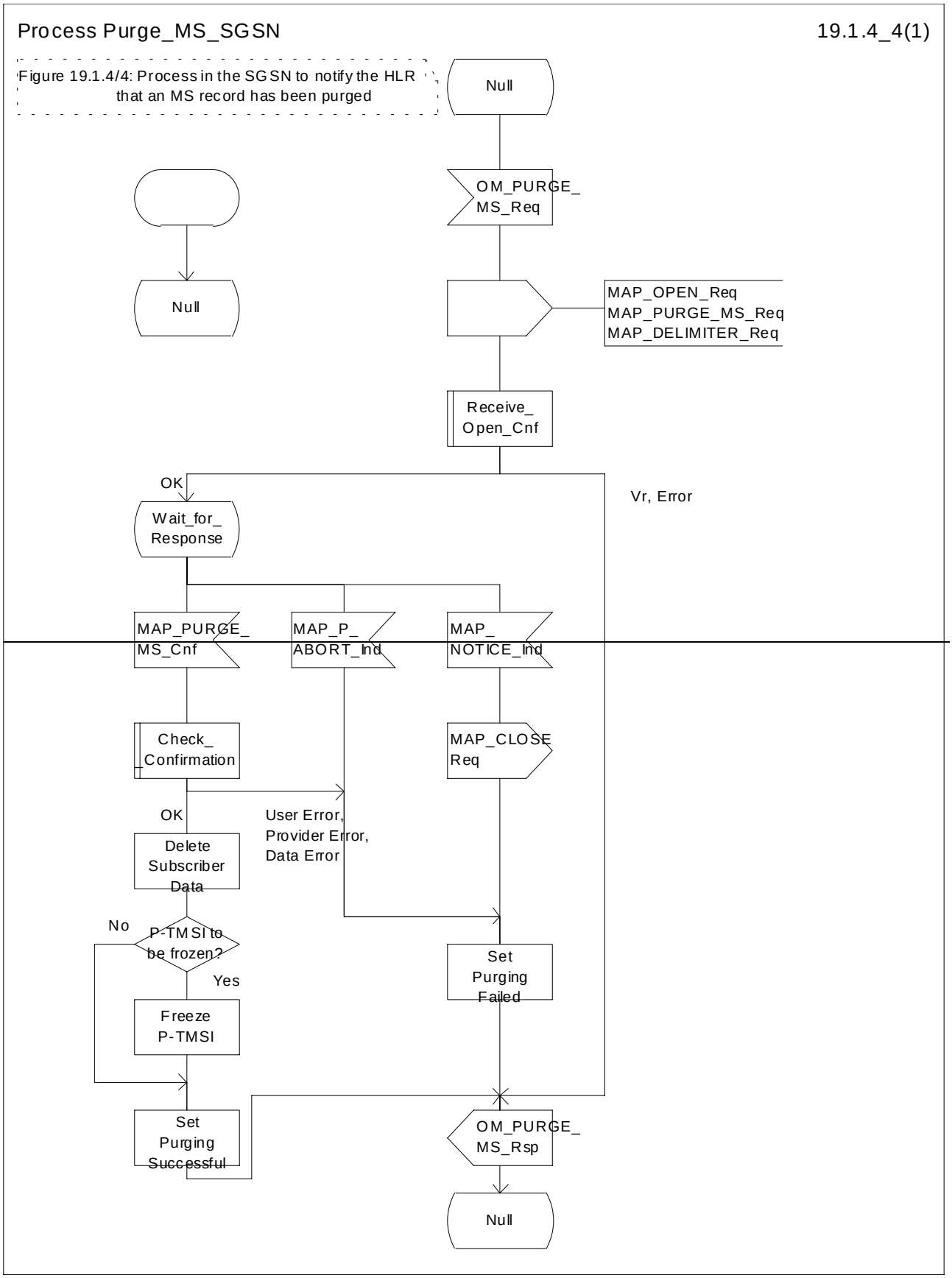


Figure 19.1.4/4: Process Purge_MS_SGSN