Source: TSG CN WG4

Title: Small technical Enhancements and Improvements on SMS Rel-6.

Agenda item: 9.10

Document for: APPROVAL

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
23.011	003	3	N4-030235	Rel-6	Introduction of Call Barring for SMS in PS domain	C	5.0.0
23.016	030	1	N4-030161	Rel-6	Introduction of Call Barring for SMS in PS domain	C	5.2.0
23.088	003	1	N4-030162	Rel-6	Introducing SMS Call Barring in PS domain	C	5.0.0
24.088	001	2	N4-030236	Rel-6	Introducing SMS Call Barring in PS domain	C	5.0.0
29.002	509	2	N4-030234	Rel-6	Introduction of Call Barring for SMS in PS domain	C	6.0.0

CR-Form-v7

CHANGE REQUEST

| ⌘ | **23.011** CR **003** | ⌘**rev** **3** ⌘ | Current version: | **5.0.0** | ⌘ |

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

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

Title:	⌘	Introduction of Call Barring for SMS in PS domain
Source:	⌘	CN4
Work item code: ⌘	TEI6	***Date:*** ⌘ 10/02/2003
Category:	⌘ **C**	***Release:*** ⌘ Rel-6

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

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

Reason for change:	⌘	SMS is used in both CS domain and PS domain in the current stage2 and stage 3 specifications. However, Call Barring for SMS is applied only in CS domain in the current specificaion. From user's point of view, this is not desireble because a short message can be sent or received via PS domain even if the user activate Call Barring for SMS. Therefore, Call Barring for SMS should be introduced to PS domain.
Summary of change: ⌘		Handling of SS Status and invocation of supplementary service (i.e. Call Barring for MO-SMS) at SGSN are defined.
Consequences if ⌘ ***not approved:***		

Clauses affected:	⌘	1, 2.1, 2.1.1, 2.1.2.1, 2.1.3, 2.1.3.1, 2.3, 3.1, 4 and 5

		Y	N		
Other specs	⌘	**X**		Other core specifications ⌘	23.016-030, 23.088-003, 24.088-001, 29.002-509
affected:			**X**	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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

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

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

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

1 Scope

The present document describes the general aspects on how supplementary services in the ~~GSM~~ 3GPP system are realised from a technical point of view.

Description of technical realisation for specific supplementary services can be found in ~~GSM~~ 3GPP TS ~~03~~23.072, 23.08x and ~~03~~23.09x-series technical specifications.

All supplementary services may require signalling on the radio path. Signalling procedures and messages used are defined in the 3GPP TS 24.072, 24.08x and 24.09x-series of technical specifications.

For some supplementary services information needs to be transferred between the Home Location Register (HLR), the Visitor Location Register (VLR)~~,~~ ~~and~~ the Mobile services Switching Centre (MSC) and the Serving GPRS Support Node (SGSN). Signalling procedures for such information transfer are defined in 3GPP TS 29.002.

Definitions and descriptions of supplementary services are given in the 3GPP TS 22.072, 22.08x and 22.09x-series of technical specifications.

Definitions are given in 3GPP TS 22.004.

NOTE: The technical specifications on the technical realisation of supplementary services do not distinguish between subscriber, user and customer, since all three do not fully cover the textual needs. Generally the term "subscriber" is used, even if this person is not having the subscription.

<<Next Modified Section>>

2 Activation, deactivation, registration, erasure, interrogation and invocation

2.1 General

Activation, deactivation, registration, erasure, interrogation and invocation are defined independently from a particular supplementary service. Whether they are applicable to a particular supplementary service or not is defined in the corresponding 3GPP TS 23.08x and 23.09x-series. Activation, deactivation, registration, erasure and invocation are applicable for CS domain. For PS domain only invocation of call barring of SMS is applicable.

The invocation of a supplementary service is executed as described in the corresponding stage 2 description and always includes an MSC and a location register for CS domain and an SGSN for PS domain.~~.~~

When an MSC receives a request for either activation/deactivation or registration/erasure or an interrogation, it invokes one of the following procedures.

The MSC then can:

- contact only the current VLR (e.g. interrogation of a call forwarding conditional supplementary service);

- contact only the HLR (e.g. interrogation of the supplementary service call forwarding unconditional);

- contact the HLR, after which the HLR updates the VLR (e.g. registration of a forwarding number for a conditional call forwarding supplementary service).

Which of the above listed procedures is applied for a call independent supplementary service operation is described in the corresponding 3GPP TS 23.08x and 23.09x -series.

Successful activation, deactivation, registration and erasure change the service state at the HLR. These transitions (if applicable to a particular service) are defined in the 3GPP TS 23.08x and 23.09x -series. Note that the HLR may also change the service state due to "HLR Induction" (see subclause 2.1.1).

In connection with supplementary service operations the served subscriber or remote subscribers may get notifications from the network.

~~When~~ If an SGSN receives a request for registration, erasure, activation, deactivation, interrogation or change of password ~~either activation/deactivation or registration/erasure or an interrogation~~, it shall return~~s~~ an error to the MS.

2.1.1 Definition of "state vectors"

In order to provide a tool to define service states the concept of a "state vector" is introduced. The state vector is used to represent the state of the service in terms of four variables:

1) Provisioning State,

   possible values are "Provisioned" or "Not Provisioned";

2) Registration State,

   possible values are "Registered", "Erased", or "Not Applicable";

3) Activation State,

   possible values are "Not Active", "Active and Operative" or "Active and Quiescent";

4) HLR Induction State,

   possible values are "Induced" or "Not Induced".

The state vector represents the state of the service by using all four variables together. The state vector is represented using the notation:

(Provisioning State, Registration State, Activation State, HLR Induction State)

e.g.: (Provisioned, Registered, Not Active, Not Induced).

Note that the state vector is a logical (not a physical) representation of the service state. Note also that though some parts of the state vector are similar to elements of SS-Status the mapping between the state vector and SS-Status is not one to one. The use of state vectors is not intended to specify any particular implementation internally in a node. There is a relationship specified between the state vector and parts of the transfer syntax. This relationship is not a direct one-to-one mapping.

The following text specifies the semantics of each variable in the state vector.

The three variables "Provisioning State", "Registration State" and "Activation State" are used to represent the state of the service according to the normal behaviour based on service provider and user actions.

The "HLR Induction State" records whether or not the HLR has temporarily induced the service (e.g. if the VLR does not support CUG, the HLR may induce an outgoing barring service). The Provisioning State, Registration State and Activation State are not affected by HLR induction of a service.

Provisioning State

- has value "provisioned", if the subscriber has a subscription to the service;

- has value "Not Provisioned" otherwise.

Registration State

- has value "Not Applicable", if registration is not applicable to the service;

- has value "Registered", if registration is applicable, and there is registration data available;

- has value "Erased" otherwise.

Activation State

- has value "Active and Operative", if the service is in a state where it can be invoked (and this is not due to HLR induction);

- has value "Active and Quiescent", if the service is in a state where it cannot be invoked, but where it will automatically move to the "Active and Operative" state when conflicting conditions are removed;

- has value "Not Active" otherwise.

HLR Induction State

- has the value "Induced" if the HLR has induced the service (e.g. if the VLR does not support CUG, the HLR may induce an outgoing barring service);

- has the value "Not Induced" otherwise.

    For further information about how HLR induction applies to particular services refer to the ~~GSM~~ 3GPP TS ~~03~~23.~~0~~8x and ~~03~~23.~~0~~9x-series.

2.1.2 Handling of service states at the HLR

Valid states (represented by state vectors) are defined on a service-by-service basis in the 3GPP TS 23.08x and 23.09x -series. For each service the set of valid states represents the logical states that can exist in the HLR. The HLR contains the master copy of service state information.

2.1.2.1 Encoding of SS-Status

To send service state information to the VLR, the SGSN or the MS, the HLR often uses the SS-Status parameter. This parameter contains four bits (referred to here as the "P bit", "R bit", "A bit" and "Q bit"). In a phase 2 context the HLR shall encode the SS-Status using the mapping defined in this subclause from the service states to SS-Status.

    If the HLR Induction State is "Not Induced" then:

- If the Provisioning State is "Provisioned", then the P bit shall be 1, otherwise the P bit shall be 0.

- If the Registration State is "Registered", the R bit shall be 1. If the Registration State is "Not Registered" the R bit shall be 0. If the Registration State is "Not Applicable" the R bit shall be either 0 or 1.

- If the Activation State is "Active and Operative" the A bit shall be 1 and the Q bit shall be 0. If the Activation State is "Active and Quiescent" the A bit shall be 1 and the Q bit shall be 1. If the Activation State is "Not Active" the A bit shall be 0 and the Q bit shall be either 0 or 1.

If the HLR Induction State is "Induced" then the P bit shall be 1, the R bit shall be 0 or 1, the A bit shall be 1 and the Q bit shall be 0.

Table 2.1: Encoding of the P, R, A and Q bits in the SS-Status parameter

HLR Induction State "Not Induced"	P bit	R bit	A bit	Q bit
Provisioning State "Provisioned" "Not Provisioned"	1 0			

Registration State   "Registered"
       "Not Registered"
       "Not Applicable"
		1
		 0
		 0/1		

Activation State   "Active and Operative"
       "Active and Quiescent"
       "Not Active"
			1
			 1
			 0
				0
				 1
				 0/1

	P bit	R bit	A bit	Q bit
HLR Induction State "Induced"	1	0/1	1	0

2.1.2.2   Invocation of services at the HLR

If the service can be invoked at the HLR (e.g. to bar an incoming call) then invocation is possible only if the Activation State is "Active and Operative". Note that the concept of HLR induction does not apply to services invoked at the HLR as the HLR can invoke the effect of these services without needing to induce them first.

2.1.3   Handling of SS-Status at the VLR or the SGSN

The VLR shall store sufficient information to support VLR based invocation, interrogation and notifications from the VLR to the MS. The SGSN shall store sufficient information to support SGSN based invocation.

The VLR or the SGSN shall not check the internal consistency of SS-Status values received from the HLR (i.e. it shall not impose any rules relating values of some bits in SS-Status to other bits). The VLR or the SGSN shall not check that the SS-Status received from the HLR is valid according to the VLR's or SGSN's definition of the relevant service.

2.1.3.1   Invocation of services at the VLR or the SGSN

The ability to invoke the service at the VLR (e.g. to forward a call, or create an MPTY call) is based on the A and Q bits of SS-Status. The service can only be invoked if A=1 and Q=0. Other bits in SS-Status are not relevant to invocation at the VLR.

The ability to invoke the service at the SGSN (i.e. to bar a MO SMS submission) is based on the A bit of SS-Status. The service can only be invoked if A=1. Other bits in SS-Status are not relevant to invocation at the SGSN.

<<Next modified Section>>

3   Password handling

3.1   General

Some supplementary services can be subscribed with the option "control of supplementary service by subscriber using password" as described in the corresponding 3GPP TS 23.08x and 23.09x -series of technical specifications. It This option is applicable only for the CS domain. These services are referenced in the following as protected supplementary services.

<<Next modified section>>

5   Format of description

The supplementary services are described according to the following format:

subclause x.1   Functions and information flows;

subclause x.2   Information stored in HLR;

subclause x.3   Information stored in VLR and SGSN;

subclause x.4   Handover.

CR-Form-v7

CHANGE REQUEST

⌘   **23.016** CR **030**   ⌘ **rev** **1** ⌘   Current version: **5.2.0** ⌘

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

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

Title: ⌘	Introduction of Call Barring for SMS in PS domain	
Source: ⌘	CN4	
Work item code: ⌘	TEI6	***Date:*** ⌘ 10/02/2003
Category: ⌘	**C**	***Release:*** ⌘ Rel-6

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

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

Reason for change: ⌘	SMS is used in both CS domain and PS domain in the current stage2 and stage 3 specifications. However, Call Barring for SMS is applied only in CS domain in the current specificaion. From user's point of view, this is not desireble because a short message can be sent or received via PS domain even if the user activate Call Barring for SMS. Therefore, Call Barring for SMS should be introduced to PS domain.
Summary of change: ⌘	Addition of Call Barring Info to GPRS Subscriber Data.
Consequences if not approved: ⌘	There would be insufficient support for SMS Call Barring in PS domain.

Clauses affected: ⌘	4.5.4

	Y	**N**	
Other specs ⌘	**X**		Other core specifications ⌘ TS23.011 CR003
			TS23.088 CR003
			TS24.088 CR001
			TS29.002 CR509
affected:		**X**	Test specifications
		X	O&M Specifications
Other comments: ⌘			

How to create CRs using this form:
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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.

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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.
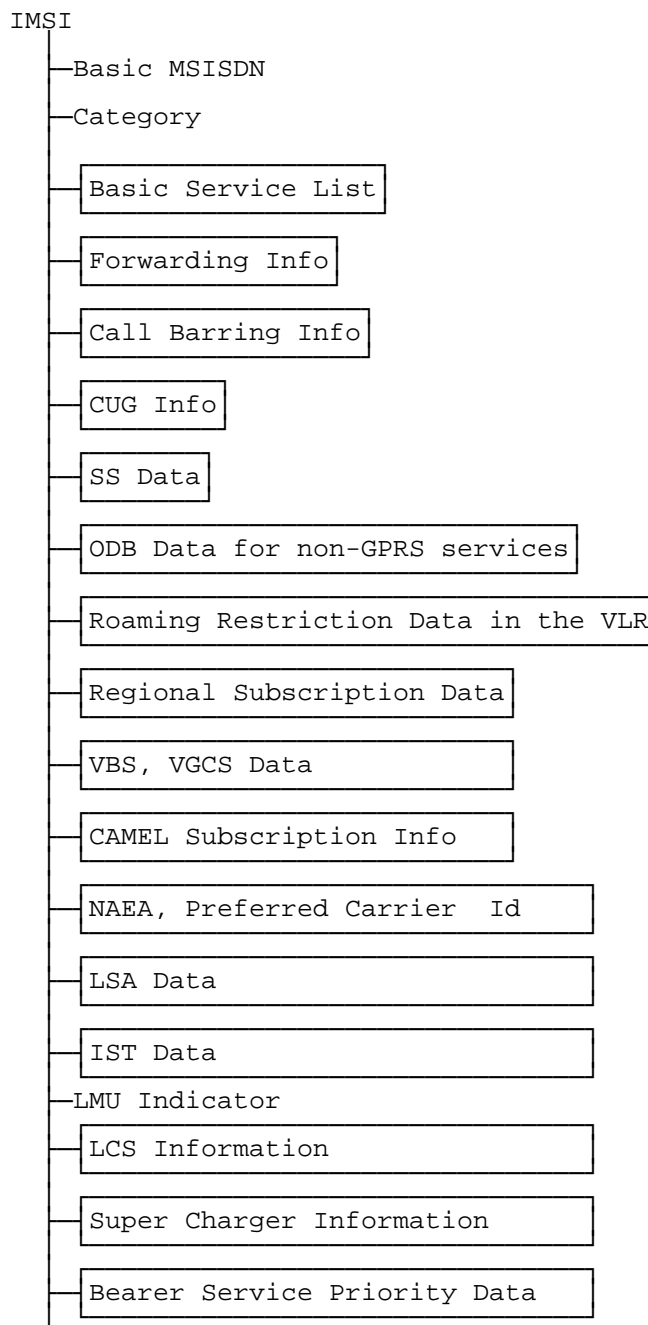
```
IMSI
 ├─Basic MSISDN
 ├─Category
 │  ┌──────────────────────────────────┐
 │  │ Basic Service List               │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ Forwarding Info                  │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ Call Barring Info                │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ CUG Info                         │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ SS Data                          │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ ODB Data for non-GPRS services   │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ Roaming Restriction Data in the VLR │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ Regional Subscription Data       │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ VBS, VGCS Data                   │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ CAMEL Subscription Info          │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ NAEA, Preferred Carrier  Id      │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ LSA Data                         │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ IST Data                         │
 │  └──────────────────────────────────┘
 ├─LMU Indicator
 │  ┌──────────────────────────────────┐
 │  │ LCS Information                  │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ Super Charger Information         │
 │  └──────────────────────────────────┘
 │  ┌──────────────────────────────────┐
 │  │ Bearer Service Priority Data     │
 │  └──────────────────────────────────┘
```

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

```
IMSI
 ├─Access Mode
 ├─Basic MSISDN
 │  ┌─────────────────────────┐
 ├──│ Basic Service List      │
 │  └─────────────────────────┘
 │  ┌─────────────────────────┐
 ├──│ Call Barring Info       │
 │  └─────────────────────────┘
 │  ┌─────────────────────────────┐
 ├──│ ODB Data for GPRS services  │
 │  └─────────────────────────────┘
 │  ┌───────────────────────────────────────┐
 ├──│ Roaming Restriction Data in the SGSN   │
 │  └───────────────────────────────────────┘
 │  ┌─────────────────────────────┐
 ├──│ Regional Subscription Data  │
 │  └─────────────────────────────┘
 │  ┌─────────────────────────────┐
 ├──│ GPRS subscription Data      │
 │  └─────────────────────────────┘
 │  ┌───────────────────────────────────────┐
 ├──│ SGSN CAMEL subscription information    │
 │  └───────────────────────────────────────┘
 │  ┌─────────────────────────────┐
 ├──│ LSA Data                    │
 │  └─────────────────────────────┘
 │  ┌─────────────────────────────┐
 ├──│ Super-Charger Information    │
 │  └─────────────────────────────┘
 │  ┌─────────────────────────────┐
 ├──│ Charging Information         │
 │  └─────────────────────────────┘
 │  ┌─────────────────────────────┐
 └──│ LCS Information              │
    └─────────────────────────────┘
```
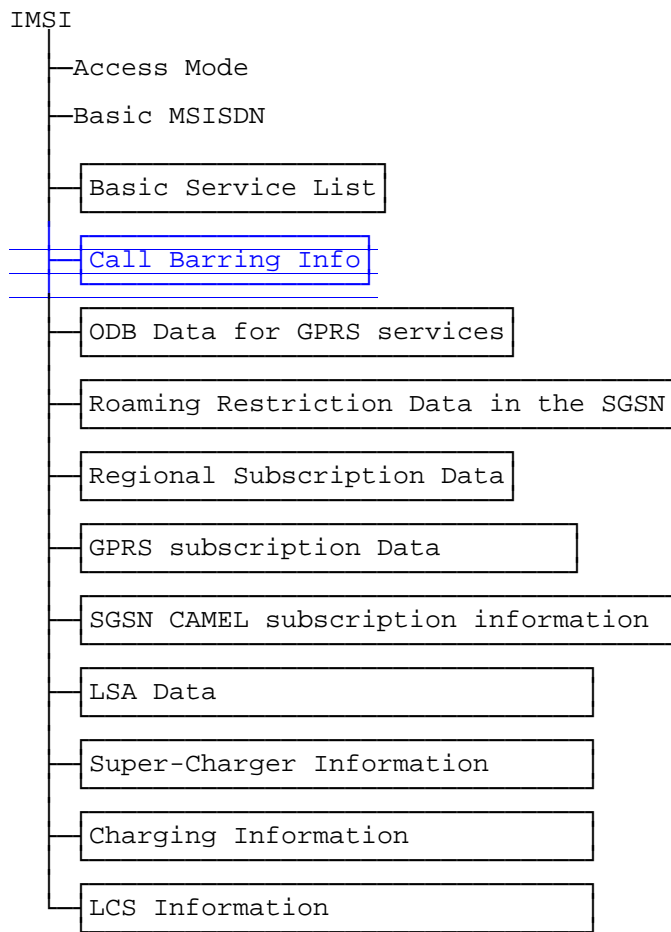
Figure 2: Abstract data structure of GPRS Subscriber Data (Data sent to the SGSN)

CR-Form-v7

CHANGE REQUEST

| ⌘ | **23.088** CR **003** | ⌘**rev** **1** ⌘ | Current version: | **5.0.0** | ⌘ |

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

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

Title:	⌘	Introducing SMS Call Barring in PS domain
Source:	⌘	CN4

Work item code: ⌘	TEI6	**Date:** ⌘	10/02/2003

Category:	⌘	**C**	**Release:** ⌘	Rel-6

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

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

Reason for change:	⌘	SMS is used in both CS domain and PS domain in the current stage2 and stage 3 specifications. However, Call Barring for SMS is applied only in CS domain in the current specificaion. From user's point of view, this is not desireble because a short message can be sent or received via PS domain even if the user activate Call Barring for SMS. Therefore, Call Barring for SMS should be introduced to PS domain.
Summary of change: ⌘		Invocation of Call Barring for SMS at SGSN is defined. It is defined that the user control defined in this TS is not applicable for PS domain. It is clarified that the Service Centre Address is used to determine whether SMS transfer is international or not in case of MT SMS. It is defined that the HLR may pass ODB data to VLR/SGSN when the serving node does not support call barring.
Consequences if not approved:	⌘	

Clauses affected:	⌘	6.1, 6.1.2.3, 6.2, 6.5, 6.6, 6.9, 7.1, 7.1.2.3, 7.2 and 7.5

		Y	N			
Other specs	⌘	X		Other core specifications	⌘	23.011-CR 23.016-CR030 24.088-CR 29.002-CR509
affected:				Test specifications		
				O&M Specifications		

Other comments: ⌘

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

<<First modified Section>>

6 Barring of outgoing calls

6.1 Handling of barring of outgoing calls

The user control defined in this section is not applicable in PS domain.

<<Next Modified Section>>

6.1.2.3 Interactions with call forwarding supplementary services

This section is not applicable for SMS.

For interactions with call forwarding supplementary services see 3G TS 22.082.

<<Next Modified Section>>

6.2 Functions and information flows

The following Mobile Additional Functions have been identified:

MAF017

Barring of all outgoing calls related authorizations examination.

The ability of a PLMN component to determine the authorizations relating to barring of all outgoing calls. See figure 6.7.

Location: VLR/ SGSN

MAF018

Barring of outgoing international calls related authorizations examination.

The ability of a PLMN component to determine the authorizations relating to barring of outgoing international calls. See figure 6.8. In case of SMS, the Service Centre Address is used to determine whether SMS transfer is international or not.
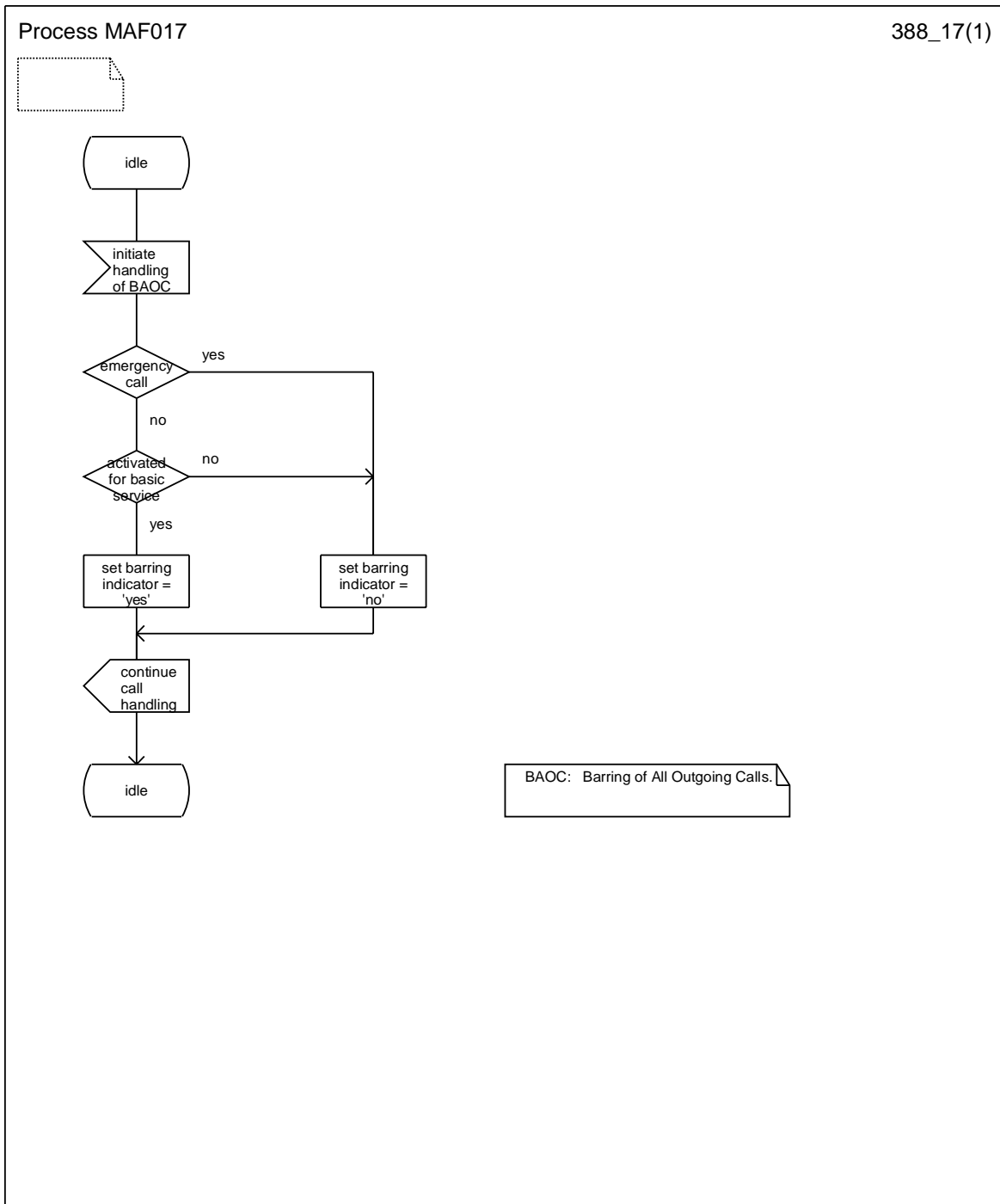
Location: VLR/SGSN

MAF020

Barring of outgoing international calls except those directed to the home PLMN country related authorizations examination.

The ability of a PLMN component to determine the authorizations relating to barring of outgoing international calls except those directed to the home PLMN country. See figure 6.9. In case of SMS, the Service Centre Address is used to determine whether the destination is in HPLMN or not.
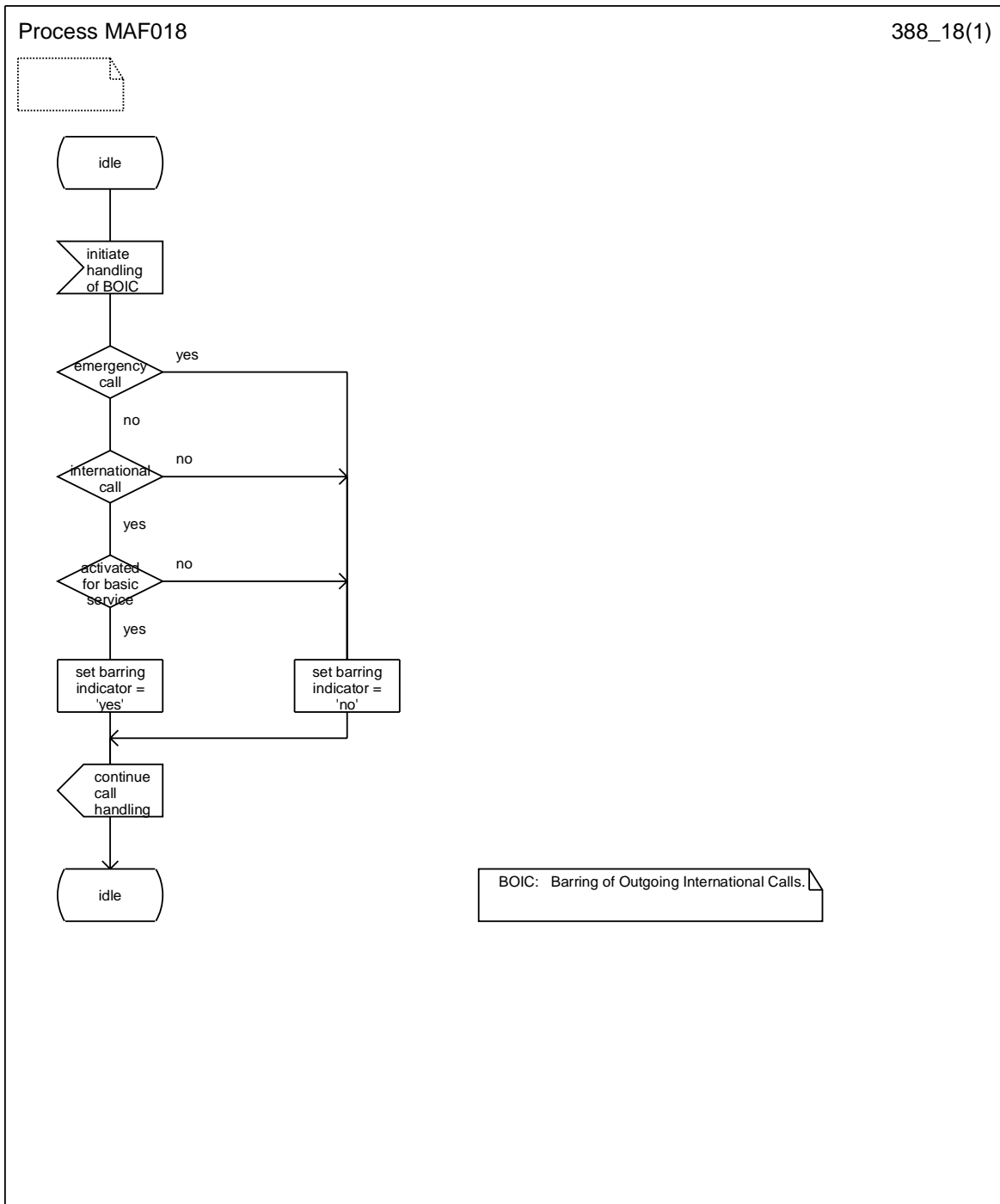
Location: VLR/SGSN

The information flow for barring of outgoing circuit switched calls in CS domain is shown in figure 6.10. The information flow for barring of MO SMS is shown in figure 6.xx.

Process MAF017 388_17(1)

```
         idle

    initiate
    handling
    of BAOC

                      yes
    emergency
      call

        no

    activated          no
    for basic
     service

       yes

  set barring      set barring
  indicator =      indicator =
    'yes'             'no'

    continue
      call
    handling

         idle                    BAOC:  Barring of All Outgoing Calls.
```

NOTE: Emergency call check is applied only at VLR.

Figure 6.7: MAF017 Barring of all outgoing calls related authorisations examination (VLR/SGSN)

Process MAF018 388_18(1)

idle

initiate
handling
of BOIC

emergency
call — yes

no

international
call — no

yes

activated
for basic
service — no

yes

set barring
indicator =
'yes'

set barring
indicator =
'no'

continue
call
handling

idle

BOIC: Barring of Outgoing International Calls.

NOTE: Emergency call check is applied only at VLR.

Figure 6.8: MAF018 Barring of all outgoing international calls related authorisations examination (VLR/SGSN)

Process MAF020 388_19(1)
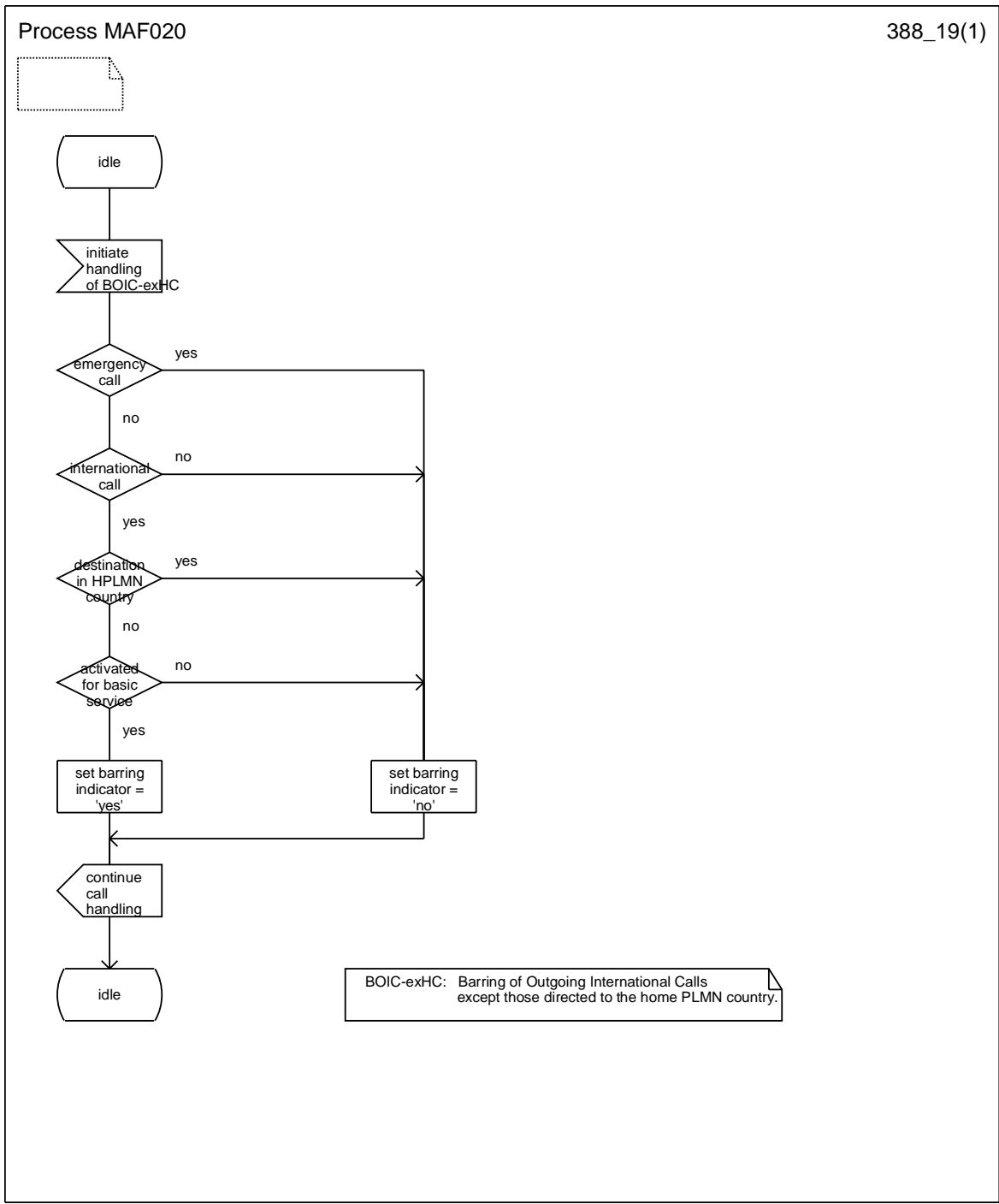
NOTE: Emergency call check is applied only at VLR.

Figure 6.9: MAF020 Barring of outgoing international calls except those directed to the home PLMN country related authorisations examination (VLR/SGSN)
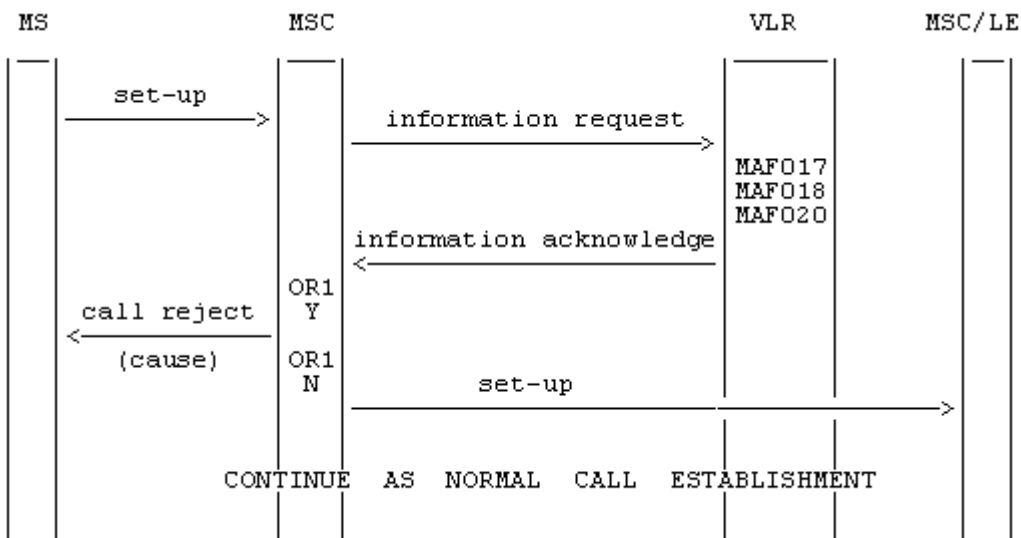
```
    MS              MSC                    VLR        MSC/LE

      set-up
    ─────────────>
                         information request
                    ──────────────────────────>
                                              MAF017
                                              MAF018
                                              MAF020
                         information acknowledge
                    <──────────────────────────
                OR1
     call reject  Y
    <──────────
     (cause)    OR1
                N              set-up
                    ──────────────────────────────────────>

            CONTINUE  AS  NORMAL  CALL  ESTABLISHMENT
```

Figure 6.10: Information flow for barring of outgoing <u>circuit switched </u>calls

NOTE: OR1: call barred Y: yes
N: no

```
    MS            SGSN or MSC/VLR                    IW-MSC

       Message Transfer
    ──────────────────>
                         MAF017
                         MAF018
                         MAF020

                          OR1
                           Y
       Failure Report
    <──────────────────
                          OR1
                           N         Forward Short Message
                              ──────────────────────────────>
```
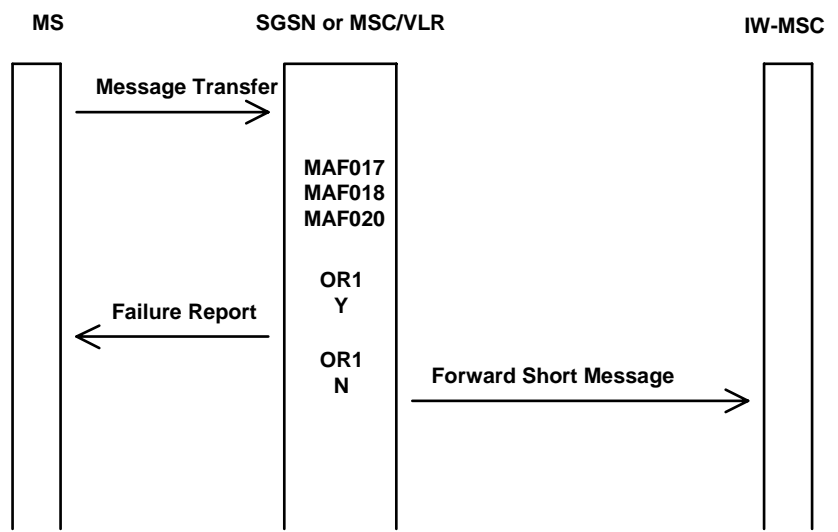
<u>Figure 6.xx: Information flow for barring of MO SMS</u>

<u>NOTE: OR1: call barred Y: yes</u>
<u>N: no</u>

<<Next Modified Section>>

6.5 Transfer of information from HLR to VLR/SGSN

If the provisioning state for the outgoing calls barring program is "Provisioned" then when the subscriber registers on a VLR/SGSN the HLR shall send that VLR/SGSN information about the logical state of the program for all relevant elementary basic service groups. Only SMS is relevant for SGSN.

If the HLR induction state for the outgoing calls barring program is "Induced" then when the subscriber registers on a VLR/SGSN the HLR shall send that VLR/SGSN information about the logical state of the program for all relevant elementary basic service groups.

If the logical state of the outgoing calls barring program is changed while a subscriber is registered on a VLR/SGSN then for the affected basic service groups, the HLR shall inform the VLR/SGSN of the new logical state of the program.

The affected basic service group for SGSN is only SMS.

6.6 Information stored in the VLR/SGSN

For each barring of outgoing calls program the VLR/SGSN shall store the service state information received from the HLR.

6.7 Handover

Handover will have no impact on the control procedures and the operation of the service.

6.8 Cross Phase compatibility

6.8.1 MS, MSC, VLR or HLR only support Phase 1 control of SS by the subscriber

In response to a Barring of outgoing calls interrogation request, if the MS or any network element involved is of Phase 1, only information concerning basic service groups for which the activation state has the value "Active and Operative" will be returned.

6.8.2 HLR only support Phase 1 updating of subscriber information

If the VLR receives the SS-status parameter from a Phase 1 HLR it shall act as if it has received the SS-Status parameter with the values shown in the following:

1) Activated　　=> P bit = 1, R bit = 0 or 1, A bit = 1, Q bit = 0;

2) Deactivated　=> P bit = 1, R bit = 0 or 1, A bit = 0, Q bit = 0 or 1.

6.9 Interworking with VLR or SGSN not supporting Call Barring

When the serving VLR/SGSN does not support call barring, the HLR/HSS may pass to the VLR/SGSN ODB data to bar outgoing circuit switched call or/and MO SMS.

7 Barring of incoming calls

7.1 Handling of barring of incoming calls

The user control defined in this section is not applicable in PS domain.

<<Next Modified Section>>

7.1.2.1 General

The procedure for activation of Barring of outgoing calls, described in subclause 16.1.2.1, is valid also for activation of Barring of incoming calls.

The information flow for activation of barring of incoming calls is shown in figure 7.3. For more details see 3G TS 23.011.

7.1.2.2 Interactions between barring of incoming call programs

In case the mobile subscriber activates barring of all incoming calls and barring of incoming calls when roaming outside the home PLMN country was already activated, barring of incoming calls when roaming outside the home PLMN country will be deactivated and barring of all incoming calls will be activated.

The SDL diagram in figure 7.1 shows the function to be performed in the HLR in order to deal with this interaction between call barring services.

7.1.2.3 Interactions with call forwarding supplementary services

This section is not applicable for SMS.

For interactions with call forwarding supplementary services see 3G TS 22.082.

<<Next Modified Section>>

7.2 Functions and information flows

The following Mobile Additional Functions have been identified:

MAF022

　　Barring of all incoming calls related authorizations examination
　　The ability of a PLMN component to determine the authorizations relating to barring of incoming calls. See figure 7.6.

　　Location: HLR

MAF023

　　Barring of incoming calls when roaming outside the home PLMN country related authorizations examination
　　The ability of a PLMN component to determine the authorizations relating to barring of incoming calls when roaming outside the home PLMN country. See figure 7.7.

　　Location: HLR

The information flow for barring of incoming circuit switched calls is shown in figure 7.8. The information flow for barring of MT SMS is shown in figure 7.x.

Process MAF022	388_26(1)

idle

initiate
handling
of BAIC

activated
for basic
service	no

yes

set barring
indicator =
'yes'

set barring
indicator =
'no'
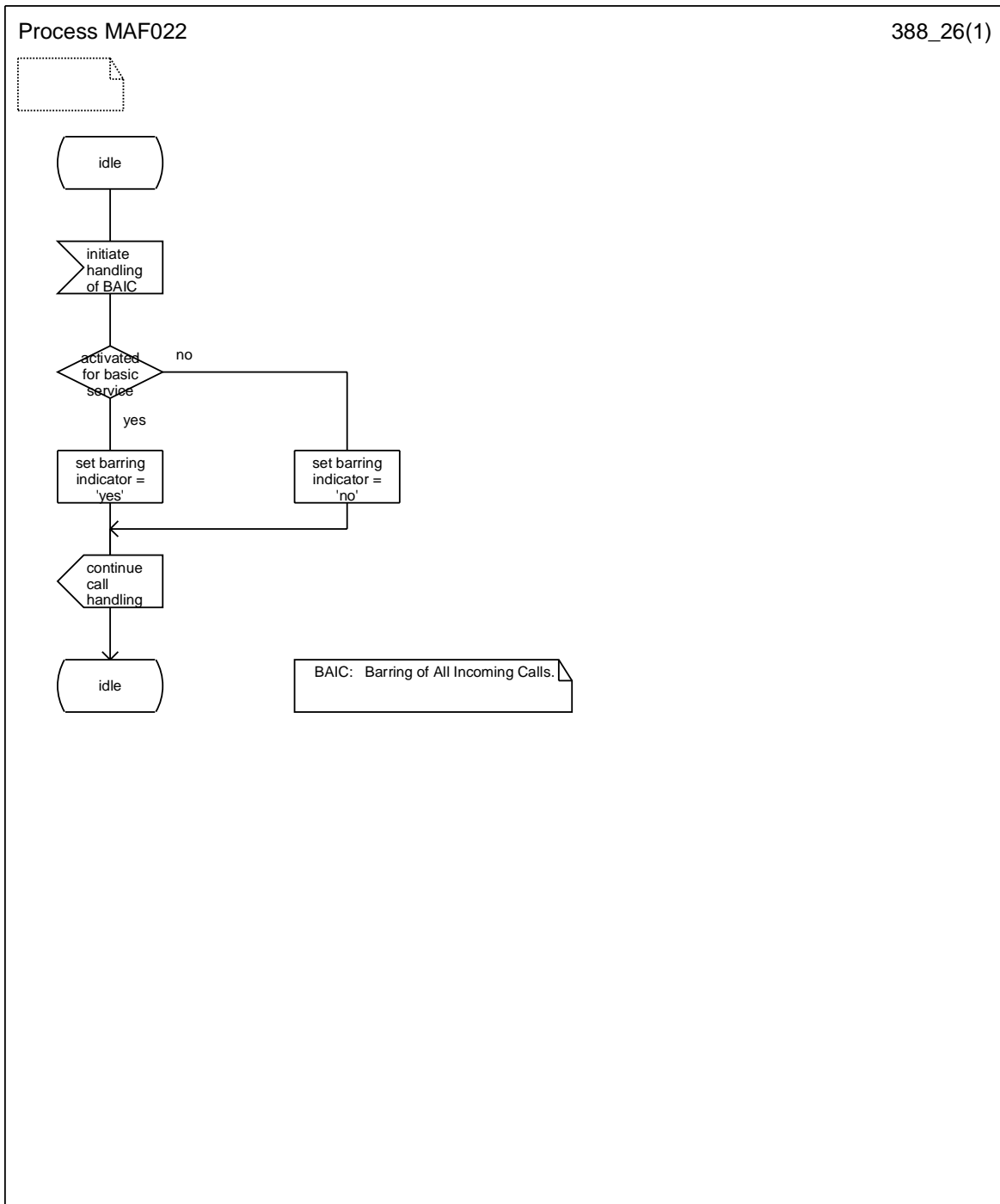
continue
call
handling

idle

BAIC: Barring of All Incoming Calls.

Figure 7.6: MAF022 Barring of all incoming circuit switched calls and MT SMS related authorisations examination (HLR)

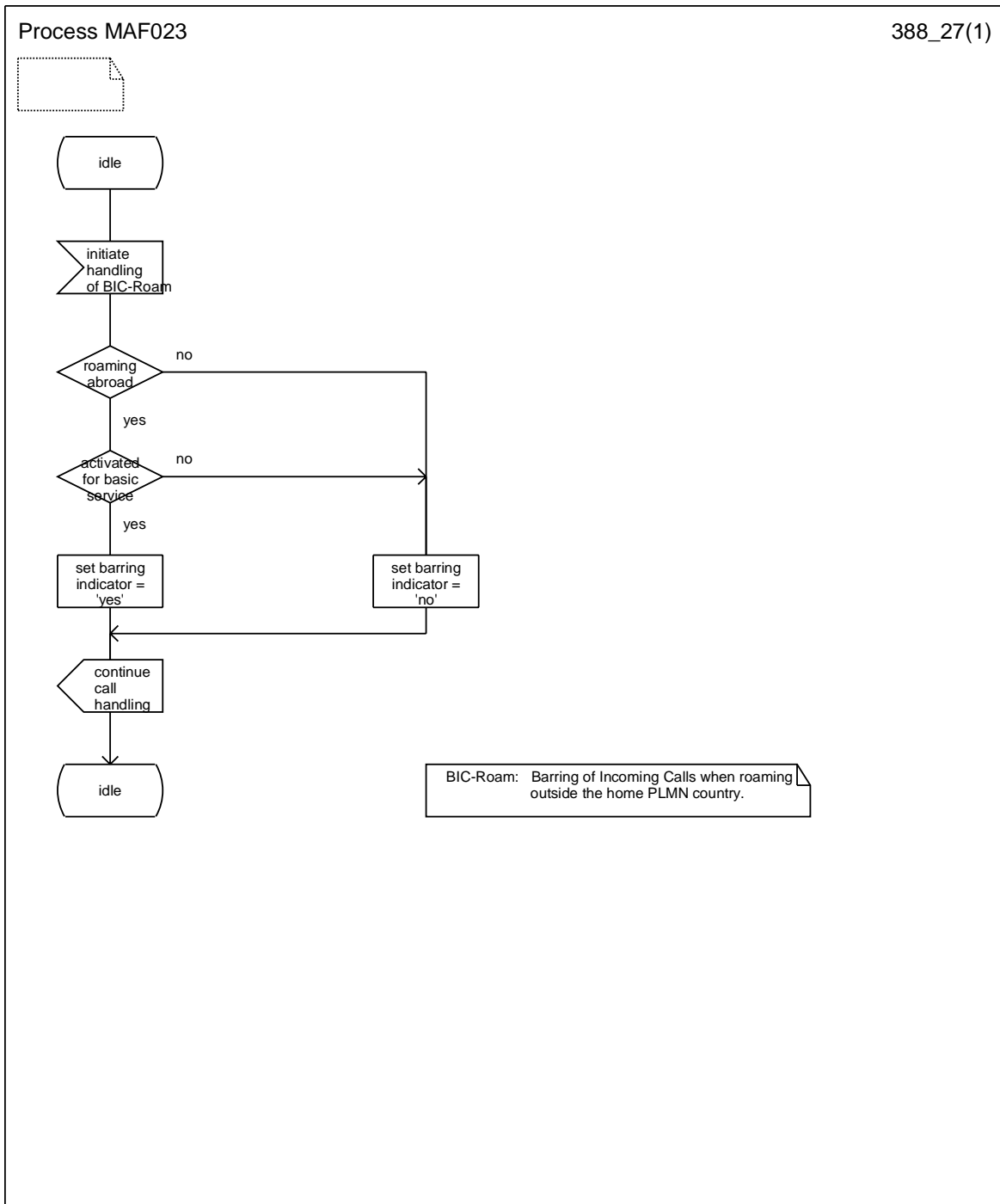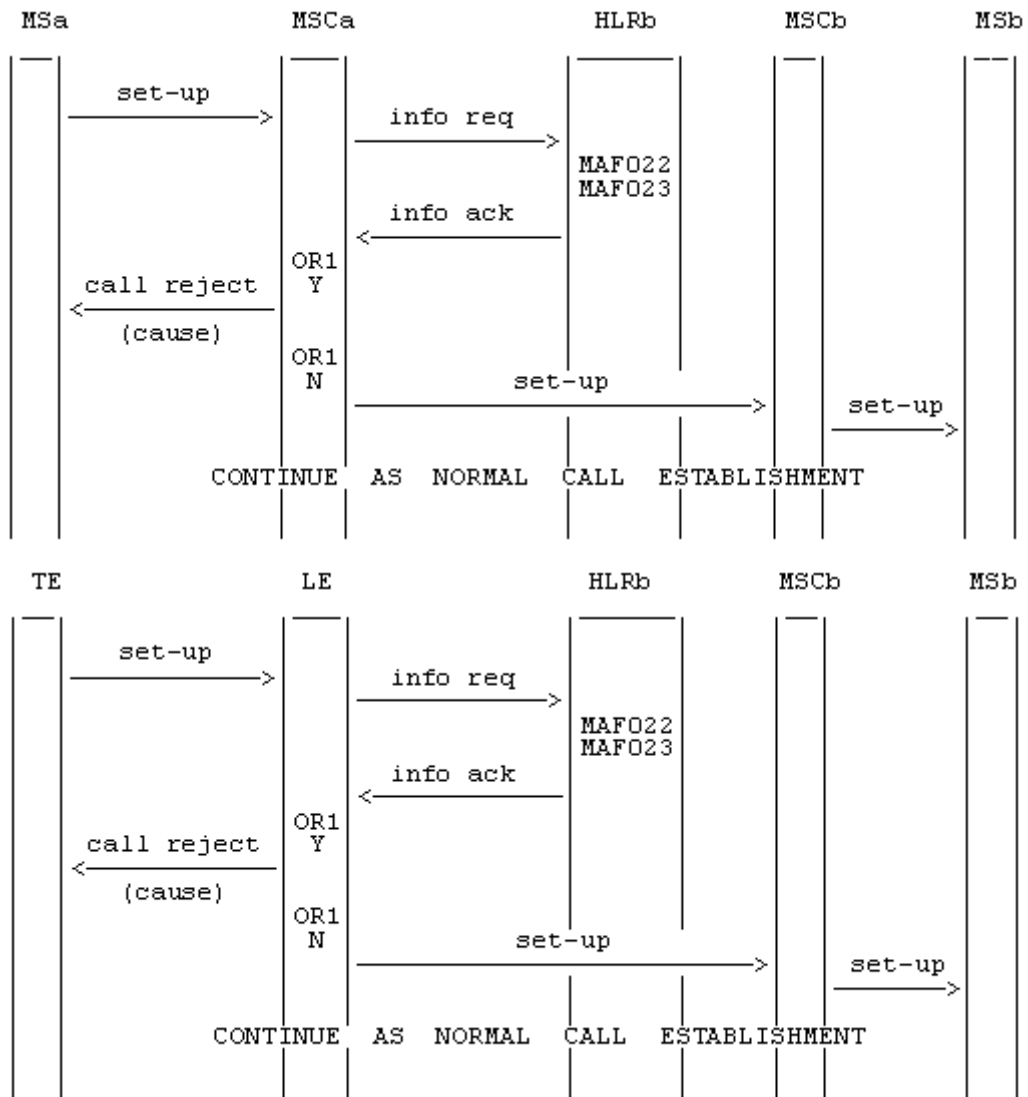Process MAF023 388_27(1)

idle

initiate
handling
of BIC-Roam

roaming
abroad — no

yes

activated
for basic
service — no

yes

set barring
indicator =
'yes'

set barring
indicator =
'no'

continue
call
handling

idle

BIC-Roam: Barring of Incoming Calls when roaming
outside the home PLMN country.

Figure 7.7: MAF023 Barring of incoming circuit switched calls and MT SMS when roaming outside the home PLMN country related authorisations examination (HLR)

```
   MSa              MSCa            HLRb        MSCb          MSb

    │ │              │ │             │ │         │ │          │ │
    │ │    set-up    │ │             │ │         │ │          │ │
    │ ├──────────────>│ │   info req │ │         │ │          │ │
    │ │              │ ├─────────────>│ │        │ │          │ │
    │ │              │ │             │ MAF022    │ │          │ │
    │ │              │ │             │ MAF023    │ │          │ │
    │ │              │ │    info ack │ │         │ │          │ │
    │ │              │ │<────────────┤ │         │ │          │ │
    │ │              │ OR1           │ │         │ │          │ │
    │ │  call reject │ Y             │ │         │ │          │ │
    │ │<─────────────┤ │             │ │         │ │          │ │
    │ │    (cause)   │ │             │ │         │ │          │ │
    │ │              │ OR1           │ │         │ │          │ │
    │ │              │ N     set-up  │ │         │ │          │ │
    │ │              │ ├────────────────────────>│ │  set-up  │ │
    │ │              │ │             │ │         │ ├──────────>│ │
    │ │        CONTINUE  AS  NORMAL  CALL  ESTABLISHMENT       │ │
    │ │              │ │             │ │         │ │          │ │


    TE               LE              HLRb        MSCb          MSb

    │ │              │ │             │ │         │ │          │ │
    │ │    set-up    │ │             │ │         │ │          │ │
    │ ├──────────────>│ │   info req │ │         │ │          │ │
    │ │              │ ├─────────────>│ │        │ │          │ │
    │ │              │ │             │ MAF022    │ │          │ │
    │ │              │ │             │ MAF023    │ │          │ │
    │ │              │ │    info ack │ │         │ │          │ │
    │ │              │ │<────────────┤ │         │ │          │ │
    │ │              │ OR1           │ │         │ │          │ │
    │ │  call reject │ Y             │ │         │ │          │ │
    │ │<─────────────┤ │             │ │         │ │          │ │
    │ │    (cause)   │ │             │ │         │ │          │ │
    │ │              │ OR1           │ │         │ │          │ │
    │ │              │ N     set-up  │ │         │ │          │ │
    │ │              │ ├────────────────────────>│ │  set-up  │ │
    │ │              │ │             │ │         │ ├──────────>│ │
    │ │        CONTINUE  AS  NORMAL  CALL  ESTABLISHMENT       │ │
    │ │              │ │             │ │         │ │          │ │
```

Figure 7.8: Information flow for barring of incoming <u>circuit switched</u> calls

NOTE: info req: information request
        info ack: information acknowledge
        OR1:   call barred   Y: yes
               N: no.

```
    SC            SMS-GMSC           HLR         SGSN or MSC/VLR

    │ │              │ │             │ │             │ │
    │ │ Message      │ │             │ │             │ │
    │ │ Transfer     │ │             │ │             │ │
    │ ├──────────────>│ │   Info req │ │             │ │
    │ │              │ ├─────────────>│ │            │ │
    │ │              │ │             │ MAF022        │ │
    │ │              │ │             │ MAF023        │ │
    │ │              │ │    Info ack │ │             │ │
    │ │              │ │<────────────┤ │             │ │
    │ │ Failure      │ OR1           │ │             │ │
    │ │ Report       │ Y             │ │             │ │
    │ │<─────────────┤ │             │ │             │ │
    │ │              │ OR1           │ │             │ │
    │ │              │ N   Forward Short Message     │ │
    │ │              │ ├──────────────────────────────>│ │
    │ │              │ │             │ │             │ │
    │ │        Continue as normal SMS transfer       │ │
    │ │              │ │             │ │             │ │
```
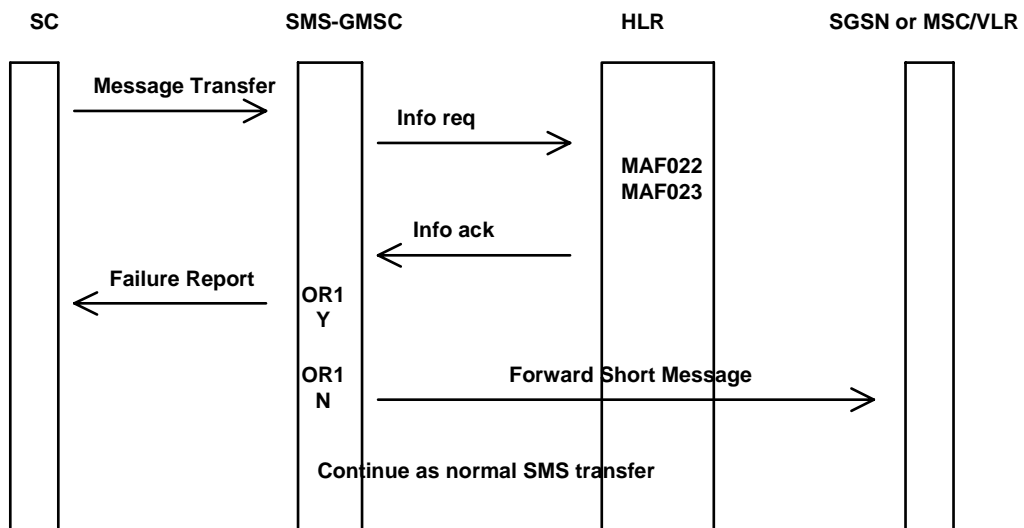
Figure 7.x: Information flow for barring of MT SMS

NOTE: info req: information request
        info ack: information acknowledge
        OR1:   call barredY: yes
               N: no.

<<Next Modified Section>>

7.5 Transfer of information from HLR to VLR/SGSN

No information is transferred from HLR to VLR/SGSN for the incoming calls barring program.

7.6 Information stored in the VLR/SGSN

No information is stored in the VLR/SGSN.

CR-Form-v7

CHANGE REQUEST

⌘ **24.088 CR 001** ⌘**rev 2** ⌘ Current version: **5.0.0** ⌘

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

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

Title: ⌘	Introducing SMS Call Barring in PS domain	
Source: ⌘	CN4	
Work item code: ⌘	TEI6	***Date:*** ⌘ 10/02/2003
Category: ⌘	**C**	***Release:*** ⌘ Rel-6

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

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

Reason for change: ⌘	SMS is used in both CS domain and PS domain in the current stage2 and stage 3 specifications. However, Call Barring for SMS is applied only in CS domain in the current specificaion. From user's point of view, this is not desireble because a short message can be sent or received via PS domain even if the user activate Call Barring for SMS.
Therefore, Call Barring for SMS should be introduced to PS domain.
Summary of change: ⌘	The information flow in case that MO SMS is barred is added.
Consequences if not approved: ⌘	

Clauses affected: ⌘	1.1

	Y	N		
Other specs ⌘	X		Other core specifications ⌘	23.011-CR003
23.016-CR030
23.088-CR003
29.002-CR509
affected:		X	Test specifications	
		X	O&M Specifications	
Other comments: ⌘				

How to create CRs using this form:

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

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

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

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

<<First modified section>>

1.1   Normal operation

When a barring program relating to outgoing calls is active and operative for a basic service, each call set up related to that basic service and not allowed by the barring program will be refused by the network. In this case a NotifySS operation containing the SS-Status indicating that a barring program relating to outgoing calls is currently active and operative will be sent to the served mobile subscriber in a clearing message (see figure 1.1). ~~In case of~~ For SMS, RP cause "Call barred" shall be sent to MS (see figure 1.2).

MS   Network

SETUP

--->

DISCONNECT/RELEASE/RELEASE COMPLETE

<--

Facility (Invoke = NotifySS (SS-Code, SS-Status))
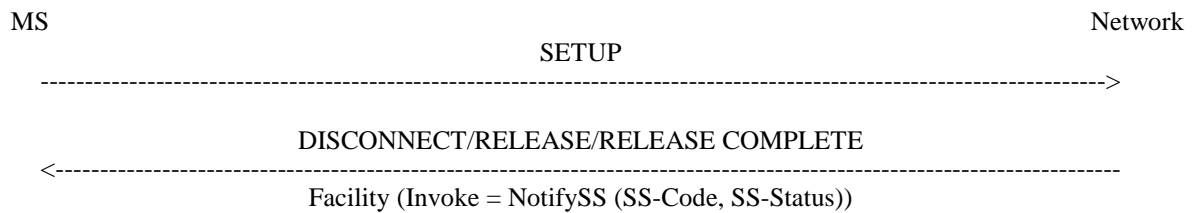
Figure 1.1: Notification to the served mobile subscriber that barring of outgoing circuit switched calls ~~except for SMS~~ is active

NOTE 1:   The SS-Code will be the common code for outgoing barring services.
NOTE 2: $(CAMEL2)$ The DISCONNECT and RELEASE messages were introduced because of CAMEL Phase 2.

MS   Network

RP-DATA

--->

RP-ERROR (RP-cause)

<--
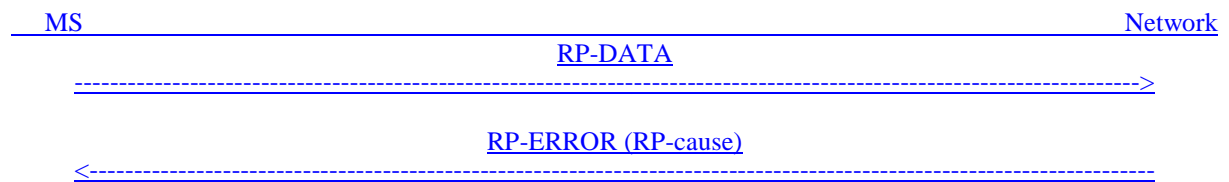
Figure 1.2: Notification to the served mobile subscriber that barring of MO SMS is active

When a barring program is active (operative or quiescent), the ability of the served mobile subscriber to set up emergency calls is not affected, irrespective of the basic service to which the barring program applies.

When a barring program relating to outgoing calls is active (operative or quiescent), the ability of the served mobile subscriber to receive calls is not affected.

CR-Form-v7

CHANGE REQUEST

⌘   **29.002** CR **509**   ⌘**rev** **3** ⌘ Current version: **6.0.0** ⌘

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

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

Title: ⌘	Introduction of Call Barring for SMS in PS domain
Source: ⌘	CN4
Work item code:⌘	TEI6

Date: ⌘ 11/02/2003

Category: ⌘	**C**

Release: ⌘ Rel-6

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

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

Reason for change: ⌘	SMS is used in both CS domain and PS domain in the current stage 2 and stage 3 specifications. However, Call Barring for SMS is applied only in CS domain in the current specification. From the user's point of view, this is not desirable because a short message can be sent or received via PS domain even if the user activates Call Barring for SMS.
Summary of change:⌘	Addition of capability to handle CB data at SGSN.
Consequences if ⌘ ***not approved:***	There would be no support for SS Call Barring of SMS in the PS domain.

Clauses affected: ⌘	7.6, 7.6.3.92 (new), 8.1.7, 8.8.1, 8.8.2, 17.7.1, 18.2.2, 23.2.4, 23.3.3

	Y	N	
Other specs ⌘	X		Other core specifications ⌘ TS 23.011 CR003 TS 23.016 CR030 TS 23.088 CR003 TS 24.088 CR001
affected:		X	Test specifications
		X	O&M Specifications

Other comments: ⌘	The handling for the case where the SMS-GMSC does not support GPRS (i.e. the transfer of two routeing addresses in the MAP_SEND_ROUTING_INFO_FOR_SM_cnf) is described differently in the SDL and the text. Since the text is aligned with the information in 23.008, the SDL handling has been aligned with the text. An editorial clean-up has been applied for the text of subclauses 23.2.4 and

23.3.3.
This CR needs to be implemented **after** CR 29.002-524

<<First Changed clause>>

7.6   Definition of parameters

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

Absent Subscriber Diagnostic SM	7.6.8.9	Invoke Id	7.6.1.1
Access connection status	7.6.9.3	ISDN Bearer Capability	7.6.3.41
		IST Alert Timer	7.6.3.66
		IST Information Withdrawn	7.6.3.68
		IST Support Indicator	7.6.3.69
		LCS Codeword	7.6.11.18
		LCS Codeword Applicability	7.6.11.19
		LCS Information	7.6.3.60
		LCS Service Type Id	7.6.11.15
		LCS Codeword Notification	7.6.11.22
Access signalling information	7.6.9.5	Kc	7.6.7.4
Additional Absent Subscriber Diagnostic SM	7.6.8.12	Linked Id	7.6.1.2
Additional Location Estimate	7.6.11.21	LMSI	7.6.2.16
Additional number	7.6.2.46	Location Information	7.6.2.30
		Location Information for GPRS	7.6.2.30a
Additional signal info	7.6.9.10	Location update type	7.6.9.6
Additional SM Delivery Outcome	7.6.8.11	Long Forwarded-to Number	7.6.2.22A
		Long FTN Supported	7.6.2.22B
Age Indicator	7.6.3.72	Lower Layer Compatibility	7.6.3.42
		LSA Information	7.6.3.56
		LSA Information Withdraw	7.6.3.58
Alert Reason	7.6.8.8	MC Information	7.6.4.48
Alert Reason Indicator	7.6.8.10	MC Subscription Data	7.6.4.47
Alerting Pattern	7.6.3.44	Mobile Not Reachable Reason	7.6.3.51
All GPRS Data	7.6.3.53	Modification request for CSI	7.6.3.81
All Information Sent	7.6.1.5	Modification request for SS Information	7.6.3.82
AN-apdu	7.6.9.1	More Messages To Send	7.6.8.7
APN	7.6.2.42	MS ISDN	7.6.2.17
Authentication set list	7.6.7.1	MSC number	7.6.2.11
B-subscriber Address	7.6.2.36	MSIsdn-Alert	7.6.2.29
B subscriber Number	7.6.2.48	Multicall Bearer Information	7.6.2.52
B subscriber subaddress	7.6.2.49	Multiple Bearer Requested	7.6.2.53
Basic Service Group	7.6.4.40	Multiple Bearer Not Supported	7.6.2.54
Bearer service	7.6.4.38	MWD status	7.6.8.3
BSSMAP Service Handover	7.6.6.5		
Call Barring Data	7.6.3.83	NbrUser	7.6.4.45
Call barring feature	7.6.4.19	Network Access Mode	7.6.3.50
Call barring information	7.6.4.18	Network node number	7.6.2.43
Call barring support indicator	7.6.3.92		
Call Direction	7.6.5.8	Network resources	7.6.10.1
Call Forwarding Data	7.6.3.84	Network signal information	7.6.9.8
Call Info	7.6.9.9	New password	7.6.4.20
Call reference	7.6.5.1	No reply condition timer	7.6.4.7

<<Next Changed clause>>

7.6.3.91   gsmSCF Initiated Call

This parameter is used to indicate that the call was initiated by the gsmSCF.

7.6.3.92   Call barring support indicator

This parameter is used to indicate that the SGSN supports the call barring services for ~~those basic services which the SGSN supports~~SMS.

<<Next Changed clause>>

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(=)		
Supported CAMEL Phases	C	C(=)		
SoLSA Support Indicator	C	C(=)		
Super-Charger Supported in Serving Network Entity	C	C(=)		
GPRS enhancements support indicator	C	C(=)		
Supported LCS Capability Sets	C	C(=)		
Offered CAMEL 4 CSIs	C	C(=)		
Inform Previous Network Entity	C	C(=)		
PS LCS Not Supported by UE	C	C(=)		
Call barring support indicator	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 clause 7.6.1.

<Unchanged text skipped>

PS LCS Not Supported by UE

See definition in clause 7.6.11.

Call Barring support indicator

See definition in clause 7.6.3.92~~3~~.

User error

In case of unsuccessful updating, an error cause shall be returned by the HLR. The following error causes defined in clause 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 clause 7.6.1.

<<Next Changed clause>>

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 an 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 subscriber has changed data concerning one or more supplementary services by using a subscriber procedure;

- 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 3GPP TS 23.116.

It is a confirmed service and consists of the primitives shown in table 8.8/1.

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(=)		
MC-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	U	C(=)		

Parameter name	Request	Indication	Response	Confirm
Id List				
SGSN CAMEL Subscription Info	C	C(=)		
LSA Information	C	C(=)		
IST Alert Timer	C	C(=)		
SS-Code List			C	C(=)
LMU Identifier	C	C(=)		
LCS Information	C	C(=)		
CS Allocation/Retention priority	C	C(=)		
Super-Charger Supported In HLR	C	C(=)		
Regional Subscription Response			C	C(=)
Supported CAMEL Phases			C	C (=)
Offered CAMEL 4 CSIs			C	C (=)
User error			U	C(=)
Provider error				O

8.8.1.3 Parameter use

All parameters are described in clause 7.6. The following clarifications are applicable:

Network access mode

This parameter defines if the subscriber has access to MSC/VLR and/or to SGSN. This parameter is used by SGSN and MSC/VLR. In VLR, the parameter is used only as part of Restore Data Procedure and the parameter is not stored in the VLR. This parameter shall always be sent to the SGSN as part of the GPRS subscriber data at GPRS location updating. It shall be sent to the SGSN if it is changed as a result of administrative action.

<Unchanged text skipped>

Call barring information List

A list of Extensible Call barring information parameters (Extensible Call barring information is defined in clause 7.6). It includes Call Barring services either at location updating or at restoration or when they are changed. Each Extensible Call barring information parameter shall be treated independently of all other parameters in the primitive.

The Extensible Call barring information shall include the SS-Code for an individual call barring supplementary service. The Extensible Call barring information shall contain one or more Extensible Call Barring Features (Extensible Call Barring Feature is defined in clause 7.6).

The Extensible Call Barring Feature may include an Extensible Basic Service Group. This shall be interpreted according to the rules in clause 8.8.1.4.

The Extensible Call Barring Feature shall contain an extensible SS-Status parameter.

If the VLR or the SGSN receives an Indication containing any Extensible Call Barring service codes which it does not support/allocate it returns them to the HLR in the parameter SS-Code List and discards the unsupported Extensible Call Barring service codes (no error is sent back). This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

<Unchanged text skipped>

SS-Code List

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

<Unchanged text skipped>

8.8.1.4   Basic service information related to supplementary services

A number of parameters that relate to supplementary services can be qualified by a Basic Service Group (or a Basic Service Group List). This clause explains how this information is to be interpreted. Supplementary service parameters to which this clause is applicable only apply to the basic service groups described in this clause, and only those basic service groups shall be overwritten at the VLR ~~and~~or the SGSN.

The Basic Service Group (or Basic Service Group List) is optional.

If present the Basic Service Group (or ~~the~~ each element~~s~~ of the Basic Service Group List) shall be one of:

-    an Elementary Basic Service Group for which the supplementary service is applicable to at least one basic service in the group~~;~~ and ~~to~~ for which the subscriber has a subscription to at least one basic service in the group;

-    the group "All Teleservices" provided that the service is applicable to at least one teleservice and that the subscriber has a subscription to at least one teleservice ~~that~~ which is in the same Elementary Basic Service Group as a teleservice to which the service is applicable;

-    the group "All Bearer Services" provided that the service is applicable to at least one bearer service and that the subscriber has a subscription to at least one bearer service ~~that~~ which is in the same Elementary Basic Service Group as a basic service to which the service is applicable.

If the Basic Service Group (or Basic Service Group List) is not present then the parameter shall apply to all Basic Service Groups.

If the basic service information is not a single Elementary Basic Service Group then the parameter shall be taken as applying individually to all the Elementary Basic Service Groups for which:

-    the supplementary service is applicable to at least one basic service in the Basic Service Group; and

-    the subscriber has a subscription to at least one basic service in the Basic Service Group.

The VLR and the SGSN are~~is~~ not required to store supplementary services data for Basic Service Groups ~~that~~ which are not supported at the VLR ~~and~~or the SGSN respectively.

<<Next Changed clause>>

8.8.2   MAP-DELETE-SUBSCRIBER-DATA service

8.8.2.1   Definition

This service is used by an HLR to remove certain subscriber data from a VLR or SGSN if the subscription of one or more supplementary services or basic services is withdrawn. Note that this service is not used in case of erasure or deactivation of supplementary services.

~~Also t~~This service is also used by an HLR to remove GPRS subscription data from a~~n~~ SGSN.

It is a confirmed service and consists of the primitives shown in table 8.8/2.

8.8.2.2   Service primitives

Table 8.8/2: MAP-DELETE-SUBSCRIBER-DATA

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	M	M(=)		
Basic service List	C	C(=)		

SS-Code List	C	C(=)		
Roaming Restriction Due To Unsupported Feature	C	C(=)		
Camel Subscription Info Withdraw	C	C(=)		
Specific CSI Withdraw	C	C(=)		
Regional Subscription Data	C	C(=)		
VBS Group Indication	C	C(=)		
VGCS Group Indication	C	C(=)		
GPRS Subscription Data Withdraw	C	C(=)		
Roaming Restricted In SGSN Due To Unsupported Feature	C	C(=)		
LSA Information Withdraw	C	C(=)		
IST Information Withdraw	C	C(=)		
Regional Subscription Response			C	C(=)
GMLC List Withdraw	C	C(=)		
User error			C	C(=)
Provider error				O

8.8.2.3   Parameter use

All parameters are described in clause 7.6. The following clarifications are applicable:

Basic service List

A list of Extensible Basic service parameters (Extensible Basic service is defined in clause 7.6). It is used when one, several or all basic services are to be withdrawn from the subscriber. If the VLR or the SGSN receives a value for an Extensible Basic Service which it does not support, it shall ignore that value. This parameter is used by the VLR and by the SGSN.

SS-Code List

A list of SS-Code parameters (SS-Code is defined in clause 7.6). It is used when several or all supplementary services are to be withdrawn from the subscriber.

There are three possible options:

-   deletion of basic service(s);

    The parameter Basic service List is only included.

-   deletion of supplementary service(s);

    The parameter SS-Code List is only included.

-   deletion of basic and supplementary services;

    Both Basic service List and SS-Code List are included.

This parameter is used by the VLR and SGSN for Call Barring and LCS. Otherwise, this parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

Roaming Restriction Due To Unsupported Feature

This parameter is used if Roaming Restriction Due To Unsupported Feature is deleted from the subscriber data. This may occur if unsupported features or services are removed from the subscriber data in the HLR.

If this parameter is sent the VLR shall check if the current Location Area is possibly allowed now. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

CAMEL Subscription Info Withdraw

This parameter is used to indicate that CAMEL Subscription Info shall be deleted from the VLR or from the SGSN. All CAMEL Subscription Info for the subscriber shall be deleted. This parameter is used by the VLR and by the SGSN. This parameter should not be sent in the same message as the Specific CSI Withdraw parameter.

Specific CSI Withdraw

This parameter is used to indicate that one or more specific elements of CAMEL Subscription Info shall be deleted from the VLR or from the SGSN.

The specific elements of CAMEL Subscription Info which may be withdrawn are:

- O-CSI with TDP criteria for O-CSI;

- SS-CSI;

- TIF-CSI;

- D-CSI;

- VT-CSI with TDP criteria for VT-CSI;

- MO-SMS-CSI;

- MT-SMS-CSI with TDP-Criteria for MT-SMS-CSI;

- M-CSI;

- MG-CSI;

- GPRS-CSI.

This parameter is used by the VLR and by the SGSN. It shall not be sent to VLRs that do not support CAMEL phase 3 or higher. This parameter should not be sent in the same message as the CAMEL Subscription Info Withdraw parameter.

Regional Subscription Identifier

Contains one single Zone Code (as defined in clause 7.6) and is used if all Zone Codes shall be deleted from the subscriber data. When all the Zone Codes are deleted, the VLR or the SGSN shall check for its location areas whether they are allowed or not. If the whole MSC area is restricted, VLR will report it to HLR by returning the Regional Subscription Response "MSC Area Restricted". If the whole SGSN area is restricted, SGSN will report it to HLR by returning the Regional Subscription Response "SGSN Area Restricted".

The binary coding of the Zone Code value received in a Delete Subscriber Data request shall not be checked by the VLR or by the SGSN.

Note that support of this parameter is a network operator option and it shall not be sent to networks which do not support Regional Subscription.

If Regional Subscription is not supported by the VLR or by the SGSN, the request for deletion of Zone Codes is refused by sending the Regional Subscription Response "Regional Subscription Not Supported" to the HLR.

If no Zone Codes are stored in the respective subscriber data record, the request for deleting all Zone Code information shall be ignored and no Regional Subscription Response shall be returned. This parameter is used by the VLR and by the SGSN.

VBS Group Indication

Contains an indication (flag) which is used if all Group Ids shall be deleted from the subscriber data for the Voice Broadcast teleservice.

If VBS is not supported in the VLR or no Group Ids are stored for VBS in the respective subscriber record, the request for deletion of all Group Ids shall be ignored. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

VGCS Group Indication

Contains an indication (flag) which is used if all Group Id's shall be deleted from the subscriber data for the Voice Group Call teleservice. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

If VGCS is not supported in the VLR or no Group Ids are stored for VGCS in the respective subscriber record, the request for deletion of all Group Ids shall be ignored.

GPRS Subscription Data Withdraw

This parameter is used to indicate whether all GPRS Subscription Data for the subscriber shall be deleted or if only a subset of the stored GPRS Subscription Data for the subscriber shall be deleted. In the latter case only those PDP contexts whose identifiers are included in the subsequent identifier list will be deleted. This parameter is used only by the SGSN and if the VLR receives this parameter it shall ignore it.

Roaming Restricted In SGSN Due To Unsupported Feature

This parameter is used if Roaming Restricted In SGSN Due To Unsupported Feature is deleted from the GPRS subscriber data. This may occur if unsupported features or services are removed from the GPRS subscriber data in the HLR.

If this parameter is sent the SGSN shall check if the current Location Area is possibly allowed now. This parameter is used only by the SGSN and if the VLR receives this parameter it shall ignore it.

LSA Information Withdraw

This parameter is used to indicate whether all LSA Information for the subscriber shall be deleted or if only a subset of the stored LSA Information for the subscriber shall be deleted. In the latter case only the LSA data whose LSA identities are included in the subsequent LSA data list will be deleted. This parameter is used by the VLR and the SGSN.

IST Information Withdraw

This parameter is used to indicate that the IST condition has been removed for the subscriber. See 3GPP TS 43.035 for the use of this parameter.

Regional Subscription Response

If included in the Delete Subscriber Data response this parameter indicates one of:

-   MSC Area Restricted;

-   SGSN Area Restricted;

-   Regional Subscription Not Supported.

This parameter is used by the VLR and by the SGSN.

GMLC List Withdraw

This parameter indicates that the subscriber's LCS GMLC List shall be deleted from the VLR or SGSN.

User error

Only one of the following values is applicable:

-   Unidentified subscriber;

-   Data missing;

-   Unexpected data value.

<<Next Changed clause>>

17.7.1   Mobile Service data types

```
MAP-MS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version8 (8)}

DEFINITIONS
```

```
IMPLICIT TAGS

::=

BEGIN
```

Unchanged ASN.1 skipped

```
-- 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,
    informPreviousNetworkEntity        [1]  NULL                    OPTIONAL,
    ps-LCS-NotSupportedByUE            [2]  NULL                    OPTIONAL }
```

```
SGSN-Capability ::= SEQUENCE{
    solsaSupportIndicator                    NULL                              OPTIONAL,
    extensionContainer                       [1] ExtensionContainer            OPTIONAL,
    ... ,
    superChargerSupportedInServingNetworkEntity   [2] SuperChargerInfo    OPTIONAL ,
    gprsEnhancementsSupportIndicator         [3] NULL                      OPTIONAL,
    supportedCamelPhases                     [4] SupportedCamelPhases      OPTIONAL,
    supportedLCS-CapabilitySets              [5]  SupportedLCS-CapabilitySets OPTIONAL,
    offeredCamel4CSIs                        [6] OfferedCamel4CSIs         OPTIONAL,
    smsCallBarringSupportIndicator           [7]  NULL                     OPTIONAL }
```

Unchanged ASN.1 skipped

<<Next Changed clause>>

18.2.2   Naming conventions

Events related to MAP are represented by MAP service primitives. The signal names used in the SDL diagrams are derived from the service primitive names defined in clauses 7 to 12, with some lexical transformations for readability and parsability purposes (blanks between words are replaced by underscores, the first letter of each word is capitalised).

Events received and sent on other interfaces are named by appending the message or signal name to a symbol representing the interface type, with some lexical transformations for readability and parsability purposes (blanks between words are replaced by underscores, the first letter of each word is capitalised).

The following symbols are used to represent the interface types:

"I":   For interfaces to the fixed network. "I" stands for ISUP interface.

"A":   For interfaces to between the MSC and the BSS (i.e. A-interfaces);

"Gb":   For interfaces between the SGSN and the BSS (i.e. Gb-interfaces);

"OM":   For network management interfaces (communication with OMC, MML interface, ...);

"SC":   For interfaces to a Service Centre;

"HO_CA":   For internal interfaces to the Handover Control Application.

"US":   For a local USSD application.

These naming conventions can be summarised by the following BNF description:

<Event_Name>   ::= <MAP_Primitive> | <External_Event>

<MAP_Primitive>   ::= <MAP_Open> | <MAP_Close> | <MAP_U_Abort> | <MAP_P_Abort> |

                                <MAP_Specific> | <MAP_Notice>

<MAP_Open>   ::= MAP_Open_Req | MAP_Open_Ind | MAP_Open_Rsp | MAP_Open_Cnf

<MAP_Close>   ::= MAP_Close_Req | MAP_Close_Ind

<MAP_U_Abort>   ::= MAP_U_Abort_Req | MAP_U_Abort_Ind

<MAP_P_Abort>   ::= MAP_P_Abort_Ind

<MAP_Notice>   ::= MAP_Notice_Ind

<MAP_Specific>   ::= <MAP_Req> | <MAP_Ind> | <MAP_Rsp> | <MAP_Cnf>

<MAP_Req>   ::= MAP_<Service_Name>_Req

<MAP_Ind>   ::= MAP_<Service_Name>_Ind

<MAP_Rsp>   ::= MAP_<Service_Name>_Rsp

<MAP_Cnf>   ::= MAP_<Service_Name>_Cnf

<External_Event>   ::= <Interface_Type>_<External_Signal>

<Interface_Type>   ::= I | A | Gb | OM | SC | HO AC | US

<External_Signal>   ::= <Lexical_Unit>

<Service_Name>   ::= <Lexical_Unit>

<Lexical_Unit>   ::= <Lexical_Component> | <Lexical_Unit>_ <Lexical_Component>

<Lexical_Component> ::= <Upper_Case_Letter><Letter_Or_Digit_List>

<Letter_Or_Digit_List> ::= <Letter_Or_Digit> | <Letter_Or_Digit_List><Letter_Or_Digit>

<Letter_Or_Digit>   ::= <Letter> | <Digit>

<Letter>   ::= <Lower_Case_Letter> | <Upper_Case_Letter>

<Upper_Case_Letter>   ::= A|B|C|D|E|F|G|H|I|J|K|L|M|N|O|P|Q|R|S|T|U|V|W|X|Y|Z

<Lower_Case_Letter>   ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z

<Digit>   ::= 1|2|3|4|5|6|7|8|9|0

Figure 18.2/1: Interfaces applicable to the MAP-User

<<Next Changed clause>>

23.2.4   Procedure in the ~~servicing~~ SGSN

Any CAMEL-specific handling defined in this subclause is omitted if the SGSN does not support CAMEL control of MO SMS.

When the SGSN receives~~ing the~~ a short message from the MS, the SGSN acts as follows:

- if there is ~~incompatibility in the~~no subscription ~~check~~for MO SMS, the SGSN returns an RP_ERROR with cause ~~r~~"Requested facility not subscribed" ~~is provided~~ to the ~~mobile station~~MS;

- if there is a subscription for MO SMS, the SGSN opens a CAMEL dialogue as specified in 3GPP TS 23.078 [98]. If the CAMEL service bars the MO SM submission then the SGSN reports the failure ~~is reported~~ to the MS;

- if the short message transfer would contravene operator determined barring~~,~~ or an outgoing barring supplementary service, the SGSN reports the failure ~~is reported~~ to the CAMEL service as specified in 3GPP TS~~ ~~23.078 [98] and returns an ~~the~~ RP_ERROR with the appropriate cause ~~operator determined barring is provided~~ to the ~~mobile station~~MS;

NOTE: The RP_ERROR causes are described in 3GPP TS 24.011 [37].

- if no error is detected, the ~~short message transmission towards~~SGSN requests a dialogue with the IWMSC ~~is initiated using the MAP_MO_FORWARD_SHORT_MESSAGE request~~to forward the short message.

If the dialogue with the IWMSC ~~service MAP_MO_FORWARD_SHORT_MESSAGE~~ is ~~started~~to be opened, the SGSN ~~will~~ checks whether the ~~grouping of~~ MAP_OPEN request and the MAP_MO_FORWARD_SHORT_MESSAGE request ~~needs segmentation~~can be carried in the TC-BEGIN message.

If ~~this is the case~~ the TC-BEGIN message cannot carry both the MAP_OPEN request and the MAP_MO_FORWARD_SHORT_MESSAGE request then the SGSN shall send the MAP_OPEN request primitive ~~shall be sent~~first without any associated MAP service request primitive; ~~and~~ the SGSN shall wait for the dialogue confirmation ~~must be received~~ before it sends the MAP_MO_FORWARD_SHORT_MESSAGE request~~is sent~~. When the SGSN has sent the MAP_MO_FORWARD_SHORT_MESSAGE request, it waits for the response from the IWMSC.

~~As a response to the procedure, the servicing~~The SGSN ~~will~~ may receive ~~the~~ a MAP_MO_FORWARD_SHORT_MESSAGE confirmation from the IWMSC indicating either that:

- the short message has been successfully ~~delivered~~submitted to the Service Centre. The SGSN reports to the CAMEL service the successful submission of the SM ~~is reported to the CAMEL service~~ as specified in 3GPP TS~~ ~~23.078 [98] and sends ~~the~~ an acknowledgement ~~is sent~~ to the ~~mobile station~~MS; or

- one of several error cases has occurred. The mapping between MAP error causes and RP_ERROR causes is described in 3GPP TS~~ ~~23.~~1~~040 [26]. The SGSN reports to the CAMEL service the failure ~~in~~of the SM submission ~~is reported to the CAMEL service~~ as specified in 3GPP TS 23.078 [98] and ~~the~~ sends an appropriate error indication ~~is provided~~ to the ~~mobile station~~MS.

If the MAP dialogue with the IWMSC fails, ~~procedure failed, a provider error or an abort indication is received~~the SGSN will receive a MAP abort indication or a MAP_NOTICE indication. The SGSN reports to the CAMEL service the failure of the SM submission as specified in 3GPP TS 23.078 [98] and sends an RP_ERROR with the cause ~~n~~"Network out of order" ~~is provided~~ to the ~~mobile station~~MS.

~~If the access signalling connection to the MS is released while the SGSN is waiting for the response from the IWMSC, the SGSN aborts the MAP dialogue with the IWMSC and reports to the CAMEL service the failure of the SM submission as specified in 3GPP TS 23.078 [98].~~

The mobile originated short message service procedure is shown in figure 23.2/5.

Process MOSM_SGSN   23.2_5.1(3)

Figure 23.2/5: The mobile originated short message
service process in the SGSN.

NULL

A_RP_MO_DATA

'MO SMS Provisioned'   No

Yes

CAMEL_O_SMS_INIT   See 3G TS 23.078

Result?

SMS_Aborted   Release_SMS   Redirect_SMS   Continue

Modify data according to gsmSCF instructions

'SET RP_ERROR according to gsmSCF instructions.'

'Operator Barring'   Yes

No

'SET RP_ERROR= REQUESTED FACILITY NOT SUBSCRIBED'

A_RP_ERROR_req

'SET RP_ERROR= OPERATOR DETERMINED BARRING

CAMEL_O_SMS_FAILURE   See 3G TS 23.078

A_RP_ERROR_req

1
Page 3

process MO_SM_SGSN   MO_SM_SGSN1(3)

Process in the SGSN to handle submission of a short message

Signals to/from the left are to/from the UE

Null

Gb_RP_MO_DATA_ind

MO SMS provisioned?

No → Set RP_ERROR: Requested facility not subscribed

Yes

CAMEL_O_SMS_INIT --- See 3GPP TS 23.078

Result?

- SMS_Aborted
  - Set RP_ERROR according to gsmSCF instructions
  - Gb_RP_ERROR_req
  - Null
- Release_SMS
  - Modify data according to gsmSCF instructions
  - Null
- Redirect_SMS
  - Operator barring?
    - Yes → Set RP_ERROR: Operator determined barring
    - No
      - SS barring?
        - Yes → Set RP_ERROR: Call barred
        - No
- Continue

See 3GPP TS 23.078 --- CAMEL_O_SMS_FAILURE

Gb_RP_ERROR_req

Null

1

Figure 23.2/5 (sheet 1 of 3): Process MOSM_SGSN

Process MOSM_SGSN

23.2_5.2(3)

Figure 23.2/5: The mobile originated short message service process in the SGSN.

WAIT_FOR_MO_SMS_RESULT

A_LLC_RELEASE_ind

MAP_NOTICE_ind

MAP_U_ABORT_ind,
MAP_P_ABORT_ind

MAP_U_ABORT_req

MAP_CLOSE_req

The application may use a timer to wait for acknowledgement.
In case of expiry the CAMEL_O_SMS_FAILURE shall be called.

'SET RP_ERROR = NETWORK OUT OF ORDER'

-

CAMEL_O_SMS_FAILURE

See 3G TS 23.078

A_RP__ERROR__req
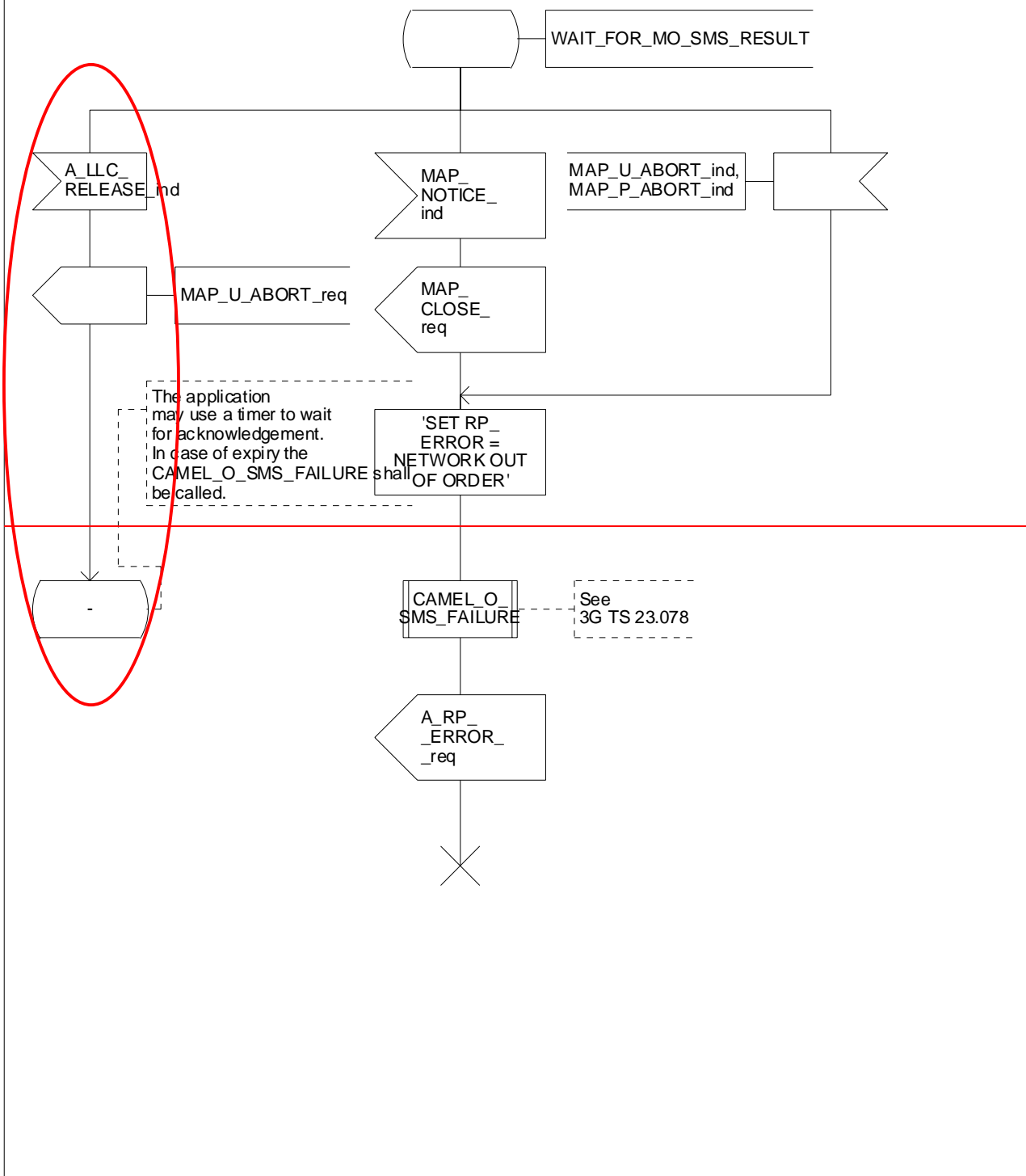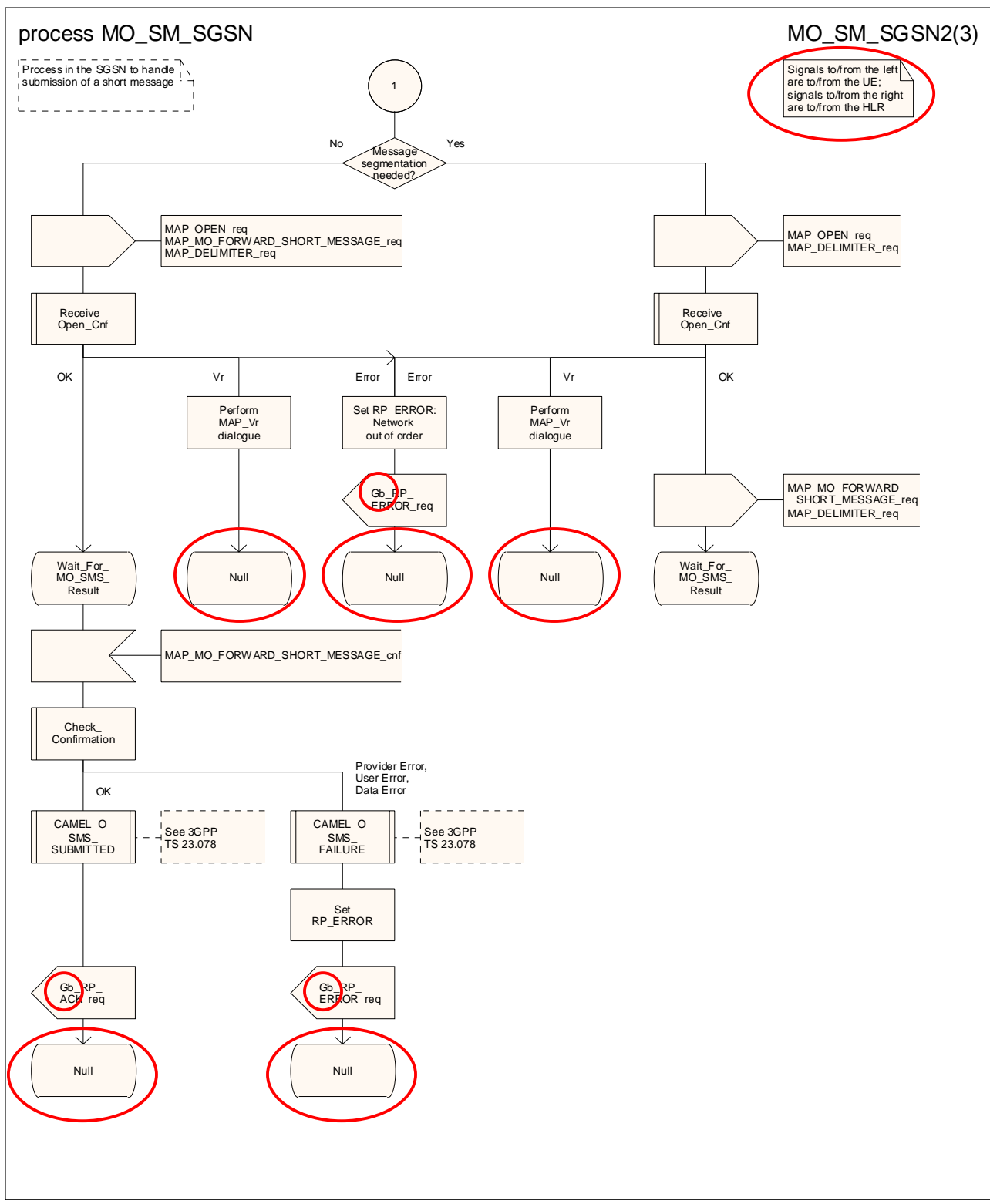
Figure 23.2/5 (sheet 2 of 3): Process MOSM_SGSN

CR editor's note: Sheets 2 & 3 of this SDL have been exchanged; the old sheet 3 follows on logically from sheet 1, and the old sheet 2 follows on logically from the old sheet 3.

Process MOSM_SGSN

23.2_5.3(3)

Figure 23.2/5: The mobile originated short message service process in the SGSN.

1
Page 1

message segmentation needed

no   yes

MAP_OPEN_Req
MAP_MO_FORWARD_SHORT_MESSAGE_req
MAP_DELIMITER

MAP_OPEN_Req
MAP_DELIMITER_Req

Receive_
Open_
Cnf

Receive_
Open_
Cnf

Error

OK   Vr   Error   Vr   Ok

WAIT_FOR_
_MO_SMS
_RESULT

Perform_
MAP_Vr_
Dialogue

'Set
RP-ERROR =
Network
out of order'

MAP_MO_FORWARD_
SHORT_MESSAGE_Req
MAP_DELIMITER_Req

MAP_MO_FORWARD_
SHORT
MESSAGE
_cnf

A_RP_
ERROR
_req

WAIT_FOR_
MO_SMS_
RESULT

Check_
Confirmation

OK   Provider Error,
                      User Error,
                      Data Error

See
3G TS 23.078

'SET RP_
ERROR'

Perform_
MAP_Vr_
Dialogue

CAMEL_O_
SMS_SUBMITTED

CAMEL_O_
SMS_FAILURE

A_RP_
ACK
_req

A_RP_
ERROR
_req

Figure 23.2/5 (sheet 3 of 3): Process MOSM_SGSN

<<Next Changed clause>>

23.3.3   Procedures in the HLR

The process is triggered by a MAP_SEND_ROUTING_INFO_FOR_SM indication from the SMS-GMSC. For any of the following error cases, the HLR returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing the appropriate user error, closes the dialogue and terminates the process:

~~The MAP_SEND_ROUTING_INFO_FOR_SM indication is received from the GMSC. The following error cases are reported to the GMSC in the MAP_SEND_ROUTING_INFO_FOR_SM response as an unsuccessful outcome of the procedure:~~

- if the necessary parameters and data are not present in the ~~primitive~~ indication, or they are badly formatted, the HLR returns a ~~d~~"Data missing" or ~~u~~"Unexpected data value" error ~~is returned~~;

- if the mobile subscriber is unknown, i.e. it cannot be identified from the MSISDN given, the HLR returns an ~~u~~"Unknown subscriber" error ~~is returned~~;

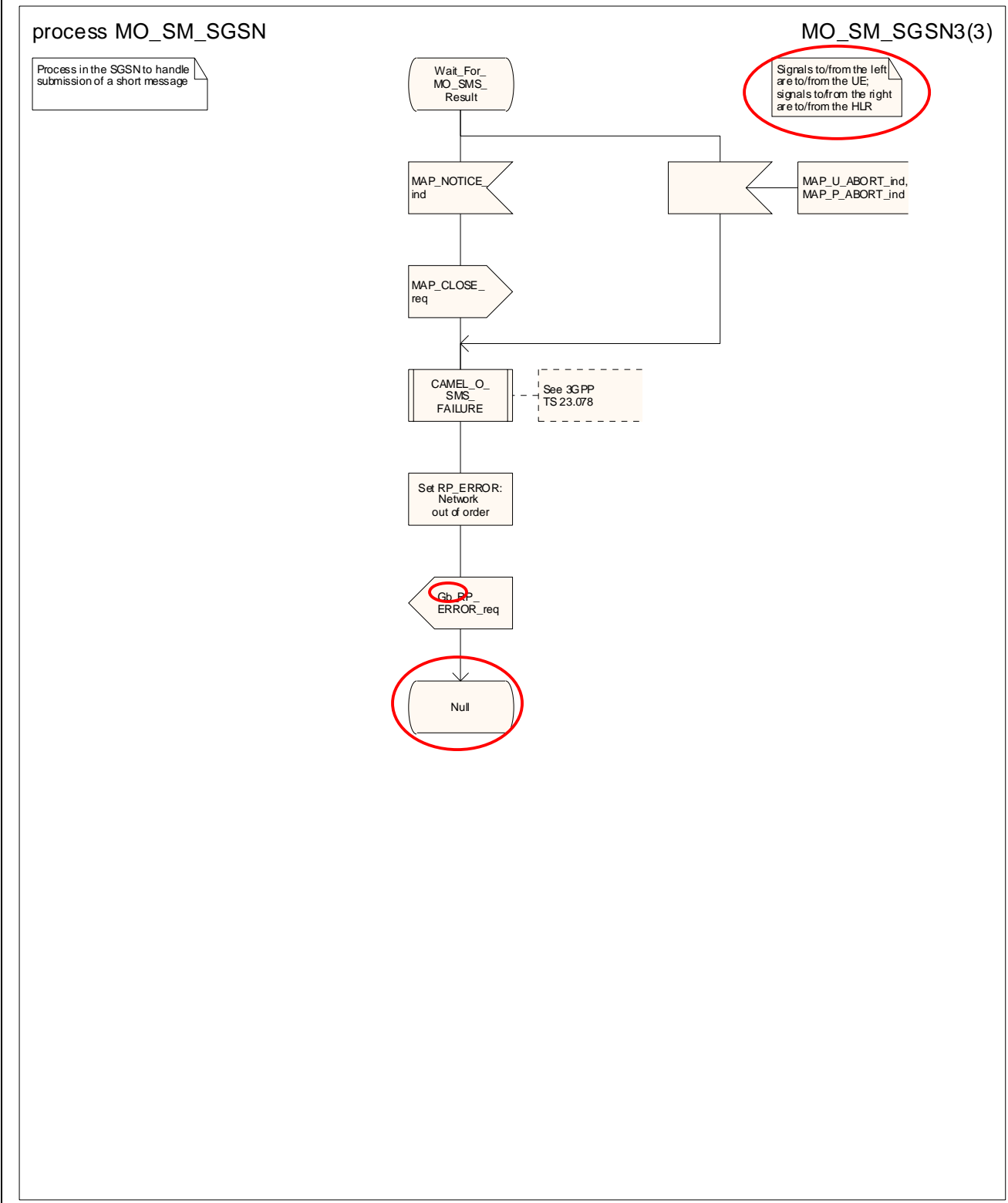- if the subscription does not include the MT SMS teleservice, the HLR returns a "Teleservice not provisioned" error;

- ~~if the short message transfer would contravene operator determined barring, the call barred error with cause operator barring is returned;~~

- if the short message transfer would contravene the ~~«~~"SM filtering by the HPLMN"~~»~~ function ~~criteria~~, the HLR returns a ~~e~~"Call barred" error with cause ~~u~~"Unauthorised Message Originator"~~. is returned (t~~The definition of the filtering function is out of the scope of ~~GSM~~ UMTS specification~~s~~. Filtering may be based on the SM-RP-SMEA information element if ~~it is~~ received from the SMS-GMSC~~)~~;

- ~~if the mobile subscription identified by the given MSISDN number does not include the short message service, the teleservice not provisioned error is returned;~~

- depending on the Network Access Mode ("Non-GPRS", "GPRS" or "Non-GPRS and GPRS"), the HLR behaves as follows:

  - if the Network Access Mode is "Non-GPRS", i.e. the subscriber is not a GPRS subscriber, then:

    - if the MS is not reachable in an MSC, i.e. no MSC identity is stored for the mobile subscriber or the "MSC Area Restricted Flag" is set or the "MS purged for non GPRS" flag is set, the HLR sets the MNRF and returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing an "Absent subscriber" error with the appropriate diagnostic, i.e. "Deregistered in HLR for non GPRS", "Roaming Restricted" or "MS-Purged for non GPRS". The HLR then continues processing as described below under the heading "Addition of the Service Centre Address to the MWD list";

    - if the MSC where the subscriber is registered does not support MT SMS, the HLR returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing a "Facility not supported" error, closes the dialogue and terminates the process;

    - if the short message transfer would contravene operator determined barring, the HLR returns a "Call barred" error with cause "Operator barring";

    - if the short message transfer would contravene supplementary service barring, the HLR returns a "Call barred" error with cause "Barring service active";

    - if the MNRF is set, the HLR checks whether the SM-RP-Priority information element was present in the MAP_SEND_ROUTING_INFO_FOR_SM indication. If the priority information element was present, the HLR sets the "mnrf-Set" and "mcef-Set" bits of the mw-Status parameter according to the state of the corresponding flags, and returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing the MSC number as routeing information. The HLR then continues processing as described below under the heading "Return of Routeing Information because the SM-RP-Priority is true". If the priority information element was not present, the HLR returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing an "Absent subscriber" error. If a reason for the subscriber's absence for non-GPRS is stored in the mobile not reachable reason (MNRR) in the subscriber data, the HLR includes this as the diagnostic for the "Absent subscriber" error. The HLR then continues processing as described below under the heading "Addition of the Service Centre Address to the MWD list";

- if the MNRF is not set, the HLR returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing the MSC number as routeing information. The HLR then continues processing as described below under the heading "Return of Routeing Information – normal case".

- if the Network Access Mode is "GPRS", i.e. the subscriber is a GPRS subscriber, then:

    - if the MS is not reachable in an SGSN, i.e. no SGSN identity is stored for the mobile subscriber or the "SGSN Area Restricted Flag" is set or the "MS purged for GPRS" flag is set, the HLR sets the MNRG flag and returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing an "Absent subscriber" error with the appropriate diagnostic. The HLR then continues processing as described below under the heading "Addition of the Service Centre Address to the MWD list";

    - if the SGSN where the subscriber is registered does not support MT SMS, the HLR returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing a "Facility not supported" error, closes the dialogue and terminates the process;

    - if the short message transfer would contravene operator determined barring, the HLR returns a "Call barred" error with cause "Operator barring";

    - if the short message transfer would contravene supplementary service barring, the HLR returns a "Call barred" error with cause "Barring service active";

    - if the MNRG flag is set, the HLR checks whether the SM-RP-Priority information element was present in the MAP_SEND_ROUTING_INFO_FOR_SM indication. If the priority information element was present, the HLR sets the "mnrg-Set" and "mcef-Set" bits of the mw-Status parameter according to the state of the corresponding flags, and returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing the SGSN number as routeing information. If the SMS-GMSC did not indicate in the MAP_SEND_ROUTING_INFO_FOR_SM indication that it supports GPRS functionality (i.e. it can handle two routeing addresses in the MAP_SEND_ROUTING_INFO_FOR_SM response), the HLR maps the state of the MNRG flag into the "mnrf-Set" bit of the mw-Status parameter.

NOTE: If the SMS-GMSC does not support GPRS functionality, it uses the protocol defined in the Release 96 version of the specification. The parameter "msc-Number" in "RoutingInfoForSM-Res" in the Release 96 version of the protocol definition corresponds to the parameter "networkNode-Number" in "RoutingInfoForSM-Res" in the Release 97 (and later) version of the protocol definition; therefore if the HLR populates the parameter "networkNode-Number" with the SGSN number, the Release 96 GMSC will interpret the SGSN number as an MSC number. If the HLR populates the "gprsNodeIndicator" parameter in the MAP_SEND_ROUTING_INFO_FOR_SM response, a Release 96 SMS-GMSC will silently discard the parameter.

    The HLR then continues processing as described below under the heading "Return of Routeing Information because the SM-RP-Priority is true";

    - if the priority information element was not present, the HLR returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing an "Absent subscriber" error. If a reason for the subscriber's absence for GPRS is stored in the mobile not reachable reason (MNRR) in the subscriber data, the HLR includes this as the diagnostic for the "Absent subscriber" error. The HLR then continues processing as described below under the heading "Addition of the Service Centre Address to the MWD list";

    - if the MNRG flag is not set, the HLR returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing the SGSN number as routeing information. The HLR then continues processing as described below under the heading "Return of Routeing Information – normal case".

- if the Network Access Mode is "Non-GPRS and GPRS", i.e. the subscriber is a non-GPRS and GPRS subscriber, then:

    - the HLR checks whether the SMS-GMSC supports GPRS functionality, i.e. it can handle two routeing addresses in the MAP_SEND_ROUTING_INFO_FOR_SM response;

    - if the SMS-GMSC does not support GPRS functionality then:

        - if the subscription option for MT SMS delivery when the SMS-GMSC does not support GPRS is set to "Delivery via the MSC", the HLR processes the MAP_SEND_ROUTING_INFO_FOR_SM indication as described above for Network Access Mode "Non-GPRS";

- if the subscription option for MT SMS delivery when the SMS-GMSC does not support GPRS is set to "Delivery via the SGSN", the HLR processes the MAP_SEND_ROUTING_INFO_FOR_SM indication as described above for Network Access Mode "GPRS".

- if the SMS-GMSC supports GPRS functionality then:

  - if the MS is not reachable in an MSC (see the definition above under Network Access Mode "Non-GPRS") and not reachable in an SGSN (see the definition above under Network Access Mode "GPRS"), the HLR sets the MNRF and the MNRG flag and returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing an "Absent subscriber" error with the appropriate diagnostic. The HLR then continues processing as described below under the heading "Addition of the Service Centre Address to the MWD list";

  - if the MS is not reachable in an SGSN (see the definition above under Network Access Mode "GPRS") but is reachable in an MSC, the HLR processes the MAP_SEND_ROUTING_INFO_FOR_SM indication as described above for Network Access Mode "Non-GPRS";

  - if the MS is not reachable in an MSC (see the definition above under Network Access Mode "Non-GPRS") but is reachable in an SGSN, the HLR processes the MAP_SEND_ROUTING_INFO_FOR_SM indication as described above for Network Access Mode "GPRS";

  - if the MS is reachable in both an MSC and an SGSN, the HLR continues as described below;

  - if neither the MSC nor the SGSN where the subscriber is registered supports MT SMS, the HLR returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing a "Facility not supported" error, closes the dialogue and terminates the process;

  - if only the MSC where the subscriber is registered supports MT SMS, the HLR processes the MAP_SEND_ROUTING_INFO_FOR_SM indication as described above for Network Access Mode "Non-GPRS";

  - if only the SGSN where the subscriber is registered supports MT SMS, the HLR processes the MAP_SEND_ROUTING_INFO_FOR_SM indication as described above for Network Access Mode "GPRS";

  - if both the MSC and the SGSN where the subscriber is registered support MT SMS, the HLR checks whether the short message transfer would contravene operator determined barring or supplementary service barring.

  - if the short message transfer would contravene operator determined barring, the HLR returns a "Call barred" error with cause "Operator barring";

  - if the short message transfer would contravene supplementary service barring, the HLR returns a "Call barred" error with cause "Barring service active";

  - if the short message transfer is not prevented by operator determined barring or supplementary service barring, the HLR checks the states of the MNRF and the MNRG flag, and whether the SM-RP-Priority information element was present in the MAP_SEND_ROUTING_INFO_FOR_SM indication.

  - if both the MNRF and the MNRG flag are set and the priority information element was absent, the HLR returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing an "Absent subscriber" error. If a reason for the subscriber's absence for non-GPRS or GPRS is stored in the mobile not reachable reason (MNRR) in the subscriber data, the HLR includes this as the diagnostic for the "Absent subscriber" error. The HLR then continues processing as described below under the heading "Addition of the Service Centre Address to the MWD list";

  - if one or both of the MNRF and the MNRG flag is set and the priority information element was present, the HLR sets the "mnrf-Set", "mnrg-Set" and "mcef-Set" bits of the mw-Status parameter according to the state of the corresponding flags, and returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing the MSC number and SGSN number as routeing information. The HLR then continues processing as described below under the heading "Return of Routeing Information because the SM-RP-Priority is true";

- if the MNRG flag is set but the priority information element was absent, the HLR sets the "mnrf-Set", "mnrg-Set" and "mcef-Set" bits of the mw-Status parameter according to the state of the corresponding flags, and returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing the MSC number as routeing information. The HLR then continues processing as described below under the heading "Return of Routeing Information because the SM-RP-Priority is true";

- if the MNRF is set but the priority information element was absent, the HLR sets the "mnrf-Set", "mnrg-Set" and "mcef-Set" bits of the mw-Status parameter according to the state of the corresponding flags, and returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing the SGSN number as routeing information. The HLR then continues processing as described below under the heading "Return of Routeing Information because the SM-RP-Priority is true";

- if neither the MNRF nor the MNRG flag is set, the HLR returns a MAP_SEND_ROUTING_INFO_FOR_SM response containing the MSC number and SGSN number as routeing information. The HLR then continues processing as described below under the heading "Return of Routeing Information – normal case".

Addition of the Service Centre Address to the MWD list

The HLR checks whether the service centre address is included in the Message Waiting Data (MWD) list.

- if the service centre address is not in the MWD list, the HLR attempts to add the service centre address. If it was not possible to add the service centre address to the MWD list (e.g. because the MWD list was full), the HLR sets the MWD status to show that the service centre address was not included, otherwise the HLR sets the MWD status to show that the service centre address was included;

- if the service centre address is in the MWD list, the HLR sets the MWD status to show that the service centre address was included.

The HLR then checks whether the MSISDN used to address the destination subscriber is the same as the MSISDN-Alert. If the MSISDN used to address the destination subscriber is not the same as the MSISDN-Alert, the HLR sets the MSISDN-Alert parameter in the MAP_INFORM_SERVICE_CENTRE request.

The HLR then sends a MAP_INFORM_SERVICE_CENTRE request to the SMS-GMSC, closes the MAP dialogue and terminates the process.

Return of Routeing Information because the SM-RP-Priority is true

The HLR checks whether the service centre address is included in the Message Waiting Data (MWD) list.

- if the service centre address is not in the MWD list, the HLR sets the MWD status to show that the service centre address was not included;

- if the service centre address is in the MWD list, the HLR sets the MWD status to show that the service centre address was included.

The HLR then checks whether the MSISDN used to address the destination subscriber is the same as the MSISDN-Alert. If the MSISDN used to address the destination subscriber is not the same as the MSISDN-Alert, the HLR sets the MSISDN-Alert parameter in the MAP_INFORM_SERVICE_CENTRE request.

The HLR then sends a MAP_INFORM_SERVICE_CENTRE request to the SMS-GMSC, closes the MAP dialogue and terminates the process.

Return of Routeing Information – normal case

The HLR checks the MCEF.

- if the MCEF is set, the HLR:

  - sets the "mcef-Set" bit of the mw-Status parameter;

  - checks whether the MSISDN used to address the destination subscriber is the same as the MSISDN-Alert. If the MSISDN used to address the destination subscriber is not the same as the MSISDN-Alert, the HLR sets the MSISDN-Alert parameter in the MAP_INFORM_SERVICE_CENTRE request;

- sends a MAP_INFORM_SERVICE_CENTRE request to the SMS-GMSC, closes the MAP dialogue and terminates the process.

- if the MCEF is not set, the HLR:

    - checks whether the MSISDN used to address the destination subscriber is the same as the MSISDN-Alert. If the MSISDN used to address the destination subscriber is not the same as the MSISDN-Alert, the HLR sends to the SMS-GMSC a MAP_INFORM_SERVICE_CENTRE request including the MSISDN-Alert parameter;

    - closes the MAP dialogue and terminates the process.

Use of LMSI

If the HLR received a LMSI from the VLR at location updating, it shall include the LMSI in the MAP_SEND_ROUTING_INFO_FOR_SM response only if the MAP_SEND_ROUTING_INFO_FOR_SM response also includes the MSC number.

- if the GMSC does not support the GPRS functionality, the behaviour of the HLR depends on the following conditions:

    - if the subscriber is not a GPRS subscriber then the behaviour of the HLR shall be the same as for a subscriber only registered as non GPRS and for SMS delivery;

    - if the subscriber is a GPRS subscriber and a non-GPRS subscriber with the option « transfer of SM via the MSC when GPRS is not supported in the GMSC » then the behaviour of the HLR shall be the same as for a subscriber only registered as non GPRS and for SMS delivery;

    - if the subscriber is a GPRS subscriber and a non-GPRS subscriber with the option « transfer of SM via the SGSN when GPRS is not supported in the GMSC » or if the subscriber is a GPRS subscriber only then the behaviour of the HLR shall be the same as for the case transfer over GPRS described in MAP release 97, with the following precision: because GMSC does not support MAP release 97, the previous MAP protocol release is used. When the HLR sends the MAP_SEND_ROUTING_INFO_FOR_SM_Resp, the SGSN number is mapped to the MAP parameter « MSC number ». When the HLR sends the MAP_INFORM_SERVICE_CENTRE_resp, the MNRG status shall be mapped to the MAP parameter « mnrf set ».

The HLR may send the MSC, SGSN or both numbers as routing information to SMS-GMSC based on the following:

    A) The subscriber may only be registered as non GPRS and for SMS delivery:

    - if the short message transfer would contravene the supplementary service barring, the call barred error with cause barring service active is returned;

    - if the location registration of the mobile subscriber shows that the VLR in the visited PLMN does not support the MT short message service, the facility not supported error is returned;

    - if no MSC identity is stored for the mobile subscriber or the "MSC Area Restricted Flag" is set or the "MS purged for non GPRS" flag is set, i.e. the MS is not reachable, the MSISDN-Alert and the SC address are included in the MWD (if possible), the flag MNRF is set and the "Absent Subscriber_SM" error is returned with the appropriate absent subscriber diagnostic indication, i.e. 'Deregistered in HLR for non GPRS ', 'Roaming Restricted' or 'MS Purged for non GPRS '.

The priority parameter (SM_RP_PRI) is processed as follows:

    - if the priority is low (SM_RP_PRI = False) and the mobile station not reachable flag (MNRF) is set, an absent subscriber_SM error is returned. If a reason for the subscriber's absence for non GPRS is stored in the mobile not reachable reason (MNRR) in the subscriber data, then this is returned with the absent subscriber_SM error. The SC address given in the request will be included in the MWD if possible. The service MAP_INFORM_SERVICE_CENTRE including the parameter MW Status is invoked to indicate whether or not the SC address has been included in the MWD list.

    - if the priority is low (SM_RP_PRI = False), and the MNRF is clear, the routing information with MSC number is retrieved as described below;

    - if the priority is high (SM_RP_PRI = True) and the MNRF is set, the HLR will send the acknowledge primitive containing the routing information with MSC number to the gateway MSC. In addition the service

MAP_INFORM_SERVICE_CENTRE including the parameter MW Status is invoked to indicate whether or not the SC address is already included in the MWD list.

B) The subscriber may only be registered as GPRS and for SMS delivery:

- if the short message transfer would contravene the supplementary service barring, the call barred error with cause barring service active is returned;

- if the location registration of the mobile subscriber shows that the SGSN in the visited PLMN does not support the MT short message service, the facility not supported error is returned;

- if no SGSN identity is stored for the mobile subscriber or the "SGSN Area Restricted Flag" is set or the "MS purged for GPRS" flag is set, i.e. the MS is not reachable, the MSISDN-Alert and the SC address are included in the MWD (if possible), the flag MNRG is set and the "Absent Subscriber_SM" error is returned with the appropriate absent subscriber diagnostic indication, i.e. 'Deregistered in HLR for GPRS', 'Roaming Restricted' or 'MS Purged for GPRS '.

The priority parameter (SM_RP_PRI) is processed as follows:

- if the priority is low (SM_RP_PRI = False) and the mobile station not reachable for GPRS (MNRG) flag is set, an absent subscriber_SM error is returned. If a reason for the subscriber's absence for GPRS is stored in the mobile not reachable reason (MNRR) in the subscriber data, then this is returned with the absent subscriber_SM error. The SC address given in the request will be included in the MWD if possible. The service MAP_INFORM_SERVICE_CENTRE including the parameter MW Status is invoked to indicate whether or not the SC address has been included in the MWD list.

- if the priority is low (SM_RP_PRI = False), and the MNRG is clear, the routing information with SGSN number is retrieved as described below;

- if the priority is high (SM_RP_PRI = True) and the MNRG is set, the HLR will send the acknowledge primitive containing the routing information with SGSN number to the gateway MSC. In addition the service MAP_INFORM_SERVICE_CENTRE including the parameter MW Status is invoked to indicate whether or not the SC address is already included in the MWD list.

C) The subscriber may be registered as non GPRS and GPRS and for SMS Delivery:

- if the short message transfer would contravene the supplementary service barring, the behaviour is the same as for a subscriber only registered for GPRS and SMS delivery.

- if the location registration of the mobile subscriber shows that the VLR in the visited PLMN does not support the MT short message service, the behaviour is the same as for a subscriber only registered for GPRS and SMS delivery;

- if the location registration of the mobile subscriber shows that the SGSN in the visited PLMN does not support the MT short message service, the behaviour is the same as for a subscriber only registered for non GPRS and SMS delivery;

- if no MSC and SGSN identities are stored for the mobile subscriber or the "MSC and SGSN Area Restricted Flags" are set or the "MS purged for non GPRS and GPRS" flags are set or a combination of these errors for non GPRS and GPRS are used, i.e. the MS is not reachable, the MSISDN-Alert and the SC address are included in the MWD (if possible), the flags MNRF and MNRG are set and the "Absent Subscriber_SM" error is returned with the appropriate absent subscriber diagnostic indication, i.e. 'Deregistered in HLR for non GPRS or GPRS', 'Roaming Restricted', 'MS Purged for non GPRS or GPRS' or both.

The priority parameter (SM_RP_PRI) is processed as follows:

- if the priority is low (SM_RP_PRI = False), the MNRF and MNRG are set, an absent subscriber_SM error is returned. If reasons for the subscriber's absence for non GPRS and GPRS are stored in MNRR in the subscriber data, then this is returned with the absent subscriber_SM error. The SC address given in the request will be included in the MWD if possible. The service MAP_INFORM_SERVICE_CENTRE including the parameter MW Status is invoked to indicate whether or not the SC address has been included in the MWD list.

- if the priority is low (SM_RP_PRI = False), and the MNRF is clear and MNRG is set, the routing information with MSC number is retrieved as described below;

- if the priority is low (SM_RP_PRI = False), and the MNRF is set and MNRG is clear, the routing information with SGSN number is retrieved as described below;

- if the priority is low (SM_RP_PRI = False), and the MNRF and MNRG are clear, the routing information with MSC and SGSN numbers is retrieved as described below;

- if the priority is high (SM_RP_PRI = True) and the MNRF, the MNRG or both are set, the HLR will send the acknowledge primitive containing the routeing information with both MSC and SGSN numbers to the gateway MSC. In addition the service MAP_INFORM_SERVICE_CENTRE including the parameter MW Status is invoked to indicate whether or not the SC address is already included in the MWD list.

If the MSISDN-Alert number of the mobile subscriber stored in the MWD is not the same as that received in the MAP_SEND_ROUTING_INFO_FOR_SM indication, the HLR will include in the MAP_INFORM_SERVICE_CENTRE request to the GMSC the MSISDN-Alert number stored.

The MAP_INFORM_SERVICE_CENTRE request is sent also when the MCEF, MNRF, MNRG or both are set but the routing information is still sent to the GMSC. The status of the flags is indicated in the parameter MW Status.

The routing information is included in a MAP_SEND_ROUTING_INFO_FOR_SM response as follows:

- the IMSI will be returned to the GMSC together with the MSC, SGSN or both numbers and may be optionally accompanied by the LMSI.

- an indication specifying which number belongs the MSC and the SGSN will be returned to the GSMC.

LMSI shall not be used in case only the SGSN number is sent by HLR.

The mobile terminated short message transfer procedure in the HLR is shown in figure 23.3/6.

CR editor's note: the material in the SDL diagrams has undergone major **editorial** rearrangement. The handling of the output signals on the old sheets 2, 3 & 4 has been moved to the new sheet 4, together with the handling on the old sheet 5. The intention of this rearrangement is to improve the presentation, with no technical impact.

Process Mobile_terminated_SM_HLR   23.3_6.1(5)

Figure 23.3/6:   The mobile terminated short message service process in the HLR in case the subscriber is registered as non-GPRS and/or GPRS

MAP_SEND_ROUTING_INFO_FOR_SM_ind

NULL

Check_Indication

OK   Error

'Subscriber known'   —No→

Yes

'MT SM provisioned'   —No→   'SET UE = UNKNOWN SUBSCRIBER'

Yes

'Operator barring'   —Yes→   'SET UE = TELE-SERVICE NOT PROVISIONED'

No

SM FILTERING BY HPLMN FUNCTION?   —Yes→   'SET UE = CALL BARRED'   'SET CB-CAUSE = OPERATOR BARRING'

No

GMSC supports GPRS functionality?   —No→   'SET UE = CALL BARRED'

Yes

'Which subscription?'

non-GPRS   GPRS   non-GPRS and GPRS

1 Page 2   4 Page 3   5 Page 4

MAP-SEND-ROUTING-INFO-FOR-SM-rsp
MAP-CLOSE-req

'SET CB-CAUSE = UNAUTHORISED MESSAGE ORIGINATOR'

Figure 23.3/6 (sheet 1 of 5): Process Mobile_terminated_SM_HLR

Process Mobile_terminated_SM_HLR   23.3_6.2(5)

Figure 23.3/6:   The mobile terminated short message
service process in the HLR in case the
subscriber is registered as non-GPRS
and/or GPRS

process MT_SM_HLR   MT_SM_HLR2(5)
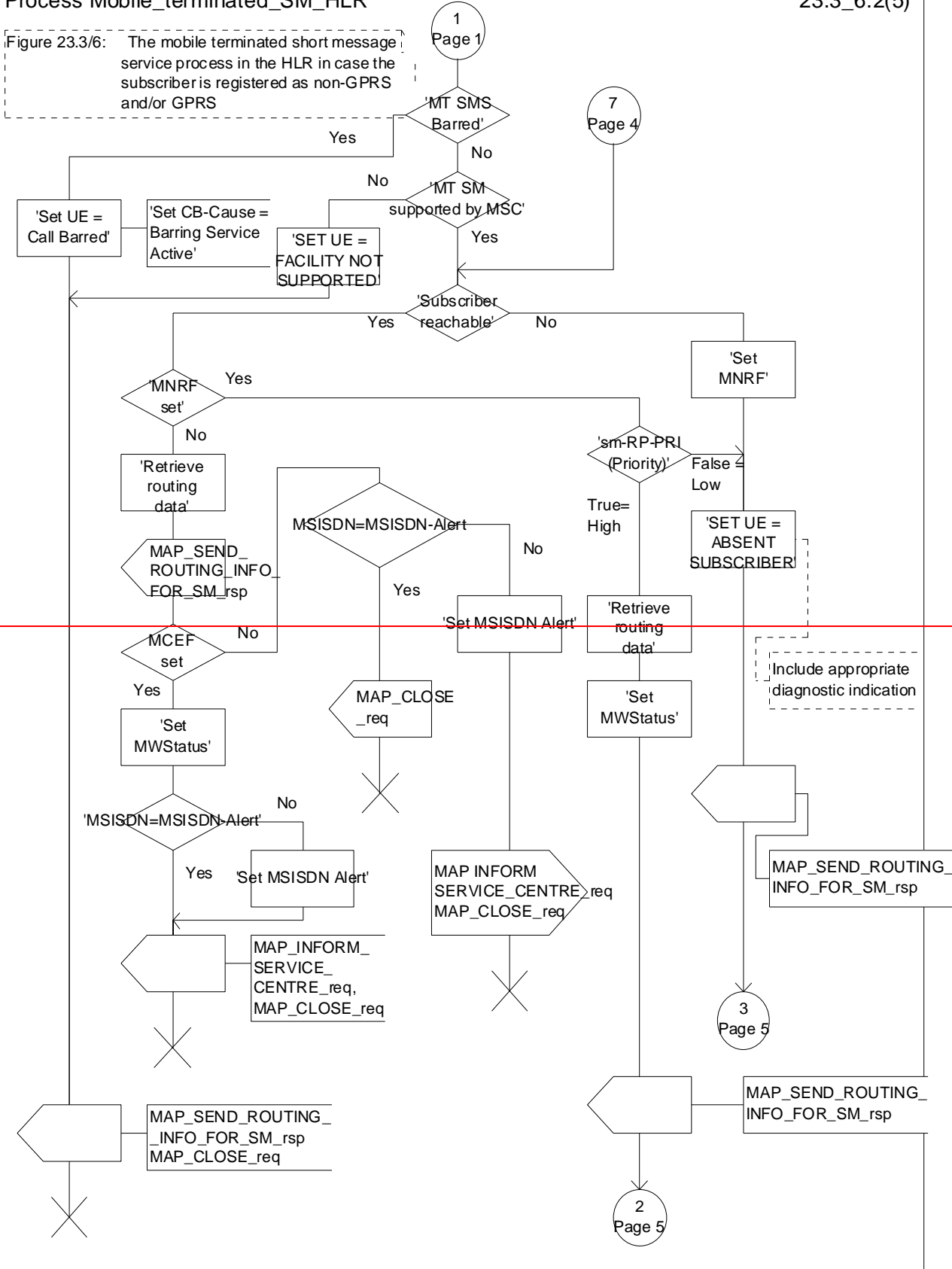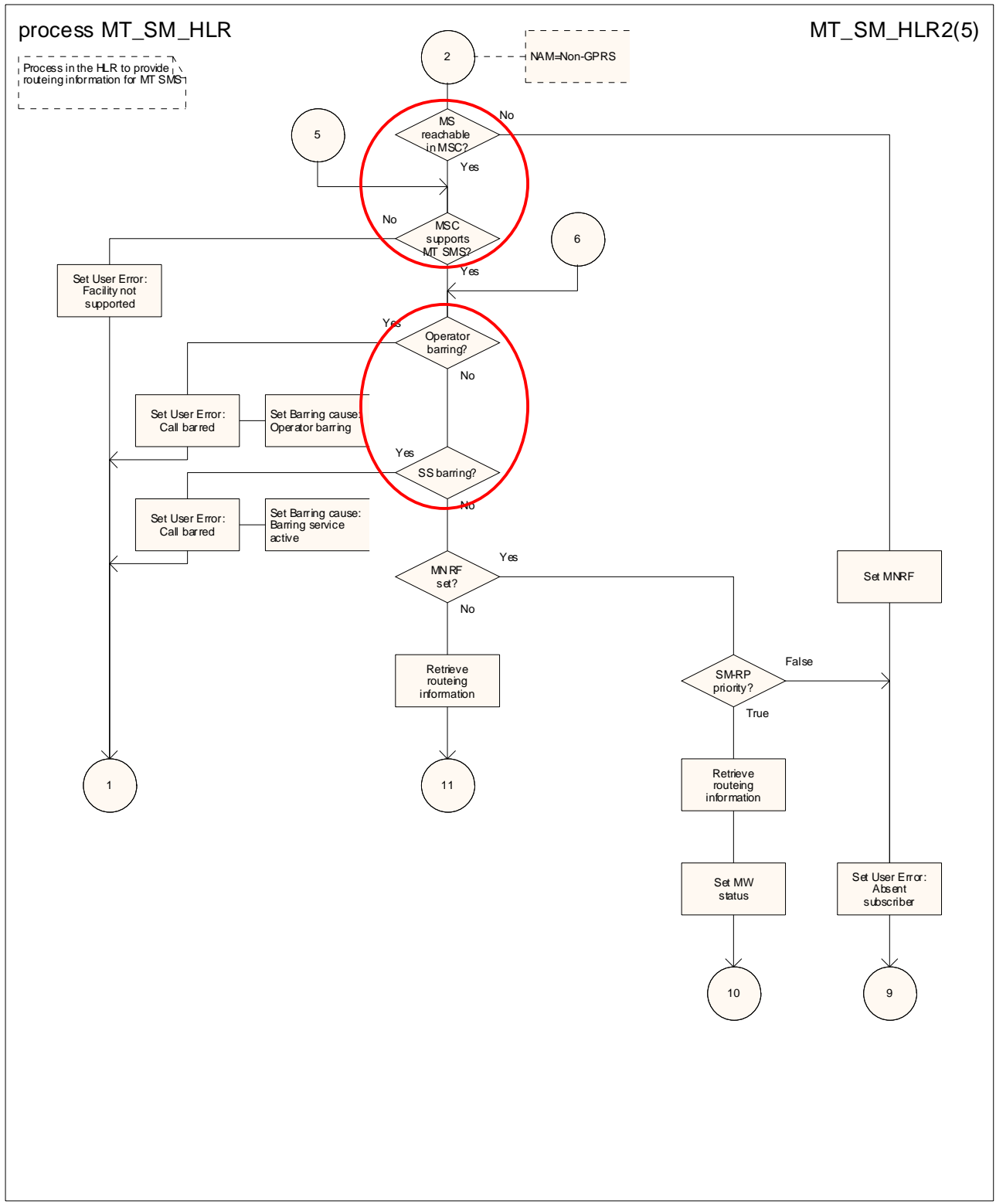
Figure 23.3/6 (sheet 2 of 5): Process Mobile_terminated_SM_HLR

Process Mobile_terminated_SM_HLR   23.3_6.3(5)

Figure 23.3/6:   The mobile terminated short message
service process in the HLR in case the
subscriber is registered as non-GPRS
and/or GPRS

process MT_SM_HLR   MT_SM_HLR3(5)

Process in the HLR to provide
routeing information for MT SMS

(3) - - - - [NAM=GPRS]

(7)

MS
reachable
in SGSN?
No ────────────────────────────────►
Yes

SGSN
supports
MT SMS?
No
Yes

(8)

Set User Error:
Facility not
supported

Operator
barring?
Yes
No

Set User Error: Set Barring cause:
Call barred   Operator barring

SS barring?
Yes
No

Set User Error: Set Barring cause:
Call barred   Barring service
                       active

MNRG
set?
Yes ────────────────────────────►
No

Set MNRG

Retrieve
routeing
information

SM-RP
priority?
False ──────────────►
True

Retrieve
routeing
information

(1)   (11)

Set MW
status

Set User Error:
Absent
subscriber

(10)   (9)

Figure 23.3/6 (sheet 3 of 5): Process Mobile_terminated_SM_HLR

Process Mobile_terminated_SM_HLR   23.3_6.4(5)

Figure 23.3/6:   The mobile terminated short me
service process in the HLR in case the
subscriber is registered as non-GPRS
and/or GPRS

```
                                                               5
                                                            Page 1                              No      'MT SMS      Yes
                                                                                                        Barred'

                                                              'MT SM
                                                         supported in VLR'
                                                  No                         Yes
                                                                                                                            4
                                         No          'MT SM            Yes                                                Page 3
                                                 supported in SGSN'

                                                                                          Yes    'Subscriber
  'MT SM                                                                                          reachable'
  supported in SGSN'                                 7
                                                   Page 2     No    'MNRF and    Yes                        No
            No                                                      MNRG set'

                                                                                                      'Set MNRF
      Yes                                    No    'MNRF                                               and MNRG'
                                                   set'       Yes
       6                                                     'SM_RP_PRI    True =
     Page 3                                                  (Priority)'    High
                                                                                            'sm-RP-PRI
                                              'MNRG        False = Low      (Priority)'
                                              set'
                                                          'Set SGSN                    True =   False =
                                                   No     address'                     High     Low
  'SET UE =               'Set MSC and   Yes
  FACILITY NOT           SGSN addresses'                                   'Set MSC and
  SUPPORTED'                                       'SM_RP_PRI  True = High  SGSN addresses'
                                                   (Priority)'
─────────────────────────────────────────────────────────────────────────────────────────────────────
                          'Retrieve                False = Low                                 'SET UE =
                          routing                                                              ABSENT
                          data'           'Set MSC   'Set MSC and                              SUBSCRIBER'
                                          address'   SGSN addresses'
                          MAP_SEND_                                                             Include appropriate
                          ROUTING_INFO_                                                         diagnostic indication
                          FOR_SM_rsp              MSISDN=MSISDN-Alert
                                                                         No
                          MCEF      No
                          set                     Yes                               MAP_SEND_ROUTING_
                                          MAP_CLOSE   'Set MSISDN Alert'             INFO_FOR_SM_rsp
                               Yes        _req
                          'Set                    MAP INFORM         'Retrieve
                          MWStatus'               SERVICE_CENTRE_req  routing
                                                  MAP_CLOSE_req       data'
                                                                                                  3
                    No                                                'Set                      Page 5
  'MSISDN=MSISDN-Alert'                                               MWStatus'

       Yes   'Set MSISDN Alert'                                                       MAP_SEND_ROUTING_
                                                                                      INFO_FOR_SM_rsp
          MAP_SEND_ROUTING_      MAP_INFORM_
          _INFO_FOR_SM_rsp       SERVICE_
          MAP_CLOSE_req          CENTRE_req,
                                 MAP_CLOSE_req
                                                      2
                                                    Page 5
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Figure 23.3/6 (sheet 4 of 5): Process Mobile_terminated_SM_HLR

Process Mobile_terminated_SM_HLR

23.3_6.5(5)

Figure 23.3/6: The mobile terminated short message service process in the HLR in case the subscriber is registered as non-GPRS and/or GPRS
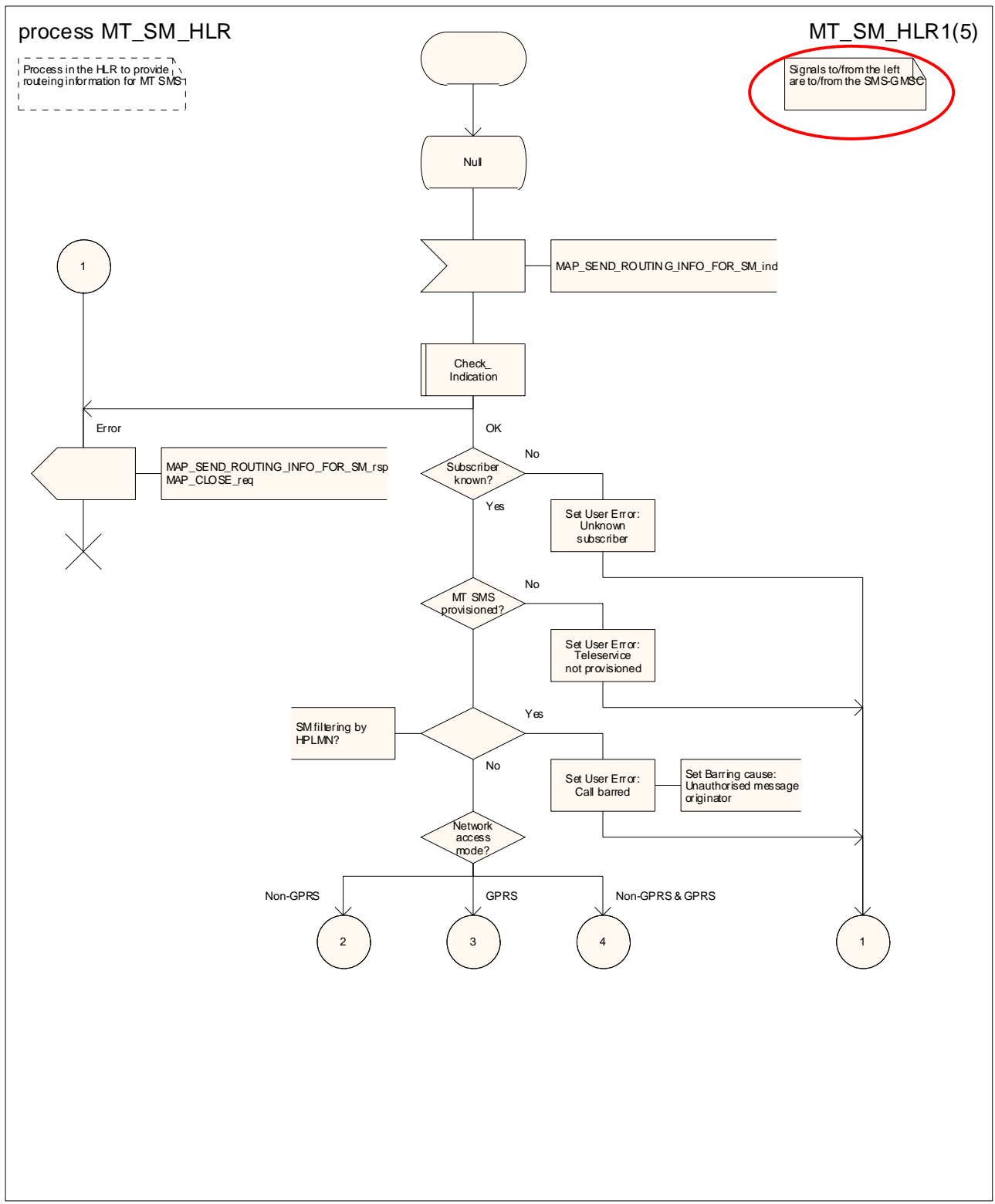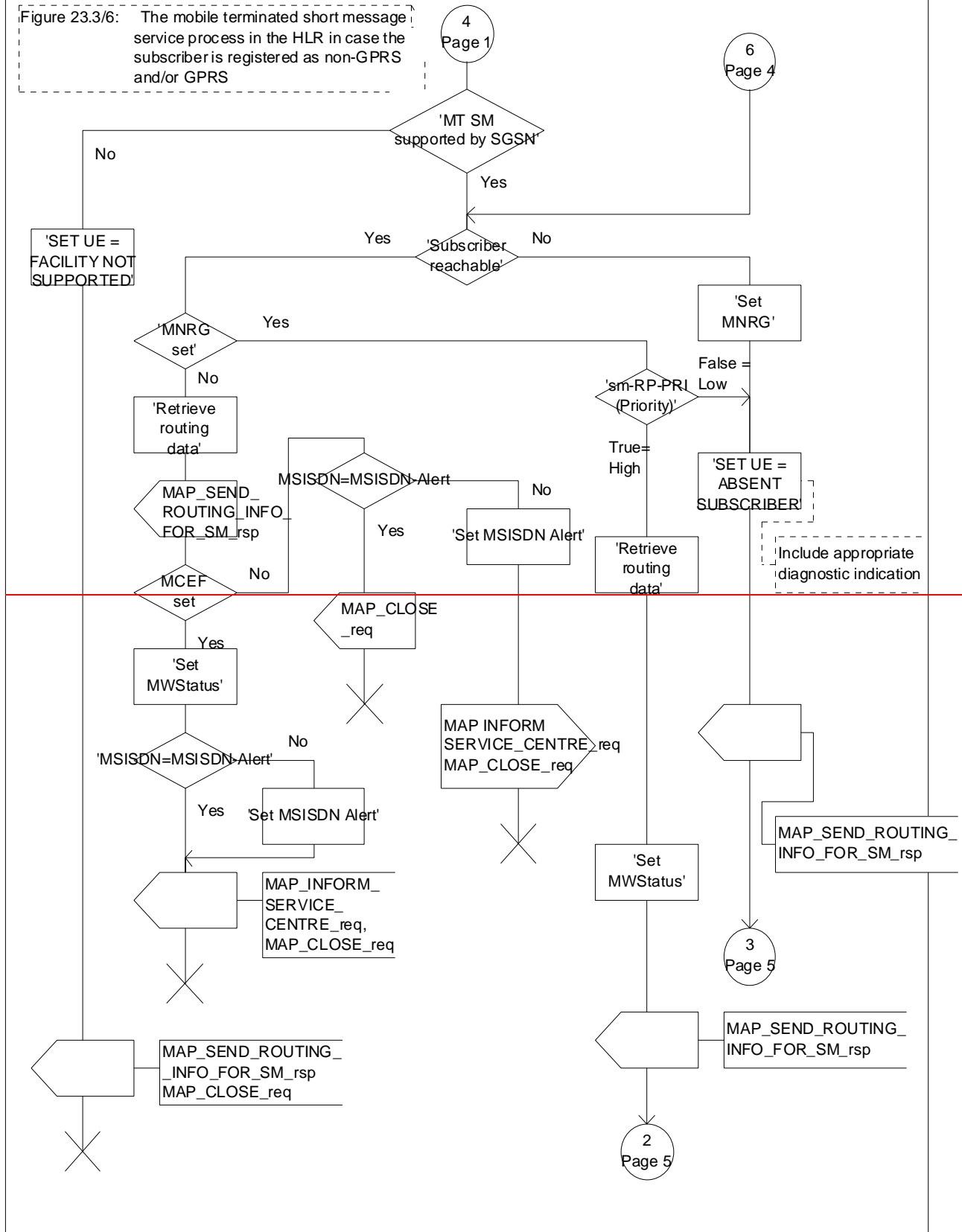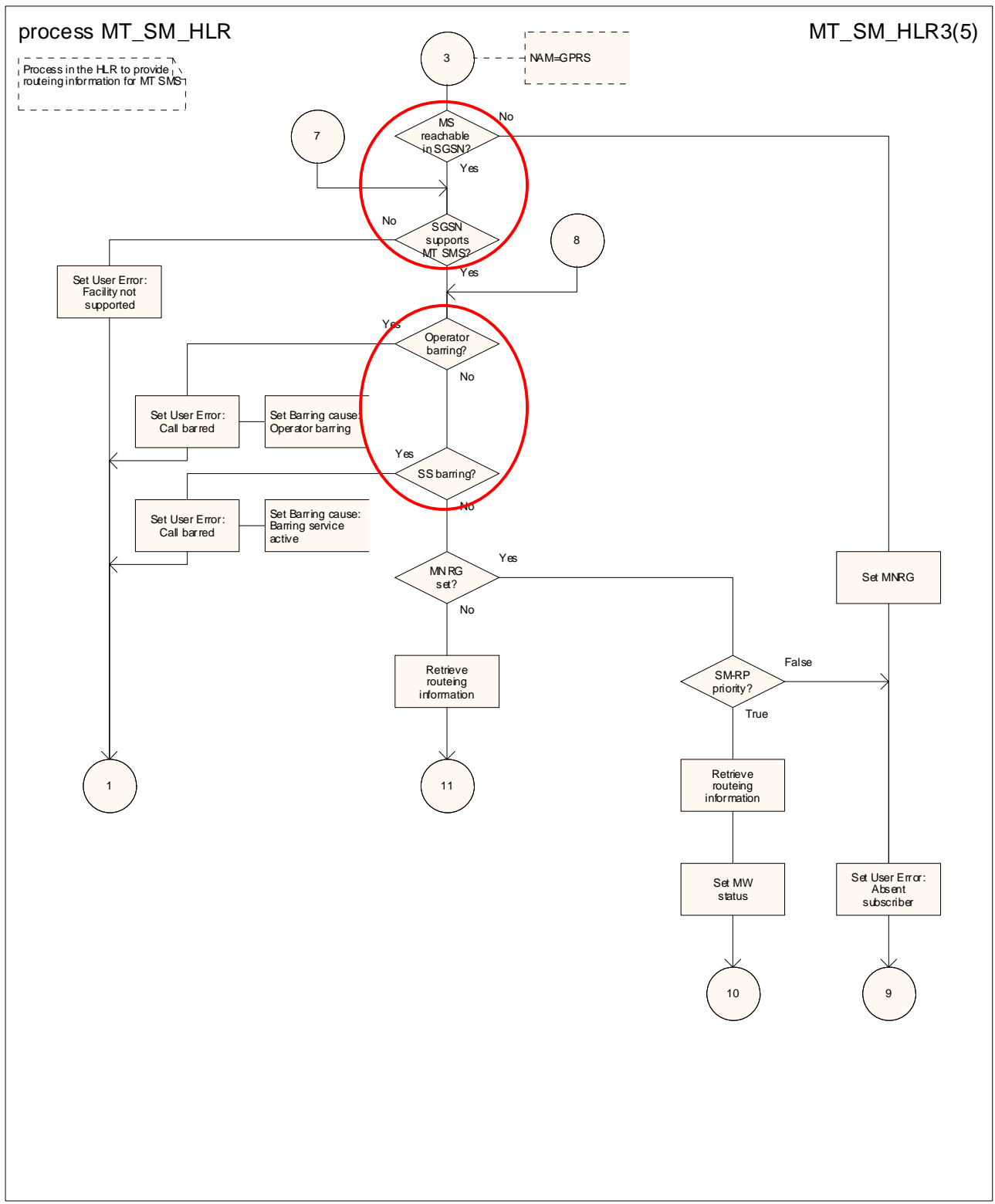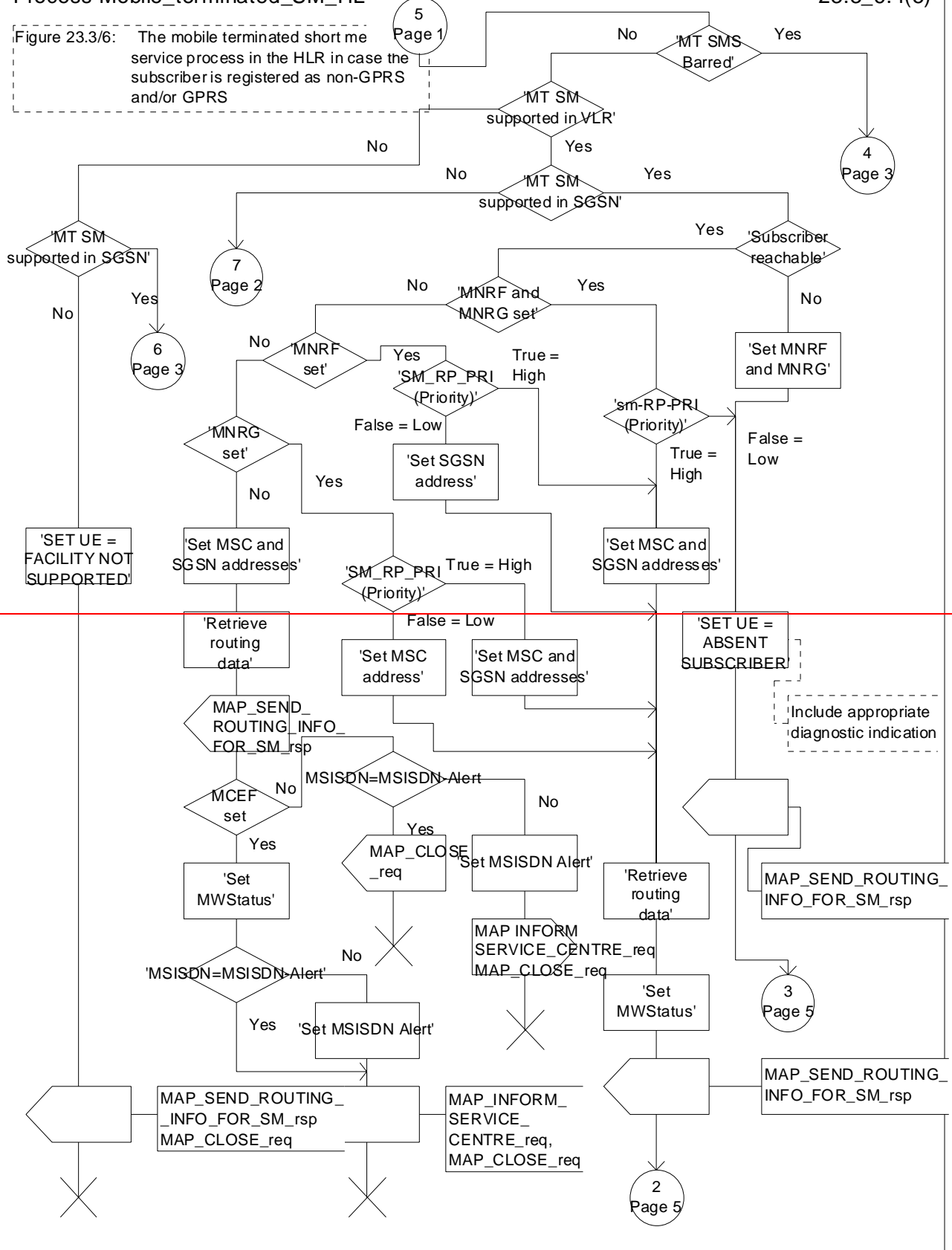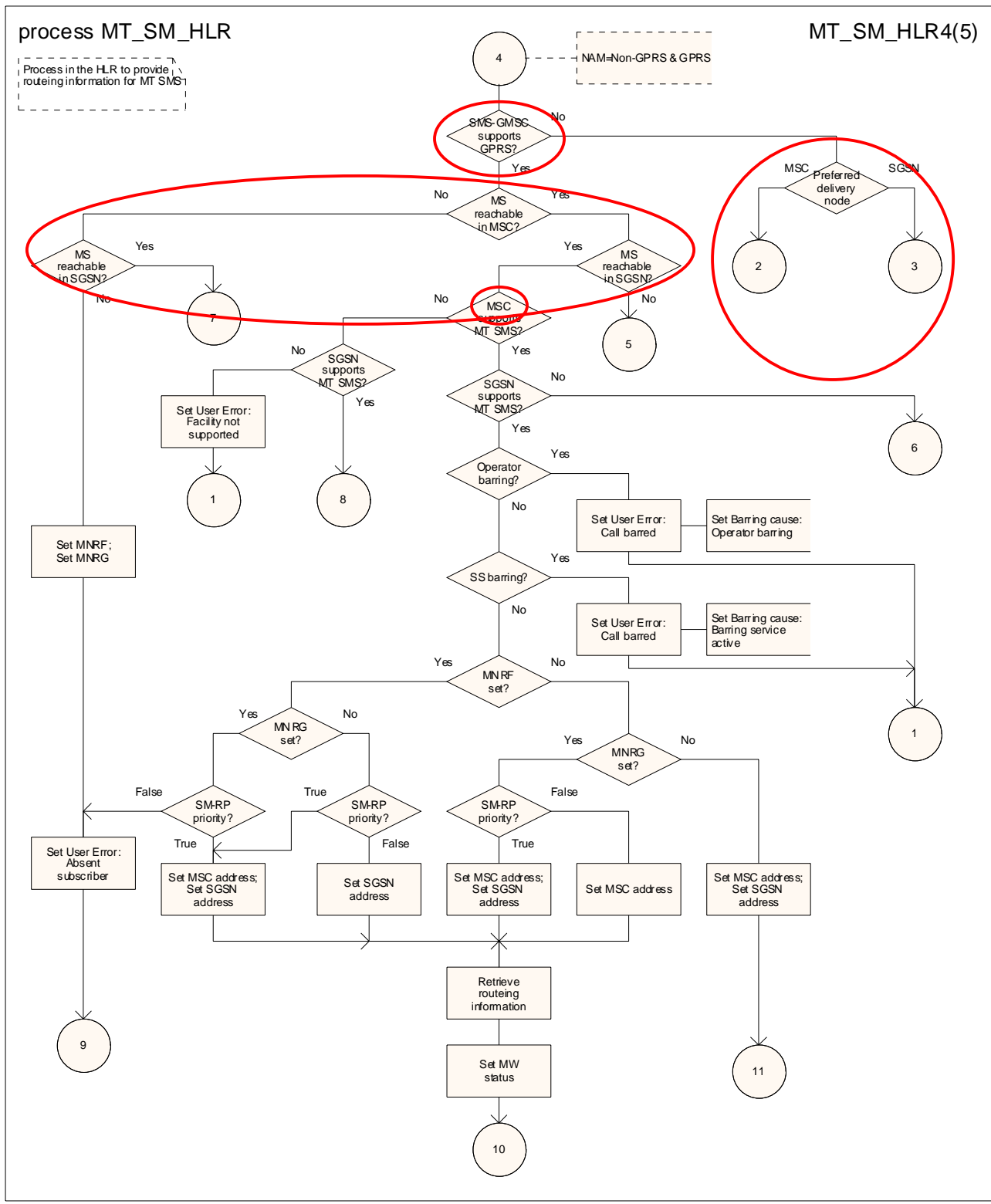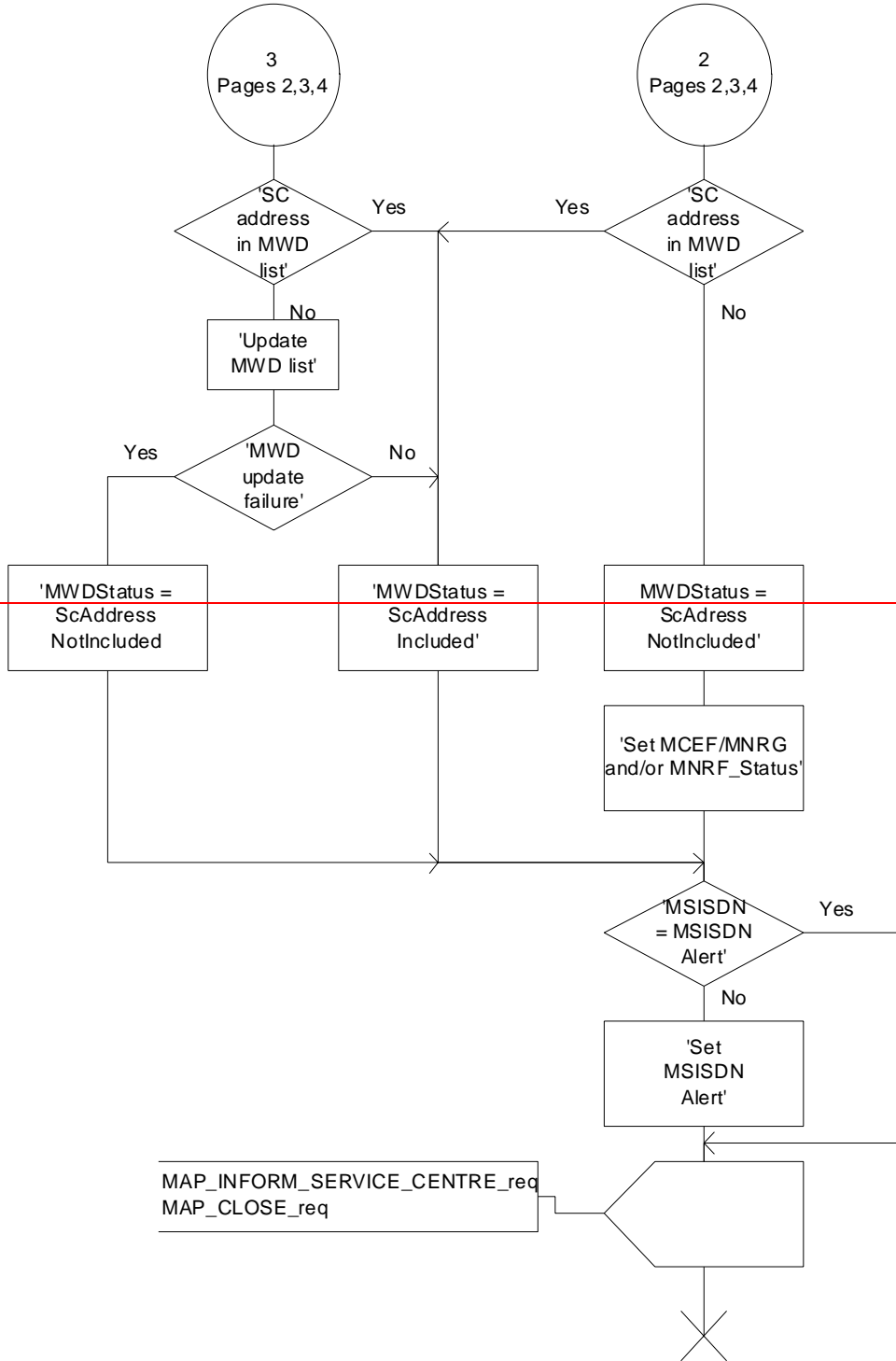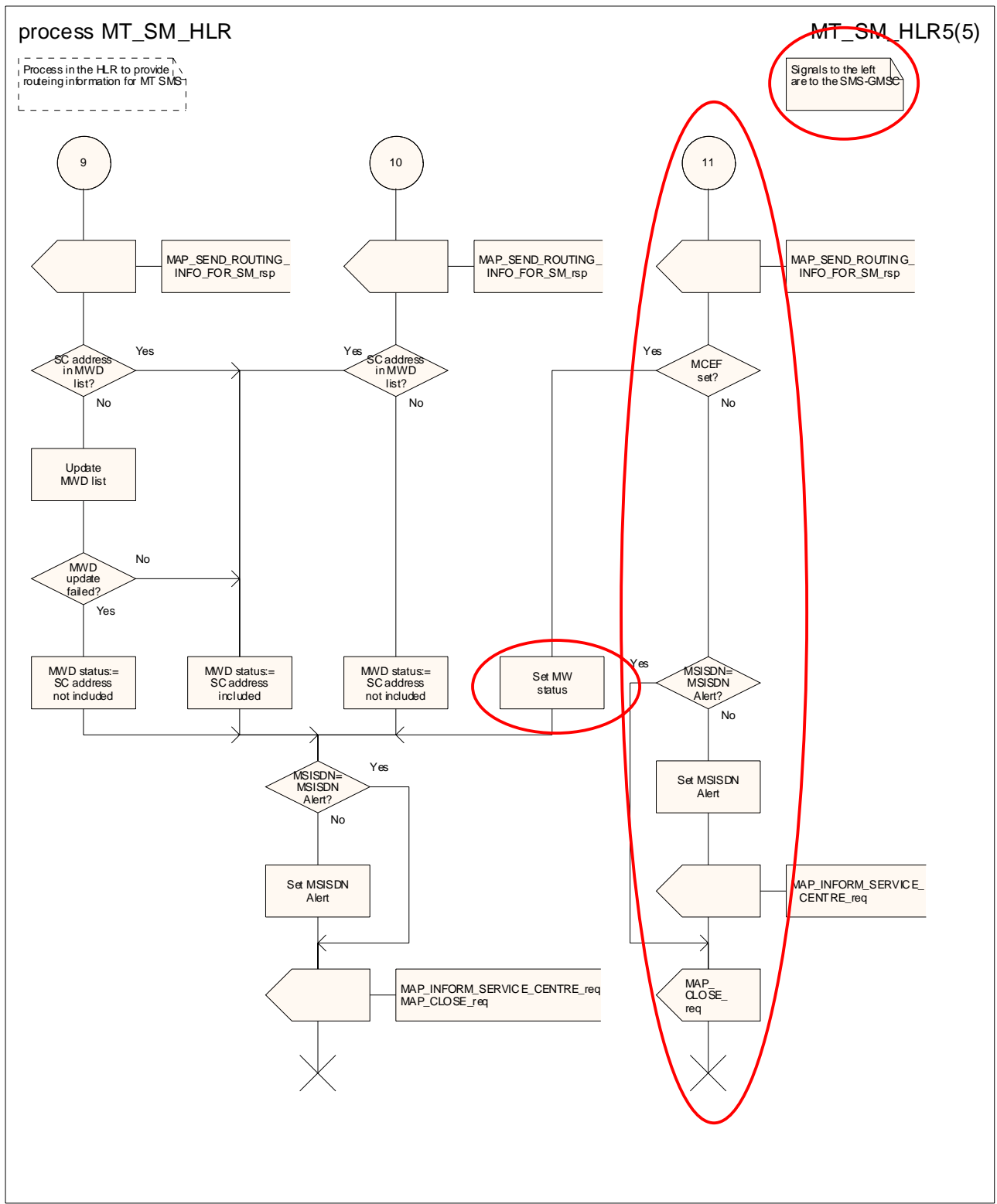
(3 / Pages 2,3,4)

(2 / Pages 2,3,4)

'SC address in MWD list' — Yes —— Yes — 'SC address in MWD list'

No (left diamond) → 'Update MWD list'

No (right diamond)

'Update MWD list' → 'MWD update failure'

Yes (MWD update failure) → 'MWDStatus = ScAddress NotIncluded

No (MWD update failure) → 'MWDStatus = ScAddress Included'

MWDStatus = ScAdress NotIncluded'

'Set MCEF/MNRG and/or MNRF_Status'

'MSISDN = MSISDN Alert' — Yes

No → 'Set MSISDN Alert'

MAP_INFORM_SERVICE_CENTRE_req
MAP_CLOSE_req

Figure 23.3/6 (sheet 5 of 5): Process Mobile_terminated_SM_HLR

<<End of document>>