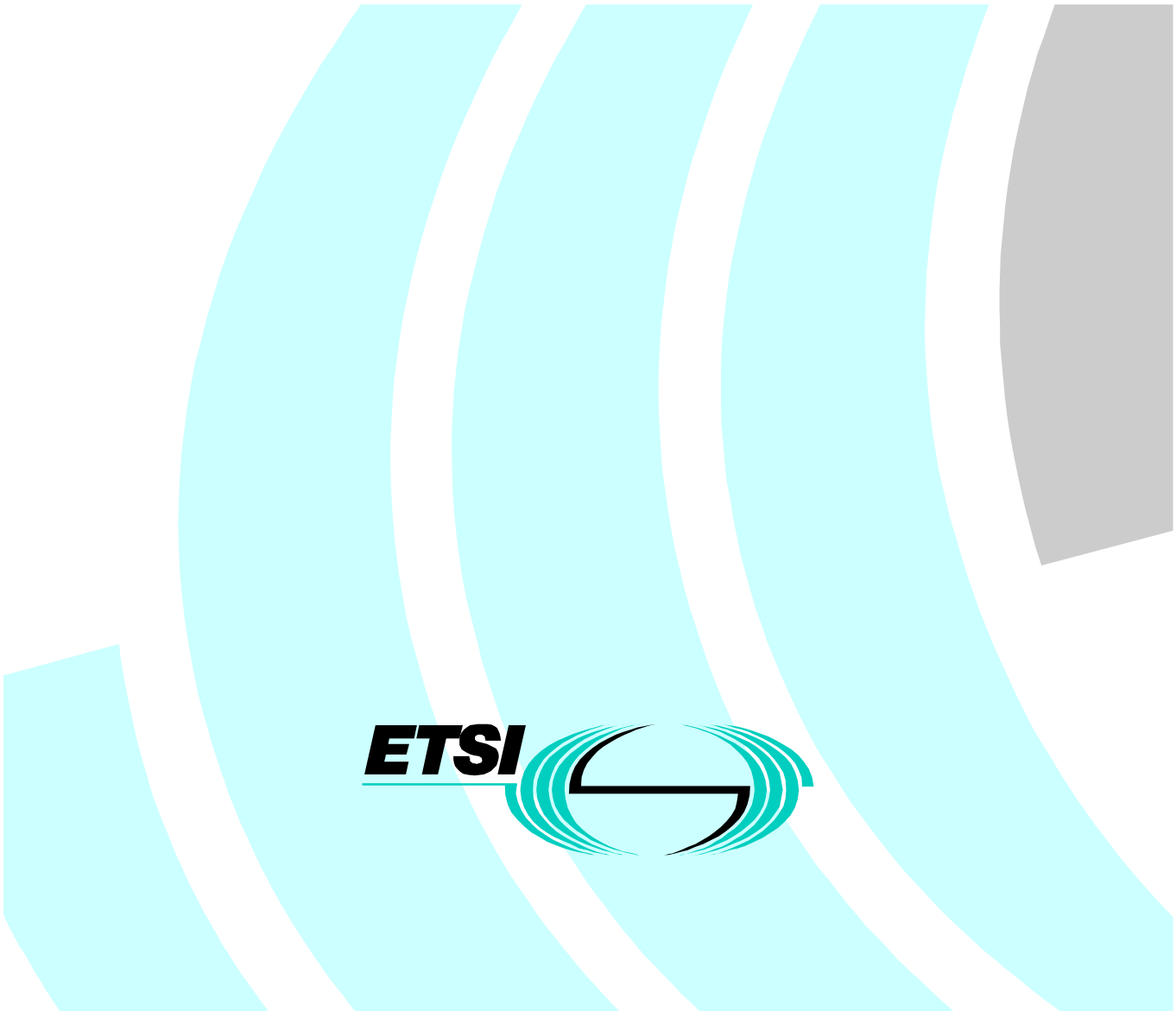
ETSI TS 101 377-3-17 V1.1.1 (2001-03)

Technical Specification

GEO-Mobile Radio Interface Specifications;
Part 3: Network specifications;
Sub-part 17: Call Barring (CB)
Supplementary Services - Stage 2;
GMR-2 03.088



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supplementary service

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Contents

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IPRs:

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TS 101 377 V1.1.1	Digital Voice Systems Inc		US	US 5,715,365	US
TS 101 377 V1.1.1	Digital Voice Systems Inc		US	US 5,754,974	US
TS 101 377 V1.1.1	Digital Voice Systems Inc		US	US 5,226,084	US
TS 101 377 V1.1.1	Digital Voice Systems Inc		US	US 5,701,390	US
TS 101 377 V1.1.1	Digital Voice Systems Inc		US	US 5,826,222	US

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Project	Company	Title	Country of Origin	Patent n°	Countries Applicable
TS 101 377 V1.1.1	Ericsson Mobile Communication	Improvements in, or in relation to, equalisers	GB	GB 2 215 567	GB
TS 101 377 V1.1.1	Ericsson Mobile Communication	Power Booster	GB	GB 2 251 768	GB
TS 101 377 V1.1.1	Ericsson Mobile Communication	Receiver Gain	GB	GB 2 233 846	GB
TS 101 377 V1.1.1	Ericsson Mobile Communication	Transmitter Power Control for Radio Telephone System	GB	GB 2 233 517	GB

IPR Owner: Ericsson Mobile Communications (UK) Limited
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Project	Company	Title	Country of Origin	Patent n°	Countries Applicable
TS 101 377 V1.1.1	Hughes Network Systems		US	Pending	US

IPR Owner: Hughes Network Systems
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Fax: +1 301-428-2802

Project	Company	Title	Country of Origin	Patent n°	Countries Applicable
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	2.4-to-3 KBPS Rate Adaptation Apparatus for Use in Narrowband Data and Facsimile Communication Systems	US	US 6,108,348	US
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Cellular Spacecraft TDMA Communications System with Call Interrupt Coding System for Maximizing Traffic ThroughputCellular Spacecraft TDMA Communications System with Call Interrupt Coding System for Maximizing Traffic Throughput	US	US 5,717,686	US
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Enhanced Access Burst for Random Access Channels in TDMA Mobile Satellite System	US	US 5,875,182	
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Spacecraft Cellular Communication System	US	US 5,974,314	US
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Spacecraft Cellular Communication System	US	US 5,974,315	US
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Spacecraft Cellular Communication System with Mutual Offset High-argin Forward Control Signals	US	US 6,072,985	US
TS 101 377 V1.1.1	Lockheed Martin Global Telecommunic. Inc	Spacecraft Cellular Communication System with Spot Beam Pairing for Reduced Updates	US	US 6,118,998	US

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES).

The contents of the present document are subject to continuing work within TC-SES and may change following formal TC-SES approval. Should TC-SES modify the contents of the present document it will then be republished by ETSI with an identifying change of release date and an increase in version number as follows:

Version 1.m.n

where:

- the third digit (n) is incremented when editorial only changes have been incorporated in the specification;
- the second digit (m) is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.

The present document is part 3, sub-part 17 of a multi-part deliverable covering the GEO-Mobile Radio Interface Specifications, as identified below:

Part 1: "General specifications";

Part 2: "Service specifications";

Part 3: "Network specifications";

Sub-part 1: "Network Functions; GMR-2 03.001";

Sub-part 2: "Network Architecture; GMR-2 03.002";

Sub-part 3: "Numbering, Addressing and Identification; GMR-2 03.003";

Sub-part 4: "Restoration Procedures; GMR-2 03.007";

Sub-part 5: "Organization of Subscriber Data; GMR-2 03.008";

Sub-part 6: "Handover Procedures; GMR-2 03.009";

Sub-part 7: "Technical Realization of Short Message Service (SMES) Point-to-Point; GMR-2 03.040";

Sub-part 8: "Location Registration Procedures; GMR-2 03.012";

Sub-part 9: "Discontinuous Reception (DRX) in the GMR-2 System; GMR-2 03.013";

Sub-part 10: "Security Related Network Functions; GMR-2 03.020";

Sub-part 11: "Functions Related to Mobile Earth Station (MES) in idle Mode; GMR-2 03.022";

Sub-part 12: "Technical Realization of Facsimile Group 3 Transparent; GMR-2 03.045";

Sub-part 13: "Transmission Planning Aspects of the Speech Service in the Public Satellite Mobile Network (PSMN) system; GMR-2 03.050";

Sub-part 14: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 2; GMR-2 03.083";

Sub-part 15: "Multiparty Supplementary Services; GMR-2 03.084";

Sub-part 16: "Technical Realization of Operator Determined Barring; GMR-2 03.015";

Sub-part 17: "Call Barring (CB) Supplementary Services - Stage 2; GMR-2 03.088";

Part 4: "Radio interface protocol specifications";

Part 5: "Radio interface physical layer specifications";

Part 6: "Speech coding specifications";

Part 7: "Terminal adaptor specifications".

Introduction

GMR stands for GEO (Geostationary Earth Orbit) Mobile Radio interface, which is used for mobile satellite services (MSS) utilizing geostationary satellite(s). GMR is derived from the terrestrial digital cellular standard GSM and supports access to GSM core networks.

Due to the differences between terrestrial and satellite channels, some modifications to the GSM standard are necessary. Some GSM specifications are directly applicable, whereas others are applicable with modifications. Similarly, some GSM specifications do not apply, while some GMR specifications have no corresponding GSM specification.

Since GMR is derived from GSM, the organization of the GMR specifications closely follows that of GSM. The GMR numbers have been designed to correspond to the GSM numbering system. All GMR specifications are allocated a unique GMR number as follows:

GMR-n xx.zyy

where:

xx.0yy (z=0) is used for GMR specifications that have a corresponding GSM specification. In this case, the numbers xx and yy correspond to the GSM numbering scheme.

xx.2yy (z=2) is used for GMR specifications that do not correspond to a GSM specification. In this case, only the number xx corresponds to the GSM numbering scheme and the number yy is allocated by GMR.

n denotes the first (n=1) or second (n=2) family of GMR specifications.

A GMR system is defined by the combination of a family of GMR specifications and GSM specifications as follows:

- If a GMR specification exists it takes precedence over the corresponding GSM specification (if any). This precedence rule applies to any references in the corresponding GSM specifications.

NOTE: Any references to GSM specifications within the GMR specifications are not subject to this precedence rule. For example, a GMR specification may contain specific references to the corresponding GSM specification.

- If a GMR specification does not exist the corresponding GSM specification may or may not apply. The applicability of the GSM specifications are defined in GMR-n 01.201

1 Scope

The present document gives the stage 2 description of the call barring services. It defines the possibility for a mobile subscriber to have certain categories of calls barred. Specific categories are as follows:

- Barring of all outgoing calls (BAOC) - (Barring program 1) (see figure 4.8);
- Barring of all incoming calls (BAIC) - (Barring program 2) (see figure 5.8).

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, subsequent revisions do apply.

[1] GMR-2 01.004 (ETSI TS 101 377-1-1): "GEO-Mobile Radio Interface Specifications; Part 1: General specifications; Sub-part 1: Abbreviations and Acronyms".

[2] GSM 02.82 (ETS 300 515) "European digital cellular telecommunications system (Phase 2); Call Forwarding (CF) supplementary services - Stage 1" (V4.5.2).

[3] GSM 03.11 (ETS 300 529): "European digital cellular telecommunications system (Phase 2); Technical realization of supplementary services" (V4.9.1).

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Cross-Phase compatibility

For the following supplementary services, a number of changes exist between the present document and the Phase 1 specification:

- barring of outgoing calls;
- barring of incoming calls.

The main body of the present document assumes that all network entities comply with this version of the service. In each case, an additional clause (i.e. 4.8 and 5.8) defines the additional requirements for when one or more network entities or the MES complies with the Phase 1 specifications for the supplementary service procedures.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in GMR-2 01.004 [1] apply.

4 Barring of outgoing calls

4.1 Handling of barring of outgoing calls

4.1.1 Registration

If the served mobile subscriber at provision time has selected the subscription option "control of barring services by subscriber using password", he has to register a password at provision time. Furthermore the served mobile subscriber can change the password by an appropriate control procedure at any time. The control procedure consists of three steps: first, the old password has to be provided. Secondly, the new password has to be given, after which it has to be verified by providing it once more, see GSM 03.11 [3].

If the served mobile subscriber at provision time has selected the subscription option "control of barring services by the service provider" an attempt to register a password will be denied and the served mobile subscriber should receive a notification.

The subscriber can register a new password, thus causing the previous registration to be overridden, see GSM 03.11 [3].

4.1.2 Activation

4.1.2.1 General

If the served mobile subscriber at provision time has selected the subscription option "control of barring services by subscriber using password" the supplementary service is activated if the subscriber provides the following information to the network:

1) password;

2) information as to whether the activation applies to all basic services or a specific basic service group;

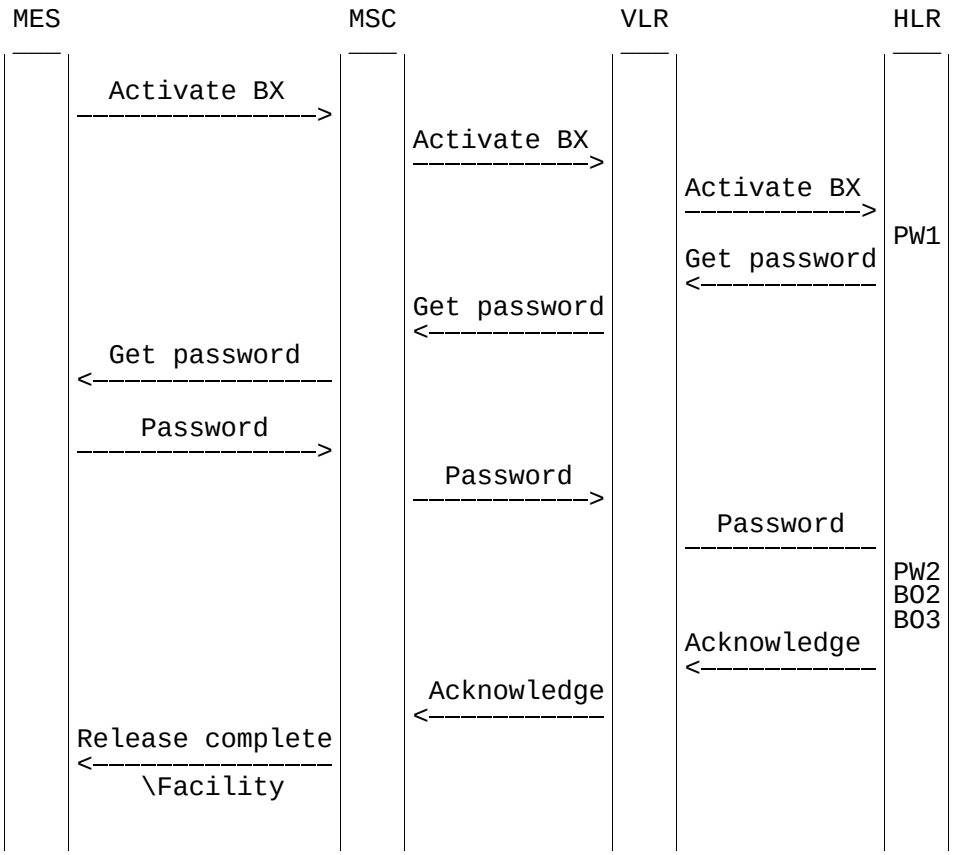
3) selected barring program.

Activation can take place with an appropriate control procedure by the subscriber.

If the served mobile subscriber at provision time has selected the subscription option "control of barring services by the service provider", the supplementary service cannot be activated by the subscriber. The activation has to be performed by the service provider. An attempt to activate the service will be denied and the served mobile subscriber should receive a notification.

If the served mobile subscriber at provision time has selected the subscription option "control of barring services by subscriber using password", and if a wrong password is entered to activate the service the supplementary service will not be activated and the served mobile subscriber is notified.

The information flow for activation of barring of outgoing calls is shown in figure 4.1. For more details see GSM 03.11 [3].



NOTE: BX indicates any of the barring programs. PW1 and PW2 indicate password handling programs, see GSM 03.11 [3].

Figure 4.1: Activation of barring of outgoing calls

4.1.2.2 Interactions between barring of outgoing call programs

In case the mobile subscriber activates one of the call barring programs and another call barring program was already activated, this program will be deactivated and the requested call barring program will be activated. The SDL diagram in figure 4.2 shows the function to be performed in the HLR in order to deal with this interaction between call barring programs.

4.1.2.3 Interactions with call forwarding supplementary services

For interactions with call forwarding supplementary services see GSM 02.82 [2].

The SDL diagram in figure 4.3 shows the function to be performed in the HLR in order to deal with the interactions with call forwarding supplementary services.

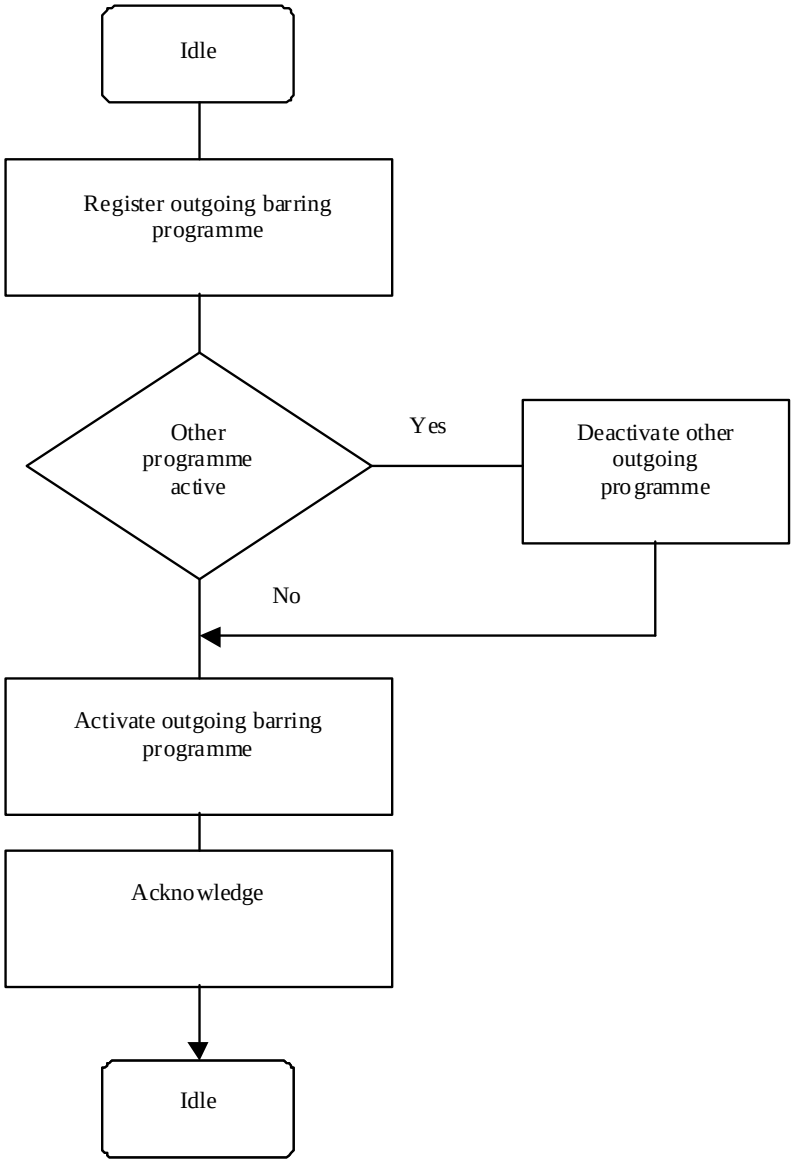


Figure 4.2: BO2 Interaction between call barring programs

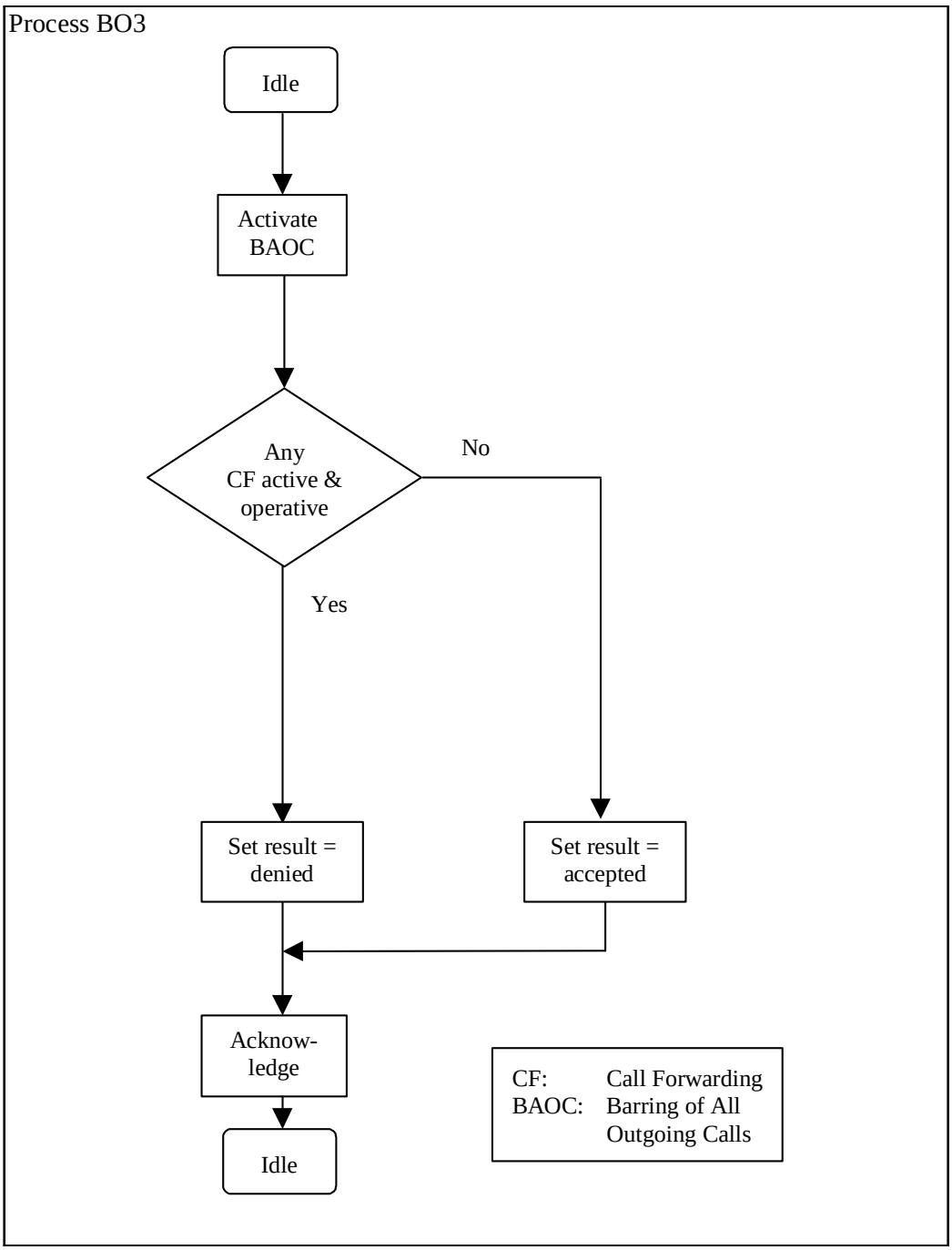
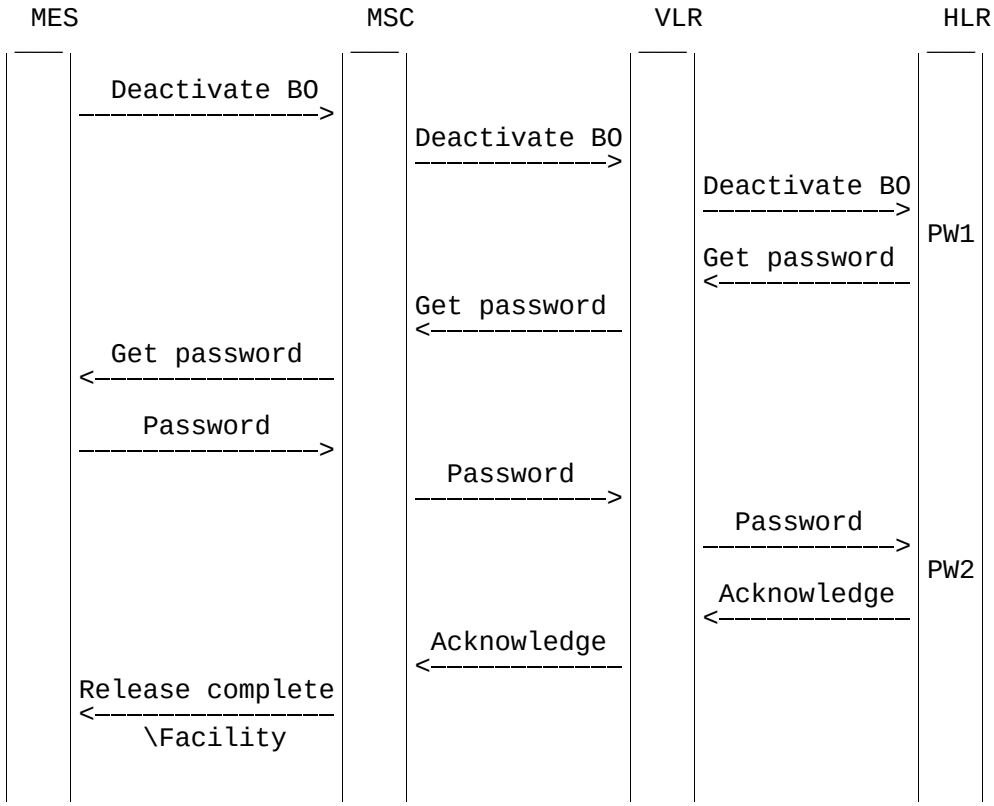


Figure 4.3: BO3 Interaction between call forwarding supplementary services and barring of outgoing calls programs

4.1.3 Deactivation

The procedure for activation, described in clause4.1.2.1, is valid also correspondingly for deactivation with the addition that a barring supplementary service, i.e. the Outgoing barring service, or All barring services can be signalled.

The information flow for deactivation of barring of outgoing calls is shown in figure 4.4. For more details see GSM 03.11 [3].



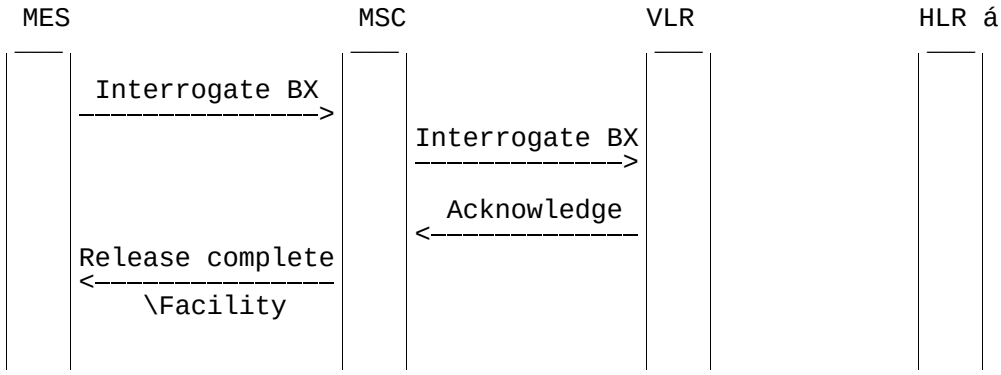
NOTE: BO indicates the general code for barring of outgoing calls. PW1 and PW2 indicate password handling programs, see GSM 03.11 [3].

Figure 4.4: Deactivation of barring of outgoing calls

4.1.4 Interrogation

The interrogation procedure enables the mobile subscriber to obtain information about the data stored in the PSMN. After having requested this procedure the network shall return a list of all basic services to which the given barring program is active.

The information flow for interrogation of barring of outgoing calls is shown in figure 4.5.



NOTE: BX indicates any of the barring programs.

Figure 4.5: Interrogation of barring of outgoing calls

4.2 Functions and information flows

The following Mobile Additional Function has been identified:

MAF017:

- barring of all outgoing calls related authorizations examination;
- the ability of a PSMN component to determine the authorizations relating to barring of all outgoing calls (see figure 4.6);
- location: VLR.

The information flow for barring of outgoing calls is shown in figure 4.7.

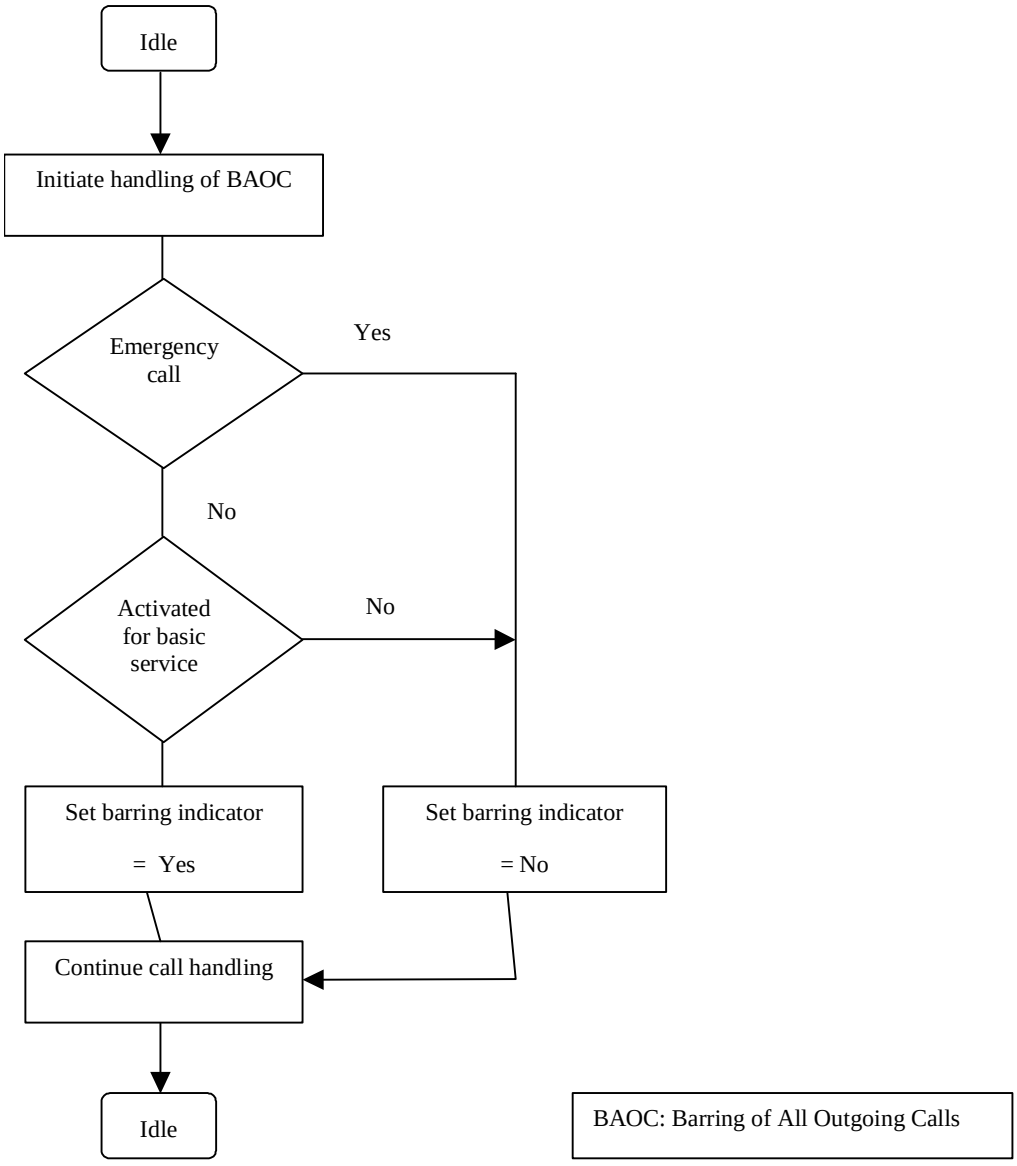
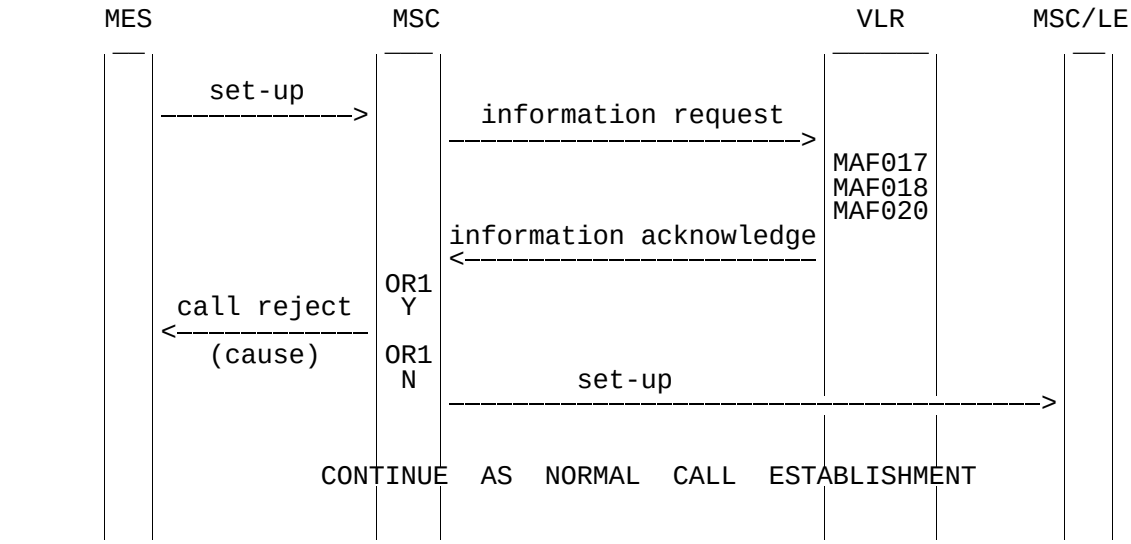


Figure 4.6: MAF017 Barring of all outgoing calls related authorizations examination (VLR)



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

Figure 4.7: Information flow for barring of outgoing calls

4.3 Information stored in the HLR

For all call barring supplementary services, the HLR must store:

- the subscription option "control of barring services" on a per subscriber basis.

This subscription option takes one of the following values:

- by subscriber using password;
- by the service provider.

If the subscription option "control of barring services" has been set to "by subscriber using password" for barring of outgoing calls, the HLR must store on a per subscriber basis:

- the registration parameter "call barring password".

The password is valid for all basic services to which barring of outgoing calls applies:

- the status parameter "wrong password attempts counter" associated with the password.

Note that the subscription option and the call barring password are parameters associated with all call barring services.

The outgoing calls barring program may have the following logical states (refer to GSM 03.11 [3] for an explanation of the notation):

Provisioning State	Registration State	Activation State	HLR Induction State
Not Provisioned	Not Applicable	Not Active	Not Induced
Provisioned	Not Applicable	Not Active	Not Induced
Provisioned	Not Applicable	Active and Operative	Not Induced
Not Provisioned	Not Applicable	Not Active	Induced
Provisioned	Not Applicable	Not Active	Induced
Provisioned	Not Applicable	Active and Operative	Induced

The activation and HLR induction states may be different for each applicable elementary basic service group.

The provisioning state shall be on a per subscriber basis, and hence the same for all basic service groups.

The HLR shall also store the logical state of the outgoing calls barring program (which shall be one of the valid states listed above) for each applicable elementary basic service group.

4.4 State transition model

Figure 4.8 shows the successful cases of transition between the applicable logical states of the barring of outgoing call program. The state changes are either caused by actions of the service provider, the mobile user or the network. Note that error cases are not shown in the diagram, as they normally do not cause a state change. Additionally, some successful requests may not cause a state change. Hence, they are not shown in diagram. The diagram only shows operations on an elementary basic service group.

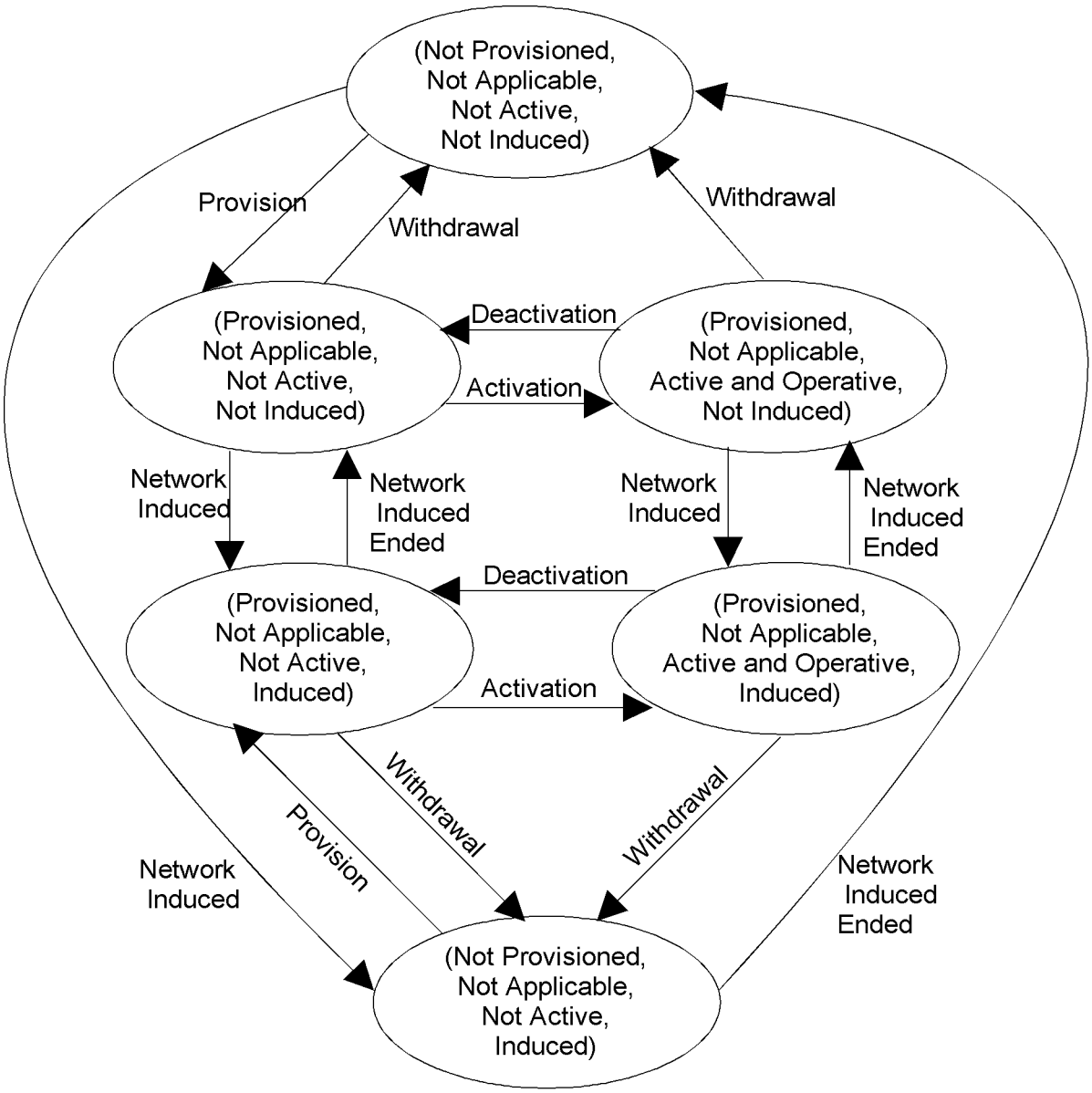


Figure 4.8: State transition model for BAOC

4.5 Transfer of information from HLR to VLR

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

If the HLR induction state for the outgoing calls barring program is "Induced", then when the subscriber registers on a VLR, the HLR shall send that VLR 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, then for the affected basic service groups, the HLR shall inform the VLR of the new logical state of the program.

4.6 Information stored in the VLR

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

4.7 Handover

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

4.8 Cross Phase compatibility

4.8.1 MES, 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 MES 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.

4.8.2 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.

5 Barring of incoming calls

5.1 Handling of barring of incoming calls

5.1.1 Registration

If the served mobile subscriber at provision time has selected the subscription option "control of barring services by subscriber using password", he has to register a password at provision time. Furthermore the served mobile subscriber can change the password by an appropriate control procedure at any time. The control procedure consists of three steps: first, the old password has to be provided. Secondly, the new password has to be given, after which it has to be verified by providing it once more, see GSM 03.11 [3].

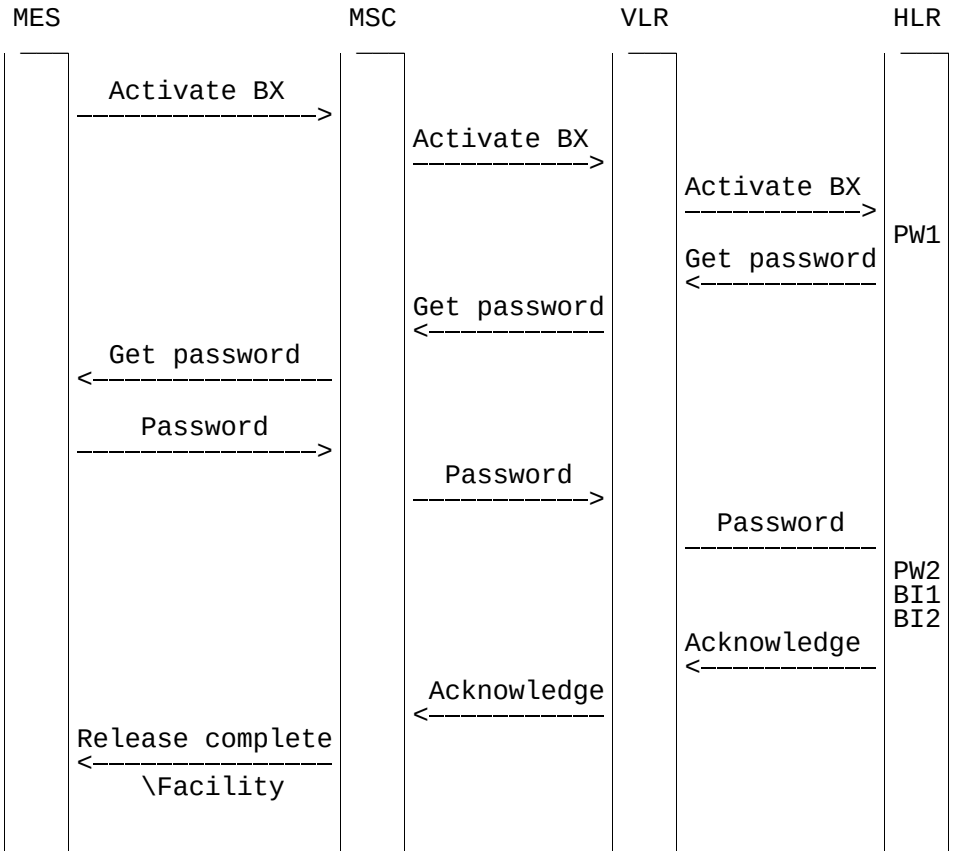
If the served mobile subscriber at provision time has selected the subscription option "control of barring services by the service provider" an attempt to register a password will be denied and the served mobile subscriber should receive a notification.

The subscriber can register a new password, thus causing the previous registration to be overridden, see GSM 03.11 [3].

5.1.2 Activation

5.1.2.1 General

The procedure for activation of Barring of outgoing calls, described in clause 4.1.2.1, is valid also for activation of barring of incoming calls. The information flow for activation of barring of incoming calls is shown in figure 5.1. For more details see GSM 03.11 [3].



NOTE: BX indicates any of the barring programs.
PW1 and PW2 indicate password handling programs, see GSM 03.11 [3].

Figure 5.1: Activation of barring of incoming calls

5.1.2.2 Interactions between barring of incoming call programs

The SDL diagram in figure 5.2 shows the function to be performed in the HLR in order to deal with any interaction between call barring services.

5.1.2.3 Interactions with call forwarding supplementary services

For interactions with call forwarding supplementary services see GSM 02.82 [2]. The SDL diagram in figure 5.3 shows the function to be performed in the HLR in order to deal with the interactions with call forwarding services.

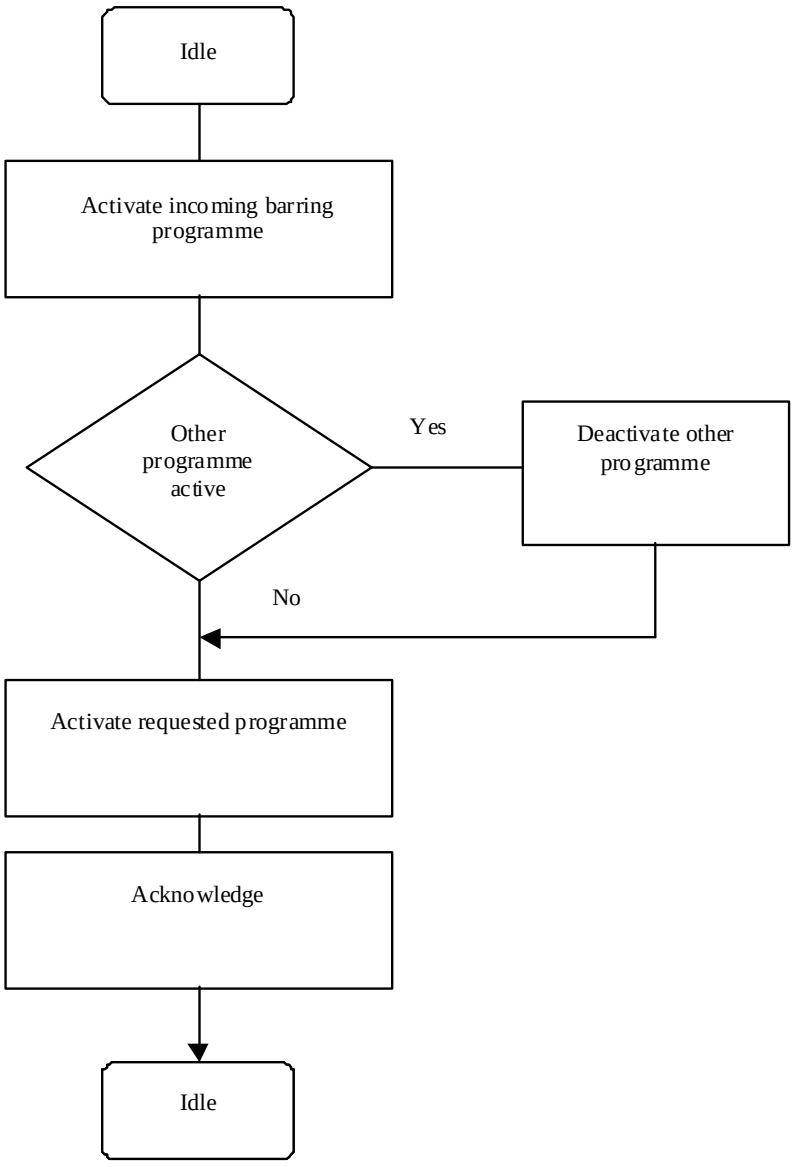


Figure 5.2: BI1 Interaction between call barring programs

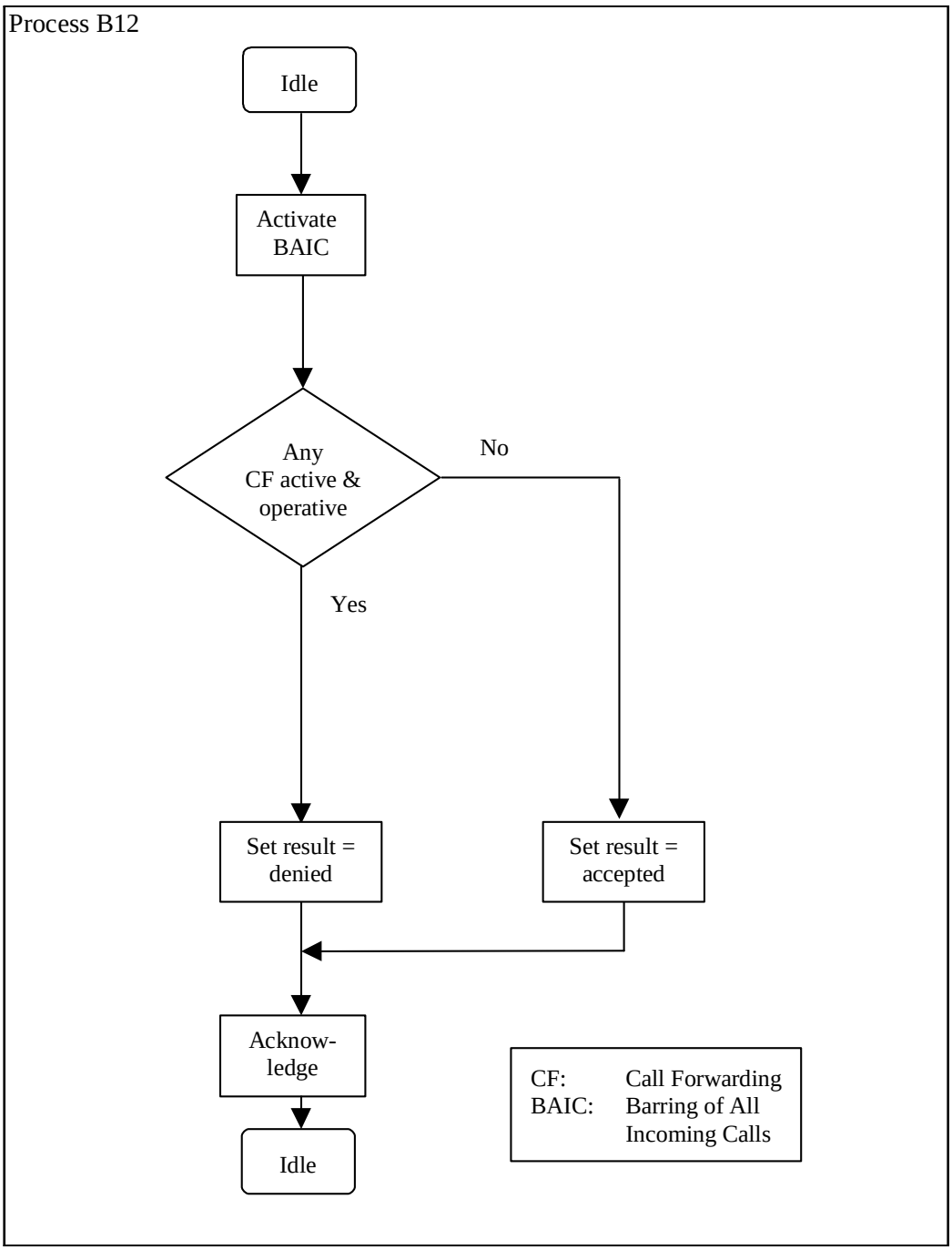
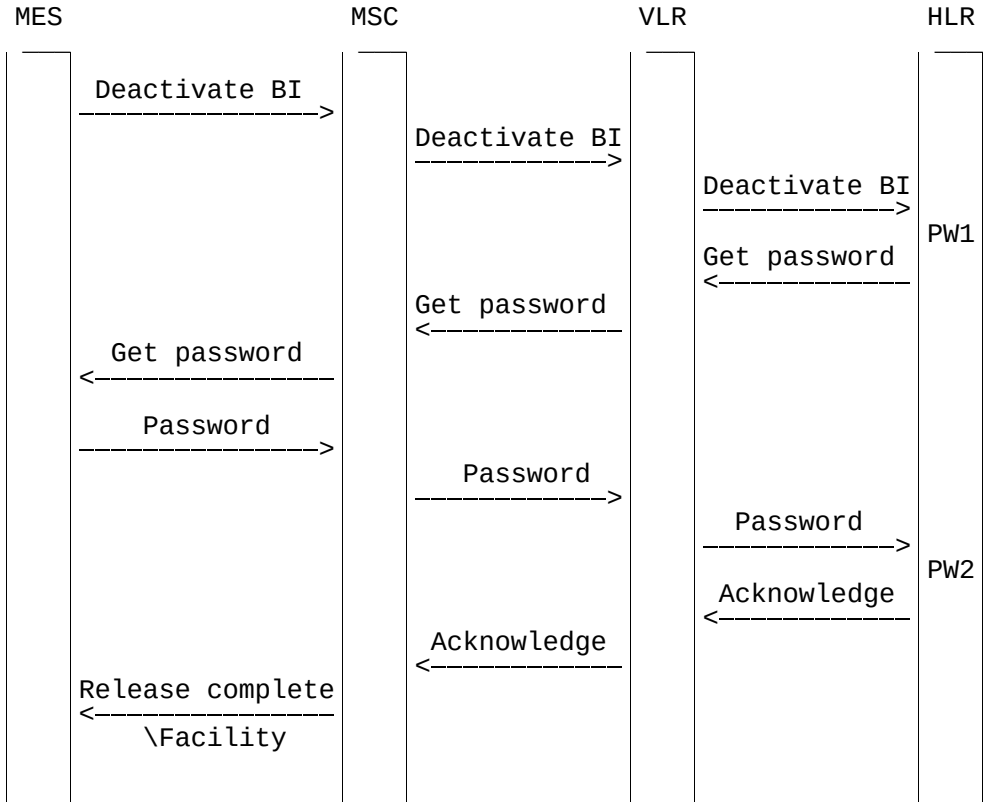


Figure 5.3: BI2 Interaction between call forwarding supplementary services and barring of incoming calls programs

5.1.3 Deactivation

The procedure for activation of Barring of outgoing calls, described in clause 4.1.2.1, is valid also correspondingly for deactivation of Barring of incoming calls with the addition that a barring supplementary service, i.e. the Incoming barring service, or All barring services can be signalled.

The information flow for deactivation of barring of incoming calls is shown in figure 5.4. For more details see GSM 03.11 [3].



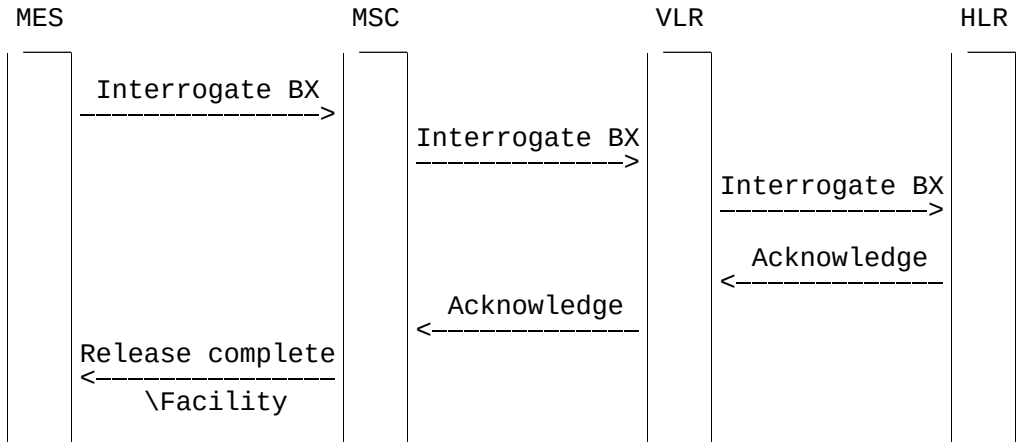
NOTE: BI indicates the general code for barring of incoming calls.
PW1 and PW2 indicate password handling programs, see GSM 03.11 [3].

Figure 5.4: Deactivation of barring of incoming calls

5.1.4 Interrogation

The interrogation procedure enables the mobile subscriber to obtain information about the data stored in the PSMN. After having requested this procedure the network shall return a list of all basic services to which the given program is active.

The information flow for interrogation of barring of incoming calls is shown in figure 5.5.



NOTE: BX indicates any of the barring programs.

Figure 5.5: Interrogation of barring of incoming calls

5.2 Functions and information flows

The following Mobile Additional Function has been identified:

MAF022

- barring of all incoming calls related authorizations examination;
- the ability of a PSMN component to determine the authorizations relating to barring of incoming calls (see figure 5.6);
- location: HLR.

The information flow for barring of incoming calls is shown in figure 5.7.

5.3 Information stored in the HLR

For all call barring supplementary services, the HLR must store:

- the subscription option "control of barring services" on a per subscriber basis.

This subscription option takes one of the following values:

- by subscriber using password;
- by the service provider.

If the subscription option "control of barring services" has been set to "by subscriber using password" for barring of incoming calls, the HLR must store on a per subscriber basis:

- the registration parameter "call barring password".

The password is valid for all basic services to which barring of incoming calls applies;

- the status parameter "wrong password attempts counter" associated with the password.

Note that the subscription option and the call barring password are parameters which are associated with all call barring services.

The incoming calls barring program may have the following logical states (refer to GSM 03.11 [3] for an explanation of the notation):

Provisioning State	Registration State	Activation State	HLR Induction State
Not Provisioned	Not Applicable	Not Active	Not Induced
Provisioned	Not Applicable	Not Active	Not Induced
Provisioned	Not Applicable	Active and Operative	Not Induced

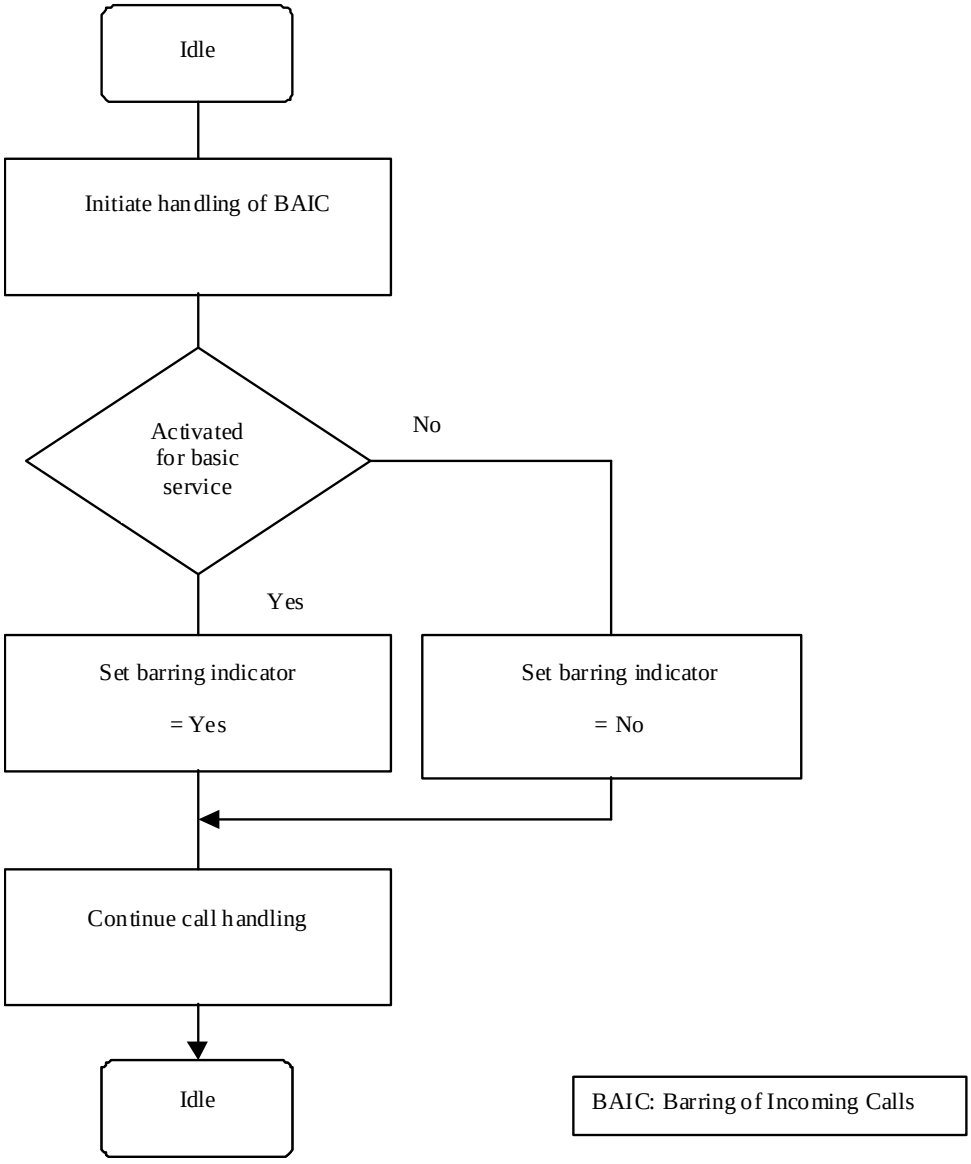
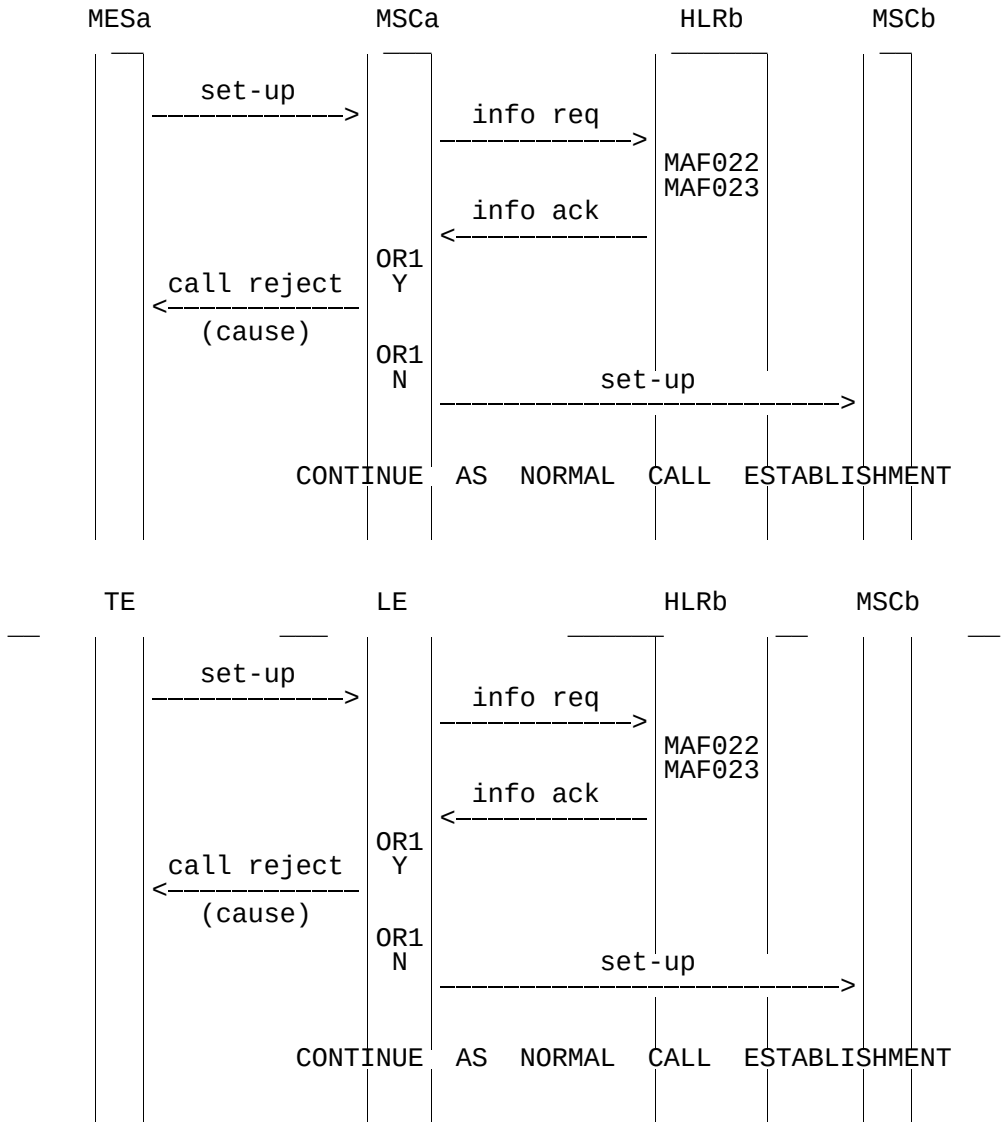


Figure 5.6: MAF022 Barring of all incoming calls related authorizations examination (HLR)



NOTE: Info req: Information request
Info ack: Information acknowledge
OR1: Call barred
N: No
Y: Yes

Figure 5.7: Information flow for barring of incoming calls

The activation and HLR induction states may be different for each applicable elementary basic service group.

The provisioning state shall be on a per subscriber basis, and hence the same for all basic service groups.

The HLR shall also store the logical state of the incoming calls barring program (which shall be one of the valid states listed above) for each applicable elementary basic service group.

5.4 State transition model

Figure 5.8 shows the successful cases of transition between the applicable logical states of the call barring program. The state changes are either caused by actions of the service provider, the mobile user or the network.

Note that error cases are not shown in the diagram as they normally do not cause a state change. Additionally, some successful requests may not cause a state change. Hence, they are not shown in the diagram.

The diagram only shows operations on an elementary basic service group.

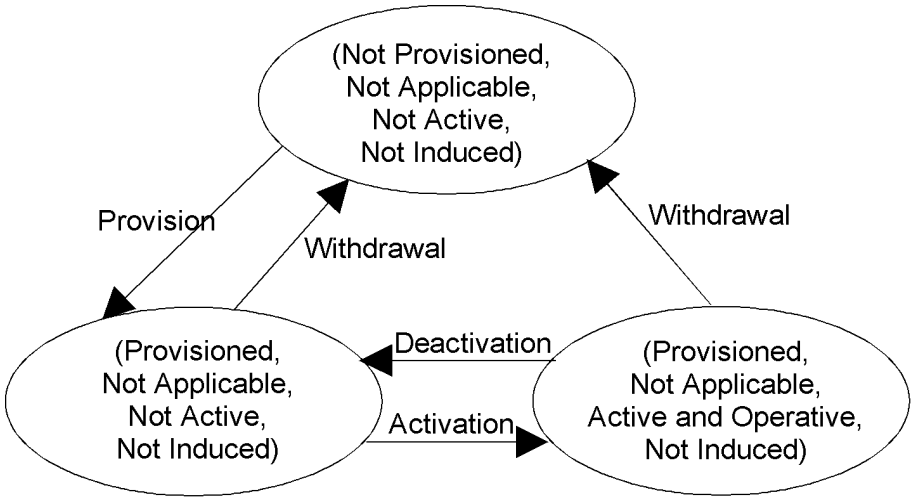


Figure 5.8: State transition model for BAIC

5.5 Transfer of information from HLR to VLR

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

5.6 Information stored in the VLR

No information is stored in the VLR.

5.7 Handover

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

5.8 Cross Phase compatibility

5.8.1 MES, MSC, VLR or HLR only support Phase 1 control of SS by the subscriber

In response to a Barring of incoming calls interrogation request, if the MES or any network element involved is of Phase 1, only information concerning basic service groups for which Barring of incoming calls is active will be returned.

In Phase 1 the state active and quiescent is not used in the HLR.

In Phase 2 the HLR will support the quiescent state.

As this quiescent state is only relevant within the HLR, a Phase 1 MSC/VLR and a Phase 1 MES can support the Phase 2 interrogation even if the service becomes quiescent, i.e. there is no functional cross Phase compatibility problem.

Note that the interrogation result received by the user will be, in Phases 1 and 2, a list of basic services. The only difference is that in Phase 1 it contains the active basic services irrespective of whether it is operative or quiescent.

5.8.2 HLR only supports Phase 1 updating of subscriber information

In Phase 1 the VLR stores the activation status also for barring of incoming calls.

In Phase 2 no information is stored in the VLR in case of barring of incoming calls. The VLR may receive subscription information for barring of incoming calls from a Phase 1 HLR. In this case, the VLR shall ignore this information.

History

Document history		
V1.1.1	March 2001	Publication