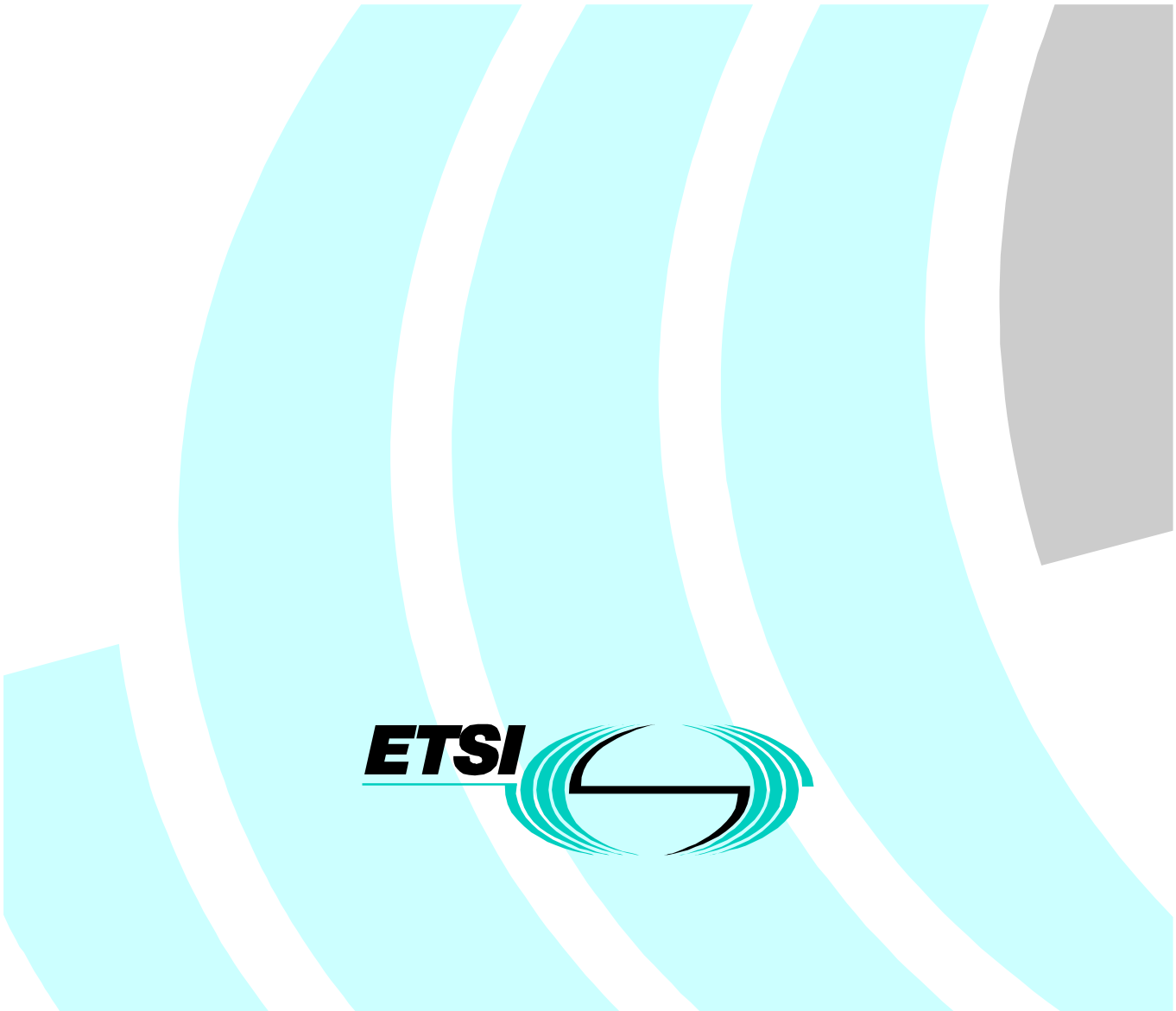
ETSI TS 101 377-3-16 V1.1.1 (2001-03)

Technical Specification

GEO-Mobile Radio Interface Specifications;
Part 3: Network specifications;
Sub-part 16: Technical Realization of
Operator Determined Barring;
GMR-2 03.015



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Contents

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IPRs:

Project	Company	Title	Country of Origin	Patent n°	Countries Applicable
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;
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The present document is part 3, sub-part 16 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 is defined in GMR-n 01.201.

1 Scope

The network feature Operator Determined Barring allows a network operator or service provider to regulate access by subscribers to GSM services, by the barring of certain categories of incoming or outgoing traffic. Operator Determined Barring applies to all bearer services and teleservices except the Emergency Call teleservice; the teleservice Short Message Point-to-Point is therefore subject to Operator Determined Barring in the same way as circuit-switched calls.

The application of specific categories of Operator Determined Barring to a subscription is controlled by the network operator or service provider, using administrative interaction at the HLR; this interface is not standardized.

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] GMR-2 02.041 (ETSI TS 101 377-2-7): "GEO-Mobile Radio Interface Specifications; Part 2: Service specifications; Sub-part 7: Operator Determined Barring (ODB)".

[3] GSM 03.40 (ETSI ETS 300 536): "Digital cellular telecommunications system (Phase 2); Technical realization of Short Message Service (SMS) Point-to-Point (PP) (V4.13.0)".

3 Definitions and abbreviations

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

4 Method of realization

The GSM entities, which control the application of Operator Determined Barring, and the methods used, are described in this clause. Two cases are considered for each type of barring: the effect of administrative action in the HLR to modify the application of the category to a particular subscription, and the effect of the category on the handling of calls or other traffic involving the subscriber.

4.1 Barring of Outgoing Calls or Mobile Originated Short Messages

Barring of outgoing calls or mobile originated short messages includes the categories 'outgoing calls' and 'outgoing premium rate calls' defined in GMR-2 02.041 [2], and the 'operator specific barring' category where this is defined by the PSMN operator to apply to outgoing calls or mobile originated short messages.

4.1.1 Application or Change of Barring in the HLR

If barring of outgoing calls or mobile originated short messages is applied to a subscription, (or existing barring of outgoing calls or mobile originated short messages is modified or removed), by administrative action in the HLR, the HLR will update the subscription information accordingly. The HLR will also transfer the updated subscription information to the VLR using one or more Insert Subscriber Data operations, as shown in figure 1.

If operator specific barring is applied to a subscription (or existing operator specific barring is modified or removed) by administrative action in the HLR, the HLR will update the subscription information accordingly. If the mobile subscriber is registered in the home PSMN, the HLR will transfer the updated subscription information to the VLR using one or more Insert Subscriber Data operations, as shown in figure 1.

If the VPSMN does not support Operator Determined Barring of outgoing calls, the VLR shall indicate this in the acknowledgement of the Insert Subscriber Data message. The HLR shall then, as an operator option, apply the Outgoing Calls Barred supplementary service or take any other action decided by the operator of the HPSMN.

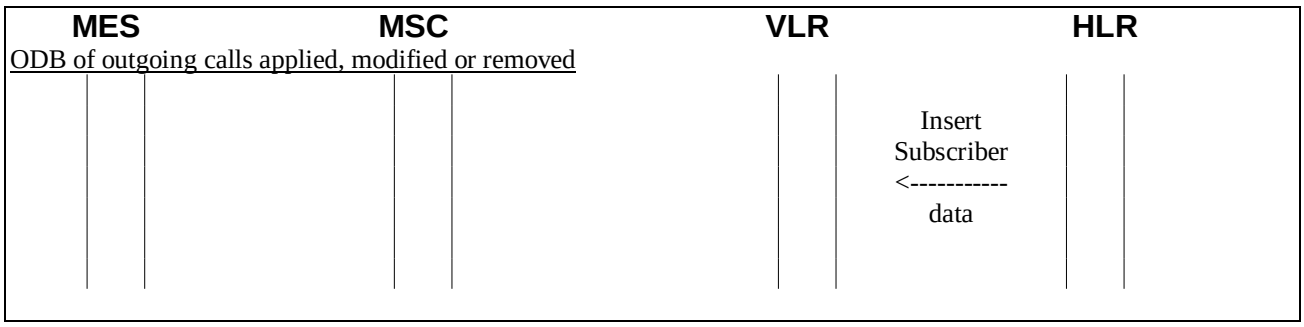

Figure 1: Transfer of updated subscription information to VLR

4.1.2 Invocation of Barring

Barring of outgoing calls or mobile originated short messages is invoked in the VLR. If the VLR receives a request for subscription information for an outgoing call or mobile originated short message which is prohibited by Operator Determined Barring, the VLR will return a negative response to the request for subscription information, with an appropriate error indication. The MSC may relay this error indication via the BSS to the mobile earth station over the radio path, or (in the case of an outgoing call) may connect the mobile earth station to an address to be determined by the network operator.

Barring of all premium rate (information) calls or barring of all premium rate (entertainment) calls requires the VLR to analyse the called number to determine whether the requested call is barred.

Operator Specific Barring may apply to outgoing or incoming calls, or mobile originated or mobile terminated short messages; if it applies to outgoing calls or mobile originated short messages, it is invoked in the VLR, as described above. If the barring applies to calls directed to a specific class of destination, the VLR must analyse the called number to determine whether the requested call is barred.

An indicative message flow diagram for the handling of Operator Determined Barring of outgoing calls or mobile originated short messages is given in figure 2. For the case where the mobile earth station is connected to an address determined by the network operator, this address is assumed to be directly connected to the MSC, so that no inter-MSC signalling is required.

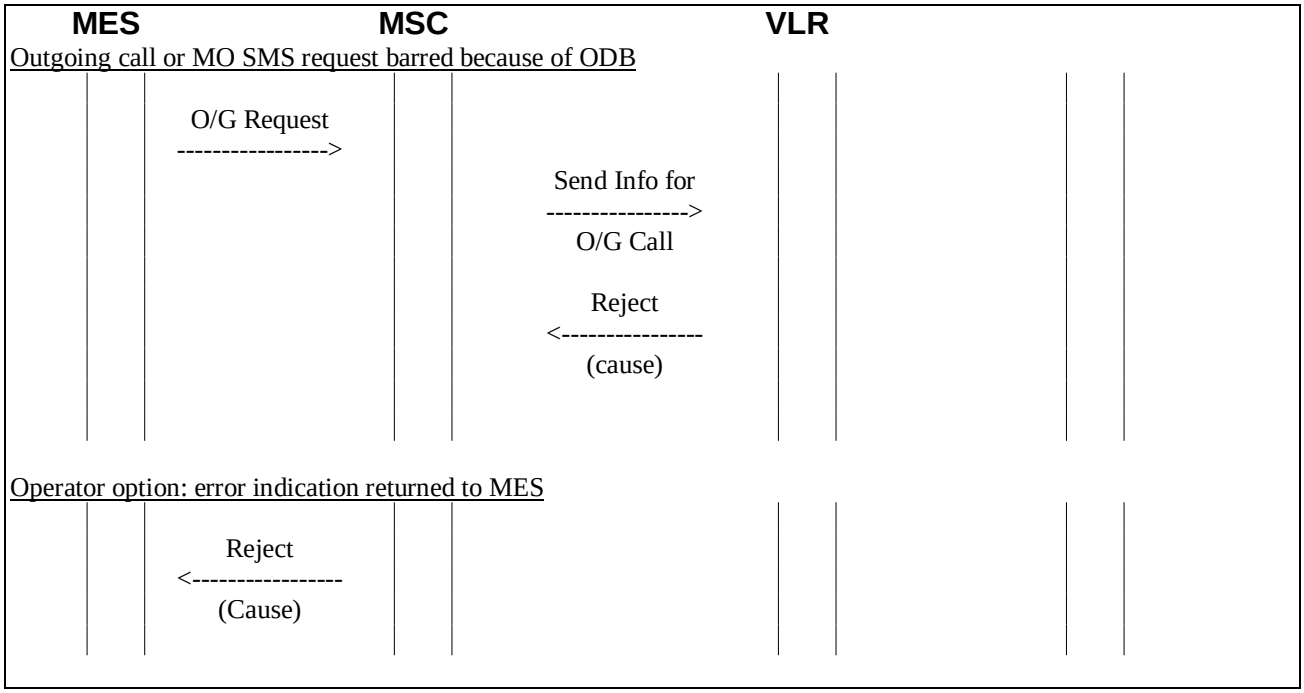

Figure 2: Operator Determined Barring of Outgoing Calls or Mobile Originated Short Messages

4.2 Barring of Incoming Calls or Mobile Terminated Short Messages

4.2.1 Application or Change of Barring in the HLR

If barring of incoming calls or mobile terminated short messages is applied to a subscription (or existing barring of incoming calls or mobile terminated short messages is modified or removed) by administrative action in the HLR, the HLR will update the subscription information accordingly. It is not necessary to transfer the updated subscription information to the VLR.

4.2.2 Invocation of Barring

Barring of incoming calls is invoked in the HLR. If the HLR receives a request for routing information for a call directed to a mobile earth station, which is subject to barring of incoming calls, the HLR will return a negative response to the request for routing information, with an appropriate error indication. The Gateway MSC may relay this error indication to the originating network using the appropriate telephony signalling system, or may connect the call to a recorded announcement to be determined by the network operator.

Barring of mobile terminated short messages is invoked in the HLR. If the HLR receives a request for routing information for a short message directed to a mobile earth station, which is subject to barring of incoming calls, the HLR will return a negative response to the request for routing information, with an appropriate error indication. This error indication will be relayed to the originating Short Message service centre by the Gateway MSC using the protocol defined in GSM 03.40 [3].

Operator Specific Barring may apply to outgoing or incoming calls, or mobile originated or mobile terminated short messages; if it applies to incoming calls or mobile terminated short messages, it is invoked in the HLR, as described above.

An indicative message flow diagram for the handling of Operator Determined Barring of incoming calls is given in figure 3. For the case where the call is connected to an address determined by the network operator, this address is assumed to be directly connected to the GMSC, so that no inter-MSC signalling is required.

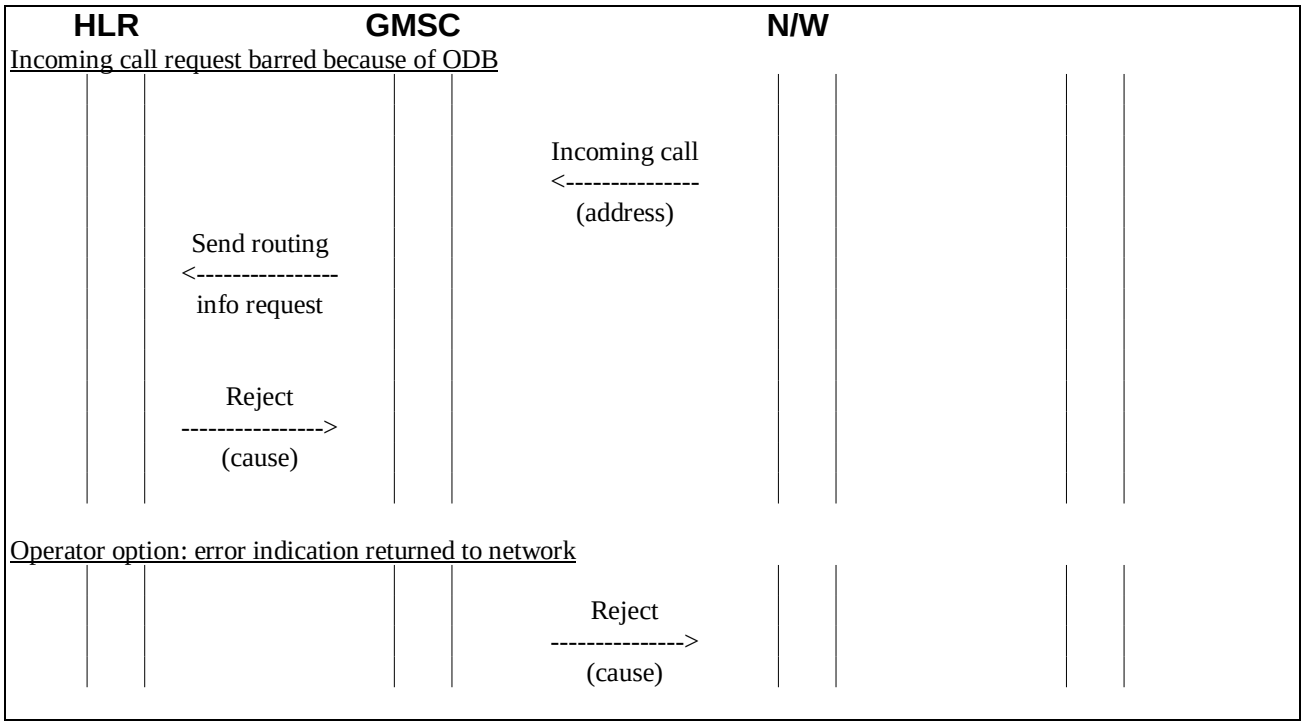

Figure 3: Operator Determined Barring of Incoming Calls

An indicative message flow diagram for the handling of Operator Determined Barring of mobile terminated short messages is given in figure 4.

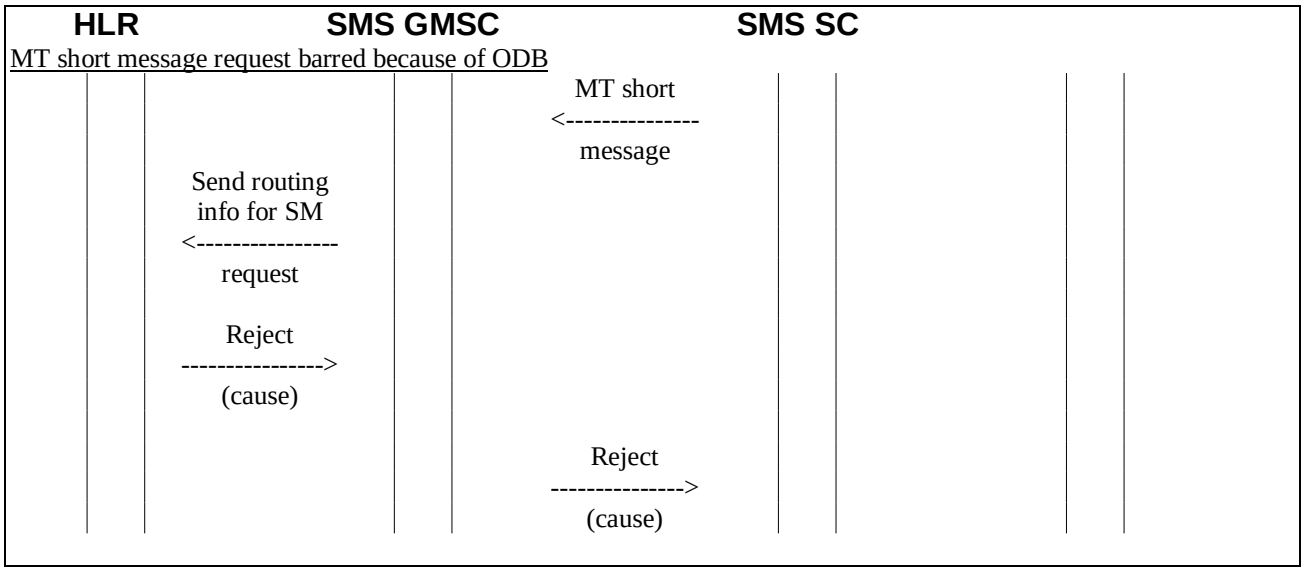

Figure 4: Operator Determined Barring of Mobile Terminated Short Messages

4.3 Barring of Roaming

This service is not supported in the current version of GMR-2.

4.4 Barring of Supplementary Services Management

4.4.1 Application or Change of Barring in the HLR

If barring of supplementary services management is applied to a subscription (or existing barring of supplementary services management is modified or removed) by administrative action in the HLR, the HLR will update the subscription information accordingly, and transfer the updated subscription information to the VLR using one or more Insert Subscriber Data operations, as shown in figure 1.

If the VPSMN does not support Operator Determined Barring of supplementary service management, the VLR shall indicate this in the acknowledgement to the Insert Subscriber Data message. The HLR shall then, as an operator option, take any action decided by the operator of the HPSMN.

4.4.2 Invocation of Barring

Barring of supplementary services management is invoked in the HLR or the VLR, depending on the supplementary service operation.

Barring of management of the following supplementary service operations is invoked in the HLR:

- registration;
- erasure;
- activation;
- deactivation;
- password registration;
- processing unstructured SS data.

An indicative message flow diagram for the handling in the HLR of Operator Determined Barring of management of supplementary services is given in figure 5. For the case where the mobile earth station is connected to an address determined by the network operator, this address is assumed to be directly connected to the MSC, so that no inter-MSC signalling is required.

Note although the HLR handles interrogation of some supplementary services, Operator Determined Barring of interrogation of all supplementary services is invoked in the VLR. This reduces the amount of analysis which the VLR must perform on supplementary service requests before deciding whether to relay a supplementary service request to the HLR or reject it because of Operator Determined Barring of access to supplementary services. Operator Determined Barring of control of PSMN specific supplementary services is invoked in the VLR for the same reason.

Barring of access to the following supplementary service operations is invoked in the VLR:

- interrogation;
- invocation;
- control of PSMN specific supplementary services.

An indicative message flow diagram for the handling in the VLR of Operator Determined Barring of access to supplementary services is given in figure 6. For the case where the mobile station is connected to an address determined by the network operator, this address is assumed to be directly connected to the MSC, so that no inter-MSC signalling is required.

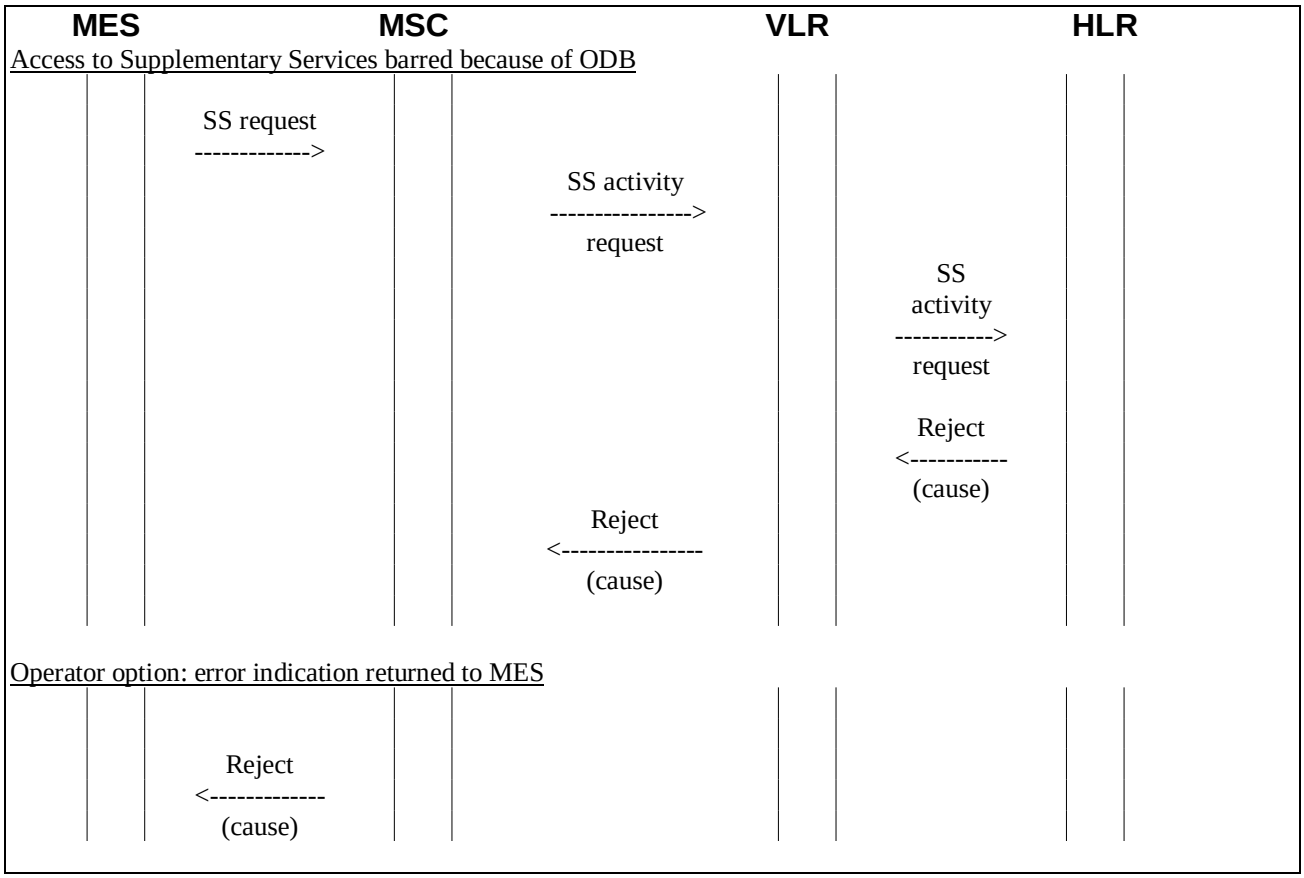

Figure 5: Operator Determined Barring of Access to Supplementary Services in the HLR

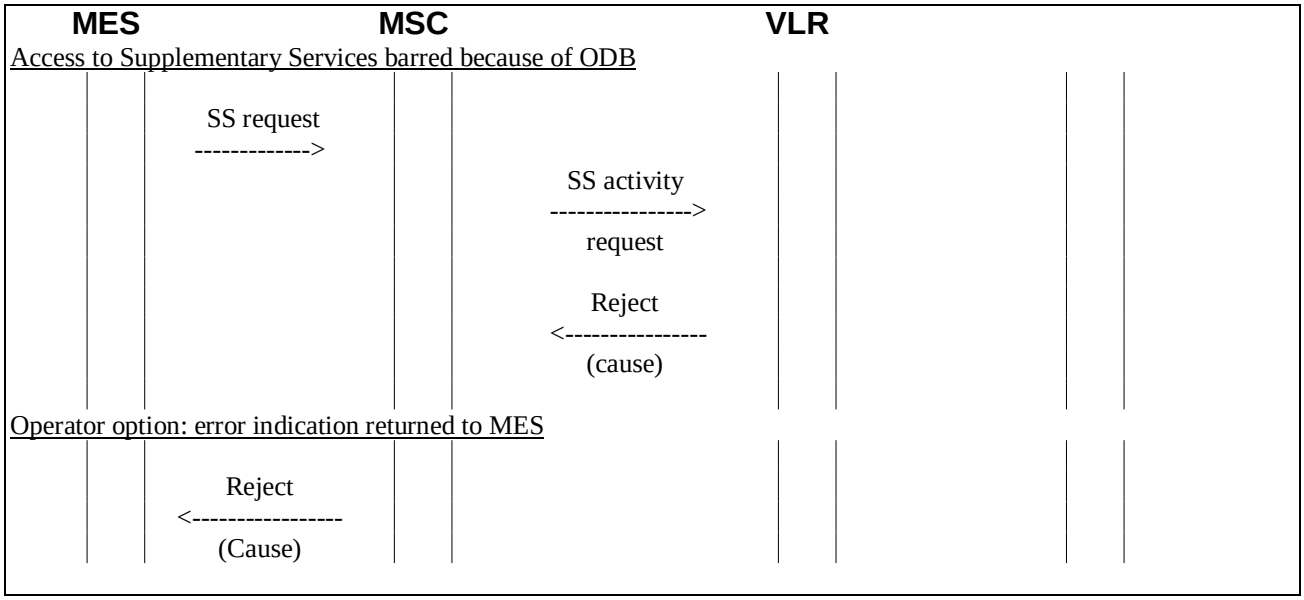

Figure 6: Operator Determined Barring of Access to Supplementary Services in the VLR

4.4.3 Operator Determined Barring of access to supplementary service not supported in VLR

If the VLR does not support Operator Determined Barring of access to supplementary services the HLR shall take the following actions:

The VLR supports only phase 1:

If the HLR receives a request, which should normally be barred by the VLR, the HLR shall reject the request with the appropriate phase 1 error (illegal SS operation or system failure).

The VLR supports phase 2 but does not support this Operator Determined Barring category:

If the HLR receives a request, which should normally be barred by the VLR, the HLR shall reject the request instead of the VLR.

Note that requests handled locally by the VLR (e.g. interrogation) will not be barred.

4.5 Interactions of Operator Determined Barring with Supplementary Services

The following interactions of Operator Determined Barring with supplementary services have been identified:

4.5.1 Call Forwarding

The interactions between Operator Determined Barring and Call Forwarding are specified in GMR-2 02.041 [2].

The interaction where Operator Determined Barring is applied when there is an existing Call Forwarding programme which is in contravention of the Operator Determined Barring programme is shown in the message flow diagram in figure 7. The HLR modifies the subscription information for the mobile subscriber to show that the contravening call forwarding programme is quiescent, and forwards the modified subscription information to the VLR. No indication is forwarded to the mobile earth station or the user.

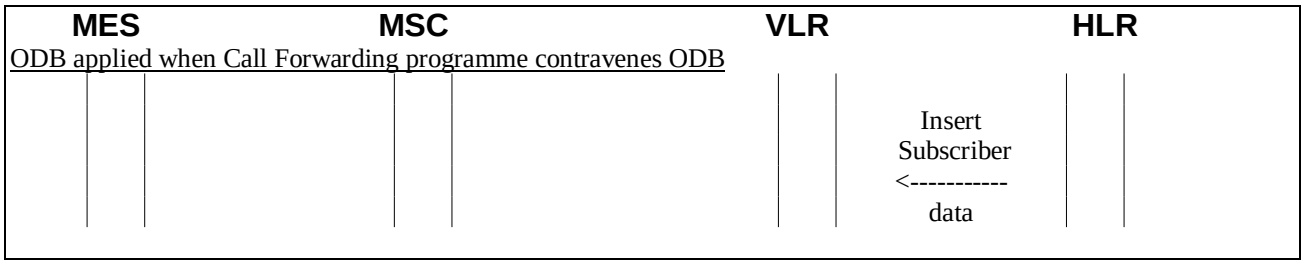

Figure 7: Effect of Operator Determined Barring on Call Forwarding programme

The interaction where the user attempts to activate or register a call forwarding programme which is in contravention of an operator determined barring category is shown in the message flow diagram in figure 8.

4.5.2 Closed User Group

The interaction between Operator Determined Barring and Closed User Group is specified in GMR-2 02.041 [2]. In order to meet the service requirement, the checks of a call request in the HLR (for incoming calls) or VLR (for outgoing calls) against the Operator Determined Barring programme shall be carried out before the checks for Closed User Group.

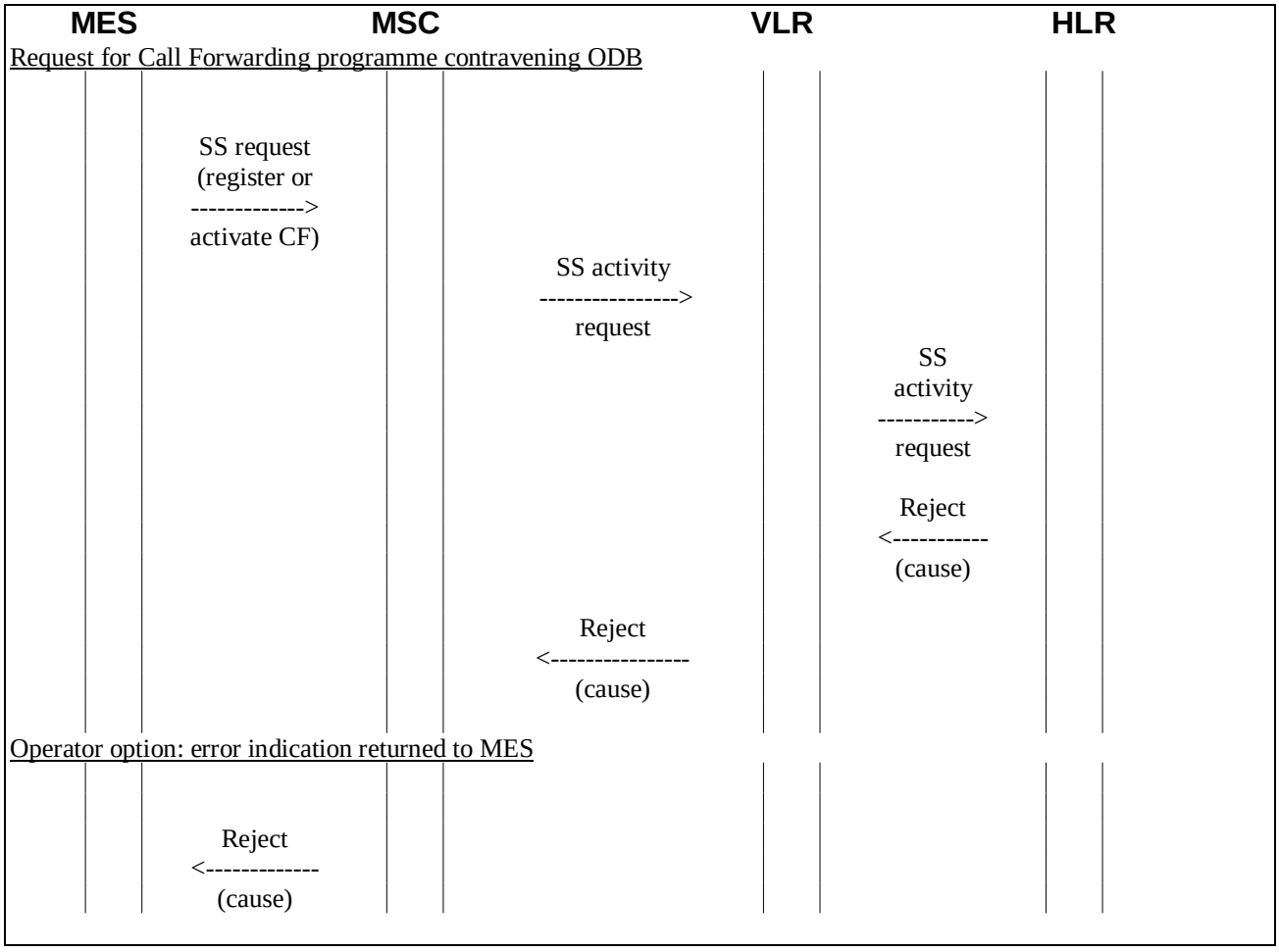

Figure 8: Interaction between Operator Determined Barring and Call Forwarding

4.5.3 Call Barring

The interaction between Operator Determined Barring and the Call Barring supplementary service is specified in GMR-2 02.041 [2]. In order to meet the service requirement, the checks of a call request in the HLR (for incoming calls) or VLR (for outgoing calls) against the Operator Determined Barring programme shall be carried out before the checks for the Call Barring supplementary service.

5 Information stored in location registers

5.1 Information stored in the HLR

The HLR must store subscription information for each mobile subscriber to define which of the following categories of barring is to be applied, independently of each other:

- barring of all outgoing calls (including mobile originated short messages);
- barring of all incoming calls (including mobile terminated short messages);
- barring of outgoing premium rate calls - one or both of:
  - barring of outgoing premium rate (information) calls;
  - barring of outgoing premium rate (entertainment) calls.
- barring specific to the home PSMN - when the mobile station is registered in its home PSMN, any one or more of:
  - operator Specific Barring (type 1);
  - operator Specific Barring (type 2);
  - operator Specific Barring (type 3);
  - operator Specific Barring (type 4).
- barring of Supplementary Services Management

5.2 Information stored in the VLR

The VLR must store subscription information for each mobile subscriber to define which of the following categories of barring is to be applied, independently of each other:

- barring of all outgoing calls (including mobile originated short messages)
- barring of outgoing premium rate calls - one or both of:
  - barring of outgoing premium rate (information) calls;
  - barring of outgoing premium rate (entertainment) calls.
- barring specific to the home PSMN - when the mobile station is registered in its home PSMN, any one or more of:
  - operator specific barring (type 1);
  - operator specific barring (type 2);
  - operator specific barring (type 3);
  - operator specific barring (type 4).
- barring of Supplementary Services Management

5.3 Transfer of Subscription Information

The following subscription information for Operator Determined Barring must be transferred from the HLR to the VLR when a mobile earth station registers in a VLR:

- barring of outgoing calls;
- barring of outgoing premium rate calls;
- barring of supplementary services management.

In addition, when a mobile earth station registers in a VLR in its home PSMN the subscription information for Operator Determined Barring specific to the home PSMN must be transferred from the HLR to the VLR.

History

Document history		
V1.1.1	March 2001	Publication