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*Technical Specification*

**Digital cellular telecommunications system (Phase 2+);  
Universal Mobile Telecommunications System (UMTS);  
LTE;  
Call Deflection Supplementary Service;  
Stage 2  
(3GPP TS 23.072 version 8.0.0 Release 8)**

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## Foreword

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The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

# Contents

Intellectual Property Rights .....	2
Foreword.....	2
Foreword.....	5
1 Scope .....	6
2 Normative references .....	6
3 Definitions and abbreviations.....	6
3.1 Abbreviations .....	6
4 Information flow .....	7
5 Messages and their Contents .....	7
5.1 Messages between the MS and the MSC.....	7
5.1.1 CD Request .....	7
5.1.2 CD Request ack .....	8
5.1.3 CD Request negative response.....	8
5.2 Messages between the MSC and the VLR .....	8
5.2.1 Process Call Waiting negative response .....	8
5.2.2 Complete Call negative response.....	8
5.2.3 Send Info for Incoming Call negative response.....	9
6 Functions of the serving MSC.....	9
6.1 Procedure Handling_CD_MSC .....	9
6.2 Procedure CD_Reject.....	9
6.3 Procedure CD_Failure.....	9
6.4 Procedure CD_UUS_Interaction .....	9
6.5 Procedure CD_Success.....	9
6.6 Procedure CD_Notify_SS_Invocation .....	9
7 Functions of the serving VLR .....	16
7.1 Procedure CD_Authorization .....	16
7.2 Procedure CAMEL_Check_CD_Interaction .....	16
8 Interaction with other supplementary services .....	19
8.1 Line Identification services .....	19
8.2 Call Forwarding services.....	19
8.3 Call Waiting .....	19
8.4 Call Hold .....	19
8.5 Multi Party (MPTY).....	19
8.6 Closed User Group .....	19
8.7 Advice of Charge (AoC) .....	19
8.8 Call Barring Services.....	19
8.9 Explicit call transfer (ECT) .....	19
8.10 Completion of Calls to Busy Subscriber (CCBS).....	19
9 Interaction with other network features.....	20
9.1 Customised Applications for Mobile network Enhanced Logic (CAMEL) .....	20
9.2 Support of Optimal Routing .....	20
10 Information stored in the HLR .....	20
11 State transition model.....	21
12 Transfer of information from HLR to VLR .....	21
13 Information stored in the VLR.....	21
14 Handover .....	21

**Annex A (informative):**    **Change history** .....22  
History .....23

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# Foreword

This Technical Specification has been produced by the 3GPP.

This specification describes the technical realization of the Call Deflection supplementary service within the 3GPP system.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version 3.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 Indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the specification;

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# 1 Scope

This Technical Specification gives the stage 2 description of the Call Deflection supplementary service.

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## 2 Normative references

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "3GPP Vocabulary".
- [2] 3GPP TS 23.011: "Technical realization of supplementary services".
- [3] 3GPP TS 23.018: "Basic call handling; Technical realization".
- [4] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 2; Stage 2"
- [5] 3GPP TS 23.079: "Support of Optimal Routeing (SOR); Technical realisation"
- [6] 3GPP TS 23.081: "Line identification supplementary services - Stage 2".
- [7] 3GPP TS 23.085: "Closed User Group (CUG) supplementary services - Stage 2".
- [8] 3GPP TS 23.091: "Explicit Call Transfer (ECT) supplementary service - Stage 2".
- [9] 3GPP TS 23.093: "Technical Realisation of Completion of Calls to Busy Subscriber (CCBS)".

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## 3 Definitions and abbreviations

### 3.1 Abbreviations

Abbreviations used in this specification are listed in TR 21.905.

For the purpose of this specification the following abbreviations apply:

CD: Call Deflection

## 4 Information flow

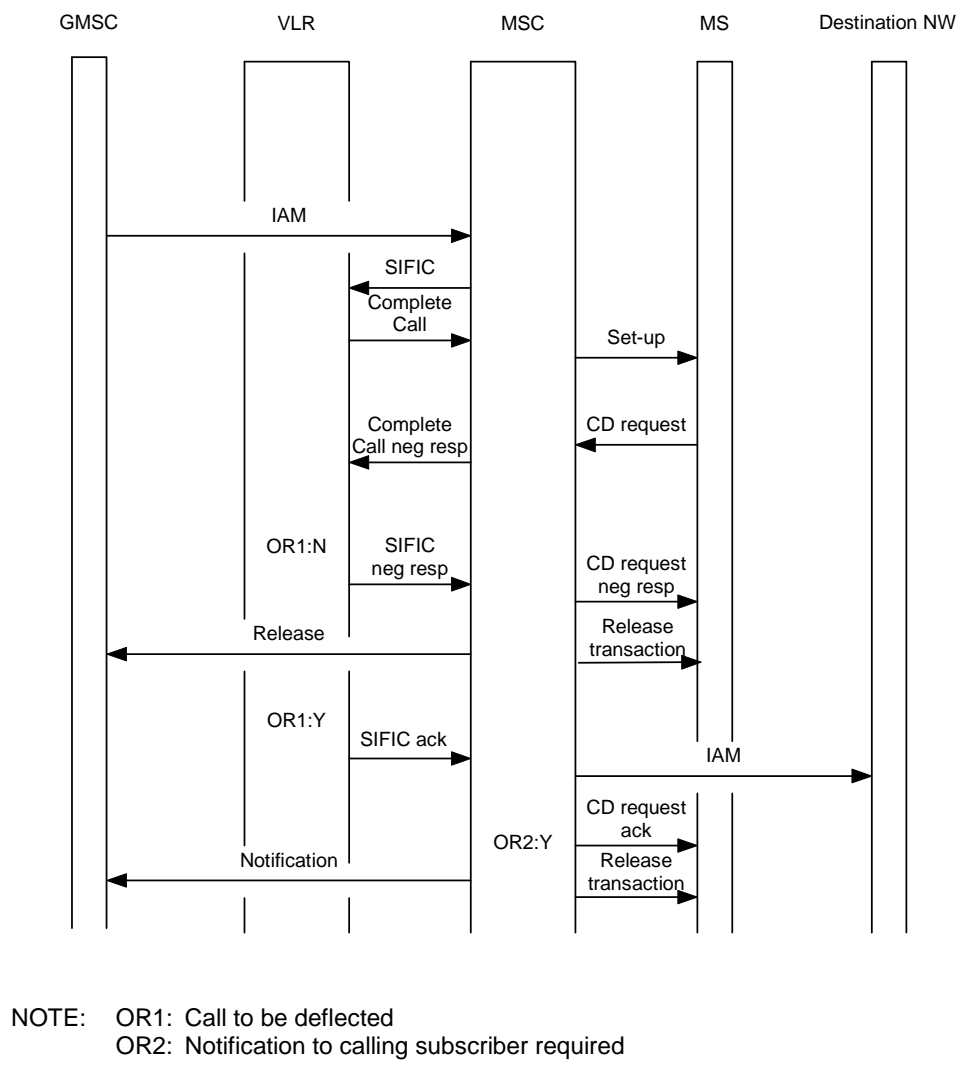


Figure 4.1: Information flow for Call Deflection

## 5 Messages and their Contents

### 5.1 Messages between the MS and the MSC

#### 5.1.1 CD Request

The CD Request message is sent from the MS to MSC direction.

Information element name	Required	Description
Deflected-to number	M	Number of the C subscriber as entered by the served subscriber.
Deflected-to subaddress	C	Subaddress of the C subscriber; shall be present if it was entered by the served subscriber; otherwise shall be absent



## 5.1.2 CD Request ack

The CD Request ack message is sent from the MSC to MS direction. This message contains no information elements.

## 5.1.3 CD Request negative response

CD Request negative response message is sent from the MSC to MS direction. The negative response information element can take the following values:

- service not subscribed;
- deflected-to number is own number;
- deflected-to number is a special service code;
- number invalid;
- call barred;
- SS incompatibility;
- forwarding violation;
- forwarding failure.

## 5.2 Messages between the MSC and the VLR

### 5.2.1 Process Call Waiting negative response

For the description of the Process Call Waiting negative response message refer to TS 23.018. The negative response information element can take the following additional value:

- Call Deflection.

**For the purpose of the CD supplementary service the following additional information elements for the Process Call Waiting negative response message are required.**

Information element name	Required	Description
Deflected-to number	M	Number of the C subscriber as entered by the served subscriber.
Deflected-to subaddress	C	Subaddress of the C subscriber; shall be present if it was entered by the served subscriber; otherwise shall be absent

### 5.2.2 Complete Call negative response

For the description of the Complete Call negative response message refer to TS 23.018. The negative response information element can take the following additional value:

- Call Deflection.

**For the purpose of the CD supplementary service the following additional information elements for the Complete Call negative response message are required.**

Information element name	Required	Description
Deflected-to number	M	Number of the C subscriber as entered by the served subscriber.
Deflected-to subaddress	C	Subaddress of the C subscriber; shall be present if it was entered by the served subscriber; otherwise shall be absent

### 5.2.3 Send Info for Incoming Call negative response

For the description of the Send Info for Incoming Call negative response message refer to TS 23.018. The negative response information element can take the following additional values:

- service not subscribed;
- deflected-to number is own number;
- deflected-to number is a special service code;
- number invalid;
- call barred.

---

## 6 Functions of the serving MSC

The functions of the serving MSC are specified in TS 23.018. The procedures specific to the CD supplementary service are specified in this subclause.

### 6.1 Procedure Handling\_CD\_MSC

This procedure is called when a CD request is received from the MS.

### 6.2 Procedure CD\_Reject

This procedure is called if the CD request was treated unsuccessful in the VLR.

### 6.3 Procedure CD\_Failure

This procedure is called if the CD request was treated unsuccessful in the serving MSC.

### 6.4 Procedure CD\_UUS\_Interaction

This procedure is called if the CD request was treated unsuccessful in the serving MSC due to the interaction with the UUS supplementary service.

### 6.5 Procedure CD\_Success

This procedure is called if the CD request was treated successful in the serving MSC.

### 6.6 Procedure CD\_Notify\_SS\_Invocation

This procedure is called by the procedures CD\_OR\_Clear and CD\_Success to send notification of the CD invocation to the gsmSCF if required.

The output signal SS Invocation Notify is sent if the SS-CSI was received in the SIFIC ack. The SS-CSI will only be included in the SIFIC ack if there is a requirement to notify the gsmSCF that CD has been invoked.

## Procedure Handling\_CD\_MSC

1(1)

Procedure in the MSC to handle an Call Deflection request received from the MS  
The procedure sets the value of the negative response information element of the  
Complete Call negative response message or  
Process Call Waiting negative response message respectively

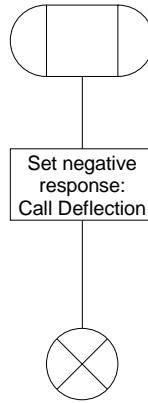


Figure 6.1: Procedure Handling\_CD\_MSC

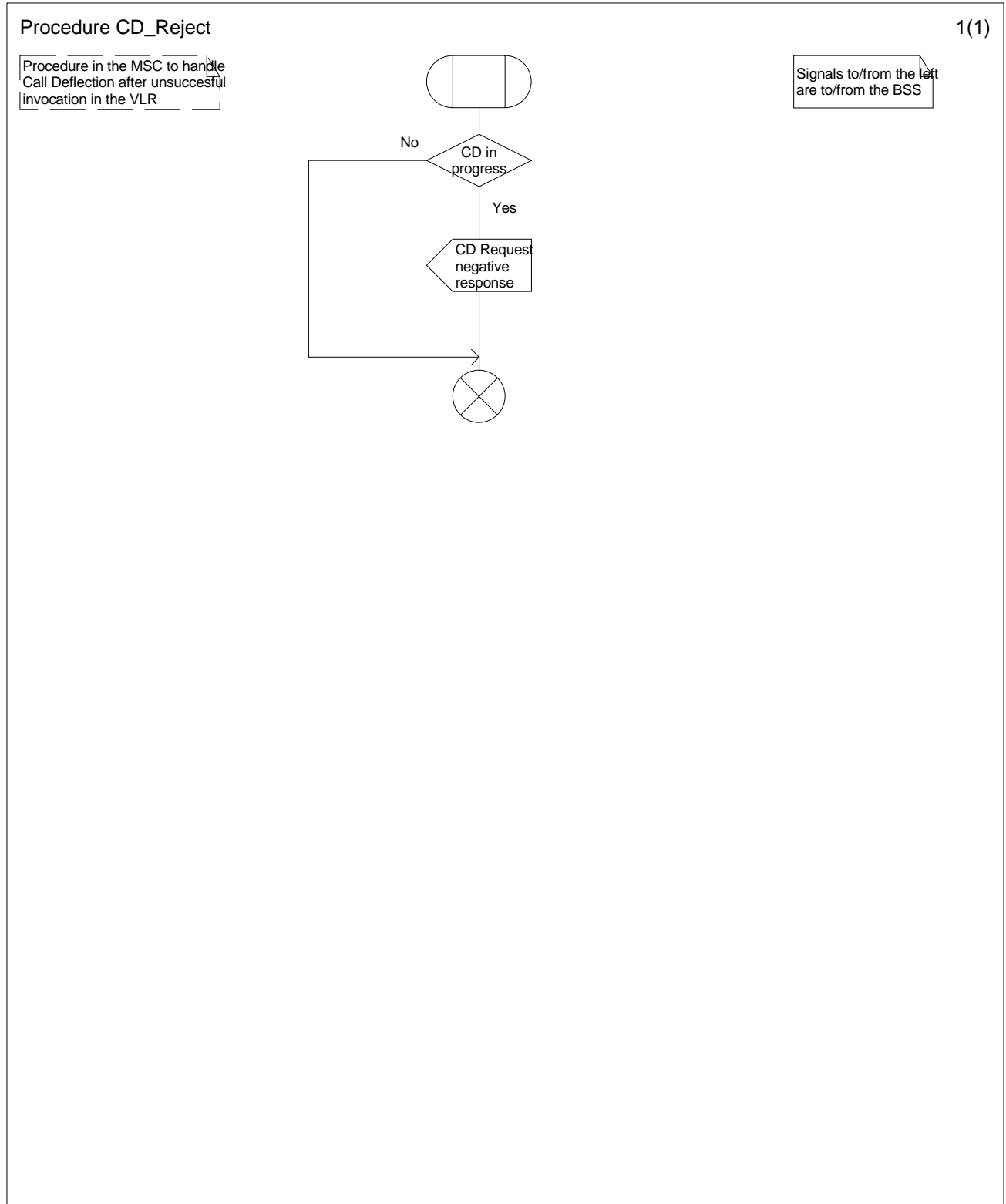


Figure 6.2: Procedure CD\_Reject

### Procedure CD\_Failure

1(1)

Procedure in the MSC to handle  
Call Deflection after unsuccessful  
in vocation

Signals to/from the left  
are to/from the BSS

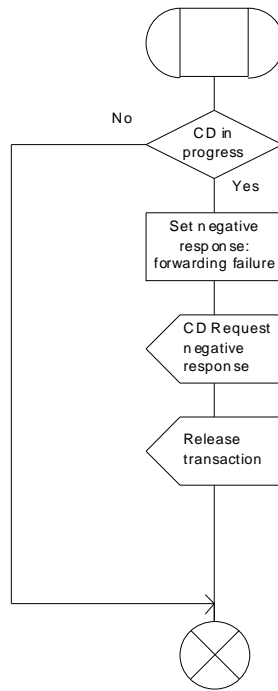


Figure 6.3: Procedure CD\_Failure

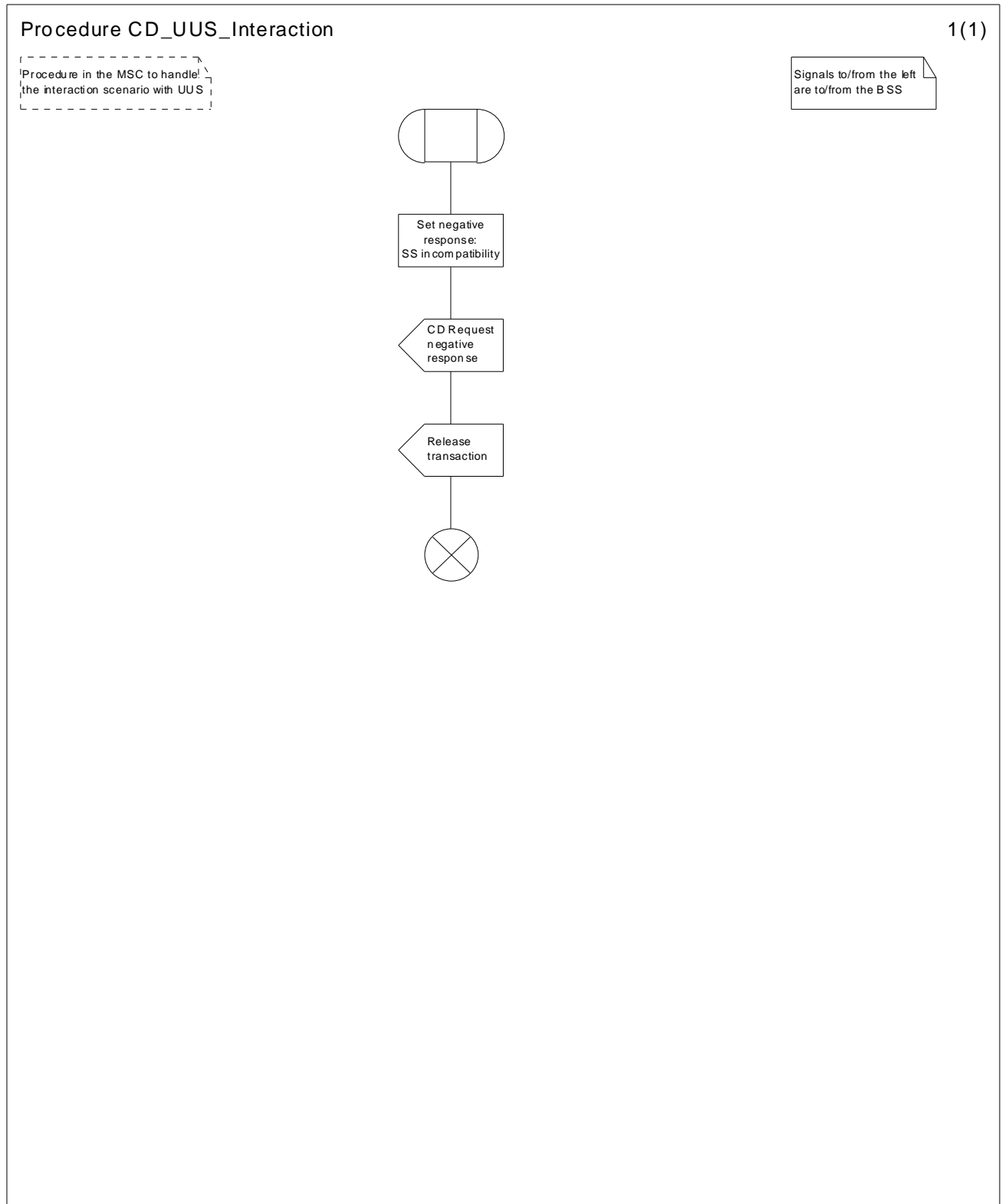


Figure 6.4: Procedure CD\_UUS\_Interaction

Procedure CD\_Success

1(1)

Procedure in the MSC to handle CD after successful invocation

Signals to/from the left are to/from the BSS

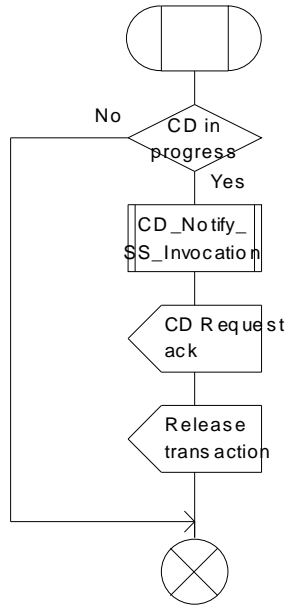


Figure 6.5: Procedure CD\_Success

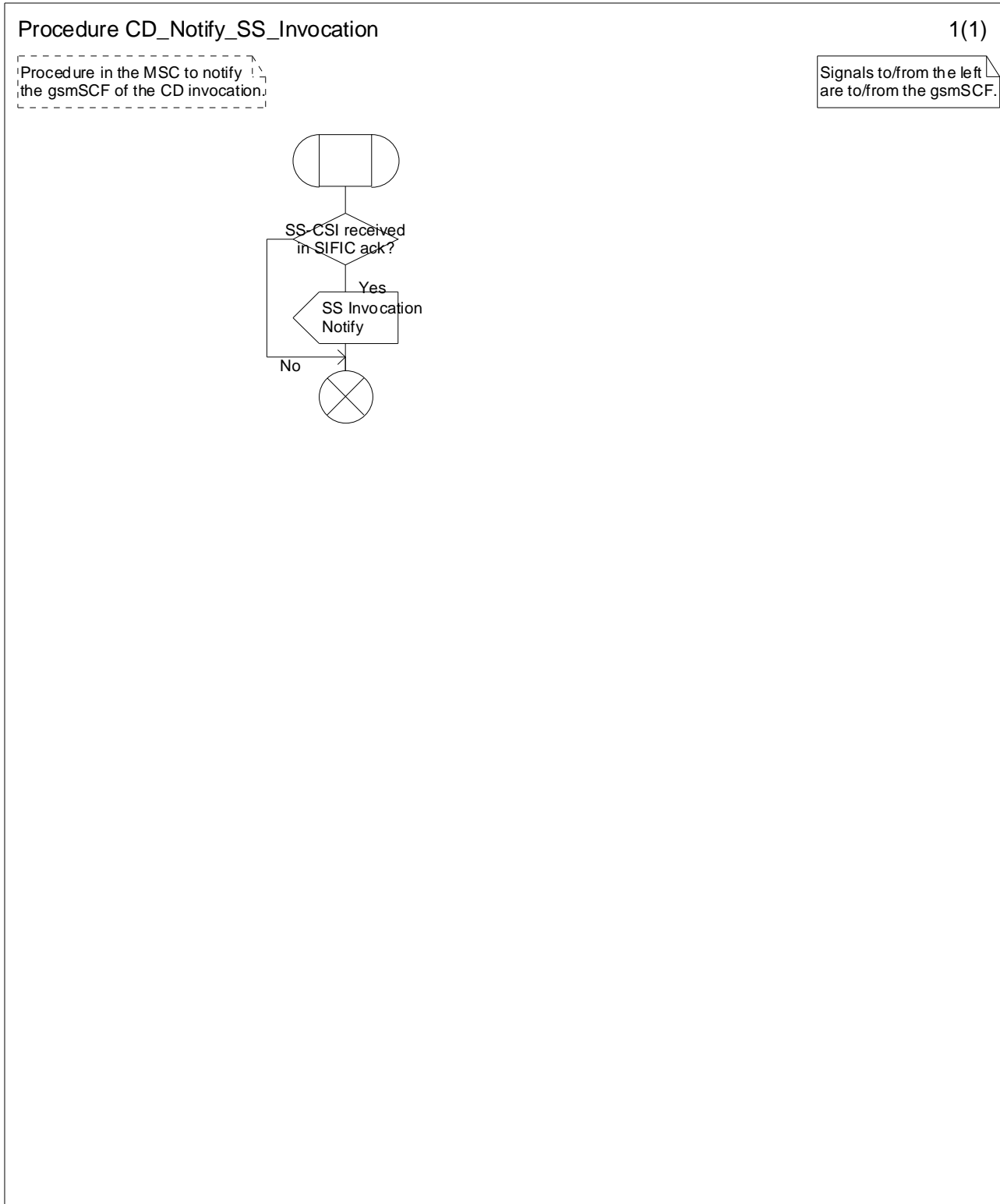


Figure 6.6 Procedure CD\_Notify\_SS\_Invocation



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## 7 Functions of the serving VLR

The functions of the serving VLR are specified in TS 23.018. The procedure specific to the CD supplementary service is specified in this subclause.

### 7.1 Procedure CD\_Authorization

This procedure examines the authorization related to Call Deflection.

The procedure CAMEL\_Check\_CD\_Interaction is specific to CAMEL phase 2. If CAMEL phase 2 is not supported in the VLR, processing continues from the "No" exit of the test "Result=Pass?".

The procedure CAMEL\_CHECK\_SII2\_CDTI is specific to CAMEL Phase 3 or higher. If CAMEL Phase 3 or higher is not supported in the VLR, processing continues from the "Yes" exit of the test "Result = Pass?".

### 7.2 Procedure CAMEL\_Check\_CD\_Interaction

This procedure examines whether a Translation Interaction Flag (TIF-CSI) is provided for the served subscriber.

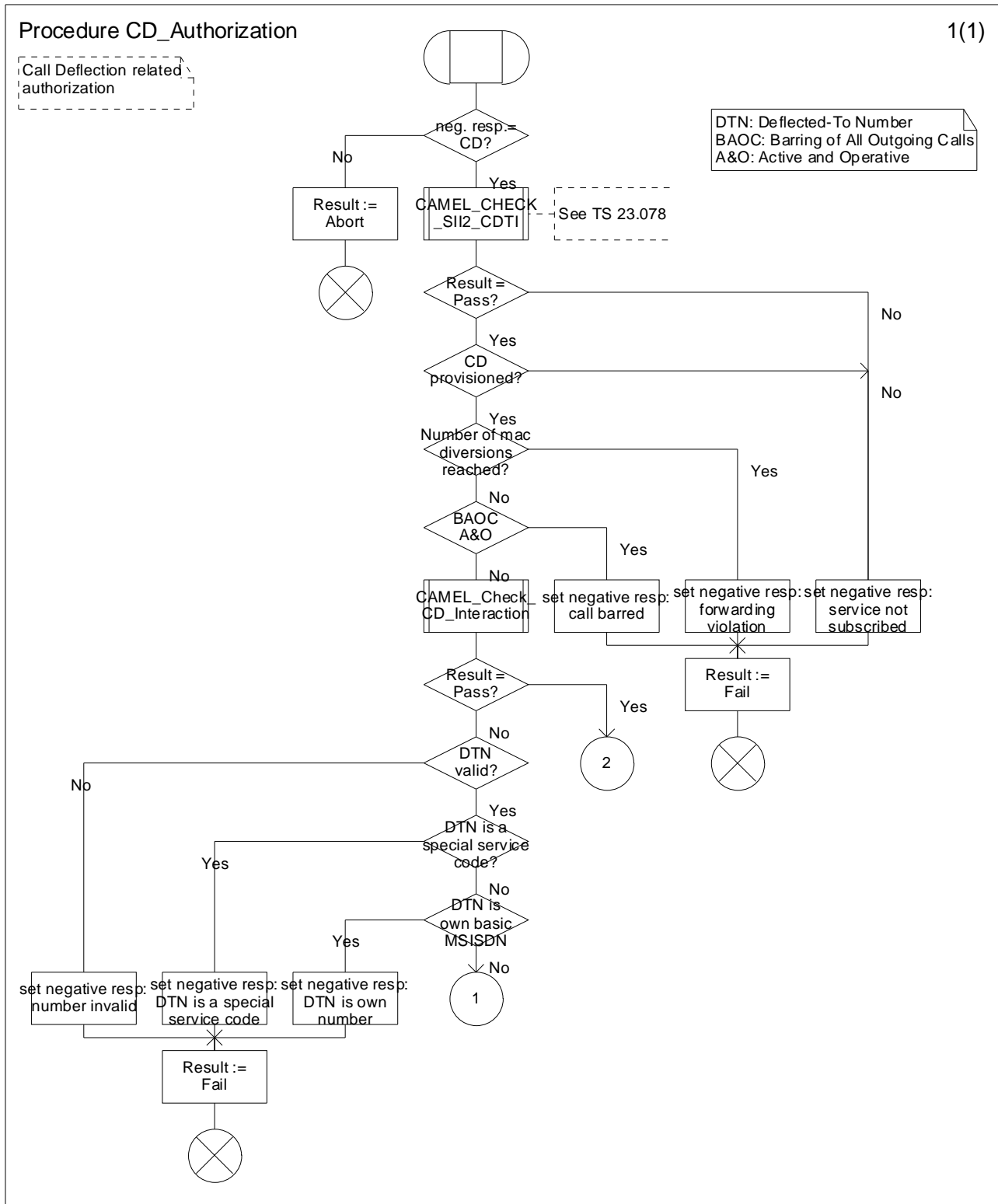


Figure 7.1 (sheet 1): Procedure CD\_Authorization

Procedure CAMEL\_Check\_CD\_Interaction

1(1)

Procedure in the VLR to  
Check the Provision of TIF\_CSI

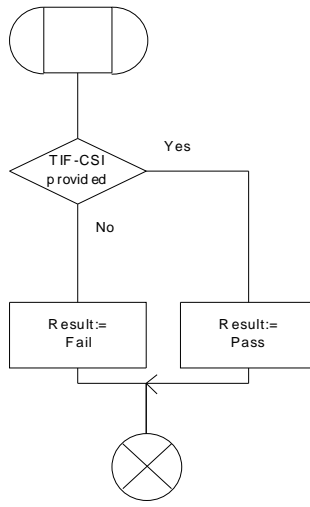


Figure 7.2: Procedure CAMEL\_Check\_CD\_Interaction

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## 8 Interaction with other supplementary services

### 8.1 Line Identification services

If the serving MSC receives an Answer message from the destination C network after the successful invocation of the call deflection supplementary service, the process MAF039 of TS 23.081 shall be performed. Refer to Process ICH\_MSC of TS 23.018 for further details.

### 8.2 Call Forwarding services

No impact.

### 8.3 Call Waiting

The MS may send a CD Request message for an incoming waiting call. Refer to procedure Process\_Call\_Waiting\_MSC of TS 23.018 for further details.

### 8.4 Call Hold

No impact.

### 8.5 Multi Party (MPTY)

No impact.

### 8.6 Closed User Group

The serving VLR shall perform the forwarding CUG authorisation as defined in TS 23.085 while processing a call deflection request. Refer to Process ICH\_VLR of TS 23.018 for details.

### 8.7 Advice of Charge (AoC)

No impact.

### 8.8 Call Barring Services

If a call deflection request is processed, the serving VLR shall check whether the requested deflected-to number contradicts active and operative outgoing barring programs. Refer to Procedure CD\_Authorization (figure 6.6) for details.

### 8.9 Explicit call transfer (ECT)

If in the originating network ECT is invoked (one call answered, the other alerting), the serving MSC shall map a redirection number parameter received in the ECT notification into the calling identity parameter of the outgoing IAM message. Refer to TS 23.091 (Interaction of Call Forwarding on mobile subscriber busy due to UDUB and explicit call transfer) for details.

### 8.10 Completion of Calls to Busy Subscriber (CCBS)

If a call is deflected to a NDUB destination, the serving MSC shall set the diagnostic to "CCBS not possible" when it releases the call towards the calling network. Refer to Process ICH\_MSC of TS 23.018 for further details.

The serving MSC shall remove the CCBS call Indicator from the IAM message when deflecting a call.

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## 9 Interaction with other network features

### 9.1 Customised Applications for Mobile network Enhanced Logic (CAMEL)

If the served subscriber is provided with a Translation Information Flag (TIF-CSI) as defined in TS 23.018 the VLR shall neither perform checks regarding the validity of the deflected-to number nor perform interactions with BOIC and BOIC-exHC barring programs. Refer to Procedure CD\_Authorization for further details.

### 9.2 Support of Optimal Routeing

The procedures for optimal routeing of late call forwarding shall apply if the Call Deflection supplementary service is invoked. Refer to TS 23.079 for further details.

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## 10 Information stored in the HLR

The following logical states are applicable for the Call Deflection service (refer to TS 23.011 for an explanation of the notation):

<b><u>Provisioning State</u></b>	<b><u>Registration State</u></b>	<b><u>Activation State</u></b>	<b><u>HLR Induction State</u></b>
(Not Provisioned,	Not Applicable,	Not Active,	Not Induced)
(Provisioned,	Not Applicable,	Active and Operative,	Not Induced)

The HLR shall store:

- the logical state of the Call Deflection service (which shall be one of the valid states listed above) on a per subscriber basis.
- the subscription option "notification to the calling party" on a per subscriber basis;  
This subscription option takes one of the following values:
  - no notification;
  - notification.
- the subscription option "MSISDN of the served subscriber can be presented to the forwarded-to subscriber" on a per subscriber basis;  
This subscription option takes one of the following values:
  - presentation restricted;
  - presentation allowed.

## 11 State transition model

Figure 11.1 shows the successful cases of transition between the applicable logical states of the Call Deflection service. The state changes are caused by actions of the service provider.

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 and are therefore not shown in the diagram.

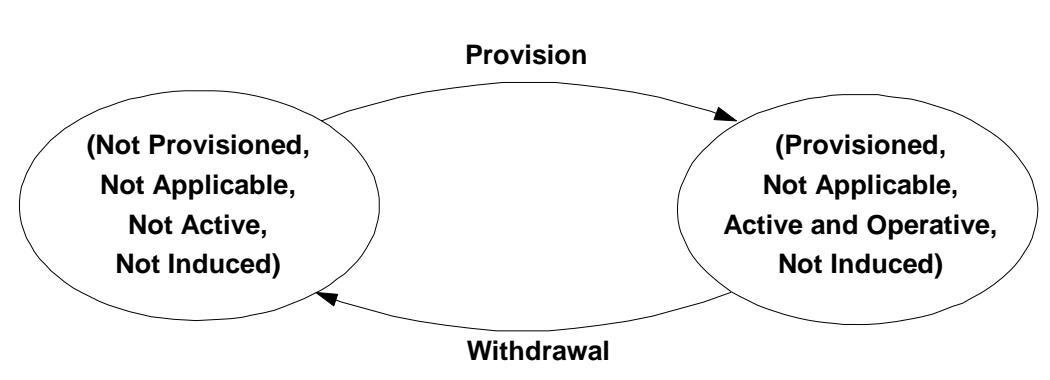


Figure 11.1: State transition model

## 12 Transfer of information from HLR to VLR

If the provisioning state for the Call Deflection service is "Provisioned" then when the subscriber registers on a VLR the HLR shall send that VLR information about the logical state of the Call Deflection service. In this case the following additional information shall be sent to the VLR:

- subscription options "notification to the calling party" and "MSISDN of the served subscriber can be presented to the forwarded-to subscriber".
- Translation Information Flag (TIF-CSI) if contained in the CAMEL subscriber data of the served subscriber (refer to TS 23.078 for further details).

If the logical state of the Call Deflection service or the value of the subscription options "notification to the calling party" or "MSISDN of the served subscriber can be presented to the forwarded-to subscriber" or the presence of the Translation Information Flag (TIF-CSI) is changed while a subscriber is registered on a VLR then the HLR shall inform the VLR of the new logical state or the new value of the subscription option or the presence of the Translation Information Flag (TIF-CSI).

## 13 Information stored in the VLR

For the supplementary service Call Deflection the VLR shall store the service state information, information about the subscription options "notification to the calling party" and "MSISDN of the served subscriber can be presented to the forwarded-to subscriber" and the Translation Information Flag (TIF-CSI) received from the HLR.

## 14 Handover

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

## Annex A (informative): Change history

Change history						
TSG CN#	Spec	Version	CR	<Phase>	New Version	Subject/Comment
Apr 1999	GSM 03.72	7.0.0				Transferred to 3GPP CN1
CN#03	23.072				3.0.0	Approved at CN#03
CN#05	23.072	3.0.0	001		3.1.0	Approved at CN#05
CN#05	23.072	3.0.0	003		3.1.0	Approved at CN#05
CN#06	23.072	3.1.0	002r1		3.2.0	Approved at CN#06
CN#09	23.072	3.2.0	004		3.3.0	Transfer of Procedure Check_CD_SII2 to TS 23.078
CN#09	23.072	3.2.0	005		3.3.0	Handling of the Call Diversion Treatment Indicator
CN#11	23.072	3.3.0		Rel-4	4.0.0	Release 4 after CN#11
CN#16	23.072	4.0.0		Rel-4	4.0.1	References updated
CN#16	23.072	4.0.1		Rel-5	5.0.0	Release 5 after CN#16
CN#26	23.072	5.0.0		Rel-6	6.0.0	Release 6 after CN#26
CT#36	23.072	6.0.0		Rel-7	7.0.0	Upgraded unchanged from Rel-6
CT#42	23.072	7.0.0		Rel-8	8.0.0	Upgraded unchanged from Rel-7

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# History

<b>Document history</b>		
V8.0.0	January 2009	Publication