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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;

1 Scope

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

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)".

3 Definitions and abbreviations

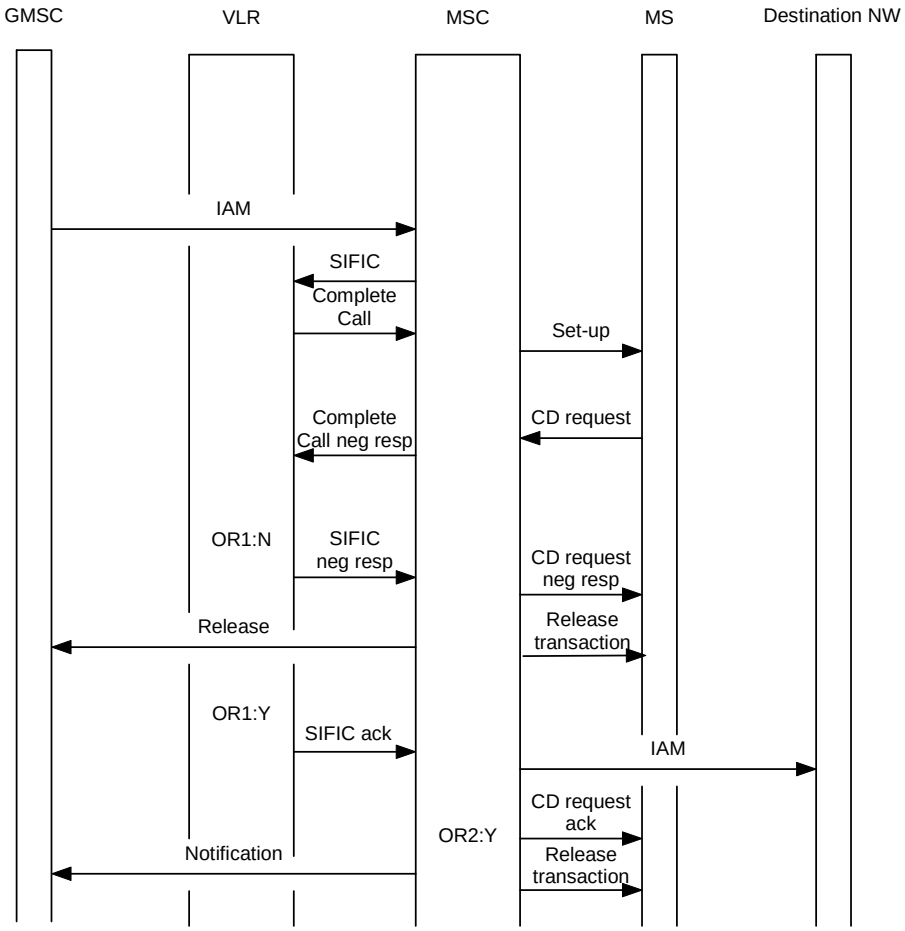
3.1 Abbreviations

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



NOTE: OR1: Call to be deflected
OR2: Notification to calling subscriber required

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 clause.

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.

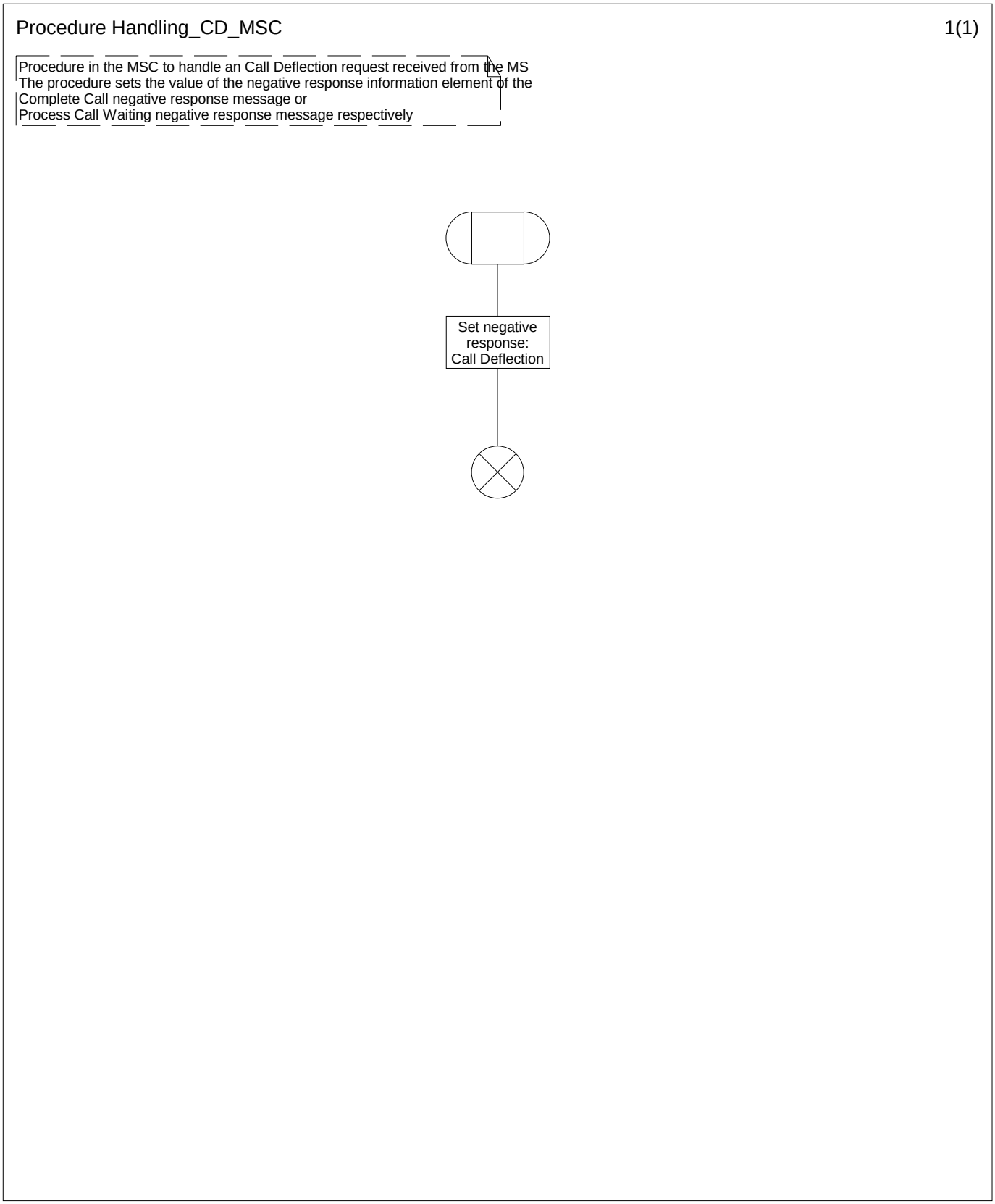


Figure 6.1: Procedure Handling_CD_MSC

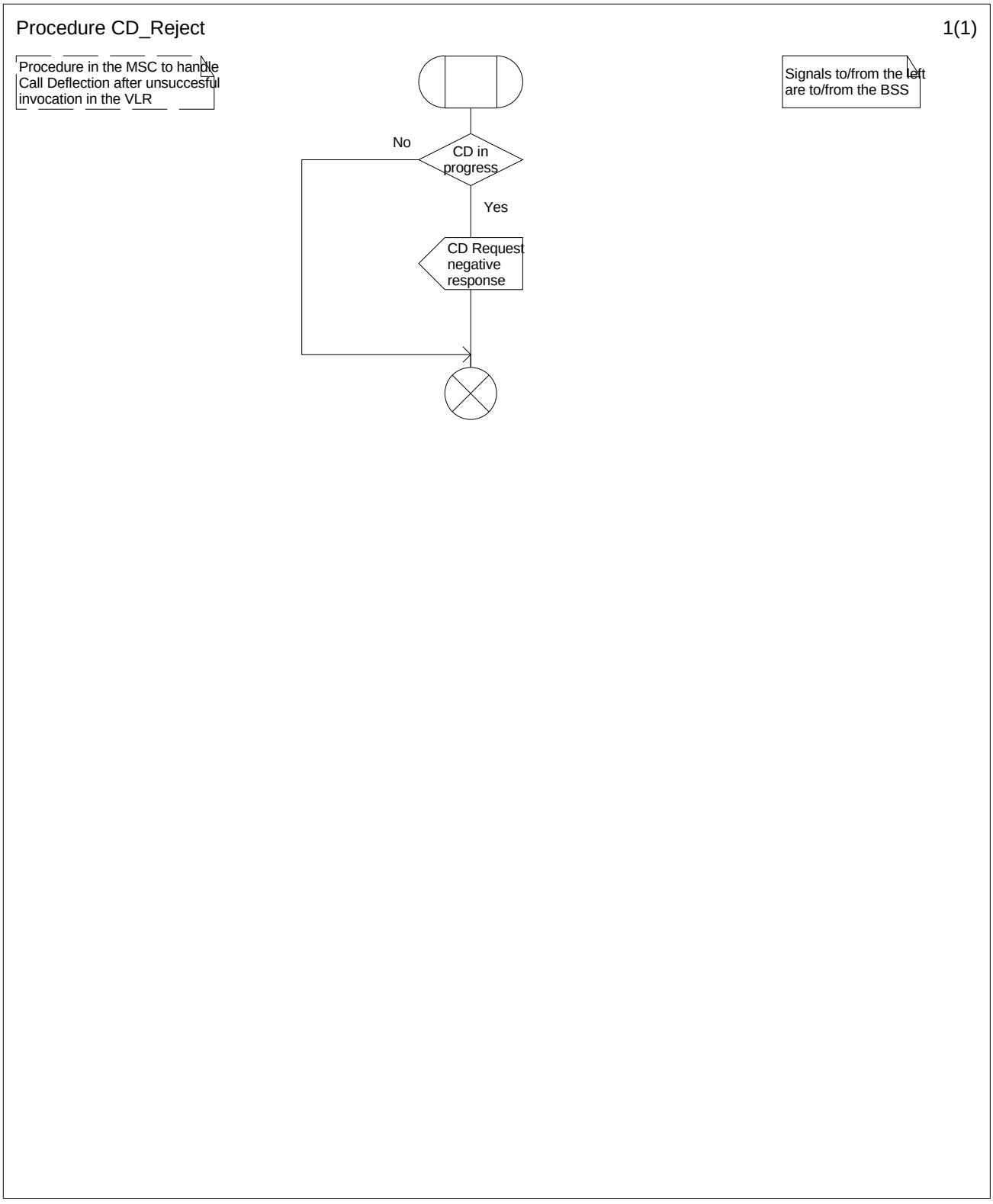


Figure 6.2: Procedure CD_Reject

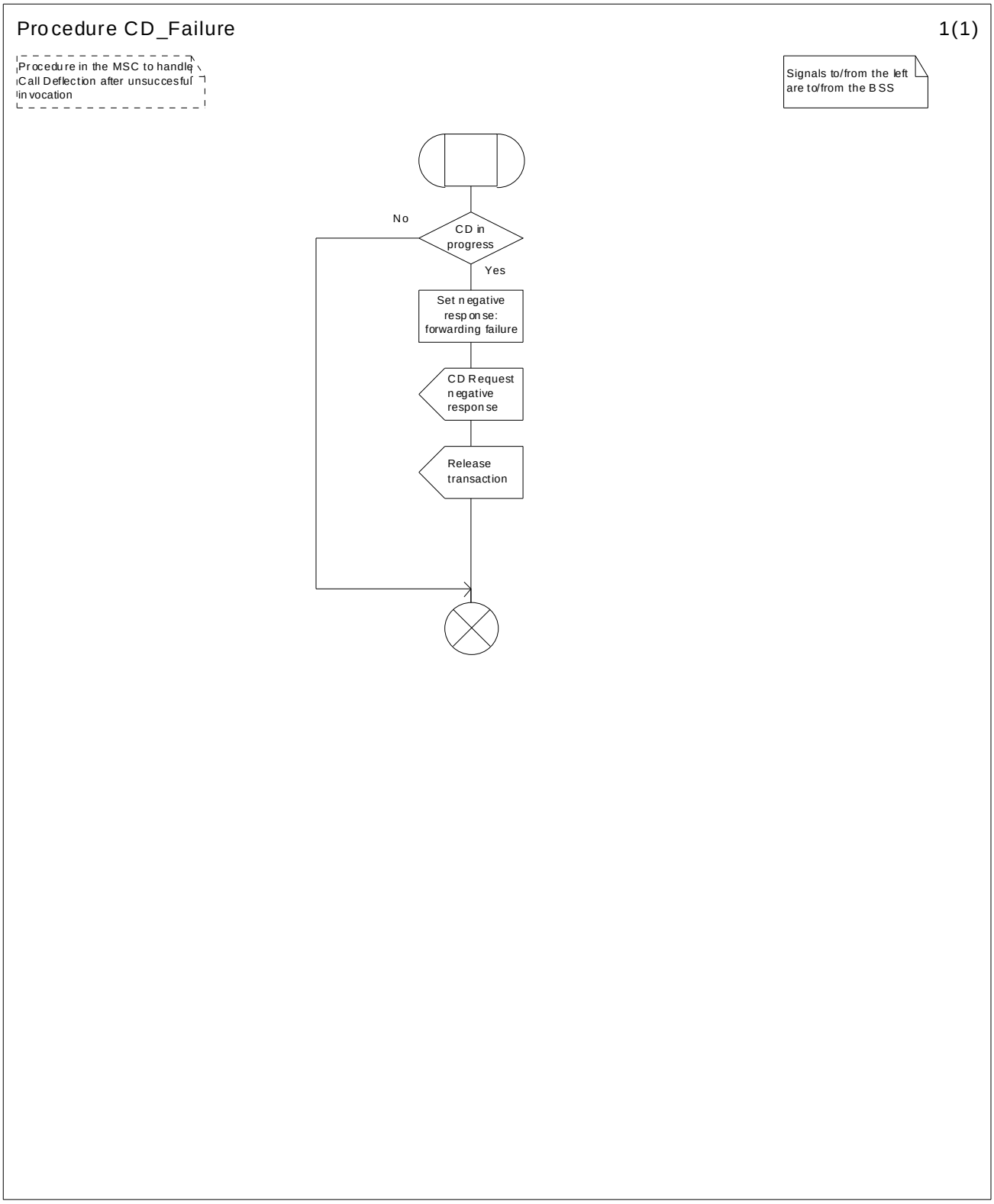


Figure 6.3: Procedure CD_Failure

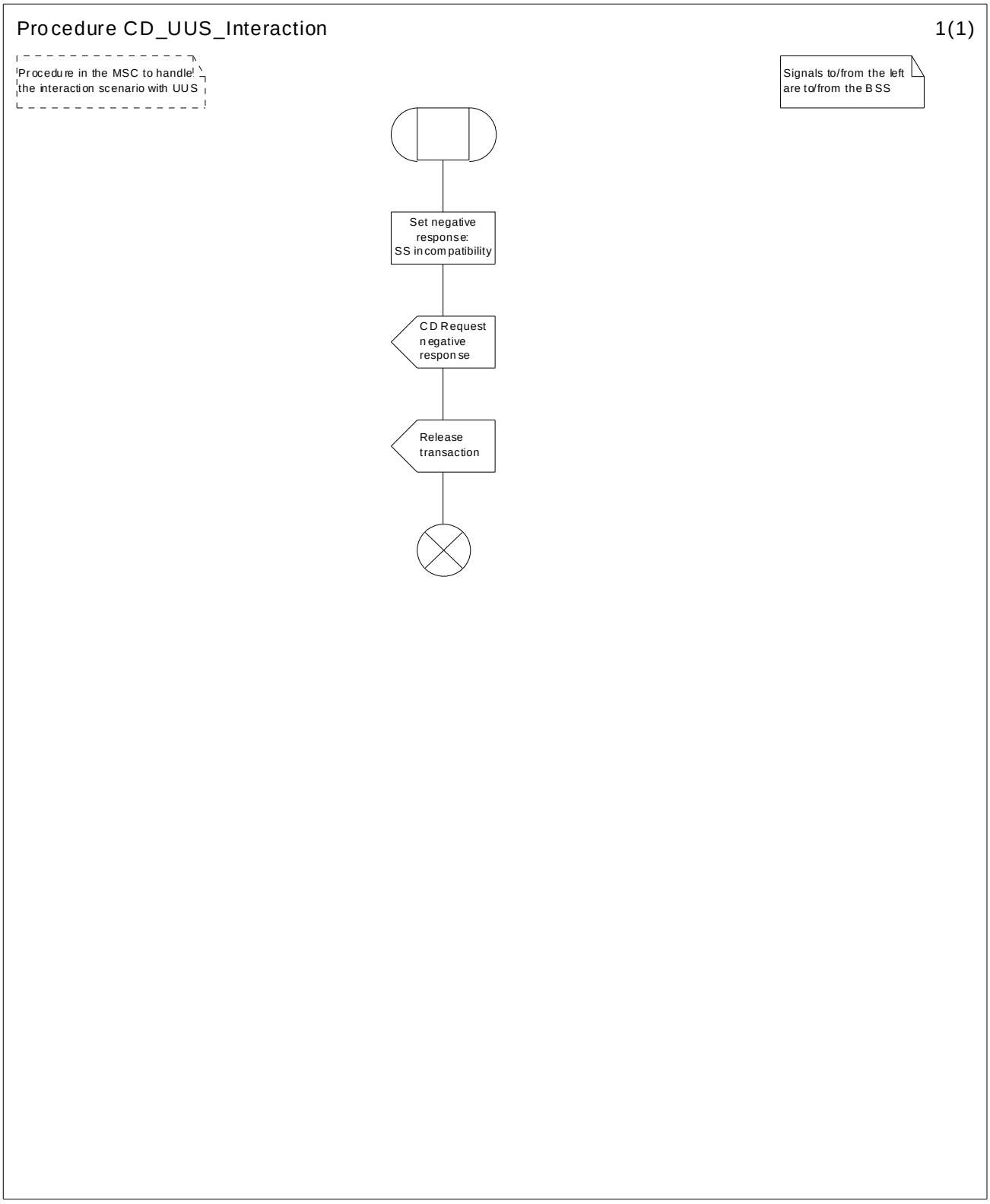


Figure 6.4: Procedure CD_UUS_Interaction

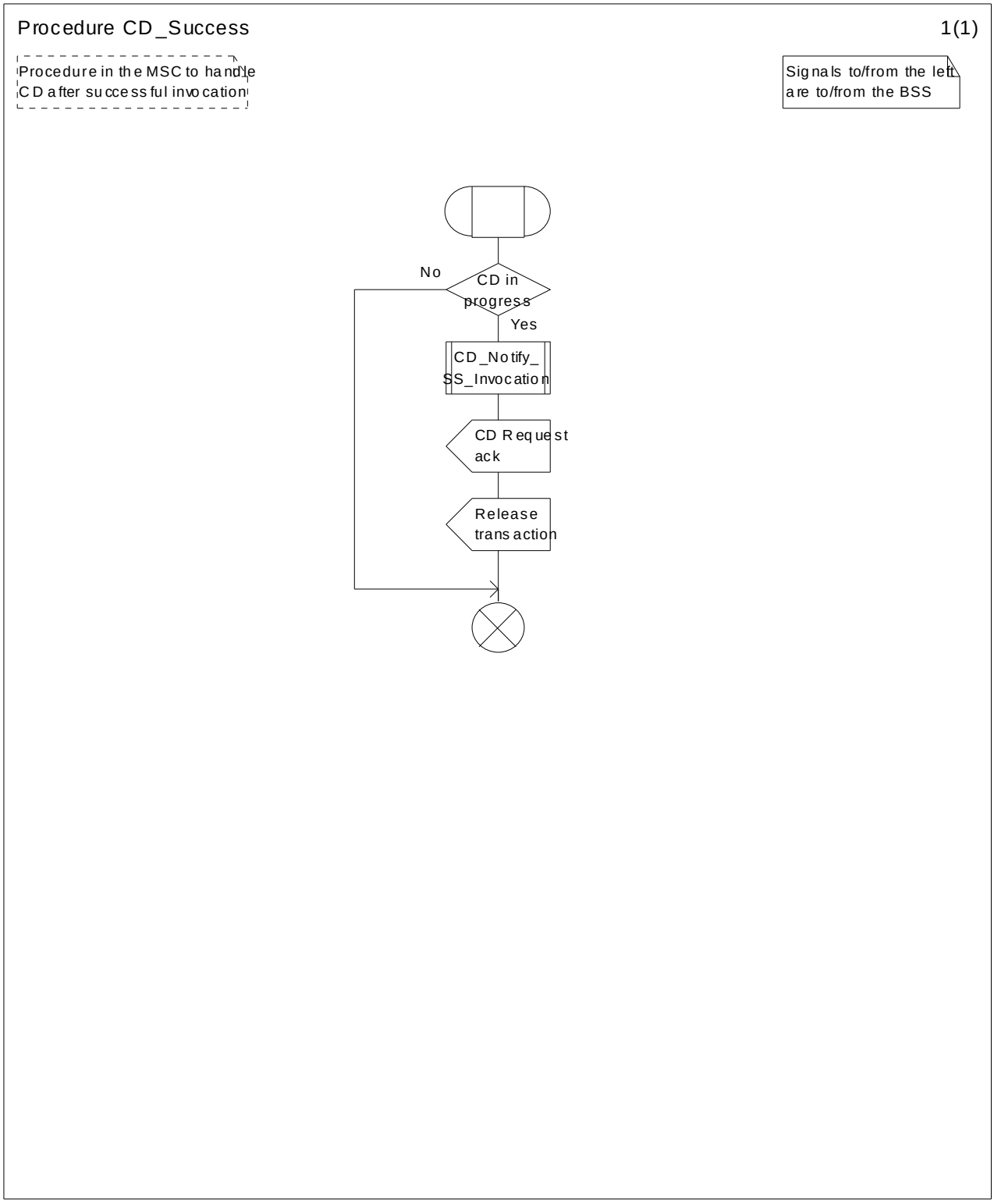


Figure 6.5: Procedure CD_Success

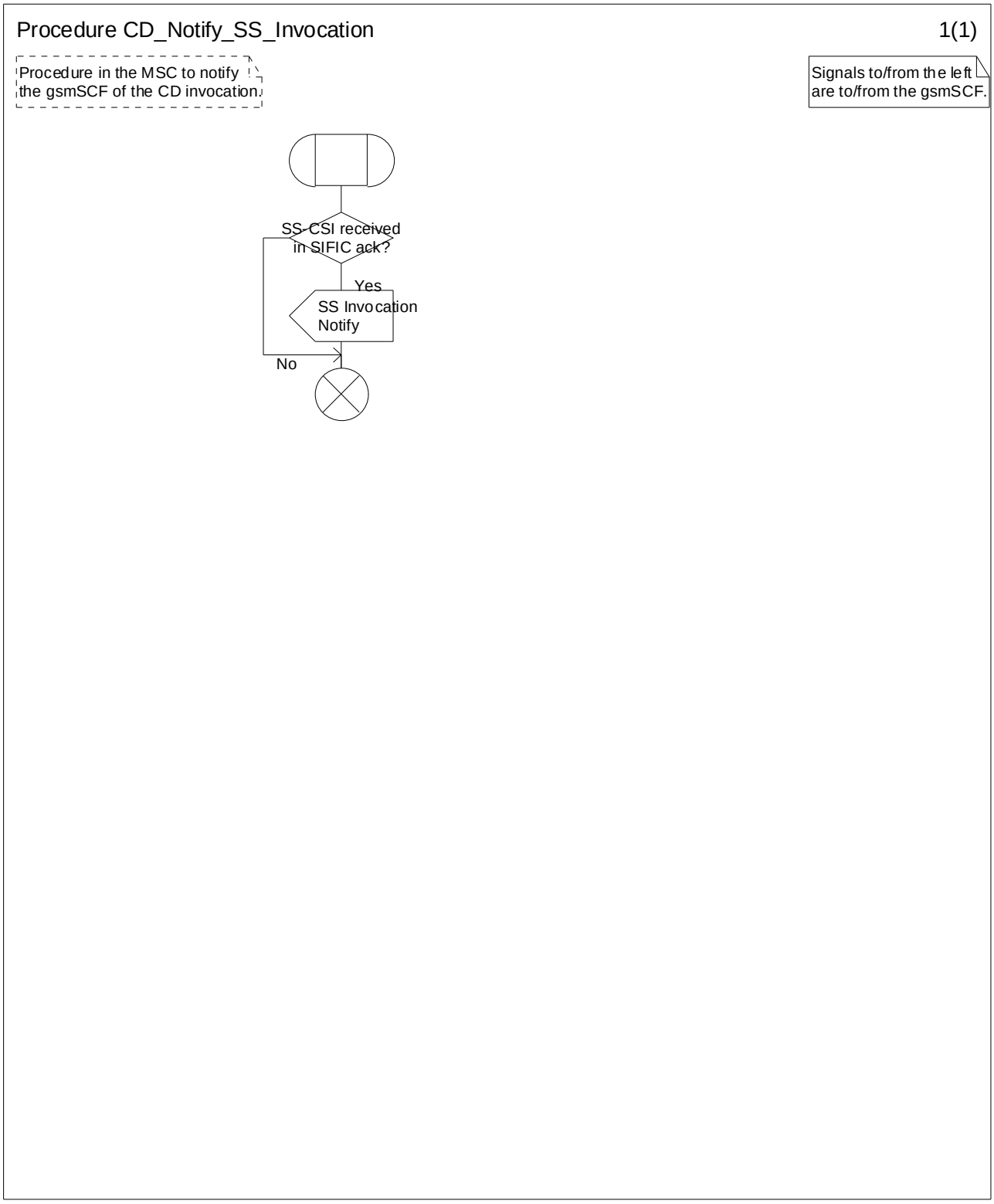


Figure 6.6 Procedure CD_Notify_SS_Invocation

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 clause.

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.

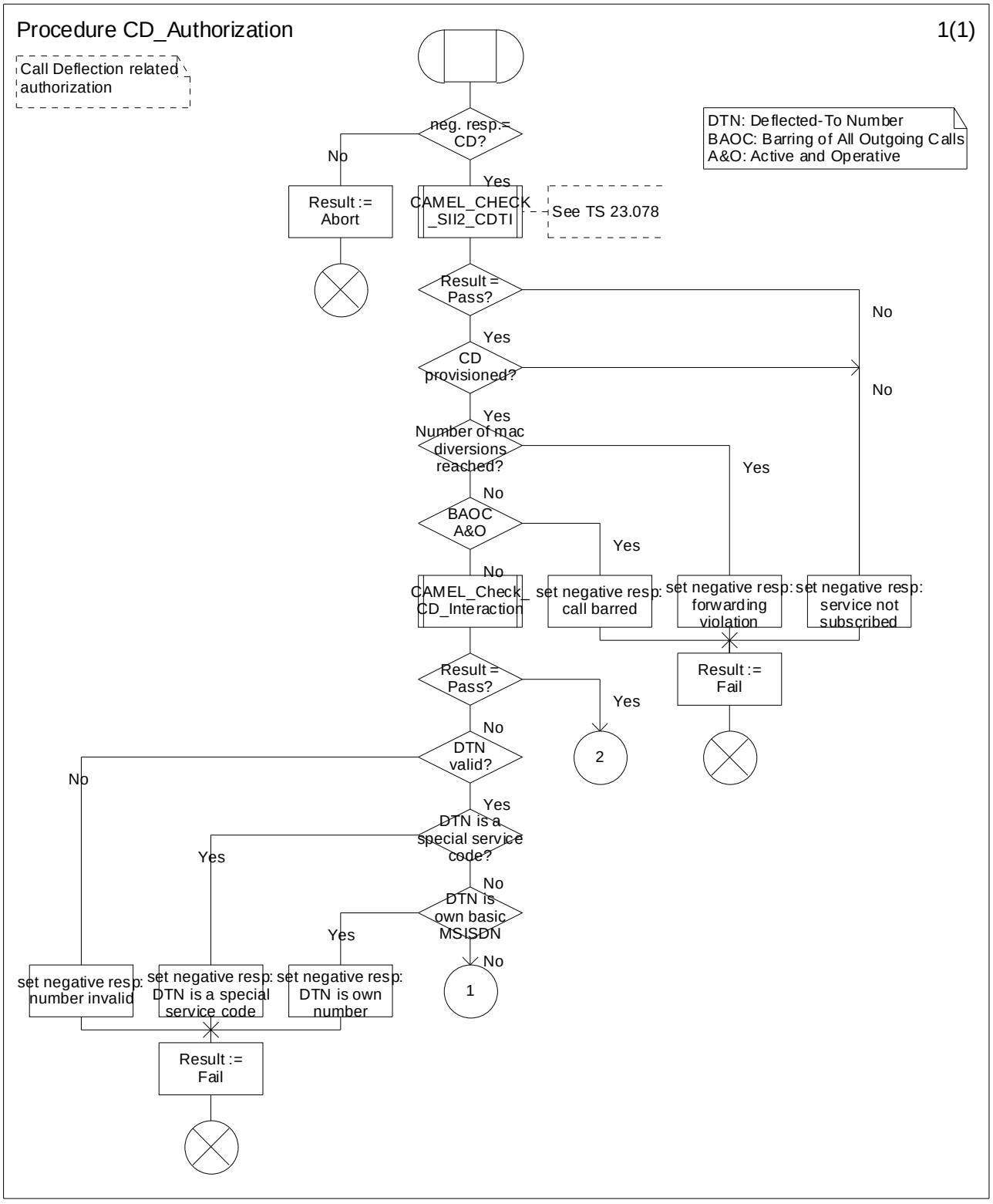


Figure 7.1 (sheet 1): Procedure CD_Authorization

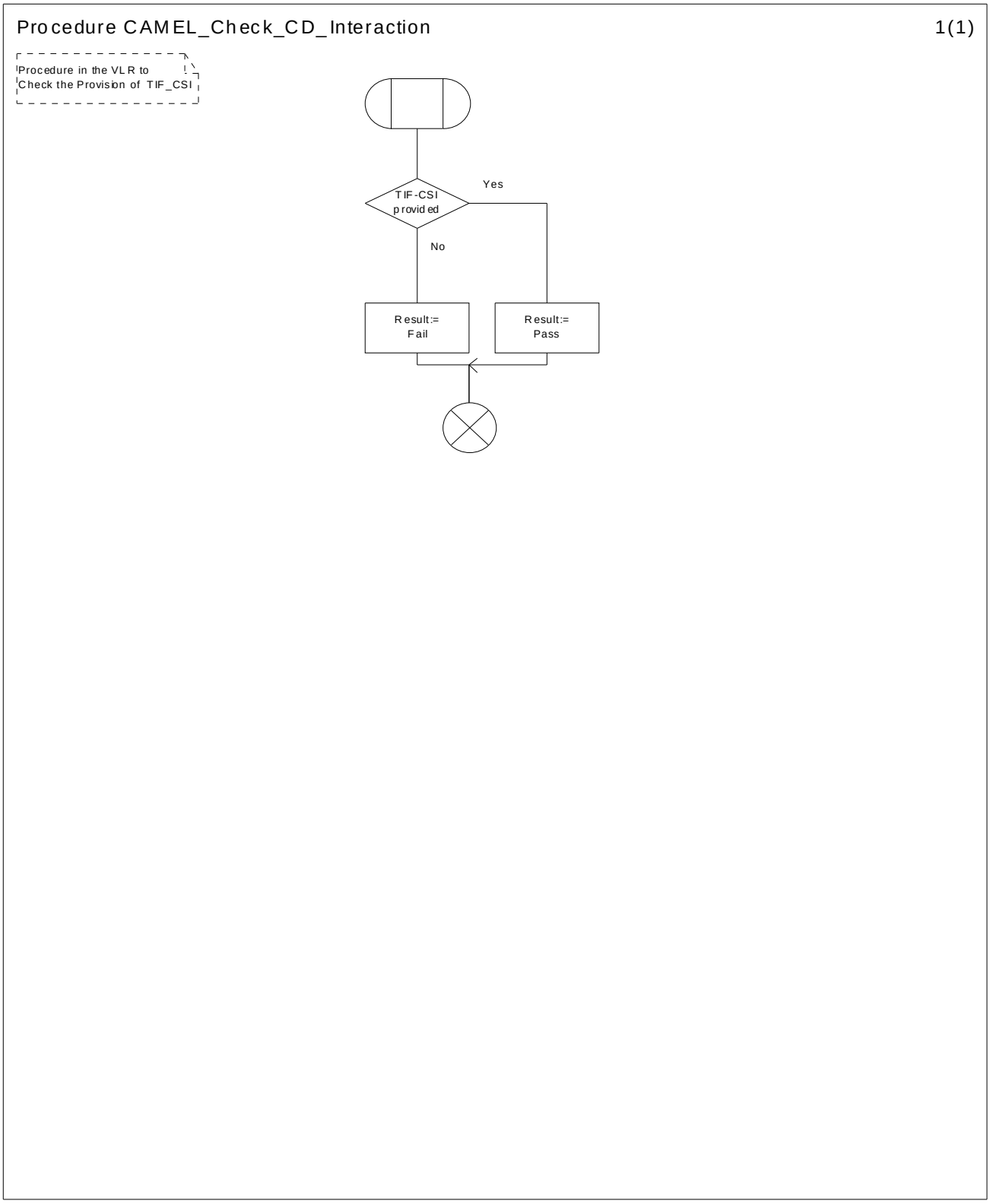


Figure 7.2: Procedure CAMEL_Check_CD_Interaction

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.

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.

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):

Provisioning State	**Registration State**	**Activation State**	**HLR Induction State**
(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.

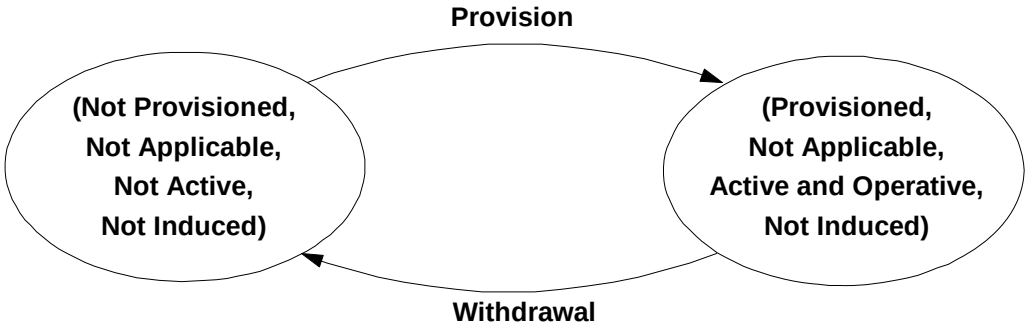


Figure 11.1: State transition model

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							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
Apr 1999						Transferred to 3GPP CN1	
CN#03						Approved at CN#03	3.0.0
CN#05			001			Approved at CN#05	3.1.0
CN#05			003			Approved at CN#05	3.1.0
CN#06			002	1		Approved at CN#06	3.2.0
CN#09			004			Transfer of Procedure Check_CD_SII2 to TS 23.078	3.3.0
CN#09			005			Handling of the Call Diversion Treatment Indicator	3.3.0
CN#11						Release 4 after CN#11	4.0.0
CN#16						References updated	4.0.1
CN#16						Release 5 after CN#16	5.0.0
CN#26						Release 6 after CN#26	6.0.0
CT#36						Upgraded unchanged from Rel-6	7.0.0
CT#42						Upgraded unchanged from Rel-7	8.0.0
CT#46			-			Update to Rel-9 version (MCC)	9.0.0
2011-03			-			Update to Rel-10 version (MCC)	10.0.0
2012-09			-			Update to Rel-11 version (MCC)	11.0.0
2014-09			-			Update to Rel-12 version (MCC)	12.0.0
2015-12			-			Update to Rel-13 version (MCC)	13.0.0
2017-03			-			Update to Rel-14 version (MCC)	14.0.0
2018-06			-			Update to Rel-15 version (MCC)	15.0.0
2020-07			-			Update to Rel-16 version (MCC)	16.0.0
2022-03	-	-	-	-	-	Update to Rel-17 version (MCC)	17.0.0

History

Document history		
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