3GPP TSG CT Plenary Meeting #28 **CP-050103**
1st – 3rd June 2005 Quebec, Canada.

Source: TSG CT WG4

Title: Corrections on Camel Trunk Triggers

Agenda item: 10.12

Document for: APPROVAL

Doc-2nd-Level	Spec	CR #	Rev	Rel	Tdoc Title	CAT	C_Version
C4-050785	23.018	145	1	Rel-7	Trunk Originated CAMEL triggering - SDLs	B	6.4.0
C4-050786	23.078	770	1	Rel-7	Trunk Originated CAMEL triggering - SDLs	B	6.5.0
C4-050782	23.078	764	1	Rel-7	CAMEL procedures for trunk originated services	B	6.5.0
C4-050784	29.002	765	1	Rel-7	Addition of CollectInformation procedure to OfferedCAMEL4Functionalities	B	6.9.0
C4-050783	29.078	392	1	Rel-7	Additions to CAP for trunk originated services	B	6.4.0

3GPP TSG-CT WG4 Meeting #27 **C4-050782**
Cancun, MEXICO. 25th to 29th April 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.078** **CR** **764** ⌘ **rev** **1** ⌘ Current version: **6.5.0** ⌘

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

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

Title:	⌘	CAMEL procedures for trunk originated services
Source:	⌘	Nortel
Work item code:	⌘	CAMELR7
Date:	⌘	28/04/2005
Category:	⌘	**B**
Release:	⌘	Rel-7

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

Use one of the following releases:

Ph2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	To enable CSE interaction for calls received over a trunk interface at the MSC. This capability has application in CAMEL-based IN networks to allow (public and private) trunk access to CSE-based services.
Summary of change:	⌘	Addition of CAMEL procedures for trunk originated services, including: - Provision of additional dialled digits (support for overlap signalling) - Description of trunk originated camel service information (TO-CSI) - Additions to O-BCSM for trunk originating calls - Additions to O-BCSM DPs in the MSC for TO calls - Description of call model for TO calls - Description of information flows for TO calls - Interaction of TO calls with supplementary services (CUG only)
Consequences if not approved:	⌘	Operators have to use proprietary solutions that restrict multi-vendor interoperability.

Clauses affected:	⌘	1,3,4.3.8(new), 4.4.2.1, 4.4.2.2(new), 4.4.4, 4.4.5.5(new), 4.6, 4.6.2.x(new), 4.7.4

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	23.018 CR145, 29.002 CR765, 29.078 CR392, 23.078 CR770
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	A separate CR contains the relevant SDLs for TO calls (23.078 CR770).

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

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

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

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

****** First Modification ******

1 Scope

The present document specifies the stage 2 description for the fourth phase (see 3GPP TS 22.078 [6]) of the Customized Applications for Mobile network Enhanced Logic (CAMEL) feature which provides the mechanisms to support services of operators which are not covered by standardized services even when roaming outside the HPLMN.

The CAMEL feature is a network feature and not a supplementary service. It is a tool to help the network operator to provide the subscribers with the operator specific services even when roaming outside the HPLMN.

In the present document, the GSM Service Control Function (gsmSCF) is treated as being part of the HPLMN. The regulatory environment in some countries may require the possibility that the gsmSCF and the HPLMN are controlled by different operators, and the gsmSCF and the HPLMN are therefore distinct entities.

The fourth phase of the CAMEL feature supports, in addition to the third phase of the CAMEL:

- Interactions with Optimal Routing;
- Call Party Handling;
- DTMF Mid call procedure for Mobile Originated and Mobile Terminating calls;
- Inclusion of flexible tone injection;
- Provision of location information of called subscriber;
- Provide location information during ongoing call;
- CAMEL control over MT SMS;
- Notification of GPRS mobility management to CSE;
- Inclusion of ODB data in Any Time Modification;
- Enhancement of Any Time Interrogation and Provide Subscriber Information for PS Domain;
- Mobile Number Portability database interrogation;
- Criteria for the provision of location information during ongoing call;
- Enhanced Dialled Services;
- Enhancement to Establish Temporary Connection;
- CAMEL control of trunk originated calls;
- Reporting of additional dialled digits.

CAMEL applicability to IP-based multimedia services is introduced in the fourth phase of the CAMEL. It is specified in 3GPP TS 23.278 [29].

CAMEL is not applicable to Emergency Setup (TS 12), i.e. if an Emergency call is requested, then the gsmSSF shall not be invoked.

The mechanism described in the present document addresses especially the need for information exchange between the VPLMN or IPLMN and the HPLMN for support of operator specific services. Any user procedures for the control of operator specific services are outside the scope of the present document. Subscribers who have subscribed to operator specific services and therefore need the functional support of the CAMEL feature shall be marked in the HPLMN and VPLMN. In case a subscriber is marked to need CAMEL support, the appropriate procedures which provide the necessary information to the VPLMN or the HPLMN are invoked. It is possible for the HPLMN to instruct the VPLMN or IPLMN to interact with a gsmSCF which is controlled by the HPLMN.

The specification of operator specific services is outside the scope of the present document.

1.1 Support of partial implementation of CAMEL phase 4

A functional entity (VMSC, GMSC or SGSN) may support the complete CAMEL phase 4 functionality or, as a network option, it may support the complete CAMEL phase 3 functionality and a partial implementation of CAMEL phase 4.

If a functional entity supports any part of CAMEL phase 4, then the HLR is informed of the CAMEL phase 4 CSIs supported. An SGSN may also indicate support of the Provide Subscriber Information IF. To indicate support of a specific CSI, a functional entity shall have the ability to trigger on any initial service event possible for that CSI.

If a VMSC or GMSC supports any of the CAMEL phase 4 circuit switched CSIs (O-CSI, D-CSI, T-CSI or VT-CSI), then the gsmSCF is informed of the CAMEL phase 4 circuit switched functionalities offered. The gsmSCF shall not send information flows or parameters that conflict with the functionalities offered by the VMSC or GMSC.

If a CAMEL subscriber attempts to register in a VMSC or SGSN which supports at least one CAMEL phase 4 CSI or the enhancement of Provide Subscriber Information IF, then the VMSC or SGSN indicates in the registration request to the HLR the phase of CAMEL which the VMSC or SGSN supports (at least phase 4). In addition, the VMSC or SGSN indicates which CAMEL phase 4 CSIs may be downloaded. An SGSN may also indicate support of the Provide Subscriber Information IF.

If a GMSC supports at least one CAMEL phase 4 CSI, then the GMSC indicates in the Send Routeing Info to the HLR the phase of CAMEL which the GMSC supports (at least phase 4). In addition, the GMSC indicates which CAMEL phase 4 CSIs may be downloaded.

If a VMSC/gsmSSF or GMSC/gsmSSF initiates contact with the gsmSCF using the Initial DP IF, or acknowledges a gsmSCF initiated contact using the Initiate Call Attempt ack IF, then the VMSC/gsmSSF or GMSC/gsmSSF indicates in the IF the CAMEL phase 4 functionalities offered to the gsmSCF.

If a VLR initiates contact with the gsmSCF using a Mobility Management Event Notification IF, then the VLR or SGSN indicates in the IF the functionalities offered to the gsmSCF.

1.1.1 CAMEL Phase 4 CSIs

A network entity may indicate to the HLR an offer of support for the following CAMEL phase 4 CSIs:

- CAMEL phase 4 O-CSI;
- CAMEL phase 4 D-CSI;
- CAMEL phase 4 T-CSI;
- CAMEL phase 4 VT-CSI;
- CAMEL phase 4 MT-SMS-CSI;
- CAMEL phase 4 MG-CSI.

An SGSN may also indicate support of the CAMEL phase 4 Provide Subscriber Information IF.

A functional entity (VMSC, GMSC or SGSN) may offer the CSIs in any combination applicable for this entity. A functional entity shall indicate to the HLR all the CSIs it offers. The HLR may ignore the offer of the supported CSIs if they are not applicable for the sending entity, but it shall not reject the operation in this case.

1.1.2 CAMEL Phase 4 Functionalities

The CAMEL phase 4 functionalities which may be offered to the gsmSCF are the following:

- Creating additional parties in a call, Creating a new call (Initiate Call Attempt);
- Placing an individual call party on hold or moving an individual call party to Call Segment 1, when Call Segment 1 does not exist (Split Leg);

- Connecting an individual call party to the group (Move Leg);
- Releasing an individual call party (Disconnect Leg);
- Indication of the release of a call party or call segment (Entity Released);
- Enhancements for subscriber interactions with the gsmSCF (Disconnect Forward Connection With Argument);
- Inclusion of flexible tone injection (Play Tone);
- DTMF Mid call procedure for MO and VT calls (DP O_Mid_Call, DP T_Mid_Call);
- Provision of Charge Indicator at answer DP (Charge Indicator at DP O_Answer, DP T_Answer);
- Support of Alerting DP (DP O_Term_Seized, DP Call_Accepted);
- Provision of location information of subscriber at alerting DP (Location information at DP O_Term_Seized, DP Call_Accepted);
- Provision of location information during an ongoing call (DP O_Change_Of_Position, DP T_Change_Of_Position);
- Interactions with Basic Optimal Routeing (Basic OR Interrogation Requested in Connect and Continue With Argument, Route Not Permitted in DP O_Abandon);
- Warning tone enhancements (Burstlist for Audible Indicator);
- Enhancements of Call Forwarding indication (Forwarding Destination Number);
- Criteria for the provision of location information during ongoing call (Criteria for DP O_Change_Of_Position and DP T_Change_Of_Position);
- Subscribed Enhanced Dialled services (see description below);
- Serving Network Enhanced Dialled Services (see description below); ~~and~~
- SCUDIF notification during active phase of the call (DP O_Service_Change and T_Service_Change); and
- Collection of additional dialled digits (Arming CollectedInfo DP as EDP-R).

For the Subscribed Enhanced Dialled Services and Serving Network Enhanced Dialled Services, the following information flows apply in addition to the information flows allowed at TDP Analysed_Information since CAMEL phase 3: Apply Charging, Call Information Request, Cancel (all requests) and Request Report BCSM Event together with their acknowledgements and reportings. In addition, all the other offered CAMEL phase 4 functionalities apply also to the enhanced dialled services.

A functional entity (VMSC or GMSC) may offer the functionalities in any combination applicable for this entity and applicable to the offered CSIs.

A functional entity (VMSC or GMSC) shall indicate to the gsmSCF all the functionallities it offers.

****** Next Modification ******

3 Definitions and abbreviations

3.1 Definitions

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

Basic Call State Model (BCSM): BCSM provides a high-level model of GMSC- or MSC/VLR-activities required to establish and maintain communication paths for users. As such, it identifies a set of basic call activities in a GMSC or MSC/VLR and shows how these activities are joined together to process a basic call.

Call Control Function (CCF): CCF is the Call Control Function in the network that provides call/service processing and control (see ITU-T Recommendation Q.1224 [44]).

Call Party Handling (CPH) Information Flow: Any of the Disconnect Leg, Move Leg or Split Leg information flows.

Call Segment: A call segment contains one or more legs that are controlled by the same CS_gsmSSF instance. The call parties in the same call segment can communicate with each other (using a conference bridge if necessary). Call segments are identified by a number, eg. CSID1 is the call segment with id number 1.

Call Segment Association (CSA): A CSA contains one or more call segments. Legs can be moved between call segments within the CSA. There is a single CAP dialogue between the CSA and the gsmSCF.

Detection Points (DP): points in processing at which notifications (to the service logic) can occur and transfer of control (to the gsmSCF) is possible are called Detection Points (DPs).

Dialled Service CAMEL Subscription Information (D-CSI): D-CSI identifies the subscriber as having originating CAMEL dialled services.

Forwarding MSC: MSC which is either an MSC invoking a standardized Call Forwarding supplementary service or Call Deflection supplementary service; or an MSC invoking a CAMEL based call forwarding service.

Gateway MLC (GMLC): functional entity that allows external LCS Clients to request real-time information about a Mobile Station. The information that can be requested from the GMLC is:

- location of Mobile Station

See 3GPP TS 23.271 [28] and 3GPP TS 25.305 [32] for information on the GMLC.

Geodetic Information: information defining the location of a mobile station, coded according to ITU-T Recommendation Q.763 [43]. The derivation of this information from other information defining the location of a mobile station is a network operator option. If an entity derives the geodetic information it shall also provide the equivalent geographical information.

Geographical Information: information defining the location of a mobile station, coded according to 3GPP TS 23.032 [13].

GPRS CAMEL Subscription Information (GPRS-CSI): GPRS-CSI identifies the subscriber as having GPRS CAMEL services.

GPRS Dialogue: A dialogue between the gprsSSF and the gsmSCF. A single GPRS Dialogue may consist of one or more TCAP dialogues. Only one TCAP dialogue shall exists at one point in time for one gprsDialogue.

GPRS Service Switching Function (gprsSSF): functional entity that interfaces the SGSN to the gsmSCF. The concept of the gprsSSF is derived from the IN SSF, but uses different triggering mechanisms because of the nature of the mobile network.

GPRS Session: GPRS session starts when the GPRS subscriber attaches to the GPRS data network. It ends when the GPRS subscriber detaches from the GPRS data network.

GSM Service Control Function (gsmSCF): functional entity that contains the CAMEL service logic to implement OSS. It interfaces with the gsmSSF, the gsmSRF, the GMLC and the HLR.

GSM Service Switching Function (gsmSSF): functional entity that interfaces the MSC or GMSC to the gsmSCF. The concept of the gsmSSF is derived from the IN SSF, but uses different triggering mechanisms because of the nature of the mobile network.

GSM Specialised Resource Function (gsmSRF): functional entity which provides various specialized resources. It interfaces with the gsmSCF and with the MSC. This entity is defined in ITU-T Recommendation Q.1224 [44] with variations defined in the present document.

Inter-connecting MSC:MSC which provides CAMEL support for incoming trunk calls.

Location Information: indicates the location of the Mobile Station. The provision of location information is independent of the MS status. As part of the location information, an indication of the age of this information may be delivered.

Mobile Originating Short Message Service CAMEL Subscription Information (MO-SMS-CSI): MO-SMS-CSI identifies the subscriber as having MO SMS CAMEL services. MO-SMS-CSI (CAMEL Phase 4) is identical to SMS-CSI (CAMEL Phase 3).

Mobile Station State: similar to **Subscriber State**, but associated only with a Mobile Station, not with a subscriber.

Mobile Terminating Short Message Service CAMEL Subscription Information (MT-SMS-CSI): MT-SMS-CSI identifies the subscriber as having MT SMS CAMEL services.

Mobility Management event CAMEL Subscription Information (M-CSI): M-CSI identifies the subscriber as having Mobility Management event notification CAMEL services.

Mobility Management event GPRS CAMEL Subscription Information (MG-CSI): MG-CSI identifies the GPRS subscriber as having Mobility Management event notification CAMEL services.

NA (North American): prefix attached to certain information items used by North American PLMNs in connection with routing a call to a preferred or dialled long distance carrier.

Network CAMEL Service Information (N-CSI): N-CSI identifies services offered on a per-network basis by the serving PLMN operator for all subscribers.

Originating Basic Call State Model (O-BCSM): originating half of the BCSM. The O-BCSM corresponds to that portion of the BCSM associated with the originating party.

Originating CAMEL Subscription Information (O-CSI): O-CSI identifies the subscriber as having originating CAMEL services.

Point In Association (PIA): PIAs identify MSC/VLR or SGSN activities associated with one or more basic association/connection states of interest to OSS service logic instances.

Point In Call (PIC): PICs identify MSC/VLR (GMSC) activities associated with one or more basic call/connection states of interest to OSS service logic instances.

Service Key: Service Key identifies to the gsmSCF the service logic. The Service Key is administered by the HPLMN, and is passed transparently by the VPLMN/IPLMN to the gsmSCF. The Service Key is a part of the T/O/VT/D/GPRS/SMS/M-CSI.

Serving MLC: functional entity that performs location information retrieval.

Short Message Control Protocol (SM-CP): Protocol between the MSC or SGSN and the MS. This protocol, which is specified in 3GPP TS 24.011 [31], is used to carry RPDU elements between the MSC or SGSN and the MS.

Short Message Service Centre (SMSC): also abbreviation SC is used for SMSC.

Subscriber State: see 3GPP TS 22.078 [6].

Supplementary Service Notification CAMEL Subscription Information (SS-CSI): SS-CSI identifies the subscriber as having supplementary service invocation notification CAMEL services.

Terminating Basic Call State Model (T-BCSM): terminating half of the BCSM. The T-BCSM corresponds to that portion of the BCSM associated with the terminating party.

Terminating CAMEL Subscription Information (in the GMSC) (T-CSI): T-CSI identifies the subscriber as having terminating CAMEL services in the GMSC.

VMSC Terminating CAMEL Subscription Information (VT-CSI): VT-CSI identifies the subscriber as having terminating CAMEL services in the VMSC.

Translation Information Flag (TIF-CSI): TIF-CSI is a flag in the CAMEL subscriber data which indicates that when the subscriber registers a forwarded-to number, that the HLR shall not attempt to perform any translation, number format checks, prohibited FTN checks, call barring checks.

USSD CAMEL Subscription Information (U-CSI): U-CSI identifies a set of subscriber specific mappings from a USSD service code to a gsmSCF address.

USSD General CAMEL Service Information (UG-CSI): UG-CSI globally identifies a set of mappings from a USSD service code to a gsmSCF address. The global mapping applies to all HPLMN subscribers. If, for a particular service code, both U-CSI and UG-CSI are applicable then the U-CSI shall take precedence.

Trunk Originated CAMEL Service Information (TO-CSI): TO-CSI identifies services offered by the PLMN operator to all incoming calls on a specific MSC trunk.

3.2 Abbreviations

Abbreviations used in the present document are listed in 3GPP TR 21.905 [1].

For the purposes of the present document, the following abbreviations apply:

BCSM	Basic Call State Model
CAMEL	Customized Applications for Mobile network Enhanced Logic
CPH	Call Party Handling
CS	Call Segment
CS	Circuit Switched
CSA	Call Segment Association
CSID	Call Segment (followed by an identification Number e.g. CSID1)
DP	Detection Point
DTN	Deflected To Number
D-CSI	Dialled Services CAMEL Subscription Information
EDP	Event Detection Point
EDS	Enhanced Dialled Services
FTN	Forwarded To Number
GMLC	Gateway MLC
GMSC	Gateway MSC
GPRS	General Packet Radio Service
gprsSSF	GPRS Service Switching Function
GPRS-CSI	GPRS CAMEL Subscription Information
gsmSCF	GSM Service Control Function
gsmSRF	GSM Specialised Resource Function
gsmSSF	GSM Service Switching Function
HLR	Home Location Register
HPLMN	Home PLMN
ICA	Initiate Call Attempt
IE	Information Element
IF	Information Flow
IP	Intelligent Peripheral
IPLMN	Interrogating PLMN
LCS	Location Services
LSA	Localised Service Area
M-CSI	Mobility Management event Notification CAMEL Subscription Information
MF	Mobile Forwarding
MG-CSI	Mobility Management event Notification GPRS CAMEL Subscription Information
MLC	Mobile Location Centre
MNP	Mobile Number Portability
MNP SRF	Mobile Number Portability Signalling Relay Function
MO	Mobile Originating
MO-SMS-CSI	Mobile Originated Short Message Service CAMEL Subscription Information
MSC	Mobile service Switching Centre
MT	Mobile Terminating
MT	Mobile Terminating in GMSC
MT-SMS-CSI	Mobile Terminating Short Message Service CAMEL Subscription Information
N-CSI	Network CAMEL Service Information
NA	North American
NNI	Network Node Interface
O-BCSM	Originating Basic Call State Model

O-CSI	Originating CAMEL Subscription Information
ODB	Operator Determined Barring
OR	Optimal Routeing
OSS	Operator Specific Service
PDP	Packet Data Protocol
PIC	Point In Call
PLMN	Public Land Mobile Network
SGSN	Serving GPRS Support Node
SLPI	Service Logic Program Instance
SM	Short Message
SM-CP	Short Message Control Protocol
SMF	Service Management Function
SMLC	Serving MLC
SMRSE	Short Message Relay Service Element
SMS	Short Message Service
SMSC	Short Message Service Centre
SMS-CSI	Short Message Service CAMEL Subscription Information
SS-CSI	Supplementary Service Notification CAMEL Subscription Information
T-BCSM	Terminating Basic Call State Model
T-CSI	Terminating CAMEL Subscription Information (in the GMSC)
TDP	Trigger Detection Point
TO-CSI	Trunk Originated CAMEL Service Information
TPDU	Transfer Protocol Data Unit
TIF-CSI	Translation Information Flag
U-CSI	USSD CAMEL Subscription Information
UG-CSI	USSD General CAMEL Service Information
UNI	User Network Interface
VLR	Visitor Location Register
VPLMN	Visited PLMN
VT	Mobile Terminating in VMSC
VT-CSI	VMSC Terminating CAMEL Subscription Information

4 Circuit switched Call Control

****** Next Modification ******

4.3.8 Trunk Originated CAMEL Service Information (TO-CSI)

The TO-CSI identifies services offered on a MSC basis by the serving PLMN operator for all incoming calls on a specific MSC trunk. This CSI shall be stored in the MSC. The contents of the TO-CSI is outside the scope of this specification.

When processing trunk originating calls requiring CAMEL support, the TO-CSI informs the MSC to request instructions from the gsmSSF. The MSC monitors on request the call states (events) and informs the gsmSSF of these states during processing, enabling the gsmSSF to control the execution of the call in the MSC.

Certain basic call events may be visible to the GSM Service Control Function (gsmSCF). The DPs are the points in call at which these events are detected. The DPs for Trunk Originated Calls are described in subclauses 4.4.2.

Dynamic arming/ disarming rules for TO calls are specified in subclause 4.2.1.1. Static arming/ disarming of DP Collected_Info and DP Analysed_Information for TO calls shall use the following rules:

- A DP for trunk originating call is statically armed in the MSC as a result of TO-CSI for the specific MSC trunk.
- A statically armed DP is disarmed when the TO-CSI that caused the DP to be statically armed is withdrawn from the MSC.

TDP Criteria may be defined for the case when collection of dialled digits has been performed. Criteria may be based on the contents and/ or length of the dialled number, basic service, call type or other information at the discretion of the network operator, however this is outside the scope of this specification.

TDP Criteria on the contents of the called number may be defined for dialled services at the discretion of the network operator, however this is outside the scope of this specification.

DP processing rules for TO calls are defined in subclause 4.2.2.

4.4 Description of CAMEL BCSMs

4.4.1 General Handling

The BCSM is used to describe the actions in an MSC or GMSC or VMSC during originating, forwarded or terminating calls.

The BCSM identifies the points in basic call processing when Operator Specific Service (OSS) logic instances (accessed through the gsmSCF) are permitted to interact with basic call control capabilities.

Figure 4.2 shows the components that have been identified to describe a BCSM.

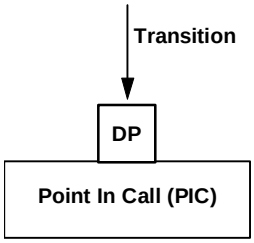


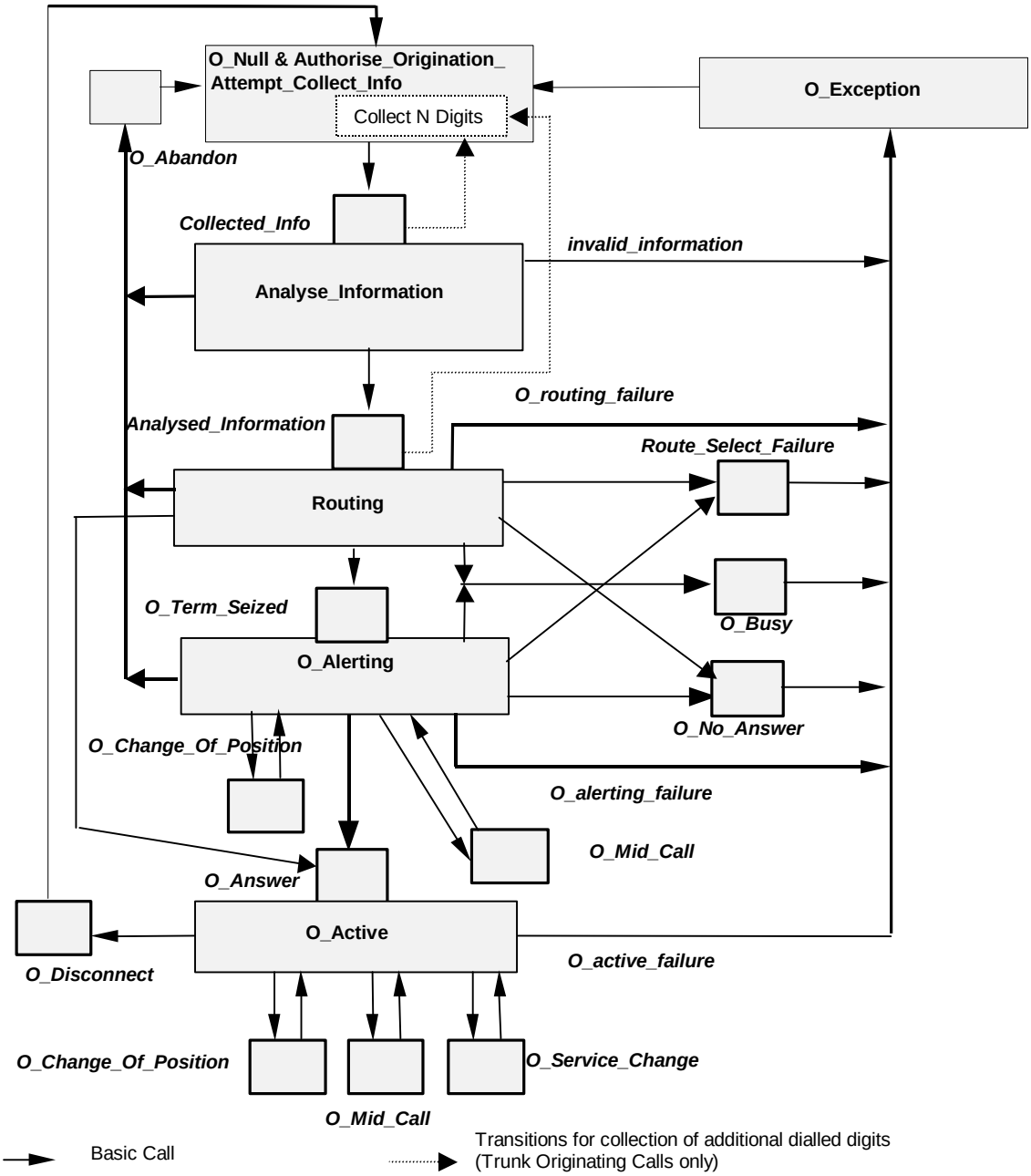
Figure 4.2: BCSM Components

4.4.2 Originating Basic Call State Model (O-BCSM)

4.4.2.1 Description of O-BCSM

The O-BCSM is used to describe the actions in an MSC during originating (MSC) or forwarded (MSC or GMSC) calls.

When encountering a DP the O-BCSM processing is suspended at the DP and the MSC or GMSC indicates this to the gsmSSF which determines what action, if any, shall be taken if the DP is armed. For gsmSCF initiated new calls the O-BCSM is initially suspended at DP Collected_Info.



NOTE: The DP O_Busy also includes the 'not reachable' case.

Figure 4.3: Originating BCSM for CAMEL

The table below defines the different DPs which apply to mobile originating and forwarded calls and trunk originating calls.

Table 4.2: Description of O-BCSM DPs in the MSC

CAMEL Detection Point:	DP Type	Description:
DP Collected_Info	TDP-R, EDP-R (note 7)	Indication that the O-CSI is analysed, or the gsmSCF has initiated a call attempt (. In this case later case the DP is neither triggered nor reported) or additional digits have been collected.
DP Analysed_Information	TDP-R (note 2)	Availability of routeing address and nature of address.
DP Route_Select_Failure	TDP-R (note 3), EDP-N, EDP-R	Indication that the call establishment failed.
DP O_Busy	EDP-N, EDP-R	Indication that: - a busy indication is received from the terminating party, - a not reachable event is determined from a cause IE in the ISUP Release message.
DP O_No_Answer	EDP-N, EDP-R	Indication that: - an application timer associated with the O_No_Answer DP expires, - a no answer event is determined from a cause IE in the ISUP Release message.
DP O_Term_Seized	EDP-N, EDP-R	Indication that the called party is being alerted.
DP O_Answer	EDP-N, EDP-R	Indication that the call is accepted and answered by the terminating party.
DP O_Mid_Call	EDP-N, EDP-R	Indication that a service/service feature indication is received from the originating party (DTMF - note 4, note 5).
DP O_Change_Of_Position	EDP-N	Indication that the originating party has changed position (note 6).
DP O_Disconnect	EDP-N, EDP-R	A disconnect indication is received from the originating party or from the terminating party.
DP O_Abandon	EDP-N, EDP-R	Indication that a disconnect indication is received from the originating party during the call establishment procedure.
DP O_Service_Change	EDP-N	Indication that the bearer service has changed.
NOTE 1: The DPs are defined in ITU-T Recommendation Q.1224 [44]. NOTE 2: For TDP-R Analysed_Information new relationship to gsmSCF is opened. NOTE 3: DP Route_Select_Failure shall be reported as TDP-R when there is no relationship to gsmSCF. If a relationship to gsmSCF is already open, it shall be reported as EDP-R or EDP-N if armed so. DP Route_Select_Failure cannot be armed as TDP-R for Trunk Originating Calls. NOTE 4: DTMF is only applicable for the Mobile Originating or Trunk Originating Call in the VMSC. NOTE 5: Call Processing is suspended at DP O_Mid_Call if a Call Party Handling information flow is handled. However, the DP is not reported. NOTE 6: DP O_Change_Of_Position is applicable only for the Mobile Originating Call in the VMSC. NOTE 7: DP Collected_Info as a EDP-R is applicable only for Trunk Originating Calls.		

4.4.2.1.1 Description of the call model (PICs)

This subclause describes the call model for originating and forwarded calls. For each PIC a description can be found of the entry events, functions and exit events.

It should be noted that although the names used for PICs match those used in ITU-T Recommendation Q.1224 [44] the specific descriptions differ.

4.4.2.1.1.1 O_Null & Authorise_Origination_Attempt_Collect_Info

Entry events:

- Disconnection and clearing of a previous call (DP O_Disconnect) or default handling of exceptions by gsmSSF/(G)MSC completed.
- Abandon event is reported from Analyse_Information or Routing and Alerting PIC.
- Exception event is reported.
- gsmSCF requests additional digits (DP CollectedInfo or DP AnalysedInfo).

Actions:

If entry event is 'gsmSCF requests additional digits' then MSC starts collecting additional digits.

Otherwise:

- Interface is idled.
- Mobile Originating call:
  - SETUP information flow containing the dialled number is received from MS, preceeding call leg or originating exchange.
  - ~~Originating call:~~ The supplementary service "barring of all outgoing calls" is checked and invoked if necessary.
  - ~~Originating call:~~ The ODB category "barring of all outgoing calls" is checked and ODB is invoked if necessary.

    NOTE: the ODB category "barring of all outgoing calls when roaming" causes the HLR to send the category "barring of all outgoing call" if the VLR is not in the HPLMN.
  - ~~Originating call:~~ CUG checks done in the originating MSC/VLR are performed.
  - Information being analysed e.g. O-CSI is analysed.
- Trunk Originating call:
  - The initial information flow containing the complete dialled number or an initial information package/ dialling string is received from the trunk interface.
  - Any operator specific service checks done in the originating MSC are performed.
  - Information being analysed e.g., TO-CSI is analysed.

Exit events:

If entry event was 'gsmSCF requests additional digits' then:

- Additional digits collected.
- Inter-digit timer expires
- An exception condition is encountered. For example, collection of additional digits fails due to a lack of switch resources (e.g. no digit receivers are available) or calling party abandons call.

Otherwise:

- Originating CSI is analysed.
- Trunk Originating CSI is analysed.
- An exception condition is encountered. For this PIC, if the call encounters one of these exceptions during the PIC processing, the exception event is not visible because there is no corresponding DP. Example exception condition: Calling party abandons call.

4.4.2.1.1.2 Analyse_Information

Entry events:

- Originating CSI is analysed. (DP Collected Info).
- Trunk Originating CSI is analysed (DP Collected Info).
- Additional digits collected (DP Collected Info)
- The gsmSCF has initiated a call attempt (DP Collected_Info). In this case the DP has neither been triggered nor has it been reported.

- New routeing information is received when the Busy event (DP O_Busy), Route Select Failure event (DP Route_Select_Failure), Not Reachable event (DP O_Busy) or No Answer event (DP O_No_Answer) is reported from the Routing and Alerting PIC.
- New routeing information is received when the Disconnect event is reported from the O_Active PIC.

Actions:

- Compare the called party number with the dialled services information.

Exit events:

- Availability of routeing address and nature of address. (DP Analysed_Information).
- An exception condition is encountered (e.g. ~~wrong~~ invalid number); this leads to the O_Exception PIC.
- The calling party abandons the call; this leads to the O_Abandon DP.

4.4.2.1.1.3 Routing

Entry events:

- Availability of routeing address and nature of address. (DP Analysed_Information).

Actions:

- Information is being analysed and/or translated according to dialling plan to determine routeing address.
- Routeing address being interpreted.
- Mobile Originating or forwarded call: Outgoing barring services and ODB categories not already applied are checked and invoked if necessary.
- Trunk Originating call: Any operator specific service checks in the originating MSC are performed.

Exit events:

- An alerting indication (ISUP ACM) is received from the terminating party; this leads to the O_Term_Seized DP.
- The attempt to select the route for the call fails; this leads to the Route_Select_Failure DP.
- A busy indication is received from the terminating party; this leads to the O_Busy DP.
- A not reachable indication is received from the terminating party; this leads to the O_Busy DP.
- A no reply indication is received from the terminating party or a no reply condition is determined at the MSC/ gsmSSF; this leads to the O_No_Answer DP
- An indication is received from the terminating half BCSM that the call is accepted and answered by the terminating party; this leads to O_Answer DP.
- The calling party abandons the call' this leads to the O_Abandon DP.
- An exception condition is encountered; this leads to the O_Exception PIC.

~~- The calling party abandons the call; this leads to the O_Abandon DP.~~

~~- A busy indication is received from the terminating party; this leads to the O_Busy DP.~~

~~- A not reachable indication is received from the terminating party; this leads to the O_Busy DP.~~

~~- The attempt to select the route for the call fails; this leads to the Route_Select_Failure DP.~~

~~- An alerting indication (ISUP ACM) is received from the terminating party; this leads to the O_Term_Seized DP.~~

~~- The no reply timer expires; this leads to the O_No_Answer DP.~~

4.4.2.1.1.4 O_Alerting

Entry events:

- Called Party is being alerted (DP O_Term_Seized).
- Continue is received in O_Mid_Call DP.

Actions:

- Call is being processed by the terminating half BCSM. Waiting for indication from terminating half BCSM that the call has been answered by terminating party.
- Send a notification to the gsmSCF if the originating party changes position and DP O_Change_Of_Position is armed.

Exit events:

- A service/service feature request is received from the originating party (DTMF) or DP O_Mid_Call is used for Call Party Handling; this leads to the O_Mid_Call DP.
- An indication is received from the terminating half BCSM that the call is accepted and answered by the terminating party; this leads to the O_Answer DP.
- ~~An exception condition is encountered; this leads to the O_Exception PIC.~~
- ~~The calling party abandons the call; this leads to the O_Abandon DP.~~
- A route select failure indication is received from the terminating party; this leads to the Route_Select_Failure DP.
- A busy indication ~~(UDUB)~~ is received from the terminating party; this leads to the O_Busy DP.
- A not reachable indication is received from the terminating party; this leads to the O_Busy DP.
- A no reply indication is received from the terminating party or a no reply condition is determined at the MSC/ gsmSSF~~The no reply timer expires~~; this leads to the O_No_Answer DP.
- The calling party abandons the call; this leads to the O_Abandon DP.
- An exception condition is encountered; this leads to the O_Exception PIC.

4.4.2.1.1.5 O_Active

Entry events:

- Indication from the terminating half BCSM that the call is accepted and answered by the terminating party. (DP O_Answer)
- Continue is received in O_Mid_Call DP.

Actions:

- Connection established between originating party and terminating party. Call supervision is provided.
- Send a notification to the gsmSCF if the originating party changes position and DP O_Change_Of_Position is armed.
- Send a notification to the gsmSCF if the bearer is changed due to the SCUDIF and DP O_Service_Change is armed.
- Call release is awaited.

Exit events:

- A service/service feature request is received from the originating party (DTMF) or DP O_Mid_Call is used for Call Party Handling (DP O_Mid_Call).
- A disconnection indication is received from the originating party, or received from the terminating party via the terminating half BCSM (DP O_Disconnect).
- An exception condition is encountered.

4.4.2.1.1.6 O_Exception

Entry events:

- An exception condition is encountered. In addition to specific examples listed above, exception events include any type of failure, which means that the normal exit events for a PIC can not be met.

Actions:

- Default handling of the exception condition is being provided. This includes general actions necessary to ensure that no resources remain inappropriately allocated such as:
  - If any relationship exists between the gsmSSF and the gsmSCF, the gsmSSF shall send an error information flow closing the relationships and indicating that any outstanding call handling instructions will not run to completion.
  - The (G)MSC/gsmSSF should make use of vendor-specific procedures to ensure release of resources within the (G)MSC/gsmSSF, so that line, trunk and other resources are made available for new calls.

Exit events:

- Default handling of the exception condition by gsmSSF/(G)MSC completed.

****** Next Modification ******

4.4.4 Rules for Implicit Disarming of Event Detection Points

The tables below give the rules for implicit disarming of event detection points.

Implicit EDP disarming rules are specified in the tables below for Originating BCSM and Terminating BCSM respectively. Each table specifies which EDP's shall be disarmed (i.e. MonitorMode set to Transparent) if/when each EDP is encountered, irrespective of the EDP's Monitor Mode (Transparent, Notify And Continue, or Request).

When EDPs armed with MonitorMode 'Request' (EDP-Rs) are encountered, any implicit EDP disarming shall take place before reporting the EDP and transiting the gsmSSF to the Waiting_For_Instruction state (if not already suspended in the Waiting_For_Instruction state).

If the BCSM has encountered DP O/T_Answer then an originator release must be detected as a DP O/T_Disconnect.

The table entry 'X' means that if the DP is encountered (independently of arming and reporting to the gsmSCF) the marked DP is implicitly disarmed.

It shall be possible to rearm explicitly an implicitly disarmed DP, e.g. for follow on call.

Table 4.4: Implicit disarmed DPs in the O-BCSM

Encountered DP	Implicit disarmed DPs											
	ollected_Info	Route_Select_Failure	O_Busy	O_No_Answer	O_Answer	O_Mid_Call Leg 1	O_Disconnect Leg 1	O_Disconnect any other Leg	O_Abandon	O_Term_Seized	O_Change_Of_Position	O_Service_Change
Collected_Info	X											
Route_Select_Failure		X	X	X	X			X		X		
O_Busy		X	X	X	X			X		X		
O_No_Answer		X	X	X	X			X		X		
O_Answer		X	X	X	X				X	X		
O_Mid_Call Leg 1 (note 1)						X						
O_Disconnect Leg 1						X	X		X		X	X
O_Disconnect any other Leg		X	X	X	X			X		X		
O_Abandon	X					X	X		X		X	X
O_Term_Seized										X		
O_Change_Of_Position (note 1)											X	
O_Service_Change (note 1)												X

Note 1 If the Automatic Rearm IE was present in the Request Report BCSM Event information flow for the O_Change_Of_Position DP, O_Service_Change or the O_Mid_Call DP and armed as EDP-N, then the DP shall be automatically rearmed by the gsmSSF when it is encountered.

Table 4.5: Implicit disarmed DPs in the T-BCSM

Encountered DP	Implicit disarmed DPs									
	T_Busy	T_No_Answer	T_Answer	T_Mid_Call Leg 2	T_Disconnect any other Leg	T_Disconnect Leg 2	T_Abandon	Call_Accepted	T_Change_Of_Position	T_Service_Change
T_Busy	X	X	X	X		X		X	X	X
T_No_Answer	X	X	X	X		X		X	X	X
T_Answer	X	X	X				X	X		
T_Mid_Call Leg 2 (note 1)				X						
T_Disconnect any other Leg					X		X			
T_Disconnect Leg 2	X	X	X	X		X		X	X	X
T_Abandon					X		X			
Call_Accepted								X		
T_Change_Of_Position (note 1)									X	
T_Service_Change (note 1)										X

Note 1 If the Automatic Rearm IE was present in the Request Report BCSM Event information flow for the T_Change_Of_Position DP, T_Service_Change or the T_Mid_Call DP and armed as EDP-N, then the DP shall be automatically rearmed by the gsmSSF when it is encountered.

4.4.5 BCSM Modelling of Call Scenarios

****** Next Modification ******

4.4.5.5 Trunk Originated Call

For the call from A to B, an instance of the O-BCSM will be created in the MSC (labelled "O(A-B)"). If the MSC has an active TO-CSI for the trunk on which the call has originated, and the trigger criteria (if present) are fulfilled, then a CAMEL control relationship with gsmSCF(1) shall be established.

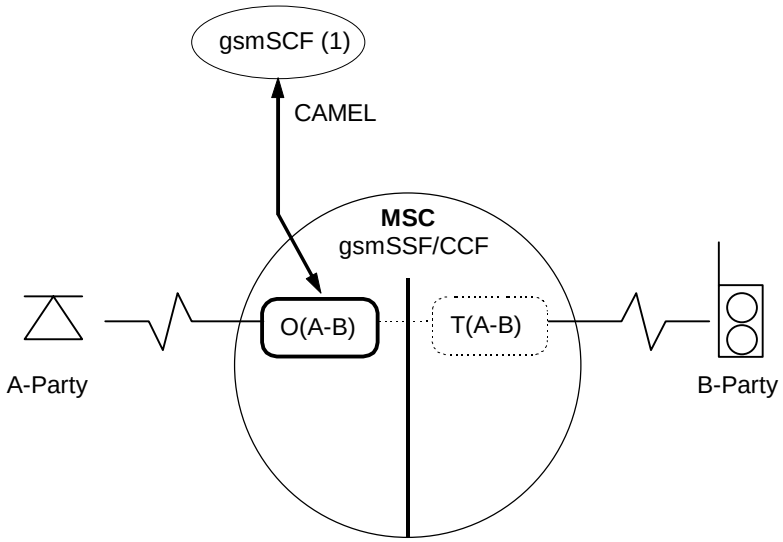


Figure 4.5: BCSM Scenario for Trunk Originated Call

****** Next Modification ******

4.6 Description of information flows

This clause contains the detailed description of the information flows used by CAMEL for Circuit Switched call control.

Each Information Element (IE) is marked as Mandatory (M), Conditional (C), Specific conditions (S), mutually Exclusive (E), Optional (O) or not applicable (-) for each different traffic case applicable to the following CSI:

- MO Mobile Originating call in the VMSC (O-CSI, D-CSI or N-CSI dialogue);
- MF Mobile Forwarded call in the VMSC or the GMSC as in figure 4.7 (O-CSI, D-CSI or N-CSI dialogue);
- MT Mobile Terminating call in the GMSC (T-CSI dialogue);
- VT Mobile Terminating call in the VMSC (VT-CSI dialogue);
- NC gsmSCF initiated new call;
- NP gsmSCF initiated new party in an existing call;
- TO Trunk Originating call in the MSC (TO-CSI dialogue).

If the IEs in one table apply in all the possible cases listed above or no distinction is needed, then the IEs are marked in the "Status" column.

An 'M' IE shall always be included for the corresponding traffic case. A 'C' IE shall be included if the sending entity has the necessary information to populate the IE. The conditions for the inclusion of an 'S' IE are shown in the 'Description' column of the definition table. When a set of 'E' IEs is shown in the definition of an Information Flow or compound IE,

only one of those IEs may be included. An 'O' IE may be included or omitted as required by the service logic. A '-' IE shall always be omitted for the corresponding traffic case. This categorization is a functional classification, i.e. it defines the requirements for the stage 2 information. it is not a stage 3 classification to be used for the ASN.1 syntax of the protocol.

The distinction between MO, MF, MT, VT, NC, ~~and~~ NP and TO calls is not applicable to all Information Flows.

The following principles apply for the handling of the IEs by the receiving entity:

- The gsmSSF shall functionally support all IEs which can be sent to it.
- The gsmSCF may silently discard any IE which it does not functionally support.
- The gsmSRF shall return an error if it does not functionally support an IE which it receives.
- The HLR may silently discard any IE which it does not functionally support.

Details of errors and exceptions to these rules are specified in are specified in 3GPP TS 29.078 [36].

4.6.1 gsmSSF to gsmSCF information flows

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4.6.1.6 Event Report BCSM

4.6.1.6.1 Description

This IF is used to notify the gsmSCF of a call-related event (i.e. BCSM events as answer and disconnect) previously requested by the gsmSCF in a Request Report BCSM Event IF.

4.6.1.6.2 Information Elements

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Event Type BCSM	M	M	M	M	M	M	M	This IE specifies the type of event that is reported.
Event Specific Information BCSM	C	C	C	C	C	C	C	This IE indicates the call related information specific to the event.
Leg ID	M	M	M	M	M	M	M	This IE indicates the party in the call for which the event is reported.
Misc Call Info	M	M	M	M	M	M	M	This IE indicates the DP type.

If the Event Type BCSM IE contains either O_Answer or T_Answer, then the Event Specific Information BCSM IE contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Destination Address	M	M	M	M	M	M	M	This IE specifies the destination address for the call leg. The *NatureOfAddress indicator* may contain a national-specific value. For some national-specific *NatureOfAddress indicator* values the length of the digit part of destination address may be zero.
OR	-	C	C	-	-	-	-	This IE indicates that the call was subject to basic Optimal Routeing as specified in 3GPP TS 23.079 [19].
Forwarded Call	-	M	C	C	-	-	-	This IE indicates that the call has been subject to a Call Forwarding supplementary service.
Charge Indicator	S	S	S	S	S	S	S	This IE specifies the value which will be stored in the Call Data Record. See ITU-T Recommendation Q.763 [43].
Ext-Basic Service Code	S	S	S	S	-	-	S	This IE is used for SCUDIF calls. It indicates the type of basic service, i.e. teleservice or bearer service. It indicates the service active at answer for

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
								the SCUDIF call (as defined in 3GPP TS 23.172 [27]).
Ext-Basic Service Code 2	S	S	S	S	-	-	S	This IE is used for SCUDIF calls. It indicates the type of basic service, i.e. teleservice or bearer service. It indicates the service which is not active at answer for the SCUDIF call (as defined in 3GPP TS 23.172 [27]). It shall be present if the negotiation of the SCUDIF services resulted in both basic services for the SCUDIF call. Otherwise shall be absent.

If the Event Type BCSM IE contains either O_Mid_Call or T_Mid_Call, then the Event Specific Information BCSM IE contains the following information element:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Midcall Info	M	-	-	M	-	-	M	This IE is described in a table below.

MidCall Info contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
DTMF Digits Completed	S,E	-	-	S,E	-	-	S,E	This IE contains the detected mid-call digits. This IE shall be present when triggering takes place after the minimum number of digits has been detected.
DTMF Digits Timeout	S,E	-	-	S,E	-	-	S,E	This IE contains the detected mid-call digits. This IE shall be present when triggering takes place before the minimum number of digits has been detected.

If the Event Type BCSM IE contains one of Route_Select_Failure, O_Busy, O_Disconnect or T_Disconnect, then the Event Specific Information BCSM IE contains the following information element:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Cause	C	C	C	C	C	C	C	This IE indicates the cause.

If the Event Type BCSM IE contains T_Busy, then the Event Specific Information BCSM IE contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Cause	C	C	C	C	-	-	This IE indicates the cause.
Call forwarded	-	-	C	C	-	-	This IE indicates that the call may be forwarded by the appropriate Call Forwarding supplementary service or Call Deflection supplementary service. If T_Busy is reported from the GMSC, then this IE shall be present in the following cases: - The event is triggered by the reception of an FTN in the 2nd Send Routeing Info ack from the HLR; - The event is triggered by the reception of the Resume Call Handling information flow from the VMSC. If T_Busy is reported from the VMSC, then this IE shall be present in the following cases: - The event is triggered by the invocation of conditional call forwarding (Busy or Not_Reachable); - The event notification is triggered by the invocation of Call Deflection.
Route Not permitted	-	-	S	-	-	-	This IE indicates that the further call setup will not take place in this GMSC due to the rules of basic optimal routeing. See 3GPP TS 23.079 [19].
Forwarding Destination Number	-	-	C	C	-	-	This IE contains the Forwarded-to-Number or the Deflected-to-Number. It shall be present if the Call Forwarded IE is present. Otherwise, it shall be absent.

If the Event Type BCSM IE contains T_No_Answer, then the Event Specific Information BCSM IE contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Call Forwarded	-	-	C	C	-	-	This IE indicates that the call may be forwarded by the appropriate Call Forwarding supplementary service. If T_No_Answer is reported from the GMSC, then this IE shall be present in the following cases: - The event is triggered by the reception of the Resume Call Handling information flow from the VMSC. If the T_No_Answer is reported from the VMSC, then this IE shall be present in the following cases: - The event is triggered by the invocation of conditional call forwarding (No_Answer).
Forwarding Destination Number	-	-	C	C	-	-	This IE contains the Forwarded-to-Number or the Deflected-to-Number. It shall be present if the Call Forwarded IE is present. Otherwise, it shall be absent.

If the Event Type BCSM IE contains Call_Accepted or O_Term_Seized, then the Event Specific Information BCSM IE contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Location Information	C	-	-	C	-	-	-	See subclause 4.6.1.8 with VLR Number IE as "- (not applicable)".

NOTE If gsmSCF does not arm DP O_Change_Of_Position, then the Location Information reported at DP O_Term_Seized may be the same as the Location Information reported at DP Collected_Information, even when the subscriber has changed location between DP Collected Information and DP O_Term_Seized.

If the Event Type BCSM IE contains O_Change_Of_Position or T_Change_Of_Position, then the Event Specific Information BCSM IE contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Location Information	C	-	-	C	-	-	See subclause 4.6.1.8 with VLR Number IE as "- (not applicable)".
Met DP Criteria List	S	-	-	S	-	-	This IE is described in a table below. It carries the list of criteria that were triggered and met for the reporting of the change of position event. It shall be present if change of position control info was received in the request.

Met DP Criteria List contains a list of up to 10 instances of the following information element:

Information element name	MO	MF	MT	VT	NC	NP	Description
Met DP Criterion	M	-	-	M	-	-	Each Met DP Criterion IE is one of the 6 possibilities indicated in the table below. If multiple instances of the Met DP Criterion IE have the same value, this is not an error.

Each instance of the Met DP Criterion IE contains one of the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Cell Global ID	E	-	-	E	-	-	This IE indicates that the mobile station performed handover across the boundary of the cell specified in this IE. Furthermore it indicates whether the handover was into or out of the cell.
Service Area ID	E	-	-	E	-	-	This IE indicates that the mobile station performed handover across the boundary of the service area specified in this IE. Furthermore it indicates whether the handover was into or out of the service area.
Location Area ID	E	-	-	E	-	-	This IE indicates that the mobile station performed handover across the boundary of the location area specified in this IE. Furthermore it indicates whether the handover was into or out of the location area.
Inter-System Handover	E	-	-	E	-	-	This IE indicates that the mobile station performed inter-system handover. Furthermore it indicates whether the handover was from GSM to UMTS or from UMTS to GSM.
Inter-PLMN Handover	E	-	-	E	-	-	This IE indicates that the mobile station performed inter-PLMN handover.
Inter-MSC Handover	E	-	-	E	-	-	This IE indicates that the mobile station performed inter-MSC handover.

If the Event Type BCSM IE contains O_Abandon, then the Event Specific Information BCSM IE contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Route Not Permitted	-	S	-	-	-	-	-	This IE indicates that the further call setup will not take

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
								place in this MSC due to the rules of basic optimal routeing. See 3GPP TS 23.079 [19].

If the Event Type BCSM IE contains one of O_Service_Change or T_Service_Change, then the Event Specific Information BCSM IE contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Ext-Basic Service Code	M	M	M	M	-	-	M	This IE indicates the new basic service code after a successful bearer service modification.

If the Event Type BCSM IE contains O_No_Answer, then the Event Specific Information BCSM IE is not included.

If the Event Type BCSM IE contains Collected_Info, then the Event Specific Information BCSM IE contains the following information elements:

Information element name	TO	Description
Called Party Number	M	The contents of the Called Party Number parameter are as follows: - Nature of address indicator – set to the same value as the Called Party Number parameter sent in InitialDP: - Numbering plan indicator – set to the same value as the Called Party Number parameter sent in InitialDP; - Address signals: the following address signals are included: - If the end of pulsing signal (ST) has been received then all collected address signals are included, plus the end of pulsing signal (ST), plus a filler digit if necessary. (The number of address signals included may therefore be <, =, or > than the 'N' digits requested by the gsmSCF). - If the inter-digit timer expires in the MSC then all collected address signals are included. The end-of-pulsing signal(ST) is inserted by the MSC/gsmSSF, plus a filler digit if necessary. (The number of address signals included may therefore be <, =, or > than the 'N' digits requested by the gsmSCF). - If the inter-digit timer expires in the MSC and no additional digits have been collected then the originally received called party number plus end-of-pulsing signal (ST) is included by the MSC/ gsmSSF, plus a filler digit if necessary. - If 'N' address signals have been collected and the end of pulsing signal (ST) has not been received then 'N' address signals (where 'N' is the number of digits requested by the gsmSCF) are included plus a filler digit if necessary.

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4.6.1.8 Initial DP

4.6.1.8.1 Description

This IF is generated by the gsmSSF when a trigger is detected at a DP in the BCSM, to request instructions from the gsmSCF.

4.6.1.8.2 Information Elements

(Note: IEs in the NC columns in this IF may need further study.)

Information element name	MO	MF	MT	VT	NC	NP	TO	Description

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Additional Calling Party Number	C	C	C	C	-	C	C	This IE contains the calling party number provided by the access signalling system of the calling user or received from the gsmSCF due to the previous CAMEL processing.
Called Party Number	C	M	M	M	-	M	M	This IE contains the number used to identify the called party in the forward direction. For MO and MF calls this IE is used in the case of TDP Route_Select_Failure (this is the destination number used to route the call) and in the case of TDP Busy and TDP No Reply (this is the MSISDN when the destination number used for the call is an MSRN, or in the case of unsuccessful call establishment received from the HLR via the MAP interface, otherwise it is the number used to route the call). For VT calls when there is no forwarding pending this is the MSISDN received in the Provide Roaming Number; if the MSISDN is not available, the basic MSISDN is used. For the MT and VT call case when there is call forwarding or call deflection pending, this is the MSISDN, i.e. not the forwarded-to or deflected-to number. If the Initial DP IF is sent at TDP Route_Select_Failure or TDP Analysed_Information then the *NatureOfAddress indicator* may contain a national-specific value. For some national-specific *NatureOfAddress indicator* values the length of the digit part of the destination address may be zero. For TO calls this IE is used to identify the called party in the forward direction. It is used in the case of TDP Collected_Information and TDP Analysed_Information. The number contained in this IE shall be the number received in the telephony signalling system call establishment message (e.g. ISUP IAM). The number may or may not include the end of pulsing signal (ST).
Called Party BCD Number	C	-	-	-	-	-	-	This IE contains the number used to identify the called party in the forward direction. It is used for an MO call in all cases except in the case of TDP Route_Select_Failure. For the TDP Collected_Information, the number contained in this IE shall be identical to the number received over the access network. It may e.g. include service selection information, such as ∗ and # digits, or carrier selection information dialled by the subscriber. For the TDP Analysed_Information, the number contained in this IE shall be the dialled number received over the network access or received from a gsmSCF in a Connect IF, Service selection information, such as * and # digits may be present (see subclause 4.2.1.2.2); carrier selection information dialled by the subscriber is not present.
Calling Party Number	M	C	C	C	-	C	C	This IE carries the calling party number to identify the calling party or the origin of the call.
Calling Partys Category	M	C	C	C	-	C	C	This IE indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).
CallGap Encountered	C	C	C	C	-	C	C	This IE indicates the type of gapping which has been applied to the related call. This IE shall be present only if a call gapping context is applicable to the Initial DP IF.

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Call Reference Number	M	M	M	M	-	M	M	This IE may be used by the gsmSCF for inclusion in a network optional gsmSCF call record. It has to be coupled with the identity of the MSC which allocated it in order to define unambiguously the identity of the call. For MO calls, the call reference number is set by the serving VMSC and included in the MO call record. For MT calls, the call reference number is set by the GMSC and included in the RCF call record in the GMSC and in the MT call record in the terminating MSC. For VT calls, the call reference number is set by the GMSC and included in the RCF call record in the GMSC and in the MT call record in the terminating MSC. For MF calls, the call reference number is set by the GMSC and included in the CF record in the forwarding MSC. For the setting of the Call Reference Number for NP calls, see the corresponding call case above (MO, MT, VT or MF). For TO calls, the call reference number is set by the inter-connecting MSC.
Cause	C	C	C	C	-	-	-	This IE indicates the cause specific to the armed BCSM DP event. This IE is applicable to DP Route_Select_Failure and DP T_Busy. The cause may be used by the gsmSCF to decide how to continue the call handling.
Event Type BCSM	M	M	M	M	-	M	M	This IE indicates the armed BCSM DP event, resulting in the Initial DP IF. For the TO traffic case this will be 'CollectedInformation' or 'AnalysedInformation'.
IMSI	M	M	M	M	-	S	-	This IE identifies the mobile subscriber. For the NP case, the IMSI is mandatory if the new party is initiated in an MO, MF, MT, or VT call, otherwise it shall be absent.
IP SSP Capabilities	C	C	C	C	-	C	C	This IE indicates which SRF resources are supported within the gsmSSF and are available. If this IE is absent, it indicates that no gsmSRF is attached and available.
Location Information	M	-	C	M	-	-	-	This IE is described in a table below.
Location Number	M	C	C	C	-	-	C	For mobile originated calls this IE represents the location of the calling party. For all other call scenarios this IE contains the location number received in the incoming ISUP signalling.
MSC Address	M	M	M	M	-	M	M	For MO calls, the MSC Address carries the international E.164 address of the serving VMSC. For MT calls, the MSC Address carries the international E.164 address of the GMSC. For VT calls, the MSC Address carries the international E.164 address of the serving VMSC. For MF calls, the MSC Address carries the international E.164 address of the forwarding MSC. For NP case, see the corresponding call case above (MO, MT, VT or MF). For TO calls, the MSC Address carries the international E.164 address of the inter-connecting MSC.
GMSC Address	-	M	-	M	-	S	-	For MF calls, the GMSC Address carries the international E.164 address of the GMSC. For VT calls, the GMSC Address carries the international E.164 address of the GMSC. For NP calls, the GMSC Address is mandatory if the new party is initiated in an MF call or in a VT call, otherwise it shall be absent. The GMSC Address carries the international E.164 address of the GMSC.

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Carrier	S	S	S	S	-	S	S	This IE is described in a table below. This IE may be present when the VPLMN and the HPLMN of the subscriber are both North American. For MO calls, this IE shall identify any carrier that was explicitly selected by the calling subscriber. If no carrier was explicitly selected, this IE shall contain the calling subscriber's subscribed carrier. For MT and VT calls, the IE shall contain the carrier subscribed to by the called subscriber. For MF calls, the IE shall contain the carrier subscribed to by the forwarding subscriber. For TO calls, this IE shall identify any carrier that was explicitly selected by the calling party, as received from the telephony signalling system (e.g. ISUP IAM).
Original Called Party ID	C	C	C	C	-	-	C	This IE carries the dialled digits if the call has met call forwarding on the route to the gsmSSF. This IE shall also be sent if it was received from the gsmSCF due to previous CAMEL processing.
Redirecting Party ID	C	C	C	C	-	-	C	This IE indicates the directory number the call was redirected from. This IE shall also be sent if it was received from the gsmSCF due to previous CAMEL processing.
Redirection Information	C	C	C	C	-	-	C	This IE contains forwarding related information, such as the redirection counter.
Service Key	M	M	M	M	-	M	M	This IE indicates to the gsmSCF the requested CAMEL Service. It is used to address the required application within the gsmSCF.
Subscriber State	-	-	C	C	-	-	-	This IE indicates the status of the MS. The states are: - CAMEL Busy: The MS is engaged on a transaction for a mobile originating or terminated circuit-switched call. - Network Determined Not Reachable: The network can determine from its internal data that the MS is not reachable. - Assumed Idle: The state of the MS is neither "CAMEL Busy" nor "Network Determined Not Reachable". - Not provided from VLR.
Time And Timezone	M	M	M	M	-	M	M	This IE contains the time that the gsmSSF was triggered, and the time zone in which gsmSSF resides.
Call Forwarding SS Pending	-	-	C	C	-	-	-	If the Initial DP IF is sent from the GMSC, then this IE shall be present in the following cases: - The GMSC has received an FTN in the 1st Send Routeing Info ack IF from the HLR. - The GMSC has received an FTN in the 2nd Send Routeing Info ack IF from the HLR and no relationship with the gsmSCF exists at that moment. - The GMSC has received the Resume Call Handling IF from the VMSC and no relationship with the gsmSCF exists at that moment. If the Initial DP IF is sent from the VMSC, then this IE shall be present in the following cases: - Conditional call forwarding is invoked and no relationship with the gsmSCF exists at that moment. - Call Deflection is invoked and no relationship with the gsmSCF exists at that moment.
Forwarding Destination Number	-	-	C	C	-	-	-	This IE contains the Forwarded-to-Number or the Deflected-to-Number. It shall be present if the Call Forwarding SS Pending IE is present, otherwise it shall be absent.
Service Interaction Indicators Two	C	C	C	C	-	C	C	The IE is described in a table below. This IE is present if it is received in the ISUP message or due to previous CAMEL processing.
CUG Index	C	-	-	-	-	C	-	See 3GPP TS 23.085 [22] for details of this IE.

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
CUG Interlock Code	C	C	C	C	-	C	C	This IE shall be set according to 3GPP TS 23.085 [22] unless modified by the gsmSCF via the Connect or Continue With Argument IFs.
Outgoing Access Indicator	C	C	C	C	-	C	C	This IE shall be set according to the 3GPP TS 23.085 [22] unless modified by the gsmSCF via the Connect or Continue With Argument IFs.
MS Classmark 2	C	-	-	-	-	-	-	This IE contains the MS classmark 2, which is sent by the MS when it requests access to setup the MO call or responds to paging in the CS domain.
IMEI (with software version)	C	-	-	-	-	-	-	This IE contains the IMEISV (as defined in 3GPP TS 23.003 [7]) of the ME in use by the served subscriber.
Supported CAMEL Phases	M	M	M	M	M	M	M	This IE indicates the CAMEL Phases supported by the GMSC or the VMSC.
Offered CAMEL4 Functionalities	M	M	M	M	M	M	M	This IE is described in a table below. This IE indicates the CAMEL phase 4 functionalities offered by the GMSC or the VMSC.
Bearer Capability	M	C	C	C	-	C	C	This IE indicates the bearer capability connection to the user. For a SCUDIF call (as defined in 3GPP TS 23.172 [27] this IE indicates the Bearer Capability of the preferred service.
Bearer Capability 2	C	C	C	C	-	-	C	This IE indicates the bearer capability of the less preferred service for a SCUDIF call.
Ext-Basic Service Code	C	C	C	C	-	C	C	This IE indicates the basic service, i.e. teleservice or bearer service. For a SCUDIF call this IE indicates the basic service of the preferred service
Ext-Basic Service Code 2	C	C	C	C	-	-	C	This IE indicates the basic service of the less preferred service for a SCUDIF call.
High Layer Compatibility	C	C	C	C	-	C	C	This IE indicates the high layer compatibility, which will be used to determine the ISDN-teleservice of a connected ISDN terminal. For a SCUDIF call this IE indicates the high layer compatibility of the preferred service.
High Layer Compatibility 2	C	C	C	C	-	C	C	This IE indicates the high layer compatibility of the less preferred service for a SCUDIF call.
Low Layer Compatibility	C	C	C	C	-	C	C	This IE indicates the low layer compatibility, which will be used to determine the ISDN bearer capability of a connected ISDN terminal. For a SCUDIF call this IE indicates the Low Layer Compatibility of the preferred service.
Low Layer Compatibility 2	C	C	C	C	-	C	C	This IE indicates the low layer compatibility of the less preferred service for a SCUDIF call.
Enhanced Dialled Services Allowed	S	S	-	-	S	S	S	This IE indicates that the gsmSCF may use the Enhanced Dialled Services (EDS). This IE shall be included if and only if all of following four conditions are fulfilled: - this IF is sent due to triggering on DP Analysed_Information; and - the EDS functionality is offered for this call (as indicated in the Offered CAMEL4 Functionalities); and - there is no more than one outgoing leg within this call; and - there is no other CAMEL dialogue active for the leg for which this IF is sent.
User-to-User Service activation request	O	O	O	O	-	-	O	This IE may be sent if it is received in a call control message. See 3GPP TS 23.087 [45], 3GPP TS 24.008 [30], and ETSI EN 300 356-1 [40] for details of this IE.
User-to-User Information	O	O	O	O	-	-	O	This IE may be sent if it is received in a call control message. See 3GPP TS 23.087 [45], 3GPP TS 24.008 [30], and ETSI EN 300 356-1 [40] for details of this IE.

Offered CAMEL4 Functionalities contains the following information elements:

Information element name	Status	Description

Information element name	Status	Description
Initiate Call Attempt	S	This IE indicates that the gsmSCF may send to the gsmSSF the Initiate Call Attempt IF.
Split Leg	S	This IE indicates that the gsmSCF may send to the gsmSSF the Split Leg IF.
Move Leg	S	This IE indicates that the gsmSCF may send to the gsmSSF the Move Leg IF.
Disconnect Leg	S	This IE indicates that the gsmSCF may send to the gsmSSF the Disconnect Leg IF.
Entity Released	S	This IE indicates that the gsmSSF will send to the gsmSCF the Entity Released IF, when appropriate.
DFC With Argument	S	This IE indicates that the gsmSCF may send to the gsmSSF the Disconnect Forward Connection With Argument IF.
Play Tone	S	This IE indicates that the gsmSCF may send to the gsmSSF the Play Tone IF.
DTMF Mid Call	S	This IE indicates that the gsmSCF may instruct the gsmSSF to arm the O_MidCall or T_MidCall DP. The gsmSCF may instruct the gsmSSF to automatically re-arm the DP, when encountered.
Charging Indicator	S	This IE indicates that the Charge Indicator IE may be present in the Event Report BCSM IF reporting the O_Answer or T_Answer DP.
Alerting DP	S	This IE indicates that the gsmSCF may instruct the gsmSSF to arm the O_Term_Seized or Call_Accepted DP.
Location At Alerting	S	This IE indicates that the Location Information IE shall be present (if available) in the Event Report BCSM IF reporting the O_Term_Seized or Call_Accepted DP.
Change Of Position DP	S	This IE indicates that the gsmSCF may instruct the gsmSSF to arm the O_Change_Of_Position or T_Change_Of_Position DPs. The gsmSCF may instruct the gsmSSF to automatically re-arm the DP, when encountered.
OR Interactions	S	This IE indicates that the gsmSCF may send to the gsmSSF the Basic OR Interrogation Requested IE in the Connect or Continue With Argument IF. This IE indicates that the Route Not Permitted IE may be present in the Event Report BCSM IF reporting the O_Abandon DP.
Warning Tone Enhancements	S	This IE indicates that the gsmSCF may send to the gsmSSF the Burstlist IE (within the Audible Indicator IE) in an Apply Charging IF.
CF Enhancements	S	This IE indicates that the Forwarding Destination Number IE may be present in the Event Report BCSM IF reporting the T_Busy or T_No_Answer DP.
Criteria for Change Of Position DP	S	This IE indicates that the gsmSCF may send to the gsmSSF in the Request Report BCSM Event IF criteria for reporting the report of O_Change_Of_Position or T_Change_Of_Position.
Subscribed Enhanced Dialled Services	S	This IE indicates that Subscribed Enhanced Dialled Services is offered.
Serving Network Enhanced Dialled Services	S	This IE indicates that Serving Network Enhanced Dialled Services is offered.
Service Change DP	S	This IE indicates that the gsmSCF may instruct the gsmSSF to arm the O_Service_Change or T_Service_Change DPs. The gsmSCF may instruct the gsmSSF to automatically re-arm the DP, when encountered.
Collect Information	S	This IE indicates that the gsmSCF may instruct the gsmSSF to arm the CollectedInfo EDP and order the MSC to collect a specific number of additional dialled digits.

Location Information is defined in 3GPP TS 23.018 [12]. The following differences apply:

Information element name	MO	MF	MT	VT	NC	NP	Description
Location Number	-	-	C	C	-	-	See 3GPP TS 23.018 [12].
Service area ID	C,E	-	C,E	C,E	-	-	See 3GPP TS 23.018 [12].
Cell ID	C,E	-	C,E	C,E	-	-	See 3GPP TS 23.018 [12].
Geographical information	C	-	C	C	-	-	See 3GPP TS 23.018 [12].
Geodetic information	C	-	C	C	-	-	See 3GPP TS 23.018 [12].
VLR number	M	-	C	M	-	-	See 3GPP TS 23.018 [12].
Age Of location information	M	-	C	C	-	-	See 3GPP TS 23.018 [12].
Current Location Retrieved	-	-	-	-	-	-	Not applicable
Location area ID	C,E	-	C,E	C,E	-	-	See 3GPP TS 23.003 [7].

Information element name	MO	MF	MT	VT	NC	NP	Description
Selected LSA Identity	S	-	S	S	-	-	This IE indicates the LSA identity associated with the current position of the MS. It shall be present if the LSA ID in the subscriber data matches the LSA ID of the current cell. In the case of multiple matches the LSA ID with the highest priority shall be present. See 3GPP TS 23.073 [18]. This IE shall be present if available and SoLSA is supported, otherwise it shall be absent.

Carrier contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Carrier Identification Code	M	M	M	M	-	M	M	This IE uniquely identifies a North American long distance carrier.
Carrier Selection Information	M	M	M	M	-	M	M	This IE indicates the way the carrier was selected, i.e.: - dialled - subscribed

Service Interaction Indicators Two contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Forward Service Interaction Indicator	C	C	C	C	-	C	C	This IE is described in a table below.
HOLD Treatment Indicator	C	-	-	C	-	C	-	This IE indicates whether the CAMEL subscriber can invoke HOLD for the call.
CW Treatment Indicator	C	-	-	C	-	C	-	This IE indicates whether CW can be applied for a call to the CAMEL subscriber whilst this call is ongoing.
ECT Treatment Indicator	C	-	-	C	-	C	-	This IE indicates whether the call leg can become part of an ECT call initiated by the CAMEL subscriber.

Forward Service Interaction Indicator contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Conference Treatment Indicator	C	C	C	C	-	C	C	This IE indicates whether the call leg can become part of a MPTY call initiated by the called subscriber.
Call Diversion Treatment Indicator	C	C	C	C	-	C	C	This IE indicates whether the call can be forwarded using the Call Forwarding or Call Deflection supplementary services.

****** Next Modification ******

4.6.2 gsmSCF to gsmSSF information flows

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4.6.2.2 Apply Charging

4.6.2.2.1 Description

This IF is used to instruct the gsmSSF to apply charging mechanisms to control the call duration.

4.6.2.2.2 Information Elements

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
ACh Billing Charging Characteristics	M	M	M	M	M	M	M	This IE specifies the charging related information to be provided by the gsmSSF and the conditions on which this information has to be provided back to the gsmSCF.
Party To Charge	M	M	M	M	M	M	M	This IE shall be reflected in the corresponding IE of the Apply Charging Report IF. This IE has no effect on the charging procedures in the MSC.
ACh Charging Address	M	M	M	M	M	M	M	This IE identifies the call party to which the Apply Charging IF applies. This IE is described in a table below.

ACh Billing Charging Characteristics contains the following information element:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Time Duration Charging	M	M	M	M	M	M	M	This IE is described in a table below.

Time Duration Charging contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Max Call Period Duration	M	M	M	M	M	M	M	This IE indicates the maximum call period duration timer.
Tariff Switch Interval	O	O	O	O	O	O	O	This IE indicates the tariff switch time until the next tariff switch applies for this call leg.
Release If Duration Exceeded	O	O	O	O	O	O	O	This IE indicates that the call leg, SRF connection or Temporary connection shall be released when the Max call Period Duration expires. The cause used in the Release IF shall be "normal unspecified". The default handling is to continue the call.
Audible Indicator	O	-	O	O	O	O	O	This IE is described in a table below.

Audible Indicator IE contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Tone	E	-	E	E	E	E	E	This IE indicates that a fixed sequence of tones shall be played to the CAMEL subscriber. In the NC case, the first party created will receive the warning tone. In the TO case the calling party will receive the warning tone. If present, this IE indicates that 30 seconds before the Max Call Period Duration timer expires, a fixed sequence of tones consisting of 3 tones of 900 Hz, with a 200 milliseconds tone duration and a 200 milliseconds intertone duration shall be played.
Burstlist	E	-	E	E	E	E	E	This IE is described in the table below. This IE indicates a variable sequence of bursts that shall be played during the call period to the CAMEL subscriber. In the NC case, the first party created will receive the warning tone. In the TO case the calling party will receive the warning tone.

Burstlist IE contains the following information elements:

Information element name	Status	Description
Warning Period	M	This IE indicates the time, before the Max Call Period Duration timer expires, when the Play Burst List IE shall start.
Number Of Bursts	M	This IE indicates the number of bursts to be played. There may be up to three bursts.
Burst Interval	M	This IE indicates the time interval between successive bursts.
Number Of Tones In Burst	M	This IE indicates the number of tones to be played in each burst. There may be up to three tones per burst. The tone is fixed to 900 Hz.
Tone Duration	M	This IE indicates the duration of a tone in a burst.
Tone Interval	M	This IE indicates the time interval between successive tones in a burst.

NOTE Service logic designers should note that the total duration of the Burst List should not exceed the WarningPeriod IE, otherwise an incomplete Burst List will be played to the served party.

ACh Charging Address contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Leg ID	E	E	E	E	E	E	E	This IE indicates that the Apply Charging IF applies to the specified leg.
SRF Connection	E	E	E	E	E	E	E	This IE indicates that the Apply Charging IF applies to the Temporary Connection or SRF Connection

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4.6.2.5a Collect Information

4.6.2.5a.1 Description

This IF is used to instruct the gsmSSF to collect additional dialled digits from the calling party and report them to the gsmSCF. The use of this operation is only appropriate for a call which has not yet left the set-up phase.

NOTE: It is advisable to avoid the use of gsmSCF-initiated user interaction while additional digits are being collected. Interaction with a Specialised Resource Function (SRF) may result in an ACM being sent to the originating node which will prevent any further dialled digits being sent.

NOTE: If the gsmSCF sends CAP Connect before the dialling is complete then no further digits can be collected from the calling party.

4.6.2.5a.2 Information Elements

This IF contains no information elements.

4.6.2.6 Connect

4.6.2.6.1 Description

This IF is used to request the gsmSSF to perform the call processing actions to route a call to a specific destination. To do so, the gsmSSF may use destination information from the calling party and existing call set-up information depending on the information provided by the gsmSCF.

The gsmSCF shall not send this IF when there is a CSA with a single call segment which includes only leg 1.

4.6.2.6.2 Information Elements

Information element name	MO	MF	MT	VT	NC	NP	TO	Description

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Alerting Pattern	-	-	O	O	-	-	-	This IE indicates the kind of Alerting Pattern to be applied.
Calling Partys Category	O	O	O	O	O	O	O	This IE indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).
Destination Routing Address	M	M	M	M	M	M	M	This IE contains the called party number towards which the call is to be routed. The NatureOfAddress indicator may contain a national-specific value. For some national-specific *NatureOfAddress indicator* values the length of the digit part of the destination address may be zero. The gsmSCF may use national-specific *NatureOfAddress indicator* values of the gsmSSF country.
Generic Number	O	O	O	O	O	O	O	This IE contains the generic number. Its used to convey the additional calling party number, which e.g. could be used to modify the calling line ID presented to the called user.
Carrier	O	O	O	O	O	O	O	This IE is described in a table below.
NA Originating Line Information	O	O	O	O	O	O	O	This IE identifies the type of number in the Charge Number (e.g. subscriber versus PLMN operator number).
Charge Number	O	O	O	O	O	O	O	This IE identifies the chargeable number for the usage of a North American carrier.
O-CSI Applicable	-	-	O	O	-	-	-	This IE indicates that the O-CSI, if present shall be applied on the outgoing leg.
Original Called Party ID	O	O	O	O	O	O	O	This IE carries the dialled digits if the call has met call forwarding on route to the gsmSSF or is forwarded by the gsmSCF.

Leg To Be Connected	S	S	S	S	S	S	S	This IE indicates the leg to which the Connect IF applies.
								The gsmSCF shall include this IE if:
								- The CSA has more than one call segment, or
								- The CSA has a single call segment, which contains:
								  - one leg, which is not leg 2; or
								  - two legs, which are not leg 1 and leg 2, or
								  - more than two legs.
								Otherwise this IE may be present or absent as required by the service logic.
								This IE shall not indicate leg1.

Redirecting Party ID	O	O	O	O	O	O	O	This IE indicates the directory number the call was redirected from.
Redirection Information	O	O	O	O	O	O	O	This IE contains forwarding related information, such as redirecting counter.
Suppression Of Announcements	-	-	O	O	O	O	-	This IE indicates that announcements or tones generated as a result of unsuccessful call establishment shall be suppressed.
Service Interaction Indicators Two	O	O	O	O	O	O	O	This IE is described in a table below.
CUG Interlock Code	O	O	O	O	O	O	O	See 3GPP TS 23.085 [22] for details of this IE.
Outgoing Access Indicator	O	O	O	O	O	O	O	See 3GPP TS 23.085 [22] for details of this IE.
Basic OR interrogation requested	O	O	-	-	O	O	O	This IE indicates that a Basic Optimal Routeing interrogation is requested for the call. If Basic Optimal Routeing is successful, this will be reported to the gsmSCF in the Answer event report. This IE shall be ignored if the VMSC associated with the gsmSSF does not support Basic Optimal Routeing. This IE shall be ignored if it is received in a gsmSSF which is handling the MF call case in the GMSC function of the forwarding subscriber.

Carrier contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Carrier Identification Code	M	M	M	M	M	M	M	This IE uniquely identifies a North American long distance carrier.
Carrier Selection Information	M	M	M	M	M	M	M	This IE indicates the way the carrier was selected e.g.: - dialled; - subscribed.

Service Interaction Indicators Two contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Forward Service Interaction Indicator	O	O	O	O	O	O	O	This IE is described in a table below.
Backward Service Interaction Indicator	O	O	O	O	-	-	O	This IE is described in a table below.
HOLD Treatment Indicator	O	-	-	O	-	-	-	This IE allows the gsmSCF to disallow the invocation of HOLD by the CAMEL subscriber.
CW Treatment Indicator	O	-	-	O	-	-	-	This IE allows the gsmSCF to disallow the invocation of CW for a call to the CAMEL subscriber whilst this call is ongoing.
ECT Treatment Indicator	O	-	-	O	-	-	-	This IE allows the gsmSCF to disallow the call leg to become part of an ECT call initiated by the CAMEL subscriber.
Connected number treatment indicator	O	O	O	O	-	-	O	This IE indicates the treatment of the connected number at the originating side.
Non-CUG Call	O	O	O	O	O	O	O	This IE indicates that no parameters for CUG should be used for the call (i.e. the call should be a non-CUG call). Shall be absent if one or more of CUG Interlock Code and Outgoing Access Indicator is present in the IF.

Forward Service Interaction Indicator contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Conference Treatment Indicator	O	O	O	O	O	-	O	This IE allows the gsmSCF to disallow the call leg to become part of a MPTY call initiated by the CAMEL subscriber.
Call Diversion Treatment Indicator	O	O	O	O	O	-	O	This IE allows the gsmSCF to disallow the Call Forwarding or Call Deflection supplementary services for this call.
Calling Party Restriction Indicator	O	O	O	O	O	O	O	This IE allows the gsmSCF to mark the CLI as Restricted for the call.

Backward Service Interaction Indicator contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Conference Treatment Indicator	O	O	O	O	-	O	O	This IE allows the gsmSCF to disallow the call leg to become part of a MPTY call initiated by the calling subscriber.
Call Completion Treatment Indicator	O	O	O	O	-	O	O	This IE allows the gsmSCF to disallow a CCBS request to be made for the call. See also 3GPP TS 23.093 [26] for description.

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4.6.2.9 Continue With Argument

4.6.2.9.1 Description

This IF requests the gsmSSF to continue the call processing with modified information at the DP at which it previously suspended call processing to await gsmSCF instructions or to continue call processing after a Call Party Handling IF was received. The gsmSSF completes DP processing if necessary, and continues basic call processing (i.e. proceeds to the next point in call in the BCSM) with the modified call setup information as received from the gsmSCF.

This IF may also be used to continue call processing after an Initiate Call Attempt IF and Call Party Handling IF.

The gsmSCF can send modified call information at DP Collected_Info and at DP Analysed_Info, as listed in the MO and MF columns in subclause 4.6.2.9.2.

The gsmSCF can send modified call information at DP Termination_Attempt_Authorised, as listed in the MT and VT columns in subclause 4.6.2.9.2.

The gsmSCF can send modified call information immediately after sending an Initiate Call Attempt IF, as listed in the NC and NP columns in subclause 4.6.2.9.2.

The gsmSCF can send modified call information at DP Collected_Info and at DP_Analysed_Info, as listed in the TO column in subclause 4.6.2.9.2.

In all other cases, Continue With Argument shall contain no other IE than Leg ID or Call Segment ID.

When this IF is used to resume the processing of an Initiate Call Attempt IF, then a Leg ID shall be included and Call Segment ID shall be absent.

When this IF is used to resume the processing of a Call Party Handling IF, then a Call Segment ID shall be included and Leg ID shall be absent.

When this IF is used to resume processing after an EDP-R or TDP-R, then a Leg ID shall be included and Call Segment ID shall be absent. The following exception exists: if this IF is used to resume processing after an EDP-R or TDP-R in one of the following scenarios:

- the CSA has one Call Segment only, which includes leg 1 only;
- the CSA has one Call Segment only, which includes leg 2 only;
- the CSA has one Call Segment only, which includes leg 1 and leg 2, but no other legs;

then, the Leg ID may be present or absent, as required by the Service Logic.

4.6.2.9.2 Information Elements

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Alerting Pattern	-	-	O	O	O	-	-	This IE indicates the kind of Alerting Pattern to be applied.
Calling Partys Category	O	O	O	O	O	O	O	This IE indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).
Generic Number	O	O	O	O	O	O	O	This IE contains the generic number. It is used to convey the additional calling party number, which e.g. could be used to modify the calling line ID presented to the called user.
Carrier	O	O	O	O	O	O	O	This IE is described in a table below.
NA Originating Line Information	O	O	O	O	O	O	O	This IE identifies the type of number in the Charge Number (e.g. subscriber versus PLMN operator number).
Charge Number	O	O	O	O	O	O	O	This IE identifies the chargeable number for the usage of a North American carrier.
Suppression Of Announcements	-	-	O	O	O	O	-	This IE indicates that announcements or tones generated as a result of unsuccessful call establishment shall be suppressed.
Service Interaction Indicators Two	O	O	O	O	O	O	O	This IE is described in a table below.
CUG Interlock Code	O	O	-	-	O	O	O	See 3GPP TS 23.085 [22] for details of this IE.

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Outgoing Access Indicator	O	O	-	-	O	O	O	See 3GPP TS 23.085 [22] for details of this IE.
Basic OR Interrogation Requested	O	O	-	-	O	O,S	O	This IE indicates that a Basic Optimal Routeing interrogation is requested for the call. If Basic Optimal Routeing is successful, this will be reported to the gsmSCF in the Answer event report. This IE shall be ignored if the VMSC associated with the gsmSSF does not support Basic Optimal Routeing. This IE shall be ignored if it is received in a gsmSSF which is handling the MF call case in the GMSC function of the forwarding subscriber. For an NP call leg, this IE can only be included if the original call was an MO or NC call.
Leg ID	O,E	O,E	O,E	O,E	O,E	O,E	O,E	This IE indicates the party for which call processing is to be resumed.
Call Segment ID	O,E	O,E	O,E	O,E	O,E	O,E	O,E	This IE indicates the call segment for which call processing is to be resumed.
Suppress O-CSI	-	-	O	O	-	-	-	This IE indicates that O-CSI shall be suppressed for the forwarding leg or deflecting leg.
Suppress D-CSI	-	-	-	-	-	O	-	This IE indicates that D-CSI shall be suppressed for the new call leg. This IE can only be included if this IE is sent to the VMSC or GMSC of the CAMEL subscriber.
Suppress N-CSI	-	-	-	-	O	O	-	This IE indicates that N-CSI shall be suppressed for the new call leg.
Suppress Outgoing Call Barring	-	-	-	-	-	O	-	This IE indicates that Outgoing Call Barrings for the created leg shall be suppressed. This IE can only be included if the Initiate Call Attempt IF is sent to the VMSC of the CAMEL subscriber.

Carrier contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Carrier Identification Code	M	M	M	M	M	M	M	This IE uniquely identifies a North American long distance carrier.
Carrier Selection Information	M	M	M	M	M	M	M	This IE indicates the way the carrier was selected, i.e.: - dialled - subscribed

Service Interaction Indicators Two contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Forward Service Interaction Indicator	O	O	O	O	O	O	O	This IE is described in a table below.
Backward Service Interaction Indicator	O	O	O	O	-	-	O	This IE is described in a table below.
HOLD Treatment Indicator	O	-	-	O	-	-	-	This IE allows the gsmSCF to disallow the invocation of HOLD by the CAMEL subscriber.
CW Treatment Indicator	O	-	-	O	-	-	-	This IE allows the gsmSCF to disallow the invocation of CW for a call to the CAMEL subscriber whilst this call is ongoing.
ECT Treatment Indicator	O	-	-	O	-	-	-	This IE allows the gsmSCF to disallow the call leg to become part of an ECT call initiated by the CAMEL subscriber.
Connected Number Treatment Indicator	O	O	O	O	-	-	-	This IE indicates the treatment of the connected number at the originating side.
Non-CUG Call	O	O	-	-	-	O	O	This IE indicates that no parameters for CUG should be used for the call (i.e. the call should be a non-CUG call). This IE shall be absent if one or more of CUG Interlock Code and Outgoing Access Indicator are present in the IF.

Forward Service Interaction Indicator contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Conference Treatment Indicator	O	O	O	O	O	O	O	This IE indicates whether the call leg can become part of a MPTY call initiated by the called subscriber.
Call Diversion Treatment Indicator	O	O	O	O	O	O	O	This IE indicates whether the call can be forwarded using the Call Forwarding or Call Deflection supplementary services.
Calling Party Restriction Indicator	O	O	O	O	O	O	O	This IE allows the gsmSCF to mark the CLI as Restricted for the call.

Backward Service Interaction Indicator contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Conference Treatment Indicator	O	O	O	O	-	-	O	This IE indicates if the call leg can become part of a MPTY call initiated by the calling subscriber.
Call Completion Treatment Indicator	O	O	O	O	-	-	O	This IE indicates whether a CCBS request can be made for the call. See also 3GPP TS 23.093 [26] for description.

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4.6.2.19 Request Report BCSM Event

4.6.2.19.1 Description

This IF is used to request the gsmSSF to monitor for a call-related event, then send a notification back to the gsmSCF when the event is detected (see Event Report BCSM).

4.6.2.19.2 Information Elements

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
BCSM Event	M	M	M	M	M	M	M	This IE specifies the event or events for which a report is requested.

BCSM Event contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Event type	M	M	M	M	M	M	M	This IE specifies the type of event for which a report is requested.
Leg ID	C	C	C	C	C	M	C	This IE indicates the party in the call for which the event shall be armed or disarmed.
Monitor Mode	M	M	M	M	M	M	M	If this IE is "interrupted" then the event shall be reported as a request, if this IE is "notify and continue" then the event shall be reported as a notification, if this IE is "transparent" then the event shall not be reported.
DP Specific Criteria	O	O	O	O	O	O	O	This IE is described in a table below.
Automatic Rearm	O	O	O	O	-	-	O	This IE indicates that the detection point shall be automatically rearmed by the gsmSSF when it is encountered. This IE may be present only if the Event Type is O_Mid_Call, T_Mid_Call, O_Change_Of_Position, T_Change_Of_Position, O_Service_Change or T_Service_Change and the Monitor Mode is "notify and continue". The MF and MT cases apply for O_Service_Change or T_Service_Change DPs only.

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
								The TO case applies for O_Mid_Call and O_Service_Change DPs only.

DP Specific Criteria contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Application Timer	O	O	O	O	O	O	O	This IE carries additional timer duration information (timer values for No_Answer event) required for arming the No_Answer EDPs in the gsmSSF. The TNRy timer (value defined between 10 seconds and 40 seconds) shall be shorter than the network no answer timer.
Mid Call Control Info	O	-	-	O	-	-	O	This IE is described in a table below. This IE carries the criterion for the detection and reporting of the mid-call event. If this IE is absent, then mid-call triggering shall take place when the first digit has been entered by the user.
Change of Position Control Info	O	-	-	O	-	-	-	This IE is described in a table below. It carries the list of criteria for the reporting of the change of position event. If the DP Specific Criteria IE is absent, then the criteria for any change of position shall be regarded as fulfilled.
Number of Digits	-	-	-	-	-	-	O	This IE indicates the number of digits to be collected by the gsmSSF before the CollectedInfo event is reported to the gsmSCF
NOTE If a Request Report BCSM Event information flow overwrites previous Request Report BCSM Event information flow which contained Application Timer IE for No_Answer DP, the behaviour of the gsmSSF is unpredictable.								

Mid Call Control Info contains the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
Minimum Number Of Digits	M	-	-	M	-	-	M	This IE indicates the minimum number of digits to be collected. The value of this IE includes the length of the Start digit string, if present, and the length of the End of reply digit string, if present.
Maximum Number Of Digits	M	-	-	M	-	-	M	This IE indicates the maximum number of digits to be collected. The value of this IE includes the length of the Start digit string, if present, and the length of the End of reply digit string, if present. If triggering takes place due to the detection of the maximum number of digits and the End of reply digit string, if present, is partially detected, then the partially detected End of reply digit string shall be included in the digit string to be reported to the gsmSCF.
End of Reply Digit String	O	-	-	O	-	-	O	This IE, if present, indicates the digit string that denotes the end of the digits to be collected. If triggering takes place due to the detection of the End of reply digit string, then this string shall be included in the digit string to be reported to the gsmSCF. If the interdigit timeout expires when the Start Digit String, if present, is complete and the Minimum Number Of Digits has been detected and the End Digit String, if present, has been partially detected then triggering shall take place. The partially detected End Of Reply Digit String shall be included in the string to be reported to the gsmSCF.
Cancel Digit String	O	-	-	O	-	-	O	This IE, if present, indicates the digit string that indicates that the input shall be erased and that digit collection, including the start digit string, if present, shall start afresh.
Start Digit String	O	-	-	O	-	-	O	This IE, if present, indicates the digit string that denotes the start of the digits to be collected. If this IE is absent, then the first digit entered forms part of

Information element name	MO	MF	MT	VT	NC	NP	TO	Description
								the digits to be collected. When triggering takes place, then the Start digit string shall be included in the digit string to be reported to the gsmSCF.
Inter Digit Timeout	M	-	-	M	-	-	M	This IE indicates the maximum duration allowed between receipt of successive digits from the MS. For the TO case, this IE indicates the maximum duration allowed between receipt of successive digits from the calling party.

Change of Position Control Info contains a list of up to 10 instances of the following information element:

Information element name	MO	MF	MT	VT	NC	NP	Description
Change Of Location	M	-	-	M	-	-	Each Change Of Location IE is one of the 6 possibilities indicated in the table below. If multiple instances of the Change Of Location IE have the same value, this is not an error.

Each instance of the Change Of Location IE contains one of the following information elements:

Information element name	MO	MF	MT	VT	NC	NP	Description
Cell Global ID	O,E	-	-	O,E	-	-	This IE indicates that the criteria are fulfilled if the mobile station performs handover across the boundary of the cell specified in this IE, i.e. handover into or out of the cell.
Service Area ID	O,E	-	-	O,E	-	-	This IE indicates that the criteria are fulfilled if the mobile station performs handover across the boundary of the service area specified in this IE, i.e. handover into or out of the service area.
Location Area ID	O,E	-	-	O,E	-	-	This IE indicates that the criteria are fulfilled if the mobile station performs handover across the boundary of the location area specified in this IE, i.e. handover into or out of the location area.
Inter-System Handover	O,E	-	-	O,E	-	-	This IE indicates that the criteria are fulfilled if the mobile station performs inter-system handover.
Inter-PLMN Handover	O,E	-	-	O,E	-	-	This IE indicates that the criteria are fulfilled if the mobile station performs inter-PLMN handover.
Inter-MSC Handover	O,E	-	-	O,E	-	-	This IE indicates that the criteria are fulfilled if the mobile station performs inter-MSC handover.

****** Next Modification ******

4.7 Interaction with supplementary services

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4.7.4 Closed User Group

For a CUG subscriber with CAMEL services:

- The HLR shall store (and transfer to the VLR) the necessary subscriber data to ensure that the served subscriber is not unnecessarily prevented by CUG constraints from originating calls.

- The HLR shall store the necessary subscriber data to ensure that the served subscriber is not unnecessarily prevented by CUG constraints from receiving calls.

For an MO, ~~or~~ MF or TO call, the CUG information for that call shall be sent to the gsmSCF in the Initial DP information flow.

If the gsmSCF returns a Continue information flow, the call shall continue with the original CUG information unchanged.

If the gsmSCF returns a Connect or Continue With Argument information flow, the CUG handling in table 4.7 applies.

Table 4.7: CUG handling on receipt of Connect or Continue With Argument for an MO, ~~or~~ MF or TO call

CUG parameters in information flow	Handling
Non-CUG call (note 1)	Remove CUG information for the call and continue as a non-CUG call
CUG information (note 2)	Call shall continue with modified CUG information
No CUG information	Call shall continue with original CUG information
NOTE 1: Received in Service Interaction Indicators Two IE. NOTE 2: CUG information consists of at least one of CUG Interlock Code and Outgoing Access Indicator.	

For an MT call which is to be routed to the terminating subscriber, the CUG information shall be extracted from the Send Routeing Information ack and sent to the gsmSCF in the Initial DP, but the gsmSCF shall not have the ability to change the CUG information for the call.

For an VT call which is to be routed to the terminating subscriber, the CUG information shall be extracted from the incoming ISUP IAM and sent to the gsmSCF in the Initial DP, but the gsmSCF shall not have the ability to change the CUG information for the call.

For an MT or VT call which is subject to CAMEL forwarding, the gsmSCF shall return a Connect information flow and the CUG handling in table 4.7 applies.

****** End of Document ******

3GPP TSG-CT WG4 Meeting #27 **C4-050783**
Cancun, MEXICO. 25th to 29th April 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.078** **CR** **392** ⌘ **rev** **1** ⌘ Current version: **6.4.0** ⌘

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

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

Title:	⌘	Additions to CAP for trunk originated services
Source:	⌘	Nortel
Work item code:	⌘	CAMELR7
Date:	⌘	28/04/2005
Category:	⌘	**B**
Release:	⌘	Rel-7

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

Use one of the following releases:
Ph2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*
Rel-7 *(Release 7)*

Reason for change:	⌘	To enable CSE interaction for trunk originated calls that use overlap signalling procedures for call set-up. When the CSE determines that more dialled digits from the calling party are required, to enable processing in the CSE to proceed, it requests the gsmSSF to arm DP2 and collect a specific number of additional digits from the calling party. DP2 is triggered when the digits have been collected, and the digits are sent to the CSE in an EventReportBCSM operation.
Summary of change:	⌘	Additions to support CSE interaction for calls set-up using overlap signalling: - CollectedInfo DP may be armed as EDP-R and a new DPSpecificCriteira of 'NumberOfDigits' may be included in RequestReportBCSMEvent. - CollectedInfo DP may be reported as EDP-R and a new CollectedInfoSpecificInfo parameter of CalledPartyNumber may be included in EventReportBCSM - New operation CollectInformation These changes, including the new CollectInformation operation, are included in CAP v4. To avoid an application context negotiation error, the CSE shall only invoke the CollectInformation operation if the gsmSSF has indicated support for CollectInformation in the OfferedCAMEL4Functionalities parameter.
Consequences if not approved:	⌘	Operators have to use proprietary solutions that restrict multi-vendor interoperability.

Clauses affected:	⌘	5.1, 5.3, 5.5, 6, 11.x(new), 11.18, 11.20, 11.27

Y **N**

Other specs	⌘	**X**		Other core specifications	⌘	23.018 CR145, 23.078 CR770 & CR764, 29.002 CR765
affected:			**X**	Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

How to create CRs using this form:

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

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

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

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

****** First Modification ******

5 Common CAP Types

5.1 Data types

```
CAP-datatypes {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-datatypes(52) version5(4)}

DEFINITIONS IMPLICIT TAGS ::= BEGIN


•••


DpSpecificCriteria {PARAMETERS-BOUND : bound}::= CHOICE {
    applicationTimer                    [1] ApplicationTimer,
    midCallControlInfo                  [2] MidCallControlInfo,
    dpSpecificCriteriaAlt               [3] DpSpecificCriteriaAlt {bound}
    }
--  Exception handling: reception of DpSpecificCriteriaAlt shall be treated like
--  reception of no DpSpecificCriteria.
--  The gsmSCF may set a timer in the gsmSSF for the No_Answer event.
--  If the user does not answer the call within the allotted time,
--  then the gsmSSF reports the event to the gsmSCF.
--  The gsmSCF may define a criterion for the detection of DTMF digits during a call.
--  The gsmSCF may define other criteria in the dpSpecificCriteriaAlt alternative
--  in future releases.

DpSpecificCriteriaAlt {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    ...,
    changeOfPositionControlInfo         [0] ChangeOfPositionControlInfo {bound}
    numberOfDigits                      [1] NumberOfDigits                          OPTIONAL,
    }

DpSpecificInfoAlt {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    ...,
    oServiceChangeSpecificInfo          [0] SEQUENCE {
        ext-basicServiceCode                [0] Ext-BasicServiceCode                OPTIONAL,
        ...
        },
    tServiceChangeSpecificInfo          [1] SEQUENCE {
        ext-basicServiceCode                [0] Ext-BasicServiceCode                OPTIONAL,
        ...
        }
    collectedInfoSpecificInfo           [2] SEQUENCE {
        calledPartyNumber                   [0] CalledPartyNumber                   OPTIONAL,
        ...
        }
    }
--  This datatype is for extension in future releases.

ElapsedTime ::= CHOICE {
    timeGPRSIfNoTariffSwitch            [0] INTEGER (0..86400),
    timeGPRSIfTariffSwitch              [1] SEQUENCE {
        timeGPRSSinceLastTariffSwitch       [0] INTEGER (0..86400),
        timeGPRSTariffSwitchInterval        [1] INTEGER (0..86400)                  OPTIONAL
        }
    }
--  timeGPRSIfNoTariffSwitch is measured in seconds
--  timeGPRSSinceLastTariffSwitch and timeGPRSTariffSwitchInterval are measured in seconds

ElapsedTimeRollOver ::= CHOICE {
    rO-TimeGPRSIfNoTariffSwitch         [0] INTEGER (0..255),
    rO-TimeGPRSIfTariffSwitch           [1] SEQUENCE {
        rO-TimeGPRSSinceLastTariffSwitch    [0] INTEGER (0..255)                    OPTIONAL,
        rO-TimeGPRSTariffSwitchInterval     [1] INTEGER (0..255)                    OPTIONAL
        }
    }
--  rO-TimeGPRSIfNoTariffSwitch, rO-TimeGPRSSinceLastTariffSwitch and
--  rO-TimeGPRSTariffSwitchInterval
--  present counters indicating the number of parameter range rollovers.

EndUserAddress {PARAMETERS-BOUND: bound} ::= SEQUENCE {
    pDPTypeOrganization                 [0] OCTET STRING (SIZE(1)),
    pDPTypeNumber                       [1] OCTET STRING (SIZE(1)),
    pDPAddress                          [2] OCTET STRING (SIZE(
        bound.&minPDPAddressLength .. bound.&maxPDPAddressLength))                  OPTIONAL
```

```
    }
-- Indicates the EndUserAddress, refer to 3GPP TS 29.060 [12] for the encoding.
-- The pDPTypeOrganization shall use the least significant 4 bits of the octet encoded.
-- The sender of this parameter shall set the most significant 4 bits of the octet to 1.
-- The receiver of this parameter shall ignore the most significant 4 bits of this octet.

ErrorTreatment ::= ENUMERATED {
    stdErrorAndInfo                 (0),
    help                            (1),
    repeatPrompt                    (2)
    }
-- stdErrorAndInfomeans returning the 'ImproperCallerResponse' error in the event of an error
-- condition during collection of user info.

EventSpecificInformationBCSM {PARAMETERS-BOUND : bound} ::= CHOICE {

routeSelectFailureSpecificInfo      [2] SEQUENCE {
        failureCause                    [0] Cause {bound}                       OPTIONAL,
        ...
        },
    oCalledPartyBusySpecificInfo        [3] SEQUENCE {
        busyCause                       [0] Cause {bound}                       OPTIONAL,
        ...
        },
    oNoAnswerSpecificInfo               [4] SEQUENCE {
        -- no specific info defined --
        ...
        },
    oAnswerSpecificInfo                 [5] SEQUENCE {
        destinationAddress                  [50] CalledPartyNumber {bound}      OPTIONAL,
        or-Call                             [51] NULL                           OPTIONAL,
        forwardedCall                       [52] NULL                           OPTIONAL,
        chargeIndicator                     [53] ChargeIndicator                OPTIONAL,
        ext-basicServiceCode                [54] Ext-BasicServiceCode           OPTIONAL,
        ext-basicServiceCode2               [55] Ext-BasicServiceCode           OPTIONAL,
        ...
        },
    oMidCallSpecificInfo                [6] SEQUENCE {
        midCallEvents                       [1] CHOICE {
            dTMFDigitsCompleted                 [3] Digits {bound},
            dTMFDigitsTimeOut                   [4] Digits {bound}
            }                                                                   OPTIONAL,
        ...
        },
    oDisconnectSpecificInfo             [7] SEQUENCE {
        releaseCause                        [0] Cause {bound}                   OPTIONAL,
        ...
        },
    tBusySpecificInfo                   [8] SEQUENCE {
        busyCause                           [0] Cause {bound}                   OPTIONAL,
        callForwarded                       [50] NULL                           OPTIONAL,
        routeNotPermitted                   [51] NULL                           OPTIONAL,
        forwardingDestinationNumber         [52] CalledPartyNumber {bound}      OPTIONAL,
        ...
        },
    tNoAnswerSpecificInfo               [9] SEQUENCE {
        callForwarded                       [50] NULL                           OPTIONAL,
        forwardingDestinationNumber         [52] CalledPartyNumber {bound}      OPTIONAL,
        ...
        },
    tAnswerSpecificInfo                 [10] SEQUENCE {
        destinationAddress                  [50] CalledPartyNumber {bound}      OPTIONAL,
        or-Call                             [51] NULL                           OPTIONAL,
        forwardedCall                       [52] NULL                           OPTIONAL,
        chargeIndicator                     [53] ChargeIndicator                OPTIONAL,
        ext-basicServiceCode                [54] Ext-BasicServiceCode           OPTIONAL,
        ext-basicServiceCode2               [55] Ext-BasicServiceCode           OPTIONAL,
        ...
        },
    tMidCallSpecificInfo                [11] SEQUENCE {
        midCallEvents                       [1] CHOICE {
            dTMFDigitsCompleted                 [3] Digits {bound},
            dTMFDigitsTimeOut                   [4] Digits {bound}
            }                                                                   OPTIONAL,
        ...
        },
    tDisconnectSpecificInfo             [12] SEQUENCE {
        releaseCause                        [0] Cause {bound}                   OPTIONAL,
        ...
        },
    oTermSeizedSpecificInfo             [13] SEQUENCE {
        locationInformation                 [50] LocationInformation            OPTIONAL,
        ...
        },
    callAcceptedSpecificInfo            [20] SEQUENCE {
        locationInformation                 [50] LocationInformation            OPTIONAL,
```

```
        ...
        },
    oAbandonSpecificInfo                [21] SEQUENCE {
        routeNotPermitted                   [50] NULL                               OPTIONAL,
        ...
        },
    oChangeOfPositionSpecificInfo       [50] SEQUENCE {
        locationInformation                 [50] LocationInformation                OPTIONAL,
        ...,
        metDPCriteriaList                   [51] MetDPCriteriaList {bound}          OPTIONAL
        },
    tChangeOfPositionSpecificInfo       [51] SEQUENCE {
        locationInformation                 [50] LocationInformation                OPTIONAL,
        ...,
        metDPCriteriaList                   [51] MetDPCriteriaList {bound}          OPTIONAL
        },
    dpSpecificInfoAlt                   [52] DpSpecificInfoAlt {bound}
    }
-- Indicates the call related information specific to the event.

EventSpecificInformationSMS ::= CHOICE {
    o-smsFailureSpecificInfo            [0] SEQUENCE {
        failureCause                        [0] MO-SMSCause                         OPTIONAL,
        ...
        },
    o-smsSubmissionSpecificInfo         [1] SEQUENCE {
        -- no specific info defined—
        ...
        },
    t-smsFailureSpecificInfo            [2] SEQUENCE {
        failureCause                        [0] MT-SMSCause                         OPTIONAL,
        ...
        },
    t-smsDeliverySpecificInfo           [3] SEQUENCE {
        -- no specific info defined—
        ...
        }
    }

EventTypeBCSM ::= ENUMERATED {
    collectedInfo                       (2),
    analyzedInformation                 (3),
    routeSelectFailure                  (4),
    oCalledPartyBusy                    (5),
    oNoAnswer                           (6),
    oAnswer                             (7),
    oMidCall                            (8),
    oDisconnect                         (9),
    oAbandon                            (10),
    termAttemptAuthorized               (12),
    tBusy                               (13),
    tNoAnswer                           (14),
    tAnswer                             (15),
    tMidCall                            (16),
    tDisconnect                         (17),
    tAbandon                            (18),
    oTermSeized                         (19),
    callAccepted                        (27),
    oChangeOfPosition                   (50),
    tChangeOfPosition                   (51),
    ...,
    oServiceChange                      (52),
    tServiceChange                      (53)
    }
-- Indicates the BCSM detection point event.
-- Values collectedInfo, analyzedInformation and termAttemptAuthorized may be used
-- for TDPs only.
-- Exception handling: reception of an unrecognized value shall be treated
-- like reception of no detection point.
```

•••

```
NAOliInfo ::= OCTET STRING (SIZE (1))
--  NA Oli information takes the same value as defined in ANSI T1.113-1995 [92]
--  e.g.    '3D'H  – Decimal value 61 - Cellular Service (Type 1)
--          '3E'H  – Decimal value 62 - Cellular Service (Type 2)
--          '3F'H  – Decimal value 63 - Cellular Service (roaming)

NumberOfDigits ::= INTEGER (1..255)
--  Indicates the number of digits to be collected.

OCSIApplicable ::= NULL
--  Indicates that the Originating CAMEL Subscription Information, if present, shall be
--  applied on the outgoing call leg created with a Connect operation. For the use of this
```

```
--  parameter see 3GPP TS 23.078 [7].

OriginalCalledPartyID {PARAMETERS-BOUND : bound} ::= OCTET STRING (SIZE(
    bound.&minOriginalCalledPartyIDLength .. bound.&maxOriginalCalledPartyIDLength))
--  Indicates the original called number. Refer to ETSI EN 300 356-1 [23] Original Called Number
--  for encoding.


END
```

***** *Next Modification* *****

5.3 Operation codes

```
CAP-operationcodes {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0) umts-network(1)
modules(3) cap-operationcodes(53) version5(4)}

DEFINITIONS ::= BEGIN

IMPORTS

    ros-InformationObjects
FROM CAP-object-identifiers {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version5(4)}

    Code
FROM Remote-Operations-Information-Objects ros-InformationObjects

;

-- the operations are grouped by the identified operation packages.

-- gsmSCF activation Package
    opcode-initialDP                          Code ::= local: 0
-- gsmSCF/gsmSRF activation of assist Package
    opcode-assistRequestInstructions          Code ::= local: 16
-- Assist connection establishment Package
    opcode-establishTemporaryConnection       Code ::= local: 17
-- Generic disconnect resource Package
    opcode-disconnectForwardConnection        Code ::= local: 18
    opcode-dFCWithArgument                    Code ::= local: 86
-- Non-assisted connection establishment Package

    opcode-connectToResource                  Code ::= local: 19
-- Connect Package (elementary gsmSSF function)
    opcode-connect                            Code ::= local: 20
-- Call handling Package (elementary gsmSSF function)
    opcode-releaseCall                        Code ::= local: 22
-- BCSM Event handling Package
    opcode-requestReportBCSMEvent             Code ::= local: 23
    opcode-eventReportBCSM                    Code ::= local: 24
-- gsmSSF call processing Package
    opcode-collectInformation                 Code ::= local: 27
    opcode-continue                           Code ::= local: 31
-- gsmSCF call initiation Package
    opcode-initiateCallAttempt                Code ::= local: 32
-- Timer Package
    opcode-resetTimer                         Code ::= local: 33
-- Billing Package
    opcode-furnishChargingInformation         Code ::= local: 34
-- Charging Package
    opcode-applyCharging                      Code ::= local: 35
    opcode-applyChargingReport                Code ::= local: 36
-- Traffic management Package
    opcode-callGap                            Code ::= local: 41
-- Call report Package
    opcode-callInformationReport              Code ::= local: 44
    opcode-callInformationRequest             Code ::= local: 45
-- Signalling control Package
    opcode-sendChargingInformation            Code ::= local: 46
-- Specialized resource control Package
    opcode-playAnnouncement                   Code ::= local: 47
```

```
    opcode-promptAndCollectUserInformation      Code ::= local: 48
    opcode-specializedResourceReport            Code ::= local: 49
-- Cancel Package
    opcode-cancel                               Code ::= local: 53
-- Activity Test Package
    opcode-activityTest                         Code ::= local: 55
-- CPH Response Package
    opcode-continueWithArgument                 Code ::= local: 88
    opcode-disconnectLeg                        Code ::= local: 90
    opcode-moveLeg                              Code ::= local: 93
    opcode-splitLeg                             Code ::= local: 95
-- Exception Inform Package
    opcode-entityReleased                       Code ::= local: 96
-- Play Tone Package
    opcode-playTone                             Code ::= local: 97
```

•••

```
END
```

***** *Next Modification* *****

6 Circuit Switched Call Control

6.1 gsmSSF/CCF - gsmSCF Interface

6.1.1 Operations and arguments

```
CAP-gsmSSF-gsmSCF-ops-args {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gsmSSF-gsmSCF-ops-args(101) version5(4)}

DEFINITIONS IMPLICIT TAGS ::= BEGIN

-- This module contains the operations and operation arguments used for the
-- gsmSSF – gsmSCF interface, for the control of circuit switched calls.

-- The table in subclause 2.1 lists the specifications that contain the modules
-- that are used by CAP.

IMPORTS

    errortypes,
    datatypes,
    operationcodes,
    classes,
    tc-Messages,
    ros-InformationObjects
FROM CAP-object-identifiers {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version5(4)}

    OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects

    CallingPartysCategory,
    HighLayerCompatibility,
    LegID,
    RedirectionInformation,
    ServiceKey
FROM CS1-DataTypes {itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
modules(0) cs1-datatypes(2) version1(0)}

    MiscCallInfo
FROM CS2-datatypes {itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
cs2(20) modules(0) in-cs2-datatypes (0) version1(0)}

    Ext-BasicServiceCode,
```

```
    IMEI,
    IMSI,
    ISDN-AddressString
FROM MAP-CommonDataTypes {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-Network(1) modules(3) map-CommonDataTypes(18) version9(9)}

    CUG-Index,
    CUG-Interlock,
    CUG-Info,
    LocationInformation,
    MS-Classmark2,
    SubscriberState,
    SupportedCamelPhases,
    OfferedCamel4Functionalities
FROM MAP-MS-DataTypes {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-Network(1) modules(3) map-MS-DataTypes(11) version9(9)}

    CallReferenceNumber,
    SuppressionOfAnnouncement,
    UU-Data
FROM MAP-CH-DataTypes {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
gsm-Network(1) modules(3) map-CH-DataTypes(13) version9(9)}

    PARAMETERS-BOUND
FROM CAP-classes classes

    opcode-activityTest,
    opcode-applyCharging,
    opcode-applyChargingReport,
    opcode-assistRequestInstructions,
    opcode-callGap,
    opcode-callInformationReport,
    opcode-callInformationRequest,
    opcode-cancel,
    opcode-collectInformation,
    opcode-connect,
    opcode-connectToResource,
    opcode-continue,
    opcode-continueWithArgument,
    opcode-disconnectForwardConnection,
    opcode-dFCWithArgument,
    opcode-disconnectLeg,
    opcode-entityReleased,
    opcode-establishTemporaryConnection,
    opcode-eventReportBCSM,
    opcode-furnishChargingInformation,
    opcode-initialDP,
    opcode-initiateCallAttempt,
    opcode-moveLeg,
    opcode-playTone,
    opcode-releaseCall,
    opcode-requestReportBCSMEvent,
    opcode-resetTimer,
    opcode-sendChargingInformation,
    opcode-splitLeg
FROM CAP-operationcodes operationcodes
-- The CAP Operation identifiers for CAP V4 in Rel-6 are the same as the CAP Operation
-- identifiers for CAP V4 in Rel-5.

    AChBillingChargingCharacteristics {},
    AdditionalCallingPartyNumber {},
    AlertingPattern,
    AChChargingAddress {},
    AssistingSSPIPRoutingAddress {},
    BCSMEvent {},
    BCSM-Failure,
    BearerCapability {},
    Burst,
    CalledPartyNumber {},
    CalledPartyBCDNumber {},
    CallingPartyNumber {},
    CallResult {},
    CallSegmentID {},
    CallSegmentToCancel {},
    CallSegmentFailure {},
    Carrier,
    Cause {},
    CGEncountered,
```

```
    ChargeNumber {},
    ControlType,
    CorrelationID {},
    DestinationRoutingAddress {},
    EventSpecificInformationBCSM {},
    EventTypeBCSM,
    Extensions {},
    FCIBillingChargingCharacteristics {},
    GapCriteria {},
    GapIndicators,
    GapTreatment,
    GenericNumbers {},
    InvokeID,
    IPRoutingAddress {},
    IPSSPCapabilities {},
    leg1,
    leg2,
    LegOrCallSegment {},
    LocationNumber {},
    LowLayerCompatibility {},
    MonitorMode,
    NAOliInfo,
    OCSIApplicable,
    OriginalCalledPartyID {},
    ReceivingSideID,
    RedirectingPartyID {},
    RequestedInformationList {},
    RequestedInformationTypeList,
    ScfID {},
    SCIBillingChargingCharacteristics {},
    SendingSideID,
    ServiceInteractionIndicatorsTwo,
    TimeAndTimezone {},
    TimerID,
    TimerValue
FROM CAP-datatypes datatypes
-- For Rel-6, the CAP-datatypes module is updated to version5(4); Object Identifier 'datatypes'
-- is also updated to version5(4). As a result, the present module uses Rel-6 data type definitions.

    cancelFailed,
    eTCFailed,
    missingCustomerRecord,
    missingParameter,
    parameterOutOfRange,
    requestedInfoError,
    systemFailure,
    taskRefused,
    unexpectedComponentSequence,
    unexpectedDataValue,
    unexpectedParameter,
    unknownLegID,
    unknownCSID
FROM CAP-errortypes errortypes
-- For Rel-6, the CAP-errortypes module is updated to version5(4); Object Identifier
-- 'errortypes' is also updated to version5(4). As a result, the present module uses Rel-6
-- error type definitions.

;
```

•••

```
CancelArg {PARAMETERS-BOUND : bound} ::= CHOICE {
    invokeID                        [0] InvokeID,
    allRequests                     [1] NULL,
    callSegmentToCancel             [2] CallSegmentToCancel {bound}
    }
-- The InvokeID has the same value as that which was used for the operation to be cancelled.

collectInformation OPERATION::= {
RETURN RESULT       FALSE
ALWAYS RESPONDS     FALSE
CODE                opcode-collectInformation}
-- Direction: gsmSCF-> gsmSSF, Timer: Tci
-- This operation is used to request the gsmSSF to perform the call
-- processing actions to prompt a calling party for additional destination informationdigits.
```

```
connect {PARAMETERS-BOUND : bound} OPERATION ::= {
    ARGUMENT        ConnectArg {bound}
    RETURN RESULT   FALSE
    ERRORS          {missingParameter |
                    parameterOutOfRange |
                    systemFailure |
                    taskRefused |
                    unexpectedComponentSequence |
                    unexpectedDataValue |
                    unexpectedParameter |
                    unknownLegID}
    CODE            opcode-connect}
-- Direction: gsmSCF-> gsmSSF, Timer: Tcon
-- This operation is used to request the gsmSSF to perform the call processing actions
-- to route or forward a call to a specified destination.

ConnectArg {PARAMETERS-BOUND : bound} ::= SEQUENCE {
    destinationRoutingAddress           [0] DestinationRoutingAddress {bound},
    alertingPattern                     [1] AlertingPattern                         OPTIONAL,
    originalCalledPartyID               [6] OriginalCalledPartyID {bound}           OPTIONAL,
    extensions                          [10] Extensions {bound}                     OPTIONAL,
    carrier                             [11] Carrier {bound}                        OPTIONAL,
    callingPartysCategory               [28] CallingPartysCategory                  OPTIONAL,
    redirectingPartyID                  [29] RedirectingPartyID {bound}             OPTIONAL,
    redirectionInformation              [30] RedirectionInformation                 OPTIONAL,
    genericNumbers                      [14] GenericNumbers {bound}                 OPTIONAL,
    serviceInteractionIndicatorsTwo     [15] ServiceInteractionIndicatorsTwo        OPTIONAL,
    chargeNumber                        [19] ChargeNumber {bound}                   OPTIONAL,
    legToBeConnected                    [21] LegID                                  OPTIONAL,
    cug-Interlock                       [31] CUG-Interlock                          OPTIONAL,
    cug-OutgoingAccess                  [32] NULL                                   OPTIONAL,
    suppressionOfAnnouncement           [55] SuppressionOfAnnouncement              OPTIONAL,
    oCSIApplicable                      [56] OCSIApplicable                         OPTIONAL,
    naOliInfo                           [57] NAOliInfo                              OPTIONAL,
    bor-InterrogationRequested          [58] NULL                                   OPTIONAL,
    ...
    }
-- na-Info is included at the discretion of the gsmSCF operator.
```

•••

The following value ranges apply for operation specific timers in CAP:

short:	1 s - 10 s
medium:	1 s - 60 s
long:	1 s - 30 minutes

Table 6-1 lists all operation timers and the value range for each timer. The definitive value for each operation timer may be network specific and has to be defined by the network operator.

Table 6-1: Timer value ranges

Operation Name	Timer	value range
ActivityTest	T_{at}	Short
ApplyCharging	T_{ac}	Short
ApplyChargingReport	T_{acr}	Short
AssistRequestInstructions	T_{ari}	Short
CollectInformation	T_{ci}	Short
CallInformationReport	T_{cirp}	Short
CallInformationRequest	T_{cirq}	Short
Cancel	T_{can}	Short
CallGap	T_{cg}	Short
Connect	T_{con}	Short
ConnectToResource	T_{ctr}	Short
Continue	T_{cue}	Short
ContinueWithArgument	T_{cwa}	Short
DisconnectForwardConnectionWithArgument	T_{dfcwa}	Short
DisconnectLeg	T_{dl}	Short
EntityReleased	T_{er}	Short
DisconnectForwardConnection	T_{dfc}	Short
EstablishTemporaryConnection	T_{etc}	Medium
EventReportBCSM	T_{erb}	Short
FurnishChargingInformation	T_{fci}	Short
InitialDP	T_{idp}	Short
InitiateCallAttempt	T_{ica}	Short
MoveLeg	T_{ml}	Short
PlayTone	T_{pt}	Short
ReleaseCall	T_{rc}	Short
RequestReportBCSMEvent	T_{rrb}	Short
ResetTimer	T_{rt}	Short
SendChargingInformation	T_{sci}	Short
SplitLeg	T_{sl}	Short

6.1.2 gsmSSF/gsmSCF packages, contracts and ACs

6.1.2.1 gsmSSF/gsmSCF ASN.1 module

```
CAP-gsmSSF-gsmSCF-pkgs-contracts-acs {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-gsmSSF-gsmSCF-pkgs-contracts-acs(102) version5(4)}

DEFINITIONS ::= BEGIN

-- This module specifies the Operation Packages, Contracts, Application Contexts
-- and Abstract Syntaxes used for the gsmSSF – gsmSCF interface, for the control of
-- circuit switched calls.

-- The table in subclause 2.1 lists the specifications that contain the modules
-- that are used by CAP.

IMPORTS

    PARAMETERS-BOUND,
    cAPSpecificBoundSet
FROM CAP-classes classes
-- Elements that exist in cAPSpecificBoundSet in Rel-5 are not changed in Rel-6. As a
-- result, the value range of data type definitions in Rel-5 are not changed in Rel-6.

    CONTRACT,
```

```
    OPERATION-PACKAGE,
    OPERATION
FROM Remote-Operations-Information-Objects ros-InformationObjects

    TCMessage {}
FROM TCAPMessages tc-Messages

    APPLICATION-CONTEXT,
    dialogue-abstract-syntax
FROM TC-Notation-Extensions tc-NotationExtensions

    activityTest,
    applyCharging {},
    applyChargingReport {},
    assistRequestInstructions {},
    callGap {},
    callInformationReport {},
    callInformationRequest {},
    cancel {},
    collectInformation {},
    connect {},
    connectToResource {},
    continue,
    continueWithArgument {},
    disconnectForwardConnection,
    disconnectForwardConnectionWithArgument {},
    disconnectLeg {},
    entityReleased {},
    establishTemporaryConnection {},
    eventReportBCSM {},
    furnishChargingInformation {},
    initialDP {},
    initiateCallAttempt {},
    moveLeg {},
    playTone {},
    releaseCall {},
    requestReportBCSMEvent {},
    resetTimer {},
    sendChargingInformation {},
    splitLeg {}
FROM CAP-gsmSSF-gsmSCF-ops-args gsmSSF-gsmSCF-Operations
-- Object Identifier 'gsmSSF-gsmSCF-Operations' is updated to version5(4) in Rel-6. As
-- a result, the present module, 'CAP-gsmSSF-gsmSCF-pkgs-contracts-acs', IMPORTS CAP
-- Operation definitions from CAP-gsmSSF-gsmSCF-ops-args version5(4). Operation
-- definitions are used in the ABSTRACT SYNTAX definitions and in the OPERATION PACKAGE
-- definitions.
    playAnnouncement {},
    promptAndCollectUserInformation {},
    specializedResourceReport
FROM CAP-gsmSCF-gsmSRF-ops-args gsmSCF-gsmSRF-Operations-- Object Identifier 'gsmSCF-gsmSRF-
Operations' is updated to version5(4) in Rel-6. AS
-- a result, the present module, 'CAP-gsmSSF-gsmSCF-pkgs-contracts-acs', IMPORTS CAP
-- Operation definitions from CAP-gsmSCF-gsmSRF-ops-args version5(4). Operation
-- definitions are used in the ABSTRACT SYNTAX definitions and in the OPERATION PACKAGE
-- definitions.

    specializedResourceControlPackage {}
FROM CAP-gsmSCF-gsmSRF-pkgs-contracts-acs gsmSCF-gsmSRF-Protocol
-- Object Identifier 'gsmSCF-gsmSRF-Protocol' is updated to version5(4) in Rel-6. As a
-- result, the present module, 'CAP-gsmSSF-gsmSCF-pkgs-contracts-acs', IMPORTS CAP Operation
-- Package definitions from CAP-gsmSCF-gsmSRF-pkgs-contracts-acs version5(4). Operation
-- Package definitions are used in the CONTRACT definitions.

    id-ac-CAP-gsmSSF-scfGenericAC,
    id-ac-CAP-gsmSSF-scfAssistHandoffAC,
    id-ac-CAP-scf-gsmSSFGenericAC,
-- The APPLICATION-CONTEXT Identifiers for CAP V4 in Rel-6 are the same as for CAP V4 in Rel-5.

    id-CAPSsfToScfGeneric,
    id-CAPAssistHandoffssfToScf,
    id-CAPScfToSsfGeneric,
-- The CONTRACT Identifiers for CAP V4 in Rel-6 are the same as for CAP V4 in Rel-5.

    id-as-gsmSSF-scfGenericAS,
    id-as-scf-gsmSSFGenericAS,
    id-as-assistHandoff-gsmSSF-scfAS,
-- The ABSTRACT-SYNTAX Identifiers for CAP V4 in Rel-6 are the same as for CAP V4 in Rel-5.
```

```
    id-package-scfActivation,
    id-package-gsmSRF-scfActivationOfAssist,
    id-package-assistConnectionEstablishment,
    id-package-genericDisconnectResource,
    id-package-nonAssistedConnectionEstablishment,
    id-package-connect,
    id-package-callHandling,
    id-package-bcsmEventHandling,
    id-package-ssfCallProcessing,
    id-package-scfCallInitiation,
    id-package-timer,
    id-package-billing,
    id-package-charging,
    id-package-trafficManagement,
    id-package-callReport,
    id-package-signallingControl,
    id-package-activityTest,
    id-package-cancel,
    id-package-cphResponse,
    id-package-exceptionInform,
    id-package-playTone,
-- The OPERATION-PACKAGE Identifiers for CAP V4 in Rel-6 are the same as for CAP V4 in Rel-5.

    classes,
    ros-InformationObjects,
    tc-Messages,
    tc-NotationExtensions,

    gsmSSF-gsmSCF-Operations,
    gsmSCF-gsmSRF-Operations,
-- Object Identifiers gsmSSF-gsmSCF-Operations and gsmSCF-gsmSRF-Operations are updated
-- to version5(4) in Rel-6. As a result, the present module, 'CAP-gsmSSF-gsmSCF-pkgs-
-- contracts-acs', IMPORTS Rel-6 versions of the CAP Operation definitions.

    gsmSCF-gsmSRF-Protocol
-- Object Identifier gsmSCF-gsmSRF-Protocol is updated to version5(4) in Rel-6. As a result,
-- the present module IMPORTS Rel-6 versions of the CAP Operation Package definitions.

FROM CAP-object-identifiers {itu-t(0) identified-organization(4) etsi(0) mobileDomain(0)
umts-network(1) modules(3) cap-object-identifiers(100) version5(4)};

-- Application Contexts

-- CAP V4 Rel-5 and CAP V4 Rel-6 use the same Application Context version. The CONTRACT
-- and ABSTRACT SYNTAXES for the call control related Application Contexts, however, are
-- defined in Rel-6. This is needed to use parameter definitions that are defined in Rel-6.

-- Refer to ITU-T Recommendation Q.775 for the formal definition of APPLICATION-CONTEXT.
-- The structured DIALOGUE MODE is defined in ITU-T Recommendation Q.771; the
-- dialogue-abstract-syntax ABSTRACT SYNTAX is defined in ITU-T Recommendation Q.775.

capssf-scfGenericAC APPLICATION-CONTEXT ::= {
    CONTRACT                    capSsfToScfGeneric
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                gsmSSF-scfGenericAbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-CAP-gsmSSF-scfGenericAC}
-- 'capSsfToScfGeneric' and 'gsmSSF-scfGenericAbstractSyntax' are defined in the present
-- module.

capssf-scfAssistHandoffAC APPLICATION-CONTEXT ::= {
    CONTRACT                    capAssistHandoffssfToScf
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                assistHandoff-gsmSSF-scfAbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-CAP-gsmSSF-scfAssistHandoffAC}
-- 'capAssistHandoffssfToScf' and 'assistHandoff-gsmSSF-scfAbstractSyntax' are defined in
-- the present module.

capscf-ssfGenericAC APPLICATION-CONTEXT ::= {
    CONTRACT                    capScfToSsfGeneric
    DIALOGUE MODE               structured
    ABSTRACT SYNTAXES           {dialogue-abstract-syntax |
                                scf-gsmSSFGenericAbstractSyntax}
    APPLICATION CONTEXT NAME    id-ac-CAP-scf-gsmSSFGenericAC}
-- 'capScfToSsfGeneric' and 'scf-gsmSSFGenericAbstractSyntax' are defined in the present
-- module.
```

```
-- Contracts
-- The CONTRACT definitions are updated for Rel-6, due to the fact that the individual
-- OPERATION-PACKAGE definitions are updated in Rel-6.

capSsfToScfGeneric CONTRACT ::= {
-- dialogue initiated by gsmSSF with InitialDP Operation
    INITIATOR CONSUMER OF       {exceptionInformPackage {cAPSpecificBoundSet} |
                                scfActivationPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF       {activityTestPackage |
                                assistConnectionEstablishmentPackage {cAPSpecificBoundSet} |
                                bcsmEventHandlingPackage {cAPSpecificBoundSet} |
                                billingPackage {cAPSpecificBoundSet} |
                                callHandlingPackage {cAPSpecificBoundSet} |
                                callReportPackage {cAPSpecificBoundSet} |
                                cancelPackage {cAPSpecificBoundSet} |
                                chargingPackage {cAPSpecificBoundSet} |
                                connectPackage {cAPSpecificBoundSet} |
                                cphResponsePackage {cAPSpecificBoundSet} |
                                genericDisconnectResourcePackage {cAPSpecificBoundSet} |
                                nonAssistedConnectionEstablishmentPackage {cAPSpecificBoundSet} |
                                playTonePackage {cAPSpecificBoundSet} |
                                signallingControlPackage {cAPSpecificBoundSet} |
                                specializedResourceControlPackage {cAPSpecificBoundSet} |
                                ssfCallProcessingPackage {cAPSpecificBoundSet} |
                                timerPackage {cAPSpecificBoundSet} |
                                trafficManagementPackage {cAPSpecificBoundSet} |
                                scfCallInitiationPackage {cAPSpecificBoundSet}}
    ID                          id-CAPSsfToScfGeneric}
-- The OPERATION-PACKAGEs are defined in the present module, except for
-- specializedResourceControlPackage, which is defined in CAP-gsmSCF-gsmSRF-pkgs-contracts-acs.

capAssistHandoffssfToScf CONTRACT ::= {
-- dialogue initiated by gsmSSF with AssistRequestInstructions
    INITIATOR CONSUMER OF       {gsmSRF-scfActivationOfAssistPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF       {activityTestPackage |
                                cancelPackage {cAPSpecificBoundSet} |
                                genericDisconnectResourcePackage {cAPSpecificBoundSet} |
                                nonAssistedConnectionEstablishmentPackage {cAPSpecificBoundSet} |
                                specializedResourceControlPackage {cAPSpecificBoundSet} |
                                timerPackage {cAPSpecificBoundSet}}
    ID                          id-CAPAssistHandoffssfToScf}
-- The OPERATION-PACKAGEs are defined in the present module, except for
-- specializedResourceControlPackage, which is defined in CAP-gsmSCF-gsmSRF-pkgs-contracts-acs.

capScfToSsfGeneric CONTRACT ::= {
-- dialogue initiated by gsmSCF with InitiateCallAttempt, Generic Case
    INITIATOR CONSUMER OF       {activityTestPackage |
                                assistConnectionEstablishmentPackage {cAPSpecificBoundSet} |
                                bcsmEventHandlingPackage {cAPSpecificBoundSet} |
                                billingPackage {cAPSpecificBoundSet} |
                                callHandlingPackage {cAPSpecificBoundSet} |
                                callReportPackage {cAPSpecificBoundSet} |
                                cancelPackage {cAPSpecificBoundSet} |
                                chargingPackage {cAPSpecificBoundSet} |
                                connectPackage {cAPSpecificBoundSet} |
                                cphResponsePackage {cAPSpecificBoundSet} |
                                genericDisconnectResourcePackage {cAPSpecificBoundSet} |
                                nonAssistedConnectionEstablishmentPackage {cAPSpecificBoundSet} |
                                playTonePackage {cAPSpecificBoundSet} |
                                scfCallInitiationPackage {cAPSpecificBoundSet} |
                                specializedResourceControlPackage {cAPSpecificBoundSet} |
                                ssfCallProcessingPackage {cAPSpecificBoundSet} |
                                timerPackage {cAPSpecificBoundSet}}
    RESPONDER CONSUMER OF       {exceptionInformPackage {cAPSpecificBoundSet}}
    ID                          id-CAPScfToSsfGeneric}
-- The OPERATION-PACKAGEs are defined in the present module, except for
-- specializedResourceControlPackage, which is defined in CAP-gsmSCF-gsmSRF-pkgs-contracts-acs.


-- Operation Packages
-- The OPERATION-PACKAGE definitions are updated for Rel-6, due to the fact that the individual
-- OPERATION definitions are updated in Rel-6. The OPERATION definitions are IMPORTED from
-- CAP-gsmSSF-gsmSCF-ops-args and from CAP-gsmSCF-gsmSRF-ops-args.

scfActivationPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {initialDP {bound}}
    ID                  id-package-scfActivation}
```

```
gsmSRF-scfActivationOfAssistPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {assistRequestInstructions {bound}}
    ID                  id-package-gsmSRF-scfActivationOfAssist}

assistConnectionEstablishmentPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {establishTemporaryConnection {bound}}
    ID                  id-package-assistConnectionEstablishment}

genericDisconnectResourcePackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {disconnectForwardConnection |
                         disconnectForwardConnectionWithArgument {bound}}
    ID                  id-package-genericDisconnectResource}

nonAssistedConnectionEstablishmentPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {connectToResource {bound}}
    ID                  id-package-nonAssistedConnectionEstablishment}

connectPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {connect {bound}}
    ID                  id-package-connect}

callHandlingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {releaseCall {bound}}
    ID                  id-package-callHandling}

bcsmEventHandlingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {requestReportBCSMEvent {bound}}
    SUPPLIER INVOKES    {eventReportBCSM {bound}}
    ID                  id-package-bcsmEventHandling}

ssfCallProcessingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {collectInformation | continueWithArgument {bound} | continue}
    ID                  id-package-ssfCallProcessing}

scfCallInitiationPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {initiateCallAttempt {bound}}
    ID                  id-package-scfCallInitiation}

timerPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {resetTimer {bound}}
    ID                  id-package-timer}

billingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {furnishChargingInformation {bound}}
    ID                  id-package-billing}

chargingPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {applyCharging {bound}}
    SUPPLIER INVOKES    {applyChargingReport {bound}}
    ID                  id-package-charging}

trafficManagementPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {callGap {bound}}
    ID                  id-package-trafficManagement}

callReportPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {callInformationRequest {bound}}
    SUPPLIER INVOKES    {callInformationReport {bound}}
    ID                  id-package-callReport}

signallingControlPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {sendChargingInformation {bound}}
    ID                  id-package-signallingControl}

activityTestPackage OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {activityTest}
    ID                  id-package-activityTest}

cancelPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {cancel {bound}}
    ID                  id-package-cancel}

cphResponsePackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {continueWithArgument {bound} |
                         disconnectLeg {bound} |
                         moveLeg {bound} |
                         splitLeg {bound}}
    ID                  id-package-cphResponse}
```

```
exceptionInformPackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {entityReleased {bound}}
    ID                  id-package-exceptionInform}

playTonePackage {PARAMETERS-BOUND : bound} OPERATION-PACKAGE ::= {
    CONSUMER INVOKES    {playTone {bound}}
    ID                  id-package-playTone}


-- Abstract Syntaxes

-- SsfToScfGenericInvokable and SsfToScfGenericReturnable use OPERATION definitions with
-- version5(4). As a result, GenericSSF-gsmSCF-PDUs uses version5(4) OPERATION definitions.
-- As a subsequent result, gsmSSF-scfGenericAbstractSyntax uses version5(4) OPERATION
-- definitions. That ABSTRACT-SYNTAX is used in the capssf-scfGenericAC APPLICATION-CONTEXT
-- definition (CAP from gsmSSF to gsmSCF).

gsmSSF-scfGenericAbstractSyntax ABSTRACT-SYNTAX ::= {
    GenericSSF-gsmSCF-PDUs
    IDENTIFIED BY       id-as-gsmSSF-scfGenericAS}
-- 'GenericSSF-gsmSCF-PDUs' is defined in the present module.

GenericSSF-gsmSCF-PDUs ::= TCMessage {{SsfToScfGenericInvokable},
                                      {SsfToScfGenericReturnable}}
-- 'SsfToScfGenericInvokable' and 'SsfToScfGenericReturnable' are defined in the present module.

SsfToScfGenericInvokable OPERATION ::= {
    activityTest |
    applyCharging {cAPSpecificBoundSet} |
    applyChargingReport {cAPSpecificBoundSet} |
    callInformationReport {cAPSpecificBoundSet} |
    callInformationRequest {cAPSpecificBoundSet} |
    cancel {cAPSpecificBoundSet} |
    connect {cAPSpecificBoundSet} |
    continueWithArgument {cAPSpecificBoundSet} |
    connectToResource {cAPSpecificBoundSet} |
    disconnectForwardConnection |
    disconnectForwardConnectionWithArgument {cAPSpecificBoundSet} |
    disconnectLeg {cAPSpecificBoundSet} |
    entityReleased {cAPSpecificBoundSet} |
    establishTemporaryConnection {cAPSpecificBoundSet} |
    eventReportBCSM {cAPSpecificBoundSet} |
    furnishChargingInformation {cAPSpecificBoundSet} |
    initialDP {cAPSpecificBoundSet} |
    initiateCallAttempt {cAPSpecificBoundSet} |
    moveLeg {cAPSpecificBoundSet} |
    releaseCall {cAPSpecificBoundSet} |
    requestReportBCSMEvent {cAPSpecificBoundSet} |
    resetTimer {cAPSpecificBoundSet} |
    sendChargingInformation {cAPSpecificBoundSet} |
    splitLeg {cAPSpecificBoundSet} |
    playAnnouncement {cAPSpecificBoundSet} |
    playTone {cAPSpecificBoundSet} |
    promptAndCollectUserInformation {cAPSpecificBoundSet} |
    specializedResourceReport
    }
-- The OPERATION definitions are IMPORTED from CAP-gsmSSF-gsmSCF-ops-args and from
-- CAP-gsmSCF-gsmSRF-ops-args.

SsfToScfGenericReturnable OPERATION ::= {
    activityTest |
    applyCharging {cAPSpecificBoundSet} |
    applyChargingReport {cAPSpecificBoundSet} |
    callGap {cAPSpecificBoundSet} |
    callInformationRequest {cAPSpecificBoundSet} |
    cancel {cAPSpecificBoundSet} |
    connect {cAPSpecificBoundSet} |
    connectToResource {cAPSpecificBoundSet} |
    collectInformation |
    continue |
    continueWithArgument {cAPSpecificBoundSet} |
    disconnectForwardConnection |
    disconnectForwardConnectionWithArgument {cAPSpecificBoundSet} |
    disconnectLeg {cAPSpecificBoundSet} |
    entityReleased {cAPSpecificBoundSet} |
    establishTemporaryConnection {cAPSpecificBoundSet} |
    furnishChargingInformation {cAPSpecificBoundSet} |
```

```
    initialDP {cAPSpecificBoundSet} |
    initiateCallAttempt {cAPSpecificBoundSet} |
    moveLeg {cAPSpecificBoundSet} |
    releaseCall {cAPSpecificBoundSet} |
    requestReportBCSMEvent {cAPSpecificBoundSet} |
    resetTimer {cAPSpecificBoundSet} |
    sendChargingInformation {cAPSpecificBoundSet} |
    splitLeg {cAPSpecificBoundSet} |
    playAnnouncement {cAPSpecificBoundSet} |
    playTone {cAPSpecificBoundSet} |
    promptAndCollectUserInformation {cAPSpecificBoundSet}
    }
-- The OPERATION definitions are IMPORTED from CAP-gsmSSF-gsmSCF-ops-args and from
-- CAP-gsmSCF-gsmSRF-ops-args.


-- AssistHandoffssfToScfInvokable and AssistHandoffssfToScfReturnable use OPERATION definitions
-- with version5(4). As a result, AssistHandoffsSF-gsmSCF-PDUs uses version5(4) OPERATION
-- definitions. As a subsequent result, assistHandoff-gsmSSF-scfAbstractSyntax uses version5(4)
-- OPERATION definitions. That ABSTRACT-SYNTAX is used in the capssf-scfAssistHandoffAC
-- APPLICATION-CONTEXT definition (CAP from assist gsmSSF to gsmSCF).

assistHandoff-gsmSSF-scfAbstractSyntax ABSTRACT-SYNTAX ::= {
    AssistHandoffsSF-gsmSCF-PDUs
    IDENTIFIED BY   id-as-assistHandoff-gsmSSF-scfAS}
-- 'AssistHandoffsSF-gsmSCF-PDUs' is defined in the present module.

AssistHandoffsSF-gsmSCF-PDUs ::= TCMessage {{AssistHandoffssfToScfInvokable},
                                            {AssistHandoffssfToScfReturnable}}
-- 'AssistHandoffssfToScfInvokable' and 'AssistHandoffssfToScfReturnable' are defined in the
-- present module.

AssistHandoffssfToScfInvokable OPERATION ::= {
    activityTest |
    assistRequestInstructions {cAPSpecificBoundSet} |
    cancel {cAPSpecificBoundSet} |
    connectToResource {cAPSpecificBoundSet} |
    disconnectForwardConnection |
    playAnnouncement {cAPSpecificBoundSet} |
    promptAndCollectUserInformation {cAPSpecificBoundSet} |
    resetTimer {cAPSpecificBoundSet} |
    specializedResourceReport
    }
-- The OPERATION definitions are IMPORTED from CAP-gsmSSF-gsmSCF-ops-args and from
-- CAP-gsmSCF-gsmSRF-ops-args.

AssistHandoffssfToScfReturnable OPERATION ::= {
    activityTest |
    assistRequestInstructions {cAPSpecificBoundSet} |
    cancel {cAPSpecificBoundSet} |
    connectToResource {cAPSpecificBoundSet} |
    disconnectForwardConnection |
    playAnnouncement {cAPSpecificBoundSet} |
    promptAndCollectUserInformation {cAPSpecificBoundSet} |
    resetTimer {cAPSpecificBoundSet}
    }
-- The OPERATION definitions are IMPORTED from CAP-gsmSSF-gsmSCF-ops-args and from
-- CAP-gsmSCF-gsmSRF-ops-args.

-- ScfToSsfGenericInvokable and ScfToSsfGenericReturnable use OPERATION definitions
-- with version5(4). As a result, GenericSCF-gsmSSF-PDUs uses version5(4) OPERATION
-- definitions. As a subsequent result, scf-gsmSSFGenericAbstractSyntax uses version5(4)
-- OPERATION definitions. That ABSTRACT-SYNTAX is used in the capscf-ssfGenericAC
-- APPLICATION-CONTEXT definition (CAP from gsmSCF to gsmSSF).
scf-gsmSSFGenericAbstractSyntax ABSTRACT-SYNTAX ::= {
    GenericSCF-gsmSSF-PDUs
    IDENTIFIED BY   id-as-scf-gsmSSFGenericAS}
-- 'GenericSCF-gsmSSF-PDUs' is defined in the present module.

GenericSCF-gsmSSF-PDUs ::= TCMessage {{ScfToSsfGenericInvokable},
                                      {ScfToSsfGenericReturnable}}
-- 'ScfToSsfGenericInvokable' and 'ScfToSsfGenericReturnable' are defined in the
-- present module.

ScfToSsfGenericInvokable OPERATION ::= {
    activityTest |
    applyCharging {cAPSpecificBoundSet} |
    applyChargingReport {cAPSpecificBoundSet} |
```

```
    callInformationRequest {cAPSpecificBoundSet} |
    cancel {cAPSpecificBoundSet} |
    collectInformation |
    connect {cAPSpecificBoundSet} |
    connectToResource {cAPSpecificBoundSet} |
    continue |
    continueWithArgument {cAPSpecificBoundSet} |
    disconnectForwardConnection |
    disconnectForwardConnectionWithArgument {cAPSpecificBoundSet} |
    disconnectLeg {cAPSpecificBoundSet} |
    establishTemporaryConnection {cAPSpecificBoundSet} |
    furnishChargingInformation {cAPSpecificBoundSet} |
    initiateCallAttempt {cAPSpecificBoundSet} |
    moveLeg {cAPSpecificBoundSet} |
    playTone {cAPSpecificBoundSet} |
    releaseCall {cAPSpecificBoundSet} |
    requestReportBCSMEvent {cAPSpecificBoundSet} |
    resetTimer {cAPSpecificBoundSet} |
    sendChargingInformation {cAPSpecificBoundSet} |
    splitLeg {cAPSpecificBoundSet} |
    playAnnouncement {cAPSpecificBoundSet} |
    promptAndCollectUserInformation {cAPSpecificBoundSet}
    }
-- The OPERATION definitions are IMPORTED from CAP-gsmSSF-gsmSCF-ops-args and from
-- CAP-gsmSCF-gsmSRF-ops-args.

ScfToSsfGenericReturnable OPERATION ::= {
    activityTest |
    applyCharging {cAPSpecificBoundSet} |
    applyChargingReport {cAPSpecificBoundSet} |
    callInformationReport {cAPSpecificBoundSet} |
    callInformationRequest {cAPSpecificBoundSet} |
    cancel {cAPSpecificBoundSet} |
    connect {cAPSpecificBoundSet} |
    connectToResource {cAPSpecificBoundSet} |
    disconnectForwardConnection |
    disconnectForwardConnectionWithArgument {cAPSpecificBoundSet} |
    disconnectLeg {cAPSpecificBoundSet} |
    entityReleased {cAPSpecificBoundSet} |
    establishTemporaryConnection {cAPSpecificBoundSet} |
    eventReportBCSM {cAPSpecificBoundSet} |
    furnishChargingInformation {cAPSpecificBoundSet} |
    initiateCallAttempt {cAPSpecificBoundSet} |
    moveLeg {cAPSpecificBoundSet} |
    requestReportBCSMEvent {cAPSpecificBoundSet} |
    resetTimer {cAPSpecificBoundSet} |
    sendChargingInformation {cAPSpecificBoundSet} |
    splitLeg {cAPSpecificBoundSet} |
    playAnnouncement {cAPSpecificBoundSet} |
    playTone {cAPSpecificBoundSet} |
    promptAndCollectUserInformation {cAPSpecificBoundSet} |
    specializedResourceReport
    }
-- The OPERATION definitions are IMPORTED from CAP-gsmSSF-gsmSCF-ops-args and from
-- CAP-gsmSCF-gsmSRF-ops-args.

END
```

***** *Next Modification* *****

Note: section renumbering is required

11 Detailed operation procedures for circuit switched call control

…

11.x CollectInformation Procedure

11.x.1 General description

The gsmSCF uses this operation to request the gsmSSF to perform the call processing actions to collect additional digits from the calling party and report it to the gsmSCF. The CollectInformation operation may be used for TO calls in the gsmSSF. The gsmSCF shall arm the Collected_Info DP as EDP-R before sending this operation.

11.x.1.1 Parameters

None

11.x.2 Responding entity (gsmSSF)

11.x.2.1 Normal procedure

gsmSSF preconditions:

(1) A control relationship exists between the gsmSCF and the gsmSSF;

(2) Basic call processing has been suspended at CollectedInfo DP or AnalysedInfo DP;

(3) CollectedInfo DP has been armed as EDP-R;

(4) The gsmSSF FSM is in the state "Waiting_for_Instructions".

gsmSSF postconditions:

(1) The gsmSSF performs the call processing actions to collect additional dialled digits from the calling party;

(2) The gsmSSF FSM transits to the state “Monitoring”;

(3) In the O-BCSM, call processing resumes at PIC Collect_Info or PIC Analyze_Information.

11.x.2.2 Error handling

Operation related error handling is not applicable, due to class 4 operation.

•••

11.12 ContinueWithArgument Procedure

11.12.1 General description

The gsmSCF uses this operation to request the gsmSSF to proceed with call processing at the DP at which it previously suspended call processing to await gsmSCF instructions. It is also used to provide additional service related information to a User (Called Party or Calling Party) whilst the call processing proceeds.

In general all parameters which are provided in a ContinueWithArgument operation to the gsmSSF shall replace the corresponding signalling parameter in the CCF, in accordance with ETSI ES 201 296 [21], and shall be used for subsequent call processing. Parameters which are not provided by the ContinueWithArgument operation shall retain their value (if already assigned) in the CCF for subsequent call processing.

11.12.1.1 Parameters

- legOrCallSegment:
  This parameter indicates the leg or Call Segment to which the ContinueWithArgument operation shall apply.

- alertingPattern:
  This parameter indicates the type of alerting to be applied. It is defined in 3GPP TS 29.002 [11].

- serviceInteractionIndicatorsTwo:
  This parameter contains indicators that are used to resolve interactions between CAMEL based services and network based services.

- callingPartysCategory:
  This parameter indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).

- genericNumbers:
  This parameter allows the gsmSCF to set the Generic Number parameter used in the network. It is used for transfer of Additional Calling Party Number.

- suppressionOfAnnouncement:
  This parameter indicates that announcements and tones which are played in the exchange at non-successful call set-up attempts shall be suppressed.

- carrier:
  This parameter indicates carrier information. It consists of the carrier selection field followed by the Carrier ID information to be used by gsmSSF for routeing a call to a carrier.

  It contains the following embedded parameter:

  - carrierSelectionField:
    This parameter indicates how the selected carrier is provided (e.g. pre-subscribed).

  - carrierID:
    This parameter indicates the carrier to use for the call. It contains the digits of the carrier identification code.

- naOliInfo:
  This parameter contains originating line information which identifies the charged party number type to the carrier.

- chargeNumber:
  This parameter contains the number that identifies the entity to be charged for the call. It identifies the chargeable number for the usage of a carrier (applicable on a call sent into a North American long distance carrier). For a definition of this parameter refer to ANSI T1.113-1995 [92].

- cug-Interlock:
  This parameter uniquely identifies a CUG within a network.

- cug-OutgoingAccess:
  This parameter indicates if the calling user has subscribed to the outgoing access inter-CUG accessibility subscription option.

- bor-InterrogationRequested:
  This parameter indicates that Basic Optimal Routeing is requested for the call.

- suppress-O-CSI:
  This parameter indicates that O-CSI shall be suppressed for the forwarding leg or deflecting leg.

- suppress-D-CSI:
  This parameter indicates that D-CSI shall be suppressed for the leg.

- suppress-N-CSI:
  This parameter indicates that N-CSI shall be suppressed for the leg.

- suppressOutgoingCallBarring:
  This parameter indicates that outgoing call barrings shall be suppressed for the leg.

•••

11.18 EventReportBCSM procedure

11.18.1 General description

The gsmSSF uses this operation to notify the gsmSCF of a call related event previously requested by the gsmSCF in a "RequestReportBCSMEvent" operation.

11.18.1.1 Parameters

- eventTypeBCSM:
  This parameter specifies the type of event that is reported.

- eventSpecificInformationBCSM:
  This parameter indicates the call related information specific to the event.

  For Collected_Info it shall contain the CalledPartyNumber parameter.

  For Route_Select_Failure it shall contain the "FailureCause", if available.

  For O_Busy it shall contain the "BusyCause", if available.

  - If the busy event is triggered by an ISUP release message, then the BusyCause is a copy of the ISUP release cause, for example: Subscriber absent, 20 or User busy, 17.

  - If the busy event is trigerred by a MAP error, for example: Absent subscriber, received from the HLR, then the MAP cause is mapped to the corresponding ISUP release cause.

  NOTE 1: If no BusyCause is received, then the gsmSCF shall assume busy.

  For T_Busy it may contain the following parameters, if available.

  - CallForwarded:
    This parameter indicates that the busy event is triggered by call forwarding at the GMSC or VMSC.

  - ForwardingDestinationNumber:
    This parameter indicates the forwarding destination.

  - RouteNotPermitted:
    This parameter indicates that the busy event is triggered because call forwarding was not invoked in this GMSC due to the rules of Basic Optimal Routeing.

  - BusyCause:

    - If the busy event is triggered by an ISUP release message, then the BusyCause is a copy of the ISUP release cause, for example: Subscriber absent, 20 or User busy, 17.

    - If the busy event is triggered by a MAP error, for example: Absent subscriber, received from the HLR, then the MAP cause is mapped to the corresponding ISUP release cause.

    - If the busy event is triggered by call forwarding or call deflection invocation in the GMSC or VMSC, then the BusyCause will refer to the release cause in accordance with the mapping table in 3GPP TS 23.078 [7].

    - If the busy event is triggered by call forwarding at the GMSC, then the BusyCause reflects the forwarding reason (Subscriber Absent, 20 or User busy, 17). The eventSpecificInformationBCSM shall in that case also contain the CallForwarded indication.

    NOTE 2: If no BusyCause is received, then the gsmSCF shall assume busy.

For O_No_Answer it shall be empty.

For T_No_Answer it may contain the CallForwarded indication and the ForwardingDestinationNumber.

- If the No_Answer event is triggered by an ISUP release message or expiry of the CAMEL timer TNRy, then the eventSpecificInformationBCSM shall be empty.
- If the No_Answer event is triggered by call forwarding at the GMSC or VMSC, then the eventSpecificInformationBCSM shall contain the CallForwarded indication and the ForwardingDestinationNumber.

For O_Answer or T_Answer it shall contain the following information, if available:

- The destination address for the call;
- The OR indicator, in the case that the call was subject to Basic Optimal Routeing, as specified in 3GPP TS 23.079 [8];
- The forwarding indicator, in the case that the Call Forwarding Supplementary Service was invoked;
- The charge indicator;
- The Extended Basic Service Code, for SCUDIF calls (see 3GPP TS 23.172 [16]);
- The Extended Basic Service Code 2, for SCUDIF calls (see 3GPP TS 23.172 [16]).

For O_Mid_Call and T_Mid_Call it shall contain the detected digit string, in accordance with the criterion defined in the RequestReportBCSMEvent operation.

For Call_Accepted, O_Term_Seized, O_Change_Of_Position and T_Change_Of_Position it shall contain the following information:

- locationInformation:
  This parameter indicates the location of the MS.

For O_Disconnect and T_Disconnect it shall contain the "releaseCause", if available.

For O_Abandon" it may contain the following parameter, if available.

- routeNotPermitted:
  This parameter indicates that the O-Abondon event is triggered because call set up shall not be invoked in this MSC due to the rules of Basic Optimal Routeing.

For O_Service_Change or T_Service_Change it may contain the following information:

- The Extended Basic Service Code, for SCUDIF calls (see 3GPP TS 23.172 [16]).

- legID:
  This parameter indicates the party in the call for which the event is reported. The gsmSSF shall use the option "receivingSideID" only.

- receivingSideID:
  If not included, then the default values for LegID are assumed according to the tables 11-1 and 11-2.

  The "legID" parameter shall always be included for the events O_Disconnect and T_Disconnect.

- miscCallInfo:
  This parameter indicates Detection Point (DP) related information.

- messageType:
  This parameter indicates whether the message is a request, i.e. resulting from a "RequestReportBCSMEvent" with monitorMode = interrupted, or a notification, i.e. resulting from a "RequestReportBCSMEvent" with "monitorMode" = "notifyAndContinue".

11.18.2 Invoking entity (gsmSSF)

11.18.2.1 Normal procedure

gsmSSF preconditions:

(1) A control relationship or a monitoring relationship exists between the gsmSSF and the gsmSCF.

(2) For the O_Abandon DP and T_Abandon DP, the gsmSSF FSM is in any state, except "Idle". For other DPs, refer to 3GPP TS 23.078 [7].

(3) The BCSM proceeds to an EDP that is armed.

gsmSSF postconditions:

(1) If the message type was notification and there are still armed EDPs or pending reports, then the gsmSSF FSM stays in the state "Monitoring".

(2) If the message type was notification and there are neither any armed EDPs nor pending reports, then the gsmSSF FSM transits to the state "Idle".

(3) If the message type was request, then the gsmSSF FSM transits to the state "Waiting_for_Instructions". Call processing is interrupted.

11.18.2.2 Error handling

If the message type is "request" and the Tssf timer expires, then the gsmSSF shall abort the TC dialogue and shall instruct the MSC to treat the call in accordance with the Default Call Handling, valid for this CAMEL dialogue.

Operation related error handling is not applicable, due to class 4 operation.

•••

11.20 InitialDP procedure

11.20.1 General description

The gsmSSF uses this operation after detection of a TDP-R in the BCSM, to request the gsmSCF for instructions to complete the call.

11.20.1.1 Parameters

- serviceKey:
  This parameter indicates to the gsmSCF the requested IN service. It is used to address the required application/SLP within the gsmSCF; this parameter is not for SCP addressing.

- calledPartyNumber:
  This parameter contains the number used to identify the called party in the forward direction, i.e. see ETSI EN 300 356-1 [23]. This parameter shall be sent only in the Mobile Terminating, Mobile Forwarding, ~~and~~ mobile originating on unsuccessful TDP and trunk originating cases. For the trunk originating case the end of pulsing signal (ST) is included in the calledPartyNumber address signals if it has been received or the MSC has determined that the called number information is complete.

- callingPartyNumber:
  This parameter carries the calling party number to identify the calling party or the origin of the call. See ETSI EN 300 356-1 [23] Calling Party Number signalling information.

- callingPartysCategory:
  Indicates the type of calling party (e.g. operator, pay phone, ordinary subscriber). See ETSI EN 300 356-1 [23] Calling Party Category signalling information.

- locationNumber:
  This parameter is used to convey the geographical area address for mobility services, see ITU-T Recommendation Q.762 [44]. It is used when "callingPartyNumber" does not contain any information about the geographical location of the calling party (e.g., origin dependent routeing when the calling party is a mobile subscriber).

- originalCalledPartyID:
  If the call has met call forwarding on the route to the gsmSSF, then this parameter carries the dialled digits. Refer to EN 300 356-1[23] Original Called Number signalling information.

- highLayerCompatibility:
  This parameter indicates the type of the high layer compatibility, which will be used to determine the ISDN - teleservice of a connected ISDN terminal. The highlayerCompatibility can also be transported by ISUP (e.g. within the ATP (see ITU-T Recommendation Q.763 [45]) parameter).

- additionalCallingPartyNumber:
  The calling party number provided by the access signalling system of the calling user, e.g. provided by a PBX.

- bearerCapability:
  This parameter indicates the type of the bearer capability connection or the transmission medium requirements to the user. It is a network option to select which of the two parameters to be used:

  - bearerCap:
    This parameter contains the value of the ISUP User Service Information parameter.

    The parameter "bearerCapability" shall be included in the "InitialDP" operation only in the case the ISUP User Service Information parameter is available at the gsmSSF.

    If User Service Information and User Service Information Prime are available at the gsmSSF, then the "bearerCap" shall contain the value of the User Service Information Prime parameter.

- eventTypeBCSM:
  This parameter indicates the armed BCSM DP event, resulting in the "InitialDP" operation.

- redirectingPartyID:
  This parameter indicates the last directory number the call was redirected from.

- redirectionInformation:
  This parameter contains forwarding related information, such as redirecting counter.
  See ITU-T Recommendation Q.763 [45] Redirection Information signalling information.

- iPSSPCapabilities:
  This parameter indicates which gsmSRF resources supported within the VMSC or GMSC the gsmSSF resides in are attached and available.

- serviceInteractionIndicatorsTwo:
  This parameter contains indicators that are used to resolve interactions between CAMEL based services and network based services.

- iMSI:
  This parameter contains the IMSI of the mobile subscriber for which the service is invoked.

- subscriberState:
  This parameter indicates the state of the mobile subscriber for which the service is invoked. The possible states are "busy", "idle" and "not reachable".

- locationInformation:
  This parameter indicates the location of the MS and the age of the information defining the location.

- ext-BasicServiceCode:
  This parameter indicates the Basic Service Code.

- callReferenceNumber:
  This parameter contains the call reference number assigned to the call by the CCF.

- mscAddress:
  This parameter contains the mscId assigned to the MSC.

- gmscAddress:
  This parameter contains the gmscId assigned to the GMSC.

- calledPartyBCDNumber:
  This parameter contains the number used to identify the called party in the forward direction. It may also include service selection information, including * and # characters.

- time&Timezone:
  This parameter contains the time that the gsmSSF was triggered, and the time zone that the invoking gsmSSF resides in.

- callForwardingSS-Pending:
  This parameter indicates that a forwarded-to-number was received and that the call will be forwarded due to the Call Forwarding supplementary service in the GMSC or in the VMSC, unless otherwise instructed by the gsmSCF.

- carrier:
  This parameter contains carrier information. It consists of the carrier selection field followed by the Carrier ID information associated with the calling subscriber of a mobile originating call or trunk originating call, the called subscriber of a mobile terminating call or the forwarding subscriber of a mobile fowarded call.

  It contains the following embedded parameter:

  - carrierSelectionField:
    This parameter indicates how the selected carrier is provided (e.g. pre-subscribed).

  - carrierID:
    This parameter indicates the carrier to use for the call. It contains the digits of the carrier identification code.

- cug-Index:
  This parameter is used to select a CUG for an outgoing call at the user, or to indicate an incoming CUG call to the user.

- cug-Interlock:
  This parameter uniquely identifies a CUG within a network.

- cug-OutgoingAccess:
  This parameter indicates if the calling user has subscribed to the outgoing access inter-CUG accessibility subscription option.

- cGEncountered:
  This parameter indicates the type of call gapping the related call has been subjected to, if any.

- cause:
  This parameter indicates the release cause which triggered the event:

  For Route_Select_Failure" it shall contain the "FailureCause", if available.

  For T_Busy it may contain the following parameters, if available.

  - If the busy event is triggered by an ISUP release message, then the BusyCause shall a copy of the ISUP release cause, for example: Subscriber absent, 20 or User busy, 17.

  - If the busy event is triggered by a MAP error, for example: Absent subscriber, received from the HLR, then the MAP cause is mapped to the corresponding ISUP release cause.

  - If the busy event is triggered by call forwarding invocation in the GMSC or VMSC, then the BusyCause shall refer to the type of the call forwarding service in accordance with the mapping table in 3GPP TS 23.078 [7].

- forwardingDestinationNumber:
  This parameter contains the forwarding destination.

- ms-Classmark2:
  This parameter contains the MS Classmark 2 of the mobile subscriber for which the service is invoked.

- iMEI:
  This parameter contains the IMEI (with software version) of the mobile subscriber for which the service is invoked.

- supportedCamelPhases:
  This parameter indicates the CAMEL Phases supported in the GMSC or VMSC which sends this operation.

- offeredCamel4Functionalities:
  This parameter contains the offered CAMEL phase 4 functionalities.

- bearerCapability2:
  This parameter indicates the type of the bearer capability connection or the transmission medium requirements to the user.

- ext-BasicServiceCode2:
  This parameter indicates the Basic Service Code2.

- highLayerCompatibility2:
  This parameter indicates the high layer compatibility2 for a SCUDIF call.

- lowLayerCompatibility:
  This parameter indicates the low layer compatibility.

- lowLayerCompatibility2:
  This parameter indicates the low layer compatibility2 for a SCUDIF call.

- enhancedDialledServicesAllowed:
  This parameter indicates that the gsmSCF may use the Enhanced Dialled Services (EDS) for this call.

- UU-Data:
  This parameter contains user-to-user signalling service related information.

11.20.2 Invoking entity (gsmSSF)

11.20.2.1 Normal procedure

gsmSSF preconditions:

(1) An event fulfilling the criteria for the DP being executed has been detected.

(2) Call gapping and SS7 overload are not in effect for the call.

gsmSSF postconditions:

(1) If the DP was armed as a TDP-R and trigger conditions, if present, are fulfilled, then a control relationship between the gsmSCF and the gsmSSF is established. The gsmSSF FSM transits to the state "Waiting_for_Instructions".

The address of the gsmSCF shall be fetched from the valid CSI. The gsmSSF shall provide all available parameters to the gsmSCF.

If no triggering takes place, because trigger conditions were not fulfilled, then the gsmSSF shall proceed with call handling without CAMEL Service.

The gsmSSF application timer Tssf is loaded and started when the gsmSSF sends "InitialDP" for requesting instructions from the gsmSCF. It is used to prevent excessive call suspension time.

11.20.2.2 Error handling

If the gsmSCF is not accessible, then the call proceeds in accordance with the Default Call Handling parameter in the CSI.

When Tssf expires, then the gsmSSF shall abort the interaction with the gsmSCF by means of an abort to TC and shall call continue the call in accordance with the Default Call Handling parameter in the valid CSI.

If the calling party abandons after the sending of "InitialDP" and before the TC dialogue is established, then the gsmSSF shall abort the interaction with the gsmSCF by means of an abort to TC.

Generic error handling for the operation related errors are described in clause 10 and the TC services which are used for reporting operation errors are described in clause 14.

•••

11.27 RequestReportBCSMEvent procedure

11.27.1 General description

The gsmSCF uses this operation to request the gsmSSF to monitor for a call-related event (e.g., BCSM events such as O_Busy or O_No_Answer) and to send a notification to the gsmSCF when the event is detected.

The monitoring of more than one event may be requested with a single "RequestReportBCSMEvent" operation, but each of these requested events will be reported in a separate "EventReportBCSM" operation.

NOTE: If the RequestReportBCSMEvent requests arming of the current DP from which the call processing was suspended, then the next occurrance of the DP encountered during BCSM processing will be detected (i.e. not the current one from which the call was suspended).

The DP arming principle is as follows:

- The DPs O_Disconnect and T_Disconnect can be armed for any or all legs depending on the direction for which events have to be captured. As an example, the O_Disconnect DP can be armed for leg1 and leg2; in this case, if a release request is received from the A-party, then it will be detected by the O_Disconnect DP armed for leg1, while a release request from the B-party will be detected by the O_Disconnect DP armed for leg2.

- The O_Abandon DP can be armed only for leg1 in the O-BCSM and the T_Abandon DP can be armed only for leg1 in the T-BCSM.

- The Collected_Info DP can be armed only for leg1 in the O-BCSM for TO calls.

Table 11-1: DP Arming Table for O-BCSM:

O-BCSM	leg1	Not leg 1	Default_leg_ID
O_Term_Seized DP	-	X	2
Route_Select_Failure DP	-	X	2
O_Busy DP	-	X	2
O_No_Answer DP	-	X	2
O_Answer DP	-	X	2
O_Disconnect DP	X	X	- (note 1)
O_Abandon DP	X	-	1
O_Mid_Call	X	-	1
O_Change_Of_Position	X	-	1
O_Service_Change	X	-	1
Collected_Info DP	X	-	1
Note 1: The "legID" parameter shall be included Nomenclature: X = Arming Applicable - = Arming not Applicable			

Table 11-2: DP Arming Table for T-BCSM:

T-BCSM	leg2	leg1	Default Leg ID
Call_Accepted DP	X	-	2
T_Busy DP	X	-	2
T_No_Answer DP	X	-	2
T_Answer DP	X	-	2
T_Disconnect DP	X	X	- (note 1)
T_Abandon DP	-	X (note 2)	1
T_Mid_Call	X	-	2
T_Change_Of_Position	X	-	2
T_Service_Change	X	-	2
Note 1: The "legID" parameter shall be included Note 2: T_Abandon can be armed for leg1 only. Nomenclature: X = Arming Applicable - = Arming not Applicable			

11.27.1.1 Parameters

- bcsmEvents:
  This parameter specifies the event or events of which a report is requested.

  - eventTypeBCSM:
    This parameter specifies the type of event of which a report is requested.

  - monitorMode:
    This parameter indicates how the event shall be reported. If the "monitorMode" is "interrupted", then the event shall be reported as a request; if the "monitorMode" is "notifyAndContinue", then the event shall be reported as a notification; if the "monitorMode" is "transparent", then the event shall not be reported.

  - legID:
    This parameter indicates the party in the call for which the event shall be reported. The gsmSCF shall use the option "sendingSideID" only.

    - sendingSideID:

      If not included, then the default values for LegID are assumed according to the tables 11-1 and 11-2.

    The "legID" parameter shall always be included for the events O_Disconnect and T_Disconnect.

  - dPSpecificCriteria:
    This parameter contains information specific to the EDP that shall be armed.

    - numberOfDigits:
      This parameter indicates the number of digits to be collected by the gsmSSF before the CollectedInfo event is reported to the gsmSCF

    - applicationTimer:
      This parameter indicates the No_Answer timer value for the No_Answer event. If the called party does not answer the call within the allotted time, then the gsmSSF shall report the event to the gsmSCF. This timer shall be shorter than the network No_Answer timer.

    - midCallControlInfo:
      This parameter defines the criterion for the detection and reporting of mid-call digits. If this parameter is absent, then the first digit entered shall be reported.

    - changeOfPositionControlInfo:
      This parameter defines the criterion for the reporting of change of location. If this parameter is absent, then any change of position shall be reported.

  - automaticRearm:
    This parameter indicates that the gsmSSF shall rearm the DP whenever it is encountered.

11.27.2 Responding entity (gsmSSF)

11.27.2.1 Normal procedure

gsmSSF preconditions:

(1) A control relationship exists between the gsmSSF and the gsmSCF.

(2) The gsmSSF FSM is in the state "Waiting_for_Instructions" or in the state "Monitoring".

NOTE: In the state "monitoring" only requests to disarm detection points (with MonitorMode set to "Transparent") or to send notifications of events (with MonitorMode set to "NotifyAndContinue") shall be accepted by the gsmSSF.

gsmSSF postconditions:

(1) The requested EDPs are armed or disarmed as indicated.

(2) Previously requested events are monitored until ended by a transparent monitor mode, until the end of the call, until the EDPs are detected or until the corresponding leg is released.

(3) The gsmSSF FSM remains in the same state, unless all EDPs have been disarmed and no CallInformationReport or ApplyChargingReport has been requested; in the latter case, the gsmSSF FSM transits to the state "Idle".

11.27.2.2 Error handling

Generic error handling for the operation related errors are described in clause 10 and the TC services which are used for reporting operation errors are described in clause 14.

****** End of Document ******

3GPP TSG-CT WG4 Meeting #27 **C4-050602**
Cancun, MEXICO. 25th to 29th April 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.002** **CR** **765** ⌘ **rev** **1** ⌘ Current version: **6.9.0** ⌘

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

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

Title:	⌘	Addition of CollectInformation procedure to OfferedCAMEL4Functionalities
Source:	⌘	Nortel
Work item code:	⌘	CAMELR7
Date:	⌘	07/04/2005
Category:	⌘	**B**
Release:	⌘	Rel-7

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

Use one of the following releases:
Ph2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)
Rel-7 (Release 7)

Reason for change:	⌘	To enable CSE interaction for trunk originated calls that use overlap signalling procedures for call set-up. When the CSE determines that more dialled digits from the calling party are required, to enable processing in the CSE to proceed, it requests the gsmSSF to arm DP2 and collect a specific number of additional digits from the calling party. DP2 is triggered when the digits have been collected, and the digits are sent to the CSE in an EventReportBCSM operation.
Summary of change:	⌘	Addition of a new bit in OfferedCAMEL4Functionalities so that the MSC/ SSP can indicate to the SCP that it supports the collection of additional digits for trunk originated calls (i.e. signalled in InitialDP at DP2-T) and/ or that it supports the collection of additional digits for trunk originated dialled services (i.e. signalled in InitialDP at DP3-T).
Consequences if not approved:	⌘	Operators have to use proprietary solutions that restrict multi-vendor interoperability.

Clauses affected:	⌘	17.7.1			
		Y	**N**		
Other specs affected:	⌘	**X**		Other core specifications	⌘ 23.078 CR764, 23.018 CR145, 23.078 CR770, 29.078 CR392
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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

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

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

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

****** First Modification ******

17.7 MAP constants and data types

17.7.1 Mobile Service data types

```
MAP-MS-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version9 (9)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS
. . .


   -- subscriber management types
   InsertSubscriberDataArg,
   InsertSubscriberDataRes,
   LSAIdentity,
   DeleteSubscriberDataArg,
   DeleteSubscriberDataRes,
   Ext-QoS-Subscribed,
   Ext2-QoS-Subscribed,
   SubscriberData,
   ODB-Data,
   SubscriberStatus,
   ZoneCodeList,
   maxNumOfZoneCodes,
   O-CSI,
   D-CSI,
   O-BcsmCamelTDPCriteriaList,
   T-BCSM-CAMEL-TDP-CriteriaList,
   SS-CSI,
   ServiceKey,
   DefaultCallHandling,
   CamelCapabilityHandling,
   BasicServiceCriteria,
   SupportedCamelPhases,
   OfferedCamel4CSIs,
   OfferedCamel4Functionalities,
   maxNumOfCamelTDPData,
   CUG-Index,
   CUG-Info,
   CUG-Interlock,
   InterCUG-Restrictions,
   IntraCUG-Options,
   NotificationToMSUser,
   QoS-Subscribed,
   IST-AlertTimerValue,
   T-CSI,
   T-BcsmTriggerDetectionPoint,
   APN,

. . .

-- subscriber management types

. . .
```

```
OfferedCamel4Functionalities ::= BIT STRING {
     initiateCallAttempt                 (0),
     splitLeg                            (1),
     moveLeg                             (2),
     disconnectLeg                       (3),
     entityReleased                      (4),
     dfc-WithArgument                    (5),
     playTone                            (6),
     dtmf-MidCall                        (7),
     chargingIndicator                   (8),
     alertingDP                          (9),
     locationAtAlerting                  (10),
     changeOfPositionDP                  (11),
     or-Interactions                     (12),
     warningToneEnhancements             (13),
     cf-Enhancements                     (14),
     subscribedEnhancedDialledServices   (15),
     servingNetworkEnhancedDialledServices (16),
     criteriaForChangeOfPositionDP       (17),
     serviceChangeDP                     (18),
     collectInformation                  (19)
} (SIZE (15..64))
-- A node supporting Camel phase 4 shall mark in the BIT STRING all CAMEL4
-- functionalities it offers.
-- Other values than listed above shall be discarded.
```

. . .

****** End of Document ******

3GPP TSG-CT4 Meeting #27
Cancun, Mexico, 25 – 29 April 2005

Tdoc ⌘C4-050785

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.018** **CR** **145** ⌘**rev** **1** ⌘ Current version: **6.4.0** ⌘

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

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

Title:	⌘	Trunk Originated CAMEL triggering - SDLs
Source:	⌘	Nokia
Work item code:	⌘	CAMELR7
Date:	⌘	28/4/2005
Category:	⌘	**B**
Release:	⌘	Rel-7

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

Use one of the following releases:

Ph2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	Trunk Originated CAMEL triggering is to be defined as required by SA1
Summary of change:	⌘	1. A new process is introduced: TO_MSC. It handles the trunk originated call. The process calls appropriate CAMEL procedures for trunk triggering. 2. Process MSC_Coord is removed and replaced by MSC_Coord_Setup procedure. 3. Trunk triggering works with CAPv4 only.
Consequences if not approved:	⌘	Missing functionality. Misalignment to CAMEL stage 1.

Clauses affected:	⌘	1, 3.2, 4.3, 7.5, Annex A			
		Y	**N**		
Other specs affected:	⌘	**X**		Other core specifications	⌘ 23.078 CR 764, 770, 29.002 CR 765, 29.078 CR 392
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘	• The SDL is based on call forwarding SDL. The existing SDL is used whenever it is possible. • Open issue: Is UUS clear procedure applicable for TOC? • Open issue: Cut-and-paste parameter in Connect operation could be considered (as in ETSI INAP CS1).			

- Modified section -

1 Scope

The present document specifies the technical realization of the handling of calls originated by a UMTS or GSM mobile subscriber and calls directed to a UMTS or GSM mobile subscriber, up to the point where the call is established. Normal release of the call after establishment is also specified. Trunk Originated call is also modelled.

In the present document, the term MS is used to denote a UMTS UE or GSM MS, as appropriate.

The handling of DTMF signalling and Off-Air Call set-up (OACSU) are not described in the present document.

The details of the effects of UMTS or GSM supplementary services on the handling of a call are described in the relevant 3GPP TS 23.07x, 3GPP TS 23.08x and 3GPP TS 23.09x series of specifications.

The specification of the handling of a request from the HLR for subscriber information is not part of basic call handling, but is required for both CAMEL (3GPP TS 23.078 [12]) and optimal routeing (3GPP TS 23.079 [13]). The use of the Provide Subscriber Information message flow is shown in 3GPP TS 23.078 [12] and 3GPP TS 23.079 [13].

The logical separation of the MSC and VLR (shown in clauses 4, 5 and 7), and the messages transferred between them (described in clause 8) are the basis of a model used to define the externally visible behaviour of the MSC/VLR, which is a single physical entity. They do not impose any requirement except the definition of the externally visible behaviour.

If there is any conflict between the present document and the corresponding stage 3 specifications (3GPP TS 24.008 [26], 3GPP TS 25.413 [27], 3GPP TS 48.008 [2] and 3GPP TS 29.002 [29]), the stage 3 specification shall prevail.

- Modified section -

3 Definitions and abbreviations

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

A&O	Active & Operative
ACM	Address Complete Message
ANM	ANswer Message
AoC	Advice of Charge
BC	Bearer Capability
BOIC-exHC&BOIZC	Barring of Outgoing International Calls except those directed to the HPLMN Country & Barring of Outgoing InterZonal Calls
BOIZC	Barring of Outgoing InterZonal Calls
BOIZC-exHC	Barring of Outgoing InterZonal Calls except those directed to the HPLMN Country
CCBS	Completion of Calls to Busy Subscriber
CFB	Call Forwarding on Busy
CFNRc	Call Forwarding on mobile subscriber Not Reachable
CFNRy	Call Forwarding on No Reply
CFU	Call Forwarding Unconditional
CLIP	Calling Line Identity Presentation
CLIR	Calling Line Identity Restriction
COLP	COnnected Line identity Presentation
COLR	COnnected Line identity Restriction
CUG	Closed User Group
CW	Call Waiting
FTN	Forwarded-To Number
FTNW	Forwarded-To NetWork
GMSCB	Gateway MSC of the B subscriber
GPRS	General Packet Radio Service
HLC	Higher Layer Compatibility
HLRB	The HLR of the B subscriber
HPLMNB	The HPLMN of the B subscriber
IAM	Initial Address Message
IPLMN	Interrogating PLMN - the PLMN containing GMSCB
IWU	Inter Working Unit
LLC	Lower Layer Compatibility
MO	Mobile Originated
MPTY	MultiParTY
MT	Mobile Terminated
NDUB	Network Determined User Busy
NRCT	No Reply Call Timer
PLMN BC	(GSM or UMTS) PLMN Bearer Capability
PRN	Provide Roaming Number
PUESBINE	Provision of User Equipment Specific Behaviour Information to Network Entities
SCUDIF	Service Change and UDI/RDI Fallback
SGSN	Serving GPRS support node
SIFIC	Send Information For Incoming Call
SIFOC	Send Information For Outgoing Call
SRI	Send Routeing Information
TO	Trunk Originated
UDUB	User Determined User Busy
UESBI-Iu	User Equipment Specific Behaviour Information over the Iu interface

VLRA	The VLR of the A subscriber
VLRB	The VLR of the B subscriber
VMSCA	The Visited MSC of the A subscriber
VMSCB	The Visited MSC of the B subscriber
VPLMNA	The Visited PLMN of the A subscriber
VPLMNB	The Visited PLMN of the B subscriber

- Modified section -

4 Architecture

Subclauses 4.1 and 4.2 show the architecture for handling a basic MO call and a basic MT call. A basic mobile-to-mobile call is treated as the concatenation of an MO call and an MT call.

4.1 Architecture for an MO call

A basic mobile originated call involves signalling between the MS and its VMSC via the BSS, between the VMSC and the VLR and between the VMSC and the destination exchange, as indicated in figure 1.

In figure 1 and throughout the present document, the term BSS is used to denote a GSM BSS or a UTRAN, as appropriate.

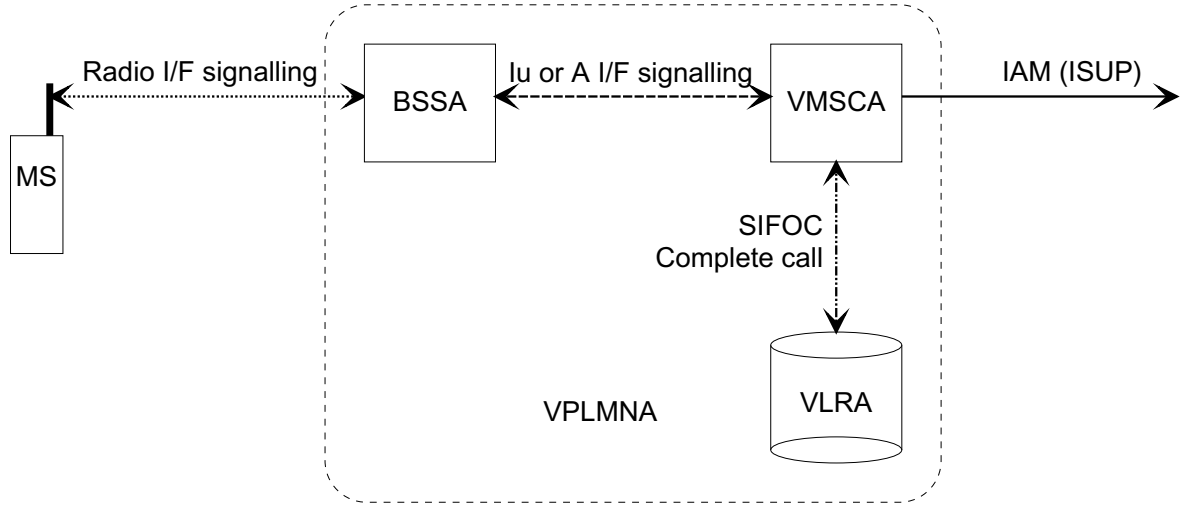


Figure 1: Architecture for a basic mobile originated call

In figure 1 and throughout the present document, the term ISUP is used to denote the telephony signalling system used between exchanges. In a given network, any telephony signalling system may be used.

When the user of an MS wishes to originate a call, the MS establishes communication with the network using radio interface signalling, and sends a message containing the address of the called party. VMSCA requests information to handle the outgoing call (SIFOC) from VLRA, over an internal interface of the MSC/VLR. If VLRA determines that the outgoing call is allowed, it responds with a Complete Call. VMSCA:

- establishes a traffic channel to the MS; and
- constructs an ISUP IAM using the called party address and sends it to the destination exchange.

4.2 Architecture for an MT call

A basic mobile terminated call involves signalling as indicated in figure 2. Communication between VMSCB and the MS is via the BSS, as for the mobile originated case. If VPLMNB supports GPRS and the Gs interface between VLRB and the SGSN is implemented (see 3GPP TS 23.060 [9]) and there is an association between VLRB and the SGSN for the MS, the paging signal towards the MS goes from VMSCB via VLRB and the SGSN to the BSS. The IPLMN, containing GMSCB, is in principle distinct from HPLMNB, containing HLRB, but the practice for at least the majority of current UMTS or GSM networks is that a call to an MS will be routed to a GMSC in HPLMNB.

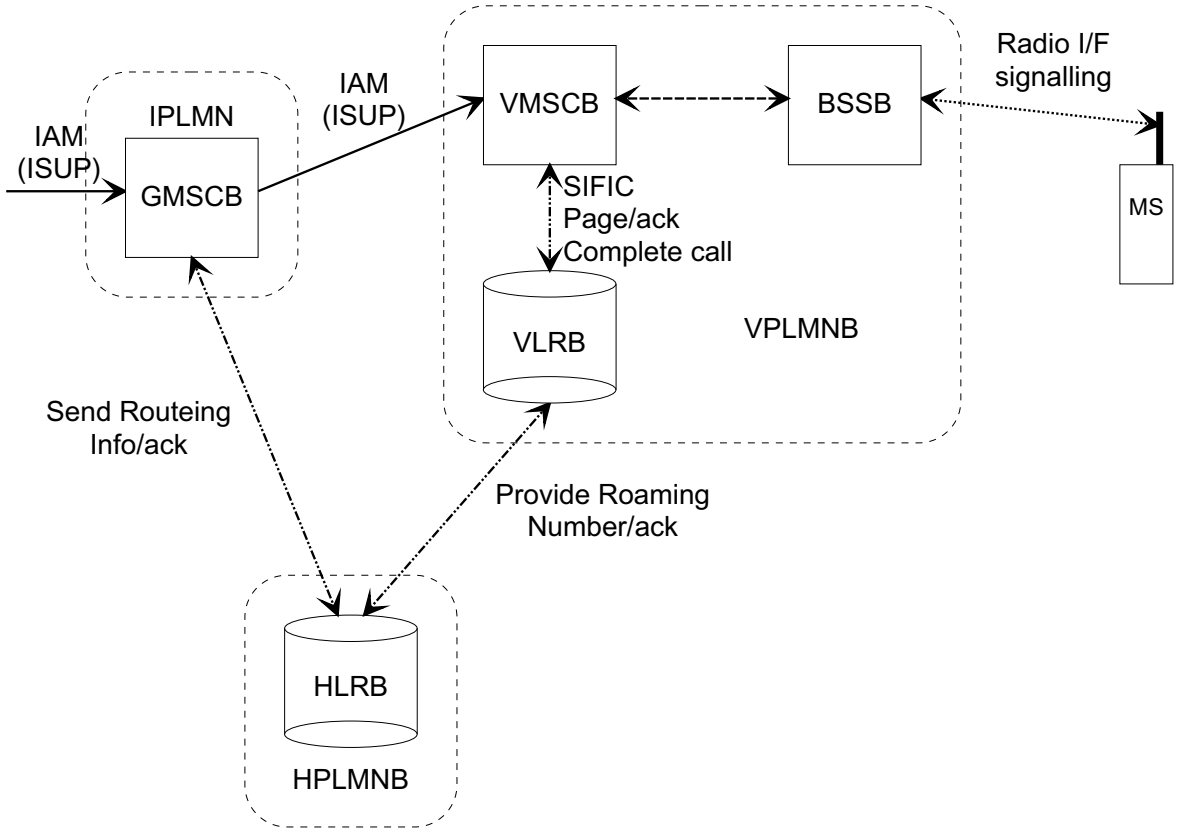


Figure 2: Architecture for a basic mobile terminated call

When GMSCB receives an ISUP IAM, it requests routeing information from HLRB using the MAP protocol. HLRB requests a roaming number from VLRB, also using the MAP protocol, and VLRB returns a roaming number in the Provide Roaming Number Ack. HLRB returns the roaming number to GMSCB in the Send Routeing Info ack. GMSCB uses the roaming number to construct an ISUP IAM, which it sends to VMSCB. When VMSCB receives the IAM, it requests information to handle the incoming call (SIFIC) from VLRB, over an internal interface of the MSC/VLR. If VLRB determines that the incoming call is allowed, it requests VMSCB to page the MS. VMSCB pages the MS using radio interface signalling. When the MS responds, VMSCB informs VLRB in the Page ack message. VLRB instructs VMSCB to connect the call in the Complete call, and VMSCB establishes a traffic channel to the MS.

4.3 Architecture for a TO call

A basic trunk originated call involves signalling between the PSTN and the PLMN's MSC, as indicated in figure x. The originating exchange may also be another MSC of the same or different PLMN.

The MSC may also be connected to PBX but that is outside the scope of this document. In the PBX case same modelling applies but the PBX signalling is different to ISUP.

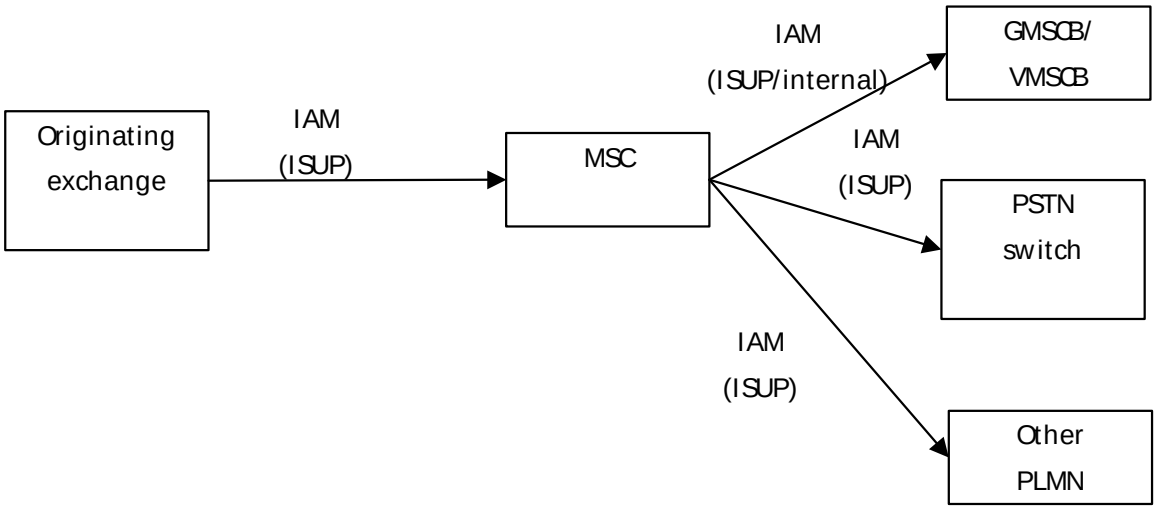


Figure x: Architecture for a basic trunk originated call

In figure x and throughout the present document, the term ISUP is used to denote the telephony signalling system used between exchanges. In a given network, any telephony signalling system may be used.

The MSC receives a setup (IAM) message from the originating exchange. The MSC analyses the called party number and routes the call to an appropriate destination. If the called party number is an MSISDN the gateway MSC functionality is activated. If the MSISDN belongs to another PLMN (or is ported out), the call is routed to another PLMN. If the called number is a PSTN number then the call is routed to (appropriate) PSTN operator. There may be other destinations also.

- Modified section -

7.5 TO call

7.5.1 Functional requirements of inter-connecting MSC

7.5.1.1 Process TO_MSC

Sheet 1: the procedure CAMEL_TOC_INIT is specific to CAMEL; it is specified in 3GPP TS 23.078 [12]. If the MSC does not support CAMEL, processing continues from the "Pass" exit of the test "Result=?". The procedure call formal parameter “First” or “NotFirst” indicates whether the procedure was called earlier in the same call.

Sheet 1, sheet 4: the procedure CAMEL_TOC_Dialled_Services is specific to CAMEL phase 3 or later; it is specified in 3GPP TS 23.078 [12]. If the MSC does not support CAMEL trunk triggering, processing continues from the "Pass" exit of the test "Result?". The procedure call formal parameter “First” or “NotFirst” indicates whether the procedure was called earlier in the same call.

Sheet 1: the procedure MOBILE_NUMBER_PORTABILITY_IN_OQoD is specific to Mobile Number Portability; it is specified in 3GPP TS 23.066 [10].

Sheet 1, sheet 2, sheet 3: the procedure CAMEL_Store_Destination_Address is specific to CAMEL phase 3 or later; it is specified in 3GPP TS 23.078 [12].

Sheet 1, sheet 4: the procedure CAMEL_OCH_MSC_DISC3 is specific to CAMEL phase 1; it is specified in 3GPP TS 23.078 [12].

Sheet 1, sheet2, sheet 4: the procedure CAMEL_OCH_MSC_DISC4 is specific to CAMEL Phase 2 or later; it is specified in 3GPP TS 23.078 [12].

Sheet 1, sheet 7: the procedure CAMEL_MT_CF_LEG1_MSC is specific to CAMEL phase 4 or later; it is specified in 3GPP TS 23.078 [12].

Sheet 1, sheet 2: The variable “Return_Place” indicates at which detection point the additional digit collection is.

Sheet 1, sheet 2: The “inter-digit timer” is a MSC internal timer to wait for additional dialling from the incoming side. At the expiry of the timer, the MSC/gsmSSF may report digits to the gsmSCF (if the event detection point is armed). This timer is used for the SDL modelling purposes only and it may not present the actual implementations.

Sheet 2: “Number_of_Digits” is the Collected_Info specific reporting criterion. The gsmSCF specifies the criterion. The process CS_gsmSSF sends the parameter to the TO_MSC process.

Sheet 2: “ST digit” is the ISUP value for a digit indicating that the Called Party Number is complete.

Sheet 3: the procedures CAMEL_Start_TNRy and CAMEL_Stop TNRy are specific to CAMEL phase 2 or later; they are specified in 3GPP TS 23.078 [12].

Sheet 3: the procedure CAMEL_CF_MSC_ANSWER is specific to CAMEL; it is specified in 3GPP TS 23.078 [12]. If the MSC does not support CAMEL, processing continues from the "Pass" exit of the test "Result?".

Sheet 3: the procedure UUS_MSC_Clear_UUS is specific to UUS; it is specified in 3GPP TS 23.087 [20].

Sheet 3: the procedure CAMEL_CF_MSC_ALERTING is specific to CAMEL phase 4 or later; it is specifed in 3GPP TS 23.078 [12]. If the GMSC does not support CAMEL phase 4 or later, processing continues from the "Pass" exit of the test "Result?".

Sheet 4: the procedure CAMEL_Stop_TNRy is specific to CAMEL phase 2 or later; it is specified in 3GPP TS 23.078 [12].

Sheet 4: the processing in the branch beginning with the Int_O_Release input will occur only if the MSC supports CAMEL.

Sheet 5: the input signal TNRy expired and all the subsequent processing are specific to CAMEL phase 2 or later, and will occur only if the GMSC supports CAMEL phase 2 or later. The procedure CAMEL_OCH_MSC2 is specified in 3GPP TS 23.078 [12].

Sheet 6: the procedure CAMEL_OCH_MSC_DISC1 is specific to CAMEL; it is specified in 3GPP TS 23.078 [12]. If the MSC does not support CAMEL, processing continues from the "No" exit of the test "Result=CAMEL handling?".

Sheet 6: the procedure CAMEL_OCH_MSC_DISC2 is specific to CAMEL; it is specified in 3GPP TS 23.078 [12]. If the MSC does not support CAMEL, processing continues from the "No" exit of the test "Result=Reconnect?" .

Sheet 6: the processing in the branch beginning with the Int_O_Release input will occur only if the MSC supports CAMEL.

Sheet 6: after the process TO_MSC has sent an IAM to the forwarded-to exchange, it acts as a relay for messages received from the parent process and the forwarded-to exchange.

Sheet 7: the process CAMEL_MT_CF_LEG2_MSC is specific to CAMEL phase 4 or later; it is specified in 3GPP TS 23.078 [12].

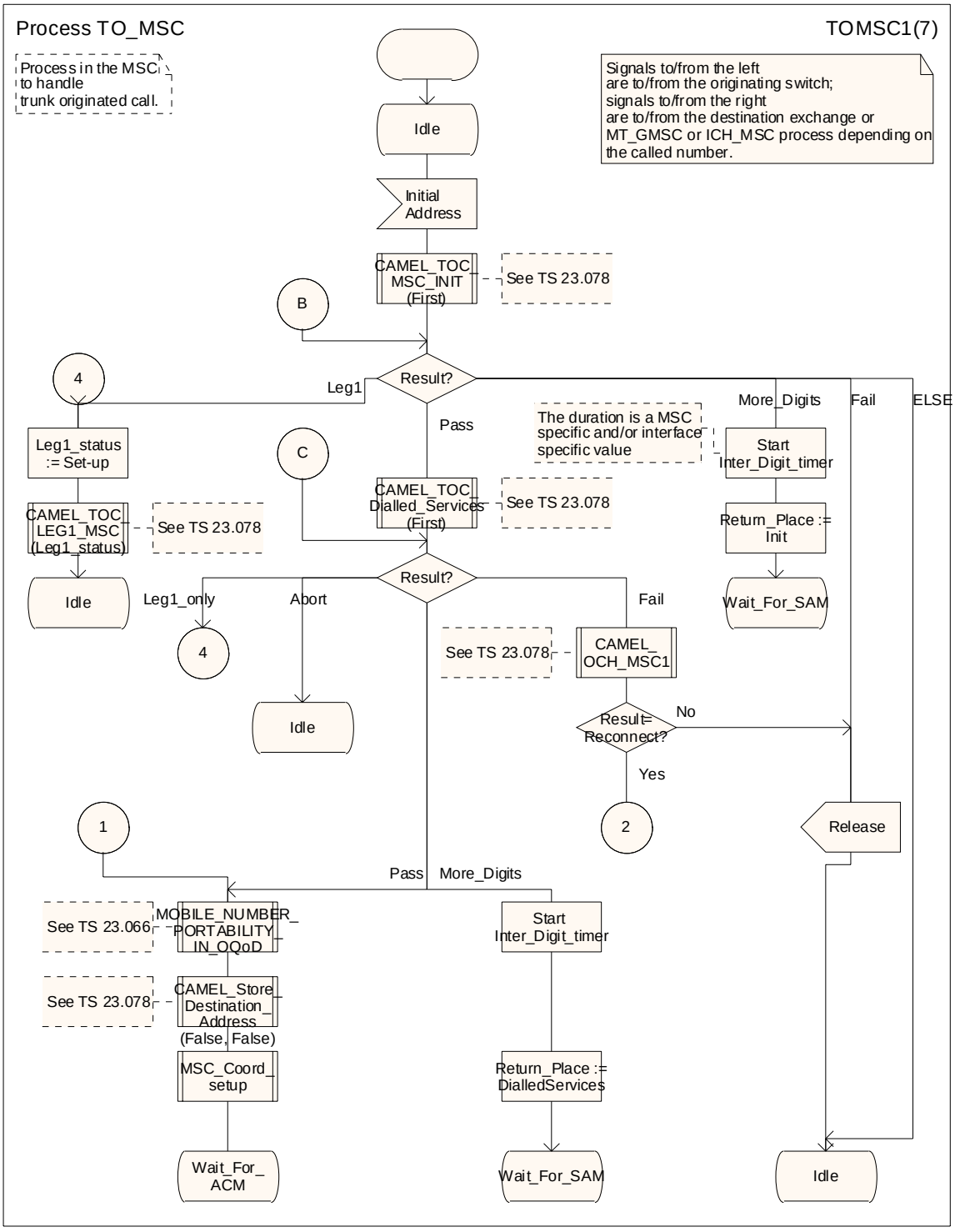


Figure X: Process TO_MSC (sheet 1)

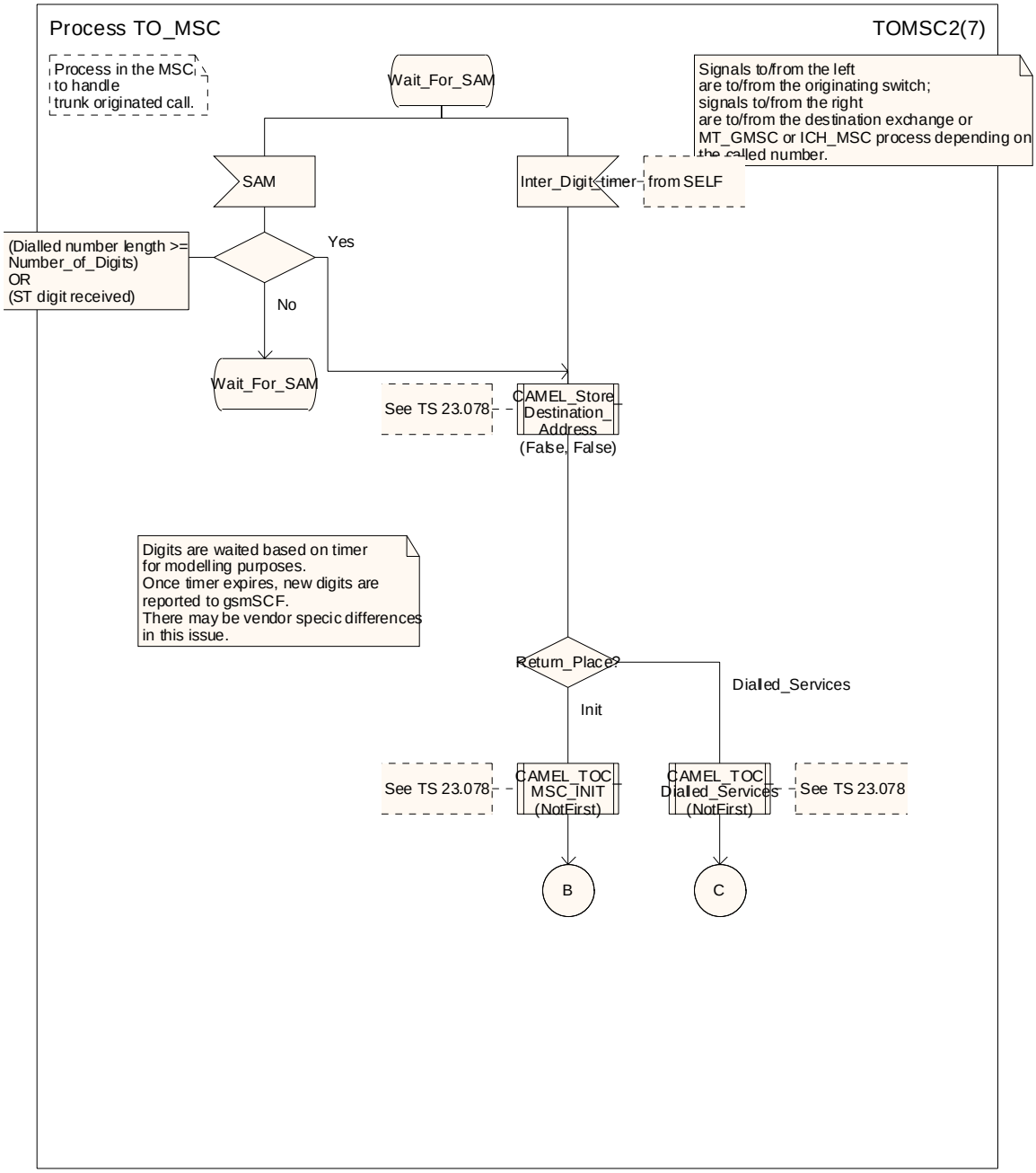


Figure X: Process TO_MSC (sheet 2)

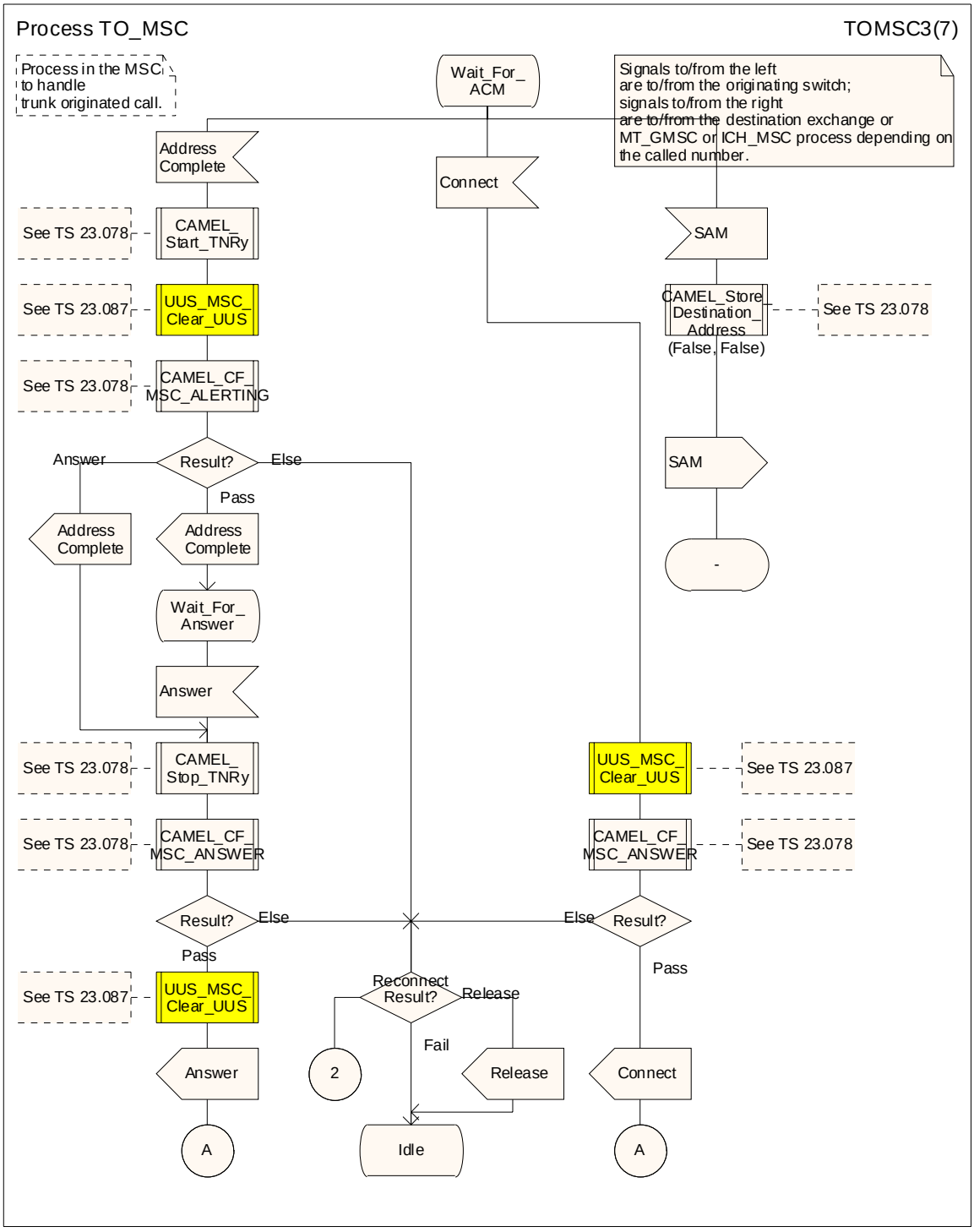


Figure X: Process TO_MSC (sheet 3)

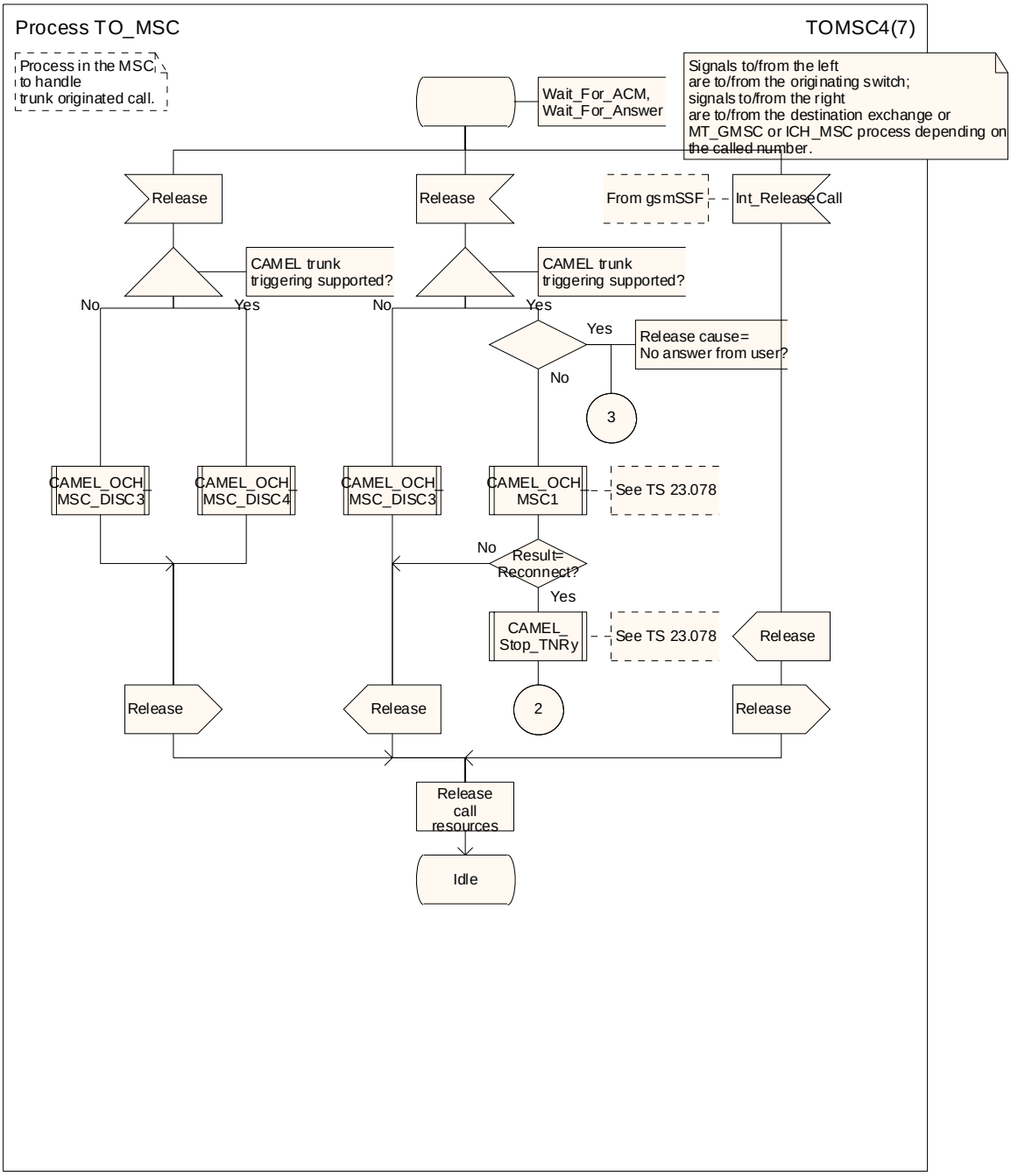


Figure X: Process TO_MSC (sheet 4)

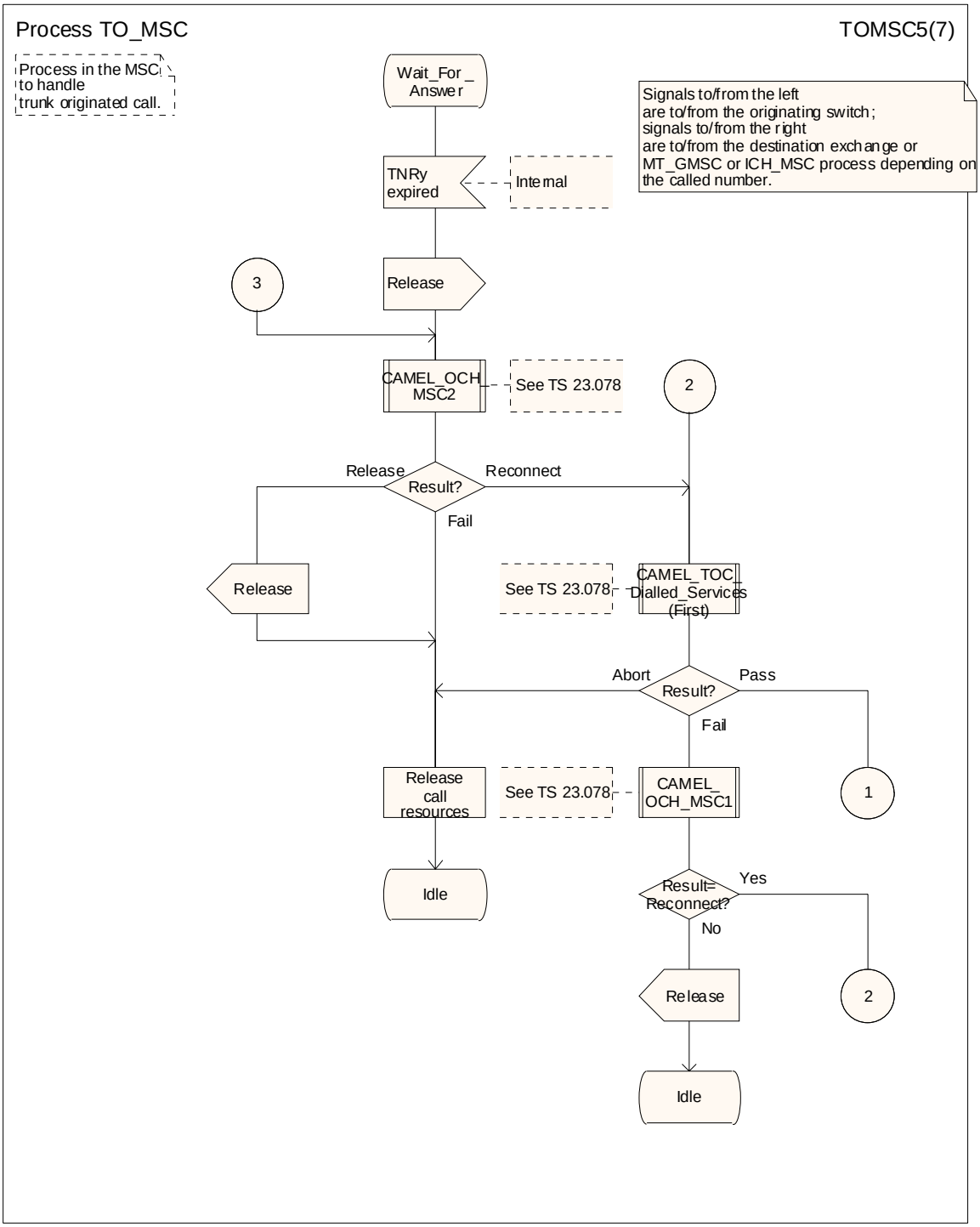


Figure X: Process TO_MSC (sheet 5)

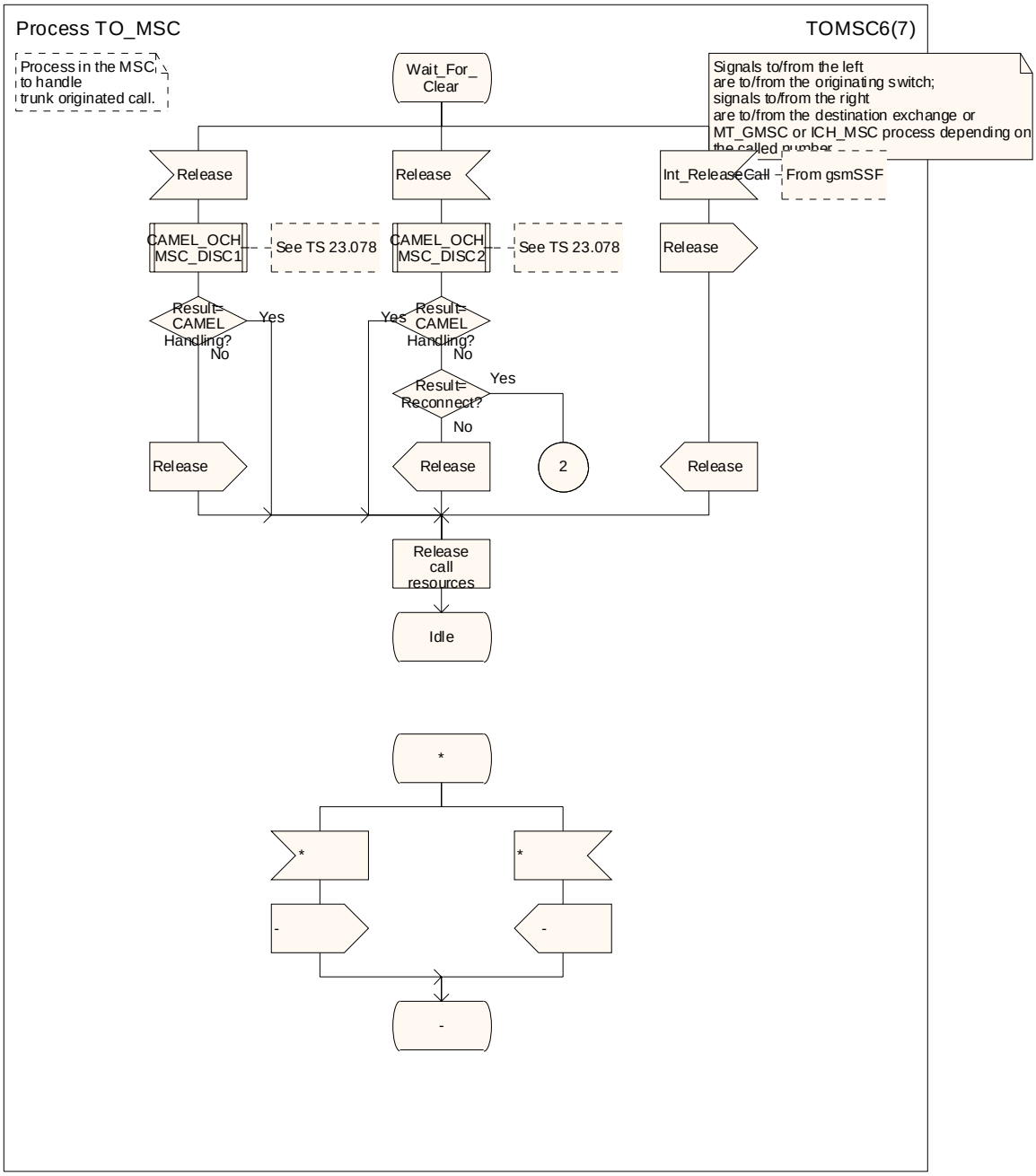


Figure X: Process TO_MSC (sheet 6)

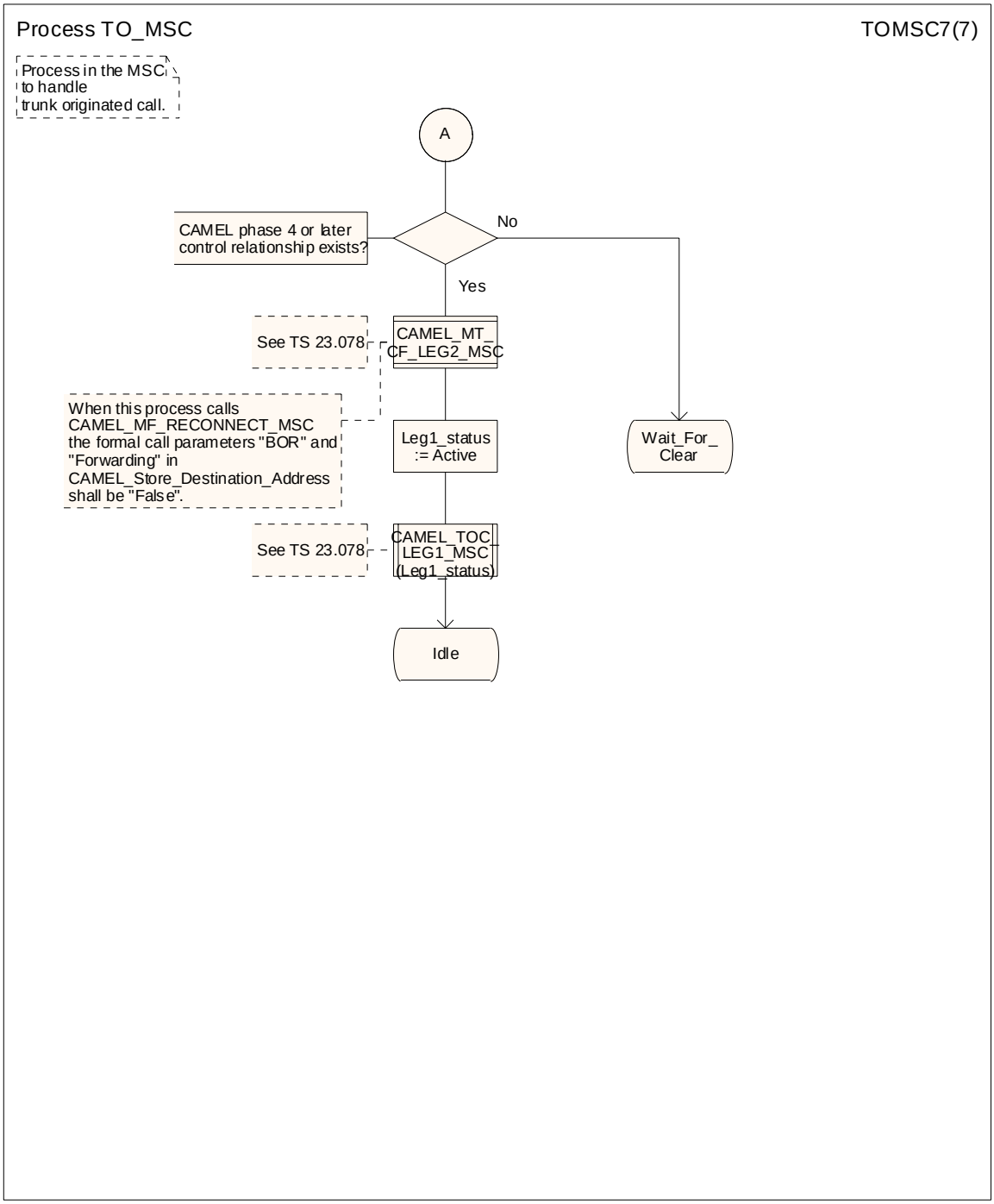


Figure X: Process TO_MSC (sheet 7)

Annex A (informative): Handling of an IAM at an MSC

An MSC which receives an IAM from an originating exchange may react in three different ways:

- It acts as a transit exchange, i.e. it relays the IAM to a destination exchange determined by analysis of the called party address, and thereafter relays other telephony signalling between the originating and destination exchange until the connection is released. This behaviour is not specific to UMTS or GSM.

- It acts as a terminating exchange, i.e. it attempts to connect the call to an MS currently registered in the service area of the MSC.

- It acts as a GMSC, i.e. it interrogates an HLR for information to route the call. If the HLR returns routeing information, the MSC uses the routeing information from the HLR to construct an IAM, which it sends to a destination exchange determined by analysis of the routeing information from the HLR.

Sheet 1: when the MSC co-ordinating setup ~~process~~procedure has decided whether the MSC is to act as a terminating VMSC, a GMSC or a transit exchange, it forwards the IAM to an idle instance of the appropriate process.

~~Sheet 2: after the MSC co-ordinating process has sent an IAM to an instance of the process MT_GMSC or ICH_MSC, it acts as a transparent relay for messages received from the originating exchange and the process instance (denoted by "“offspring"”). After the MSC co-ordinating process has relayed a Release message, it returns to the idle state.~~

~~Sheet 2: after the MSC co-ordinating process has sent an IAM to a destination exchange, it acts as a transparent relay for messages received from the originating exchange and the destination exchange. After the MSC co-ordinating process has relayed a Release message, it returns to the idle state.~~

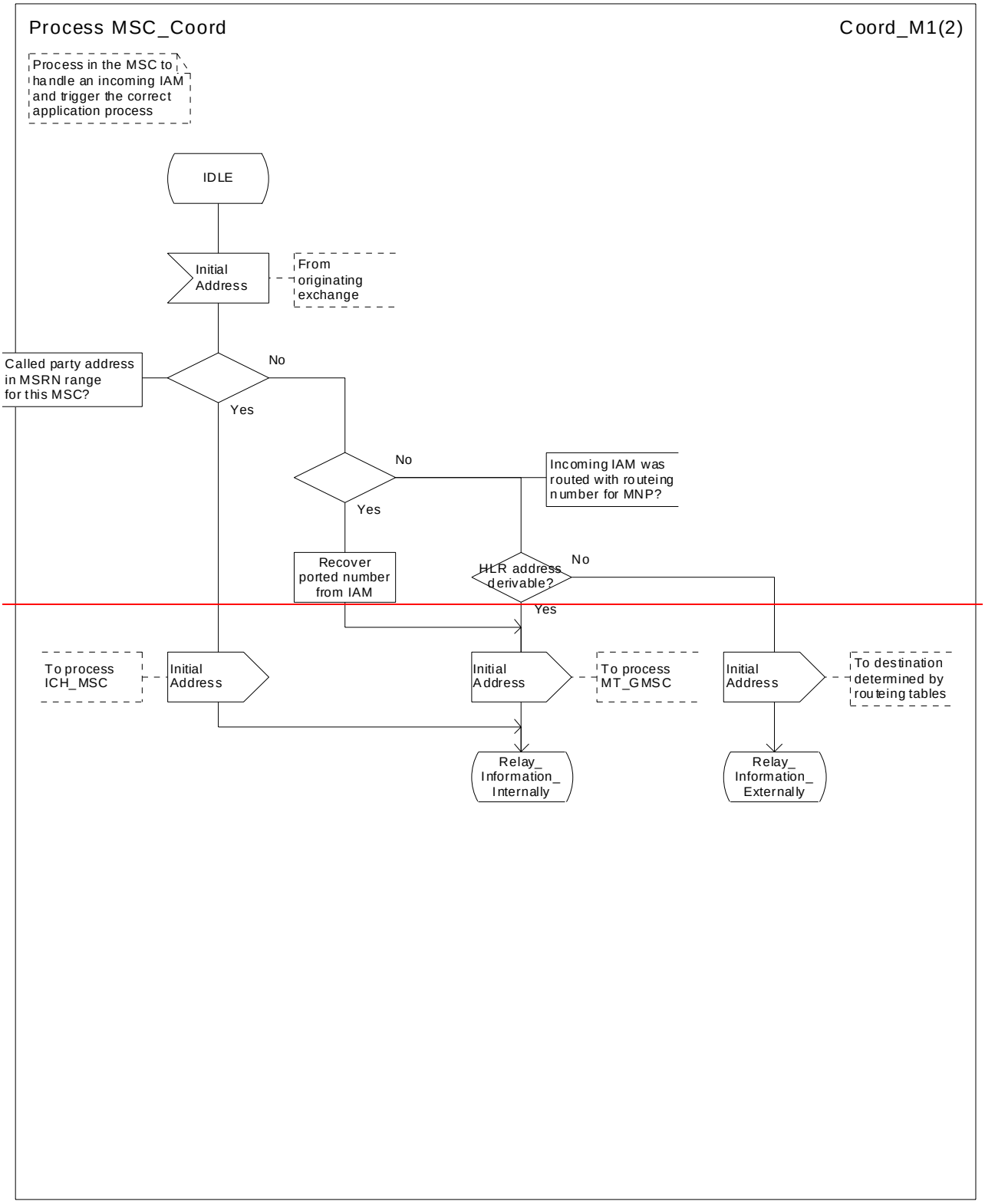


Figure 84a: Process MSC_Coord (sheet 1)

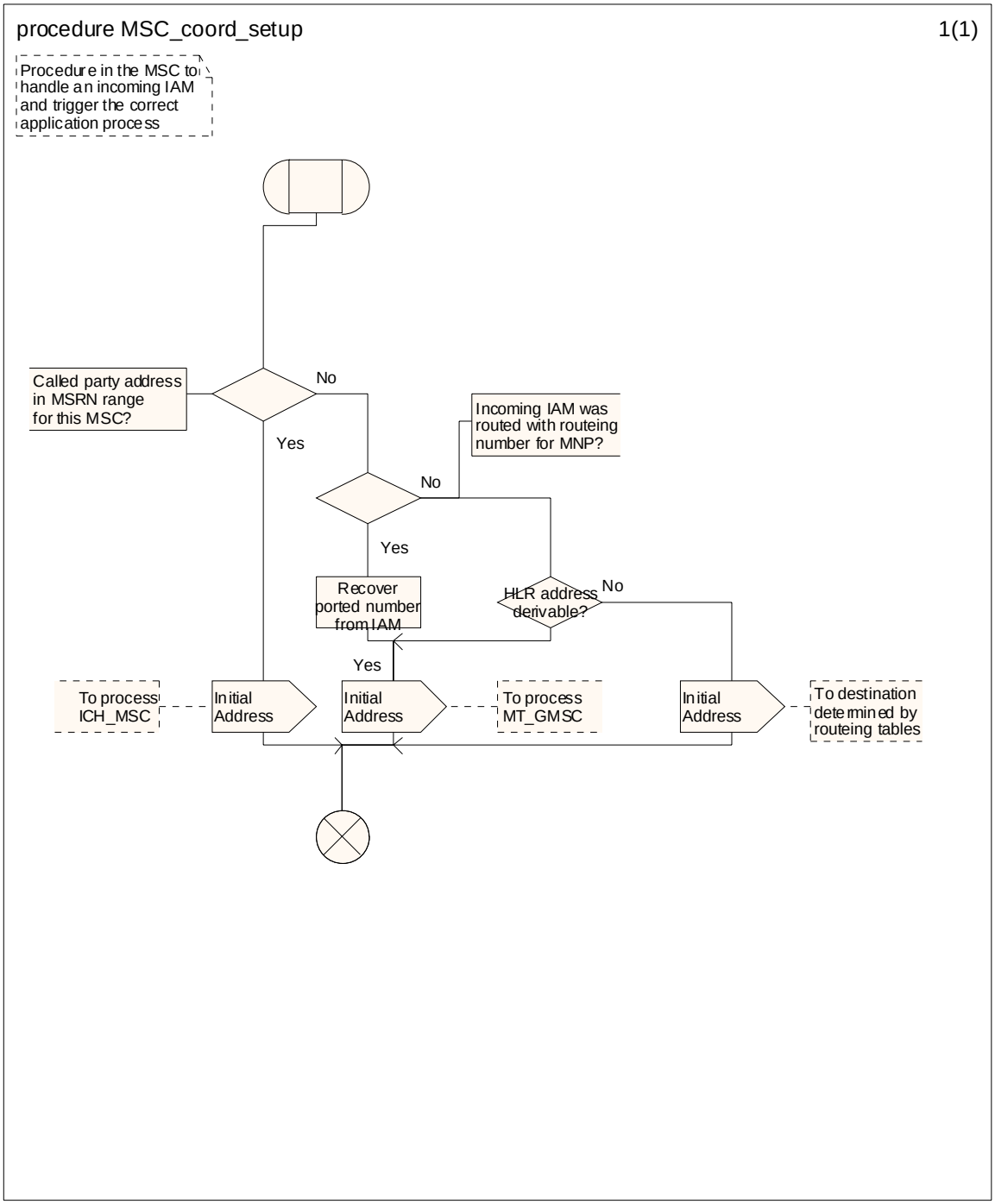
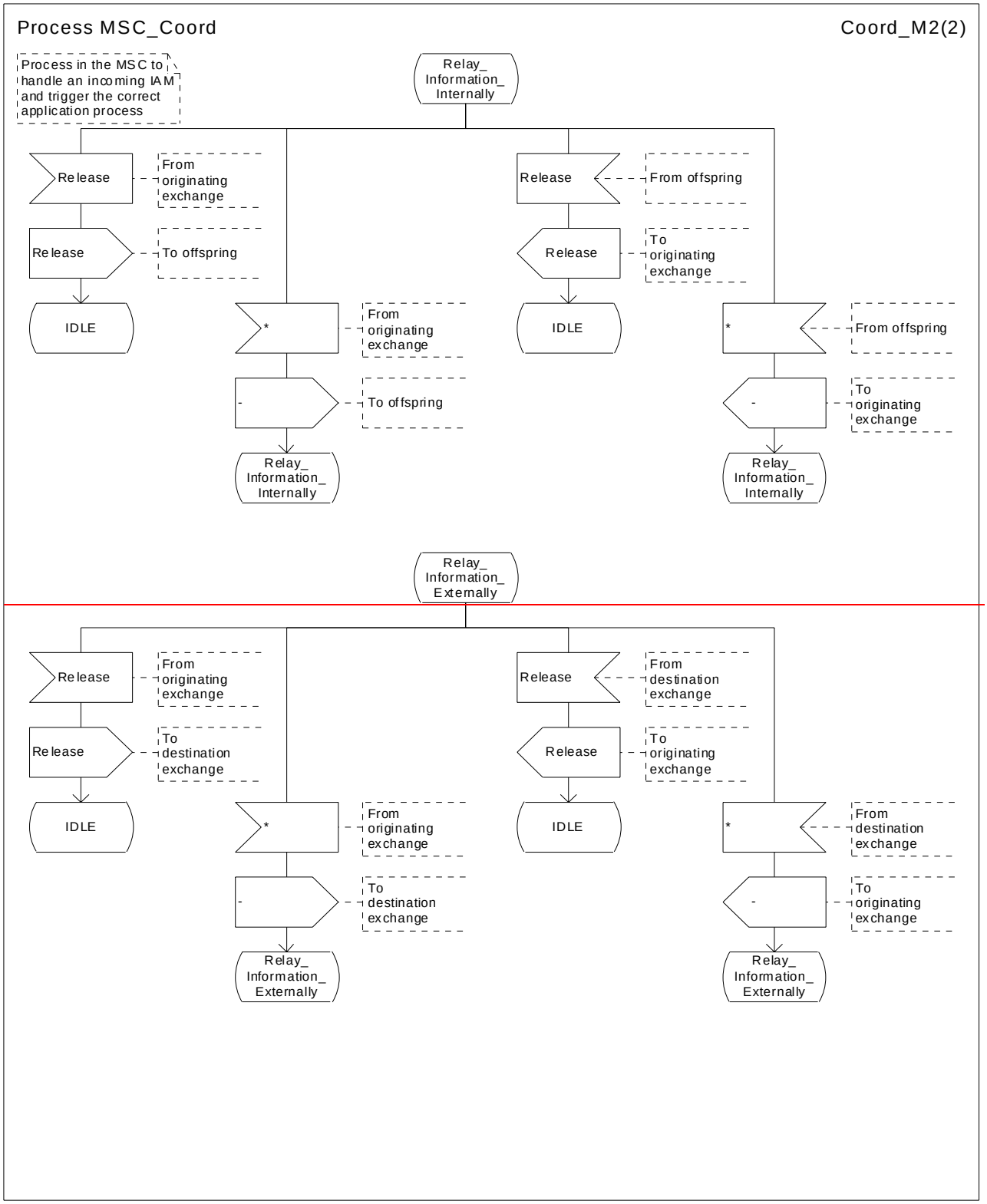


Figure 84a: Procedure MSC_Coord_setup (sheet 1)



~~Figure 84b: Process MSC_Coord (sheet 2)~~

3GPP TSG-CT4 Meeting #27
Cancun, Mexico, 25 – 29 April 2005

Tdoc ⌘C4-050786

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.078** **CR** **770** ⌘ **rev** **1** ⌘ Current version: **6.5.0** ⌘

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

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

Title:	⌘	Trunk Originated CAMEL triggering - SDLs
Source:	⌘	Nokia
Work item code:	⌘	CAMELR7
Date:	⌘	28/4/2005
Category:	⌘	**B**
Release:	⌘	Rel-7

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

Use one of the following releases:
Ph2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)
Rel-7 (Release 7)

Reason for change:	⌘	Trunk Originated CAMEL triggering is to be defined as required by SA1
Summary of change:	⌘	1. A new process is introduced in 23.018: TO_MSC. It handles the trunk originated call. The process calls appropriate CAMEL procedures for trunk triggering. 2. A new procedure CAMEL_TOC_Dialled_Services. It handles the DP3 triggering. 3. A new Procedure CAMEL_TOC_MSC_INIT that handles the DP2 triggering. 4. A new procedure CAMEL_TOC_LEG1_MSC that handles the leg1. For leg2 the existing CF process is used. 5. A new procedure Check_Criteria_for_TOC for criteria check prior to triggering. The same procedure is used for DP2 and DP3. 6. CS_gsmSSF is modified to pass throuh CollectInformation, and request digits in TO call if necessary. 7. CSA_gsmSSF is changed to releay Collect_Information operation.
Consequences if not approved:	⌘	Missing functionality. Misalignment to CAMEL stage 1.

Clauses affected:	⌘	4.5.1, 4.5.x (new subclause), 4.5.7.5, 4.5.7.7

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	23.018 CR 145, 23.078 CR 764, 29.002 CR 765, 29.078 CR 392
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	For DP_Analysed_Information there are at least the following possibilities: 1. Collect all digits before triggering. The IDP may indicate that the called number is complete and/or the functionality of CollectInformation operation is not supported. For foreign numbers the completion detection may be based on inter-digit timer. This is vendor specific. 2. MSC collects some digits and indicates in IDP that CollectInformation operation is not supported. 3. MSC collects some digits and IDP indicates that CollectInformation operation is supported. Open issue: - C4 should decide whether to use TO-CSI, N-CSI or e.g. TD-CSI for TDP3/dialled services triggering. It is also to be decided whether dialled services should open a new and separate CAP dialogue like in MO calls. The current CR uses TO-CSI for trunk originating dialled services.

- Modified section -

4.5 Procedures for CAMEL

The SDLs in the present document illustrate how CAMEL modifies the normal call handling. They do not attempt to show all the details of call handling in nodes that support CAMEL. Relevant parts of 3GPP TS 23.018 [12] apply in addition to these SDLs. For example, some inputs leading to unsuccessful call attempts are not shown on these diagrams - corresponding clauses in 3GPP TS 23.018 [12] apply.

Note that in some SDL processes and procedures the Release information flow may be sent on both an access interface and an inter-switch interface. If the message is sent on a UNI, its effect is the same as a Release transaction information flow.

The text in this clause is a supplement to the definition in the SDL diagrams; it does not duplicate the information in the SDL diagrams.

4.5.1 Overall SDL architecture

The following mapping from the SDL procedures to the Intelligent Network concepts apply:

SDL process	Description	SDL process specification
CSA_gsmSSF	Call Segment Association (CSA). The CSA SDL process distributes the CAP operations to the appropriate Call Segment(s).	3GPP TS 23.078
CS_gsmSSF	Call Segment (CS). Controls one or more BCSMs.	3GPP TS 23.078
OCH_MSC	O-BCSM in VMSC for Mobile Originating call controlling both Leg 1 and Leg 2. If CAP Disconnect Leg (leg 2) is received at the initial detection point (Collected_Info), then the call is not routed to the destination and the process calls the procedure CAMEL_OCH_LEG1_MSC to control Leg 1. If Answer is received, the process spawns the child process CAMEL_OCH_LEG2_MSC to control Leg 2 and calls the procedure CAMEL_OCH_LEG1_MSC to control Leg 1. The handling of the legs after answer is completely separate.	3GPP TS 23.018
MT_GMSC	T-BCSM in the GMSC controlling both Leg 1 and Leg 2. If CAP Disconnect Leg (leg 2) is received at the initial detection point (Terminating_Attempt_Authorised), then the call is not routed to the destination and the process spawns the child process CAMEL_MT_LEG1_GMSC to control Leg 1. The process MT_GMSC terminates. If Answer is received, the process spawns the child process CAMEL_MT_LEG1_GMSC to control Leg 1 and calls the procedure CAMEL_MT_LEG2_GMSC to control Leg 2. The handling of the legs after answer is completely separate.	3GPP TS 23.018
MT_CF_MSC	O-BCSM in the redirecting MSC for Call Forwarding supplementary service, or Call Deflection supplementary service, or for CAMEL-based call forwarding. This process controls both Leg 1 and Leg 2. If CAP Disconnect Leg (leg 2) is received at the initial detection point (Collected_Info), then the call is not routed to the destination and the process calls the procedure CAMEL_MT_CF_LEG1_MSC to control Leg 1. If Answer is received, the process spawns the child process CAMEL_MT_CF_LEG2_MSC to control Leg 2 and calls the procedure CAMEL_MT_CF_LEG1_MSC to control Leg 1. The handling of the legs after answer is completely separate.	3GPP TS 23.018
ICH_MSC	T-BCSM in the VMSC controlling both Leg 1 and Leg 2. If CAP Disconnect Leg (leg 2) is received at the initial detection point (Terminating_Attempt_Authorised), then the call is not routed to the destinationn and the process spawns the child process CAMEL_ICH_LEG1_MSC to control Leg 1. The process ICH_MSC terminates. If Answer is received, the process spawns the child process CAMEL_ICH_LEG1_MSC to control Leg 1 and calls the procedure CAMEL_ICH_LEG2_MSC to control Leg 2. The handling of the legs after answer is completely separate.	3GPP TS 23.018

SDL process	Description	SDL process specification
TO_MSC	O-BCSM in the inter-connecting MSC for trunk originated calls. This process controls both Leg 1 and Leg 2. If CAP Disconnect Leg (leg 2) is received at the initial detection point (Collected_Info), then the call is not routed to the destination and the process calls the procedure CAMEL_TOC_LEG1_MSC to control Leg 1. If Answer is received, the process spawns the child process CAMEL_MT_CF_LEG2_MSC to control Leg 2 and calls the procedure CAMEL_TOC_LEG1_MSC to control Leg 1. The handling of the legs after answer is completely separate.	3GPP TS 23.018
Assisting_MSC	The process in the MSC to handle an assist request.	3GPP TS 23.078
CAMEL_ICA_MSC	O-BCSM for gsmSCF initiated new call, or for new party set-up. This process controls the new leg.	3GPP TS 23.078

The following general rules apply:

1 There is only one CSA per CAP dialogue.

2 The CSA controls one or more Call Segments.

3 A Call Segment controls one or more BCSMs. Due to Call Party Handling, legs may be moved from one Call Segment to another and new Call Segments may be created. When legs are moved they take their properties with them, i.e. armed EDPs and pending reports.

4 Legs are not moved between BCSMs.

5 The active legs in the same Call Segment have a voice connection. They hear each other and the same in-band tone and announcements. The following exceptions exist:

- Apply Charging IF: the warning tone associated with the Apply Charging IF is played to a single call party in the Call Segment.

- Play Tone IF: the flexible tone from the Play Tone IF may be played to a single call party in the Call Segment.

The following diagrams shows the overall architecture for the SDL diagrams.

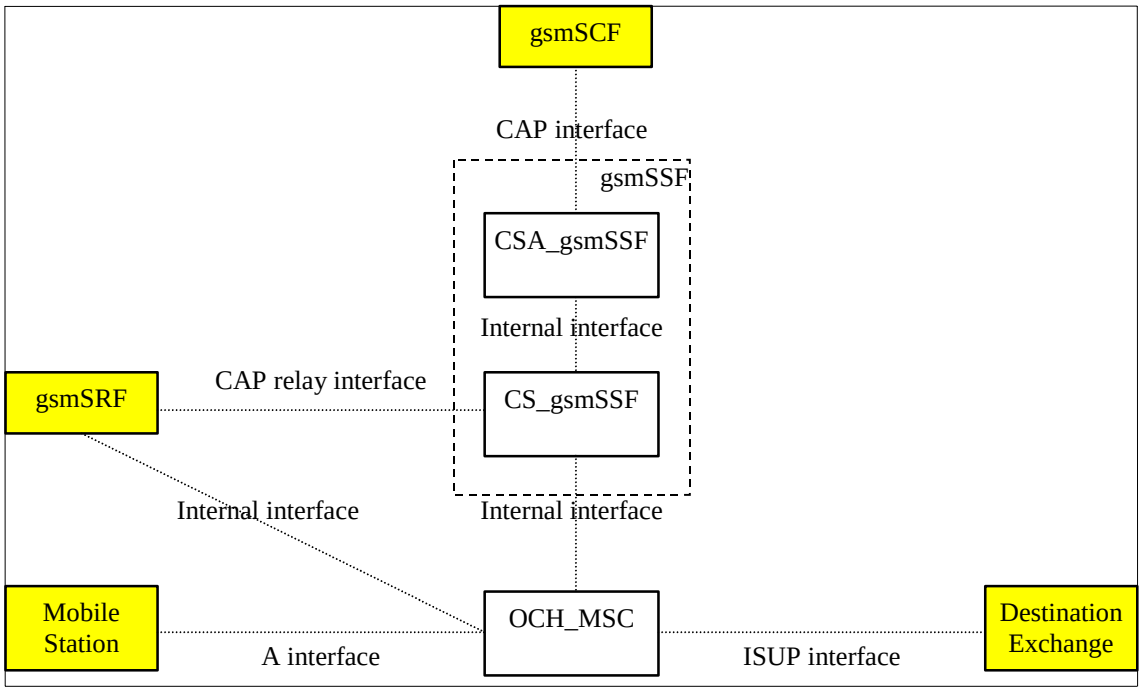


Figure 4.9-1: Outgoing case (gsmSSF relay)

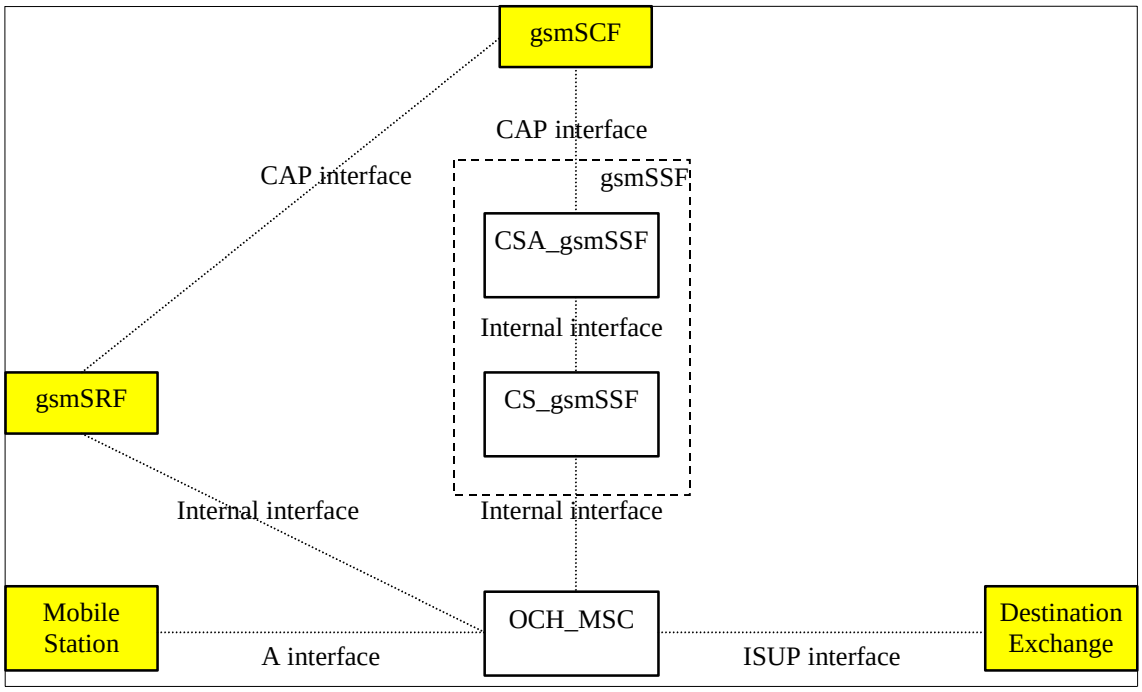


Figure 4.9-2: Outgoing case (direct path gsmSCF to gsmSRF or assist with relay)

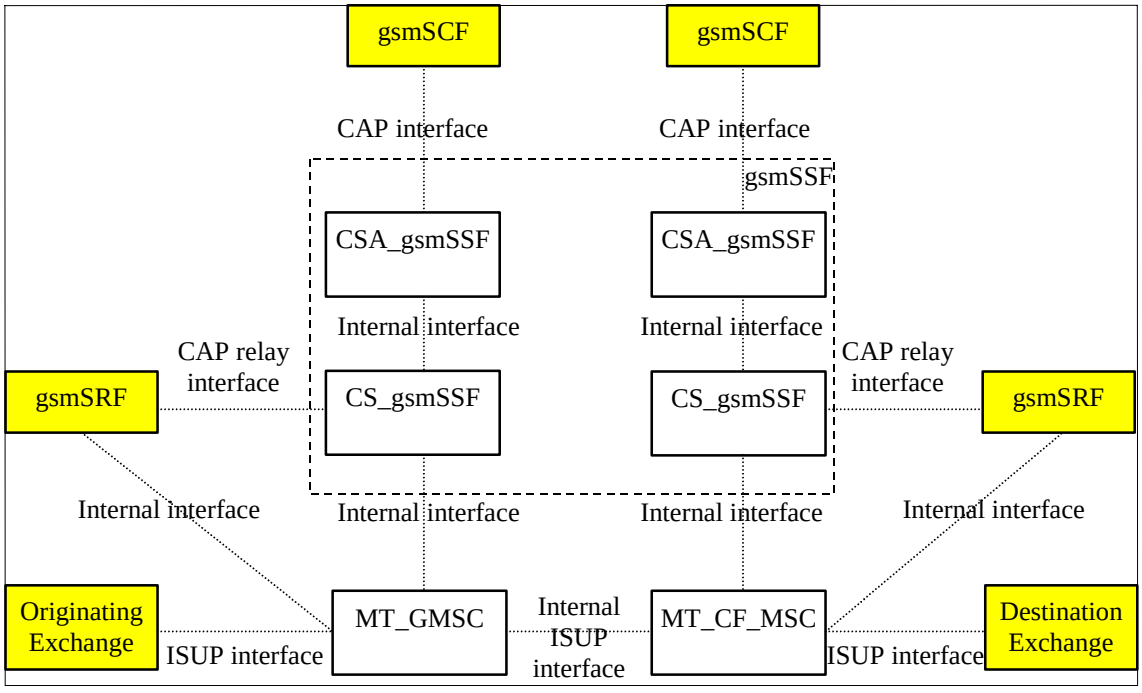


Figure 4.9-3: Terminating GMSC case (gsmSSF relay)

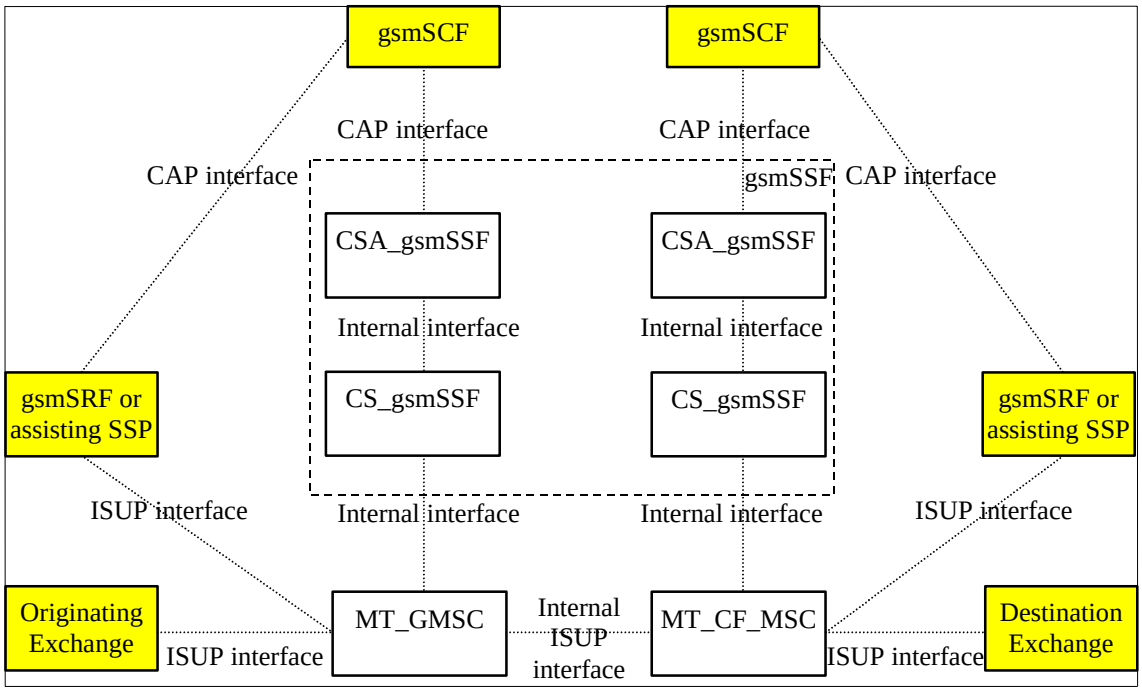
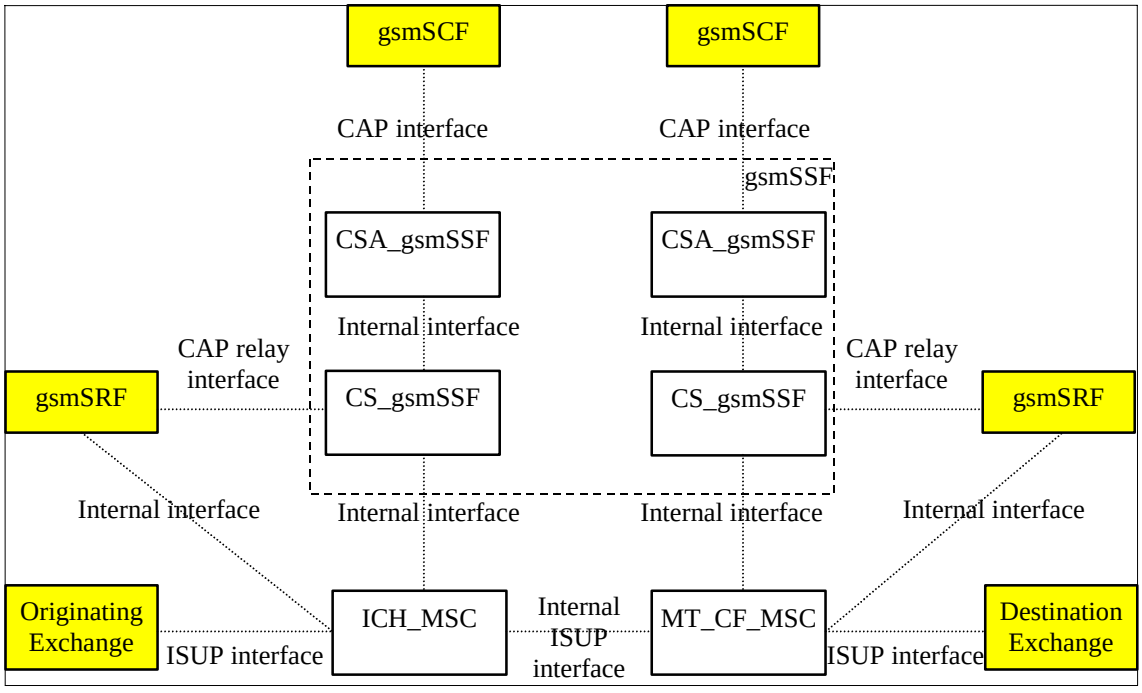
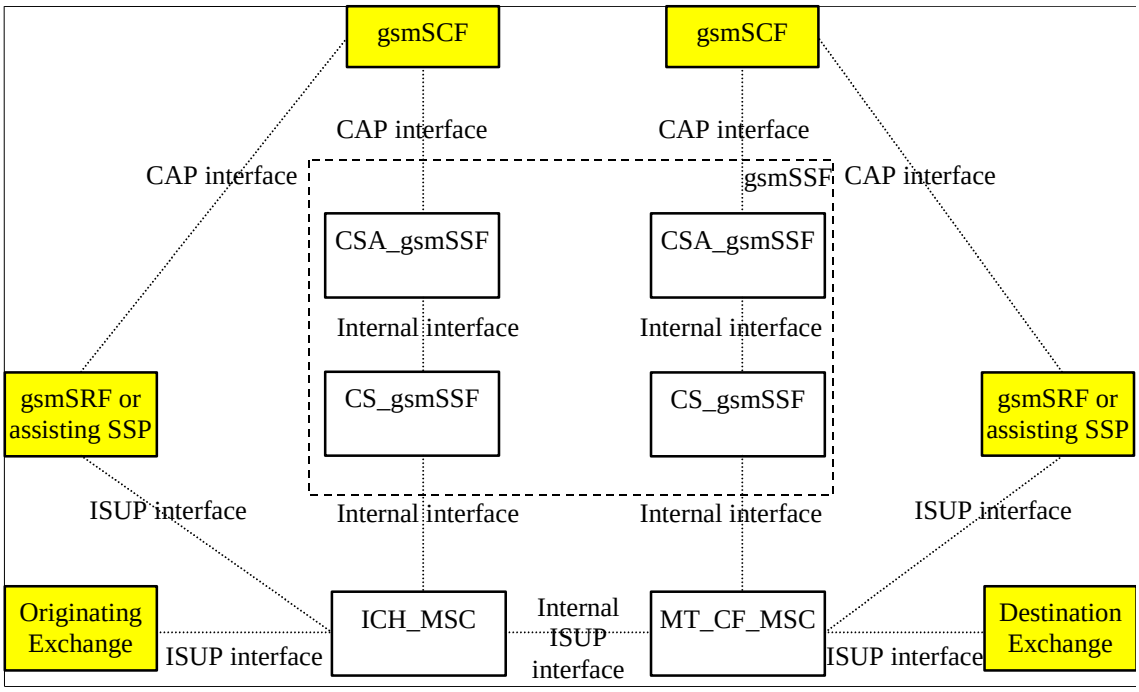


Figure 4.9-4: Terminating GMSC case (direct path gsmSCF to gsmSRF or assist with relay)



NOTE: The ICH_MSC may also be connected via an A interface to the terminating Mobile Station.

Figure 4.9-5: Terminating VMSC case (gsmSSF relay)



NOTE: The ICH_MSC may also be connected via an A interface to the terminating Mobile Station

Figure 4.9-6: Terminating VMSC case (direct path gsmSCF to gsmSRF or assist with relay)

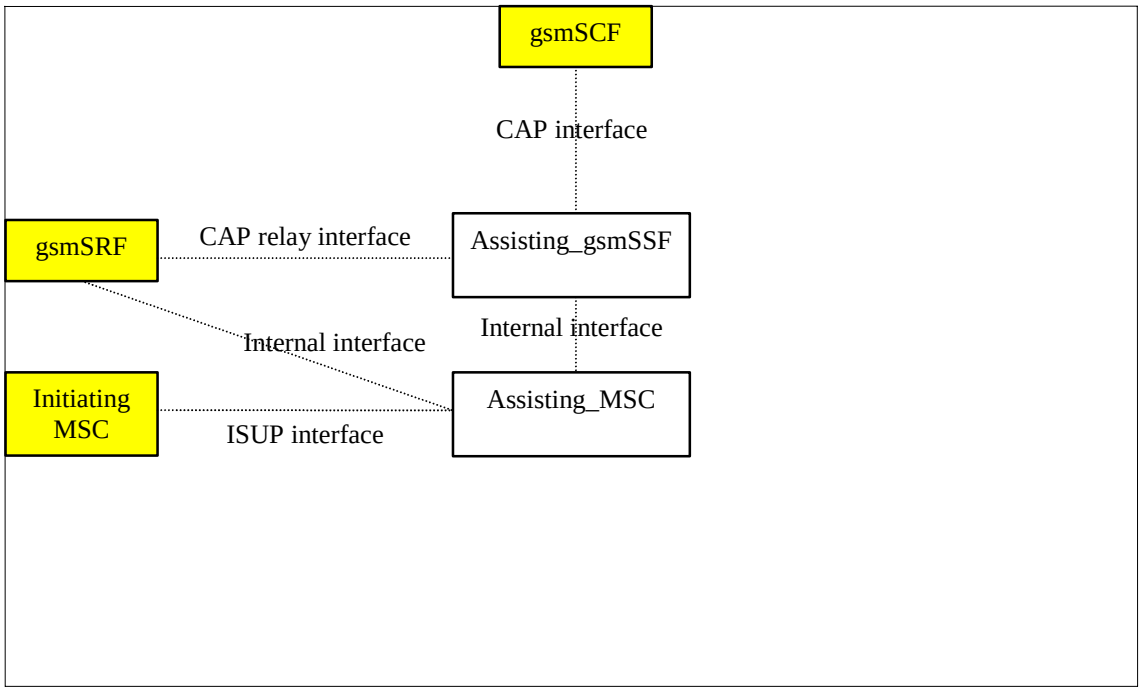


Figure 4.9-7: Assisting case

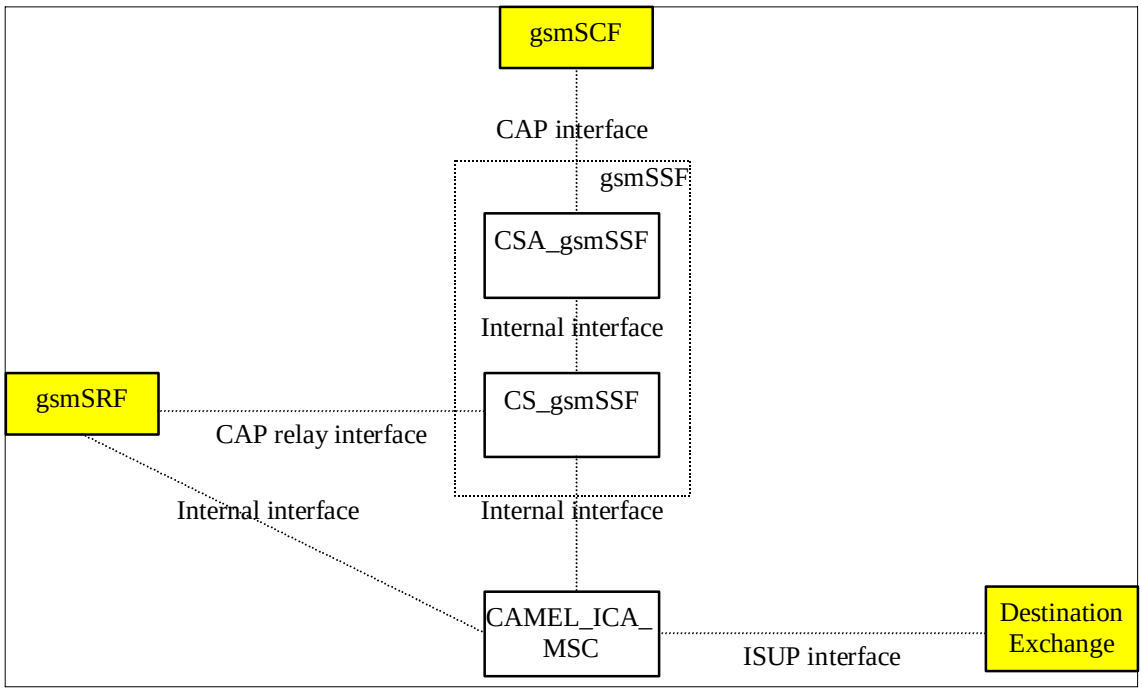


Figure 4.9-8: gsmSCF initiated call case (gsmSSF relay)

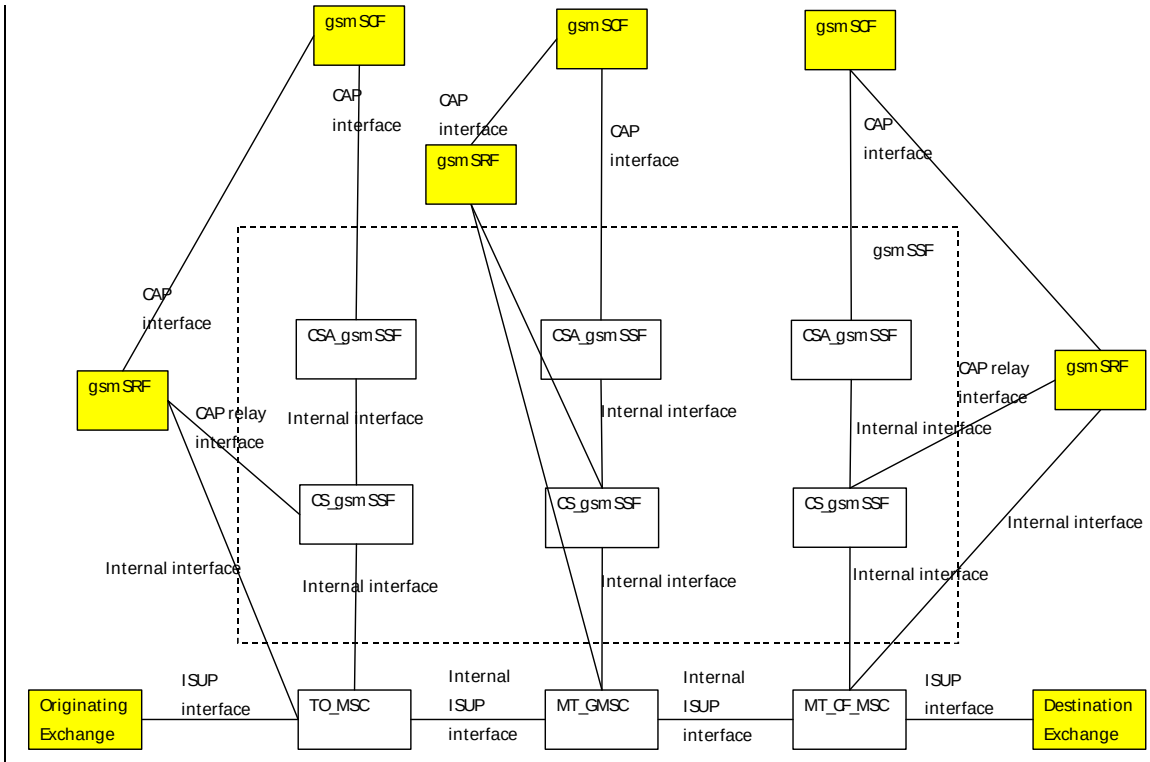


Figure 4.9-x: Trunk Originating case (gsmSSF relay)

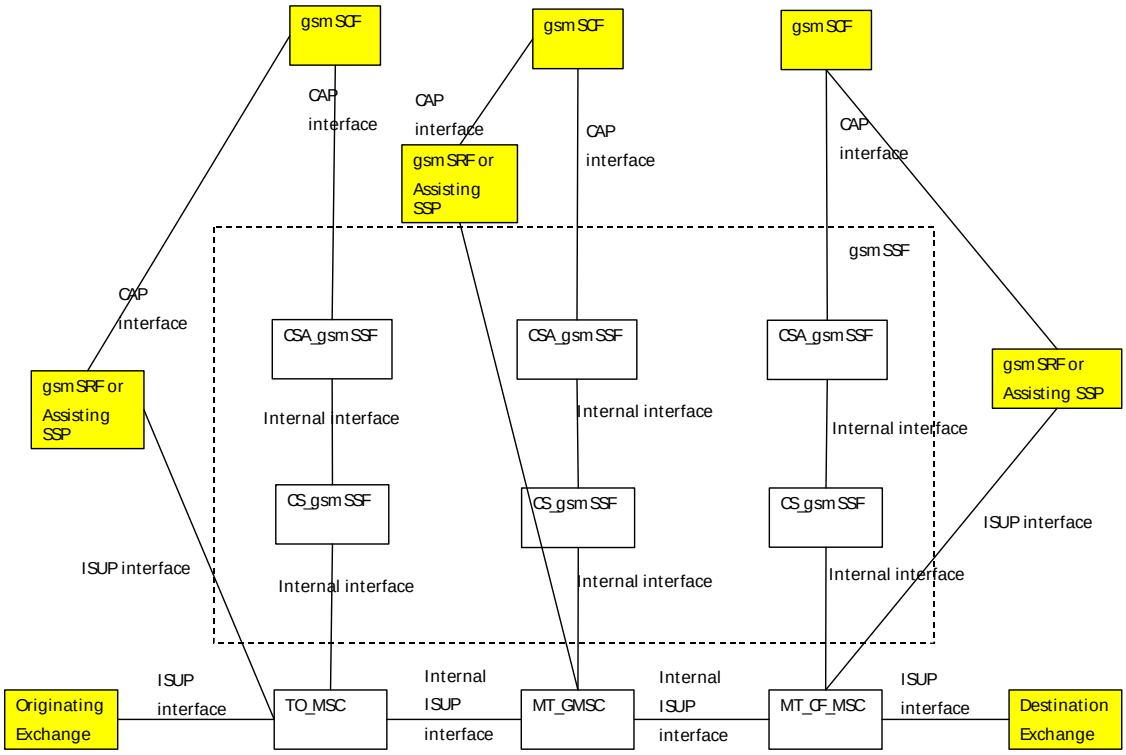


Figure 4.9-y: Trunk Originating case (direct path gsmSCF to gsmSRF or assist with relay)

- Modified section -

4.5.x Handling of trunk originated calls

The handling of forwarded calls in the inter-conecting MSC is specified in 3GPP TS 23.018 [12]. The processes and procedures specific to CAMEL are specified in this subclause.

- Procedure CAMEL_TOC_Dialled_Services;
- Procedure CAMEL_TOC_MSC_INIT;
- Procedure CAMEL_NDS_TOC_INIT;
- Procedure CAMEL_TOC_LEG1_MSC.

The procedure CAMEL_TOC_LEG1_MSC supervises the originating party only. The process CAMEL_MT_CF_LEG2_MSC supervises the called-to party only. Hence, signals from the originating exchange are received by the procedure CAMEL_TOC_LEG1_MSC and signals from the destination exchange are received by the process CAMEL_MT_CF_LEG2_MSC.

4.5.x.1 Procedure CAMEL_TOC_Dialled_Services

Void

4.5.x.2 Procedure CAMEL_TOC_MSC_INIT

Sheet 1: Decision “First procedure call”: The procedure call formal parameter (FPAR) values “First” or “NotFirst” indicate whether the gsmSSF instance has been invoked for this call at the Collected_Information DP.

- First_ The gsmSSF has not been invoked.
- NotFirst: The gsmSSF has been invoked earlier and the gsmSSF is waiting for additional dialling. The gsmSSF may have not triggered a CAP dialogue to gsmSCF.

4.5.x.3 Procedure CAMEL_NDS_TOC_INIT

Sheet 1: Decision “First procedure call”: The procedure call formal parameter (FPAR) values “First” or “NotFirst” indicate whether the gsmSSF instance has been invoked for this call at Analysed_Information DP. The dialled services invoke a different instance of gsmSSF than at the Collected_Information DP.

- First_ The gsmSSF has not been invoked.
- NotFirst: The gsmSSF has been invoked earlier and the gsmSSF is waiting for additional dialling. The gsmSSF may have not triggered a CAP dialogue to gsmSCF.

4.5.x.4 Procedure CAMEL_TOC_LEG1_MSC

Void

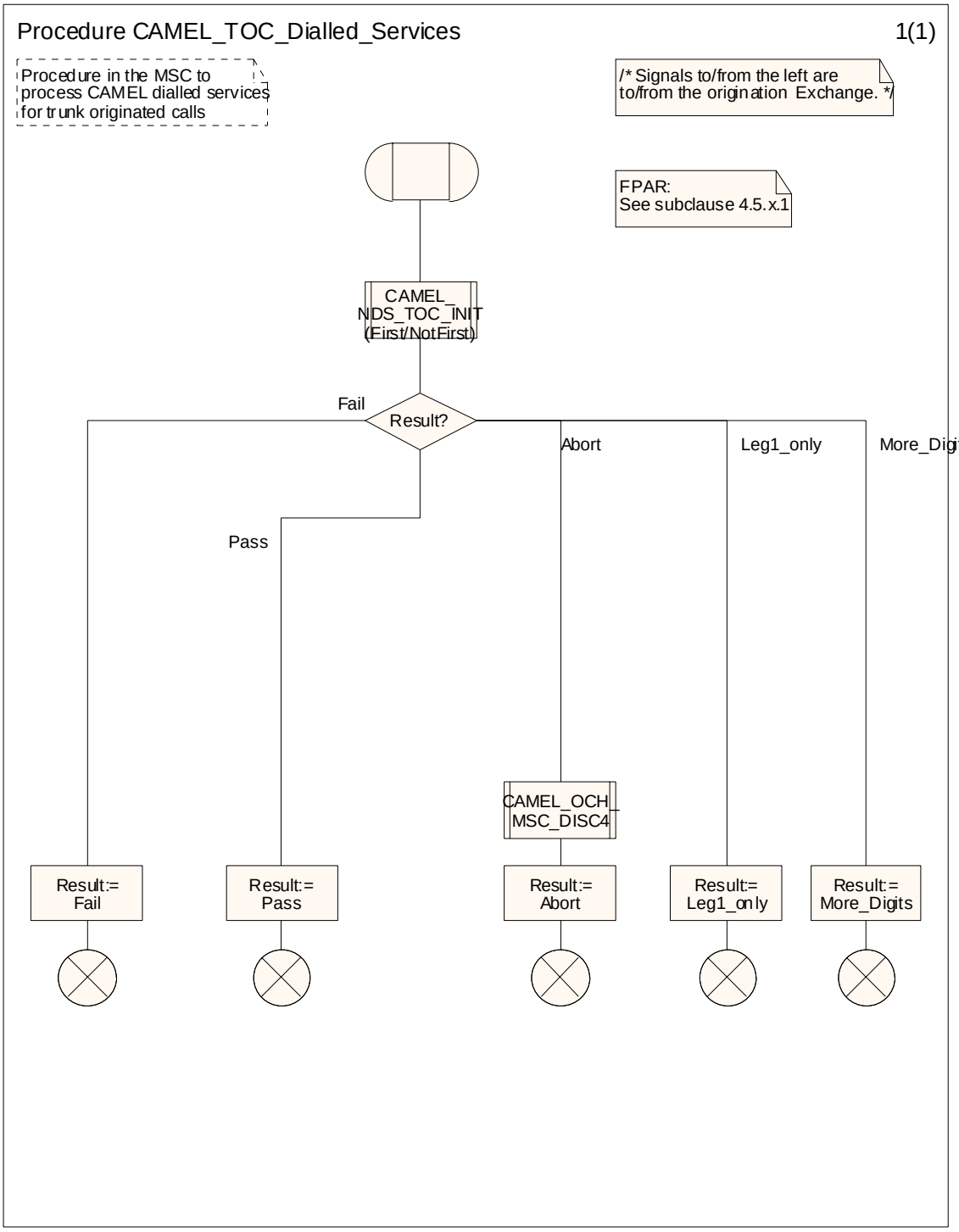


Figure 4.x-1: Procedure CAMEL_TOC_Dialled_Services (sheet 1)

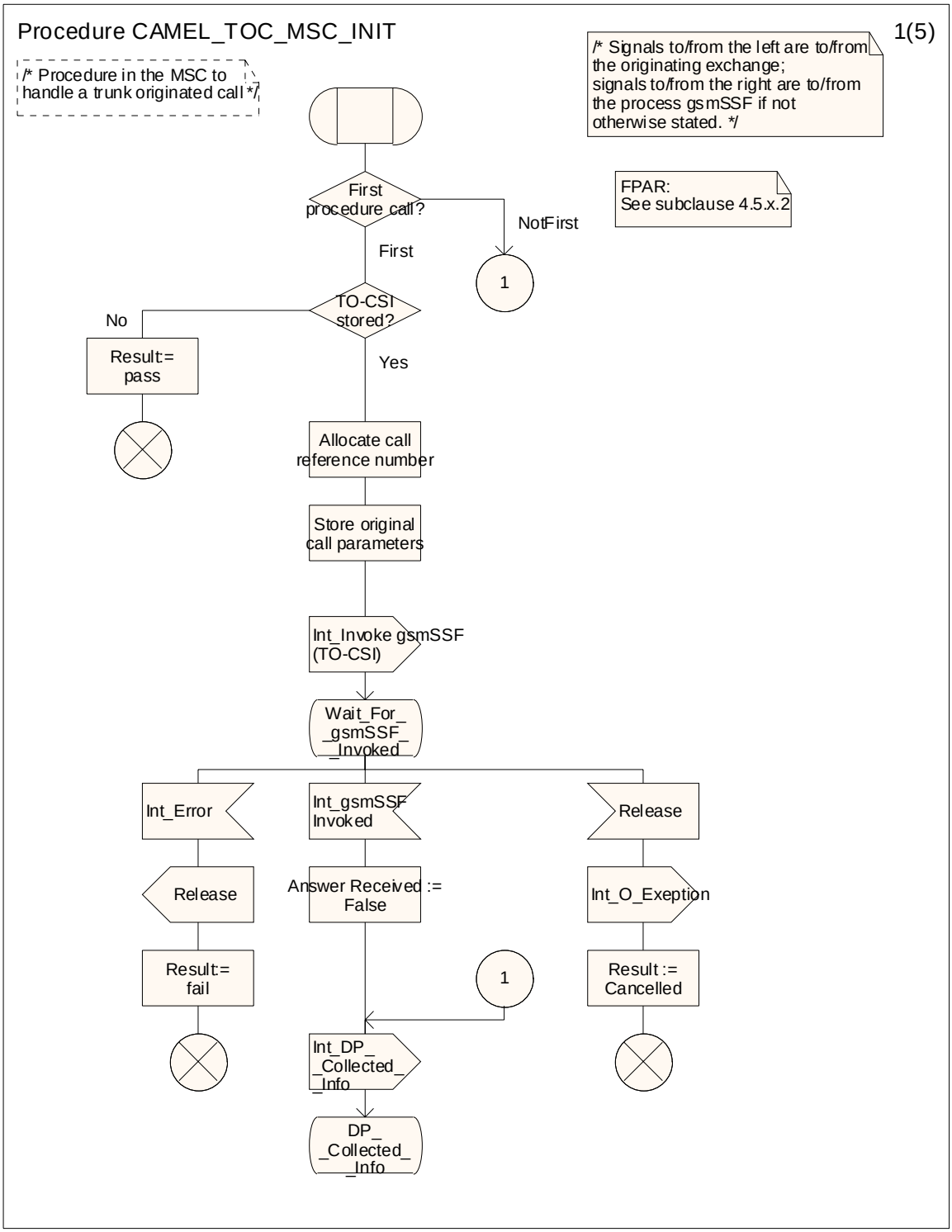


Figure 4.y-1: Procedure CAMEL_TOC_MSC_INIT (sheet 1)

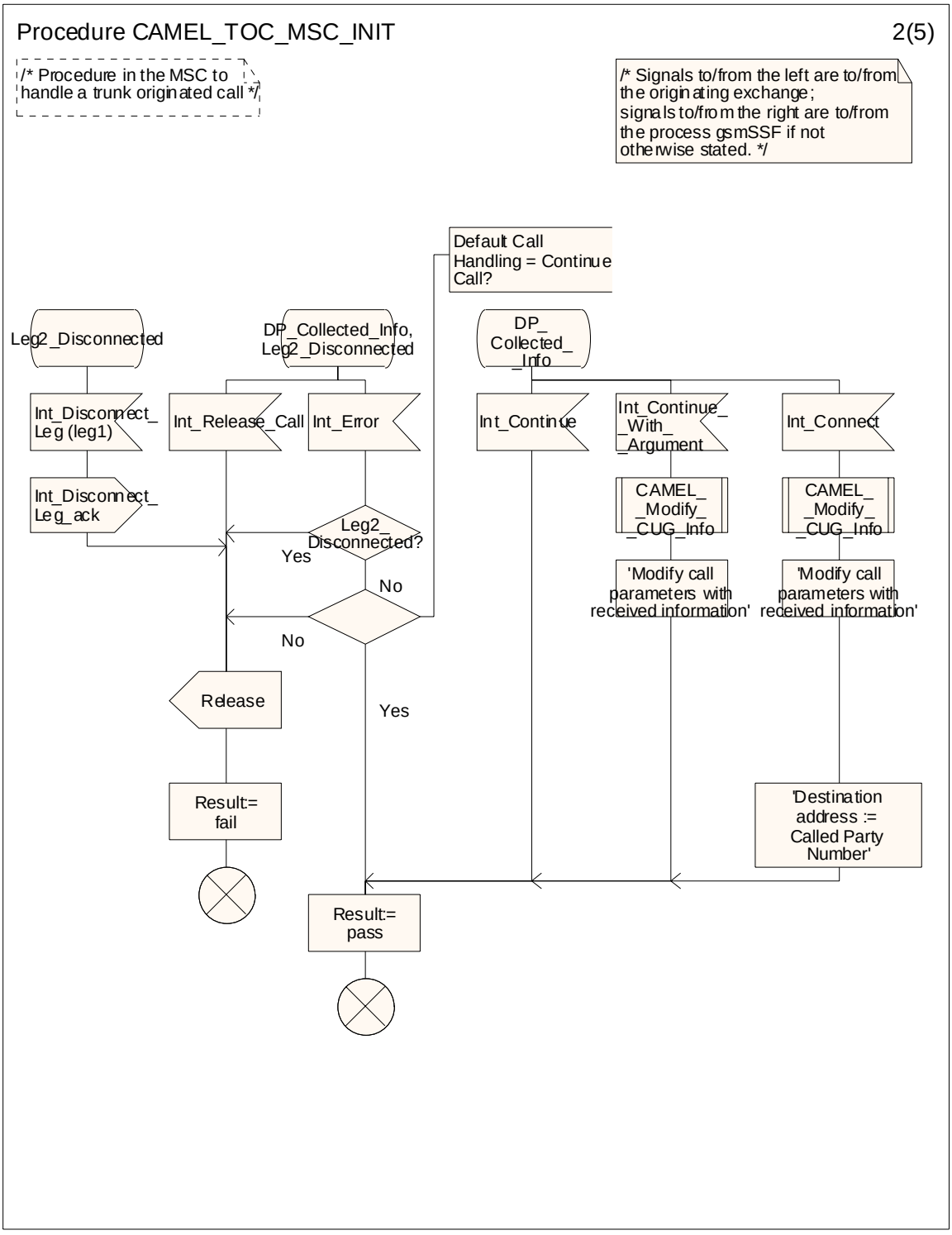


Figure 4.y-1: Procedure CAMEL_TOC_MSC_INIT (sheet 2)

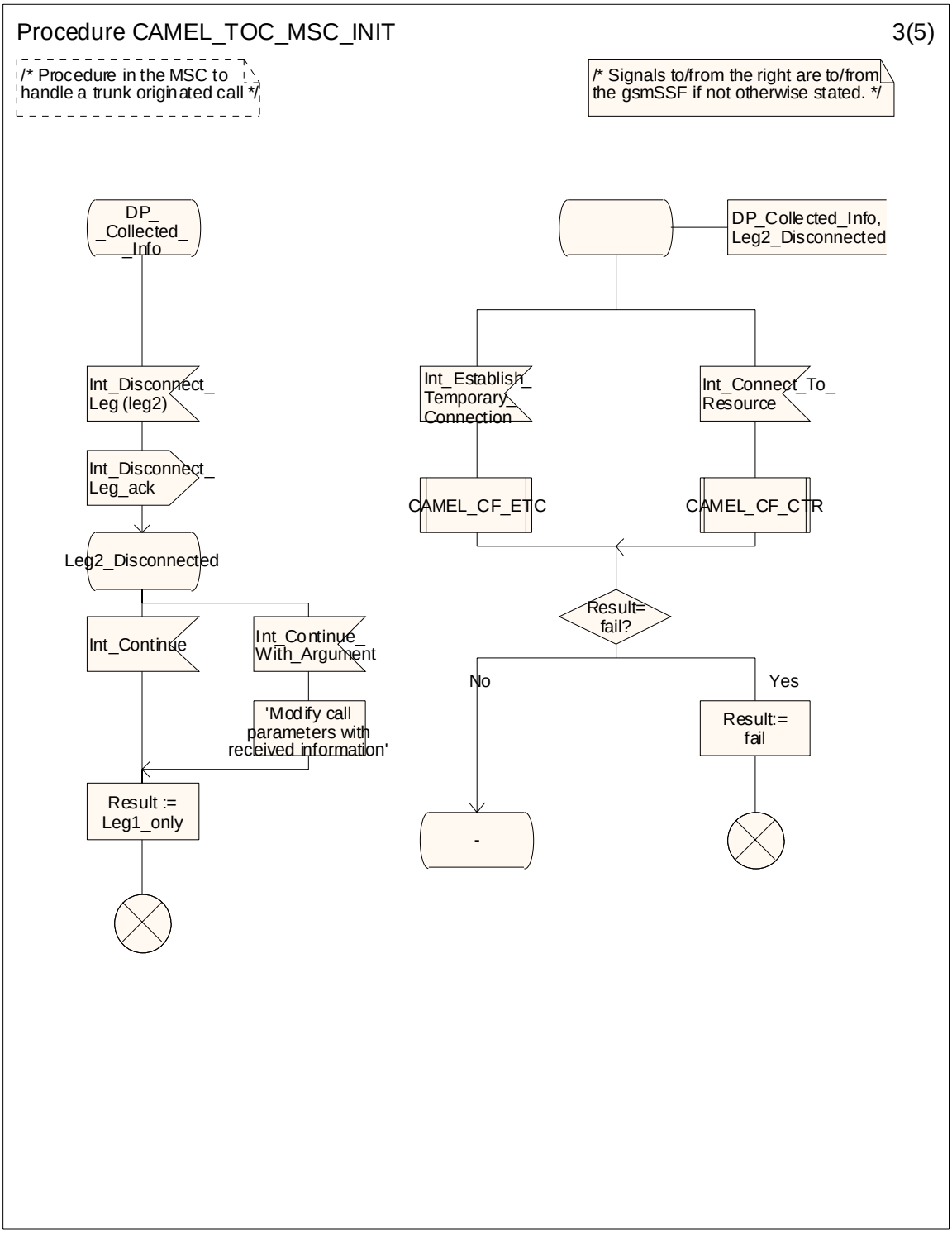


Figure 4.y-1: Procedure CAMEL_TOC_MSC_INIT (sheet 3)

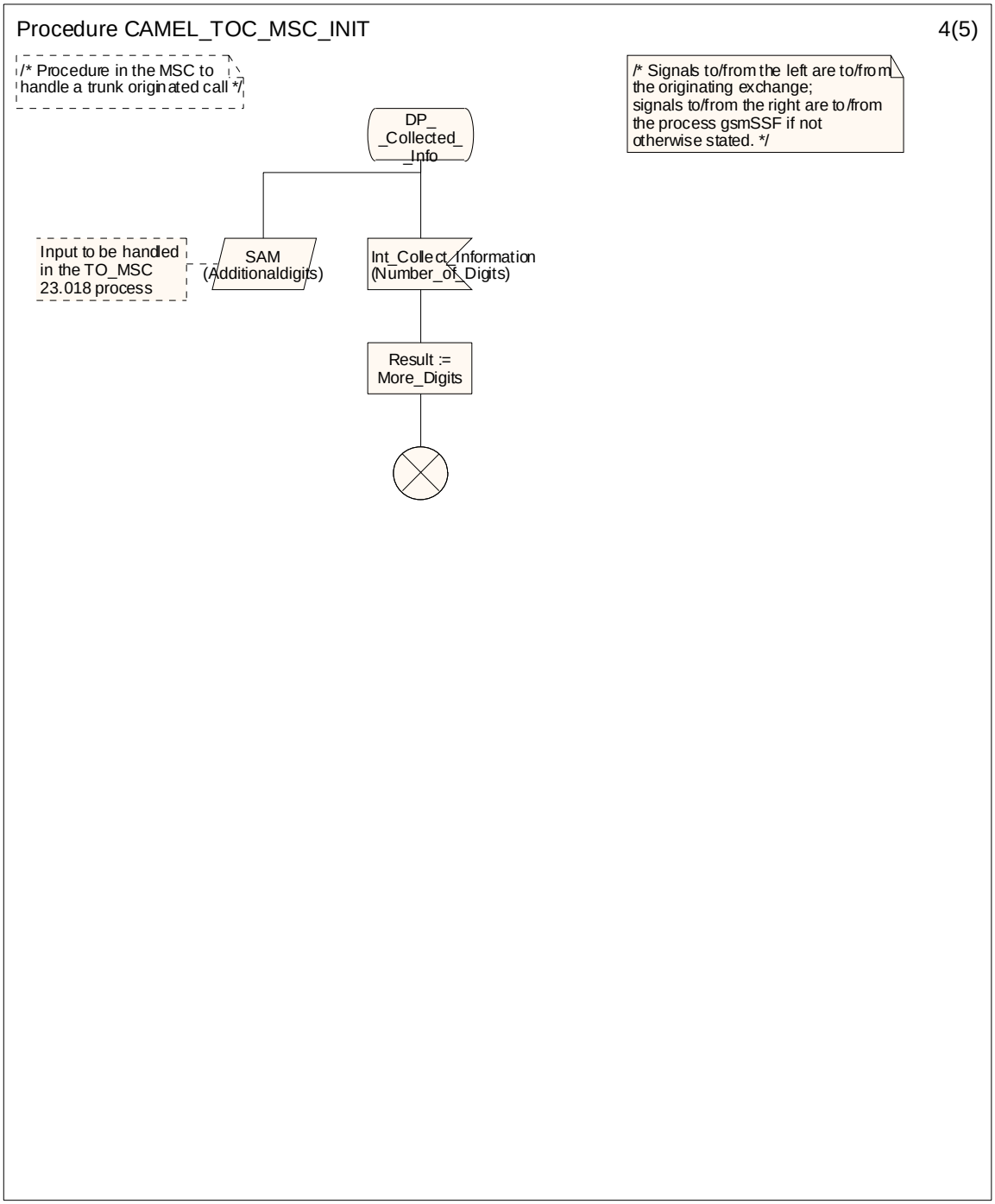


Figure 4.y-1: Procedure CAMEL_TOC_MSC_INIT (sheet 4)

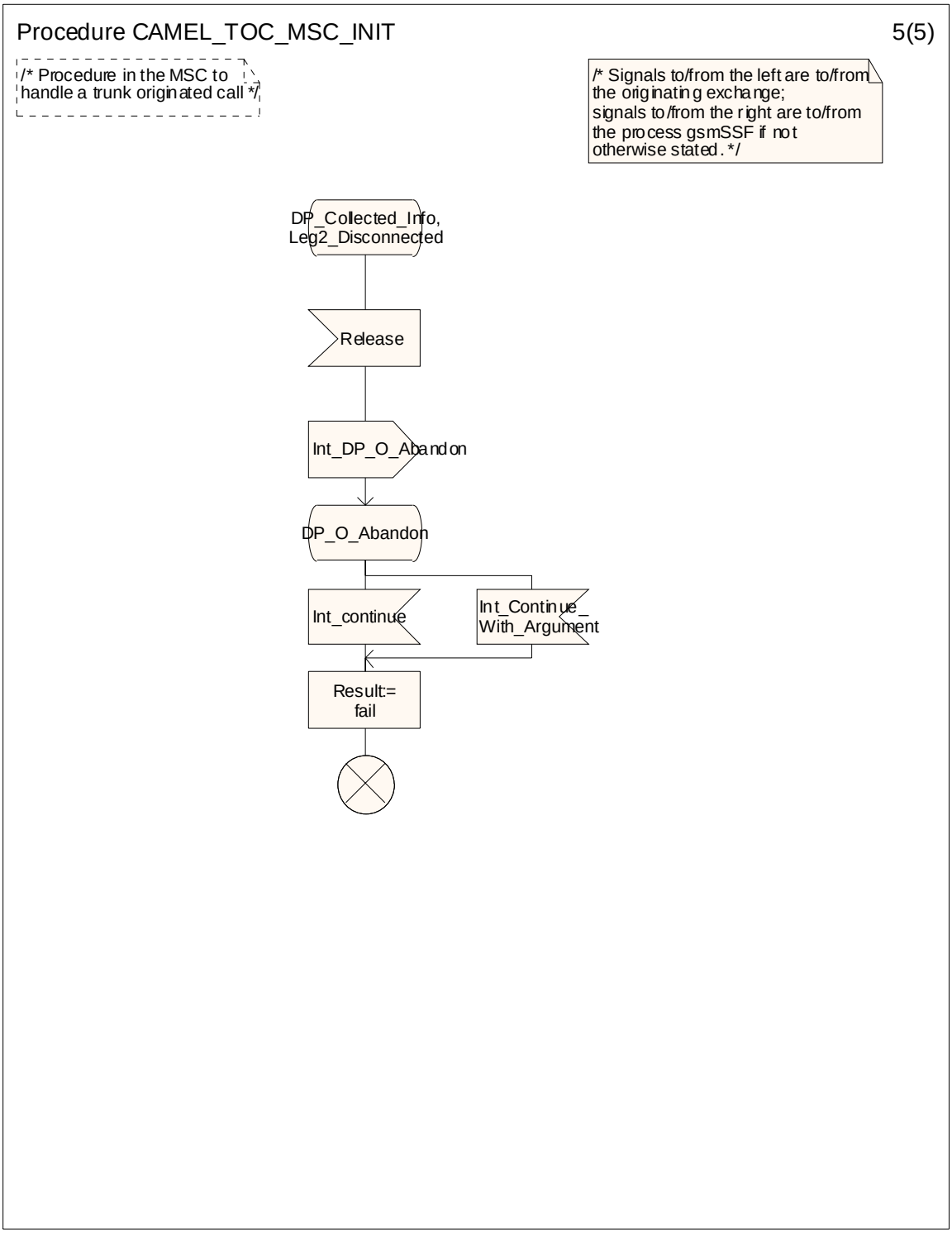


Figure 4.y-1: Procedure CAMEL_TOC_MSC_INIT (sheet 5)

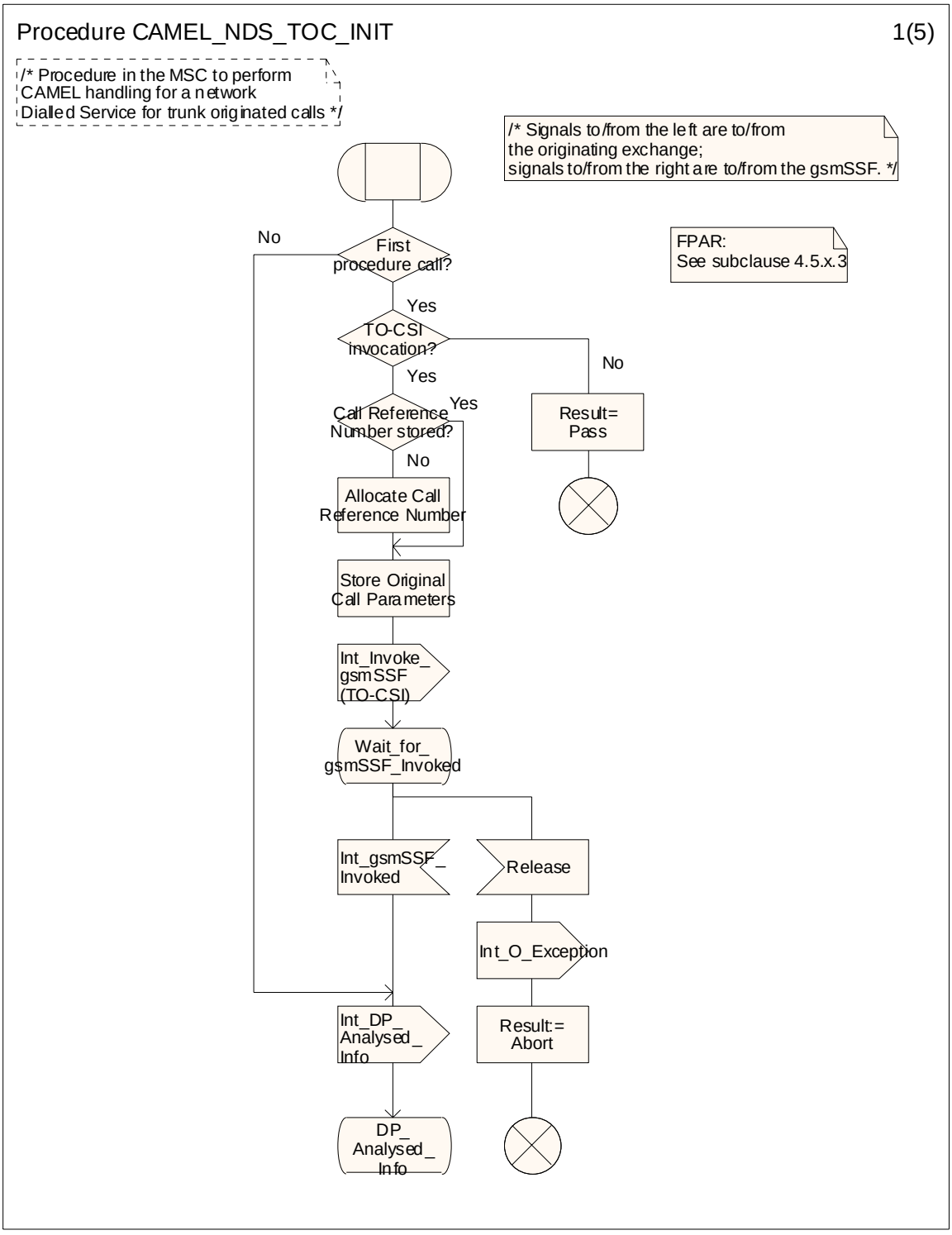


Figure 4.z-1: Procedure CAMEL_NDS_TOC_INIT (sheet 1)

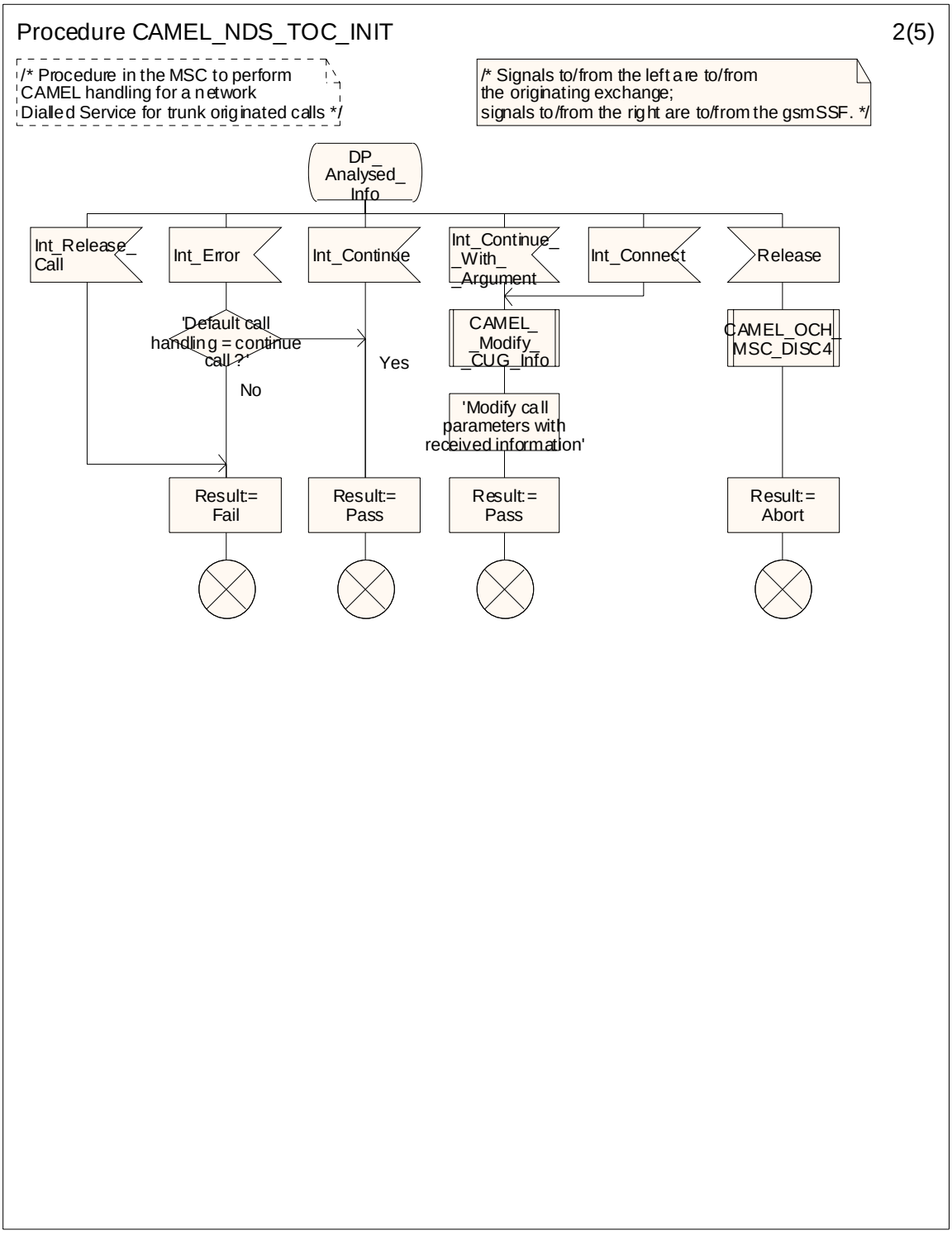


Figure 4.z-1: Procedure CAMEL_NDS_TOC_INIT (sheet 2)

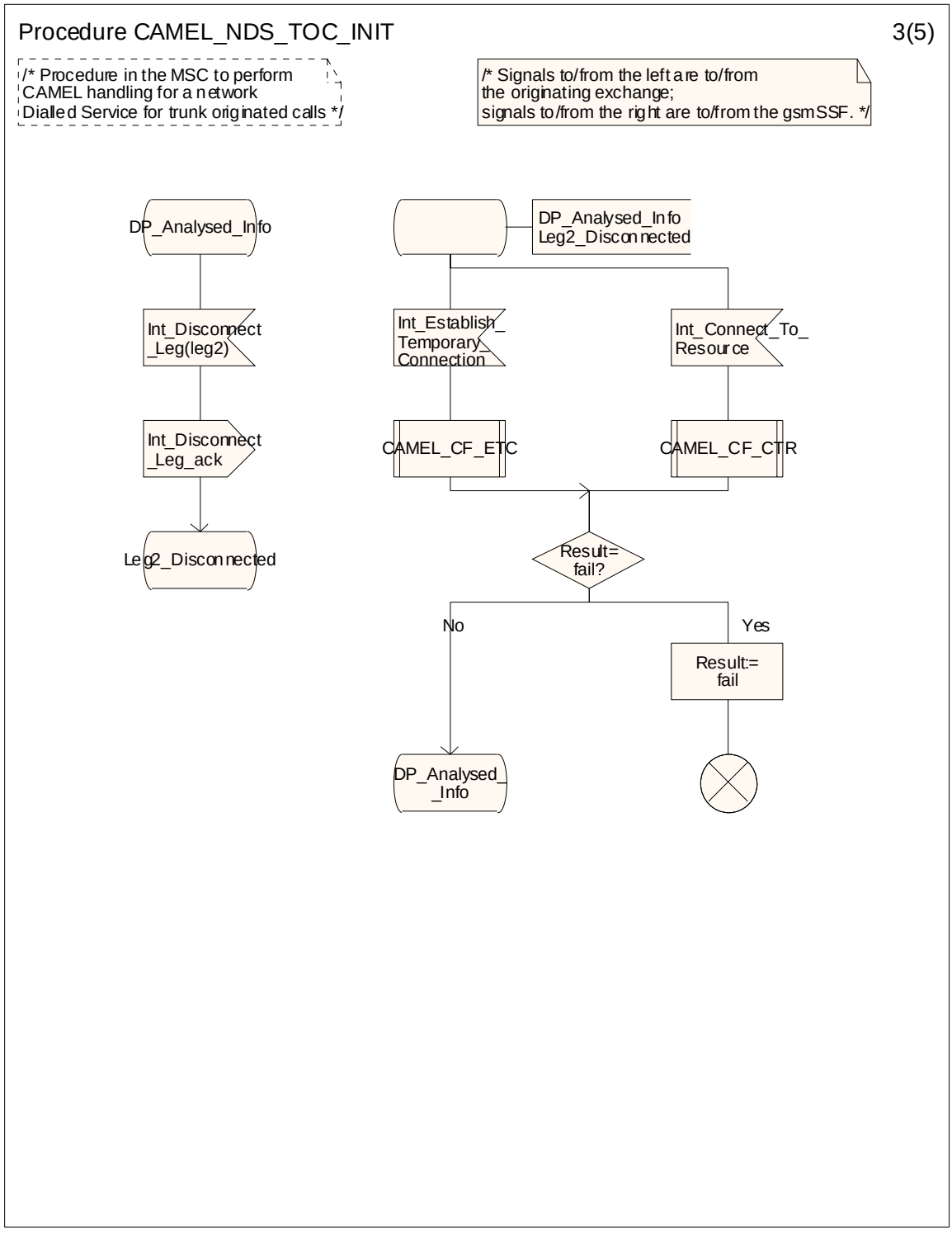


Figure 4.z-1: Procedure CAMEL_NDS_TOC_INIT (sheet 3)

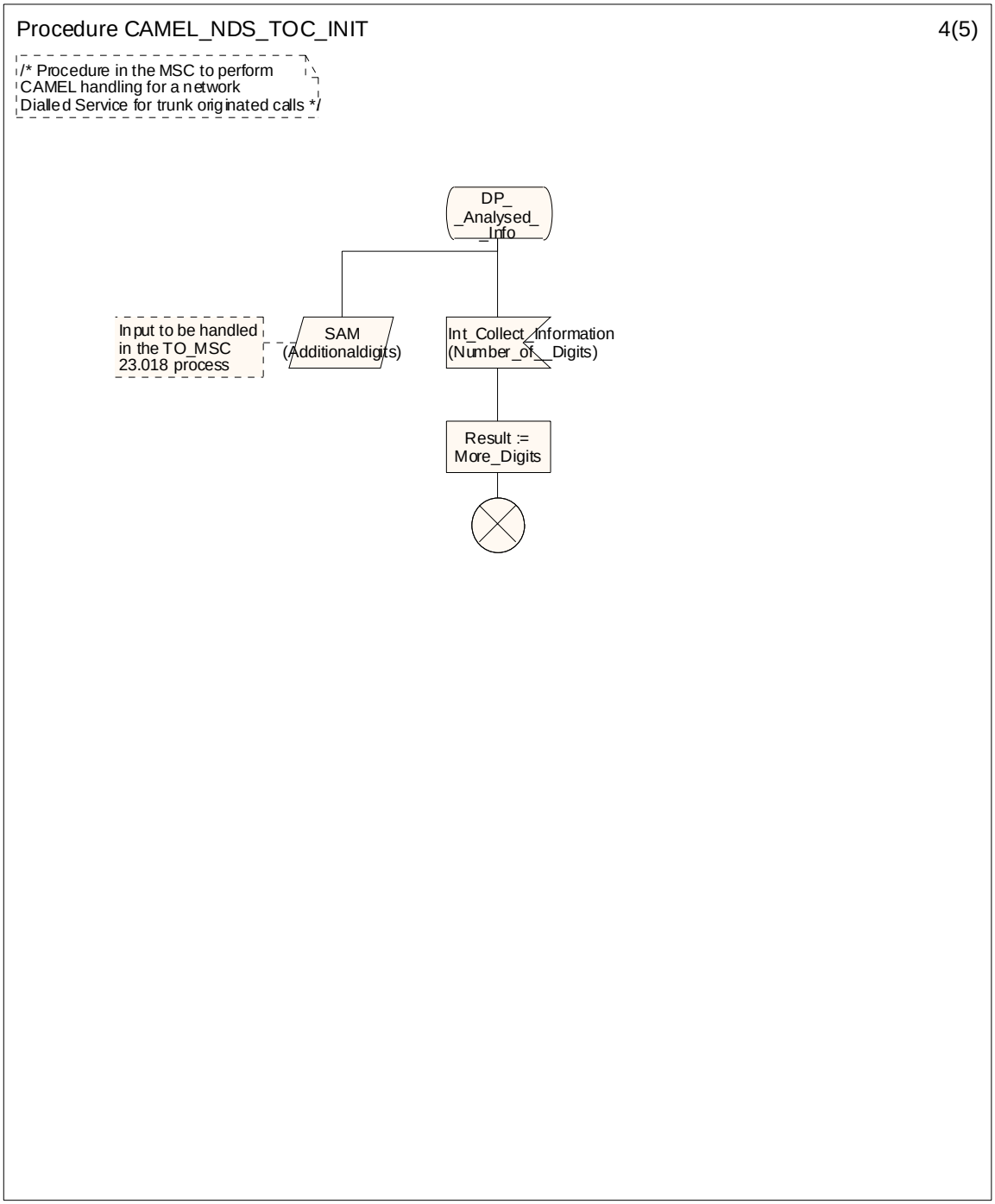


Figure 4.z-1: Procedure CAMEL_NDS_TOC_INIT (sheet 4)

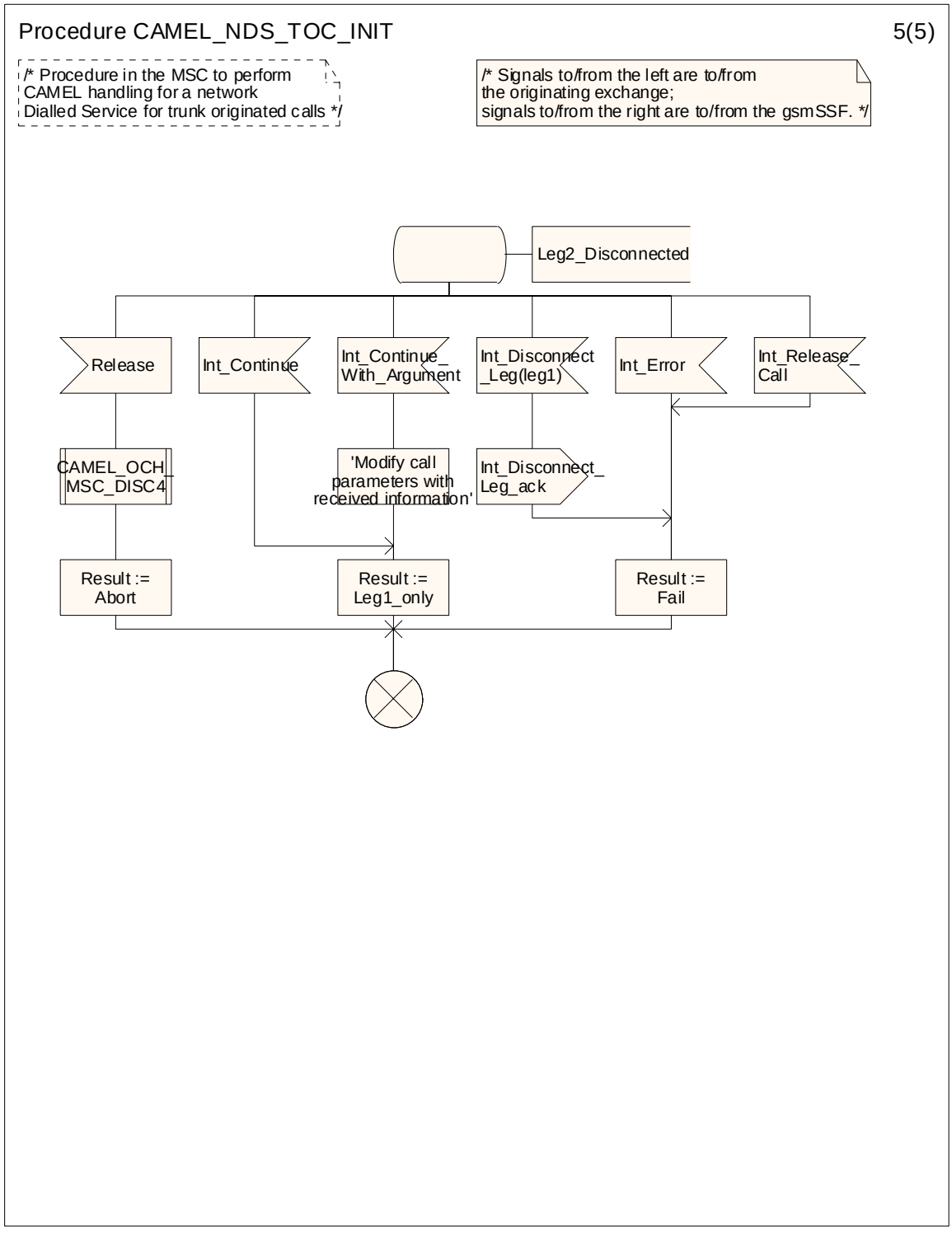


Figure 4.z-1: Procedure CAMEL_NDS_TOC_INIT (sheet 5)

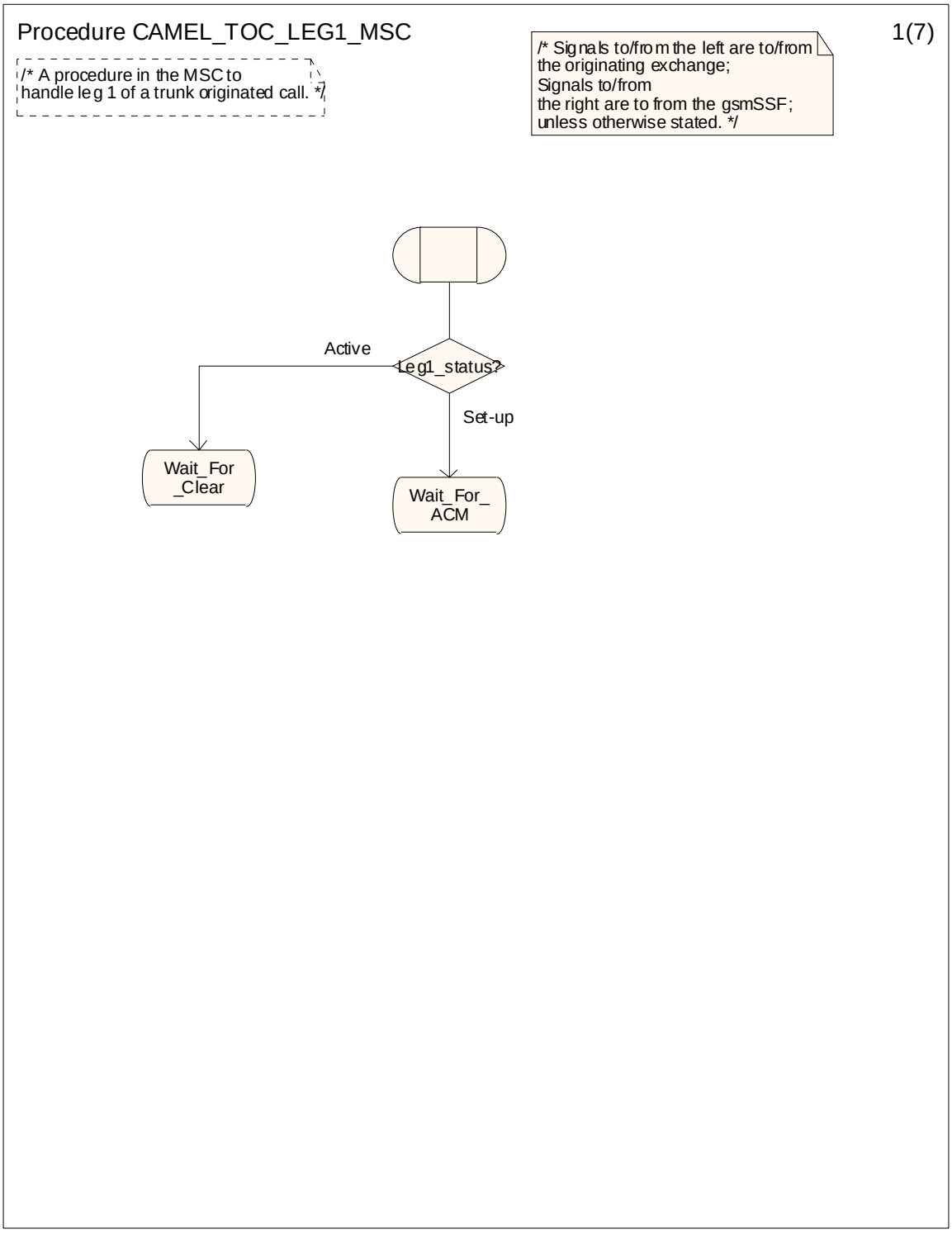


Figure 4.k-1: Procedure CAMEL_TOC_LEG1_MSC (sheet 1)

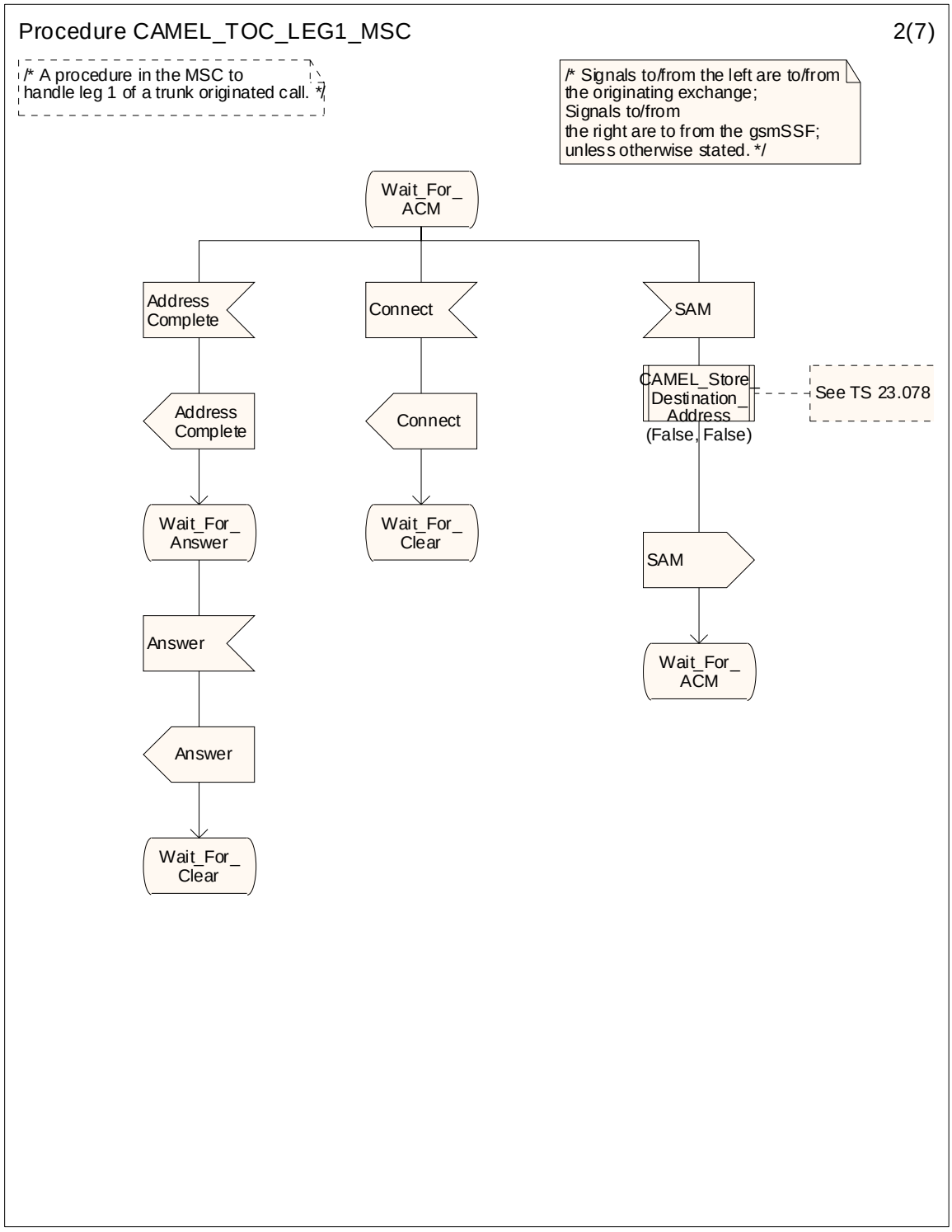


Figure 4.k-1: Procedure CAMEL_TOC_LEG1_MSC (sheet 2)

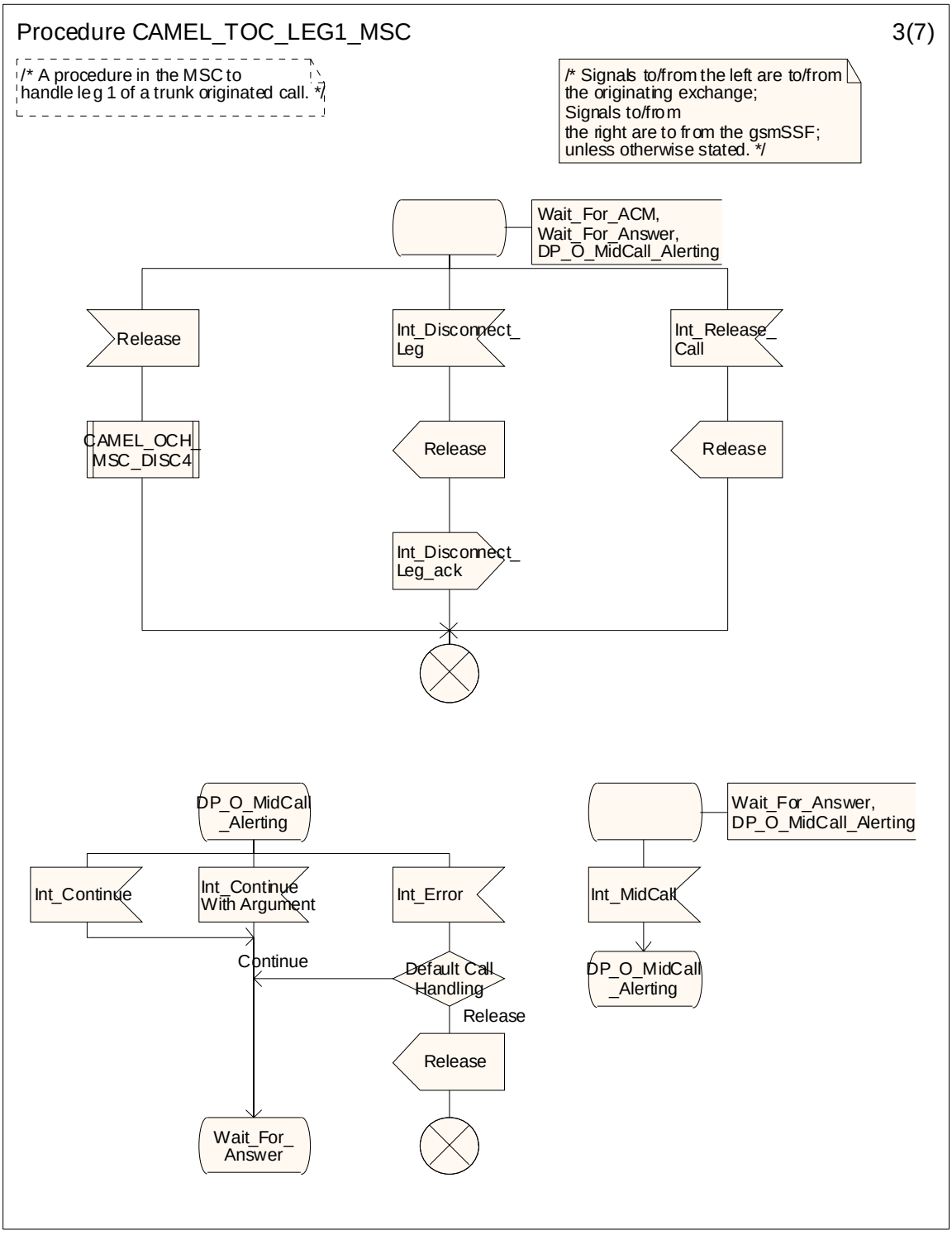


Figure 4.k-1: Procedure CAMEL_TOC_LEG1_MSC (sheet 3)

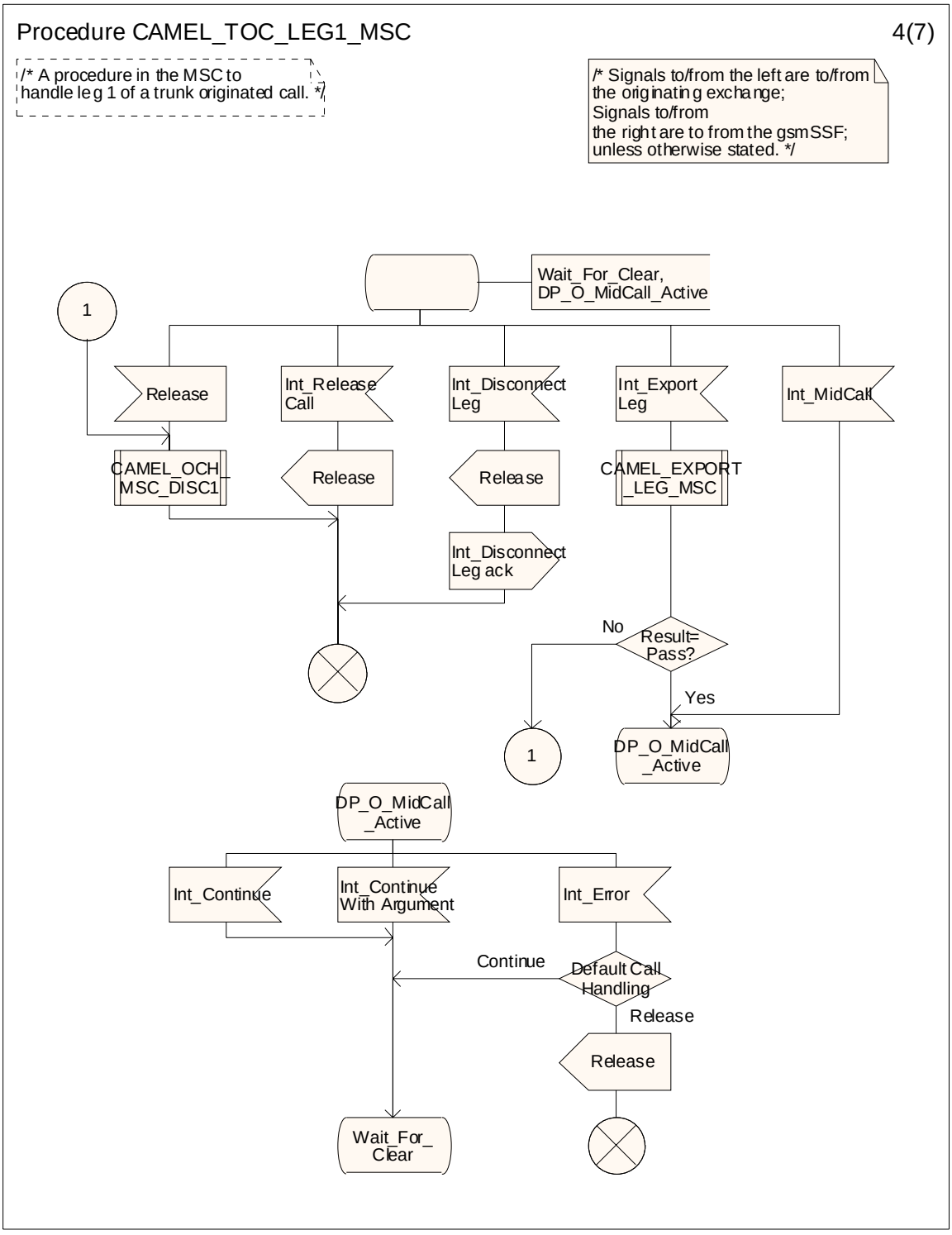


Figure 4.k-1: Procedure CAMEL_TOC_LEG1_MSC (sheet 4)

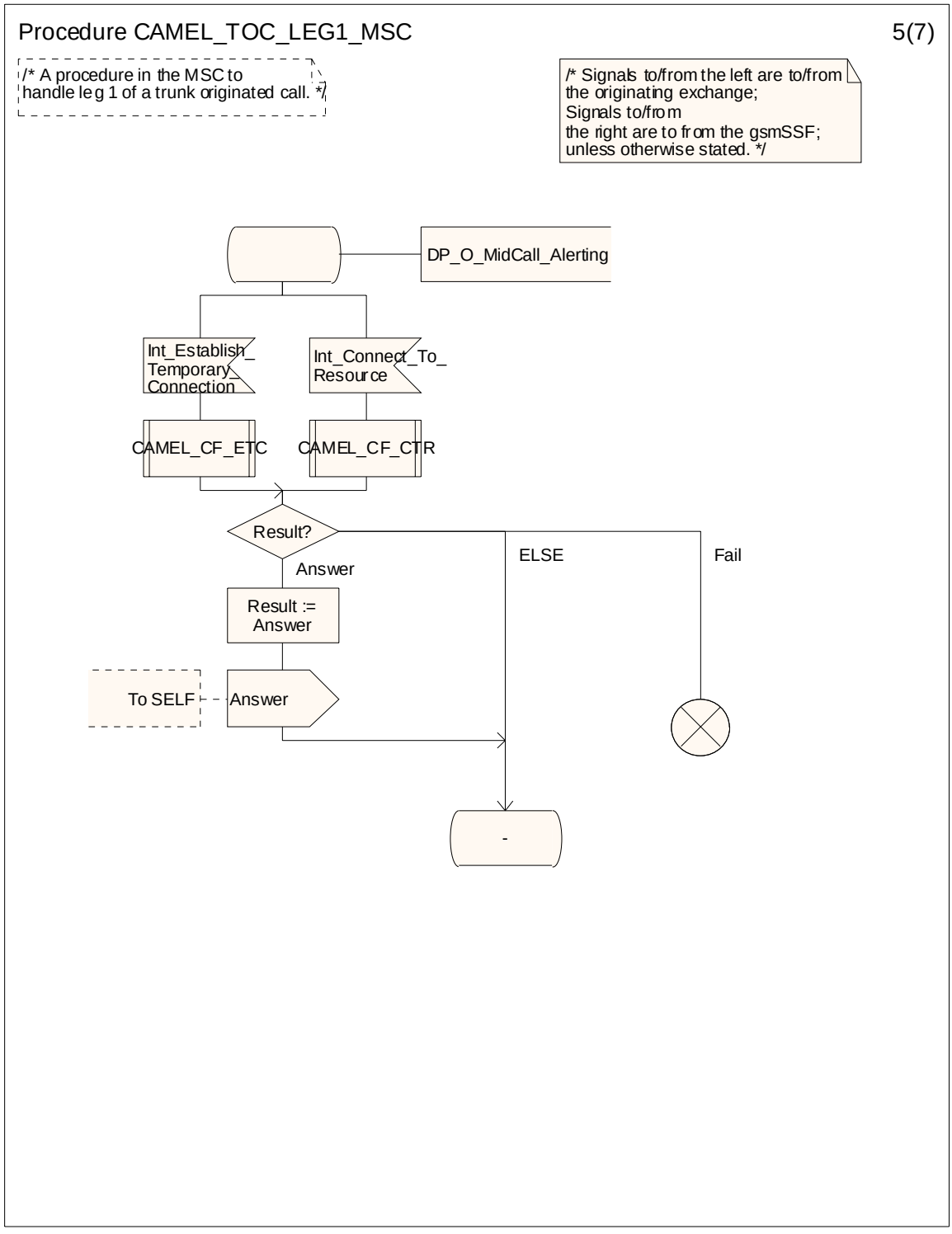


Figure 4.k-1: Procedure CAMEL_TOC_LEG1_MSC (sheet 5)

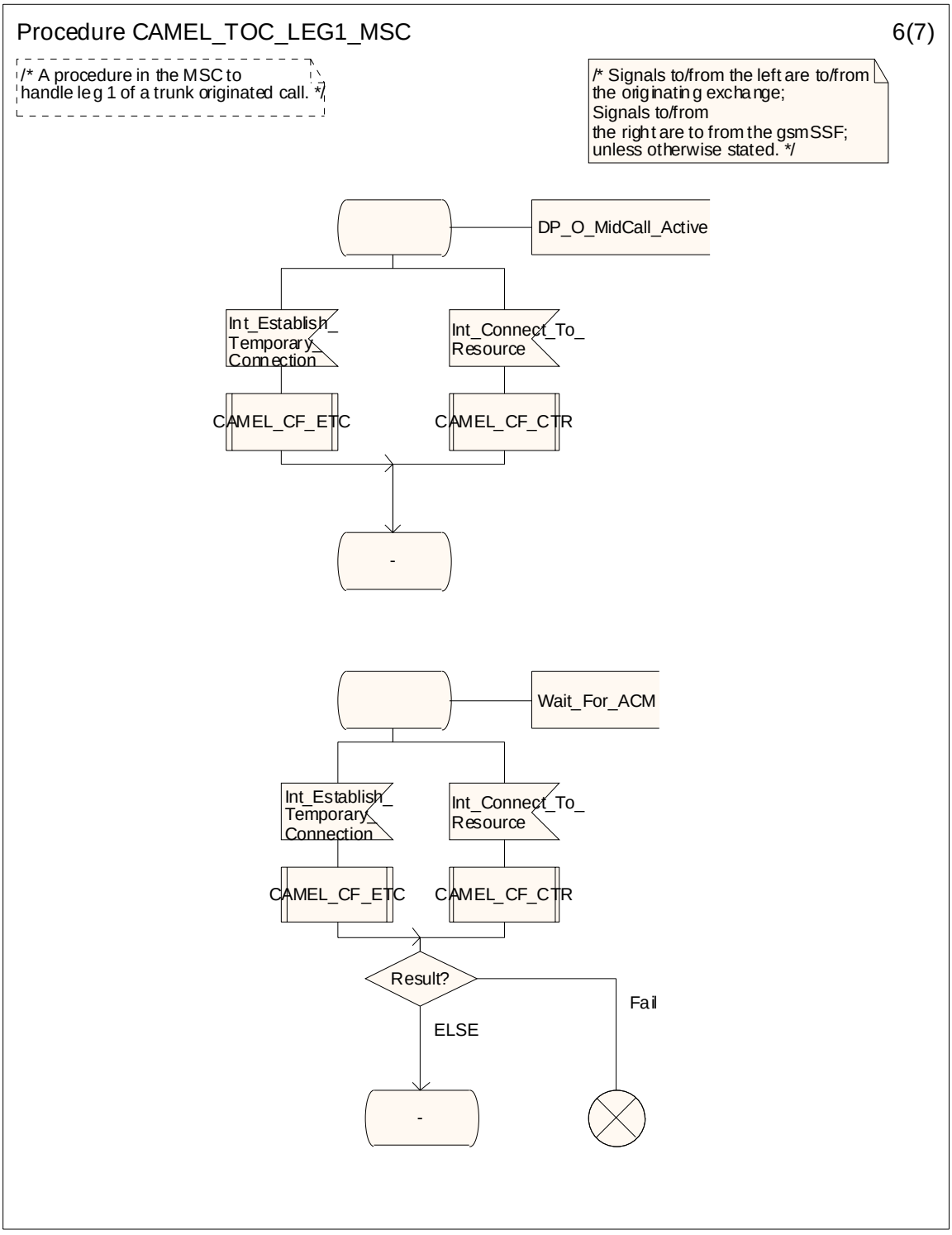


Figure 4.k-1: Procedure CAMEL_TOC_LEG1_MSC (sheet 6)

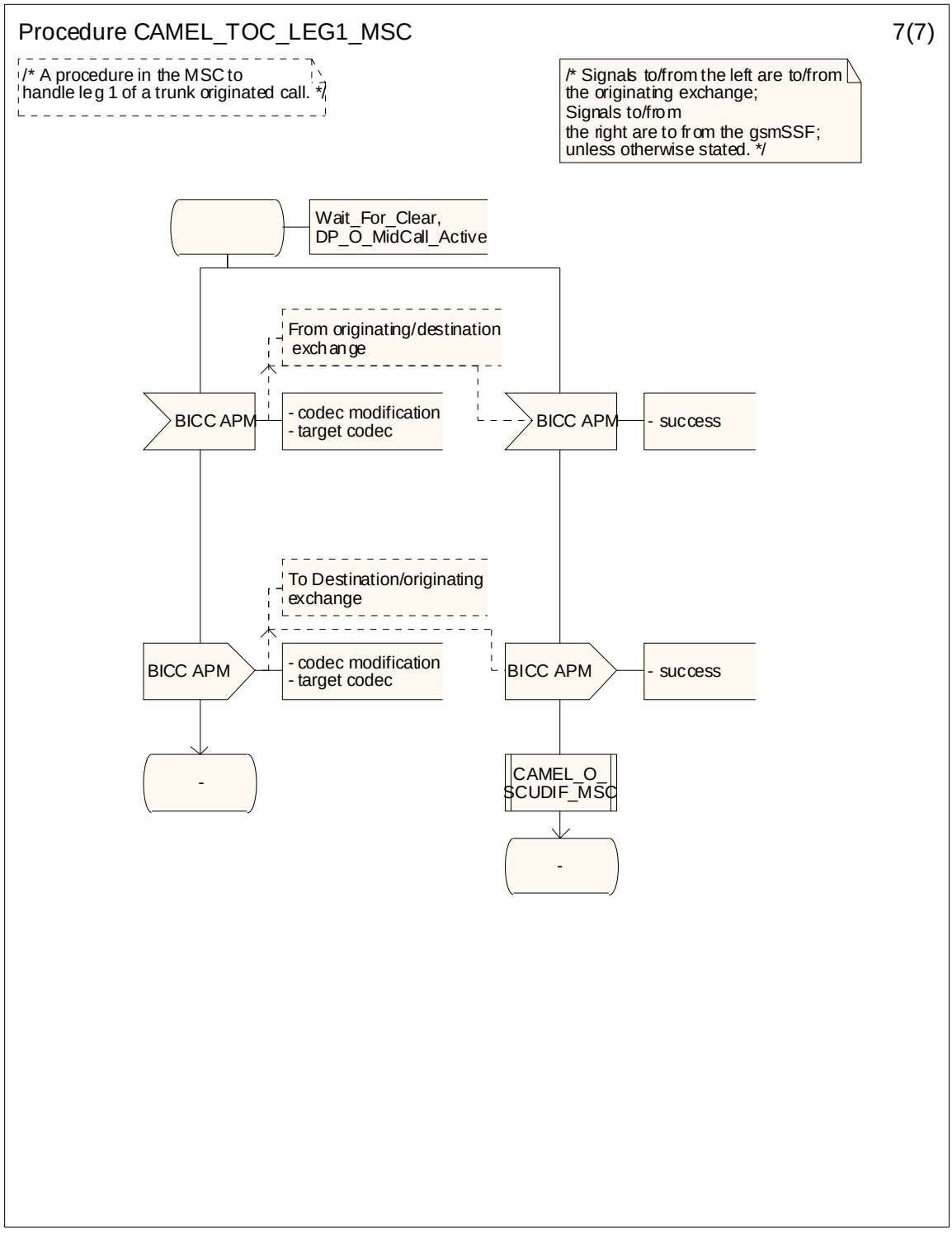


Figure 4.k-1: Procedure CAMEL_TOC_LEG1_MSC (sheet 7)

- Modified section -

4.5.7.5 Process CS_gsmSSF and procedures

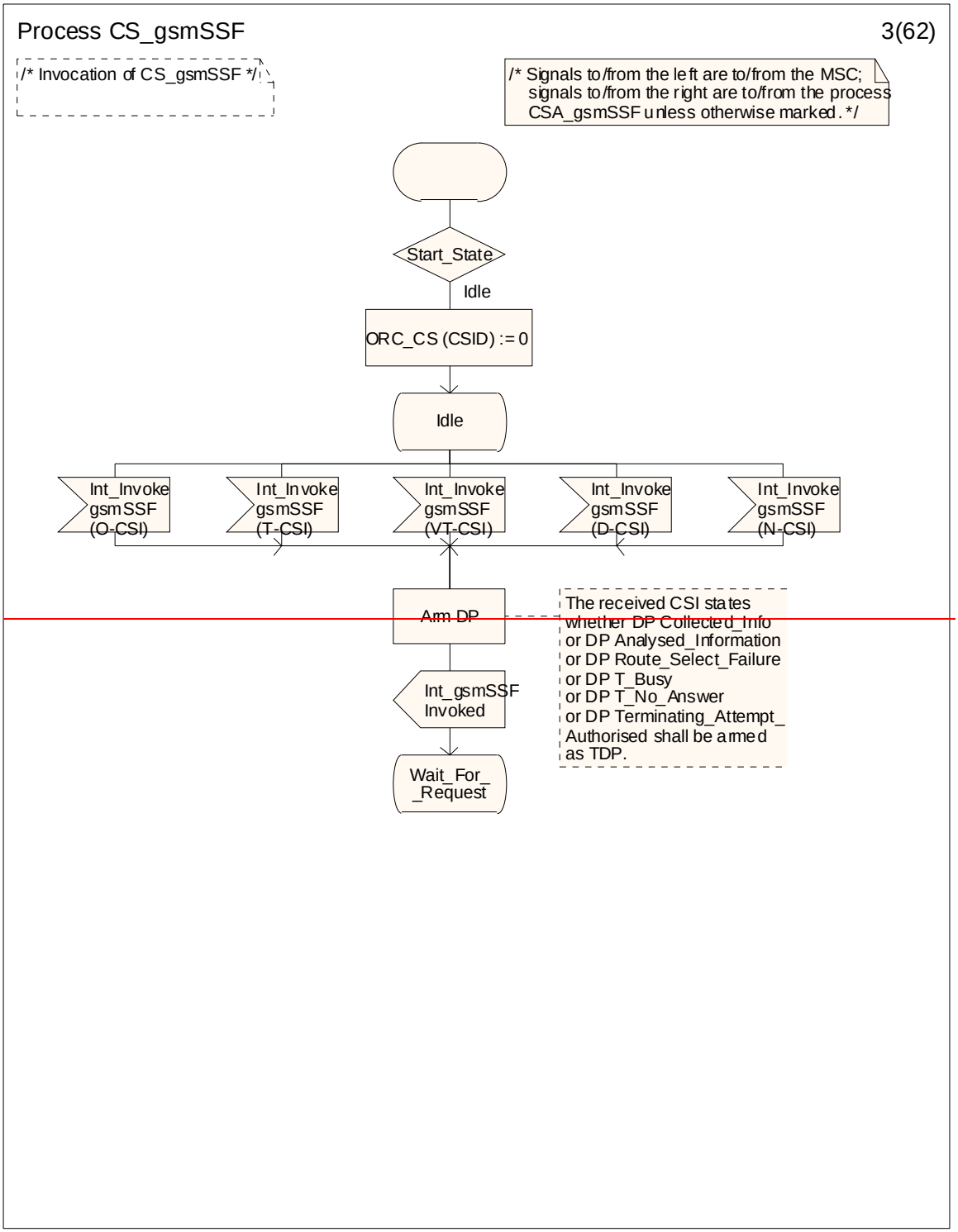
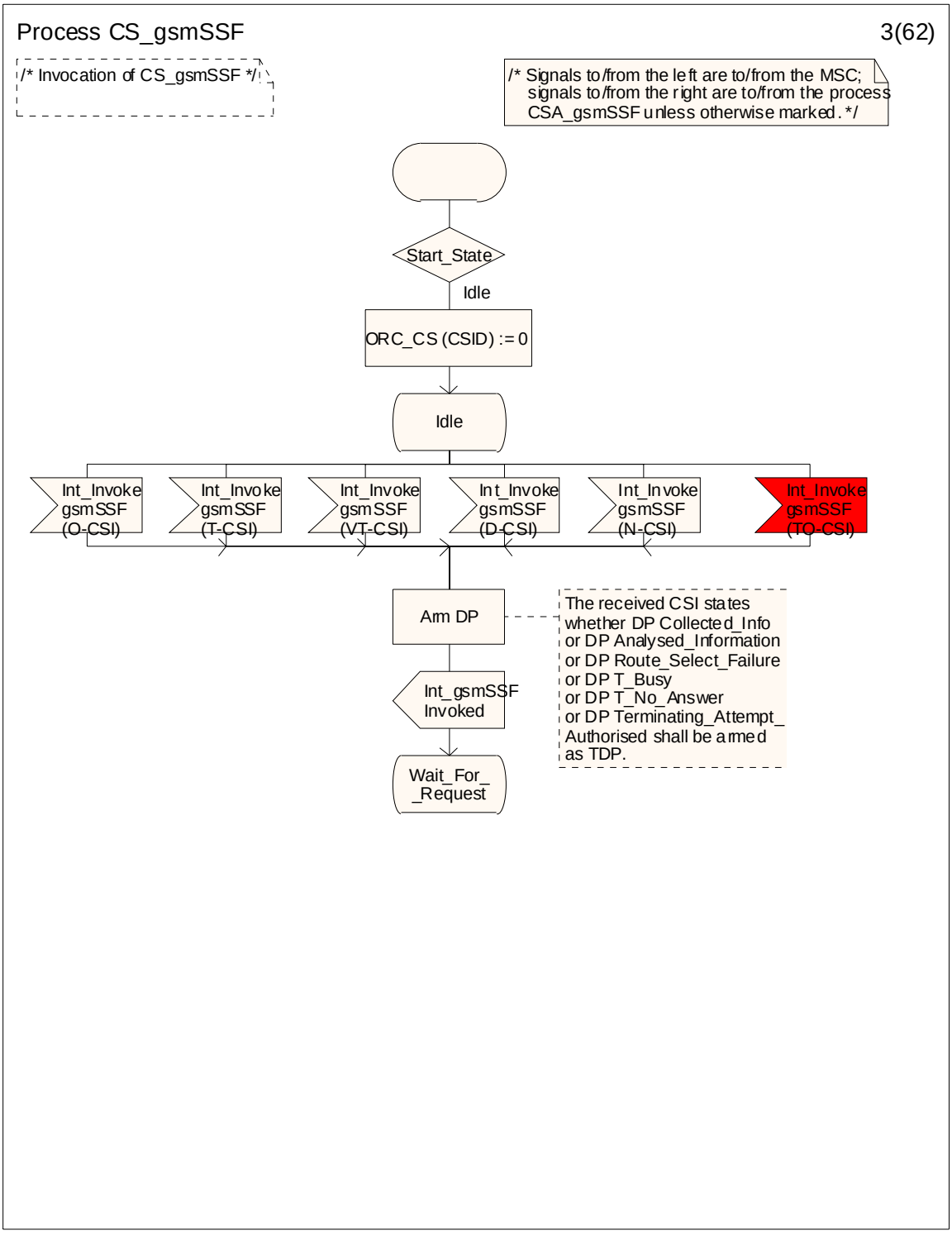


Figure 4.99-3: Process CS_gsmSSF (sheet 3)


Process CS_gsmSSF
3(62)
/* Invocation of CS_gsmSSF */
/* Signals to/from the left are to/from the MSC; signals to/from the right are to/from the process CSA_gsmSSF unless otherwise marked. */
Start_State
Idle
ORC_CS (CSID) := 0
Idle
Int_Invoke gsmSSF (O-CSI)
Int_Invoke gsmSSF (T-CSI)
Int_Invoke gsmSSF (VT-CSI)
Int_Invoke gsmSSF (D-CSI)
Int_Invoke gsmSSF (N-CSI)
Int_Invoke gsmSSF (TO-CSI)
Arm DP
The received CSI states whether DP Collected_Info or DP Analysed_Information or DP Route_Select_Failure or DP T_Busy or DP T_No_Answer or DP Terminating_Attempt_Authorised shall be armed as TDP.
Int_gsmSSF Invoked
Wait_For_ _Request

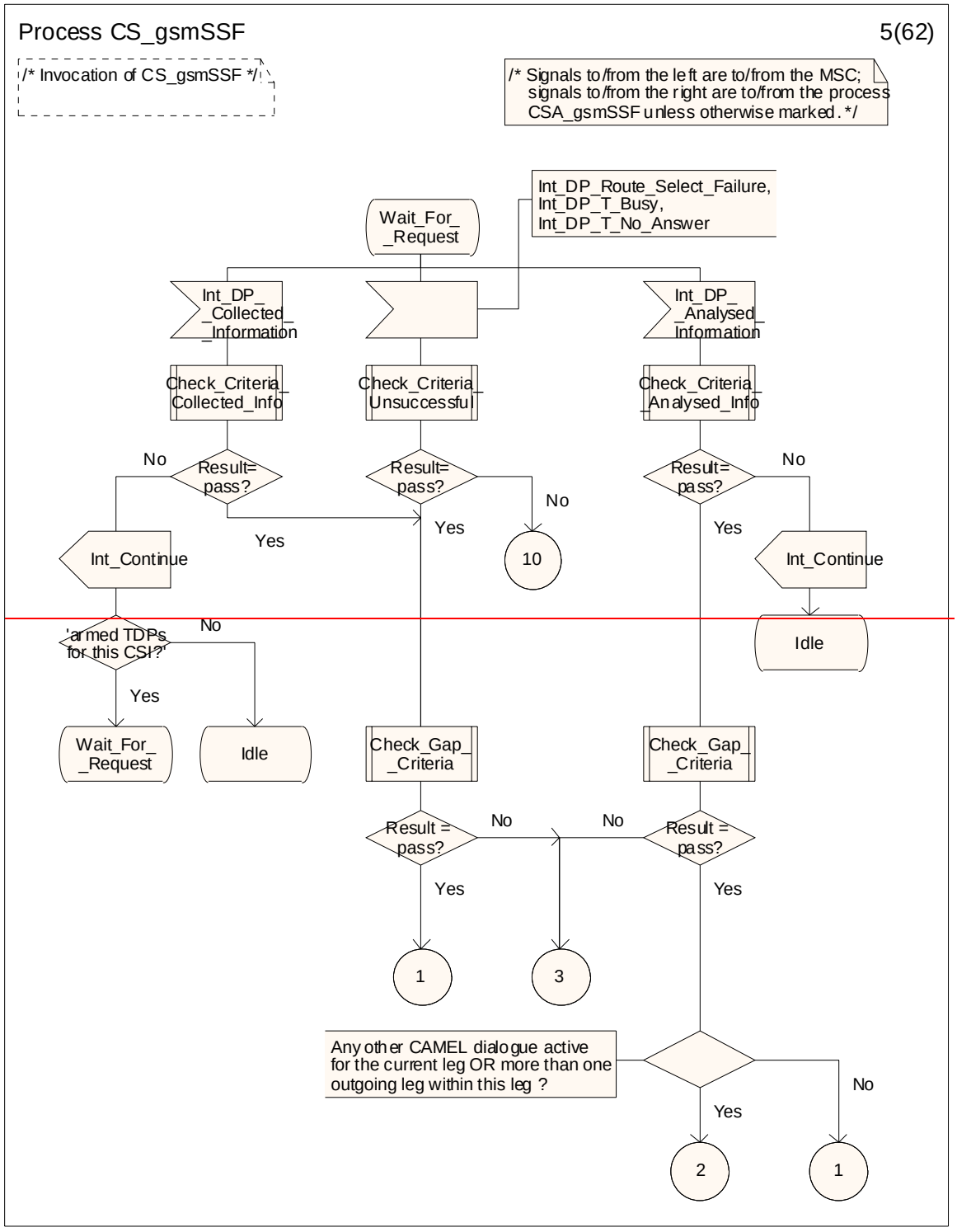
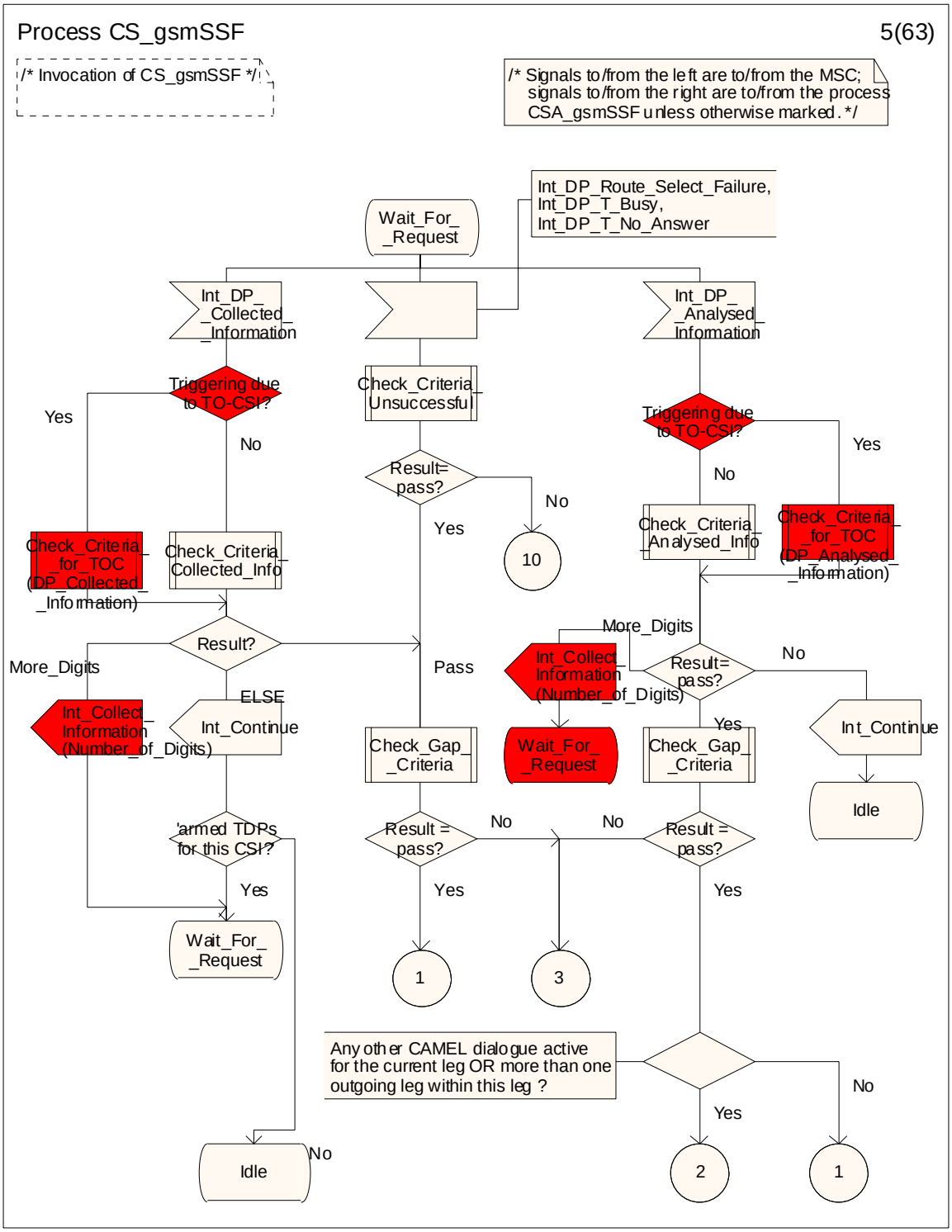


Figure 4.99-5: Process CS_gsmSSF (sheet 5)


Process CS_gsmSSF
5(63)
/* Invocation of CS_gsmSSF */
/* Signals to/from the left are to/from the MSC; signals to/from the right are to/from the process CSA_gsmSSF unless otherwise marked. */
Int_DP_Route_Select_Failure,
Int_DP_T_Busy,
Int_DP_T_No_Answer
Wait_For_Request
Int_DP_Collected_Information
Check_Criteria_Unsuccessful
Int_DP_Analysed_Information
Triggering due to TO-CSI?
Yes
No
Result= pass?
No
Yes
10
Check_Criteria_for_TOC (DP_Collected_Information)
Check_Criteria_Collected_Info
Result?
More_Digits
Pass
ELSE
Int_Collect_Information (Number_of_Digits)
Int_Continue
'armed TDPs for this CSI?
Yes
Wait_For_Request
Check_Gap_Criteria
Result = pass?
No
Yes
1
3
Check_Criteria_Analysed_Info
Check_Criteria_for_TOC (DP_Analysed_Information)
More_Digits
Int_Collect_Information (Number_of_Digits)
Wait_For_Request
Result= pass?
No
Yes
Check_Gap_Criteria
Result = pass?
No
Yes
Int_Continue
Idle
Any other CAMEL dialogue active for the current leg OR more than one outgoing leg within this leg ?
Yes
No
2
1
Idle
No

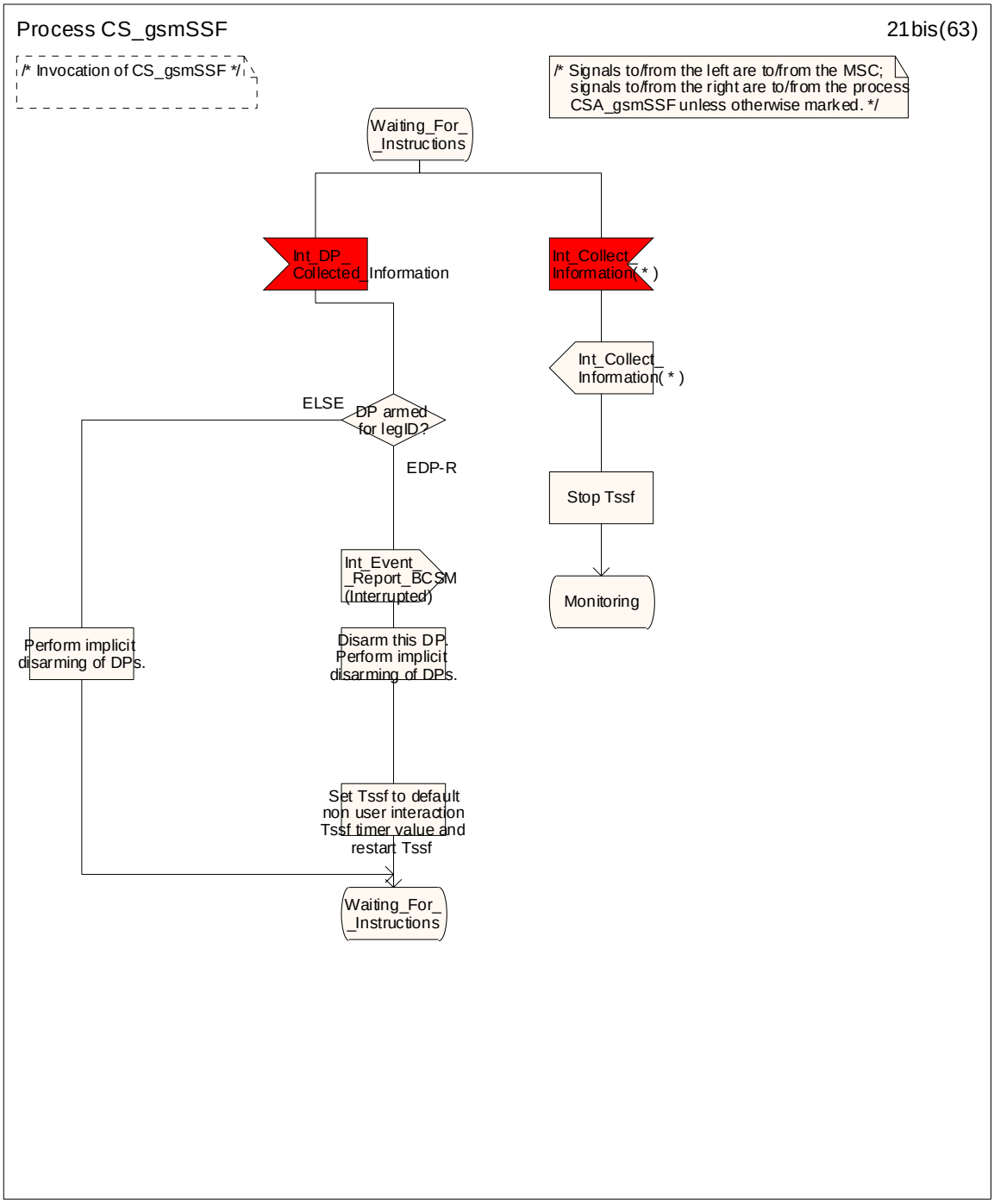


Figure 4.99-21bis: Process CS_gsmSSF (sheet 21bis) <New>

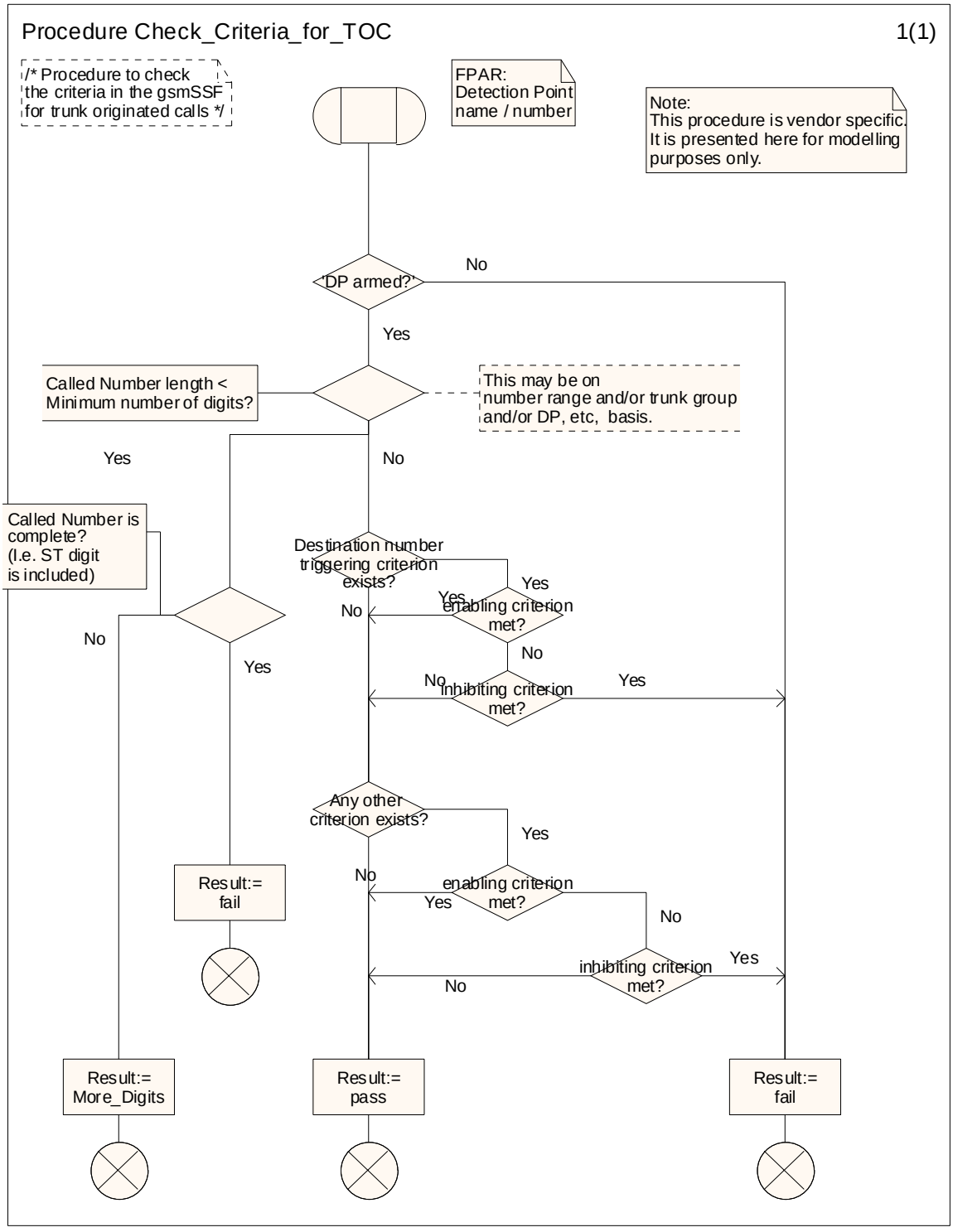


Figure 4.xx-1: Procedure Check_Criteria_for_TOC (sheet 1)

- Modified section -

4.5.7.7 Process CSA_gsmSSF and procedures

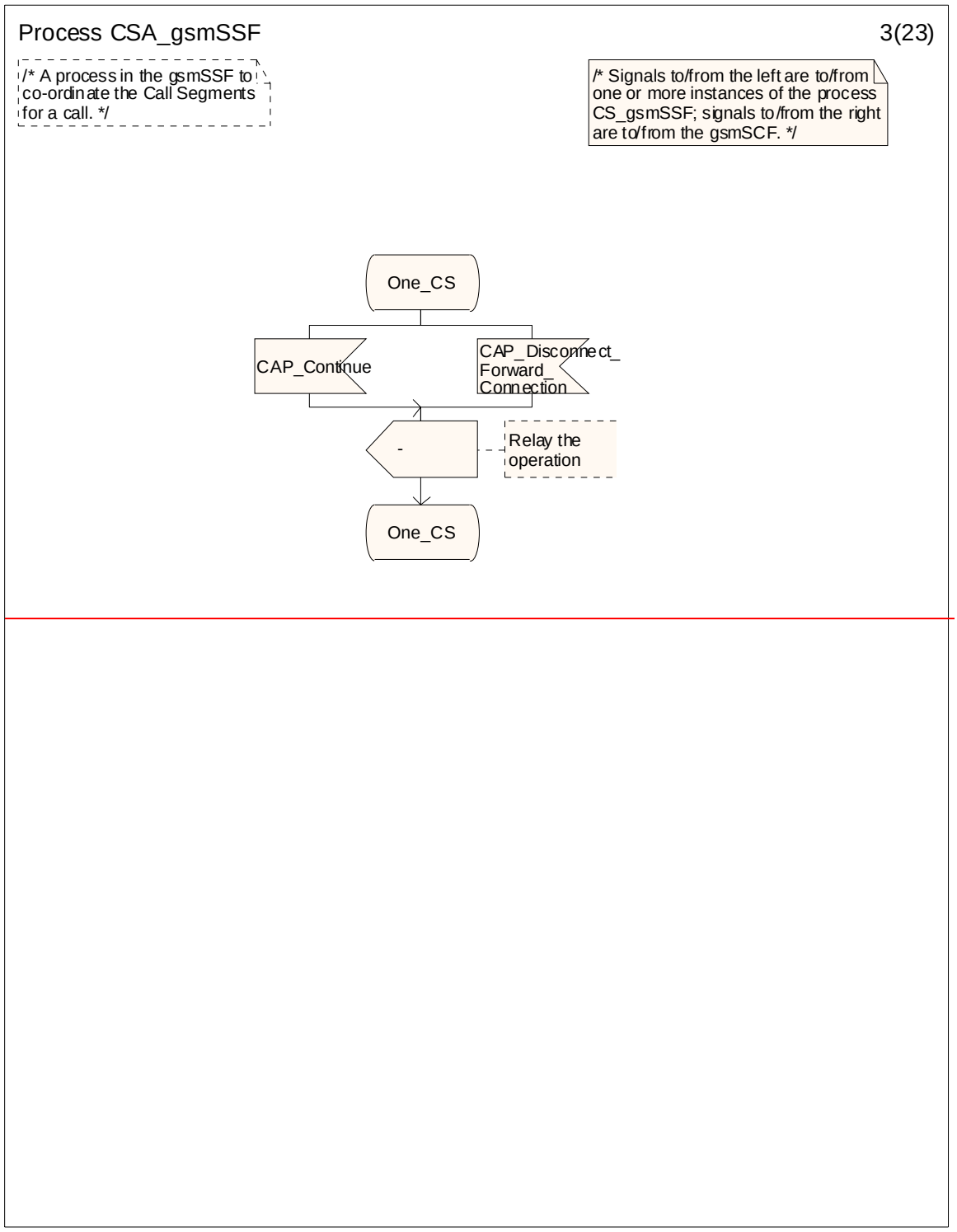


Figure 4.116-3: Process CSA_gsmSSF (sheet 3)

Process CSA_gsmSSF 3(23)

/* A process in the gsmSSF to co-ordinate the Call Segments for a call. */

/* Signals to/from the left are to/from one or more instances of the process CS_gsmSSF; signals to/from the right are to/from the gsmSCF. */