3GPP TSG CN Plenary Meeting #18 **NP-020531**
4th - 6th December 2002. New Orleans, USA.

Source: TSG CN WG2

Title: CRs to Rel-5 WI IMS-CAMEL, Pack2

Agenda item: 8.1

Document for: APPROVAL

Introduction:

This document contains 7 editorial CRs on Rel-5 WI IMS-CAMEL (TS 23.278). These CRs have been agreed by TSG CN WG2 and are forwarded to TSG CN Plenary meeting #18 for approval.

Spec	CR	Rev	Doc-2nd-Level	Phase	Subject	Cat	Ver_C
23.278	15		N2-020966	Rel-5	For better document structure	D	5.0.0
23.278	16		N2-020967	Rel-5	Editorial improvement - clause 2	D	5.0.0
23.278	17		N2-020968	Rel-5	Editorial improvement - clause 3	D	5.0.0
23.278	18		N2-020969	Rel-5	Editorial improvement - clause 4	D	5.0.0
23.278	19		N2-020970	Rel-5	Editorial improvement - clause 5	D	5.0.0
23.278	20		N2-020971	Rel-5	Editorial improvement - clause 6	D	5.0.0
23.278	21		N2-020972	Rel-5	Editorial improvement - clause 7	D	5.0.0

3GPP TSG-CN WG2 Meeting #27 **Tdoc ⌘N2-020966**
Bangkok, Thailand, 11th - 15th November 2002.

CR-Form-v7

CHANGE REQUEST

⌘ **23.278** **CR** **015** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

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

Title:	⌘	For better document structure
Source:	⌘	Siemens AG
Work item code:	⌘	IMS-CAMEL
Date:	⌘	31/10/2002
Category:	⌘	**D**
Release:	⌘	Rel-5

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:
2 (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)

Reason for change:	⌘	Current document structure is as follows: Clause 4 deals with CAMEL/IP Multimedia Core Network Interworking which includes; 4.1 Architecture 4.2 Interfaces defined for an IM-SSF based Application Server 4.3 Detection Points (DPs) 4.4 Description of CAMEL Subscriber Data 4.5 Description of CAMEL State Models Clause 5 deals with the procedures (SDLs) and the information flows which are related to clause 4. Why is clause 5, considering the contents, independent, while clauses 6 and 7 include the procedures and the IFs? It is proposed that the current clause 5 is included in clause 4.
Summary of change:	⌘	Change as follows. Clause 5 be subclause 4.6 (style shall be changed accordingly); Subclause be subclause 4.7. Clauses 6 and 7 shall be changed according to the above change (5 and 6 respectively).
Consequences if not approved:	⌘	Question would remain: “Why is clause 5 independent?”

Clauses affected:	⌘	All

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	

Other comments: ⌘

***** Overview of the change (as the result of this CR) *****

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

Title:	⌘	Editorial improvement – clause 2
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Category:	⌘	**D**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
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Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(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)*

Reason for change:	⌘	Editorial improvement for good readability
Summary of change:	⌘	References and linked document numbers – listed as document numbers sorted. Book marks are set in the clause 2 and the reference to the book marks are set in other clauses. Figure numbers and table numbers – Re-numberd as “clause number”.”sequence” (- subsequence). Sequence numbers are also assigned as gigit(s). Book marks on the figure and/or table numbers are set when neccessary. Reference to the figures and/or tables in the text are book marked. Insert non-breakable space and hiphon where neccessary. Delete (unneccessary) double spaces, double blank lines.
Consequences if not approved:	⌘	

Clauses affected:	⌘	2

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	O&M Specifications	

Other comments:	⌘	

2 References

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

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

[1~~1~~] 3GPP TR 21.905: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP Specifications".

[2~~2~~] 3GPP TS 22.078: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Customised Applications for Mobile network Enhanced Logic (CAMEL);Service description, Stage 1".

[3~~3~~] 3GPP TS 22.228: "3rd Generation Partnership Project; Technical Specification Group Systems Aspects; IP Multimedia (IM) Subsystem –Stage 1.

~~[4] 3GPP TS 23.228: "3rd Generation Partnership Project; Technical Specification Group Systems Aspects; IP Multimedia (IM) Subsystem - Stage 1.~~

[4] 3GPP TS 23.078: “3rd Generation Partnership Project; Technical Specification Group Core Networks; Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 Stage 2 specification (Release 99)”.

[5~~5~~] 3GPP TS 23.218: "3rd Generation Partnership Project; Technical Specification Group Core Networks; IP Multimedia (IM) Session Handling; IP Multimedia Call Model.

[6] 3GPP TS 23.228: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; IP Multimedia Subsystem (IMS) Stage 2.

[7~~6~~] 3GPP TS 24.228: "3rd Generation Partnership Project; Technical Specification Group Core Networks; Signalling flows for the IP multimedia call control based on SIP and SDP.

[8] 3GPP TS 24.229: “3rd Generation Partnership Project; Technical Specification Group Core Networks; IP Multimedia Call Control Protocol based o SIP and SDP; Stage 3”.

[9~~7~~] 3GPP ~~-~~TS 29.002: "3rd Generation Partnership Project; Technical Specification Group Core Network; Mobile Application Part (MAP) specification".

[10] 3GPP TS 29.229: “3rd Generation Partnership Project; Technical Specification Group Core Networks; Cx and Dx Interfaces Based on the Diameter Protocol; Protocol details”.

[11~~8~~] 3GPP ~~-~~TS 29.278: "3rd Generation Partnership Project; Technical Specification Group Core Network; Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 4 CAMEL Application Part (CAP) specification for IP Multimedia Subsystems (IMS)”.

~~[9] 3GPP TS 24.229: “3rd Generation Partnership Project; Technical Specification Group Core Networks; IP Multimedia Call Control Protocol based o SIP and SDP; Stage 3”.~~

~~[10] 3GPP TS 29.229: “3rd Generation Partnership Project; Technical Specification Group Core Networks; Cx and Dx Interfaces Based on the Diameter Protocol; Protocol details”.~~

~~[11] 3GPP TS 23.078: “3rd Generation Partnership Project; Technical Specification Group Core Networks; Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 Stage 2 specification (Release 99)”.~~

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R96	*(Release 1996)*
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Consequences if not approved:	⌘	

Clauses affected:	⌘	3

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	O&M Specifications	

Other comments:	⌘	

3 Definitions and abbreviations

3.1 Definitions

Home Subscriber Server (HSS): Functional entity containing the subscription related information to support the network entities actually handling calls/sessions. For subscribers requiring CAMEL support, the HSS includes partial HLR functionality for storing the information relevant to the current subscription regarding CAMEL Subscription Information for IMS. The HSS sends IM CAMEL Subscription Information data to the IM-SSF and CSE using a MAP interface.

IP Multimedia Service Switching Function (IM-SSF): CAMEL functional entity that provides the interworking between SIP session control and the CAMEL state models. The IM-SSF also provides the CAMEL interface to HSS for downloading the subscriber's CAMEL Subscription Information data for IMS.

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

IP Multimedia CAMEL Subscription Information (IM-CSI): IM-CSI identifies the subscriber as having IP Multimedia CAMEL services.

IP Multimedia session: IP Multimedia session and IP Multimedia call are treated as equivalent in this specification.

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

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

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

Terminating IP Multimedia CAMEL Subscription Information (T-IM-CSI): T-IM-CSI identifies the subscriber as having terminating IP Multimedia CAMEL services.

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
CAP	CAMEL Application Part
CSCF	Call State Control Function
DP	Detection Point
D-IM-CSI	Dialled Service IP Multimedia CAMEL Subscription Information
EDP	Event Detection Point
FTN	Forwarded To Number
GPRS	General Packet Radio Service
gsmSCF	GSM Service Control Function
gsmSRF	GSM Specialised Resource Function
gsmSSF	GSM Service Switching Function
HPLMN	Home PLMN
HSS	Home Subscriber Server
IE	Information Element
IF	Information Flow
IP	Internet Protocol

ISC	IM–CN Service Control
I–CSCF	Interrogating CSCF
IM	IP Multimedia
IM–BCSM	IP Multimedia Basic Call State Model
IMCN	IP Multimedia Core Network
imcnSSF	IM CN Service Switching Function
IM–CSI	IP Multimedia CAMEL Subscription Information
IM–SSF	IP Multimedia Service Switching Function
IPLMN	Interrogating PLMN
MGCF	Media Gateway Control Function
MO	Mobile Originating
MT	Mobile Terminating
NNI	Network Node Interface
O–IM–BCSM	Originating IP Multimedia Basic Call State Model
O–IM–CSI	Originating IP Multimedia CAMEL Subscription Information
PIC	Point In Call
PLMN	Public Land Mobile Network
P–CSCF	Proxy CSCF
SIP	Session Initiation Protocol
S–CSCF	Serving CSCF
T–IM–BCSM	Terminating IP Multimedia Basic Call State Model
VT–IM–CSI	Terminating IP Multimedia CAMEL Subscription Information
TDP	Trigger Detection Point
UNI	User Network Interface
VPLMN	Visited PLMN

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R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Editorial improvement for good readability
Summary of change:	⌘	References and linked document numbers – listed as document numbers sorted. Book marks are set in the clause 2 and the reference to the book marks are set in other clauses. Figure numbers and table numbers – Re-numberd as “clause number”.”sequence” (- subsequence). Sequence numbers are also assigned as gigit(s). Book marks on the figure and/or table numbers are set when neccessary. Reference to the figures and/or tables in the text are book marked. Insert non-breakable space and hiphon where neccessary. Delete (unneccessary) double spaces, double blank lines.
Consequences if not approved:	⌘	

Clauses affected:	⌘	4

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	O&M Specifications	

Other comments:	⌘	

4 CAMEL/IP Multimedia Core Network Interworking

4.1 Architecture

This subclause describes the functional architecture needed to support CAMEL interactions with the S-CSCF in the IP Multimedia Subsystem. The IM-SSF is a SIP Application Server that interfaces SIP to CAP. The generic SIP Application Server behaviour of the IM-SSF is specified in 3GPP TS 23.218 [**Error! Reference source not found.**].

4.1.1 Functional Entities used for CAMEL at IP Multimedia Registration

Figure 4.1 shows the functional entities involved when an MS registers for IP Multimedia session requiring CAMEL support. General registration procedure is detailed in 3GPP TS 23.228 [**Error! Reference source not found.**]. Upon notification of a UE's registration, the IM-SSF requests O-IM-CSI, D-IM-CSI, VT-IM-CSI data from the HSS over the Si interface.

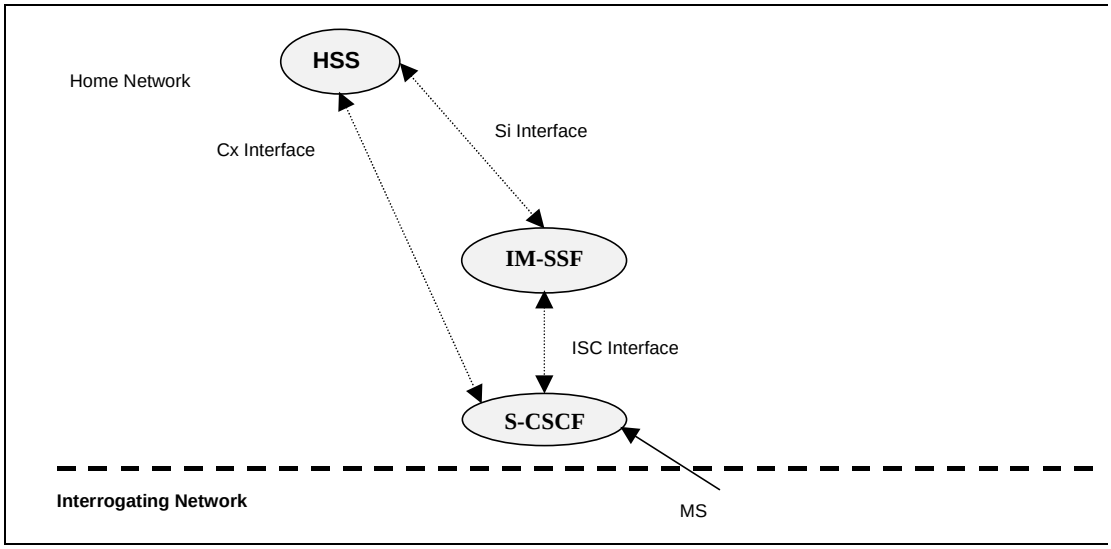

Figure 4.1: Functional architecture for support of CAMEL when mobile registers for IP Multimedia session

4.1.2 Functional Entities used for CAMEL for MO and MT IP Multimedia session

Figure 4.2 shows the functional entities involved in a Mobile Originated IP Multimedia session requiring CAMEL support. The same functional architecture applies in a Mobile Terminated IP Multimedia session for CAMEL.

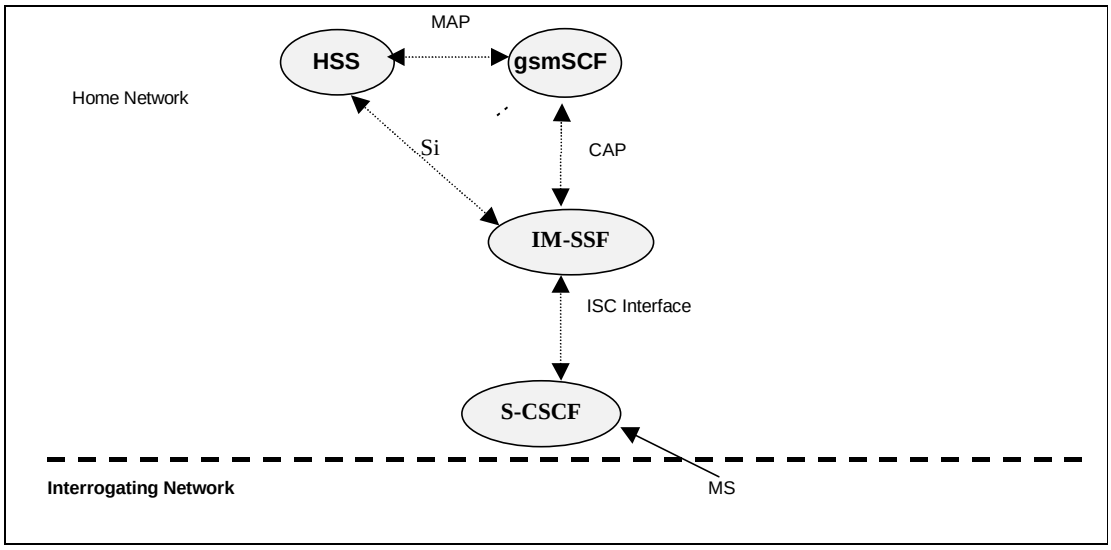

Figure 4.24.1.2.1: Functional architecture for support of CAMEL control of a MO IP Multimedia session

4.2 Interfaces defined for an IM-SSF based Application Server

4.2.1 CSCF – IM-SSF interface

This interface is the IP Multimedia Service Control interface (ISC). This interface shall be based on SIP as detailed in 3GPP TS 24.229 [**Error! Reference source not found.**10].

4.2.2 IM-SSF - gsmSCF interface

This interface is used by the gsmSCF to control an IP Multimedia session in a certain IM-SSF. Relationships between the IM-SSF and the gsmSCF on this interface are opened as a result of the IM-SSF sending a request for instructions to the gsmSCF. This interface shall be based on 3GPP TS 29.278 [**Error! Reference source not found.**9].

4.2.3 HSS – CSCF interface

This interface is used to send CAMEL related subscriber data to a CSCF, e.g. IM-CSI. This interface shall be based on 3GPP TS 29.229 [**Error! Reference source not found.**].

4.3 Detection Points (DPs)

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.

A DP can be armed in order to notify the gsmSCF that the DP was encountered, and potentially to allow the gsmSCF to influence subsequent handling of the call. If the DP is not armed, the processing entity continues the processing without gsmSCF involvement.

Three different types of DPs are identified:

- Trigger Detection Point - Request (TDP-R).

  This detection point is statically armed and initiates a CAMEL control relationship when encountered and there is no existing relationship due to the same CSI. Processing is suspended when the DP is encountered.

- Event Detection Point - Request (EDP-R).

  This detection point is dynamically armed within the context of a CAMEL control relationship. Processing is suspended when encountering the DP and the IM-SSF waits for instructions from the gsmSCF.

- Event Detection Point - Notification (EDP-N).

  This detection point is dynamically armed within the context of a CAMEL control relationship. Processing is not suspended when encountering the DP.

The DPs are characterized in the following clauses.

4.3.1 Arming/Disarming mechanism

A DP may be statically armed or dynamically armed.

The following arming rules apply:

- DPs for a mobile originating call handling is statically armed in the IM-SSF as a result of O-IM-CSI and D-IM-CSI data delivery from the HSS. Likewise, DPs for mobile terminating call handling is statically armed in the IM-SSF as a result of VT-IM-CSI data delivery from the HSS. Static arming of DPs in the IM-SSF occurs during the UE's registration in the IMS CN. Basically, when the IM-SSF is notified of the UE's initial registration, the IM-SSF queries the HSS for the subscriber's CAMEL Subscription Information via the Si interface.

- A DP is dynamically armed by the gsmSCF within the context of a CAMEL control relationship as a result of IM-SSF receiving the RequestReportBCSMEvent operation.

The following disarming rules apply:

- A statically armed DP is disarmed when the IP Multimedia CSI data is withdrawn in the HSS/HLR. Only TDP-Rs can be disarmed using this mechanism.

- If an armed EDP is met, then it is disarmed.

- If an EDP is met that causes the release of the related leg, then all EDPs related to that leg are disarmed.

- If a call session is released, then all EDPs related to that call session are disarmed.

- If an EDP is met, then other EDPS are disarmed, in accordance with the implicit disarming rule table specified in 3GPP ~~TS~~ TS 23.078 Rel-~~99~~ 99 [**Error! Reference source not found.**~~11~~] (refer to the section for "Rules for Implicit Disarming of Event Detection Points').

If an EDP is armed, it can be explicitly disarmed by the gsmSCF by means of the RequestReportBCSMEvent information flow.

4.3.2 Criteria

Criteria are the conditions that must be met in order for the IM-SSF to request instructions from the gsmSCF.

DP criteria are checked in the IM-SSF. Criteria for originating DPs (i.e. Collected_Info, Analysed_Information, and Route_Select_Failure TDPs) are checked in the IM-SSF associated with the originating UE's S-CSCF. Criteria for terminating DPs (i.e. T_Busy and T_No_Answer) are checked in the IM-SSF associated with the terminating UE's S-CSCF.

Based on the Initial Filter Criteria information, the S-CSCF forwards the SIP message to the IM-SSF. The DP encountered is identified based on the SIP message received from the S-CSCF. Refer to t~~T~~able 4.2~~4.2~~ and t~~T~~able 4.4~~4.4~~ for mapping of SIP messages to CAMEL- IM-BCSM Detection Points.

4.3.2.1 Criteria at Collected_Info

The following criteria are applicable for DP Collected_Info:

- Destination number triggering criterion: The HLR may store a list of up to 10 destination numbers and/or up to 3 number lengths. There is no restriction on the nature of address. There is no restriction on the numbering plan indicator. This criterion may be defined to be either "enabling" or "inhibiting".

Triggering at DP Collected_Info shall be strictly based on the destination number received from the S-CSCF.

The destination number received from the S--CSCF shall not be modified before conditional triggering check takes place.

If the destination number triggering criterion is enabling, then the IM--SSF may establish a dialogue with the gsmSCF if:

- the destination number matches one of the destination number strings defined in the list; or
- the length of the destination number matches one of the destination number lengths defined in the list.

In this test the destination number matches one of the destination number strings in the list if:

- the nature of address of destination number is the same as the nature of address of the destination number string;
- the destination number is at least as long as the destination number string in the list; and
- all the digits in the destination number string in the list match the leading digits of the destination number.

If the destination number triggering criterion is inhibiting, then the IM--SSF may establish a dialogue with the gsmSCF if:

- the destination number does not match any of the destination number strings defined in the list; and
- the length of the destination number does not match any of the destination number lengths defined in the list.

In this test the destination number matches one of the destination number strings in the list if:

- the nature of address of destination number is the same as the nature of address of the destination number string;
- the destination number is at least as long as the destination number string in the list; and
- all the digits in the destination number string in the list match the leading digits of the destination number.

4.3.2.2 Criteria at DP Analysed_Information

4.3.2.2.1 General

The following criteria are applicable for DP Analysed_Information:

- Destination number triggering criterion: The HLR may store a list of up to 10 destination numbers. There is no restriction on the nature of address. There is no restriction on the numbering plan indicator.

For MO calls, triggering at DP Analysed_Info shall be based on the destination number received in the Connect operation from the gsmSCF during a Mobile Originating CAMEL Service.

4.3.2.2.2 Number comparison

The following procedure shall be performed for the comparison of the destination number triggering criterion and the address information in the given order.

1. The numbering plan indicators of both numbers are ignored.
2. The type of number/nature of address indicators of both numbers are compared. If there is a match of the type of number indicator, then the check shall be performed by comparing the digits as defined in step 6. If there is no match of the type of number the comparison procedure shall continue as follows.
3. If there are other type of number/nature of address indicators present than "unknown", "national (significant) number" or "international number" then the destination number does not match the destination number triggering criterion. Otherwise the comparison procedure shall continue as follows.
4. If there is a number with type of number/nature of address "unknown" this number shall be translated based on the numbering plan of the serving entity in either of the following ways:
   - if the leading digits refer to an international prefix, those digits shall be removed and the type of number/nature of address shall be set to "international number".

- if the leading digits refer to a national (trunk) prefix, those digits shall be removed and the type of number/nature of address shall be set to "national (significant) number".

If the leading digits refer neither to an international prefix nor to a national (trunk) prefix, then the destination number does not match the destination number triggering criterion.

If there is a match of the type of number/nature of address indicator after this number modification, then the check shall be performed by comparing the digits as defined in step 6, otherwise the comparison procedure shall continue as follows.

5. If there is a number with type of number/nature of address "national (significant) number" this number shall be translated based on the numbering plan of the serving entity to international format by adding the country code of the serving entity to the number string. After this modification both numbers shall be in international format and shall be checked by comparing the digits as defined in step 6.

6 If the number digits of the address information are compared with the number digits of the destination number triggering criterion, then there is a match if:

- the destination number is at least as long as the destination number string of the destination number triggering criterion; and

- all the digits in the destination number string of the destination number triggering criterion match the leading digits of the destination number.

The check described in this clause shall be repeated for every number contained in the destination number triggering criterion of the D-IM-CSI until a match is recognised and DP Analysed_Info is triggered, or until all the destination numbers have been checked without a match being recognised. In the latter case DP Analysed_Info is not triggered.

4.3.2.3 Criteria at DP Route_Select_Failure

The HLR may store a list of up to 5 cause values.

The following criteria are applicable for DP Route_Select_Failure:

- Release cause code.

The trigger criteria is met if the cause code received from the terminating party's network (could be a PSTN or an IMS network) is equal to at least one of the cause codes in the trigger criteria list.

If a O-IM-BCSM was already invoked and there is a relationship with the gsmSCF at that moment, then no additional relationship shall be initiated.

4.3.2.4 Criteria at DP T_Busy and T_No_Answer

The HSS may store a list of up to 5 cause values.

The triggering is based on the release cause code received from terminating UE's P-CSCF.

The following criteria are applicable for DP T_Busy and T_No_Answer:

- Release cause code.

The trigger criteria are met if the cause code received from the terminating UE's P-CSCF is equal to at least one of the cause codes in the trigger criteria list.

If trigger criteria are satisfied, then the corresponding Service Logic shall be invoked.

4.4 Description of CAMEL Subscriber Data

4.4.1 IP Multimedia CAMEL Subscription Information (IM-CSI)

This subclause defines the contents of the IP Multimedia CAMEL Subscription Information. IM-CSI data are provisioned in the HSS for subscribers having originating and/or terminating IP Multimedia CAMEL services. This

information shall be sent by the HSS to the IM-SSF via the Si Interface. The IM-CSI data contains the O-IM-CSI, D-IM-CSI, and VT-IM-CSI.

4.4.1.1 Originating IP Multimedia CAMEL Subscription Information (O-IM-CSI)

4.4.1.1.1 gsmSCF Address

Address to be used to access the gsmSCF for a particular subscriber. The address shall be an E.164 number to be used for routeing.

4.4.1.1.2 Service Key

The Service Key identifies to the gsmSCF the service logic that shall apply.

4.4.1.1.3 Default Call Handling

The Default Call Handling indicates whether the IP Multimedia session shall be released or continued as requested in case of error in the IM-SSF to gsmSCF dialogue.

4.4.1.1.4 TDP List

The TDP List indicates on which detection point triggering shall take place. The following trigger detection points are possible: DP Terminating_Attempt_Authorised, DP T_Busy, and DP T_No_Answer.

4.4.1.1.5 CAMEL Capability Handling

CAMEL Capability Handling indicates the phase of CAMEL which is asked by the gsmSCF for the service.

4.4.1.1.6 CSI Status

The CSI state indicates whether the O-IM-CSI is active or not.

4.4.1.1.7 Notification Flag

The notification flag indicates whether changes of the O-IM-CSI shall trigger the Notification on Change of Subscriber Data. In order to update the IM-SSF of IM CSI changes, this flag shall be set to yes.

4.4.1.1.8 DP Criteria

The DP criteria indicate whether the IM-SSF shall request the gsmSCF for instructions.

4.4.1.2 Dialled Services IP Multimedia CAMEL Subscription Information (D-IM-CSI)

4.4.1.2.1 gsmSCF Address

Address to be used to access the gsmSCF for a particular subscriber. The address shall be an E.164 number to be used for routeing.

4.4.1.2.2 Service Key

The Service Key identifies to the gsmSCF the service logic that shall apply.

4.4.1.2.3 Default Call Handling

The Default Call Handling indicates whether the IP Multimedia session shall be released or continued as requested in case of error in the IM-SSF to gsmSCF dialogue.

4.4.1.2.4 CAMEL Capability Handling

CAMEL Capability Handling indicates the phase of CAMEL which is asked by the gsmSCF for the service.

4.4.1.2.5 CSI Status

The CSI state indicates whether the D-IM-CSI is active or not.

4.4.1.2.6 Notification Flag

The notification flag indicates whether changes of the D-IM-CSI shall trigger the Notification on Change of Subscriber Data. In order to update the IM-SSF of IM CSI changes, this flag shall be set to yes.

4.4.1.2.7 DP Criteria

The DP criteria indicate whether the IM-SSF shall request the gsmSCF for instructions.

4.4.1.3 Terminating IP Multimedia CAMEL Subscription Information (VT-IM-CSI)

4.4.1.3.1 gsmSCF Address

Address to be used to access the gsmSCF for a particular subscriber. The address shall be an E.164 number to be used for routeing.

4.4.1.3.2 Service Key

The Service Key identifies to the gsmSCF the service logic that shall apply.

4.4.1.3.3 Default Call Handling

The Default Call Handling indicates whether the IP Multimedia session shall be released or continued as requested in case of error in the IM-SSF to gsmSCF dialogue.

4.4.1.3.4 TDP List

The TDP List indicates on which detection point triggering shall take place. The following trigger detection points are allowed: DP Terminating_Attempt_Authorised, DP T_Busy, and DP T_No_Answer.

4.4.1.3.5 CAMEL Capability Handling

CAMEL Capability Handling indicates the phase of CAMEL which is asked by the gsmSCF for the service.

4.4.1.3.6 CSI Status

The CSI state indicates whether the VT-IM-CSI is active or not.

4.4.1.3.7 Notification Flag

The notification flag indicates whether changes of the- VT-IM-CSI shall trigger the Notification on Change of Subscriber Data. In order to update the IM-SSF of IM CSI changes, this flag shall be set to yes.

4.4.1.3.8 DP Criteria

The DP criteria indicate whether the IM-SSF shall request the gsmSCF for instructions.

4.4.1.4 Other CAMEL Data

4.4.1.4.1 gsmSCF address list for CSI

The gsmSCF address list for CSI indicates a list of gsmSCF addresses to which Notification on Change of Subscriber Data is to be sent. In order to provide Notification on Change of Subscriber Data to the IM-SSF, the IM-SSF address shall be included in the gsmSCF address list.

The IM-SSF address is added to the address list for notification in the HSS/HLR as described in subclause **Error! Reference source not found.**5.1.2.

The IM-SSF shall handle the receipt of the Notification on Change of Subscriber Data using the same procedure as that of a gsmSCF.

4.5 Description of CAMEL State Models

In the IM Subsystem, calls are controlled by the Serving CSCF (S-CSCF) where a subscriber is registered. A state model describes the call control behaviour of an IM-SSF.

4.5.1 General Handling

The Basic Call State Model (BCSM) is used to describe the handling of originating and terminating calls. It identifies the points in a call where gsmSCF based service applications is permitted to interact with the call control capabilities of an IM-SSF. Figure 4.34.5.1.1 illustrates how transitions between states, Detection Points and Points In Call components are shown in the BCSM diagrams.

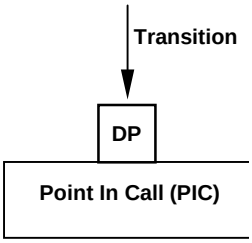

Figure 4.3 4.5.1.1: BCSM Components

4.5.2 Originating CAMEL Basic Call State Model (O-IM-BCSM)

4.5.2.1 Description of the O-IM-BCSM

The O-IM-BCSM is used to model the behaviour of an IM-SSF for an originating call. When an armed DP is encountered, O-IM-BCSM processing is suspended at the DP and the IM-SSF indicates this to the gsmSCF if appropriate.

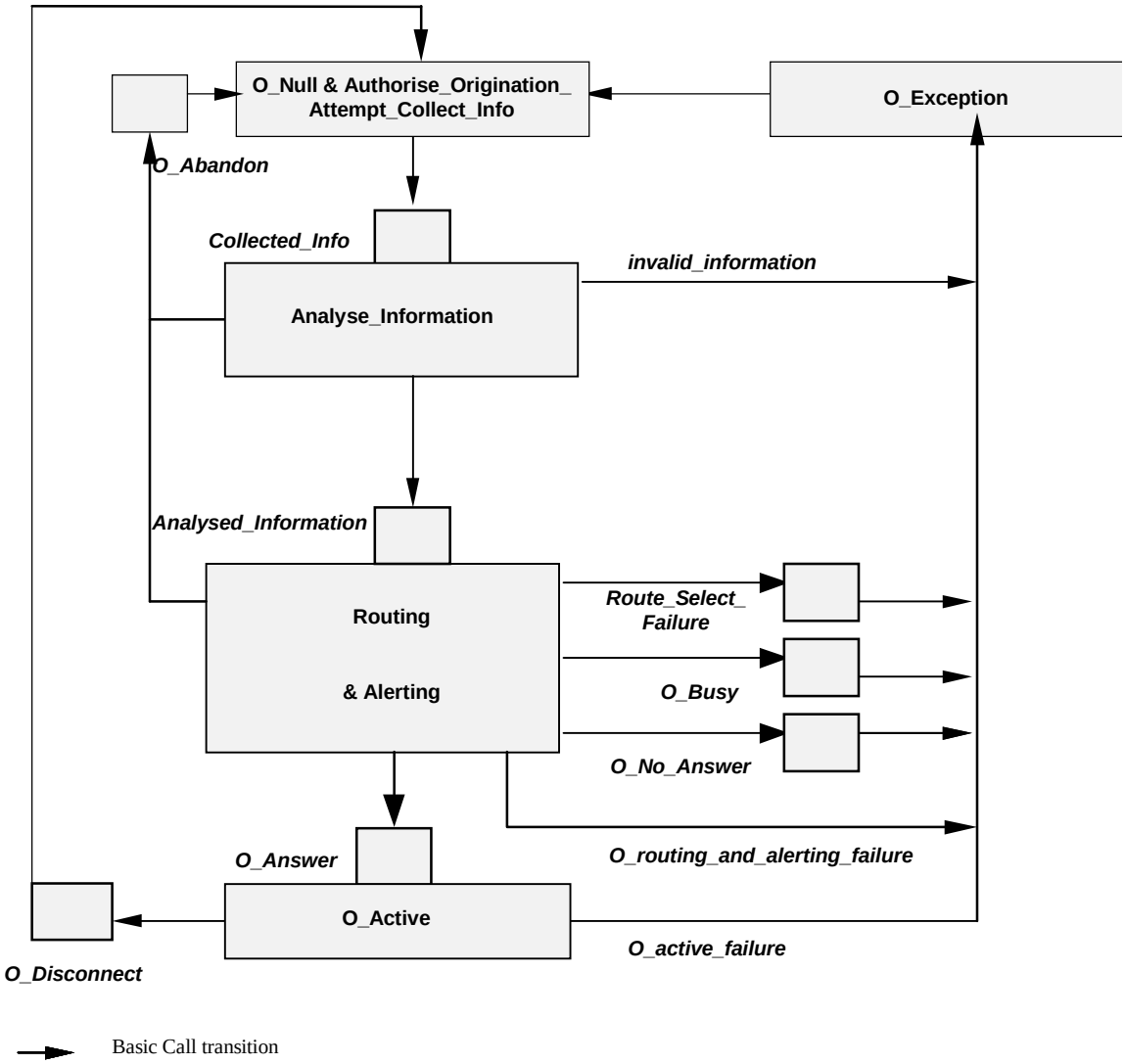

Figure 4.4~~4.5.2.1.1~~: Originating CAMEL Basic Call State Model (O-IM-BCSM)

The following table 4.1~~4.5.2.1.1~~ defines the DPs that apply to originating calls.

Table 4.14.5.2.1.1: Description of the O-IM-BCSM DPs in an IM-SSF

CAMEL Detection Point:	DP Type	Description:
DP Collected_Info	TDP-R	Indication that the O-IM-CSI is analysed
DP Analysed_Information	TDP-R	Availability of routeing address and nature of address.
DP Route_Select_Failure	TDP-R, EDP-N, EDP-R	Indication that the session 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 upon a SIP error response.
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 upon SIP a error response
DP O_Answer	EDP-N, EDP-R	Indication that the session is accepted and answered by the terminating party.
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 session establishment procedure.

4.5.2.2 Description of Points In Call

This sub-clause describes the Points In Call for originating calls. The entry events, actions and exit events are described for each Point in Call.

4.5.2.2.1 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 IM-SSF completed.
- Abandon event is reported from Analyse_Information or Routing and Alerting PIC.
- Exception event is reported.

Actions:

- Interface is idled.
- Originating call: SIP INVITE request message containing the dialled number is received from MS.
- Information being analysed e.g., O-IM-CSI is analysed.

Exit events:

- 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.

4.5.2.2.2 Analyse_Information

Entry events:

- Originating CSI is analysed. (DP Collected Info).
- New routeing information is received when 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 Routing and Alerting PIC.
- New routeing information is received when Disconnect event is reported from 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 number) - this leads to the O_Exception PIC.
- Calling party abandons the call - this leads to the O_Abandon DP.

4.5.2.2.3 Routing and Alerting

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.
- Call is being processed by the terminating half BCSM. Continued processing of SIP call session setup (e.g., ringing) is taking place. Waiting for indication from terminating half BCSM that the call has been answered by terminating party.

Exit events:

- Indication from the terminating half BCSM that the call is accepted and answered by terminating party (DP O_Answer).
- An exception condition is encountered - this leads to the O_Exception PIC.
- 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.
- Attempt to select the route for the call fails - this leads to the Route_Select_Failure DP.

If the no reply timer expires and DP O_No_Answer is armed - this leads to the O_No_Answer DP.

4.5.2.2.4 O_Active

Entry events:

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

Actions:

- SIP session established between originating party and terminating party. - Call release is awaited.

Exit events:

- 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.

4.5.2.2.5 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 IM-SSF and the gsmSCF, the IM-SSF shall send an error information flow closing the relationships and indicating that any outstanding call handling instructions will not run to completion.

  - Resources made available for setting up the SIP call session are released.

Exit events:

- Default handling of the exception condition by IM-SSF completed.

4.5.3 Mapping of SIP Method/Response to O-IM-BCSM Detection Points

This sub-clause describes mapping of SIP methods and responses to CAMEL Detection Points.

Table 4.2~~4.5.3.1~~: Mapping of SIP Method/Response to CAMEL O-IM-BCSM DPs

CAMEL O-IM-BCSM DP:	SIP Method/Response
DP Collected_Info	INVITE
DP Analysed_Information	N/A
DP Route_Select_Failure	4XX (except 401, 407, 408, 480, 486), 5xx, and 6xx (except 600, 603)
DP O_Busy	486 Busy Here 600 Busy Everywhere
DP O_No_Answer	603 Decline 408 Request Timeout 480 Temp Unavailable
DP O_Answer	200 OK
DP O_Disconnect	BYE
DP O_Abandon	CANCEL

4.5.4 Terminating CAMEL Basic Call State Model (T-IM-BCSM)

4.5.4.1 Description of the T-IM-BCSM

The T-IM-BCSM is used to model the behaviour of an IM-SSF for a terminating call. When a DP is encountered, T-IM-BCSM processing is suspended at the DP and IM-SSF indicates this to the gsmSCF if appropriate.

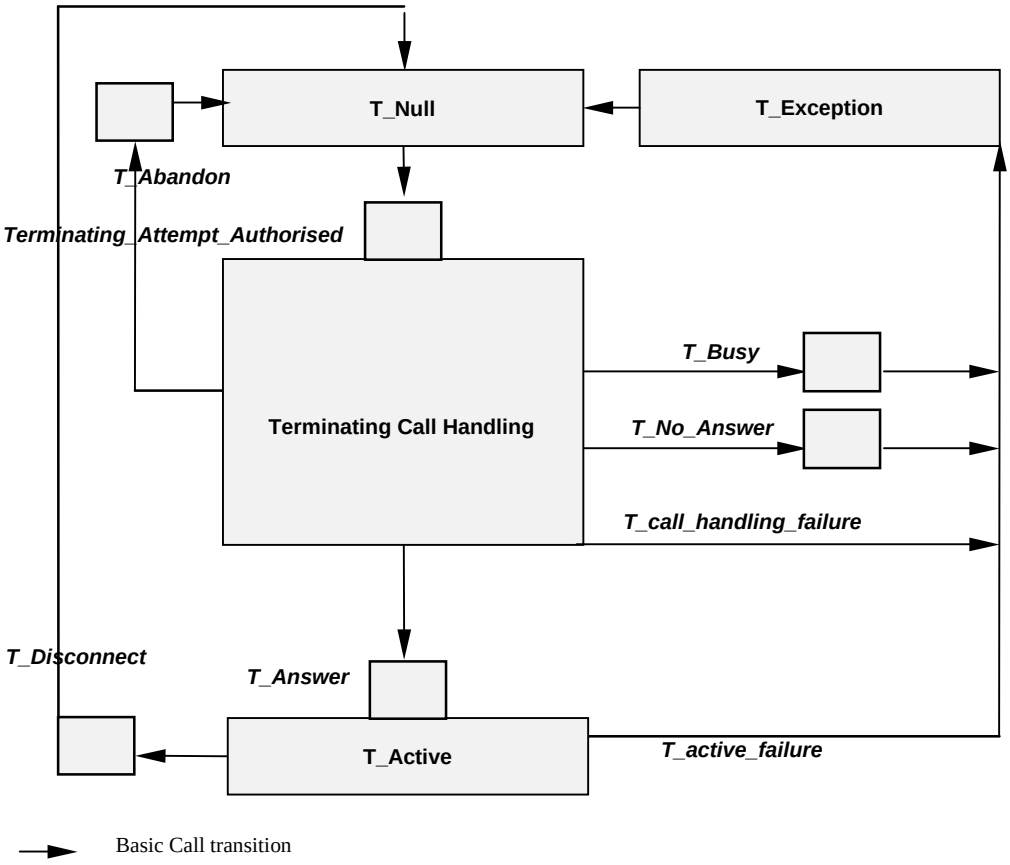

Figure 4.5~~4.5.4.1.1~~: Terminating CAMEL Basic Call State Model (T-IM-BCSM)

The following table 4.3~~4.5.4.1.1~~ defines the DPs that apply to terminating calls.

Table 4.34.5.4.1.1: Description of T-IM-BCSM DPs in the S-CSCF

CAMEL DP:	DP Type	Description:
DP Terminating_Attempt_ _Authorised	TDP-R	Indication that the VT-IM-CSI is analysed.
DP T_Busy	TDP-R, EDP-N, EDP-R	Indication that: - a busy indication is received from the terminating party, - a not reachable event is determined (e.g. terminating party is not currently registered).
DP T_No_Answer	TDP-R, EDP-N, EDP-R	Indication that an application timer associated with the T_No_Answer DP expires.
DP T_Answer	EDP-N, EDP-R	Session is accepted and answered by terminating party.
DP T_Disconnect	EDP-N, EDP-R	A disconnect indication is received from the terminating party or from the originating party.
DP T_Abandon	EDP-N, EDP-R	A disconnect indication is received from the originating party during the session establishment procedure.

4.5.4.2 Description of Points In Call

This sub-clause describes the Points In Call for terminating calls. The entry events, actions and exit events are described for each Point in Call.

4.5.4.2.1 T_Null

Entry events:

- Disconnection and clearing of a previous call (DP T_Disconnect) or default handling of exceptions by IM-SSF completed.
- Abandon event is reported from Terminating Call Handling PIC.
- Exception event is reported.

Actions:

- Interface is idled.
- SIP INVITE message for terminating call request is received, the appropriate information is analysed.
- VT-IM-CSI is analysed.

Exit events:

- Terminating 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 is:

- Calling party abandons call.

4.5.4.2.2 Terminating Call Handling

Entry events:

- Terminating CSI (if available) is analysed. (DP Terminating_Attempt_Authorised).

- New routeing information is received when Busy event (DP T_Busy) or No Answer event (DP T_No_Answer) is reported from Terminating Call Handling PIC.
- New routeing information is received when Disconnect event is reported from T_Active PIC.
- New routeing information is received when the terminating party not reachable is reported from Terminating Call Handling PIC.

Actions:

- Routeing address and call type being interpreted. The next route or terminating access is being selected.
- The terminating party is being alerted. Waiting for the call to be answered by terminating party.

Exit events:

- Call is accepted and answered by terminating party.
- An exception condition is encountered - this leads to the T_Exception PIC. Example exception conditions: the SIP call session request was not successful.
- Calling party abandons the call - this leads to the T_Abandon DP.
- A busy indication is received from the terminating party's P-CSCF - this leads to the T_Busy DP.
- Not reachable event detected from the terminating party's P-CSCF this leads to the T_Busy DP.

- If no reply timer expires and DP T_No_Answer is armed - this leads to the T_No_Answer DP.

4.5.4.2.3 T_Active

Entry events:

- Indication that the call is accepted and answered by the terminating party. (DP T_Answer).

Actions:

- SIP session established between originating party and terminating party.
- Call release is awaited.

Exit events:

- A disconnection indication is received from the terminating party, or received from the originating party via the originating half BCSM. (DP T_Disconnect).
- An exception condition is encountered. In addition to specific examples listed above, exception events include any type of failure that means that the normal exit events for a PIC can not be met.

4.5.4.2.4 T_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 PIC cannot 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 IM-SSF and the gsmSCF, the IM-SSF shall send an error information flow closing the relationships and indicating that any outstanding call handling instructions will not run to completion.
  - . Resources made available for setting up the SIP call session are released.

Exit events:

- Default handling of the exception condition by IM-SSF completed.

4.5.5 Mapping of SIP Method/Response to T-IM-BCSM Detection Points

This sub-clause describes mapping of SIP methods and responses to CAMEL Detection Points.

Table 4.4~~4.5.5.1~~: Mapping of SIP Method/Response to CAMEL T-IM-BCSM DPs

CAMEL T-IM-BCSM DP:	**SIP Method/Response**
DP Terminating_Attempt_ _Authorised	INVITE
DP T_Busy	4XX (except 401, 407, 408, 480), 5xx, and 6xx (except 603)
DP T_No_Answer	603 Decline 408 Request Timeout 480 Temp Unavailable
DP T_Answer	200 OK
DP T_Disconnect	BYE
DP T_Abandon	CANCEL

3GPP TSG-CN WG2 Meeting #27
Bangkok, Thailand, 11th - 15th November 2002.

Tdoc ⌘N2-020970

CR-Form-v7

CHANGE REQUEST

⌘ **23.278** **CR** **019** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

*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:	⌘	Editorial improvement – clause 5
Source:	⌘	Siemens AG
Work item code:	⌘	IMS-CAMEL
Date:	⌘	31/10/2002
Category:	⌘	**D**
Release:	⌘	Rel-5

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:

2	*(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)*

Reason for change:	⌘	Editorial improvement for good readability
Summary of change:	⌘	References and linked document numbers – listed as document numbers sorted. Book marks are set in the clause 2 and the reference to the book marks are set in other clauses. Figure numbers and table numbers – Re-numberd as “clause number”.”sequence” (- subsequence). Sequence numbers are also assigned as gigit(s). Book marks on the figure and/or table numbers are set when neccessary. Reference to the figures and/or tables in the text are book marked. Insert non-breakable space and hiphon where neccessary. Delete (unneccessary) double spaces, double blank lines. Clause numbers for 5 – Considering the consistency with other clauses, 6 and 7, which include the subclauses for the architecture, the procedures and the information flows, whole clause 5 shall be the part of clause 4. Renumbering required hereafter (as proposed in CR 23.278-015).
Consequences if not approved:	⌘	

Clauses affected:	⌘	5 (previous, now it will be a part of clause 4)

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	O&M Specifications	

Other comments:	⌘	Most figure numbers for the procedures have not been touched except Process imcnSSF, due to the possible interaction with other CRs. The MCC is kindly requested to consider the above change if this CR is approved.

***** First modified part *****

CR editor's note: Due to the clause number change, the heading style shall also be changed hereafter.

4.65 Procedures for IM--SSF Application Server

The SDLs in this specification illustrate how CAMEL modifies the normal multimedia call. They do not attempt to show all the details of multimedia handling in all the modes that support CAMEL.

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.

5.14.6.1 Overall SDL Architecture

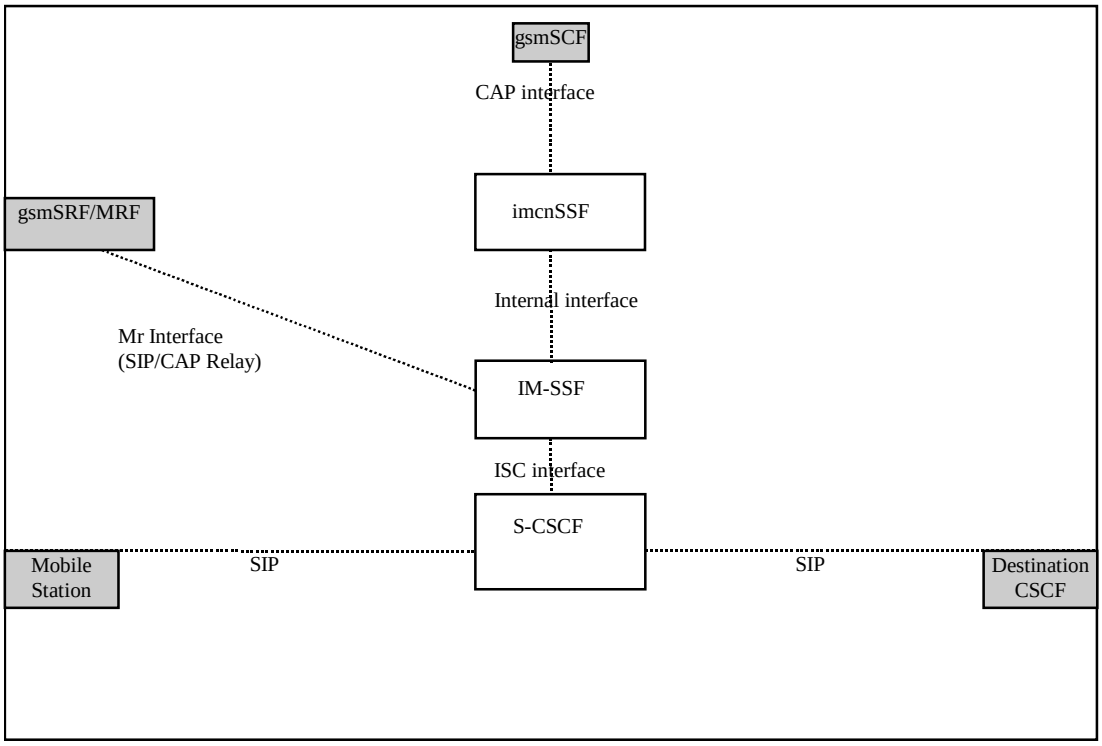

Figure Error! Reference source not found..**15.1.1: Outgoing Case (IM--SSF relay)**

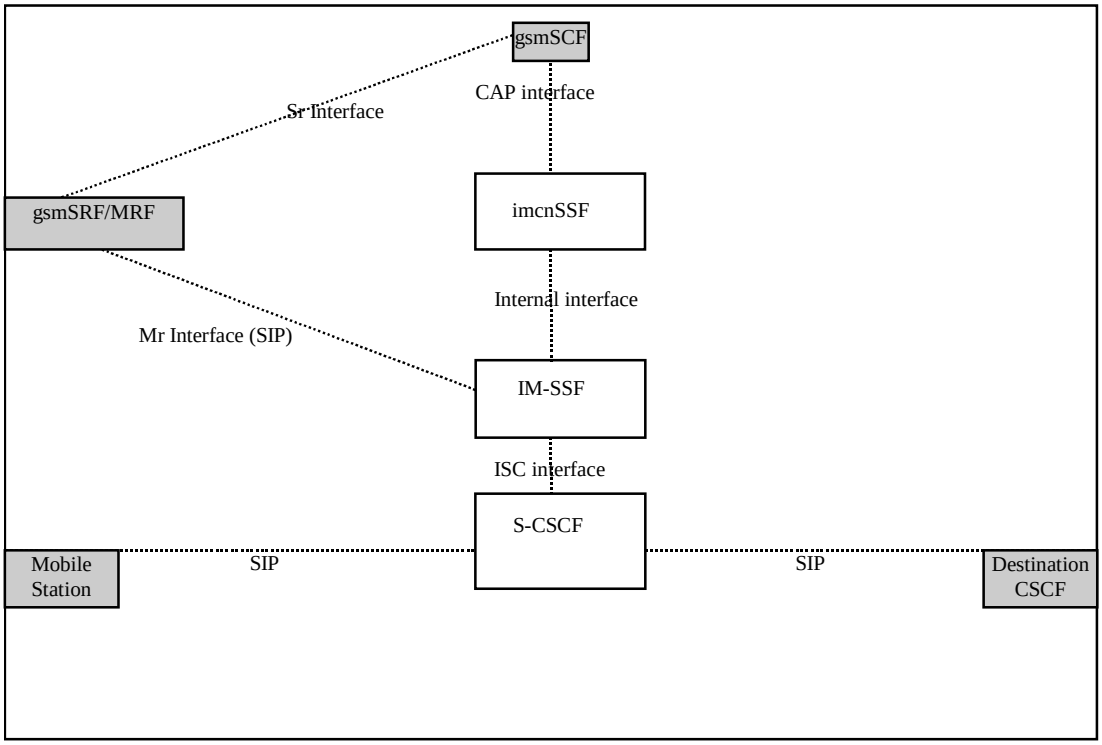

Figure Error! Reference source not found.**.25.1.2: Outgoing Case (direct path gsmSCF to gsmSRF/MRCF)**

4.6.25.1.1 Handling of Registration and De-registration in the IM--SSF

During the UE registration, the HSS shall send the filter criteria for the IM--SSF to the S--CSCF if the subscriber is provisioned with IP Multimedia CAMEL Subscription Information data at the HSS.

– The HSS shall include the IMSI data for the subscriber within the Service Information element of the filter criteria for IM--SSF. The IMSI shall be used for querying the HSS/HLR for CAMEL Subscription Information data via a MAP interface.

The CAMEL service provider determines the actual format of the data sent within the Service Information element of the filter criteria (e.g. IMSI). The actual format is transparent to the S--CSCF i.e. CAMEL service information is not processed, analysed, or evaluated by the S--CSCF. It is, however, known to the IM--SSF, gsmSCF, and the HSS (for provisioning of the service information data).

If a registration/de-registration request matches the filter criteria of the IM--SSF, the S--CSCF informs the IM--SSF of the request by performing a third party registration/de-registration i.e. a SIP REGISTER message is sent from the S--CSCF to the IM--SSF.

General handling of IP Multimedia registration, re-registration, de-registration and receipt of initial filter criteria at the S--CSCF is specified in 3GPP TS 23.228 [**Error! Reference source not found.**] and 23.218 [**Error! Reference source not found.**].

The procedures specific to CAMEL are specified in this subclause:

- –Procedure CAMEL_IMCN_Register_Init
- Procedure CAMEL_IMCN_Register;
- Procedure CAMEL_IMCN_DeRegister.

4.6.2.15.1.1.1 Procedure CAMEL_IMCN_Register

When querying the HSS for the subscriber's IM CSI data, the IM--SSF does not have to wait for the HSS's response on the first query before the subsequent queries are done. i.e Sending of multiple Any Time Interrogation operations can be

done in parallel. However, the IM-SSF shall wait for all the responses from the HSS before it shall send a SIP response message to the S-CSCF.

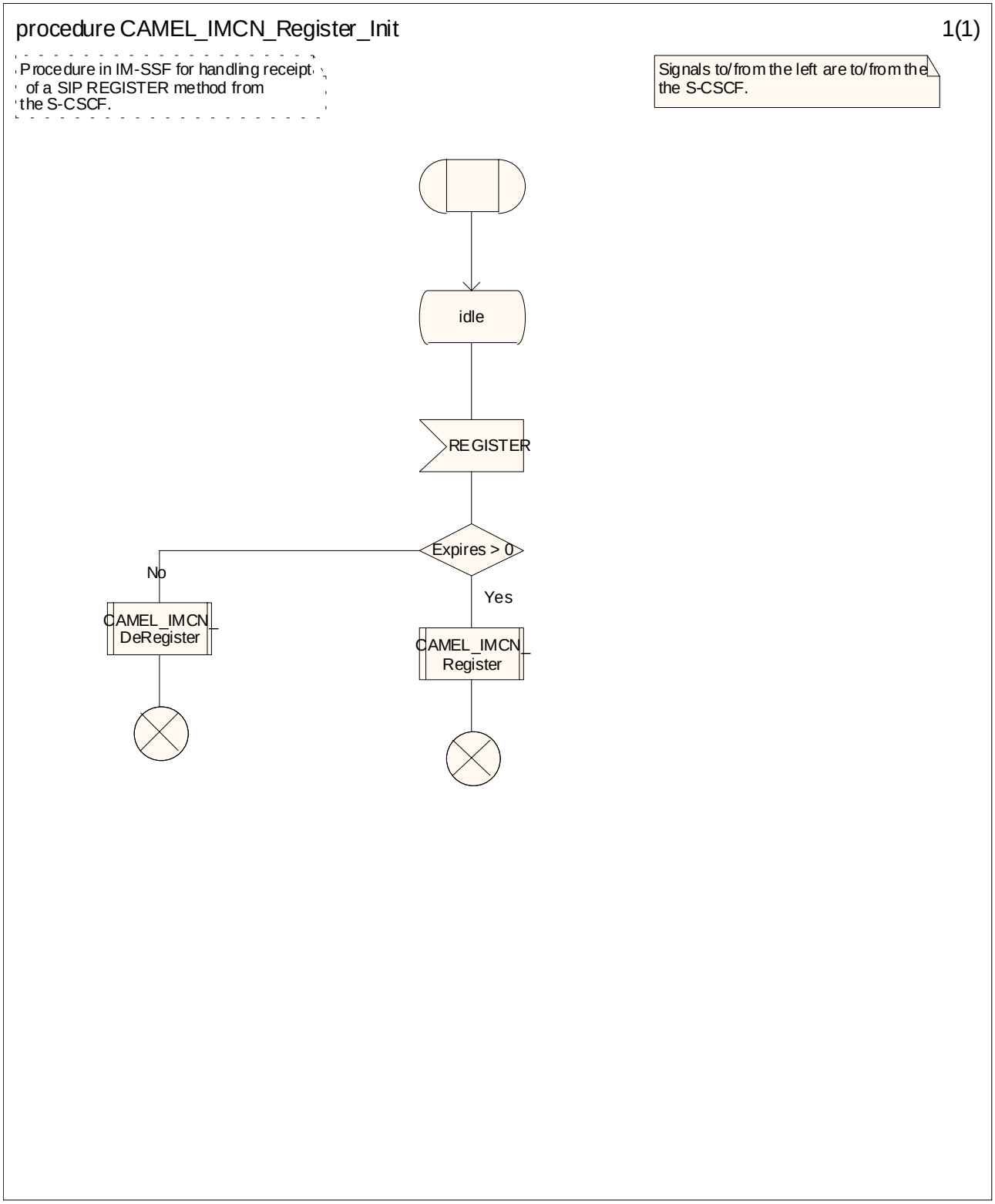

Figure 5.1.1.1a: Procedure CAMEL_IMCN_Register_Init (sheet 1)

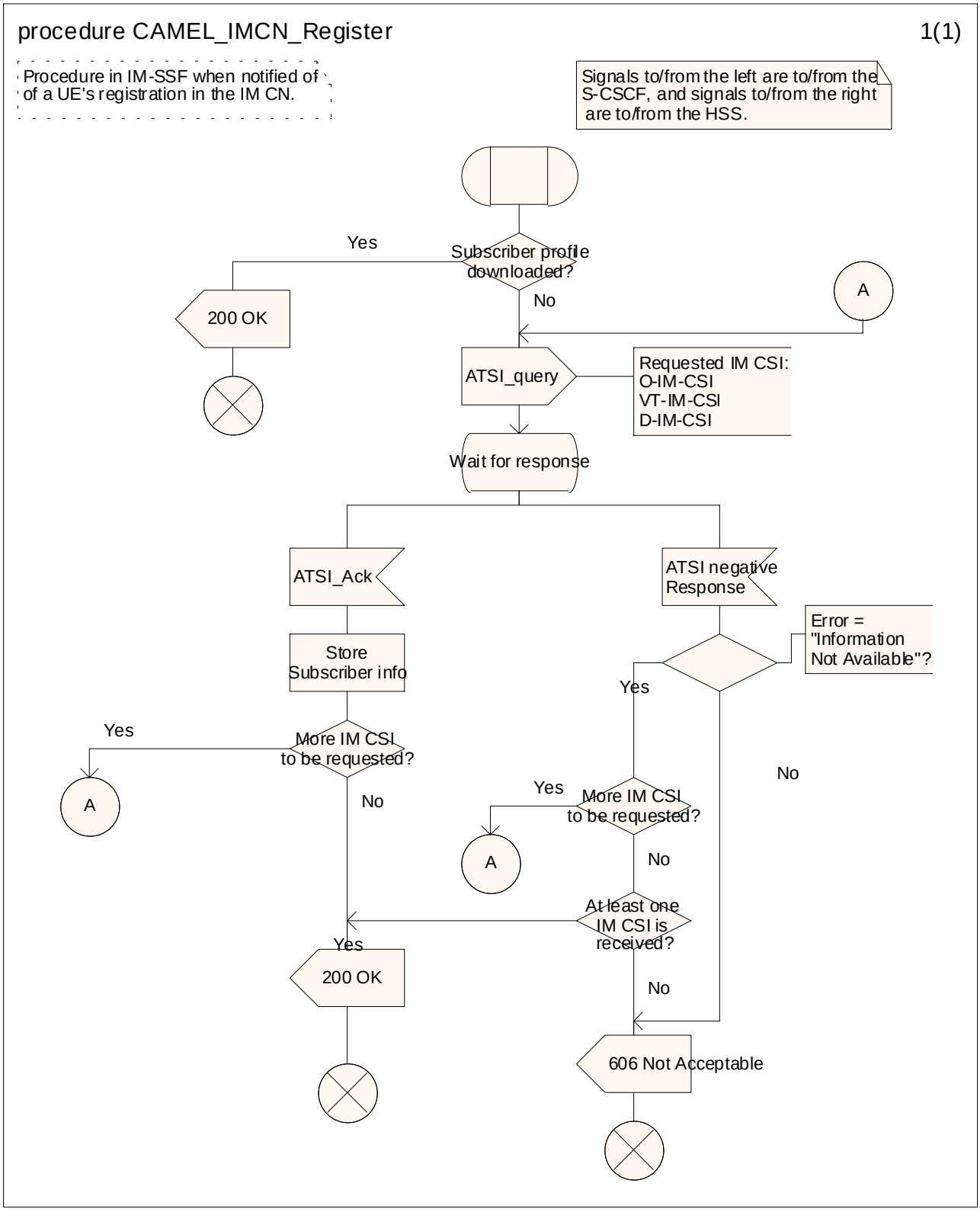

Figure 5.1.1.2a: Procedure CAMEL_IMCN_Register (sheet 1)

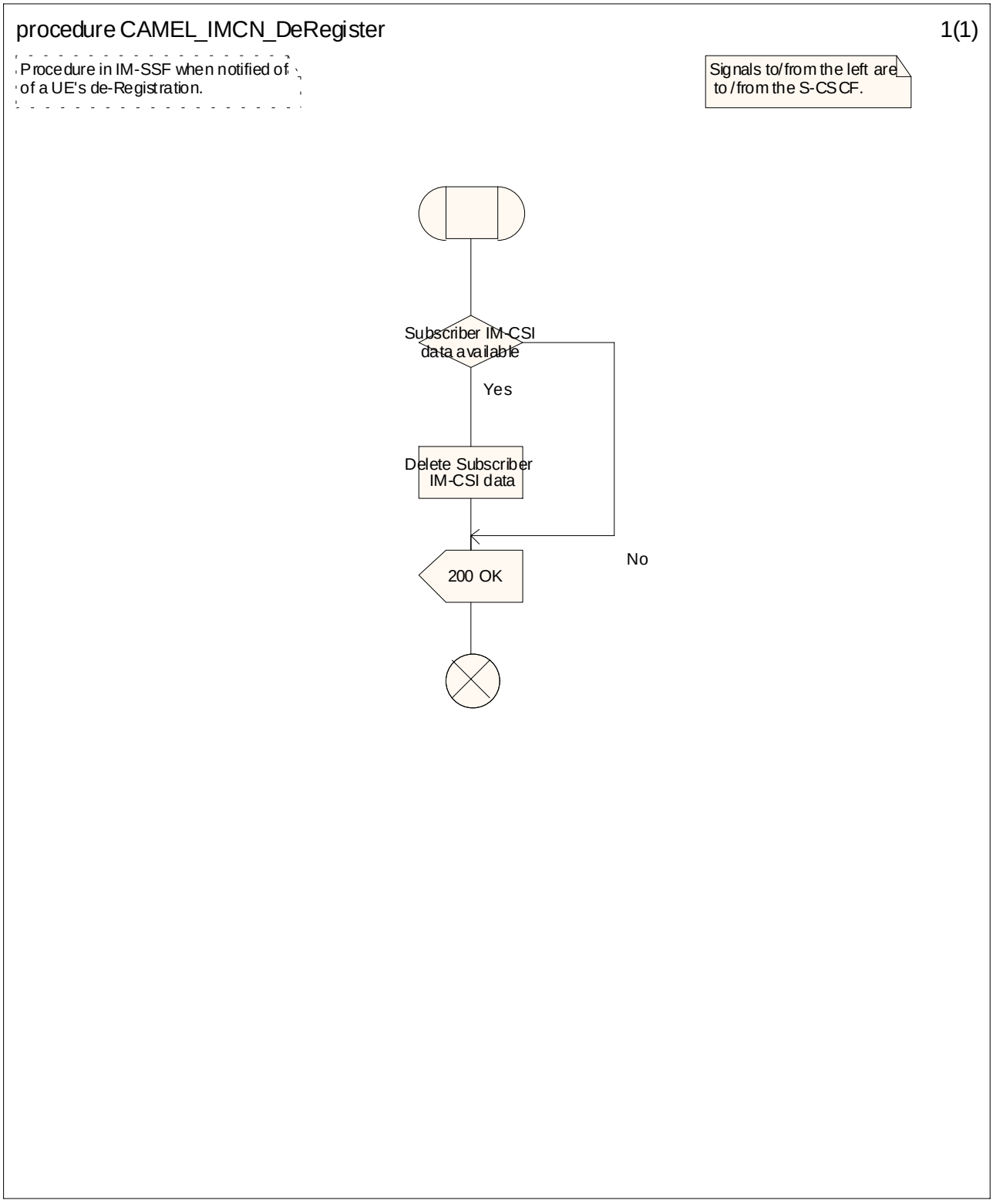

Figure 5.5a: Procedure CAMEL_IMCN_DeRegister (sheet 1)

4.6.35.1.2 Handling of Notify Subscriber Data Change

When the HSS/HLR updates the CSI for a subscriber in the IP Multimedia CN subsystem, the HSS/HLR shall send a Notify Subscriber Data Change to the IM-SSF if all of the following conditions are true:

- The IM CSI data is marked with the Notification Flag
- The IM-SSF address is included in the gsmSCF address list

The IM-SSF address shall be added in the gsmSCF address list at the HSS/HLR for notification of IM-CSI updates if one of the following conditions occurs:

a. The HSS/HLR is notified of the subscriber's registration at the S-CSCF (via Cx interface), and the subscriber is provisioned with IM CSI data.

b. Operator provisions HSS/HLR subscriber data with IMS CAMEL service while the subscriber is currently registered in the IMS network i.e. one or more IM CSI data is added to the subscriber's profile in the HSS/HLR.

c. The HSS/HLR is notified of mobile termination for an unregistered subscriber (via Cx interface), and the subscriber is provisioned with IM CSI data

The IM-SSF address shall be deleted from the gsmSCF address list when the HSS/HLR initiates, or is notified of, the UE's deregistration.

The IM-SSF address in the gsmSCF address list may be changed when the HSS/HLR receives a notification of a registration for a UE with a S-CSCF name different from the previously assigned S-CSCF name (i.e. re-registration from HSS/HLR point of -view). The HSS/HLR shall overwrite the existing IM-SSF address with the IM-SSF address associated with the new S-CSCF name.

The HSS/HLR procedure for sending the Notify Subscriber Data Change to the IM-SSF is the same procedure used for notifying the gsmSCFs in the Circuit Switched CN. This procedure is described in Procedure CAMEL_NSDC_HLR specified in 3GPP ~~TS~~ TS 23.078 Rel- ~~99~~ 99 [**Error! Reference source not found.**~~11~~].

The procedures specific to IM-SSF's handling of the Notify Subscriber Data Change is specified in this subclause:

- -Procedure CAMEL_IMCN_HSS_Update_CSI

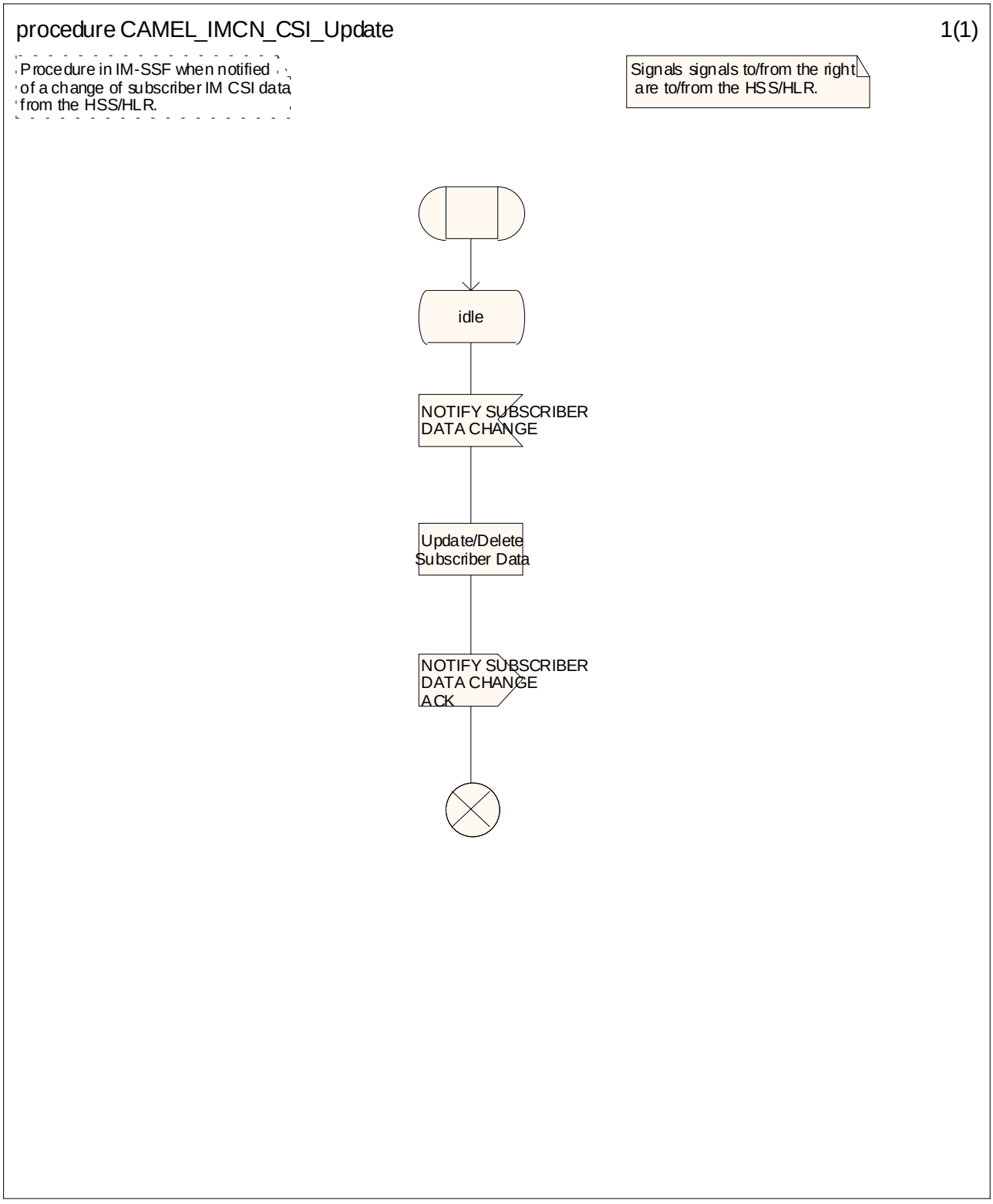

Figure 5.1.2.1a: Procedure CAMEL_IMCN_HSS_Update_CSI (sheet 1)

~~5.1.3~~4.6.4 Handling of Mobile Originated Calls in the IM-SSF

The functional behaviour of the S-CSCF is specified in 3GPP TS 23.218 [**Error! Reference source not found.**~~5~~]. The procedures specific to CAMEL are specified in this subclause:

- Procedure CAMEL_IMCN_MO_INVITE;
- Procedure CAMEL_IMCN_MO_BYE;
- Procedure CAMEL_IMCN_MO_CANCEL;
- Procedure CAMEL_IMCN_MO_Response_Code.

~~5.1.3.1~~4.6.4.1 Actions of the IM-SSF on receipt of Int_Error

The IM-SSF checks the default Call Handling parameter in the relevant CSI.

If the default call handling is release, a BYE indication is sent to the MS. The IM-SSF then releases all resources and the invoked CAMEL procedure ends.

If the call handling is continue, the IM-SSF continues processing without CAMEL support.

4.6.4.2~~5.1.3.2~~ Actions of the IM-SSF on receipt of Int_Continue

The IM-SSF continues processing without any modification of call parameters.

4.6.4.3~~5.1.3.3~~ Actions of the IM-SSF on receipt of Int_Continue_With_Argument

The IM-SSF continues processing with modified call parameters. The IM-SSF shall modify the call parameters by the information received in the Int_Continue_With_Argument message. Call parameters that are not included in the Int_Continue_With_Argument_Message are unchanged.

4.6.4.4~~5.1.3.4~~ Actions of the IM-SSF on receipt of Int_Connect

The IM-SSF continues processing with modified call parameters. The IM-SSF shall transparently modify the call parameters with the received information. Call parameters which are not included in the Int_Connect message are unchanged.

4.6.4.5~~5.1.3.5~~ Actions of the IM-SSF on receipt of Int_Release_Call

A BYE is sent to the MS, and a BYE is sent to the destination CSCF. The release cause received in the Int_Release_Call is used. The IM-SSF then releases all call resources and all CAMEL processing ends.

***** Next modified part *****

~~5.1.4~~4.6.5 Handling of Mobile Terminated IP Multimedia sessions in the IM-SSF

The functional behaviour of the S-CSCF for handling terminating calls is specified in 3GPP ~~TS~~ TS 23.218 [**Error! Reference source not found.**~~5~~]. The procedures specific to CAMEL are specified in this subclause:

- Procedure CAMEL_IMCN_MT_INVITE;
- Procedure CAMEL_IMCN_MT_BYE;
- Procedure CAMEL_IMCN_MT_CANCEL
- Procedure CAMEL_IMCN_MT_Response_Code.

~~5.1.4.1~~4.6.5.1 Actions of the IM--SSF on receipt of Int_Error

The IM--SSF checks the default Call Handling parameter in the relevant CSI.

If the default call handling is release, a BYE indication is sent to the originating CSCF. The IM--SSF then releases all resources and the invoked CAMEL procedure ends.

If the call handling is continue, the IM--SSF continues processing without CAMEL support.

4.6.5.2~~5.1.4.2~~ Actions of the IM--SSF on receipt of Int_Release_Call

The IM--SSF BYE message is sent to the originating CSCF and resources are released.

4.6.5.3~~5.1.4.3~~ Actions of the IM--SSF on receipt of Int_Continue_With_Argument

The IM--SSF shall replace the call parameters by the information received in the Int_Continue_With_Argument message. Call parameters that are not included in the Int_Continue_With_Argument_Message are unchanged.

4.6.5.4~~5.1.4.4~~ Actions of IM--SSF in procedure CAMEL_IMCN_MT_INVITE for Unregistered Subscriber

When querying the HSS for the subscriber's IM CSI data, the IM--SSF does not have to wait for the HSS's response on the first query before the subsequent queries are done. i.e Sending of multiple Any Time Interrogation operations can be done in parallel. However, the IM--SSF shall wait for all the responses from the HSS before it shall continue with the handling of the terminating IP multimedia session.

***** Next modified part *****

CR editor's note: Below the figure numbers for the process imcnSSF, 4.8-n, are just example. It shall be correctly allocate considering all other figures.

~~5.1.5~~4.6.6 Handling of call in the imcnSSF

Handling of mobile calls in the imcnSSF may involve the following process and procedures:

- imcnSSF;
- imcnCheck_Criteria;
- imcnConnect_To_Resource;
- imcnHandle_AC;
- imcnHandle_ACR;
- imcnHandle_CIR;
- imcnHandle_CIR_leg;
- imcnComplete_FCI_record;
- imcnComplete_all_FCI_records;
- imcnHandle_O_AcceptCall;
- imcnHandle_T_AcceptCall.

The detailed error handling for the process imcnSSF and the associated procedures is specified in 3GPP TS 29.278 [**Error! Reference source not found.**].

~~5.1.5.1 Process imcnSSF~~

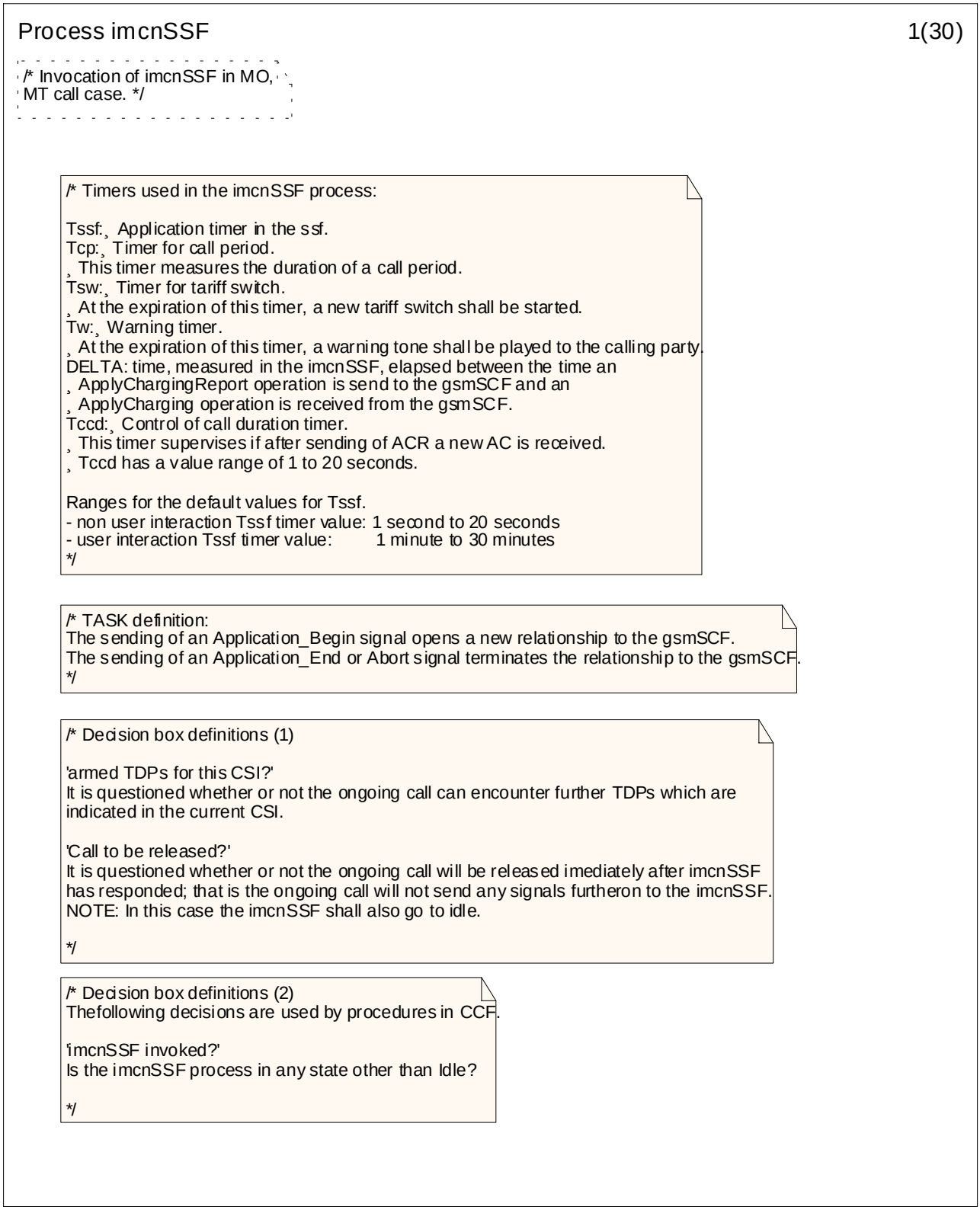

Figure Error! Reference source not found.**-3-15~~.5.1.5.1.1a~~: Process imcnSSF (sheet 1~~1~~)**

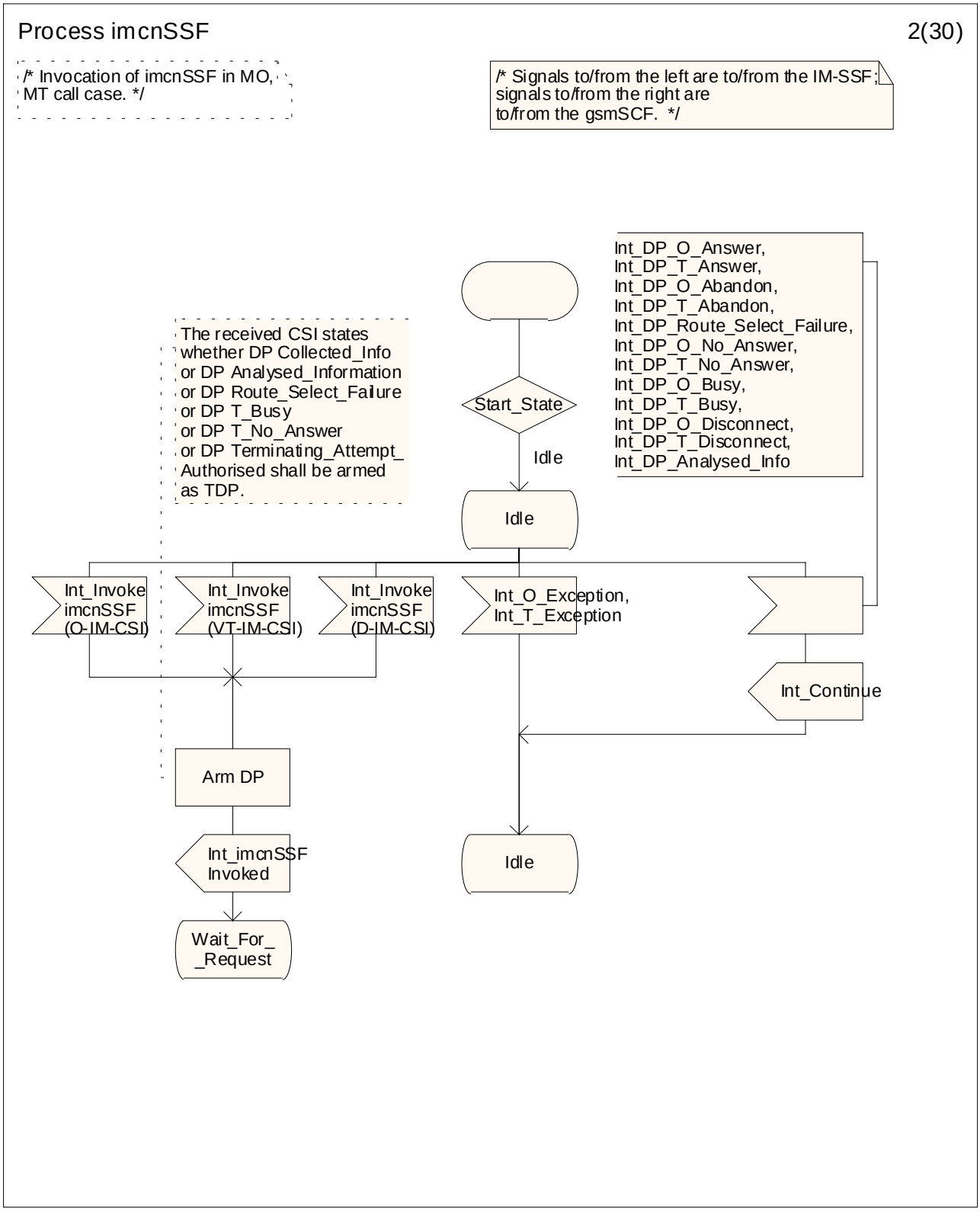

Figure Error! Reference source not found.**.3-2~~5.1.5.1.1b~~: Process imcnSSF (sheet 2~~2~~)**

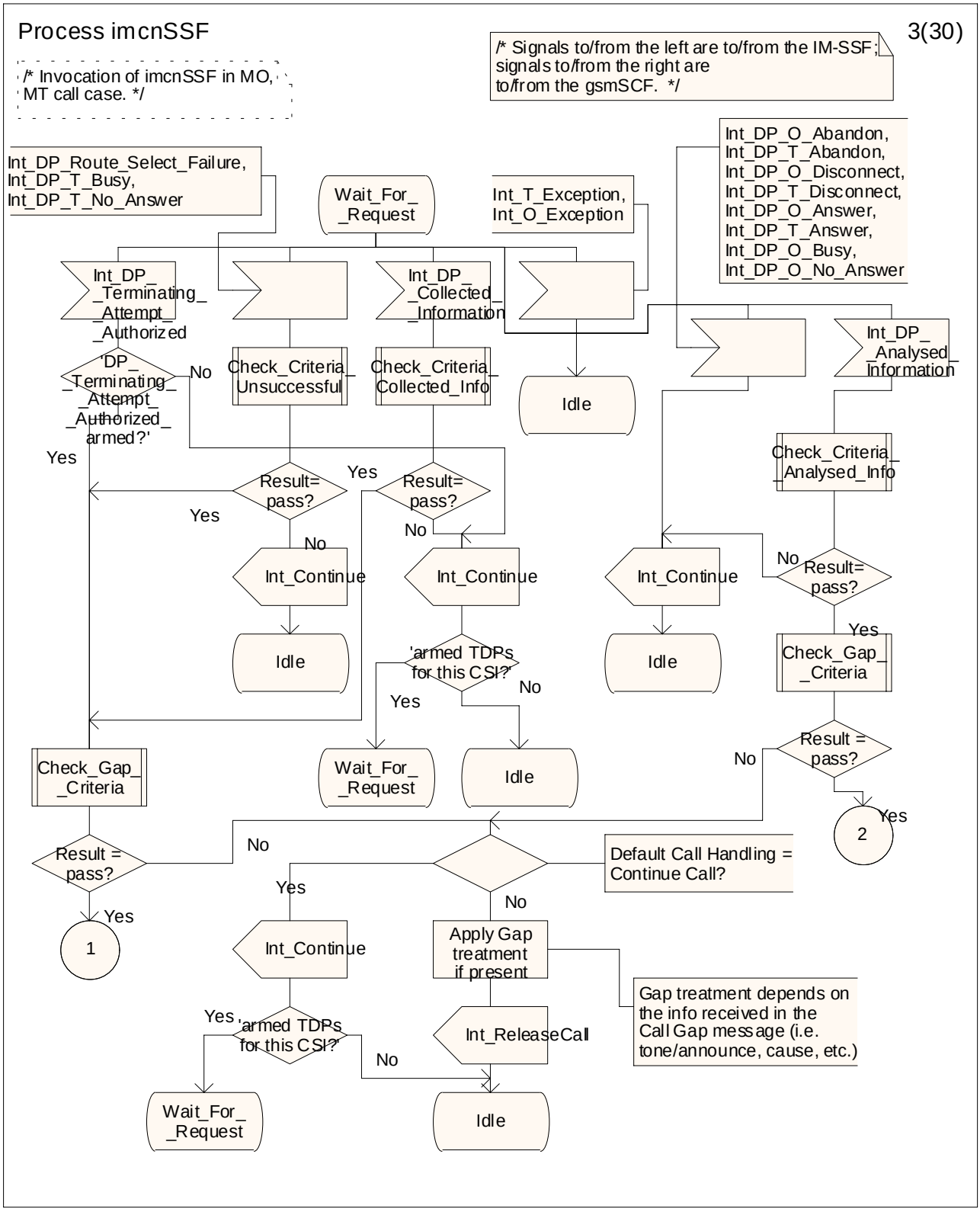

Figure Error! Reference source not found.**-3-3: Process imcnSSF (sheet 3)**~~Figure 5.1.5.1.1c: Process imcnSSF (sheet 3)~~

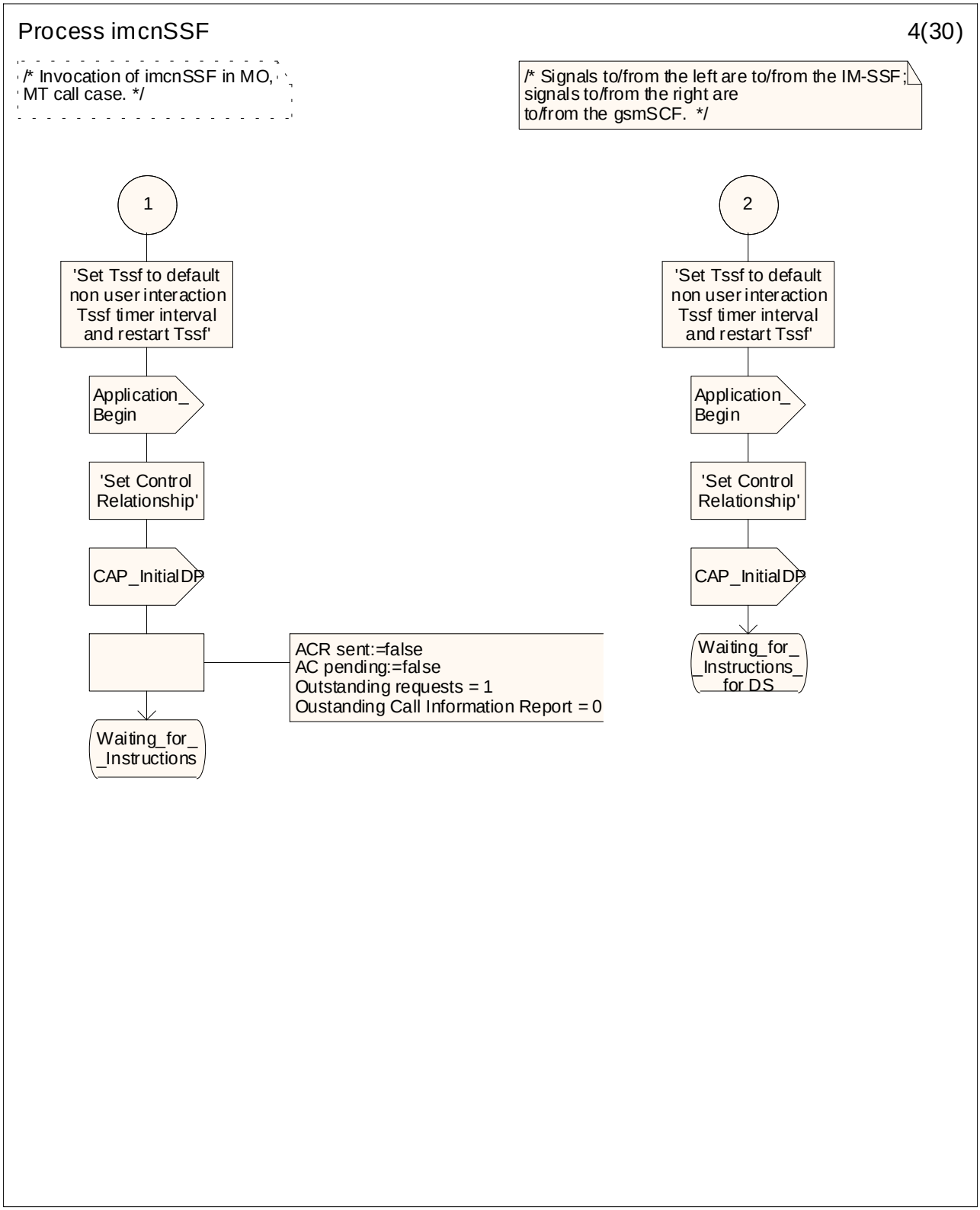

Figure Error! Reference source not found.**-3-4: Process imcnSSF (sheet 4)~~Figure 5.1.5.1.1d: Process imcnSSF (sheet 4)~~**

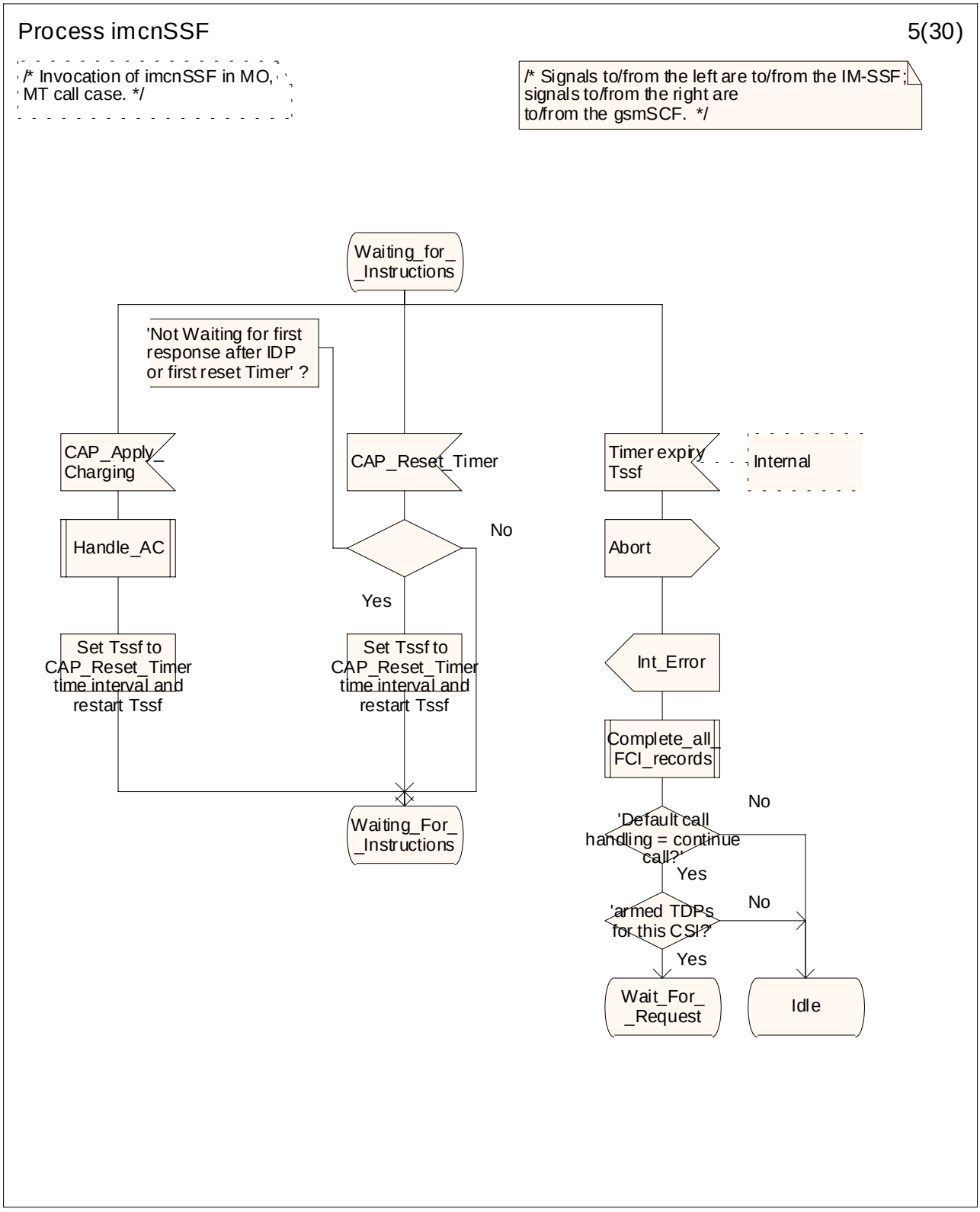

Figure Error! Reference source not found.**-3-5: Process imcnSSF (sheet 5)**~~Figure 5.1.5.1.1e: Process imcnSSF (sheet 5)~~

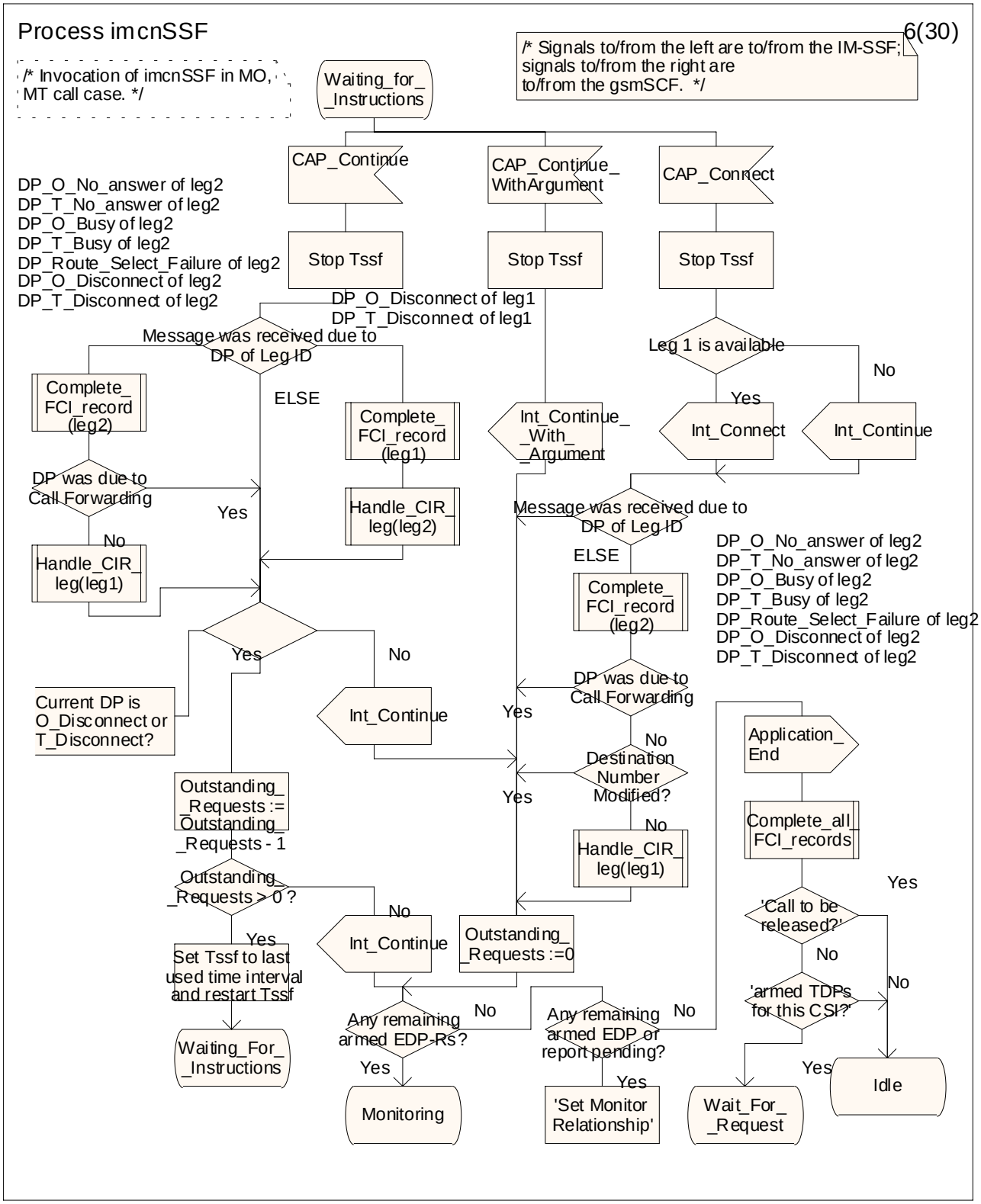

Figure Error! Reference source not found.**3-6: Process imcnSSF (sheet 6)~~Figure 5.1.5.1.1f: Process imcnSSF (sheet 6)~~**

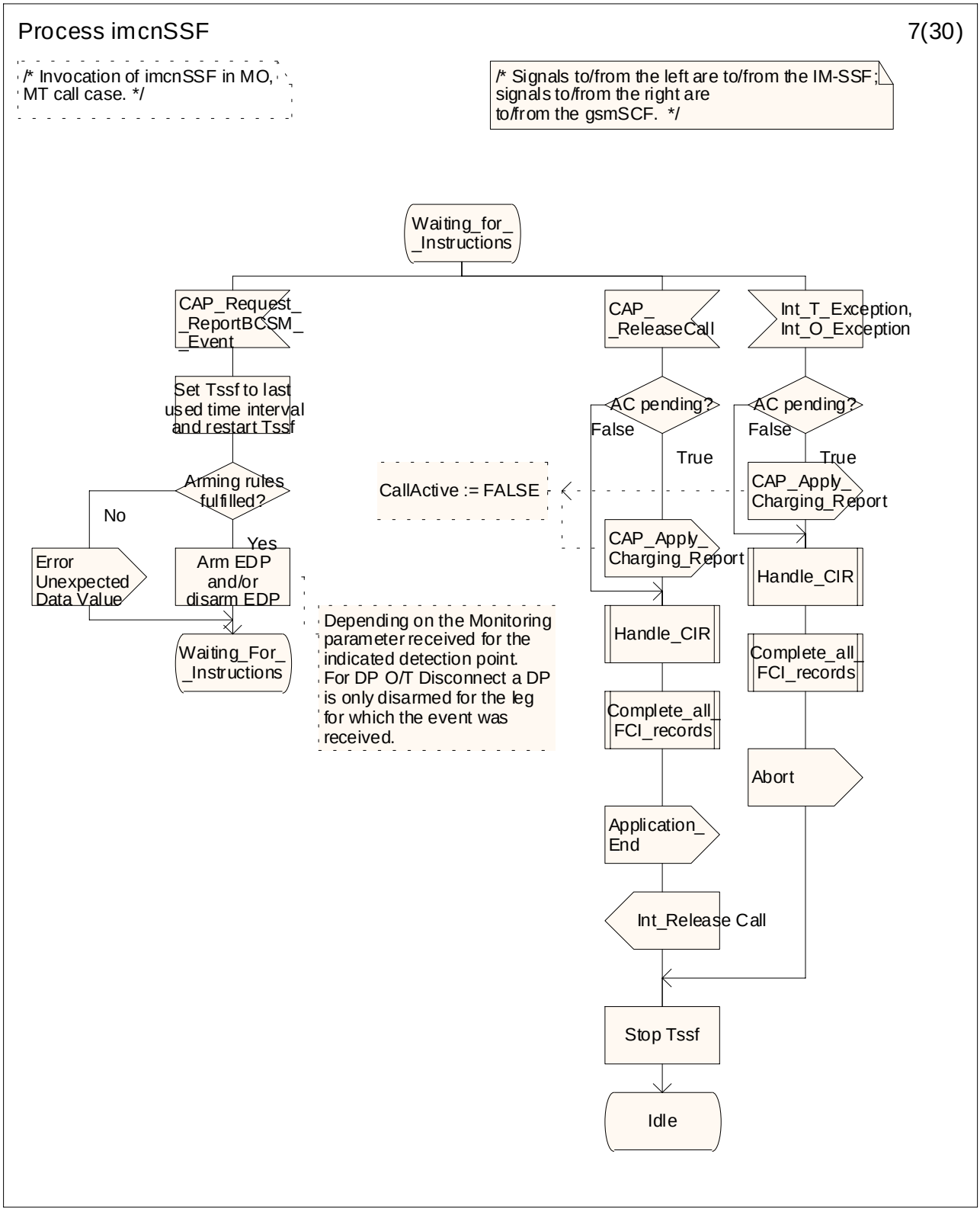

Figure Error! Reference source not found.**-3-7: Process imcnSSF (sheet 7)**~~Figure 5.1.5.1.1g: Process imcnSSF (sheet 7)~~

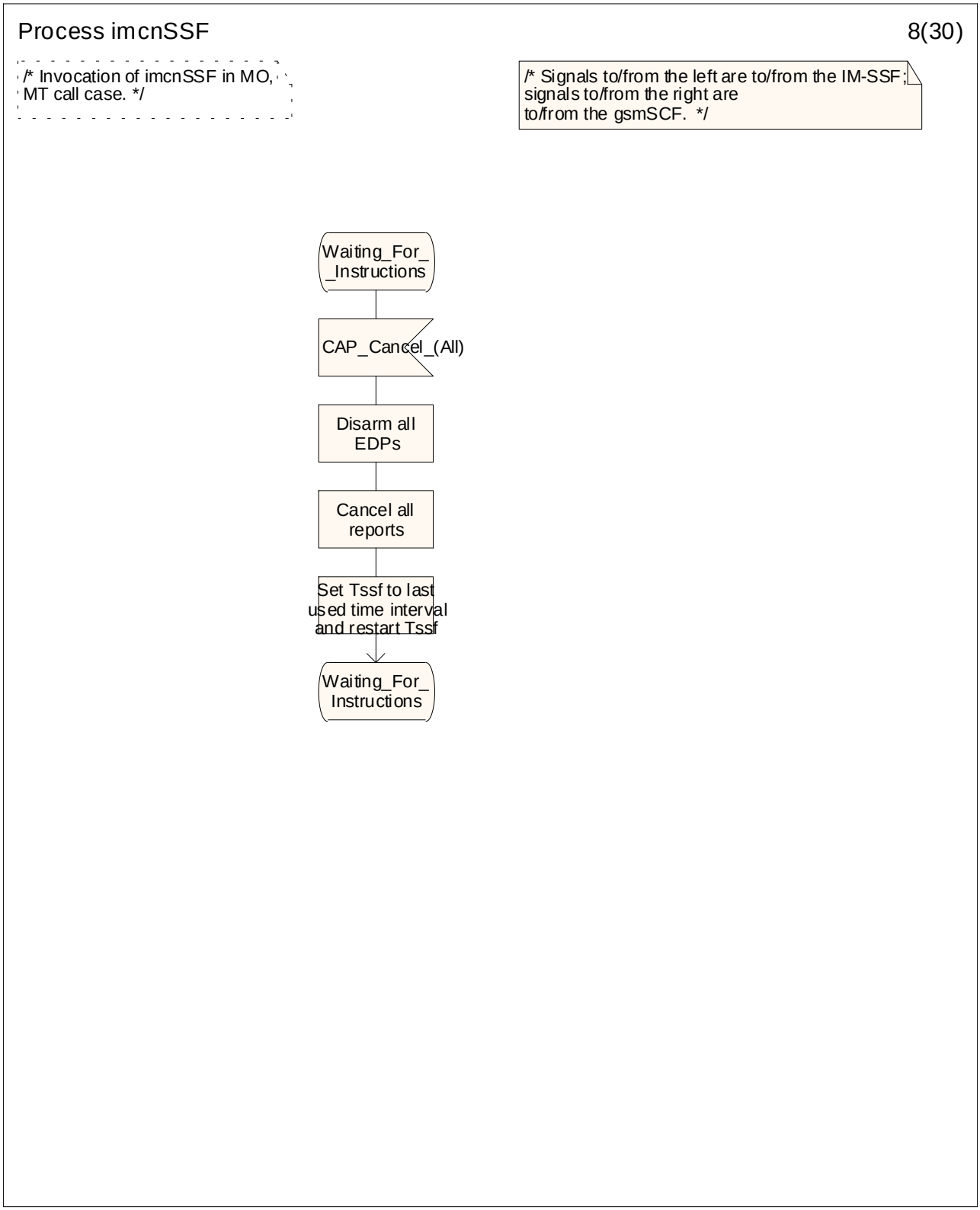

Figure Error! Reference source not found.**-3-8: Process imcnSSF (sheet 8)**~~Figure 5.1.5.1.1h: Process imcnSSF (sheet 8)~~

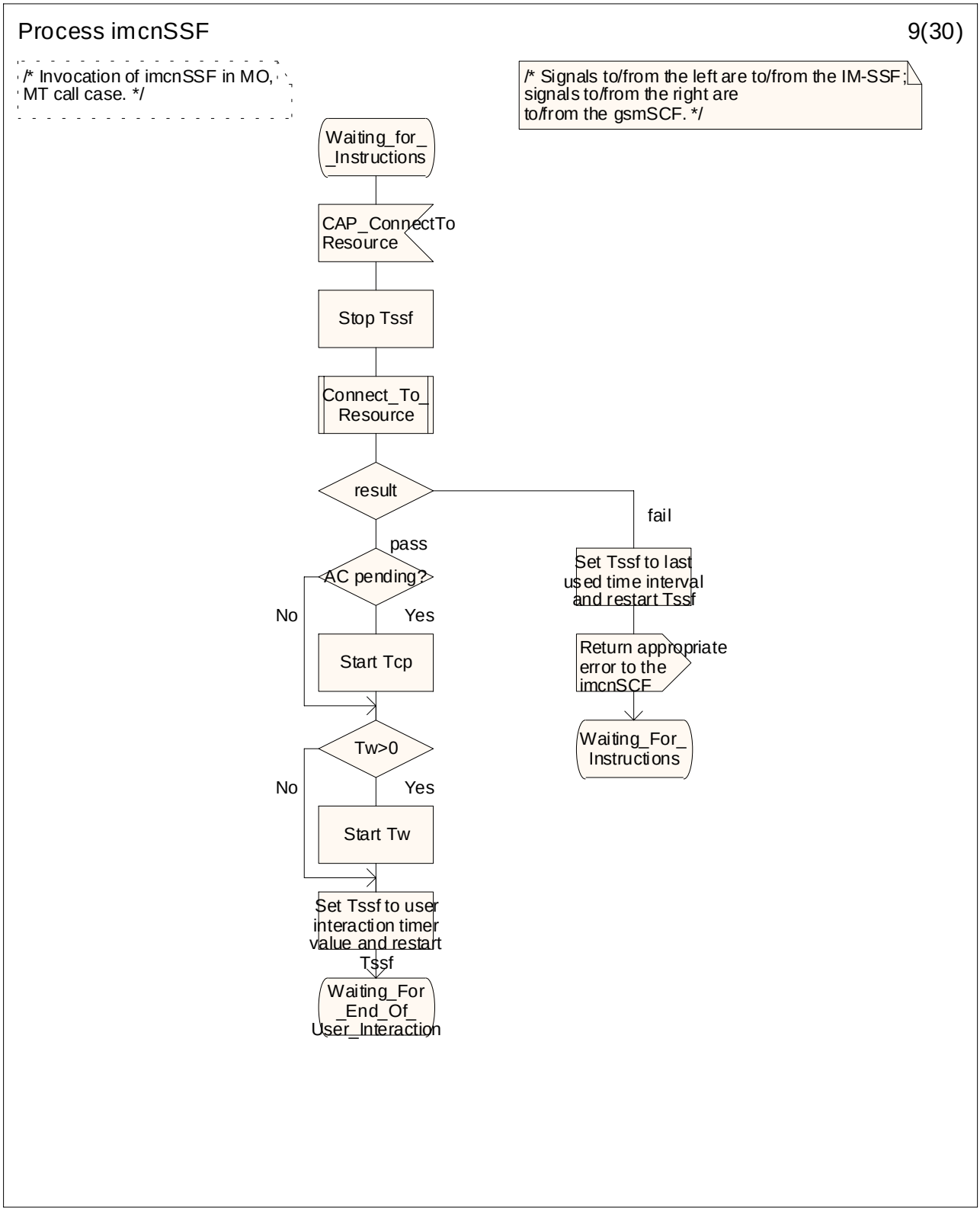

Figure Error! Reference source not found.**-3-9: Process imcnSSF (sheet 9)** ~~**Figure 5.1.5.1.1i: Process imcnSSF (sheet 9)**~~

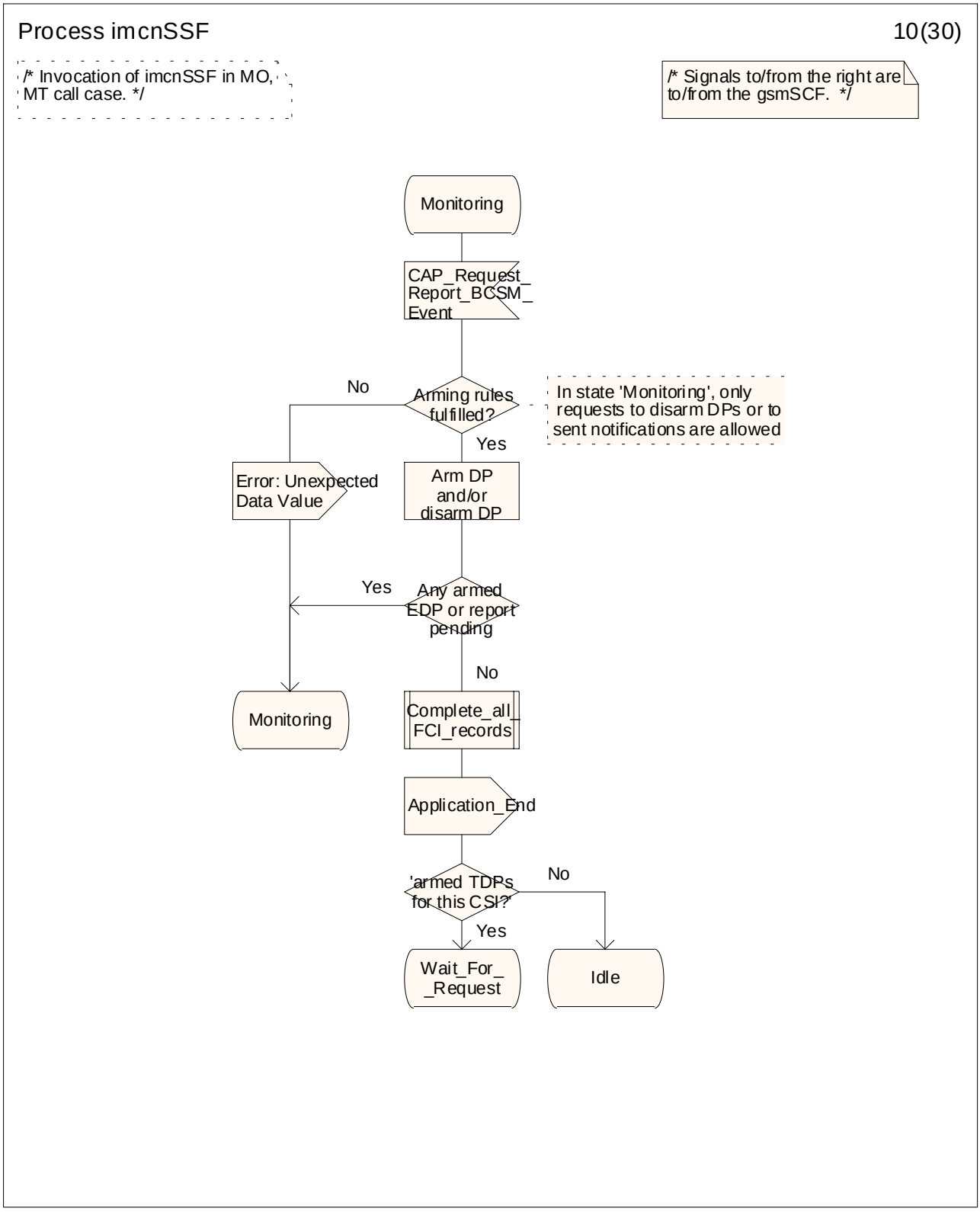

Figure Error! Reference source not found.**3-10: Process imcnSSF (sheet 10)**~~**Figure 5.1.5.1.1j: Process imcnSSF (sheet 10)**~~

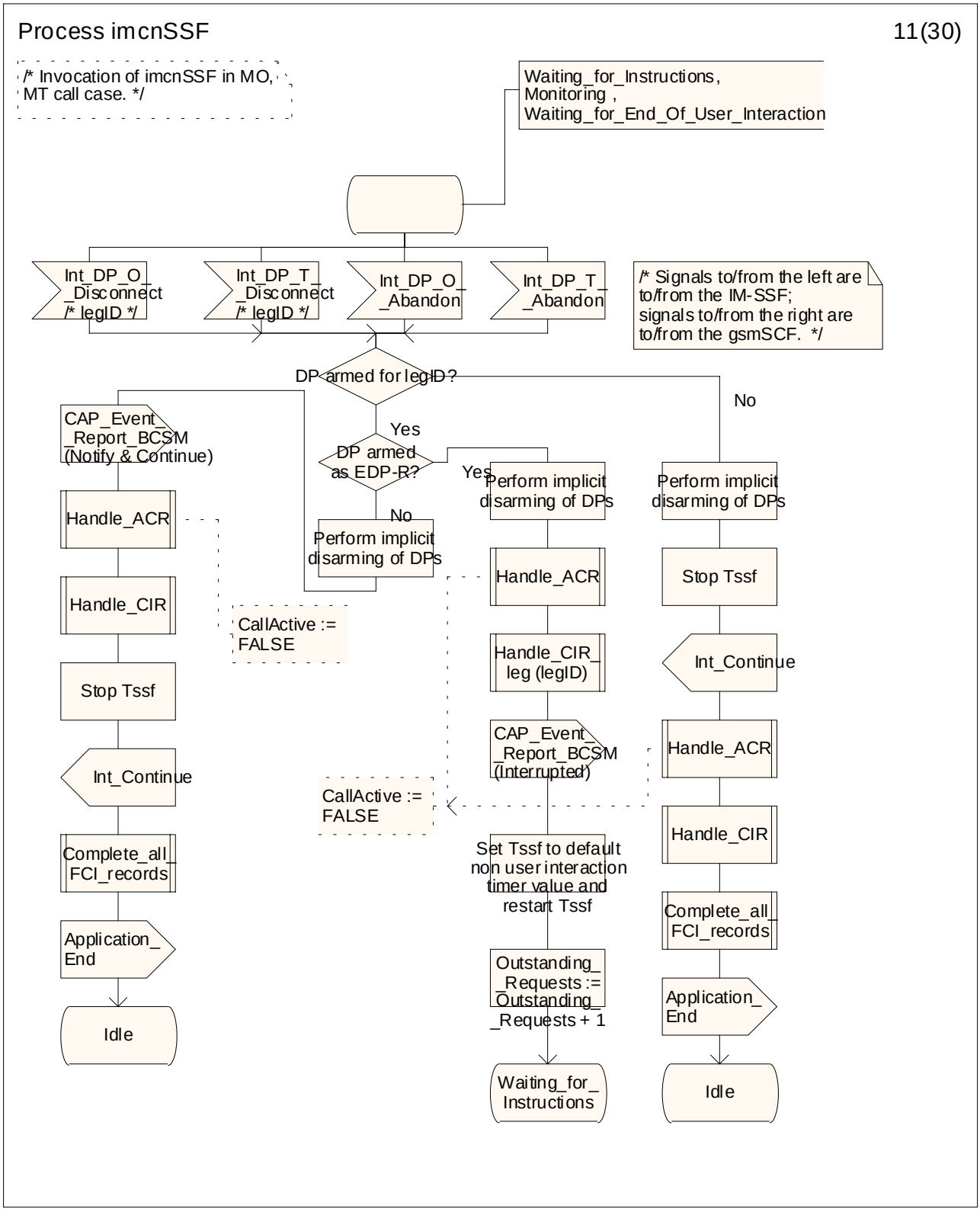

Figure Error! Reference source not found.**-3-11: Process imcnSSF (sheet 11)~~Figure 5.1.5.1.1k: Process imcnSSF (sheet 11)~~**

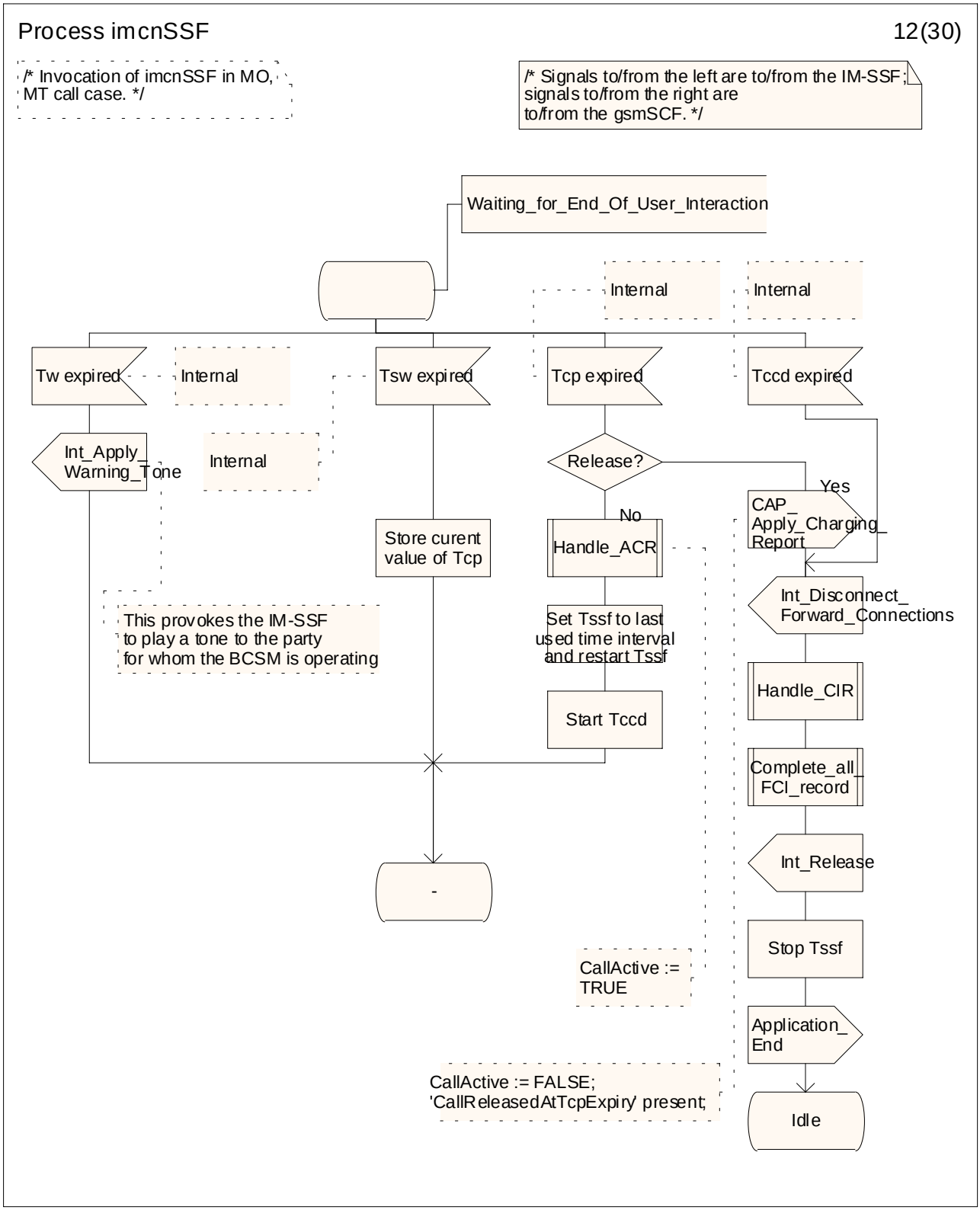

Figure Error! Reference source not found.**3-12: Process imcnSSF (sheet 12)**~~**Figure 5.1.5.1.1l: Process imcnSSF (sheet 12)**~~

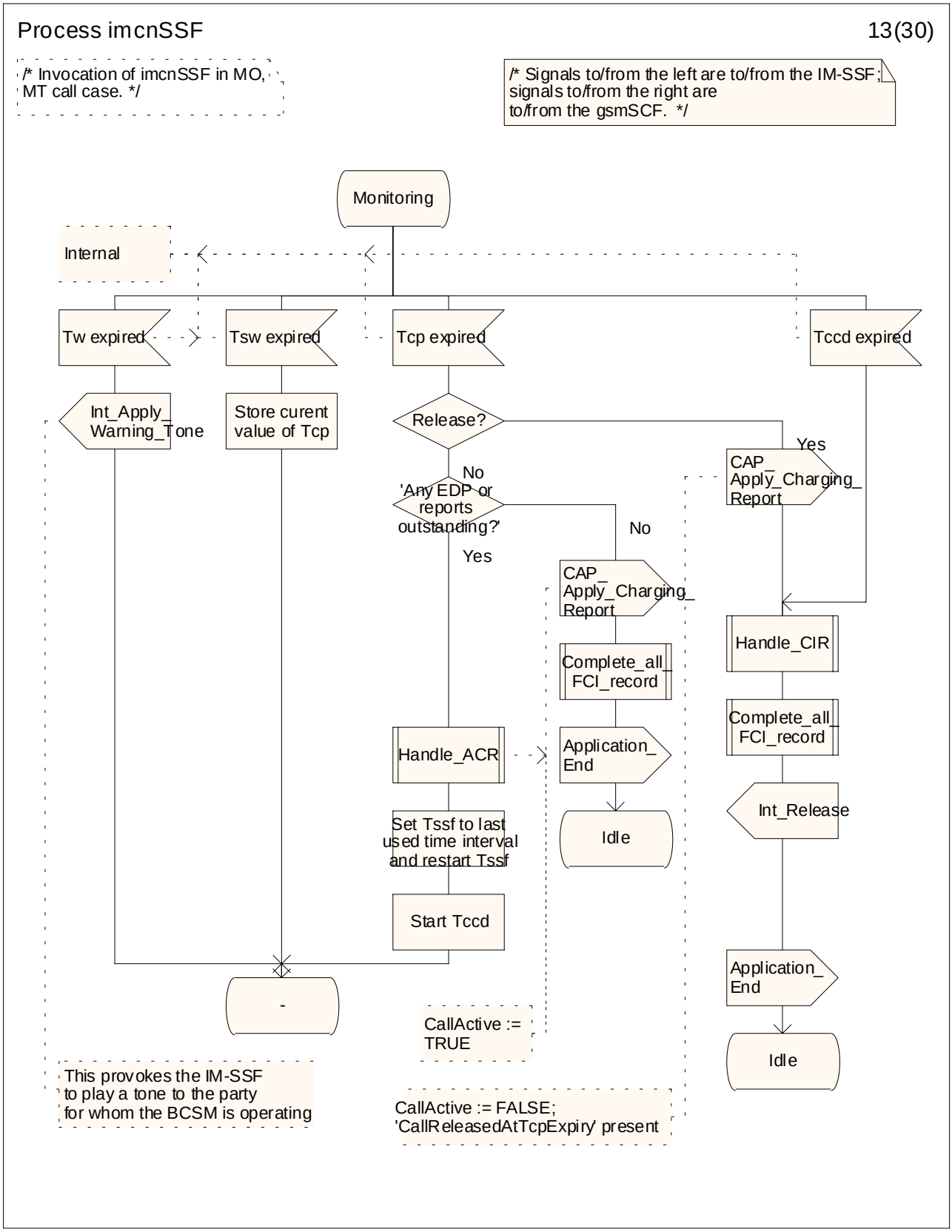

Figure Error! Reference source not found.**-3-13: Process imcnSSF (sheet 13)** ~~**Figure 5.1.5.1.1m: Process imcnSSF (sheet 13)**~~

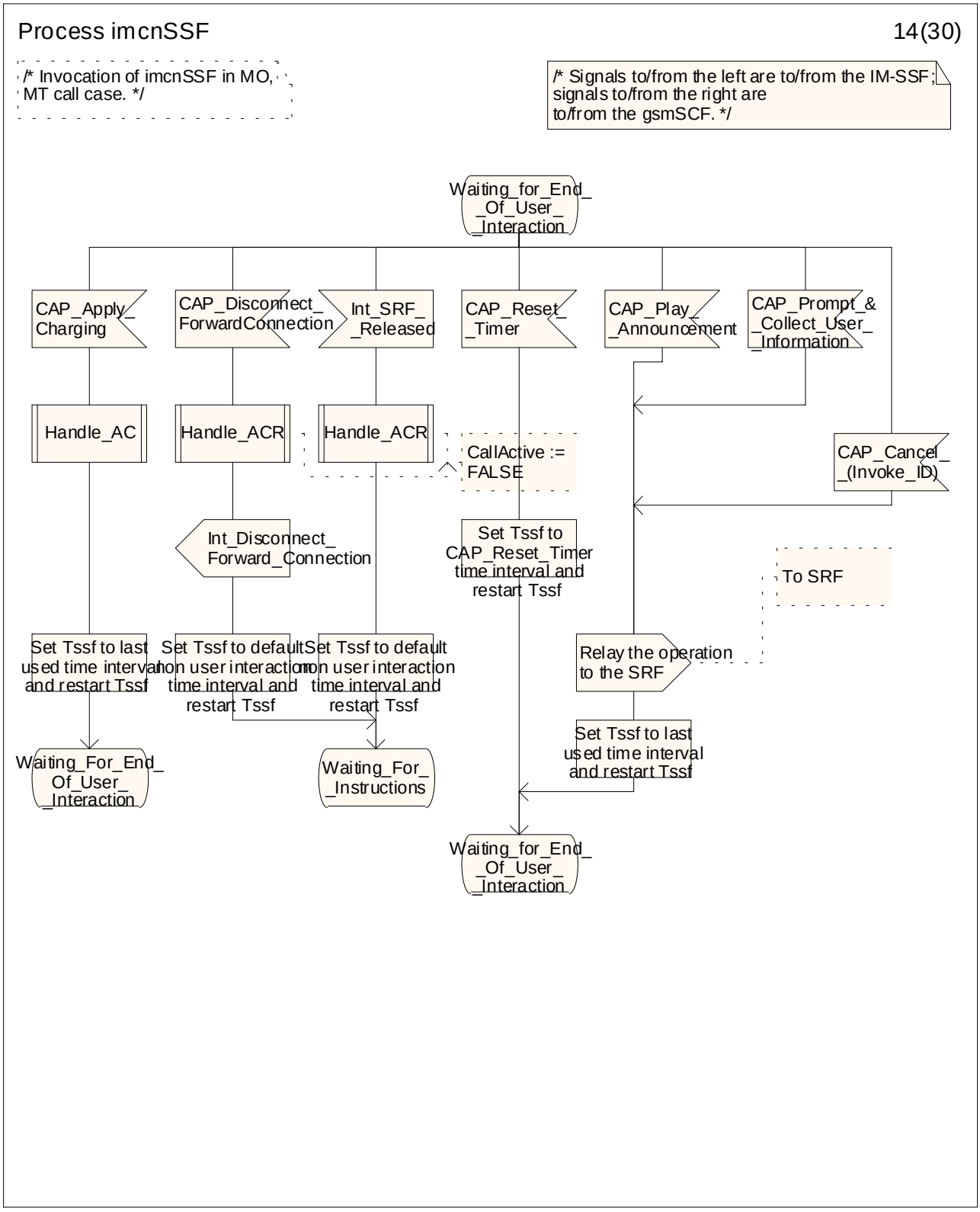

Figure Error! Reference source not found.**-3-14: Process imcnSSF (sheet 14)~~Figure 5.1.5.1.1n: Process imcnSSF (sheet 14)~~**

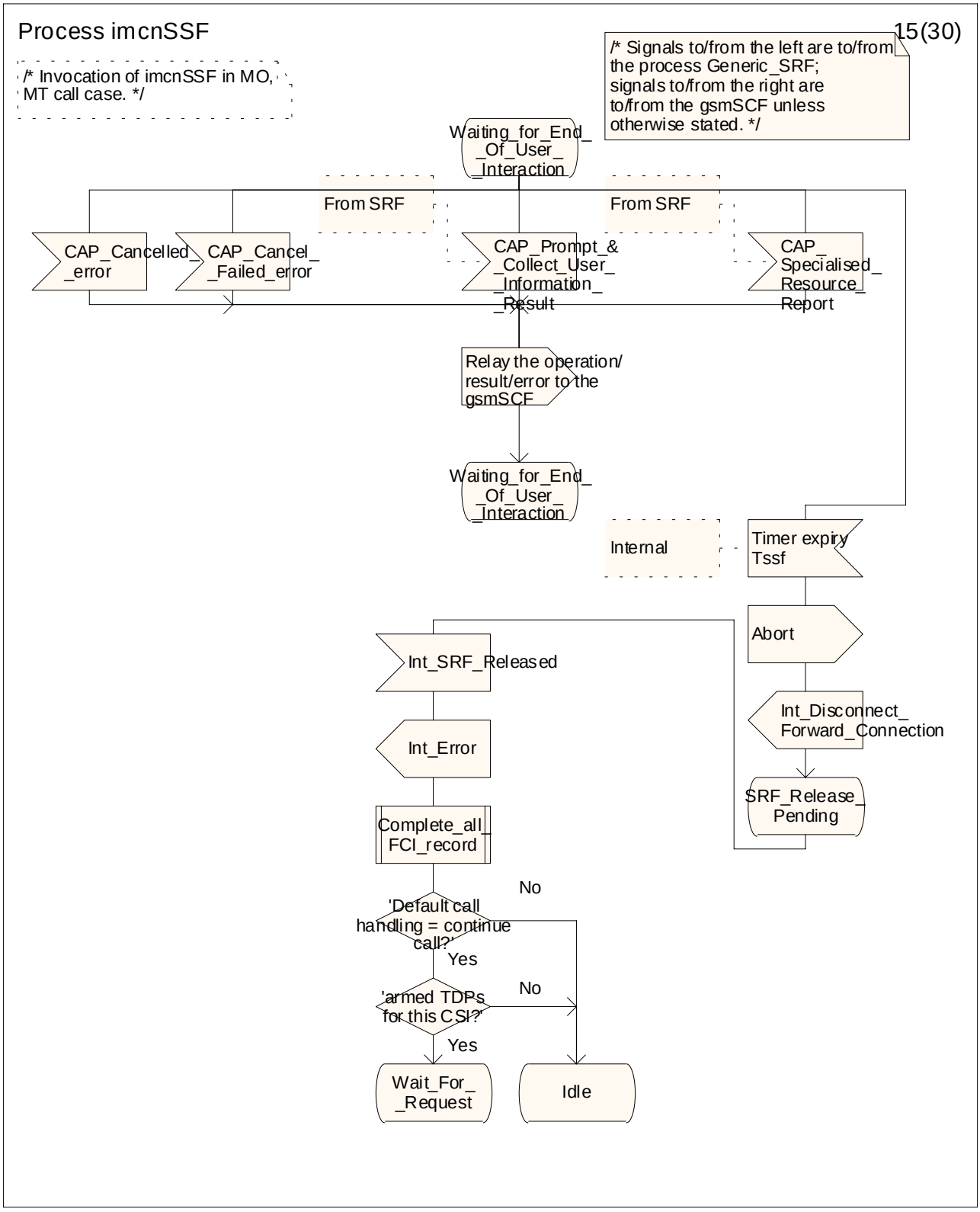

Figure Error! Reference source not found.**-3-15: Process imcnSSF (sheet 15)~~Figure 5.1.5.1.1o: Process imcnSSF (sheet 15)~~**

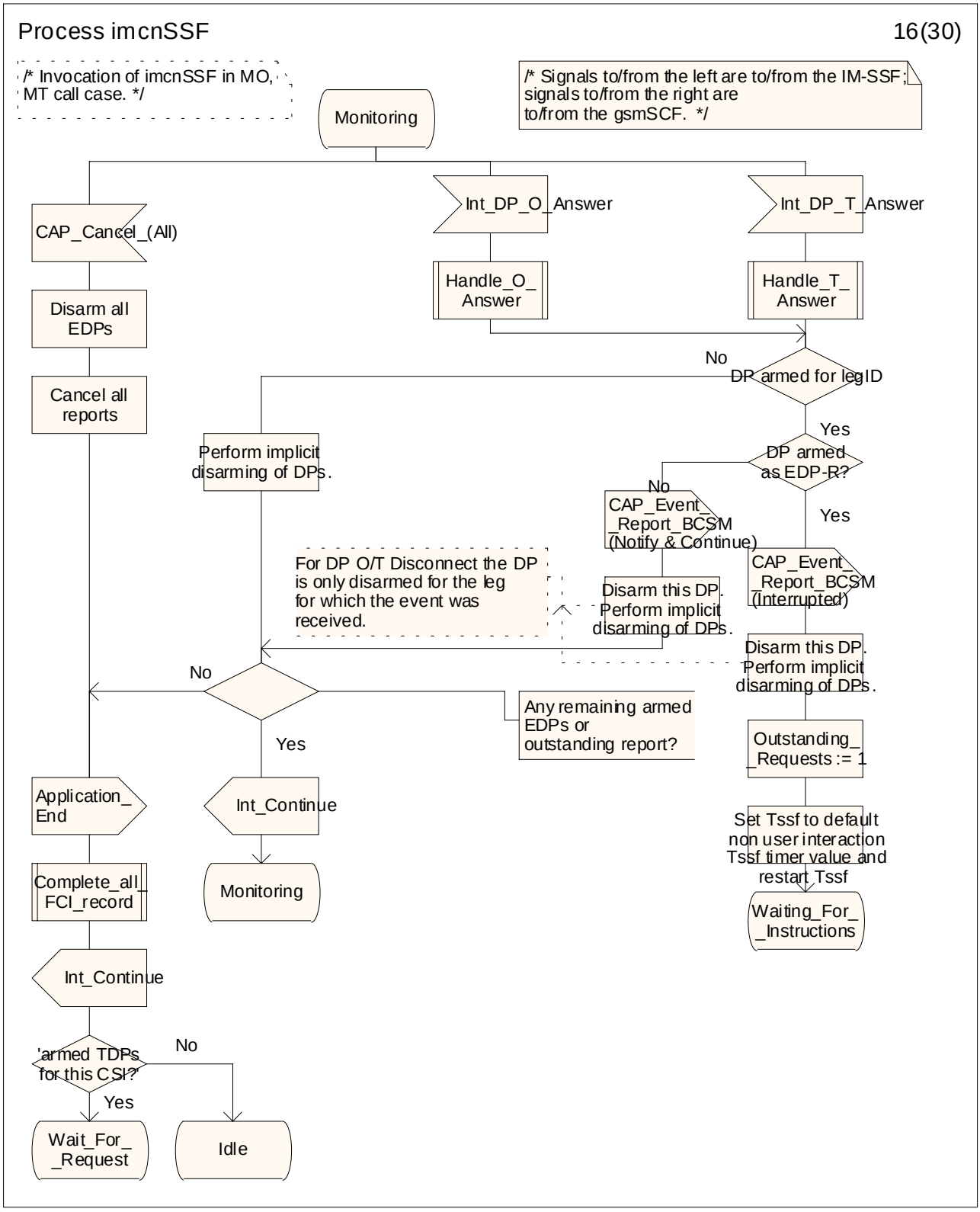

Figure Error! Reference source not found.**-3-16: Process imcnSSF (sheet 16)~~Figure 5.1.5.1.1p: Process imcnSSF (sheet 16)~~**

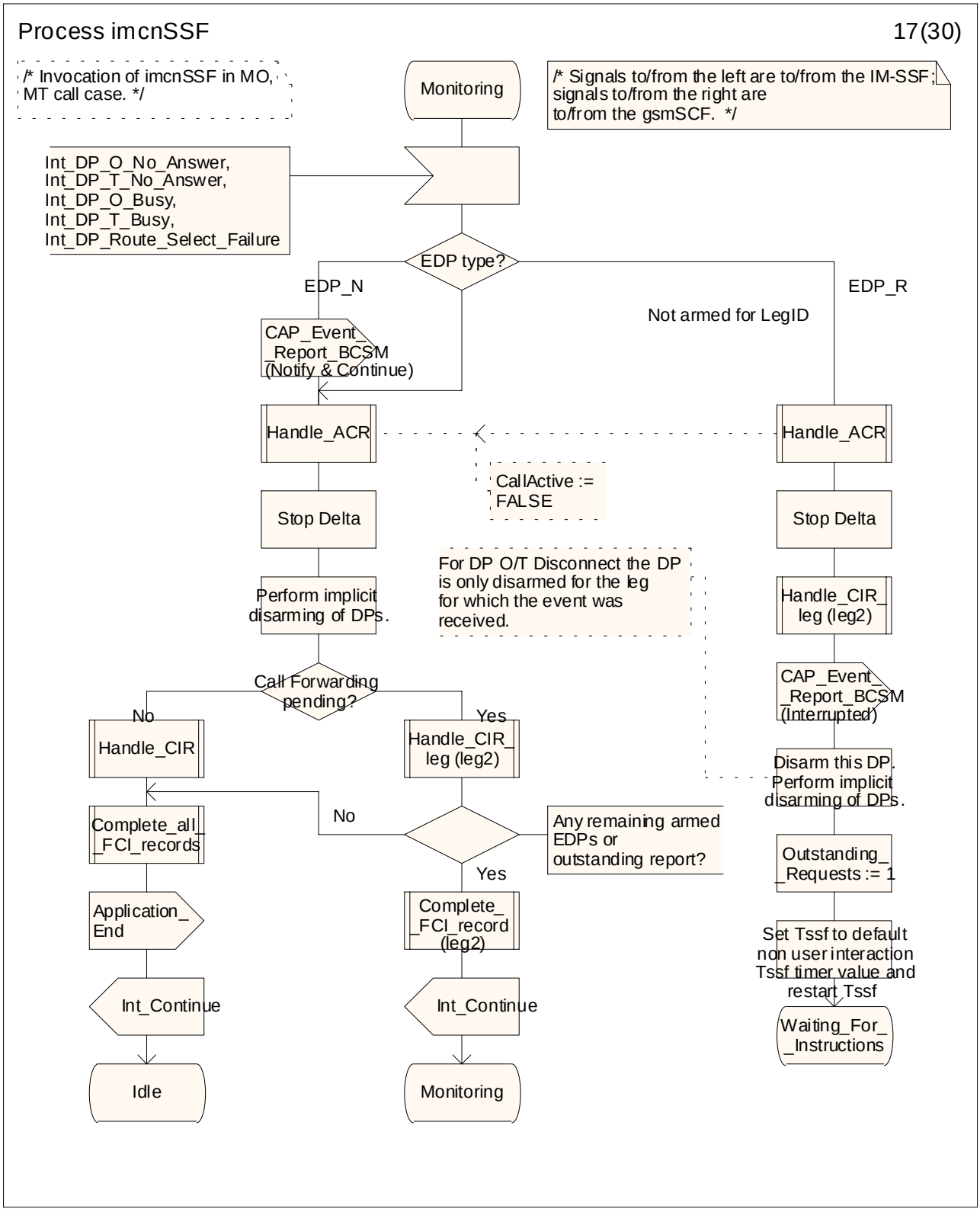

Figure Error! Reference source not found.**-3-17: Process imcnSSF (sheet 17)**~~**Figure 5.1.5.1.1q: Process imcnSSF (sheet 17)**~~

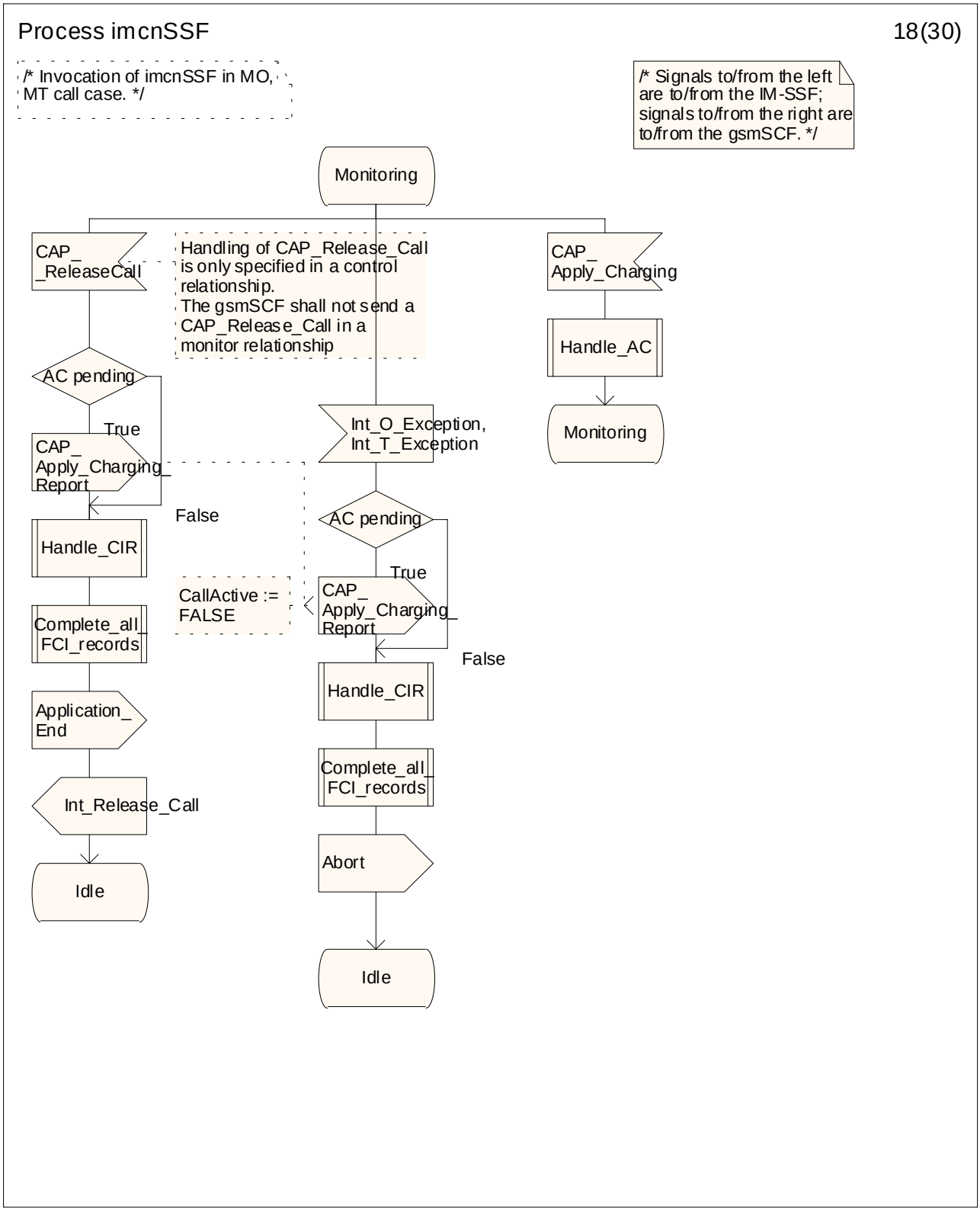

Figure Error! Reference source not found.**3-18: Process imcnSSF (sheet 18)**~~**Figure 5.1.5.1.1r: Process imcnSSF (sheet 18)**~~

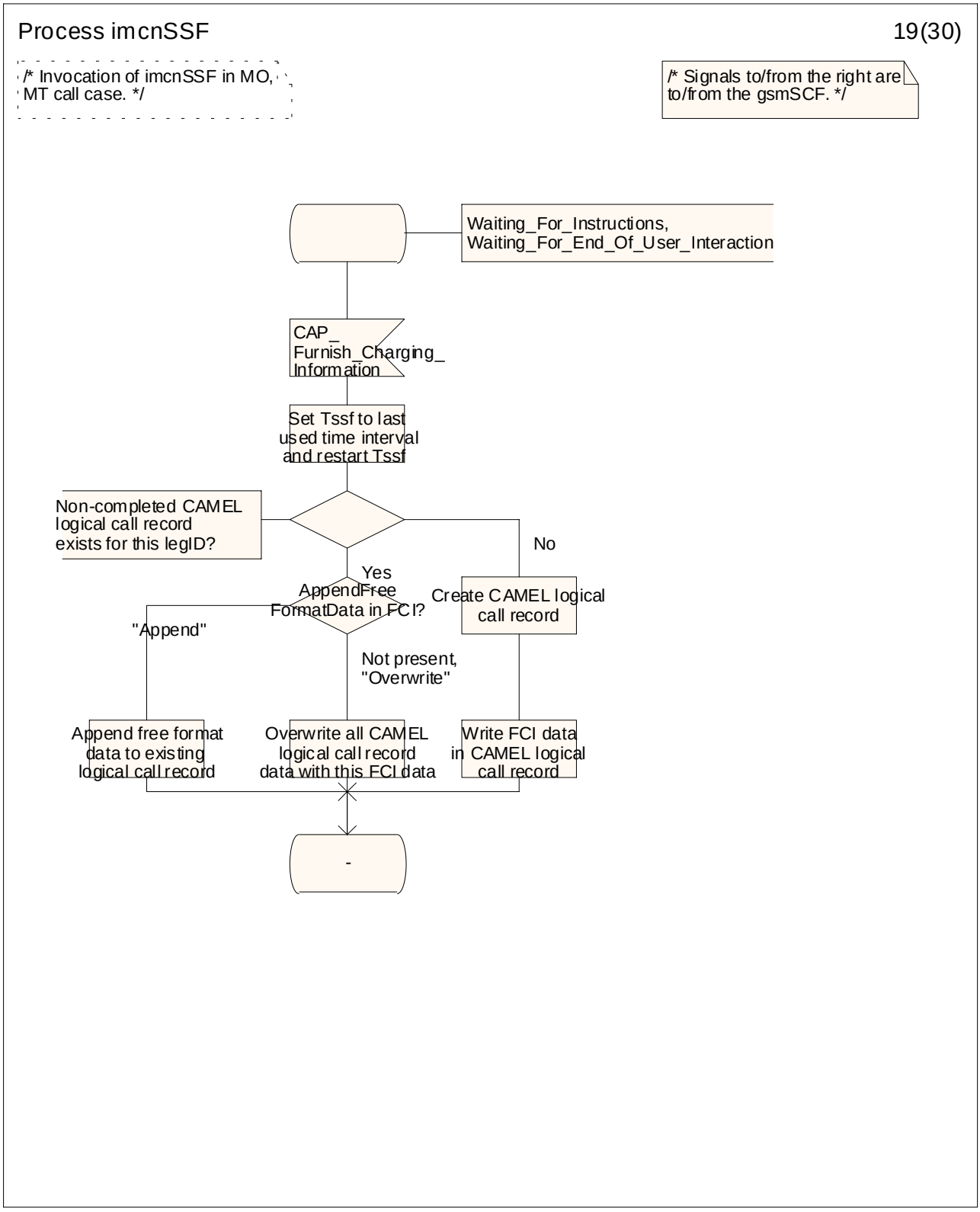

Figure Error! Reference source not found.**3-19: Process imcnSSF (sheet 19)~~Figure 5.1.5.1.1s: Process imcnSSF (sheet 19)~~**

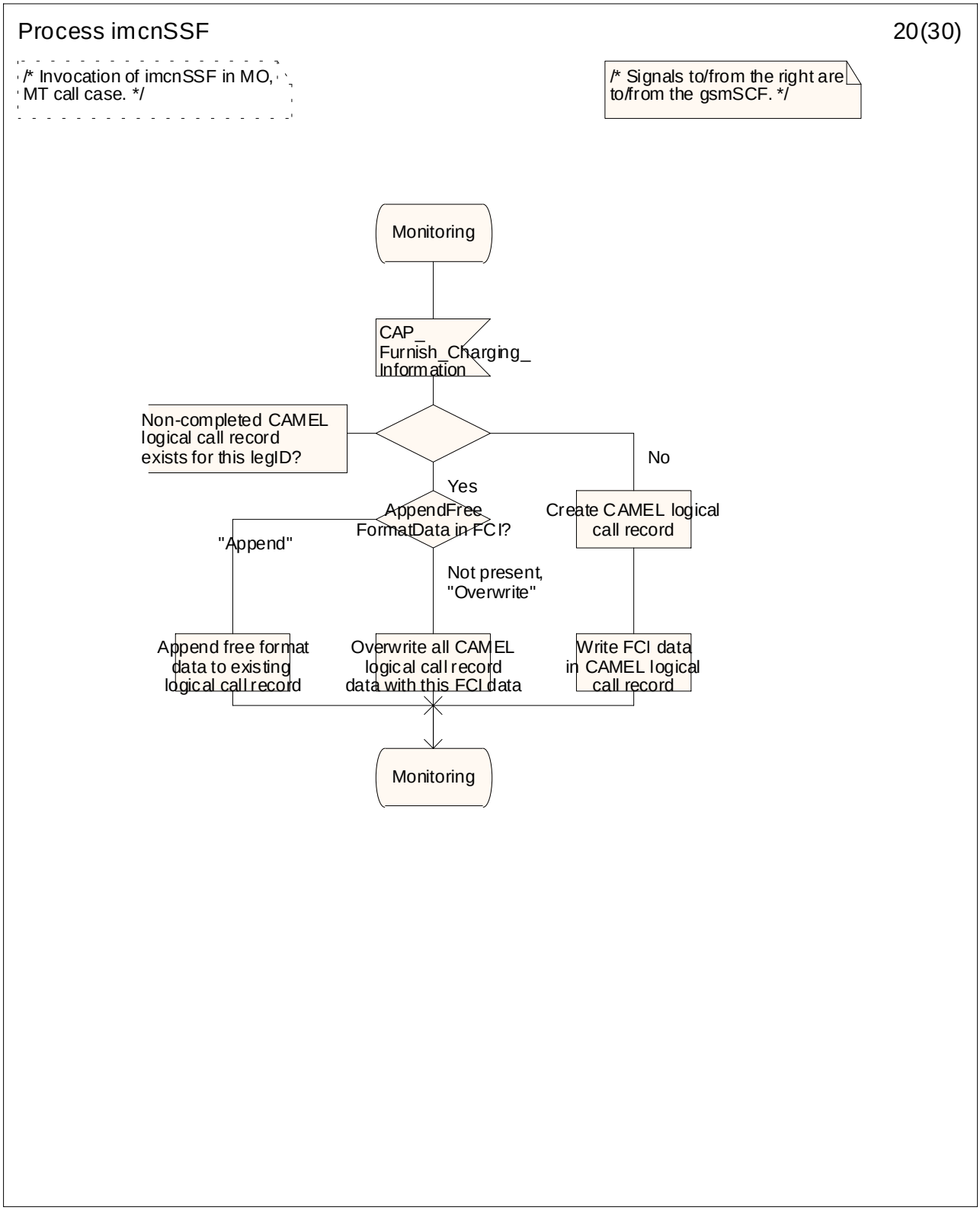

Figure Error! Reference source not found.**3-20: Process imcnSSF (sheet 20)**~~**Figure 5.1.5.1.1t: Process imcnSSF (sheet 20)**~~

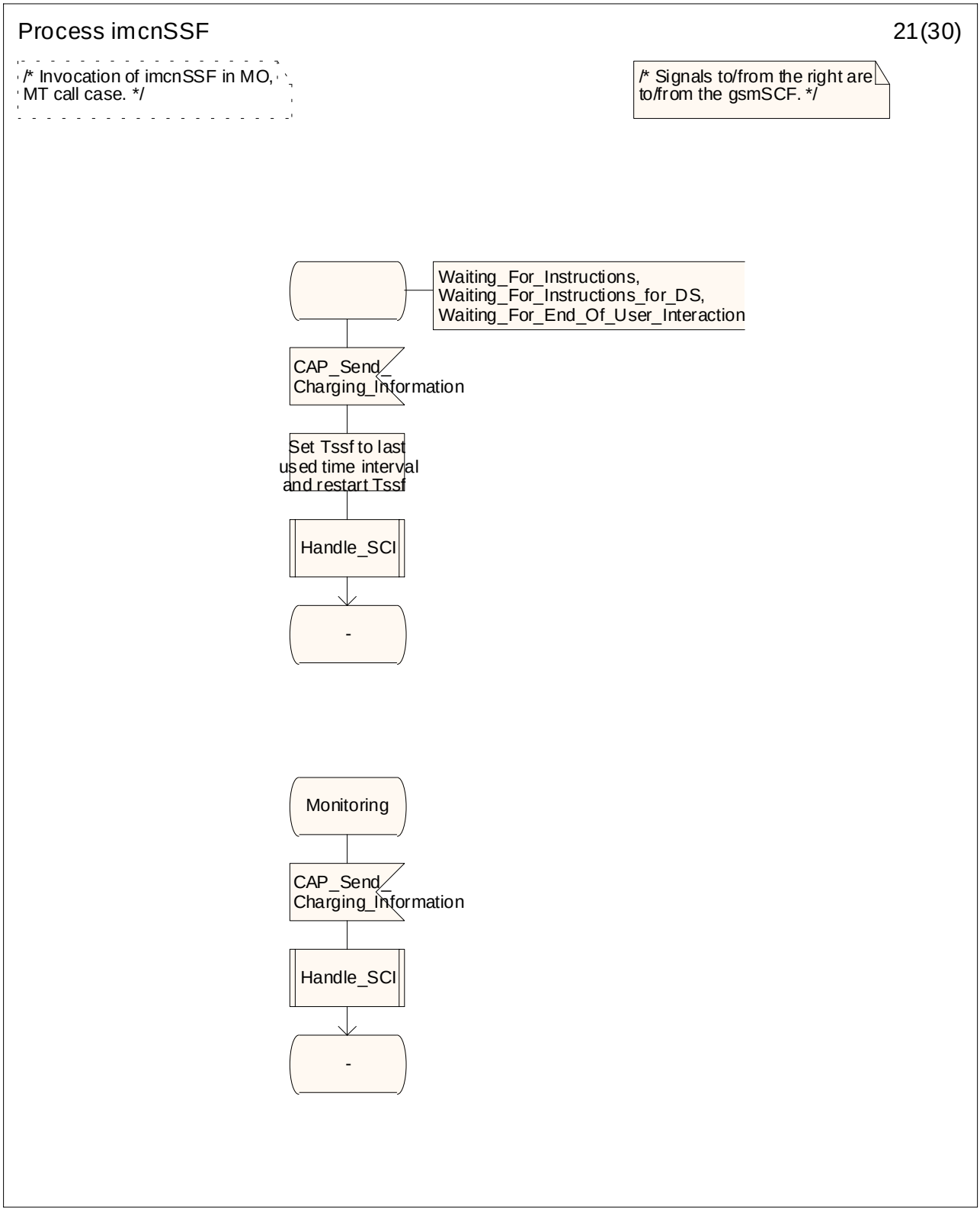

Figure Error! Reference source not found.**-3-21: Process imcnSSF (sheet 21)**~~**Figure 5.1.5.1.1u: Process imcnSSF (sheet 21)**~~

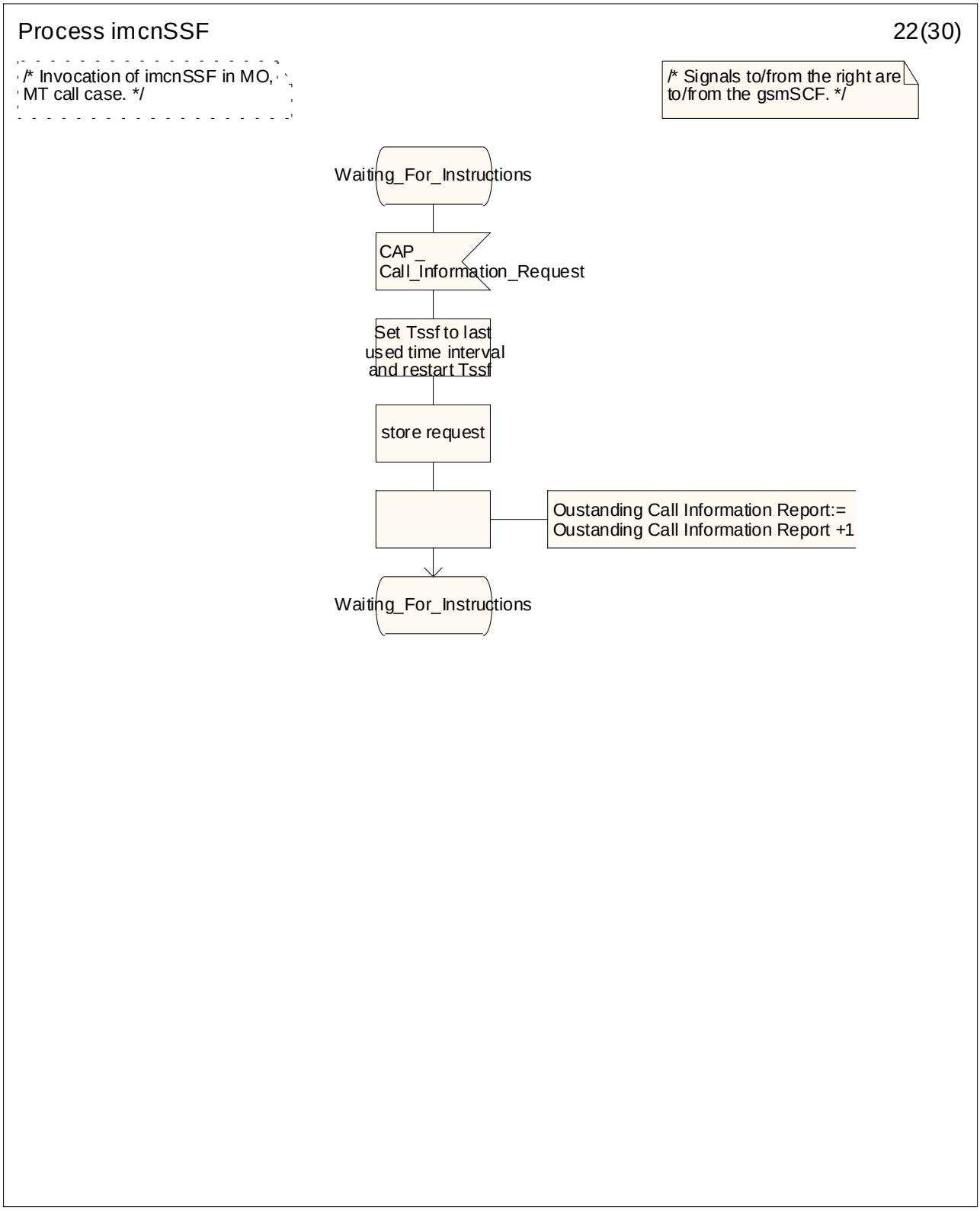

Figure Error! Reference source not found.**-3-22: Process imcnSSF (sheet 22)~~Figure 5.1.5.1.1v: Process imcnSSF (sheet 22)~~**

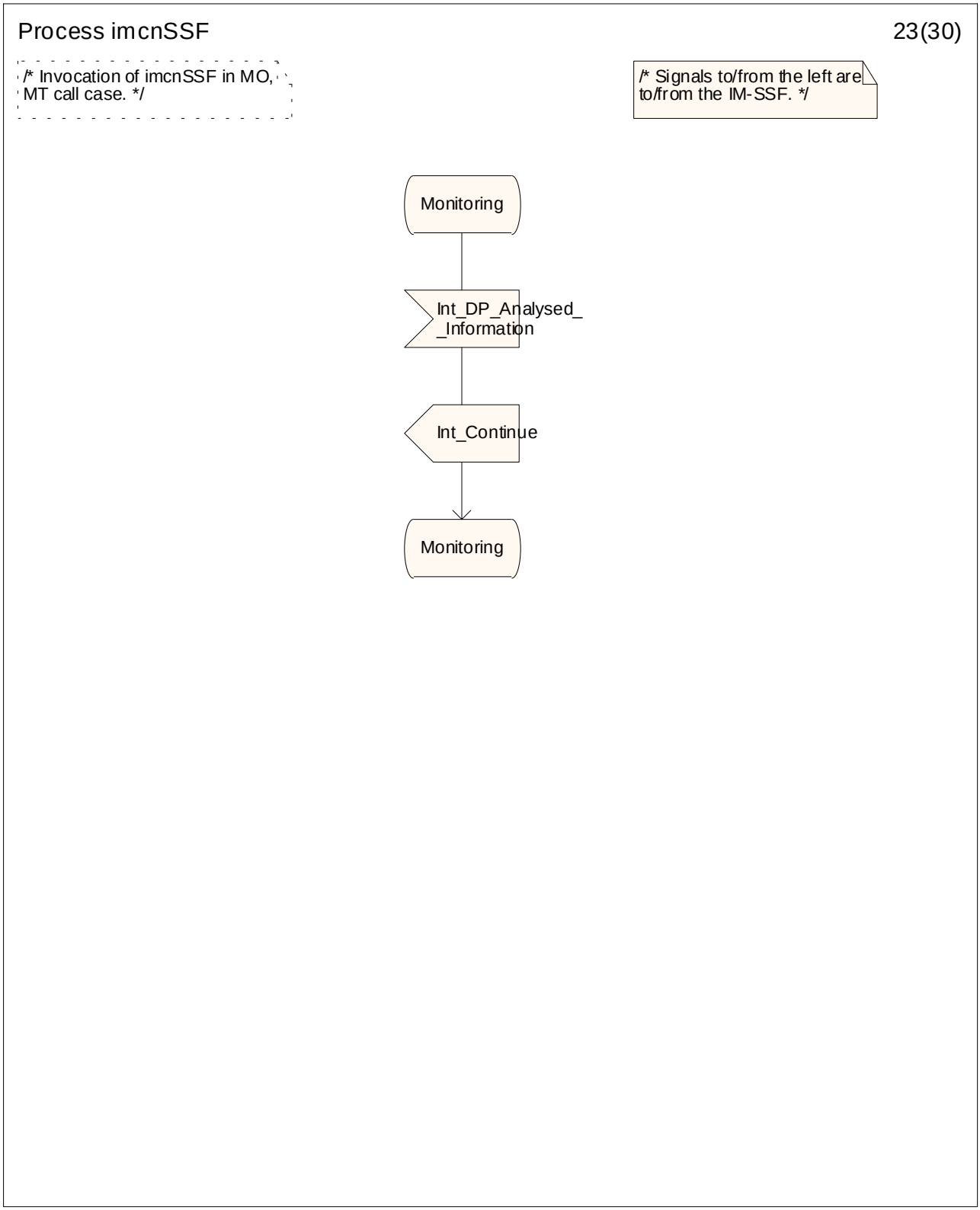

Figure Error! Reference source not found.**-3-23: Process imcnSSF (sheet 23)**~~**Figure 5.1.5.1.1w: Process imcnSSF (sheet 23)**~~

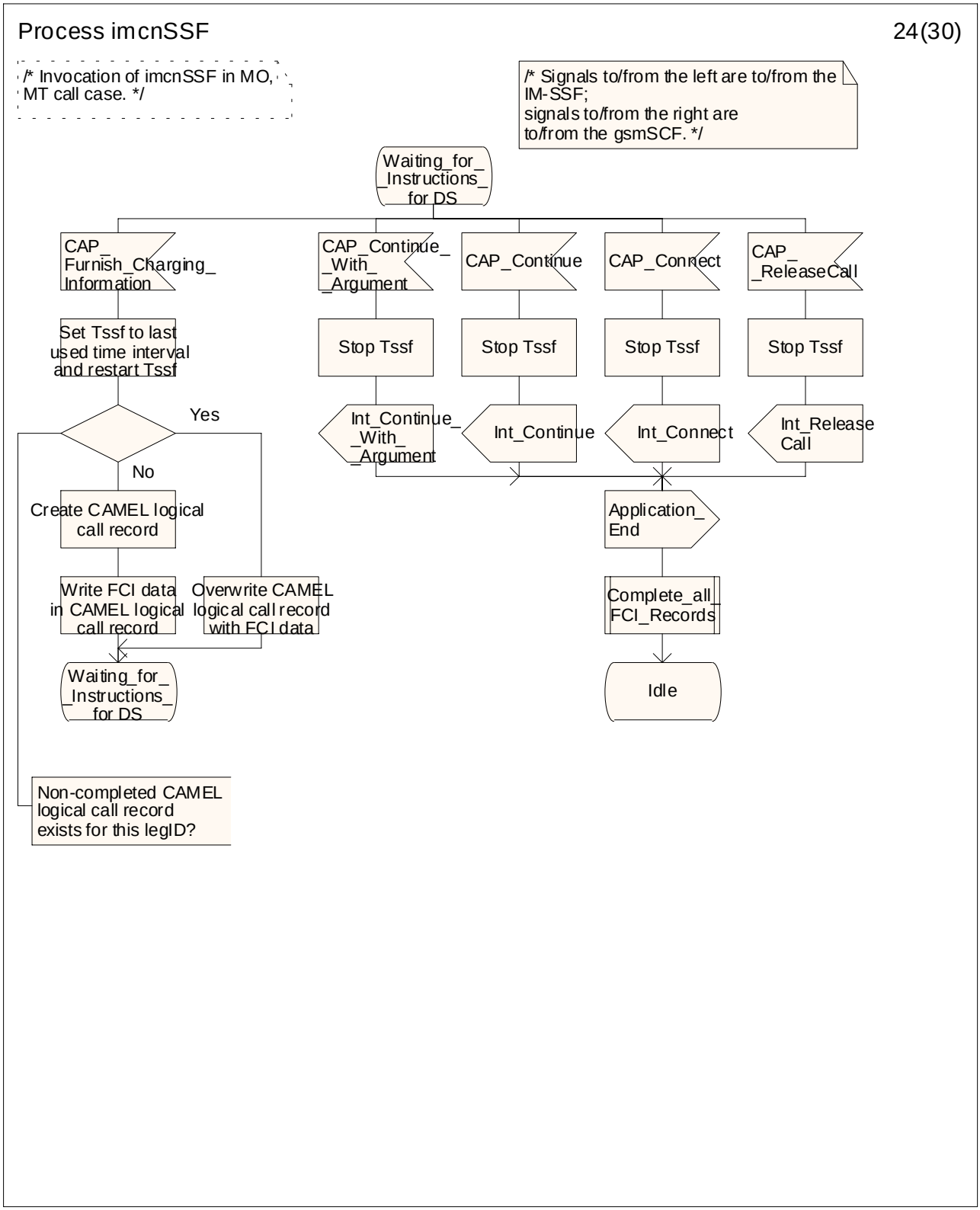

Figure Error! Reference source not found.**.3-24: Process imcnSSF (sheet 24)**~~**Figure 5.1.5.1.1x: Process imcnSSF (sheet 24)**~~

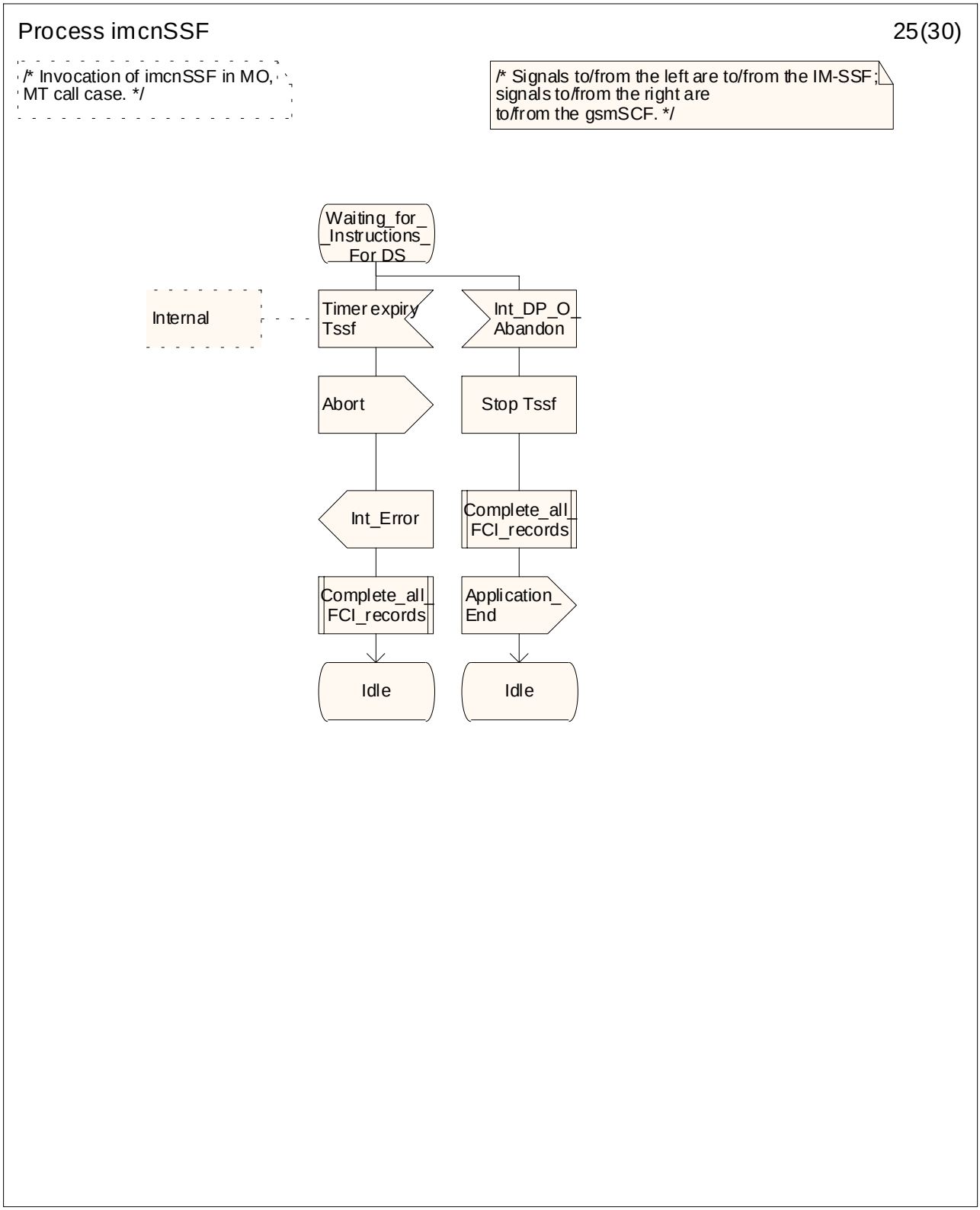

Figure Error! Reference source not found.**.3-25: Process imcnSSF (sheet 25)**~~**Figure 5.1.5.1.1y: Process imcnSSF (sheet 25)**~~

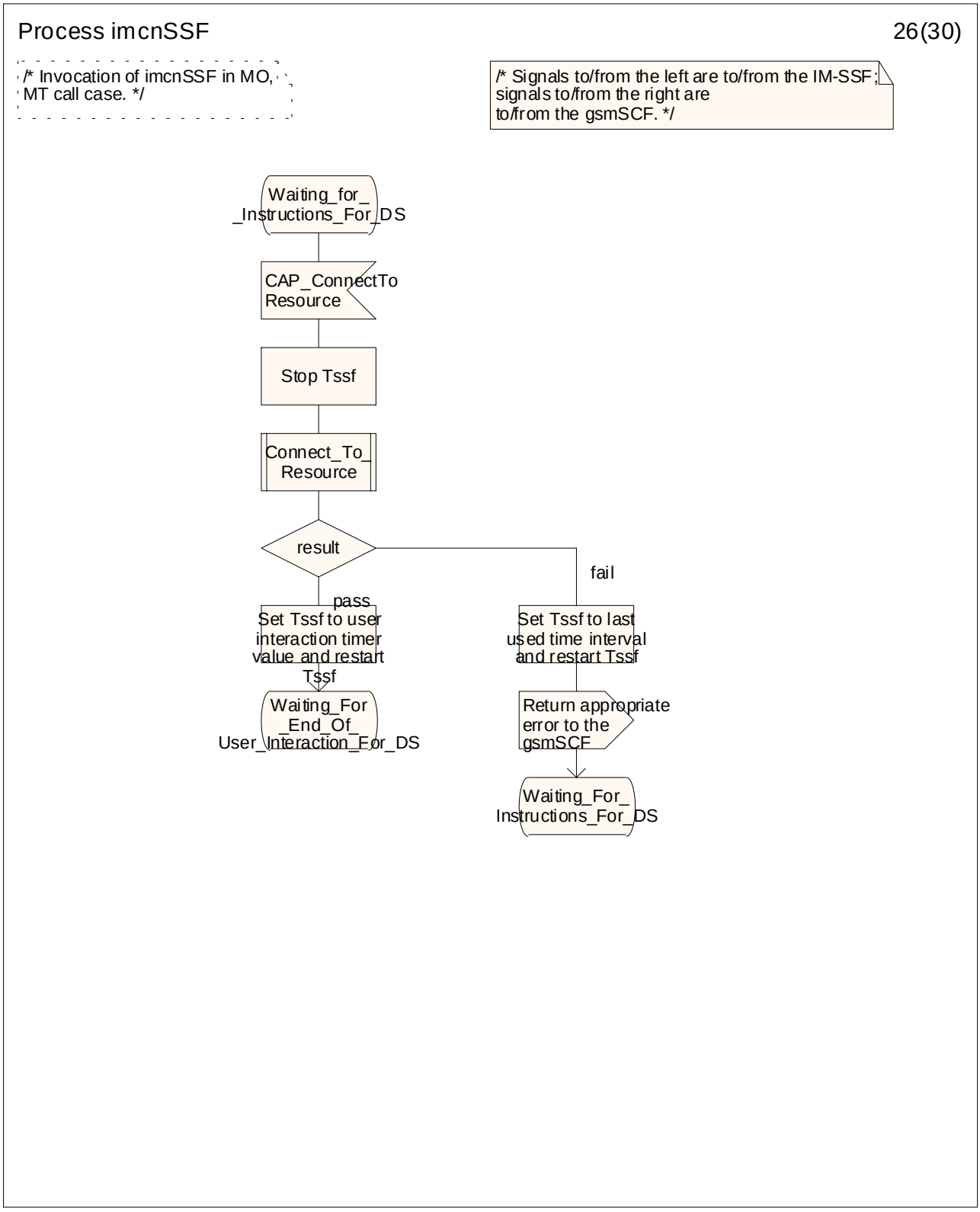

Figure Error! Reference source not found.**.3-26: Process imcnSSF (sheet 26)~~Figure 5.1.5.1.1z: Process imcnSSF (sheet 26)~~**

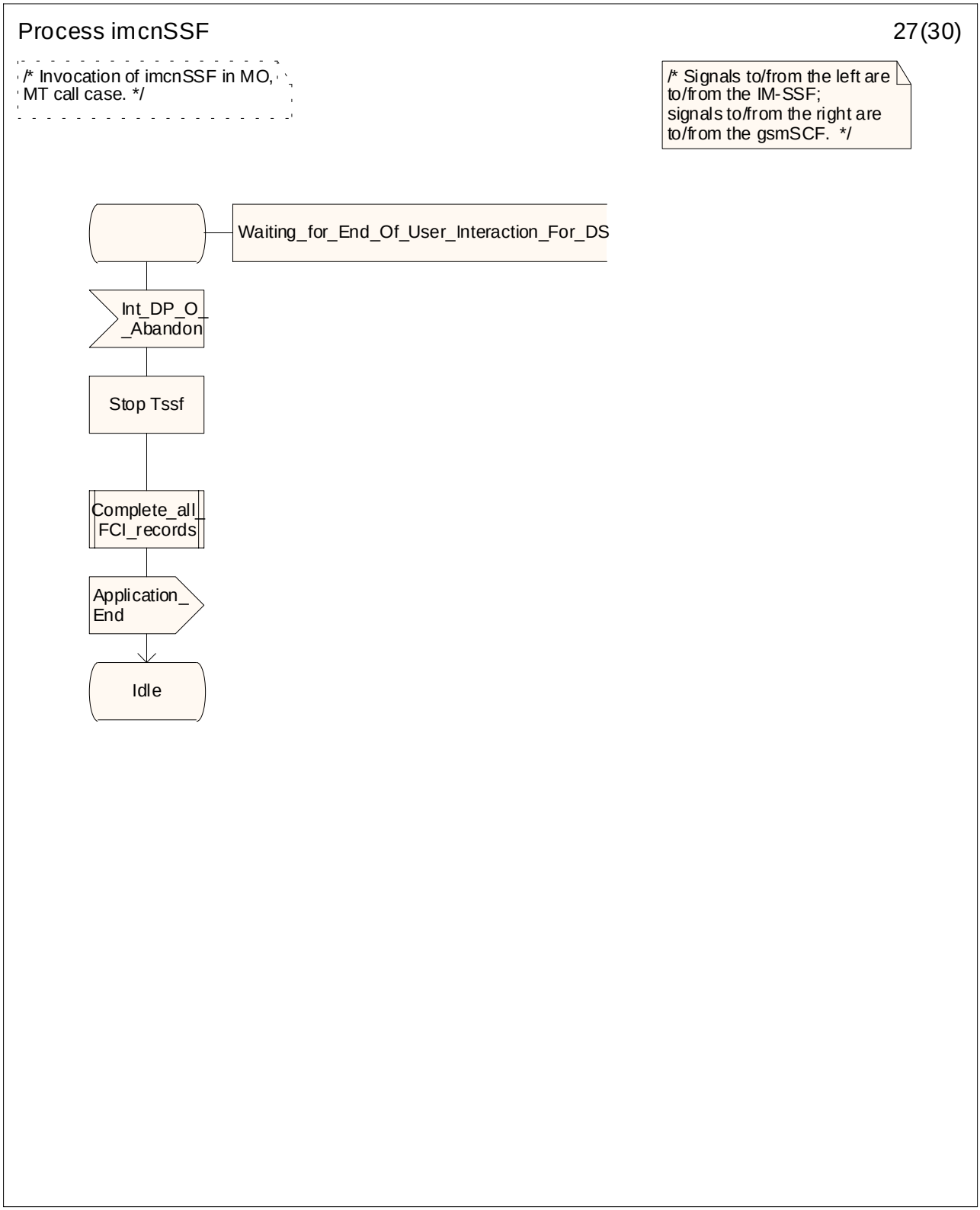

Figure Error! Reference source not found.**-3-27: Process imcnSSF (sheet 27)** ~~**Figure 5.1.5.1.1aa: Process imcnSSF (sheet 27)**~~

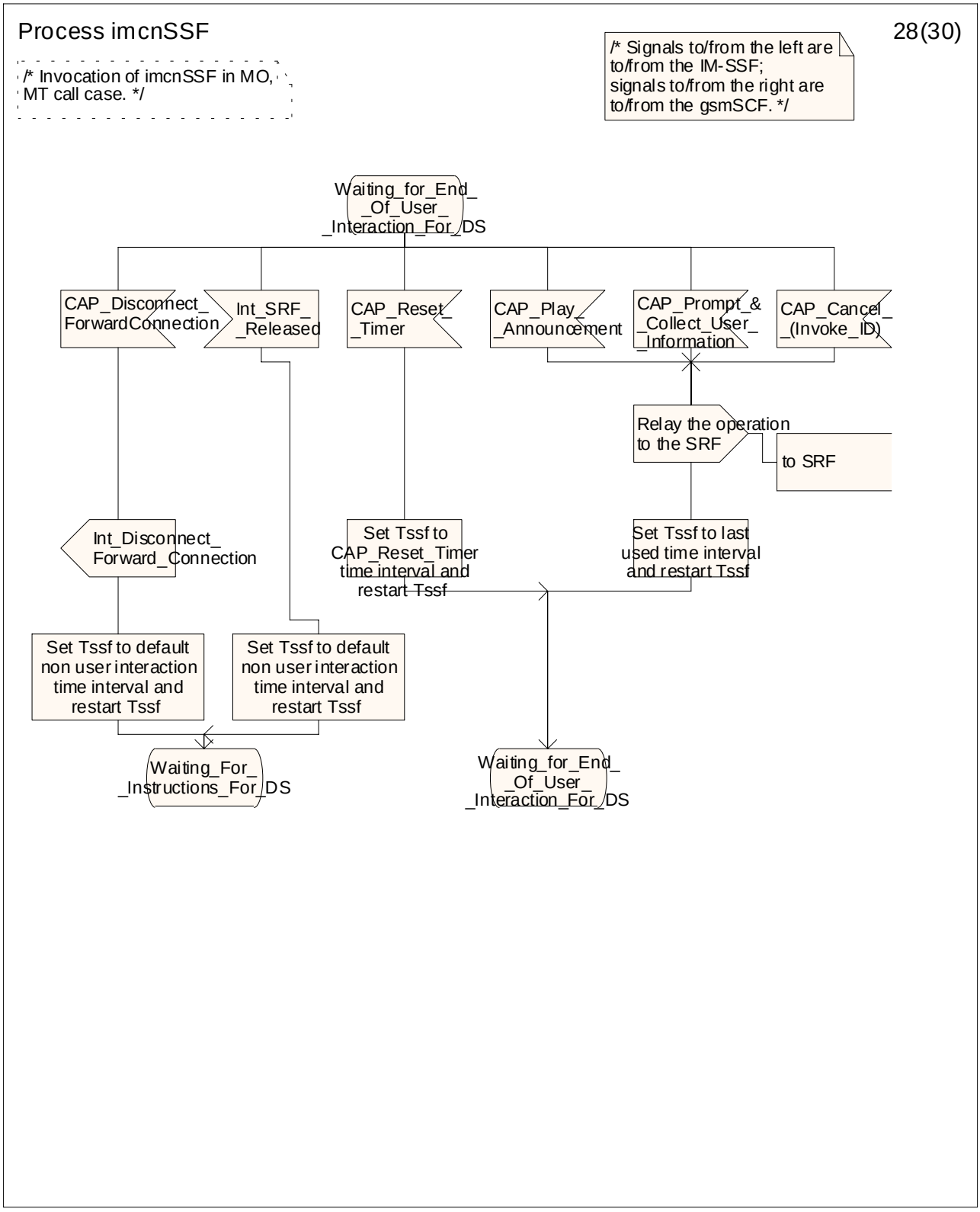

Figure Error! Reference source not found.**3-28: Process imcnSSF (sheet 28)**~~**Figure 5.1.5.1.1bb: Process imcnSSF (sheet 28)**~~

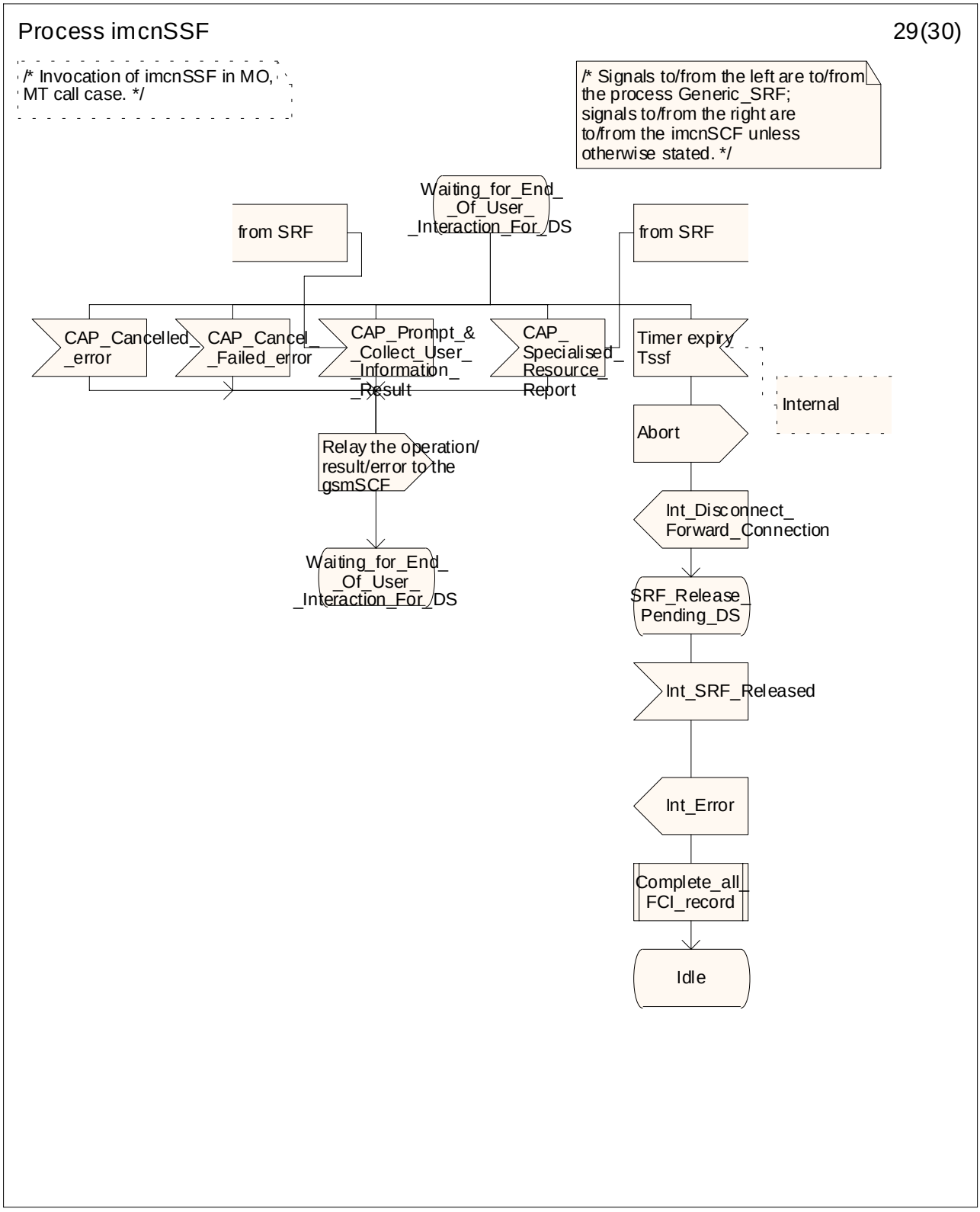

Figure Error! Reference source not found.**-3-29: Process imcnSSF (sheet 29)**~~**Figure 5.1.5.1.1cc: Process imcnSSF (sheet 29)**~~

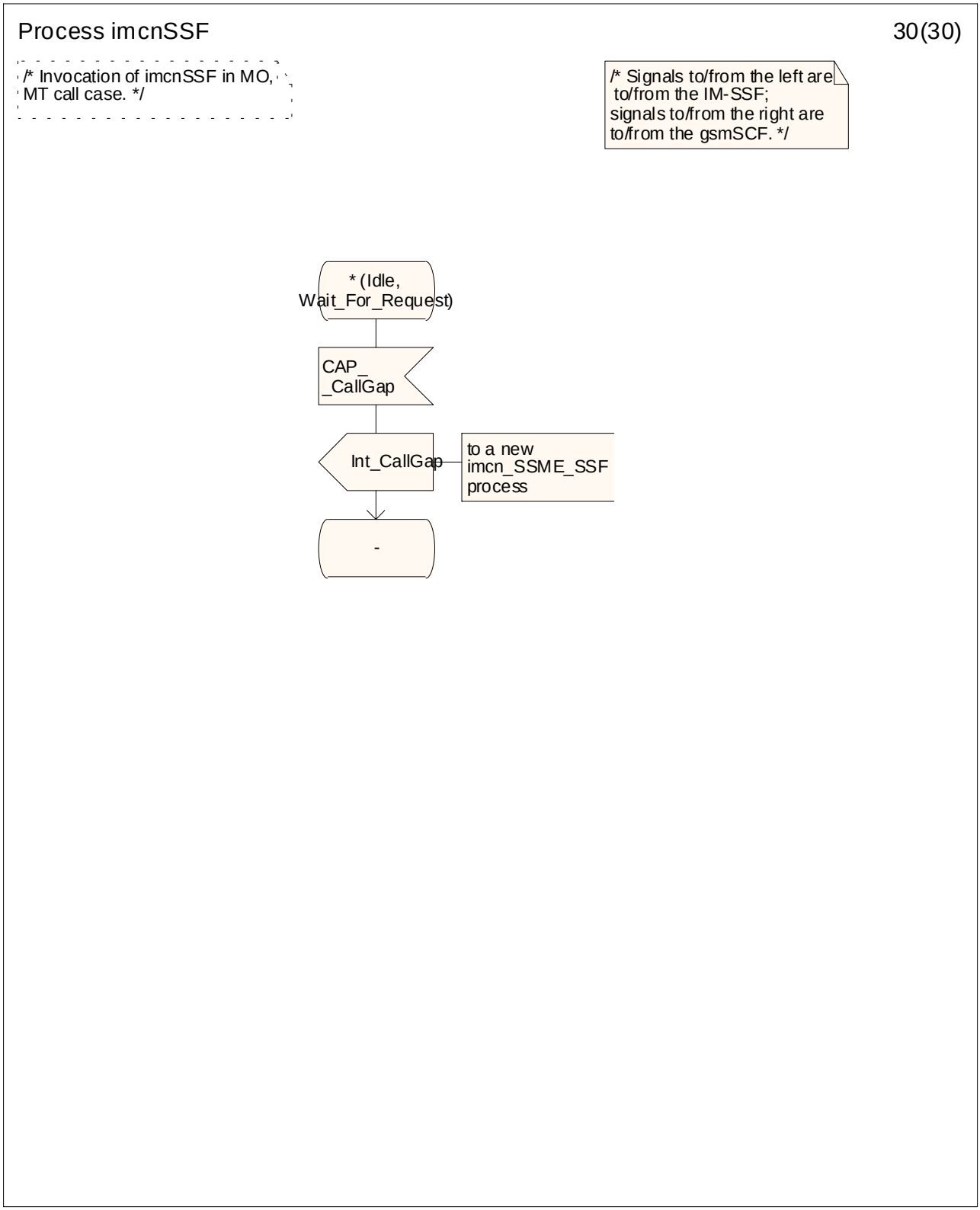

Figure Error! Reference source not found.**-3-30: Process imcnSSF (sheet 30)**~~**Figure 5.1.5.1.1dd: Process imcnSSF (sheet 30)**~~

5.24.7 Descriptions of information Flows

This clause contains the detailed description of the information flows used by CAMEL for IP Multimedia Subsystems 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: IP Multimedia Origination (IM_Orig), IP Multimedia Termination (IM_Term). The distinction between IM_Orig and IM_Term calls is not applicable to all Information Flows.

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.

Details of errors and exceptions to these rules are specified in 3GPP TS 29.2078 [**Error! Reference source not found.**43].

5.24.7.1 IM--SSF to gsmSCF information flows

4.75.2.1.1 Activity Test ack

4.75.2.1.1.1 Description

This IF is the response to the Activity Test.

5.24.7.1.1.2 Information Elements

This IF contains no information elements.

5.24.7.1.2 Apply Charging Report

5.24.7.1.2.1 Description

This IF is used by the IM-SSF to report to the gsmSCF the information requested in the Apply Charging IF.

5.24.7.1.2.2 Information Elements

Information element name	Status	Description
Call Result	M	This IE contains the charging information to be provided by the IM--SSF.

Call Result contains the following information:

Information element name	Status	Description
Time Duration Charging Result	M	This IE is a list defined in the next table.

Time Duration Charging Result contains the following information:

Information element name	Status	Description
Time Information	M	This IE is a choice between Time if No Tariff Switch and Time if Tariff Switch. This IE is described in the next table.
Party To Charge	M	This IE is received in the related ApplyCharging operation to correlate the result to the request. This IE shall be a copy of the corresponding IE received in the Apply Charging operation.
Call Active	M	This IE indicates whether the call is active or not.
Call Released at Tcp Expiry	C	This element is an indication that the IM-SSF has released the call and terminated the dialogue, due to Tcp expiry. It shall be present when ACR is sent due to Tcp expiry and the IM-SSF has released the call (because "ReleaseIfExceeded" was present in ACH operation). In all other circumstances, this element shall be absent.

Time Information contains one of the following information:

Information element name	Status	Description
Time If No Tariff Switch	C	This IE will be present if no tariff switch has occurred since the detection of Answer for the connection to the Called Partyor the SRF connection, otherwise it will be absent.
Time If Tariff Switch	C	This IE will be present if a tariff switch has occurred since the detection of Answer for the connection to the Called Party, the Temporary Connection, or the SRF connection, otherwise it will be absent.

~~5.2~~4.7.1.3 Call Information Report

~~5.2~~4.7.1.3.1 Description

This IF is used to send specific call information for a single call to the gsmSCF as requested from the gsmSCF in a previous Call Information Request.

~~5.2~~4.7.1.3.2 Information Elements

Information element name	Status	Description
Requested Information List	M	This IE specifies a list of Requested information Values which are requested.
Leg ID	M	This IE indicates the party in the call for which information shall be collected.

~~5.2~~4.7.1.4 Event Report BCSM

~~5.2~~4.7.1.4.1 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.

5.24.7.1.4.2 Information Elements

Information element name	Status	Description
Event type BCSM	M	This IE specifies the type of event that is reported.
Event Specific Information BCSM	C	This IE indicates the call related information specific to the event.
Leg ID	M	This IE indicates the party in the call for which the event is reported.
Misc Call Info	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	Status	Description
Destination address	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.

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

Information element name	Status	Description
Cause	C	This IE indicates the cause.

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

5.24.7.1.5 Initial DP

5.24.7.1.5.1 Description

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

5.24.7.1.5.2 Information Elements

Information element name	IM_Orig	IM_Term	Description
Media Type	M	——M	This IE indicates the media type associated with the SIP call session.
Called Party Number	C	C	This IE contains the ISDN number used to identify the called party in the forward direction. The ISDN called party number is received from the gsmSCF due to the previous CAMEL processing or is derived from the SIP URL received from the S--CSCF for the destination address. For all IM terminating call scenarios, at least one of the following IEs shall be present: - CalledPartyNumber - CalledPartyURL
Called Party URL	C	C	This IE contains the SIP URL used to identify the called party in the forward direction. For all IM terminating call scenarios, at least one of the following IEs shall be present: - CalledPartyNumber - CalledPartyURL
Calling Party Number	C	C	This IE carries the ISDN calling party number to identify the calling party or the origin of the call. For all IM originating call scenarios, at least one of the following IEs shall be present: - CallingPartyNumber - CallingPartyURL
Calling Party URL	C	C	This IE contains the SIP URL used to identify the calling party or the origin of the call. For all IM originating call scenarios, at least one of the following IEs shall be present: - CallingPartyNumber - CallingPartyURL
Calling Party Category	C	C	Indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).
CallGap Encountered	C	C	This parameter indicates the type of gapping the related call have been subjected to. This parameter shall be present only if a call gapping context is applicable to the initialDP operation.
SIP Call ID	M	M	This IE represents a globally unique identifier for the SIP call. This IE may be used by the gsmSCF for inclusion in a network optional gsmSCF call record. This IE is received from the SIP request message from S--CSCF.
Cause	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 SCF to decide about the further handling of the call. For IM Termination for an unregistered subscriber, the Cause IE shall be set to indicate Subscriber Absent.
Event Type BCSM	M	M	This IE indicates the armed BCSM DP event, resulting in the Initial DP IF. This IE shall be set to indicate DP T_Busy if a not reachable event is detected (e.g. IM termination to a subscriber not currently registered).

Information element name	IM_Orig	IM_Term	Description
IMSI	M	M	This IE identifies the mobile subscriber. This IE shall contain the IMSI value received from the S-CSCF during notification of a SIP registration.
IP SSP Capabilities	C	C	This IE indicates which MRFC resources are supported within the IM-SSF and are available. If this IE is absent, this indicates that no MRFC is attached and available.
IM-SSF Address	M	M	This IE represents the E.164 address of the IM-SSF from which the InitialDP operation is sent from.
Original Called Party ID	C	C	This contains the ISDN number used to identify the original destination number if the call has been forwarded on route to the IM-SSF or is forwarded by the gsmSCF due to the previous CAMEL processing.
Original Called Party URL	C	C	This IE contains the SIP URL identifying the original destination number if the call has been forwarded on route to the IM-SSFor is forwarded by the gsmSCF due to the previous CAMEL processing.
Redirecting Party ID	C	C	This IE indicates the ISDN number identifying the directory number the call was redirected from. This IE shall also be sent if it was received from the gsmSCF due to the previous CAMEL processing.
Redirecting Party URL	C	C	This IE indicates the SIP URL identifying the directory number the call was redirected from. This IE shall also be sent if it was received from the gsmSCF due to the previous CAMEL processing.
Redirection Information	C	C	This IE contains forwarding related information, such as redirection reason. This IE shall also be sent if it was received from the gsmSCF due to the previous CAMEL processing.
Service Key	M	M	This IE indicates to the gsmSCF the requested CAMEL Service. It is used to address the required application/SLP within the gsmSCF.
Subscriber State	-	C	This IE indicates the status of the IMS Subscriber. The states are: - CAMELBusy: The IMS subscriber is engaged on a transaction for an originating or terminating IM call session. - NetworkDeterminedNotReachable: The network can determine from its internal data that the IMS subscriber is not reachable. - AssumedIdle: The state of the IMS subscriber is neither "CAMELBusy" nor "NetworkDeterminedNotReachable".
Time And Timezone	M	M	This IE contains the time that the IM-SSF was triggered, and the time zone the IM-SSF resides in.

5.24.7.1.6 Specialized Resource Report

5.24.7.1.6.1 Description

This IF is used to response to a PlayAnnouncement IF when the announcement complete indication is set.

5.24.7.1.6.2 Information Elements

This IF contains no information elements.

5.24.7.2 gsmSCF to IM--SSF information flows

5.24.7.2.1 Activity Test

5.24.7.2.1.1 Description

This IF is used to check for the continued existence of a relationship between the gsmSCF and IM–SSF. If the relationship is still in existence, then the IM–SSF will respond. If no reply is received, then the gsmSCF will assume that the IM–SSF has failed in some way and will take the appropriate action.

5.24.7.2.1.2 Information Elements

This IF contains no information elements.

5.24.7.2.2 Apply Charging

5.24.7.2.2.1 Description

This IF is used for interacting from the gsmSCF with the IM–SSF charging mechanisms to control the call duration.

5.24.7.2.2.2 Information Elements

Information element name	Status	Description
ACh Billing Charging Characteristics	M	This IE specifies the charging related information to be provided by the IM--SSF and the conditions on which this information has to be provided back to the gsmSCF.
Party To Charge	M	This IE shall be reflected in the corresponding IE of the Apply Charging Report operation. This IE has no effect on the charging procedures in the MSC.

ACh Billing Charging Characteristics contains the following information:

Information element name	Status	Description
Time Duration Charging	M	This IE is described in the next table.

Time Duration Charging contains the following information:

Information element name	Status	Description
Max Call Period Duration	M	This IE indicates the maximum call period duration timer.
Tariff Switch Interval	O	This IE indicates the tariff switch time until the next tariff switch applies.
Release If Duration Exceeded	O	This IE indicates that the call shall be released when the Max call Period Duration expires, with a warning tone if the Play Tone IE is present. The cause used in the release message shall be "normal unspecified". Default is to continue the call.
Play Tone	O	This IE is set if a tone has to be played to the party for whom the BCSM is operating. If present, this IE indicates that 30 seconds before the Max Call Period Duration timer expires, a triple tone of 900 Hz (200 milliseconds tone, 200 milliseconds pause) shall be played.

5.24.7.2.3 Call Information Request

5.24.7.2.3.1 Description

This IF is used to request the IM-SSF to record specific information about a single call and report it to the gsmSCF (with a CallInformationReport).

5.24.7.2.3.2 Information Elements

Information element name	Status	Description
Requested Information Type List	M	This IE specifies a list of specific items of information which are requested.
Leg ID	M	This IE indicates the party in the call for which information shall be collected.

Requested Information Type List contains the following information:

Information element name	Status	Description
Call Attempt Elapsed Time	O	This IE indicates that the Call Attempt Elapsed Time is requested in the Call Information Report. Call Attempt Elapsed Time is the duration between the end of the CAMEL processing initiating call setup (Connect, Continue or Continue With Argument IF) and the received answer indication from the called party side. For the Calling Party, the value of Call Attempt Elapsed Time in the Call Information Report shall be set to 0.
Call Stop Time	O	This IE indicates that the Call Stop Time is requested in the Call Information Report. Call Stop Time is the time stamp when the connection is released.
Call Connected Elapsed Time	O	This IE indicates that the Call Connected Elapsed Time is requested in the Call Information Report. Call Connected Elapsed Time is the duration between the received answer indication from the called party side and the release of the connection. For a Calling Party, it indicates the duration between the sending of IDP and the release of that party
Release Cause	O	This IE indicates that the Release Cause is requested in the Call Information Report. Release Cause is the release cause for the call.

5.24.7.2.4 Cancel

5.24.7.2.4.1 Description

This IF is used by the gsmSCF to request the IM-SSF to cancel all EDPs and reports.

5.24.7.2.4.2 Information Elements

Information element name	Status	Description
All Requests	M	This IE indicates that all active requests for EventReportBCSM, ApplyChargingReport and CallInformationReport shall be cancelled.

5.24.7.2.5 Connect

5.24.7.2.5.1 Description

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

5.24.7.2.5.2 Information Elements

Information element name	Status	Description
Calling Party Category	O	This IE indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).
Destination Routing Address	E1	This IE contains the called party number towards which the call is to be routed using an ISDN value.
Destination Routing Address URL	E1	This IE contains the called party number towards which the call is to be routed using a SIP URL.
Original Called Party ID	O,E2	This contains the original destination number if the call has been forwarded on route to the IM-SSF or is forwarded by the gsmSCF. This IE shall use an ISDN value to identify the original destination number.
Original Called Party URL	O,E2	This contains the original destination number if the call has been forwarded on route to the IM-SSF or is forwarded by the gsmSCF. This IE shall use a SIP URL to identify the original destination number.
Redirecting Party ID	O,E3	This IE indicates the directory number the call was redirected from. This IE shall use an ISDN value to identify the redirecting party.
Redirecting Party URL	O,E3	This IE indicates the directory number the call was redirected from. This IE shall use a SIP URL to identify the redirecting party.

5.24.7.2.6 Connect To Resource

5.24.7.2.6.1 Description

This IF is used to connect a call from the IM-SSF to MRFC via S-CSCF.

5.24.7.2.6.2 Information Elements

This IF requires no information elements for IMS.

5.24.7.2.7 Continue

5.24.7.2.7.1 Description

This IF requests the IM-SSF to proceed with call processing at the DP at which it previously suspended call processing to await gsmSCF instructions. The IM-SSF completes DP processing, and continues basic call processing (i.e. proceeds to the next point in call in the BCSM) without substituting new data from the gsmSCF.

5.24.7.2.7.2 Information Elements

This IF contains no information elements.

5.24.7.2.8 Continue With Argument

5.24.7.2.8.1 Description

This information flow requests the IM--SSF to proceed the call processing with modified information at the DP at which it previously suspended call processing to await gsmSCF instructions. The IM--SSF completes DP processing, 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.

5.24.7.2.8.2 Information Elements

Information element name	Status	Description
Calling Party Category	O	This IE indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).

5.24.7.2.9 Disconnect Forward Connection

5.24.7.2.9.1 Description

This IF is used to disconnect a connection with a MRFC previously established with a Connect To Resource IF.

5.24.7.2.9.2 Information Elements

This IF contains no information elements.

5.24.7.2.10 Furnish Charging Information

5.24.7.2.10.1 Description

This IF is used to request the IM--SSF to include call related information in the CAMEL specific logical call record. The logical call record is created when FCI is received and a logical call record for that leg does not exist. For modelling purposes the logical call record is buffered in the IM--SSF. The IM--SSF completes logical call records as defined in the SDLs. Once the logical call record is completed, then its free format data is moved to the corresponding CDR and the logical call record is deleted.

The CSE can send multiple concatenated FCIs per leg for completion. The total maximum of free format data is 160 octets per leg. The 160 octets may be sent in one or more FCI operations. If there is non-completed free format data and new FCI operation(s) is/are received to overwrite the non-completed data, then the non-completed data is discarded and the gsmSCF can send another 160 octets per leg. The SDLs of 3GPP TS 23.078 Rel-99 [**Error! Reference source not found.**] define when Logical CDRs are completed. After the completion the gsmSCF can send another 160 octets of free format data in one or more FCI operations for the called leg.

5.24.7.2.10.2 Information Elements

Information element name	Status	Description
FCI Billing Charging Characteristics	M	This IE is described in the next table.

FCI Billing Charging Characteristics contains the following information:

Information element name	Status	Description
FCIBCCCAMEL Sequence 1	M	This IE is described in the next table.

FCIBCCCAMEL Sequence 1 contains the following information:

Information element name	Status	Description
Free Format Data	M	This IE is a free format data to be inserted in the CAMEL logical call record.
Party To Charge	M	This IE indicates the party for whom a CAMEL logical call record will be created.
Append Free Format Data	O	This IE indicates that the IM-SSF shall append the free format data to the Logical call record. - If this IE is present and indicates "Append", the IM-SSF shall append the free format data received in this IF to the free format data already present in the Logical call record for that leg of the call. - If this IE is absent or in value "Overwrite", then the IM-SSF shall overwrite all free format data already present in the Logical call record for that leg of the call, by the free format data received in this IF. If no Logical call record exists yet for that leg of the call, then the IM-SSF shall ignore this IE.

5.24.7.2.11 Release Call

5.24.7.2.11.1 Description

This IF is used to tear down by the gsmSCF an existing call at any phase of the call for all parties involved in the call.

5.24.7.2.11.2 Information Elements

The following information elements are required:

Information element name	Status	Description
Release Cause	M	A number giving an indication to the IM-SSF about the reason of releasing this specific call. This may be used by MSC/GMSC for generating specific tones to the different parties in the call or to fill in the "cause" in the release message.

5.24.7.2.12 Request Report BCSM Event

5.24.7.2.12.1 Description

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

5.24.7.2.12.2 Information Elements

Information element name	Status	Description
BCSM Event	M	This IE specifies the event or events of which a report is requested.

BCSM Event contains the following information:

Information element name	Status	Description
Event type	M	This IE specifies the type of event of which a report is requested.
Leg ID	C	This IE indicates the party in the call for which the event shall be reported.
Monitor Mode	M	When this IE is "interrupted", the event shall be reported as a request, if it is "notifyAndContinue", the event shall be reported as a notification, if the IE is "transparent", the event shall not be reported.
DP Specific Criteria	O	This IE is described in the next table.

DP Specific Criteria is defined as:

Information element name	Status	Description
Application Timer	O	This IE carries additional timer duration information (timer values for No Answer event) required for arming No_Answer EDPs in the IM-SSF. The TNRy timer (value defined between 10 s and 40 s) shall be shorter than the network no answer timer.

5.24.7.2.13 Reset Timer

5.24.7.2.13.1 Description

This IF is used to refresh a timer.

5.24.7.2.13.2 Information Elements

Information element name	Status	Description
Timer Value	M	This IE specifies the value to which the indicated timer shall be set.
Timer ID	O	This IE indicates which timer shall be reset. It shall be set to "Tssf".

5.24.7.3 Optional (service logic dependant) gsmSCF to gsmSRF information flows

5.24.7.4 IM-SSF to HSS information flows

5.24.7.4.1 Any Time Subscription Interrogation request

5.24.7.4.1.1 Description

This IF is used by the IM-SSF to request subscription information from the HSS/HLR. For example, the IM-SSF shall send this as a result of receiving a third party SIP registration from the S-CSCF (over the ISC interface). The IM-SSF shall also send the MAP ATSI request when a SIP INVITE message on a MT session for an unregistered subscriber is received.

5.24.7.4.1.2 Information Elements

Information element name	Status	Description
gsmSCF Address	M	This IE shall indicate the address of the interrogating IM-SSF.
Requested Info	M	This IE indicates the type of subscriber information being requested. This shall consist of the CAMEL Subscription Information; the CAMEL Subscription Information is described in a table below.
Subscriber Identity	M	This IE identifies the subscriber for which the information is requested. The identity shall be an IMSI.

CAMEL subscription information contains the following information elements:

Information element name	Status	Description
Additional Requested CAMEL Subscription Info	M	This IE shall contain one of the following: O-IM-CSI/VT-IM-CSI/D-IM-CSI

5.24.7.4.2 Notify Subscriber Data Change ack

5.24.7.4.2.1 Description

This IF is used to respond to the HSS/HLR's notification of the change of subscriber data.

5.24.7.4.2.2 Information Elements

This IF contains no information elements.

5.24.7.5 HSS to IM-SSF information flows

5.24.7.5.1 Any Time Subscription Interrogation ack

5.24.7.5.1.1 Description

This IF is used by the HSS/HLR to provide the requested subscriber's IM-CSI data to the IM-SSF.

5.24.7.5.1.2 Information Elements

Information element name	Status	Description
CAMEL Subscription Information	C	This IE shall be present if the subscriber is provisioned with a CAMEL Subscription Information for IM CN. This IE is described in a table below.

CAMEL Subscription Information contains the following information elements:

Information element name	Status	Description
O-IM-CSI	C	See subclause **Error! Reference source not found.**4.4.1.1
D-IM-CSI	C	See subclause **Error! Reference source not found.**4.4.1.2.
VT-IM-CSI	C	See subclause **Error! Reference source not found.**4.4.1.3.

5.24.7.5.2 Notify Subscriber Data Change

5.24.7.5.2.1 Description

This IF is used by the HSS/HLR to notify to the IM-SSF of the change of subscriber IM CSI data. This IF is sent at each time subscriber IM CSI data is changed.

5.24.7.5.2.2 Information Elements

Information element name	Status	Description
IMSI	M	The IMSI is used to identify the subscriber.
MSISDN	C	This shall consist of the subscriber's MSISDN if available. If no MSISDN is available, the parameter shall be set with a dummy MSISDN value.
CAMEL Subscription Information	M	The CAMEL Subscription Information IE is used to indicate the modified or deleted CAMEL Subscription Information data. This IE is described in a table below.

CAMEL Subscription Information Modified contains the following information elements:

Information element name	Status	Description
O-IM-CSI	S	See subclause **Error! Reference source not found.**4.4.1.1. It shall be present if it was modified.
D-IM-CSI	S	See subclause **Error! Reference source not found.**4.4.1.2. It shall be present if it was modified.
VT-IM-CSI	S	See subclause **Error! Reference source not found.**4.4.1.3. It shall be present if it was modified.
Specific CSI Deleted List	S	This IE indicates that one or more specific elements of IMS CAMEL Subscription Information have been deleted from the HSS/HLR. It shall indicate any of the following; - O-IM-CSI (with TDP criteria for O-IM-CSI); - D-IM-CSI; - VT-IM-CSI with TDP criteria for VT-IM-CSI; This IE shall be present if IM CSI is/are deleted.

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CHANGE REQUEST

⌘ **23.278** **CR** **020** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

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:	⌘	Editorial improvement – clause 6
Source:	⌘	Siemens AG
Work item code:	⌘	IMS-CAMEL
Date:	⌘	31/10/2002
Category:	⌘	**D**
Release:	⌘	Rel-5

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:

2	*(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)*

Reason for change:	⌘	Editorial improvement for good readability
Summary of change:	⌘	References and linked document numbers – listed as document numbers sorted. Book marks are set in the clause 2 and the reference to the book marks are set in other clauses. Figure numbers and table numbers – Re-numberd as “clause number”.”sequence” (- subsequence). Sequence numbers are also assigned as gigit(s). Book marks on the figure and/or table numbers are set when neccessary. Reference to the figures and/or tables in the text are book marked. Insert non-breakable space and hiphon where neccessary. Delete (unneccessary) double spaces, double blank lines. Clause numbers for 5 – Considering the consistency with other clauses, 6 and 7, which include the subclauses for the architecture, the procedures and the information flows, whole clause 5 shall be the part of clause 4. Renumbering required hereafter (as proposed in CR 23.278-015).
Consequences if not approved:	⌘	

Clauses affected:	⌘	6 (previous, now it will be clause 5)

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments: ⌘

56 Control and interrogation of subscription data

Support of the procedures described in this clause in CAMEL Phase 4 is a network operator option.

56.1 Architecture

The architecture for the control and the interrogation of subscription data described in the clause 10 in 3GPP TS 23.078 Rel-99 99 [411] for the HLR and the gsmSCF also applies for the HSS and the gsmSCF.

56.2 Procedures for CAMEL

56.2.1 Any Time Subscription Interrogation

The following process in the HLR described in 3GPP TS 23.078 Rel-99 99 [411] applies for the handling of Any Time Interrogation for Subscription Information Retrieval in the HSS:

- CAMEL_ATSI_HLR.

56.2.2 Any Time Modification

The following process in the HLR described in 3GPP TS 23.078 [411] applies for the handling of Any Time Modification in the HSS:

- CAMEL_ATM_HLR.

56.2.3 Notify Subscriber Data Change

The description of the procedure in 3GPP TS 23.078 Rel-99 [411] applies for the handling of Notify Subscriber Data Change in the HSS.

56.3 Description of information flows

This subclause contains the detailed description of the information flows used by CAMEL for control and interrogation of subscription data.

Each Information Element (IE) is marked as Mandatory (M), Conditional (C), Specific conditions (S), mutually Exclusive (E) or Optional (O).

An 'M' IE shall always be included. 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. An 'O' IE may be included or omitted as required by the service logic. 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 following principles apply for the handling of the IEs by the receiving entity:

- The gsmSCF may silently discard any IE which it does not functionally support.
- The HSS shall return an error if it does not functionally support an IE which it receives.

Details of errors and exceptions to these rules are specified in 3GPP TS 29.002 [932].

56.3.1 gsmSCF to HSS information flows

56.3.1.1 Any Time Modification Request

56.3.1.1.1 Description

This IF is used to modify information in the HSS at any time. The IF from the gsmSCF to the HLR is specified in 3GPP TS 23.078 Rel-99 [411]. The IF is also applied to the interface between the gsmSCF to the HSS.

56.3.1.2 Any Time Subscription Interrogation Request

56.3.1.2.1 Description

This IF is used to request subscription information from the HSS at any time. The IF from the gsmSCF to the HLR is specified in 3GPP TS 23.078 Rel-99 [411]. The IF is also applied to the interface between the gsmSCF to the HSS.

56.3.1.2.2 Information Elements

Any Time Subscription Interrogation Request is specified in 3GPP TS 23.078 Rel-99 [411]. Additionally the following IMS specific information elements are required:

Information element name	Status	Description
Requested Info	M	This IE may indicate supported CAMEL phases in HSS.
Additional CAMEL Subscription Info	S,E	This IE may be one of the following elements: O-IM-CSI / VT-IM-CSI / D-IM-CSI.

56.3.1.3 Notify Subscriber Data Change response

56.3.1.3.1 Description

This IF is used by the gsmSCF to respond to the HSS of the change of subscriber data notify. The IF from the gsmSCF to the HLR is specified in 3GPP TS 23.078 Rel-99 [411]. The IF is also applied to the interface between the gsmSCF to the HSS.

56.3.2 HSS to gsmSCF information flows

56.3.2.1 Any Time Modification ack

56.3.2.1.1 Description

This IF is used by the HSS to provide the modified information to the gsmSCF. The IF from the HLR to the gsmSCF is specified in 3GPP TS 23.078 Rel-99 [411]. The IF is also applied to the interface between the gsmSCF to the HSS.

56.3.2.1.2 Information Elements

Any Time Modification ack is specified in 3GPP ~~TS~~ TS 23.078 Rel-~~99~~ 99 [411]. Additionally the following IMS specific information elements are required:

Information element name	Status	Description
O-IM-CSI	S	See subclause 4.4.1.1~~4.4.1.1~~. It shall be present if it was modified.
VT-IM-CSI	S	See subclause 4.4.1.3~~4.4.1.3~~. It shall be present if it was modified.
D-IM-CSI	S	See subclause 4.4.1.2~~4.4.1.2~~. It shall be present if it was modified.

56.3.2.2 Any Time Subscription Interrogation ack

56.3.2.2.1 Description

This IF is used by the HSS to provide the requested subscription information to the gsmSCF. The IF from the HLR to the gsmSCF is specified in 3GPP TS 23.078 [411]. The IF is also applied to the interface between the gsmSCF to the HSS.

56.3.2.2.2 Information Elements

Any Time Subscription Interrogation ack is specified in 3GPP TS 23.078 [411]. Additionally the following IMS specific information elements are required:

Information element name	Status	Description
Supported CAMEL Phases In HSS	C	This IE indicates the CAMEL phase supported in the HSS.
O-IM-CSI	C	See subclause 4.4.1.14.4.1.1.
VT-IM-CSI	C	See subclause 4.4.1.34.4.1.3.
D-IM-CSI	C	See subclause 4.4.1.24.4.1.2.

56.3.2.3 Notify Subscriber Data Change

56.3.2.3.1 Description

This IF is used by the HSS to notify to the gsmSCF of the change of subscriber data. This IF is sent at each time subscriber data is changed. The IF from the HLR to the gsmSCF is specified in 3GPP TS 23.078 Rel-99 99 [411]. The IF is also applied to the interface between the gsmSCF to the HSS.

56.3.2.3.2 Information Elements

Notify Subscriber Data Change is specified in 3GPP TS 23.078 Rel-99 99 [411]. Additionally the following IMS specific information elements are required:

Information element name	Status	Description
Specific CSI Deleted List	S	This IE shall indicate any of the following; - O-IM-CSI (with TDP criteria for O-IM-CSI); - D-IM-CSI (with TDP criteria for D-IM-CSI); - VT-IM-CSI with TDP criteria for VT-IM-CSI;

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CHANGE REQUEST

⌘ **23.278** **CR** **021** ⌘ **rev** **-** ⌘ Current version: **5.0.0** ⌘

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

Title:	⌘	Editorial improvement – clause 7
Source:	⌘	Siemens AG
Work item code:	⌘	IMS-CAMEL
Date:	⌘	31/10/2002
Category:	⌘	**D**
Release:	⌘	Rel-5

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:

2	*(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)*

Reason for change:	⌘	Editorial improvement for good readability
Summary of change:	⌘	References and linked document numbers – listed as document numbers sorted. Book marks are set in the clause 2 and the reference to the book marks are set in other clauses. Figure numbers and table numbers – Re-numberd as "clause number"."sequence" (- subsequence). Sequence numbers are also assigned as gigit(s). Book marks on the figure and/or table numbers are set when neccessary. Reference to the figures and/or tables in the text are book marked. Insert non-breakable space and hiphon where neccessary. Delete (unneccessary) double spaces, double blank lines. Clause numbers for 5 – Considering the consistency with other clauses, 6 and 7, which include the subclauses for the architecture, the procedures and the information flows, whole clause 5 shall be the part of clause 4. Renumbering required hereafter (as proposed in CR 23.278-015).
Consequences if not approved:	⌘	

Clauses affected:	⌘	7 (previous, now it will be clause 6)

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘

67 Subscriber Location and State retrieval

Support of the procedures described in this clause in CAMEL Phase 4 is a network operator option.

67.1 Architecture

The architecture for the subscriber location and state retrieval described in the clause 11 in 3GPP TS 23.078 Rel-99 [**Error! Reference source not found.**11] for the HLR and the gsmSCF applies for the HSS and the gsmSCF.

67.2 Procedures for CAMEL

67.2.1 Any Time Interrogation

The description of the procedure in 3GPP TS 23.078 Rel-99 [**Error! Reference source not found.**11] applies for the Any Time Interrogation in the HSS.

67.3 Description of information flows

This subclause contains the detailed description of the information flows used by CAMEL for the retrieval of information about the location and state of a subscriber.

Each Information Element (IE) is marked as Mandatory (M), Conditional (C), Specific conditions (S), mutually Exclusive (E) or not applicable (-).

An 'M' IE shall always be included. 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. A '-' IE shall always be omitted. 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 following principles apply for the handling of the IEs by the receiving entity:

- The gsmSCF may silently discard any IE which it does not functionally support.
- The GMLC shall return an error if it does not functionally support an IE which it receives.

Details of errors and exceptions to these rules are specified in 3GPP TS 29.002 [**Error! Reference source not found.**32].

67.3.1 gsmSCF to HSS information flows

67.3.1.1 Any Time Interrogation Request

67.3.1.1.1 Description

This IF is used to request information (any one or more of subscriber state, subscriber location, IMEI & software version, MS classmark information for the CS domain and GPRS MS classmark information) from the HSS at any time. The IF from the gsmSCF to the HLR is specified in 3GPP TS 23.078 Rel-99 [**Error! Reference source not found.**11]. The IF is also applied to the interface between the gsmSCF to the HSS.

67.3.2 HSS to gsmSCF information flows

67.3.2.1 Any Time Interrogation ack

67.3.2.1.1 Description

This IF is used by the HSS to provide the requested subscriber location and/or subscriber state information to the gsmSCF. The IF from the HLR to the gsmSCF is specified in 3GPP TS 23.078 Rel-99 [**Error! Reference source not found.**11]. The IF is also applied to the interface between the gsmSCF to the HSS.