3GPP TSG_CN **Tdoc NP-000319**
Plenary Meeting #8, Dusseldorf, Germany
21st – 23rd June 2000.

Source: **Siemens**

Title: **CR 23.078-xxx on Improved SDLs in clauses 6-11**

Agenda item: **6.2.2**

Document for: **APPROVAL**

This document contains a CR on Work Item CAMEL phase 3.

Spec	CR	Rev	CAT	Rel.	Old Ver	New Ver	Subject
23.078	182		D	R99	3.4.0	3.5.0	Improved SDLs in clauses 6-11

3GPP TSG-CN #8 Plenary
Dusseldorf, Germany, 21-23 June 2000

Document NP-000319
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.078	CR	182	Current Version:	3.4.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	CN#8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM ☐ ME ☐ UTRAN / Radio ☐ Core Network X
(at least one should be marked with an X)

Source: Siemens **Date:** 21 June 2000

Subject: Improved SDLs in clauses 6-11

Work item: CAMEL Phase 3

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification	X		Release 99	X
				Release 00	

Reason for change:

To improve readability of SDLs in clauses 6, 7, 9, 10 and 11, following changes are applied.

- Some outputs from the decision boxes have been placed far apart from the decision boxes or as if stroked through with the lines. Therefore they are placed so that the reader are easily find with less trouble nor irritation.
- Split of figures have been applied to the process GPRS_SSF for two reasons. (1) to resolve too much crowded situation in each figure, also to give more rooms for future development, and (2) to gather the states and arrange the input signals in alphabetical order.
- Notes on the signal(s) on each SDL is aligned.
- Notes on each sheet are placed between "/*" and "*/".
- Figure titles which have only one sheet for each procedure or process are added "(sheet 1)"

For detail, see the next page.

Clauses affected: 6, 7, 9, 10,11

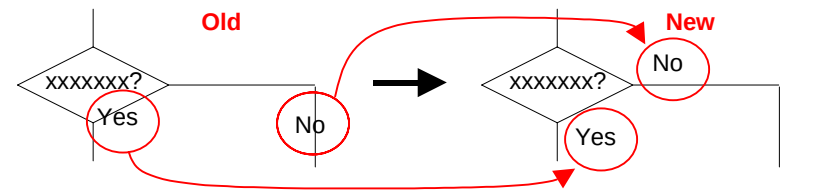
Other specs affected:

Other 3G core specifications	☐	→ List of CRs:
Other GSM core specifications	☐	→ List of CRs:
MS test specifications	☐	→ List of CRs:
BSS test specifications	☐	→ List of CRs:
O&M specifications	☐	→ List of CRs:

Other comments: This CR incorporate all the approved CRs by N2.

For Detail

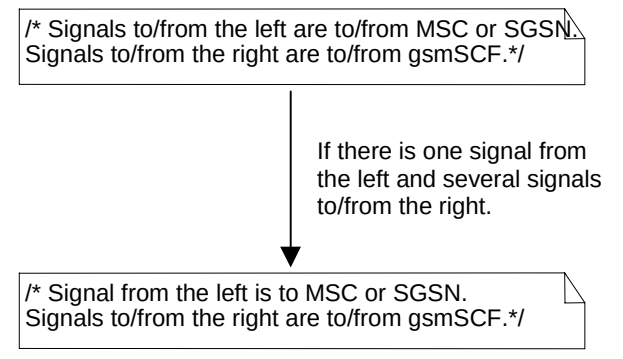
- Some outputs from the decision boxes have been placed far apart from the decision boxes or as if stroked through with the lines. Therefore they are placed so that the reader are easily find with less trouble nor irritation. See the example below.



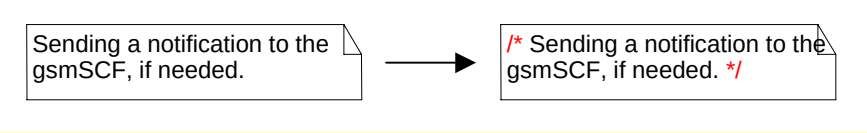
- SDLs for the process GPRS_SSF have not been arranged neatly in terms of the readability since each figure contains so much contents and the states of the gprsSSF and the expected signals are randomly scattered over the sheets. Therefore, the SDLs are proposed to be spread over seventeen sheets to give more rooms for the future development, if any, and arranged in the following order.

Sheets 1 and 2: (no change).
Sheets 3 to 5 WFI state receiving signals from GPRS_Dialogue_Handler
Sheets 6 to 8 WFI state receiving signals from the SGSN
Sheets 9 to 11 Monitoring state receiving signals from GPRS_Dialogue_Handler
Sheets 12 to 15 Monitoring state receiving signals from the SGSN
Sheets 16 WFI or Monitoring state receiving signals from GPRS_Dialogue_Handler
Sheets 17 WFI or Monitoring state receiving signals from the SGSN
Within each sheet, signals are arranged, in basic, in the alphabetical order.

- Notes on the signal(s) on each SDL is aligned in terms of the number of signals. See the example below.



- Notes on each sheet are placed between "/*" and "*/". See the example below.



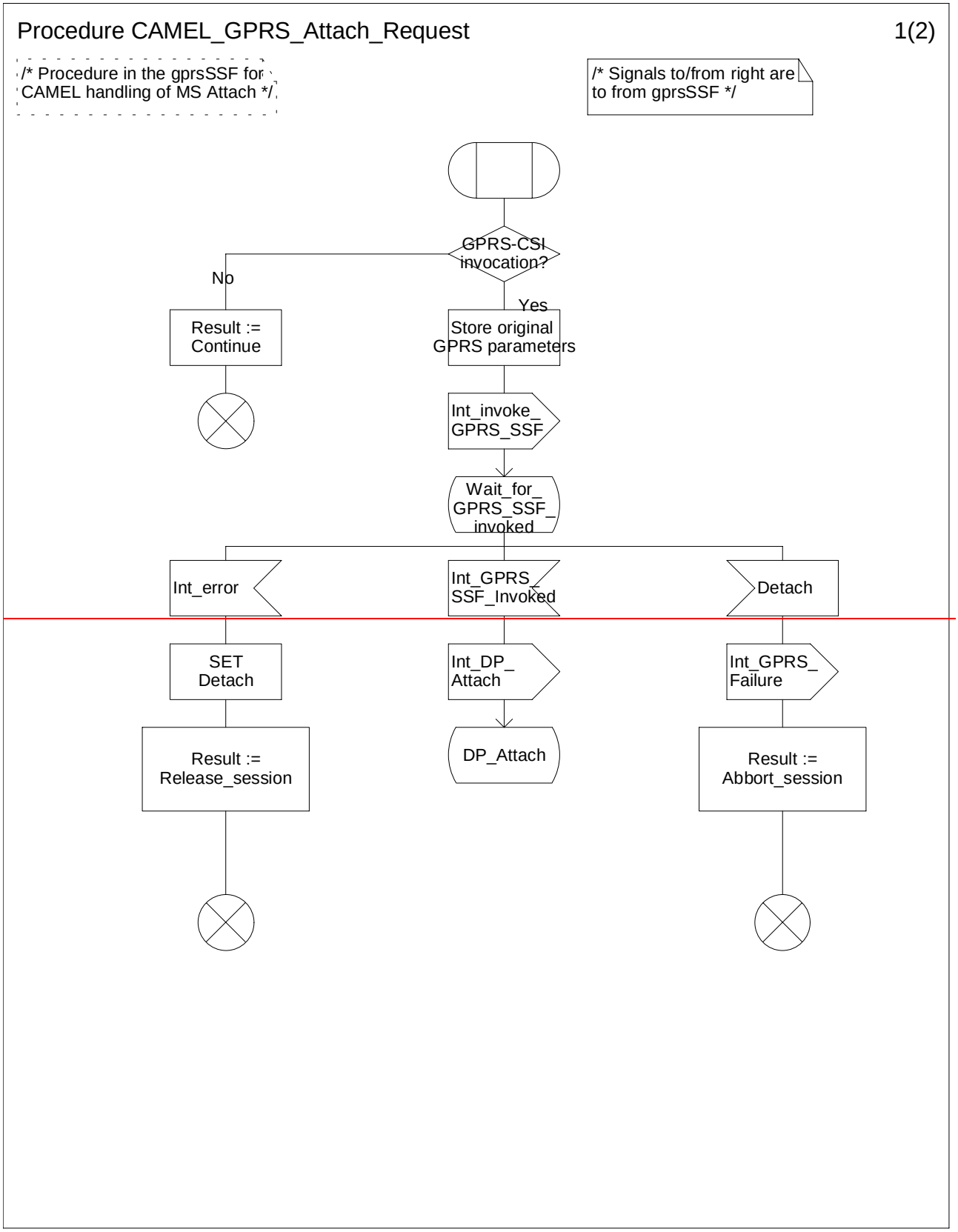
- Figure titles which have only one sheet for each procedure or process are added "(sheet 1)".

- And some editorial corrections.

***** First modified section *****

6 GPRS interworking

6.5.2.35 Handling of GPRS Attach/Detach


Procedure CAMEL_GPRS_Attach_Request
1(2)
/* Procedure in the gprsSSF for CAMEL handling of MS Attach */
/* Signals to/from right are to from gprsSSF */
GPRS-CSI invocation?
No
Yes
Result := Continue
Store original GPRS parameters
Int_invoke_ GPRS_SSF
Wait_for_ GPRS_SSF_ invoked
Int_error
Int_GPRS_ SSF_Invoked
Detach
SET Detach
Int_DP_ Attach
Int_GPRS_ Failure
Result := Release_session
DP_Attach
Result := Abbort_session

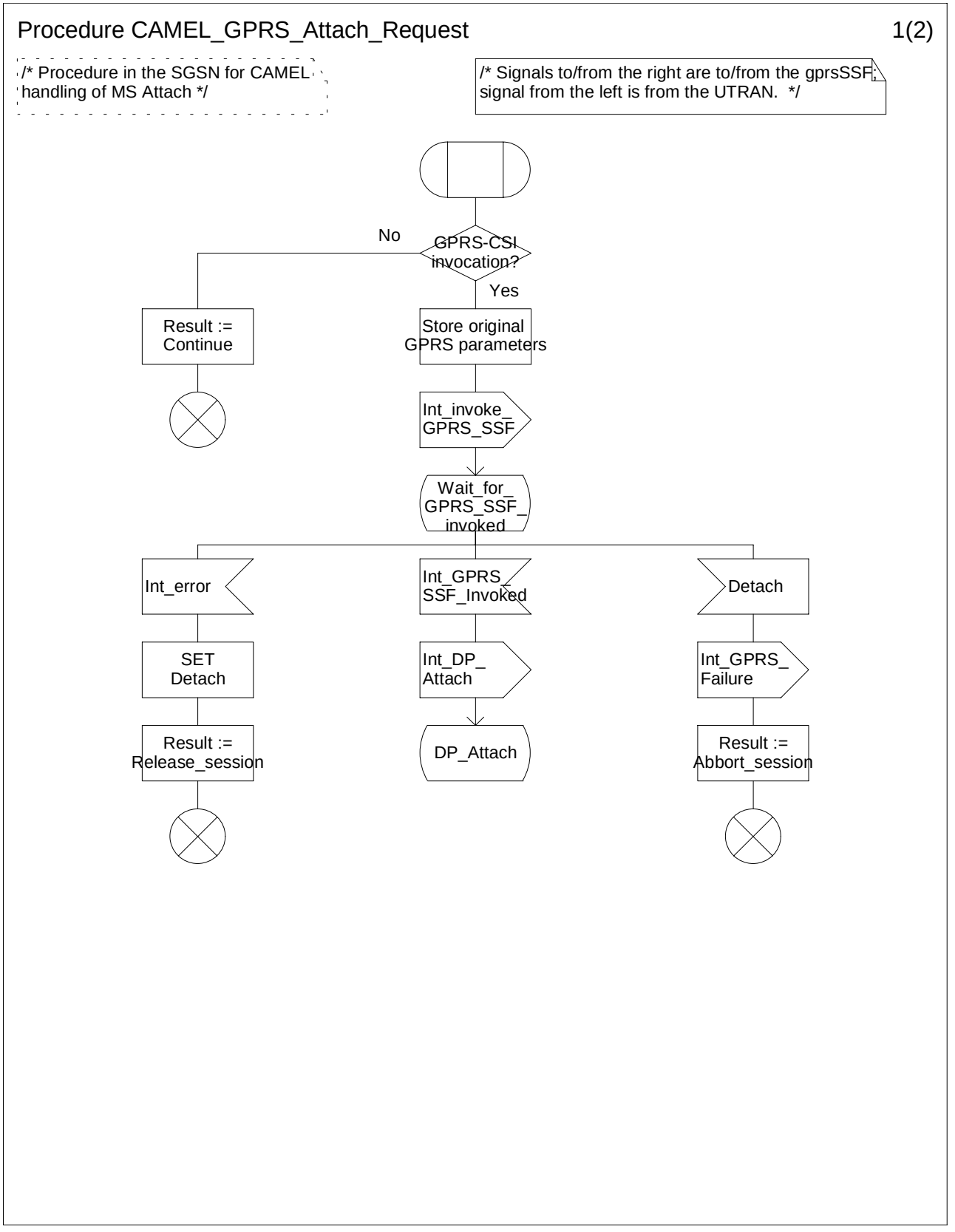
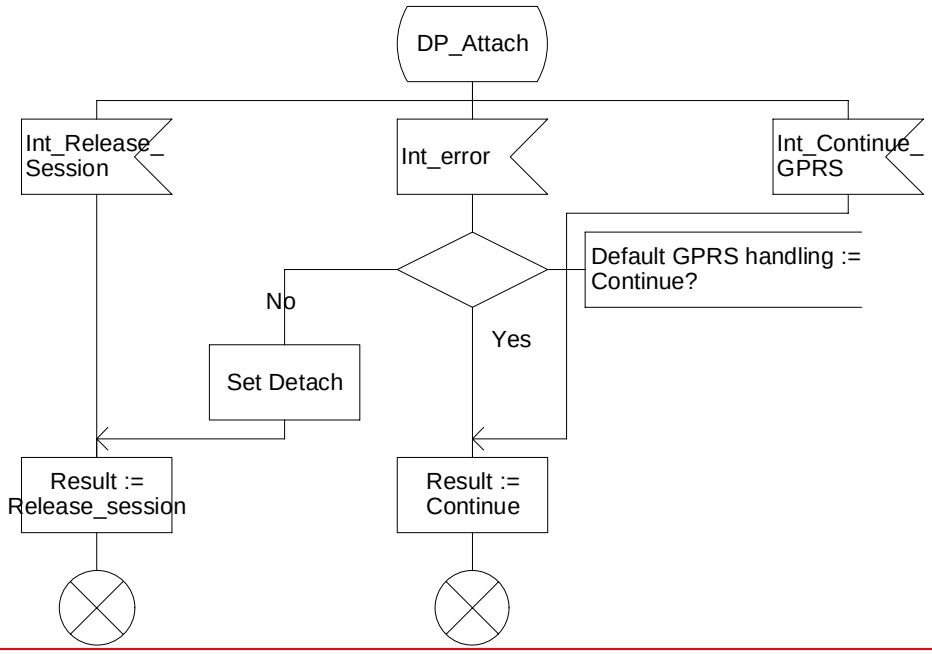


Figure 6.1 a: Procedure CAMEL_GPRS_Attach_Request (sheet 1)

Procedure CAMEL_GPRS_Attach_Request 2(2)

/* Procedure in the gprsSSF for CAMEL handling of MS Attach */



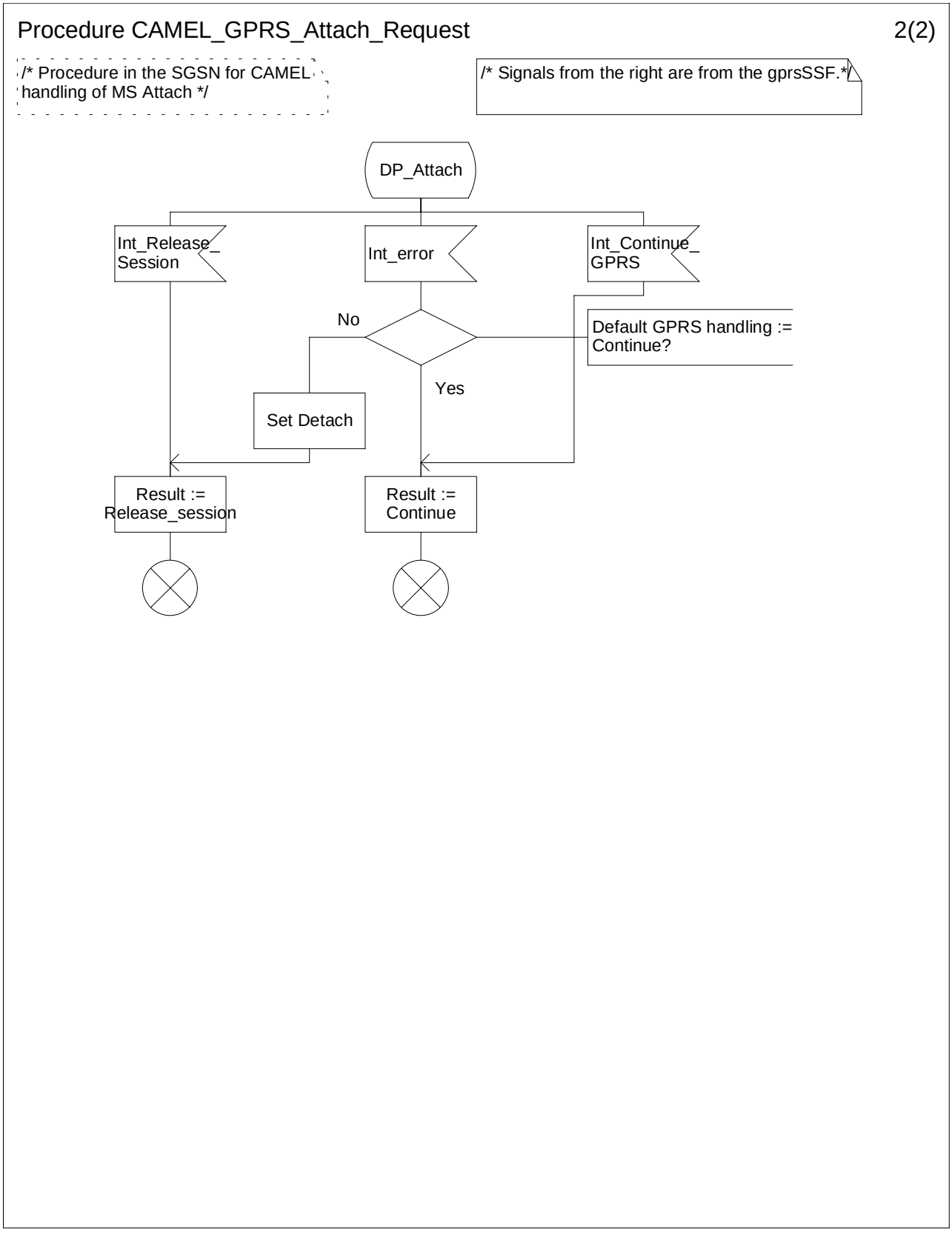
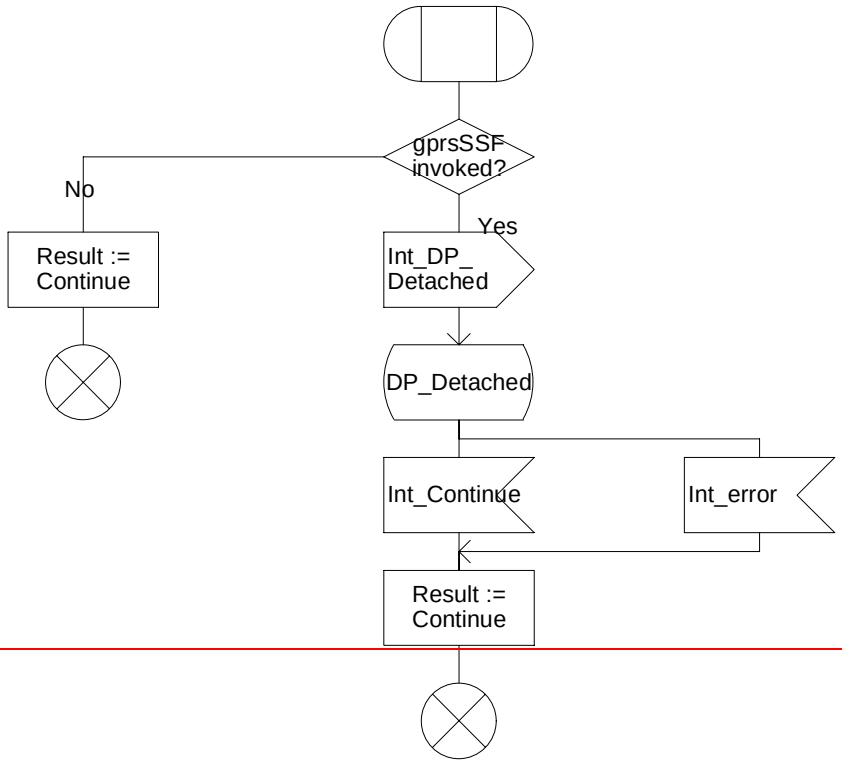


Figure 6.1 b: Procedure CAMEL_GPRS_Attach_Request (sheet 2)

Procedure CAMEL_GPRS_Detach_Indication 1(1)

/* Procedure in the gprsSSF for CAMEL handling of MS or network indicated Detach */

/* Signals to/from right are to/from gprsSSF */



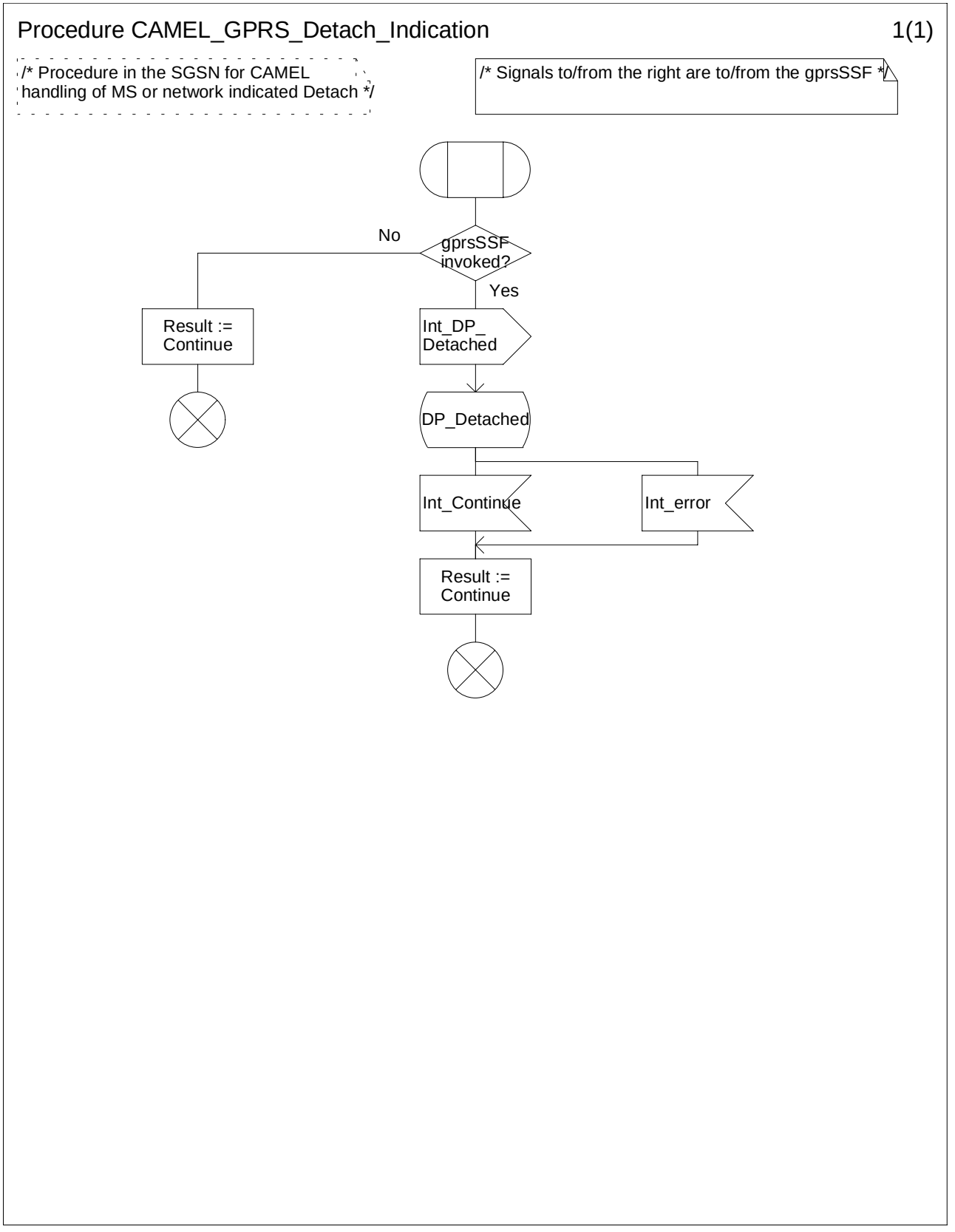
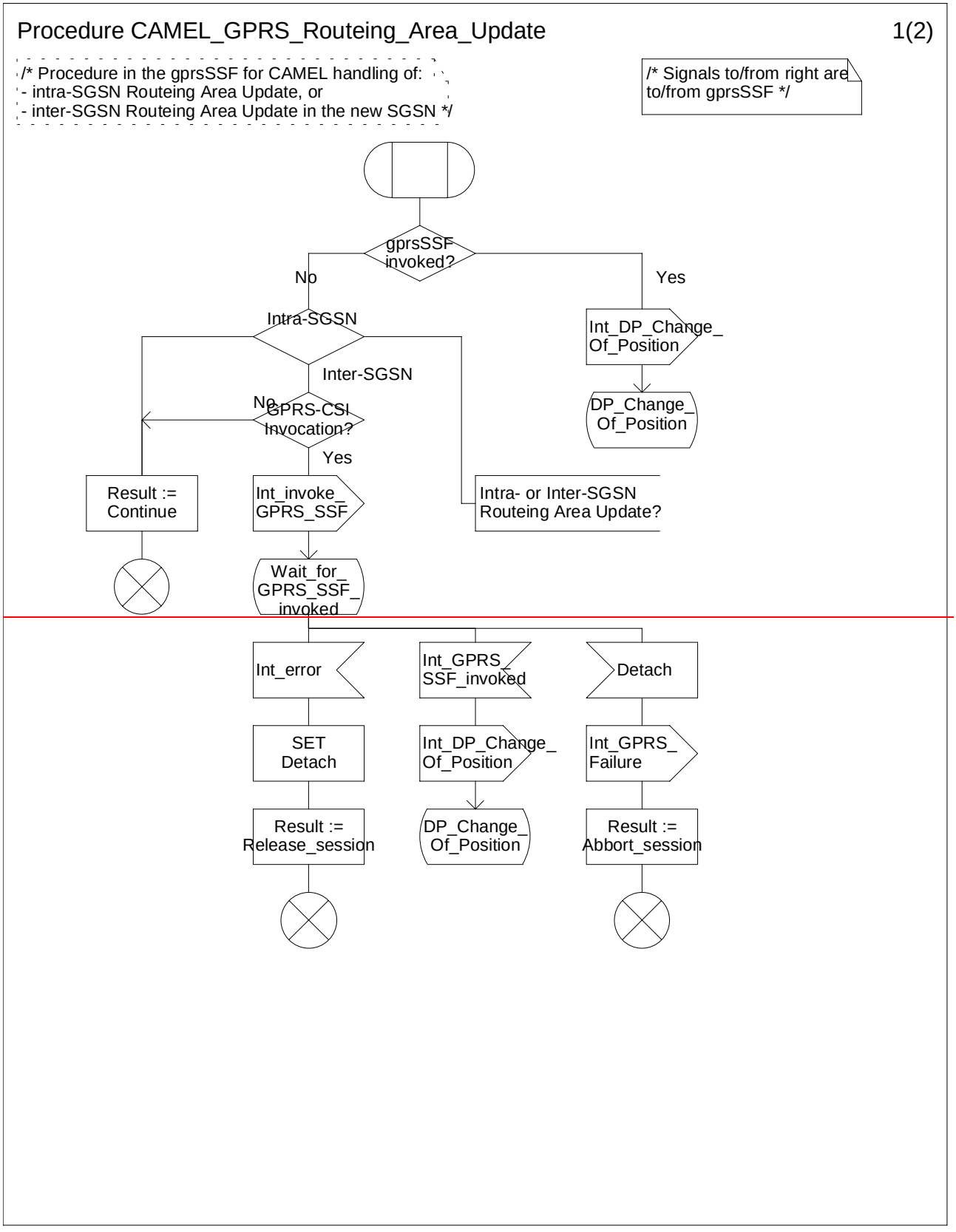


Figure 6.2: Procedure CAMEL_GPRS_Detach_Indicaton (sheet 1)

6.5.2.46 Handling of GPRS Routeing Area Update


Procedure CAMEL_GPRS_Routeing_Area_Update
1(2)
/* Procedure in the gprsSSF for CAMEL handling of:
- intra-SGSN Routeing Area Update, or
- inter-SGSN Routeing Area Update in the new SGSN */
/* Signals to/from right are to/from gprsSSF */
gprsSSF invoked?
No
Yes
Intra-SGSN
Int_DP_Change_ Of_Position
Inter-SGSN
No
GPRS-CSI Invocation?
DP_Change_ Of_Position
Yes
Result := Continue
Int_invoke_ GPRS_SSF
Intra- or Inter-SGSN Routeing Area Update?
Wait_for_ GPRS_SSF_ invoked
Int_error
Int_GPRS_ SSF_invoked
Detach
SET Detach
Int_DP_Change_ Of_Position
Int_GPRS_ Failure
Result := Release_session
DP_Change_ Of_Position
Result := Abbort_session

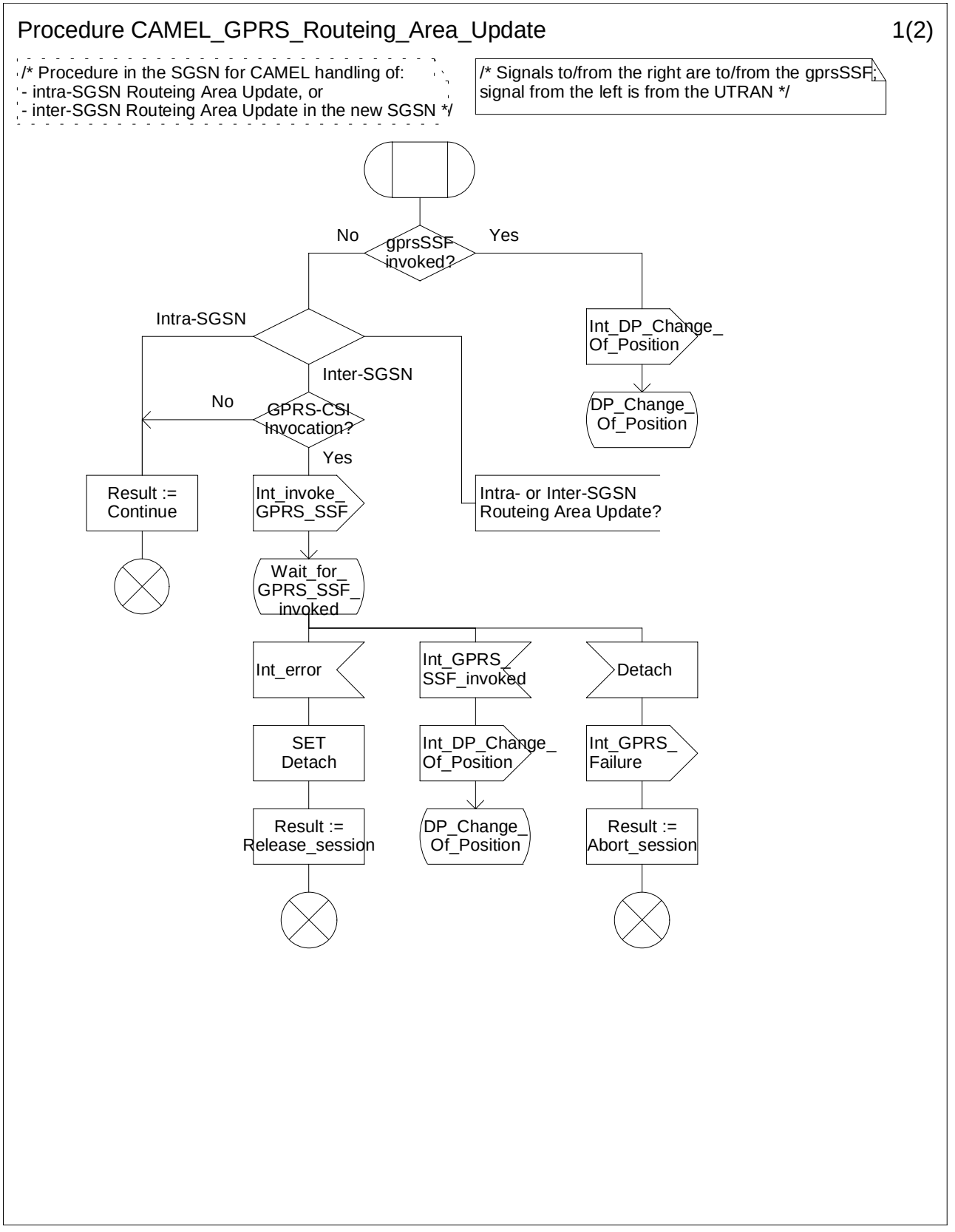
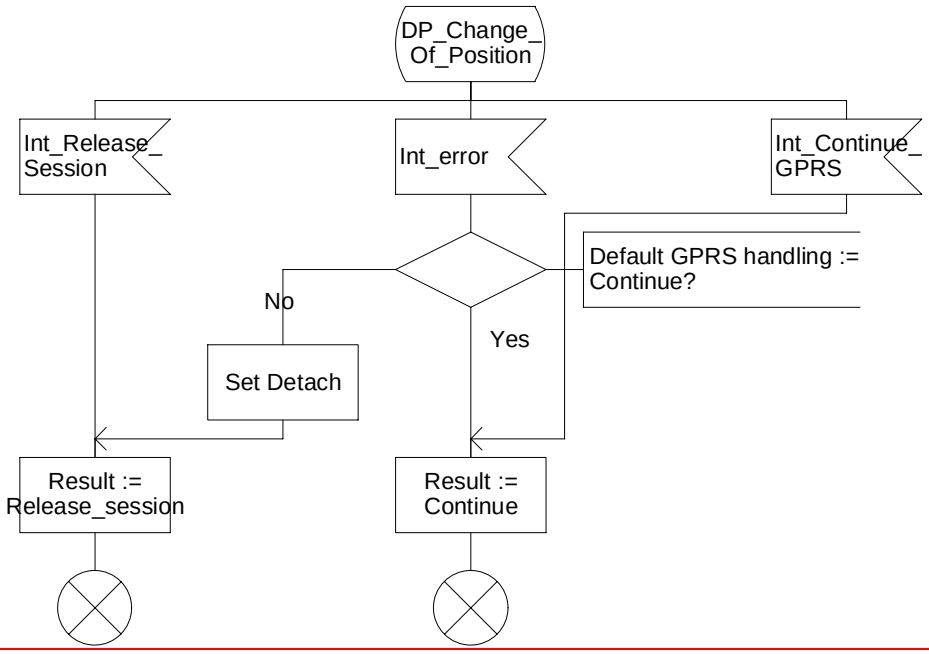


Figure 6.3 a: Procedure CAMEL_GPRS_Routeing_Area_Update (sheet 1)

Procedure CAMEL_GPRS_Routeing_Area_Update 2(2)

/* Procedure in the gprsSSF for CAMEL handling of:
- intra-SGSN Routeing Area Update, or
- inter-SGSN Routeing Area Update in the new SGSN */



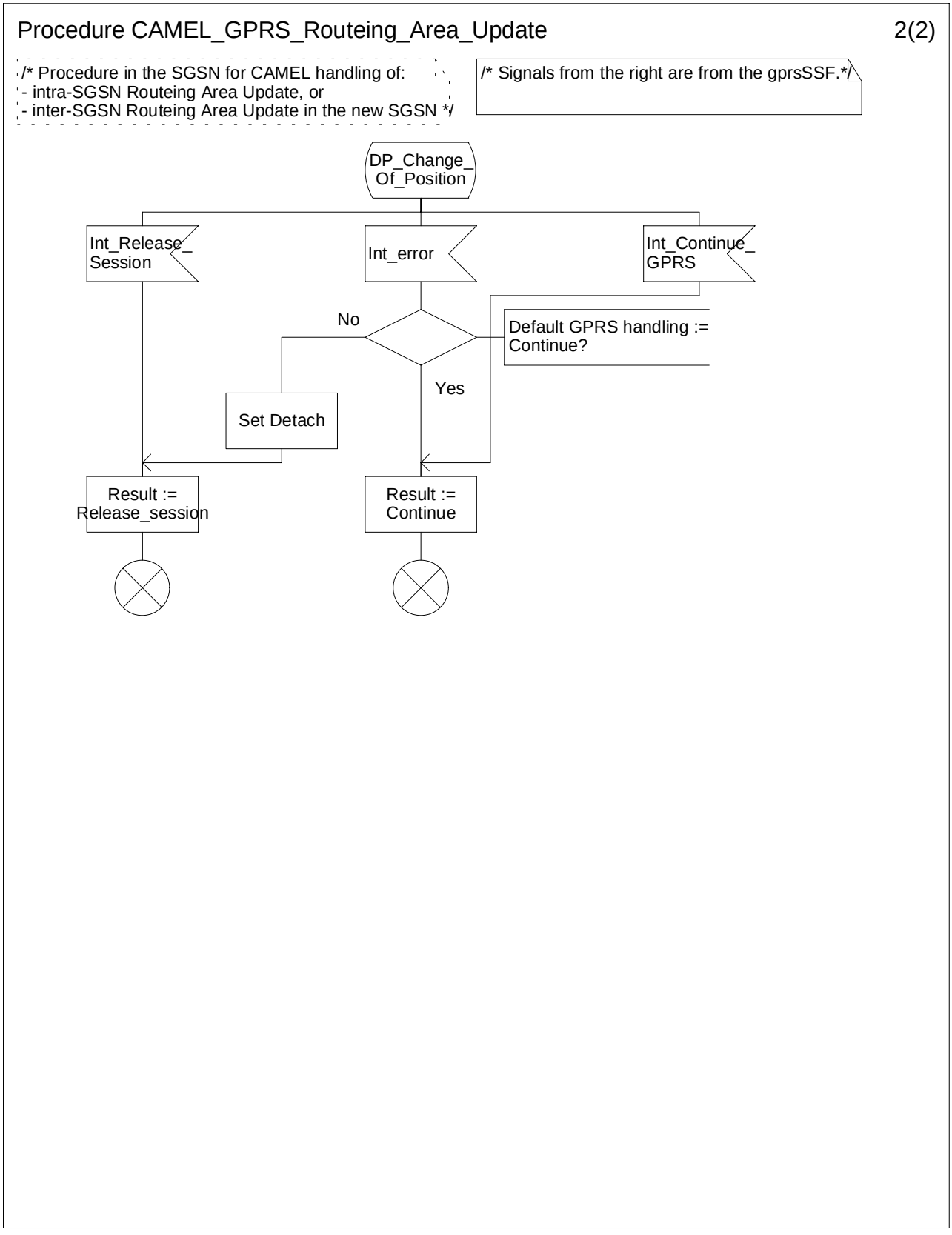
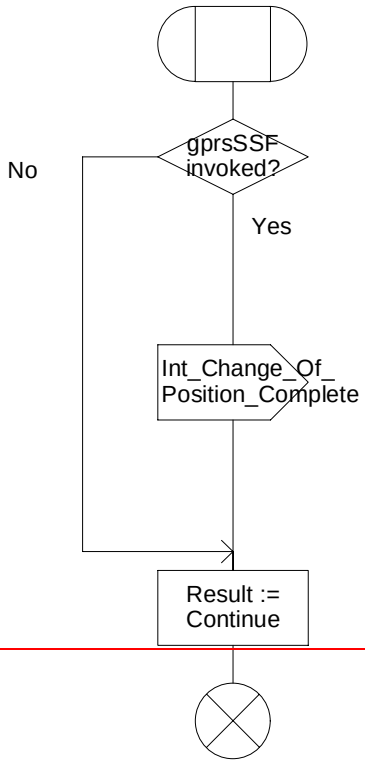


Figure 6.3 b: Procedure CAMEL_GPRS_Routeing_Area_Update (sheet 2)

Procedure CAMEL_GPRS_Context_Acknowledge 1(1)

/* Procedure in the gprsSSF for CAMEL handling of MS or network indicated Detach */

/* Signals to/from right are to/from gprsSSF */



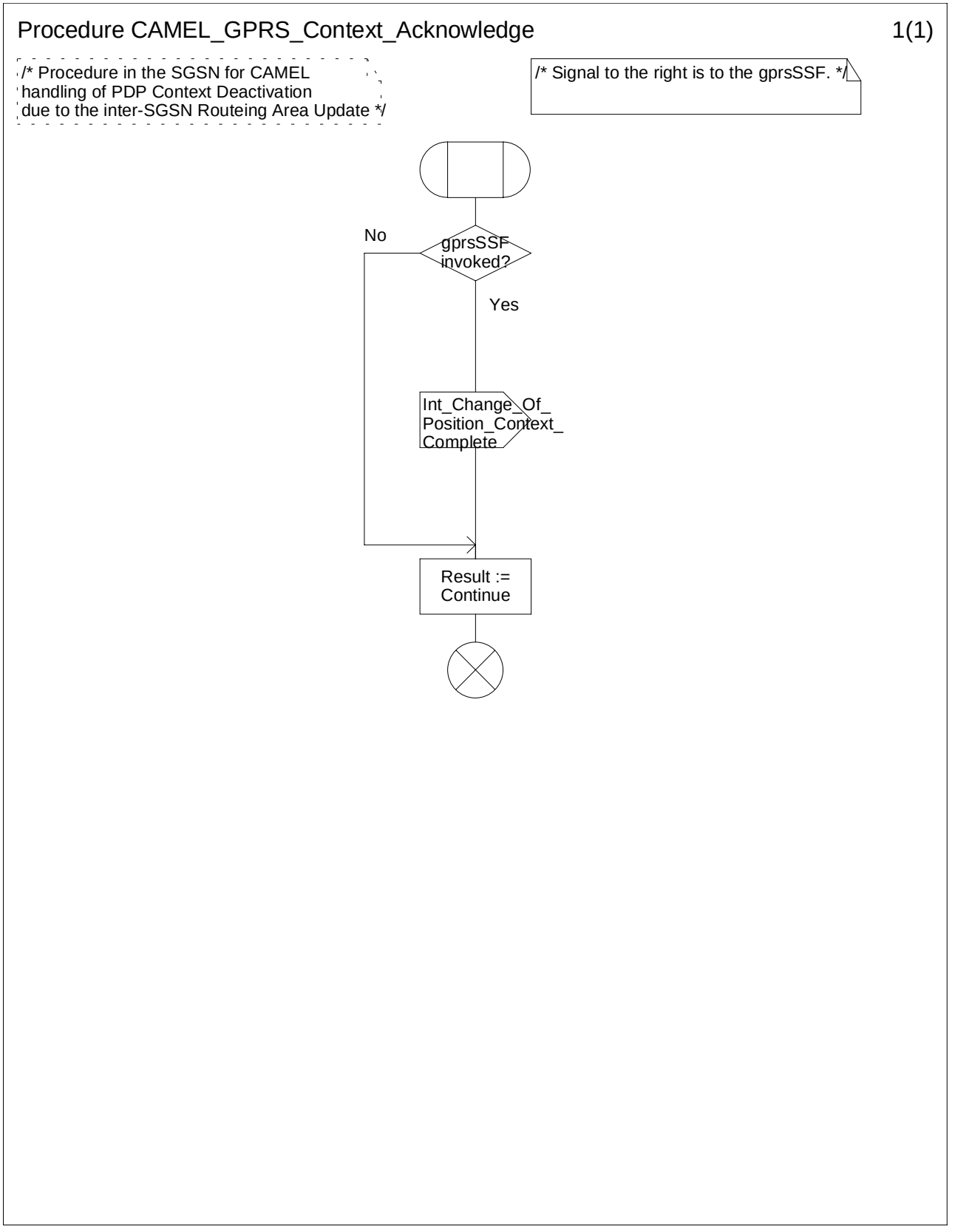
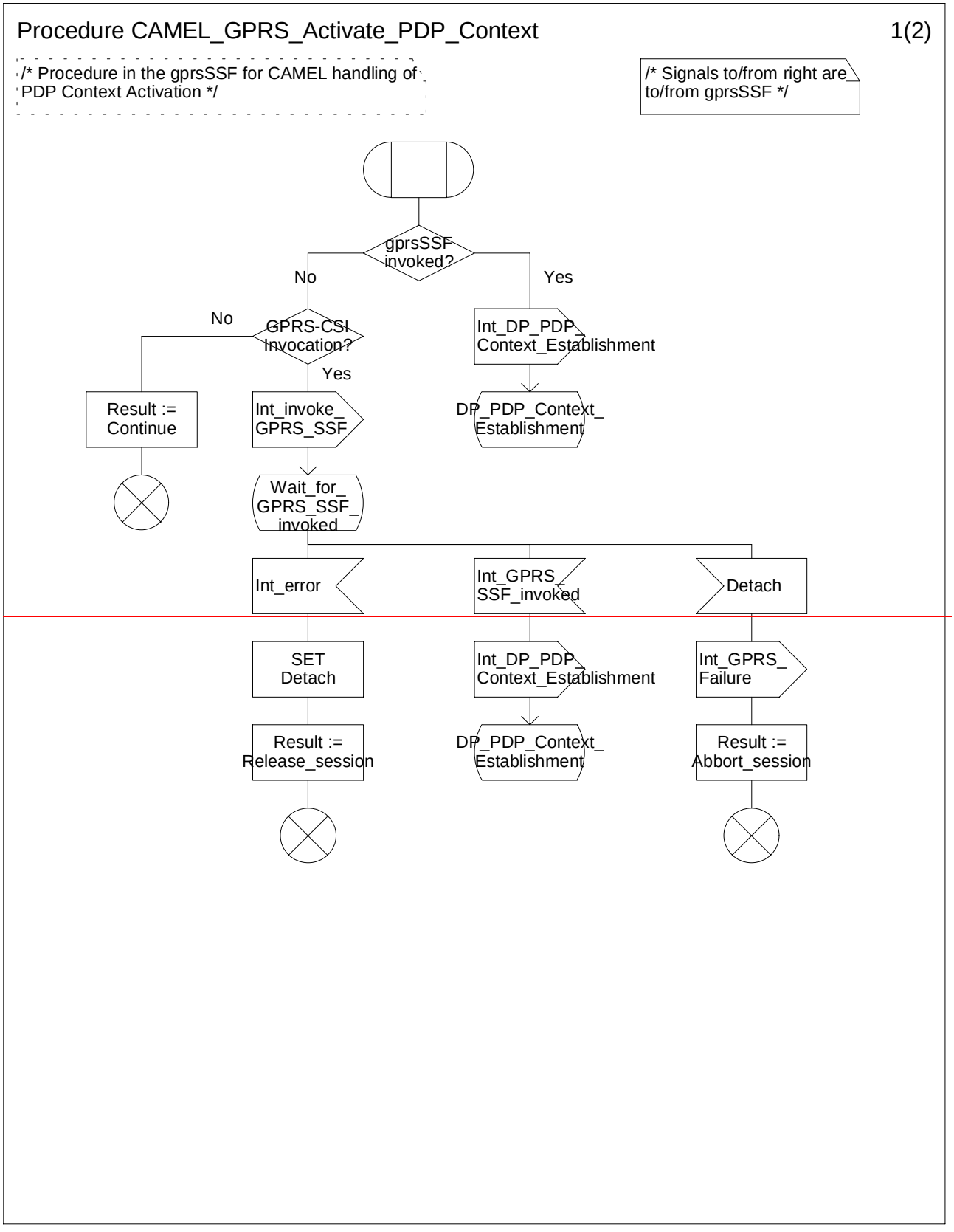


Figure 6.4: Procedure CAMEL_GPRS_Context_Acknowledge (sheet 1)

6.5.2.57 Handling of PDP Context establishment and deactivation


Procedure CAMEL_GPRS_Activate_PDP_Context
1(2)
/* Procedure in the gprsSSF for CAMEL handling of PDP Context Activation */
/* Signals to/from right are to/from gprsSSF */
gprsSSF invoked?
No
Yes
No
GPRS-CSI Invocation?
Yes
Int_DP_PDP_ Context_Establishment
Result := Continue
Int_invoke_ GPRS_SSF
DP_PDP_Context_ Establishment
Wait_for_ GPRS_SSF_ invoked
Int_error
Int_GPRS_ SSF_invoked
Detach
SET Detach
Int_DP_PDP_ Context_Establishment
Int_GPRS_ Failure
Result := Release_session
DP_PDP_Context_ Establishment
Result := Abbort_session

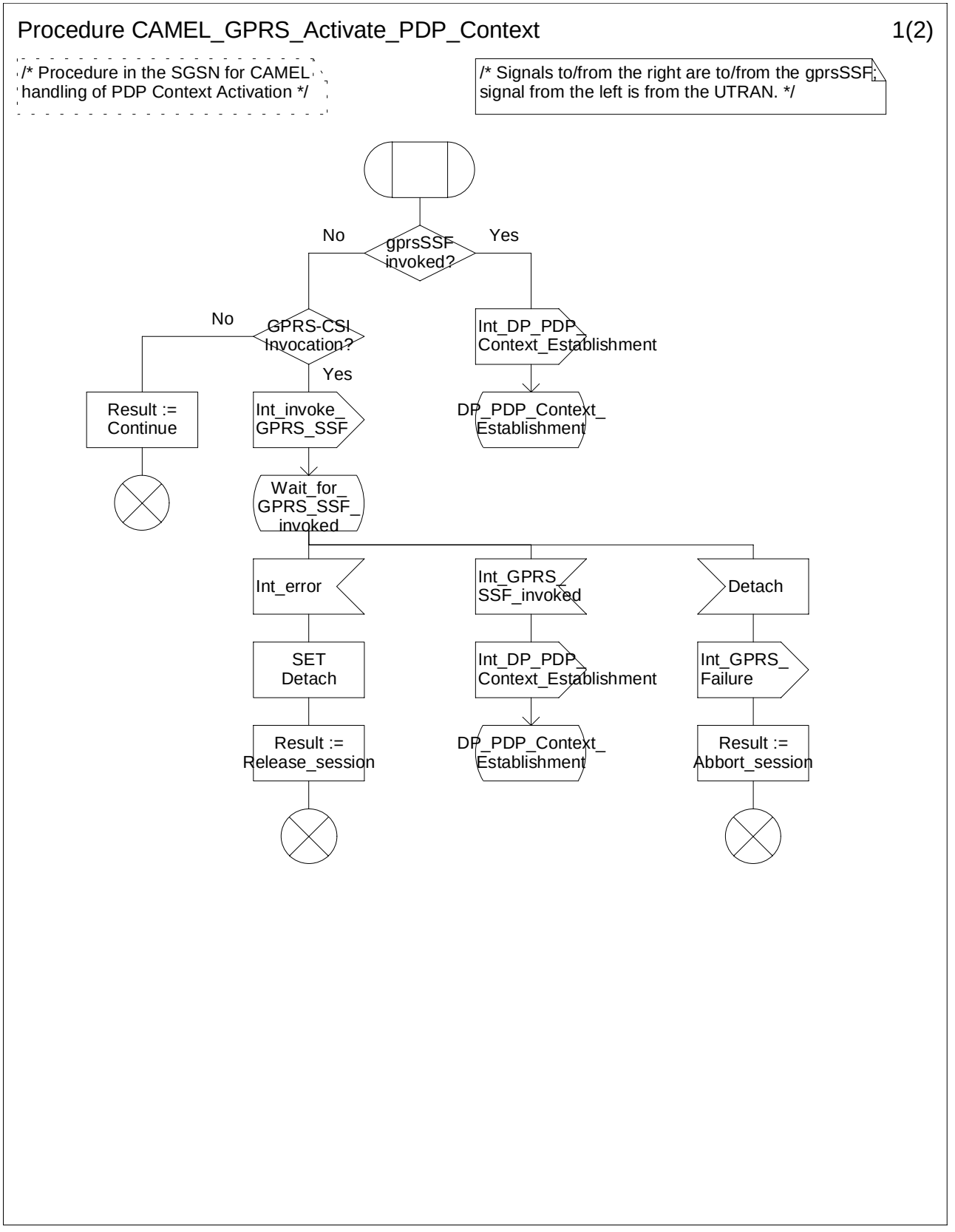
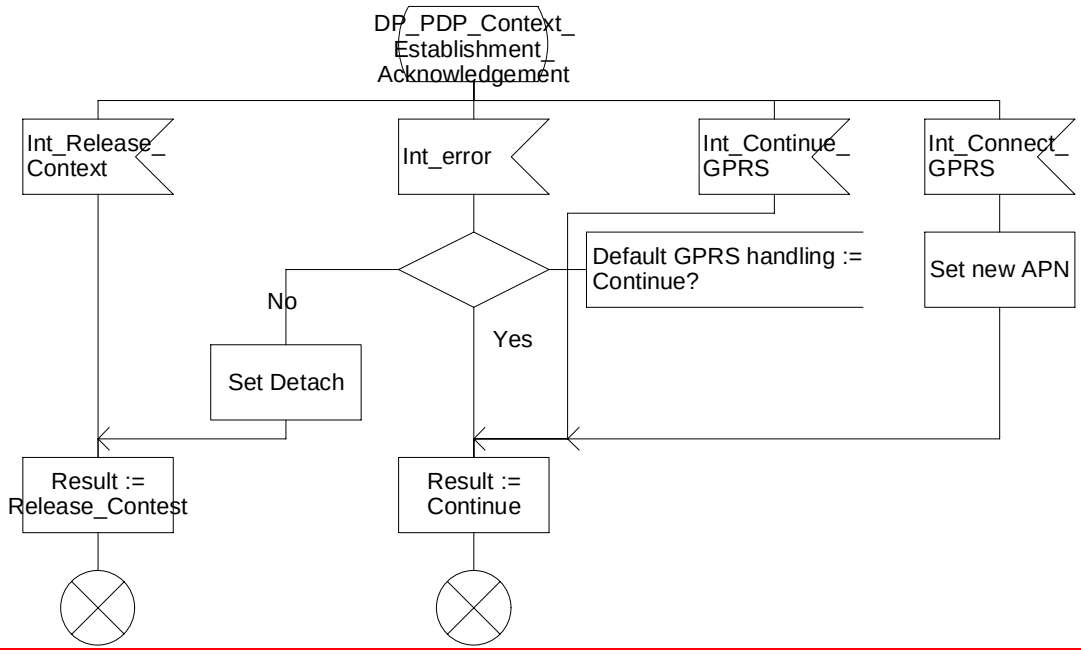


Figure 6.5 a: Procedure CAMEL_GPRS_Activate_PDP_Context (sheet 1)

Procedure CAMEL_GPRS_Activate_PDP_Context 2(2)

/* Procedure in the gprsSSF for CAMEL handling of PDP Context Activation */



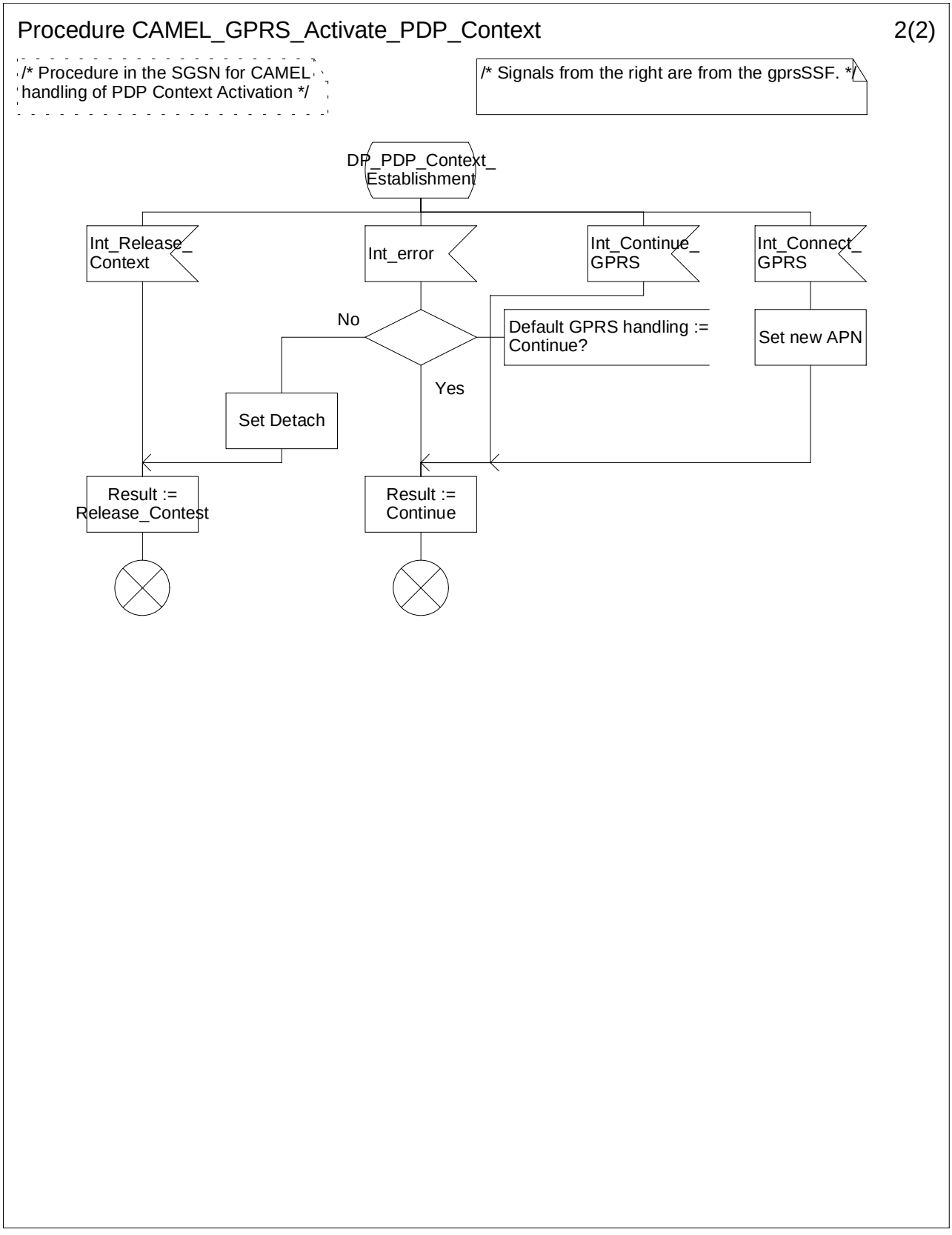
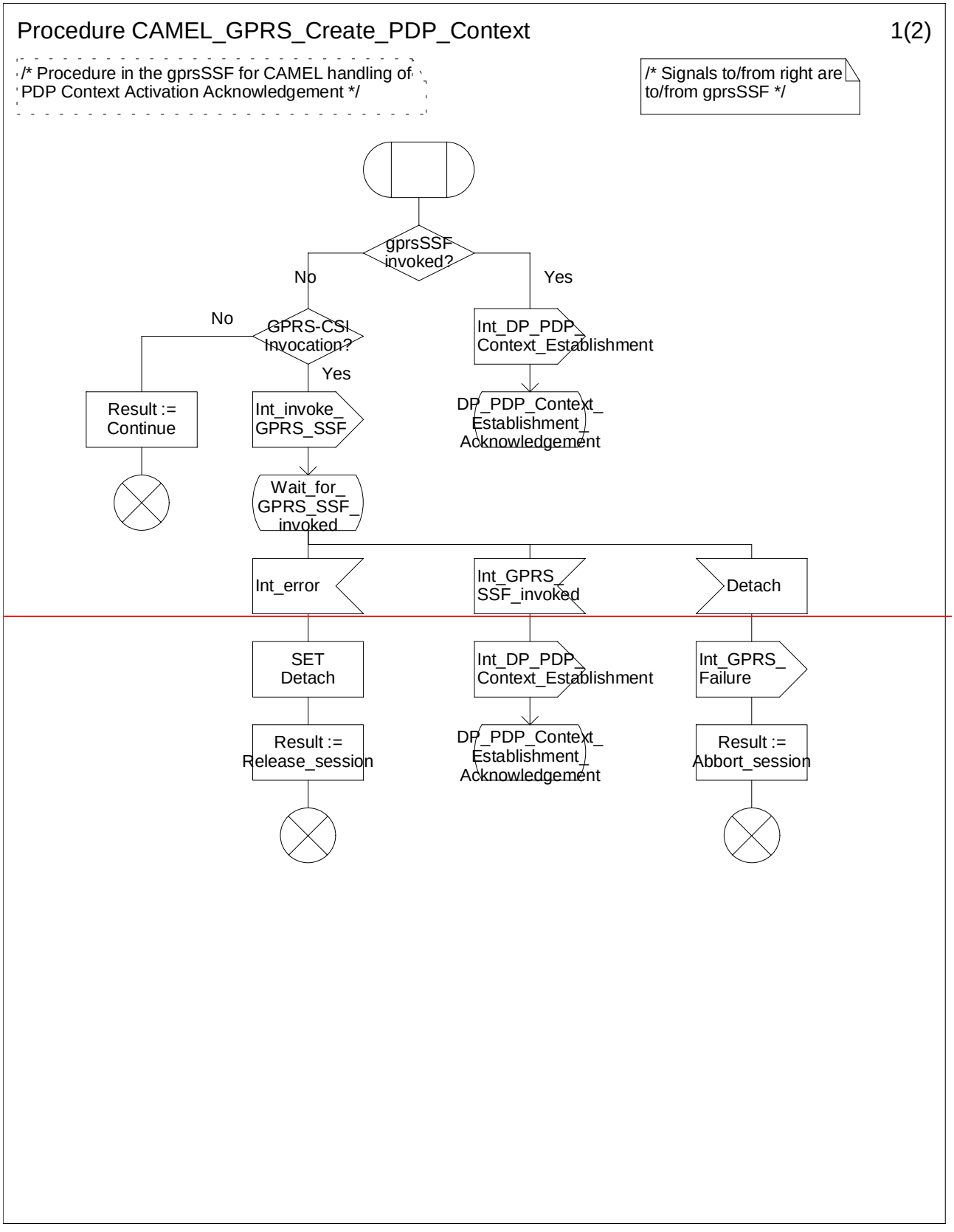


Figure 6.5 b: Procedure CAMEL_GPRS_Activate_PDP_Context (sheet 2)


Procedure CAMEL_GPRS_Create_PDP_Context
1(2)
/* Procedure in the gprsSSF for CAMEL handling of PDP Context Activation Acknowledgement */
/* Signals to/from right are to/from gprsSSF */
gprsSSF invoked?
No
Yes
No
GPRS-CSI Invocation?
Yes
Int_DP_PDP_ Context_Establishment
Result := Continue
Int_invoke_ GPRS_SSF
DP_PDP_Context_ Establishment_ Acknowledgement
Wait_for_ GPRS_SSF_ invoked
Int_error
Int_GPRS_ SSF_invoked
Detach
SET Detach
Int_DP_PDP_ Context_Establishment
Int_GPRS_ Failure
Result := Release_session
DP_PDP_Context_ Establishment_ Acknowledgement
Result := Abbort_session

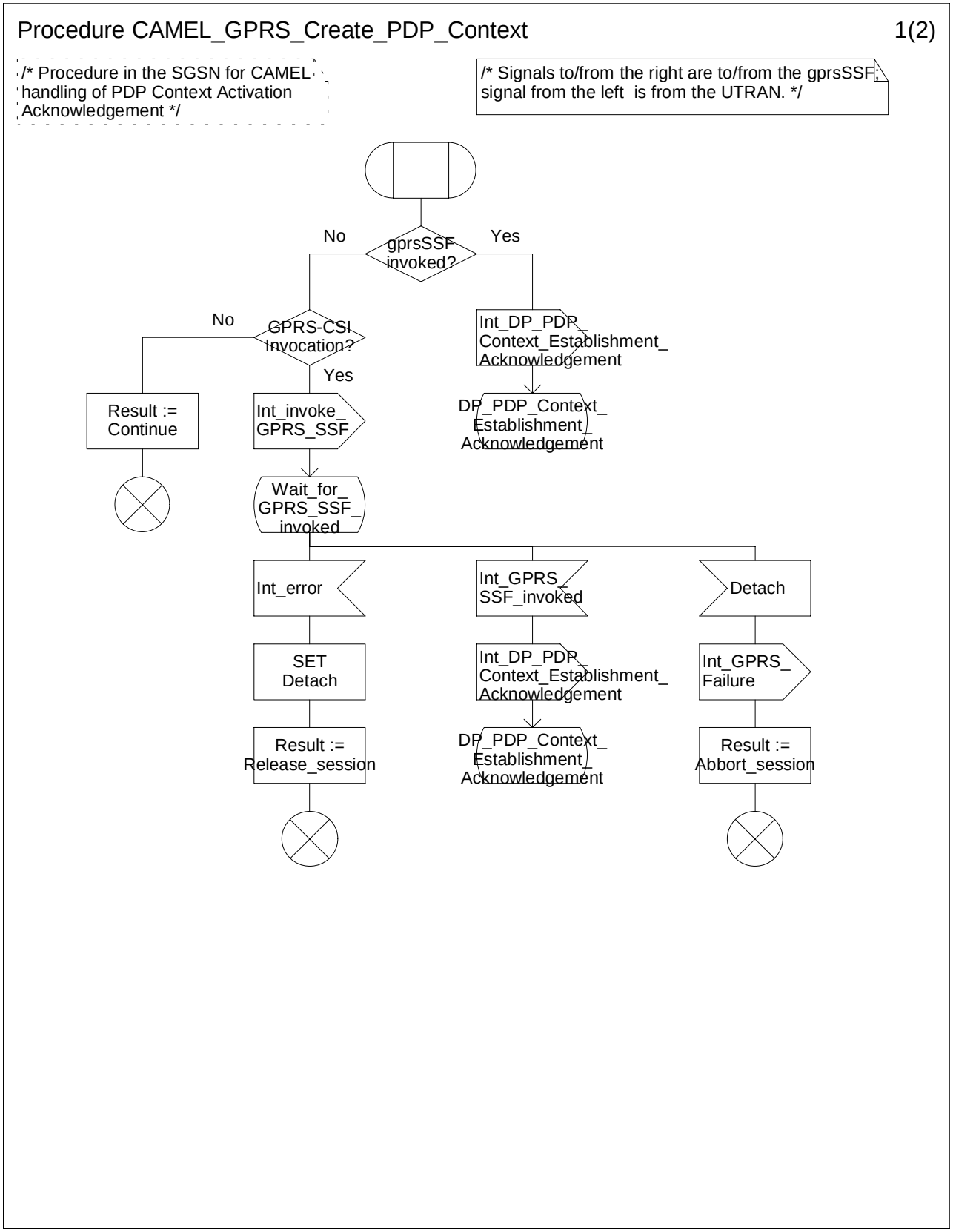
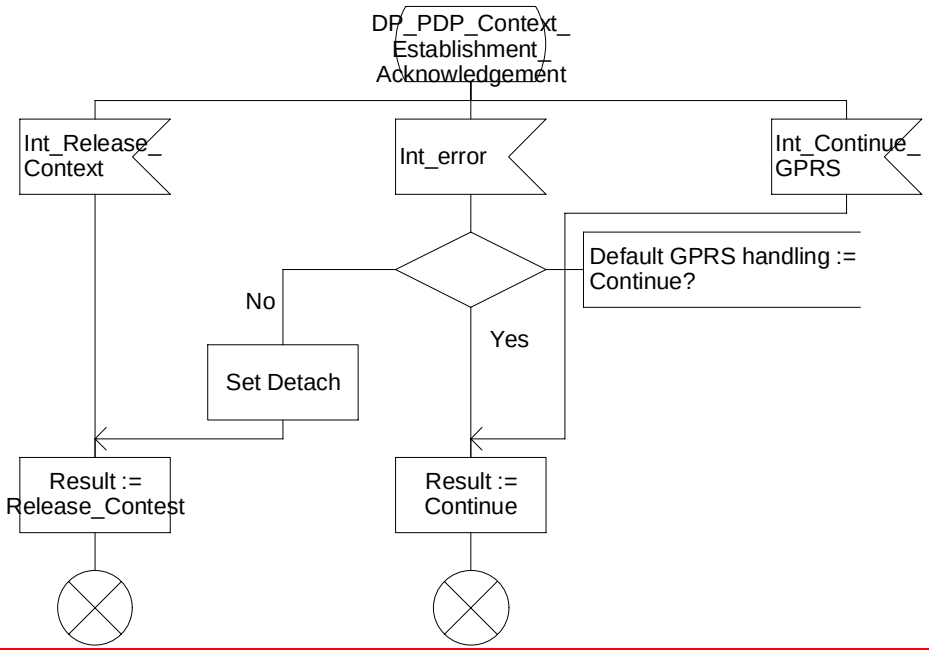


Figure 6.6 a: Procedure CAMEL_GPRS_Create_PDP_Context (sheet 1)

Procedure CAMEL_GPRS_Create_PDP_Context 2(2)

/* Procedure in the gprsSSF for CAMEL handling of PDP Context Activation Acknowledgement */



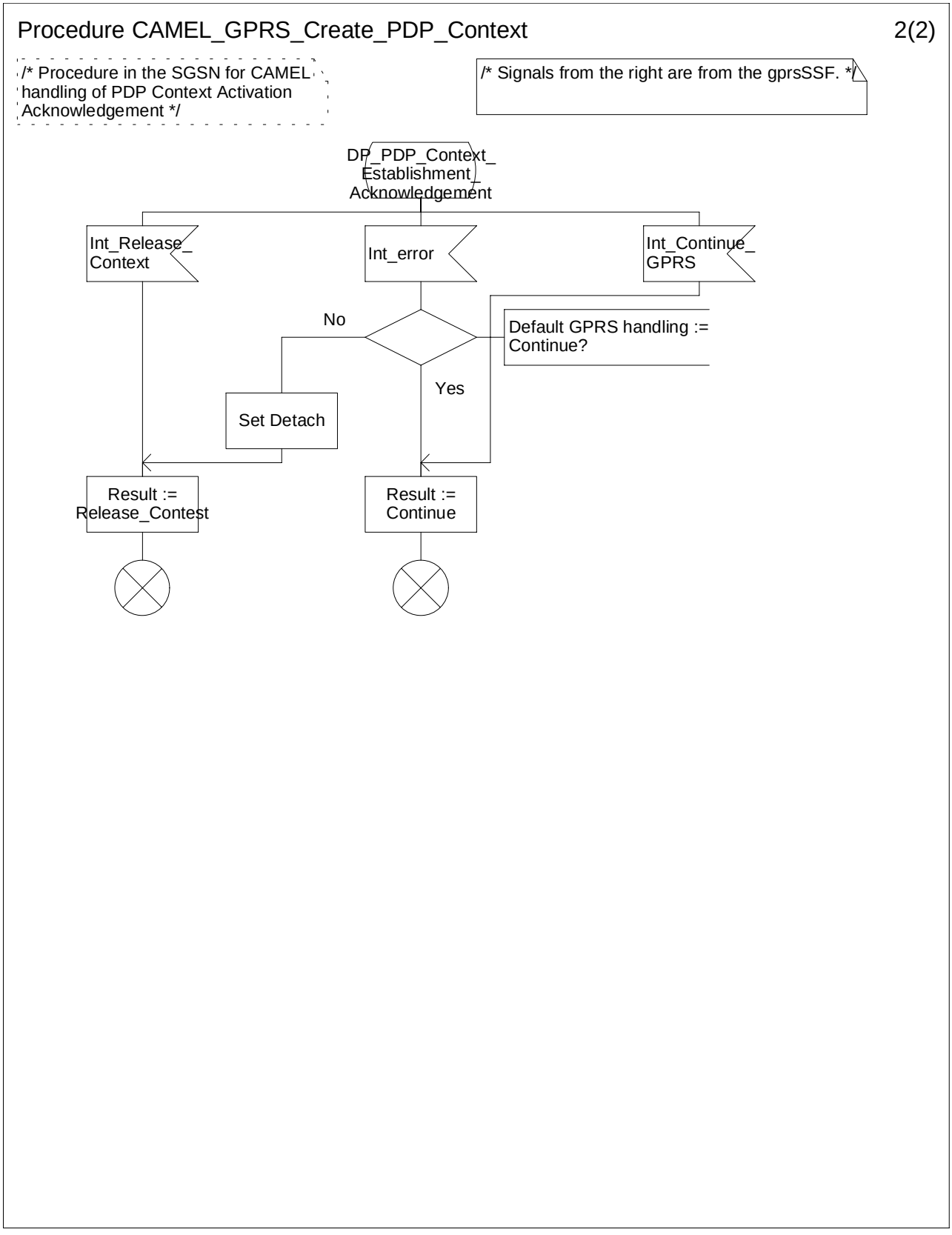
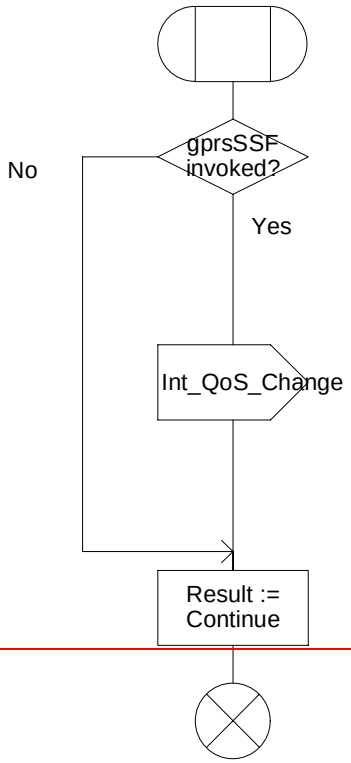


Figure 6.6 b: Procedure CAMEL_GPRS_Create_PDP_Context (sheet 2)

Procedure CAMEL_GPRS_Modify_PDP_Context 1(1)

/* Procedure in the gprsSSF for CAMEL handling of QoS modification of a PDP Context */

/* Signals to/from right are to/from gprsSSF */



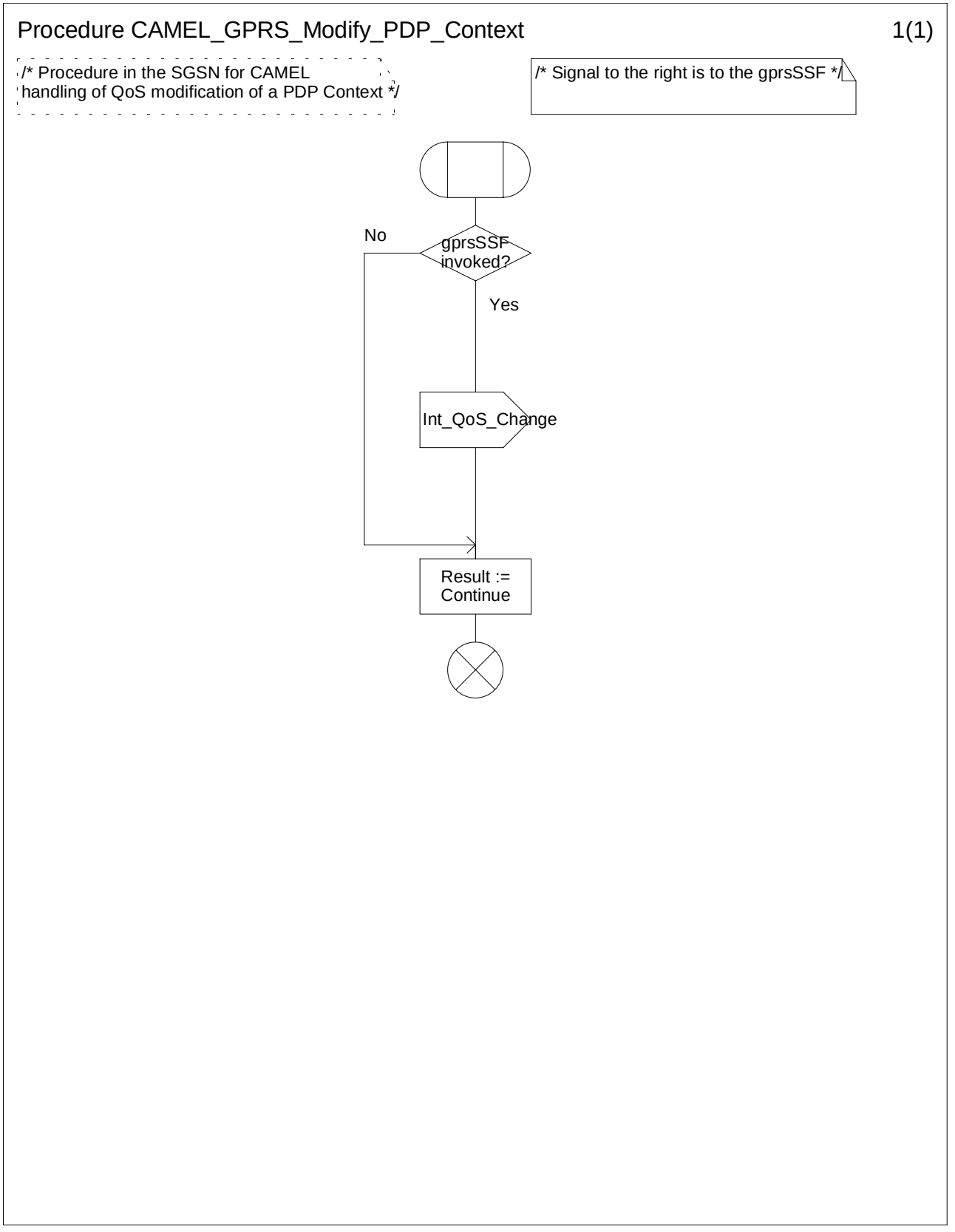
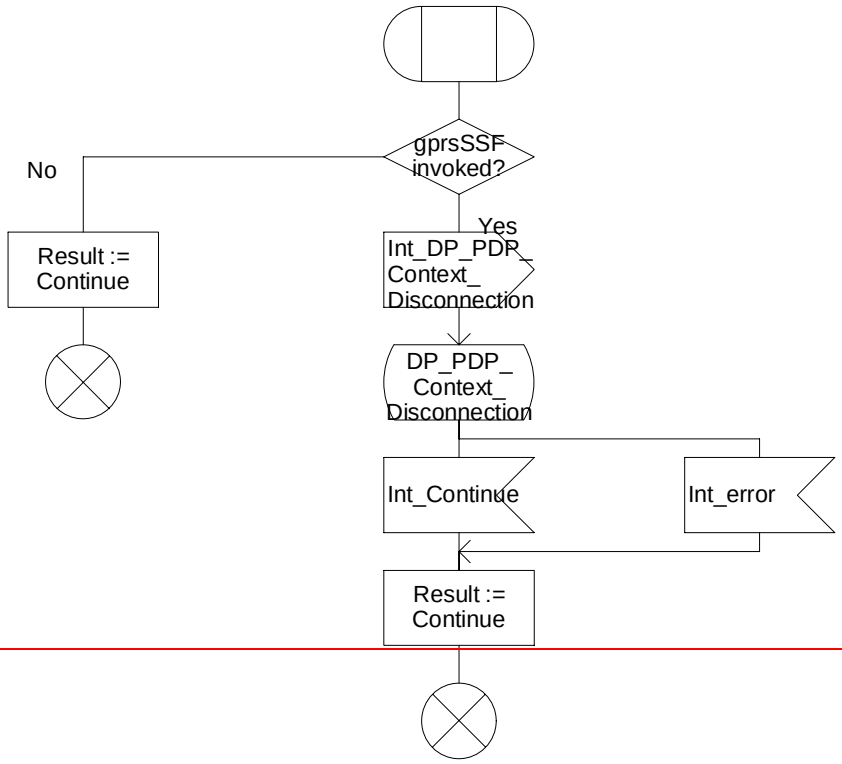


Figure 6.7: Procedure CAMEL_GPRS_Modify_PDP_Context (sheet 1)

Procedure CAMEL_GPRS_Deactivate_PDP_Context 1(1)

/* Procedure in the gprsSSF for CAMEL handling of MS or network indicated Detach */

/* Signals to/from right are to/from gprsSSF */



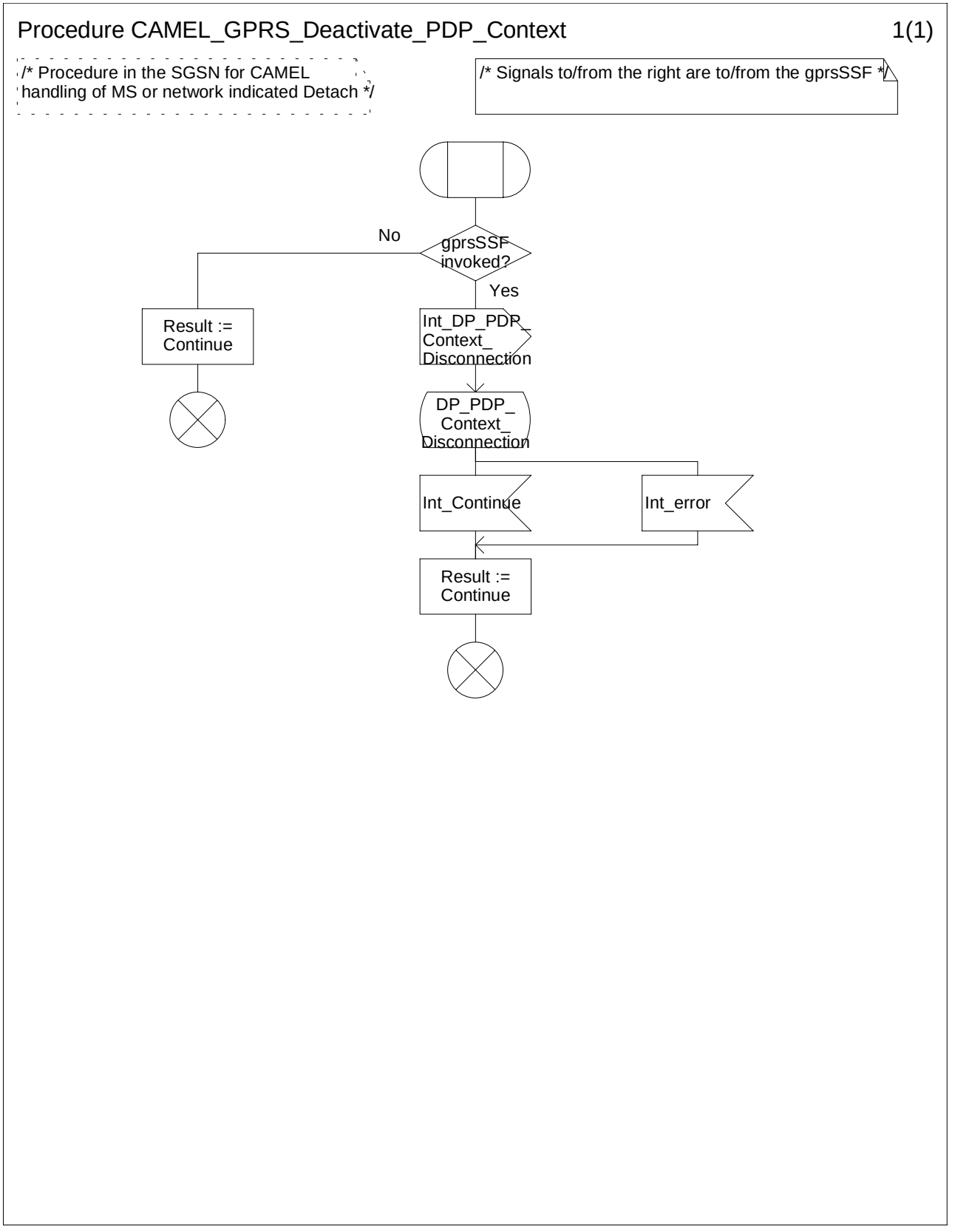


Figure 6.8: Procedure CAMEL_GPRS_Deactivate_PDP_Context (sheet 1)

6.5.38 Handling GPRS in the gprsSSF

6.5.3.1 Procedure Handle_SCI_GPRS

1) Precondition: before an answer event is detected and no Tsw running:

   if 1 set of e-parameters received --> send to the SGSN;

   if 2 sets e-parameters received --> error;

   if 1 set of e-parameters and Tariff Switch received --> error;

   if 2 sets of e-parameters and Tariff Switch received --> send 1st/start Tsw/store 2nd;

2) Precondition: before an answer event is detected and Tsw running and no e-parameters;

   if 1 set of e-parameters received --> error, no e-parameters stored;

   if 2 sets e-parameters received --> send 1st/store 2nd;

   if 1 set of e-parameters and Tariff Switch received --> error;

   if 2 sets of e-parameters and Tariff Switch received --> error.

3) Precondition: before an answer event is detected and Tsw running and e-parameters stored:

   if 1 set of e-parameters received --> error;

   if 2 sets e-parameters received --> error;

   if 1 set of e-parameters and Tariff Switch received --> error;

   if 2 sets of e-parameters and Tariff Switch received --> error.

4) Precondition: after an answer event is detected and no Tsw running:

   if 1 set of e-parameters received --> send to the SGSN;

   if 2 sets e-parameters received --> error;

   if 1 set of e-parameters and Tariff Switch received --> start Tsw/store set;

   if 2 sets of e-parameters and Tariff Switch received --> error;

5) Precondition: after an answer event is detected and Tsw running and no e-parameters;

   if 1 set of e-parameters received --> store e-parameters;

   if 2 sets e-parameters received --> error;

   if 1 set of e-parameters and Tariff Switch received --> error;

   if 2 sets of e-parameters and Tariff Switch received --> error.

6) Precondition: after an answer event is detected and Tsw running and e-parameters stored:

   if 1 set of e-parameters received --> error;

   if 2 sets e-parameters received --> error;

   if 1 set of e-parameters and Tariff Switch received --> error;

   if 2 sets of e-parameters and Tariff Switch received --> error.

NOTE: The SGSN shall store the received e-parameters to be sent subsequently to the MS. The SGSN shall send these e parameters to the MS in a Connect message or in a Facility message.

6.5.3.2 Process GPRS_SSF and procedures

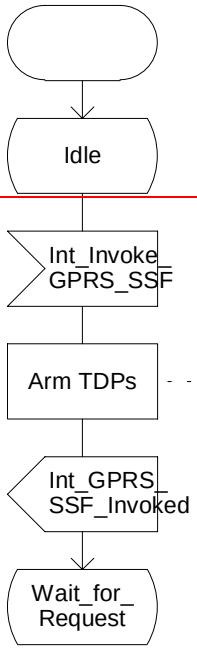
Process GPRS_SSF 1(13)

/* Process to describe the behaviour of the gprsSSF. */

/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */

/*
The following timeres are defined:
- Tsp: Session period timer,
- Dsp: Session delta timer,
- Tcp(PDPId): PDP Context period timer,
- Dcp(PDPId): PDP Context delta timer,
- Tsw: Tariff switch timer.

The following octet counters are defined:
- Vs: Session volume counter,
- Ds: Volume delta counter for the session,
- Vc(PDPId): PDP Context volume counter,
- Dc(PDPId): Volume delta counter for the PDP Context.
*/



The GPRS-CSI may contain the following TDPs:
DP_Attach,
DP_Change_Of_Position_Session,
DP_Change_Of_Position_Context,
DP_PDP_Context_Establishment,
DP_PDP_Context_Establishment_Acknowledgement

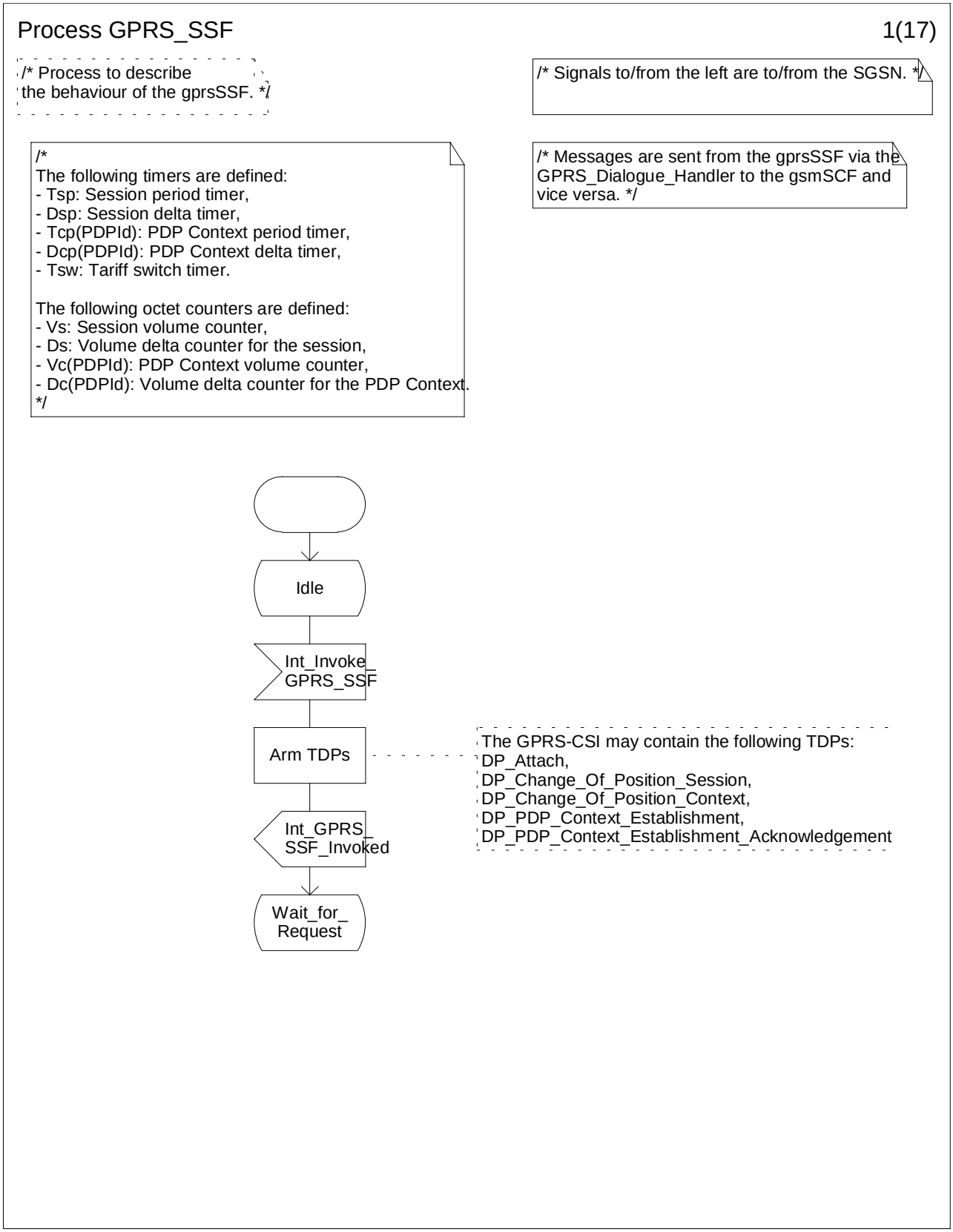
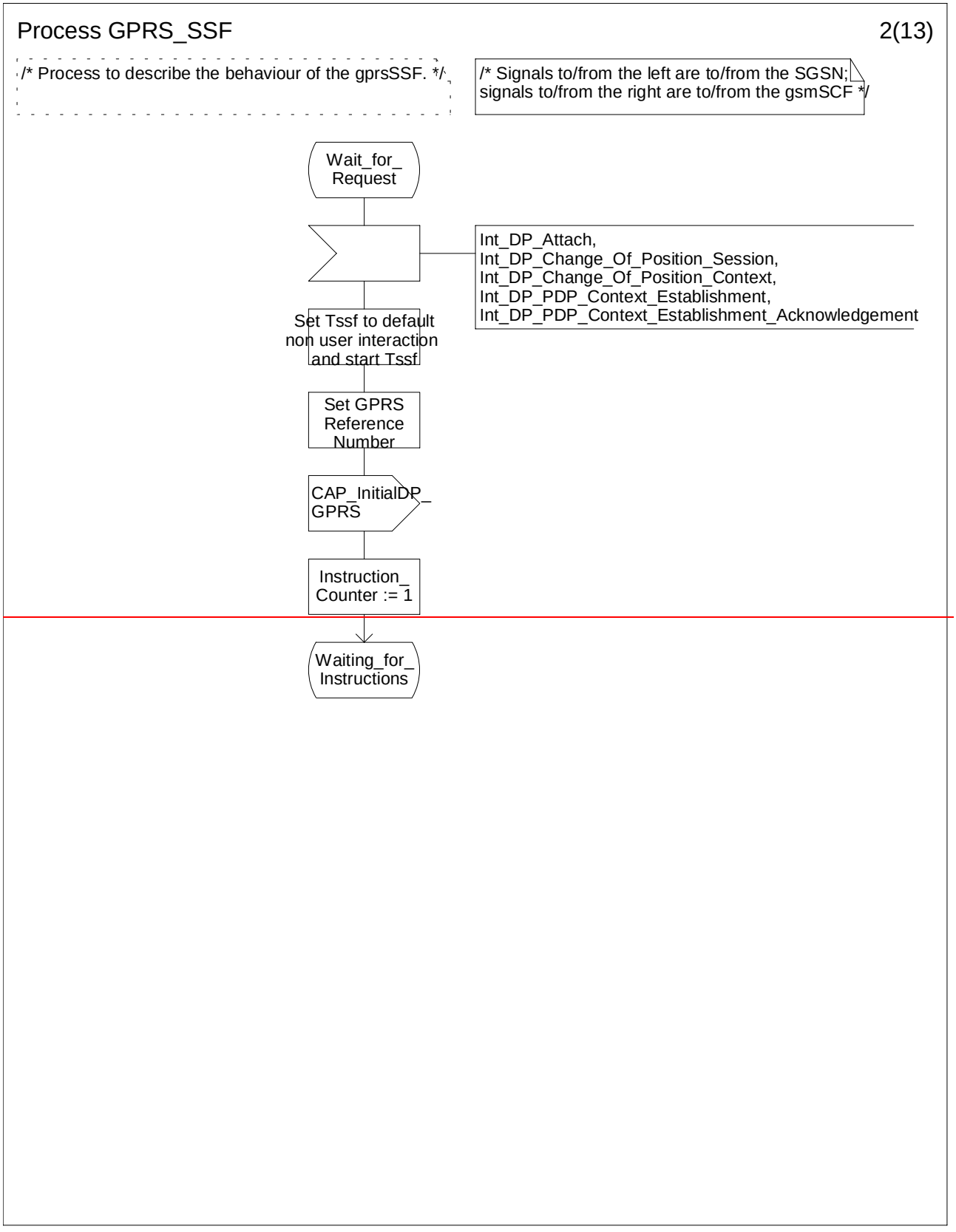


Figure 6.9 a: Process GPRS_SSF (sheet 1)


Process GPRS_SSF
2(13)
/* Process to describe the behaviour of the gprsSSF. */
/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */
Wait_for_ Request
Int_DP_Attach,
Int_DP_Change_Of_Position_Session,
Int_DP_Change_Of_Position_Context,
Int_DP_PDP_Context_Establishment,
Int_DP_PDP_Context_Establishment_Acknowledgement
Set Tssf to default non user interaction and start Tssf
Set GPRS Reference Number
CAP_InitialDP_ GPRS
Instruction_ Counter := 1
Waiting_for_ Instructions

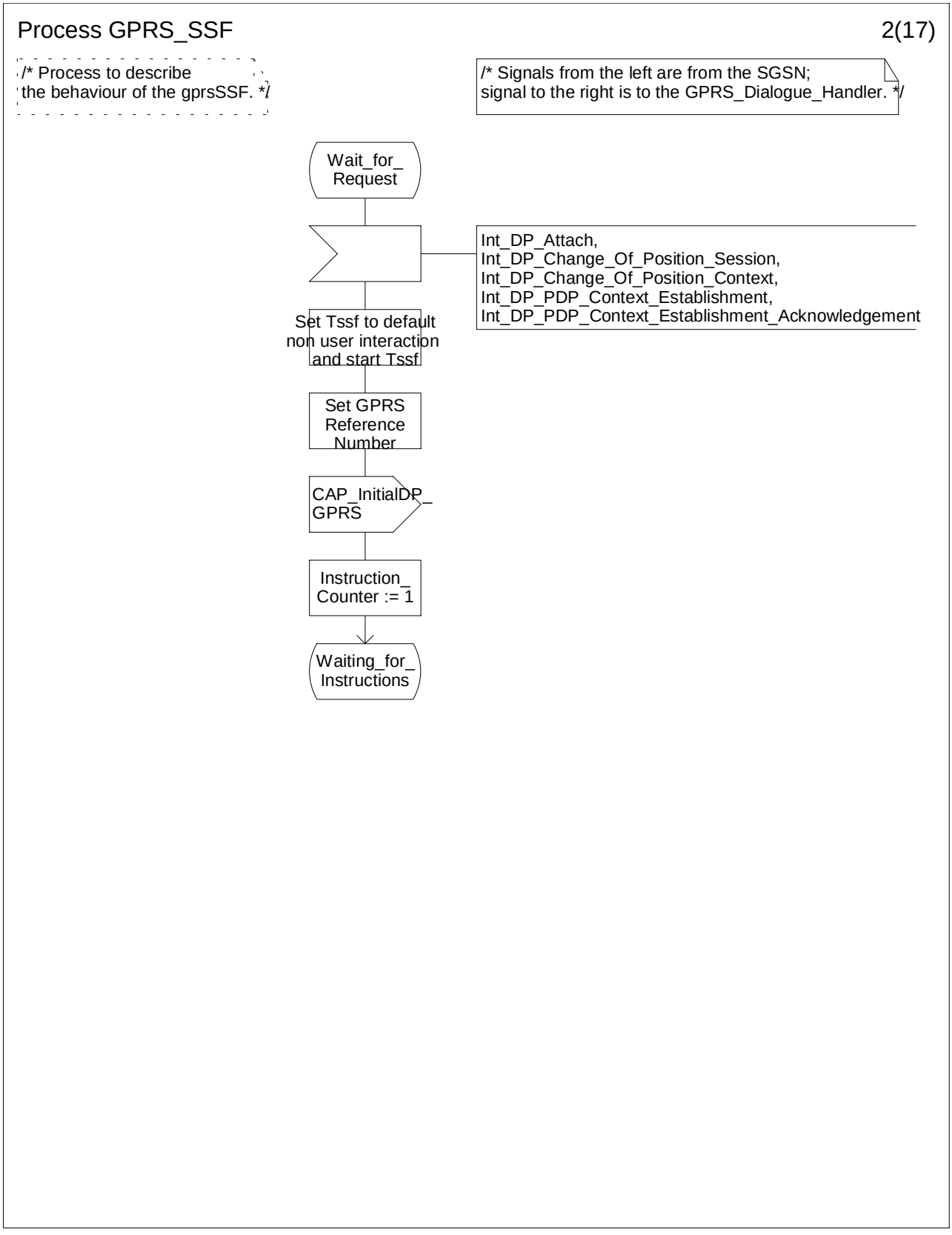
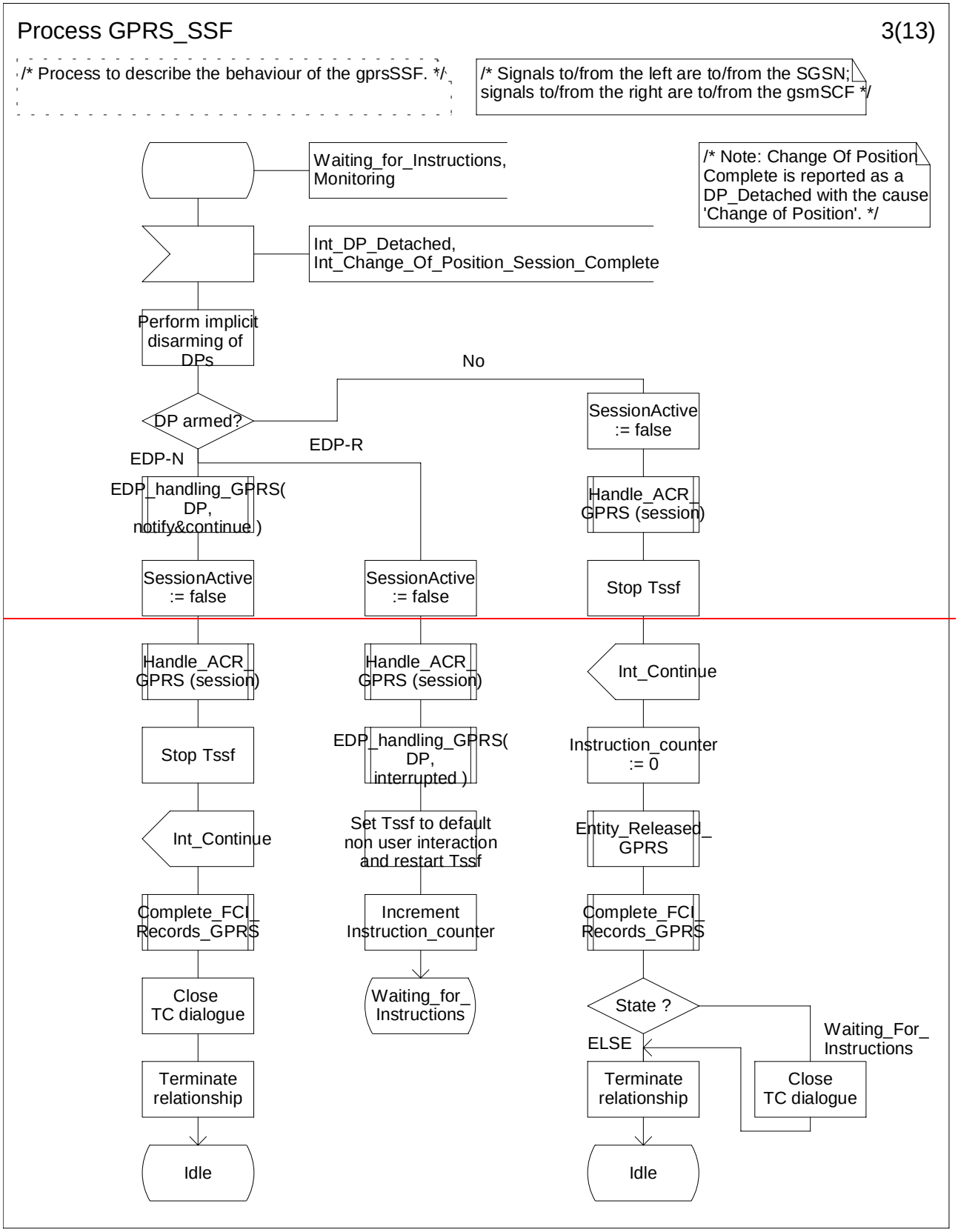


Figure 6.9 b: Process GPRS_SSF (sheet 2)


Process GPRS_SSF
3(13)
/* Process to describe the behaviour of the gprsSSF. */
/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */
/* Note: Change Of Position Complete is reported as a DP_Detached with the cause 'Change of Position'. */
Waiting_for_Instructions, Monitoring
Int_DP_Detached, Int_Change_Of_Position_Session_Complete
Perform implicit disarming of DPs
DP armed?
No
EDP-R
EDP-N
EDP_handling_GPRS(DP, notify&continue)
SessionActive := false
SessionActive := false
SessionActive := false
Handle_ACR_ GPRS (session)
Handle_ACR_ GPRS (session)
Handle_ACR_ GPRS (session)
Stop Tssf
EDP_handling_GPRS(DP, interrupted)
Stop Tssf
Int_Continue
Instruction_counter := 0
Int_Continue
Set Tssf to default non user interaction and restart Tssf
Entity_Released_ GPRS
Complete_FCI_ Records_GPRS
Increment Instruction_counter
Complete_FCI_ Records_GPRS
Close TC dialogue
Waiting_for_ Instructions
State ?
Waiting_For_ Instructions
ELSE
Terminate relationship
Close TC dialogue
Terminate relationship
Idle
Idle

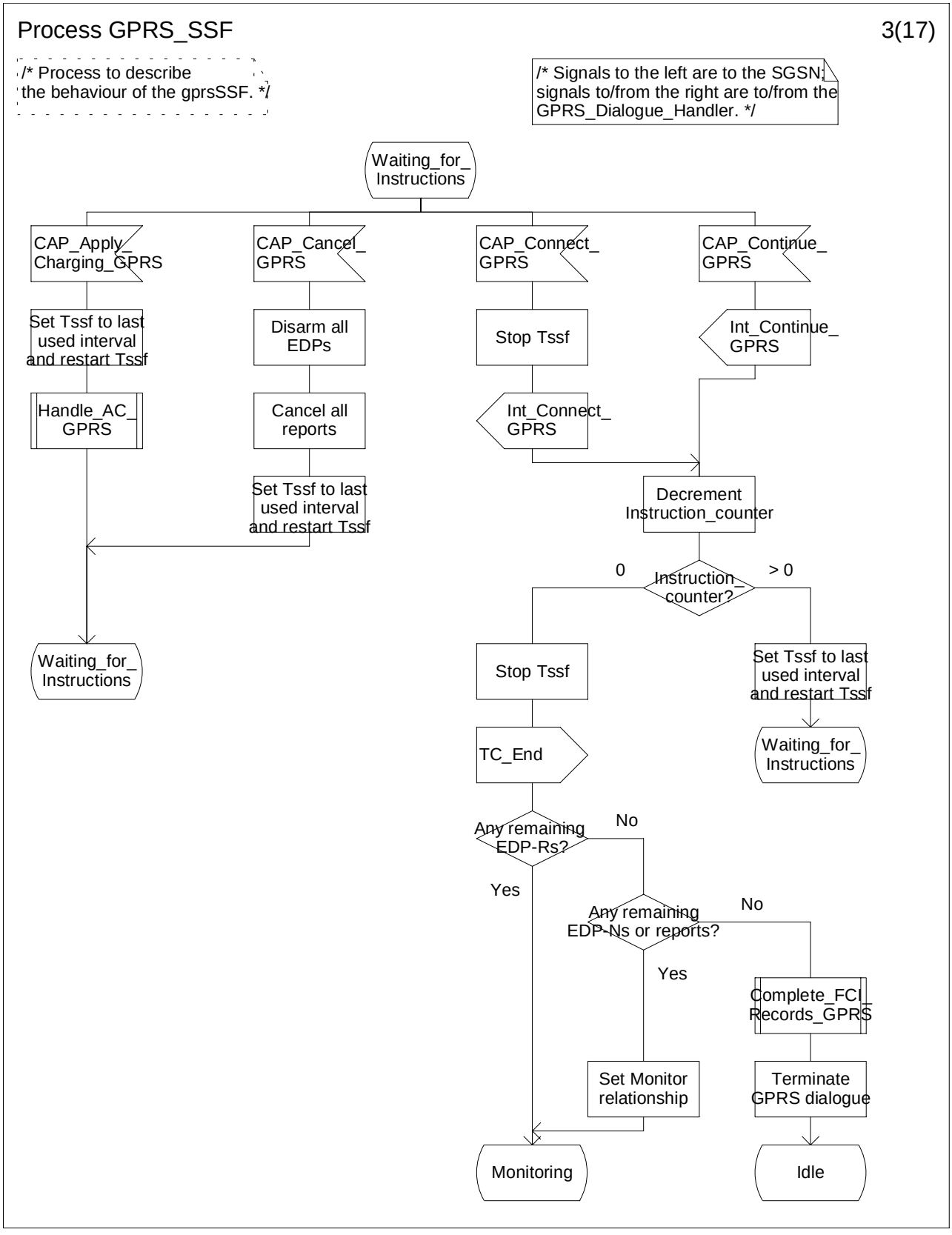
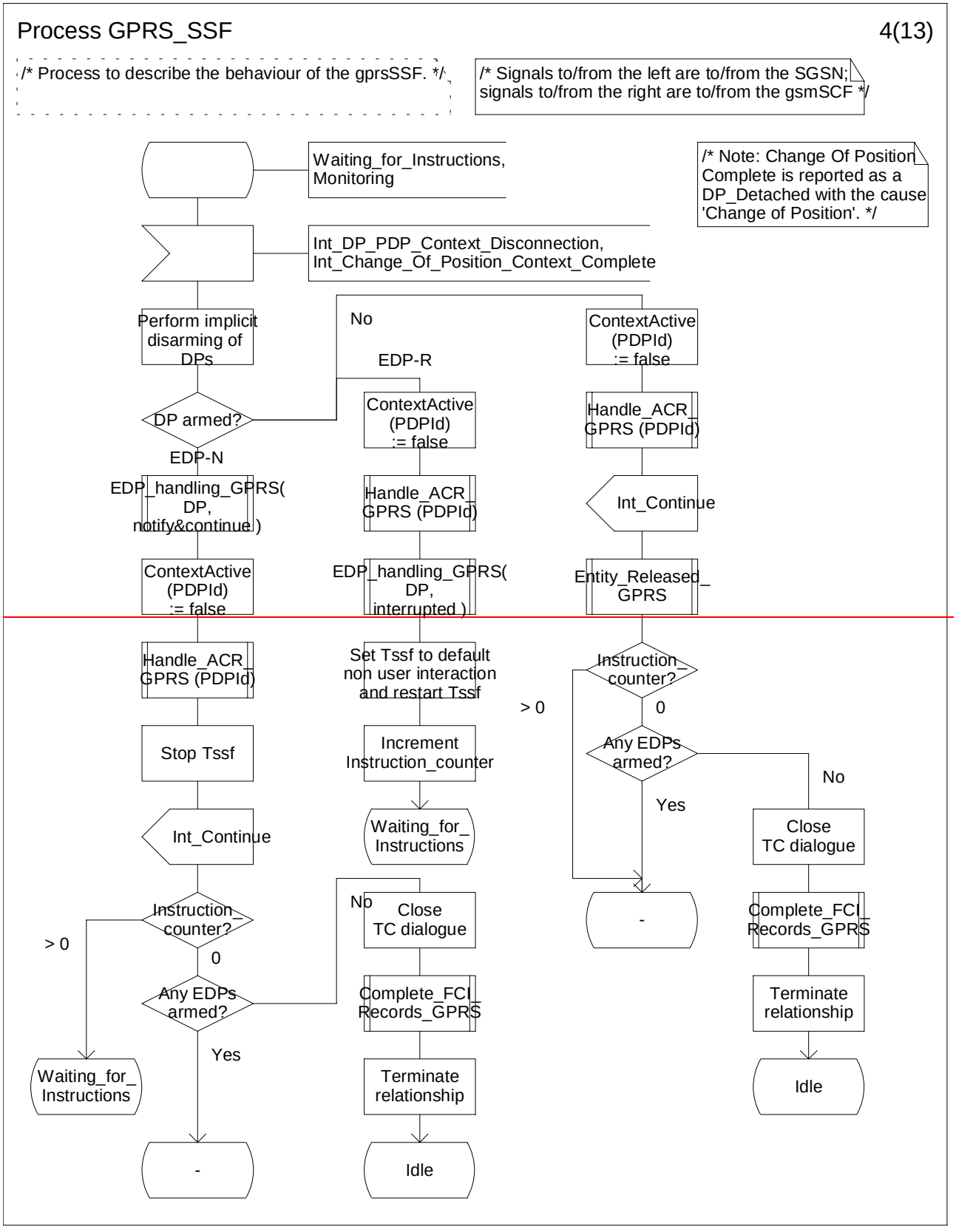


Figure 6.9 c: Process GPRS_SSF (sheet 3)


Process GPRS_SSF
4(13)
/* Process to describe the behaviour of the gprsSSF. */
/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */
/* Note: Change Of Position Complete is reported as a DP_Detached with the cause 'Change of Position'. */
Waiting_for_Instructions, Monitoring
Int_DP_PDP_Context_Disconnection, Int_Change_Of_Position_Context_Complete
Perform implicit disarming of DPs
DP armed?
No
EDP-R
EDP-N
EDP_handling_GPRS(DP, notify&continue)
ContextActive (PDPId) := false
Handle_ACR_ GPRS (PDPId)
Int_Continue
Entity_Released_ GPRS
ContextActive (PDPId) := false
EDP_handling_GPRS(DP, interrupted)
Handle_ACR_ GPRS (PDPId)
Set Tssf to default non user interaction and restart Tssf
Increment Instruction_counter
Waiting_for_ Instructions
Close TC dialogue
Complete_FCI_ Records_GPRS
Terminate relationship
Idle
Handle_ACR_ GPRS (PDPId)
Stop Tssf
Int_Continue
Instruction_ counter?
> 0
0
Any EDPs armed?
Yes
No
Waiting_for_ Instructions
-
Instruction_ counter?
> 0
0
Any EDPs armed?
Yes
No
Close TC dialogue
Complete_FCI_ Records_GPRS
Terminate relationship
Idle
-

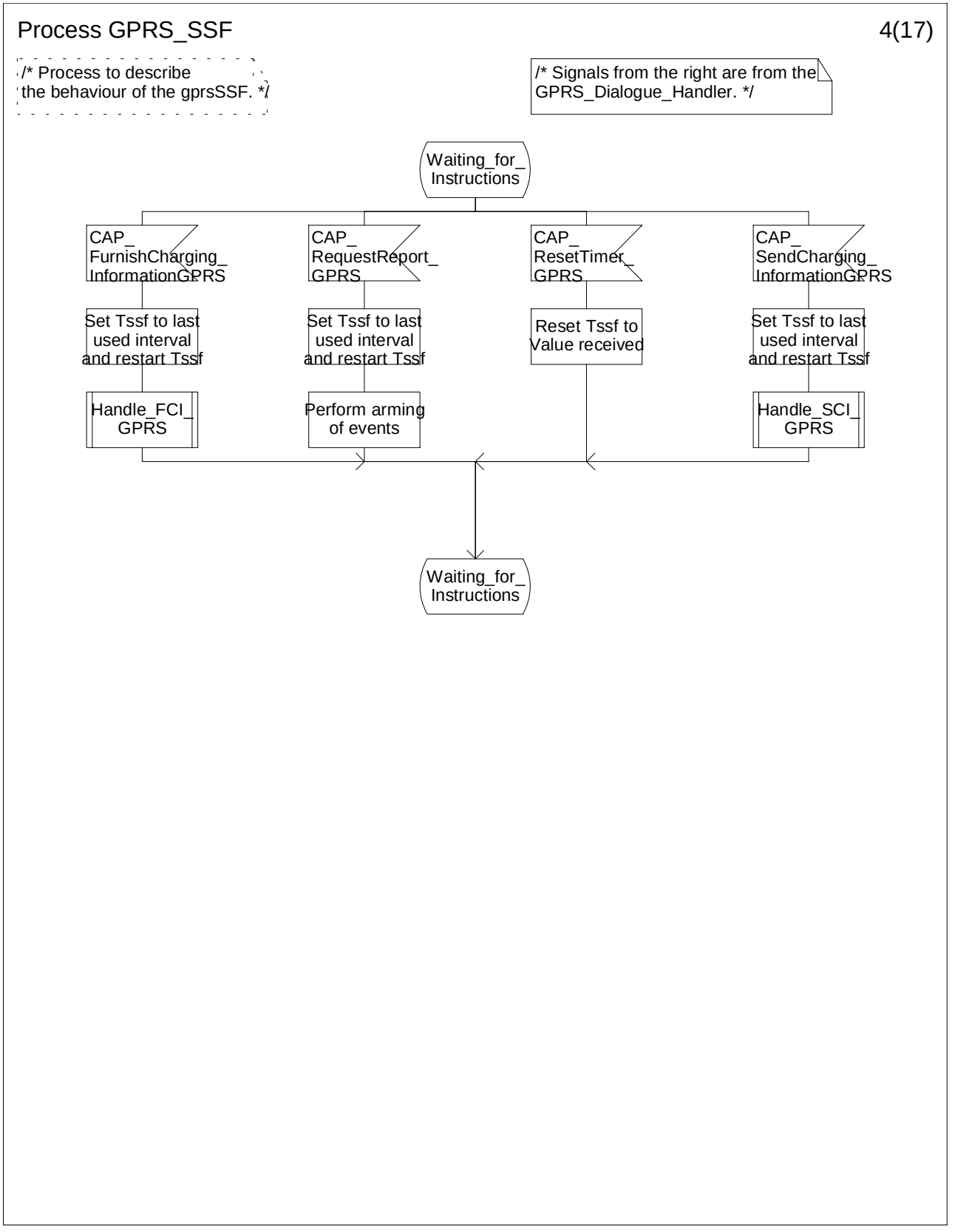
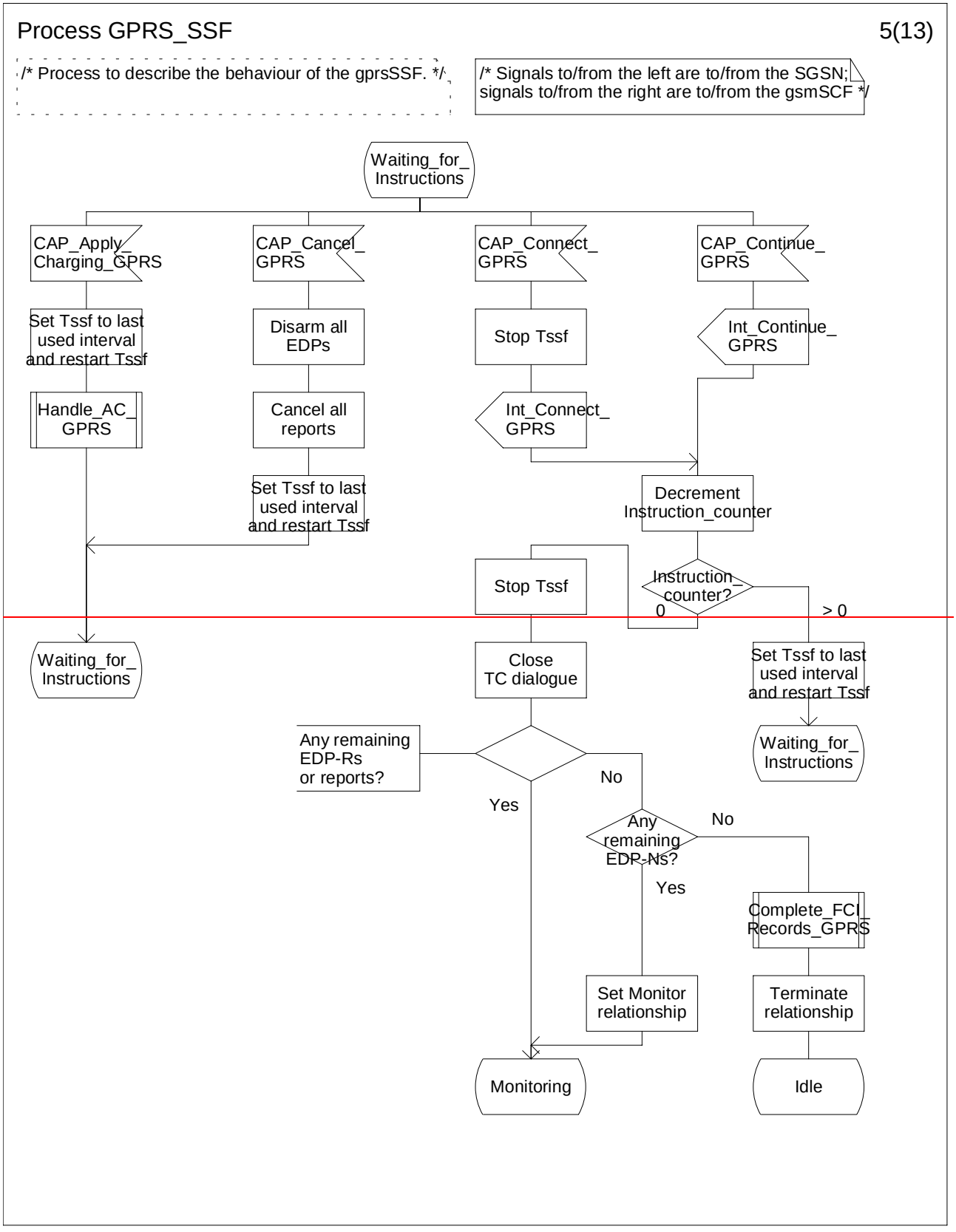


Figure 6.9 d: Process GPRS_SSF (sheet 4)


Process GPRS_SSF
5(13)
/* Process to describe the behaviour of the gprsSSF. */
/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */
Waiting_for_ Instructions
CAP_Apply_ Charging_GPRS
CAP_Cancel_ GPRS
CAP_Connect_ GPRS
CAP_Continue_ GPRS
Set Tssf to last used interval and restart Tssf
Disarm all EDPs
Stop Tssf
Int_Continue_ GPRS
Handle_AC_ GPRS
Cancel all reports
Int_Connect_ GPRS
Set Tssf to last used interval and restart Tssf
Decrement Instruction_counter
Stop Tssf
Instruction_ counter?
0
> 0
Waiting_for_ Instructions
Close TC dialogue
Set Tssf to last used interval and restart Tssf
Any remaining EDP-Rs or reports?
Waiting_for_ Instructions
No
Yes
Any remaining EDP-Ns?
No
Yes
Complete_FCI_ Records_GPRS
Set Monitor relationship
Terminate relationship
Monitoring
Idle

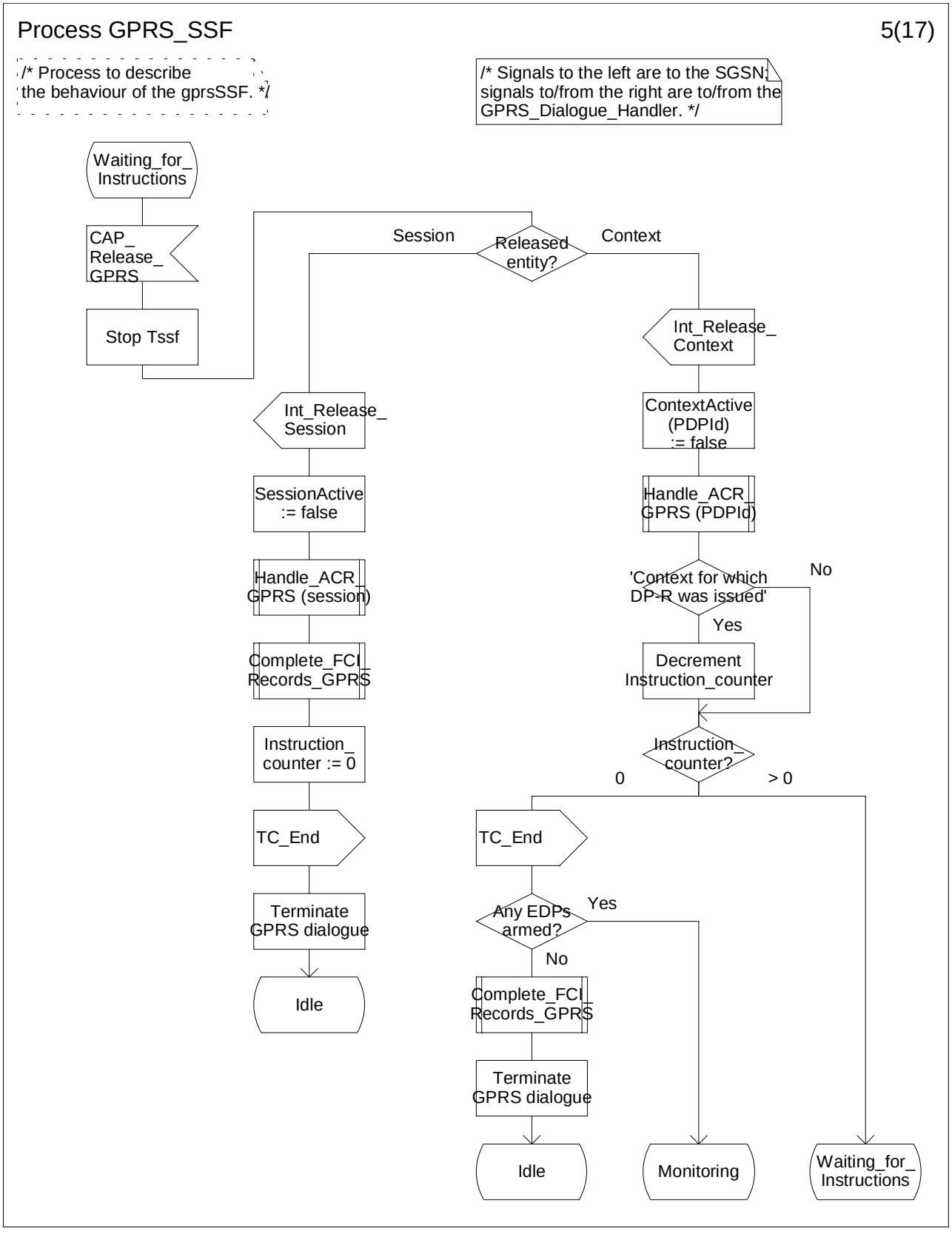
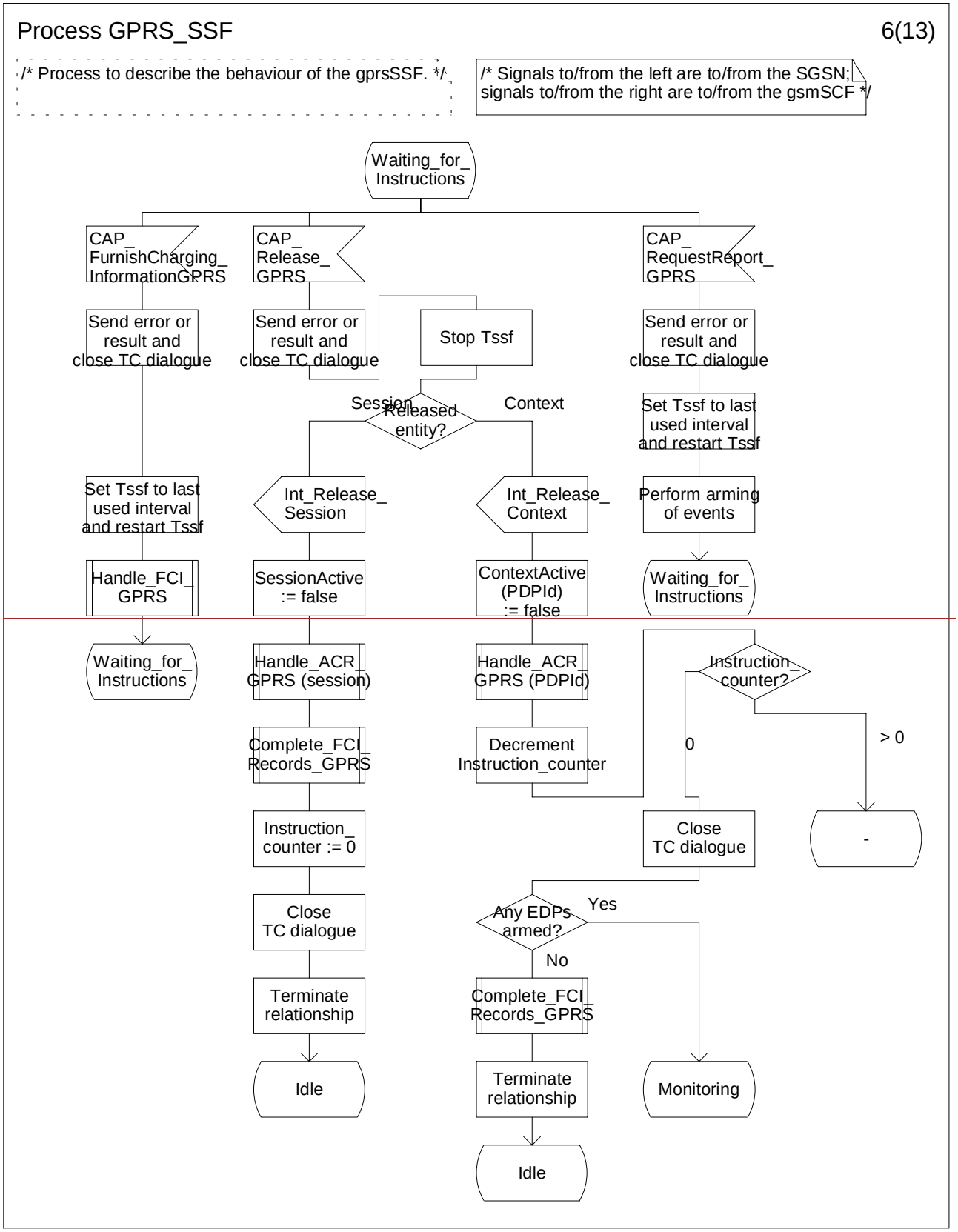


Figure 6.9 e: Process GPRS_SSF (sheet 5)


Process GPRS_SSF
6(13)
/* Process to describe the behaviour of the gprsSSF. */
/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */
Waiting_for_ Instructions
CAP_ FurnishCharging_ InformationGPRS
CAP_ Release_ GPRS
CAP_ RequestReport_ GPRS
Send error or result and close TC dialogue
Send error or result and close TC dialogue
Stop Tssf
Send error or result and close TC dialogue
Session
Released entity?
Context
Set Tssf to last used interval and restart Tssf
Set Tssf to last used interval and restart Tssf
Int_Release_ Session
Int_Release_ Context
Perform arming of events
Handle_FCI_ GPRS
SessionActive := false
ContextActive (PDPId) := false
Waiting_for_ Instructions
Waiting_for_ Instructions
Handle_ACR_ GPRS (session)
Handle_ACR_ GPRS (PDPId)
Instruction_ counter?
0
> 0
Complete_FCI_ Records_GPRS
Decrement Instruction_counter
Instruction_ counter := 0
Close TC dialogue
-
Close TC dialogue
Any EDPs armed?
Yes
No
Terminate relationship
Complete_FCI_ Records_GPRS
Idle
Terminate relationship
Monitoring
Idle

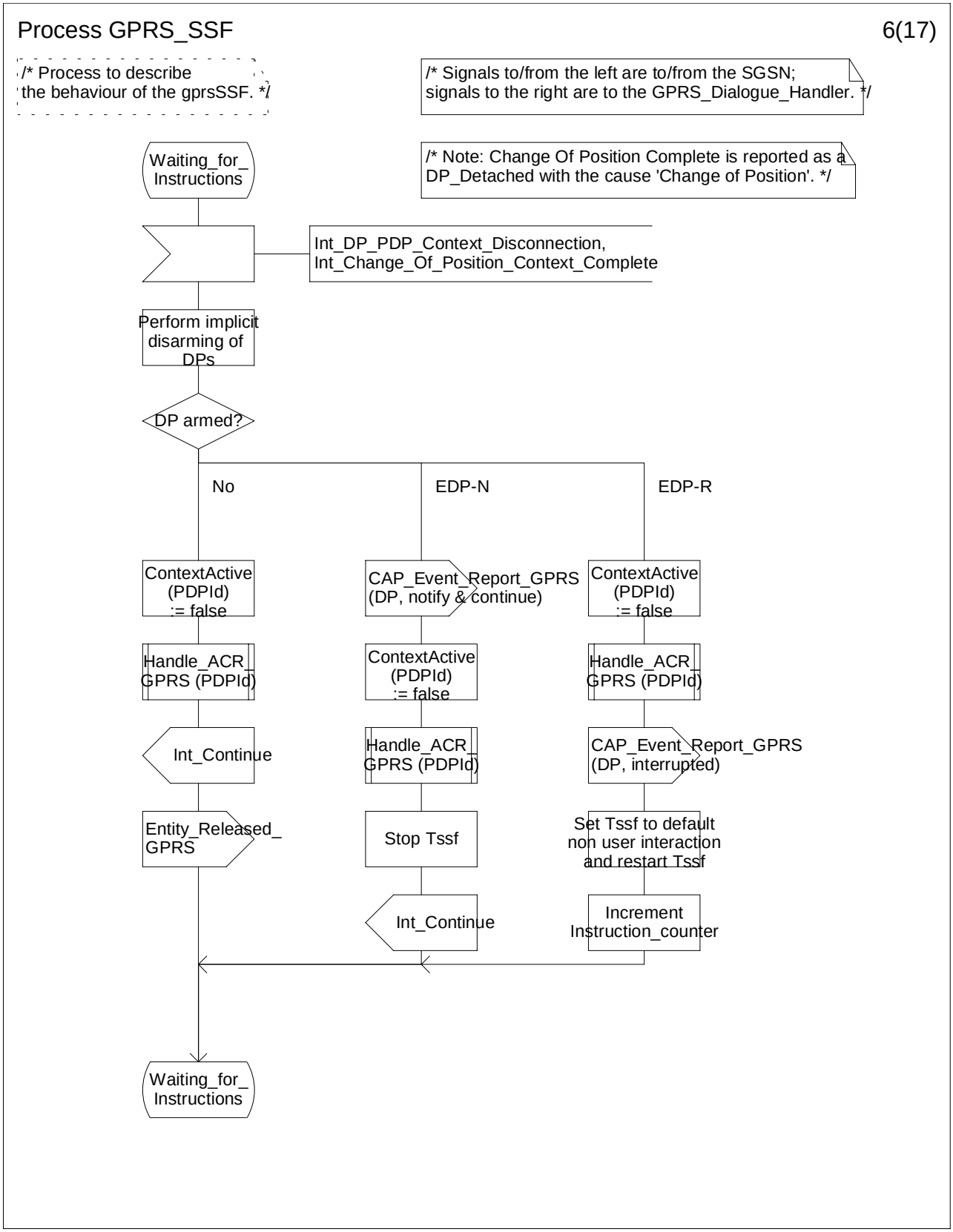
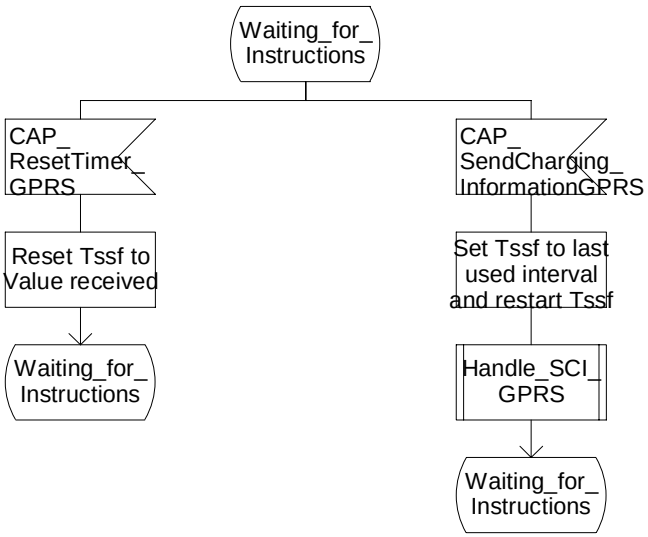


Figure 6.9 f: Process GPRS_SSF (sheet 6)

Process GPRS_SSF 7(13)

/* Process to describe the behaviour of the gprsSSF. */

/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */



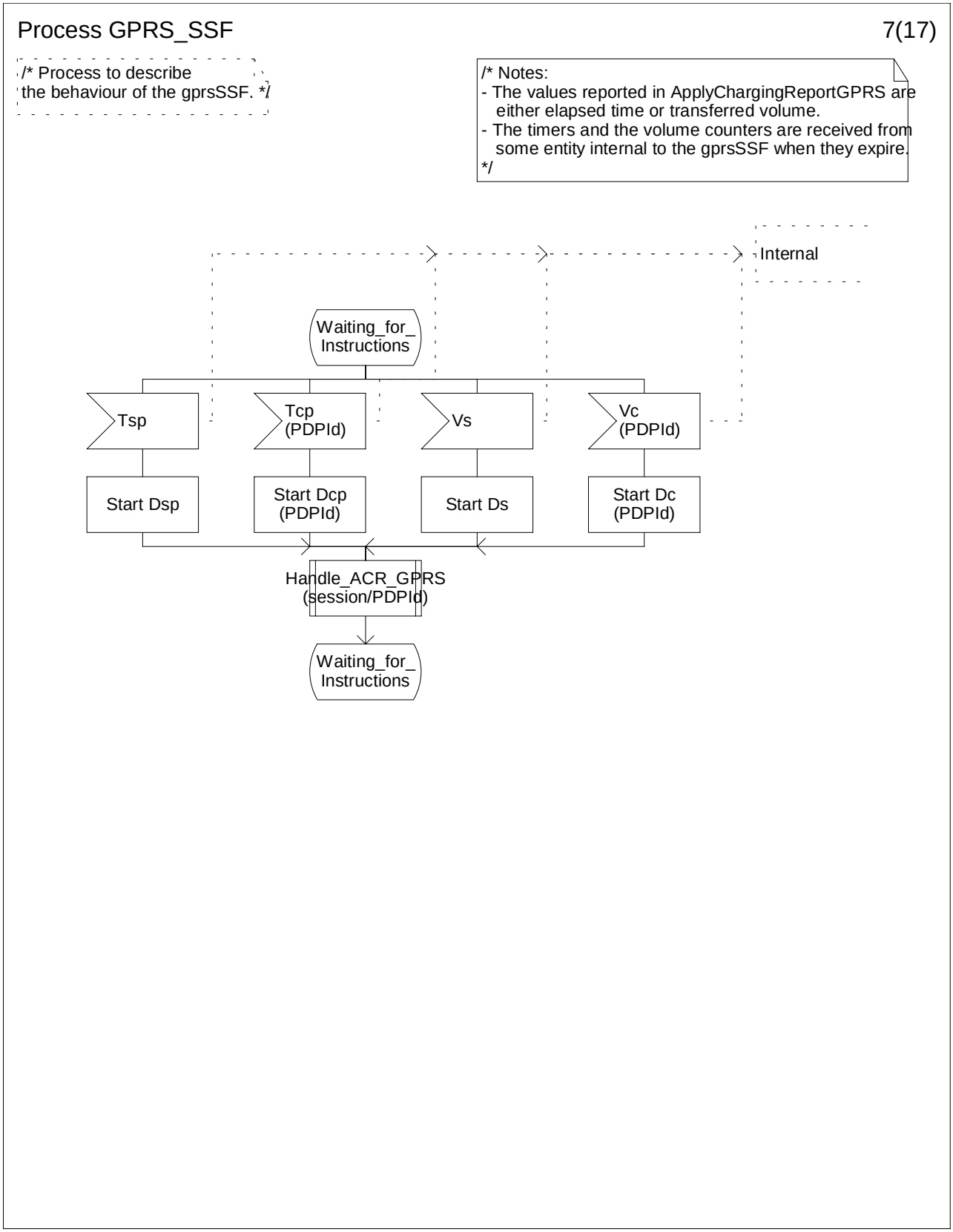
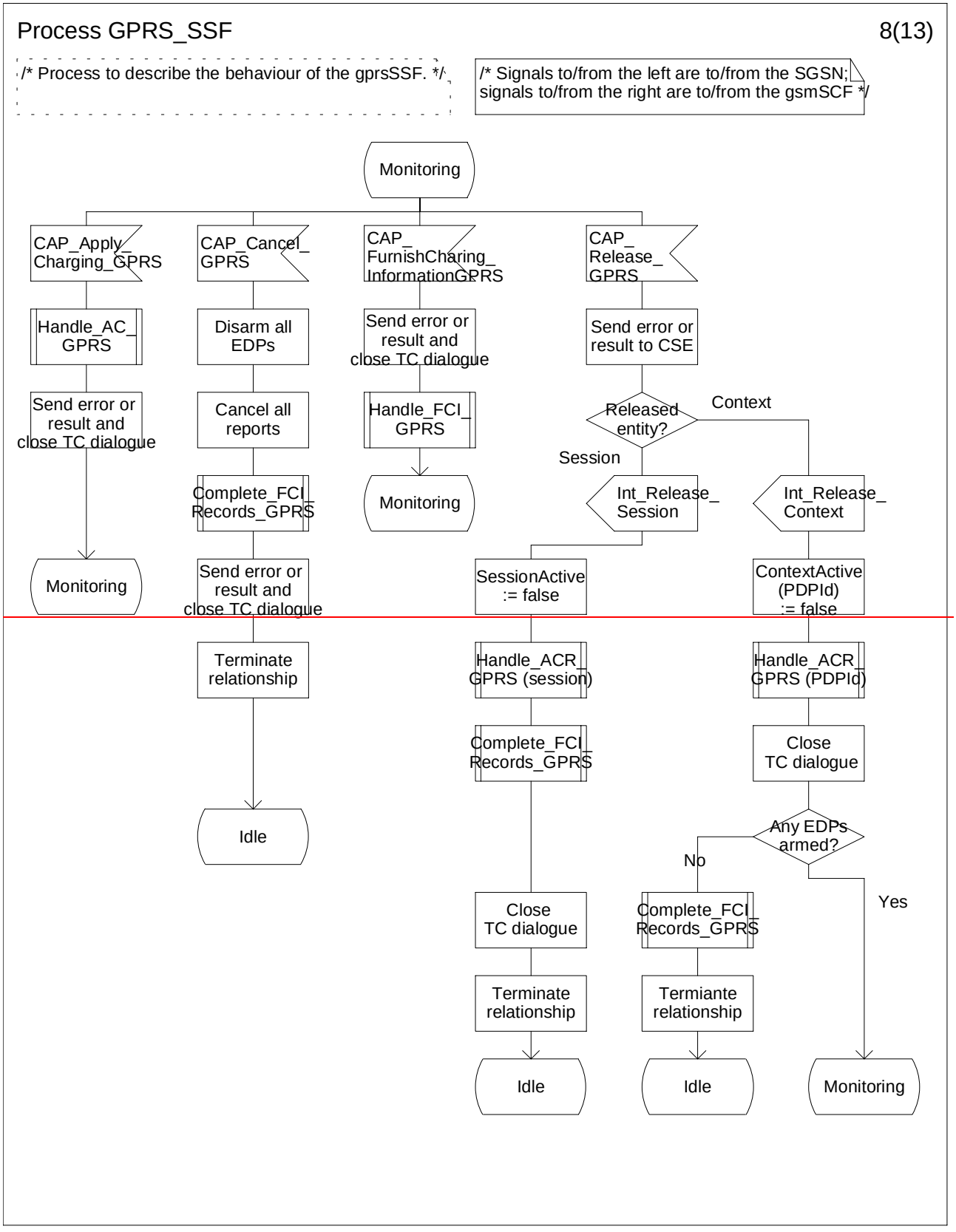


Figure 6.9 g: Process GPRS_SSF (sheet 7)


Process GPRS_SSF
8(13)
/* Process to describe the behaviour of the gprsSSF. */
/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */
Monitoring
CAP_Apply_Charging_GPRS
CAP_Cancel_GPRS
CAP_FurnishCharing_InformationGPRS
CAP_Release_GPRS
Handle_AC_GPRS
Disarm all EDPs
Send error or result and close TC dialogue
Send error or result to CSE
Send error or result and close TC dialogue
Cancel all reports
Handle_FCI_GPRS
Released entity?
Context
Session
Complete_FCI_Records_GPRS
Monitoring
Int_Release_Session
Int_Release_Context
Monitoring
Send error or result and close TC dialogue
SessionActive := false
ContextActive (PDPId) := false
Terminate relationship
Handle_ACR_GPRS (session)
Handle_ACR_GPRS (PDPId)
Complete_FCI_Records_GPRS
Close TC dialogue
Idle
Any EDPs armed?
No
Yes
Close TC dialogue
Complete_FCI_Records_GPRS
Terminate relationship
Termiante relationship
Idle
Idle
Monitoring

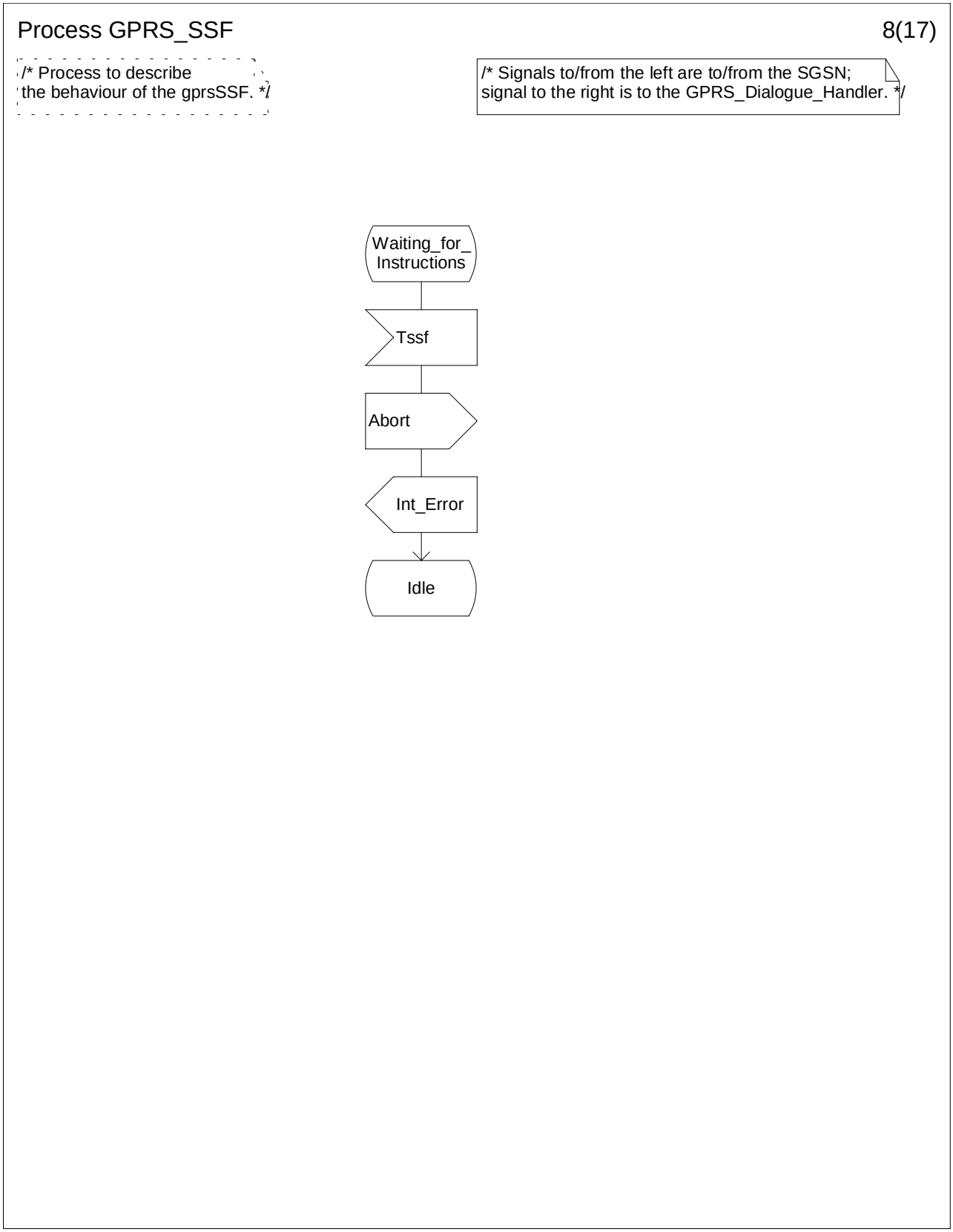
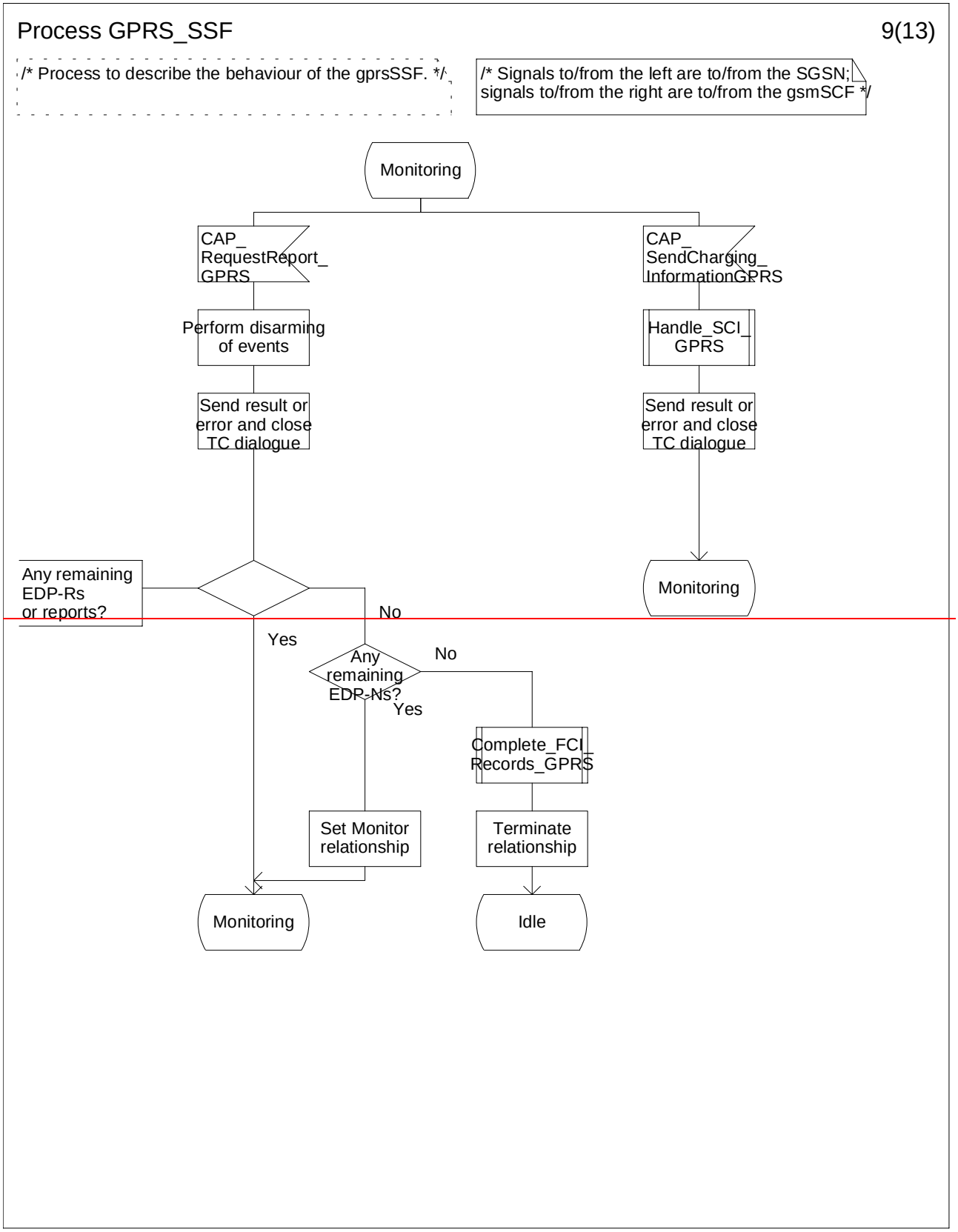


Figure 6.9 h: Process GPRS_SSF (sheet 8)


Process GPRS_SSF
9(13)
/* Process to describe the behaviour of the gprsSSF. */
/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */
Monitoring
CAP_ RequestReport_ GPRS
CAP_ SendCharging_ InformationGPRS
Perform disarming of events
Handle_SCI_ GPRS
Send result or error and close TC dialogue
Send result or error and close TC dialogue
Monitoring
Any remaining EDP-Rs or reports?
No
Yes
Any remaining EDP-Ns?
No
Yes
Complete_FCI_ Records_GPRS
Set Monitor relationship
Terminate relationship
Monitoring
Idle

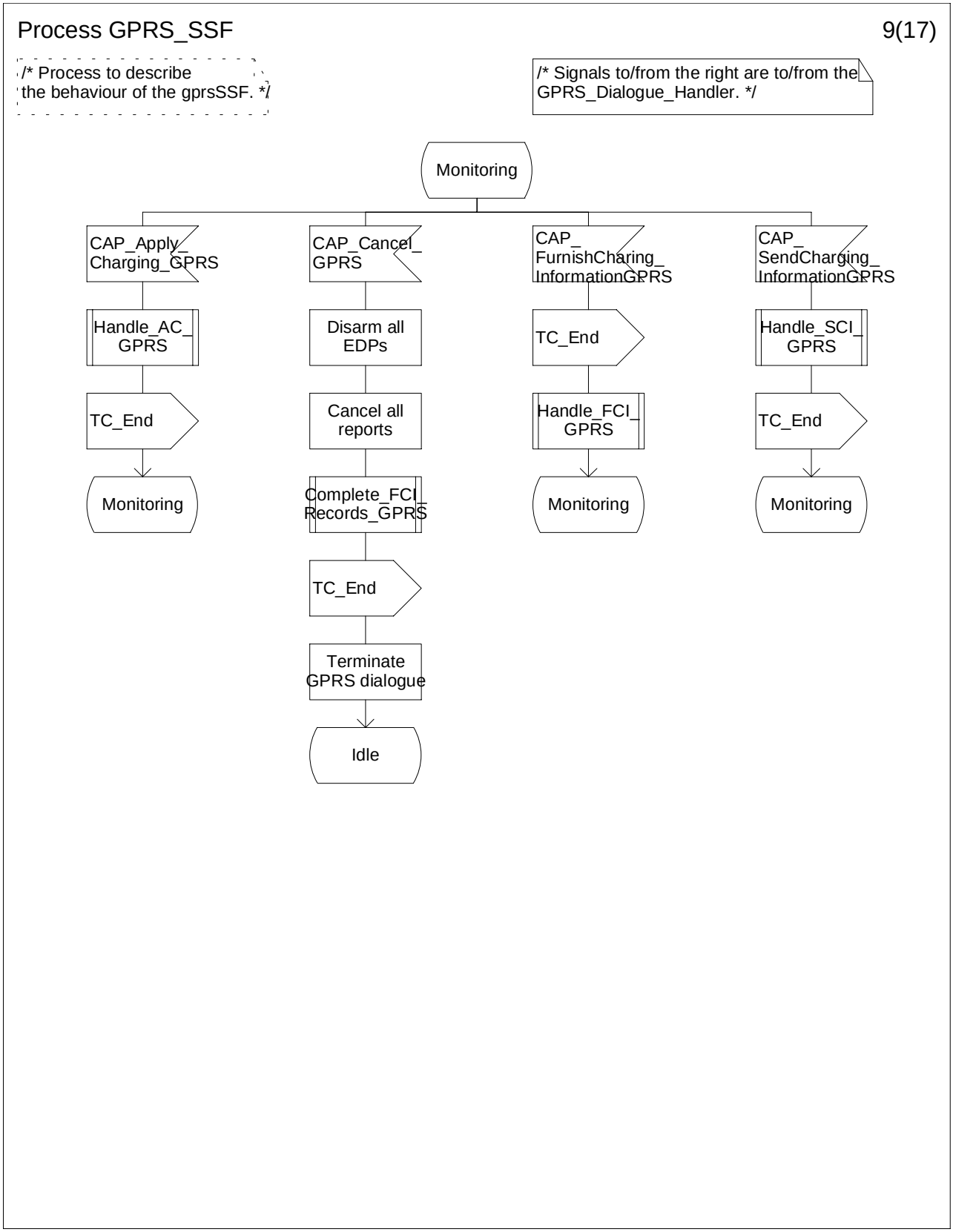
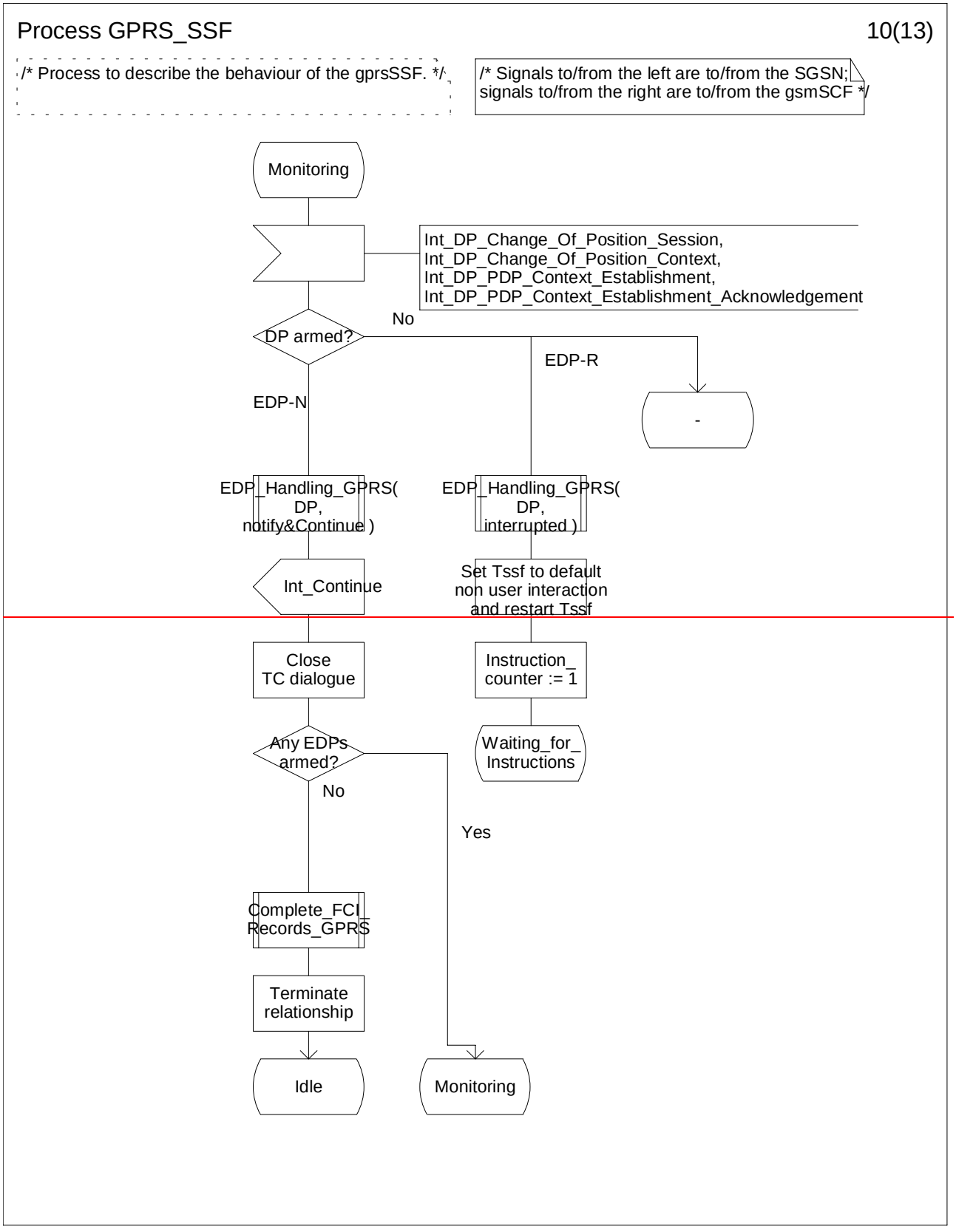


Figure 6.9 i: Process GPRS_SSF (sheet 9)


Process GPRS_SSF
10(13)
/* Process to describe the behaviour of the gprsSSF. */
/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */
Monitoring
Int_DP_Change_Of_Position_Session,
Int_DP_Change_Of_Position_Context,
Int_DP_PDP_Context_Establishment,
Int_DP_PDP_Context_Establishment_Acknowledgement
DP armed?
No
EDP-R
EDP-N
-
EDP_Handling_GPRS(DP, notify&Continue)
EDP_Handling_GPRS(DP, interrupted)
Int_Continue
Set Tssf to default non user interaction and restart Tssf
Close TC dialogue
Instruction_ counter := 1
Any EDPs armed?
Waiting_for_ Instructions
No
Yes
Complete_FCI_ Records_GPRS
Terminate relationship
Idle
Monitoring

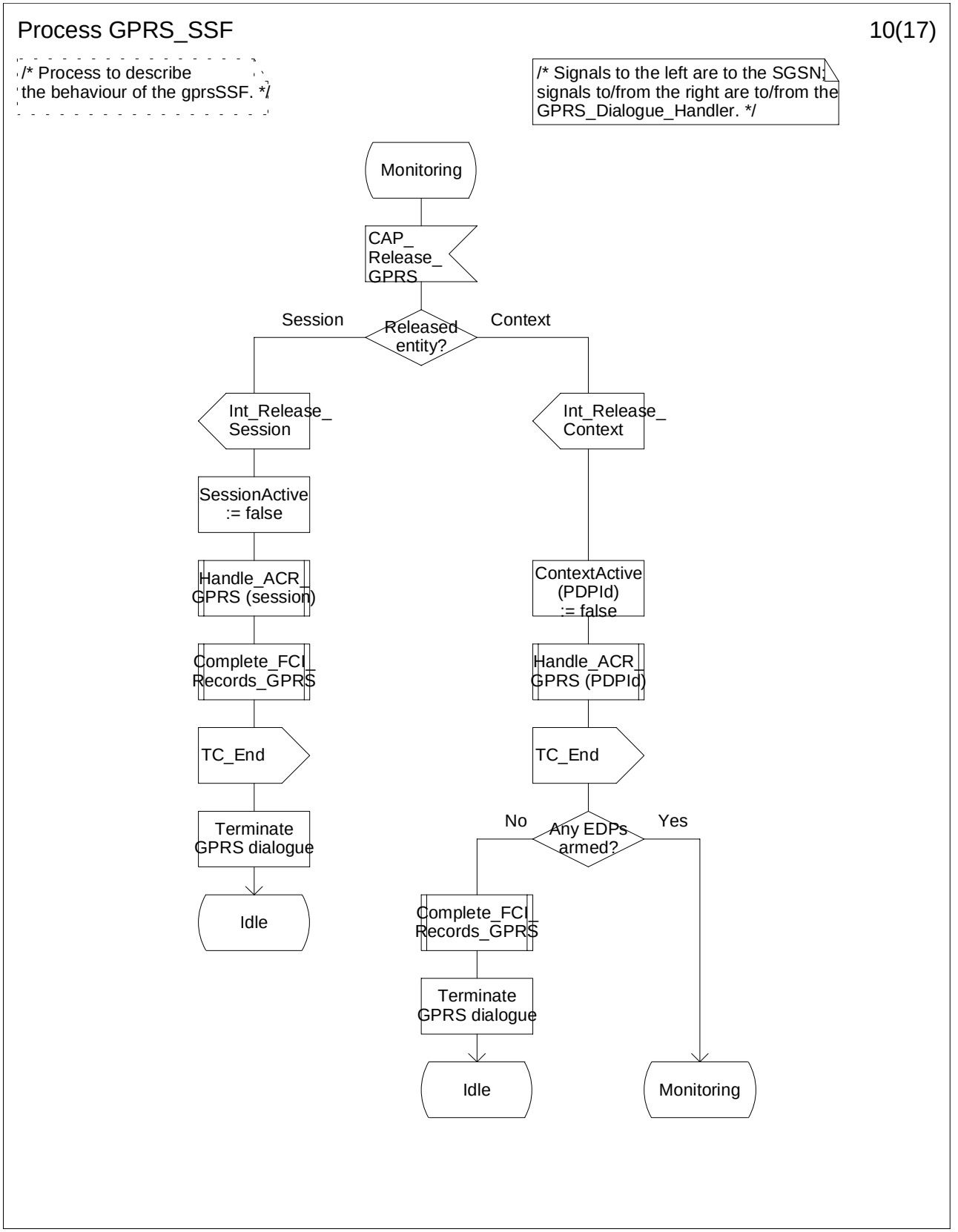


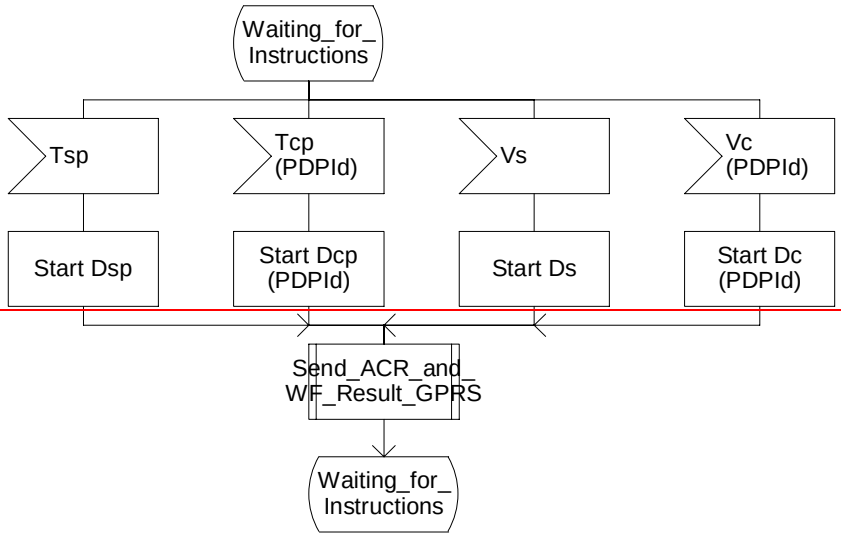
Figure 6.9 j: Process GPRS_SSF (sheet 10)

Process GPRS_SSF 11(13)

/* Process to describe the behaviour of the gprsSSF. */

/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */

/* Notes:
- The values reported in ApplyChargingReportGPRS are either elapsed timer or transferred volume.
- The volume counters are modeled as signals received from some entity internal to the gprsSSF
*/



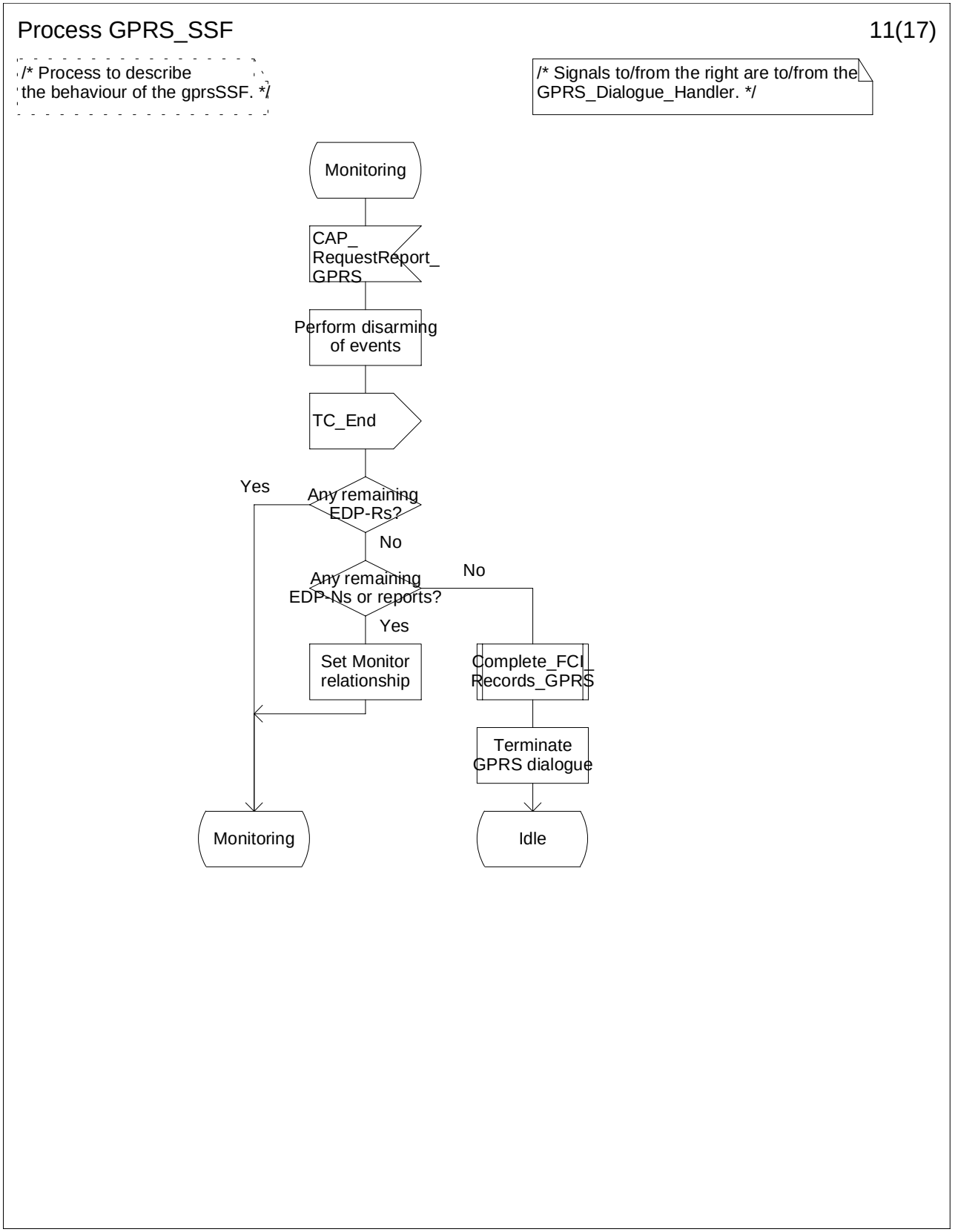


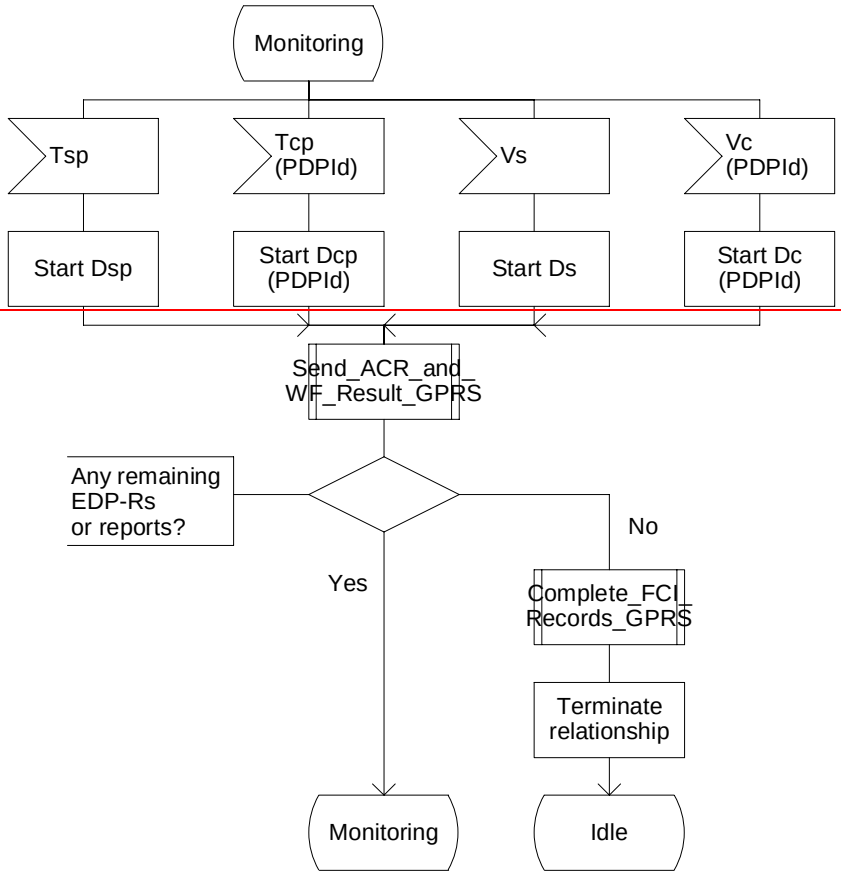
Figure 6.9 k: Process GPRS_SSF (sheet 11)

Process GPRS_SSF 12(13)

/* Process to describe the behaviour of the gprsSSF. */

/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */

/* Notes:
- The values reported in ApplyChargingReportGPRS are either elapsed timer or transferred volume.
- The volume counters are modeled as signals received from some entity internal to the gprsSSF
*/



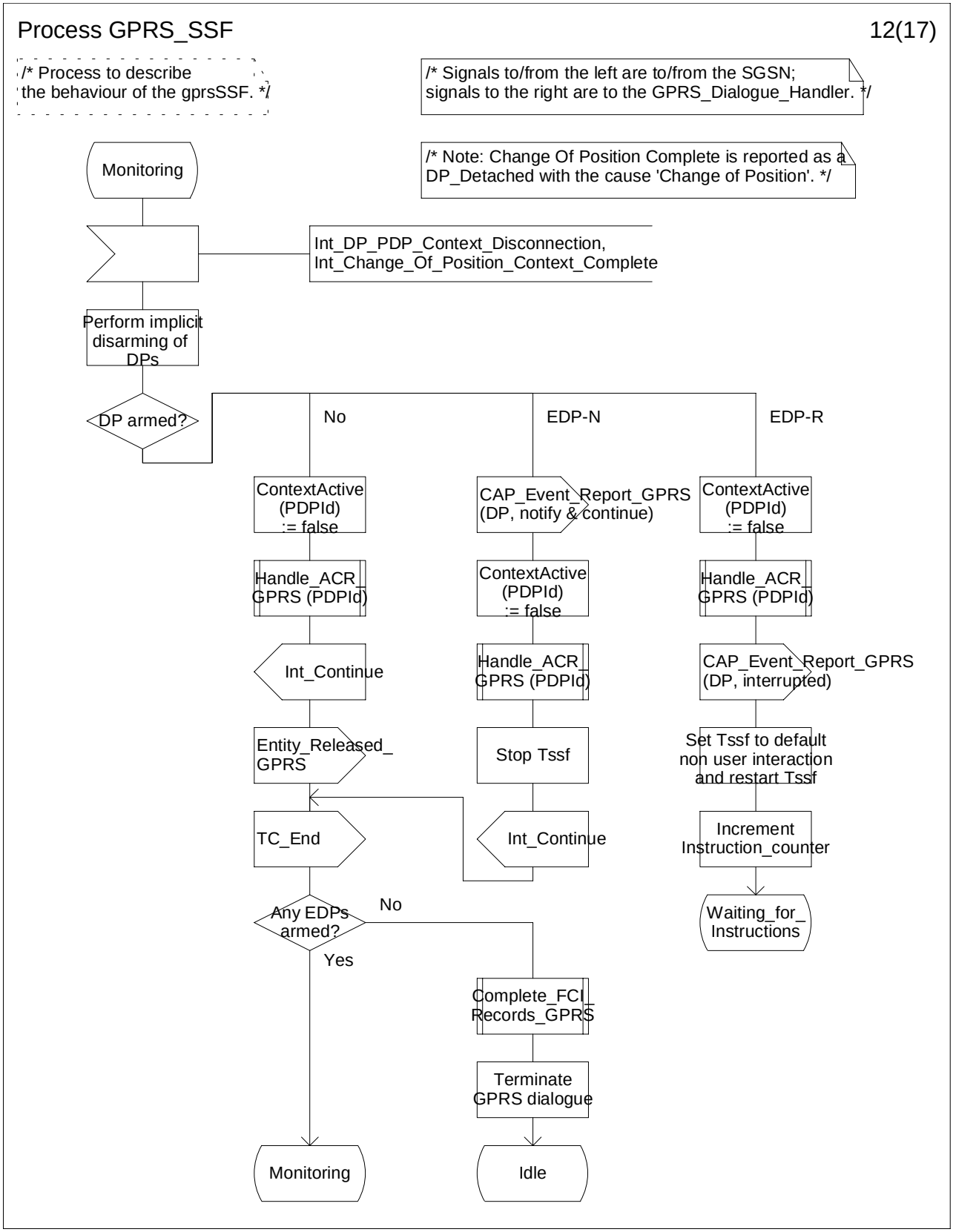
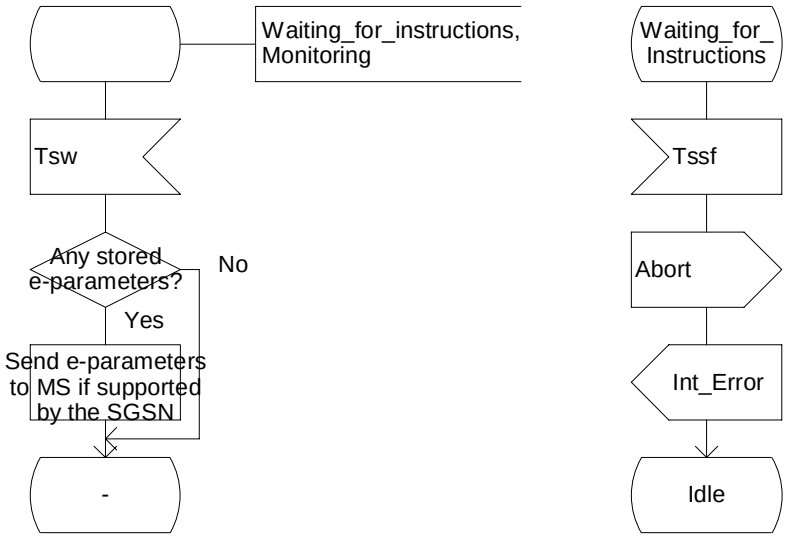


Figure 6.9 l: Process GPRS_SSF (sheet 12)

Process GPRS_SSF 13(13)

/* Process to describe the behaviour of the gprsSSF. */

/* Signals to/from the left are to/from the SGSN; signals to/from the right are to/from the gsmSCF */



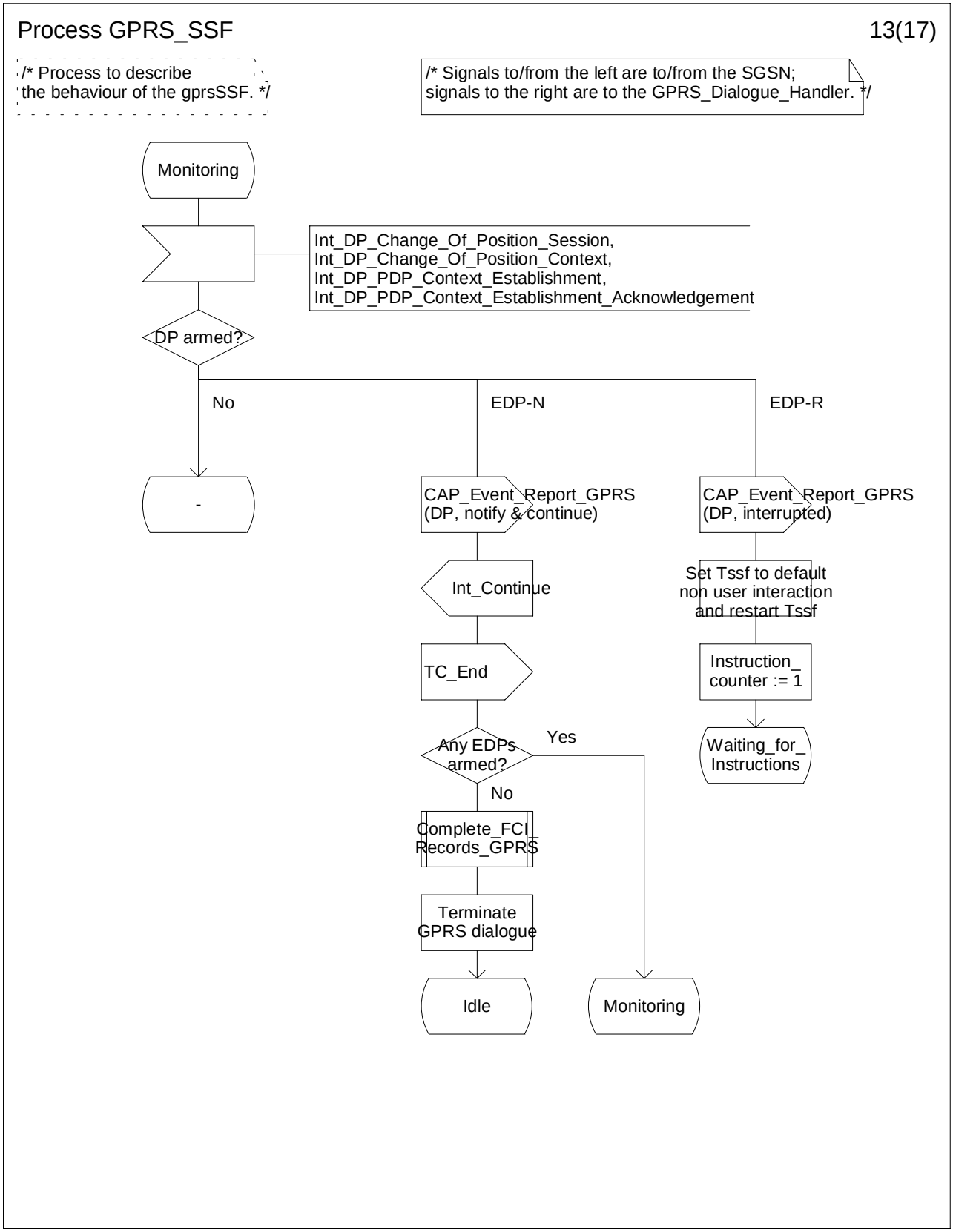


Figure 6.9 m: Process GPRS_SSF (sheet 13)

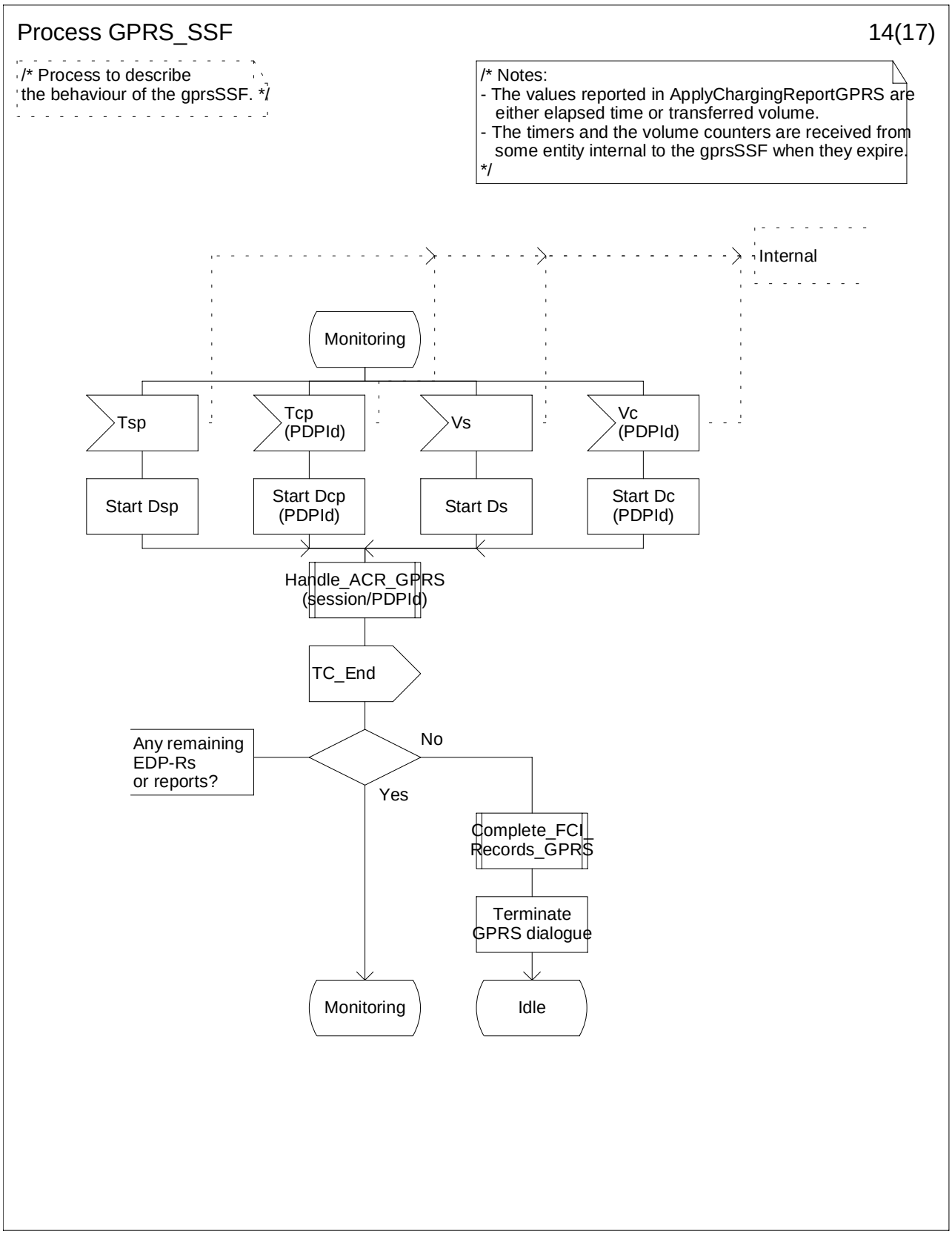


Figure 6.9 n: Process GPRS_SSF (sheet 14)

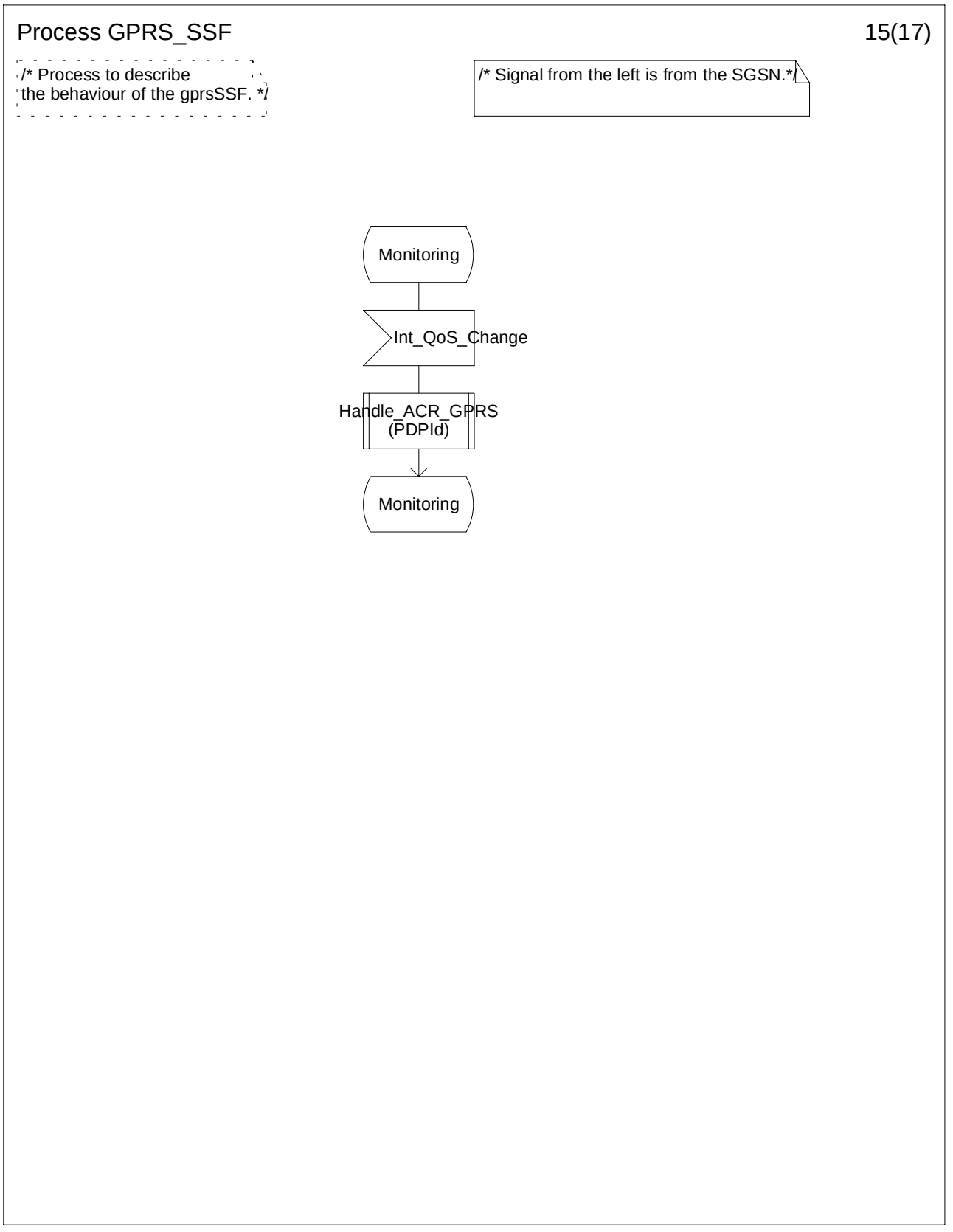


Figure 6.9 o: Process GPRS_SSF (sheet 15)

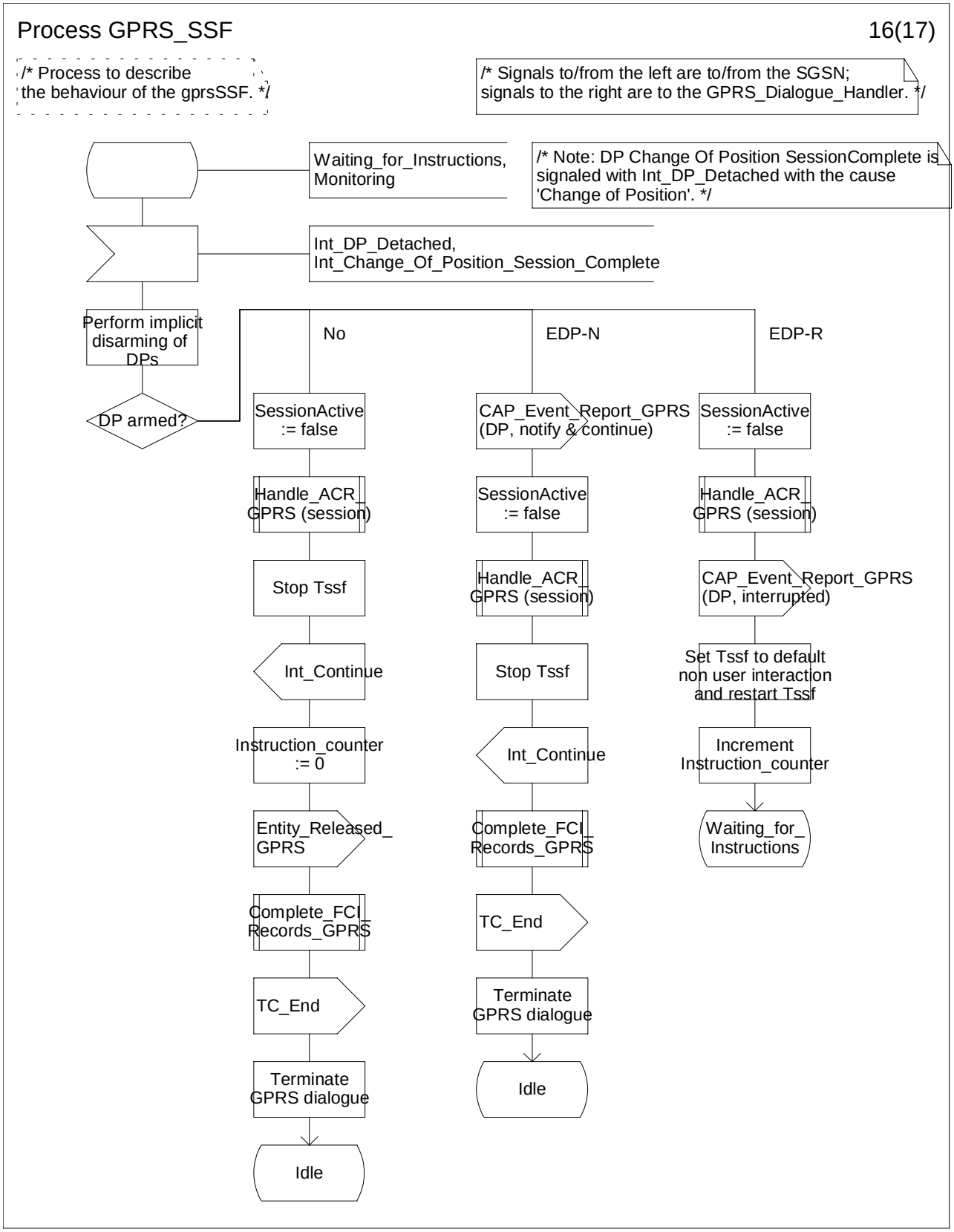


Figure 6.9 p: Process GPRS_SSF (sheet 16)

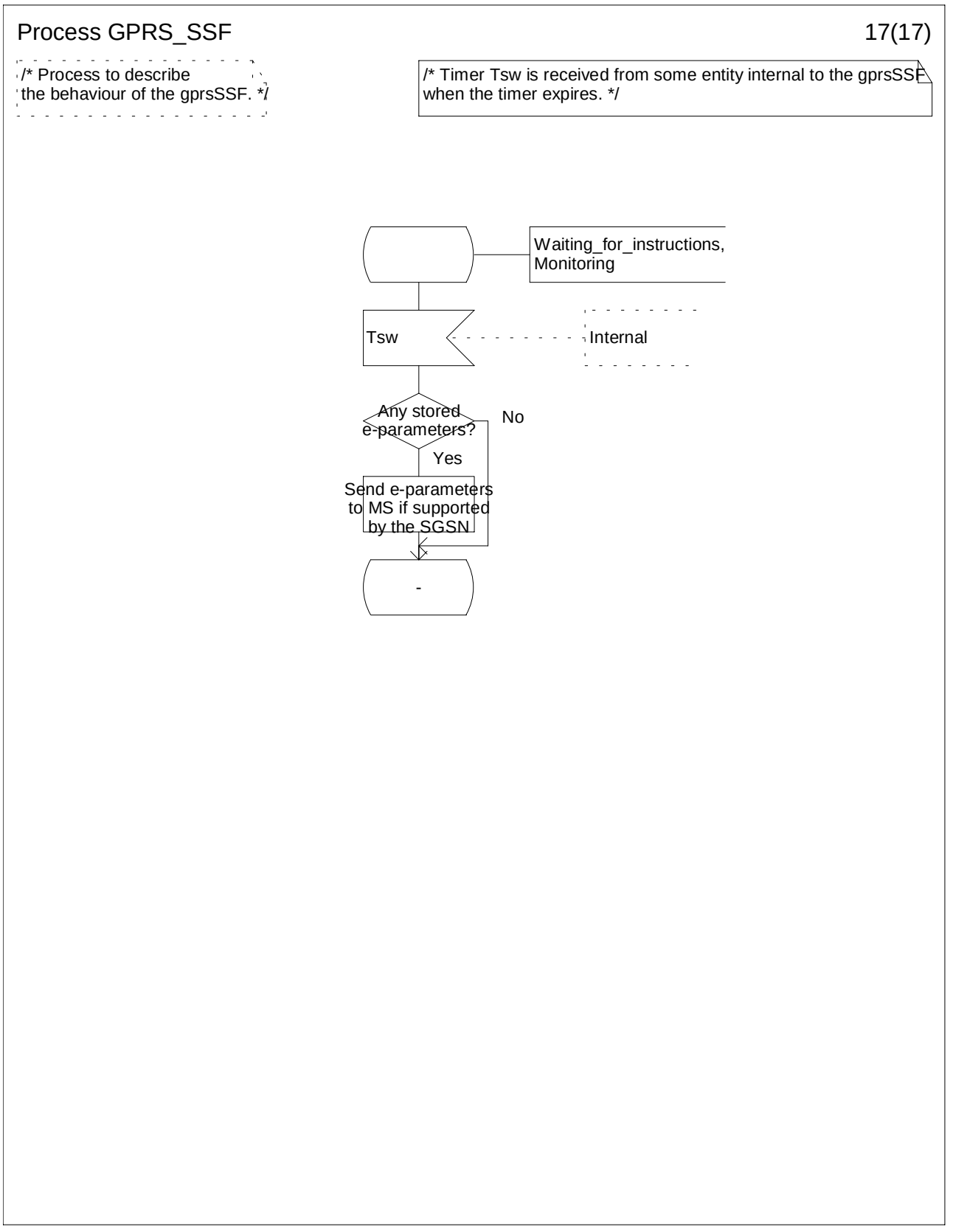


Figure 6.9 q: Process GPRS_SSF (sheet 17)

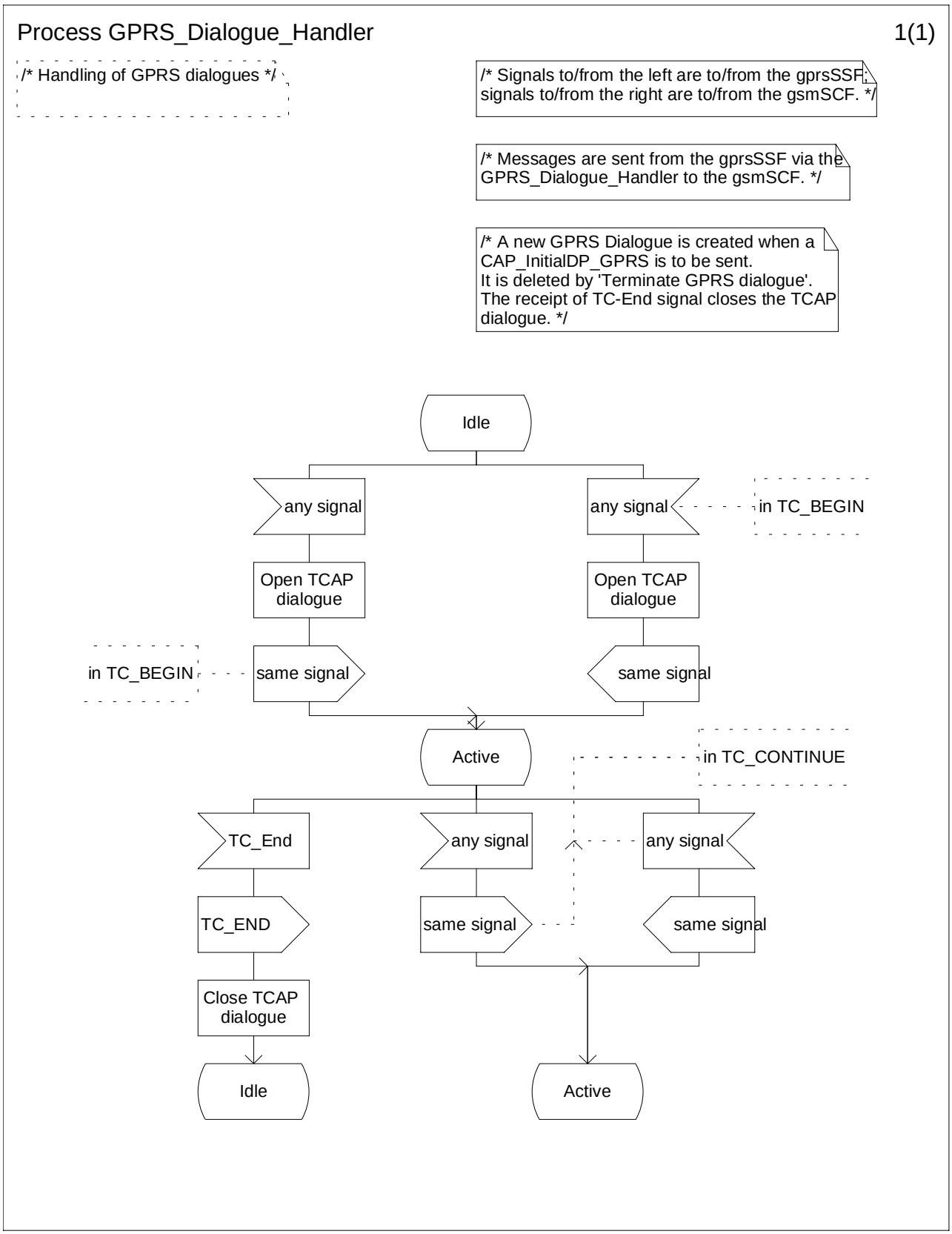
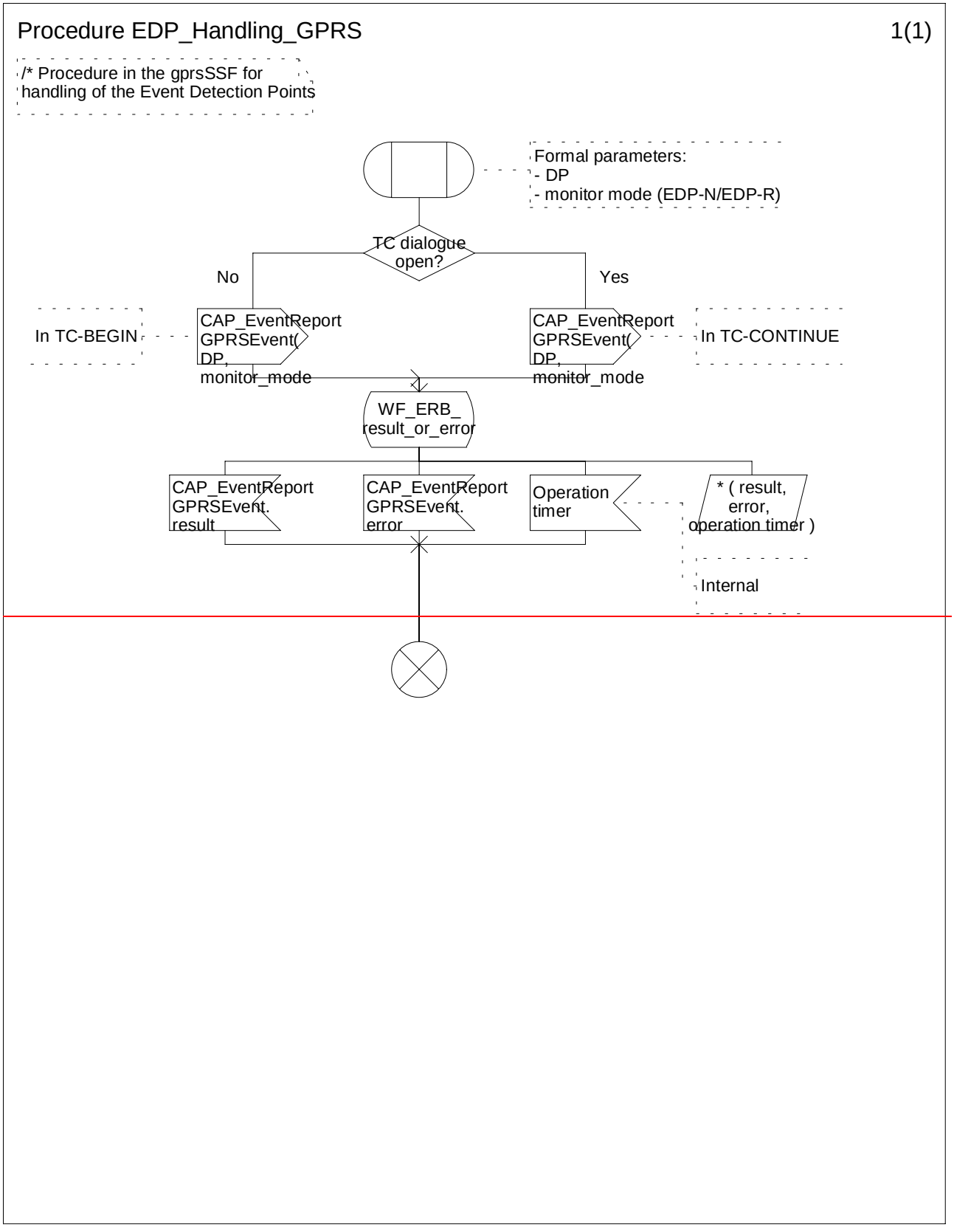
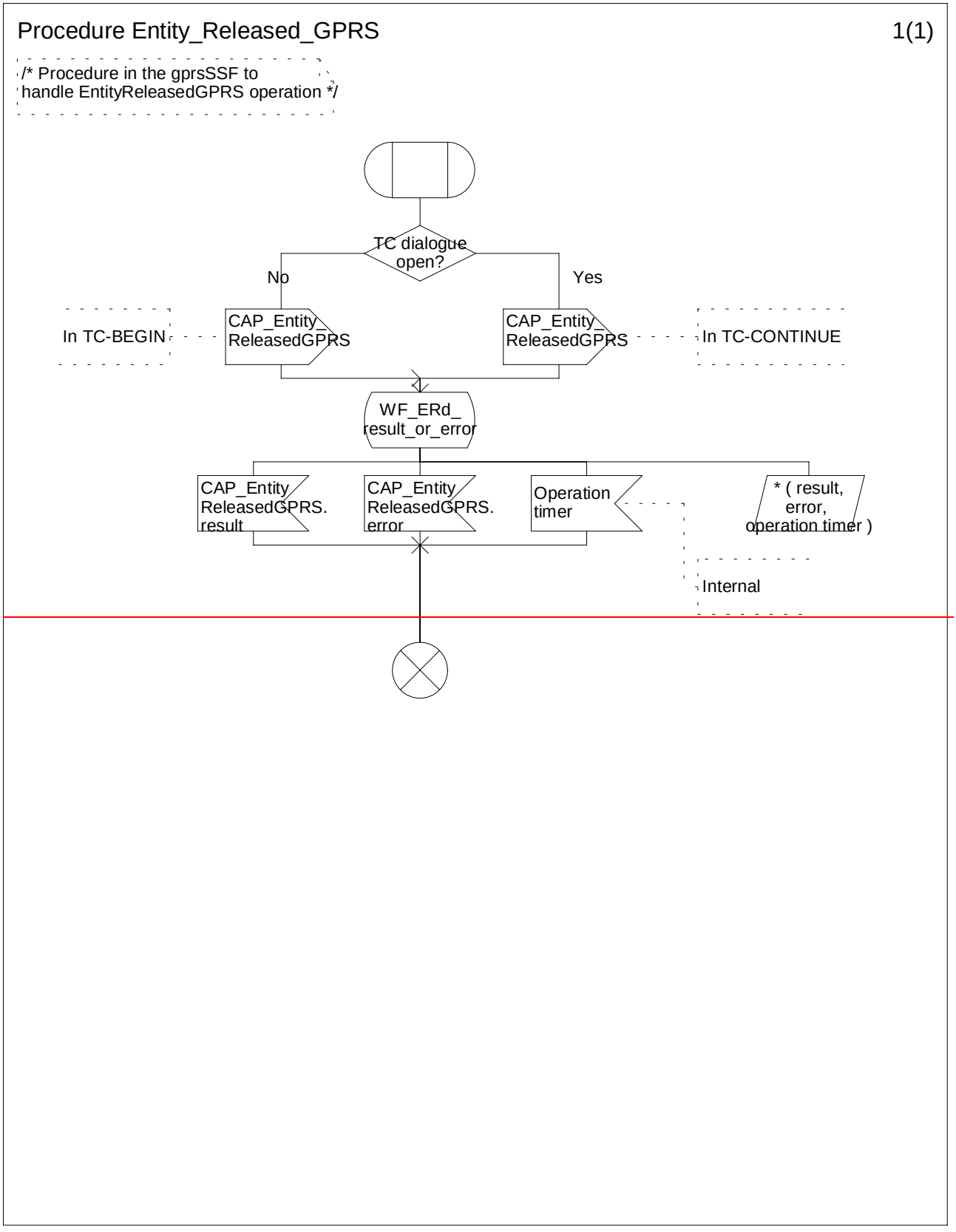


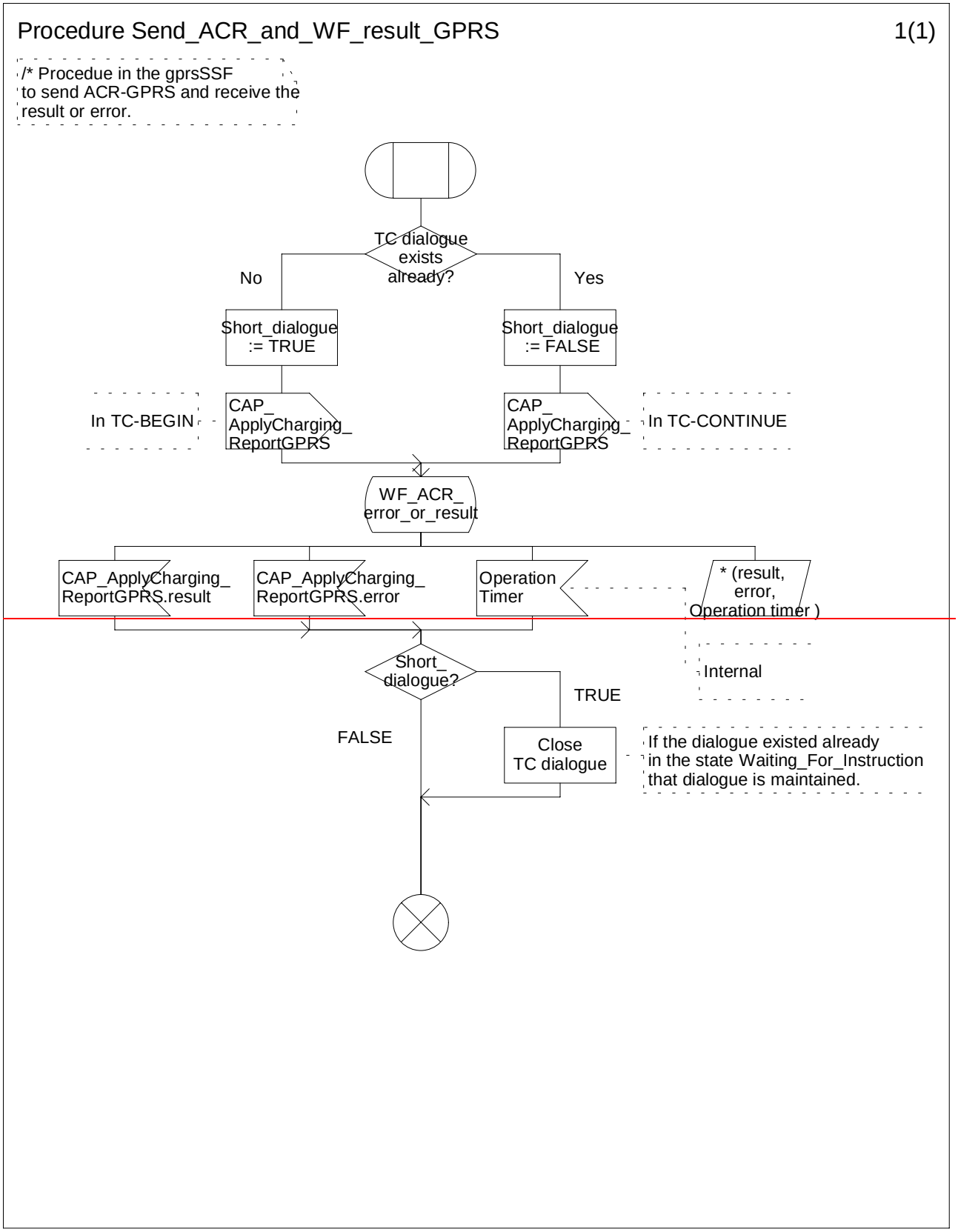
Figure 6.10 a: Process GPRS_Dialogue_Handler (sheet 1)



~~Figure 6.16 a: Procedure EDP_Handling_GPRS (sheet 1)~~



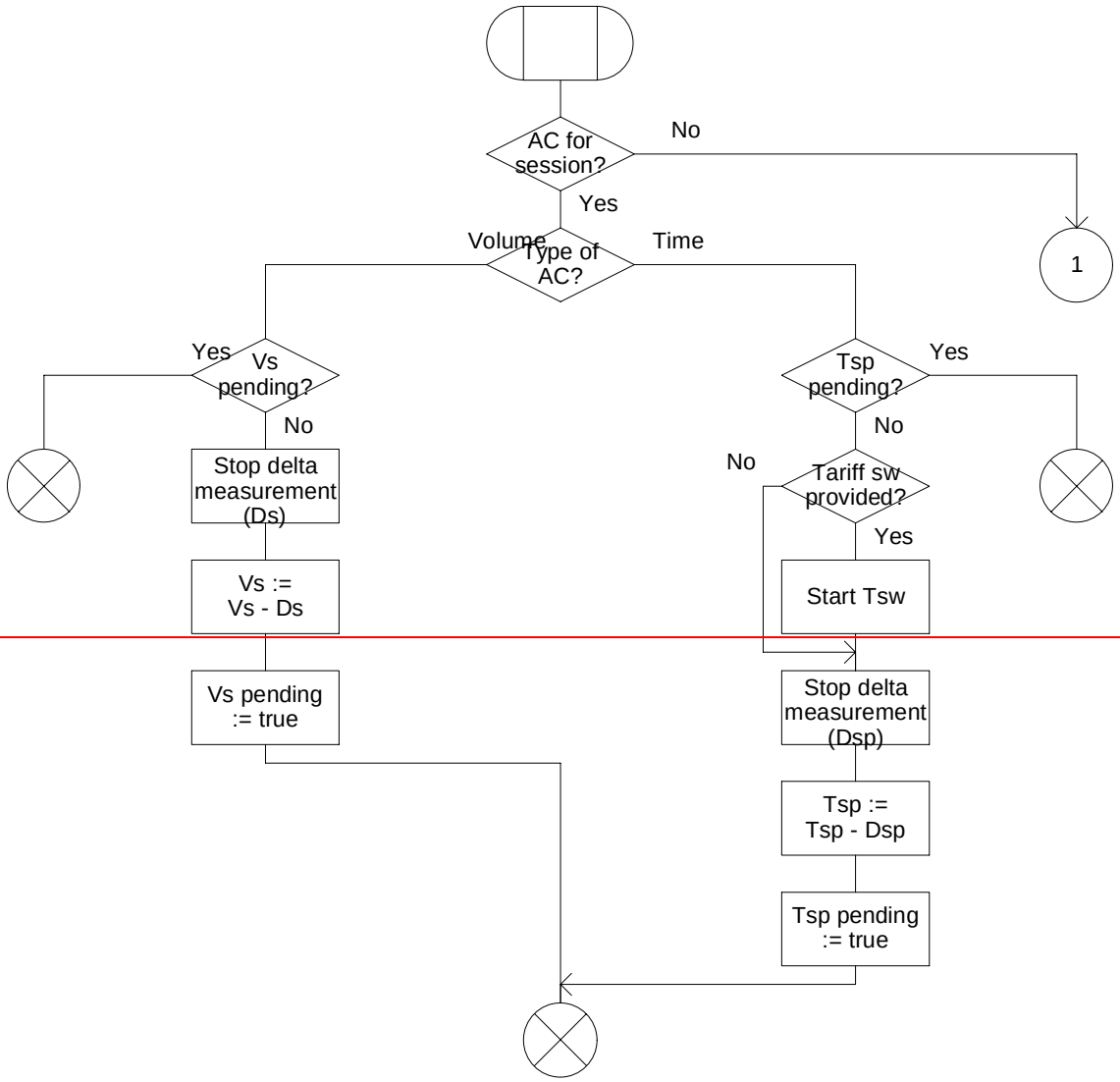
~~Figure 6.17 a: Procedure Entity_Released_GPRS (sheet 1)~~



~~Figure 6.18 a: Procedure Send_ACR_and_WF_result_GPRS (sheet 1)~~

Procedure Handle_AC_GPRS 1(2)

/* Procedure in the gprsSSF for handling of ApplyCharging. */



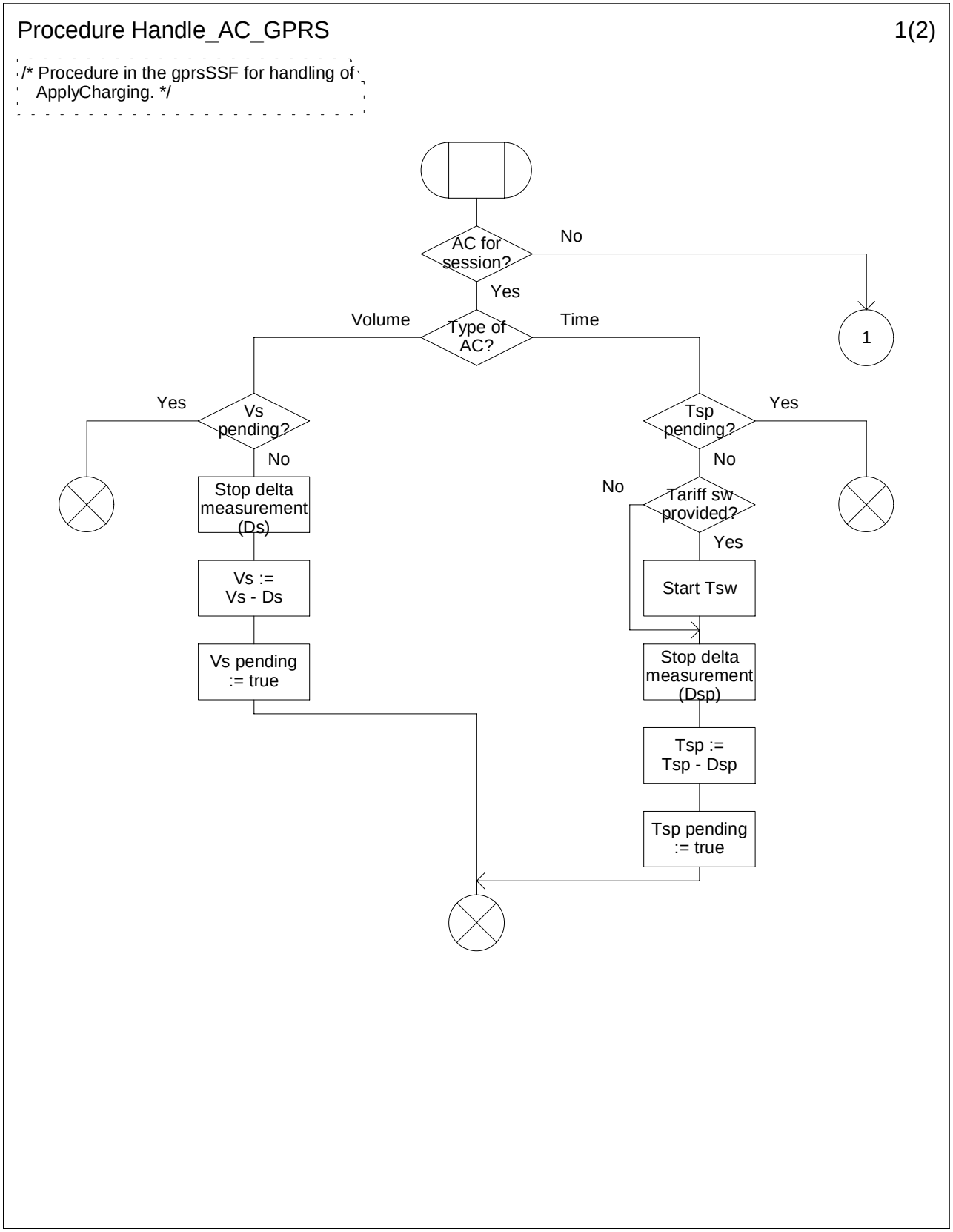
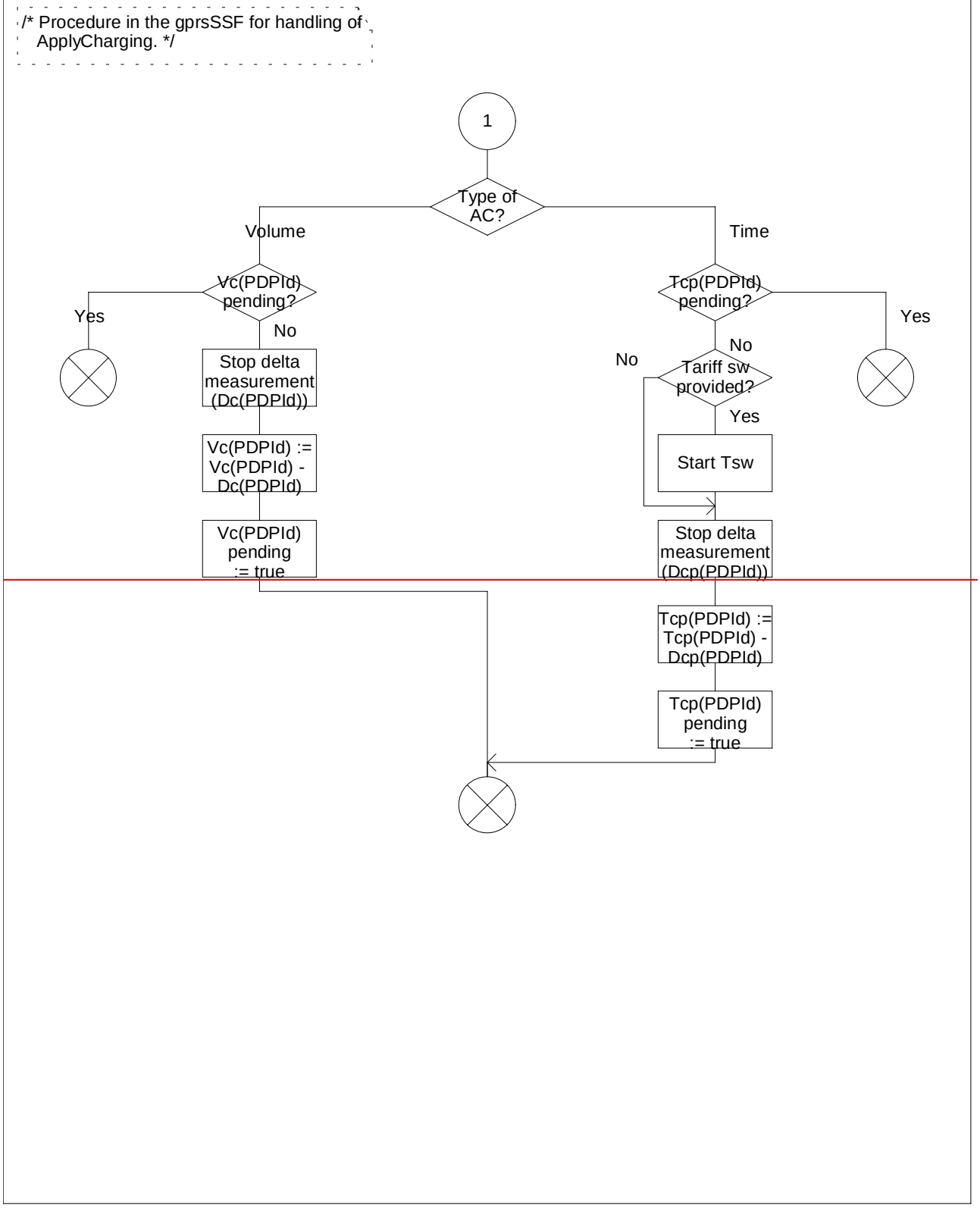


Figure 6.14 a: Procedure Handle_AC_GPRS (sheet 1)

Procedure Handle_AC_GPRS 2(2)



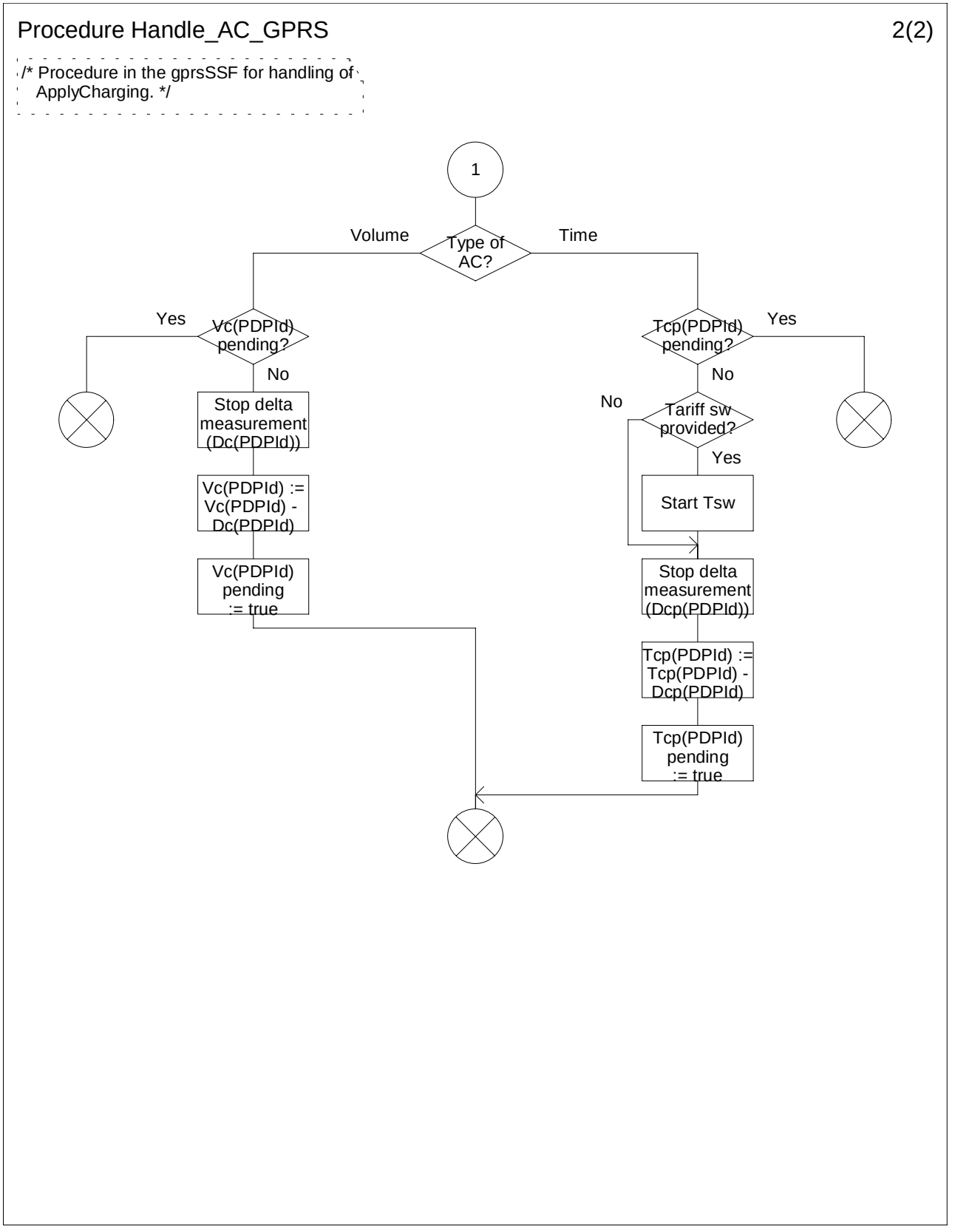
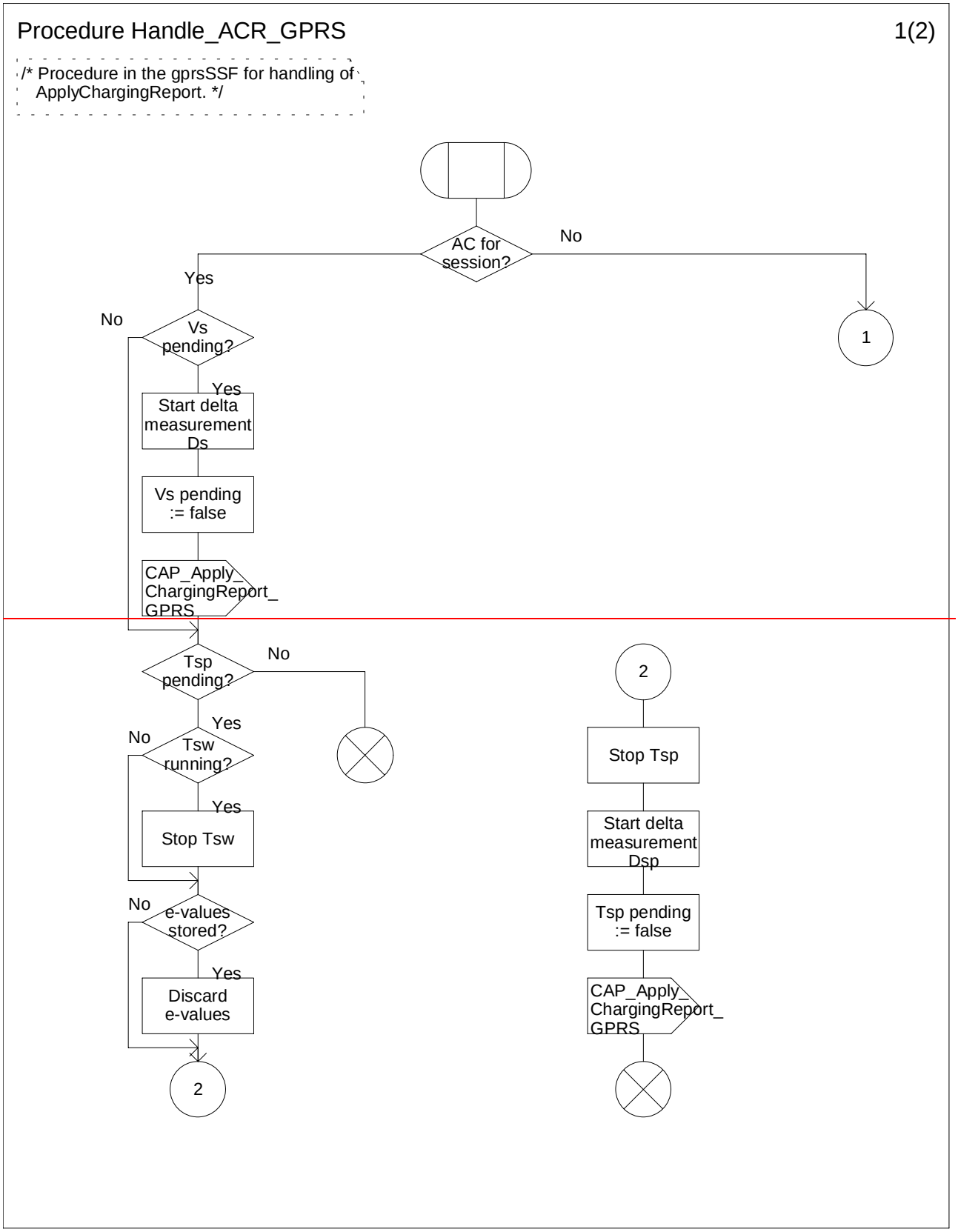


Figure 6.14 b: Procedure Handle_AC_GPRS (sheet 2)

Procedure Handle_ACR_GPRS 1(2)



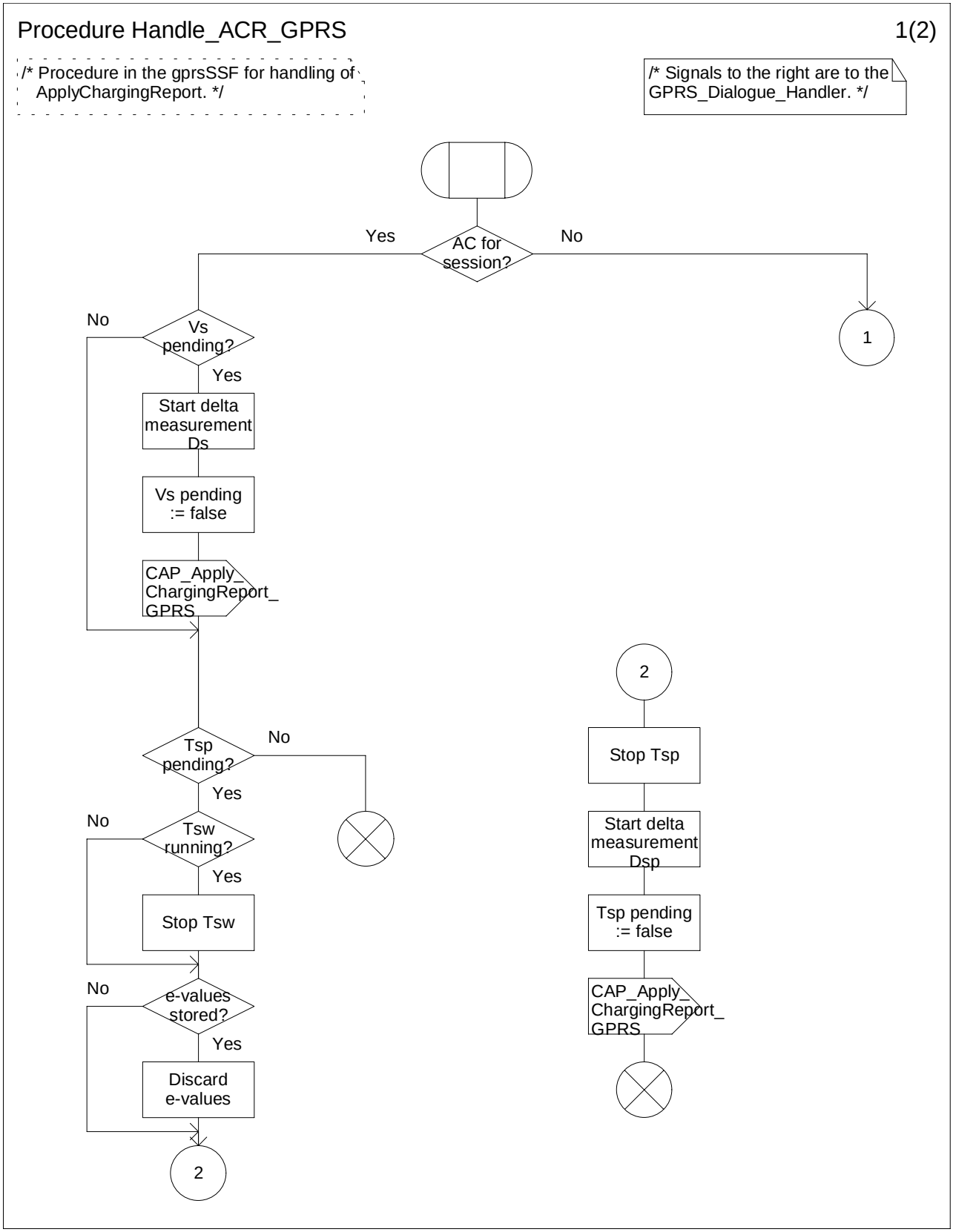
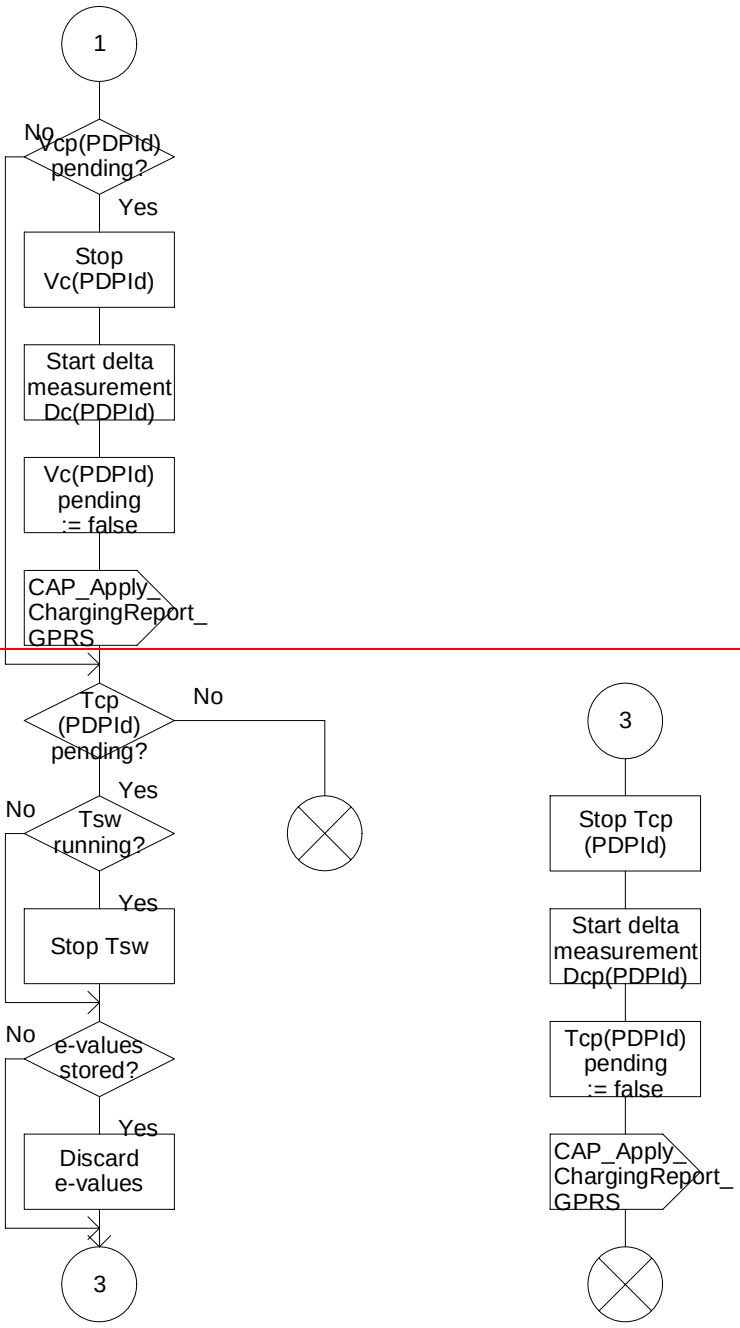


Figure 6.15 a: Procedure Handle_ACR_GPRS (sheet 1)

Procedure Handle_ACR_GPRS 2(2)

/* Procedure in the gprsSSF for handling of ApplyChargingReport. */



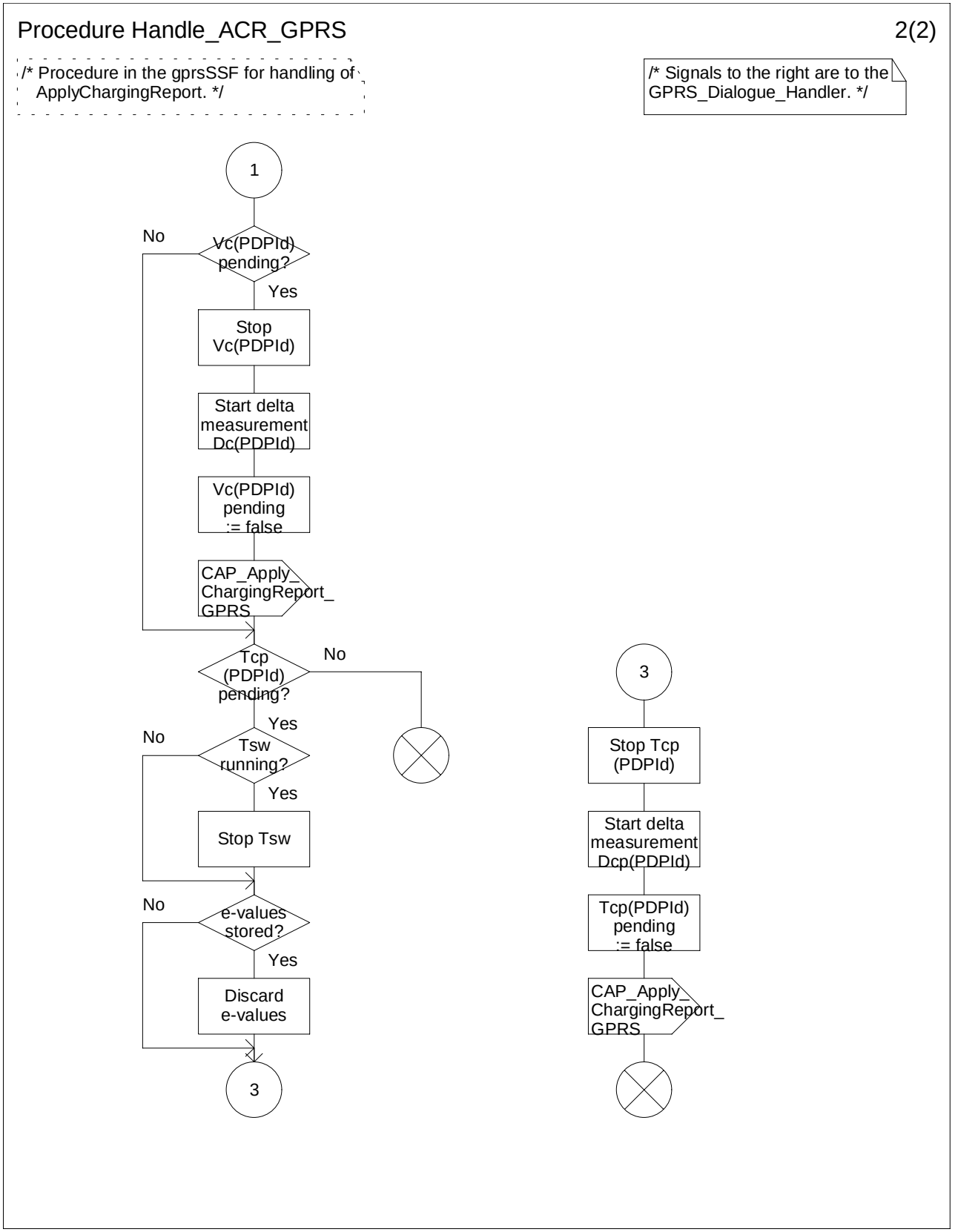
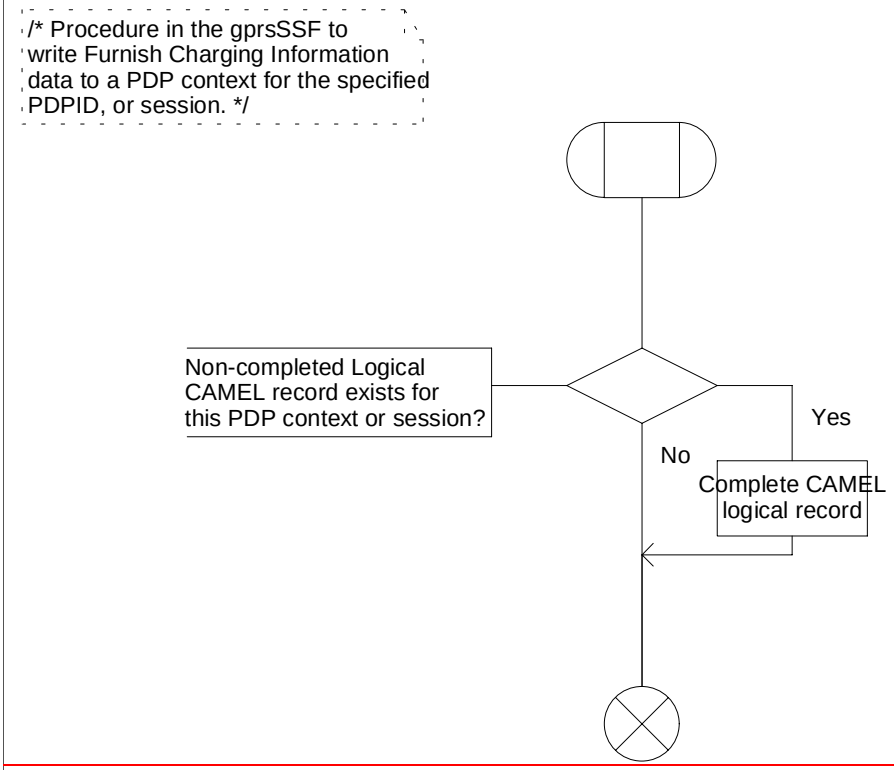


Figure 6.15 b: Procedure Handle_ACR_GPRS (sheet 2)

Procedure Complete_FCI_Record_GPRS 1(1)



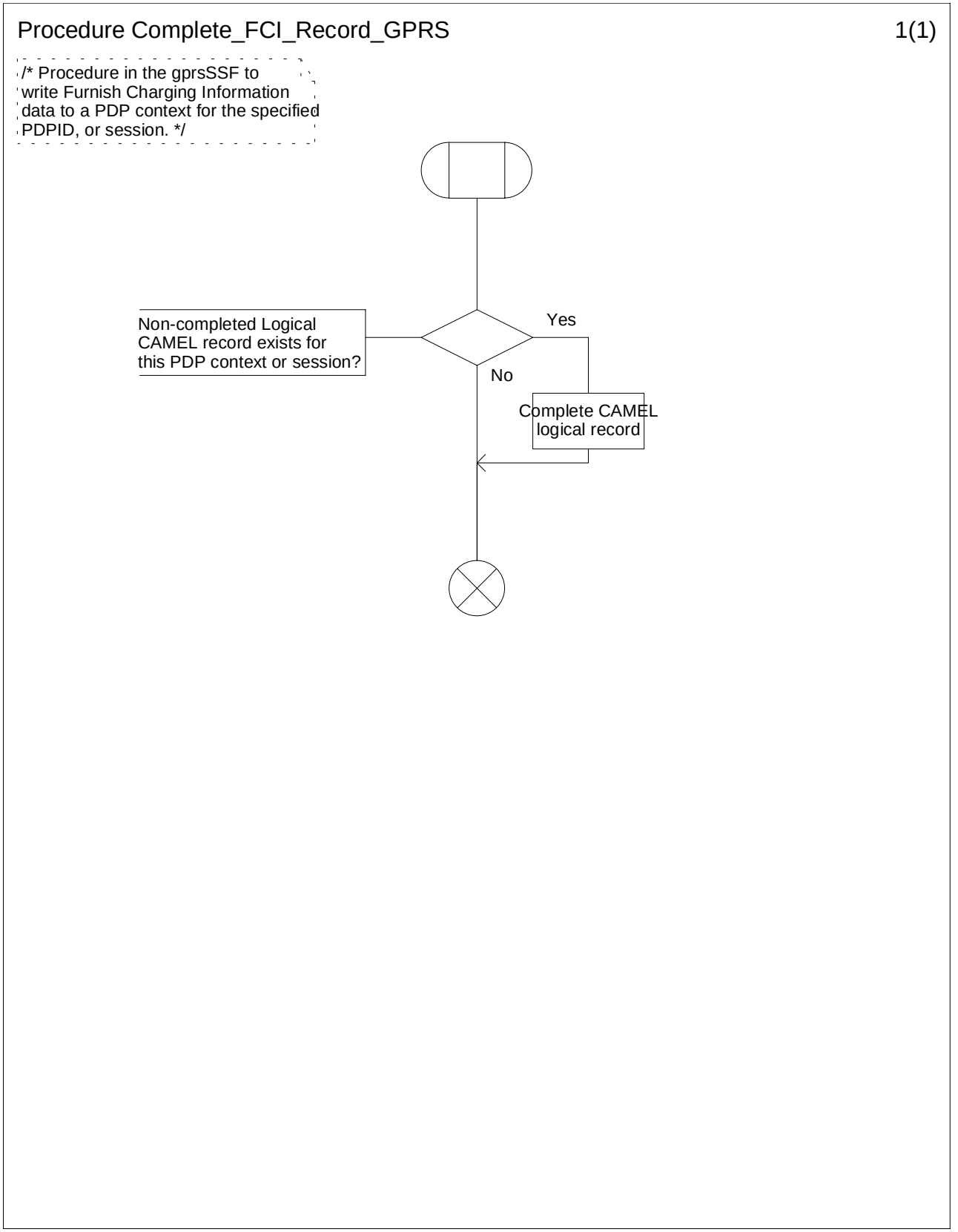
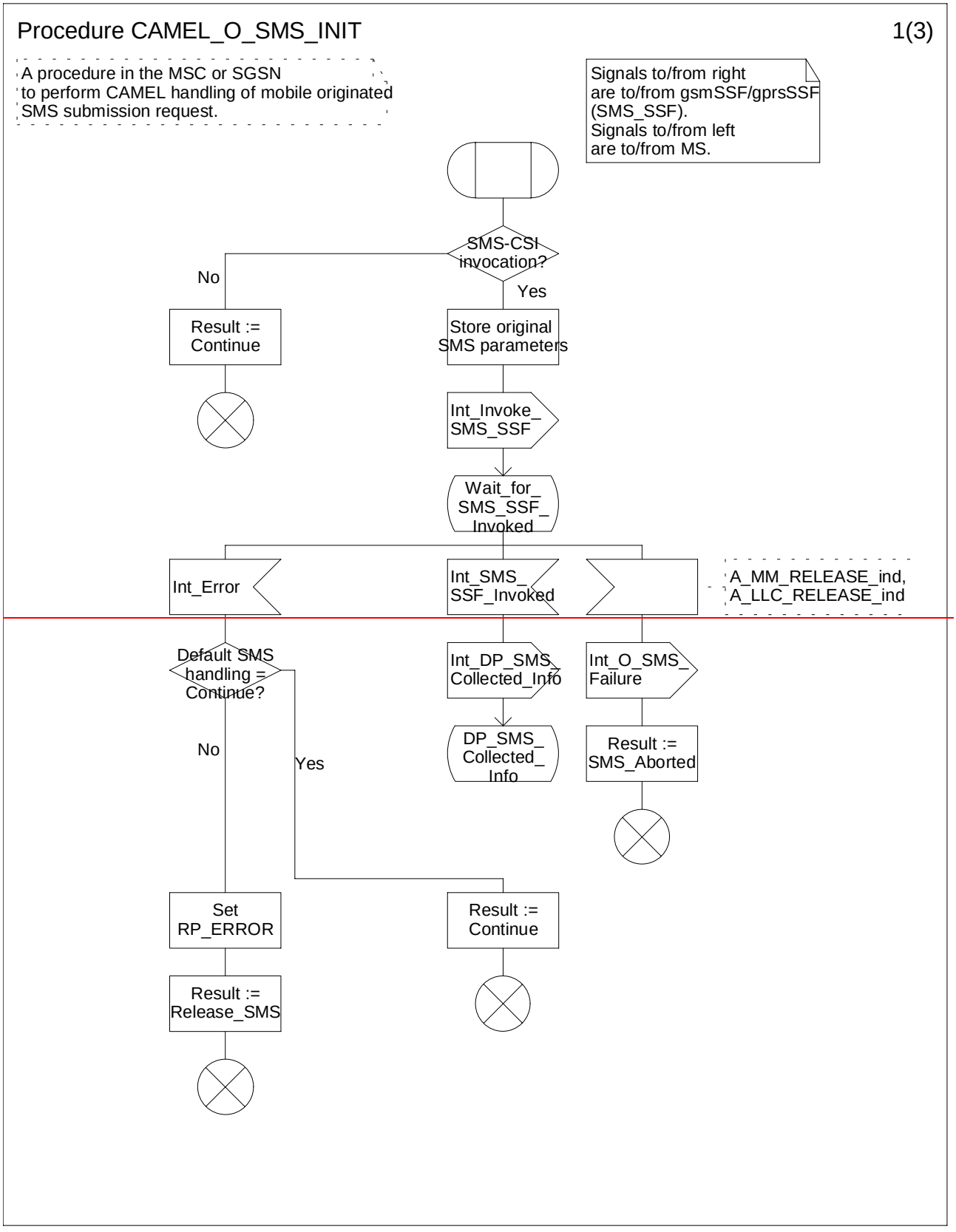


Figure 6.16 a: Procedure Complete_FCI_Record_GPRS (sheet 1)

***** Next modified section *****

7 Short Message Service


Procedure CAMEL_O_SMS_INIT
1(3)
A procedure in the MSC or SGSN to perform CAMEL handling of mobile originated SMS submission request.
Signals to/from right are to/from gsmSSF/gprsSSF (SMS_SSF).
Signals to/from left are to/from MS.
SMS-CSI invocation?
No
Yes
Result := Continue
Store original SMS parameters
Int_Invoke_ SMS_SSF
Wait_for_ SMS_SSF_ Invoked
Int_Error
Int_SMS_ SSF_Invoked
A_MM_RELEASE_ind, A_LLC_RELEASE_ind
Default SMS handling = Continue?
No
Yes
Int_DP_SMS_ Collected_Info
Int_O_SMS_ Failure
DP_SMS_ Collected_ Info
Result := SMS_Aborted
Set RP_ERROR
Result := Release_SMS
Result := Continue

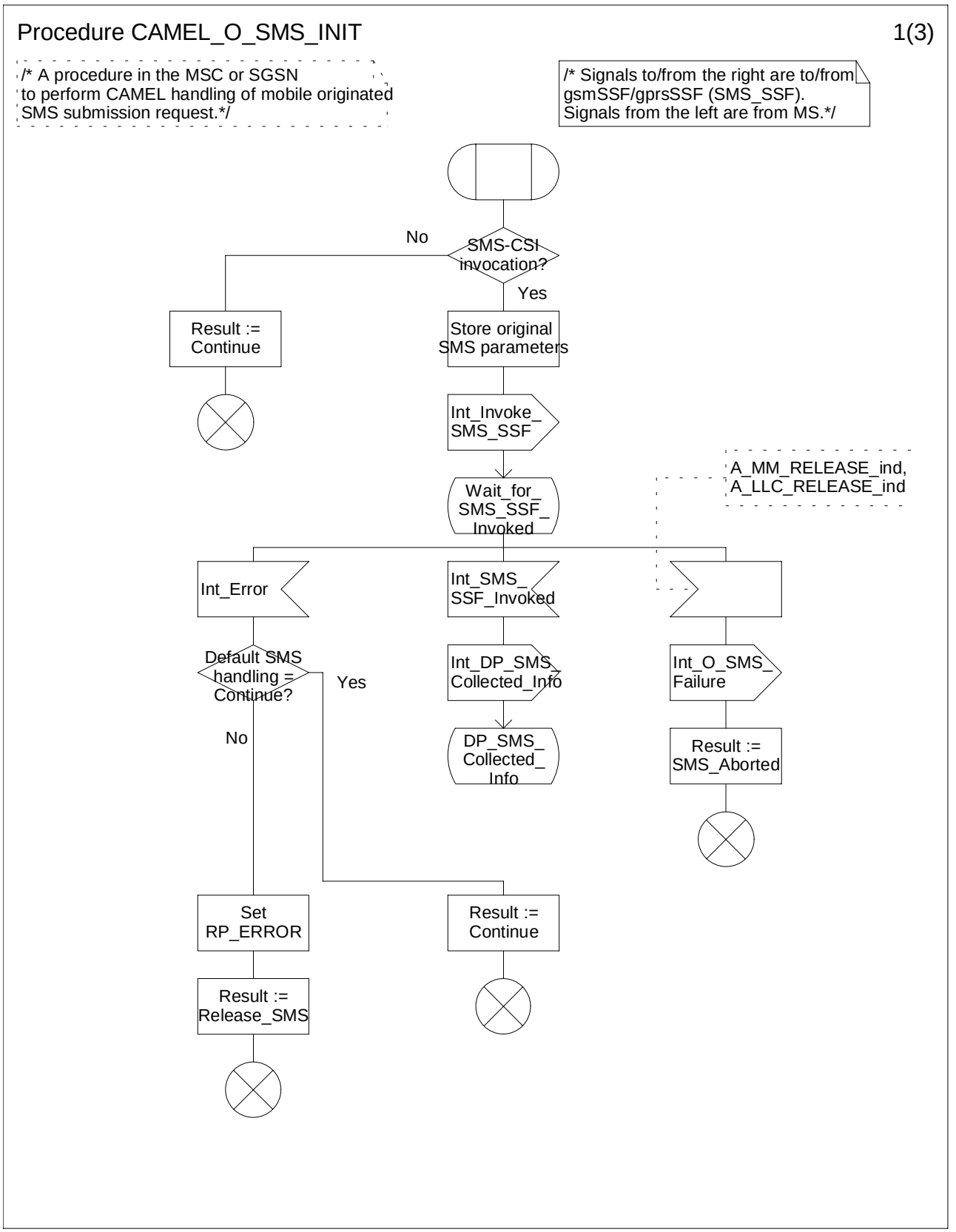
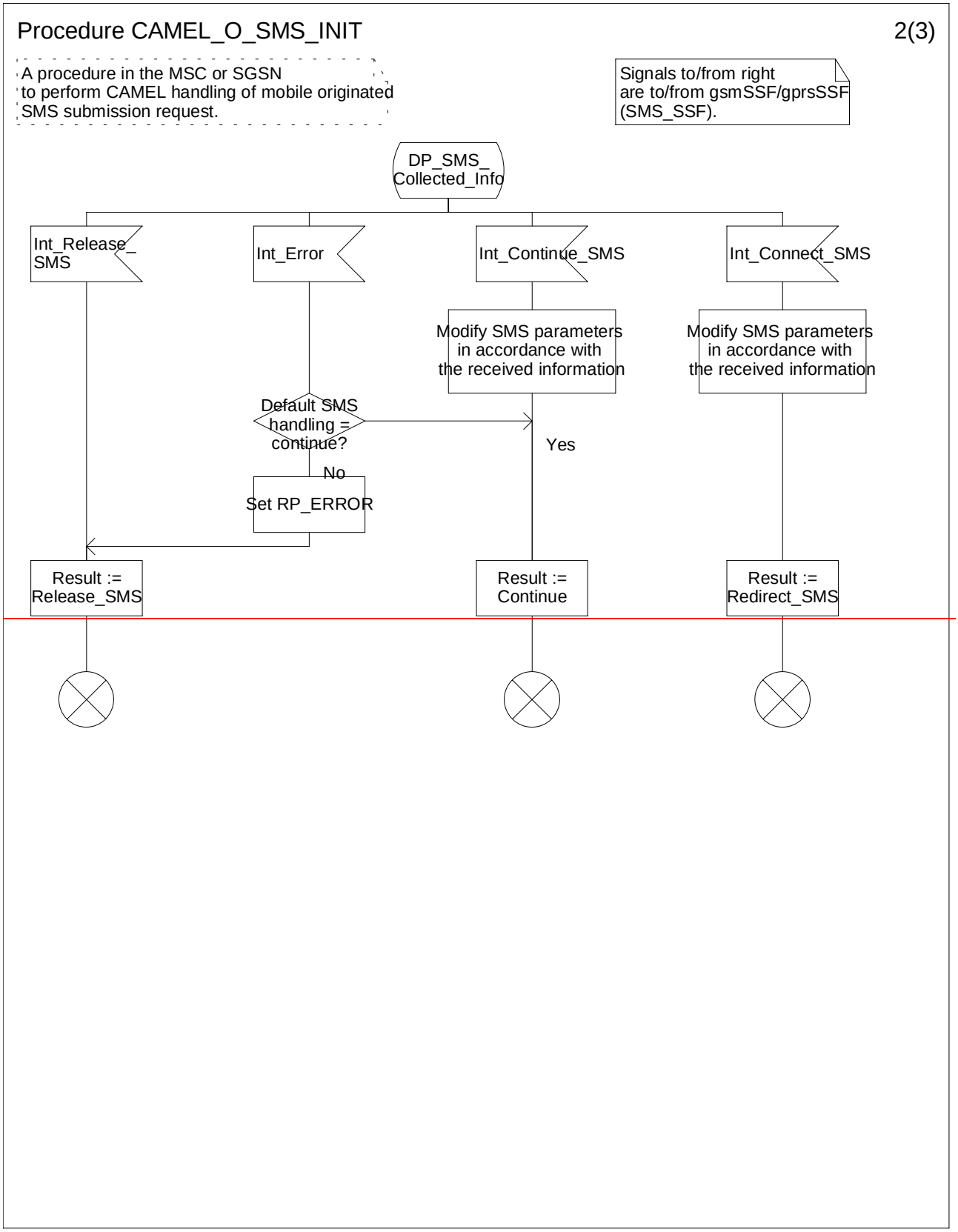


Figure 7.17 a: Procedure CAMEL_O_SMS_INIT (sheet1)


Procedure CAMEL_O_SMS_INIT
2(3)
A procedure in the MSC or SGSN
to perform CAMEL handling of mobile originated
SMS submission request.
Signals to/from right
are to/from gsmSSF/gprsSSF
(SMS_SSF).
DP_SMS_
Collected_Info
Int_Release_
SMS
Int_Error
Int_Continue_SMS
Int_Connect_SMS
Modify SMS parameters
in accordance with
the received information
Modify SMS parameters
in accordance with
the received information
Default SMS
handling =
continue?
Yes
No
Set RP_ERROR
Result :=
Release_SMS
Result :=
Continue
Result :=
Redirect_SMS

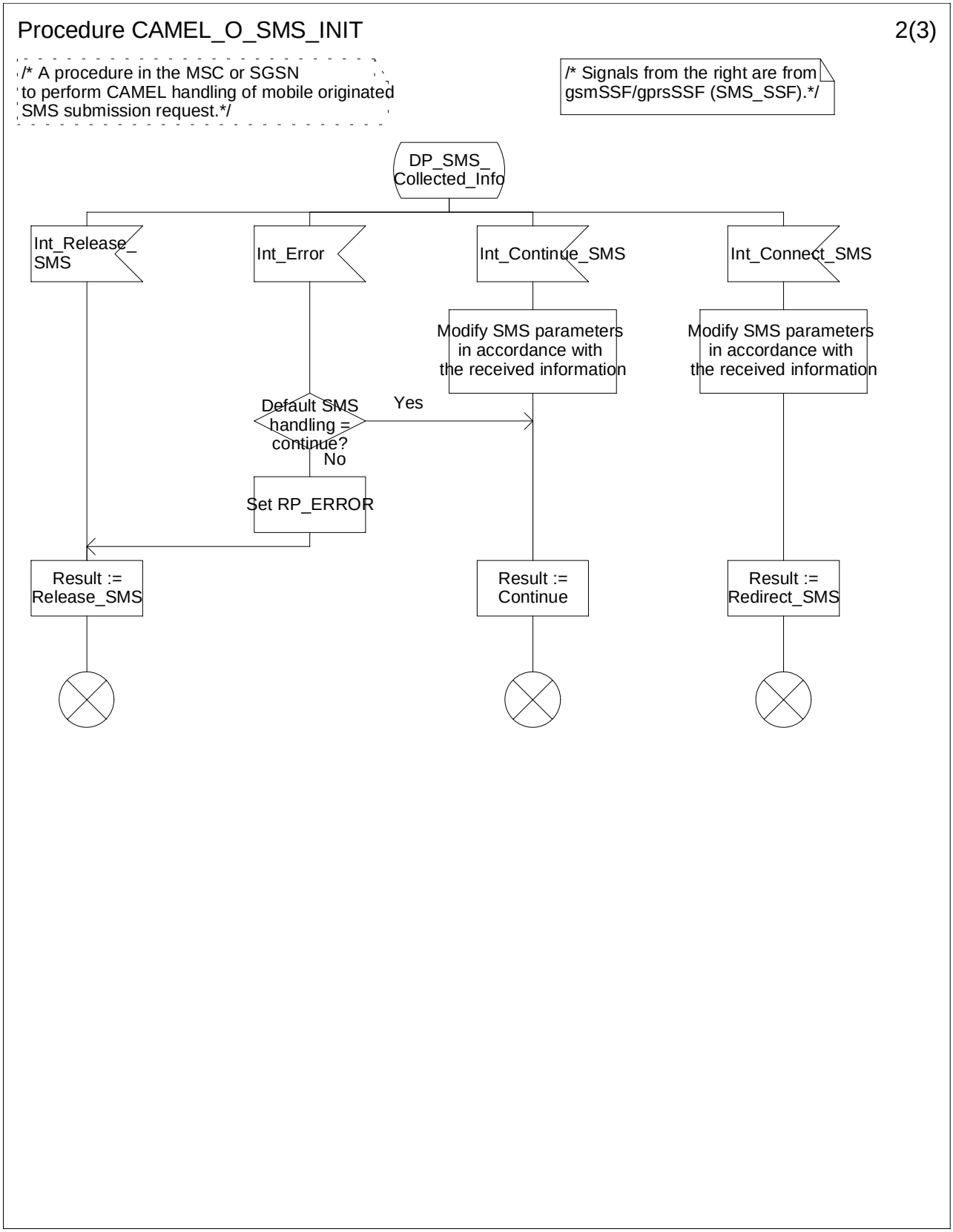
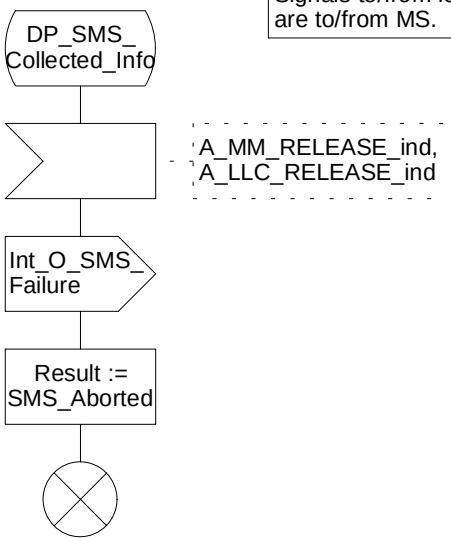


Figure 7.17 b: Procedure CAMEL_O_SMS_INIT (sheet2)

Procedure CAMEL_O_SMS_INIT 3(3)

A procedure in the MSC or SGSN to perform CAMEL handling of mobile originated SMS submission request.

Signals to/from right are to/from gsmSSF/gprsSSF (SMS_SSF).
Signals to/from left are to/from MS.



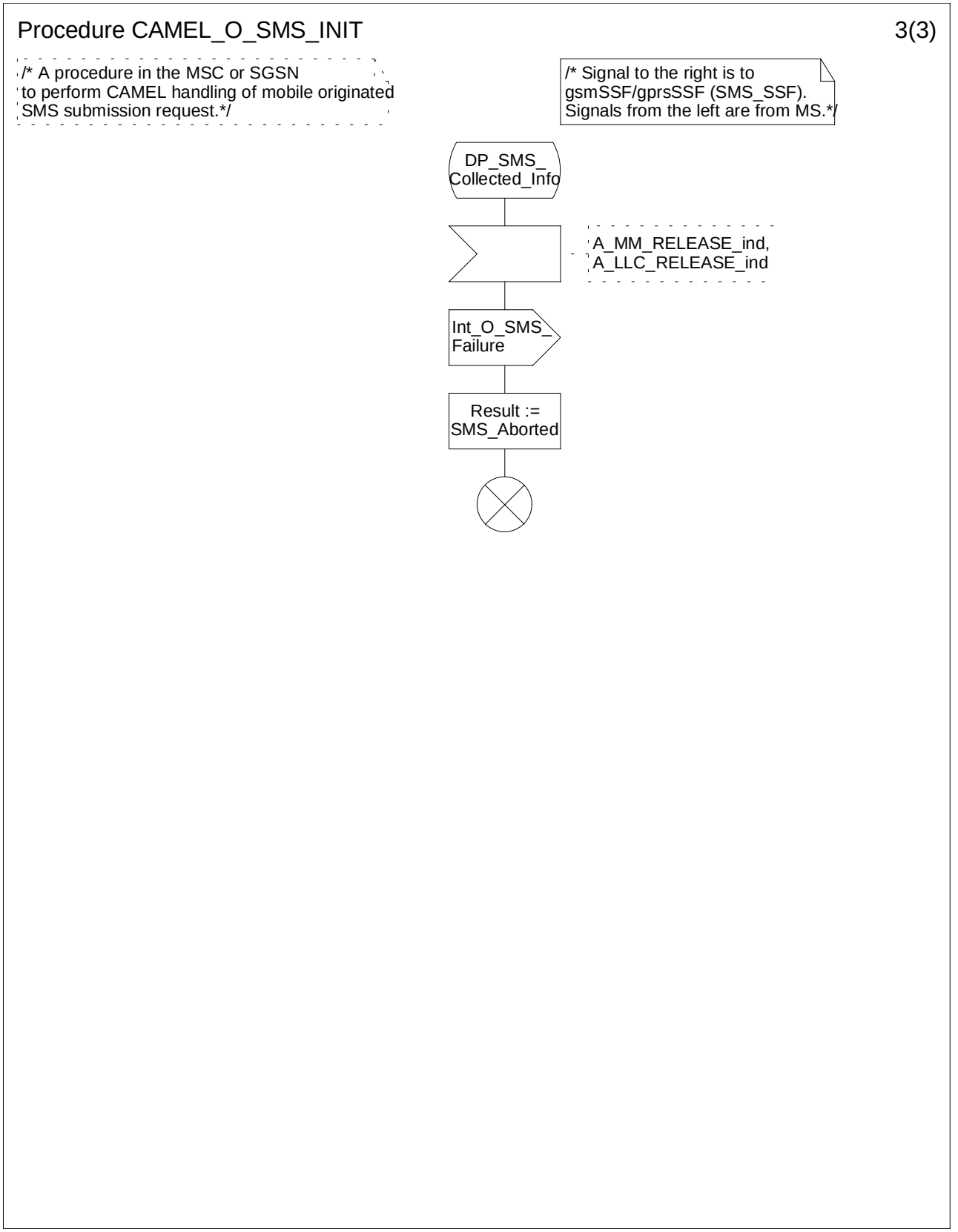
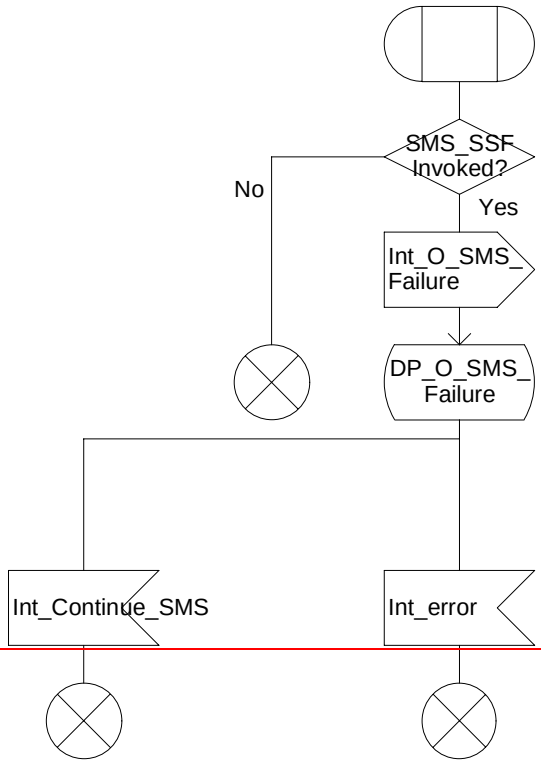


Figure 7.17 c: Procedure CAMEL_O_SMS_INIT (sheet3)

Procedure CAMEL_O_SMS_FAILURE 1(1)

Procedure in the MSC or SGSN
to handle CAMEL notification to gsmSCF
about unsuccessfull submission.

Signals to/from right
are to/from gsmSSF/gprsSSF.



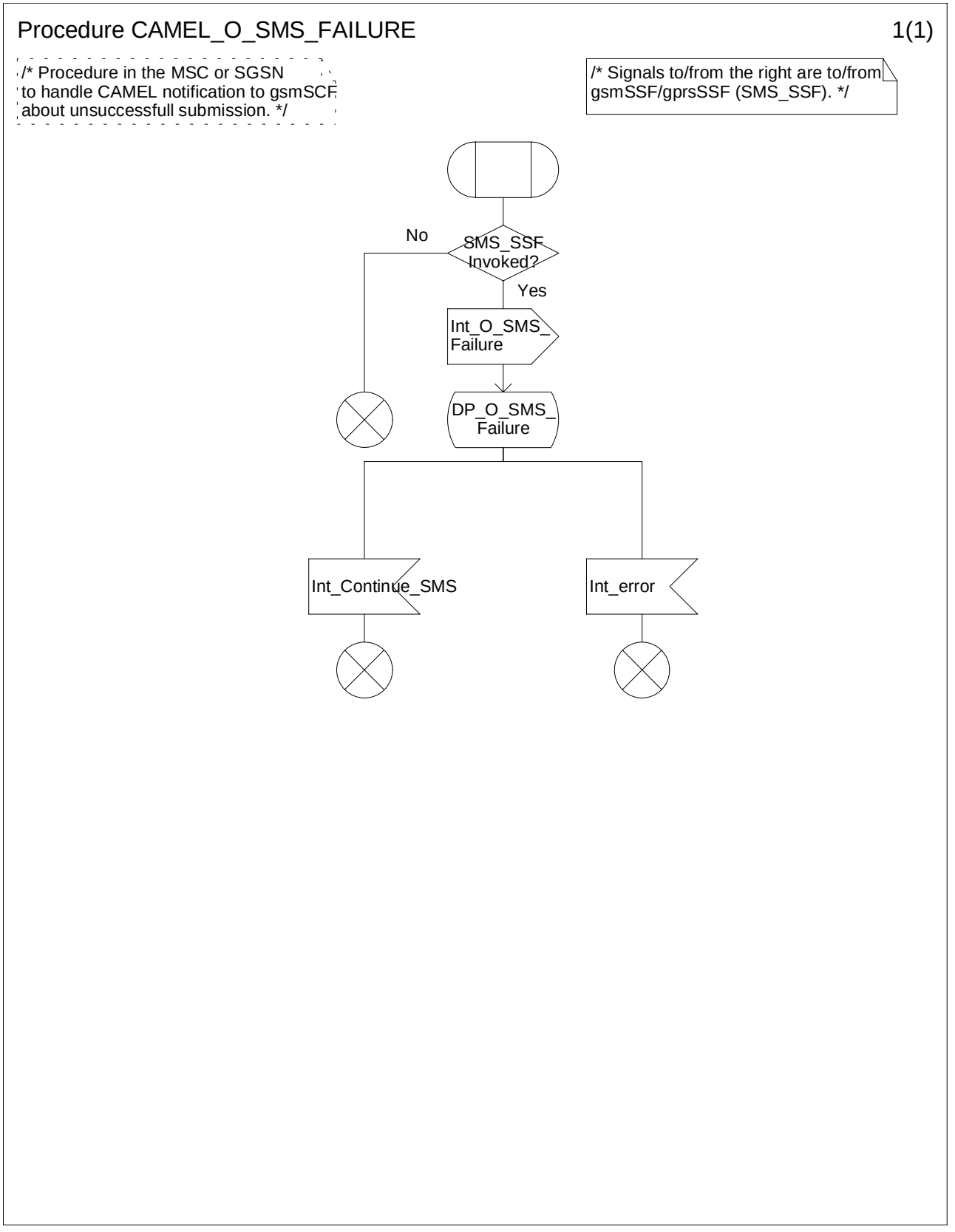
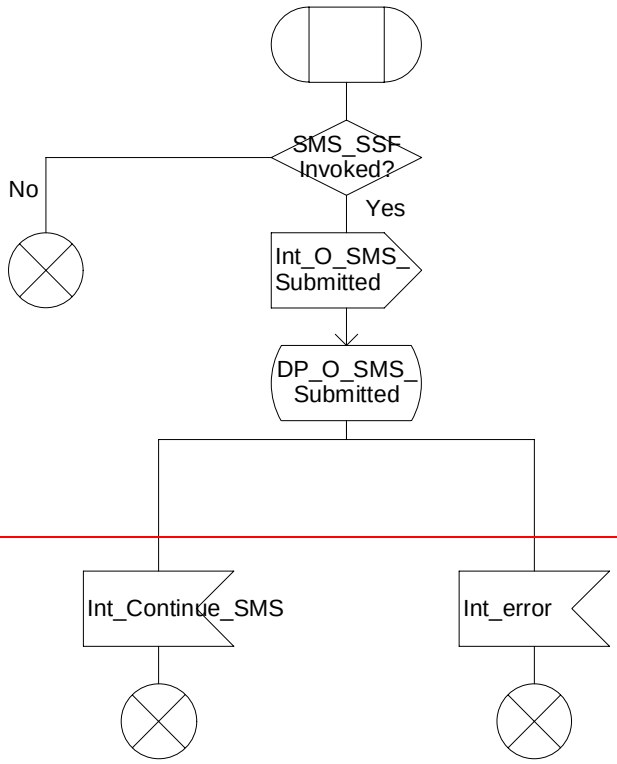


Figure 7.18: Procedure CAMEL_O_SMS_FAILURE (sheet1)

Procedure CAMEL_O_SMS_SUBMITTED 1(1)

Procedure in the MSC or SGSN (SMS_SSF) to report successful submission to gsmSCF of CAMEL.

Signals to/from right are to/from gsmSSF/gprsSSF.



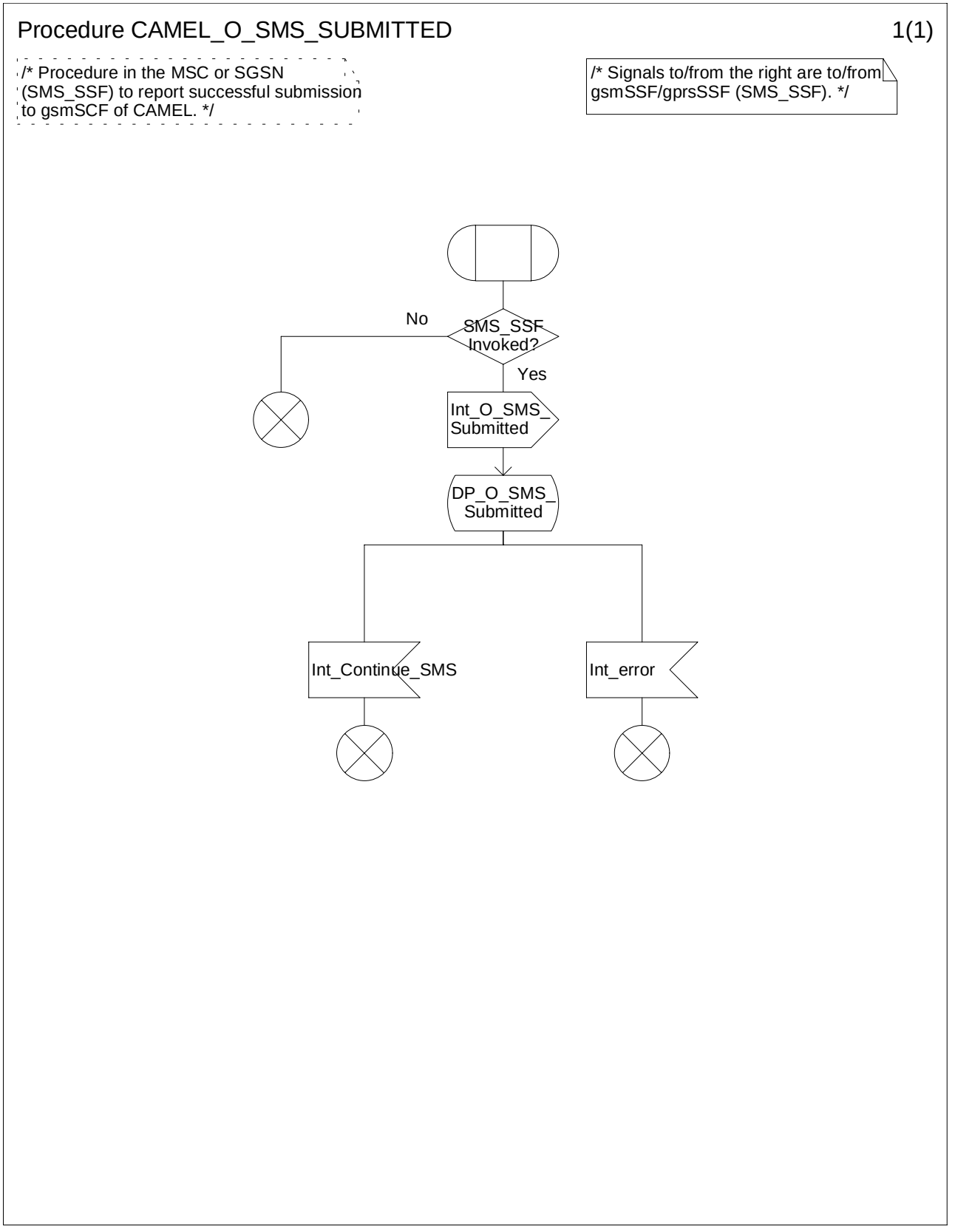
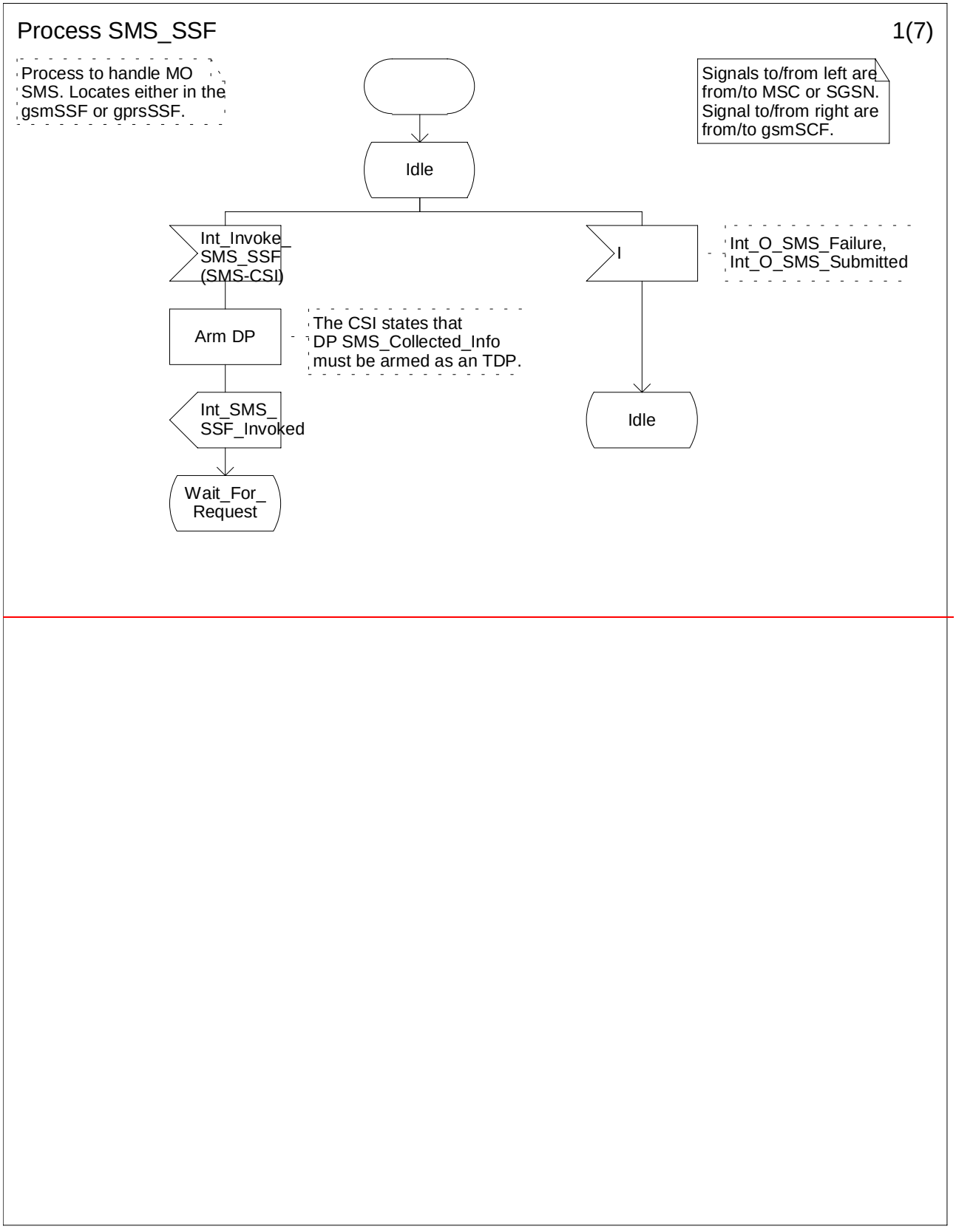


Figure 7.19: Procedure CAMEL_O_SMS_SUBMITTED (sheet1)

7.5.3 Handling of mobile originating~~ed~~ SMS in the gsmSSF/gprsSSF


Process SMS_SSF
1(7)
Process to handle MO SMS. Locates either in the gsmSSF or gprsSSF.
Signals to/from left are from/to MSC or SGSN. Signal to/from right are from/to gsmSCF.
Idle
Int_Invoke_ SMS_SSF (SMS-CSI)
I
Int_O_SMS_Failure, Int_O_SMS_Submitted
Arm DP
The CSI states that DP SMS_Collected_Info must be armed as an TDP.
Int_SMS_ SSF_Invoked
Idle
Wait_For_ Request

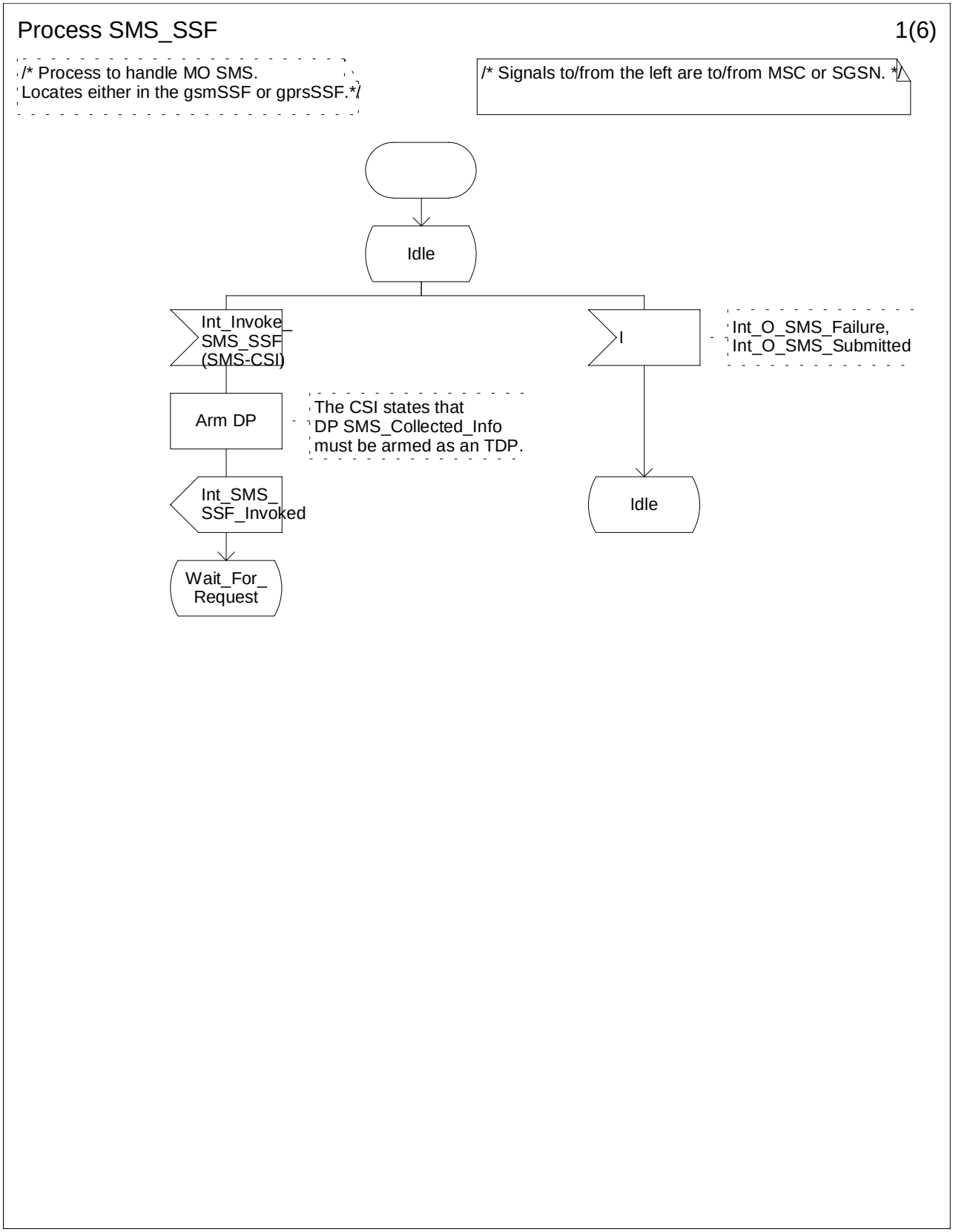


Figure 7.20 a: Process SMS_SSF (sheet 1)

Process SMS_SSF 2(7)

Process to handle MO SMS. Locates either in the gsmSSF or gprsSSF.

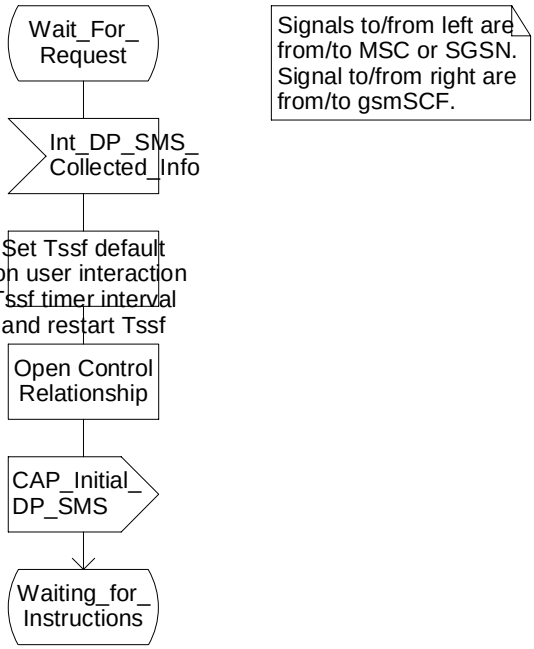
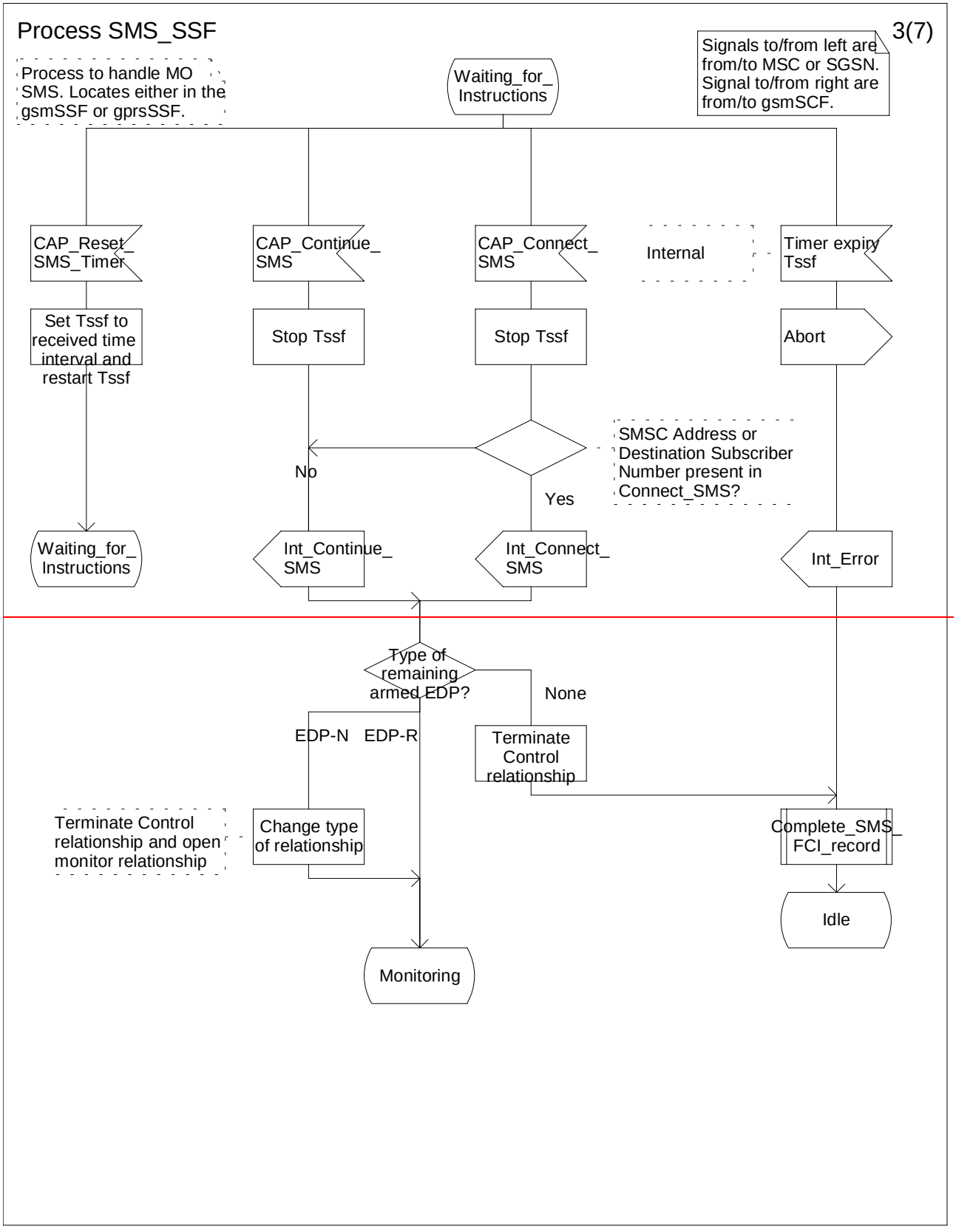


Figure 7.20 b: Process SMS_SSF (sheet 2)


Process SMS_SSF
3(7)
Process to handle MO SMS. Locates either in the gsmSSF or gprsSSF.
Waiting_for_ Instructions
Signals to/from left are from/to MSC or SGSN. Signal to/from right are from/to gsmSCF.
CAP_Reset_ SMS_Timer
CAP_Continue_ SMS
CAP_Connect_ SMS
Internal
Timer expiry Tssf
Set Tssf to received time interval and restart Tssf
Stop Tssf
Stop Tssf
Abort
SMSC Address or Destination Subscriber Number present in Connect_SMS?
No
Yes
Waiting_for_ Instructions
Int_Continue_ SMS
Int_Connect_ SMS
Int_Error
Type of remaining armed EDP?
None
EDP-N
EDP-R
Terminate Control relationship
Terminate Control relationship and open monitor relationship
Change type of relationship
Complete_SMS_ FCI_record
Idle
Monitoring

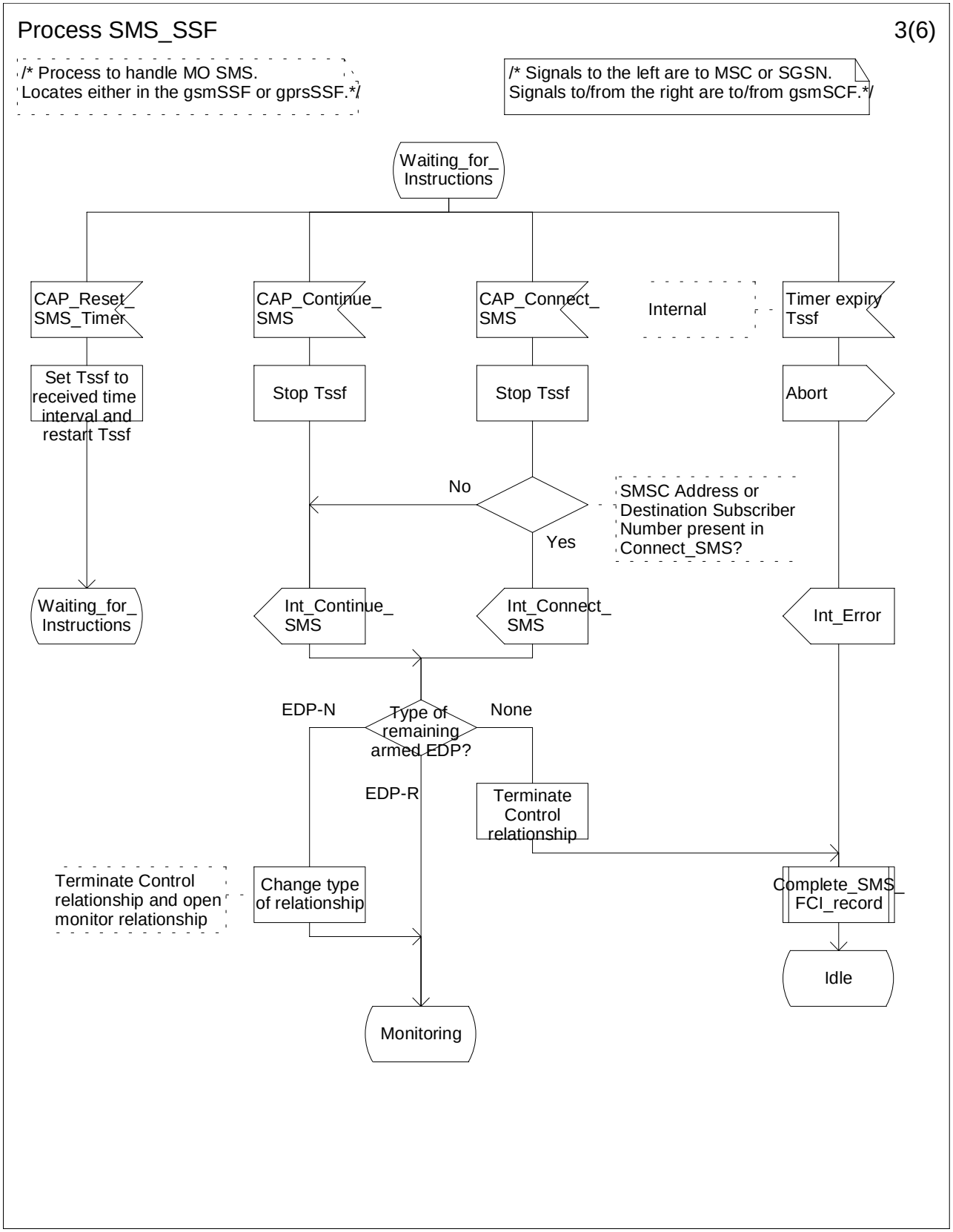
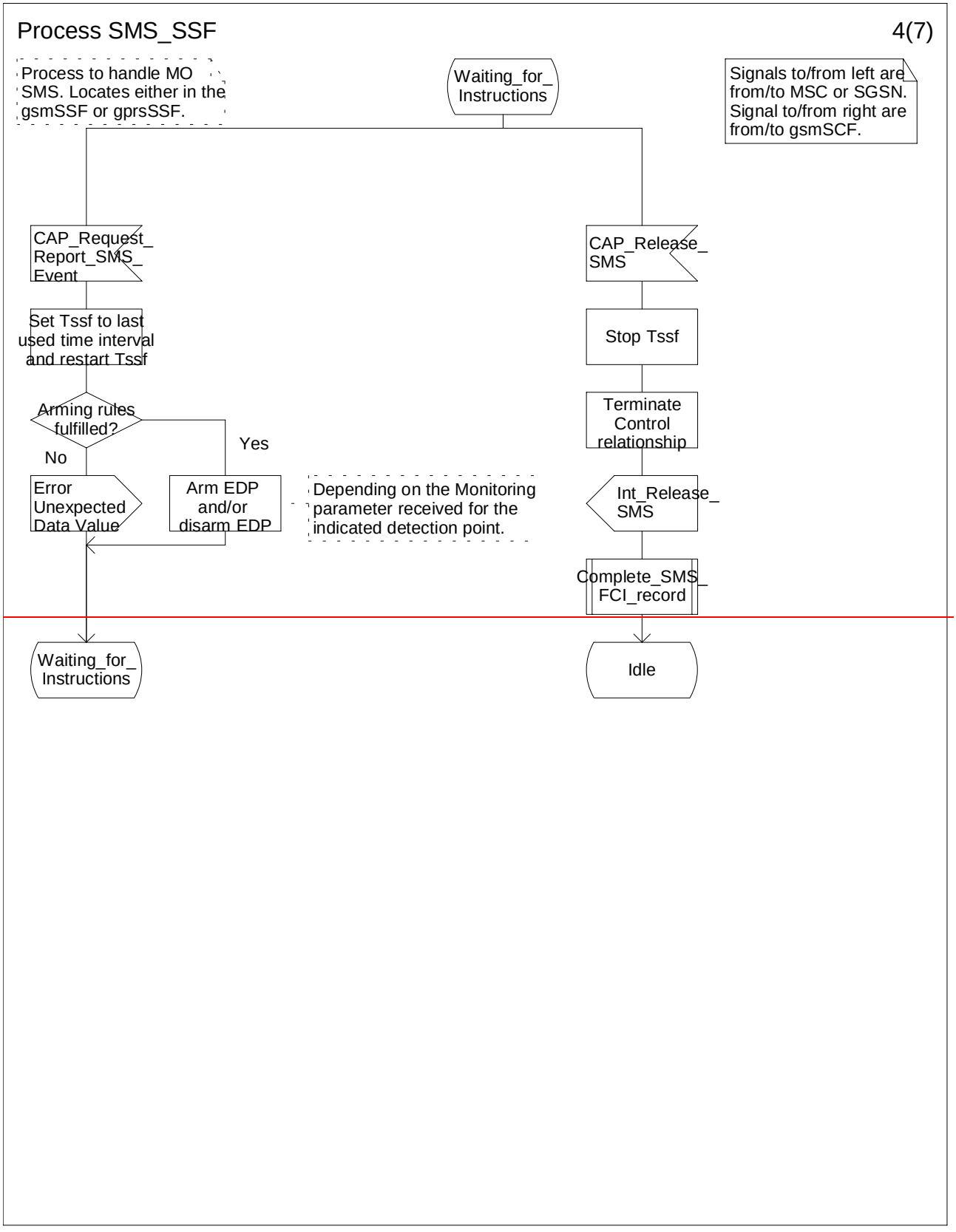


Figure 7.20 c: Process SMS_SSF (sheet 3)


Process SMS_SSF
4(7)
Process to handle MO SMS. Locates either in the gsmSSF or gprsSSF.
Waiting_for_ Instructions
Signals to/from left are from/to MSC or SGSN. Signal to/from right are from/to gsmSCF.
CAP_Request_ Report_SMS_ Event
CAP_Release_ SMS
Set Tssf to last used time interval and restart Tssf
Stop Tssf
Arming rules fulfilled?
Terminate Control relationship
Yes
No
Error Unexpected Data Value
Arm EDP and/or disarm EDP
Depending on the Monitoring parameter received for the indicated detection point.
Int_Release_ SMS
Complete_SMS_ FCI_record
Waiting_for_ Instructions
Idle

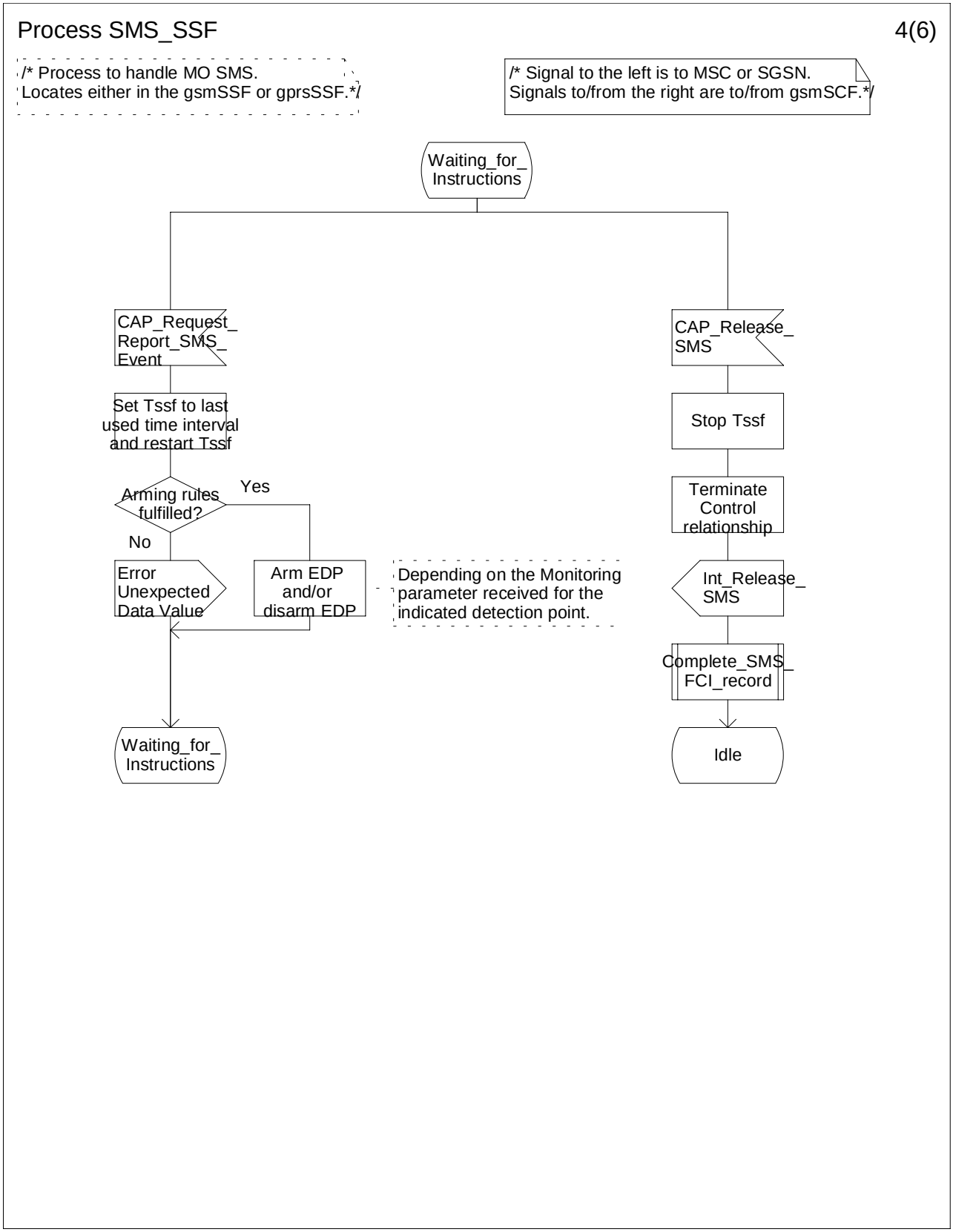
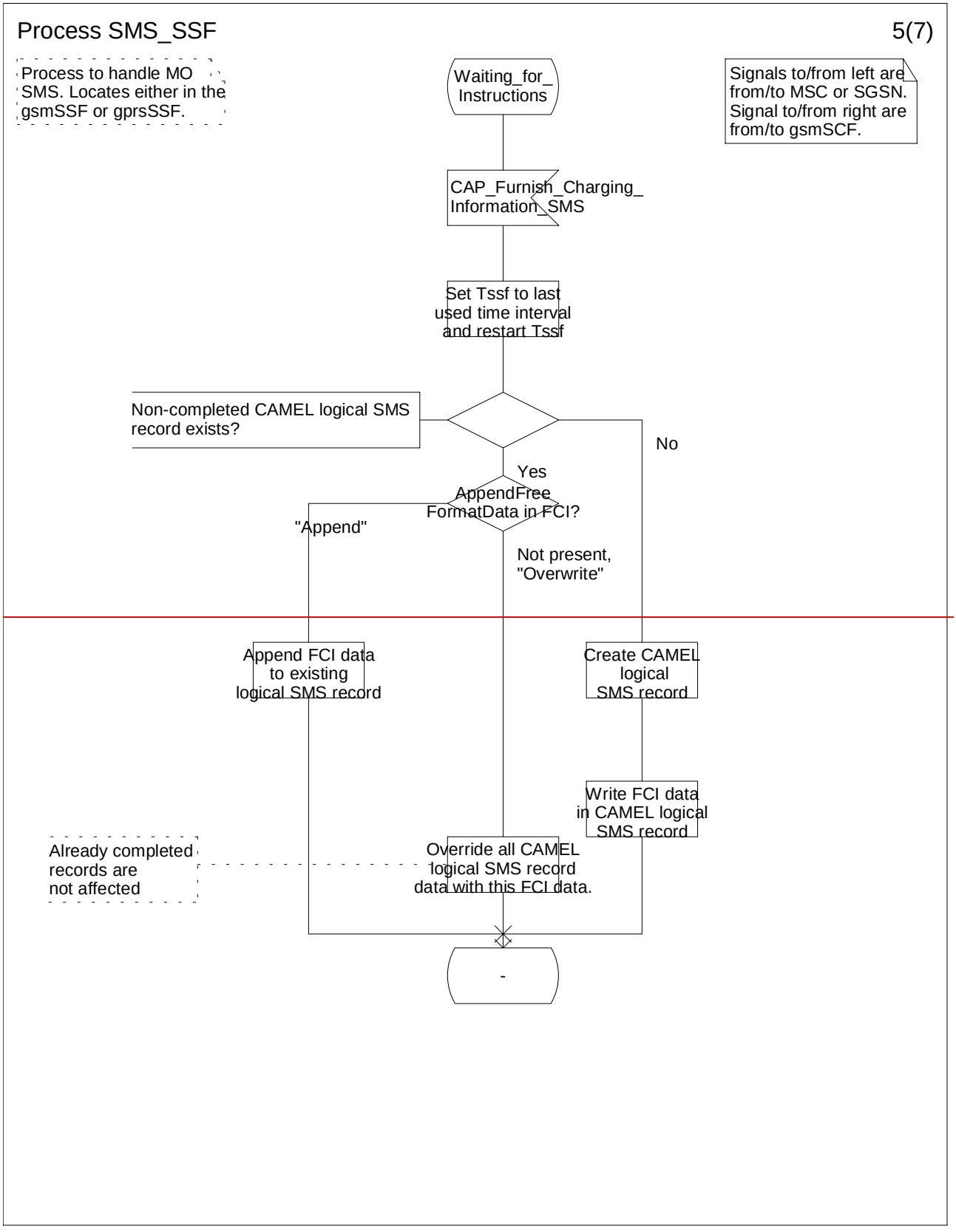


Figure 7.20 d: Process SMS_SSF (sheet 4)


Process SMS_SSF
5(7)
Process to handle MO SMS. Locates either in the gsmSSF or gprsSSF.
Waiting_for_ Instructions
Signals to/from left are from/to MSC or SGSN. Signal to/from right are from/to gsmSCF.
CAP_Furnish_Charging_ Information_SMS
Set Tssf to last used time interval and restart Tssf
Non-completed CAMEL logical SMS record exists?
No
Yes
AppendFree FormatData in FCI?
"Append"
Not present, "Overwrite"
Append FCI data to existing logical SMS record
Create CAMEL logical SMS record
Write FCI data in CAMEL logical SMS record
Already completed records are not affected
Override all CAMEL logical SMS record data with this FCI data.
-

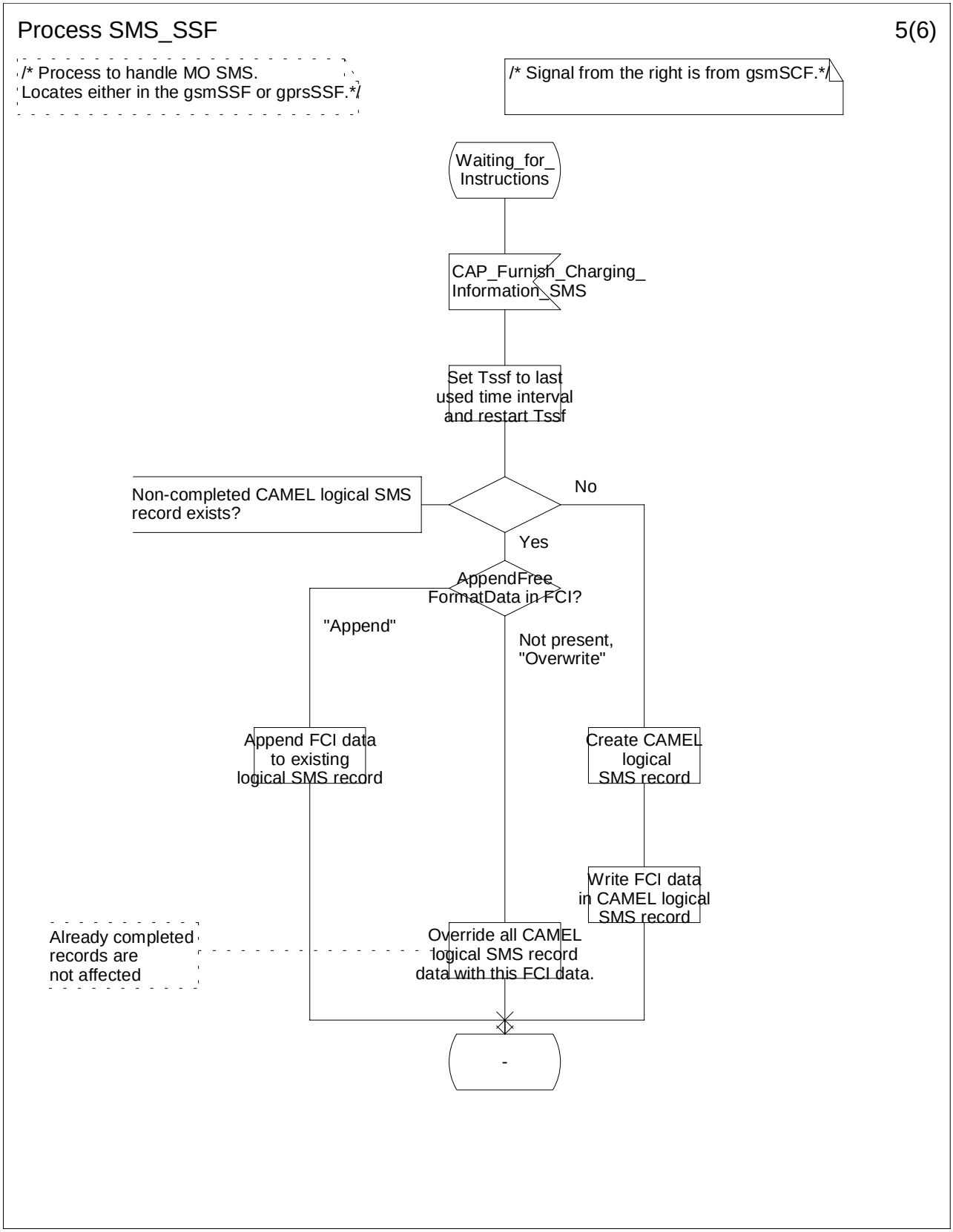
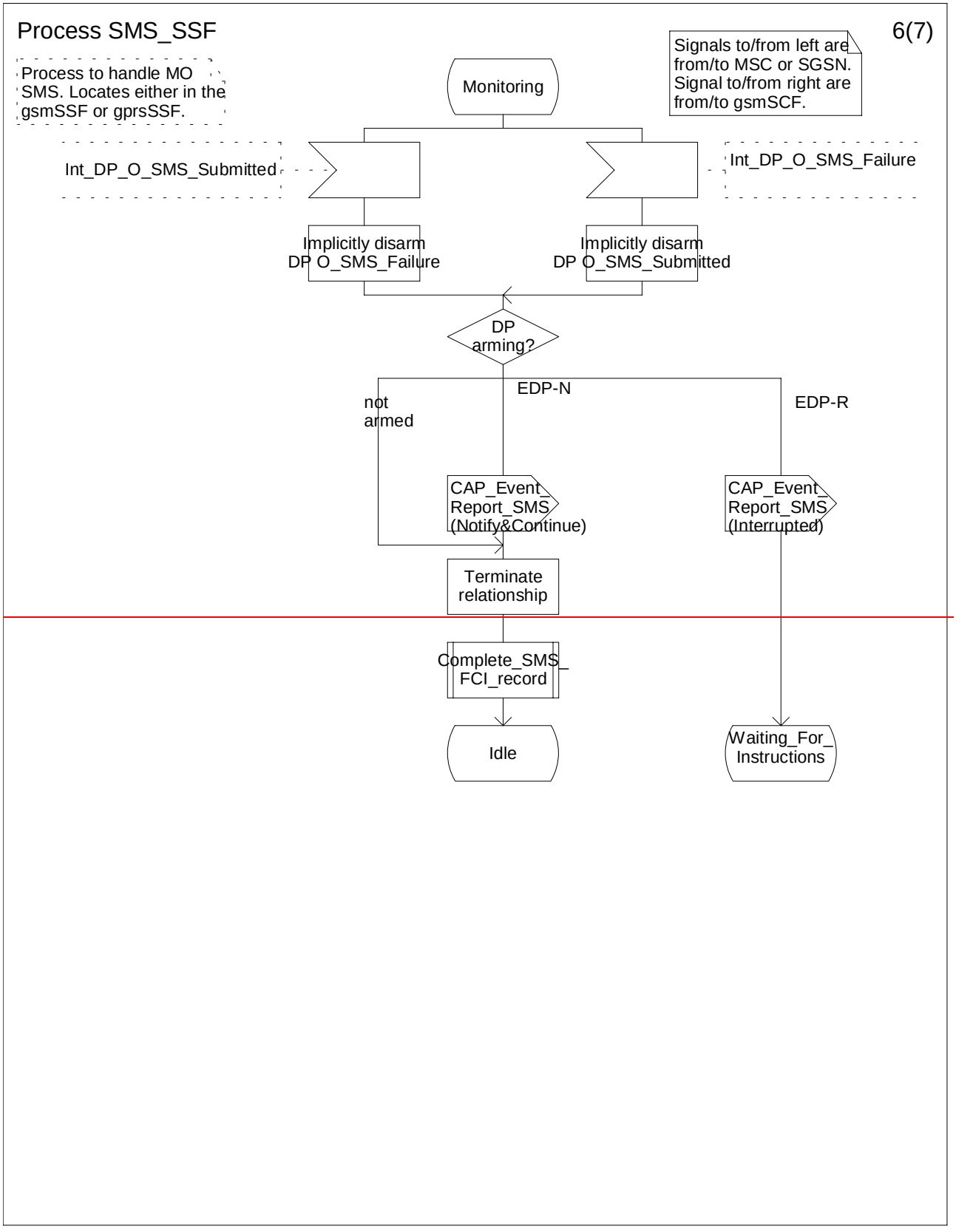


Figure 7.20 e: Process SMS_SSF (sheet 5)


Process SMS_SSF
6(7)
Process to handle MO SMS. Locates either in the gsmSSF or gprsSSF.
Signals to/from left are from/to MSC or SGSN. Signal to/from right are from/to gsmSCF.
Monitoring
Int_DP_O_SMS_Submitted
Int_DP_O_SMS_Failure
Implicitly disarm DP O_SMS_Failure
Implicitly disarm DP O_SMS_Submitted
DP arming?
not armed
EDP-N
EDP-R
CAP_Event Report_SMS (Notify&Continue)
CAP_Event Report_SMS (Interrupted)
Terminate relationship
Complete_SMS_ FCI_record
Idle
Waiting_For_ Instructions

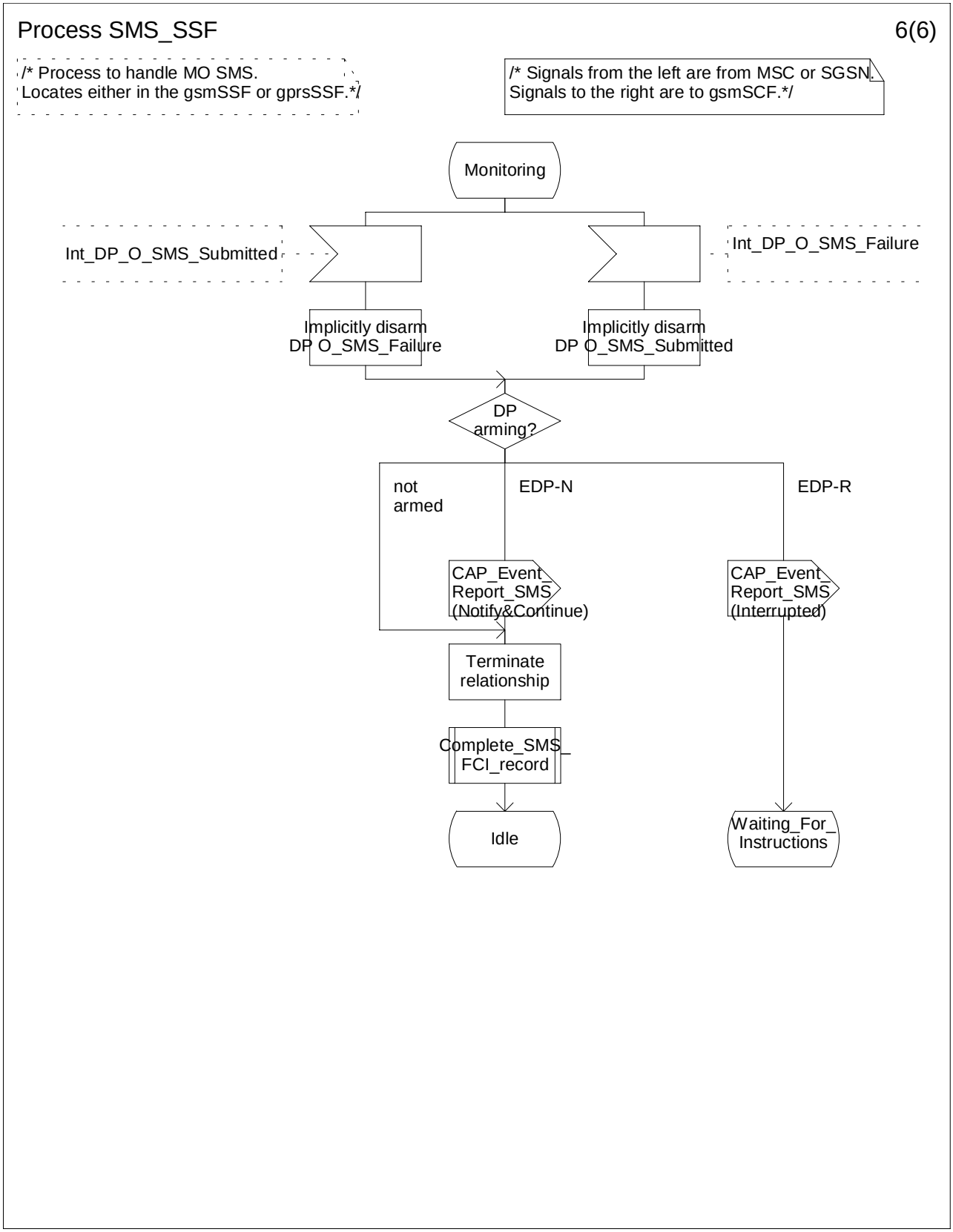
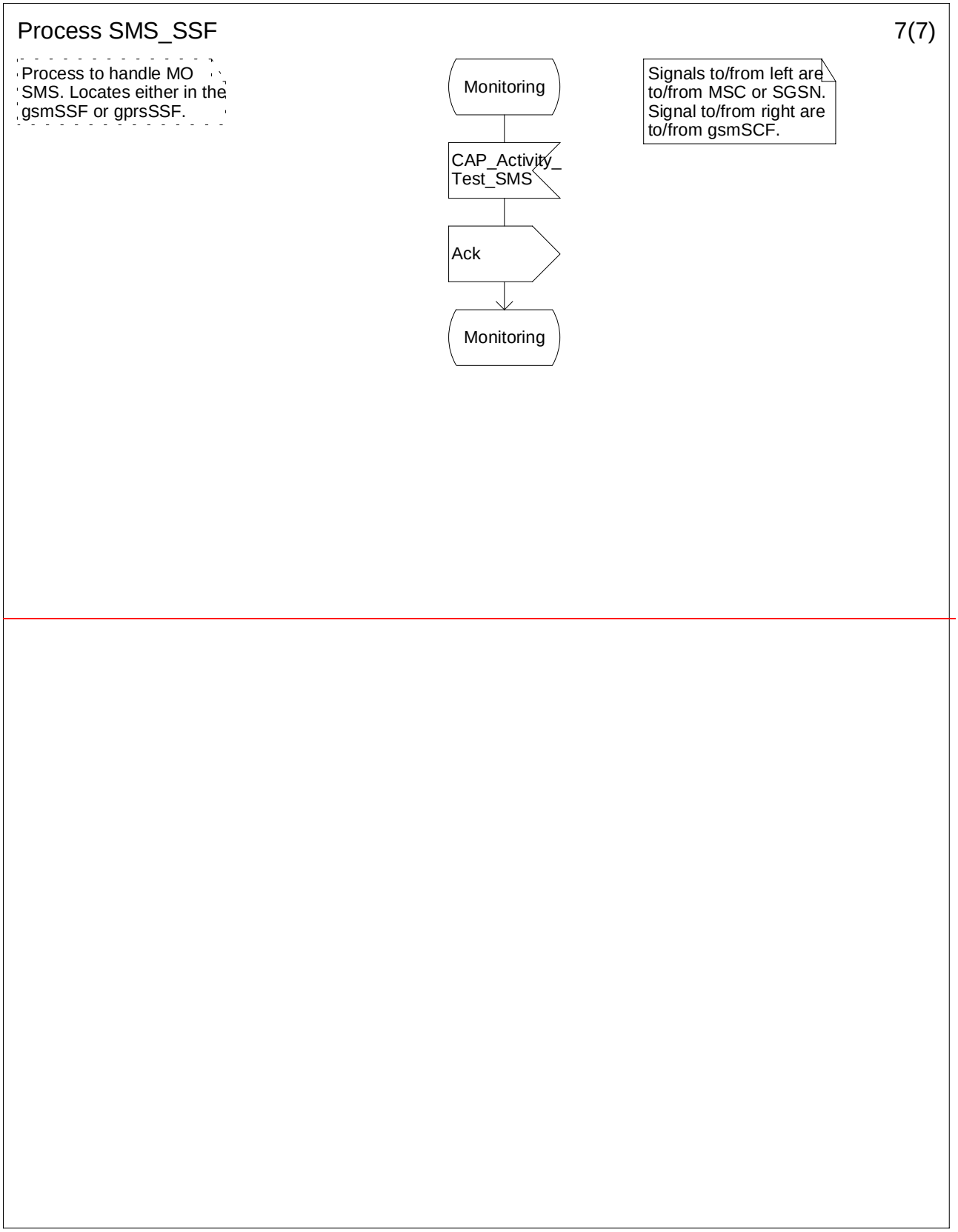


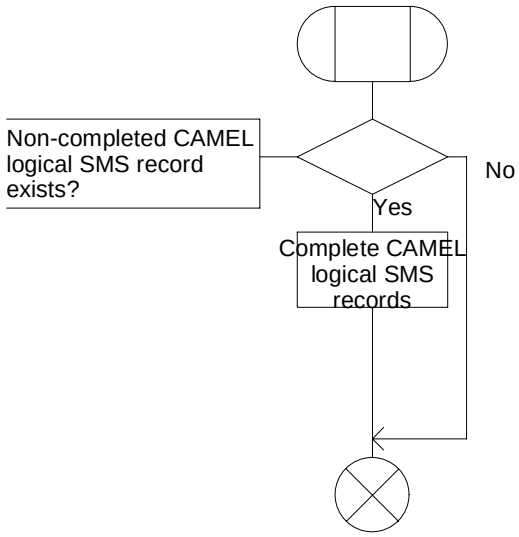
Figure 7.20 f: Process SMS_SSF (sheet 6)



~~Figure 7.10 g: Process SMS_SSF (sheet 7)~~

Procedure Complete_SMS_FCI_record 1(1)

Procedure in the MSC/SGSN (either in gsmSSF or gprsSSF) to complete logical CDRs created by Furnish_Charging_information_SMS operations.



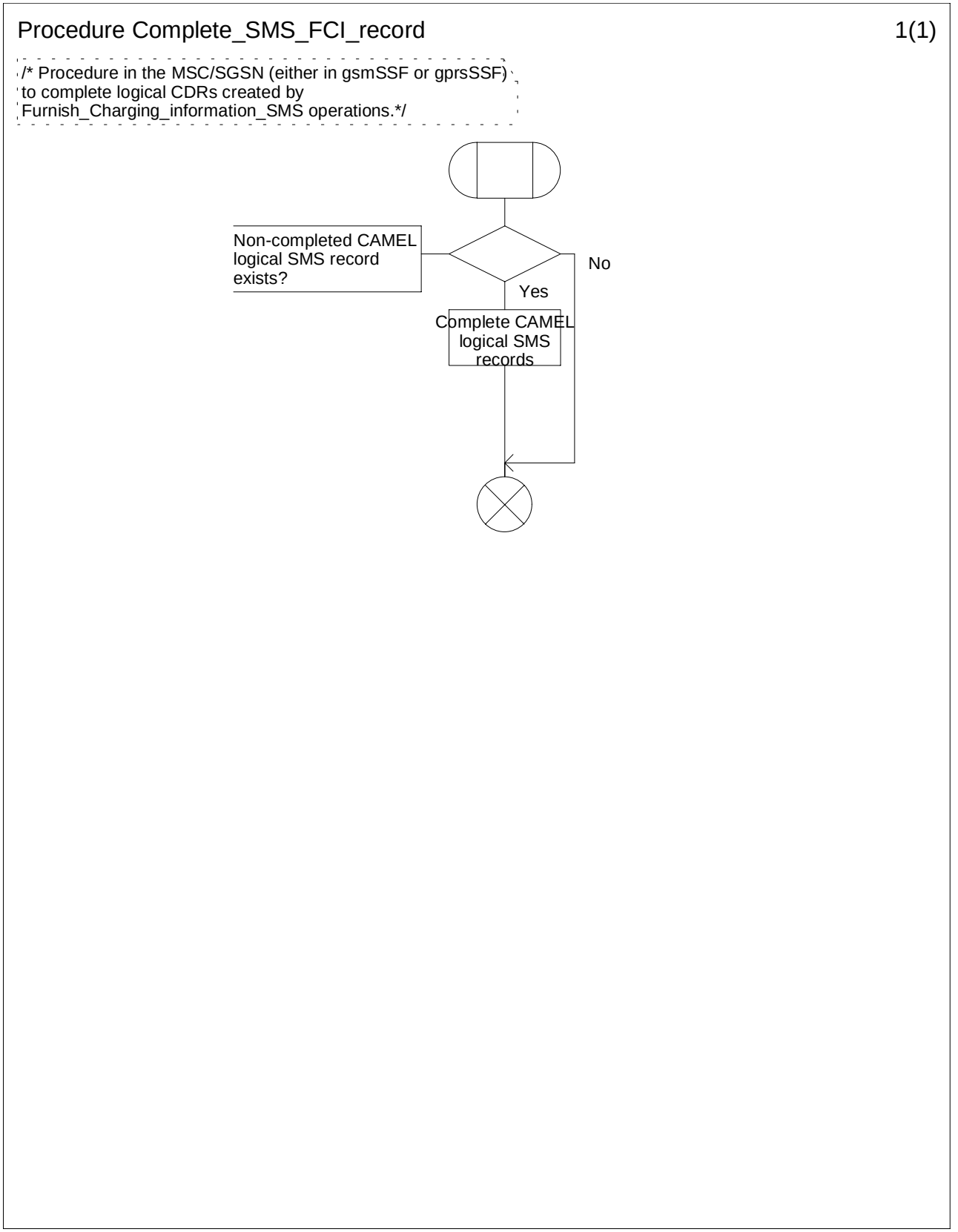


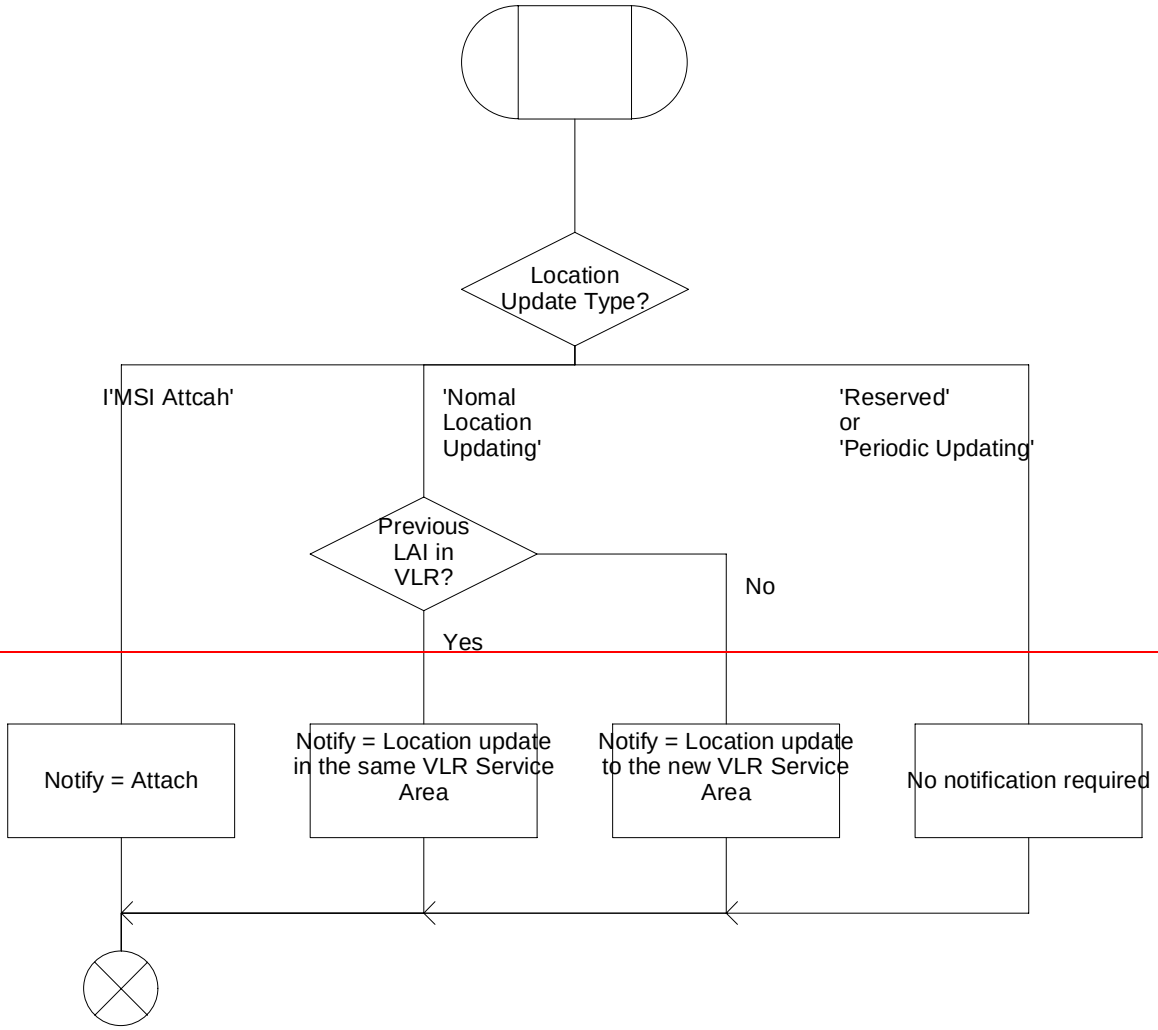
Figure 7.21: Procedure Complete_SMS_FCI_record (sheet 1)

***** Next modified section *****

9 Mobility Management

Procedure Set_Notification_Type 1(1)

Determining the type of Mobility Management event notification to be sent to the gsmSCF



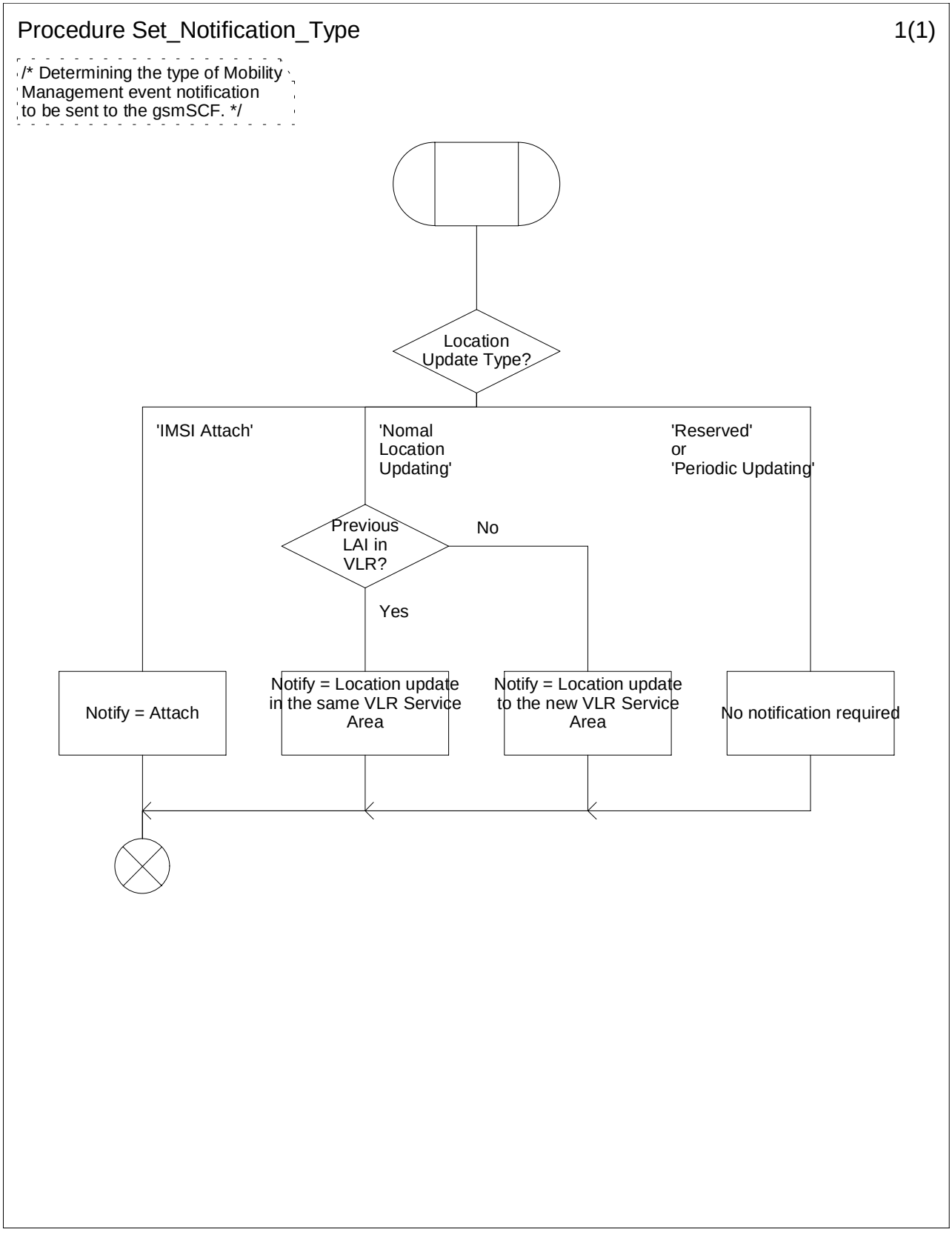


Figure 9.22: Procedure Set_Notification_Type (sheet 1)

9.3.1.2 Procedure Notify_gsmSCF

This procedure is called from the process ‘Update_Location_Area_VLR’ and process ‘Detach_IMSI_VLR’ in 3G TS 23.012 [32].
It is also called from the process ‘Update_Location_VLR’ in 3G TS 29.002 [4].

The calling process passes on the variable ‘Notify’ to the procedure ‘Notify_gsmSCF’. This variable indicates which Mobility Management notification may have to be sent to the gsmSCF.
If this variable has a value NULL, then no notification shall be sent to the gsmSCF.

If a notification may have to be sent to the gsmSCF, then the procedure checks the presence of M-CSI.

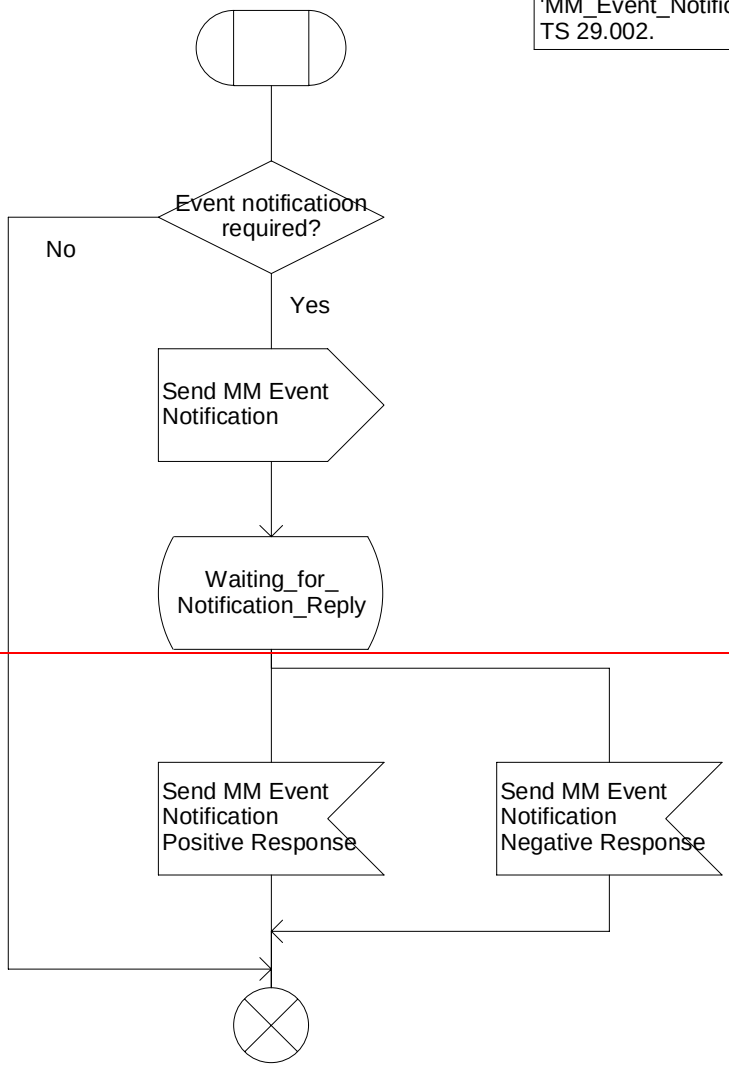
- If M-CSI is present and the Mobility Management event indicated in the variable ‘Notify’ is marked in M-CSI, then a notification shall be sent to the gsmSCF.

- If M-CSI is not present or the Mobility Management event indicated in the variable ‘Notify’ is not marked in M-CSI, then no notification shall be sent to the gsmSCF.

Procedure Notify_gsmSCF 1(1)

Sending a notification to the gsmSCF, if needed.

Signals to/from the right are to/from the process 'MM_Event_Notification' in 3G TS 29.002.



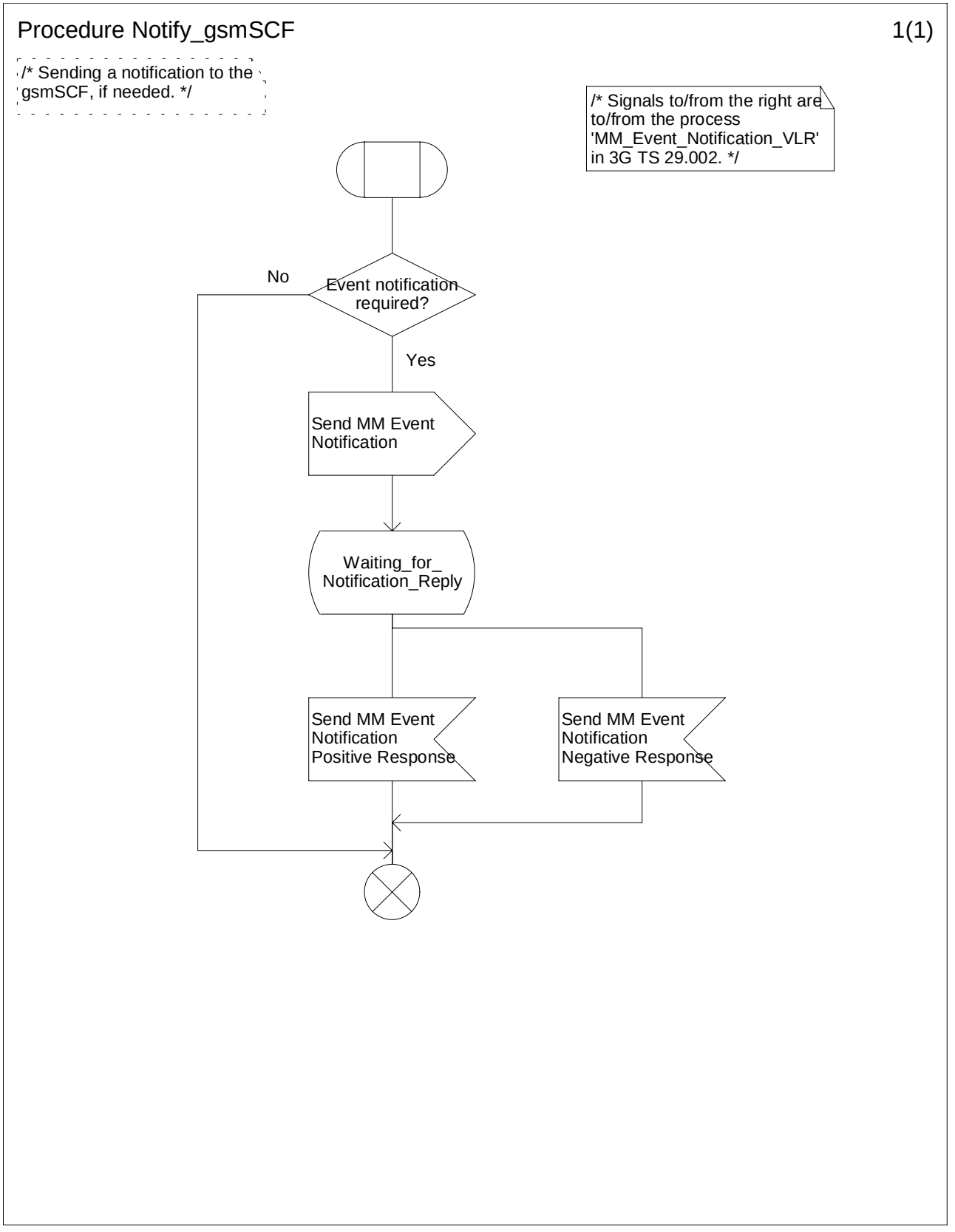
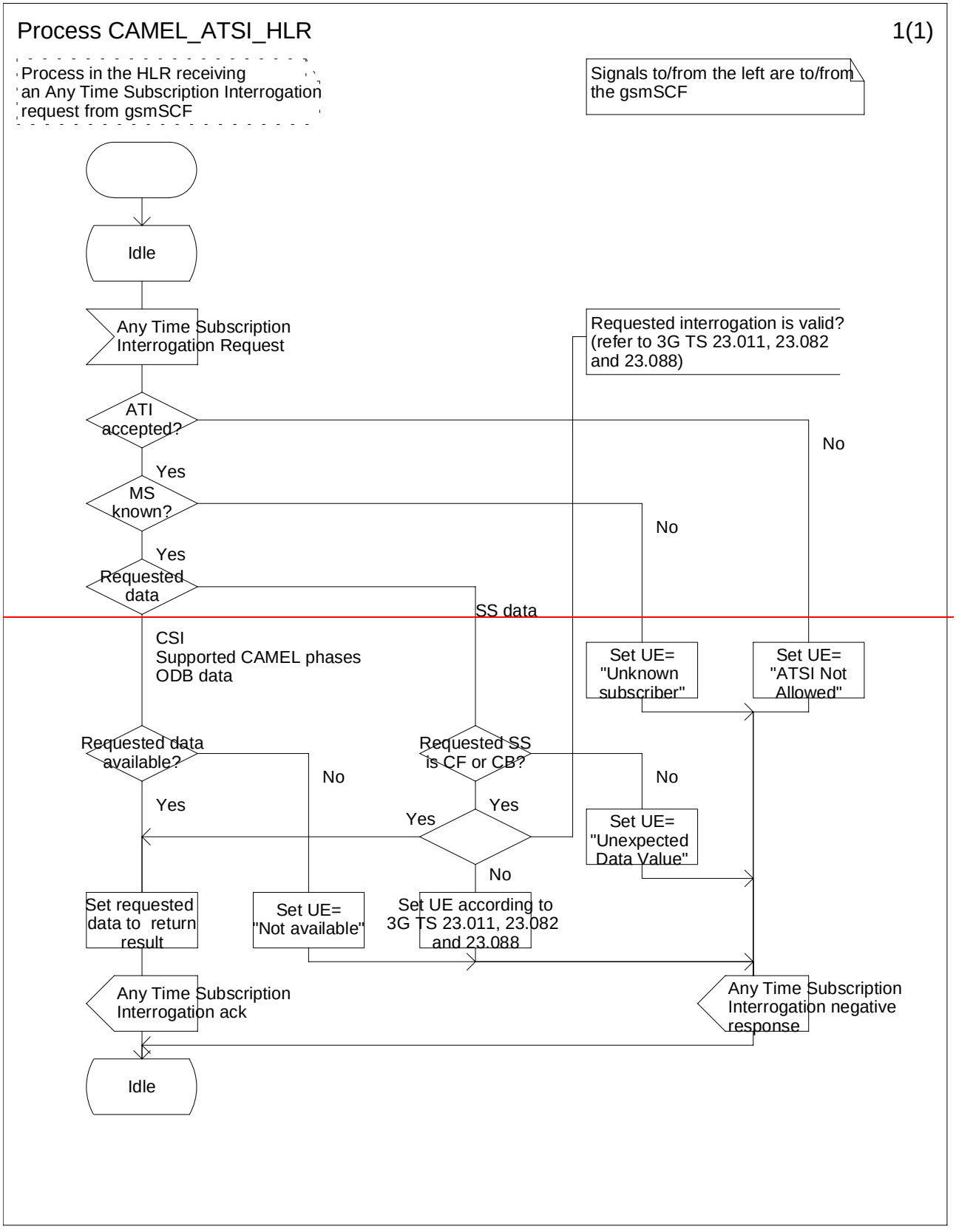


Figure 9.23: Procedure Notify_gsmSCF (sheet 1)

***** Next modified section *****

10 Control and interrogation of subscription data


Process CAMEL_ATSI_HLR
1(1)
Process in the HLR receiving an Any Time Subscription Interrogation request from gsmSCF
Signals to/from the left are to/from the gsmSCF
Idle
Any Time Subscription Interrogation Request
Requested interrogation is valid? (refer to 3G TS 23.011, 23.082 and 23.088)
ATI accepted?
No
Yes
MS known?
No
Yes
Requested data
SS data
CSI
Supported CAMEL phases
ODB data
Set UE= "Unknown subscriber"
Set UE= "ATSI Not Allowed"
Requested data available?
No
Yes
Requested SS is CF or CB?
No
Yes
Yes
Set UE= "Unexpected Data Value"
No
Set requested data to return result
Set UE= "Not available"
Set UE according to 3G TS 23.011, 23.082 and 23.088
Any Time Subscription Interrogation ack
Any Time Subscription Interrogation negative response
Idle

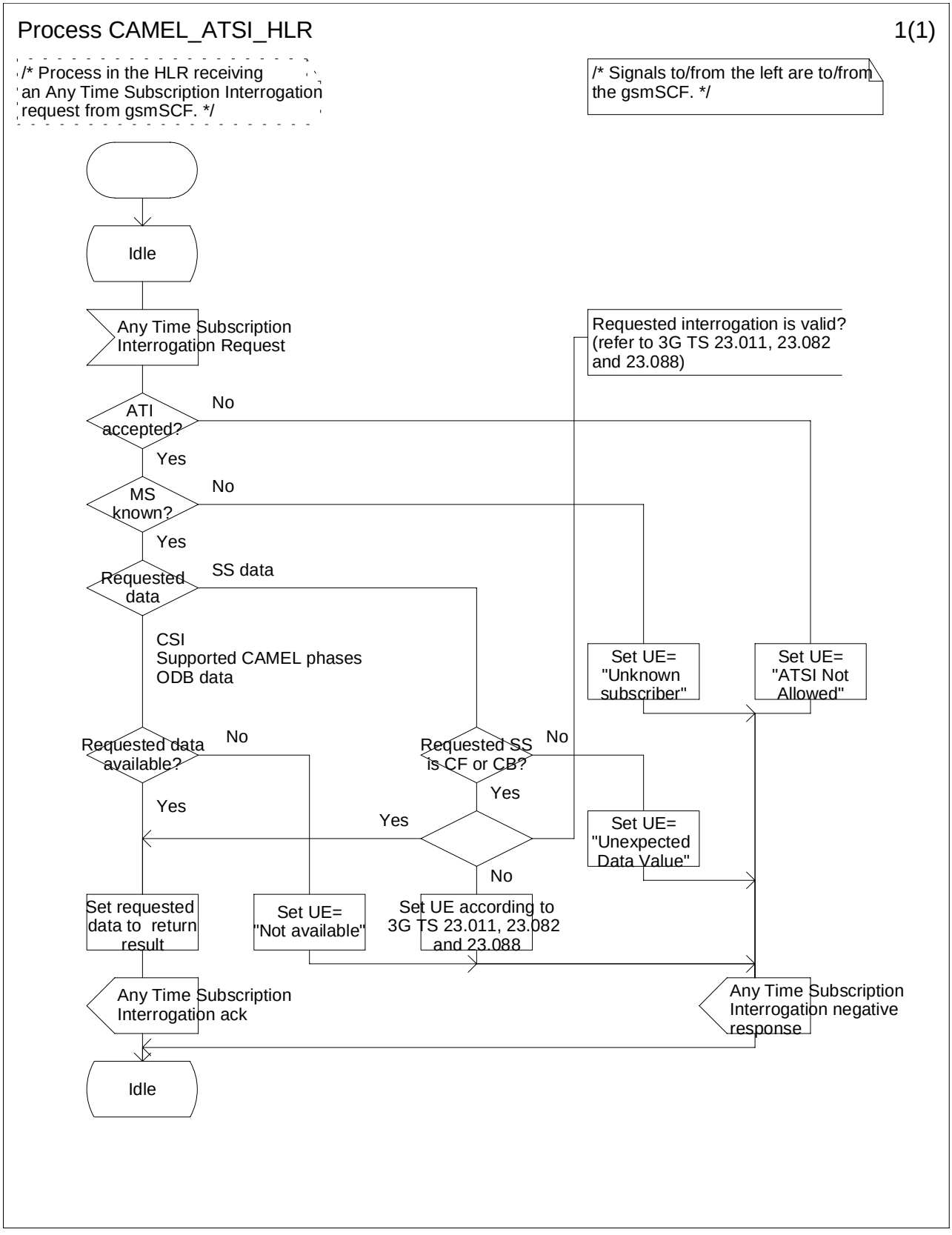
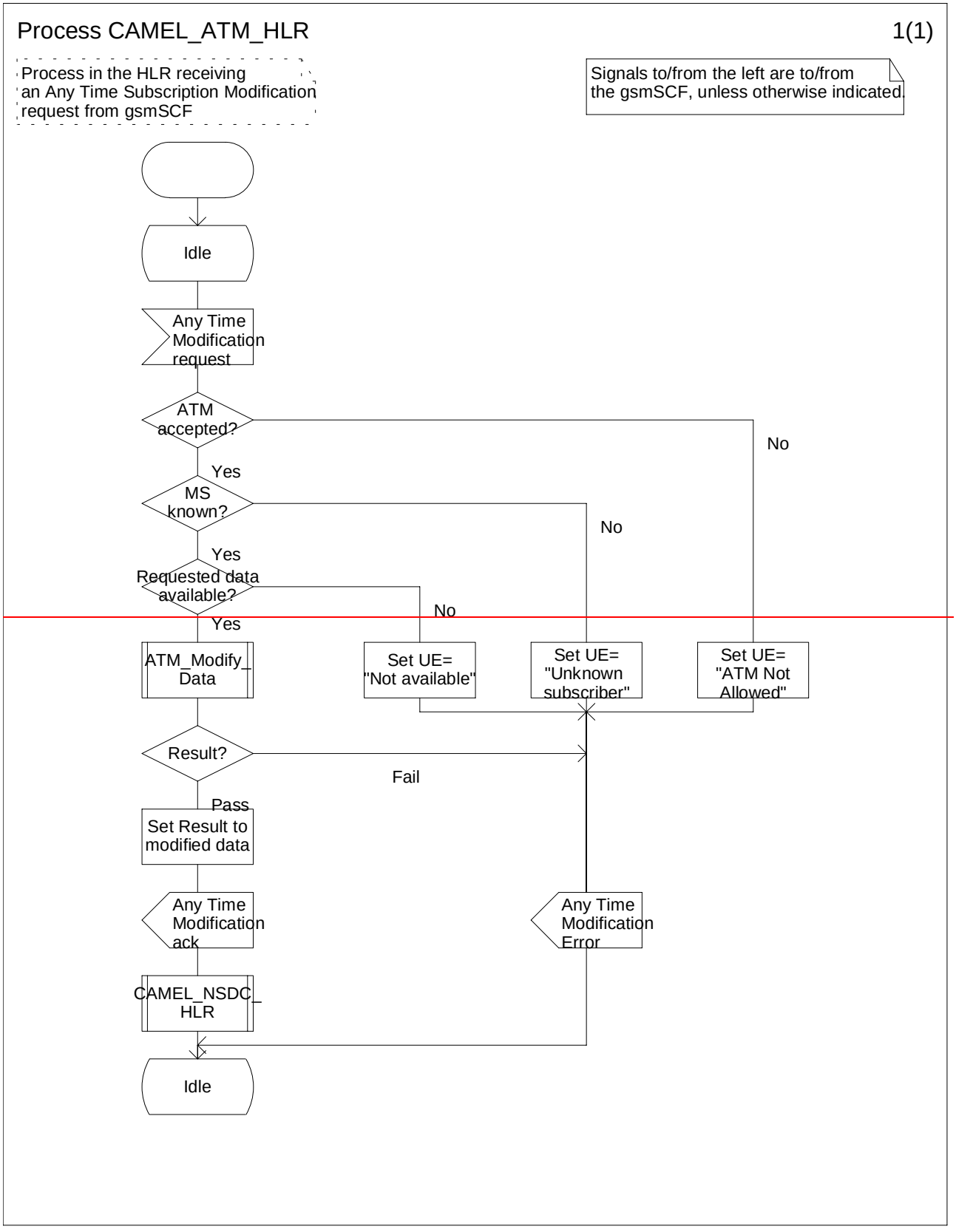


Figure 10.24: Process CAMEL_ATSI_HLR (sheet 1)

***** Next modified section *****


Process CAMEL_ATM_HLR
1(1)
Process in the HLR receiving an Any Time Subscription Modification request from gsmSCF
Signals to/from the left are to/from the gsmSCF, unless otherwise indicated.
Idle
Any Time Modification request
ATM accepted?
No
Yes
MS known?
No
Yes
Requested data available?
No
Yes
ATM_Modify_Data
Set UE= "Not available"
Set UE= "Unknown subscriber"
Set UE= "ATM Not Allowed"
Result?
Fail
Pass
Set Result to modified data
Any Time Modification ack
Any Time Modification Error
CAMEL_NSDC_HLR
Idle

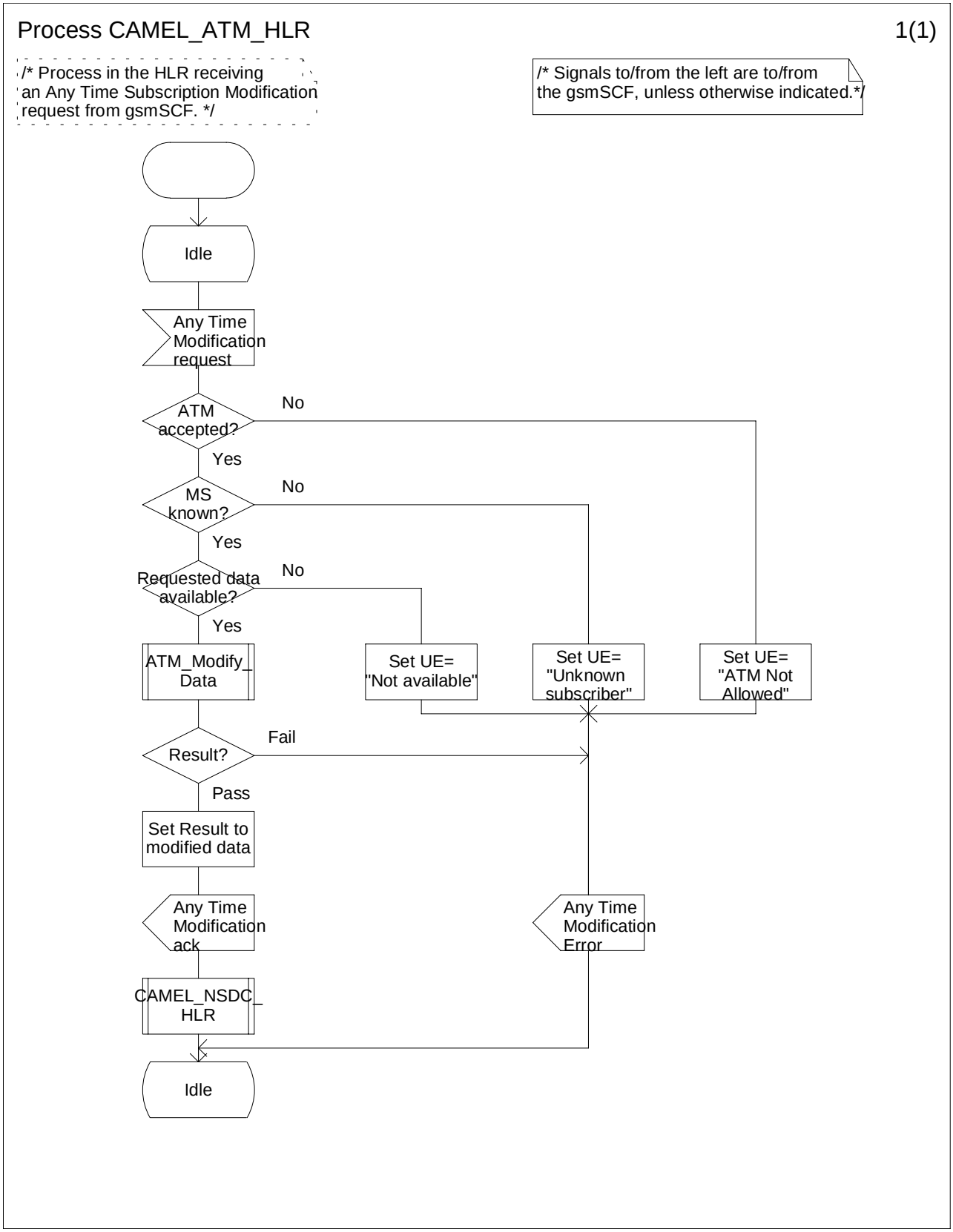
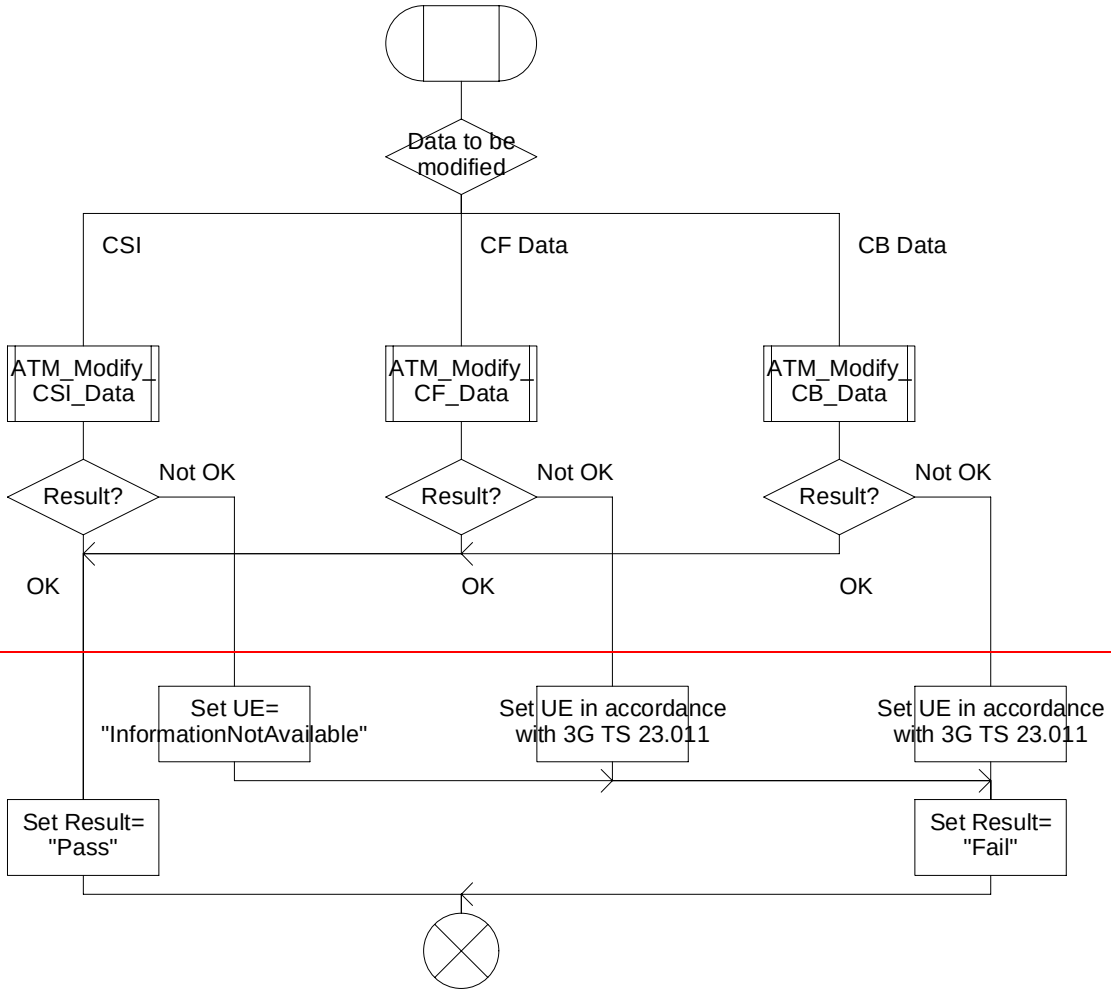


Figure 10.25: Process CAMEL_ATM_HLR (sheet 1)

Procedure ATM_Modify_Data

1(1)

Procedure in the HLR to modify subscriber data as a result of an ATM request



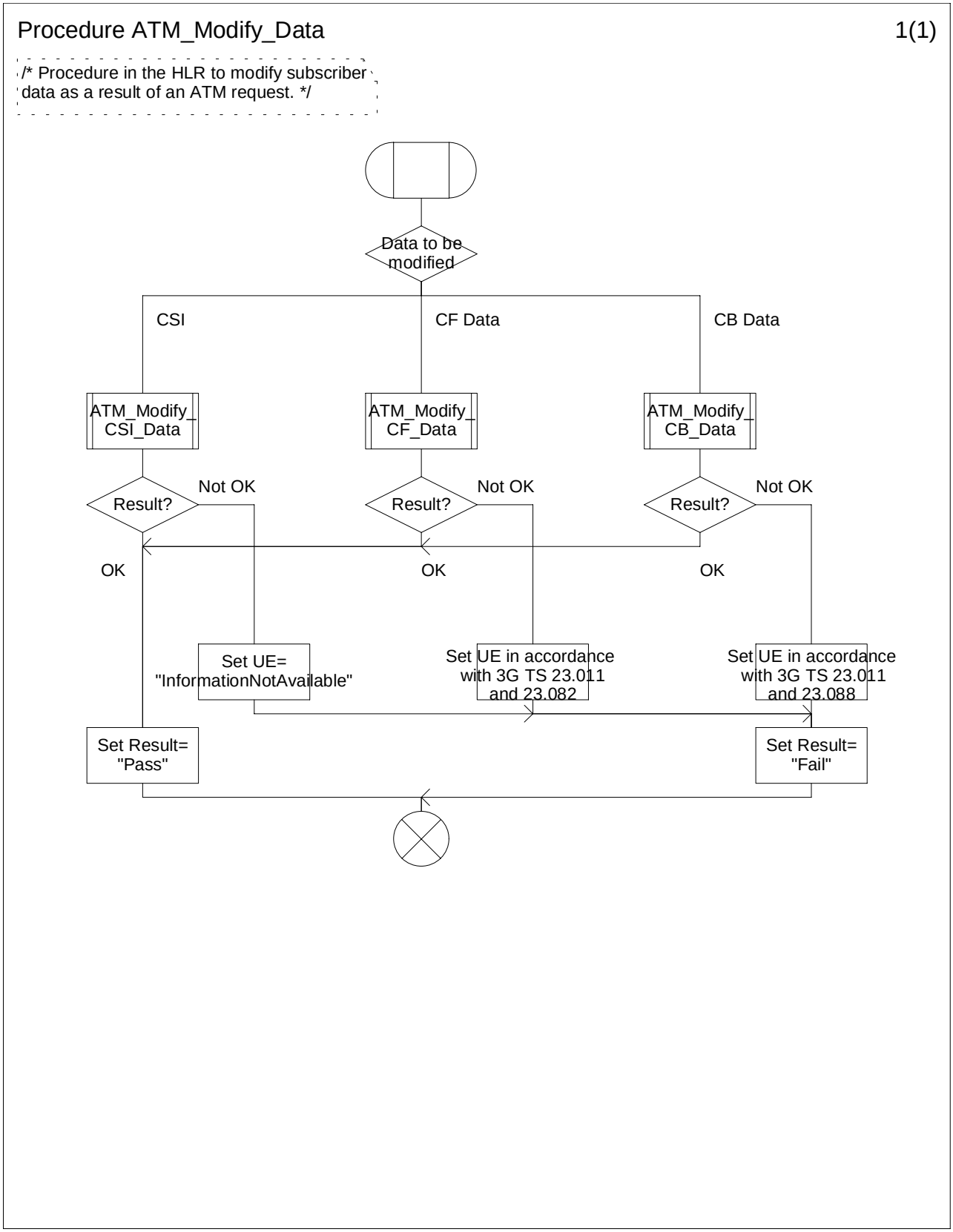
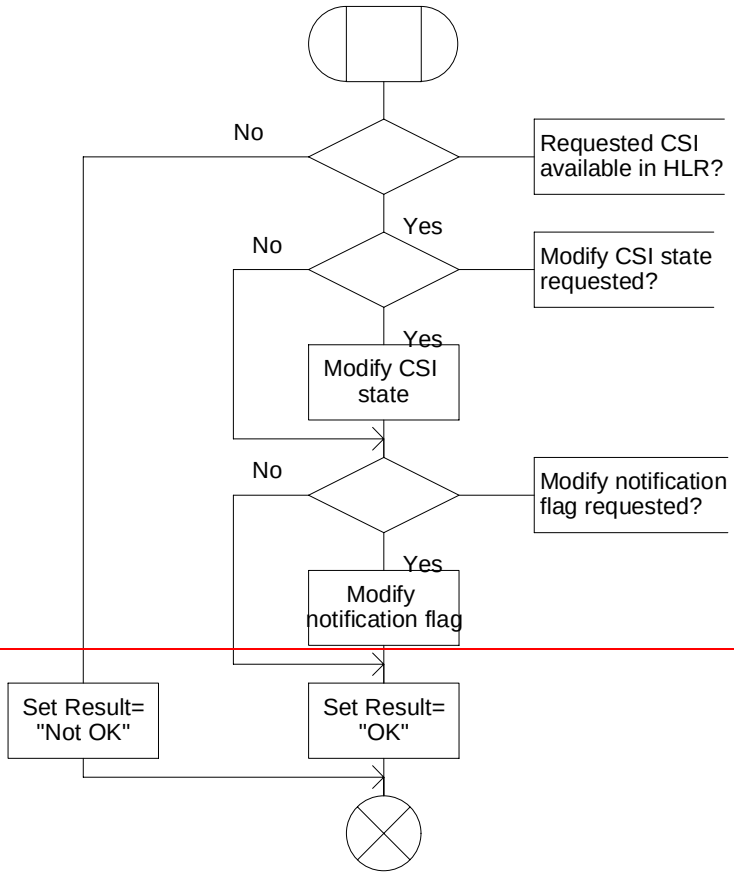


Figure 10.26: Procedure ATM_Modify_Data (sheet 1)

Procedure ATM_Modify_CSI_Data 1(1)

Procedure in the HLR to modify CSI data as a result of an ATM request.



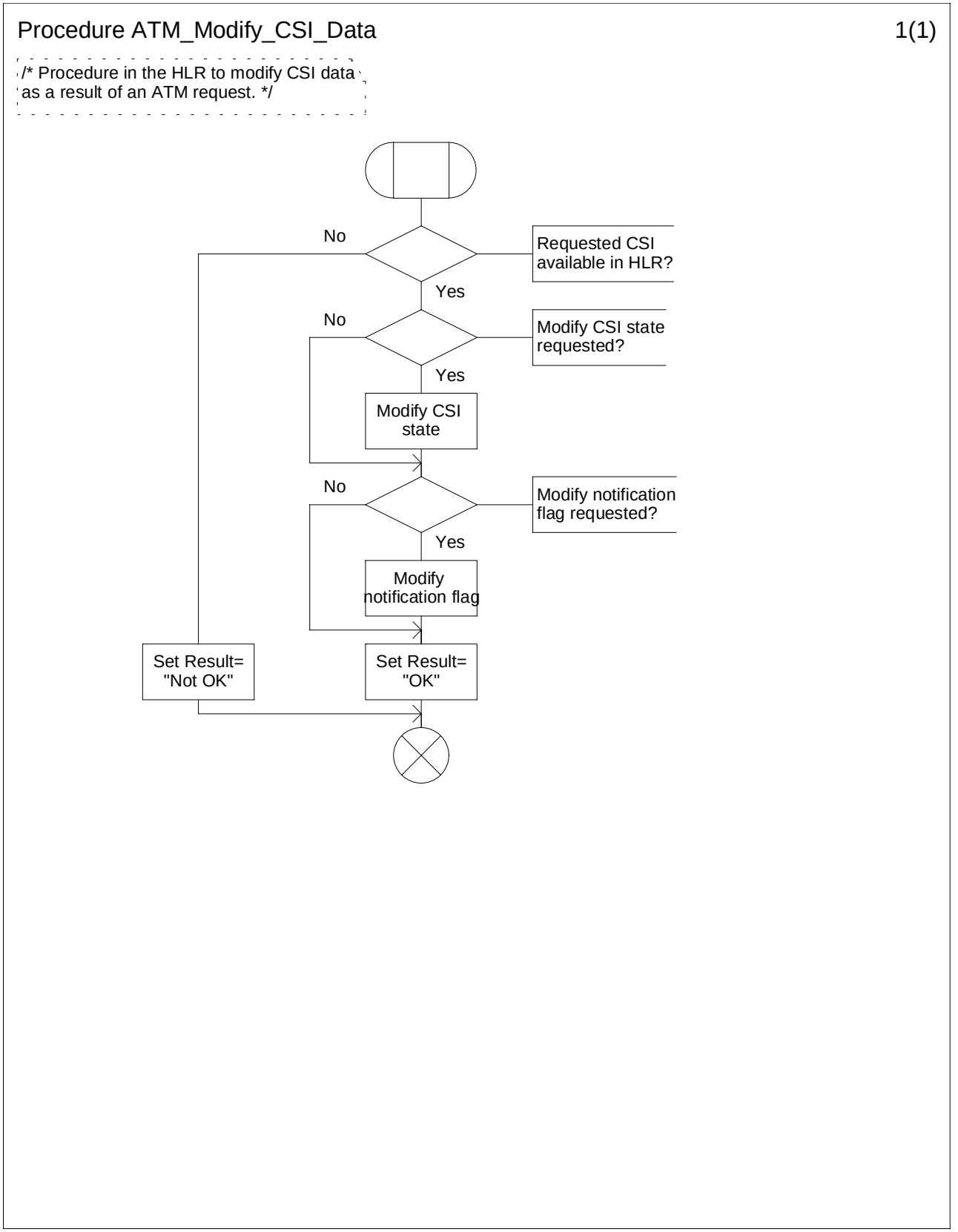


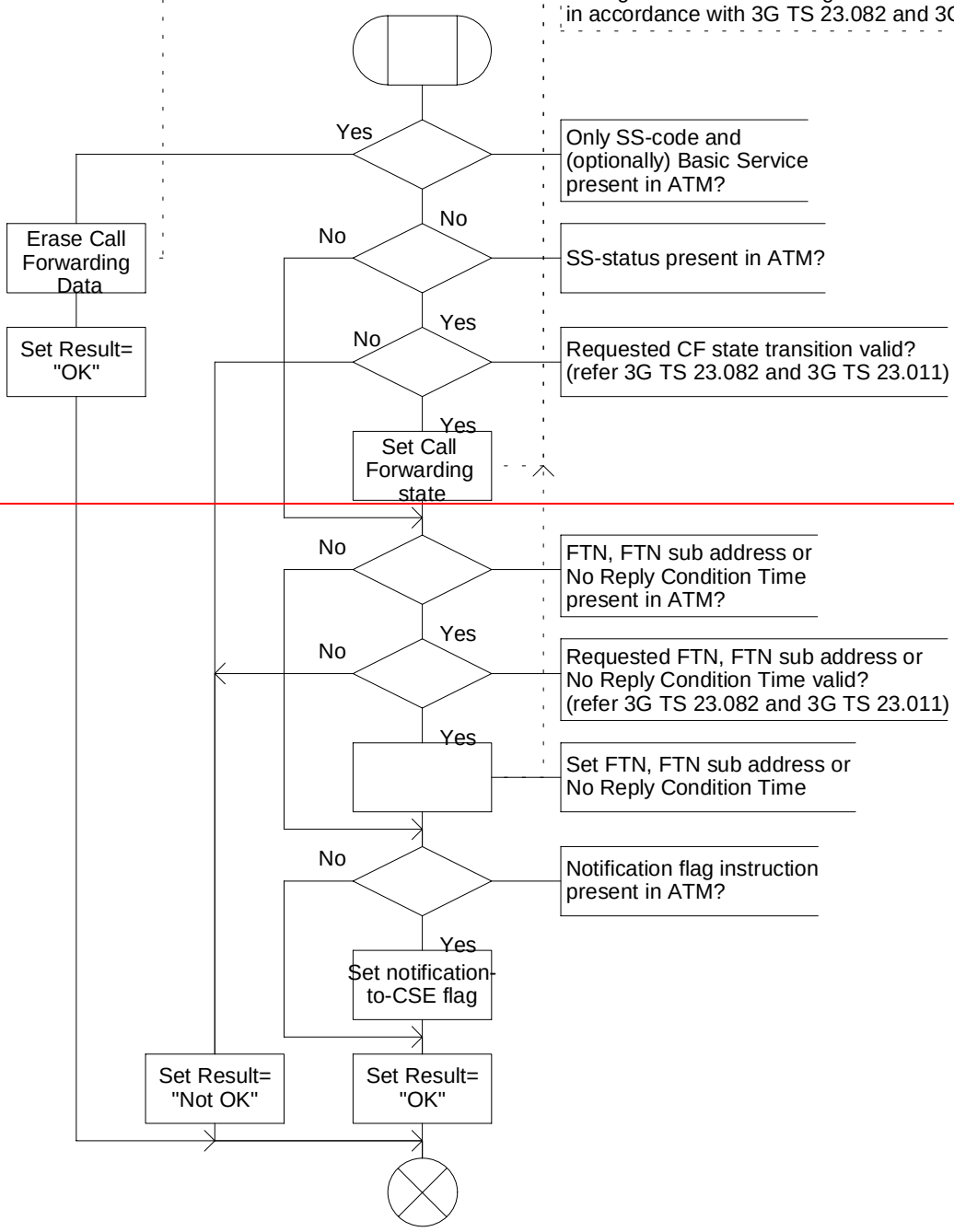
Figure 10.27: Procedure ATM_Modify_CSI_Data (sheet 1)

Procedure ATM_Modify_CF_Data 1(1)

Procedure in the HLR to modify Call Forwarding data, as a result of an ATM request.

Note 1
When ATM contains 'BasicService', then the changes to CF apply to that BasicService only.
When ATM does not contains 'BasicService', then the changes to CF apply to all BasicService.

Note 2
Changes to Call Forwarding data shall be done in accordance with 3G TS 23.082 and 3G TS 23.011.



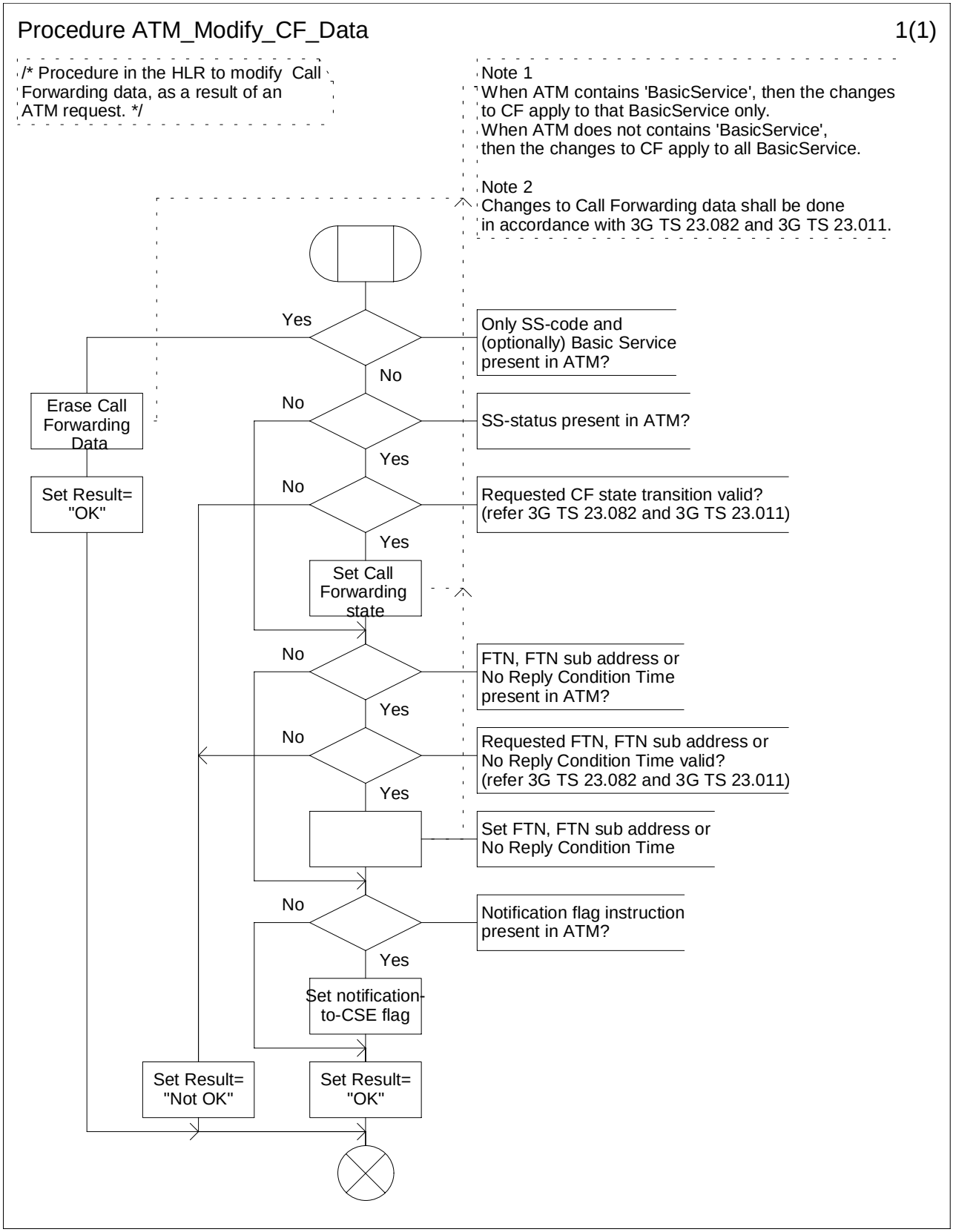
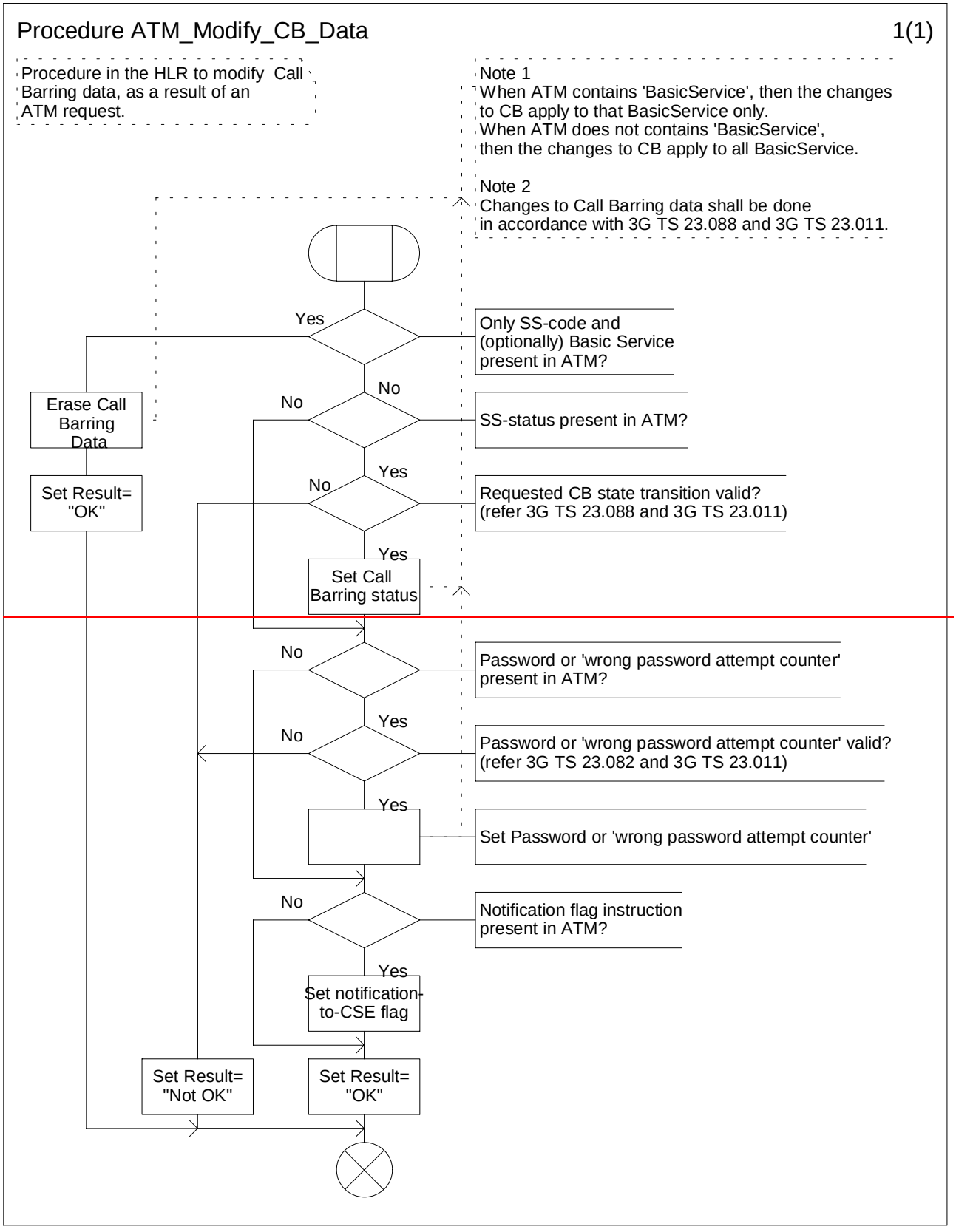


Figure 10.28: Procedure ATM_Modify_CF_Data (sheet 1)


Procedure ATM_Modify_CB_Data
1(1)
Procedure in the HLR to modify Call Barring data, as a result of an ATM request.
Note 1
When ATM contains 'BasicService', then the changes to CB apply to that BasicService only.
When ATM does not contains 'BasicService', then the changes to CB apply to all BasicService.
Note 2
Changes to Call Barring data shall be done in accordance with 3G TS 23.088 and 3G TS 23.011.
Yes
Only SS-code and (optionally) Basic Service present in ATM?
No
Erase Call Barring Data
No
SS-status present in ATM?
Yes
Set Result= "OK"
No
Requested CB state transition valid? (refer 3G TS 23.088 and 3G TS 23.011)
Yes
Set Call Barring status
No
Password or 'wrong password attempt counter' present in ATM?
Yes
No
Password or 'wrong password attempt counter' valid? (refer 3G TS 23.082 and 3G TS 23.011)
Yes
Set Password or 'wrong password attempt counter'
No
Notification flag instruction present in ATM?
Yes
Set notification-to-CSE flag
Set Result= "Not OK"
Set Result= "OK"

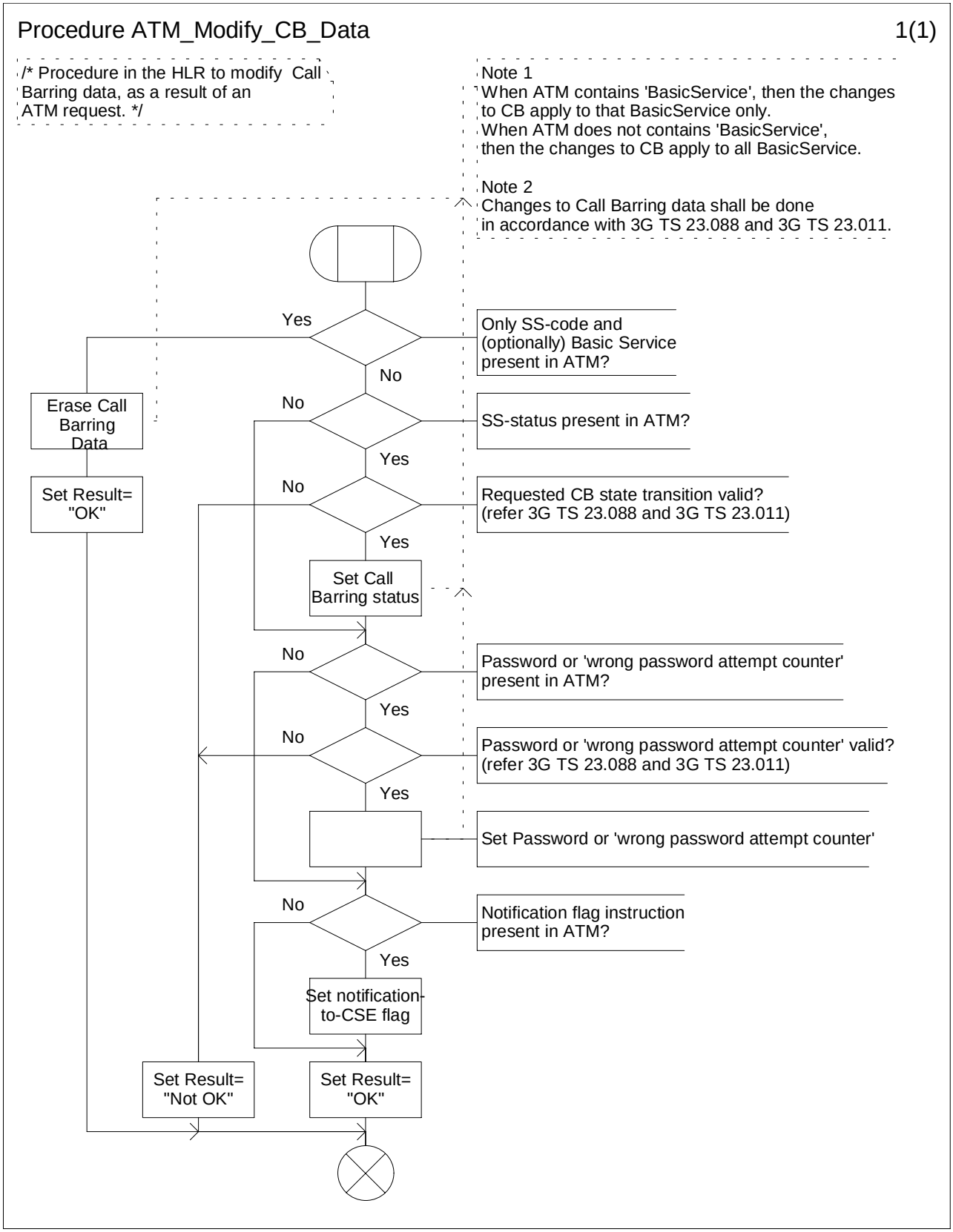
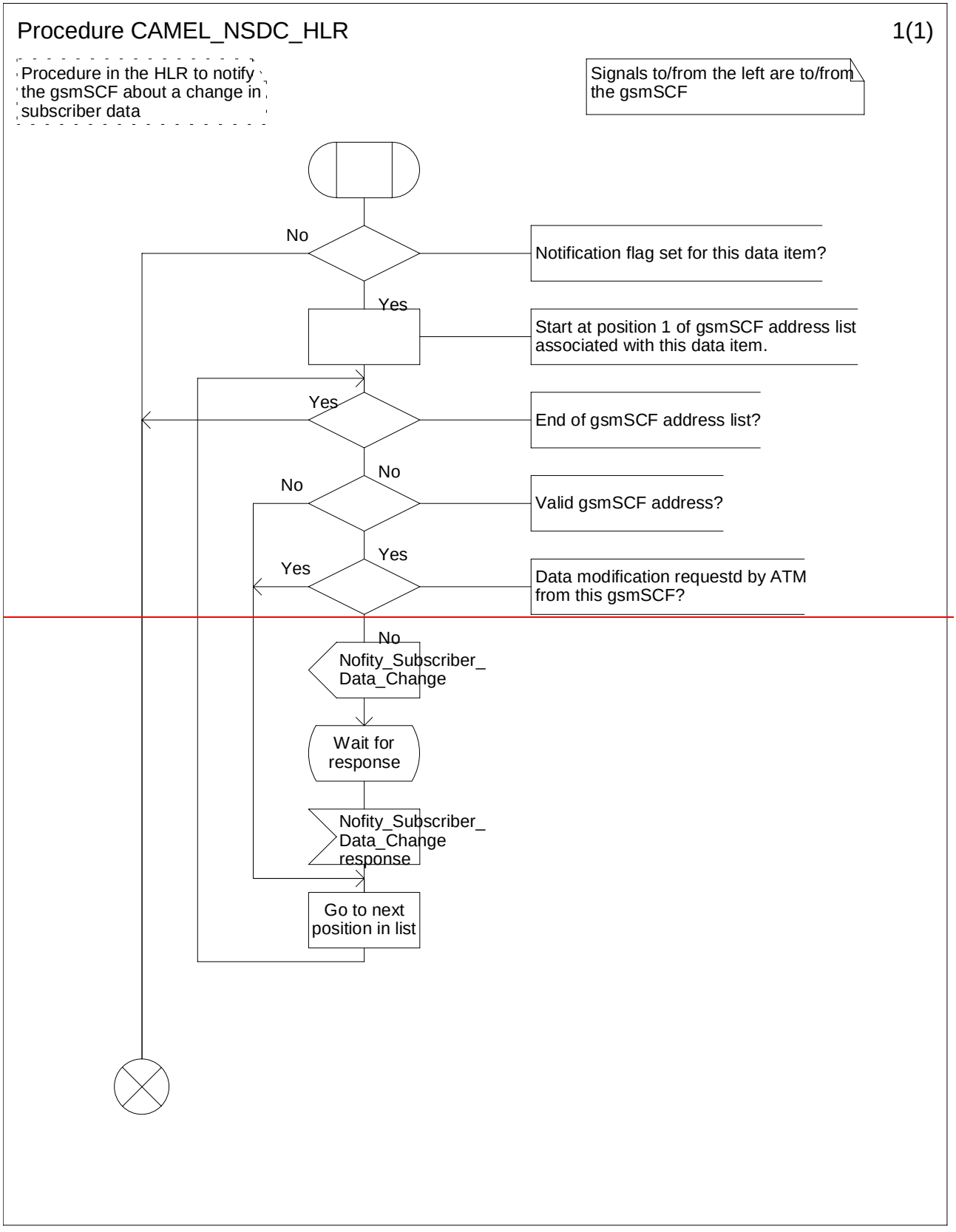


Figure 10.29: Procedure ATM_Modify_CB_Data (sheet 1)

***** Next modified section *****


Procedure CAMEL_NSDC_HLR
1(1)
Procedure in the HLR to notify the gsmSCF about a change in subscriber data
Signals to/from the left are to/from the gsmSCF
No
Notification flag set for this data item?
Yes
Start at position 1 of gsmSCF address list associated with this data item.
Yes
End of gsmSCF address list?
No
No
Valid gsmSCF address?
Yes
Yes
Data modification requestd by ATM from this gsmSCF?
No
Nofity_Subscriber_ Data_Change
Wait for response
Nofity_Subscriber_ Data_Change response
Go to next position in list

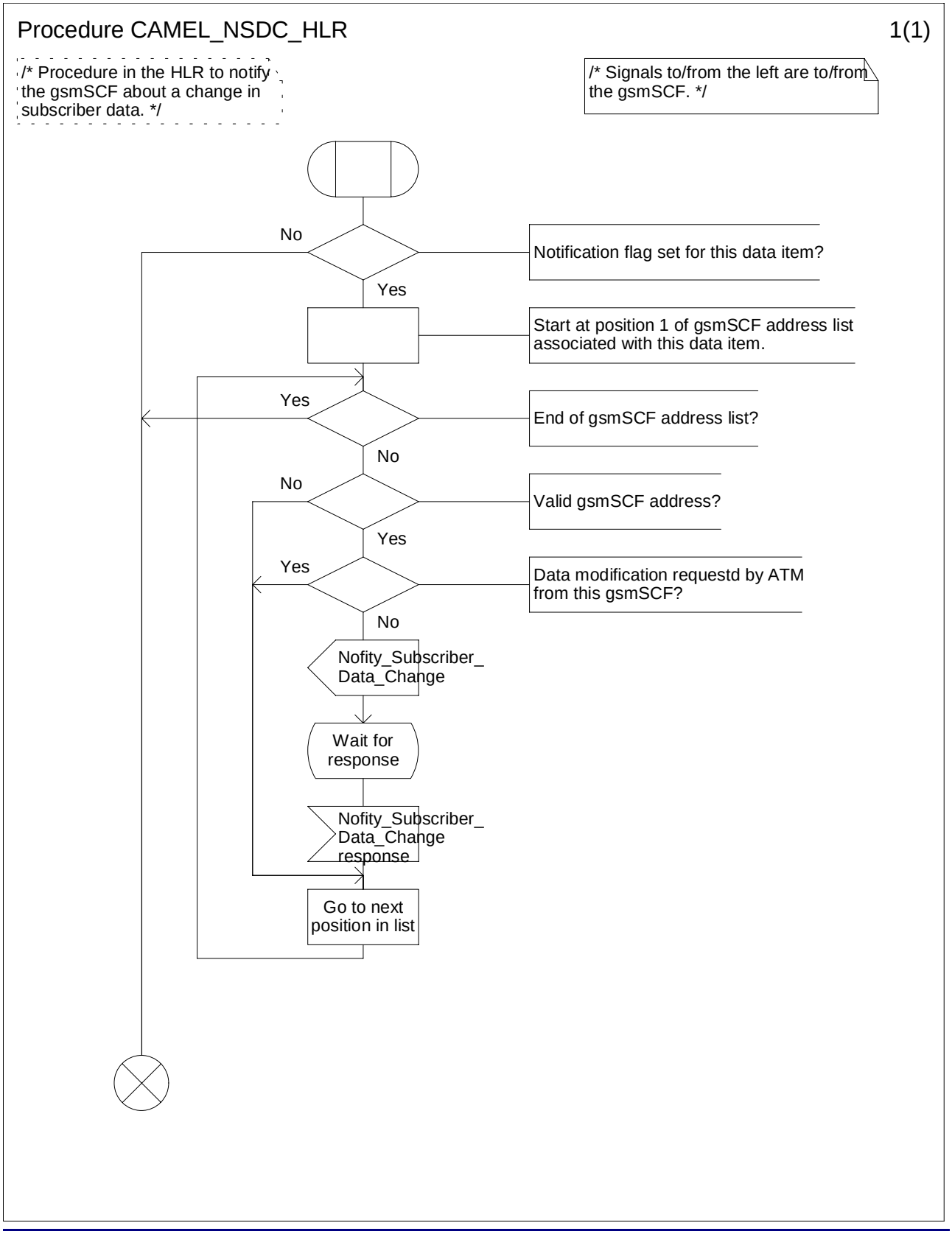
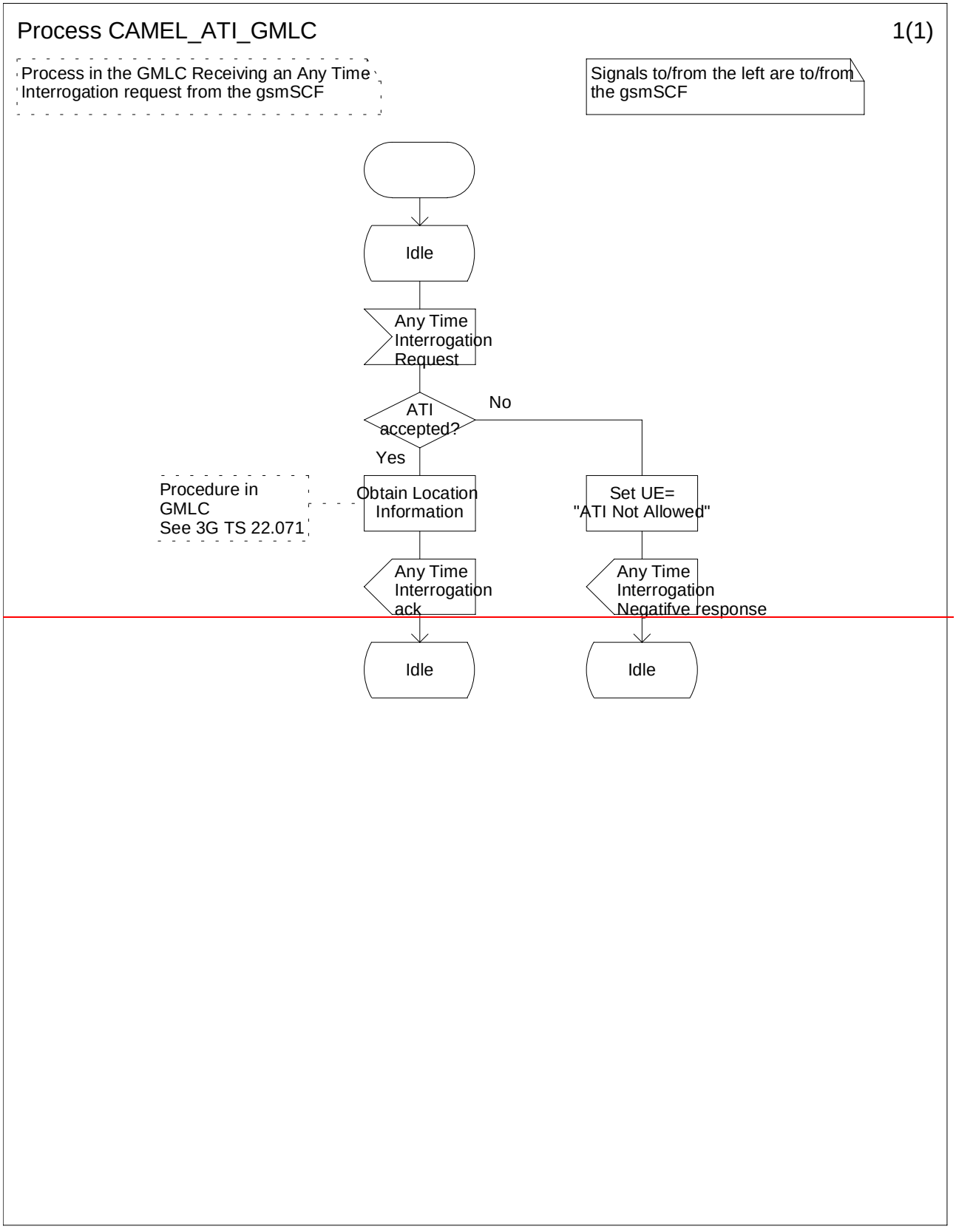


Figure 10.30: Procedure CAMEL_NSDC_HLR (sheet1)

***** Next modified section *****

11 Subscriber Location and State retrieval


Process CAMEL_ATI_GMLC
1(1)
Process in the GMLC Receiving an Any Time Interrogation request from the gsmSCF
Signals to/from the left are to/from the gsmSCF
Idle
Any Time Interrogation Request
ATI accepted?
No
Yes
Procedure in GMLC See 3G TS 22.071
Obtain Location Information
Set UE= "ATI Not Allowed"
Any Time Interrogation ack
Any Time Interrogation Negatifve response
Idle
Idle

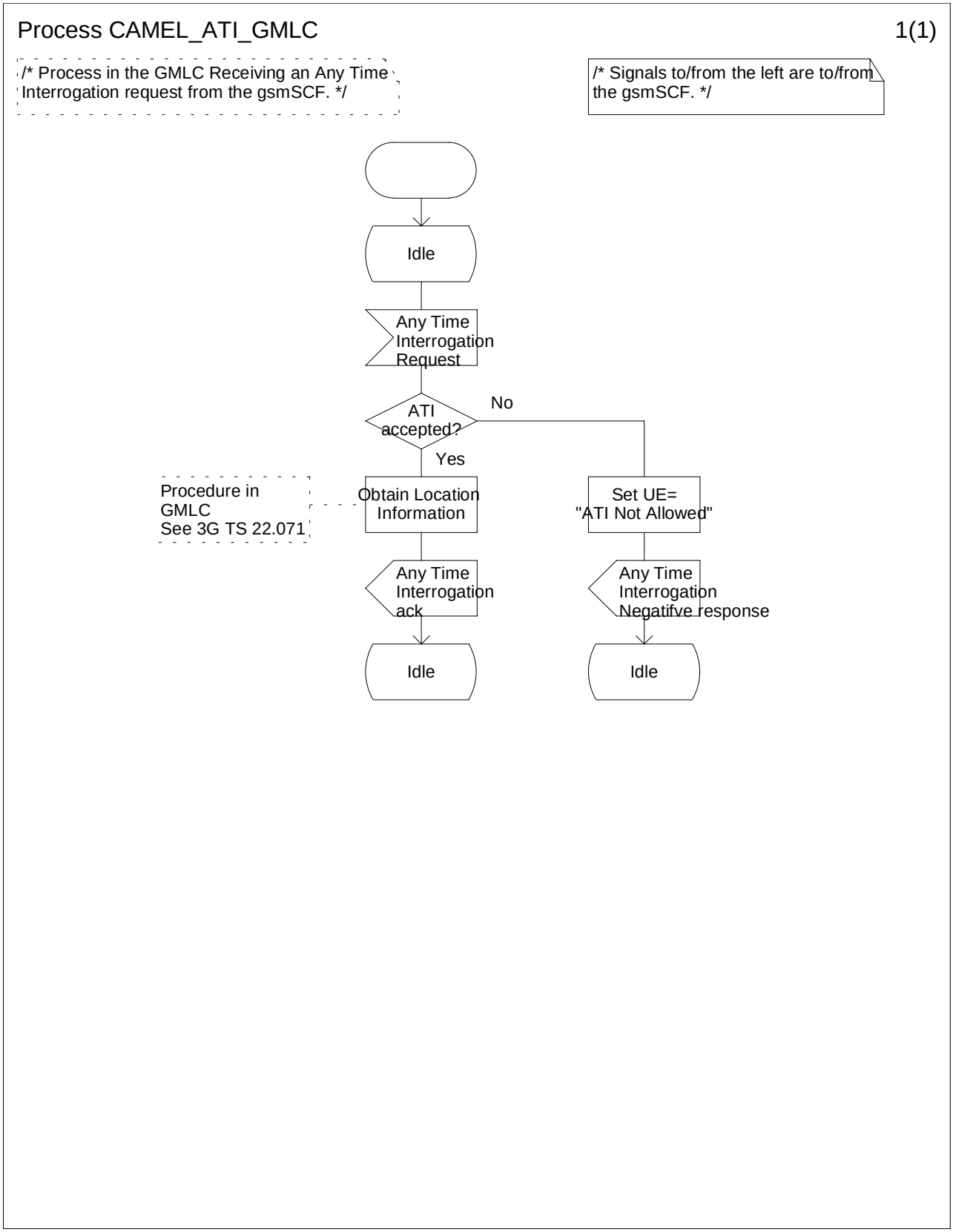


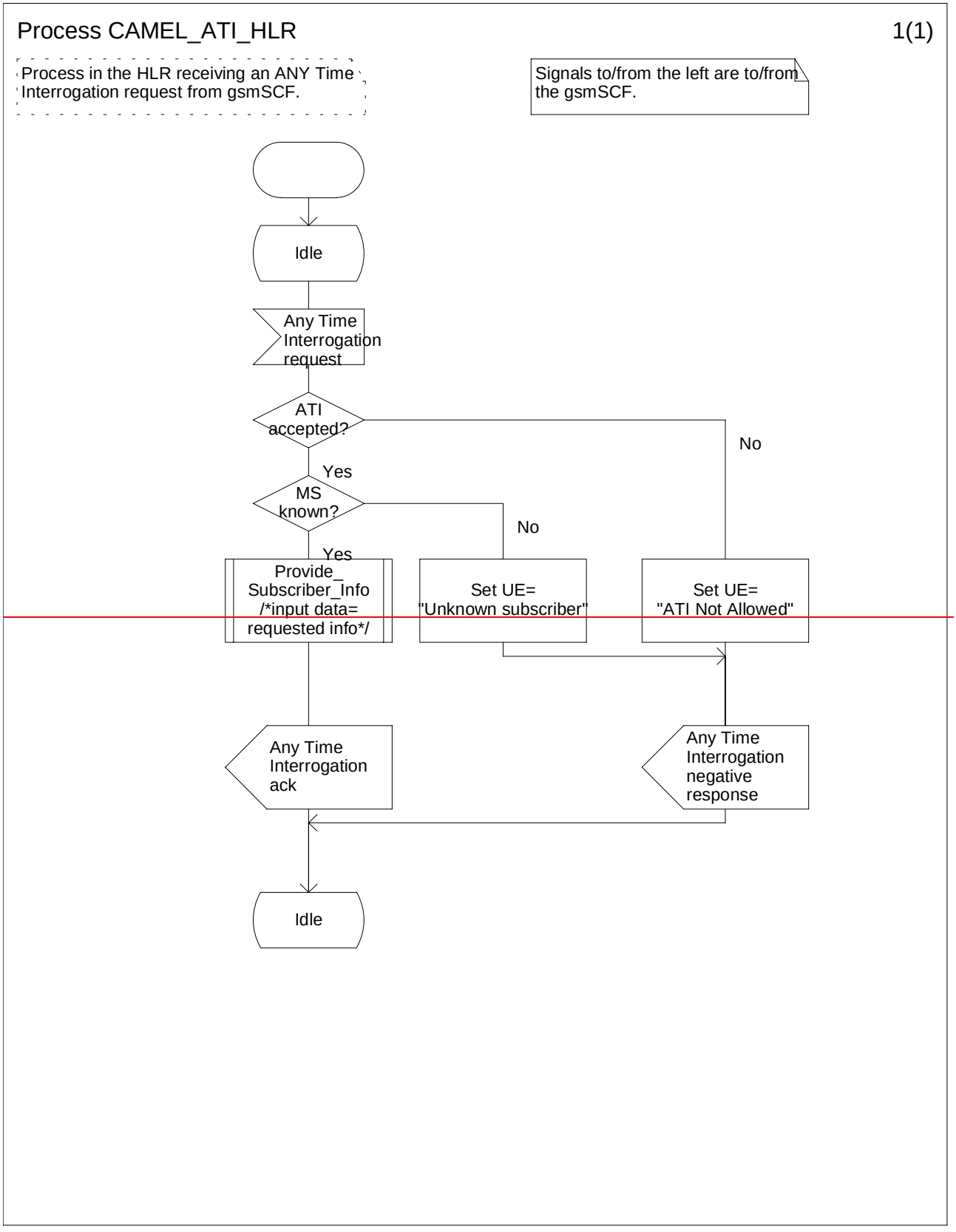
Figure 11.31: Process CAMEL_ATI_GMLC (sheet 1)

11.2.2 Any Time Interrogation

Handling of Any Time Interrogation to obtain Subscriber State and Location Information involves the following process:

- CAMEL_ATI_HLR.

If an OSS needs the Subscriber State and/or the Location Information, the gsmSCF initiates a transaction to the HLR by sending an Any_Time_Interrogation Request. ~~Support for this procedure is a network operator option.~~


Process CAMEL_ATI_HLR
1(1)
Process in the HLR receiving an ANY Time Interrogation request from gsmSCF.
Signals to/from the left are to/from the gsmSCF.
Idle
Any Time Interrogation request
ATI accepted?
No
Yes
MS known?
No
Yes
Provide_ Subscriber_Info /*input data= requested info*/
Set UE= "Unknown subscriber"
Set UE= "ATI Not Allowed"
Any Time Interrogation ack
Any Time Interrogation negative response
Idle

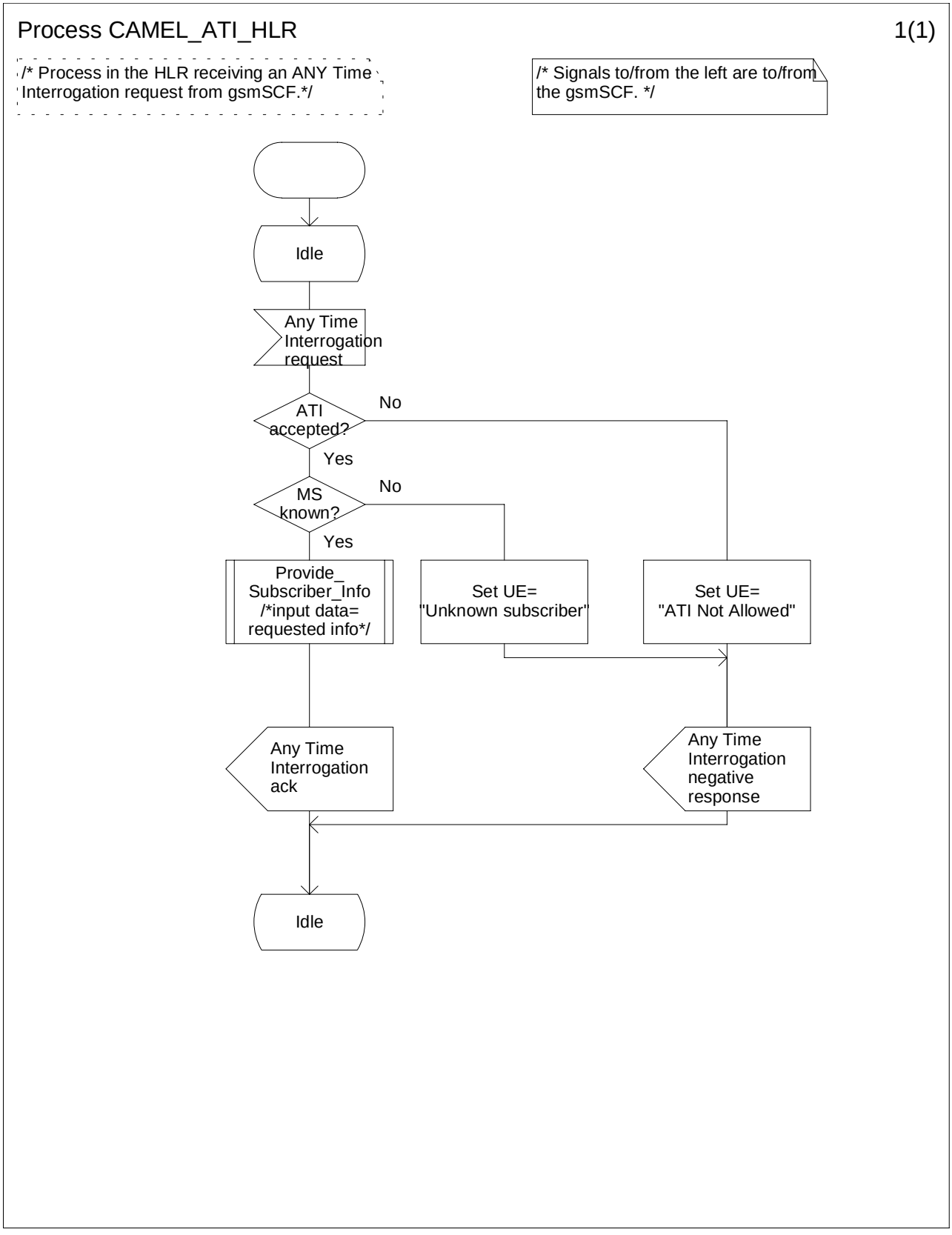


Figure 11.32: Process CAMEL_ATI_HLR (sheet 1)