3GPP TSG_CN **Tdoc NP-000247**
Plenary Meeting #8, Dusseldorf, Germany
21st – 23rd June 2000.

Source: **TSG_N WG 2**

Title: **CRs to 3G Work Item CAMEL phase 3 - Stage 2, Category F (4)**

Agenda item: **6.2.2**

Document for: **APPROVAL**

Introduction:

This document contains **9** CRs on **Work Item CAMEL phase 3,** that have been agreed by **TSG_N WG 2,** and are forwarded to **TSG_N Plenary** meeting #8 for approval.

Tdoc	Spec	CR	Rev	CAT	Rel.	Old Ver	New Ver	Subject
N2-000234	23.078	162	2	F	R99	3.4.0	3.5.0	Various corrections and updates for 23.078
N2-000207	23.078	163	1	F	R99	3.4.0	3.5.0	Specification of segmented GPRS Dialogues
N2-000153	23.078	164		F	R99	3.4.0	3.5.0	Release of PDP context during Waiting for Instructions
N2-000209	23.078	165	1	F	R99	3.4.0	3.5.0	Reset Timer GPRS
N2-000158	23.078	166		F	R99	3.4.0	3.5.0	Correction: Enhancement of the SDL for ATM
N2-000159	23.078	167		F	R99	3.4.0	3.5.0	gprsSSF definition
N2-000160	23.078	168		F	R99	3.4.0	3.5.0	Reference to 3G TS 23.088
N2-000254	23.078	176	2	F	R99	3.4.0	3.5.0	Clarifications on GPRS Concepts
N2-000257	23.078	180	1	F	R99	3.4.0	3.5.0	Addition of Location Information to Initial DP GPRS

Joint SPAN3 & 3GPP TSG CN N2 #10
Rotenburg a.d. Fulda, Hessen, Germany
May 22 - May 26, 2000

N2-000234
Document rev N2-000217
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**	**162r2**	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 #08	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: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: N2 **Date:** 25.05.2000

Subject: Various corrections and updates for 23.078

Work item: CAMEL Phase 3

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

F	Correction	X	**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			Release 99	X
				Release 00	

Reason for change:
Clarification and corrections of various points.
- include the nonCUGCall parameter in the ServiceInteractionIndicatorsTwo
- The NA parameters arre already defined in ITU-T and need not to be defined again.
- Restructure of the CallGapArgument
- Priority of Handling different CallGap criteria are now defined.
- Further corrections.

Clauses affected:

Other specs affected:

Other 3G core specifications		→ List of CRs:	CR 29.078-069r4
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: Call Gapping does not define priorities on the handling in case several GapCriterias exists. Priority rules have to be defined.


help.doc

<--------- double-click here for help and instructions on how to create a CR.

— First modified section —

4.5.11 Handling of North American Carrier Information

The following procedures apply only when the HPLMN of the CAMEL subscriber and either the VPLMN (for a mobile originated or forwarded call) or the IPLMN (for a mobile terminated call or forwarded call) are both North American. A gsmSCF may then provide the gsmSSF with any of the following North American (NA) carrier related information items.

- NA Carrier Information.
- NA Originating Line Information.
- NA Charge Number.

A gsmSSF shall use the received information items both to select any long distance carrier needed for the call and to provide certain information needed by this carrier. Any required information items not received shall be defaulted to those that would normally apply to the call in the absence of an interaction with a gsmSCF.

If any NA information item received from the gsmSCF is found to be invalid, the gsmSSF may either, as an operator option, release the call or behave as if the invalid information item had not been sent.

If the carrier specified in the ~~NA~~ Carrier ~~Information~~ parameter is not supported in the VPLMN or IPLMN, the gsmSSF may either, as an operator option, release the call or substitute for the unsupported carrier a preferred carrier of the VPLMN or IPLMN.

Support of the NA Originating Line Information and ~~NA~~ Charge Number parameters is an operator option in a VPLMN based on roaming agreements with the operators of other PLMNs, A gsmSSF may ignore these items when received from certain or all gsmSCFs located in other PLMNs and replace them with the corresponding default items for an MO, MF, MT or VT call.

4.6 Description of information flows

This clause contains the detailed description of the information flows used by CAMEL.

Each Information Element, IE is marked as Mandatory (M), Conditional (C), Optional (O) or Not applicable (-) for each different traffic case, Mobile Originating call (MO), Mobile Forwarded call (MF), Mobile Terminating call in the GMSC (MT) and Mobile Terminating call in the VMSC (VT). This categorisation is a functional classification, i.e., stage 2 information and not a stage 3 classification to be used for the ASN.1 syntax of the protocol. This distinction between MO, MF, and MT and VT calls is not applicable to all Information Flows.

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

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

Details of errors and exceptions to these rules are specified in are specified in 3G TS 29.078.

4.6.1 gsmSSF to gsmSCF information flows

4.6.1.1 Activity Test ack

4.6.1.1.1 Description

This IF is the response to the Activity Test.

4.6.1.1.2 Information Elements

This IF contains no information elements.

4.6.1.2 Apply Charging Report

4.6.1.2.1 Description

This IF is used by the gsmSSF to report to the gsmSCF the information requested in the Apply Charging IF.

4.6.1.2.2 Information Elements

Information element name	MO	MF	MT	VT	Description
Call Result	M	M	M	M	This IE contains the charging information to be provided by the gsmSSF.

M Mandatory (The IE shall always be sent).

Call Result contains the following information:

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

M Mandatory (The IE shall always be sent).

Time Duration Charging Result contains the following information:

Information element name	MO	MF	MT	VT	Description
Time Information	M	M	M	M	This IE is a choice between Time if No Tariff Switch and Time if Tariff Switch.
Party To Charge	M	M	M	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	M	M	M	This IE indicates whether the call is active or not.
Call Released at Tcp Expiry	C	C	C	C	This element is an indication that the gsmSSF 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 gsmSSF has released the call (because 'ReleaseIfExceeded' was present in ACH operation). In all other circumstances, this element shall be absent.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

Time Information contains one of the following information:

Information element name	MO	MF	MT	VT	Description
Time If No Tariff Switch	C	C	C	C	This IE will be present if no 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.
Time If Tariff Switch	C	C	C	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.

C Conditional (The IE shall be sent, if available).

4.6.1.3 Call Information Report

4.6.1.3.1 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.

4.6.1.3.2 Information Elements

Information element name	MO	MF	MT	VT	Description
Requested Information List	M	M	M	M	This IE specifies a list of Requested information Values which are requested.
Leg ID	M	M	M	M	This IE indicates the party in the call for which information shall be collected. When absent, it indicates the 'outgoing' leg created with Connect, Continue or Continue With Argument.

M Mandatory (The IE shall always be sent).

4.6.1.4 Event Report BCSM

4.6.1.4.1 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.

4.6.1.4.2 Information Elements

The following information elements are required:

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

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

Event Specific Information BCSM contains the following information for the O Answer and T Answer cases:

Information element name	MO	MF	MT	VT	Description
Destination address	M	M	M	M	This IE specifies the destination address for the call leg.
OR	-	C	C	-	This IE indicates that the call was subject to basic Optimal Routeing as specified in 3G TS 23.079 [36].
Forwarded call	-	M	C	C	This IE indicates that the call has been subject to GSM call forwarding.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent if its value is True, otherwise it shall not be sent).

- Not applicable.

4.6.1.5 Initial DP

4.6.1.5.1 Description

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

4.6.1.5.2 Information Elements

The following information elements are required:

Information element name	MO	MF	MT	VT	Description
Additional Calling Party Number	-	C	C	C	The calling party number provided by the access signalling system of the calling user.
Bearer Capability	M	C	C	C	This IE indicates the type of the bearer capability connection to the user.
Called Party Number	-	M	M	M	This IE contains the number used to identify the called party in the forward direction. For the VT calls this is the MSISDN received in the Provide Roaming Number; if the MSISDN is not available, the basic MSISDN is used.
Called Party BCD Number	M	-	-	-	This IE contains the number used to identify the called party in the forward direction. The number contained in this IE shall be identical to the number received over the access network. It may e.g. include service selection information, such as ∗ and # digits, or carrier selection information dialled by the subscriber.
Calling Party Number	M	C	C	C	This IE carries the calling party number to identify the calling party or the origin of the call.
Calling Partys Category	M	C	C	C	Indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).
CallGap Encountered	C	C	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.

Information element name	MO	MF	MT	VT	Description
Additional Calling Party Number	-	C	C	C	The calling party number provided by the access signalling system of the calling user.
Call Reference Number	M	M	M	M	This IE may be used by the gsmSCF for inclusion in a network optional gsmSCF call record. It has to be coupled with the identity of the MSC which allocated it in order to define unambiguously the identity of the call. For MO calls, the call reference number is set by the serving VMSC and included in the MO call record. For MT calls, the call reference number is set by the GMSC and included in the RCF call record in the GMSC and in the MT call record in the terminating MSC. For VT calls, the call reference number is set by the GMSC and included in the RCF call record in the GMSC and in the MT call record in the terminating MSC. For CF calls, the call reference number is set by the GMSC and included in the CF record in the forwarding MSC.
Cause	C	C	C	C	This IE indicates the cause specific to the armed BCSM DP event. This IE is applicable to DP Route_Select_Failure and DP T_Busy. The cause may be used by the SCF to decide about the further handling of the call.
Event Type BCSM	M	M	M	M	This IE indicates the armed BCSM DP event, resulting in the Initial DP IF.
Ext-Basic Service Code	C	C	C	C	This IE indicates the type of basic service i.e., teleservice or bearer service.
High Layer Compatibility	C	C	C	C	This IE indicates the type of the high layer compatibility, which will be used to determine the ISDN-teleservice of a connected ISDN terminal.
IMSI	M	M	M	M	This IE identifies the mobile subscriber.
IP SSP Capabilities	C	C	C	C	This IE indicates which SRF resources are supported within the gsmSSF and are available. If this IE is absent, this indicates that no gsmSRF is attached and available.
Location Information	M	-	C	M	This IE is described in the next table.
Location Number	M	C	C	C	For mobile originated calls this IE represents the location of the calling party. For all other call scenarios this IE contains the location number received in incoming ISUP signalling.
MSC Address	M	M	M	M	For MO calls, the MSC Address carries the international E.164 address of the serving VMSC. For MT calls, the MSC Address carries the international E.164 address of the GMSC. For VT calls, the MSC Address carries the international E.164 address of the serving VMSC. For CF calls, the MSC Address carries the international E.164 address of the forwarding MSC.
GMSC Address	-	M	-	M	For CF calls, the GMSC Address carries the international E.164 address of the GMSC. For VT calls, the GMSC Address carries the international E.164 address of the GMSC.

Information element name	MO	MF	MT	VT	Description
Additional Calling Party Number	-	C	C	C	The calling party number provided by the access signalling system of the calling user.
~~NA~~ Carrier ~~Information~~	C	C	C	C	The content of this IE is described in the next table. The IE may be sent when the VPLMN and the HPLMN of the subscriber are both North American. For MO calls, this IE shall contain any carrier that was dialed by the calling subscriber. If no carrier was dialed, the IE shall contain the calling subscriber's subscribed carrier. For MT and VT calls, the IE shall contain the carrier subscribed to by the called subscriber. For CF calls, the IE shall contain the carrier subscribed to by the forwarding subscriber.
Original Called Party ID	-	C	C	C	This IE carries the dialled digits if the call has met call forwarding on the route to the gsmSSF.
Redirecting Party ID	-	M	C	C	This IE indicates the directory number the call was redirected from.
Redirection Information	-	M	C	C	This IE contains forwarding related information, such as redirection counter.
Service Key	M	M	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	C	This IE indicates the status of the MS. The states are: - CAMELBusy: The MS is engaged on a transaction for a mobile originating or terminated circuit-switched call. - NetworkDeterminedNotReachable: The network can determine from its internal data that the MS is not reachable. - AssumedIdle: The state of the MS is neither "CAMELBusy" nor "NetworkDeterminedNotReachable". - Not provided from VLR.
Time And Timezone	M	M	M	M	This IE contains the time that the gsmSSF was triggered, and the time zone the gsmSSF resides in.
GSM Forwarding Pending	-	-	C	C	This parameter indicates that a forwarded-to-number was received and the call will be forwarded due to GSM supplementary service call forwarding in the GMSC/VMSC.
Service Interaction Indicators Two	C	C	C	C	This IE is sent if it is received in the ISUP message or due to previous CAMEL processing. The IE is described in a table below.
CUG Index	C	-	-	-	See 3G TS 23.085 [9] for details of this IE.
CUG Interlock Code	C	C	C	C	See 3G TS 23.085 [9] for details of this IE. In the MO case this IE is received from the VLR.
Outgoing Access Indicator	C	C	C	C	See 3G TS 23.085 [9] for details of this IE. In the MO case this IE is received from the VLR.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

- Not applicable.

Location Information contains the following information:

Information element name	MO	MF	MT	VT	Description
Location Number	-	-	C	C	See 3G TS 23.018 [3].
CellGlobalIdOrServiceAreaId OrLAI	M	-	C	C	See 3G TS 23.018 [3].
Geographical Information	C	-	C	C	See 3G TS 23.018 [3].
Geodetic Information	C	-	C	C	See 3G TS 23.018 [3].
Age Of Location Information	M	-	C	C	See 3G TS 23.018 [3].
VLR number	M	-	C	M	See 3G TS 23.018 [3].
Selected LSA Identity	C	-	C	C	This IE indicates the LSA identity associated with the current position of the MS. Send if the LSA ID of subscription and LSA ID of the used cell matches. In the case of multiple matches the one with the highest priority is sent. See 3G TS 23.073 [23]. The IE shall only be sent, if SoLSA is supported.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available. Further conditions are in the description column.).

- Not applicable.

~~NA~~ Carrier ~~Information~~ contains the following information:

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

M Mandatory (The IE shall always be sent).

Service Interaction Indicators Two contains the following information:

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

C Conditional (The IE shall be sent, if available).

- Not applicable.

Forward Service Interaction Indicator contains the following information:

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

C Conditional (The IE shall be sent, if available).

4.6.2 gsmSCF to gsmSSF information flows

4.6.2.1 Activity Test

4.6.2.1.1 Description

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

4.6.2.1.2 Information Elements

This IF contains no information elements.

4.6.2.2 Apply Charging

4.6.2.2.1 Description

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

4.6.2.2.2 Information Elements

Information element name	MO	MF	MT	VT	Description
ACh Billing Charging Characteristics	M	M	M	M	This IE specifies the charging related information to be provided by the gsmSSF and the conditions on which this information has to be provided back to the gsmSCF.
Party To Charge	M	M	M	M	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.

M Mandatory (The IE shall always be sent).

ACh Billing Charging Characteristics contains the following information:

Information element name	MO	MF	MT	VT	Description
Time Duration Charging	M	M	M	M	This IE is described in the next table.

M Mandatory (The IE shall always be sent).

Time Duration Charging contains the following information:

Information element name	MO	MF	MT	VT	Description
Max Call Period Duration	M	M	M	M	This IE indicates the maximum call period duration timer.
Tariff Switch Interval	O	O	O	O	This IE indicates the tariff switch time until the next tariff switch applies.
Release If Duration Exceeded	O	O	O	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	-	O	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.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

- Not applicable.

4.6.2.3 Call Gap

4.6.2.3.1 Description

This IF is used to activate/modify/remove a call gap mechanism in the gsmSSF. The call gap mechanism is used to reduce the rate at which specific service requests are sent to a gsmSCF.

A Call Gap operation can only be sent on an opened dialogue between a gsmSCF and a gsmSSF.

It is possible to have several call gapping conditions applicable to the same gsmSSF (i.e. each conditions were activated for a defined Service (identified by the serviceKey) by a defined gsmSCF (identified by the gsmSCFAddress).

4.6.2.3.2 Information Elements

Information element name	Status	Description
Gap Criteria	M	This IE specifies the criteria for a call to be subject to call gapping.
Gap Indicators	M	This parameter indicates the gapping characteristics.
Control Type	O	This parameter indicates the reason for activating call gapping. The value "sCPOverloaded" indicates that an automatic congestion detection and control mechanism in the SCP has detected a congestion situation. The value "manuallyInitiated" indicates that the service and or network/service management centre has detected a congestion situation, or any other situation that requires manually initiated controls. The controlType "manuallyInitiated" will have priority over "sCPOverloaded" call gap. It should be noted that also non-IN controlled traffic control mechanism can apply to an exchange with the SSF functionality. As the non-IN controlled traffic control is within the CCF, this traffic control has implicit priority over the IN controlled traffic control. The non-IN controlled traffic control may also have some influence to the IN call. Therefore it is recommended to take measures to coordinate several traffic control mechanisms. The non-IN controlled traffic control and co-ordinationof several traffic control mechanisms are out of the scope of core INAP.
Gap Treatment	O	This parameter indicates how calls that were rejected due to the call gapping condition and for which the Default Call Handling was set to "Release Call" shall be treated.
~~gsmSCFAddress~~	~~O~~	~~This parameter contains the address of the gsmSCF which initiated the CallGapping.~~

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

Gap Criteria contains one of the following (Choice):

Information element name	Status	Description
Basic Gap Criteria	O	This IE is a choice of various basic criteria.
Compound Gap Criteria	O	This IE is a choice of various criteria including a ScfID.

O Optional (Service logic dependent).

Compound Gap Criteria contains the following Information:

Information element name	Status	Description
Basic Gap Criteria	M	This IE is a choice of various criteria
ScfID	O	This IE contains the address of the gsmSCF which initiated the CallGapping.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

Basic Gap Criteria contains one of the following (Choice):

Information element name	Status	Description
Called Address	O	This parameter contains a string of digits. At each call attempt, when the leading digits-of the dialled number match this specific value, the call gapping treatment shall be applied to this call.
Service	O	This parameter contains a service key value. At each call attempt, when the service key match this specific value, the call gapping treatment shall be applied to this call.
Called Address and Service	O	This parameter contains a specific string of digits and a service key value. At each call attempt, when the leading digits of the dialled number and the service key of a call match these specific values, the call gapping treatment shall be applied to this call.
Calling Address and Service	O	This parameter contains a specific string of digits and a service key value. At each call attempt, when the leading digits of the calling party number and the service key match these specific values, the call gapping treatment shall be applied to this call.

O Optional (Service logic dependent).

Gap Indicators contains the following information:

Information element name	Status	Description
Duration	M	Duration specifies the total time interval during which call gapping for the specified gap criteria will be active. A duration of 0 indicates that gapping is to be removed. A duration of -2 indicates a network specific duration. Other values indicate duration in seconds.
Interval	M	This parameter specifies the minimum time between calls being allowed through. An interval of 0 indicates that calls meeting the gap criteria are not to be rejected. An interval of -1 indicates that all calls meeting the gap criteria are to be rejected. Other values indicate interval in milliseconds.

M Mandatory (The IE shall always be sent).

Gap Treatment contains one of the following (choice):

Information element name	Status	Description
Information To Send	O	This parameter indicates an announcement, a tone or display information to be sent to the calling party. At the end of information sending, the call shall be released.
Release Cause	O	If the call is to be released, this IE indicates a specific cause value to be sent in the release message. See EN 300 356-1 [20] for the coding.

O Optional (Service logic dependent).

Information To Send contains one of the following (choice):

Information element name	Status	Description
In-band Info	O	This parameter specifies the in-band information to be sent.
Tone	O	This parameter specifies a tone to be sent to the end-user.

O Optional (Service logic dependent).

In-band Info contains the following information:

Information element name	Status	Description
Message Id	M	This parameter indicates the message(s) to be sent, it can be one of the following:
Message Duration	O	This parameter indicates the maximum time duration in seconds that the message shall be played/repeated. ZERO indicates endless repetition.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

Message Id contains one of the following (choice):

Information element name	Status	Description
Elementary Message Id	O	This parameter indicates a single announcement.

O Optional (Service logic dependent).

4.6.2.4 Call Information Request

4.6.2.4.1 Description

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

4.6.2.4.2 Information Elements

Information element name	MO	MF	MT	VT	Description
Requested Information Type List	M	M	M	M	This IE specifies a list of specific items of information which are requested.
Leg ID	M	M	M	M	This IE indicates the party in the call for which information shall be collected. When absent, it indicates the 'outgoing' leg created with Connect, Continue or Continue With Argument.

M Mandatory (The IE shall always be sent).

Requested Information Type List contains the following information:

Information element name	MO	MF	MT	VT	Description
Call Attempt Elapsed Time	O	O	O	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	O	O	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	O	O	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	O	O	O	This IE indicates that the Release Cause is requested in the Call Information Report. Release Cause is the release cause for the call.

O Optional (Service logic dependent).

4.6.2.5 Cancel

4.6.2.5.1 Description

This IF is used by the gsmSCF to request the gsmSSF to cancel all EDPs and reports.

4.6.2.5.2 Information Elements

The following information elements are used:

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

M Mandatory (The IE shall always be sent).

4.6.2.6 Connect

4.6.2.6.1 Description

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

4.6.2.6.2 Information Elements

The following information elements are required:

Information element name	MO	MF	MT	VT	Description
Alerting Pattern	-	-	O	O	This parameter indicates the kind of Alerting Pattern to be applied.
Calling Partys Category	O	O	O	O	This IE indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).
Destination Routing Address	M	M	M	M	This IE contains the called party number towards which the call is to be routed.
Generic Number	O	O	O	O	This IE contains the generic number. Its used to convey the additional calling party number, which e.g. could be used to modify the calling line ID presented to the called user.
~~NA~~ Carrier ~~Information~~	O	O	O	O	This IE is described in the next table.
NA Originating Line Information	O	O	O	O	This IE identifies the type of number in the ~~NA~~ Charge Number (e.g. subscriber versus PLMN operator number).
~~NA~~ Charge Number	O	O	O	O	This IE identifies the chargeable number for the usage of a North American carrier.
O-CSI Applicable	-	-	O	O	This IE indicates that the O-CSI, if present shall be applied on the outgoing leg.
Original Called Party ID	O	O	O	O	This IE carries the dialled digits if the call has met call forwarding on route to the gsmSSF or is forwarded by the gsmSCF.
Redirecting Party ID	O	O	O	O	This IE indicates the directory number the call was redirected from.
Redirection Information	O	O	O	O	This IE contains forwarding related information, such as redirecting counter.
Suppression Of Announcements	-	-	O	O	This IE indicates that announcements or tones generated as a result of unsuccessful call setup shall be suppressed.
Service Interaction Indicators Two	O	O	O	O	This IE is described in a table below.
CUG Interlock Code	O	O	O	O	See 3G TS 23.085 [9] for details of this IE.
Outgoing Access Indicator	O	O	O	O	See 3G TS 23.085 [9] for details of this IE.
~~Non-CUG Call~~	~~O~~	~~O~~	~~O~~	~~O~~	~~This IE indicates that no parameters for CUG should be used for the call (i.e. the call should be a non-CUG call).~~

O Optional (Service logic dependent).

- Not applicable.

~~NOTE: Non-CUG Call shall not be present if at least one of CUG Interlock Code and Outgoing Access Indicator are present.~~

~~NA~~ Carrier ~~Information~~ contains the following information:

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

M Mandatory (The IE shall always be sent).

Service Interaction Indicators Two contains the following information:

Information element name	MO	MF	MT	VT	Description
Forward Service Interaction Indicator	O	O	O	O	This IE is described in a table below.
Backward Service Interaction Indicator	O	O	O	O	This IE is described in a table below.
HOLD Treatment Indicator	O	-	-	O	This IE indicates whether the CAMEL subscriber can invoke HOLD for the call.
CW Treatment Indicator	O	-	-	O	This IE indicates whether CW can be applied for a call to the CAMEL subscriber whilst this call is ongoing.
ECT Treatment Indicator	O	-	-	O	This IE indicates whether the call leg can become part of an ECT call initiated by the CAMEL subscriber.
Connected number treatment indicator	O	O	O	O	This IE indicates the treatment of the connected number at the originating side.
Non-CUG Call	O	O	O	O	This IE indicates that no parameters for CUG should be used for the call (i.e. the call should be a non-CUG call).

O Optional (Service logic dependent).

- Not applicable.

NOTE: Non-CUG Call shall not be present if at least one of CUG Interlock Code and Outgoing Access Indicator are present in the Information Flow.

Forward Service Interaction Indicator contains the following information:

Information element name	MO	MF	MT	VT	Description
Conference Treatment Indicator	O	O	O	O	This IE indicates whether the call leg can become part of a MPTY call initiated by the called subscriber.
Call Diversion Treatment Indicator	O	O	O	O	This IE indicates whether the call can be forwarded using the Call Forwarding or Call Deflection Supplementary Services.
Calling Party Restriction Indicator	O	-	-	-	This IE indicates whether the CLI shall be marked as Restricted by CAMEL action for the call.
Call Completion Treatment Indicator	O	-	-	-	This IE indicates whether the calling user can made a CCBS request for this call. See also 3G TS 23.093 [38] for further details.

O Optional (Service logic dependent).

- Not applicable.

Backward Service Interaction Indicator contains the following information:

Information element name	MO	MF	MT	VT	Description
Conference Treatment Indicator	O	O	O	O	This IE indicates if the call leg can become part of a MPTY call initiated by the calling subscriber.
Call Completion Treatment Indicator	O	O	O	O	This IE indicates whether a CCBS request can be made for the call. See also Q.1601 for description.

O Optional (Service logic dependent).

~~Not applicable.~~

4.6.2.7 Connect To Resource

4.6.2.7.1 Description

This IF is used to connect a call from the gsmSSF to a gsmSRF.

4.6.2.7.2 Information Elements

The following information elements are required:

Information element name	MO	MF	MT	VT	Description
Service Interaction Indicators Two	O	O	O	O	This parameter indicates whether or not a bothway through connection is required between the Calling party and the gsmSRF. The handling when this IE is not present is defined in EN 301 070-1 ([7]).
Resource Address	O	O	O	O	This IE indicates the physical location of the gsmSRF.

O Optional (Service logic dependent).

Resource Address contains the following information:

Information element name	MO	MF	MT	VT	Description
IP Routing Address	C	C	C	C	This IE indicates the routeing address to set up a connection towards the gsmSRF.
None	C	C	C	C	This parameter indicates that the call party is to be connected to a predefined gsmSRF.

C Conditional.

4.6.2.8 Continue

4.6.2.8.1 Description

This IF requests the gsmSSF to proceed with call processing at the DP at which it previously suspended call processing to await gsmSCF instructions. The gsmSSF 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.

4.6.2.8.2 Information Elements

This IF contains no information elements.

4.6.2.9 Continue With Argument

4.6.2.9.1 Description

This information flow requests the gsmSSF to proceed the call processing with modified information at the DP at which it previously suspended call processing to await gsmSCF instructions. The gsmSSF 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.

4.6.2.9.2 Information Elements

The following information elements are required:

Information element name	MO	MF	MT	VT	Description
Alerting Pattern	-	-	O	O	This parameter indicates the kind of Alerting Pattern to be applied.
Calling Partys Category	O	O	O	O	This IE indicates the type of calling party (e.g., operator, pay phone, ordinary subscriber).
Generic Number	O	O	O	O	This IE contains the generic number. Its used to convey the additional calling party number, which e.g. could be used to modify the calling line ID presented to the called user.
~~NA~~ Carrier ~~Information~~	O	O	O	O	This IE is described in the next table.
NA Originating Line Information	O	O	O	O	This IE identifies the type of number in the ~~NA~~ Charge Number (e.g. subscriber versus PLMN operator number).
~~NA~~ Charge Number	O	O	O	O	This IE identifies the chargeable number for the usage of a North American carrier.
Suppression Of Announcements	-	-	O	O	This IE indicates that announcements or tones generated as a result of unsuccessful call setup shall be suppressed.
Service Interaction Indicators Two	O	O	O	O	See the Information Flow table of the Connect operation for an explanation of this parameter. For Mobile Terminated calls, this parameter may only be sent to the VMSC.
CUG Interlock Code	O	O	O	O	See 3G TS 23.085 [9] for details of this IE.
Outgoing Access Indicator	O	O	O	O	See 3G TS 23.085 [9] for details of this IE.
~~Non CUG Call~~	~~O~~	~~O~~	~~O~~	~~O~~	~~This IE indicates that no parameters for CUG should be used for the call (i.e. the call should be a non CUG call).~~

O Optional (Service logic dependent).

- Not applicable.

Editor's: Note: Non CUG Call is proposed to be in the Service Interaction Indicators Two IE.

~~NOTE: Non-CUG Call shall not be present if at least one of CUG Interlock Code and Outgoing Access Indicator are present.~~

~~NA~~ Carrier ~~Information~~ contains the following information:

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

M Mandatory (The IE shall always be sent).

4.6.2.10 Disconnect Forward Connection

4.6.2.10.1 Description

This IF is used :

– to disconnect a connection with a gsmSRF previously established with a Connect To Resource IF;

– to disconnect an initiating gsmSSF from an assisting gsmSSF and its associated gsmSRF. The IF is send to the initiating gsmSSF.

4.6.2.10.2 Information Elements

This IF contains no information elements.

4.6.2.11 Establish Temporary Connection

4.6.2.11.1 Description

This IF is used to create a connection between an initiating gsmSSF and an assisting gsmSSF as a part of the assist procedure. It can also be used to create a connection between a gsmSSF and a gsmSRF.

4.6.2.11.2 Information Elements

The following information elements are required:

Information element name	MO	MF	MT	VT	Description
Assisting SSP IP Routing Address	M	M	M	M	This parameter indicates the destination address of the gsmSRF or assisting gsmSSF for the assist procedure. As a network operator option, the Assisting SSP IP Routing Address may contain embedded within it, a "Correlation ID" and " Scf ID", but only if "Correlation ID" and "Scf ID" are not specified separately.
Correlation ID	O	O	O	O	This parameter is used for : - the correlation of dialogues from the initiating gsmSSF-> gsmSCF with dialogues from gsmSRF -> gsmSCF - the correlation of dialogues from the initiating gsmSSF-> gsmSCF with dialogues from assisting gsmSSF -> gsmSCF.
~~NA~~ Carrier ~~Information~~	O	O	O	O	This IE is described in the next table.
NA Originating Line Information	O	O	O	O	This IE identifies the type of number in the ~~NA~~ Charge Number (e.g. subscriber versus PLMN operator number).
~~NA~~ Charge Number	O	O	O	O	This IE identifies the chargeable number for the usage of a North American carrier.
Scf ID	O	O	O	O	This parameter indicates the gsmSCF identifier
Service Interaction Indicators Two	O	O	O	O	This parameter indicates whether or not a bothway through connection is required between the Calling party and the gsmSRF. The handling when this IE is not present is defined in EN 301 070-1 ([7]).

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

~~NA~~ Carrier ~~Information~~ contains the following information:

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

M Mandatory (The IE shall always be sent).

4.6.2.12 Furnish Charging Information

4.6.2.12.1 Description

This IF is used to request the gsmSSF 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 gsmSSF. The gsmSSF 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 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.

4.6.2.12.2 Information Elements

The following information elements are required:

Information element name	MO	MF	MT	VT	Description
FCI Billing Charging Characteristics	M	M	M	M	This IE is described in the next table.

M Mandatory (The IE shall always be sent).

FCI Billing Charging Characteristics contains the following information:

Information element name	MO	MF	MT	VT	Description
FCIBCCCAMEL Sequence 1	M	M	M	M	This IE is described in the next table.

M Mandatory (The IE shall always be sent).

FCIBCCCAMEL Sequence 1 contains the following information:

Information element name	MO	MF	MT	VT	Description
Free Format Data	M	M	M	M	This IE is a free format data to be inserted in the CAMEL logical call record.
Party To Charge	M	M	M	M	This IE indicates the party for whom a CAMEL logical call record will be created.
Append Free Format Data	O	O	O	O	This IE indicates that the gsmSSF shall append the free format data to the Logical call record. - If this IE is present and indicates "Append", the gsmSSF 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 gsmSSF shall overwrite all free format data already present in the Logical call recird 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 gsmSSF shall ignore this IE.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

4.6.2.13 Release Call

4.6.2.13.1 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.

4.6.2.13.2 Information Elements

The following information elements are required:

Information element name	MO	MF	MT	VT	Description
Release Cause	M	M	M	M	A number giving an indication to the gsmSSF 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.

M Mandatory (The IE shall always be sent).

4.6.2.14 Request Report BCSM Event

4.6.2.14.1 Description

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

4.6.2.14.2 Information Elements

The following information elements are used:

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

M Mandatory (The IE shall always be sent).

BCSM Event contains the following information:

Information element name	MO	MF	MT	VT	Description
Event type	M	M	M	M	This IE specifies the type of event of which a report is requested.
Leg ID	C	C	C	C	This IE indicates the party in the call for which the event shall be reported.
Monitor Mode	M	M	M	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	O	O	O	This IE is described in the next table.

M Mandatory (The IE shall always be sent).

C Conditional.

O Optional (Service logic dependent).

DP Specific Criteria is defined as:

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

O Optional (Service logic dependent).

4.6.2.15 Reset Timer

4.6.2.15.1 Description

This IF is used to refresh a timer.

4.6.2.15.2 Information Elements

The following information elements are required:

Information element name	MO	MF	MT	VT	Description
Timer Value	M	M	M	M	This IE specifies the value to which the indicated timer shall be set.
Timer ID	O	O	O	O	This IE indicates which timer shall be reset. It shall be set to ‘Tssf’.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

4.6.2.16 Send Charging Information

4.6.2.16.1 Description

This IF is used to send e-parameters from the gsmSCF to the gsmSSF. If charge advice information is received from the gsmSCF, it shall replace the charge advice information which would be generated by the MSC and inhibit any further generation of CAI by the MSC. Further processing of the charge advice information by the MSC shall be in accordance with the GSM Advice of Charge Supplementary Service.

The IF is only used in the MO case or in the VT case.

NOTE: If charge advice information is received from the gsmSCF after charge information has been generated by the MSC and sent to the MS, the behaviour of the service may be unpredictable or incorrect ; the service designer should therefore ensure that the first set of charge advice information is sent to the gsmSSF before charge information is sent to the to the MS.

4.6.2.16.2 Information Elements

The following information elements are only used for the MO case and for the VT case:

Information element name	MO	MF	MT	VT	Description
SCI Billing Charging Characteristics	M	-	-	M	This IE defines the Advice Of Charge related information to be provided to the Mobile Station
Leg ID	M	-	-	M	This IE indicates where the charging information shall be sent.

M Mandatory (The IE shall always be sent).

SCI Billing Charging Characteristics is defined as:

Information element name	MO	MF	MT	VT	Description
AOC After Answer	C	-	-	C	This IE is sent after an Answer from event has been detected from the called party, the current connected SRF or the temporary connection.
AOC Before Answer	C	-	-	C	This IE is sent before an Answer event has been detected from the called party, the current connected SRF or the temporary connection.

C Conditional (only one of these IEs may be sent).

AOC Before Answer is defined as:

Information element name	MO	MF	MT	VT	Description
AOC Initial	M	-	-	M	This IE contains CAI elements as defined in 3G TS 22.024 [31].
AOC Subsequent	O	-	-	O	See definition in the next table.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

AOCSubsequent is defined as:

Information element name	MO	MF	MT	VT	Description
CAI Elements	M	-	-	M	This IE contains CAI elements as defined in 3G TS 22.024 [31]
Tariff Switch Interval	O	-	-	O	This IE indicates the tariff switch time until the next tariff switch applies.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

AOCAfterAnswer is defined as:

Information element name	MO	MF	MT	VT	Description
CAI Elements	M	-	-	M	This IE contains CAI elements as defined in 3G TS 22.024 [31]
Tariff Switch Interval	O	-	-	O	This IE indicates the tariff switch time until the next tariff switch applies.

M Mandatory (The IE shall always be sent).

— Next modified section —

4.7.4 Closed User Group

For a CUG subscriber with CAMEL services:

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

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

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

If the gsmSCF returns a Connect or Continue With Argument message, the CUG handling in table 4.5 applies.

Table 4.5: CUG handling on receipt of Connect or Continue With Argument for an MO or MF call

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

For an MT or VT call which is to be routed to the terminating subscriber, the CUG information shall be sent to the gsmSCF in the Initial DP, but the gsmSCF shall not have the ability to change the CUG information for the call.

For an MT or VT call which is to be forwarded under CAMEL control, if the gsmSCF returns a Connect or Continue With Argument message, the CUG handling in table 4.5 applies.

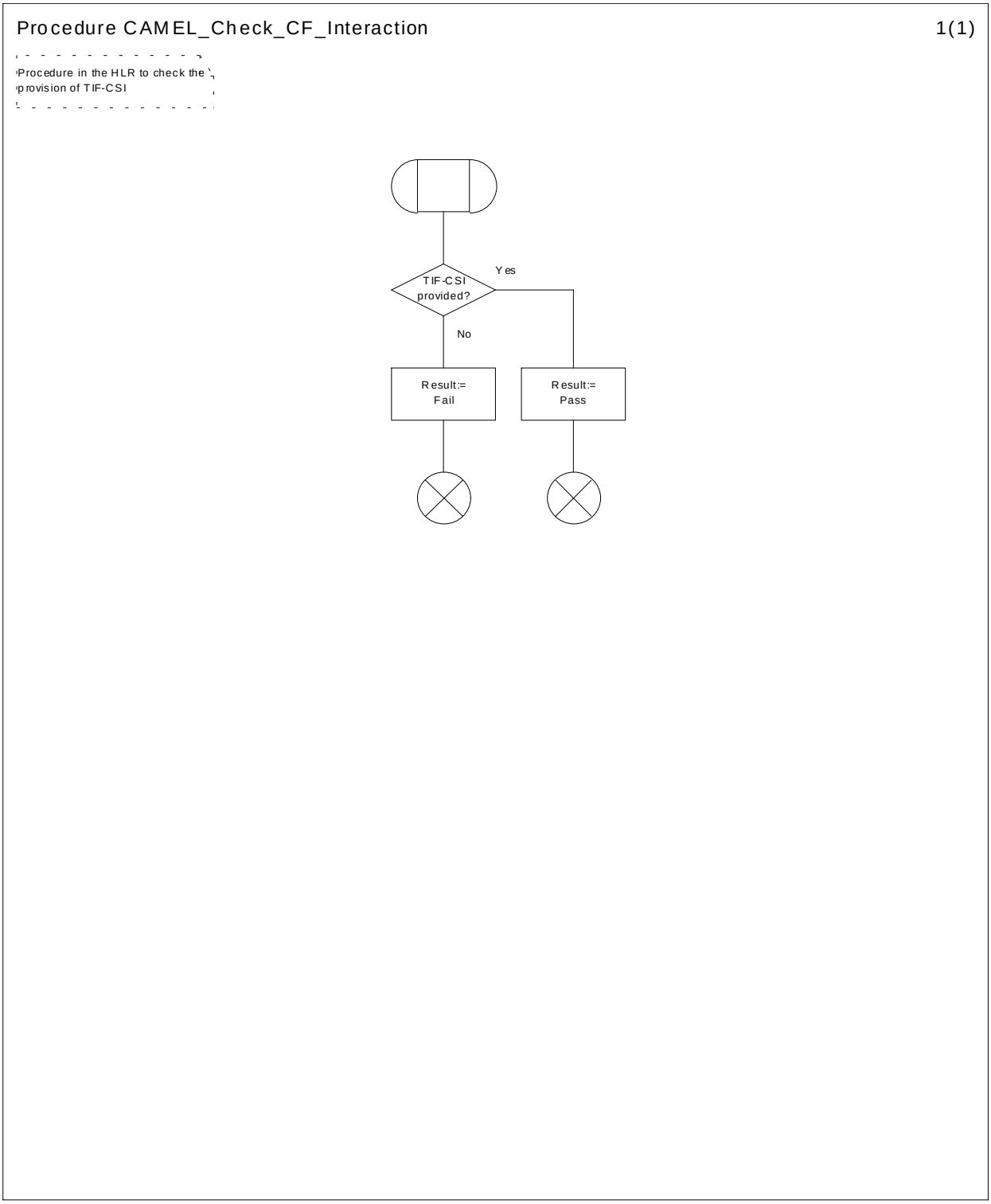


Figure 4.80: Procedure CAMEL_Check_CF_Interaction

N2-000207

3GPP TSG CN N2#10
Rotenburg a.d. Fulda, Germany
22-26 May, 2000

Document N2-000151rev
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**	**163r1**	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 #08	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: N2 **Date:** 23.05.2000

Subject: Specification of segmented GPRS Dialogues

Work item: CAMEL Phase 3

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

F	Correction	X	**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			Release 99	X
				Release 00	

Reason for change:

Simplification and correction of GPRS Dialogue handling:

- The TCAP dialoque between the SGSN and the gprsSCF may be closed and opened several time while the relationship is maintened open. This will save the resources needed for ongoing TCAP dialogues as there are long periods of time when no TCAP messages are exchanged..

- For simplification for the handling of the dialogue only the empty TC-END (basic end) shall be used. The closure of the TCAP dialogue is always done by the gprsSSF (SGSN). This implies also that most CAP operations need only to be of class 2 instead of class 1.

- As for CS calls: Condition for control relationship: "Any remaining EDP-Rs". A remaining report is not sufficient.

Clauses affected: Clauses 3 and 6

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:	CR 29.078-058
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:

Priciples of change:

a) The gprsSSF creates a IN/GPRS dialogue via the Initial DP GPRS. This GPRS dialogue may be segmented using one or more TCAP dialogues in sequence.

b) The gprsSSF and the gsmSCF should not be much concerned about the segmentation into TCAP dialogues.

c) The gprsSSF indicates when the TCAP dialogue shall be closed. Opening is automatically done if no TCAP dialogue exists yet.

d) The TCAP dialogues of one GPRS dialogue shall not overlap in time

e) The reply (e.g. the return result, return error, reject) to a TC component (e.g. an operation) shall use the same TCAP dialogue as the component.

f) Init GPRS dialogue with: Initial DP GPRS. This Initial DP GPRS operation contains the SSF-ProcessId only all other operations contain both the SSF-ProcessId and SCf-ProcessId.

g) End of TCAP dialogue: always by the gprsSSF with empty TC_END (basic end).

h) Class 1 operations (SSF -> SCF): ApplyChargingReportGPRS, EntityReleasedGPRS and EventReportGPRS. The TCAP dialogue remains open until all outstanding replies are received for the operations send.

i) During Waiting for Instruction the TCAP dialogue is not closed. The receive of Connect, Continue or Release GPRS (for the concerned PDP context) will close the TCAP dialogue.

j) The gprsSSF SDLs show the handling of operations, creation and termination of the GPRS dialogue. The TCAP dialogue is closed by sending the signal empty 'TC_end'.


help.doc

<--------- double-click here for help and instructions on how to create a CR.

— First modified section —

3 Definitions and abbreviations

3.1 Definitions

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

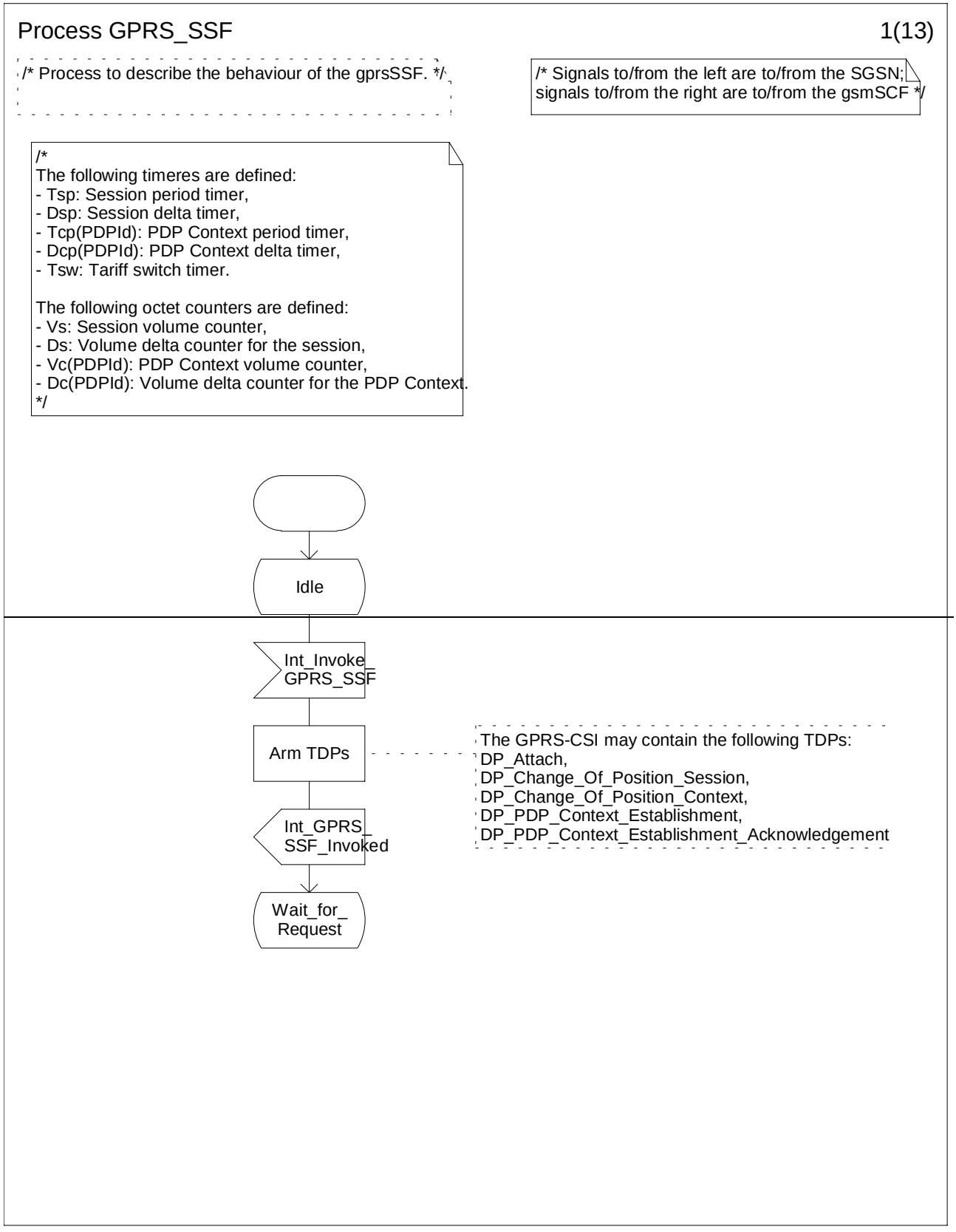
...

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

...

— Next modified section —

6.5.8 GPRS SSF



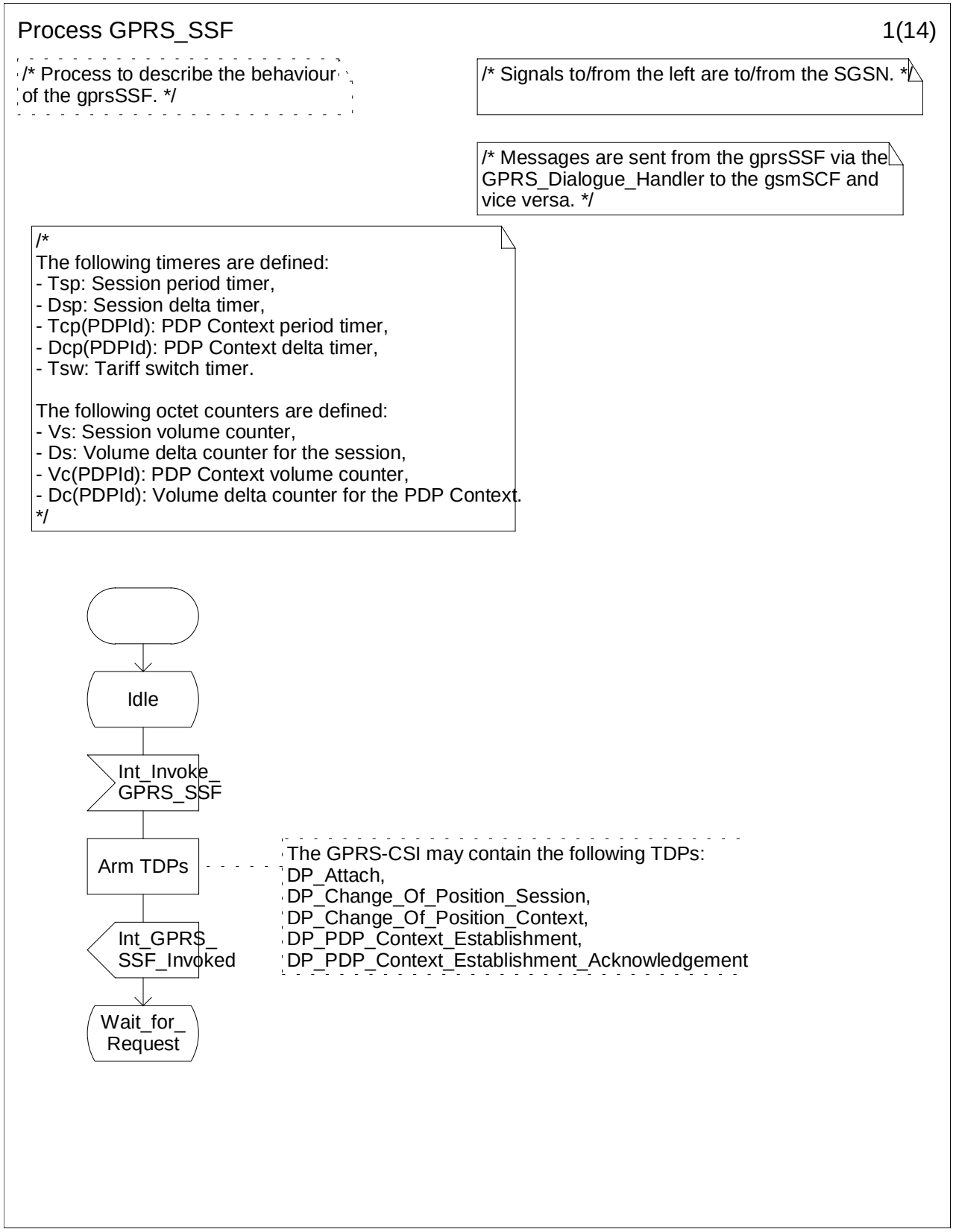
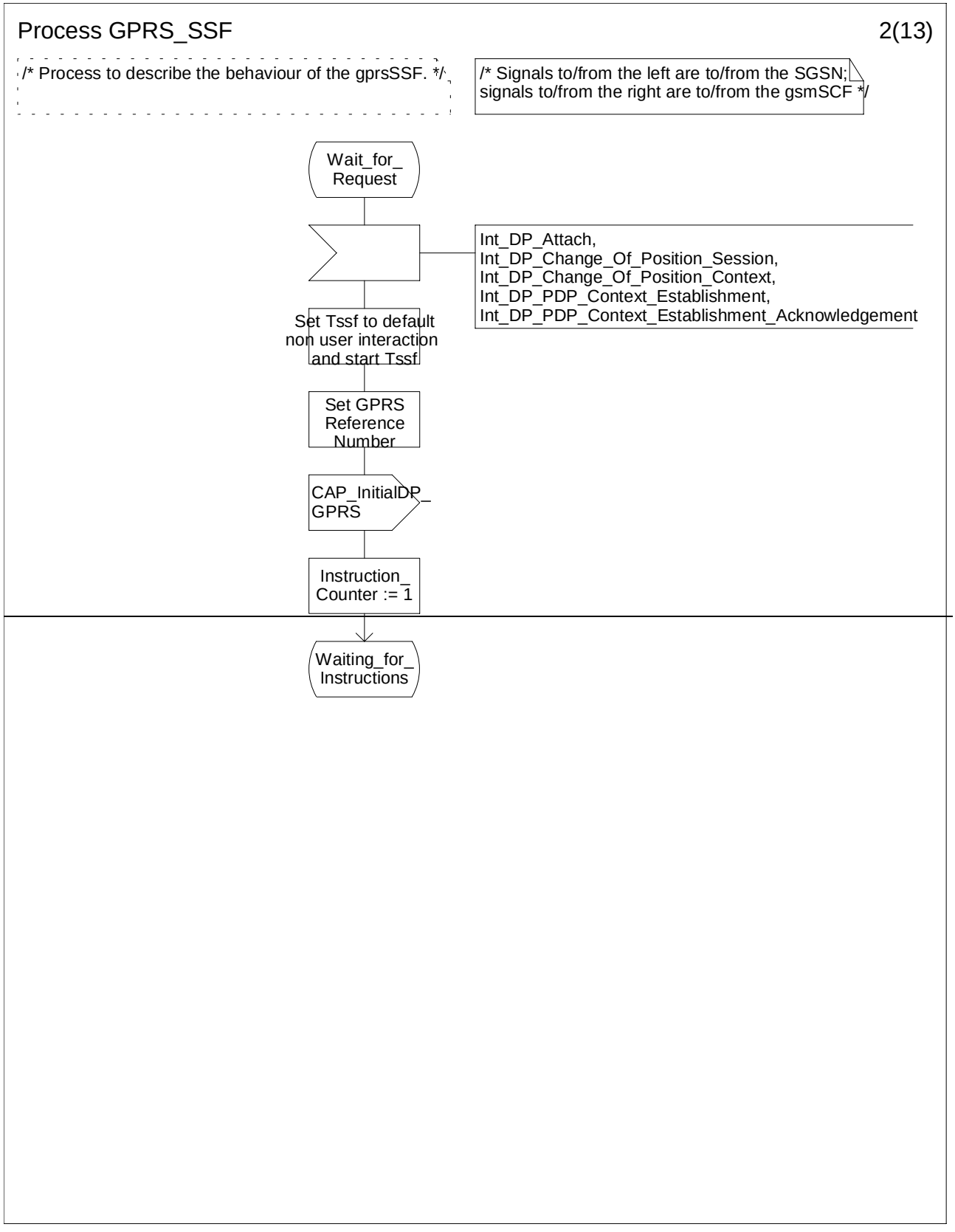


Figure 6.14 a: Process GPRS_SSF (sheet 1)


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

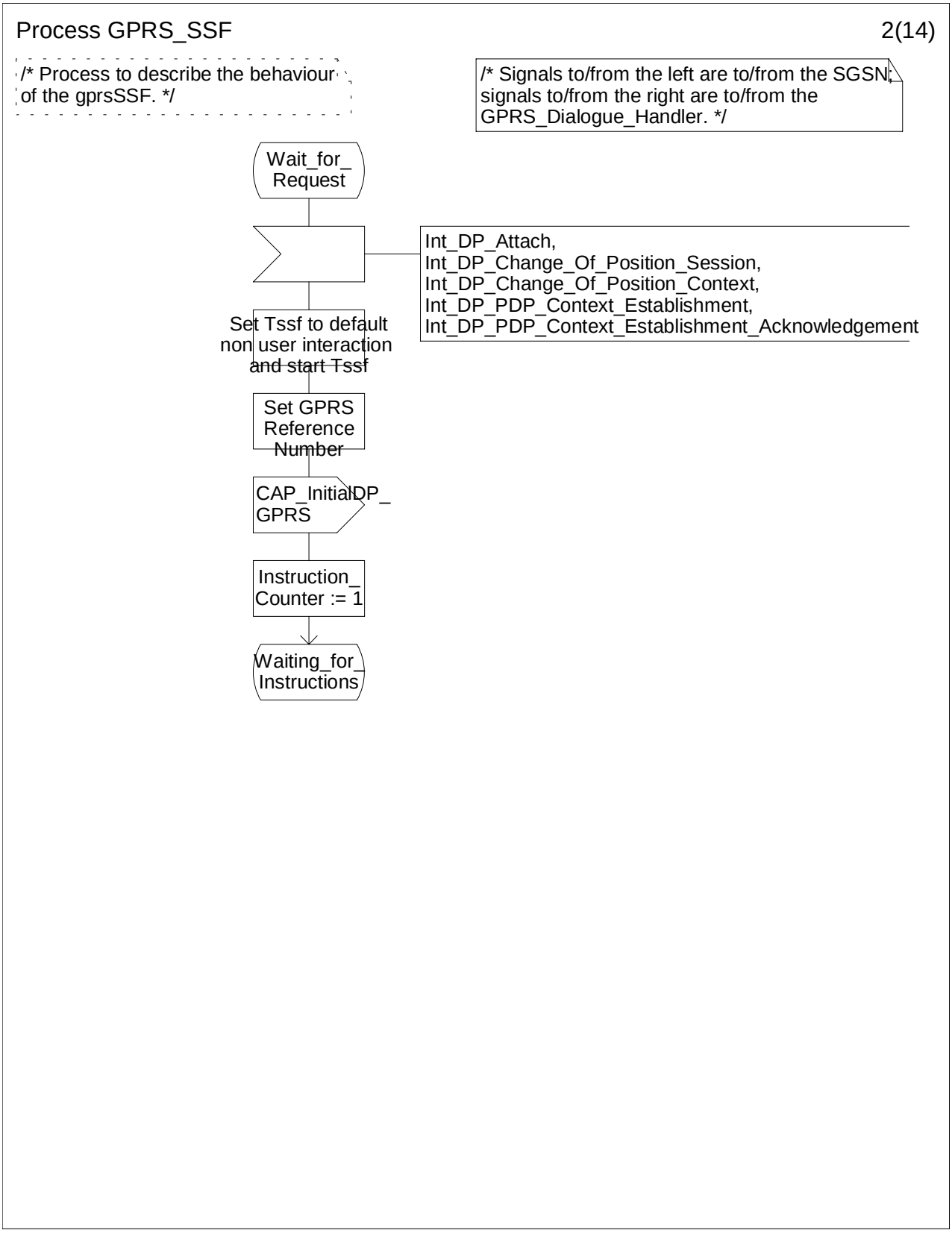
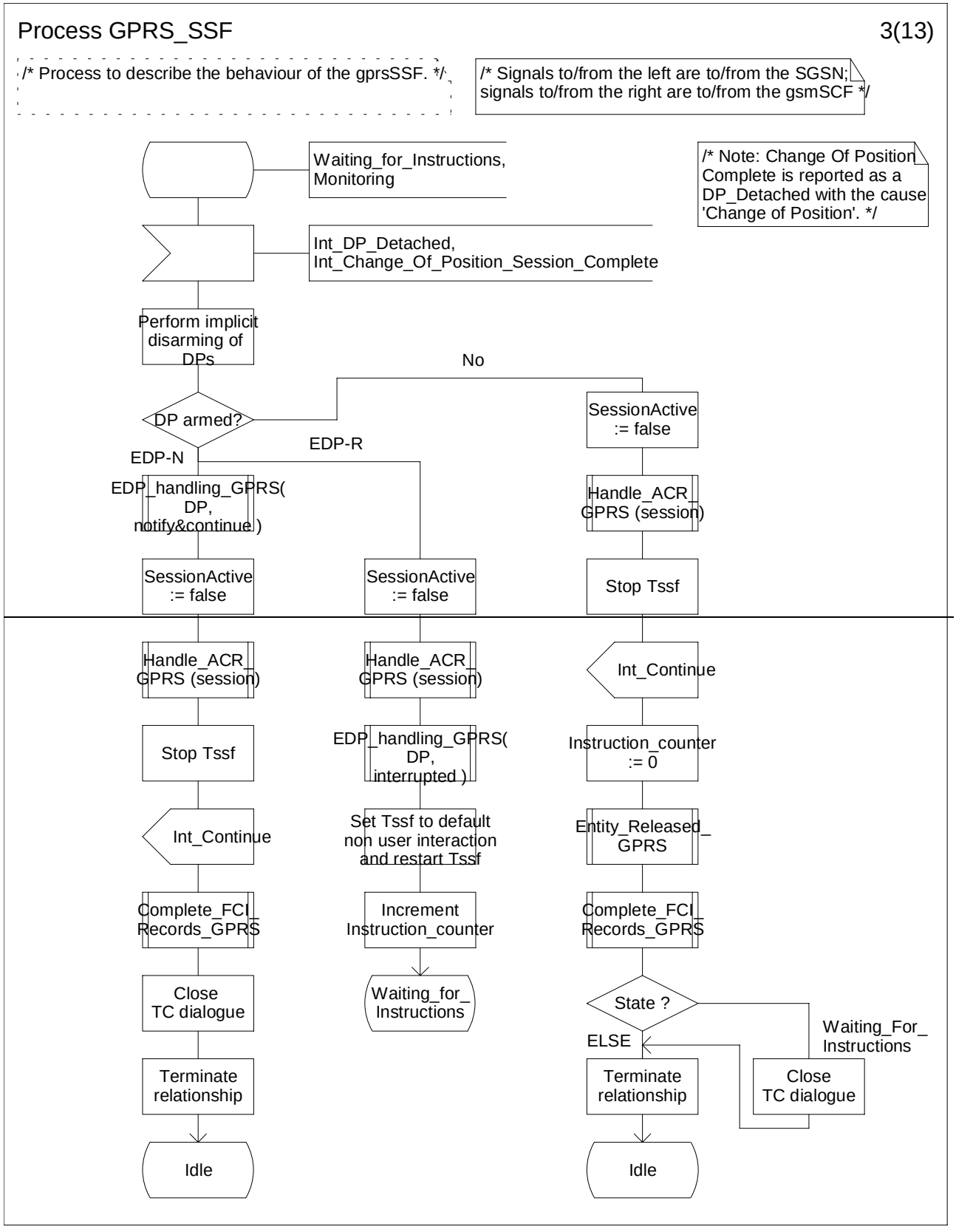


Figure 6.14 b: Process GPRS_SSF (sheet 2)


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 */
Waiting_for_Instructions, Monitoring
/* Note: Change Of Position Complete is reported as a DP_Detached with the cause 'Change of Position'. */
Int_DP_Detached, Int_Change_Of_Position_Session_Complete
Perform implicit disarming of DPs
No
DP armed?
SessionActive := false
EDP-R
EDP-N
EDP_handling_GPRS(DP, notify&continue)
Handle_ACR_GPRS (session)
SessionActive := false
SessionActive := false
Stop Tssf
Handle_ACR_GPRS (session)
Handle_ACR_GPRS (session)
Int_Continue
Stop Tssf
EDP_handling_GPRS(DP, interrupted)
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

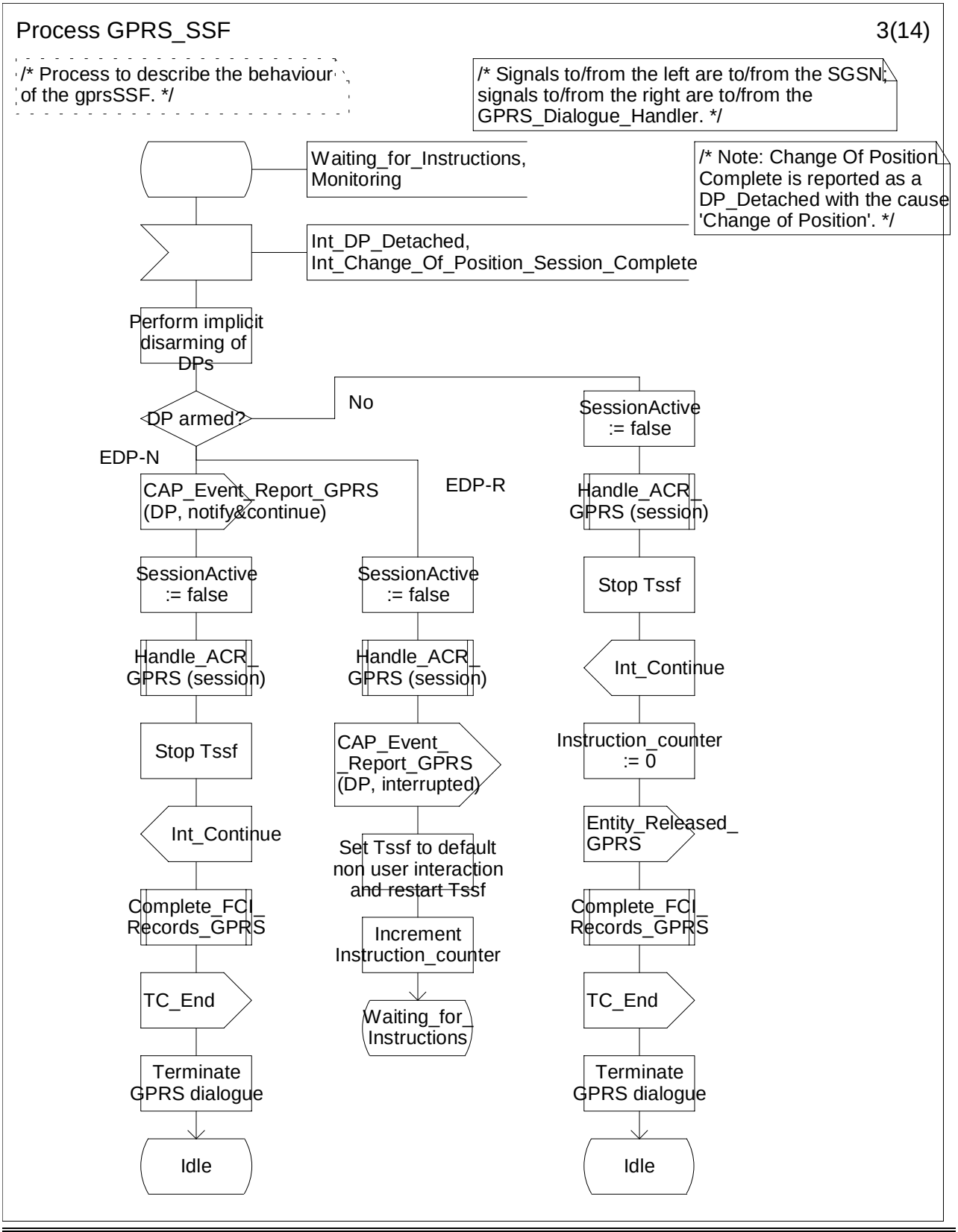
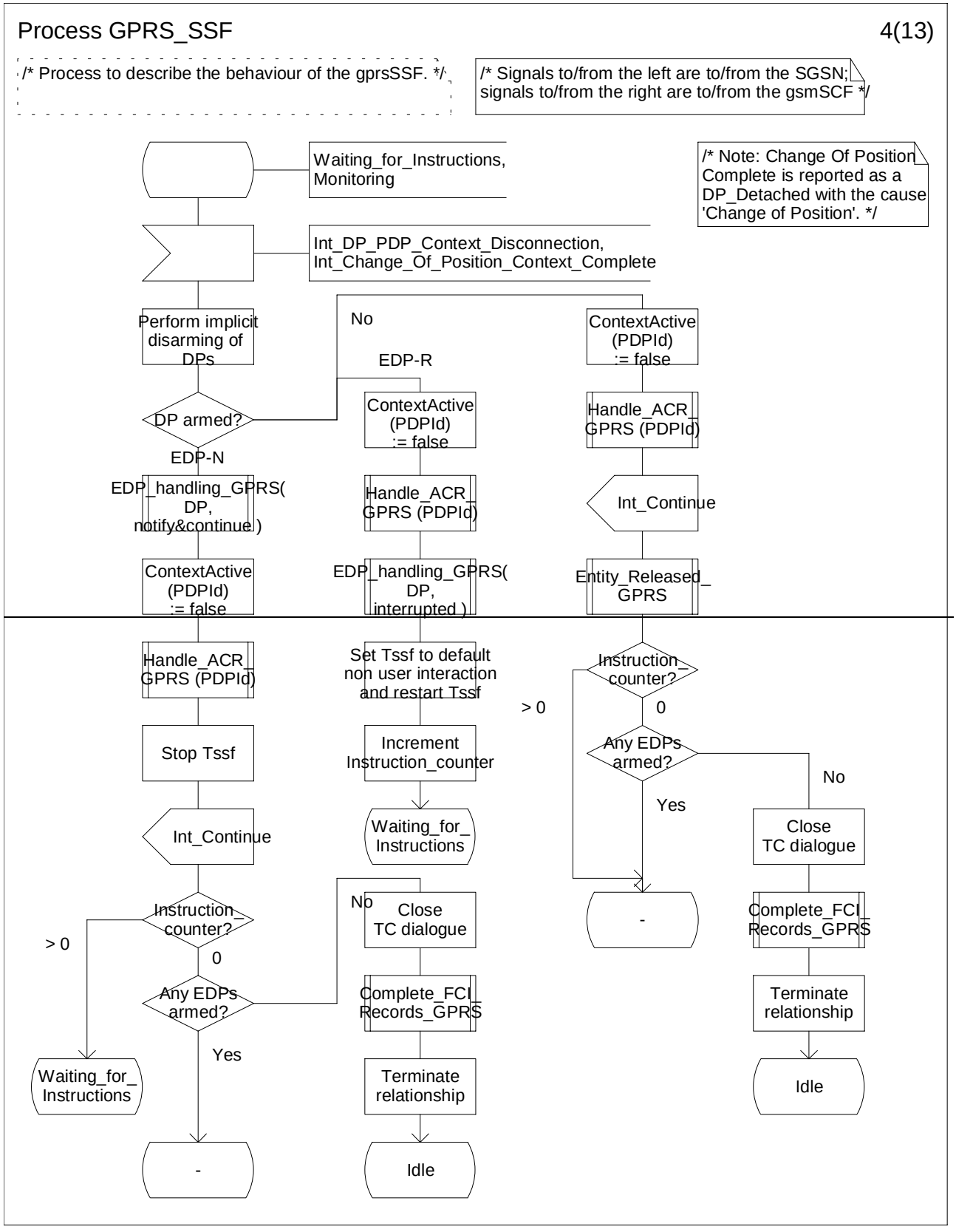


Figure 6.14 c: Process GPRS_SSF (sheet 3)


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 */
Waiting_for_Instructions, Monitoring
/* Note: Change Of Position Complete is reported as a DP_Detached with the cause 'Change of Position'. */
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)
Stop Tssf
Int_Continue
Instruction_ counter?
> 0
0
Any EDPs armed?
No
Yes
Waiting_for_ Instructions
Close TC dialogue
Complete_FCI_ Records_GPRS
Terminate relationship
Idle
-
ContextActive (PDPId) := false
Handle_ACR_ GPRS (PDPId)
Int_Continue
Entity_Released_ GPRS
Instruction_ counter?
> 0
0
Any EDPs armed?
No
Yes
Close TC dialogue
Complete_FCI_ Records_GPRS
Terminate relationship
Idle
-
ContextActive (PDPId) := false
EDP_handling_GPRS(DP, interrupted)
Set Tssf to default non user interaction and restart Tssf
Increment Instruction_counter
Waiting_for_ Instructions
No
Close TC dialogue
Complete_FCI_ Records_GPRS
Terminate relationship
Idle

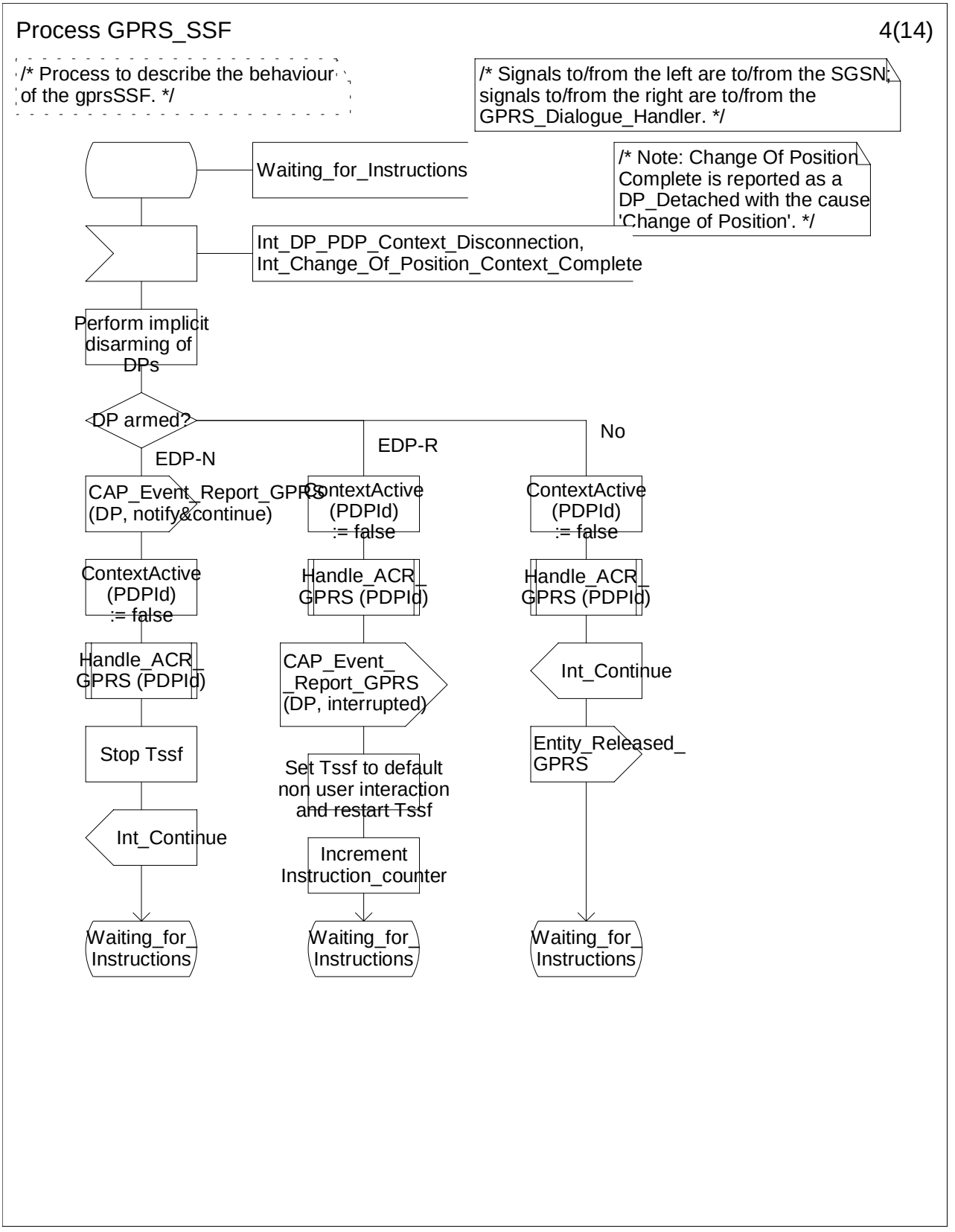


Figure 6.14 d: Process GPRS_SSF (sheet 4)

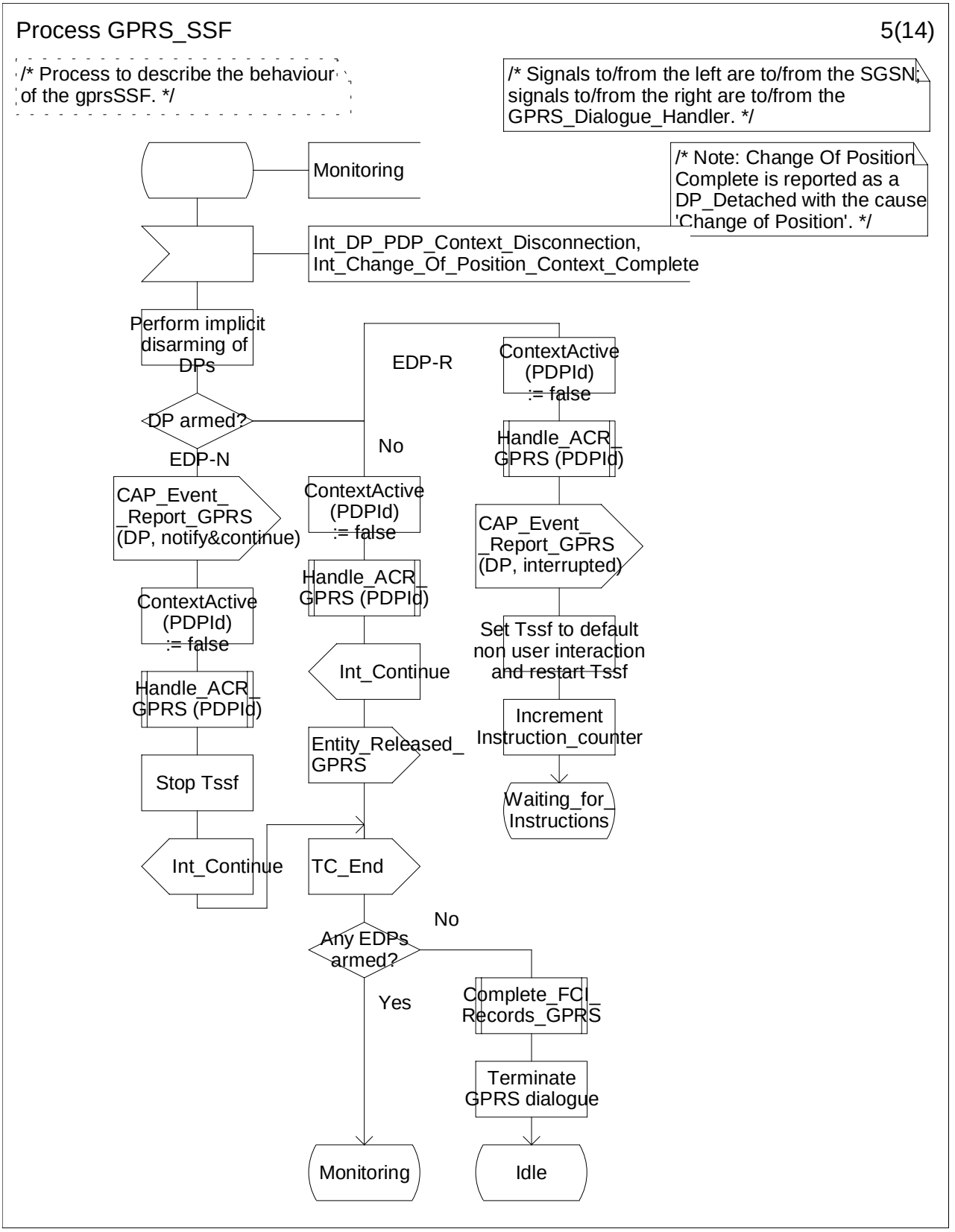
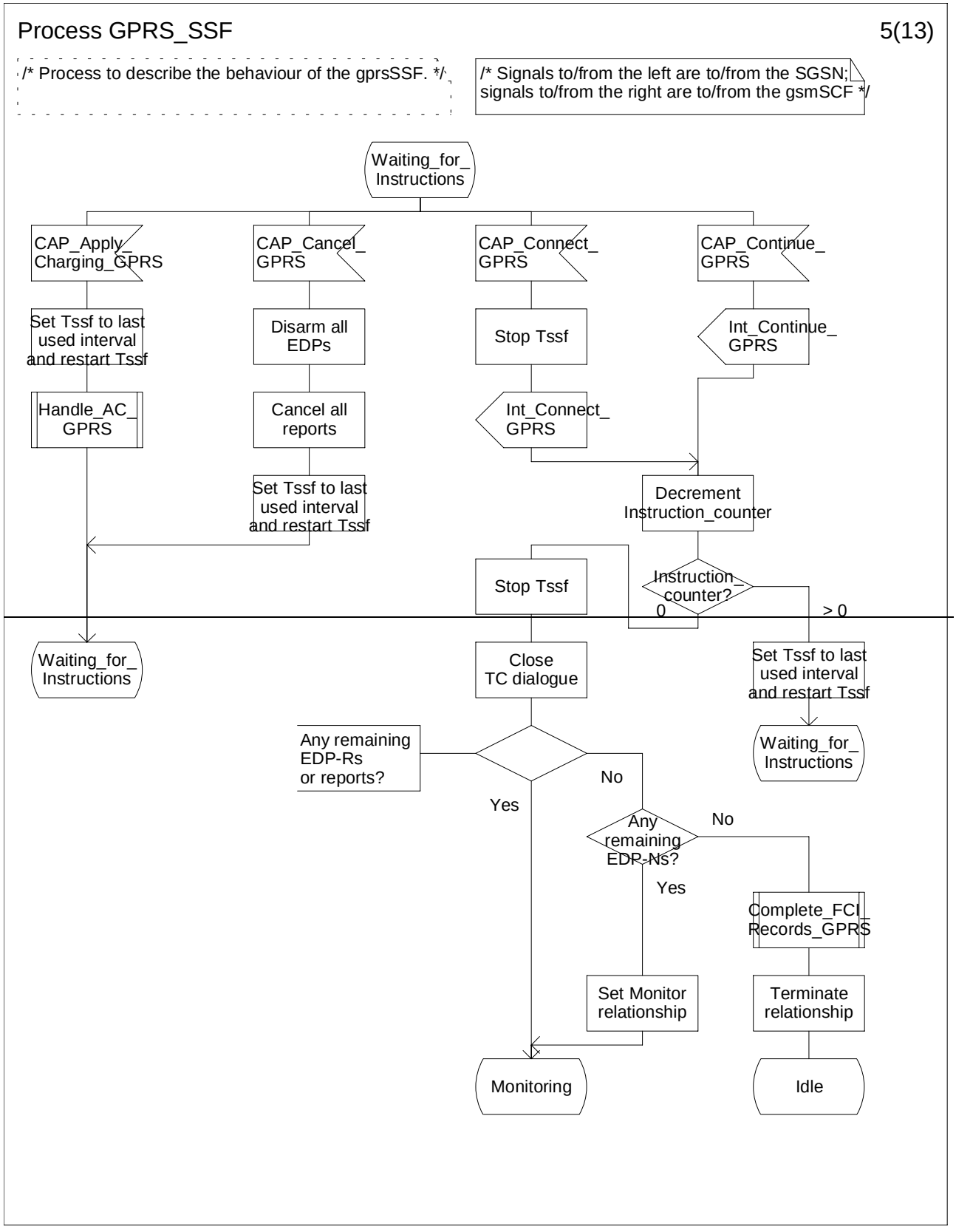


Figure 6.14 e: Process GPRS_SSF (sheet 5)

CR Edtitor's Note: renumber figures from here onwards


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

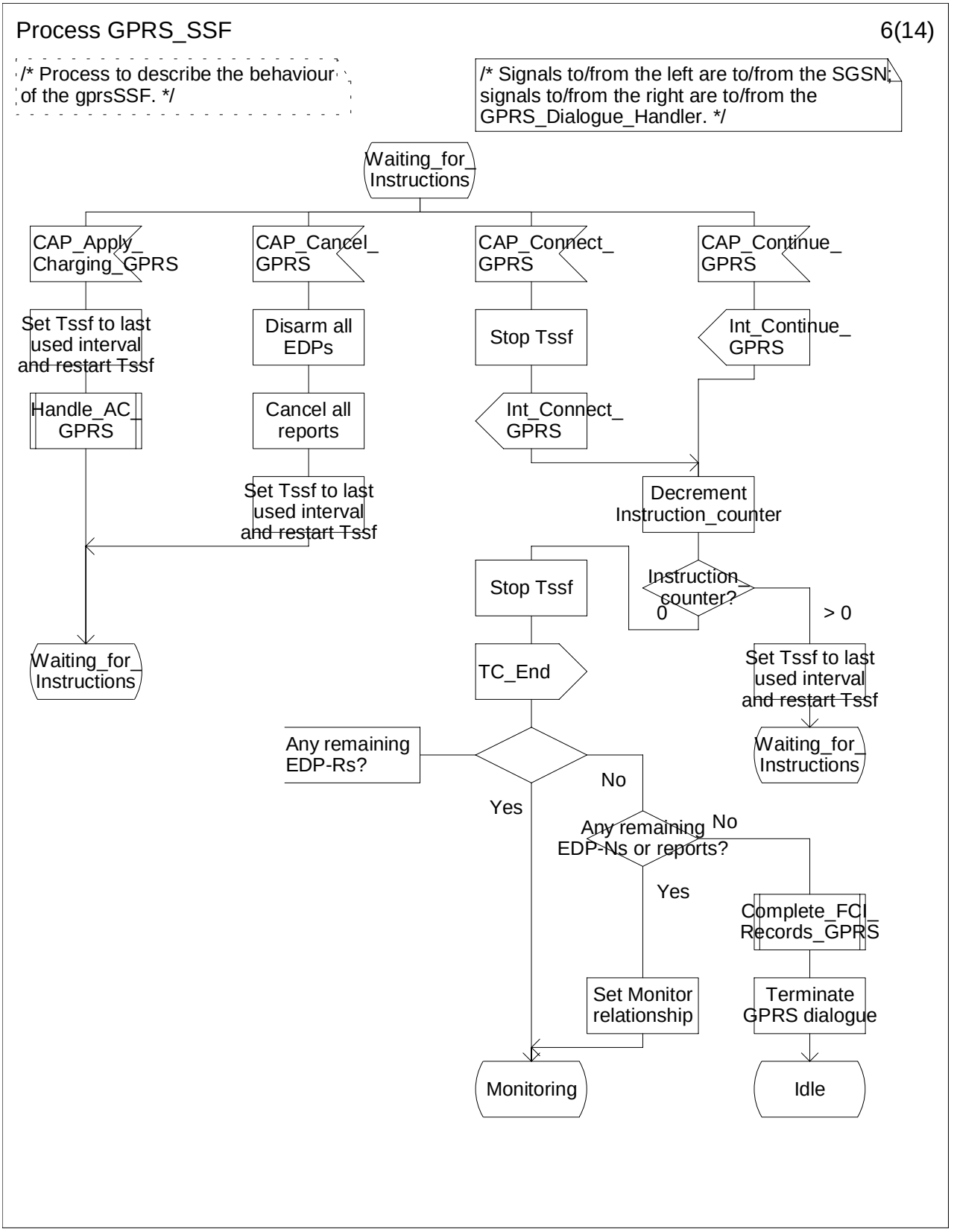
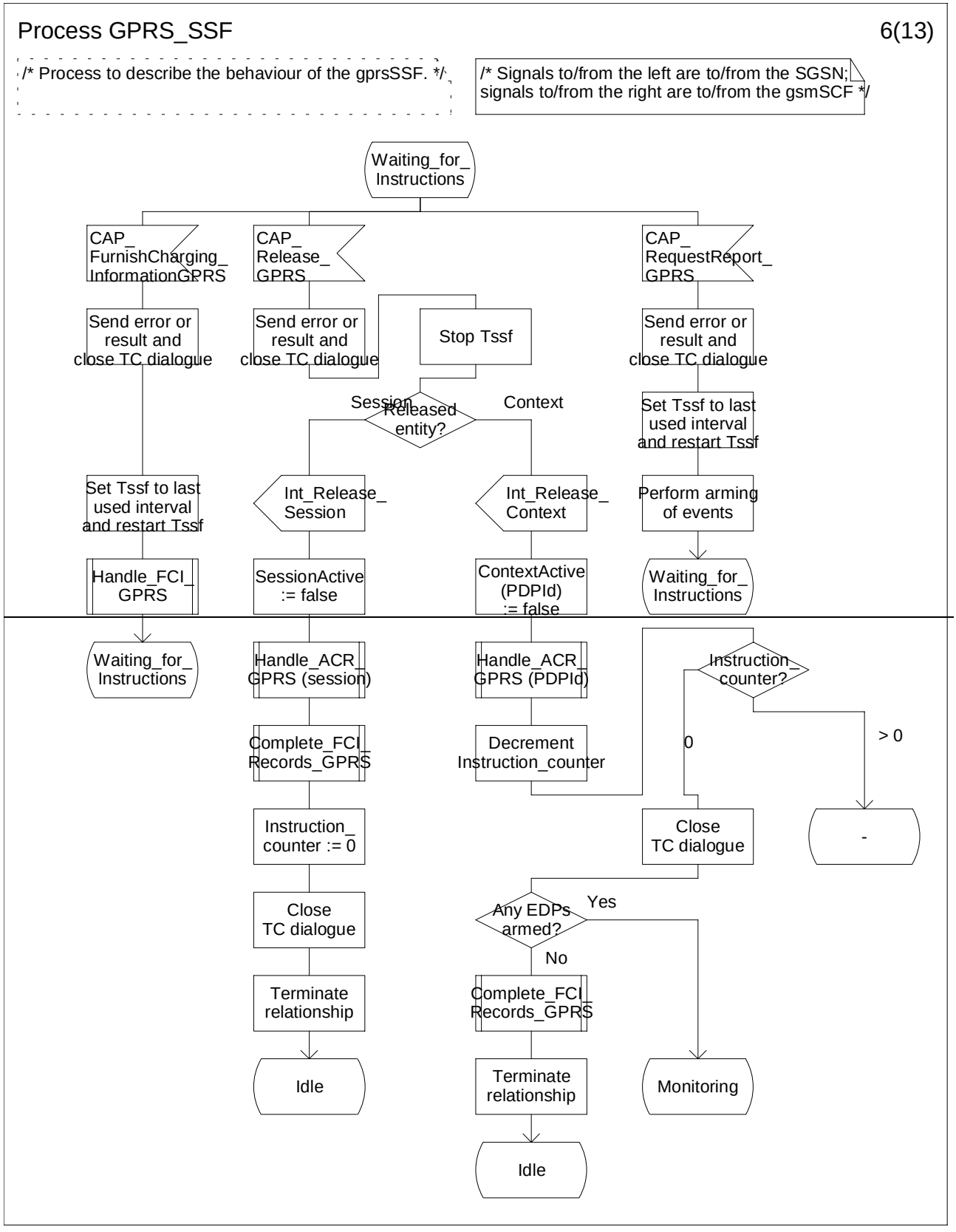


Figure 6.14 e: Process GPRS_SSF (sheet 6~~5~~)


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

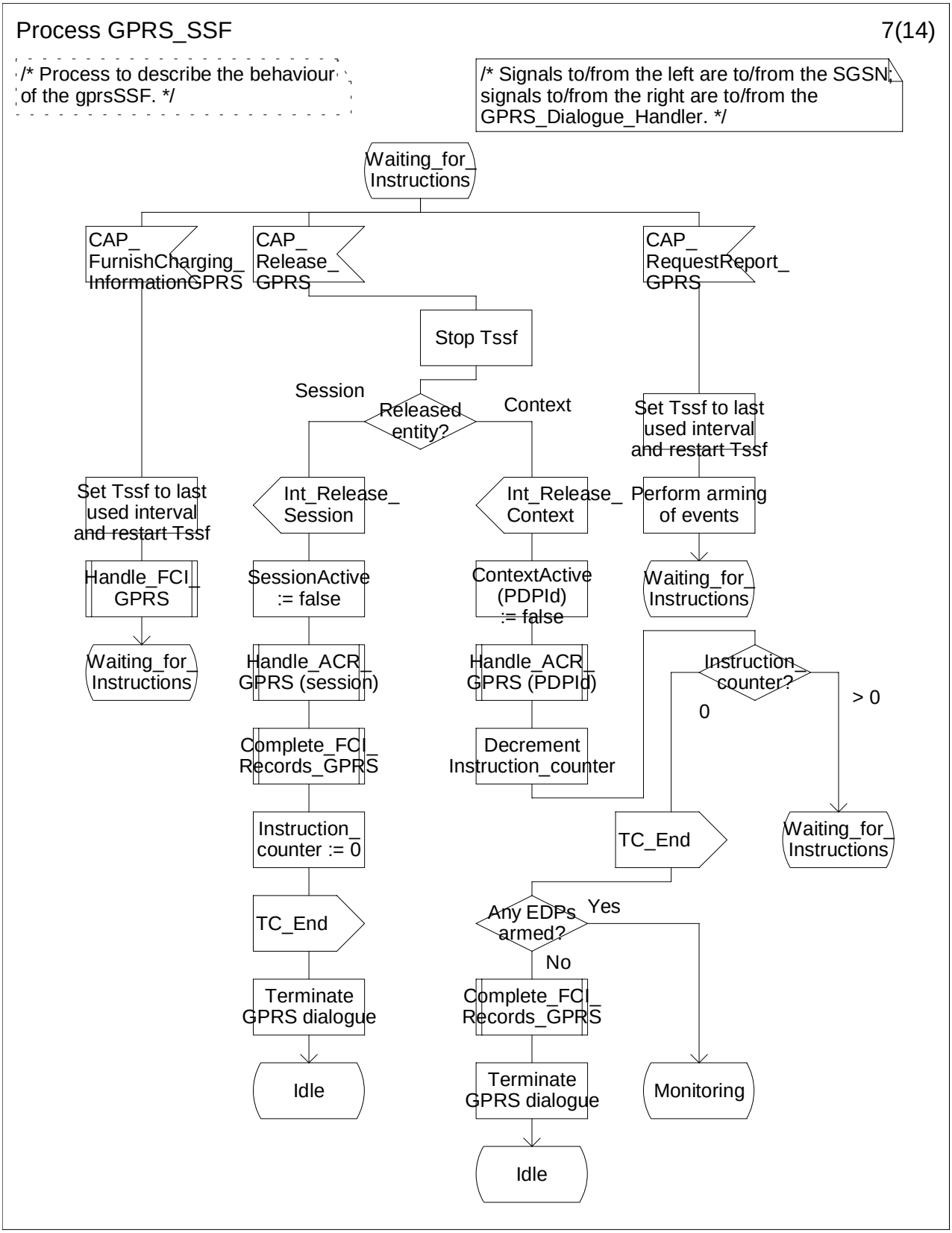
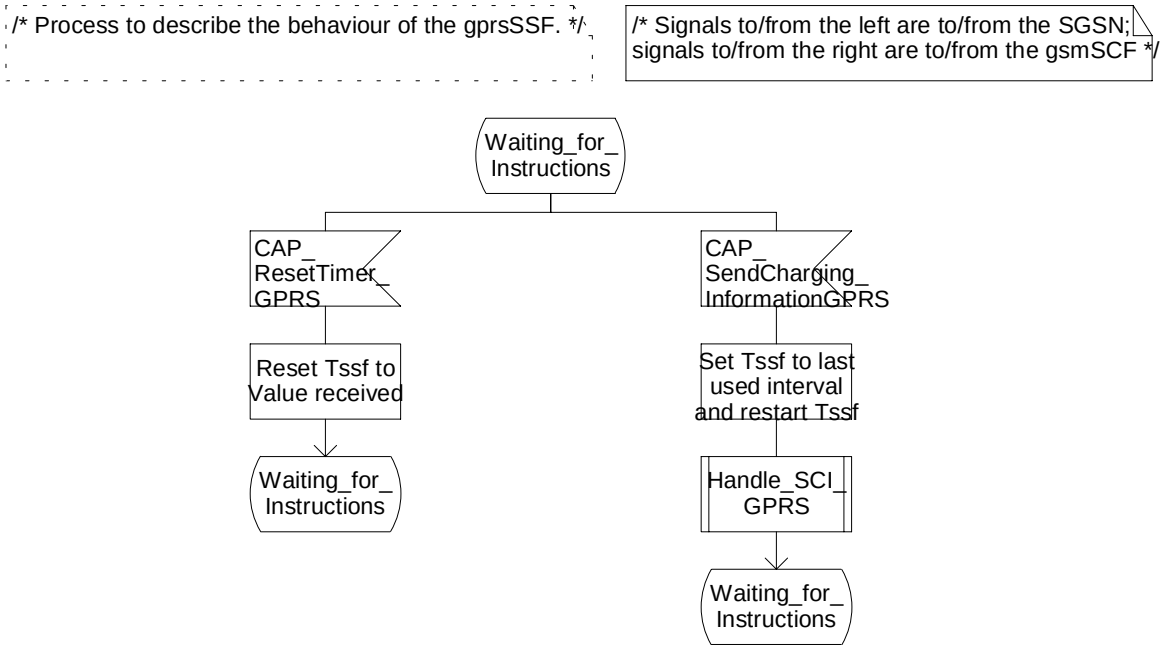


Figure 6.14 f: Process GPRS_SSF (sheet 7~~6~~)

Process GPRS_SSF 7(13)



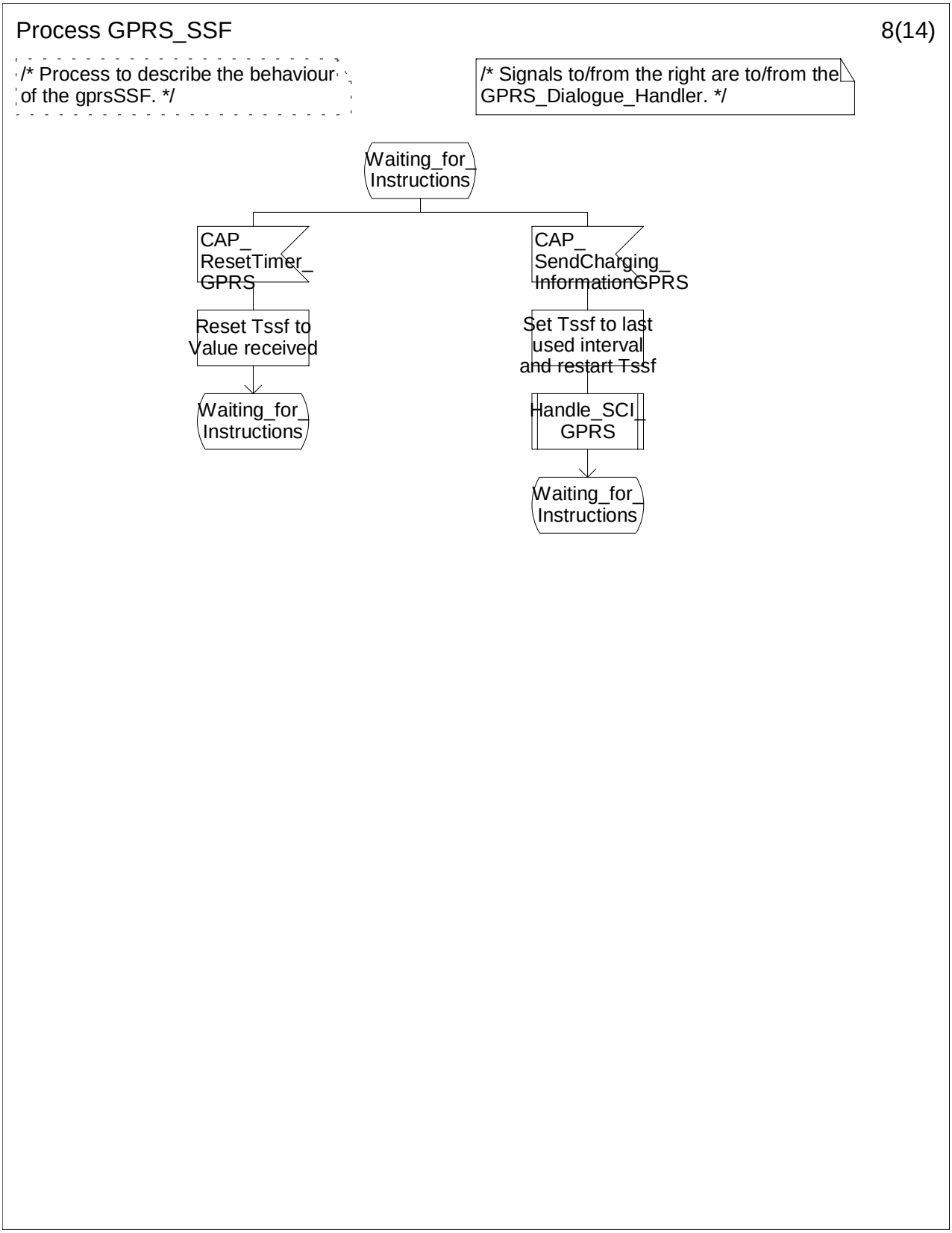
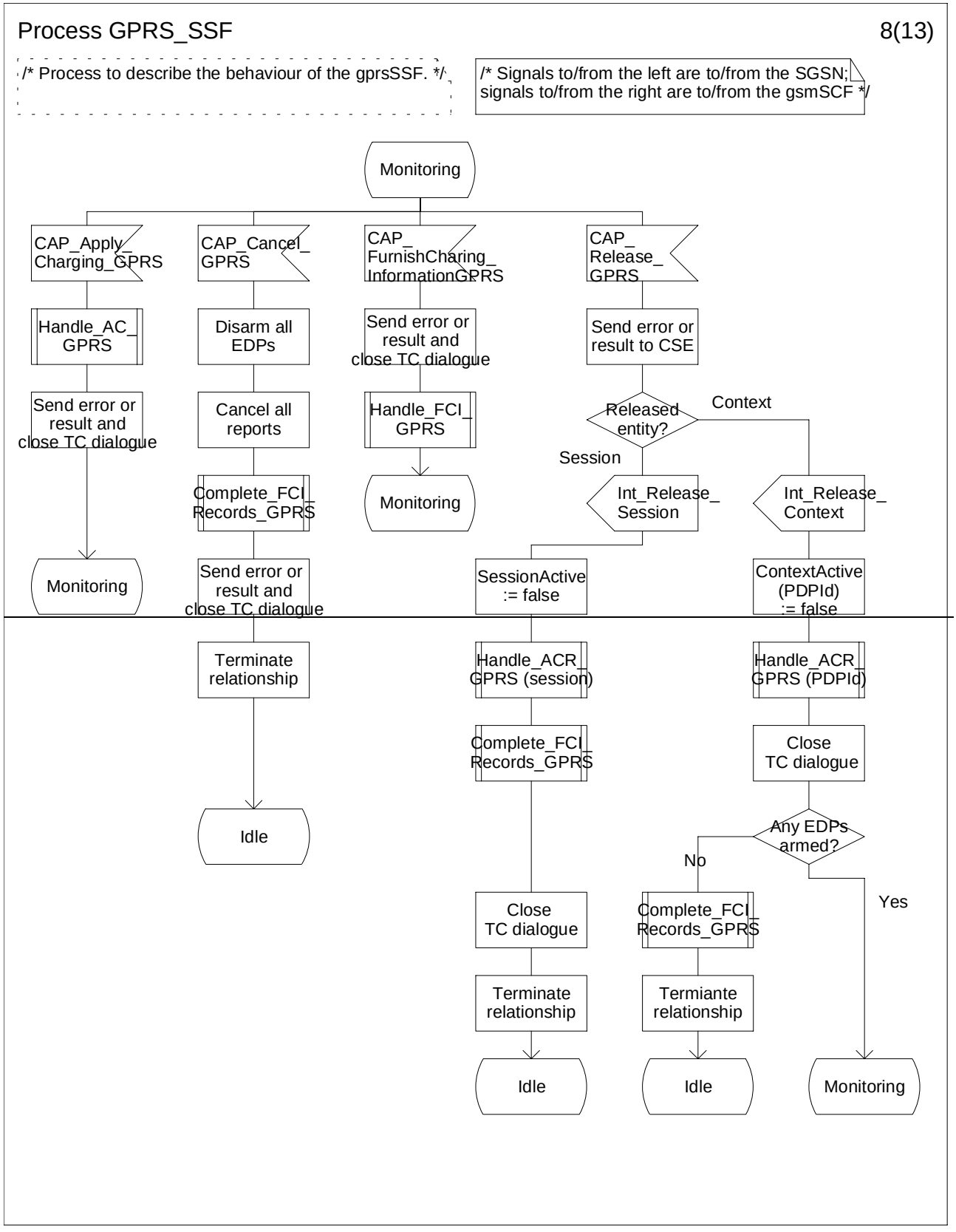


Figure 6.14 g: Process GPRS_SSF (sheet 8~~7~~)


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

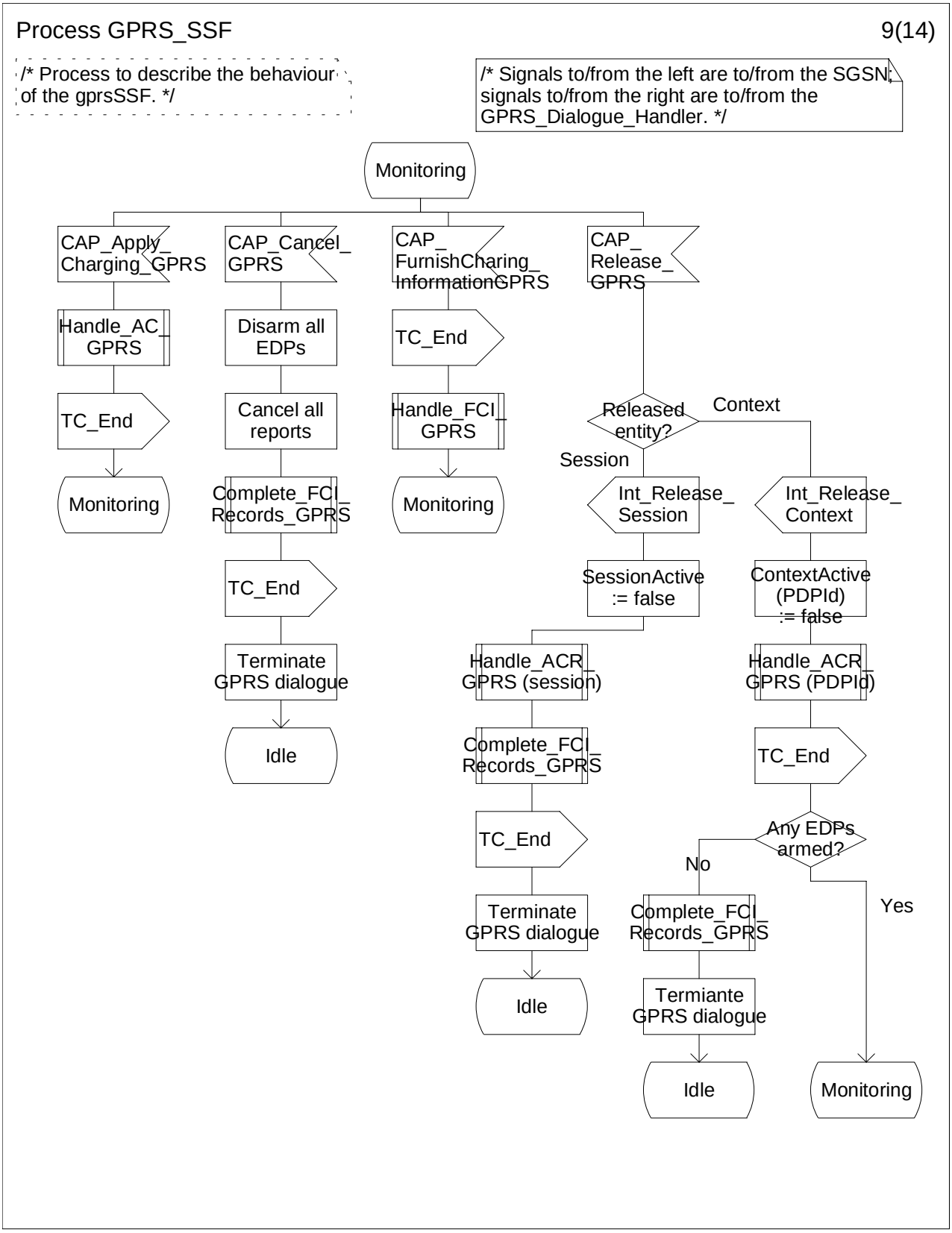
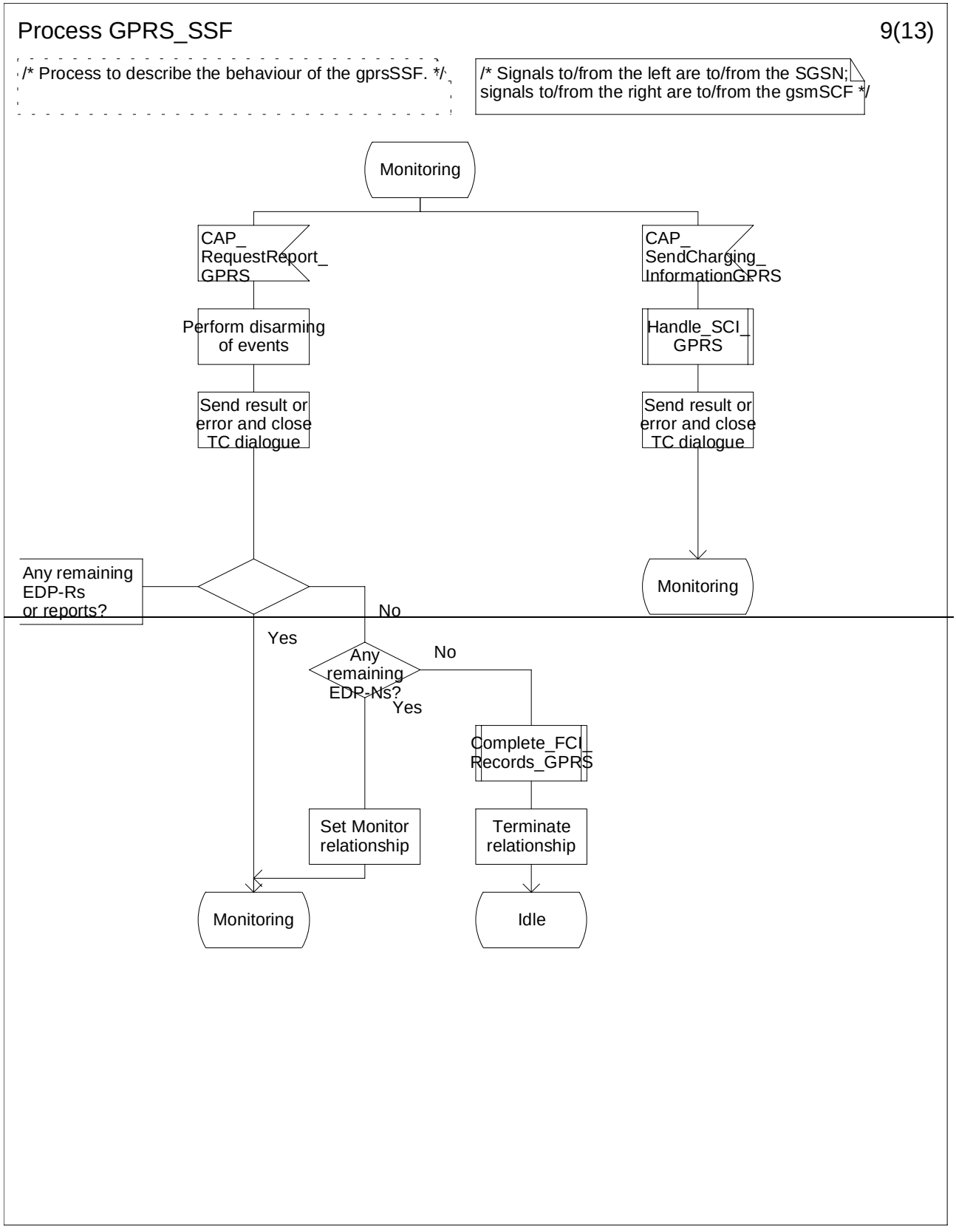


Figure 6.14 h: Process GPRS_SSF (sheet 98)


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
Any remaining EDP-Rs or reports?
Monitoring
No
Yes
Any remaining EDP-Ns?
No
Yes
Complete_FCI_ Records_GPRS
Set Monitor relationship
Terminate relationship
Monitoring
Idle

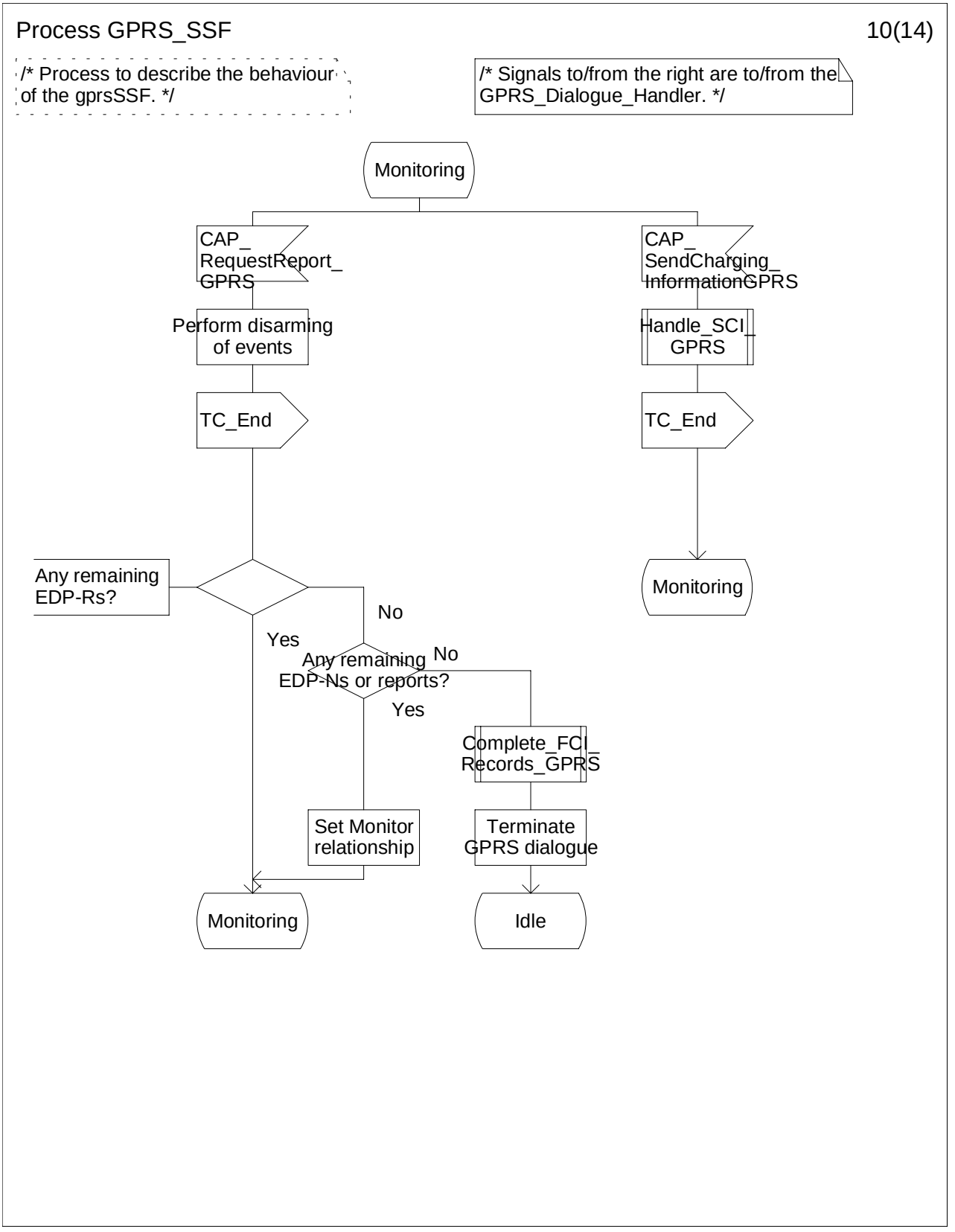
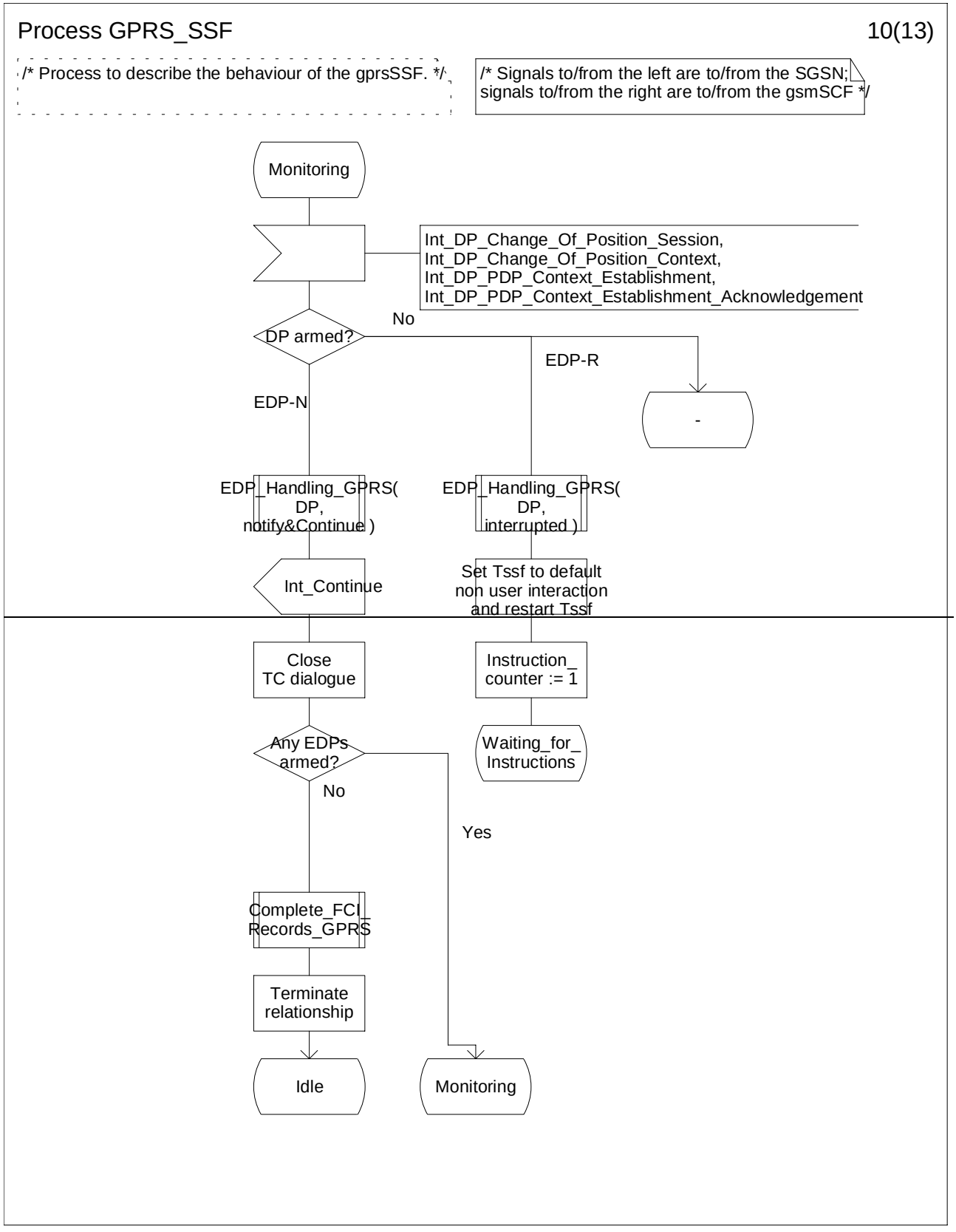


Figure 6.14 i: Process GPRS_SSF (sheet 10)


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

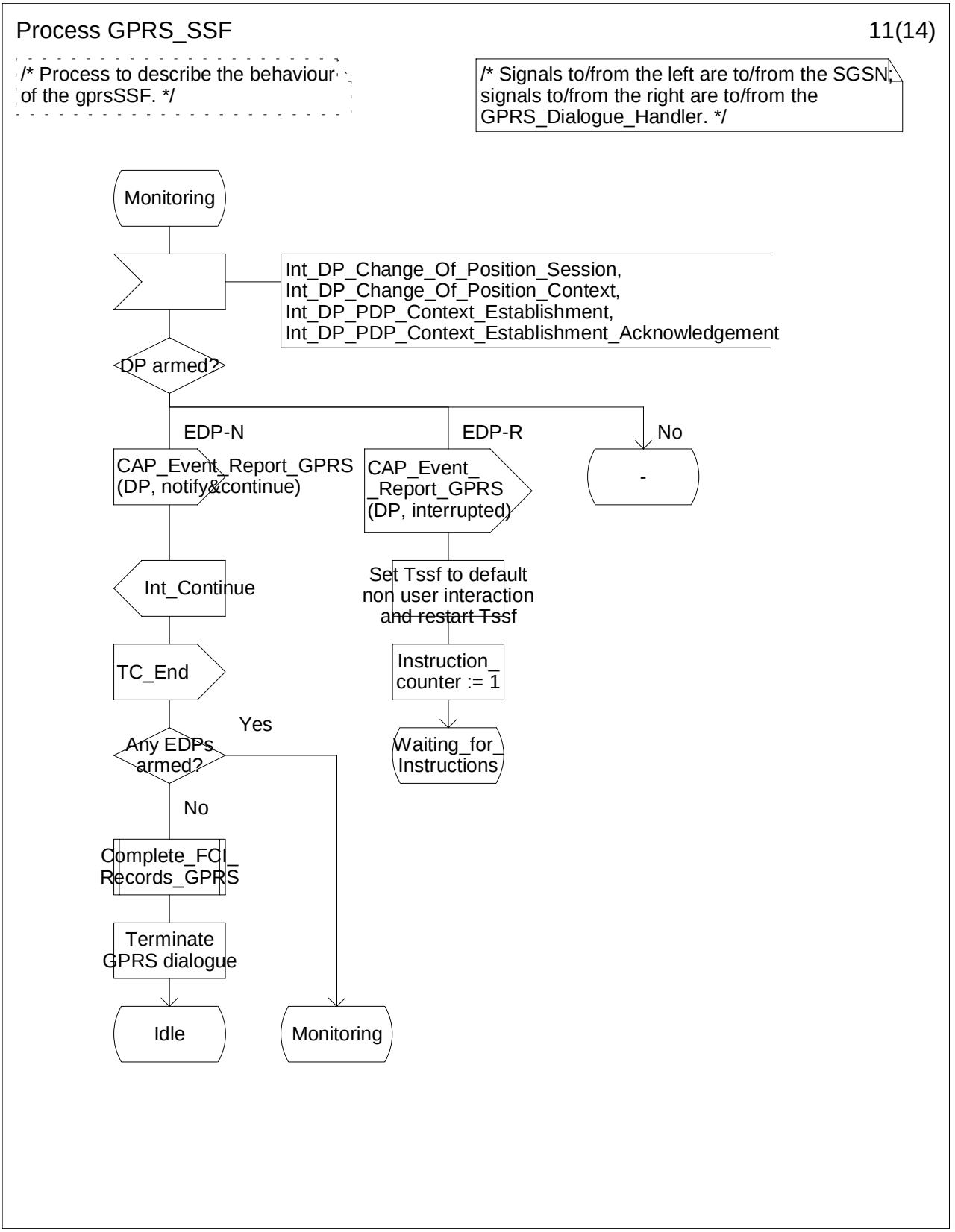


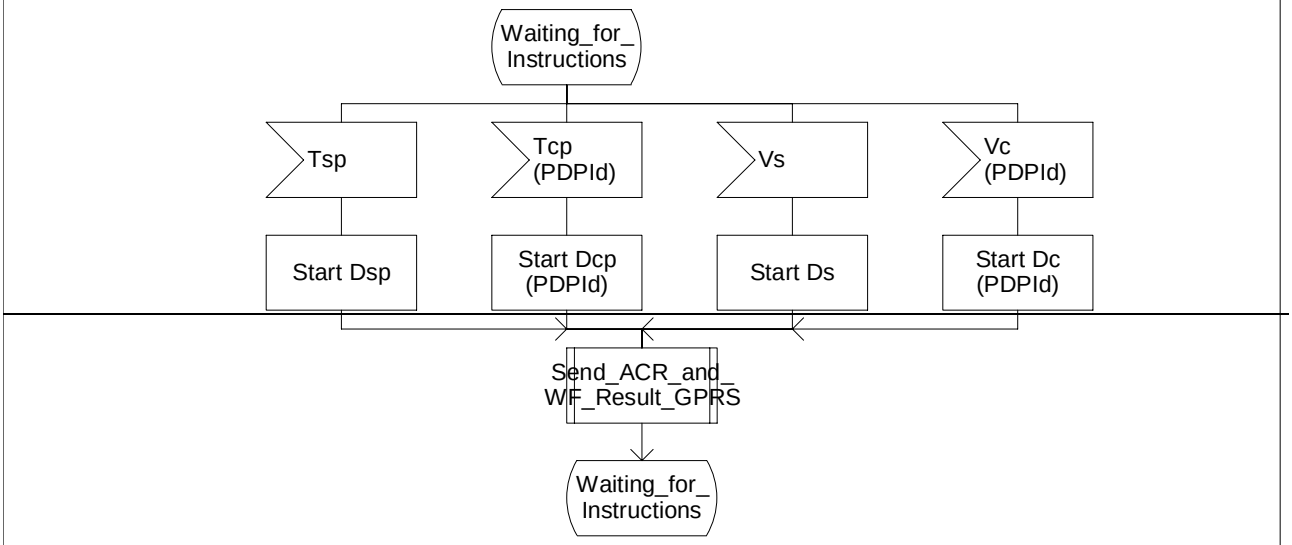
Figure 6.14 j: Process GPRS_SSF (sheet 11~~10~~)

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
*/



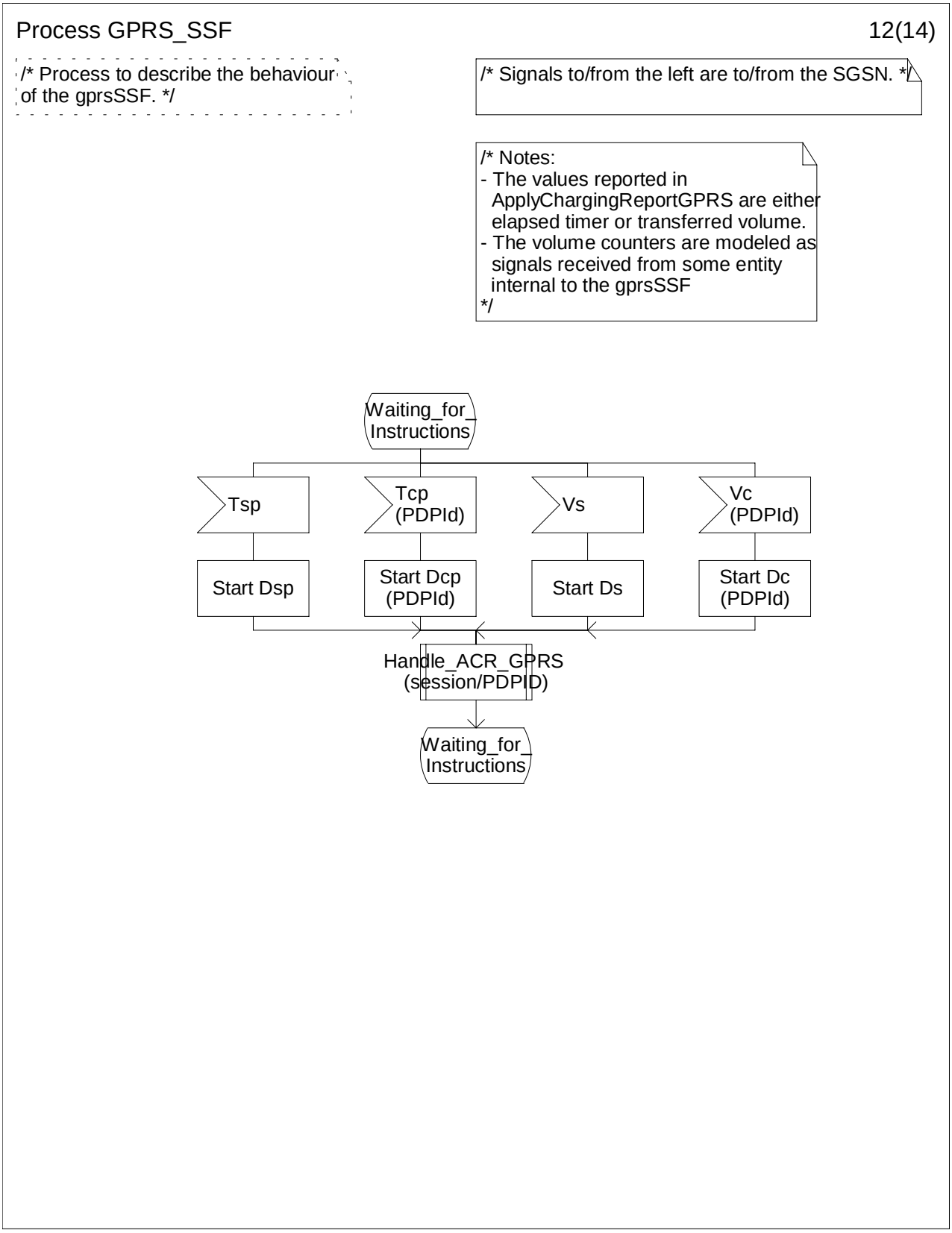


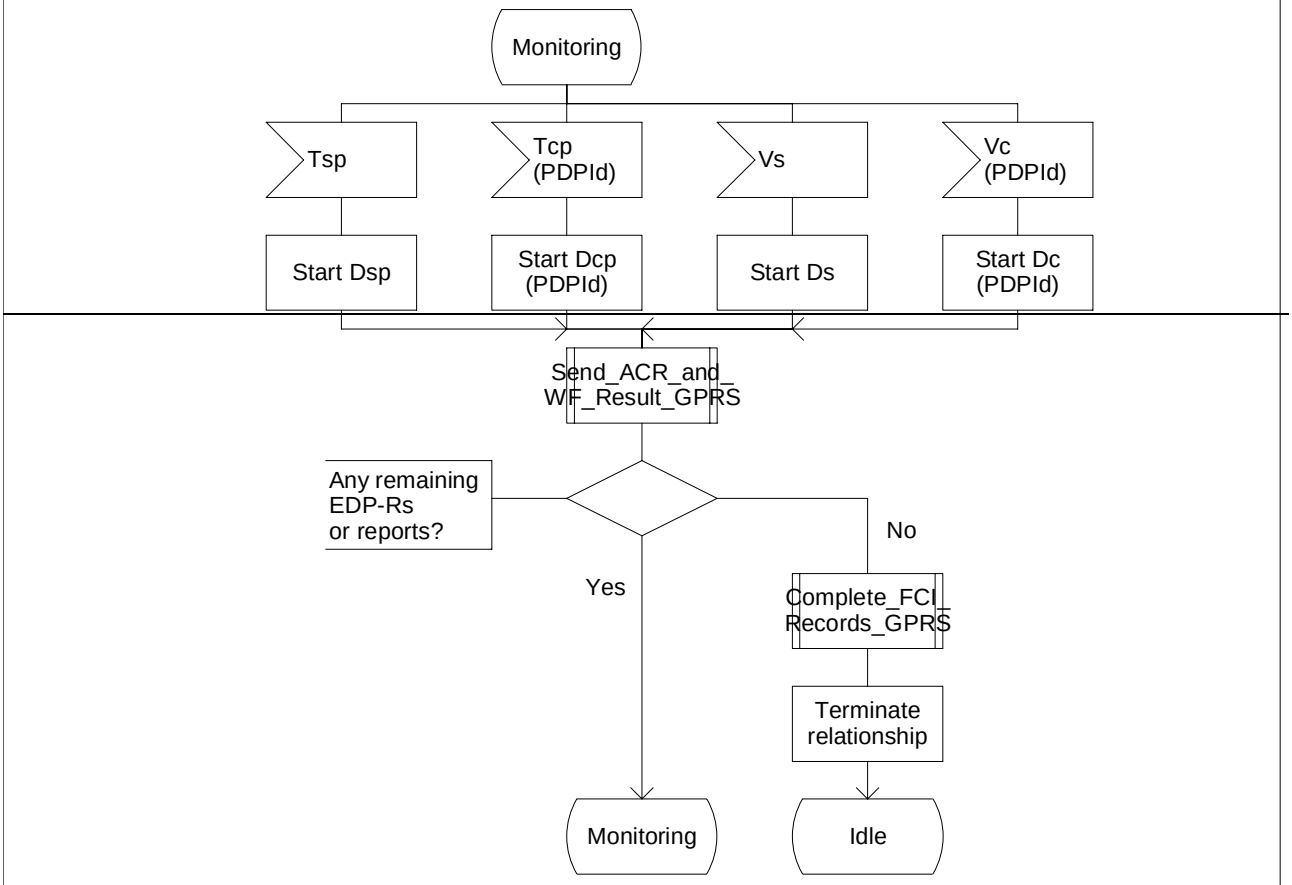
Figure 6.14 k: Process GPRS_SSF (sheet 12~~11~~)

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
*/



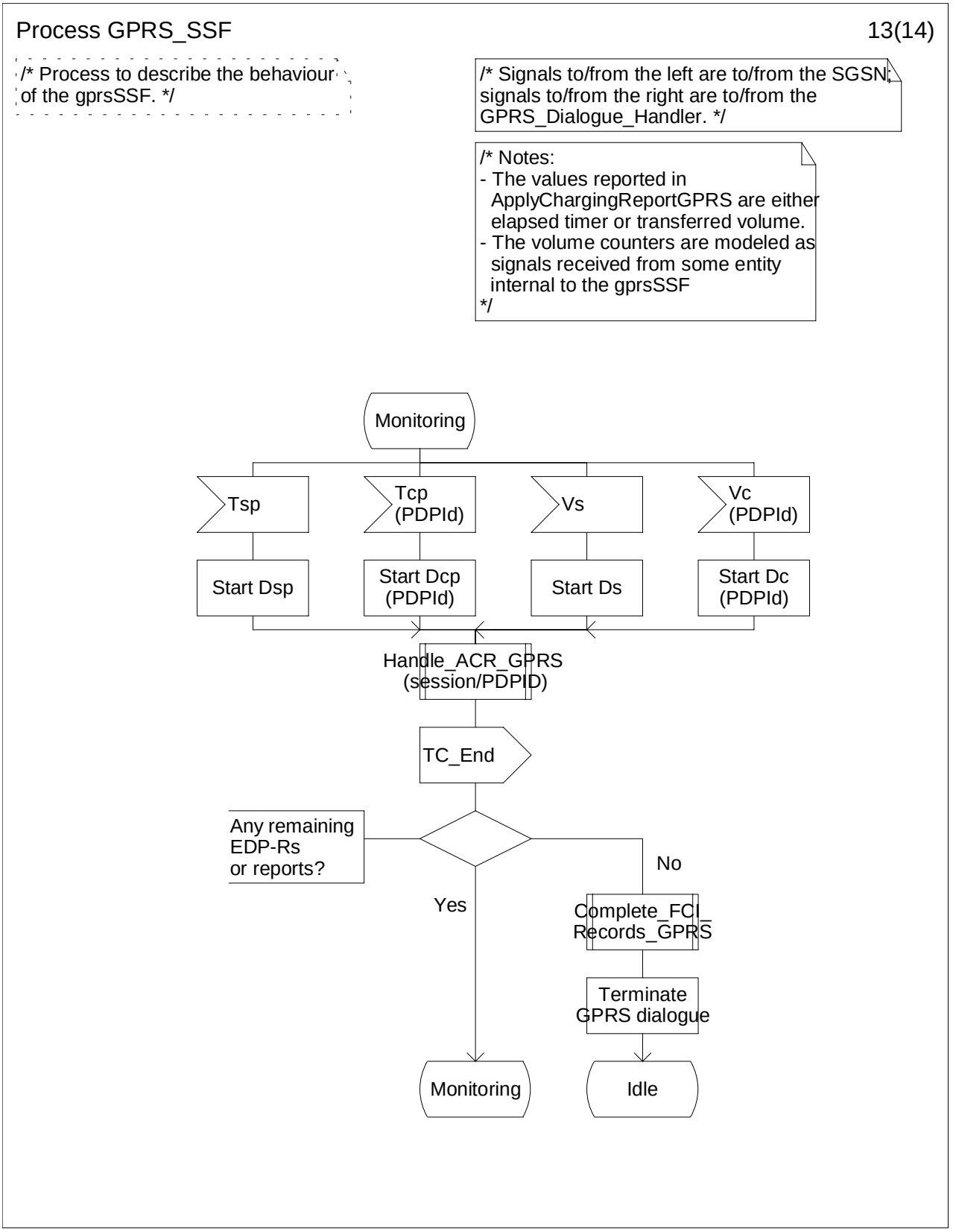
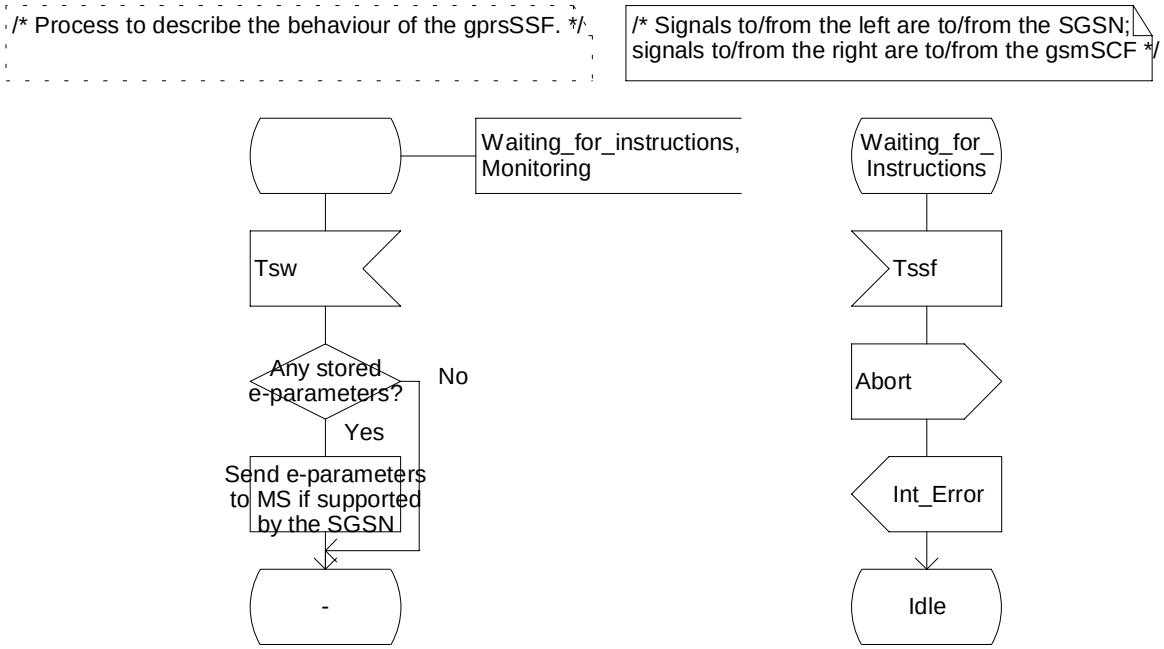


Figure 6.14 l: Process GPRS_SSF (sheet 13~~12~~)

Process GPRS_SSF 13(13)



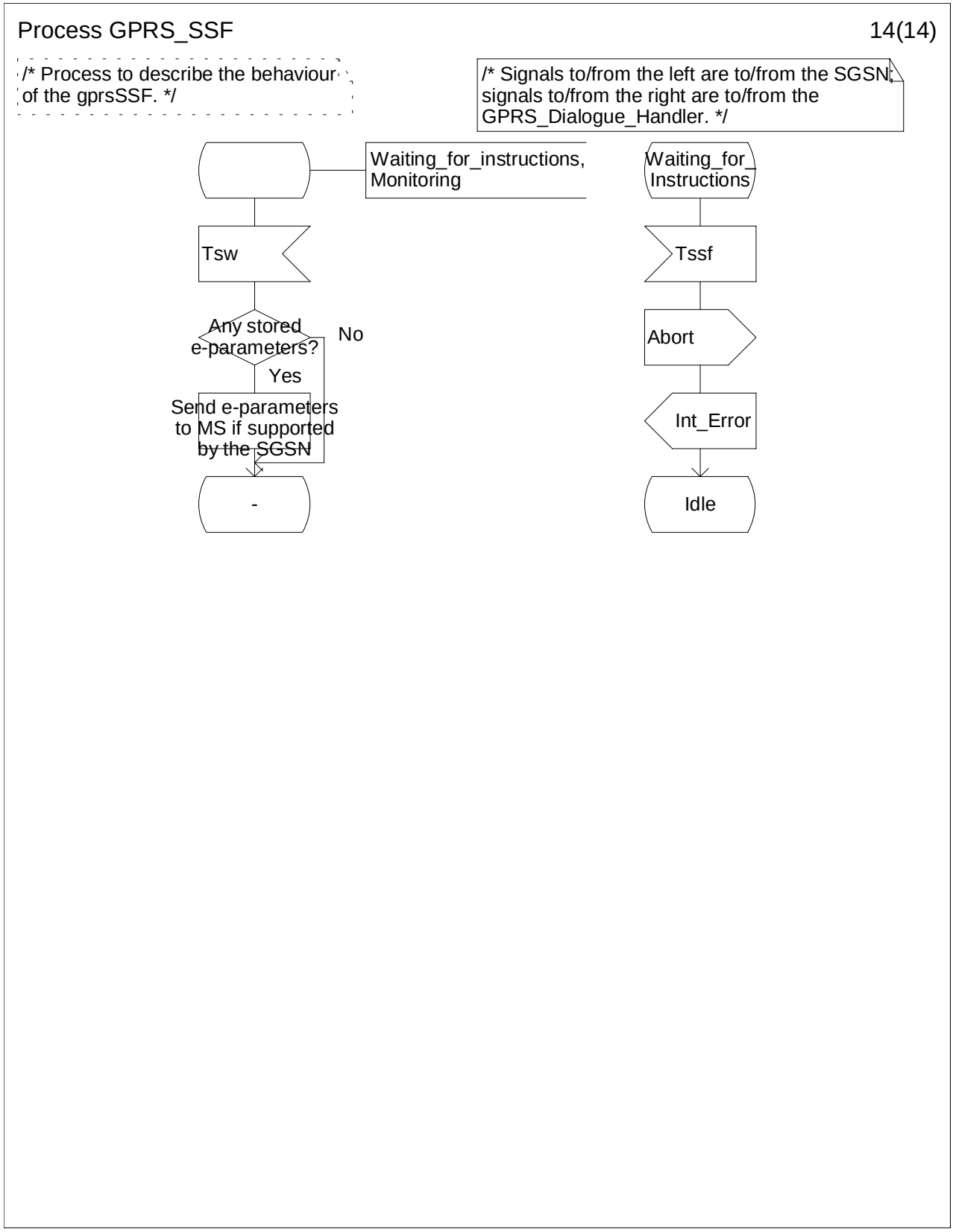


Figure 6.14 m: Process GPRS_SSF (sheet 14~~13~~)

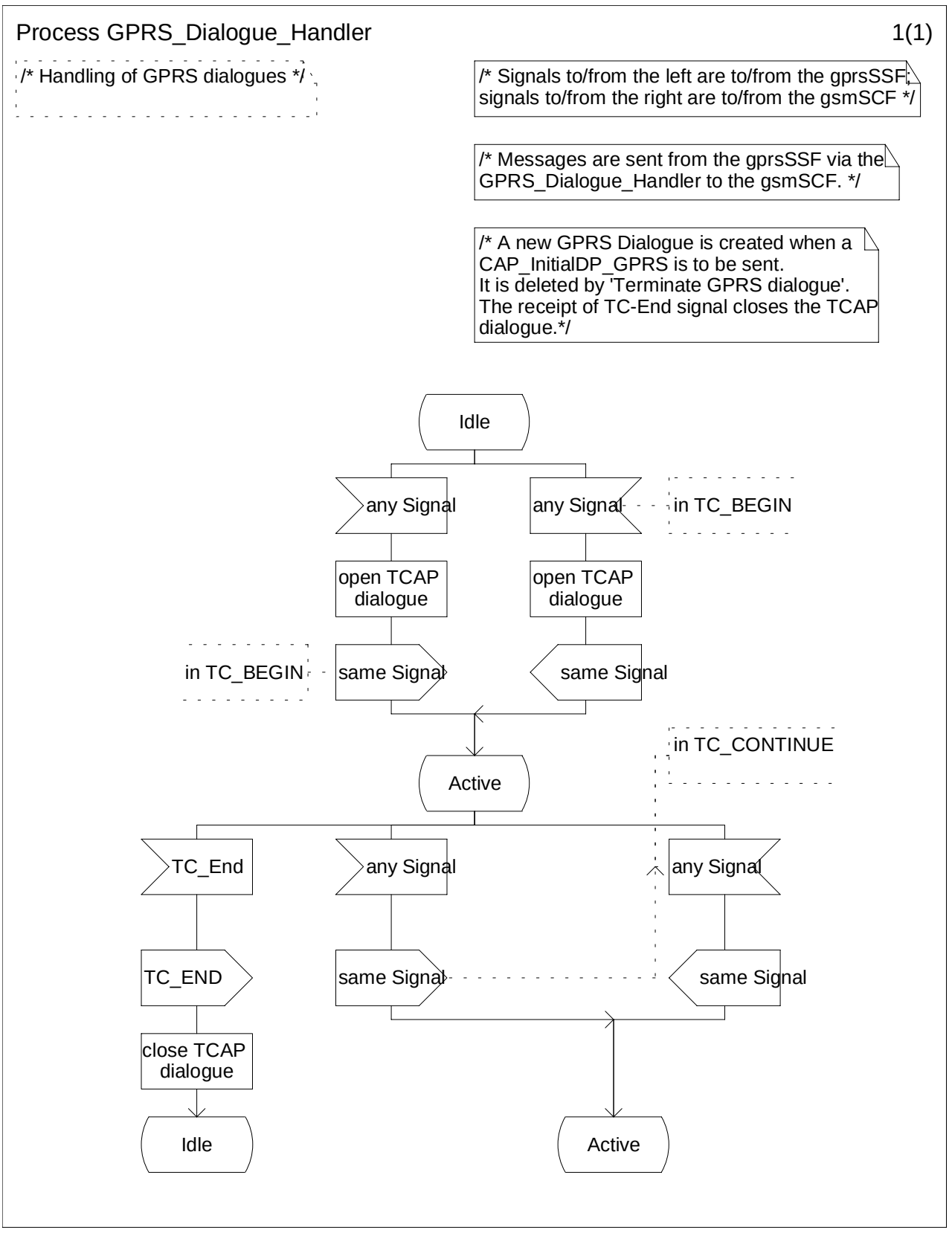
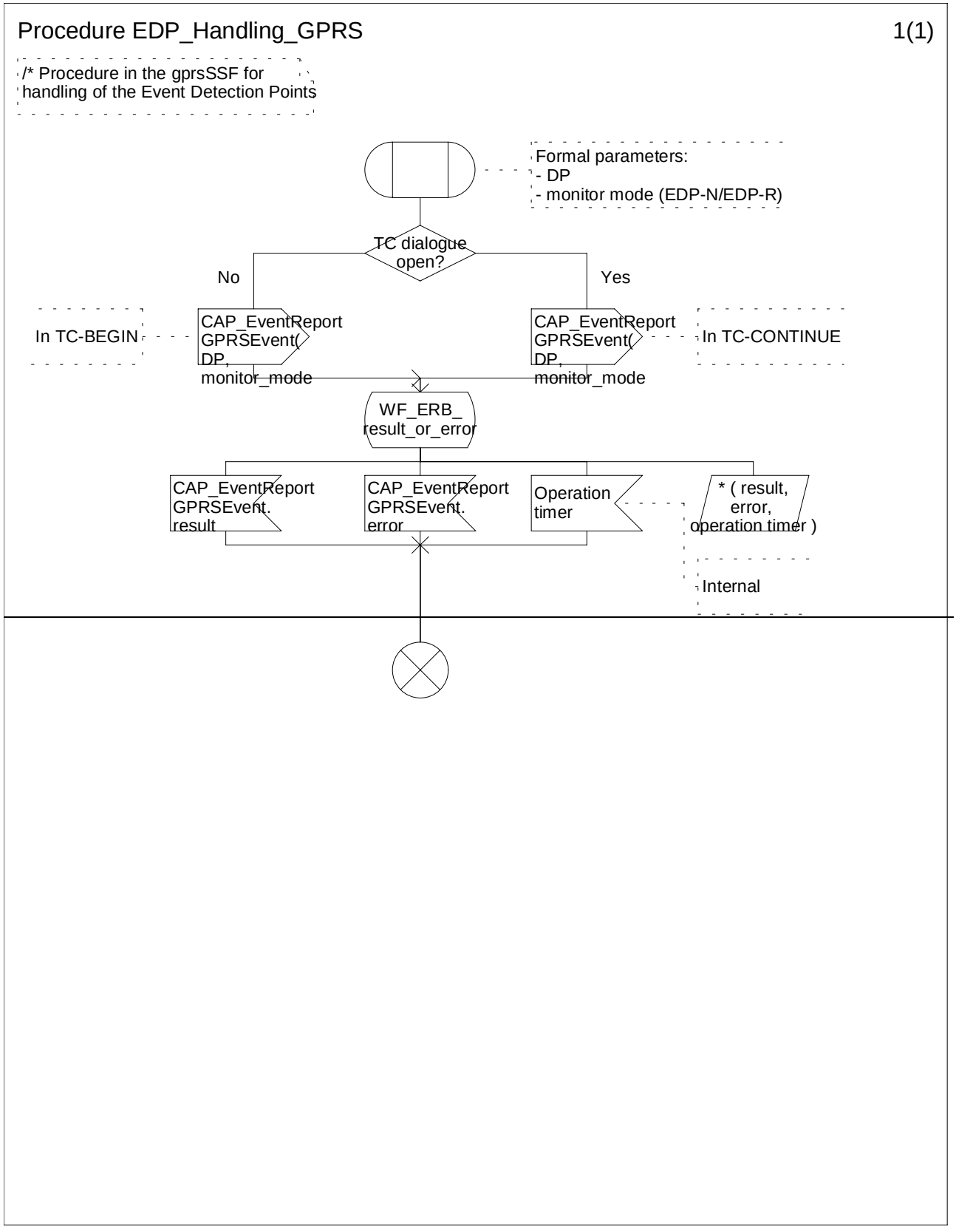
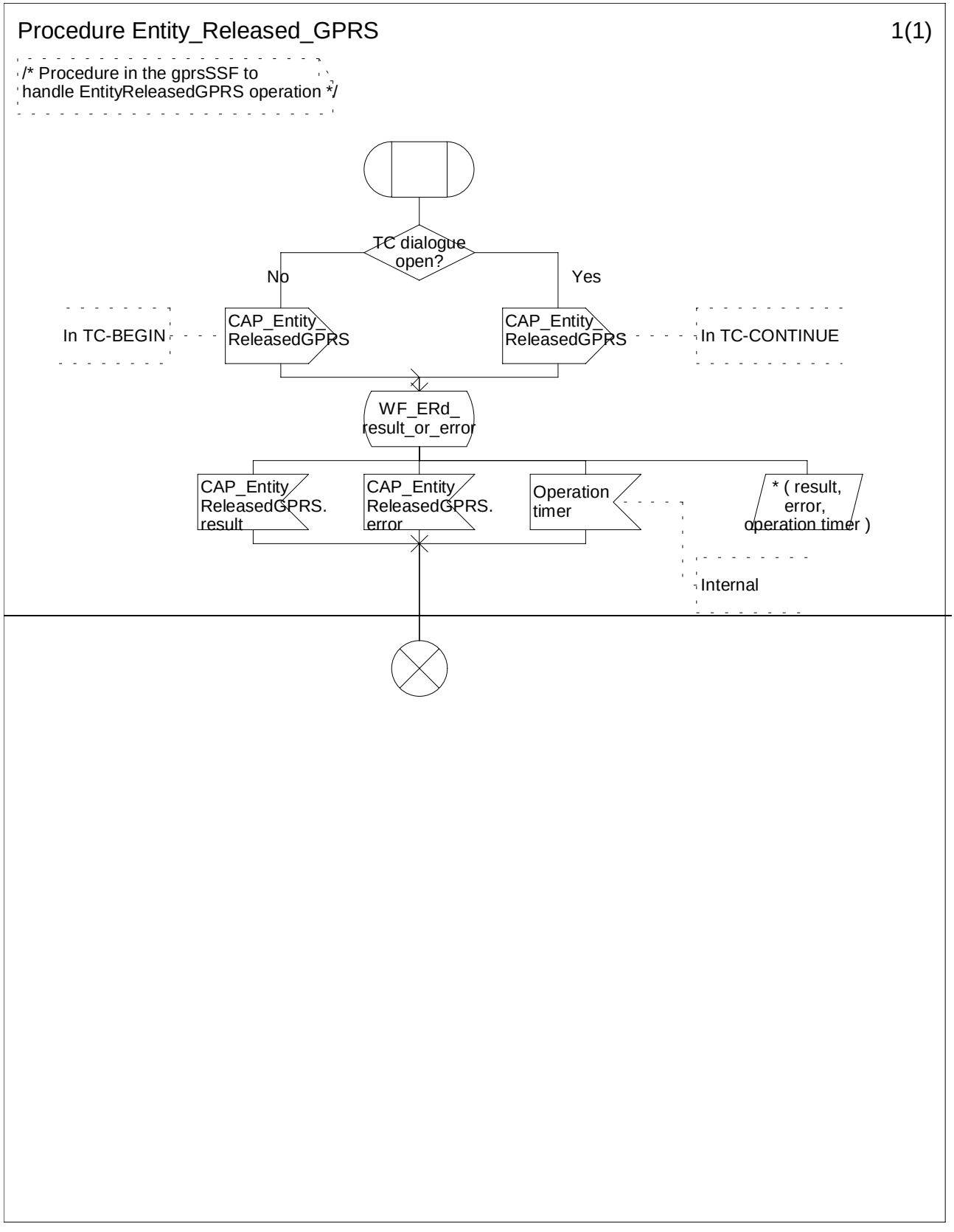


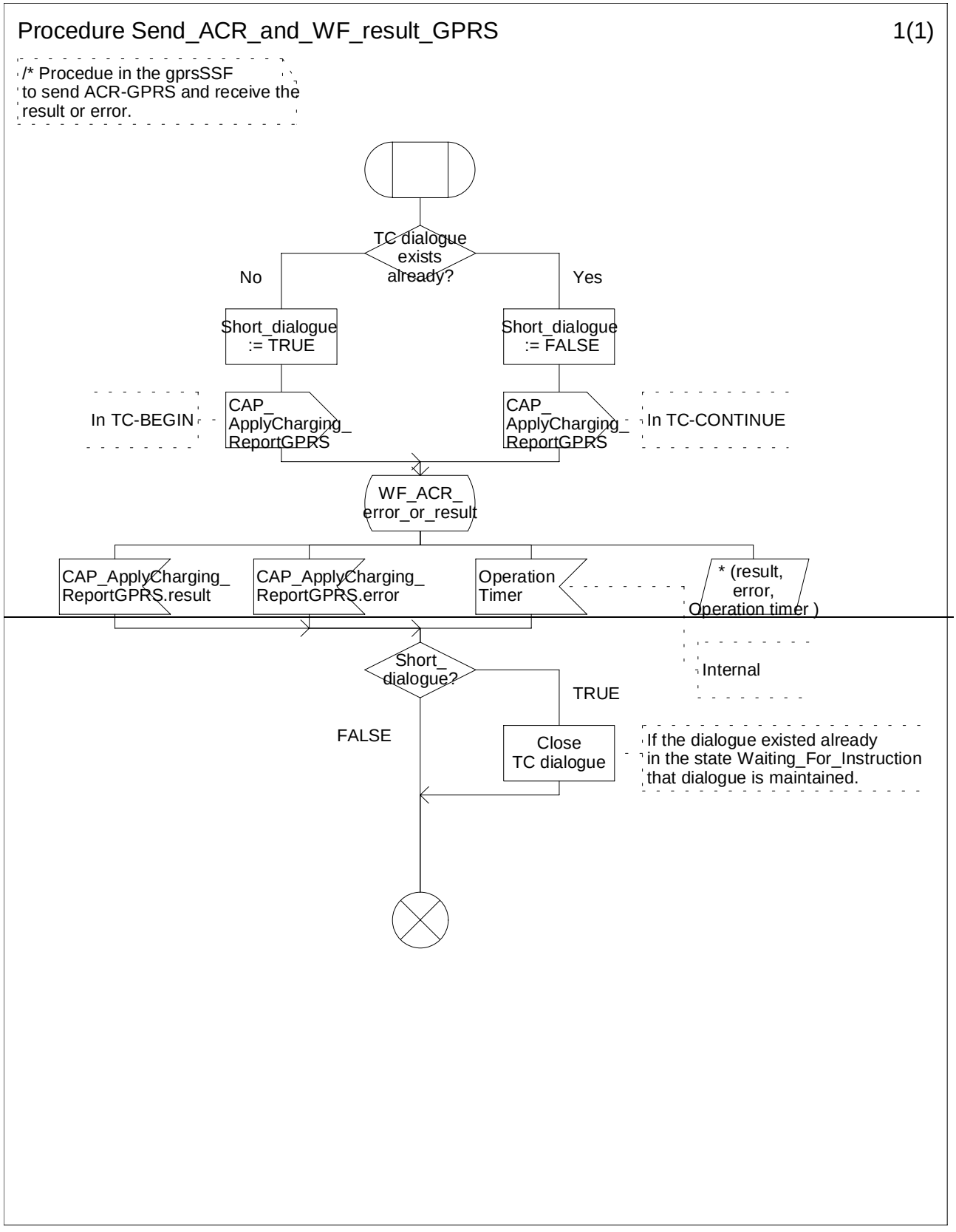
Figure 6.15: Process GPRS_Dialogue_Handler (sheet 1)



~~Figure 6.15 a: Procedure EDP_Handling_GPRS (sheet 1)~~



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



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

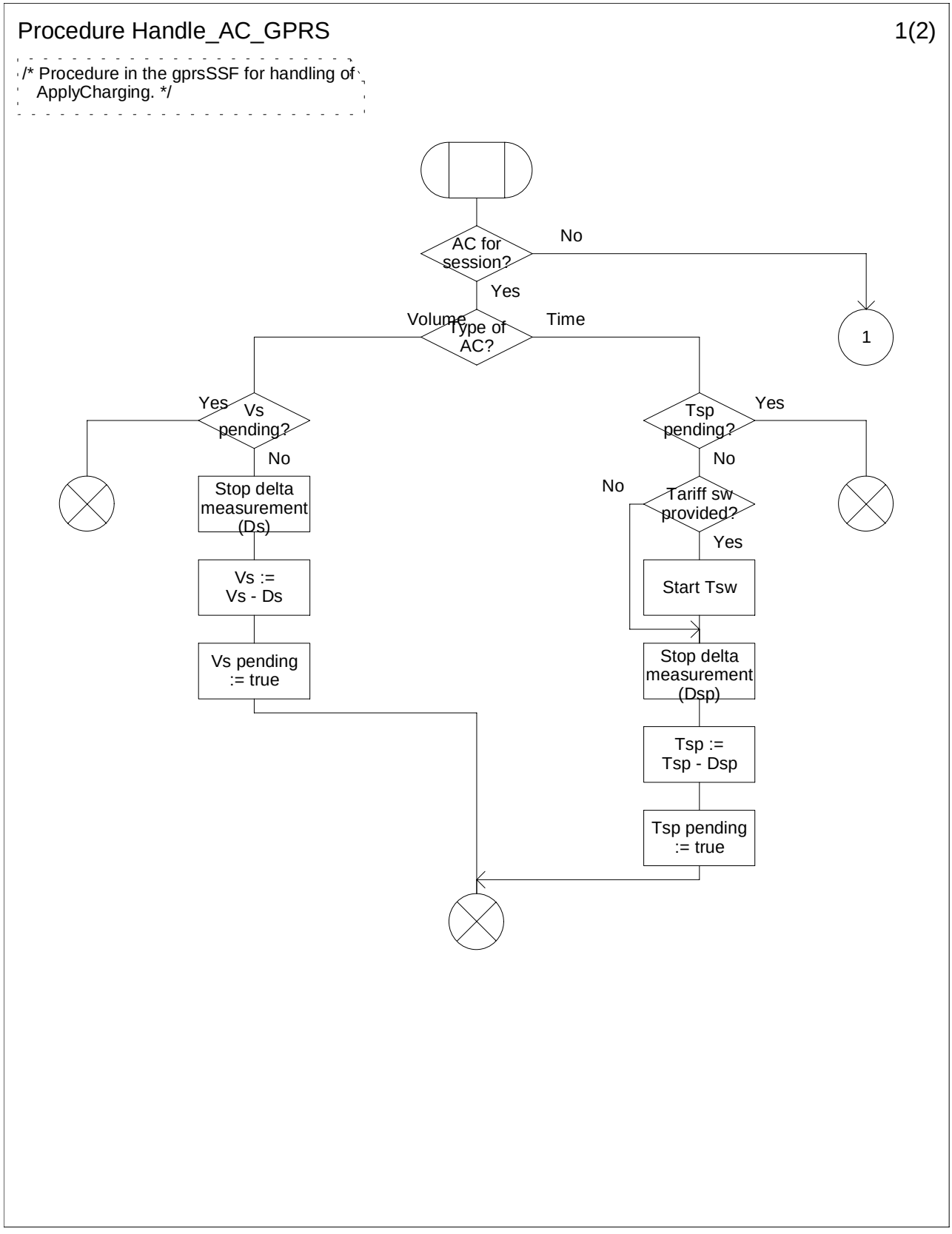


Figure Error! Reference source not found.**.4 a: Procedure Handle_AC_GPRS (sheet 1)**

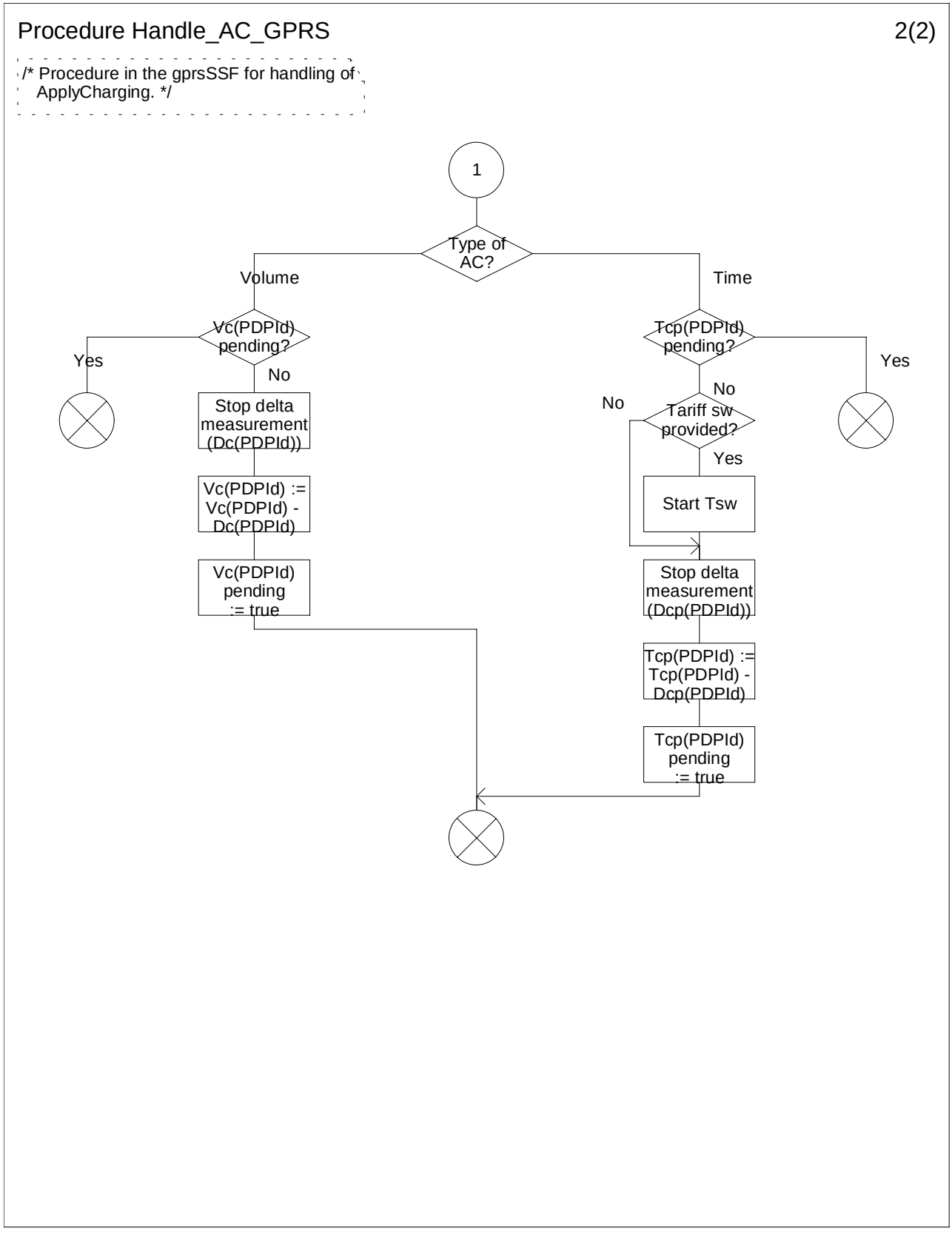


Figure Error! Reference source not found.**.4 b: Procedure Handle_AC_GPRS (sheet 2)**

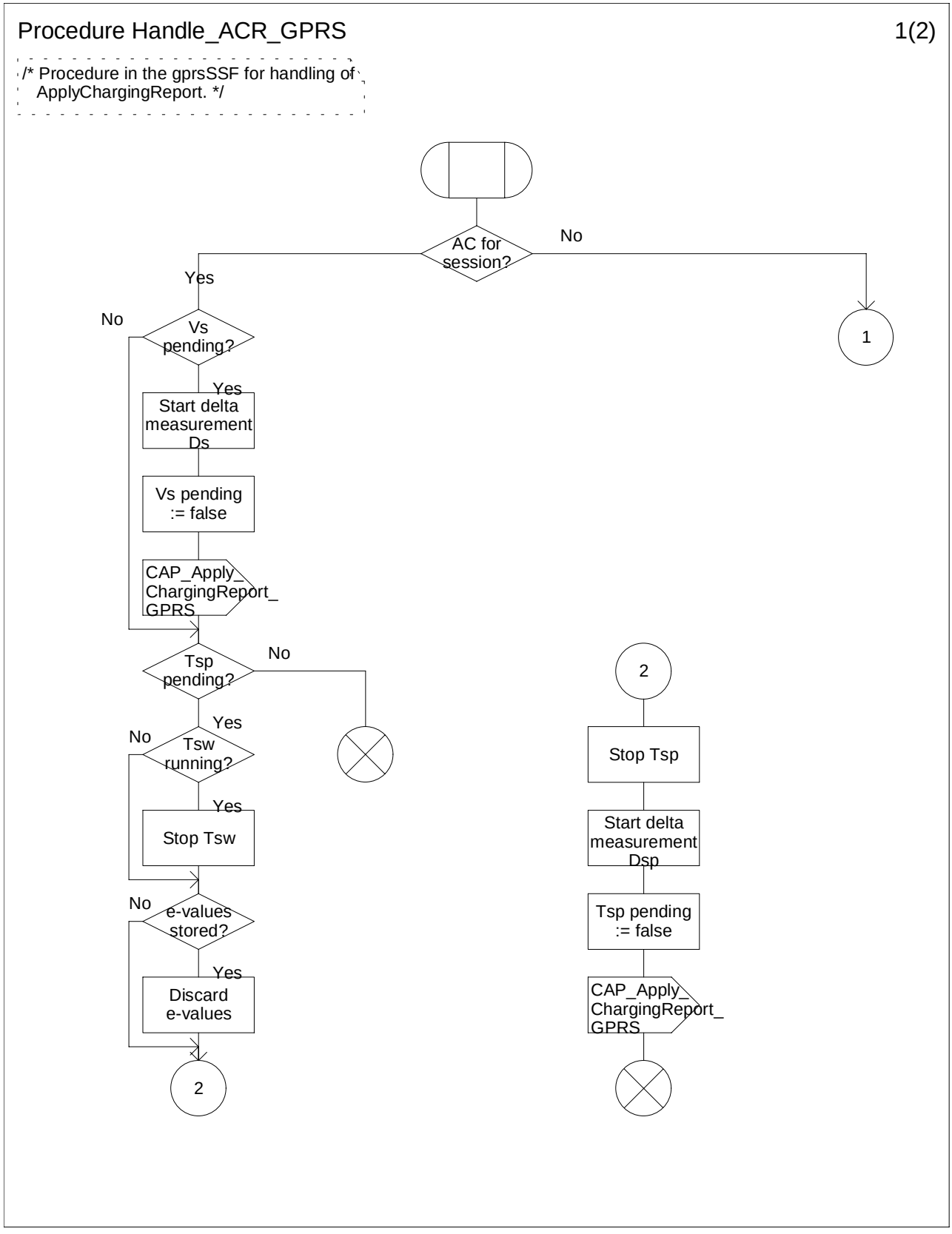


Figure Error! Reference source not found.**.5 a: Procedure Handle_ACR_GPRS (sheet 1)**

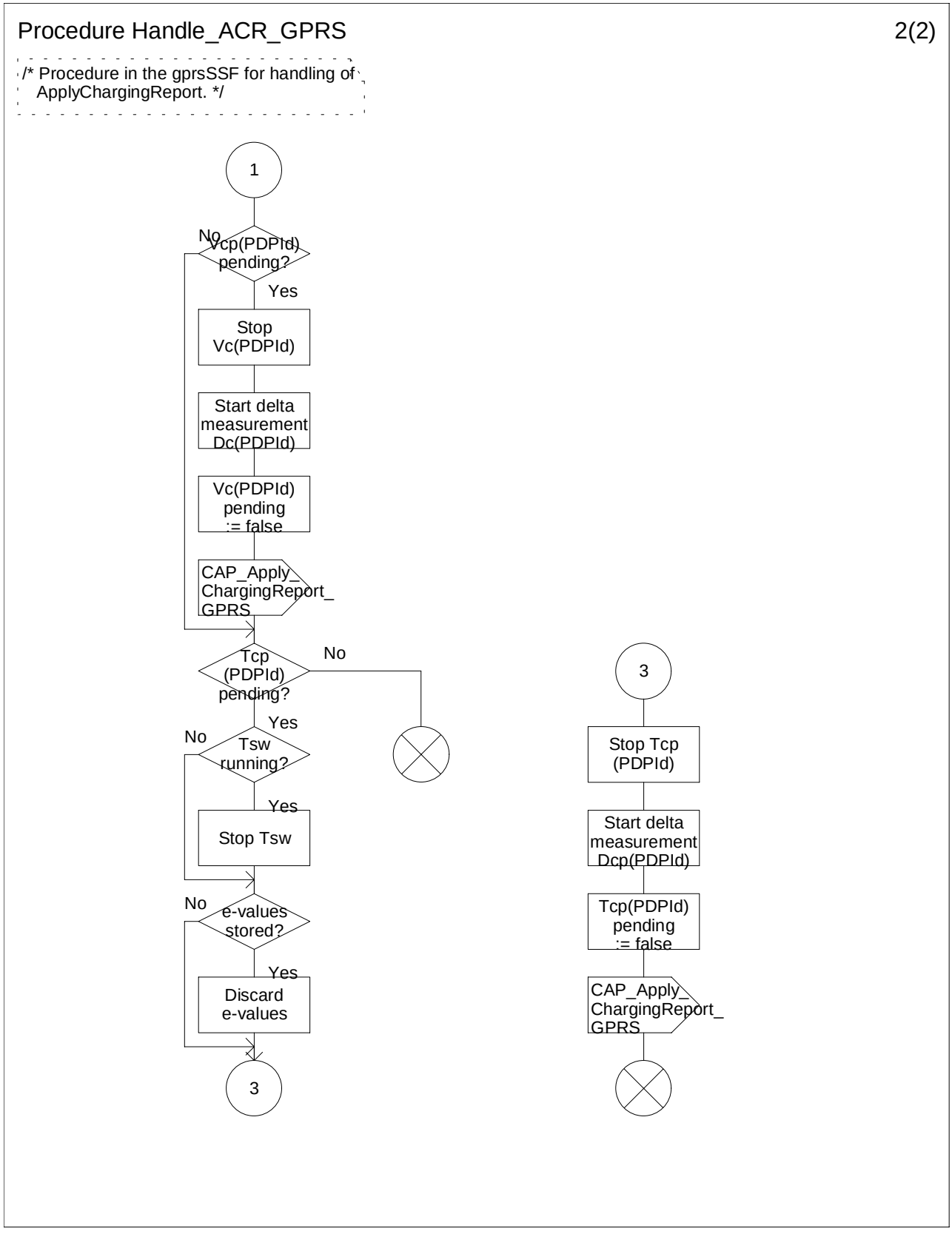


Figure Error! Reference source not found.**.5 b: Procedure Handle_ACR_GPRS (sheet 2)**

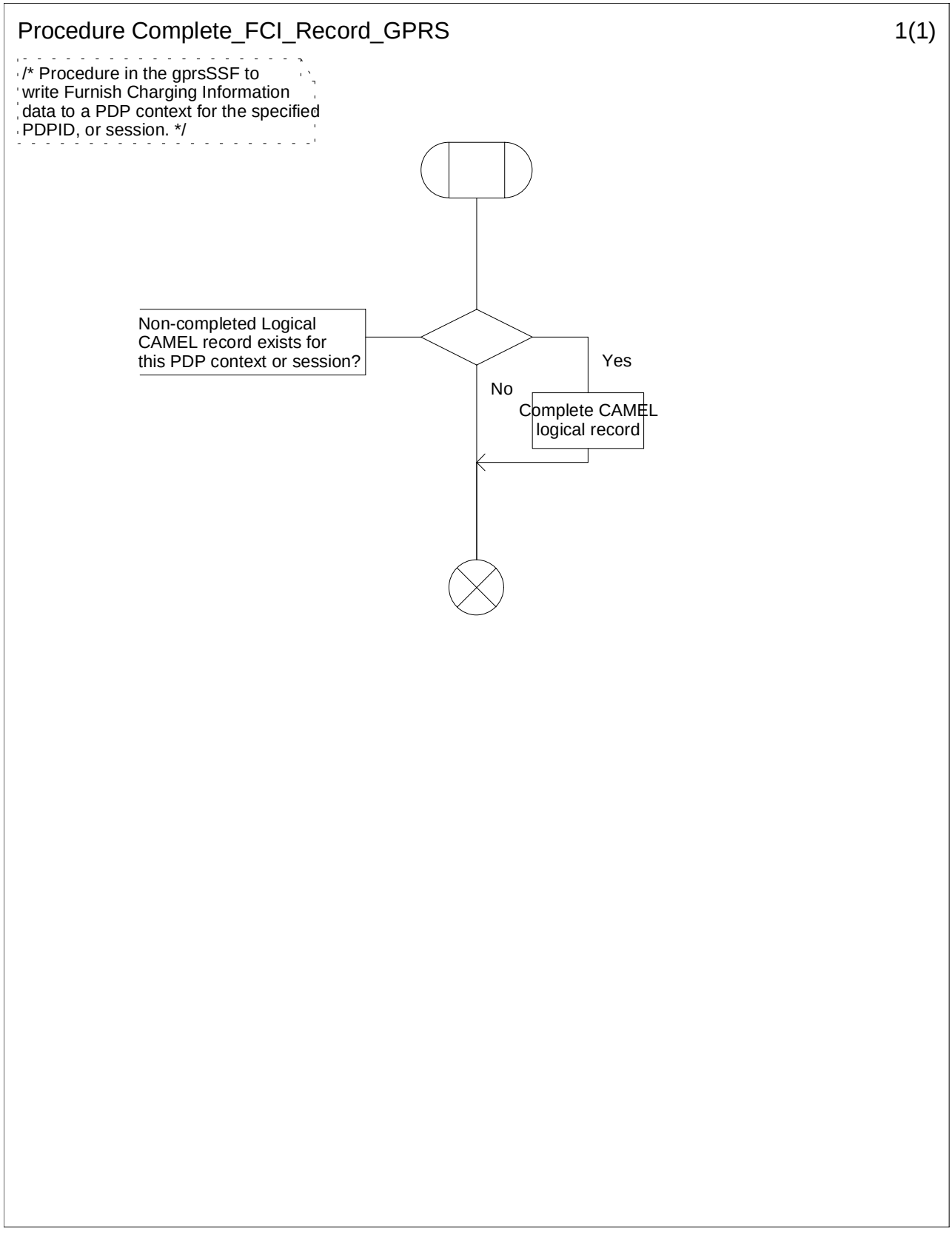


Figure Error! Reference source not found..**6 a: Procedure Complete_FCI_Record_GPRS (sheet 1)**

6.6 Description of information flows

6.6.1 gprsSSF to gsmSCF Information Flows

6.6.1.1 Activity Test GPRS Ack

6.6.1.1.1 Description

This IF is the response to the Activity Test GPRS.

6.6.1.1.2 Information Elements

This IF contains no information elements.

6.6.1.2 Apply Charging Report GPRS

6.6.1.2.1 Description

This IF is used by the gprsSSF to report to the gsmSCF the information requested in the Apply Charging GPRS IF. In addition, this IF is used to notify the gsmSCF of user initiated change in QoS. Note that there are several possible QoS profiles defined by the combinations of the different QoS attributes as defined in 3G TS 23.060, see reference [11]. A PLMN may only support and charge on a limited subset of those QoS. It is recommended that changes in QoS are only reported in Apply Charging Report GPRS for those QoS profiles.

6.6.1.2.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
Charging Result	M	This IE contains the charging information for the PDP provided by the gsmSSF. It is a choice between elapsed time and data volume.
Quality of Service	C	This IE identifies the QoS requested by the user and granted by the SGSN due to 'Modify PDP Context request. This IE shall only be present if sending of the Apply Charging Report was triggered by a change in Quality of Service.
Active	M	This IE indicates if the GPRS session or PDP context is still established, or if it has been detached or deactivated.
PDP ID	C	This IE identifies the PDP context which the Apply Charging Report is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.1.3 Entity Released GPRS

6.6.1.3.1 Description

This IF is used by the gprsSSF to inform the gsmSCF at any phase that a GPRS session or PDP context has been terminated by the SGSN without reporting any EDP.

6.6.1.3.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
GPRS Cause	M	This IE contains the Cause value indicating the reason for discontinuation of the PDP context.
PDP ID	M	This IE identifies the PDP context which has been terminated by the SGSN.

M Mandatory (The IE shall always be sent).

6.6.1.4 Event Report GPRS

6.6.1.4.1 Description

This IF is used to notify the gsmSCF of a GPRS event (e.g. Attach or Detach) previously requested by the gsmSCF in a Request Report GPRS Event IF.

6.6.1.4.2 Information Elements

The following information elements are required:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
GPRS Event type	M	This IE specifies the type of event that is reported.
Misc GPRS Info	M	This IE indicates the DP type (EDP-N or EDP-R).
GPRS Event Specific Information	C	This IE contains information specific to the reported event, e.g. new routeing area in case of change of position or charging id in case of PDP Context Establishment Acknowledgement.
PDP ID	C	This IE identifies the PDP context, which the Report GPRS Event is applicable for. If not present the dialogue corresponds to the Attach/Detach FSM or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.1.5 Initial DP GPRS

6.6.1.5.1 Description

This IF is generated by the gprsSSF when a trigger is detected at a DP in the GPRS state machines, to request instructions from the gsmSCF.

6.6.1.5.2 Information Elements

The following information elements are required:

Information element name	Required	Description
SGSN Address	M	This IE contains the international E.164 address of the SGSN.
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
ServiceKey	M	This IE indicates to the gsmSCF the requested CAMEL Service. It is used to address the required application/SLP within the gsmSCF.
GPRS Event Type	M	This IE indicates the armed GPRS DP event resulting in the Initial Data Event IF.
MSISDN	M	This IE contains the basic MSISDN of the MS.
IMSI	M	This IE identifies the mobile subscriber.
Time and Time zone	M	This IE contains the time that the gprsSSF was triggered, and the time zone the gprsSSF resides in.
GPRS MS Class	C	This IE contains the MS network and radio access capabilities.
PDP Type	C	This IE identifies the PDP Type, e.g. X.25 or IP.
Quality of Service	C	This IE identifies the QoS (subscribed, requested or negotiated).
Access Point Name	C	This IE identifies the address Access Point Name the MS has requested to connect to.
Routeing Area Identity	C	This IE contains the location information of the MS.
Charging ID	C	This IE contains the Charging ID received from the GGSN for the PDP context.
SGSN Capabilities	C	This IE specifies the capabilities of the SGSN node to support the CAMEL interwork, e.g. support of Advice of Charge.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.2 gsmSCF to gprsSSF Information Flows

6.6.2.1 Activity Test GPRS

6.6.2.1.1 Description

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

6.6.2.1.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.

M Mandatory (The IE shall always be sent).

6.6.2.2 Apply Charging GPRS

6.6.2.2.1 Description

This IF is used for interacting from the gsmSCF with the gprsSSF charging mechanisms to control the charging of a GPRS session or PDP Context.

6.6.2.2.2 Information Elements

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
Charging Characteristics	M	This IE specifies the charging related information to be provided by the gsmSSF and the conditions on which this information has to be provided back to the gsmSCF. It is a choice between granted volume and granted time for the data transfer.
Tariff Switch Interval	O	This information element specifies the time duration until the next tariff switch occurrence.
PDP ID	C	This IE identifies the PDP context, which the Apply GPRS Charging is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

C Conditional (The IE shall be sent, if available).

6.6.2.3 Apply Charging Report GPRS Ack

6.6.2.3.1 Description

This IF is the response to the Apply Charging Report GPRS.

6.6.2.3.2 Information Elements

This IF contains no information elements.

6.6.2.43 Cancel GPRS

6.6.2.43.1 Description

This IF is used by the gsmSCF to request the gprsSSF to cancel all EDPs and reports.

6.6.2.43.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
PDP ID	C	This IE identifies the PDP context which is to be cancelled. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.2.54 Connect GPRS

6.6.2.54.1 Description

This IF is used by the gsmSCF to request the gprsSSF to modify the APN used when establishing a PDP Context.

6.6.2.54.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Access Point Name	M	This IE contains the Access Point Name to be used when establishing the PDP Context.
PDP Id	C	This IE identifies the PDP Context where the new Access Point Name shall be used.

M Mandatory (The IE shall always be sent).

6.6.2.65 Continue GPRS

6.6.2.65.1 Description

This information flow requests the gprsSSF to proceed with processing at the DP at which it previously suspended processing to await gsmSCF instructions. The gprsSSF completes DP processing, and continues processing (i.e., proceeds to the next point in the Attach/Detach FSM or PDP Context FSM) without substituting new data from the gsmSCF.

6.6.2.65.2 Information Elements

The following information element is used:

Information element name	Required	Description
PDP ID	C	This IE identifies the PDP context which processing shall continue for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

C Conditional (The IE shall be sent, if available).

6.6.2.7 Entity Released GPRS Ack

6.6.2.7.1 Description

This IF is the response to the Entity Released GPRS.

6.6.2.7.2 Information Elements

This IF contains no information elements.

6.6.2.8 Event Report GPRS Ack

6.6.2.8.1 Description

This IF is the response to the Event Report GPRS.

6.6.2.8.2 Information Elements

This IF contains no information elements.

6.6.2.96 Furnish Charging Information GPRS

6.6.2.96.1 Description

This IF is used to request the gprsSSF to include information in the CAMEL specific logical call record.

The logical call record is created when FCI-GPRS is received and a logical call record for that FSM does not exist. For modelling purposes the logical call record is buffered in the gprsSSF. The gprsSSF 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.

In the SGSN there is a separate Logical call record for the attach/detach state model and for each PDP context.

The CSE can send multiple concatenated FCIs per Logical Call Record for completion. The total maximum of free format data is 160 octets per Logical Call Record. 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 CDR.

6.6.2.96.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.

FCI GPRS Billing Charging Characteristics	M	This IE is described in the next table.

M Mandatory (The IE shall always be sent).

FCI GPRS Billing Charging Characteristics contains the following information:

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

M Mandatory (The IE shall always be sent).

FCIBCCCAMEL Sequence 1 contains the following information:

Information element name	Required	Description
Free Format Data	M	This IE is a free format data to be inserted in the CAMEL logical call record.
Append Free Format Data	O	This IE indicates that the gprsSSF shall append the free format data to the Logical call record. In the SGSN there is a separate Logical call record for the attach/detach state model and for each PDP context. - If this IE is present indicating "Append", the gprsSSF shall append the free format data received in this IF to the free format data already present in the Logical call record for that GPRS session or PDP Context. - If this IE is absent or in value "Overwrite", then the gprsSSF shall overwrite all free format data already present in the Logical call record for that GPRS session or PDP Context, by the free format data received in this IF. If no Logical call record exists yet for that GPRS session or PDP Context, then the gprsSSF shall ignore this IE.
PDP Id	C	This IE identifies the PDP context's Logical call record to which the free format data shall be appended or overwritten. If not present, the free format data belong to a Logical call record for a GPRS session or a single PDP context for the dialogue.

M Mandatory (The IE shall always be sent).

O Optimal (Service logic dependent).

C Conditional (The IE shall be sent, if available).

6.6.2.10~~7~~ Release GPRS

6.6.2.10~~7~~.1 Description

This IF is used by the gsmSCF to tear down an existing GPRS session or PDP Context at any phase.

6.6.2.10~~7~~.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.

GPRS Cause	M	This IE contains the Cause value indicating the reason for releasing the GPRS session or PDP context.
PDP ID	C	This IE identifies the PDP context which shall be released. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.2.11~~8~~ Request Report GPRS Event

6.6.2.11~~8~~.1 Description

This IF is used to request the gprsSSF to monitor for an event and send a notification back to the gsmSCF when the event is detected (see Event Report Data).

6.6.2.11~~8~~.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
GPRS Event	M	This IE specifies the event or events of which a report is requested.
PDP ID	C	This IE identifies the PDP context, which the Request Report GPRS Event is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

Data Event contains the following information:

Information element name	Required	Description
GPRS Event type	M	This IE specifies the type of event of which a report is requested.
Monitor Mode	M	This IE indicates how the event shall be reported.

M Mandatory (The IE shall always be sent).

6.6.2.12~~9~~ Reset Timer GPRS

6.6.2.12~~9~~.1 Description

This IF is used to refresh the gprsSSF timer.

6.6.2.12~~9~~.2 Information Elements

The following information elements are required:

Information element name	Required	Description
Timer ID	M	This IE specifies the default value for the Tssf timer.
Timer Value	M	This IE specifies the value to which the timer Tssf shall be set.
PDP ID	C	This IE identifies the PDP context, which the Reset of the timer is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.2.13~~0~~ Send Charging Information GPRS

6.6.2.13~~0~~.1 Description

This IF is used to send e-parameters from the gsmSCF to the gprsSSF. If charge advice information is received from the gsmSCF, it shall replace the charge advice information which would be generated by the SGSN and inhibit any further generation of CAI by the SGSN. Further processing of the charge advice information by the SGSN shall be in accordance with the GSM Advice of Charge Supplementary Service.

NOTE: If charge advice information is received from the gsmSCF after charge information has been generated by the SGSN and sent to the MS, the behaviour of the service may be unpredictable or incorrect; the service designer should therefore ensure that the first set of charge advice information is sent to the gprsSSF before charge information is sent to the to the MS.

6.6.2.13~~0~~.2 Information Elements

The following information elements are required:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
SCI GPRS Billing ChargingCharacteristics	M	This IE defines the Advice Of Charge related information to be provided to the Mobile Station, if supported by the SGSN.

M Mandatory (The IE shall always be sent).

GPRS SCI Billing Charging Characteristics is defined as:

Information element name	Required	Description
AOC GPRS	M	This IE is sent after an Activate PDP Context Accept or Attach Accept has been received from the SGSN. This IE defines the Advice Of Charge related information to be provided to the Mobile Station, if supported by the SGSN.
PDP Id	C	This IE is included if the AoC is applicable to a PDP context. If not present the AoC is applicable to the GPRS session or for a single PDP context for the dialogue.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

AOC GPRS is defined as:

Information element name	Required	Description
AOC Initial	M	This IE contains CAI elements as defined in 3G TS 22.024 [x].
AOC Subsequent	O	See definition in the next table.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

AOC Subsequent is defined as:

Information element name	Required	Description
CAI Elements	M	This IE contains CAI elements as defined in 3G TS 22.024 [x].
Tariff Switch Interval	O	This IE indicates the tariff switch time until the next tariff switch applies.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

6.6.3 HLR to SGSN Information Flows

6.6.3.1 Insert Subscriber Data

6.6.3.1.1 Description

This IF is specified in 3G TS 29.002 [4] and used by the HLR to insert subscriber data in the SGSN.

6.6.3.1.2 Information Elements

Insert Subscriber Data contains the following CAMEL specific IE:

Information element name	Required	Description
GPRS-CSI	C	This IE identifies the subscriber as having CAMEL GPRS services.

C Conditional (The IE shall be sent, if required).

GPRS-CSI contains the following information:

Information element name	Required	Description
GsmSCF Address	M	This IE is described in section 0
Service Key	M	This IE is described in section 0.
Default Session Handling	M	This IE is described in section 0.
TDP List	M	This IE is described in section 0.

M Mandatory (The IE shall always be sent).

6.6.4 SGSN to HLR Information Flows

6.6.4.1 Update GPRS Location

6.6.4.1.1 Description

This IF is used by the SGSN to indicate to the HLR a GPRS location update. This IF is specified in 3G TS 29.002 [4].

6.6.4.1.2 Information Elements

Update GPRS location contains the following CAMEL specific IE:

Information element name	Required	Description
Supported CAMEL Phases	C	This IE identifies which CAMEL phases are supported by the SGSN. The SGSN may indicate support of CAMEL phase 3 or higher.

C Conditional (The IE shall always be sent when the SGSN supports CAMEL).

6.6.5 SGSN to HLR Information Flows

6.6.5.1 Insert Subscriber Data ack

See subclause 4.6.8.

3GPP TSG CN N2#10
Rotenburg a.d. Fulda, Germany
22-26 May, 2000

***Document* N2-000153**
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	164	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 #08	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: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: N2 **Date:** 15.05.2000

Subject: Release of PDP context during Waiting for Instructions

Work item: CAMEL Phase 3

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

F	Correction	[X]	**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	[ ]		Release 99	[X]
				Release 00	[ ]

Reason for change: GPRS is supporting multiple PDP Contexts within a single GPRS dialogue. If a CAP_Release_GPRS operation is received in the gprs Waiting for Instruction state it has to be distinguished wether the related PDP context is the one which is waiting for instructions or if this is another one.

Clauses affected: Clause 6

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: << to be provided >>

help.doc

<--------- double-click here for help and instructions on how to create a CR.

— Modified section —

6 GPRS interworking

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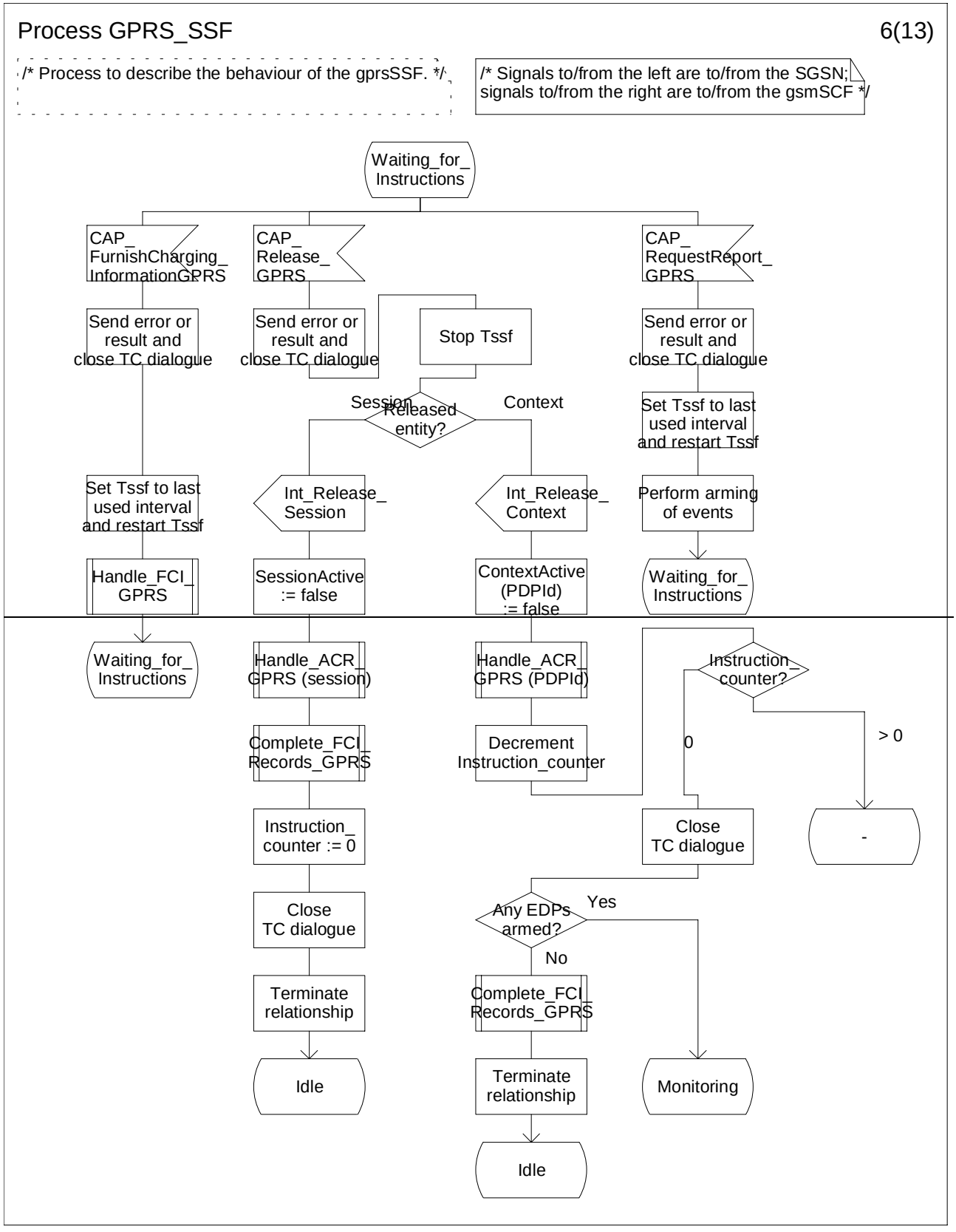
6.5 Procedures for CAMEL GPRS

…

6.5.8 GPRS SSF

…


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

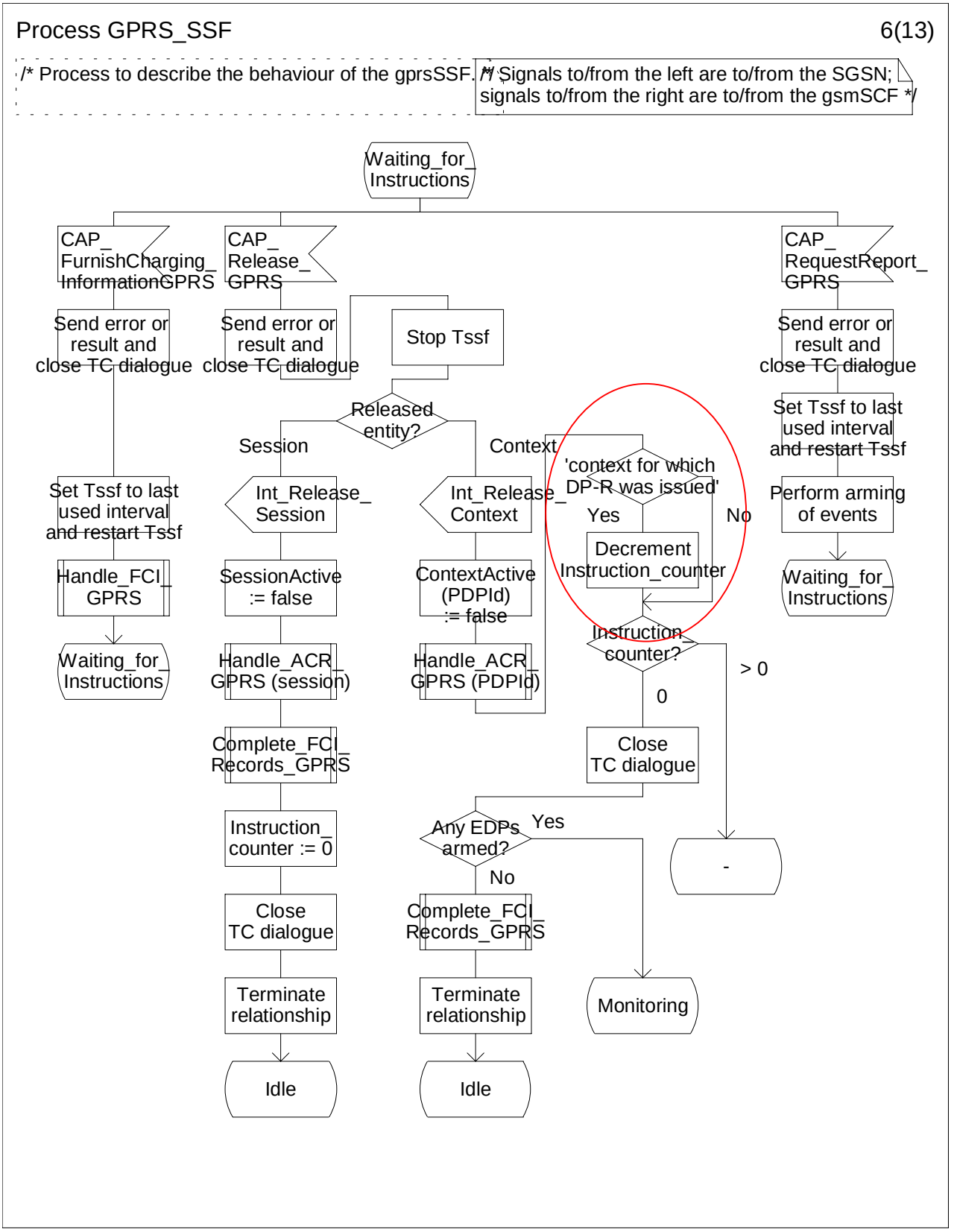


Figure 6.14 f: Process GPRS_SSF (sheet 6)

3GPP TSG CN N2#10
Rotenburg, Germany, 22-26 May 2000

Document ***N2-000209***
rev N2-000154

CHANGE REQUEST

23.078	**CR**	**165r1**	Current Version:	3.4.0

For submission to: CN #08 — for approval [X] — for information [ ] — strategic [ ] — non-strategic [ ]

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: N2 **Date:** 24-05-2000

Subject: Reset Timer GPRS

Work item: CAMEL Phase 3

Category:

F	Correction	[X]
A	Corresponds to a correction in an earlier release	[ ]
B	Addition of feature	[ ]
C	Functional modification of feature	[ ]
D	Editorial modification	[ ]

Release:

Phase 2	[ ]
Release 96	[ ]
Release 97	[ ]
Release 98	[ ]
Release 99	[X]
Release 00	[ ]

Reason for change:

The gprsSSF state «Waiting for Instructions» is guarded by the Tssf application timer. Purpose of the ResetTimerGPRS operation is to reset this Tssf application timer in order to avoid the Tssf time-out at the gprsSSF.

The Tssf application timer is only related to this specific state in the gprsSSF. It is not related to a monitoring/control relationship concerning the attach/detach FSM or individual PDP context FSMs.

Therefore the parameter PDP-ID shall be deleted in operation ResetTimerGPRS.

Clauses affected:

Other specs affected:

Other 3G core specifications	[X]	→ List of CRs:	CR 29.078-086
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:

****** FIRST MODIFIED SECTION ******

6 GPRS interworking

…

6.6.2.9 Reset Timer GPRS

6.6.2.9.1 Description

This IF is used to refresh the gprsSSF timer.

6.6.2.9.2 Information Elements

The following information elements are required:

Information element name	Required	Description
Timer ID	M	This IE specifies the default value for the Tssf timer.
Timer Value	M	This IE specifies the value to which the timer Tssf shall be set.
~~PDP ID~~	~~C~~	~~This IE identifies the PDP context, which the Reset of the timer is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.~~

M Mandatory (The IE shall always be sent).

~~C Conditional (The IE shall be sent, if available).~~

…

****** END OF DOCUMENT ******

3GPP N2 Meeting
Rotenburg, Germany, 22-26 May 2000

***Document* N2-000158**
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	166	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: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: N2 **Date:** 17 May 2000

Subject: Correction: Enhancement of the SDL for ATM

Work item: CAMEL Phase 3

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

F	Correction	[X]	**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	[ ]		Release 99	[X]
				Release 00	[ ]

Reason for change: CR 23.078-109r2 which was approved at CN#7 was not correctly implemented.

Clauses affected: 10 (SDL: Procedure ATM_modify_CB_Data)

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:

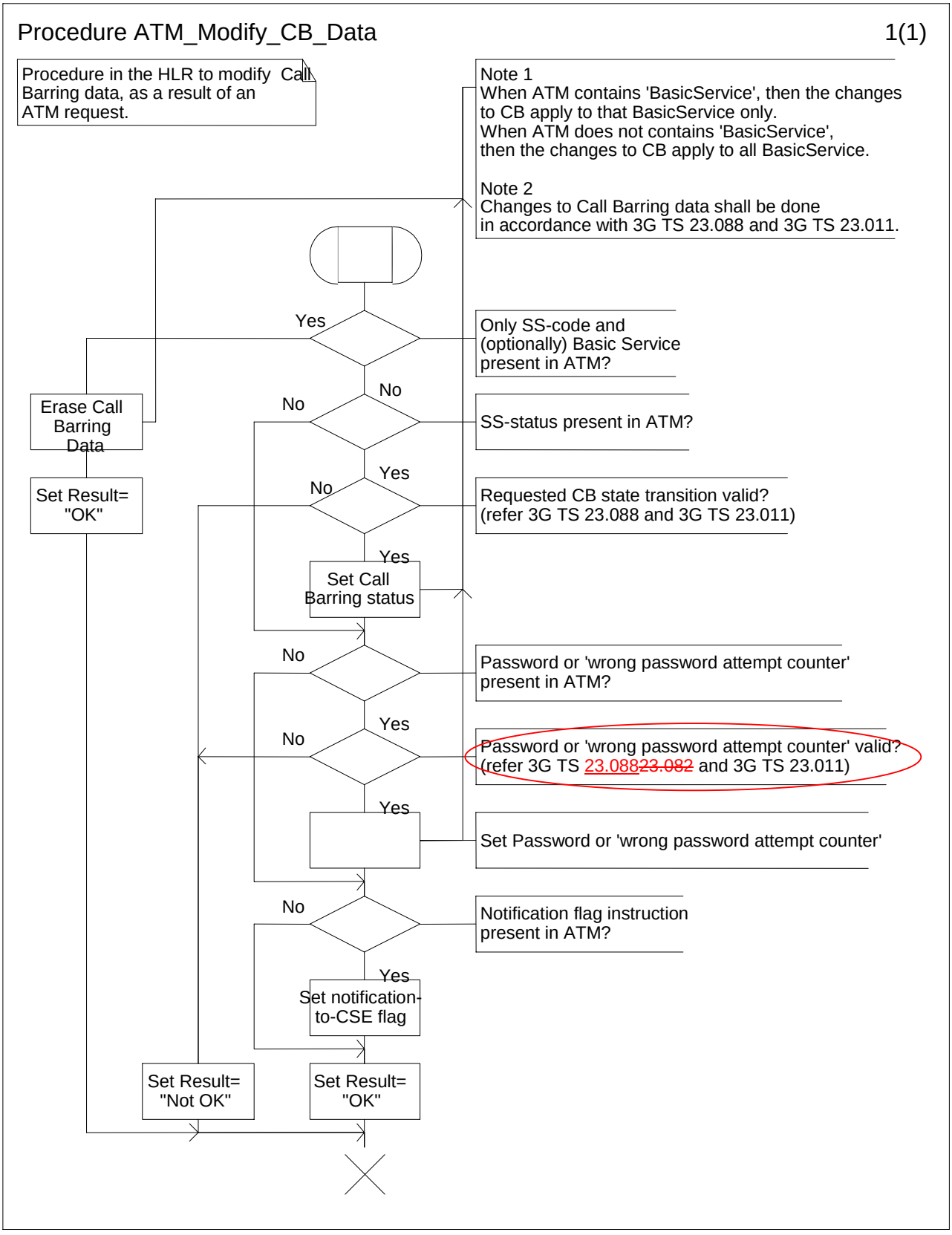


Figure 10.7: Procedure ATM_Modify_CB_Data (sheet 1)

3GPP N2 Meeting
Rotenburg, Germany, 22-26 May 2000

***Document* N2-000159**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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23.078	CR	167	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: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: N2 **Date:** 15 May 2000

Subject: gprsSSF definition

Work item: CAMEL Phase 3

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

F	Correction	X
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: The gprsSSF definition is missing. This CR proposes the definition in the clause 3.

Clauses affected: 3.1

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:

3.1 Definitions

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

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

Call Control Function (CCF): CCF is the Call Control Function in the network that provides call/service processing and control (see ITU-T Q.1214 [6]).

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

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

Forwarding MSC: MSC which is either an MSC invoking a GSM standardized call forwarding or call deflection service; or an MSC invoking a Camel based call forwarding service.

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

- location of Mobile Station

See [17] and [18] for information on the GMLC.

Geodetic Information: information defining the location of a mobile station, coded according to [16]. The derivation of this information from other information defining the location of a mobile station is a network operator option. If an entity derives the geodetic information it shall also provide the equivalent geographical information.

Geographical Information: information defining the location of a mobile station, coded according to [34].

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

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

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

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

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

GSM Specialised Resource Function (gsmSRF): functional entity which provides various specialized resources. It interfaces with the gsmSCF and with the MSC. This entity is defined in ITU-T Q.1214 ([6]) with variations defined in the specification.

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23.078	CR	168	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)
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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: N2 **Date:** 17 May 2000

Subject: Reference to 3G TS 23.088

Work item: CAMEL Phase 3

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

F	Correction	X	**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			Release 99	X
				Release 00	

Reason for change: In the chapter 10, 3G TS 23.088 is referred to on CD. This CR adds the reference to the chapter 2.

Clauses affected: 2

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:

2 References

CR editor's note: The following description shall be added in this clause with the appropriate reference number.

[xx] 3G TS 23.088: "3rd Generation Partnership Project; Technical Specification Group Core Network; Technical realization of Completion of Call Barring (CB) Supplementary Services - Stage 2".

3GPP TSG CN N2#10
Rotenburg a.d. Fulda, Germany
22-26 May, 2000

N2-000254
Document rev N2-000198
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23.078	CR	176r2	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 #08	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: *(at least one should be marked with an X)*	(U)SIM		ME		UTRAN / Radio		Core Network	X

Source:	N2	**Date:**	31.05.2000

Subject: Clarifications on GPRS Concepts

Work item: CAMEL Phase 3

Category: *(only one category shall be marked with an X)*			**Release:**	
F	Correction	X	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		Release 99	X
			Release 00	

Reason for change: The current clause 6 "GPRS interworking" is not clear in various points. This CR clarifies and correct those points.

Clauses affected: Clause 6

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:

GPRS CAMEL Principles taken as a basis for this CR:

0) To consider the GPRS reference issue is not the purpose of this CR.

1) Terminology:
The "GPRS dialogue" realizes the relationship between the gprsSSF and the gsmSCF. It may consist of multiple sequential TCAP dialogues.

2) Scenario:
We consider two scenarios:

- Scenario 1:
~ One GPRS Attach/Detach State Model and optional multiple GPRS PDP Context State Models.
~ "Generic operations" are used, e.g. to arm/disarm EDPs for new PDP context State Models within this scenario.
~ "Specific operations" are related to the GPRS session or to specific PDP contexts.

- Scenario 2:
  ~ A single GPRS PDP Context State Model for each PDP context and no GPRS Attach/Detach State Model.
  ~ All operations in this scenario are related to this single PDP context State Model.
  ~ The various GPRS dialogues for scenario 2 are independent from each other.

Scenario 1 and 2 are mutual exclusive. i.e. scenario 1 and scenario 2 are not used both at the same time. This will simplify the handling of the concurrent session and PDP context handling. GPRS sessions in different SGSN are independent from a CAMEL perspective point of view.

Note: No TDP / EDP precedense rules would be necessary.

3) GPRS dialogues:

- There is one GPRS dialogue per Scenario instance
- multiple sequential TCAP dialogues per GPRS dialogue, normaly TC_END by SGSN
- The various GPRS dialogues for scenario 2 are independent from each other.

5) State Models and relationships:

There are two types of State Models

- session
- PDP context

State Models (A/D State Model and PDP context State Models) corresponds to GPRS sessions and GPRS PDPcontexts respectively. They will be created/deleted as these GPRS objects will be; e.g. a A/D State Model will be created when a GPRS session is established and will be deleted when the session is detached.

a) There is 1 A/D State Model per non idle GPRS session in one SGSN.

b) There is 1 PDP Context State Model per active GPRS PDP context in one SGSN.

The terms control relation ship and monitor relation ship are related to the individual State Models rather than related to the GPRS dialogue as a whole. This will also allow to reflect which operations are allowed at what moment in time for the individual controlled / monitored State Models.

State Models are treated independently, e.g. in the gprsSSF state Waiting for Instructions.

6) Establishment of the GPRS dialogue and the State Models:

- Scenario 1:
  - GPRS dialogue and relationship always via the TDP for the A/D State Model. This relationship exsists up to the termination of the GPRS dialogue.
  - request for new PDP in scenario 1 via Request Report GPRS Event EDP-R generic
- Scenario 2:
  - GPRS dialogue and relationship always via the TDP for the PDP context State Model.
  - No further PDP context State Models.

7) PDP ID

A PDP ID identifies a PDP context in Scenario 1.

PDP ID is set-up by theSGSN. For Interrouteing Area Update the PDP ID for the handed over PDP context is send via the GTP protocol to the new SGSN.

- Scenario 1:
  - one PDP ID use per PDP context State Model. The PDP ID is unique in respect to one GPRS dialogue.
  - no PDP ID use for the session and for generic operations
- Scenario 2:
  - no PDP ID use at all

8) The operations are sent and received by the correct State Model (via the gprsSSF):

- Scenario 1:
  - operations without PDP ID
    ~ related to the session: A/D State Model
    Request Report GPRS Event (DPs related to session)
    ~ generic operations: gprsSSF
    Request Report GPRS Event (DPs related to PDP context)
    no implicit disarming for those operations
  - operations with correct PDP ID, related to the PDP context: PDP context State Model
  - operations with unused PDP ID: error handling
- Scenario 2:
  - no session related operations
  - no generic operations
  - operations without PDP ID are related to the : PDP context State Model
  - operations with PDP ID: error handling

Generic EDPs are armed by generic operations without a PDP ID send to the gprsSSF. The arming occurs in the context of this gprsSSSF; i.e. no dummy PDP context State Models will be created but only if a new GPRS context is established. The armed EDP will be notified within this PDP context State Model.


help.doc

<--------- double-click here for help and instructions on how to create a CR.

— First modified section —

6 GPRS interworking

6.1 Architecture

6.1.1 Functional Entities used for CAMEL

This subclause describes the functional architecture needed to support GPRS interworking for CAMEL. Figure 6.1 shows the functional entities involved in a GPRS session requiring CAMEL support. The architecture is applicable to the third phase of CAMEL.

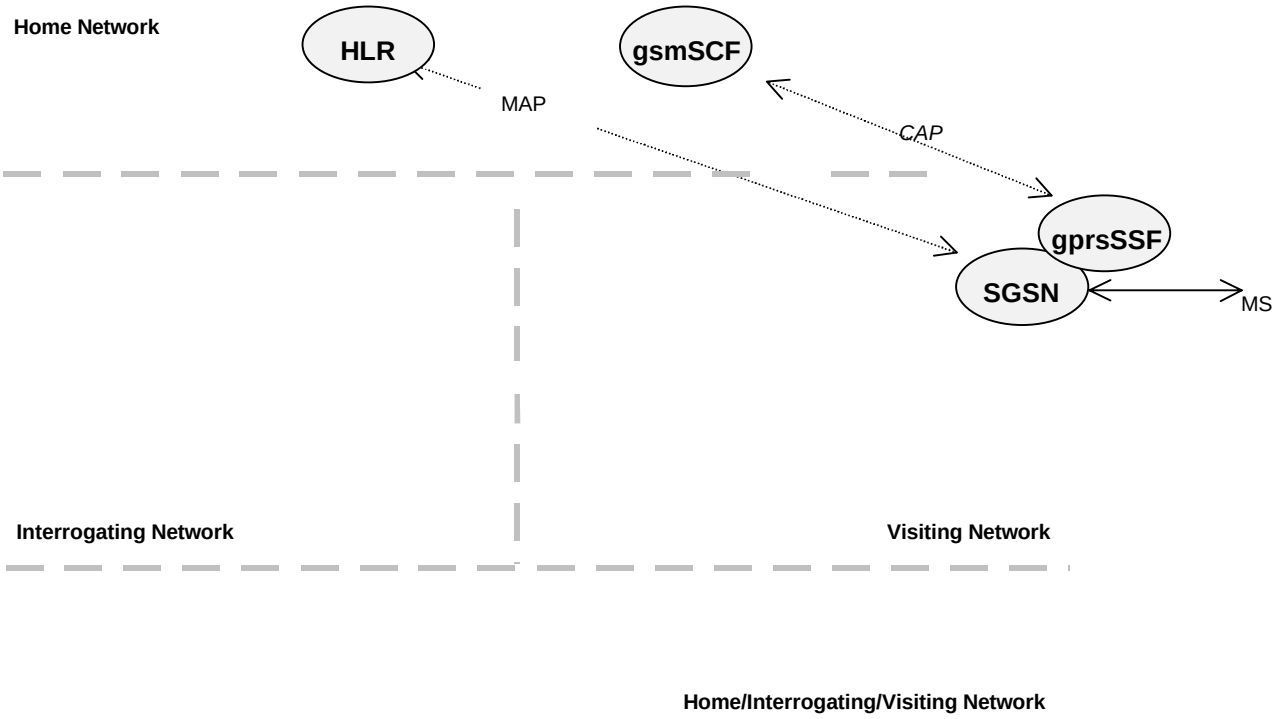

Figure 6.1 Functional architecture for support of CAMEL

HLR: The HLR stores for subscribers requiring CAMEL support the information relevant to the current subscription GPRS-CSI. The GPRS-CSI is stored in the HLR only. The HLR may provide an interface towards the gsmSCF for the Any Time Interrogation procedure.

SGSN: When processing GPRS Attach requests or Inter-SGSN Routeing Area Updates for subscribers requiring CAMEL support, the SGSN receives a GPRS-CSI from the HLR, indicating the SGSN to request instructions from the gprsSSF. The SGSN monitors on request the GPRS events and informs the gprsSSF of these events during processing, enabling the gprsSSF to control the execution of the GPRS session or individual PDP contexts in the SGSN.

gprsSSF: see subclause 3.1.

gsmSCF: see subclause 3.1.

6.1.2 Interfaces defined for CAMEL

6.1.2.1 SGSN - gprsSSF interface

This is an internal interface. The interface is described in the specification to make it easier to understand the handling of DPs (arming/disarming of DPs, DP processing etc.).

6.1.2.2 gprsSSF - gsmSCF interface

This interface is used by the gsmSCF to control a GPRS session or individual PDP Context in a certain gprsSSF. Relationships between the gprsSSF and the gsmSCF (GPRS dialogues) on this interface are opened as a result of the gprsSSF sending a request for instructions to the gsmSCF.

6.1.2.3 HLR – SGSN interface

This interface is used to send CAMEL related subscriber data to a visited GPRS network, e.g. GPRS-CSI.

6.2 Detection Points (DPs)

See subclause 4.2.

6.3 Description of CAMEL Subscriber Data

6.3.1 GPRS CAMEL Subscription Information (GPRS-CSI)

This subclause defines the contents of the GPRS CAMEL Subscription Information.

6.3.1.1 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.

6.3.1.2 Service Key

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

6.3.1.3 Default GPRS Handling

The Default GPRS Handling indicates whether the GPRS session or PDP context shall be released or continued as requested in case of error in the gprsSSF to gsmSCF dialogue.

6.3.1.4 TDP List

The TDP List indicates on which detection point triggering shall take place.

6.3.1.5 CAMEL Capability Handling

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

6.3.1.6 CSI state

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

6.3.1.7 Notification flag

The notification flag indicates whether the change of the GPRS-CSI shall trigger Notification on Change of Subscriber Data or not.

6.3.1.8 gsmSCF address list for CSI

The gsmSCF address list indicates a list of gsmSCF addresses to which Notification on Change of Subscriber Data is to be sent. This list is common to all CSI.

6.4 Description of CAMEL State Models

GPRS can support multiple PDP contexts simultaneously for an attached subscriber, requiring the behaviour of a GPRS session to be modelled by two state ~~machines~~models, one for the attach/detach procedures (GPRS Attach/Detach ~~F~~State Model) and the other for modelling individual PDP Contexts (GPRS PDP Context ~~F~~State Model).

6.4.1 General Handling

The GPRS ~~s~~State ~~m~~Model ~~(GPRS SM)~~ is used to describe the actions in an SGSN during processing of a GPRS session or PDP Contexts.

The GPRS ~~SM~~State Model identifies the points in basic GPRS processing when Operator Specific Service (OSS) logic instances (accessed through the gsmSCF) are permitted to interact with basic GPRS control capabilities.

Figure shows the components that have been identified to describe a GPRS ~~SM~~State Model.

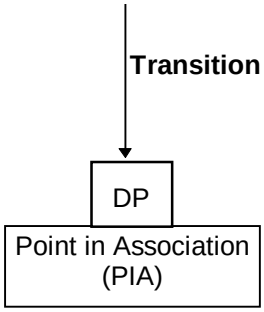

Figure 6.2: GPRS ~~SM~~State Model Components

6.4.2 GPRS Attach/Detach ~~FSM~~State Model

The GPRS Attach/Detach ~~FSM~~State Model is used to model the behaviour of the GPRS attach/detach procedures.

When encountering a DP the Attach/Detach ~~FSM~~State Model processing is suspended at the DP and the SGSN indicates this to the gprsSSF which determines what action, if any, shall be taken in case the DP is armed.

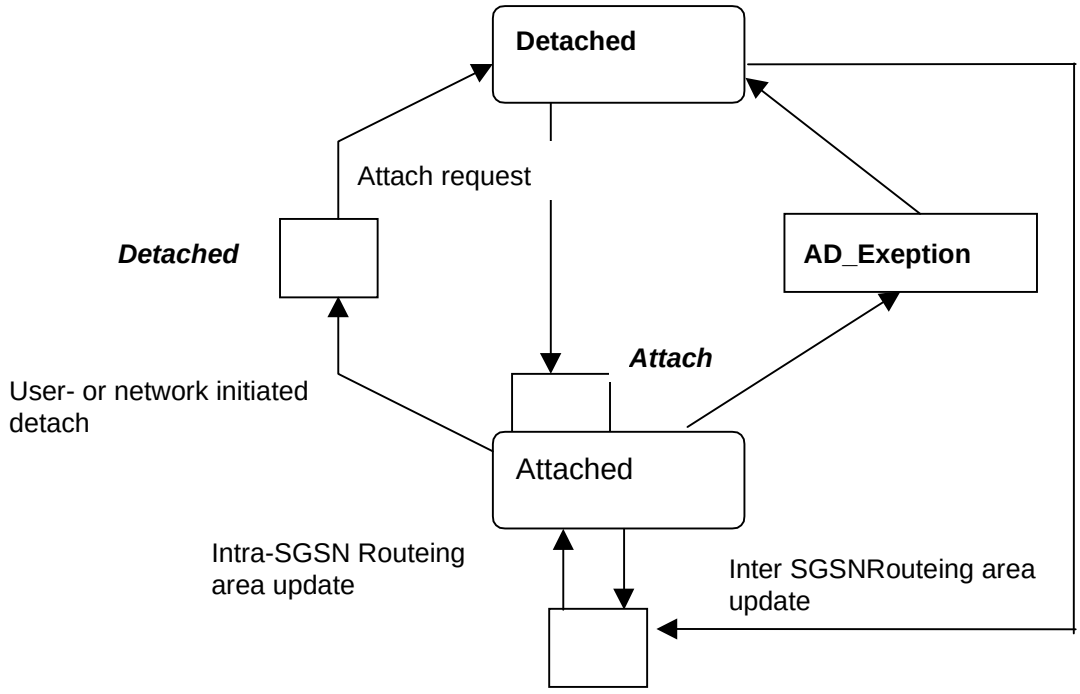

Figure 6.3: GPRS Attach/Detach ~~FSM~~State Model

Table 1: Description of GPRS Attach/Detach DPs in the SGSN

CAMEL Detection Point:	DP Type	Description:
DP Attach	TDP-R	A request to attach is received.
DP Change of position GPRS session	TDP-R[1)], EDP-N~~, EDP-R~~	Routeing Area Update is accepted.
DP Detached	EDP-N, EDP-R	A detach request is received either from the MS, the SGSN or a 'Cancel Location' received from HLR~~.~~ or Inter SGSN Routeing update occured in old SGSN.
Note 1: Change of Position GPRS session is reported as TDP-R in the case of Inter-SGSN Routeing Area Update (provided that this DP is statically armed in GPRS-CSI). Change of Position GPRS session is reported as EDP-N in the case of Intra-SGSN Routeing Area Update (provided that this DP is dynamically armed by the Service Logic).		

CREditor's Note: Deletion of EDP-R for DP Change of position GPRS session is according to stage 1.

6.4.2.1 Description of the Attach/Detach model (PIAs)

This subclause describes the model for the attach and detach a GPRS session in the SGSN. For each PIA a description can be found of the entry events, actions, information available and exit events.

6.4.2.1.1 Detached

Entry events:
- Detach (user or network initiated) and clearing of a previous GPRS session.
- Processing of exceptional conditions, e.g. STANDBY timer expiry in the SGSN.

Actions:
- Interface is idled.
- Attach request is received from MS containing the IMSI/P-TMSI and the type of attach requested and, the identity of the MS is established (IMSI) (DP Attach), or Inter-SGSN Routeing Area Update Request is accepted (DP Chage of position GPRS session).
- Information being analyzed, e.g. GPRS-CSI is analyzed.

Exit events:
- GPRS-CSI is analyzed (DP Attach or DP Change of position GPRS session).

6.4.2.1.2 Attached

Entry events:
- GPRS-CSI is analyzed (DP Attach).

Actions:
- MM contexts are established at the MS and the SGSN.

Exit events:
- A GPRS Detach request is received from the MS or the GGSN (DP Detached).
- Intra-SGSN Routeing Area Update is accepted (DP Change of position GPRS session).
- An exception is encountered, e.g. STANDBY timer expiry.

The GPRS Attach/Detach ~~FSM~~State Model shall only have one or more GPRS PDP Context ~~FSM~~State Models associated with it when in the Attached state. A GPRS PDP Context ~~FSM~~State Model cannot exist without its associated GPRS Attach/Detach ~~FSM~~State Model being in the Attached state. Closure of the GPRS Attach/Detach ~~FSM~~State Model via a detach will result in the idling of all associated GPRS PDP Context ~~FSM~~State Models and the release of the associated GPRS PDP Contexts.

It shall not be necessary to trigger a relationship from the GPRS Attach/Detach ~~FSM~~State Model to the gsmSCF in order for triggering to occur in an associated GPRS PDP Context ~~FSM~~State Model. However, in this latter case a GPRS Attach/Detach ~~FSM~~State Model shall still exist at the SGSN. This is so that CSE-initiated detach events sent within a given GSM PDP Context relationship shall result in the GPRS Attach/Detach ~~FSM~~State Model transiting to the Detached state. As noted above, in this state no PDP Contexts can exist and so all associated GSM PDP Context ~~FSM~~State Models will transit to state Idle.

6.4.3 GPRS PDP Context ~~FSM~~State Model

The GPRS PDP Context ~~FSM~~State Model is used to model the behaviour for the GPRS PDP Context procedures. There is one PDP Context ~~FSM~~State Model per GPRS PDP context.

When encountering a DP the PDP Context ~~FSM~~State Model processing is suspended at the DP and the SGSN indicates this to the gprsSSF which determines what action, if any, shall be taken in case the DP is armed.

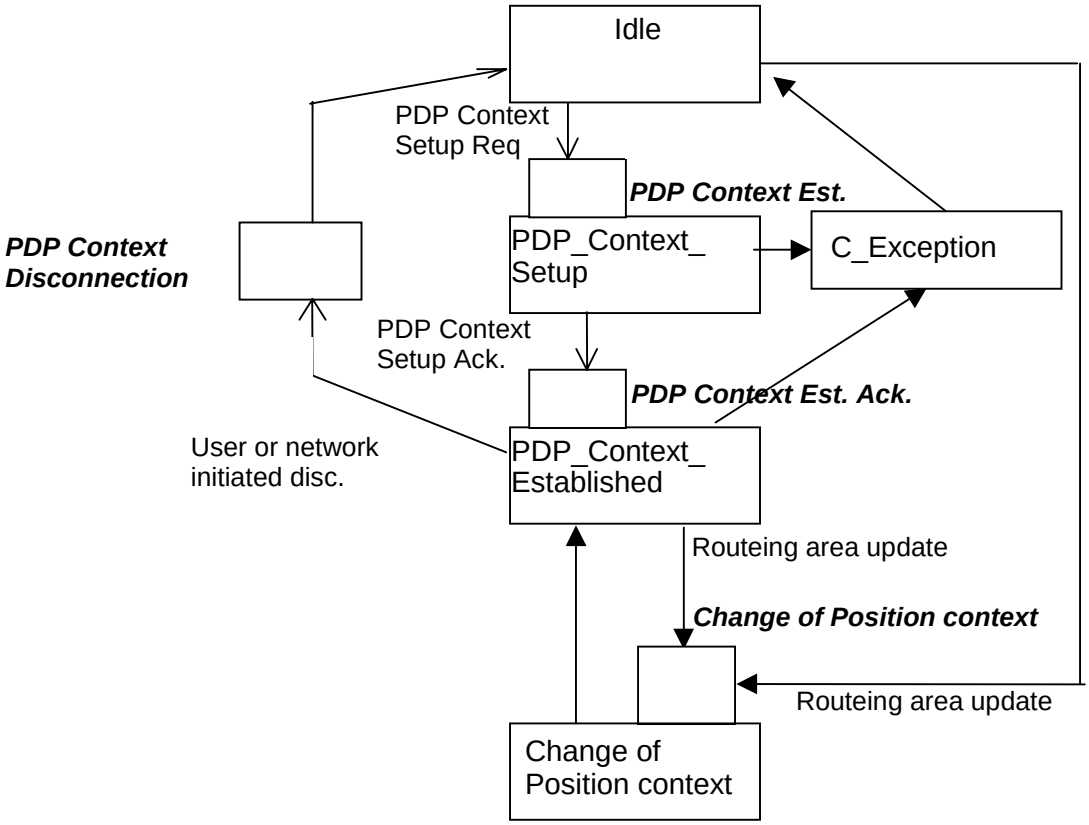

Figure 6.4: GPRS PDP Context ~~FSM~~State Model

Table 2: Description of GPRS PDP Context DPs in the SGSN

CAMEL Detection Point:	DP Type	Description:
DP PDP Context Establishment	TDP-R[1)], EDP-R	Activate PDP Context request is received from the MS.
DP PDP Context Establishment Acknowledgement	TDP-R[21)], EDP-R, EDP-N	Create PDP Context response is received from the GGSN.
DP PDP Context disconnection	EDP-N, EDP-R	Deactivate PDP Context Request is received from the MS, Delete PDP Context request is received from the GGSN. or Inter SGSN Routeing update occured in old SGSN.
DP Change of position context	TDP-R[32)], EDP-N, EDP-R	Routeing Area Update is accepted.

NOTE 1: The PDP Context Establishment shall be reported as TDP-R (provided that this DP is statically armed in GPRS-CSI) if there is no relationship with the gsmSCF. If there is a relationship with the gsmSCF it shall be reported as EDP-R or EDP-N if armed so.

NOTE 21: The PDP Context Establishment Acknowledgment shall be reported as TDP-R (provided that this DP is statically armed in GPRS-CSI) if there is no relationship with gsmSCF for this PDP context. If there is a relationship with the gsmSCF Otherwise, it shall be reported as EDP-R or EDP-N if armed so.

NOTE 23: Change of Position context is reported as TDP-R in the case of Inter-SGSN Routeing Area Update (provided that this DP is statically armed in GPRS-CSI) if there is no relationship with the gsmSCF.
Change of Position context is reported as EDP-N or EDP-R in the case of Inter-SGSN Routeing Area Update (provided that this DP is armed as generic EDP) if there is a relationship with the gsmSCF.
Change of Position context is reported as EDP-N or EDP-R in the case of Intra-SGSN Routeing Area Update (provided that this DP is dynamically armed by the Service Logic).

The PDP Context EDPs may be armed outside of the PDP context, requested by the gsmSCF.

6.4.3.1 Description of the PDP Context model (PIAs)

This subclause describes the model for PDP Context FSMState Model in the SGSN. For each PIA a description can be found of the entry events, actions, information available and exit events.

6.4.3.1.1 Idle

Entry events:
- Deactivation (user or network initiated) and clearing of a previous PDP Context.
- Processing of exceptional conditions.

Actions:
- Interface is idled.
- Activate PDP Context request is received from MS (containing NSAPI, PDP Type, PDP Address, Access Point Name, QoS Requested, PDP Configuration Options), or Inter-SGSN Routeing Area Update is accepted (DP Change of position context).
- Information being analyzed, e.g. GPRS-CSI is analyzed.

Exit events:
- GPRS-CSI is analyzed (DP PDP Context Establishment or DP Change of position context, new SGSN).

6.4.3.1.2 PDP Context Setup

Entry events:
- GPRS-CSI is analyzed (DP PDP Context Establishment).

Actions:
- GGSN address is derived from the Access Point Name by interrogation of a DNS.

- Create PDP Context Request is sent to the GGSN.

Exit events:
- Create PDP Context Response is received from the the GGSN (DP PDP Context Establishment Acknowledgement).

- An exception is encountered.

6.4.3.1.3 PDP Context Established

Entry events:
- GPRS-CSI is analyzed (DP PDP Context Establishment Acknowledgement or DP Change of position context).

Actions:
- PDP context is established at the MS and the SGSN.

Exit events:
- Deactivation of the PDP Context is received from the MS or the GGSN, or is due to an inter SGSN routing area update (DP_PDP_Context_disconnection, old SGSN).

- Intra-SGSN Routeing Area Update Request is received from the MS (DP Change of position context).

- Inter-SGSN Routeing Area Update (DP_Change of position,new SGSN).

- An exception is encountered.

6.4.3.1.4 Change of position context

Entry events:
- Inter SGSN Routing Area update accepted (new SGSN).

- Intra SGSN Routeing Area update request received from the MS.

Actions:
- PDP Context (containing NSAPI, PDP Type, PDP Address, Access Point Name, QoS Requested, PDP Configuration Options) is reestablished in case of Inter-SGSN Routeing Area update accepted (new SGSN).

- Intra SGSN Routeing Area updated.

Exit events:
- reestablishement of the PDP context at the new SGSN and return to PDP context established in case of inter SGSN Routeing Area update accepted in new SGSN (PIA PDP context established).

- Routeing Area update completed in case of intra SGSN Routeing Area update (PIA PDP context established).

6.4.4 GPRS CAMEL Scenarios

Two different scenarios are applicable for CAMEL control of GPRS.

Scenario 1:
Scenario 1 allows CAMEL control of the GPRS session and of multiple PDP contexts related to this session within a single GPRS dialogue.

Scenario 2:
Scenario 2 allows CAMEL control of single PDP contexts. Multiple PDP contexts are controlled in this scenario via multiple GPRS dialogues.

Scenario 1 and scenario 2 are mutually exclusive, i.e. it is not possible to use both for one GPRS session at the same time in one SGSN. A GPRS session is involved in GPRS CAMEL at one moment in time either by using scenario 1 or by using possible multiple instances of scenario 2. GPRS sessions in different SGSNs are independent from a CAMEL perspective.

6.4.4.1 GPRS CAMEL Scenario 1

Scenario 1 allows CAMEL control of the GPRS session and of multiple PDP contexts related to this session within a single GPRS dialogue (Session dialogue).

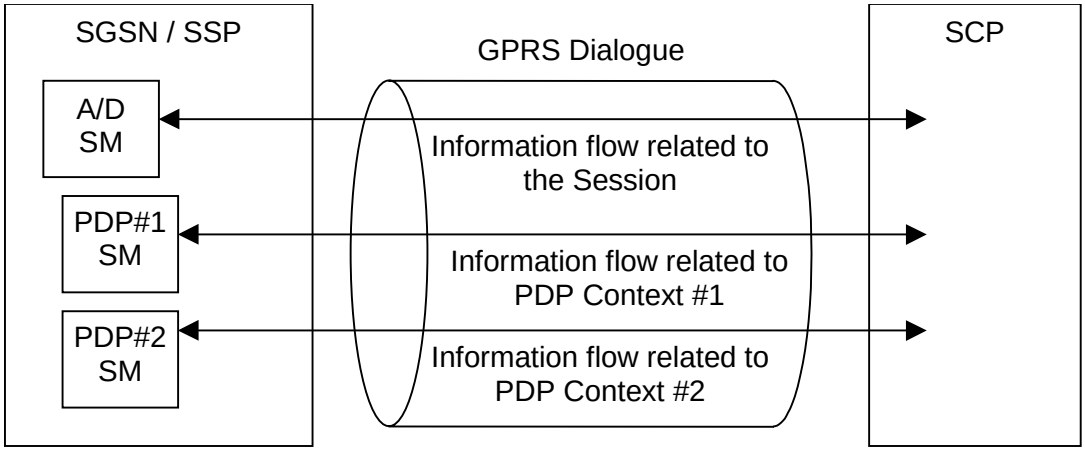

Figure 6.5: GPRS CAMEL Scenario 1

A GPRS dialogue in scenario 1 always consists of one GPRS Attach/Detach State Model and optionally of additional multiple GPRS PDP Context State Models related to the Attach/Detach State Model for the GPRS session. There is at most one GPRS Attach/Detach State Model per non idle GPRS session in one SGSN and at most one PDP Context State Model per active GPRS PDP context in one SGSN. The various PDP Context State Models are treated independently of each other.

The GPRS dialogue and the relationship between the GPRS Attach/Detach State Model and the gsmSCF are always initiated using the TDPs of the GPRS Attach/Detach State Model.

The gsmSCf requests further control or monitoring of individual GPRS PDP contexts using the Request Report GPRS Event information flow. To be informed about new individual PDP contexts the gsmSCF arms the DP 'PDP Context Establishment' or the DP 'PDP Context Establishment Acknowledgement' generically, i.e. without a PDP ID, as an EDP. To be informed about the handed over PDP contexts the gsmSCF arms the DP 'Change of position context' generically as an EDP-N or EDP-R.

Each GPRS PDP context is identified by a PDP ID. The PDP ID is assigned by the SGSN during PDP context establishment. The PDP ID is unique within one GPRS dialogue. The Request Report GPRS Event information flows to control new or handed over PDP contexts do not include a PDP ID. There is no 'PDP ID' related to the GPRS Attach/Detach State Model.

6.4.4.2 GPRS CAMEL Scenario 2

Scenario 2 allows CAMEL control of single PDP contexts. Multiple PDP contexts are controlled in this scenario via multiple GPRS dialogues (PDP Context dialogues).

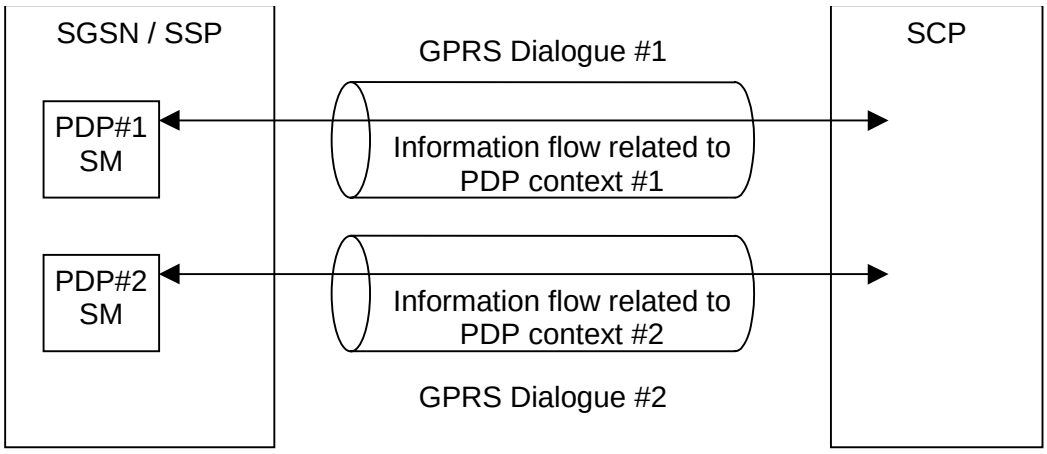

Figure 6.6: GPRS CAMEL Scenario 2

A GPRS dialogue in scenario 2 consists of a single GPRS PDP Context State Model. There is no GPRS Attach/Detach State Model involved in this scenario. There is at most one PDP Context State Model per active GPRS PDP context in one SGSN.

There might be multiple GPRS dialogues in scenarios 2 for one GPRS session, each of the dialogues controlling a single GPRS PDP context. The various GPRS dialogues are independent of each other.

The GPRS dialogue and the relationship between the GPRS PDP Ceontext State Model and the gsmSCF are always initiated using the TDPs for the GPRS PDP Ceontext State Model.

Control of further individual GPRS PDP contexts in the same GPRS dialogue as in scenario 1 is not possible. There are no PDP IDs in this scenario.

6.4.5 SGSN Routeing Area Update

6.4.5.1 Intra-SGSN Routeing Area Update

Intra-SGSN Routeing Area Update will be detected via the DP 'Change of position GPRS session' for the session using the GPRS Attach/Detach State Model and via the DPs 'Change of position context' for the individual PDP contexts using the GPRS PDP Context State Models.

It will be reported via an EDP-N if the necessary EDP-N is armed.

6.4.5.2 Inter-SGSN Routeing Area Update

Inter-SGSN Routeing Area Update from the old SGSN to the new SGSN will be detected via the DP 'Change of position GPRS session' for the session using the GPRS Attach/Detach State Model and via the DPs 'Change of position context' using the GPRS PDP Context State Models for the individual PDP contexts which have been handed over.

Scenario 1:

Inter-SGSN Routeing Area Update from the old SGSN to the new SGSN will be detected in the new SGSN via the DP 'Change of position GPRS session' for the session using the GPRS Attach/Detach State Model and in the new SGSN via the DPs 'Change of position context' using the GPRS PDP Context State Models for the individual PDP contexts which have been handed over.

In this scenario the DP 'Change of position GPRS session' is armed as a TDP-R. If the Routeing Area Update is accepted the gprsSSF reports this TDP-R to the gsmSCF using the Initial DP GPRS information flow. To be informed about new PDP contexts the gsmSCF arms the DP 'PDP Context Establishment' or the DP 'PDP Context Establishment Acknowledgement' generically as EDP-R or EDP-N. The DPs 'Change of position context' for the PDP contexts which have been handed over will be reported with all necessary information to the gsmSCF when the gprsSSF is continued, i.e. it is not longer waiting for instructions. Contexts which are not continued in the new SGSN are not reported. The EDPs for new PDP contexts are reported as usual.

Scenario 2:

Inter-SGSN Routeing Area Update from the old SGSN to the new SGSN will be detected in the new SGSN via the DPs 'Change of position context' using the GPRS PDP Context State Models for the individual PDP contexts which have been handed over.

In this scenario the DP 'Change of position context' is armed as TDP-R. If the the Routeing Area Update is accepted the gprsSSF reports these TDP-Rs PDP contexts which have been handed over to the gsmSCF using the Initial DP GPRS information flows in mutltiple GPRS dialogues.

6.4.64 Rules for Implicit Disarming of Detection Points'

The following table gives the rules for implicit disarming of event detection points.

Implicit EDP disarming rules are specified in the table below for the Attach/Detach ~~FSM~~State Model and PDP context ~~FSM~~State Model. The table specifies which EDP's shall be disarmed (i.e. MonitorMode set to Transparent) if/when each EDP is encountered, irrespective of the EDP's MonitorMode (Transparent, NotifyAndContinue, or Request).

EDPs which are armed generically for GPRS PDP Context State Models shall only be implicitly disarmed at the end of the GPRS dialogue. Explicit disarming is possible.

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

The table entry 'X' means that if one DP occurs (independently of arming and reporting to the gsmSCF) the marked one is implicitly disarmed. It shall be possible to rearm explicitly an implicitly disarmed DP.

Table 3: Implicit disarmed DPs in the Attach/Detach ~~FSM~~State Model and existing PDP ~~C~~context ~~FSM~~State Model

Encountered DP	Implicit disarmed DPs						
	DP Attach	DP Change of position GPRS session	DP Change of position context	DP Detached	DP PDP Context Establishment	DP PDP Context Establishment Acknowledgement	DP PDP Conte disconnection
DP Attach	X						
DP Change of position GPRS session	X	Note	Note	Note	Note	Note	Note
DP Change of position context	X	Note	Note	Note	Note	Note	Note
DP Detached	X	X	X	X	X	X	X
DP PDP Context Establishment	X				X		
DP PDP Context Establishment Acknowledgement	X				X	X	
DP PDP Context disconnection	X						X

NOTE: Disarmed in case of inter SGSN Routing Area update.

— Next modified section —

6.6 Description of information flows

6.6.1 gprsSSF to gsmSCF Information Flows

6.6.1.1 Activity Test GPRS Ack

6.6.1.1.1 Description

This IF is the response to the Activity Test GPRS.

6.6.1.1.2 Information Elements

This IF contains no information elements.

6.6.1.2 Apply Charging Report GPRS

6.6.1.2.1 Description

This IF is used by the gprsSSF to report to the gsmSCF the information requested in the Apply Charging GPRS IF. In addition, this IF is used to notify the gsmSCF of user initiated change in QoS. Note that there are several possible QoS profiles defined by the combinations of the different QoS attributes as defined in 3G TS 23.060, see reference [11]. A PLMN may only support and charge on a limited subset of those QoS. It is recommended that changes in QoS are only reported in Apply Charging Report GPRS for those QoS profiles.

6.6.1.2.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
Charging Result	M	This IE contains the charging information for the PDP provided by the gsmSSF. It is a choice between elapsed time and data volume.
Quality of Service	C	This IE identifies the QoS requested by the user and granted by the SGSN due to 'Modify PDP Context request. This IE shall only be present if sending of the Apply Charging Report was triggered by a change in Quality of Service.
Active	M	This IE indicates if the GPRS session or PDP context is still established, or if it has been detached or deactivated.
PDP ID	C	This IE identifies the PDP context which the Apply Charging Report is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.1.3 Entity Released GPRS

6.6.1.3.1 Description

This IF is used by the gprsSSF to inform the gsmSCF at any phase that a GPRS session or PDP context has been terminated by the SGSN without reporting any EDP.

6.6.1.3.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
GPRS Cause	M	This IE contains the Cause value indicating the reason for discontinuation of the PDP context.
PDP ID	M	This IE identifies the PDP context which has been terminated by the SGSN.

M Mandatory (The IE shall always be sent).

6.6.1.4 Event Report GPRS

6.6.1.4.1 Description

This IF is used to notify the gsmSCF of a GPRS event (e.g. Attach or Detach) previously requested by the gsmSCF in a Request Report GPRS Event IF.

6.6.1.4.2 Information Elements

The following information elements are required:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
GPRS Event type	M	This IE specifies the type of event that is reported.
Misc GPRS Info	M	This IE indicates the DP type (EDP-N or EDP-R).
GPRS Event Specific Information	C	This IE contains information specific to the reported event, e.g. new routeing area in case of change of position or charging id in case of PDP Context Establishment Acknowledgement.
PDP ID	C	This IE identifies the PDP context, which the Report GPRS Event is applicable for. If not present the dialogue corresponds to the Attach/Detach ~~FSM~~State Model or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.1.5 Initial DP GPRS

6.6.1.5.1 Description

This IF is generated by the gprsSSF when a trigger is detected at a DP in the GPRS state ~~machines~~models, to request instructions from the gsmSCF.

6.6.1.5.2 Information Elements

The following information elements are required:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.

ServiceKey	M	This IE indicates to the gsmSCF the requested CAMEL Service. It is used to address the required application/SLP within the gsmSCF.
GPRS Event Type	M	This IE indicates the armed GPRS DP event resulting in the Initial Data Event IF.
MSISDN	M	This IE contains the basic MSISDN of the MS.
IMSI	M	This IE identifies the mobile subscriber.
Time and Time zone	M	This IE contains the time that the gprsSSF was triggered, and the time zone the gprsSSF resides in.
GPRS MS Class	C	This IE contains the MS network and radio access capabilities.
PDP Type	C	This IE identifies the PDP Type, e.g. X.25 or IP.
Quality of Service	C	This IE identifies the QoS (subscribed, requested or negotiated).
Access Point Name	C	This IE identifies the address Access Point Name the MS has requested to connect to.
Routeing Area Identity	C	This IE contains the location information of the MS.
Charging ID	C	This IE contains the Charging ID received from the GGSN for the PDP context.
SGSN Capabilities	C	This IE specifies the capabilities of the SGSN node to support the CAMEL interwork, e.g. support of Advice of Charge.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.2 gsmSCF to gprsSSF Information Flows

6.6.2.1 Activity Test GPRS

6.6.2.1.1 Description

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

6.6.2.1.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.

M Mandatory (The IE shall always be sent).

6.6.2.2 Apply Charging GPRS

6.6.2.2.1 Description

This IF is used for interacting from the gsmSCF with the gprsSSF charging mechanisms to control the charging of a GPRS session or PDP Context.

6.6.2.2.2 Information Elements

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
Charging Characteristics	M	This IE specifies the charging related information to be provided by the gsmSSF and the conditions on which this information has to be provided back to the gsmSCF. It is a choice between granted volume and granted time for the data transfer.
Tariff Switch Interval	O	This information element specifies the time duration until the next tariff switch occurrence.
PDP ID	C	This IE identifies the PDP context, which the Apply GPRS Charging is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

C Conditional (The IE shall be sent, if available).

6.6.2.3 Cancel GPRS

6.6.2.3.1 Description

This IF is used by the gsmSCF to request the gprsSSF to cancel all EDPs and reports.

6.6.2.3.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
PDP ID	C	This IE identifies the PDP context which is to be cancelled. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.2.4 Connect GPRS

6.6.2.4.1 Description

This IF is used by the gsmSCF to request the gprsSSF to modify the APN used when establishing a PDP Context.

6.6.2.4.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Access Point Name	M	This IE contains the Access Point Name to be used when establishing the PDP Context.
PDP Id	C	This IE identifies the PDP Context where the new Access Point Name shall be used. If not present the dialogue corresponds to one single PDP context.

M Mandatory (The IE shall always be sent).

6.6.2.5 Continue GPRS

6.6.2.5.1 Description

This information flow requests the gprsSSF to proceed with processing at the DP at which it previously suspended processing to await gsmSCF instructions. The gprsSSF completes DP processing, and continues processing (i.e., proceeds to the next point in the Attach/Detach ~~FSM~~State Model or PDP Context ~~FSM~~State Model) without substituting new data from the gsmSCF.

6.6.2.5.2 Information Elements

The following information element is used:

Information element name	Required	Description
PDP ID	C	This IE identifies the PDP context which processing shall continue for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

C Conditional (The IE shall be sent, if available).

6.6.2.6 Furnish Charging Information GPRS

6.6.2.6.1 Description

This IF is used to request the gprsSSF to include information in the CAMEL specific logical call record.

The logical call record is created when FCI-GPRS is received and a logical call record for that ~~FSM~~State Model does not exist. For modelling purposes the logical call record is buffered in the gprsSSF. The gprsSSF 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.

In the SGSN there is a separate Logical call record for the attach/detach state model and for each PDP context.

The CSE can send multiple concatenated FCIs per Logical Call Record for completion. The total maximum of free format data is 160 octets per Logical Call Record. 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 CDR.

6.6.2.6.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
FCI GPRS Billing Charging Characteristics	M	This IE is described in the next table.

M Mandatory (The IE shall always be sent).

FCI GPRS Billing Charging Characteristics contains the following information:

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

M Mandatory (The IE shall always be sent).

FCIBCCCAMEL Sequence 1 contains the following information:

Information element name	Required	Description
Free Format Data	M	This IE is a free format data to be inserted in the CAMEL logical call record.
Append Free Format Data	O	This IE indicates that the gprsSSF shall append the free format data to the Logical call record. In the SGSN there is a separate Logical call record for the attach/detach state model and for each PDP context. - If this IE is present indicating "Append", the gprsSSF shall append the free format data received in this IF to the free format data already present in the Logical call record for that GPRS session or PDP Context. - If this IE is absent or in value "Overwrite", then the gprsSSF shall overwrite all free format data already present in the Logical call record for that GPRS session or PDP Context, by the free format data received in this IF. If no Logical call record exists yet for that GPRS session or PDP Context, then the gprsSSF shall ignore this IE.
PDP Id	C	This IE identifies the PDP context's Logical call record to which the free format data shall be appended or overwritten. If not present, the free format data belong to a Logical call record for a GPRS session or a single PDP context for the dialogue.

M Mandatory (The IE shall always be sent).

O Optimal (Service logic dependent).

C Conditional (The IE shall be sent, if available).

6.6.2.7 Release GPRS

6.6.2.7.1 Description

This IF is used by the gsmSCF to tear down an existing GPRS session or PDP Context at any phase.

6.6.2.7.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
GPRS Cause	M	This IE contains the Cause value indicating the reason for releasing the GPRS session or PDP context.
PDP ID	C	This IE identifies the PDP context which shall be released. If not present the dialogue corresponds to the GPRS session or to one single PDP context.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.2.8 Request Report GPRS Event

6.6.2.8.1 Description

This IF is used to request the gprsSSF to monitor for an event and send a notification back to the gsmSCF when the event is detected (see Event Report Data).

6.6.2.8.2 Information Elements

The following information elements are used:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
GPRS Event	M	This IE specifies the event or events of which a report is requested.
PDP ID	C	This IE identifies the PDP context, which the Request Report GPRS Event is applicable for. If not present the dialogue corresponds: - to the GPRS session, or - to a generically armed EDP in a Session dialogue, or - to one single PDP context in a PDP Context dialogue.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

Data Event contains the following information:

Information element name	Required	Description
GPRS Event type	M	This IE specifies the type of event of which a report is requested.
Monitor Mode	M	This IE indicates how the event shall be reported.

M Mandatory (The IE shall always be sent).

6.6.2.9 Reset Timer GPRS

6.6.2.9.1 Description

This IF is used to refresh the gprsSSF timer.

6.6.2.9.2 Information Elements

The following information elements are required:

Information element name	Required	Description
Timer ID	M	This IE specifies the default value for the Tssf timer.
Timer Value	M	This IE specifies the value to which the timer Tssf shall be set.
~~PDP ID~~	~~C~~	~~This IE identifies the PDP context, which the Reset of the timer is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context.~~

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

6.6.2.10 Send Charging Information GPRS

6.6.2.10.1 Description

This IF is used to send e-parameters from the gsmSCF to the gprsSSF. If charge advice information is received from the gsmSCF, it shall replace the charge advice information which would be generated by the SGSN and inhibit any further generation of CAI by the SGSN. Further processing of the charge advice information by the SGSN shall be in accordance with the GSM Advice of Charge Supplementary Service.

NOTE: If charge advice information is received from the gsmSCF after charge information has been generated by the SGSN and sent to the MS, the behaviour of the service may be unpredictable or incorrect; the service designer should therefore ensure that the first set of charge advice information is sent to the gprsSSF before charge information is sent to the to the MS.

6.6.2.10.2 Information Elements

The following information elements are required:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
SCI GPRS Billing ChargingCharacteristics	M	This IE defines the Advice Of Charge related information to be provided to the Mobile Station, if supported by the SGSN.

M Mandatory (The IE shall always be sent).

GPRS SCI Billing Charging Characteristics is defined as:

Information element name	Required	Description
AOC GPRS	M	This IE is sent after an Activate PDP Context Accept or Attach Accept has been received from the SGSN. This IE defines the Advice Of Charge related information to be provided to the Mobile Station, if supported by the SGSN.
PDP Id	C	This IE is included if the AoC is applicable to a PDP context. If not present the AoC is applicable to the GPRS session or for a single PDP context for the dialogue.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

AOC GPRS is defined as:

Information element name	Required	Description
AOC Initial	M	**This IE contains CAI elements as defined in 3G TS 22.024 [x].**
AOC Subsequent	O	See definition in the next table.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

AOC Subsequent is defined as:

Information element name	Required	Description
CAI Elements	M	This IE contains CAI elements as defined in 3G TS 22.024 [x].
Tariff Switch Interval	O	This IE indicates the tariff switch time until the next tariff switch applies.

M Mandatory (The IE shall always be sent).

O Optional (Service logic dependent).

6.6.3 HLR to SGSN Information Flows

6.6.3.1 Insert Subscriber Data

6.6.3.1.1 Description

This IF is specified in 3G TS 29.002 [4] and used by the HLR to insert subscriber data in the SGSN.

6.6.3.1.2 Information Elements

Insert Subscriber Data contains the following CAMEL specific IE:

Information element name	Required	Description
GPRS-CSI	C	This IE identifies the subscriber as having CAMEL GPRS services.

C Conditional (The IE shall be sent, if required).

GPRS-CSI contains the following information:

Information element name	Required	Description
GsmSCF Address	M	This IE is described in section 0
Service Key	M	This IE is described in section 0.
Default Session Handling	M	This IE is described in section 0.
TDP List	M	This IE is described in section 0.

M Mandatory (The IE shall always be sent).

6.6.4 SGSN to HLR Information Flows

6.6.4.1 Update GPRS Location

6.6.4.1.1 Description

This IF is used by the SGSN to indicate to the HLR a GPRS location update. This IF is specified in 3G TS 29.002 [4].

6.6.4.1.2 Information Elements

Update GPRS location contains the following CAMEL specific IE:

Information element name	Required	Description
Supported CAMEL Phases	C	This IE identifies which CAMEL phases are supported by the SGSN. The SGSN may indicate support of CAMEL phase 3 or higher.

C Conditional (The IE shall always be sent when the SGSN supports CAMEL).

6.6.5 SGSN to HLR Information Flows

6.6.5.1 Insert Subscriber Data ack

See subclause 4.6.8.

3GPP N2 Meeting
Rotenburg, Germany, 22-26 May 2000

***Document* N2-000257**
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	180r1	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: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: N2 **Date:** 26 May 2000

Subject: Addition of Location Information to Initial DP GPRS

Work item: CAME Phase 3

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

F	Correction	X
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: Location information in Initial DP GPRS is currently missing.

Clauses affected: 6

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	29.078-
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:

6.6.1.5 Initial DP GPRS

6.6.1.5.1 Description

This IF is generated by the gprsSSF when a trigger is detected at a DP in the GPRS state machines, to request instructions from the gsmSCF.

6.6.1.5.2 Information Elements

The following information elements are required:

Information element name	Required	Description
Gprs Reference Number	M	This IE contains an identifier that is allocated by the gprsSSF and it is used to identify the gprsSSF instance taking care of GPRS session or PDP context.
ServiceKey	M	This IE indicates to the gsmSCF the requested CAMEL Service. It is used to address the required application/SLP within the gsmSCF.
GPRS Event Type	M	This IE indicates the armed GPRS DP event resulting in the Initial Data Event IF.
MSISDN	M	This IE contains the basic MSISDN of the MS.
IMSI	M	This IE identifies the mobile subscriber.
Time and Time zone	M	This IE contains the time that the gprsSSF was triggered, and the time zone the gprsSSF resides in.
GPRS MS Class	C	This IE contains the MS network and radio access capabilities.
PDP Type	C	This IE identifies the PDP Type, e.g. X.25 or IP.
Quality of Service	C	This IE identifies the QoS (subscribed, requested or negotiated).
Access Point Name	C	This IE identifies the address Access Point Name the MS has requested to connect to.
Routeing Area Identity	C	This IE contains the location information of the MS.
Charging ID	C	This IE contains the Charging ID received from the GGSN for the PDP context.
SGSN Capabilities	C	This IE specifies the capabilities of the SGSN node to support the CAMEL interwork, e.g. support of Advice of Charge.
Location Information	M	This IE is described in the subclause 7.6.1.3.2.

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).