

3GPP TSG_CN#7
ETSI SMG3 Plenary Meeting #7,
Madrid, Spain
13th – 15th March 2000

NP-000036

Agenda item: 5.2.3
Source: TSG_N WG 2
Title: CRs to 3G Work Item CAMEL phase 3 (23.078) Part 3

Introduction:

This document contains “13” CRs on **Work Item CAMEL phase 3**, that have been agreed by **TSG_N WG 2**, and are forwarded to **TSG_N Plenary meeting #7** for approval.

| Tdoc | Spec | CR | Rev | Cat | Rel | Old ver | New ver | Subject |
|-----------|--------|-----|-----|-----|-----|---------|---------|--|
| N2A000188 | 23.078 | 103 | | F | R99 | 3.3.0 | 3.4.0 | Replacement of Figure 4.57g: Process gsmSSF (sheet 7) by correct SDL figure. |
| N2A000189 | 23.078 | 104 | | F | R99 | 3.3.0 | 3.4.0 | Correction of "Figure 6.2: GPRS Attach/Detach FSM" |
| N2A000190 | 23.078 | 105 | | F | R99 | 3.3.0 | 3.4.0 | Correction of first state in "Figure 6.14 I: Process GPRS_SSF" |
| N2A000272 | 23.078 | 106 | 1 | F | R99 | 3.3.0 | 3.4.0 | Correction of GPRS session description |
| N2A000298 | 23.078 | 108 | 2 | F | R99 | 3.3.0 | 3.4.0 | Correction of GPRS PDP context FSM |
| N2A000297 | 23.078 | 109 | 2 | F | R99 | 3.3.0 | 3.4.0 | Enhancement of the SDL for ATM |
| N2A000284 | 23.078 | 110 | 1 | F | R99 | 3.3.0 | 3.4.0 | Enhancement of the SDL for NCSD |
| N2A000204 | 23.078 | 111 | | D | R99 | 3.3.0 | 3.4.0 | Removal of PSI description |
| N2A000286 | 23.078 | 112 | 1 | D | R99 | 3.3.0 | 3.4.0 | Procedure Handle_SCI_GPRS and Complete_FCI_Record_GPRS |
| N2A000218 | 23.078 | 116 | | F | R99 | 3.3.0 | 3.4.0 | O-CSI and D-CSI checks for ORLCF |
| N2A000285 | 23.078 | 119 | 1 | C | R99 | 3.3.0 | 3.4.0 | Enhancement of the ATSI SDL |
| N2A000248 | 23.078 | 120 | | D | R99 | 3.3.0 | 3.4.0 | Transfer of destination address to gsmSCF |
| N2A000266 | 23.078 | 121 | 1 | F | R99 | 3.3.0 | 3.4.0 | Implementation of retriggering in gsmSSF SDL |

| | | | |
|--|--|---|-----------------------------------|
| <h2 style="margin: 0;">CHANGE REQUEST</h2> | | <small>Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.</small> | |
| 23.078 | CR | 103 | Current Version: 3.3.0 |
| <small>GSM (AA.BB) or 3G (AA.BBB) specification number ↑</small> | | <small>↑ CR number as allocated by MCC support team</small> | |
| For submission to: CN #07 <small>list expected approval meeting # here ↑</small> | for approval <input checked="" type="checkbox"/> for information <input type="checkbox"/> | strategic <input type="checkbox"/> non-strategic <input type="checkbox"/> | <small>(for SMG use only)</small> |

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
(at least one should be marked with an X)

Source: CN WG2 **Date:** 07.02.2000

Subject: Replacement of Figure 4.57g: Process gsmSSF (sheet 7) by correct SDL figure.

Work item: CAMEL Phase 3

| | | |
|--|--|--|
| Category: <small>(only one category shall be marked with an X)</small> | F Correction <input checked="" type="checkbox"/> | Release: Phase 2 <input type="checkbox"/> |
| | A Corresponds to a correction in an earlier release <input type="checkbox"/> | Release 96 <input type="checkbox"/> |
| | B Addition of feature <input type="checkbox"/> | Release 97 <input type="checkbox"/> |
| | C Functional modification of feature <input type="checkbox"/> | Release 98 <input type="checkbox"/> |
| | D Editorial modification <input type="checkbox"/> | Release 99 <input checked="" type="checkbox"/> |
| | | Release 00 <input type="checkbox"/> |

Reason for change: Sheet 6 (35) was twice in the 23.078 specification and is replaced by the correct sheet 7(35).

Clauses affected: 4.5.6.4 Process gsmSSF and procedures

| | | | |
|------------------------------|--|----------------|--|
| Other specs affected: | Other 3G core specifications <input type="checkbox"/> | → List of CRs: | |
| | Other GSM core specifications <input type="checkbox"/> | → List of CRs: | |
| | MS test specifications <input type="checkbox"/> | → List of CRs: | |
| | BSS test specifications <input type="checkbox"/> | → List of CRs: | |
| | O&M specifications <input type="checkbox"/> | → List of CRs: | |

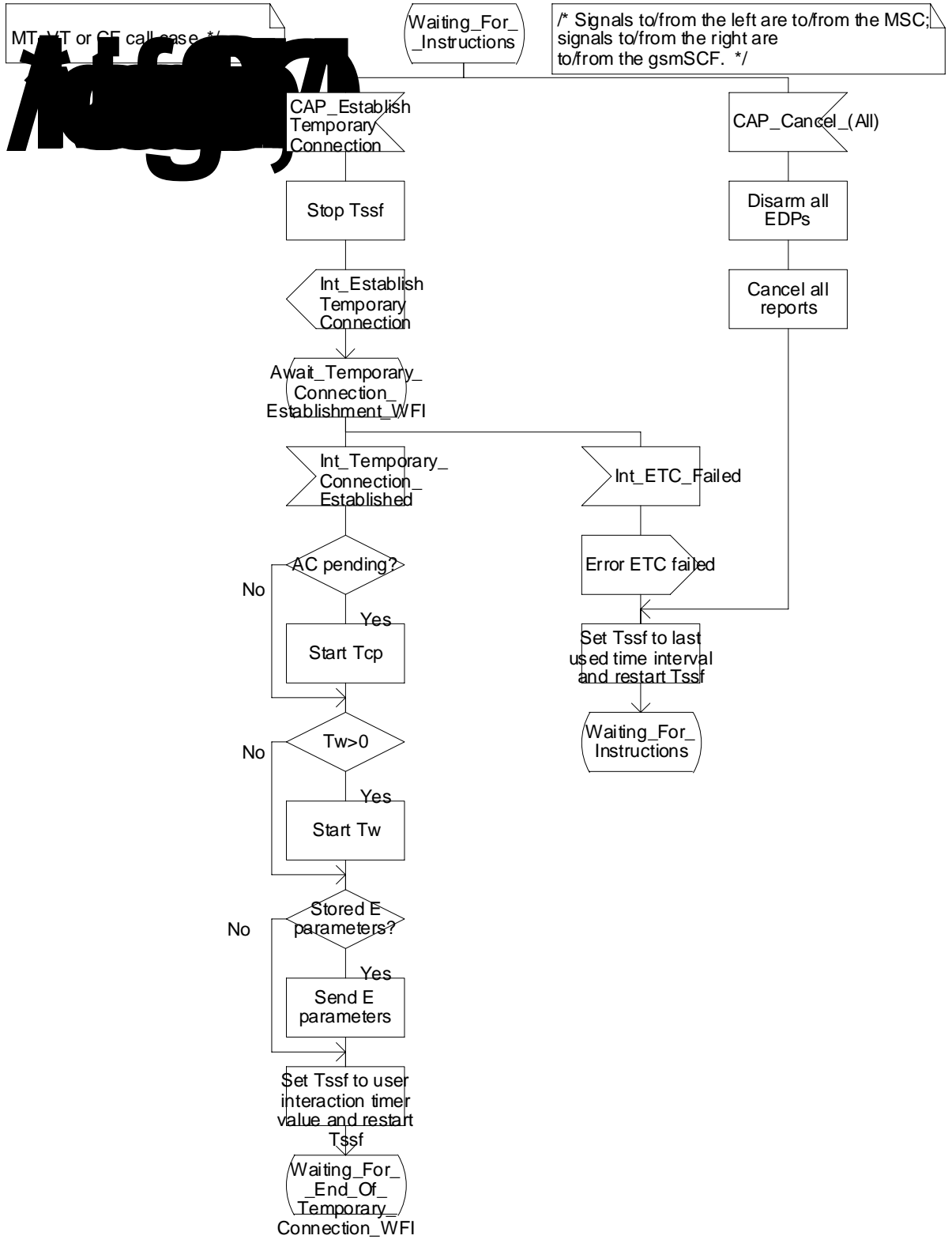
Other comments:



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Process gsmSSF

7(35)



Process gsmSSF

6(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

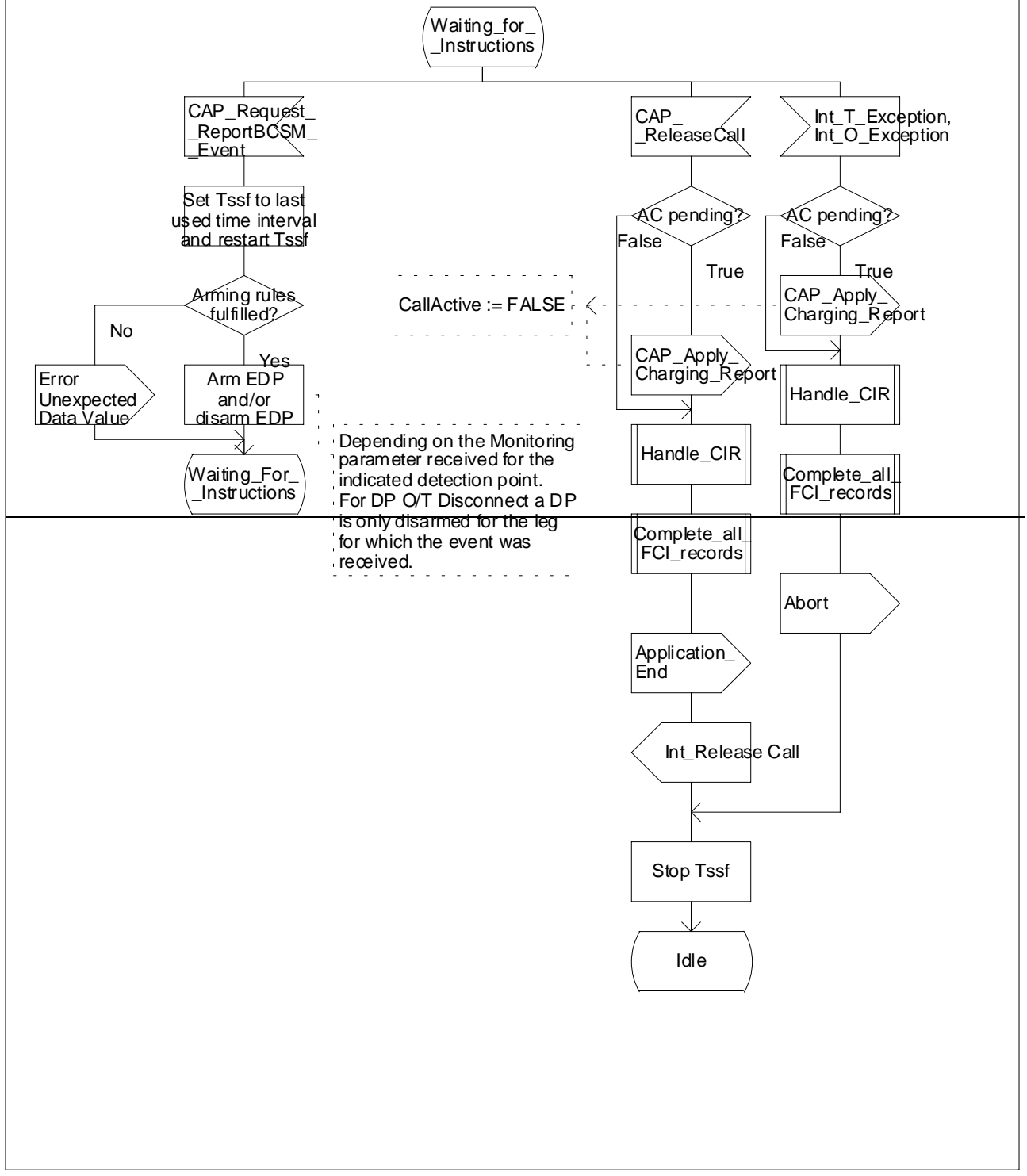


Figure 4.57g: Process gsmSSF (sheet 7)

| | | |
|--|--|--|
| <h2 style="margin: 0;">CHANGE REQUEST</h2> | | Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly. |
| 23.078 | CR 104 | Current Version: 3.3.0 |
| GSM (AA.BB) or 3G (AA.BBB) specification number ↑ | ↑ CR number as allocated by MCC support team | |
| For submission to: CN #07 <i>list expected approval meeting # here ↑</i> | for approval <input checked="" type="checkbox"/> for information <input type="checkbox"/> | strategic <input type="checkbox"/> non-strategic <input type="checkbox"/> (for SMG use only) |

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

Source: CN WG2 **Date:** 07.02.2000

Subject: Correction of "Figure 6.2: GPRS Attach/Detach FSM"

Work item: CAMEL Phase 3

| | | | |
|------------------|--|-----------------|--|
| Category: | F Correction <input checked="" type="checkbox"/> A Corresponds to a correction in an earlier release <input type="checkbox"/> B Addition of feature <input type="checkbox"/> C Functional modification of feature <input type="checkbox"/> D Editorial modification <input type="checkbox"/> | Release: | Phase 2 <input type="checkbox"/> Release 96 <input type="checkbox"/> Release 97 <input type="checkbox"/> Release 98 <input type="checkbox"/> Release 99 <input checked="" type="checkbox"/> Release 00 <input type="checkbox"/> |
|------------------|--|-----------------|--|

(only one category shall be marked with an X)

Reason for change: The "CSE initiated detach" event does not exist. It is not mentioned in the SDL diagrams neither. If the "Release GPRS" Information Flow from the gsmSCF to the gprsSSF is meant, then it is proposed to delete this event from the FSM, because this event has never been shown in the other FSM diagrams. Anyway the term CSE shall not be used in 23.078 (gprsSCF would be used).

Clauses affected: 6.4.2 GPRS Attach/Detach FSM

Other specs affected:

| | | |
|-------------------------------|--------------------------|----------------|
| Other 3G core specifications | <input type="checkbox"/> | → List of CRs: |
| Other GSM core specifications | <input type="checkbox"/> | → List of CRs: |
| MS test specifications | <input type="checkbox"/> | → List of CRs: |
| BSS test specifications | <input type="checkbox"/> | → List of CRs: |
| O&M specifications | <input type="checkbox"/> | → List of CRs: |

Other comments:



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6.4.2 GPRS Attach/Detach FSM

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

When encountering a DP the Attach/Detach FSM 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.

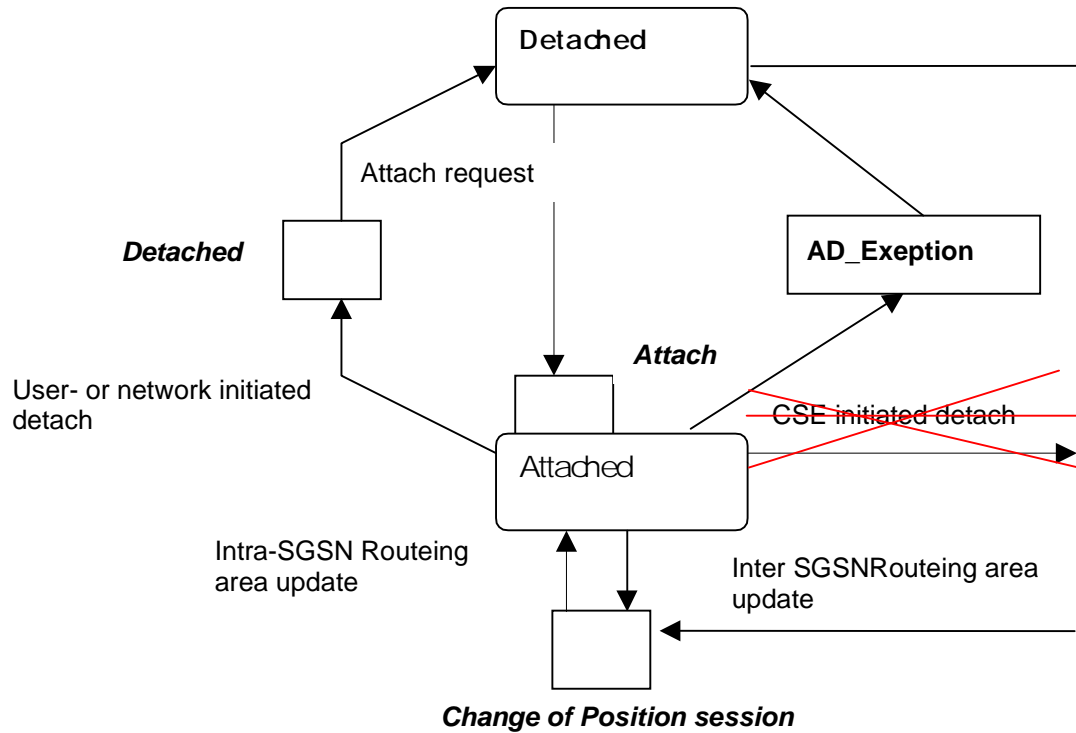


Figure 6.2: GPRS Attach/Detach FSM

CHANGE REQUEST

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23.078 CR 105

Current Version: **3.3.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **CN #07**
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for approval **X**
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Proposed change affects: (U)SIM ME UTRAN / Radio Core Network **X**
(at least one should be marked with an X)

Source: CN WG2 **Date:** 07.02.2000

Subject: Correction of first state in "Figure 6.14l: Process GPRS_SSF"

Work item: CAMEL Phase 3

| | | | | | |
|--|---|--|-----------------|------------|--|
| Category: <small>(only one category shall be marked with an X)</small> | F Correction | <input checked="" type="checkbox"/> X | Release: | Phase 2 | <input type="checkbox"/> |
| | A Corresponds to a correction in an earlier release | <input type="checkbox"/> | | Release 96 | <input type="checkbox"/> |
| | B Addition of feature | <input type="checkbox"/> | | Release 97 | <input type="checkbox"/> |
| | C Functional modification of feature | <input type="checkbox"/> | | Release 98 | <input type="checkbox"/> |
| | D Editorial modification | <input type="checkbox"/> | | Release 99 | <input checked="" type="checkbox"/> X |
| | | | | Release 00 | <input type="checkbox"/> |

Reason for change: Figure 6.14 k: Process GPRS_SSF (sheet 11) and Figure 6.14 l: Process GPRS_SSF (sheet 12) have the same state and input at the beginning. So only one of both SDL figures are correct.
 It is proposed to start the second diagram with the state monitoring.

Clauses affected:

Other specs affected:

| | | | |
|-------------------------------|--------------------------|----------------|--|
| Other 3G core specifications | <input type="checkbox"/> | → List of CRs: | |
| Other GSM core specifications | <input type="checkbox"/> | → List of CRs: | |
| MS test specifications | <input type="checkbox"/> | → List of CRs: | |
| BSS test specifications | <input type="checkbox"/> | → List of CRs: | |
| O&M specifications | <input type="checkbox"/> | → List of CRs: | |

Other comments:



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

6.5.6 GPRS SSF

...

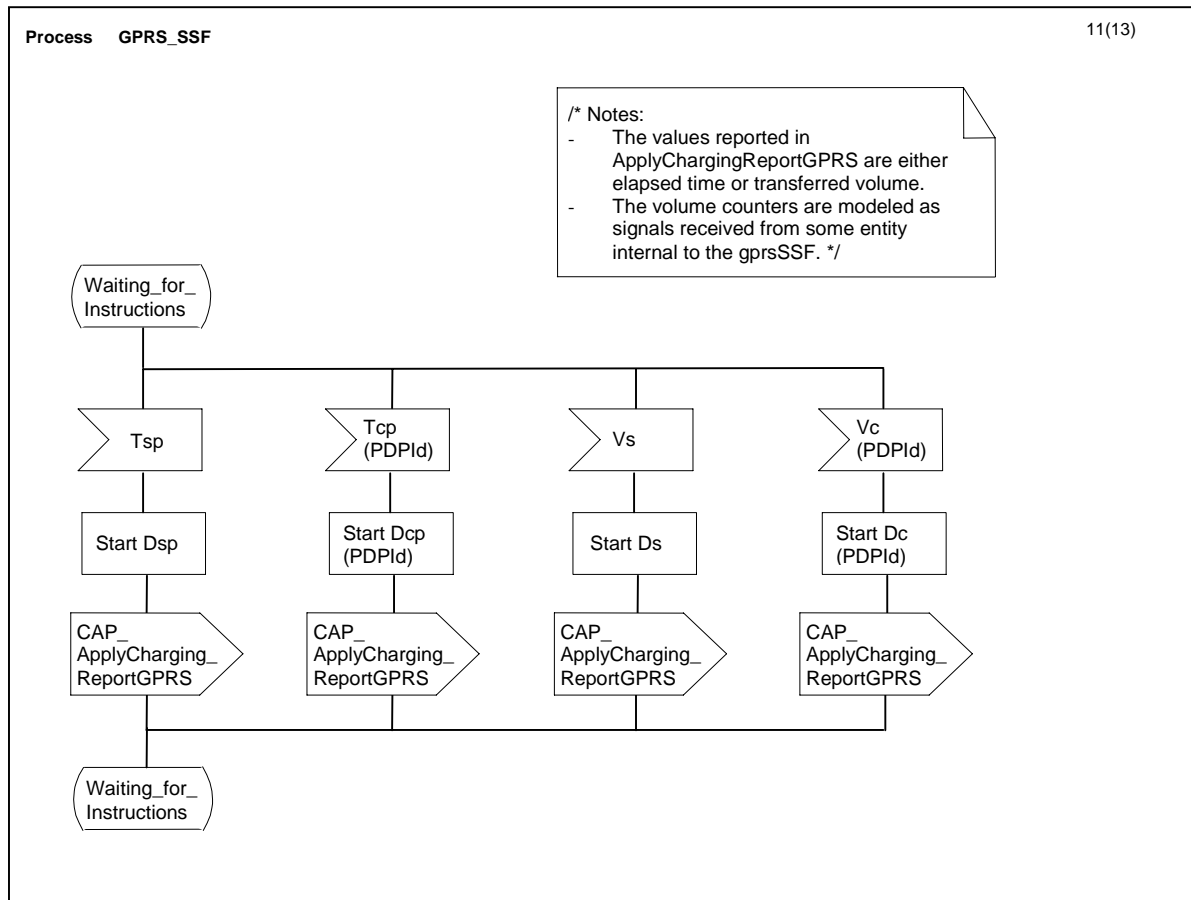


Figure 6.14 k: Process GPRS_SSF (sheet 11)

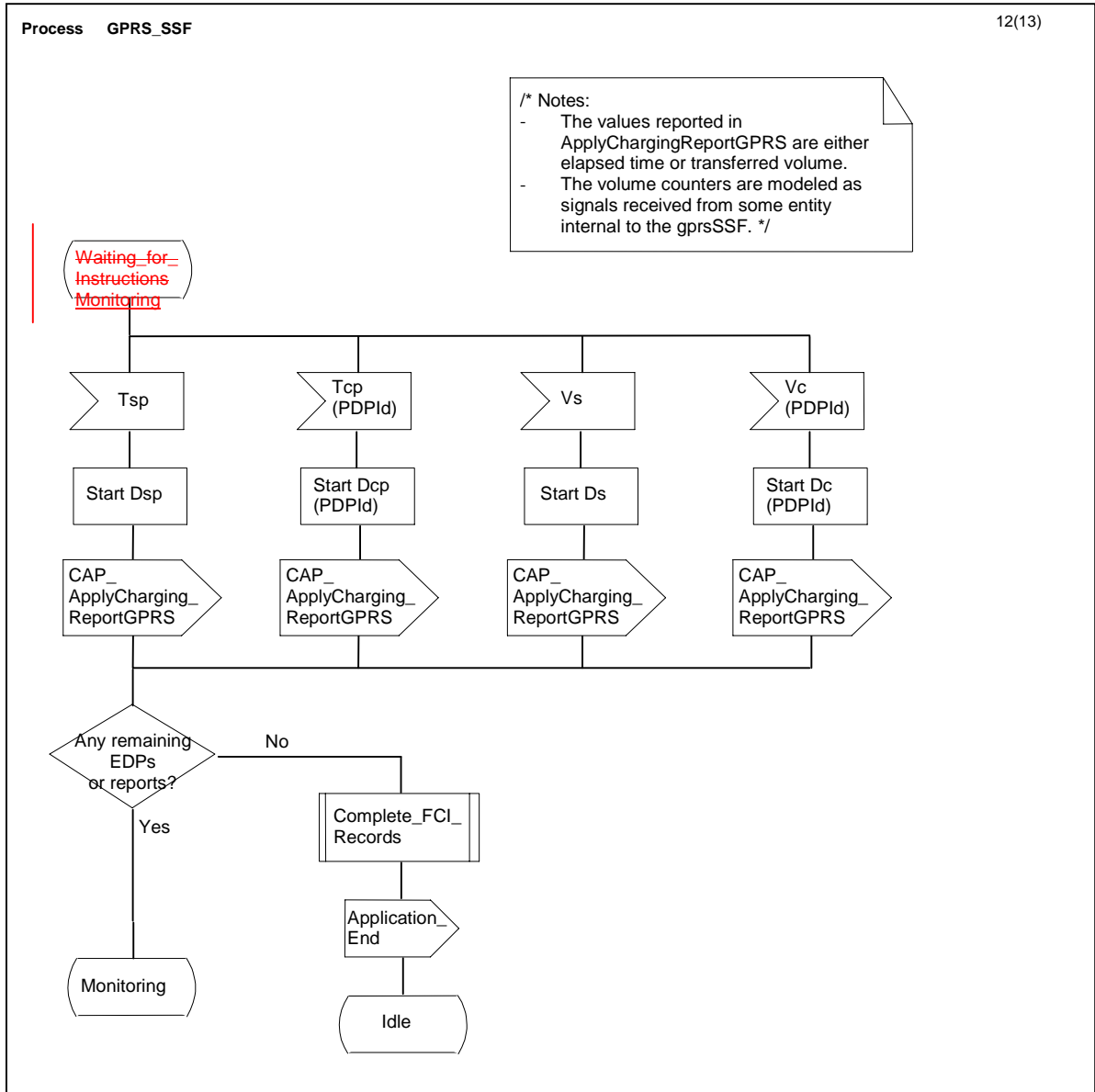


Figure 6.14 I: Process GPRS_SSF (sheet 12)

| | | | |
|---|-----------------|--|--|
| <h2 style="margin: 0;">CHANGE REQUEST</h2> | | | Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly. |
| 23.078 | CR 106r1 | Current Version: | 3.3.0 |
| GSM (AA.BB) or 3G (AA.BBB) specification number ↑ | | ↑ CR number as allocated by MCC support team | |
| For submission to: CN #07 | for approval | <input checked="" type="checkbox"/> | strategic <input type="checkbox"/> |
| list expected approval meeting # here ↑ | for information | <input type="checkbox"/> | non-strategic <input type="checkbox"/> <small>(for SMG use only)</small> |

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
(at least one should be marked with an X)

Source: CN WG2 **Date:** 25.02.2000

Subject: Correction of GPRS session description

Work item: CAMEL Phase 3

| | | | |
|---|--|-----------------|--|
| Category: | F Correction <input checked="" type="checkbox"/> | Release: | Phase 2 <input type="checkbox"/> |
| (only one category shall be marked with an X) | A Corresponds to a correction in an earlier release <input type="checkbox"/> | | Release 96 <input type="checkbox"/> |
| | B Addition of feature <input type="checkbox"/> | | Release 97 <input type="checkbox"/> |
| | C Functional modification of feature <input type="checkbox"/> | | Release 98 <input type="checkbox"/> |
| | D Editorial modification <input type="checkbox"/> | | Release 99 <input checked="" type="checkbox"/> |
| | | | |

Reason for change: The terms GPRS session, GPRS attach/detach and PDP context are used in the GPRS standards in various contexts and ways. The current set of contributions align those terminologies to the 23.078 terminology, as this one is used most consistently.

Clauses affected: _____

| | | | |
|------------------------------|--|----------------|---------------|
| Other specs affected: | Other 3G core specifications <input type="checkbox"/> | → List of CRs: | CR 29.078-053 |
| | Other GSM core specifications <input type="checkbox"/> | → List of CRs: | |
| | MS test specifications <input type="checkbox"/> | → List of CRs: | |
| | BSS test specifications <input type="checkbox"/> | → List of CRs: | |
| | O&M specifications <input type="checkbox"/> | → List of CRs: | |

Other comments: _____



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— **First modified section** —

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this TS, the following definitions apply:

...

GPRS session: A 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.

...

— Next 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 sessions requiring CAMEL support. The architecture is applicable to the third phase of CAMEL.

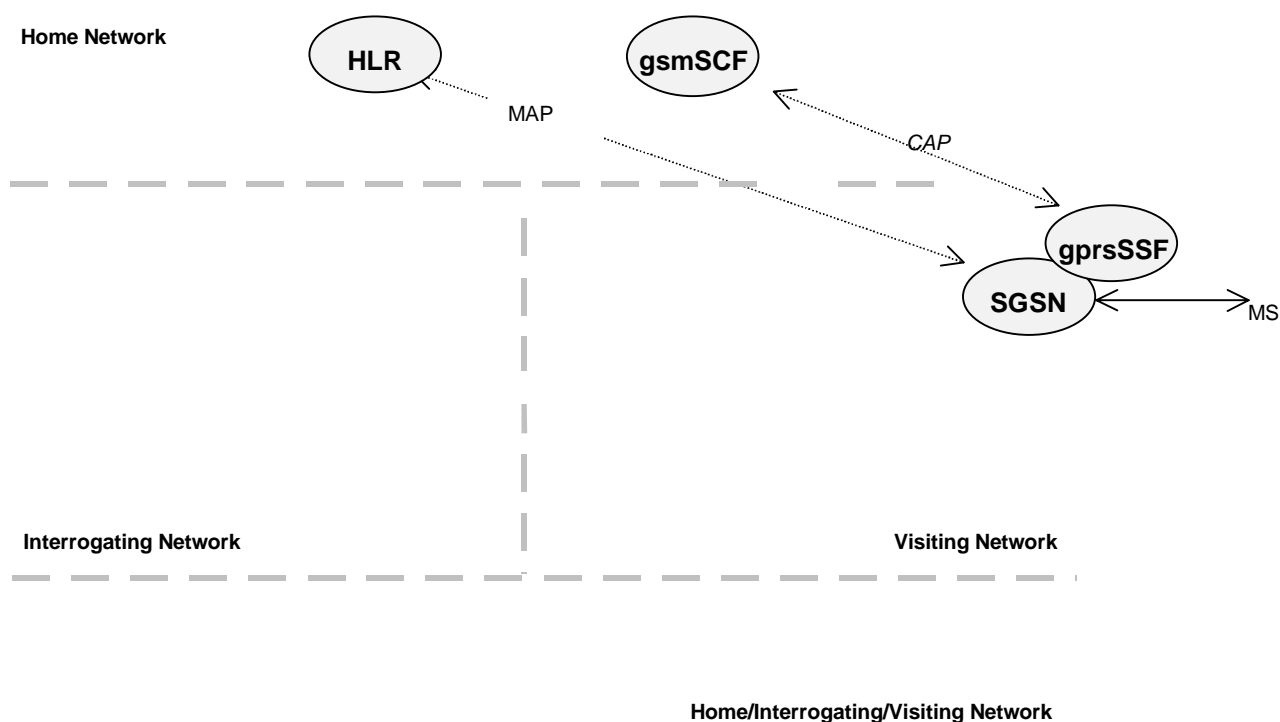


Figure 6.1 Functional architecture for support of CAMEL

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, PDP Context Activations or Inter-SGSN Routing 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 an individual PDP Contexts in a certain gprsSSF. Relationships 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 routing.

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 Session Handling

The Default ~~Session~~-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.

6.4 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, one for the attach/detach procedures (GPRS Attach/Detach FSM) and the other for modelling individual PDP Contexts (GPRS PDP Context FSM).

6.4.1 General Handling

The GPRS state model (GPRS SM) is used to describe the actions in an SGSN during processing of a GPRS sessions or PDP Contexts.

The GPRS SM 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.

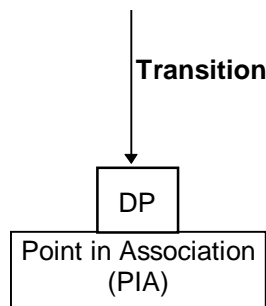


Figure 6.2: GPRS SM Components

6.4.2 GPRS Attach/Detach FSM

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

When encountering a DP the Attach/Detach FSM 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.

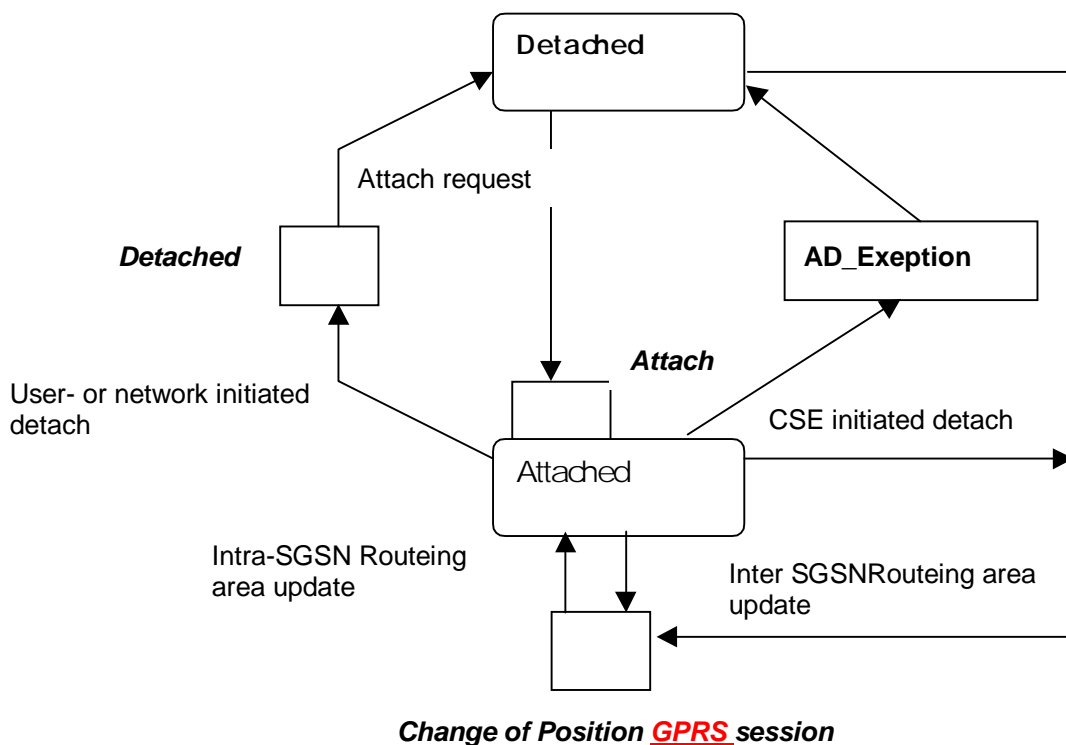


Figure 6.3: GPRS Attach/Detach FSM

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 <u>GPRS session</u> | 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. |
| Note 1: Change of Position <u>GPRS session</u> 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 <u>GPRS session</u> 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). | | |

6.4.2.1 Description of the Attach/Detach session-model (PIAs)

This subclause describes the ~~session~~-model for the attach and detach a of GPRS sessions 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 Change 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 shall only have one or more GPRS PDP Context FSMs associated with it when in the Attached state. A GPRS PDP Context FSM cannot exist without its associated GPRS Attach/Detach FSM being in the

Attached state. Closure of the GPRS Attach/Detach FSM via a detach will result in the idling of all associated GPRS PDP Context FSMs and the release of the associated GPRS PDP Contexts.

It shall not be necessary to trigger a relationship from the GPRS Attach/Detach FSM to the gsmSCF in order for triggering to occur in an associated GPRS PDP Context FSM. However, in this latter case a GPRS Attach/Detach FSM 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 transiting to the Detached state. As noted above, in this state no PDP Contexts can exist and so all associated GSM PDP Context FSMs will transit to state Idle.

6.4.3 GPRS PDP Context FSM

The GPRS PDP Context FSM is used to model the behaviour for the GPRS PDP Context procedures.

When encountering a DP the PDP Context FSM 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.

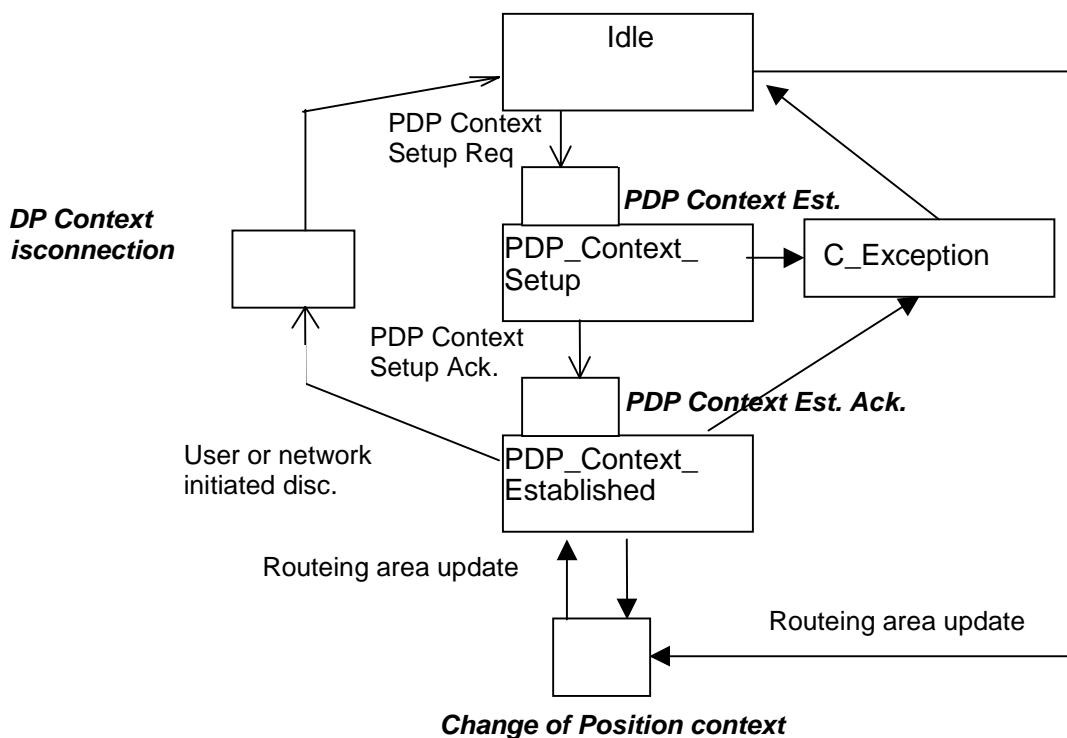


Figure 6.4: GPRS PDP Context FSM

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

| CAMEL Detection Point: | DP Type | Description: |
|--|------------------------------------|---|
| DP PDP Context Establishment | TDP-R, EDP-R | Activate PDP Context request is received from the MS. |
| DP PDP Context Establishment Acknowledgement | TDP-R ¹⁾ , 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. |
| DP Change of position context | TDP-R ²⁾ , EDP-N, EDP-R | Routeing Area Update is accepted. |

NOTE 1: The PDP Context Establishment Acknowledgment shall be reported as TDP-R if there is no relationship with gsmSCF for this PDP context. Otherwise, it shall be reported as EDP-R or EDP-N if armed so.

NOTE 2: 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).
Change of Position context 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).

6.4.3.1 Description of the ~~session~~-PDP Context model (PIAs)

This subclause describes the ~~session~~-model for PDP Context FSM 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).
- Information being analyzed, e.g. GPRS-CSI is analyzed.

Exit events

- GPRS-CSI is analyzed (DP PDP Context Establishment or DP Change of position).

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).

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 initiated by the SGSN via READY timer expiry (DP PDP Context disconnection).
- Intra-SGSN Routeing Area Update Request is received from the MS (DP Change of position).
- An exception is encountered.

6.4.4 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 and PDP context FSM. 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).

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 and PDP context FSM

| 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 Cont 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

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|--|
| 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. If not present the report is sent due to PDP context or GPRS session termination or Charging threshold reached. |
| 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 <u>GPRS</u> 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 gsmSSF at any phase that a PDP context within one dialogue has been terminated abnormally by the SGSN.

6.6.1.3.2 Information Elements

The following information elements are used:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|--|
| 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|---|
| 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 routing 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|---|
| ServiceKey | M | This IE identifies for the gsmSCF the requested set of one or more CAMEL services. It is used to address the correct 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

This IF contains no information elements.

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

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|---|
| 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 <u>GPRS</u> 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|---|
| all requests | M | This IE indicates that all active requests for EventReportGPRS and ApplyCharging shall be cancelled. |
| PDP ID | C | This IE identifies the PDP context which is to be cancelled. If not present the dialogue corresponds to the <u>GPRS</u> 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

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|--|
| 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)

6.6.2.5 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 or PDP Context FSM) without substituting new data from the gsmSCF.

6.6.2.5.2 Information Elements

The following information elements are used:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|--|
| PDP ID | C | This IE identifies the PDP context which processing shall continue for. If not present the dialogue corresponds to the <u>GPRS</u> 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 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

| Information element name | Required | Description |
|---|-----------------|---|
| 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 | <p>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.</p> <ul style="list-style-type: none"> 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 <u>GPRS</u> 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 <u>GPRS</u> session or PDP Context, by the free format data received in this IF. <p>If no Logical call record exists yet for that <u>GPRS</u> session or PDP Context, then the gprsSSF shall ignore this IE.</p> |
| 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 <u>GPRS</u> 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|--|
| GPRS Cause | M | <u>This IE contains the Cause value indicating the reason for releasing the GPRS session or PDP context.</u> |
| PDP ID | C | This IE identifies the PDP context which shall be released. If not present the dialogue corresponds to the <u>GPRS</u> 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|---|
| 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 <u>GPRS</u> 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|---|
| 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|--|
| <u>Timer ID</u> | M | <u>This IE specifies the default value for the Tssf timer.</u> |
| 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 <u>GPRS</u> 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

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|--|-----------------|--|
| 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|---|
| 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 <u>GPRS</u> session or for a single PDP context for the dialogue. |

M Mandatory (The IE shall always be sent)

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

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

AOC GPRS is defined as:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|---|
| 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|--|
| 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|--|
| 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|------------------------------------|
| 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:

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|--|
| 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 section 4.6.8.

3GPP TSG CN WG2 A
Sophia Antipolis, France, 21-25 February 2000

N2A000298
Document rev of N2A000281
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

| | | | |
|--|--|---|-------------------------------------|
| <h2 style="margin: 0;">CHANGE REQUEST</h2> | | <i>Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.</i> | |
| 23.078 CR 108r2 | | Current Version: 3.3.0 | |
| <i>GSM (AA.BB) or 3G (AA.BBB) specification number ↑</i> | | <i>↑ CR number as allocated by MCC support team</i> | |
| For submission to: | CN #07 | for approval | <input checked="" type="checkbox"/> |
| <i>list expected approval meeting # here ↑</i> | | for information | <input type="checkbox"/> |
| | | strategic | <input type="checkbox"/> |
| | | non-strategic | <input type="checkbox"/> |
| | | | <i>(for SMG use only)</i> |

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
(at least one should be marked with an X)

Source: **CN WG2** **Date:** **25.02.2000**

Subject: **Correction of GPRS PDP context FSM**

Work item: **CAMEL Phase 3**

| | | | |
|--|---|-------------------------------------|--|
| Category: <i>(only one category shall be marked with an X)</i> | F Correction | <input checked="" type="checkbox"/> | Release: Phase 2 <input type="checkbox"/> Release 96 <input type="checkbox"/> Release 97 <input type="checkbox"/> Release 98 <input type="checkbox"/> Release 99 <input checked="" type="checkbox"/> Release 00 <input type="checkbox"/> |
| | A Corresponds to a correction in an earlier release | <input type="checkbox"/> | |
| | B Addition of feature | <input type="checkbox"/> | |
| | C Functional modification of feature | <input type="checkbox"/> | |
| | D Editorial modification | <input type="checkbox"/> | |

Reason for change:
 The GPRS PDP Context FSM shall take into account the disconnection of the PDP context in the old SGSN in case of inter SGSN RA update.
 Correction of the PDP context PIA .
 (1) In fact the disconnection of the PDP context in case of inter_SGSN_RA_Update does not appear.
 (2) Addition of the PIA 'change of position context'
 (3) Editorial: the word 'session' before model is removed and replaced by PDP context model.

Clauses affected: **6.4.3**

| | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|--|------------------------------|--|----------------|--|-------------------------------|--|----------------|--|------------------------|--|----------------|--|-------------------------|--|----------------|--|--------------------|--|----------------|--|
| Other specs affected: | <table style="width: 100%; border: none;"> <tr> <td style="border: none;">Other 3G core specifications</td> <td style="border: 1px solid black; width: 30px; height: 15px;"></td> <td style="border: none;">→ List of CRs:</td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;">Other GSM core specifications</td> <td style="border: 1px solid black; width: 30px; height: 15px;"></td> <td style="border: none;">→ List of CRs:</td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;">MS test specifications</td> <td style="border: 1px solid black; width: 30px; height: 15px;"></td> <td style="border: none;">→ List of CRs:</td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;">BSS test specifications</td> <td style="border: 1px solid black; width: 30px; height: 15px;"></td> <td style="border: none;">→ List of CRs:</td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;">O&M specifications</td> <td style="border: 1px solid black; width: 30px; height: 15px;"></td> <td style="border: none;">→ List of CRs:</td> <td style="border: none;"></td> </tr> </table> | 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 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:



help.doc

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

6.4.2 GPRS Attach/Detach FSM

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

When encountering a DP the Attach/Detach FSM 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.

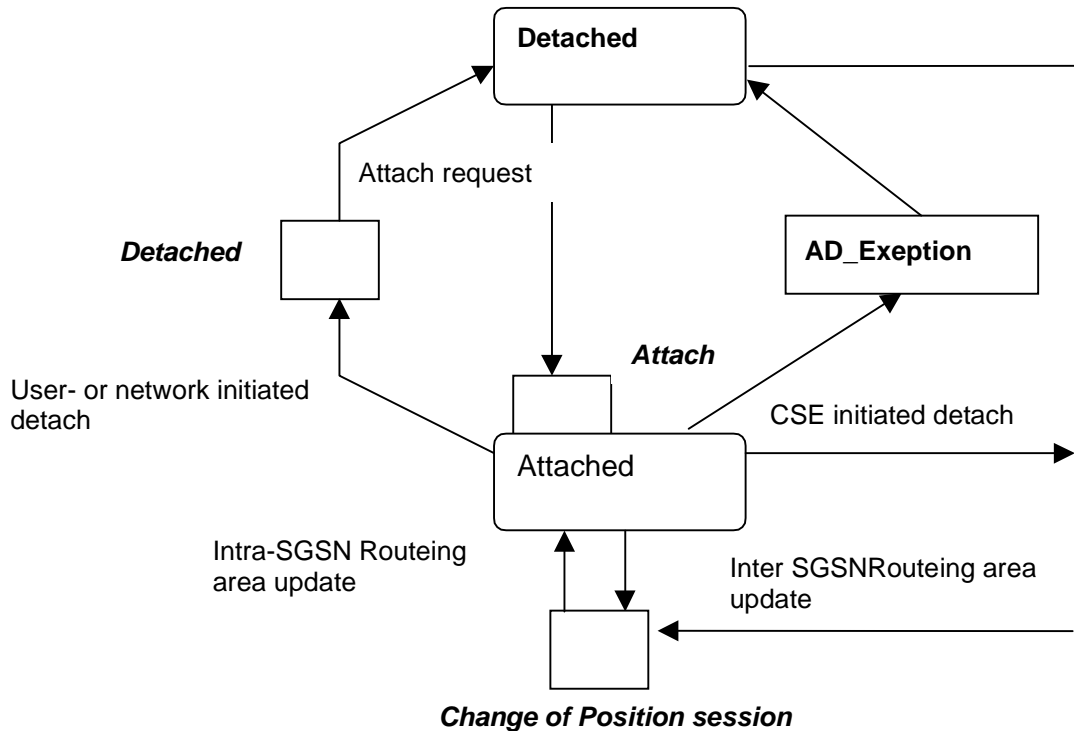


Figure Error! Reference source not found..1: GPRS Attach/Detach FSM

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 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. <u>CR editor's note: Remove the previous underline.</u> |
| Note 1: Change of Position 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 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). | | |

6.4.2.1 Description of the session model (PIAs)

This subclause describes the session model for the attach and detach of GPRS sessions 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 Change 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 shall only have one or more GPRS PDP Context FSMs associated with it when in the Attached state. A GPRS PDP Context FSM cannot exist without its associated GPRS Attach/Detach FSM being in the Attached state. Closure of the GPRS Attach/Detach FSM via a detach will result in the idling of all associated GPRS PDP Context FSMs and the release of the associated GPRS PDP Contexts.

It shall not be necessary to trigger a relationship from the GPRS Attach/Detach FSM to the gsmSCF in order for triggering to occur in an associated GPRS PDP Context FSM. However, in this latter case a GPRS Attach/Detach FSM 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 transiting to the Detached state. As noted above, in this state no PDP Contexts can exist and so all associated GSM PDP Context FSMs will transit to state Idle.

6.4.3 GPRS PDP Context FSM

The GPRS PDP Context FSM is used to model the behaviour for the GPRS PDP Context procedures.

When encountering a DP the PDP Context FSM 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.

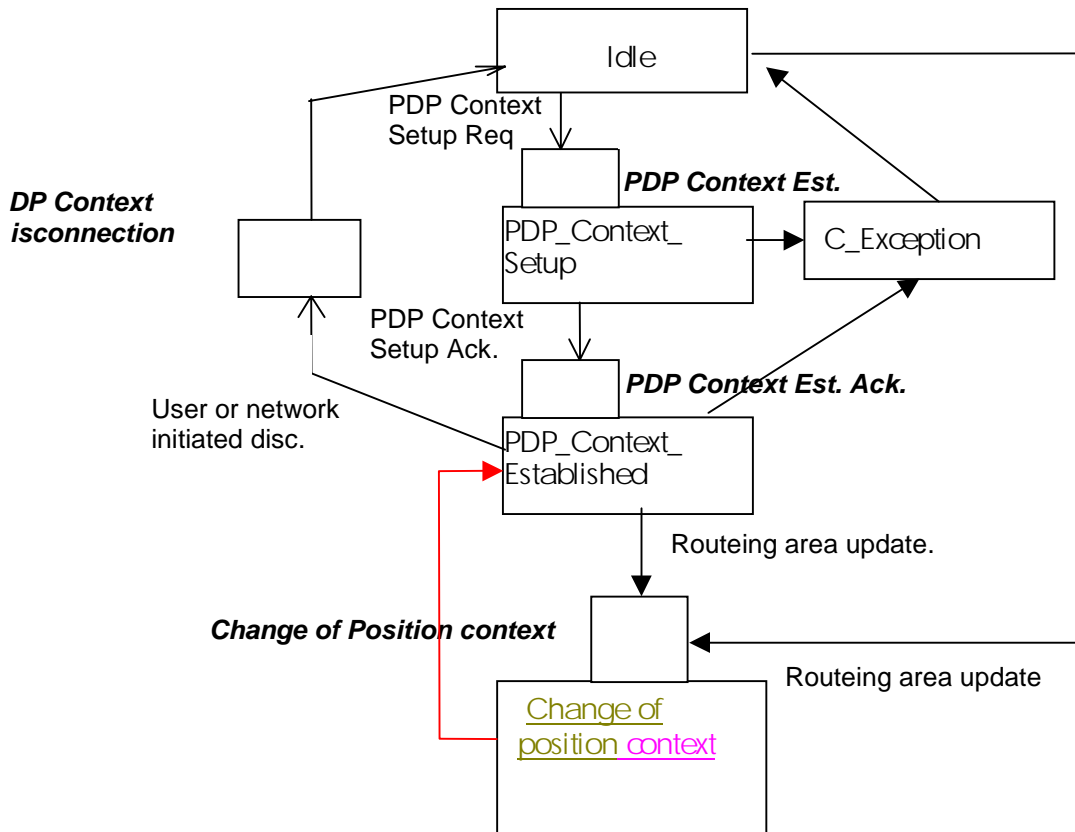
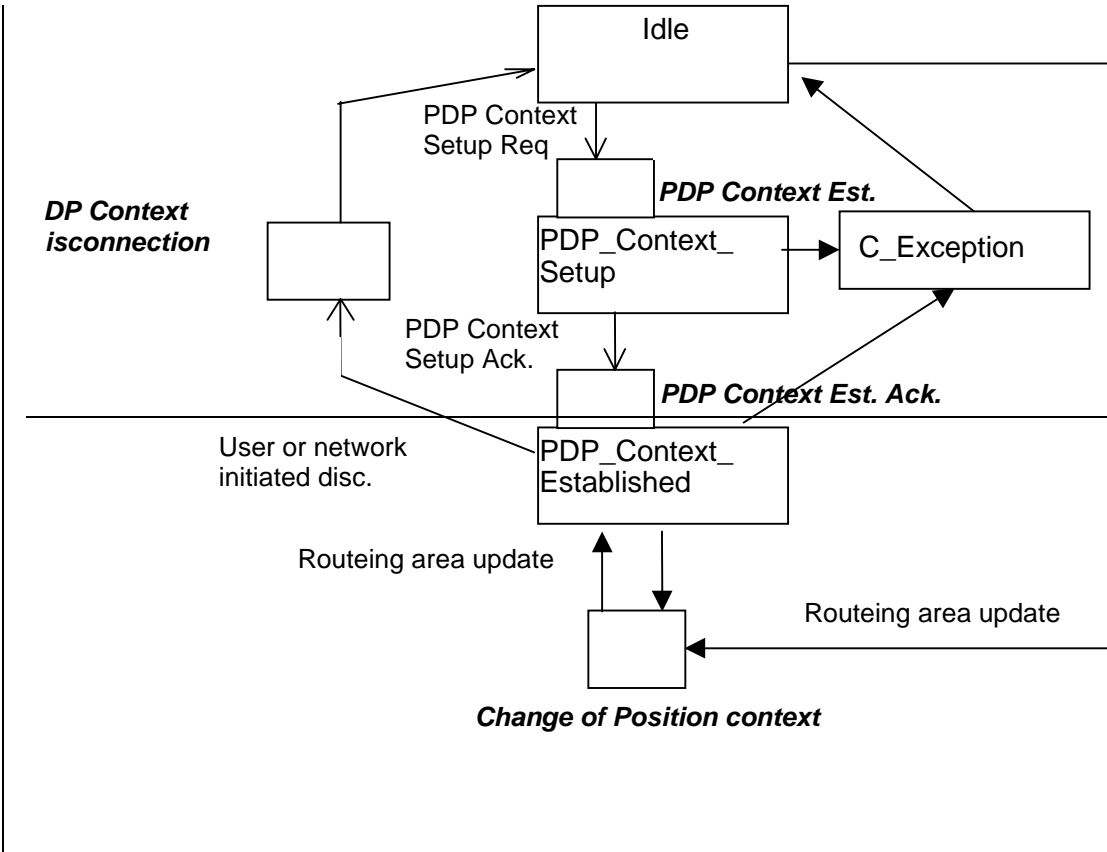


Figure Error! Reference source not found.:2: GPRS PDP Context FSM

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

| CAMEL Detection Point: | DP Type | Description: |
|--|------------------------------------|---|
| DP PDP Context Establishment | TDP-R, EDP-R | Activate PDP Context request is received from the MS. |
| DP PDP Context Establishment Acknowledgement | TDP-R ¹⁾ , 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. <u>Inter SGSN Routeing update occurred in old SGSN.</u> |
| DP Change of position context | TDP-R ²⁾ , EDP-N, EDP-R | Routeing Area Update is accepted. |
| <p>NOTE 1: The PDP Context Establishment Acknowledgment shall be reported as TDP-R if there is no relationship with gsmSCF for this PDP context. Otherwise, it shall be reported as EDP-R or EDP-N if armed so.</p> <p>NOTE 2: 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). Change of Position context is reported as EDP-N <u>or EDP-R</u> in the case of Intra-SGSN Routeing Area Update (provided that this DP is dynamically armed by the Service Logic).</p> | | |

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~~session~~ model (PIAs)

This subclause describes the ~~session~~ model for PDP Context FSM 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). initiated by the SGSN via READY timer expiry (DP PDP Context disconnection).
- 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 contextEntry 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

- reestablishment of the PDP context at the new SGSN and return to ~~DP~~-PDP context established in case of inter SGSN Routeing Area update accepted in new SGSN (~~DP~~PIA PDP context established)
- Routeing Area update completed in case of intra SGSN Routeing Area update (PIA PDP context established).

CHANGE REQUEST

23.078 CR 109r2

Current Version: 3.3.0

For submission to: **CN#7** for approval for information strategic non-strategic

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

Source: CN WG2 **Date:** 25-02-2000

Subject: Enhancement of the SDL for ATM

Work item: CAMEL Phase 3

| | | | | | |
|------------------|---|-------------------------------------|-----------------|------------|-------------------------------------|
| Category: | F Correction | <input checked="" type="checkbox"/> | Release: | Phase 2 | <input type="checkbox"/> |
| | A Corresponds to a correction in an earlier release | <input type="checkbox"/> | | Release 96 | <input type="checkbox"/> |
| | B Addition of feature | <input type="checkbox"/> | | Release 97 | <input type="checkbox"/> |
| | C Functional modification of feature | <input type="checkbox"/> | | Release 98 | <input type="checkbox"/> |
| | D Editorial modification | <input type="checkbox"/> | | Release 99 | <input checked="" type="checkbox"/> |
| | | | | Release 00 | <input type="checkbox"/> |

Reason for change: This CR proposes an enhancement to the SDL in chapter 10 for Any Time Modification. The proposed set of SDL's aim to present a clear overview of the behaviour of the HLR on reception of an ATM request.

Clauses affected: 10.2.2

| | | | | |
|------------------------------|-------------------------------|-------------------------------------|----------------|--|
| Other specs affected: | Other 3G core specifications | <input checked="" type="checkbox"/> | → List of CRs: | |
| | Other GSM core specifications | <input type="checkbox"/> | → List of CRs: | |
| | MS test specifications | <input type="checkbox"/> | → List of CRs: | |
| | BSS test specifications | <input type="checkbox"/> | → List of CRs: | |
| | O&M specifications | <input type="checkbox"/> | → List of CRs: | |

Other comments:

*** **First Modified Section** ***

10.2.2 Any Time Modification

Handling of Any Time Modification involves the following process:

- CAMEL_ATM_HLR.

The following procedures are involved:

- ATM Modify Data
This procedure checks which data shall be modified and calls the appropriate data modification procedure.
- ATM Modify CSI Data
If the CSI indicated in the ATM request is not available in the HLR, then an error is returned.
Otherwise, the CSI state and/or Notification-to-CSE flag are set as instructed with the ATM request.
- ATM Modify CF Data
When only the SS-code and (optionally) a Basic Service code are present in the ATM request, then all Call Forwarding data is erased.
Otherwise, the behaviour is as follows:
 - If a valid SS state is present in the ATM request, then an SS state transition is performed
 - If a valid FTN, FTN sub address or No Reply Condition Time is present in the ATM request, then the indicated variable is modified.
 - If an instruction to modify the notification-to-CSE flag is present in the ATM request, then the notification-to-CSE flag is modified.
- ATM Modify CB Data
When only the SS-code and (optionally) a Basic Service code are present in the ATM request, then all Call Barring data is erased.
Otherwise, the behaviour is as follows:
 - If a valid SS state is present in the ATM request, then an SS state transition is performed
 - If a valid Password or 'Wrong password attempt counter' is present in the ATM request, then the indicated variable is modified.
 - If an instruction to modify the notification-to-CSE flag is present in the ATM request, then the notification-to-CSE flag is modified.

~~If an OSS needs to modify the Subscriber Information, the gsmSCF initiates a transaction to the HLR by sending an Any_Time_Modification Request.~~

~~When the HLR receives an Any_Time_Modification Request, then HLR does the procedure as follows.~~

~~If Call Forwarding or Call Barring supplementary service data modification is requested, then~~

~~if only ss-code (and basic-service) is set present in the Any_Time_Modification Request, and ss-status is absent in the Any Time Modification Request, then the HLR erases the data related to the requested indicated supplementary service.~~

~~This may only be used for Call Forwarding supplementary service.~~

~~if ss-code (and basic-service) and ss-status are set present in the Any_Time_Modification request, then the HLR does the activation or deactivation of/activates or de-activates the requested indicated supplementary service.~~

~~This may be used for Call Forwarding or Call Barring supplementary service.~~

~~if ss-code (and basic-service) and at least one of "forwarded-to number,"/"forwarded to subaddress and"/"no reply condition time" are set present in the Any_Time_Modification request, then the HLR modifies the requested data of the requested Call Forwarding supplementary service.~~

~~If the Modify Notification Flag is present in Any Time Modification request, then the HLR modifies the state of the notification-to-CSE flag of the indicated supplementary service.~~

~~If CSI data modification is requested, then the HLR modifies the CSI state and/or the notification-to-CSE flag of the requested indicated CSI.~~

After having executed the Any Time Modification instruction from the gsmSCF, the HLR calls the procedure CAMEL NSDC HLR, which sends notifications to gsmSCF(s), if required.

If a notification flag is set for the modified data, Notify_Subscriber_Data_Change is sent for the gsmSCF except for the gsmSCF which sent Any_Time_Modification_Request. Support for this procedure is a network operator option.

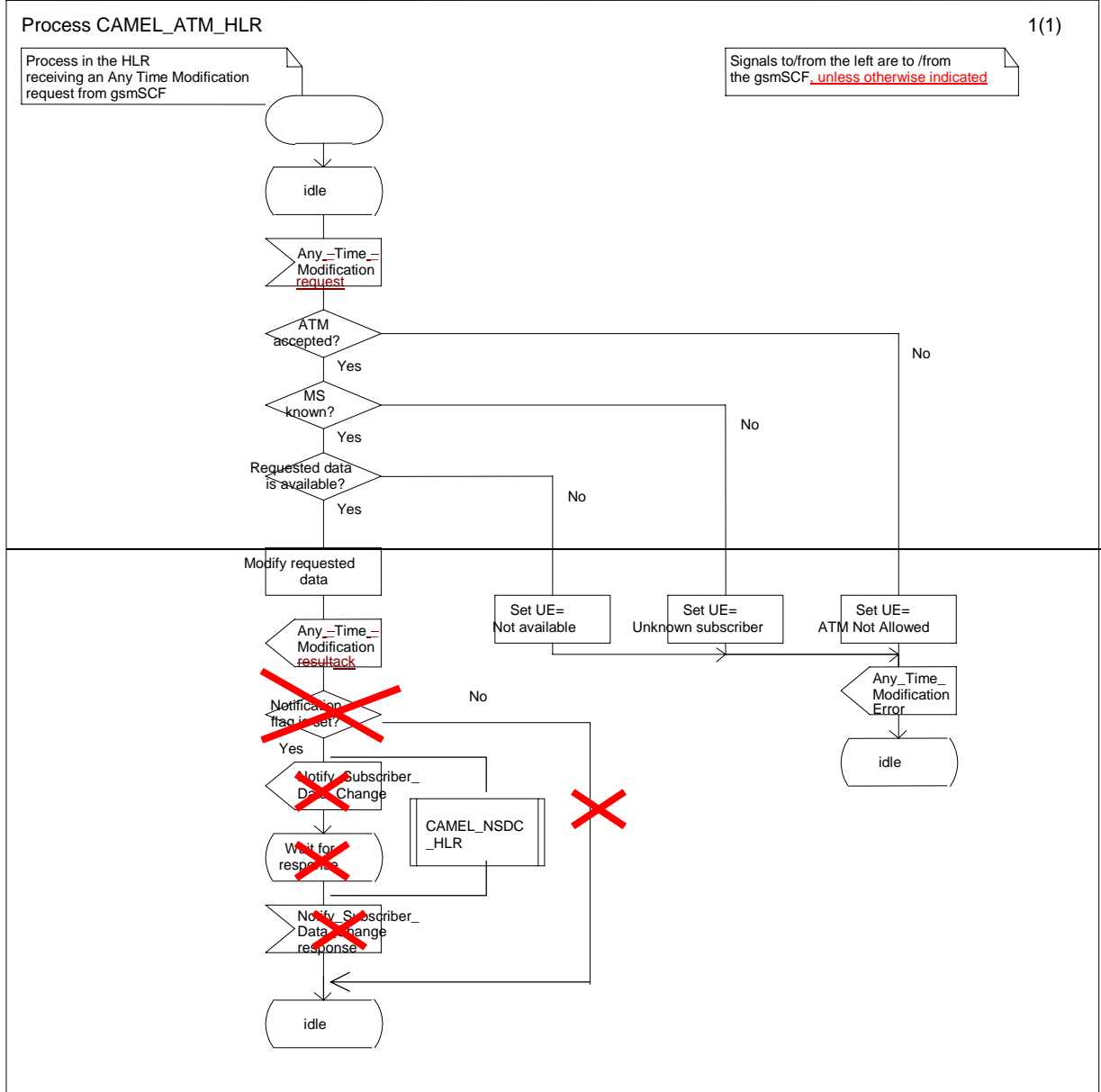


Figure 10.3: Process CAMEL_ATM_HLR (sheet 1)

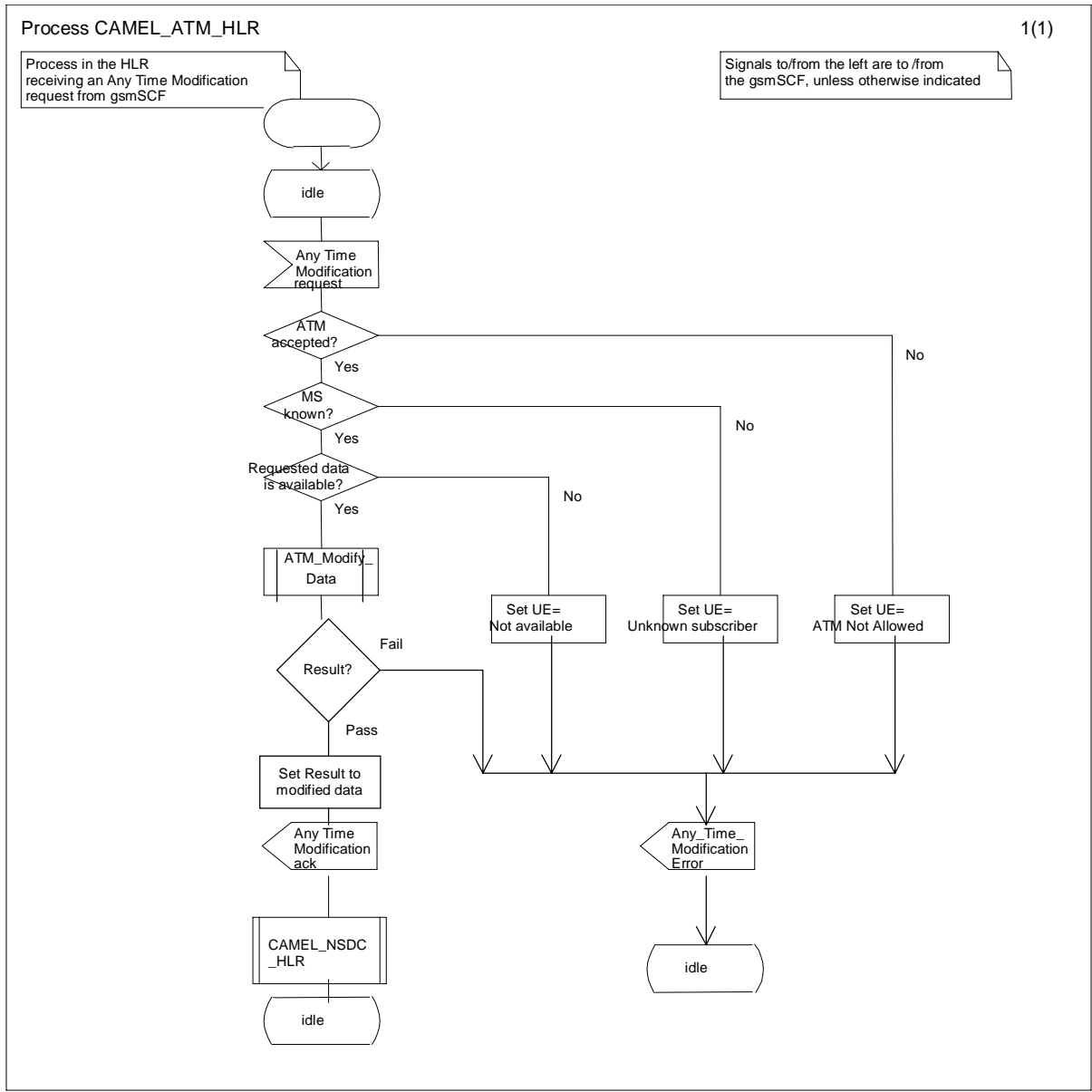


Figure.3a: Process CAMEL_ATM_HLR

Procedure ATM_Modify_Data

1(1)

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

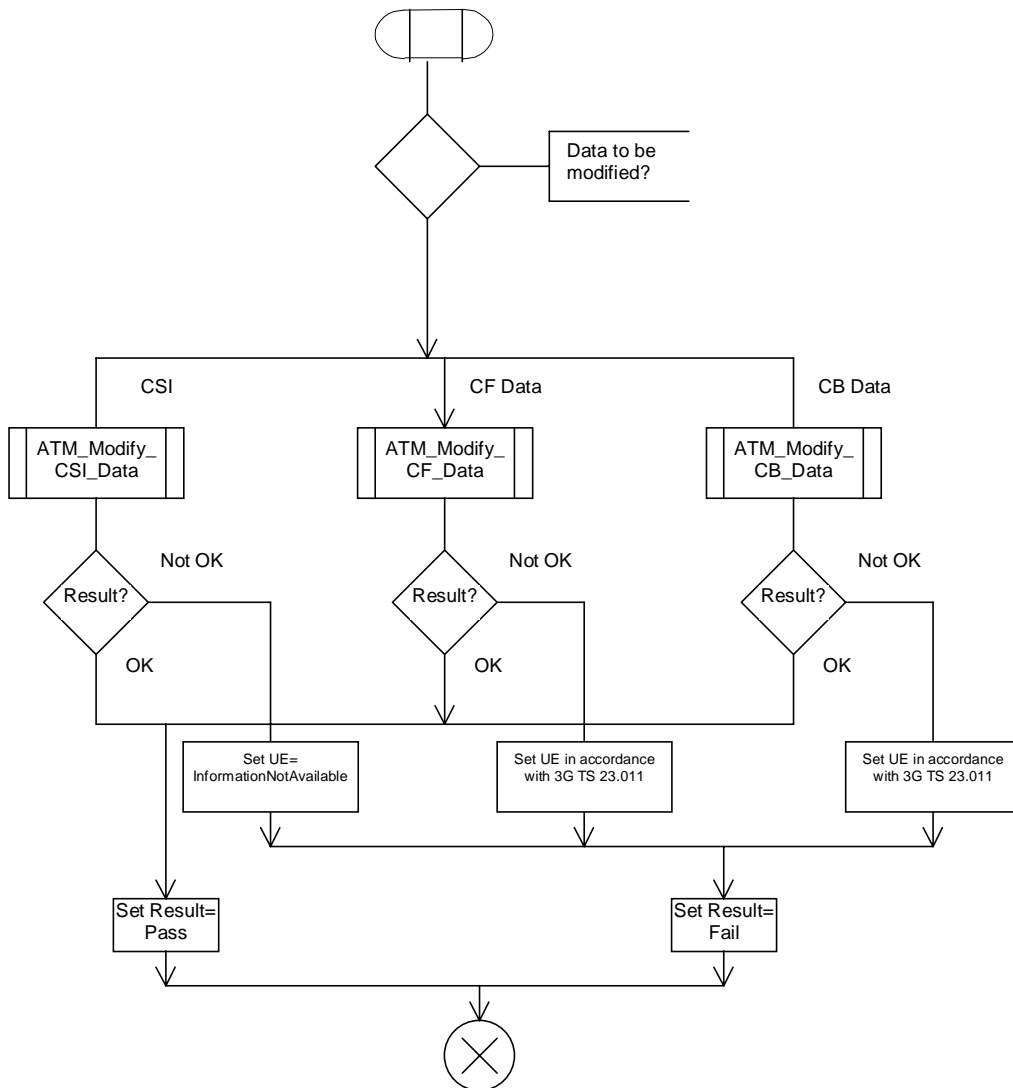


Figure3b: Procedure ATM Modify Data

Procedure ATM_Modify_CSI_Data

1(1)

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

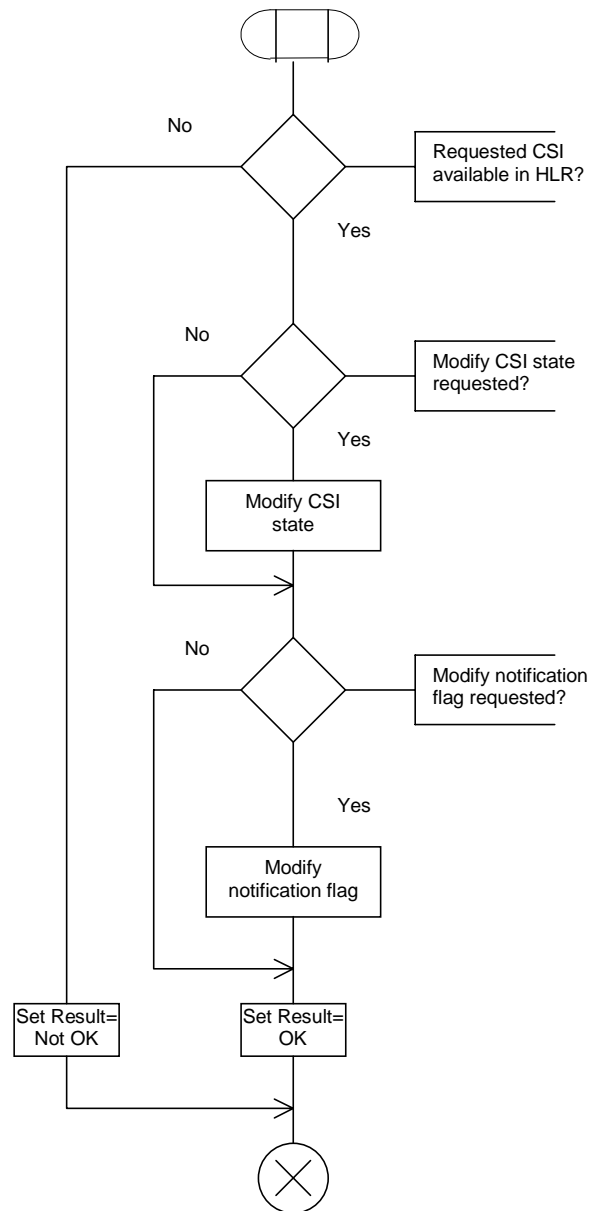


Figure3c: Procedure ATM_Modify_CSI_Data

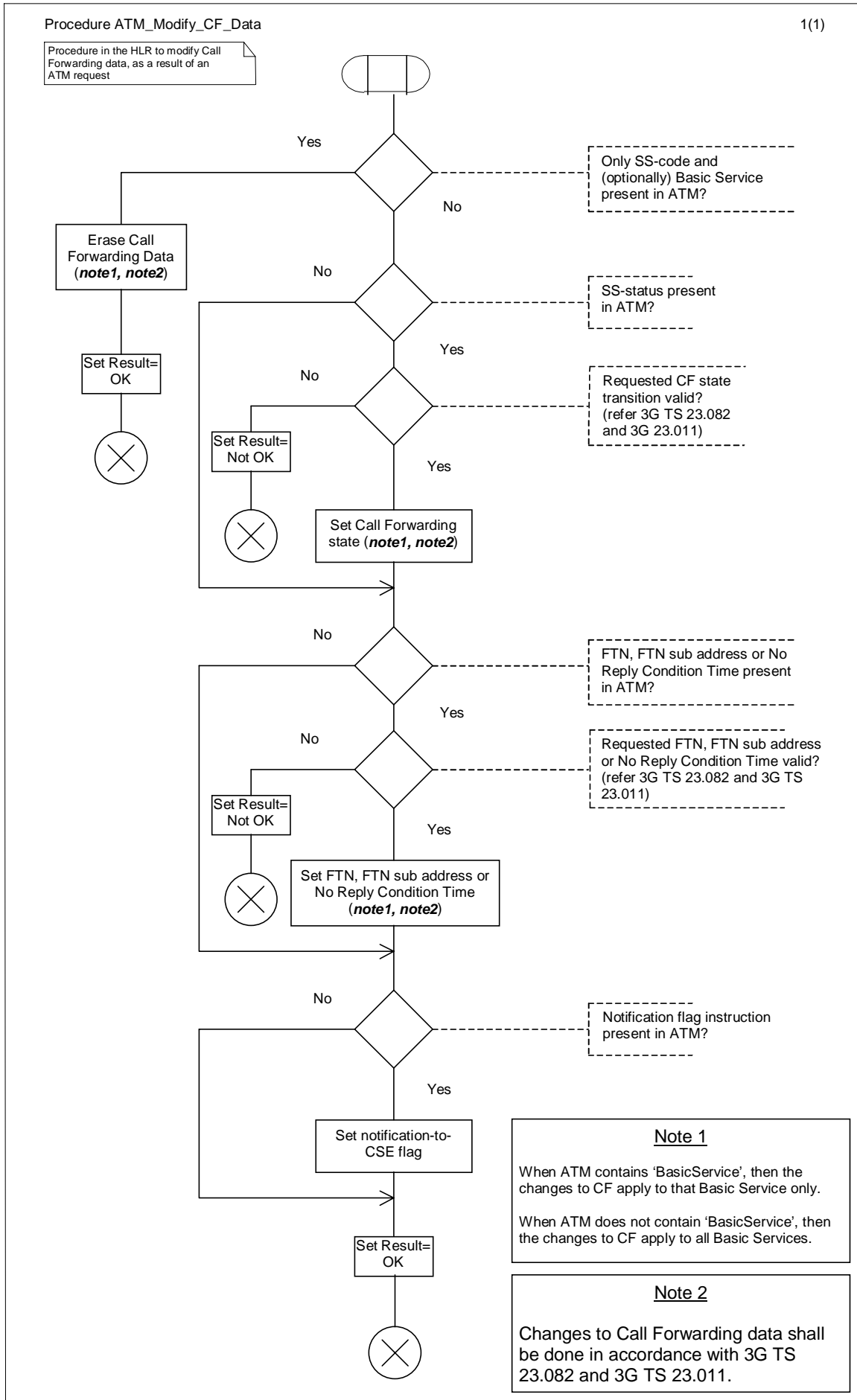


Figure3d: Procedure ATM_Modify CF Data

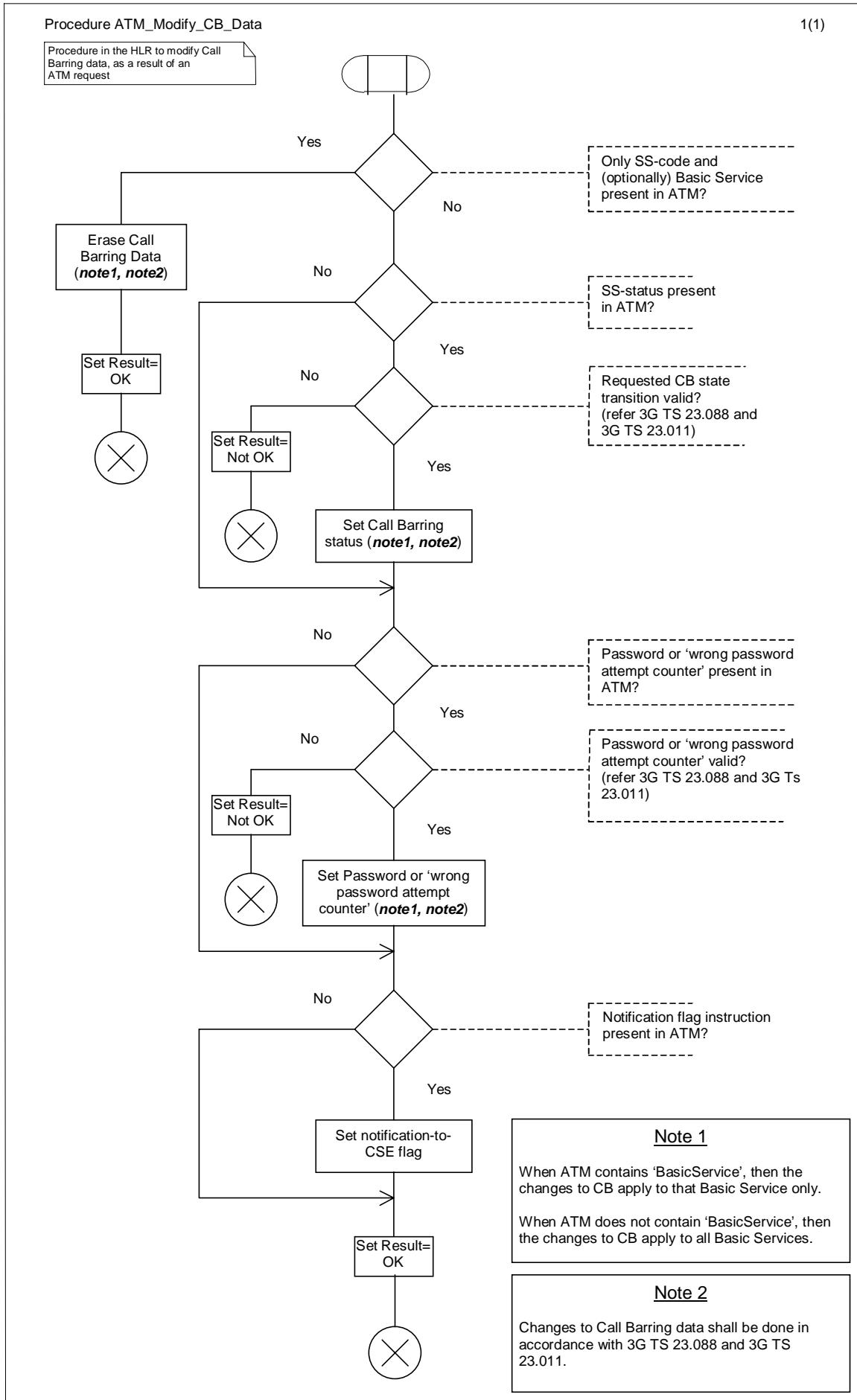


Figure3e: Procedure ATM Modify CB Data

CHANGE REQUEST

23.078 CR 110r1

Current Version: 3.3.0

For submission to: **CN#7** for approval for information strategic non-strategic

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

Source: CN WG2 **Date:** 24-02-2000

Subject: Enhancement of the SDL for NCSD

Work item: CAMEL Phase 3

| | | | | | |
|------------------|---|-------------------------------------|-----------------|------------|-------------------------------------|
| Category: | F Correction | <input checked="" type="checkbox"/> | Release: | Phase 2 | <input type="checkbox"/> |
| | A Corresponds to a correction in an earlier release | <input type="checkbox"/> | | Release 96 | <input type="checkbox"/> |
| | B Addition of feature | <input type="checkbox"/> | | Release 97 | <input type="checkbox"/> |
| | C Functional modification of feature | <input type="checkbox"/> | | Release 98 | <input type="checkbox"/> |
| | D Editorial modification | <input type="checkbox"/> | | Release 99 | <input checked="" type="checkbox"/> |
| | | | | Release 00 | <input type="checkbox"/> |

Reason for change: This CR proposes an enhancement to the SDL in chapter 10 for Notification of Change of Subscriber Data. The proposed set of SDL's aim to present a clear overview of the behaviour of the HLR when sending a notification of change of subscriber data.

Clauses affected: 10

| | | | | |
|------------------------------|-------------------------------|-------------------------------------|----------------|--|
| Other specs affected: | Other 3G core specifications | <input checked="" type="checkbox"/> | → List of CRs: | |
| | Other GSM core specifications | <input type="checkbox"/> | → List of CRs: | |
| | MS test specifications | <input type="checkbox"/> | → List of CRs: | |
| | BSS test specifications | <input type="checkbox"/> | → List of CRs: | |
| | O&M specifications | <input type="checkbox"/> | → List of CRs: | |

Other comments:

***** First Modified Section *****

10.2.3 Notify Subscriber Data Change

Changes of CSI, Call Forwarding data, Call Barring data or ODB data shall be notified only if the CSI, Call Forwarding data, Call Barring data or ODB is marked with the Notification-to-CSE flag.

The HLR maintains a list of ~~with~~ gsmSCF address(es) for Call Forwarding Data, Call Barring Data, ODB and CSI. When any of these items has been modified, a notification shall be sent to each gsmSCF in the corresponding list.

The sending of a notification to the gsmSCF may be triggered by the following processes:

- subscriber data change by administrative procedure
- subscriber data changed by subscriber
- subscriber data changed by Any Time Modification request from gsmSCF
- subscriber data changed due to a change of other subscriber data
- subscriber data change due to Location Update

When the change of subscriber data was ~~caused-requested~~ by Any Time Modification, the notification of change of subscriber data shall not be sent to the gsmSCF ~~from which originated this Any Time Modification request was received.~~

Each gsmSCF shall be notified only once. Multiple occurrence of gsmSCF Address in ~~CSIs of the subscriber~~ these lists shall not lead to multiple notification.

Handling of Notify Subscriber Data Change involves the following ~~process~~ procedure:

- CAMEL_NSDC_HLR.

~~If an OSS needs to notify to the CSE the change of subscriber data, If a change of subscriber data needs to be notified to the gsmSCF, then the HLR initiates a transaction to the gsmSCF by sending Notify_Subscriber_Data_Change Request message.~~

Support for this procedure is a network operator option.

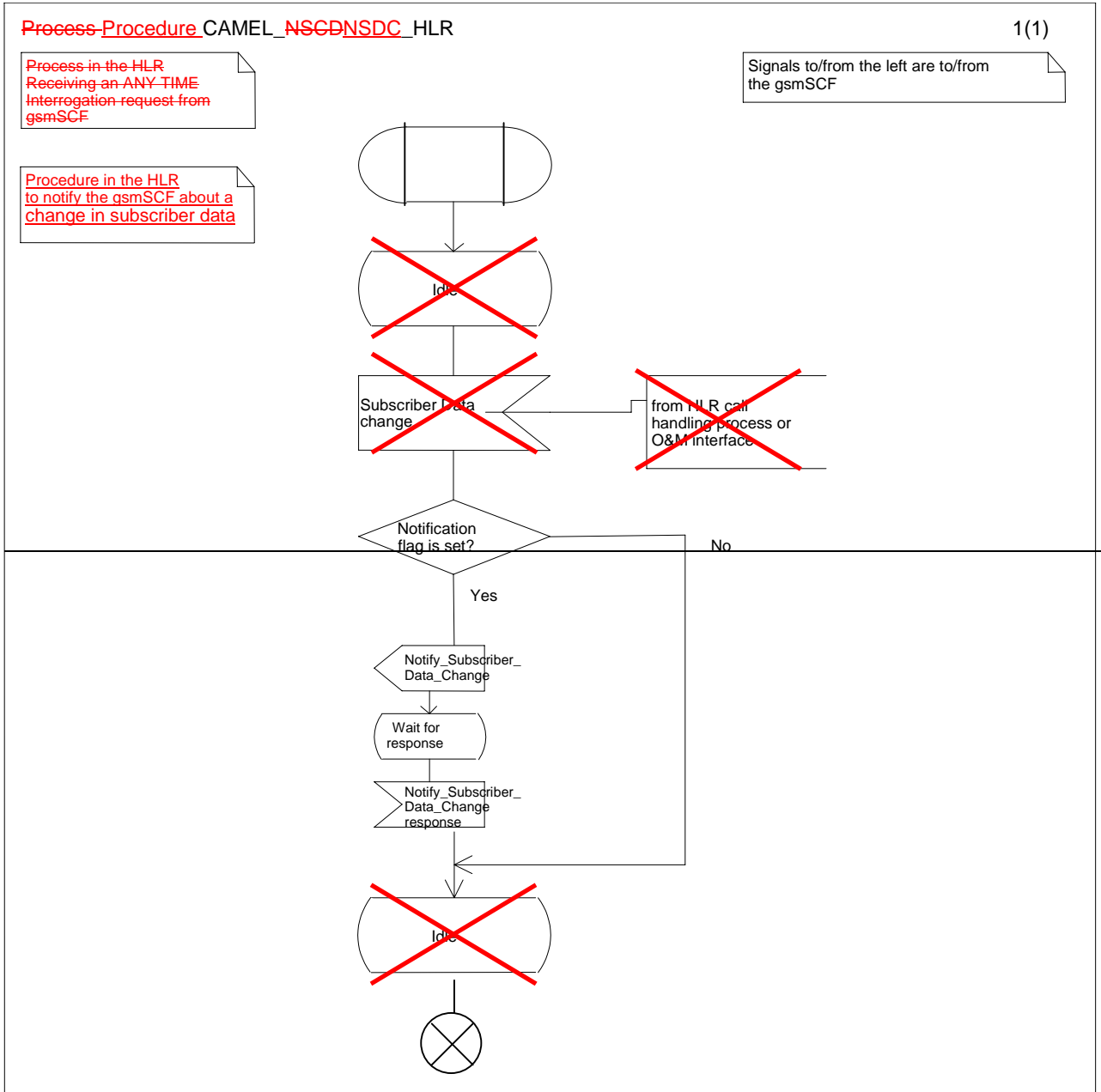


Figure 10.4: Process Procedure CAMEL_NSDC_HLR (sheet1)

Procedure CAMEL_NSDC_HLR

1(1)

Procedure in the HLR to notify the gsmSCF about a change in subscriber data

Signals to/from the left are to/from the gsmSCF

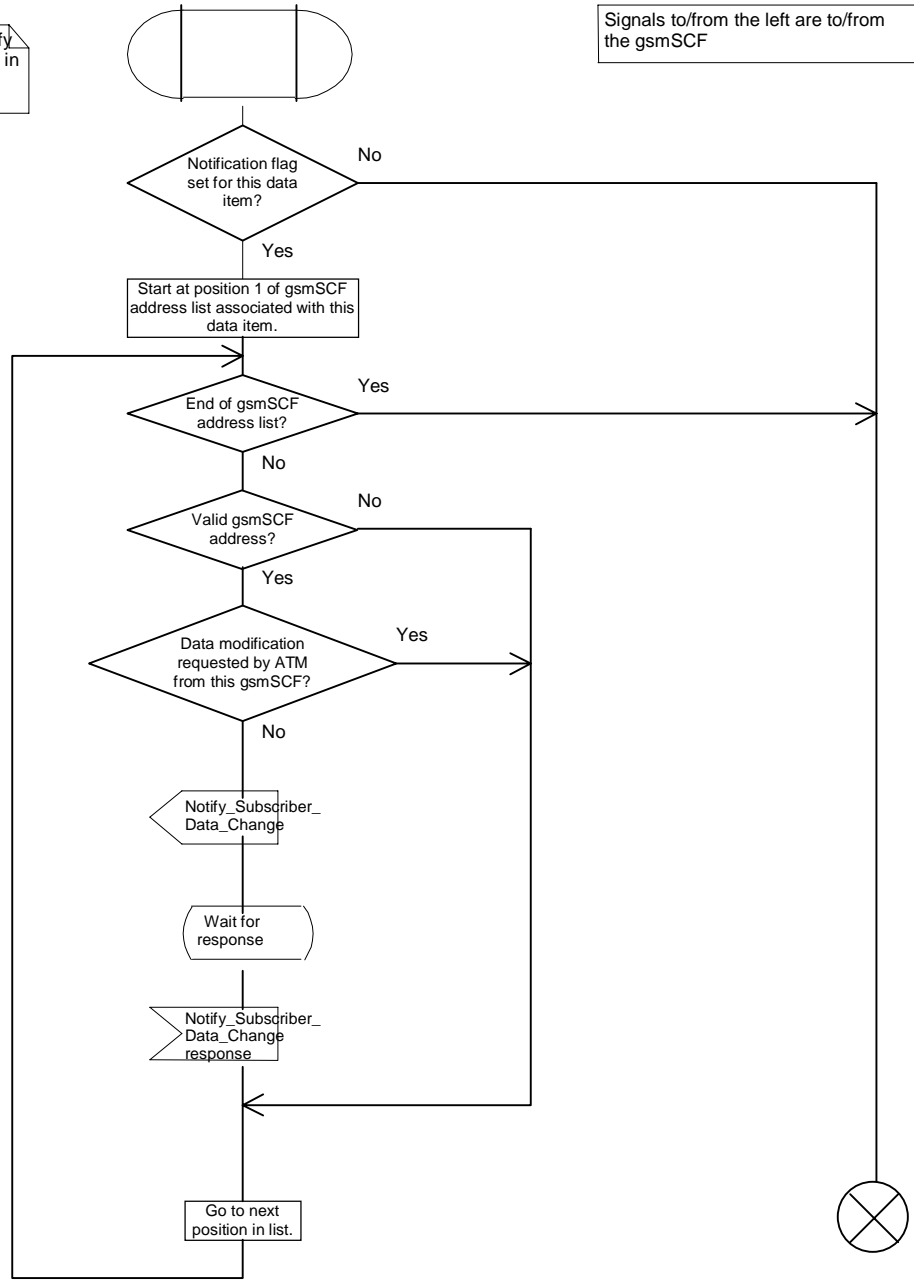


Figure 10.4: Procedure CAMEL_NSDC_HLR (sheet1)

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 111

Current Version: 3.3.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: CN#7
list expected approval meeting # here ↑

for approval X
for information

strategic
non-strategic (for SMG use only)

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
(at least one should be marked with an X)

Source: CN WG2 **Date:** 15/02/2000

Subject: Removal of PSI description

Work item: CAMEL Phase 3

| | | | | | |
|---|---|---------------------------------------|-----------------|------------|---------------------------------------|
| Category: | F Correction | <input type="checkbox"/> | Release: | Phase 2 | <input type="checkbox"/> |
| (only one category shall be marked with an X) | A Corresponds to a correction in an earlier release | <input type="checkbox"/> | | Release 96 | <input type="checkbox"/> |
| | B Addition of feature | <input type="checkbox"/> | | Release 97 | <input type="checkbox"/> |
| | C Functional modification of feature | <input type="checkbox"/> | | Release 98 | <input type="checkbox"/> |
| | D Editorial modification | <input checked="" type="checkbox"/> X | | Release 99 | <input checked="" type="checkbox"/> X |
| | | | | Release 00 | <input type="checkbox"/> |

Reason for change: Due to ALR, Provide Subscriber Info will be described in TS 23.018, hence the description in TS 23.078 should be replaced by a reference to TS 23.018. The description of Provide Subscriber Info ack is already in TS 23.018.

Clauses affected: 4.6.7.3; 4.6.8.2.

| | | | | |
|------------------------------|-------------------------------|--------------------------|----------------|------------|
| Other specs affected: | Other 3G core specifications | <input type="checkbox"/> | → List of CRs: | 23.018-026 |
| | Other GSM core specifications | <input type="checkbox"/> | → List of CRs: | |
| | MS test specifications | <input type="checkbox"/> | → List of CRs: | |
| | BSS test specifications | <input type="checkbox"/> | → List of CRs: | |
| | O&M specifications | <input type="checkbox"/> | → List of CRs: | |

Other comments:



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

***** First Modified Section *****

4.6.7.3 Provide Subscriber Info

4.6.7.3.1 Description

This IF [is described in TS 23.018 \[3\] and](#) is used by the HLR to request information (subscriber state and location) from the VLR at any time.

4.6.7.3.2 ~~Information Elements~~

~~Provide Subscriber Info contains the following CAMEL specific IE:~~

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|--|
| Requested Info | M | This IE indicates the type of subscriber information to the gsmSCF. —subscriber location —subscriber state —currentLocation (currentLocation shall not be present if locationInformation is not present in the RequestedInfo parameter) |
| Subscriber Identity | M | This IE identifies the subscriber for which the information is requested. The identity can be: —IMSI: The IMSI shall be accompanied by a LMSI if one was provided by the VLR. |

~~M – Mandatory (The IE shall always be sent)~~

***** Last Modified Section *****

4.6.8.2 Provide Subscriber Info ack

4.6.8.2.1 Description

This IF [is described in TS 23.018 \[3\] and](#) is used by the VLR to provide the requested information to the HLR.

4.6.8.2.2 ~~Information Elements~~

~~Provide Subscriber Info ack contains the following CAMEL specific IE:~~

| <u>Information element name</u> | <u>Required</u> | <u>Description</u> |
|---------------------------------|-----------------|---|
| Location Information | C | This IE indicates the location of the served subscriber. The elements contained in this IE are specified in 3G TS 23.018 ([3]). |
| Subscriber State | 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". |

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

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 112r1

Current Version: **3.3.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **CN#7**
list expected approval meeting # here ↑

for approval
for information

strategic
non-strategic (for SMG use only)

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

Source: CN WG2

Date: 25 Feb 2000

Subject: Procedure Handle_SCI_GPRS and Complete_FCI_Record_GPRS

Work item: CAMEL Phase 3

Category:

(only one category shall be marked with an X)

F Correction
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
Release 00

Reason for change:

Current process GPRS_SSF expects Procedure Handle_SCI and Complete_FCI_Record the same behaviour as specified in the clause 4. However, to avoid misunderstanding of the parameters and the wording, it is recommended to specify in the clause 6 independently.

Clauses affected: 6.5

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:

Corresponding clause and SDL in the clause 4 were copied to the clause 6. Then some wordings were adjusted for GPRS.

*** First modified part (clause 6.5) ***

6.5 Procedures for CAMEL GPRS

The functional behaviour of the SGSN is specified in 3G TS 29.002 [4]. The procedures specific to CAMEL are specified in this subclause :

- Procedure CAMEL_GPRS_Attach_Request,
- Procedure CAMEL_GPRS_Detach,
- Procedure CAMEL_GPRS_Routeing_Area_Update
- Procedure CAMEL_GPRS_SGSN_Context_Acknowledge
- Procedure CAMEL_GPRS_SGSN_Create_PDP_Context
- Procedure CAMEL_GPRS_Activate_PDP_Context
- Procedure CAMEL_GPRS_Deactivate_PDP_Context
- Procedure CAMEL_GPRS_exception_procedure
- Procedure CAMEL_GPRS_Modify_PDP_Context

~~Note: In the SDLs in the following subclauses, Handle_AC and Handle_ACR shall be renamed Handle_AC_GPRS and Handle_ACR_GPRS respectively, Handle_SCI shall be renamed Handle_SCI_GPRS, Complete_FCI_Record shall be renamed Complete_FCI_Record_GPRS.~~

6.5.1 Actions of the SGSN on receipt of Int_Error

The SGSN checks the default GPRS Handling parameter in GPRS-CSI.

If the default GPRS handling is release, a Detach indication is sent to the MS. The SGSN then releases all resources and the invoked CAMEL procedure ends.

If the default GPRS handling is continue, the SGSN continues processing without CAMEL support.

6.5.2 Actions of the SGSN on receipt of Int_Continue

The SGSN continues processing without any modification of GPRS parameters.

4.5.3 Procedure Handle_SCI_GPRS

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

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

if 2 sets e-parameters received --> error

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

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

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

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

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

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

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

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

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

if 2 sets e-parameters received --> error

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

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

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

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

if 2 sets e-parameters received --> error

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

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

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

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

if 2 sets e-parameters received --> error

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

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

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

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

if 2 sets e-parameters received --> error

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

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

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

***** Next modified part (clause 6.5.5) *****

6.5.5 GPRS SSF

CR editors note: Add this figure at the end of this subclause.

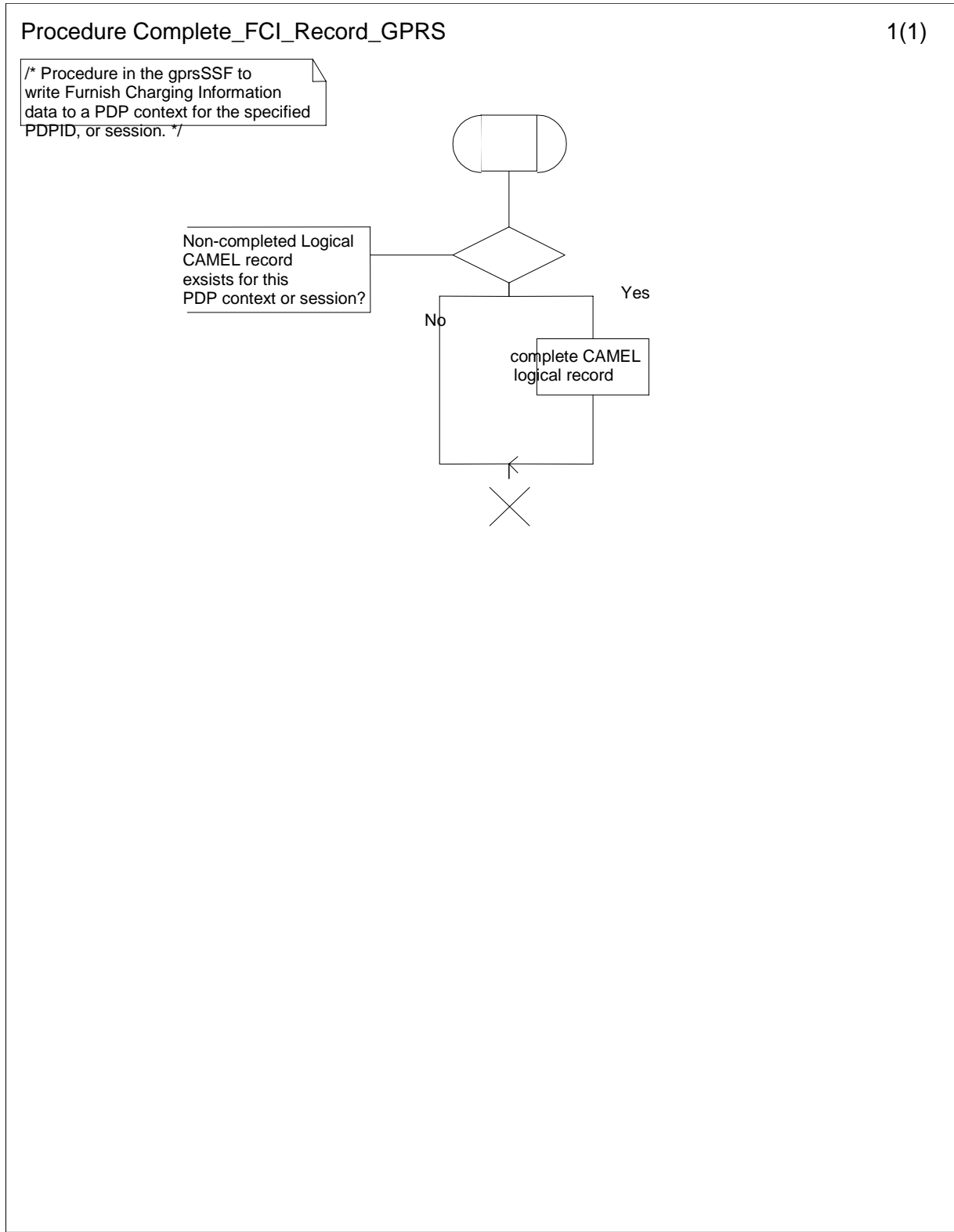


Figure 6.zz: Procedure Complete_FCI_Record_GPRS

CHANGE REQUEST

23.078 CR 116

Current Version: 3.3.0

For submission to: **CN#7** for approval for information strategic non-strategic

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

Source: CN WG2 **Date:** 16-02-2000

Subject: O-CSI and D-CSI checks for ORLCF calls

Work item: CAMEL Phase 3

| | | | | | |
|------------------|---|-------------------------------------|-----------------|------------|-------------------------------------|
| Category: | F Correction | <input checked="" type="checkbox"/> | Release: | Phase 2 | <input type="checkbox"/> |
| | A Corresponds to a correction in an earlier release | <input type="checkbox"/> | | Release 96 | <input type="checkbox"/> |
| | B Addition of feature | <input type="checkbox"/> | | Release 97 | <input type="checkbox"/> |
| | C Functional modification of feature | <input type="checkbox"/> | | Release 98 | <input type="checkbox"/> |
| | D Editorial modification | <input type="checkbox"/> | | Release 99 | <input checked="" type="checkbox"/> |
| | | | | Release 00 | <input type="checkbox"/> |

Reason for change: The introduction of D-CSI and DP Route Select Failure necessitate additional checking in the VMSC before sending O-CSI or D-CSI to the GMSC in the Resume Call Handling MAP Message for OR LCF calls.

The present CR introduces these additional checks.

Clauses affected: 4.5.5

| | | | | |
|------------------------------|-------------------------------|-------------------------------------|----------------|--------|
| Other specs affected: | Other 3G core specifications | <input checked="" type="checkbox"/> | → List of CRs: | 23.018 |
| | Other GSM core specifications | <input type="checkbox"/> | → List of CRs: | |
| | MS test specifications | <input type="checkbox"/> | → List of CRs: | |
| | BSS test specifications | <input type="checkbox"/> | → List of CRs: | |
| | O&M specifications | <input type="checkbox"/> | → List of CRs: | |

Other comments: Procedure CAMEL_Check_ORLCF_VMSC has two exits:

- Result := ORLCF: ORLCF may take place
- Result := VMSCCF: ORLCF shall not take place

If ORLCF may take place, then CAMEL_Check_ORLCF_VMSC marks the applicable CAMEL information for inclusion in RCH.

Process ICH_MSC in 3G TS 23.018 does not have to set O-CSI for inclusion in RCH, since that has been done by CAMEL_Check_ORLCF_VMSC already.

4.5.5 Handling of forwarded calls

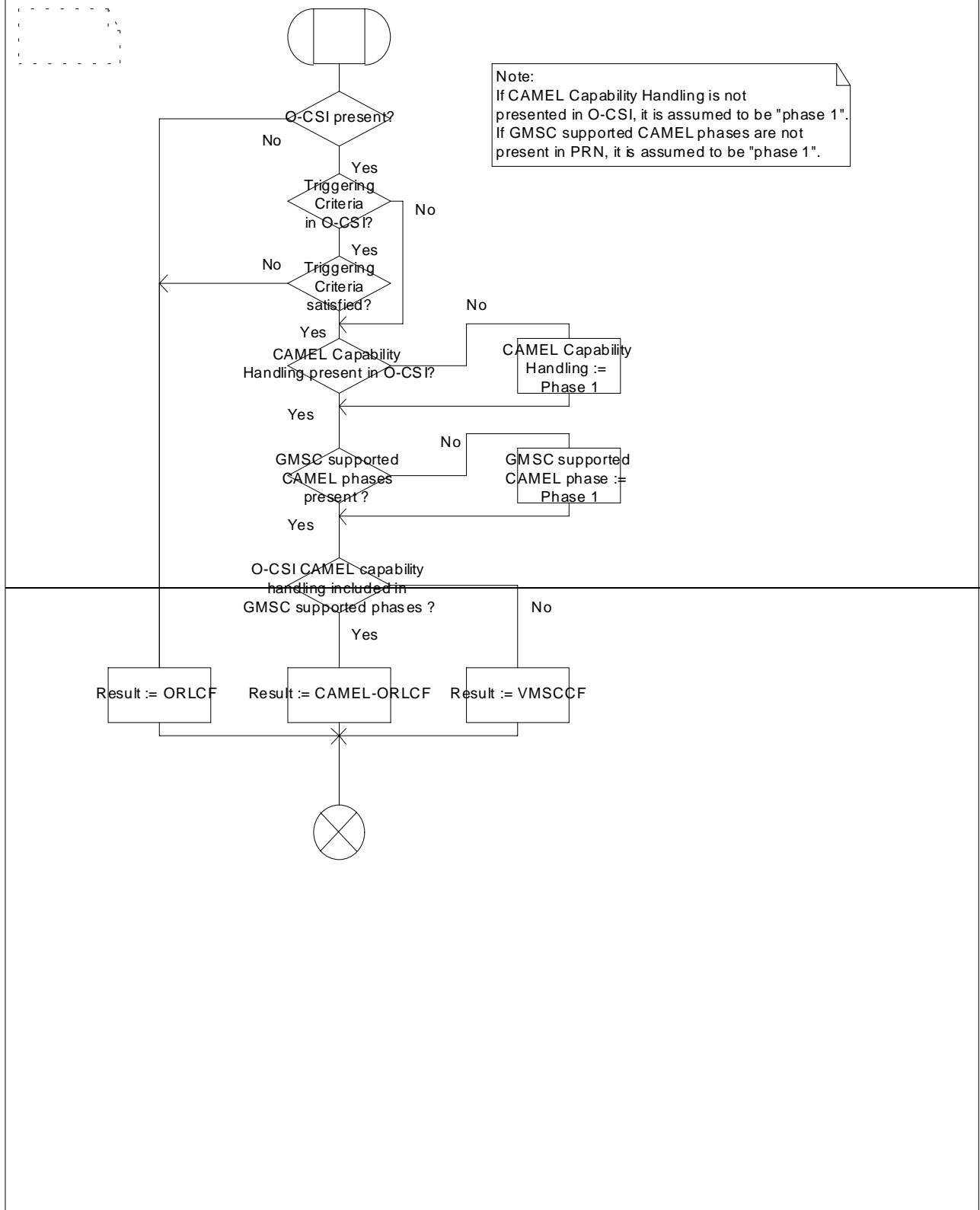
The handling of forwarded calls in the GMSC or the terminating VMSC is specified in 3G TS 23.018 [3]. The procedures specific to CAMEL are specified in this subclause.

- Procedure CAMEL_Check_ORLCF_VMSC
- Procedure CAMEL_CF_MSC_INIT,
- Procedure CAMEL_CF_MSC_ANSWER,
- Procedure CAMEL_CF_ETC,
- Procedure CAMEL_CF_CTR.

A mobile terminated call can be forwarded either in the GMSC (indicated by provision of Forwarded-To-Number from HLR or gsmSCF) or in the MSC (indicated by provisioning of Forwarded-To-Number from VLR).

...

...



Note:
 If CAMEL Capability Handling is not presented in O-CSI, it is assumed to be "phase 1".
 If GMSC supported CAMEL phases are not present in PRN, it is assumed to be "phase 1".

Figure4.48a: Procedure CAMEL_Check_ORLCF_VMSC (sheet 1)

Procedure in VMSC to check which CSI's have to be included in RCH for Optimal Routing of Late Forwarded Calls

If No O-CSI or D-CSI is present in VLR, then non-CAMEL ORLCF shall be invoked.

If the required CAMEL Phases are not supported by GMSC, then Forwarding shall be done in the VMSC. (note 1, 2)

If DP Collected Info criteria are fulfilled, then the DP Collected Info shall be included in RCH. Otherwise, DP Collected Info shall not be included in RCH.

DP Route Select Failure, if available, shall be included in RCH.

- Notes**
1. When CAMEL Capability handling is not present in O-CSI, it is assumed to be CAMEL Phase 1.
 2. When GMSC Supported CAMEL Phases was not received from HLR (in PRN), it is assumed to be CAMEL Phase 1.

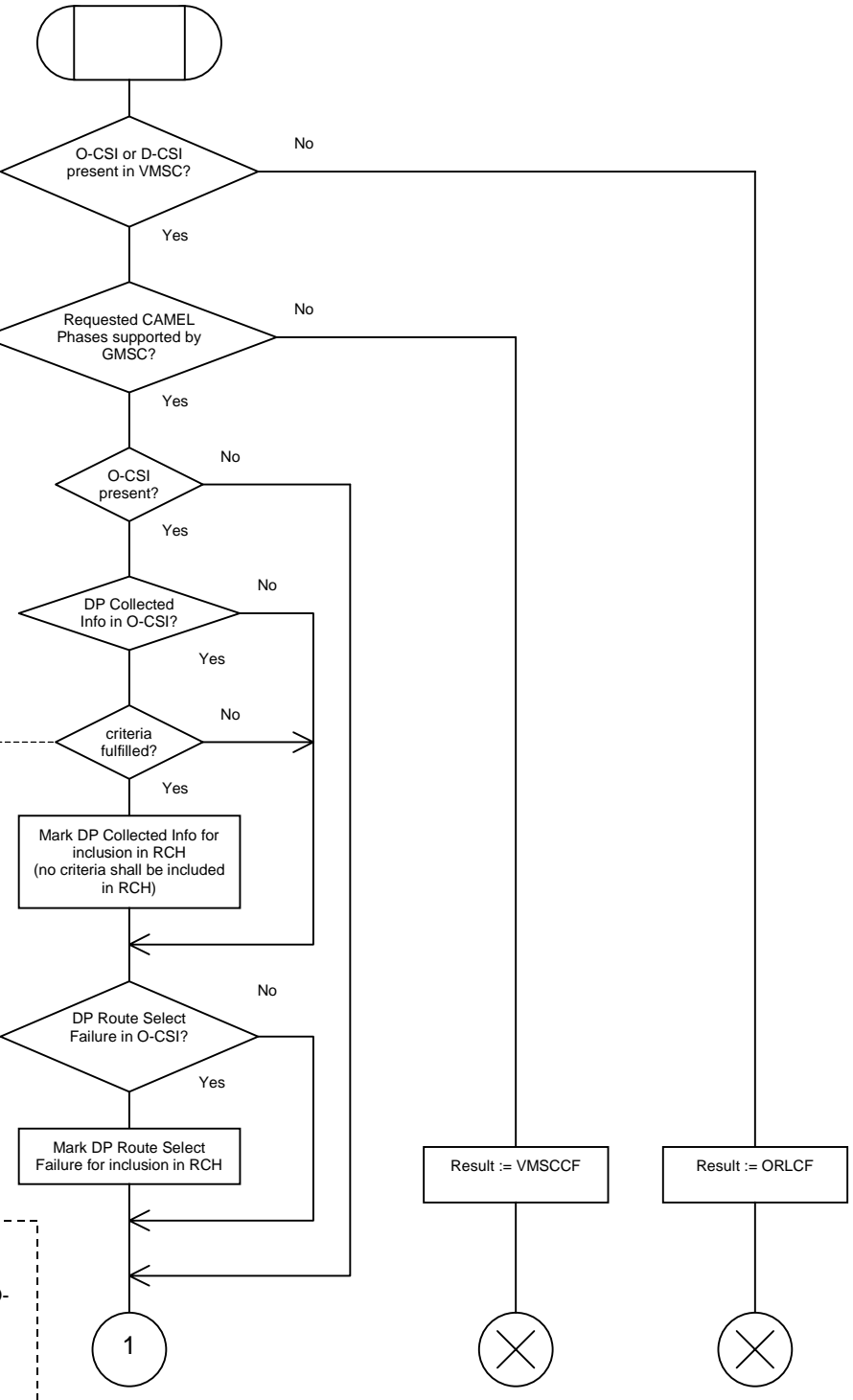


Figure4.48a: Procedure CAMEL Check ORLCF VMSC (sheet 1)

Procedure in VMSC to check which CSI's have to be included in RCH for Optimal Routeing of Late Forwarded Calls

D-CSI, if available, shall be included in RCH.

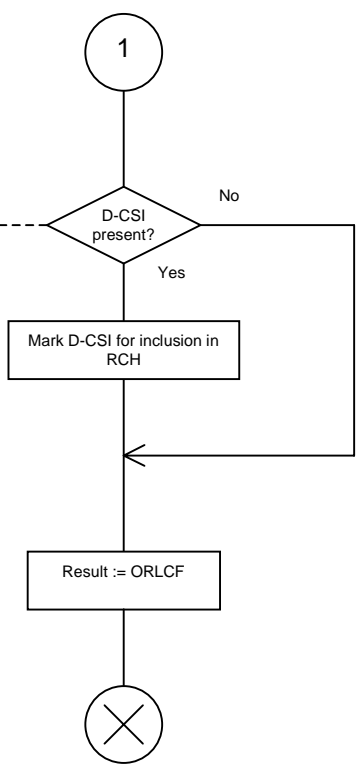


Figure4.48a: Procedure CAMEL Check ORLCF VMSC (sheet 2)

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 119r1

Current Version: **3.3.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **CN#7**
 list expected approval meeting # here ↑

for approval
 for information

strategic
 non-strategic (for SMG use only)

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
 (at least one should be marked with an X)

Source: **CN WG2** **Date:** **25 Feb. 2000**

Subject: **Enhancement of the ATSI SDL**

Work item: **CAMEL phase 3**

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

(only one category shall be marked with an X)

Reason for change: This CR proposes enhancement of the Any Time Subscription Interrogation SDL. This CR intends to clarify the process of ATSI on supplementary service data.

Clauses affected: **10.2.1**

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:



help.doc

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

10 Control and interrogation of subscription data

10.1 Architecture

10.1.1 Functional Entities used for CAMEL

This subclause describes the functional architecture required to support control and interrogation of subscription data. Figure 10.1 shows the functional entities involved in CAMEL support of control and interrogation of subscription data.



Figure 10.1: Functional architecture for support of control and interrogation of subscription data

gsmSCF: see subclause 4.1.

HLR: The HLR may provide an interface towards the gsmSCF for the Any Time Subscription Interrogation and Any Time Modification procedure. The gsmSCF may provide an interface towards the HLR for the Notify Subscriber Data Change procedure.

10.1.2 Interfaces defined for CAMEL

This subclause describes the different interface applicable to CAMEL control of subscription data. It specifies on a high level the functions specific to CAMEL.

10.1.2.1 gsmSCF - HLR

This interface is used by the gsmSCF to interrogate or modify information in the HLR. As a network operator option, the HLR may refuse to provide or modify the information requested by the gsmSCF. This interface is also used to notify to the gsmSCF of change of subscriber data by the HLR.

10.2 Procedures for CAMEL

10.2.1 Any Time Interrogation for Subscription Information Retrieval

Handling of Any Time Interrogation for Subscription Information Retrieval involves the following process:

- CAMEL_ATSI_HLR.

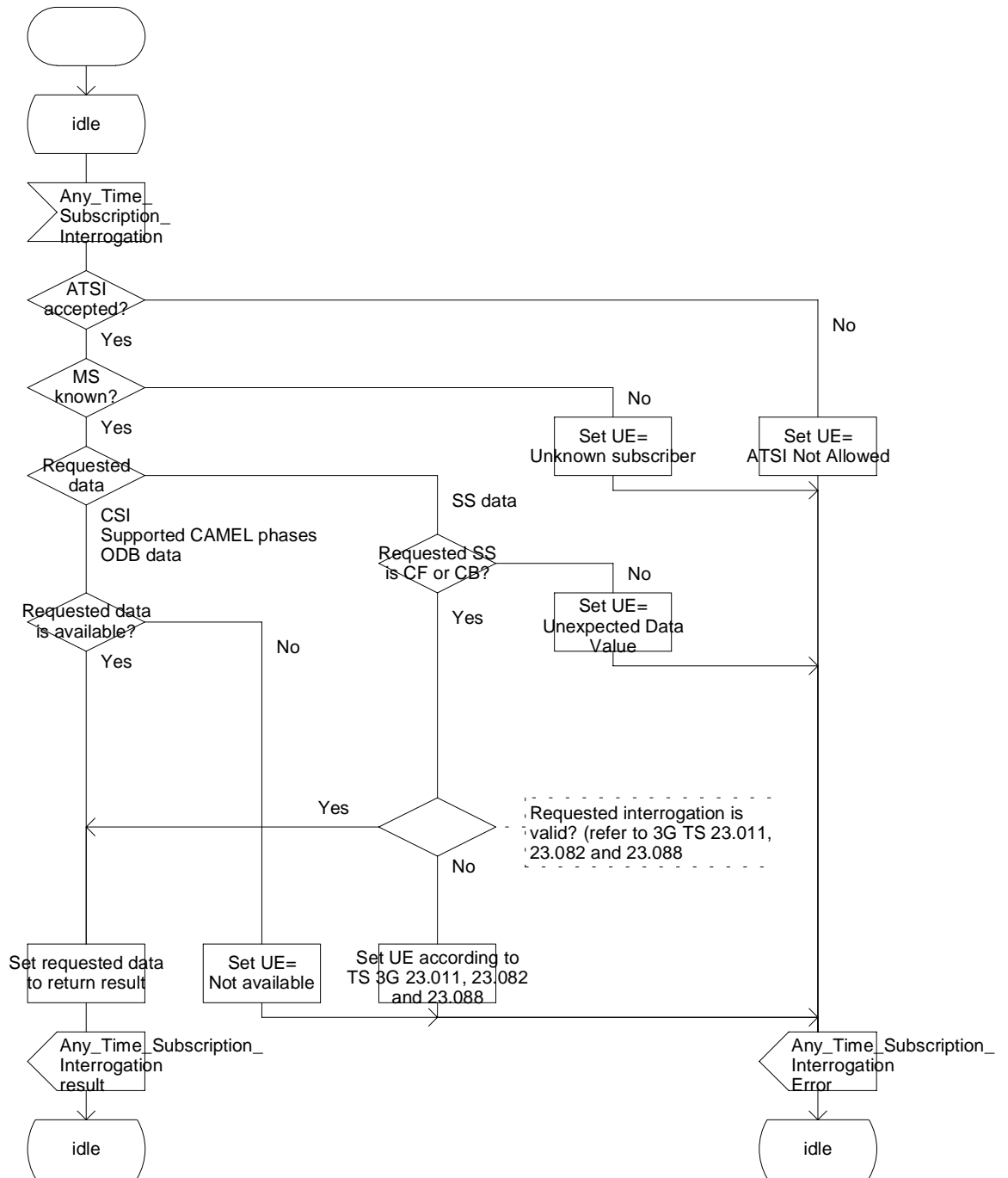
If an OSS needs the Subscription Information, the gsmSCF initiates a transaction to the HLR by sending a Any_Time_Subscription_Interrogation Request. Support for this procedure is a network operator option.

Process CAMEL_ATSI_HLR

1(1)

Process in the HLR
receiving an Any Time Subscription
Interrogation request from gsmSCF

Signals to/from the left are to /from
the gsmSCF



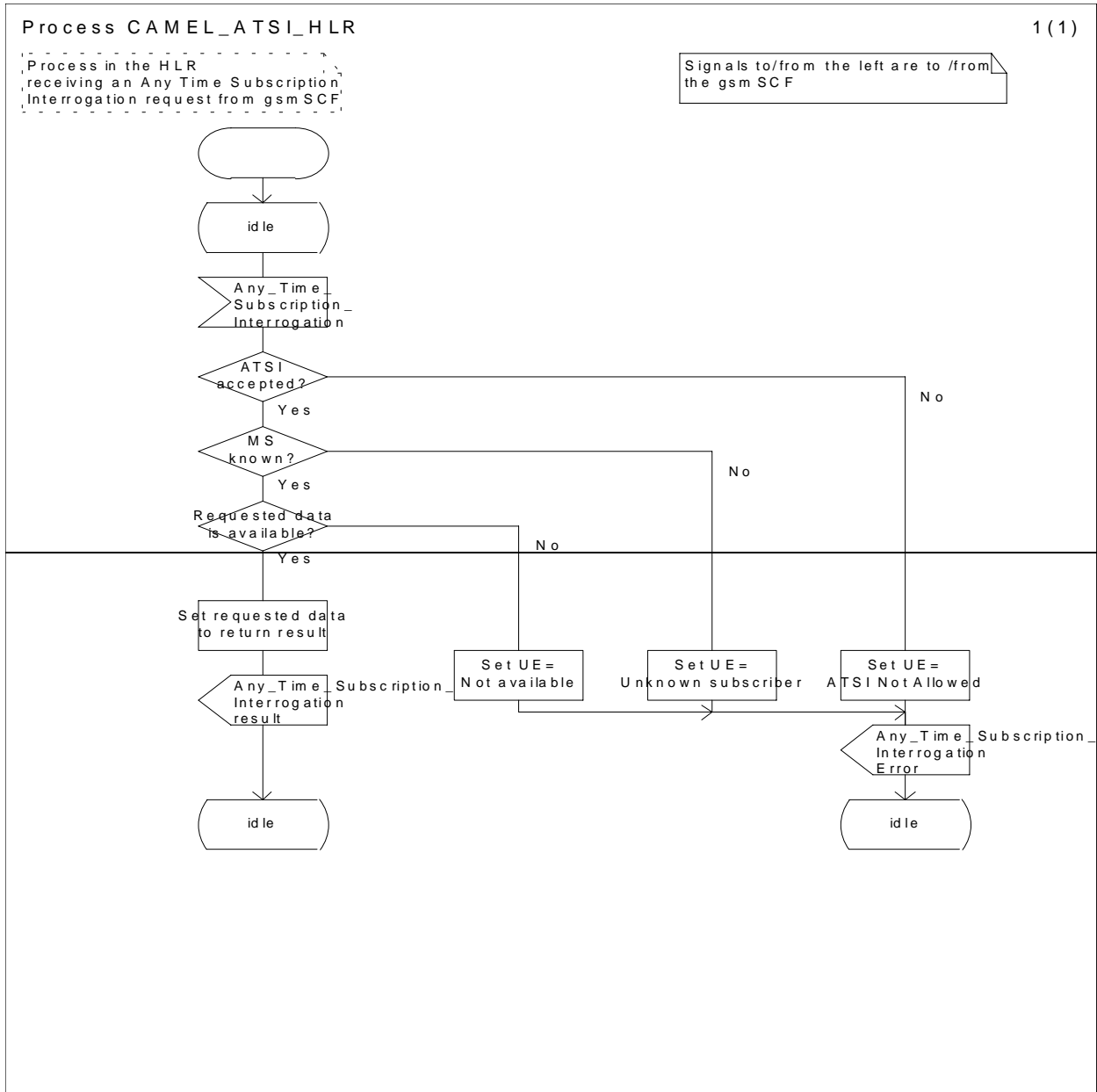


Figure 10.2: Process CAMEL_ATSI_HLR (sheet 1)

10.2.2 Any Time Modification

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 120

Current Version: **3.3.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **CN#7**
list expected approval meeting # here ↑

for approval
for information

strategic
non-strategic *(for SMG use only)*

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
(at least one should be marked with an X)

Source: CN WG2 **Date:** 22/02/2000

Subject: Transfer of destination address to gsmSCF

Work item: CAMEL Phase 3

| | | | |
|--|--|-----------------|-------------------------------------|
| Category: <small>(only one category shall be marked with an X)</small> | F Correction <input type="checkbox"/> | Release: | Phase 2 <input type="checkbox"/> |
| A Corresponds to a correction in an earlier release <input type="checkbox"/> | Release 96 <input type="checkbox"/> | | |
| B Addition of feature <input type="checkbox"/> | Release 97 <input type="checkbox"/> | | |
| C Functional modification of feature <input type="checkbox"/> | Release 98 <input type="checkbox"/> | | |
| D Editorial modification <input checked="" type="checkbox"/> | Release 99 <input checked="" type="checkbox"/> | | |
| | | | Release 00 <input type="checkbox"/> |

Reason for change: To identify more clearly obtaining the Destination Address from ISUP.

Clauses affected: 4.5.2.1.6

| | | | |
|------------------------------|--|----------------|--|
| Other specs affected: | Other 3G core specifications <input type="checkbox"/> | → List of CRs: | |
| | Other GSM core specifications <input type="checkbox"/> | → List of CRs: | |
| | MS test specifications <input type="checkbox"/> | → List of CRs: | |
| | BSS test specifications <input type="checkbox"/> | → List of CRs: | |
| | O&M specifications <input type="checkbox"/> | → List of CRs: | |

Other comments: This is the stage 2 CR for document N2A000160.



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

***** First/Last Modified Section *******4.5.2.1.6 Action of the MSC in procedure CAMEL_OCH_MSC_ANSWER**

If the MSC received a destination address from the GMSC in the ISUP Answer or Connect message, the MSC relays the destination address to the gsmSSF in the Int_DP_O_Answer message.

NOTE 1: The sending of e-parameters by the gsmSCF after receiving the DP_O_Answer indication may be too late.

NOTE 2: If the MO call is not subject to Basic OR, then the destination address is generated by the MSC. If the MO call is subject to Basic OR, the MSC will receive a destination address from the GMSC in the ISUP answer or connect message.

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 121r1

Current Version: **3.2.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **CN #07** for approval
list expected approval meeting # here ↑ for information

strategic (for SMG use only)
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
(at least one should be marked with an X)

Source: CN WG2 **Date:** 25.02.2000

Subject: Implementation of retriggering in gsmSSF SDL

Work item: CAMEL Phase 3

Category: F Correction **Release:** Phase 2
(only one category shall be marked with an X) 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
Release 00

Reason for change: The requirement to have multiple trigger after another has been implemented in the gsmSSF SDL; e.g. to have a trigger in TDP Collected_Info and after closing this dialogue in Route_Select_Failure.

Clauses affected: 4.5.6.4 Process gsmSSF and procedures

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:



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

4.5.6.4 Process gsmSSF and procedures

...

Process gsmSSF

1(35)

```

/* Invocation of gsmSSF in MO,
MT, VT or CF call case. */

```

```

/* Timers used in the gsmSSF process:

```

```

Tssf: Application timer in the ssf.

```

```

Tcp: Timer for call period.

```

```

    This timer measures the duration of a call period.

```

```

Tsw: Timer for tariff switch.

```

```

    At the expiration of this timer, a new tariff switch shall be started.

```

```

Tw: Warning timer.

```

```

    At the expiration of this timer, a warning tone shall be played to the calling party.

```

```

DELTA: time, measured in the gsmSSF, elapsed between the time an

```

```

    ApplyChargingReport operation is send to the gsmSCF and an

```

```

    ApplyCharging operation is received from the gsmSCF.

```

```

Tccd: Control of call duration timer.

```

```

    This timer supervises if after sending of ACR a new AC is received.

```

```

Ranges for the default values for Tssf.

```

```

- non user interaction Tssf timer value: 1 second to 20 seconds

```

```

- user interaction Tssf timer value: 1 minute to 30 minutes

```

```

*/

```

```

/* TASK definition:

```

```

The sending of an Application_Begin signal opens a new relationship to the gsmSCF.

```

```

The sending of an Application_End or Abort signal terminates the relationship to the gsmSCF.

```

```

*/

```

```

/* Decision box definition:

```

```

'armed TDPs for this CSI?'

```

```

It is questioned whether or not the ongoing call can encounter further TDPs which are
indicated in the current CSI.

```

```

'Call to be released?'

```

```

It is questioned whether or not the ongoing call will be released immediately after gsmSSF
has responded; that is the ongoing call will not send any signals furtheron to the gsmSSF.

```

```

NOTE: In this case the gsmSSF shall also go to idle.

```

```

*/

```

Process gsmSSF

1(35)

```
/* Invocation of gsmSSF in MO, MT, VT or CF call case. */
```

```
/* Timers used in the gsmSSF process:
```

```
Tssf: Application timer in the ssf.
```

```
Tcp: Timer for call period.
```

```
    This timer measures the duration of a call period.
```

```
Tsw: Timer for tariff switch.
```

```
    At the expiration of this timer, a new tariff switch shall be started.
```

```
Tw: Warning timer.
```

```
    At the expiration of this timer, a warning tone shall be played to the calling party.
```

```
DELTA: time, measured in the gsmSSF, elapsed between the time an
```

```
    ApplyChargingReport operation is send to the gsmSCF and an
```

```
    ApplyCharging operation is received from the gsmSCF.
```

```
Tccd: Control of call duration timer.
```

```
    This timer supervises if after sending of ACR a new AC is received.
```

```
Ranges for the default values for Tssf.
```

```
- non user interaction Tssf timer value: 1 second to 20 seconds
```

```
- user interaction Tssf timer value: 1 minute to 30 minutes
```

```
*/
```

```
/* TASK definition:
```

```
The sending of an Application_Begin signal opens a new relationship to the gsmSCF.
```

```
The sending of an Application_End or Abort signal terminates the relationship to the gsmSCF.
```

```
*/
```

-Figure 4.57a: Process gsmSSF (sheet 1)

Process gsmSSF

3(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

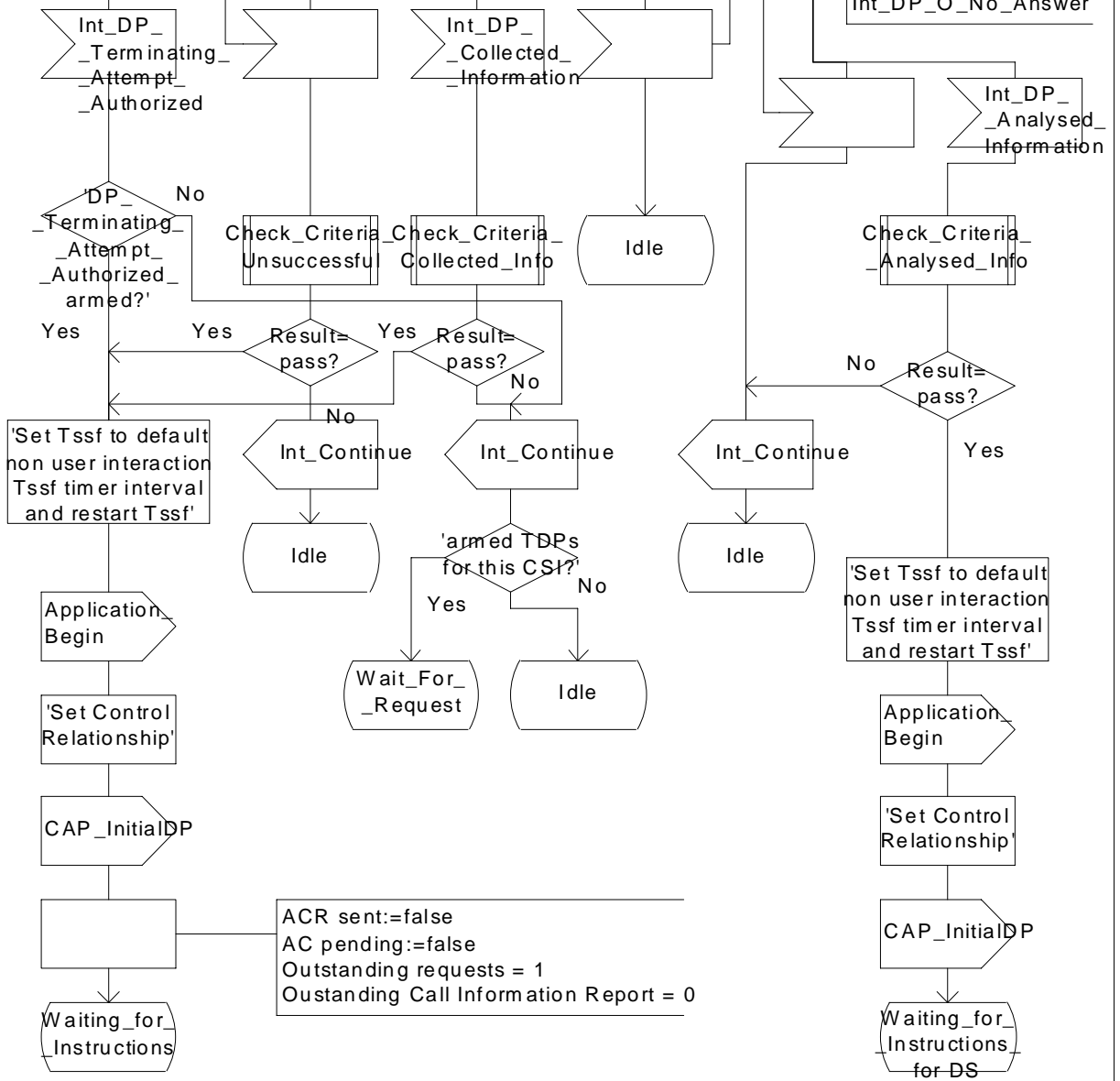
/* Signals to/from the left are to/from the MSC, signals to/from the right are to/from the gsmSCF. */

Int_DP_Route_Select_Failure,
Int_DP_T_Busy,
Int_DP_T_No_Answer

Wait_For_Request

Int_T_Exception,
Int_O_Exception

Int_DP_O_Abandon,
Int_DP_T_Abandon,
Int_DP_O_Disconnect,
Int_DP_T_Disconnect,
Int_DP_O_Answer,
Int_DP_T_Answer,
Int_DP_O_Busy,
Int_DP_O_No_Answer



Process gsmSSF

3(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

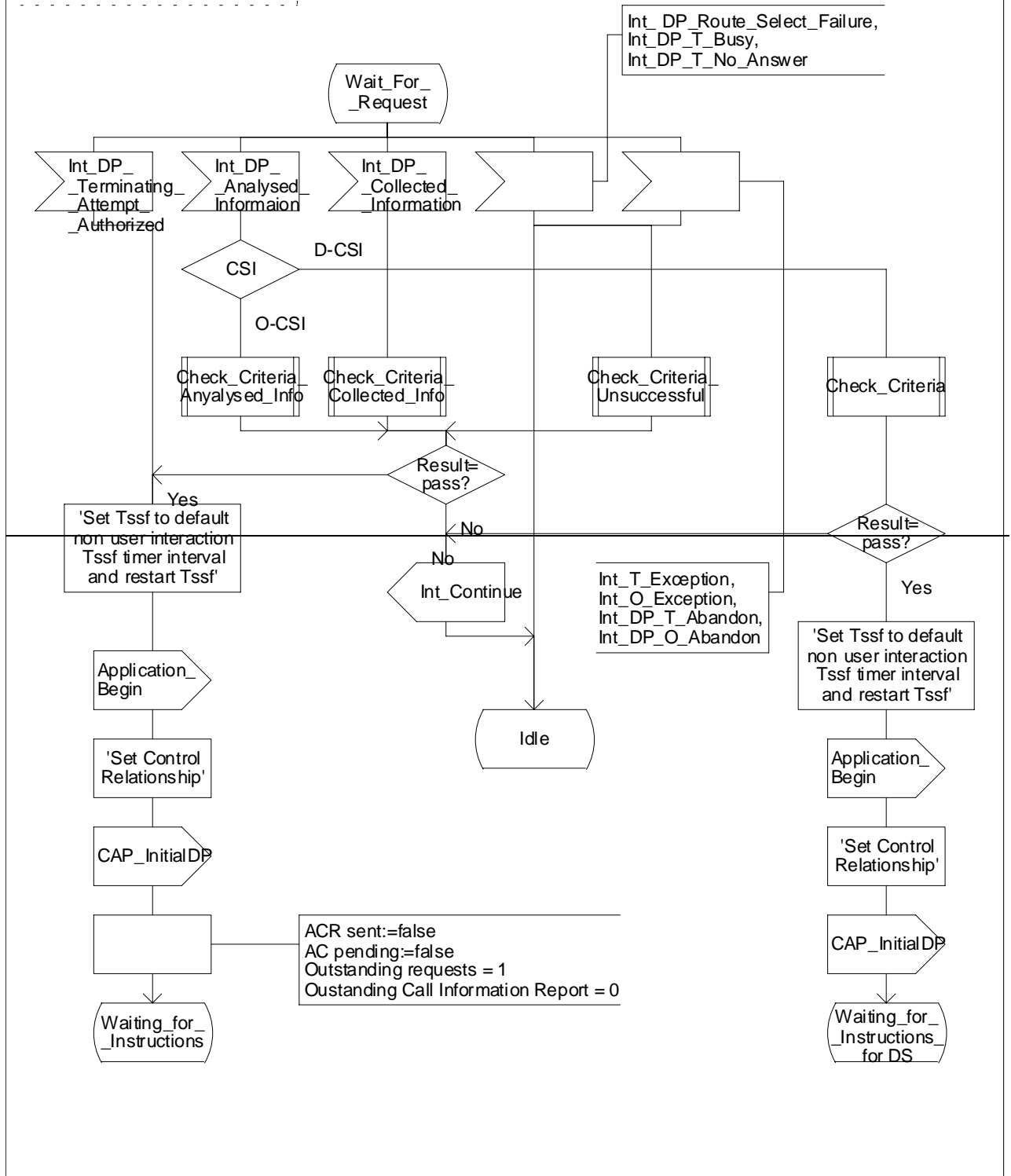


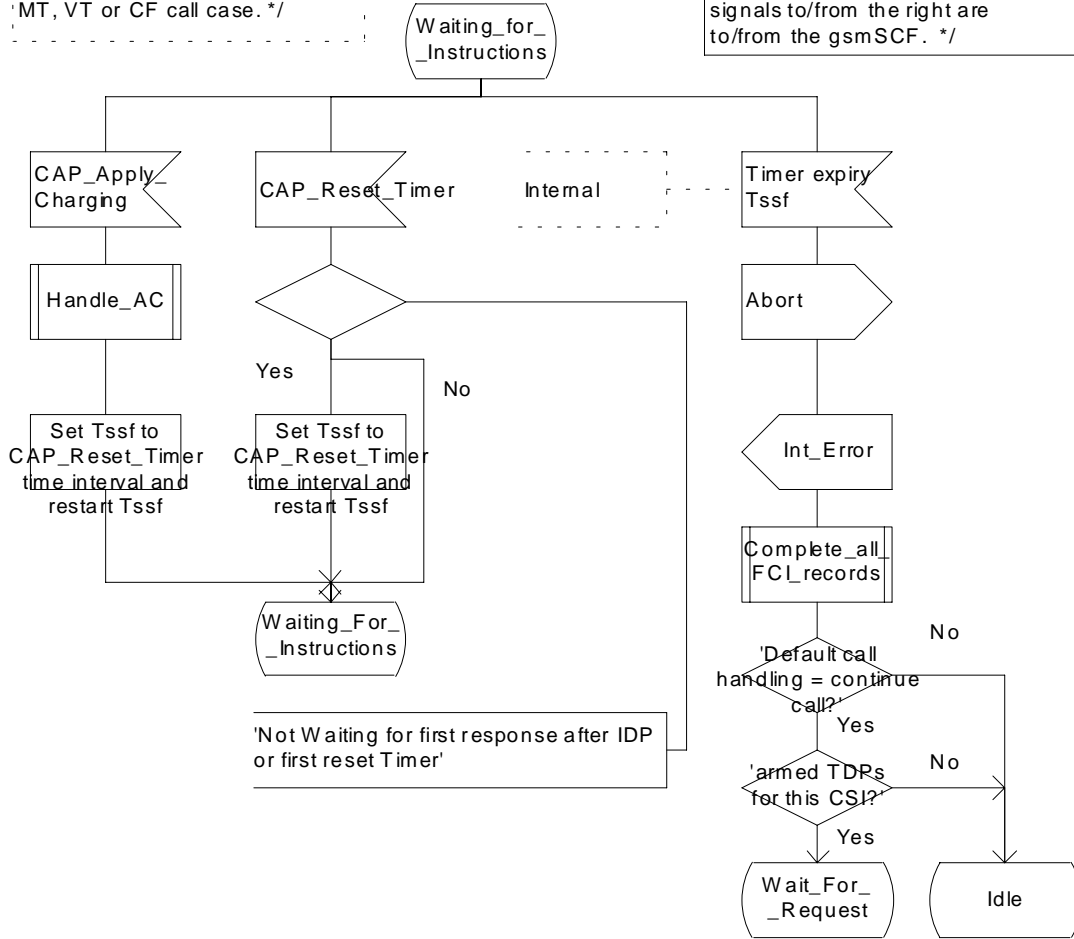
Figure 4.57c: Process gsmSSF (sheet 3)

Process gsmSSF

4(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

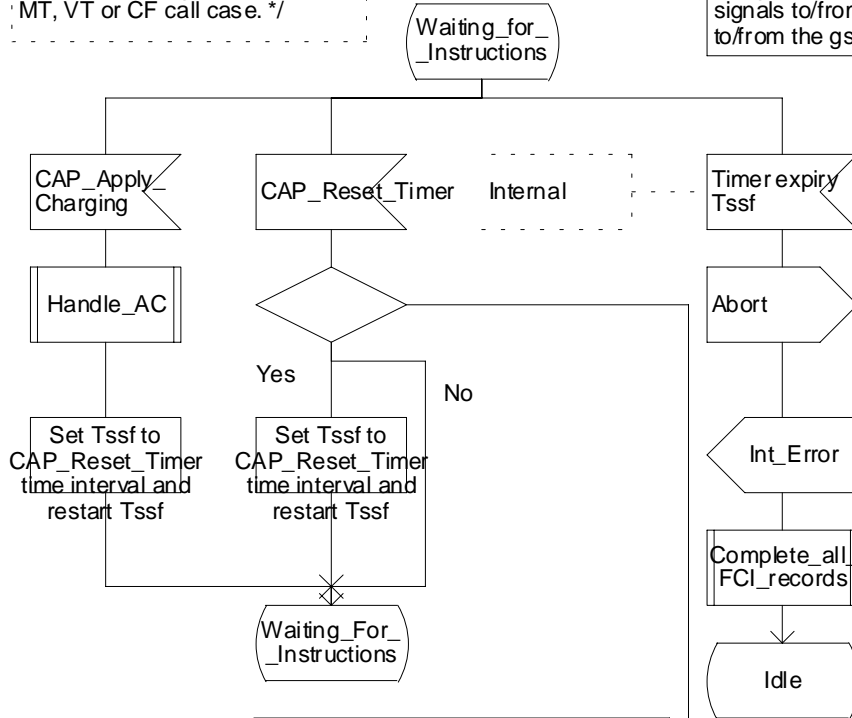


Process gsmSSF

4(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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



'Not Waiting for first response after IDP or first reset Timer'

Figure 4.57d: Process gsmSSF (sheet 4)

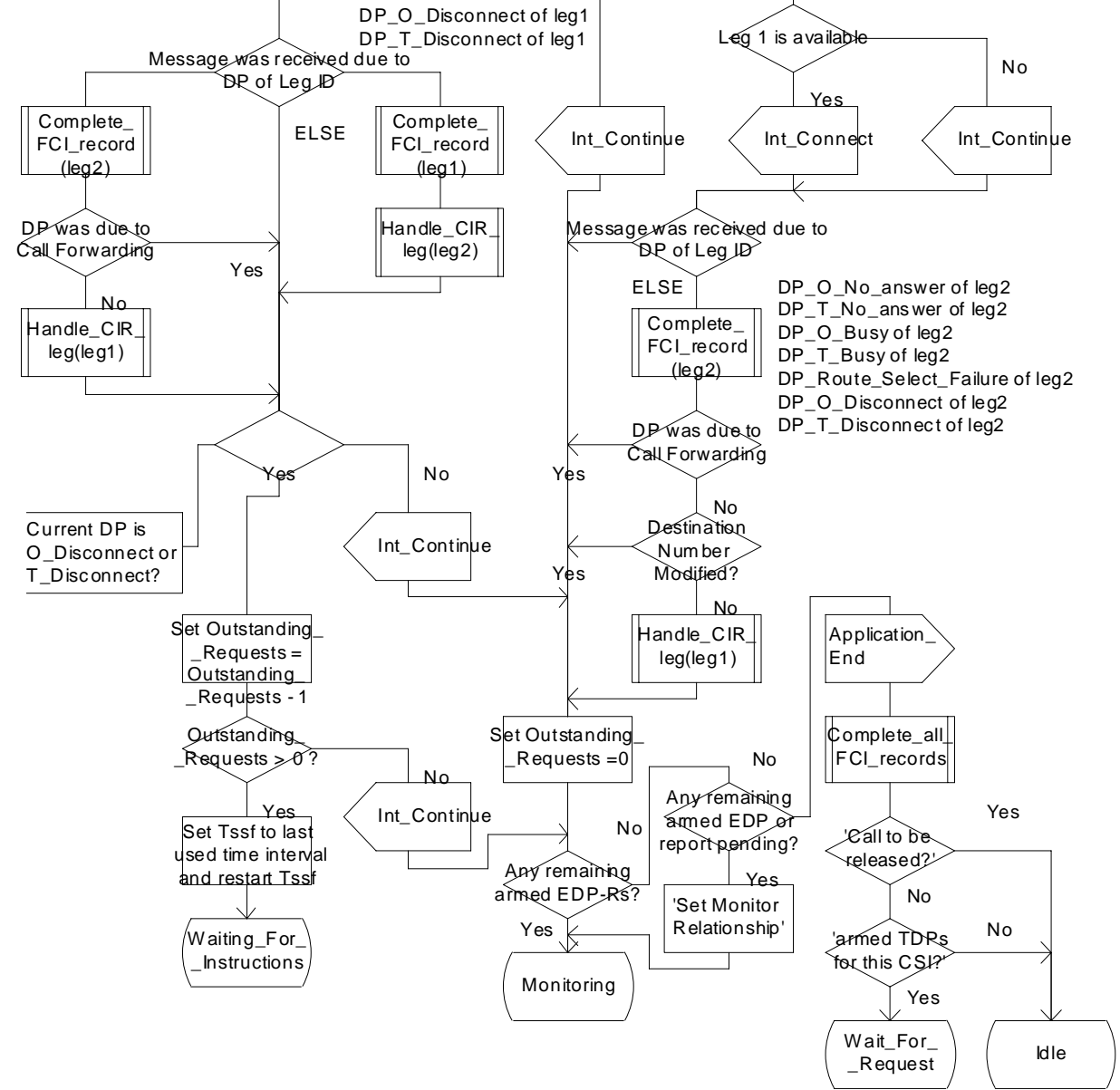
Process gsmSSF

5(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

DP_O_No_answer of leg2
DP_T_No_answer of leg2
DP_O_Busy of leg2
DP_T_Busy of leg2
DP_Route_Select_Failure of leg2
DP_O_Disconnect of leg2
DP_T_Disconnect of leg2



Process gsmSSF

5(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

DP_O_No_answer of leg2
 DP_T_No_answer of leg2
 DP_O_Busy of leg2
 DP_T_Busy of leg2
 DP_Route_Select_Failure of leg2
 DP_O_Disconnect of leg2
 DP_T_Disconnect of leg2

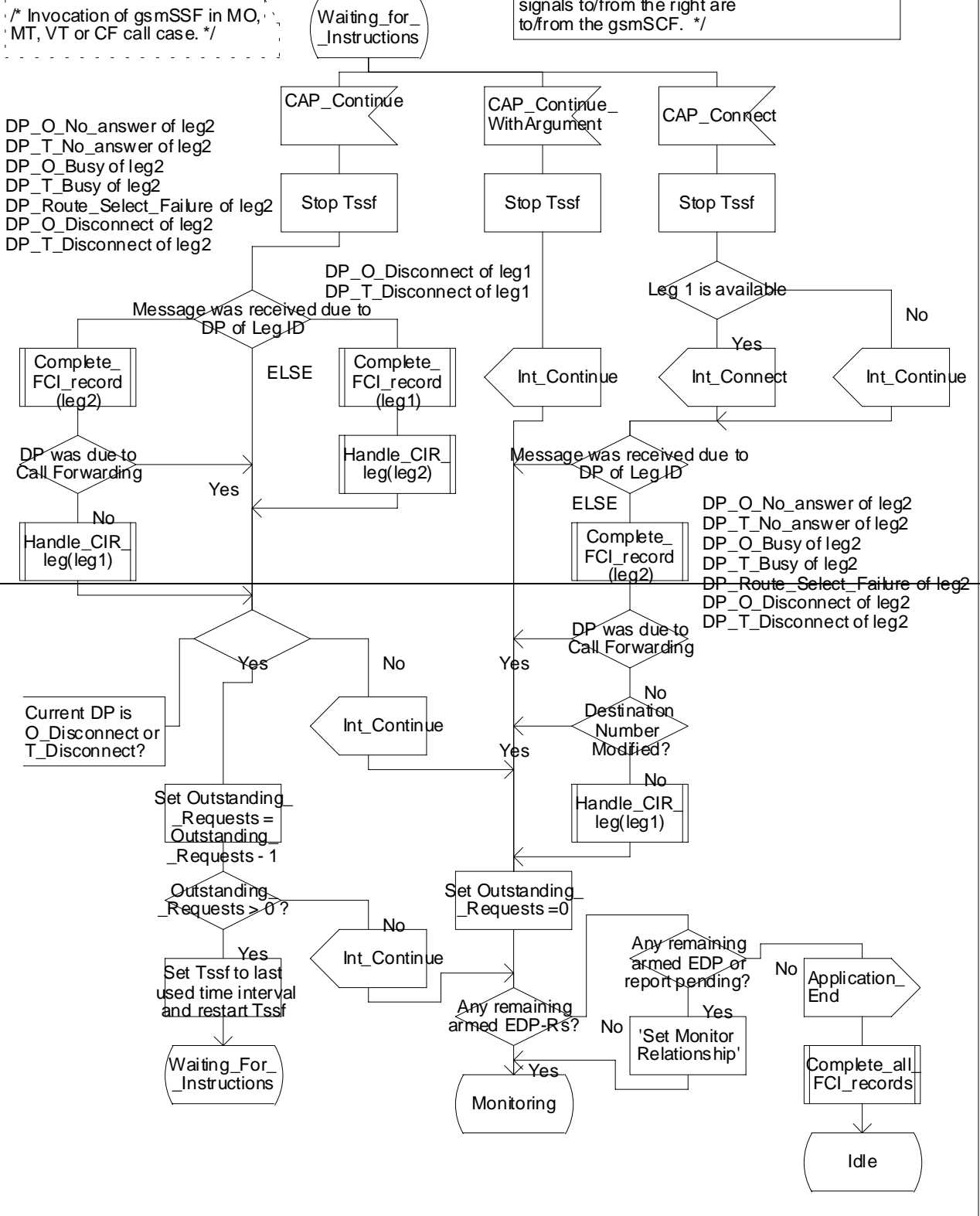


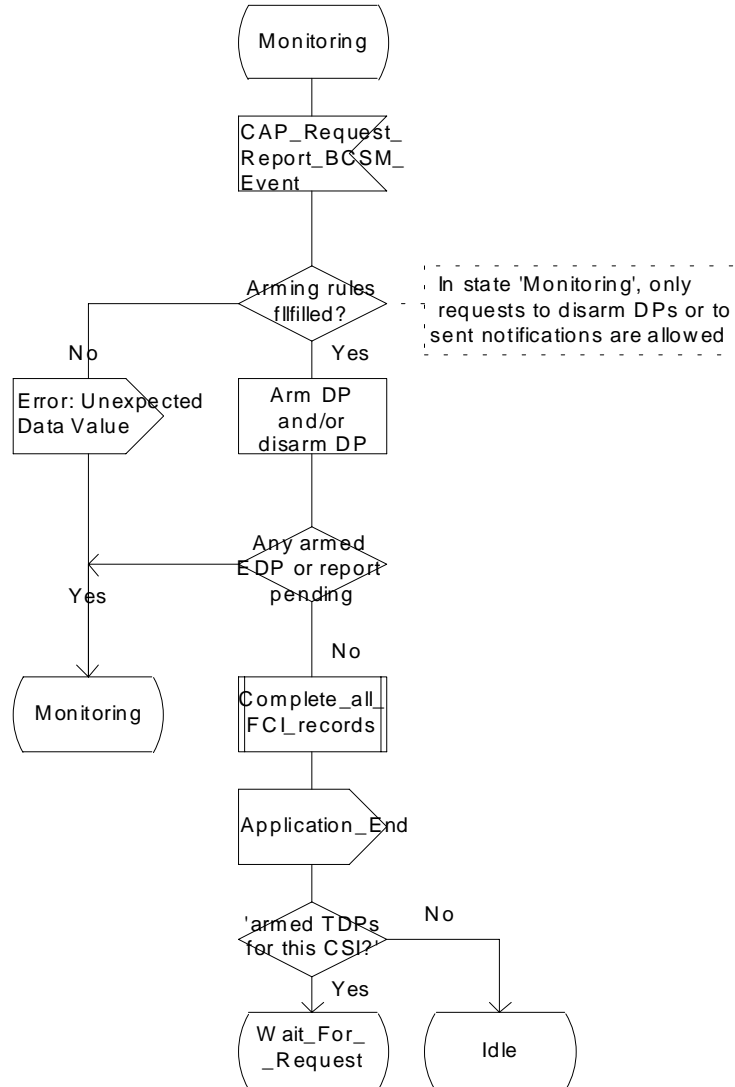
Figure 4.57e: Process gsmSSF (sheet 5)

Process gsmSSF

11(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

/* Signals to/from the right are to/from the gsmSCF. */



Process gsmSSF

11(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

/* Signals to/from the right are to/from the gsmSCF. */

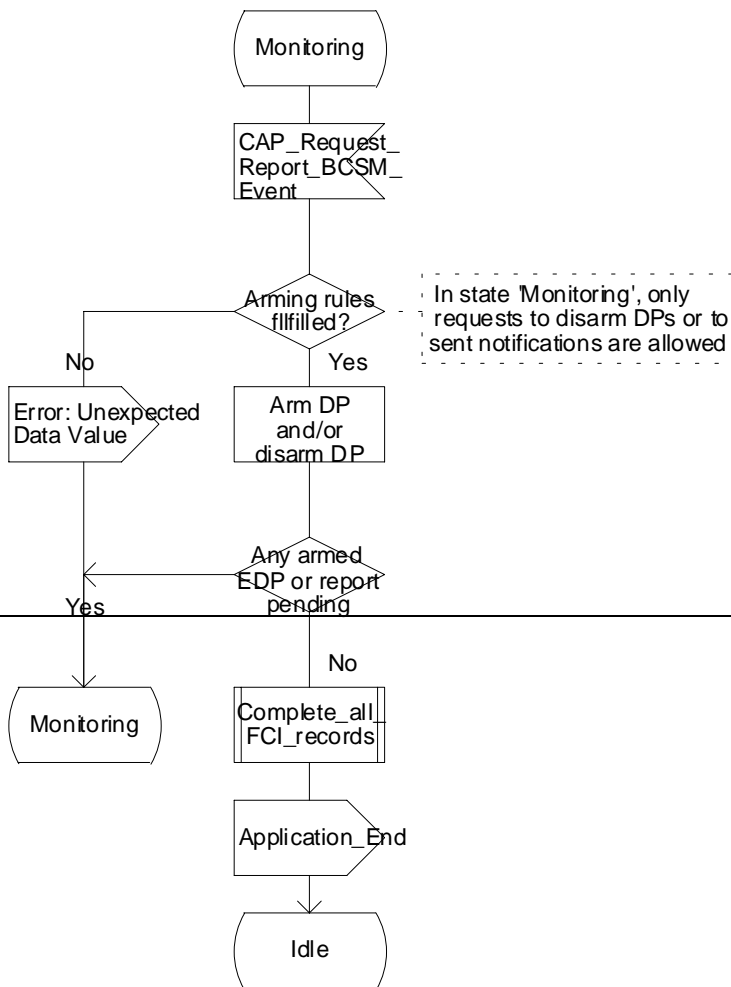


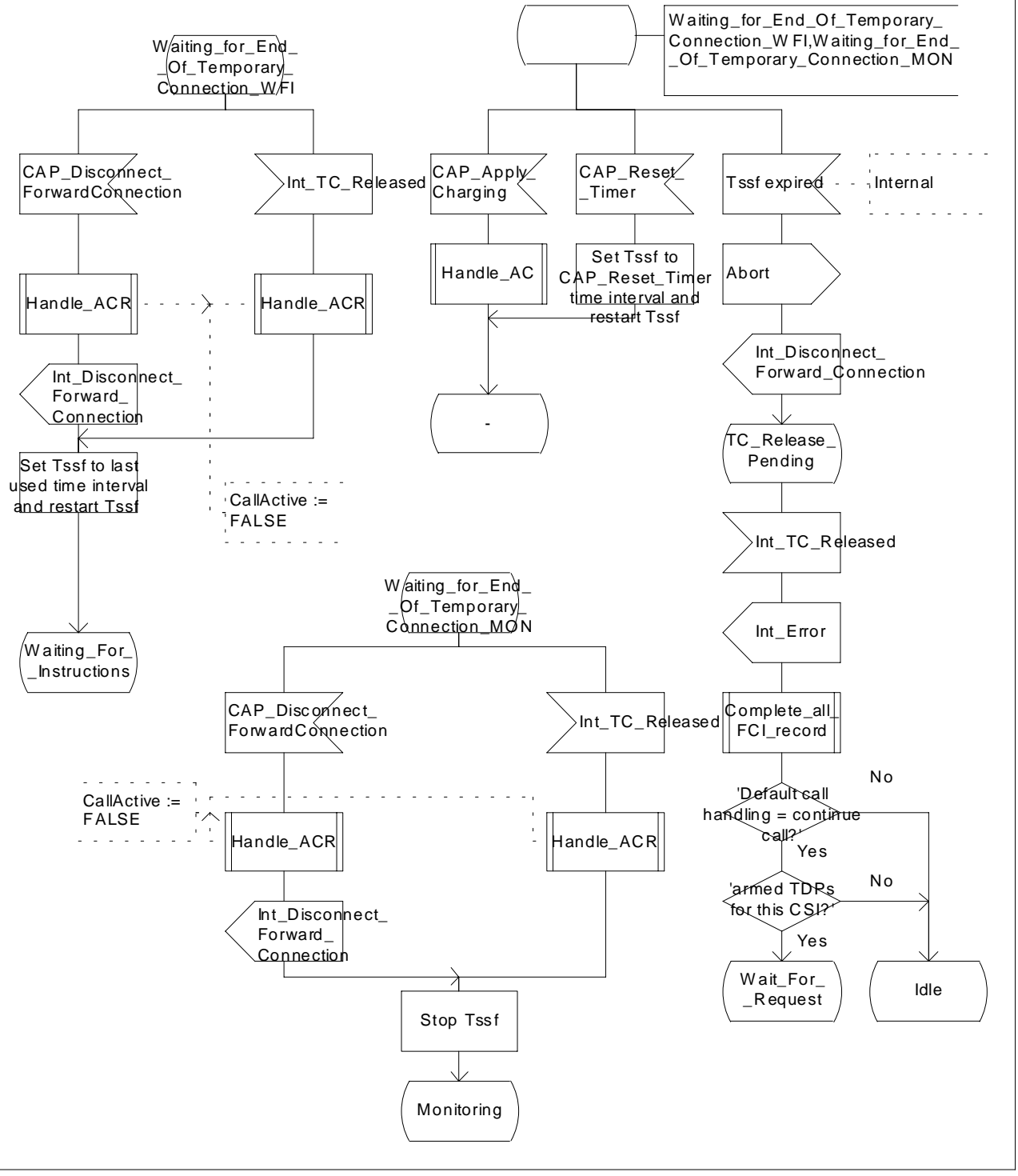
Figure 4.57k: Process gsmSSF (sheet 11)

Process gsmSSF

13(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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



Process gsmSSF

13(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

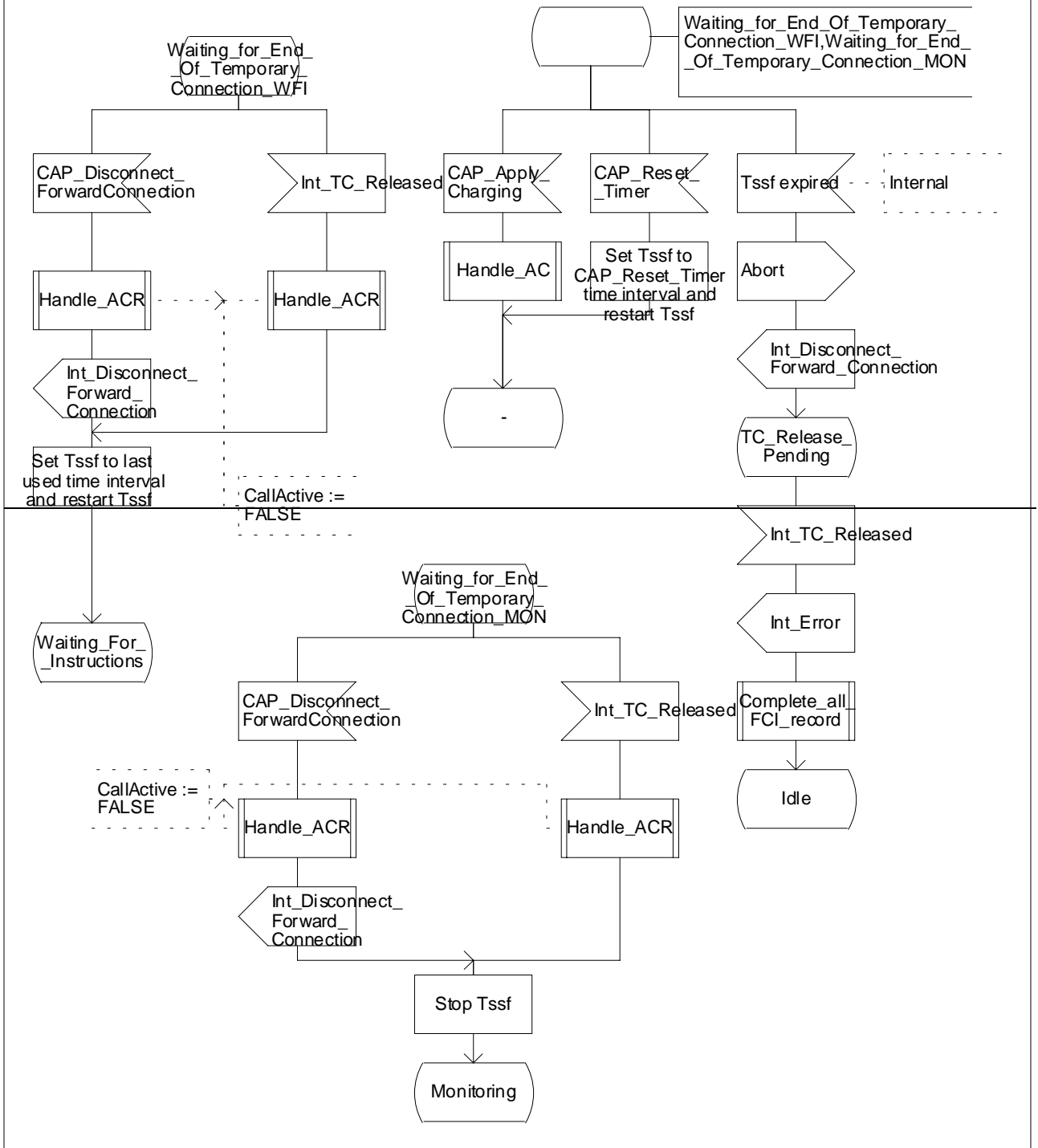


Figure 4.57m: Process gsmSSF (sheet 13)

Process gsmSSF

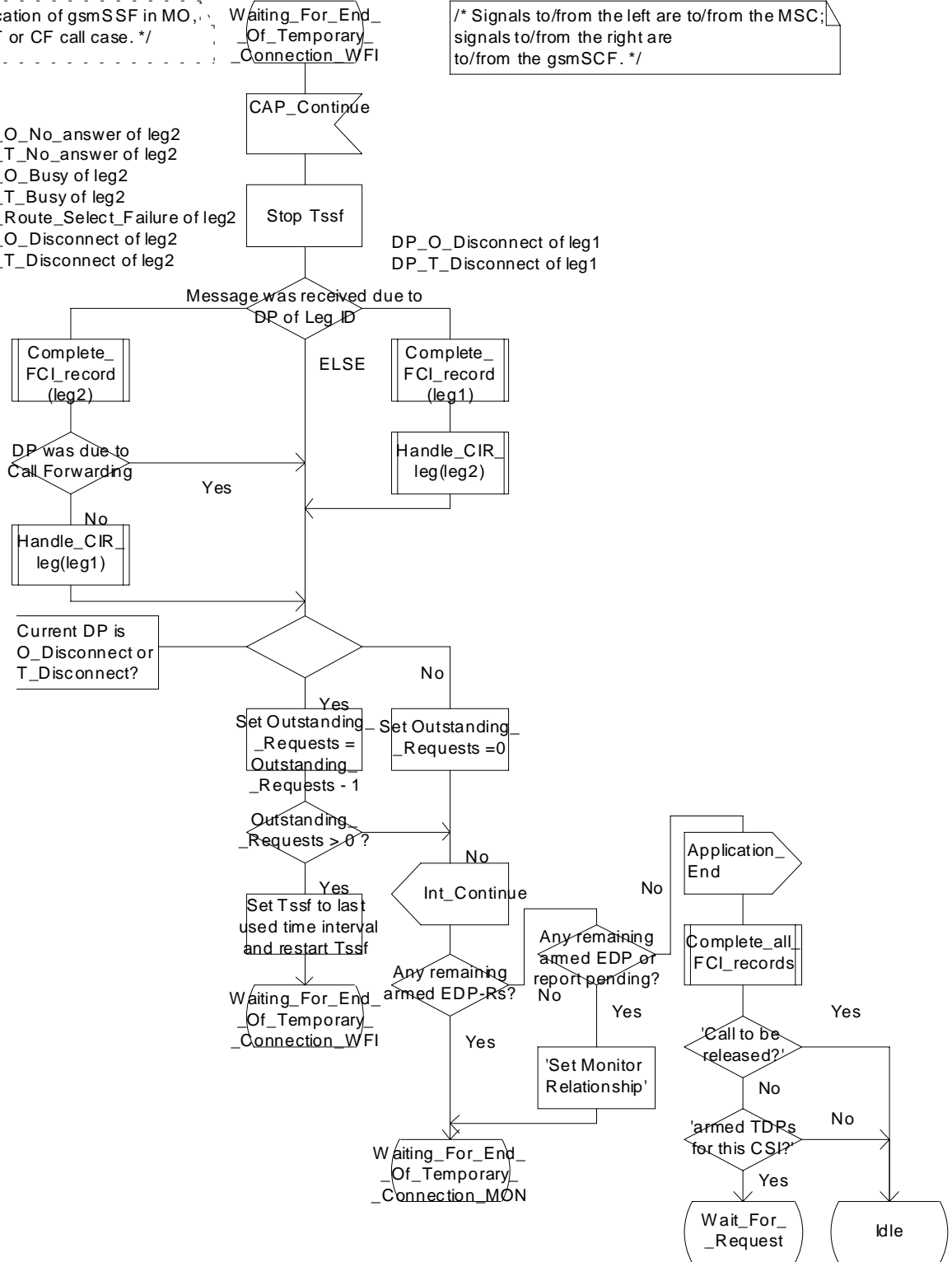
14(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

DP_O_No_answer of leg2
 DP_T_No_answer of leg2
 DP_O_Busy of leg2
 DP_T_Busy of leg2
 DP_Route_Select_Failure of leg2
 DP_O_Disconnect of leg2
 DP_T_Disconnect of leg2

DP_O_Disconnect of leg1
 DP_T_Disconnect of leg1



Process gsmSSF

14(35)

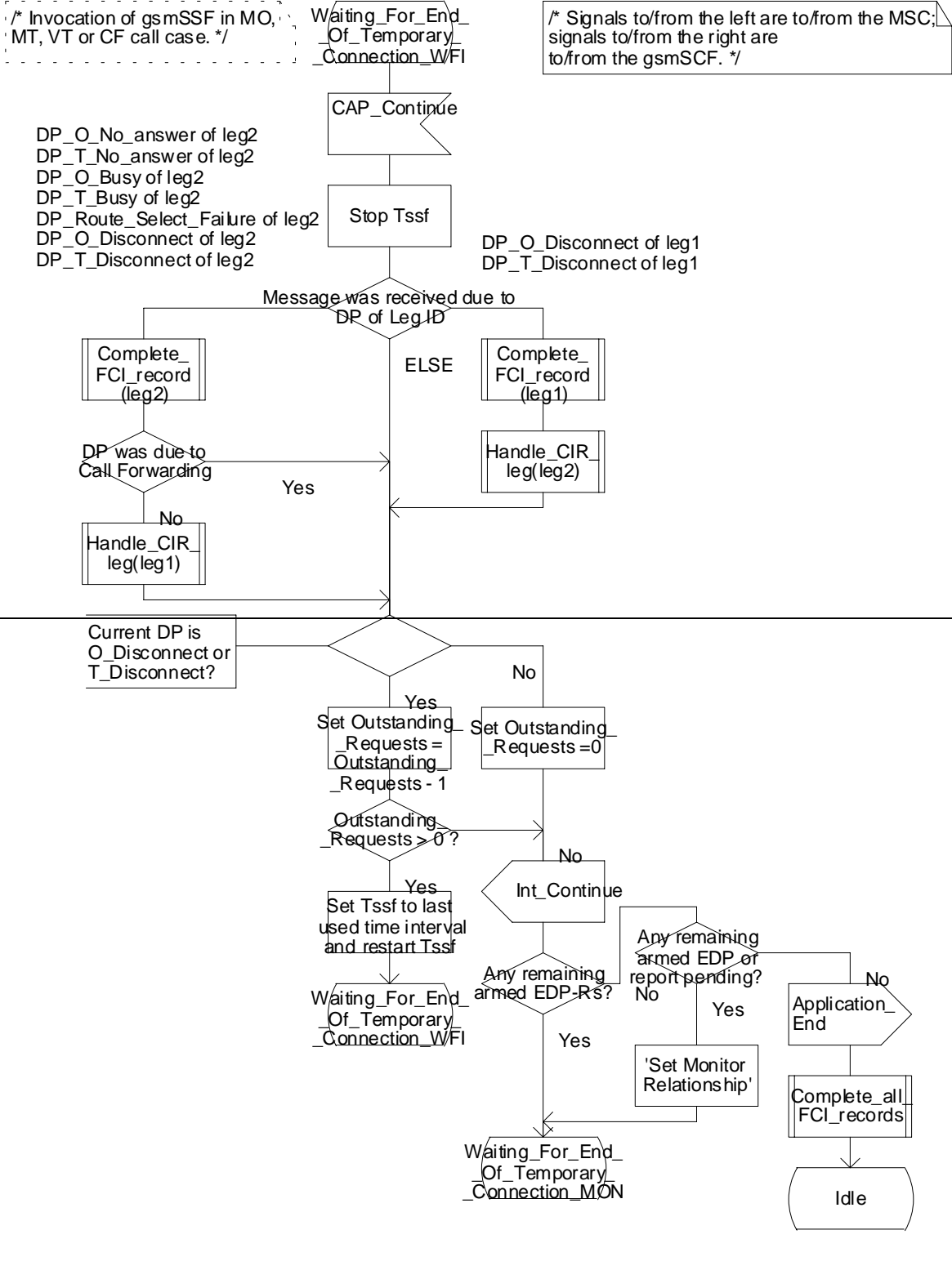


Figure 4.57n: Process gsmSSF (sheet 14)

Process gsmSSF

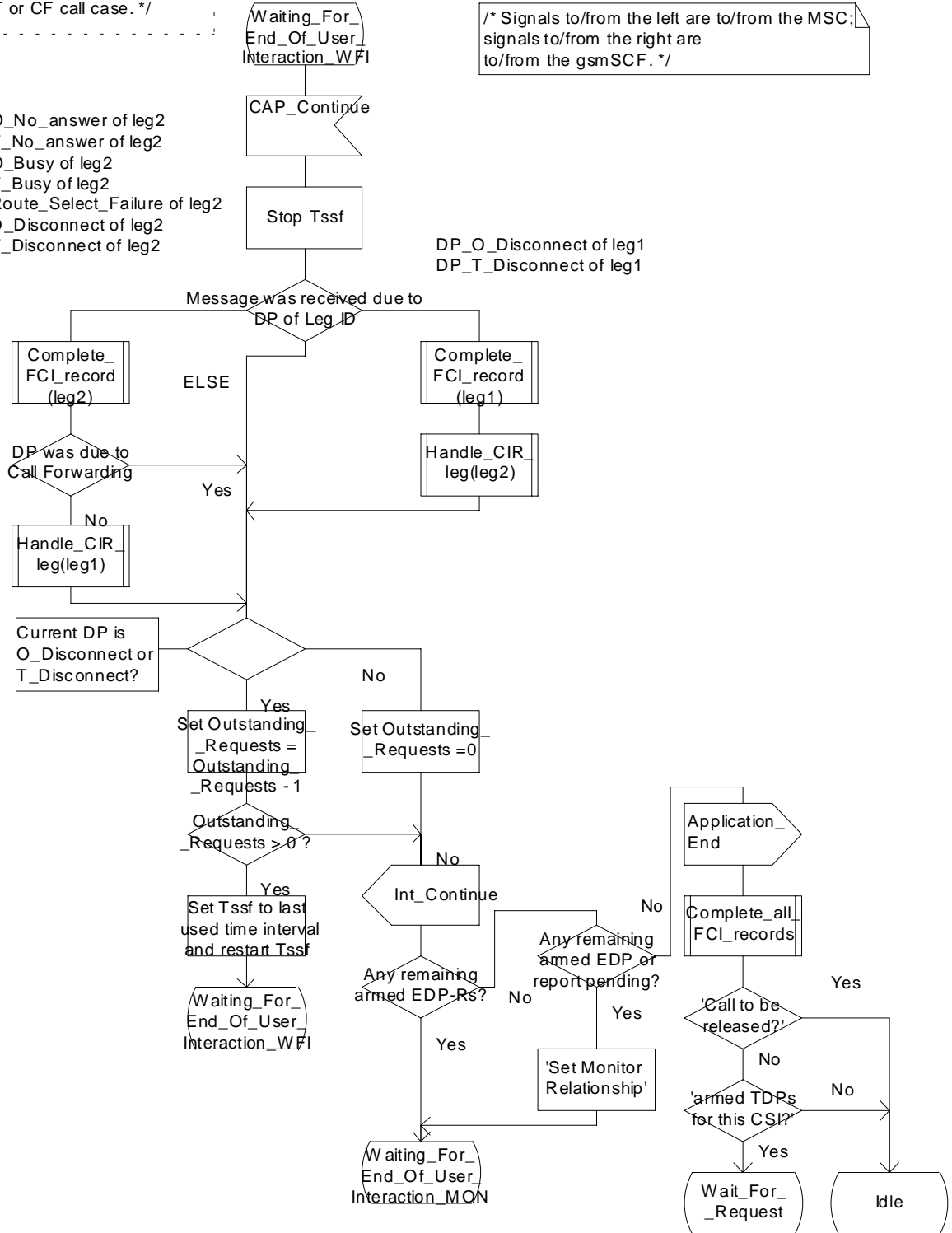
15(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

DP_O_No_answer of leg2
 DP_T_No_answer of leg2
 DP_O_Busy of leg2
 DP_T_Busy of leg2
 DP_Route_Select_Failure of leg2
 DP_O_Disconnect of leg2
 DP_T_Disconnect of leg2

DP_O_Disconnect of leg1
 DP_T_Disconnect of leg1



Process gsmSSF

15(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

DP_O_No_answer of leg2
 DP_T_No_answer of leg2
 DP_O_Busy of leg2
 DP_T_Busy of leg2
 DP_Route_Select_Failure of leg2
 DP_O_Disconnect of leg2
 DP_T_Disconnect of leg2

DP_O_Disconnect of leg1
 DP_T_Disconnect of leg1

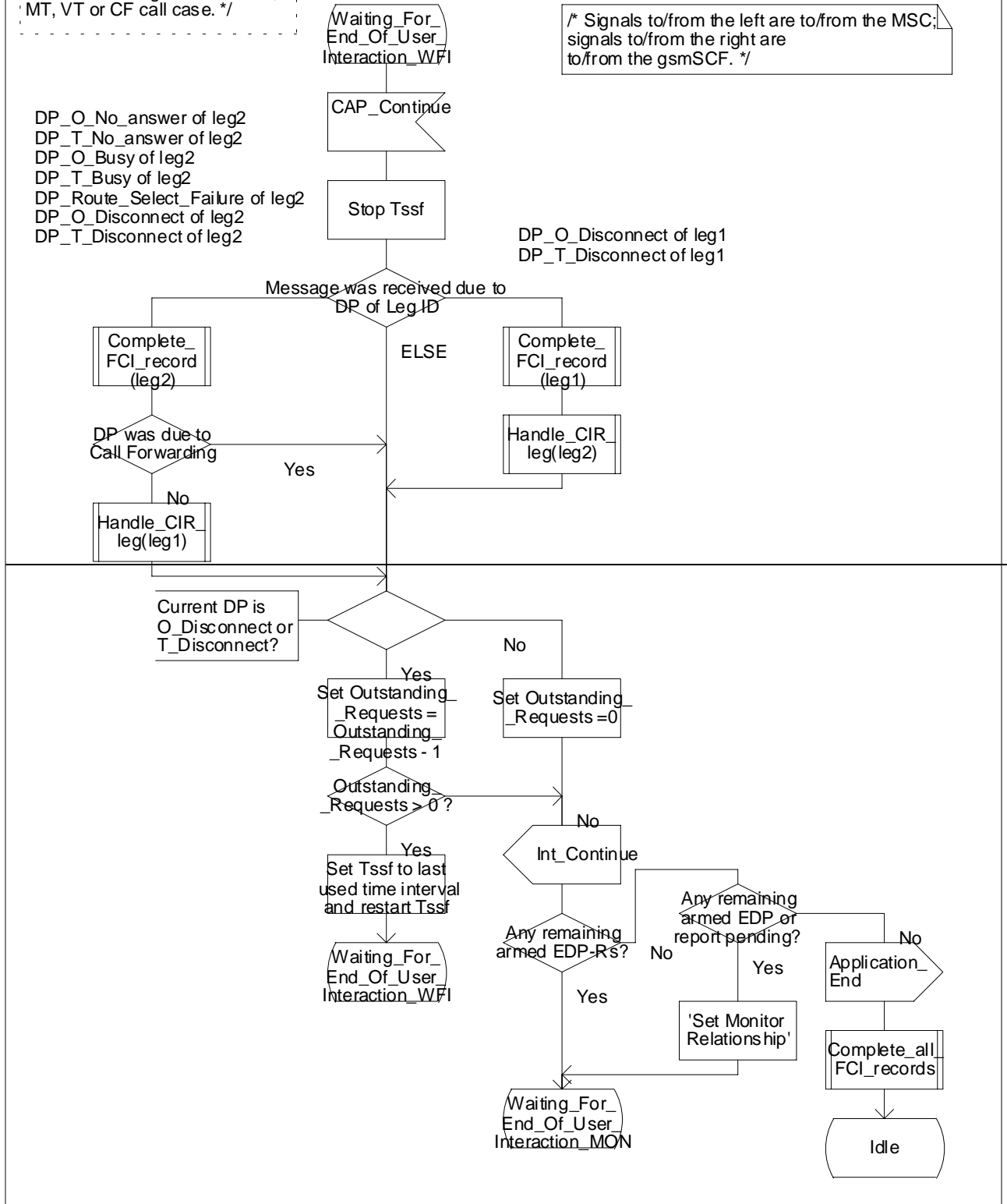


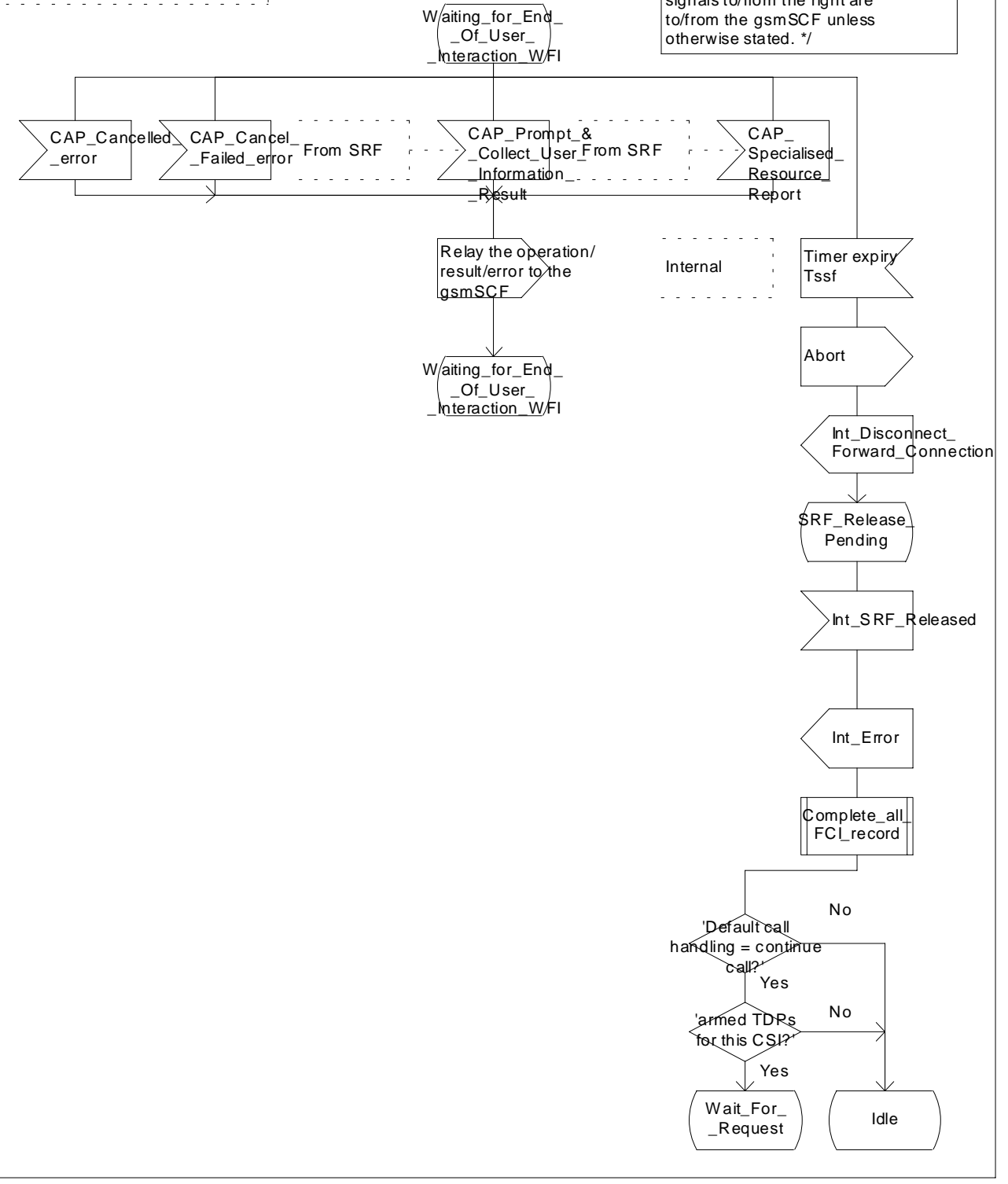
Figure 4.57o: Process gsmSSF (sheet 15)

Process gsmSSF

20(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

/* Signals to/from the left are to/from the process Generic_SRF; signals to/from the right are to/from the gsmSCF unless otherwise stated. */



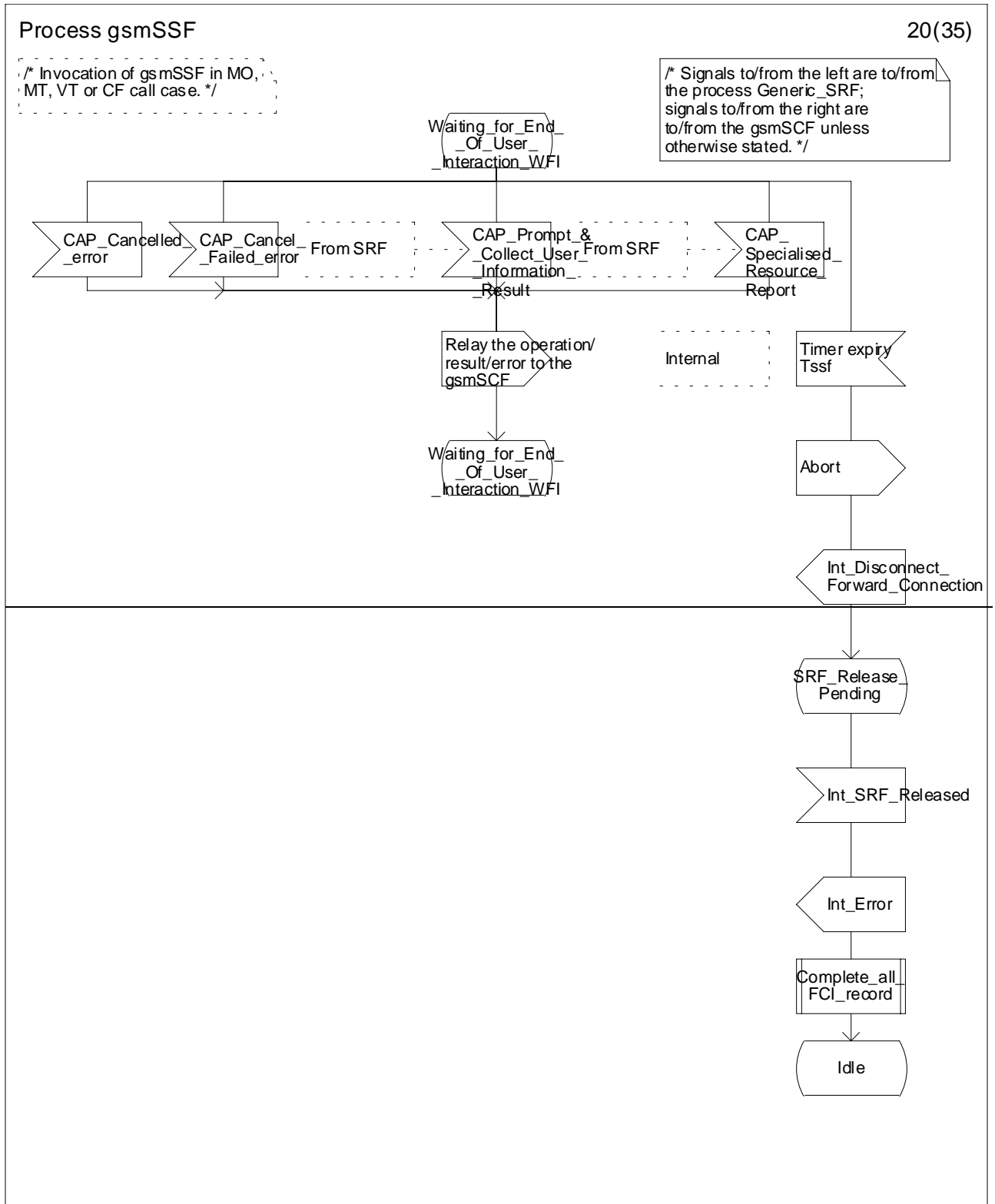


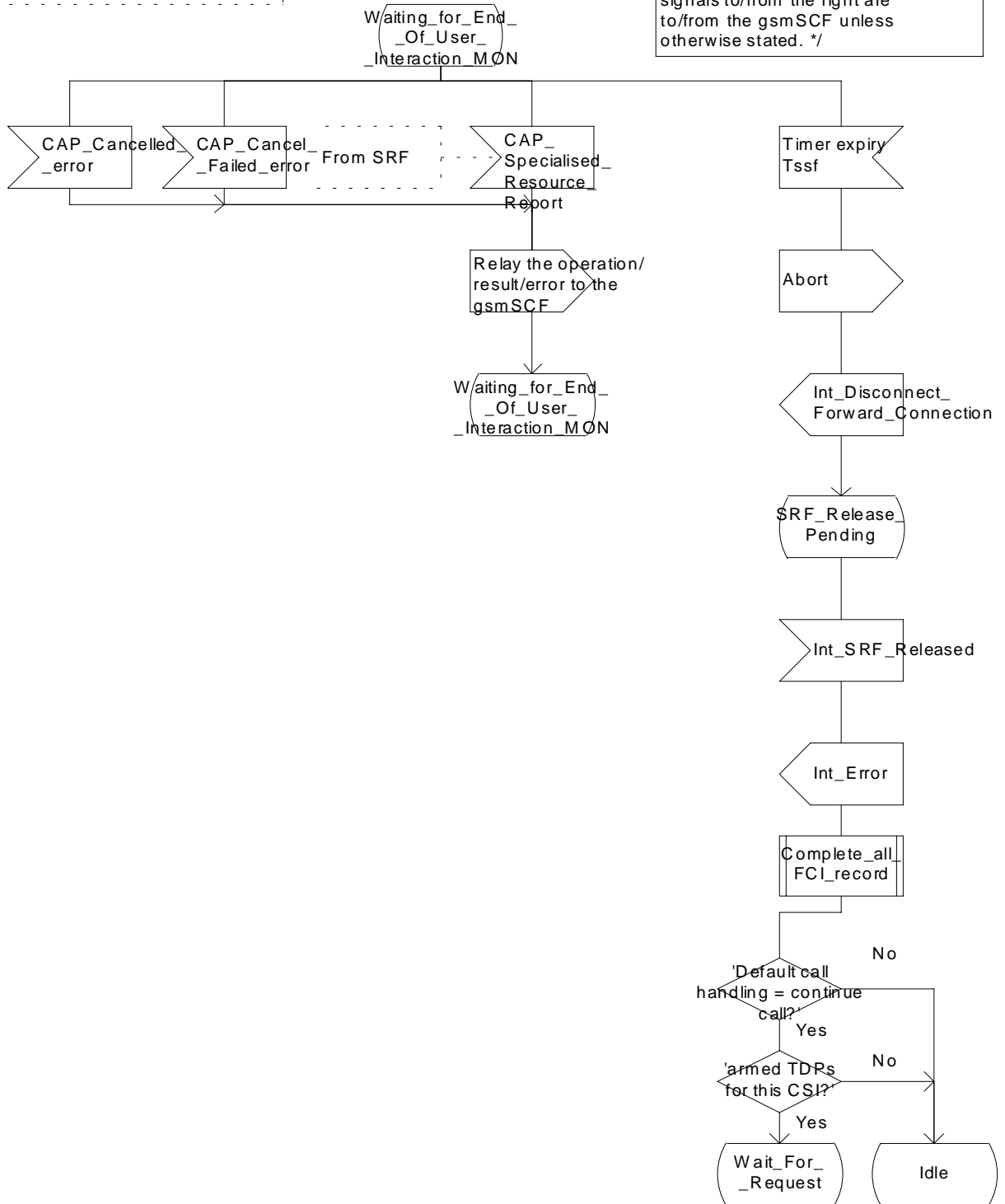
Figure 4.57t: Process gsmSSF (sheet 20)

Process gsmSSF

21(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

/* Signals to/from the left are to/from the process Generic_SRF; signals to/from the right are to/from the gsmSCF unless otherwise stated. */



Process gsmSSF

21 (35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

/* Signals to/from the left are to/from the process Generic_SRF; signals to/from the right are to/from the gsmSCF unless otherwise stated. */

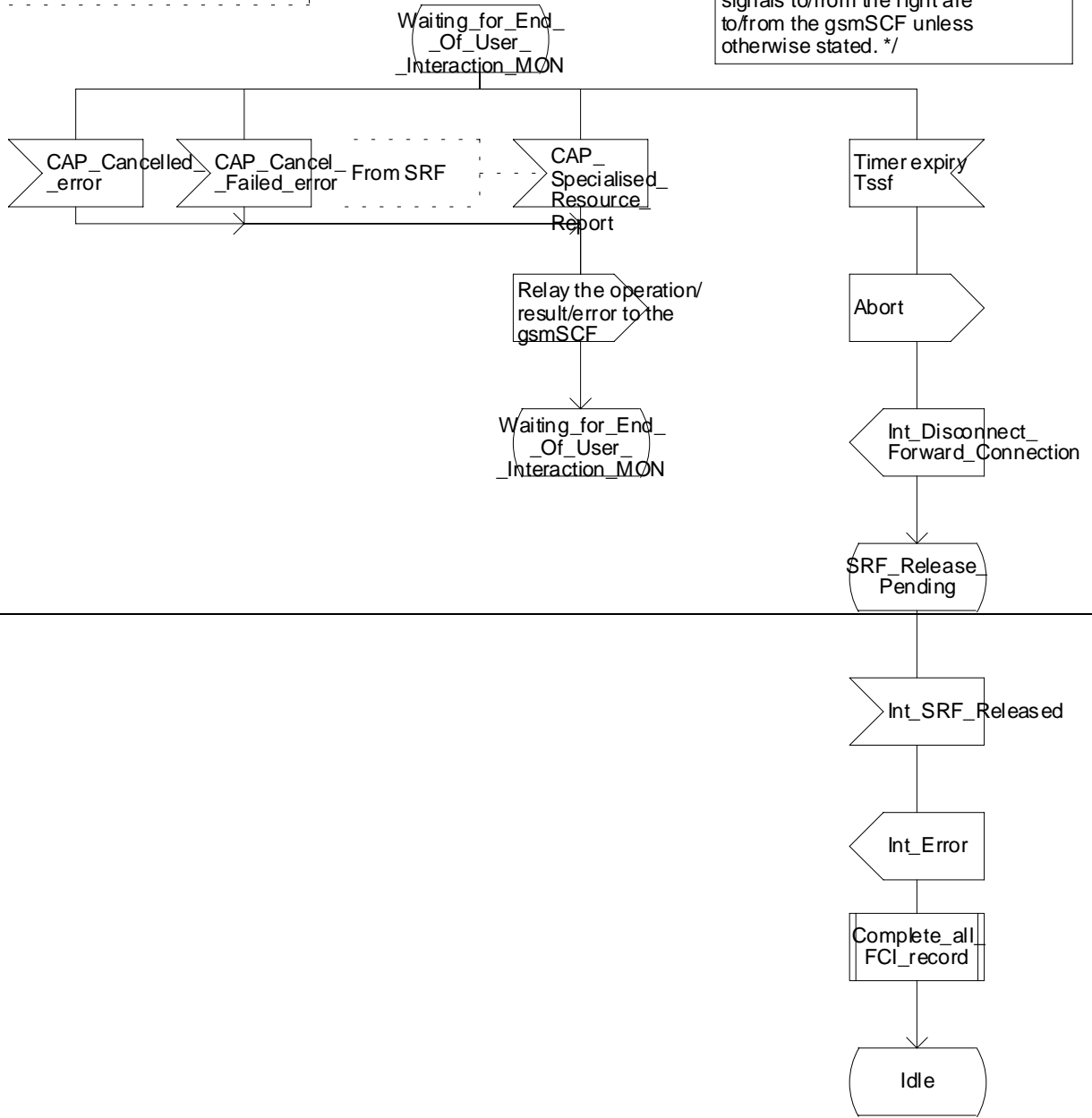


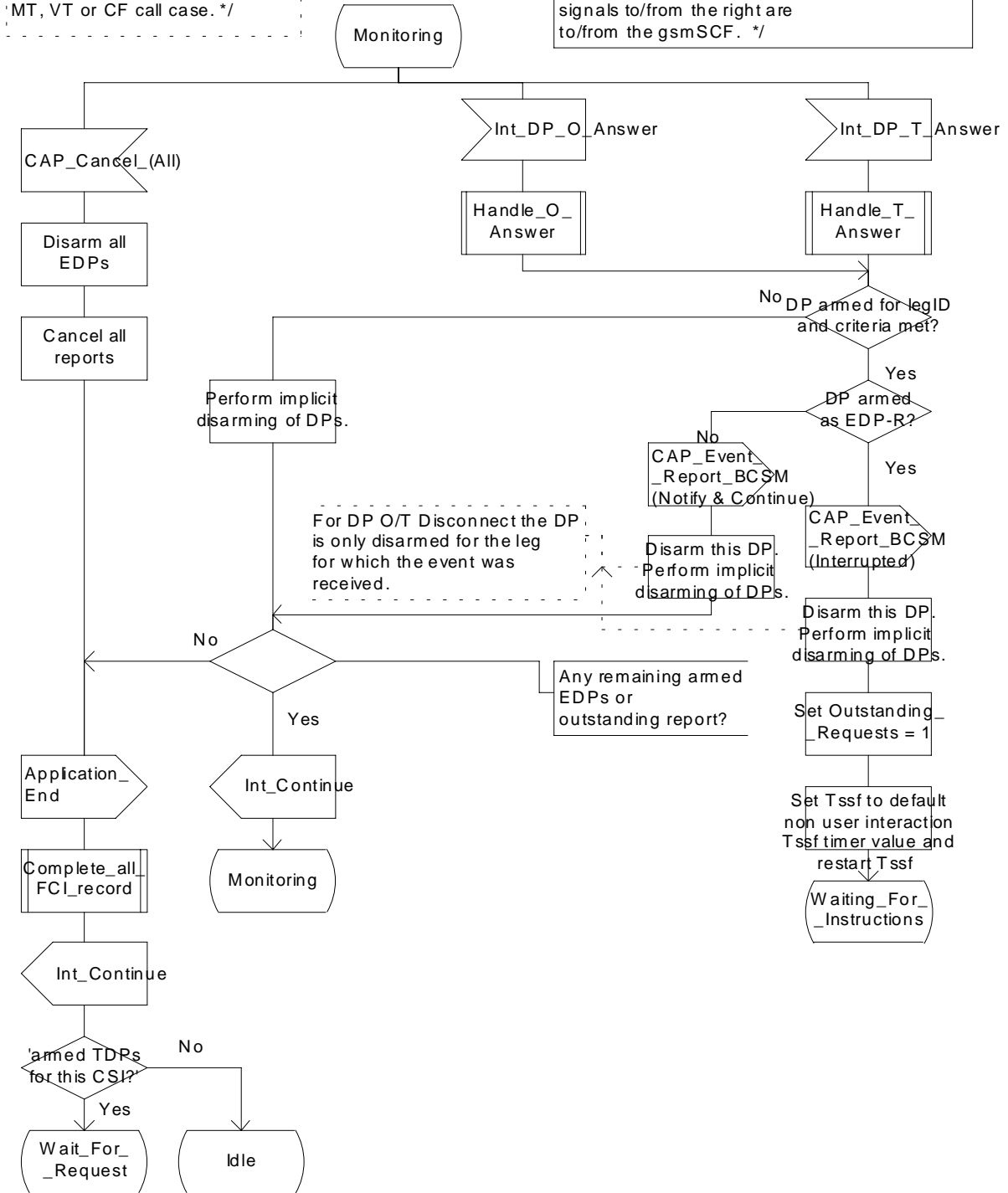
Figure 4.57u: Process gsmSSF (sheet 21)

Process gsmSSF

22(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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



Process gsmSSF

22(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

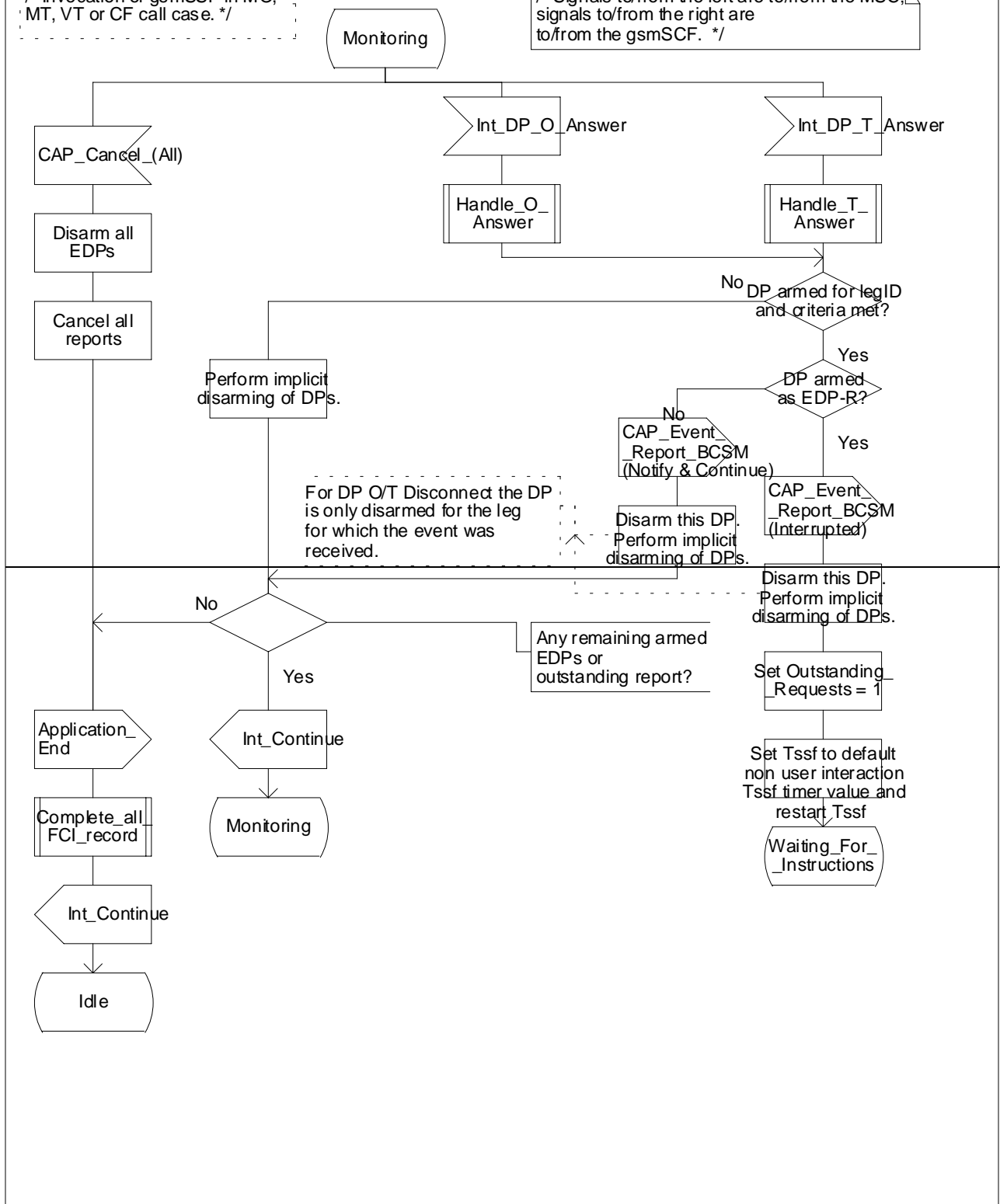


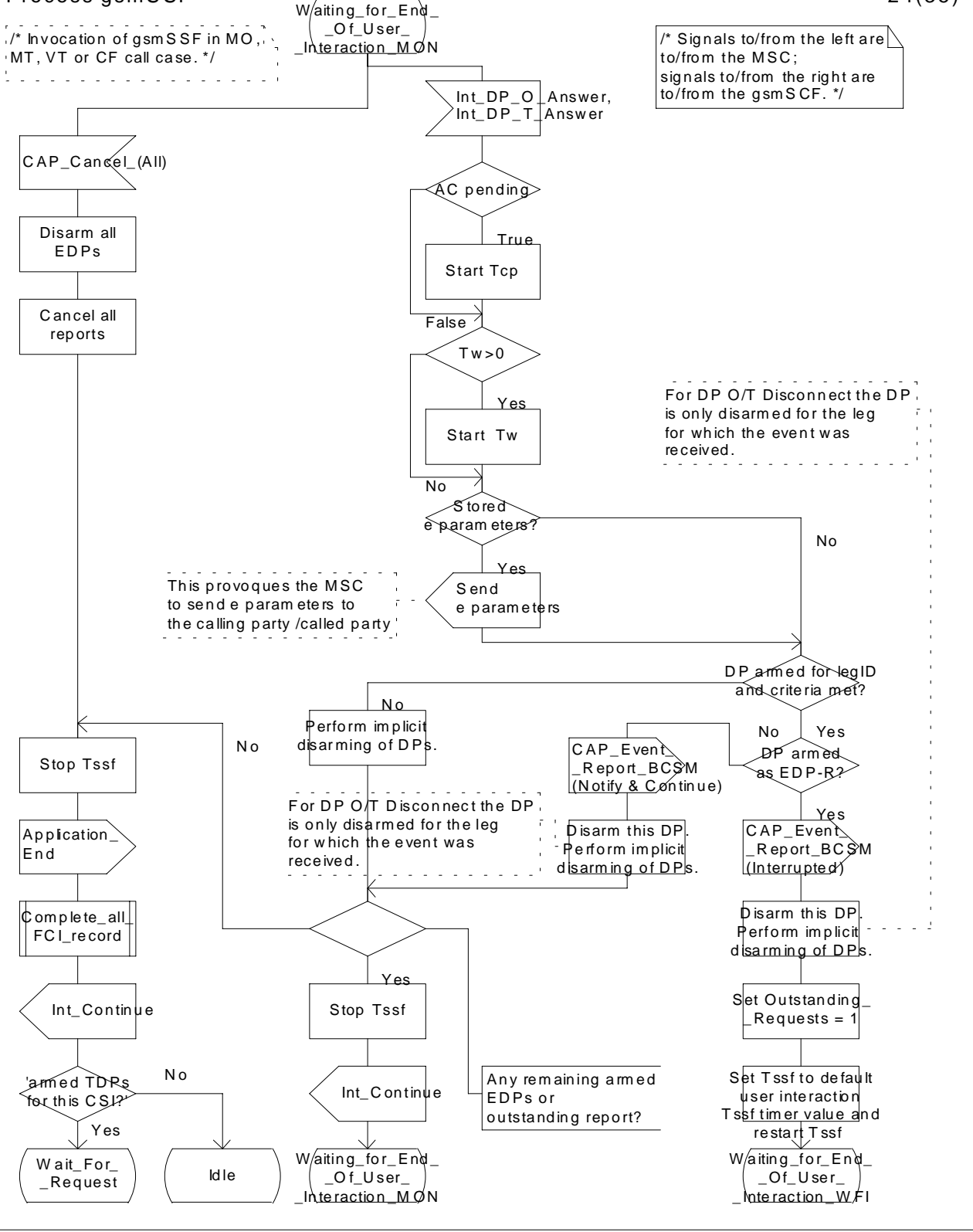
Figure 4.57v: Process gsmSSF (sheet 22)

Process gsmSSF

24(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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



Process gsmSSF

24(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

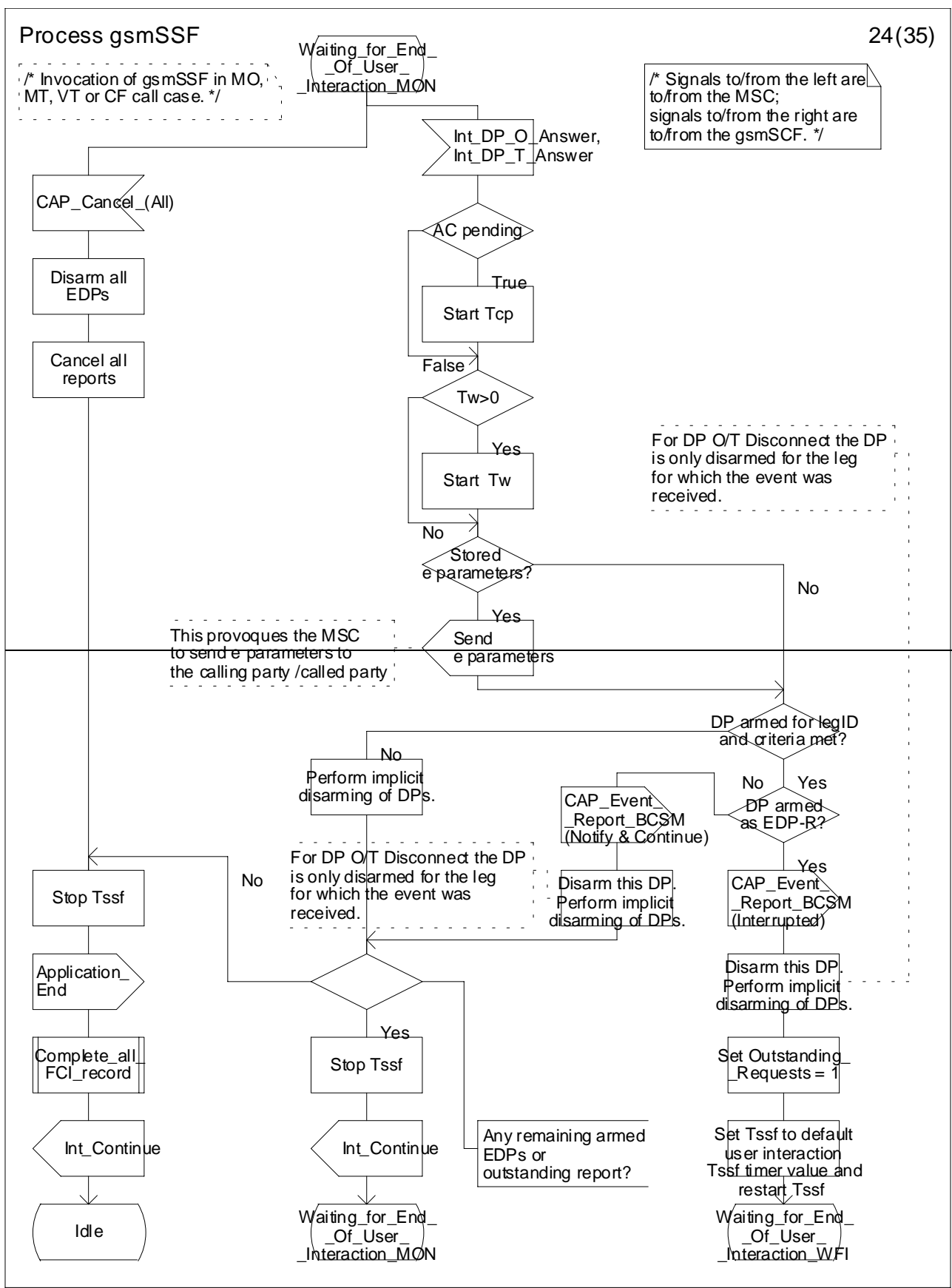


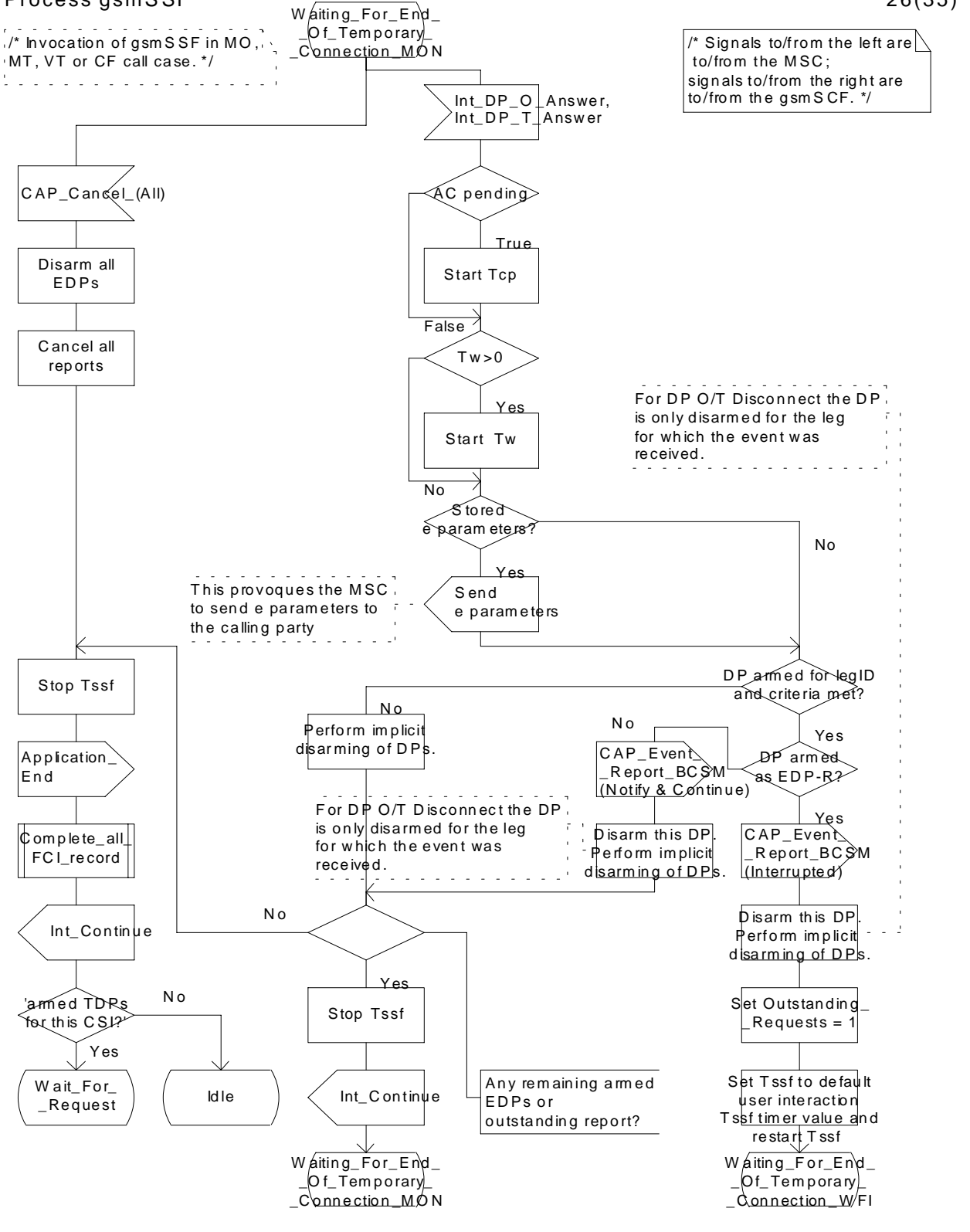
Figure 4.57x: Process gsmSSF (sheet 24)

Process gsmSSF

26(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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



Process gsmSSF

26(35)

/* Invocation of gsmSSF in MO, MT, VT or CF call case. */

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

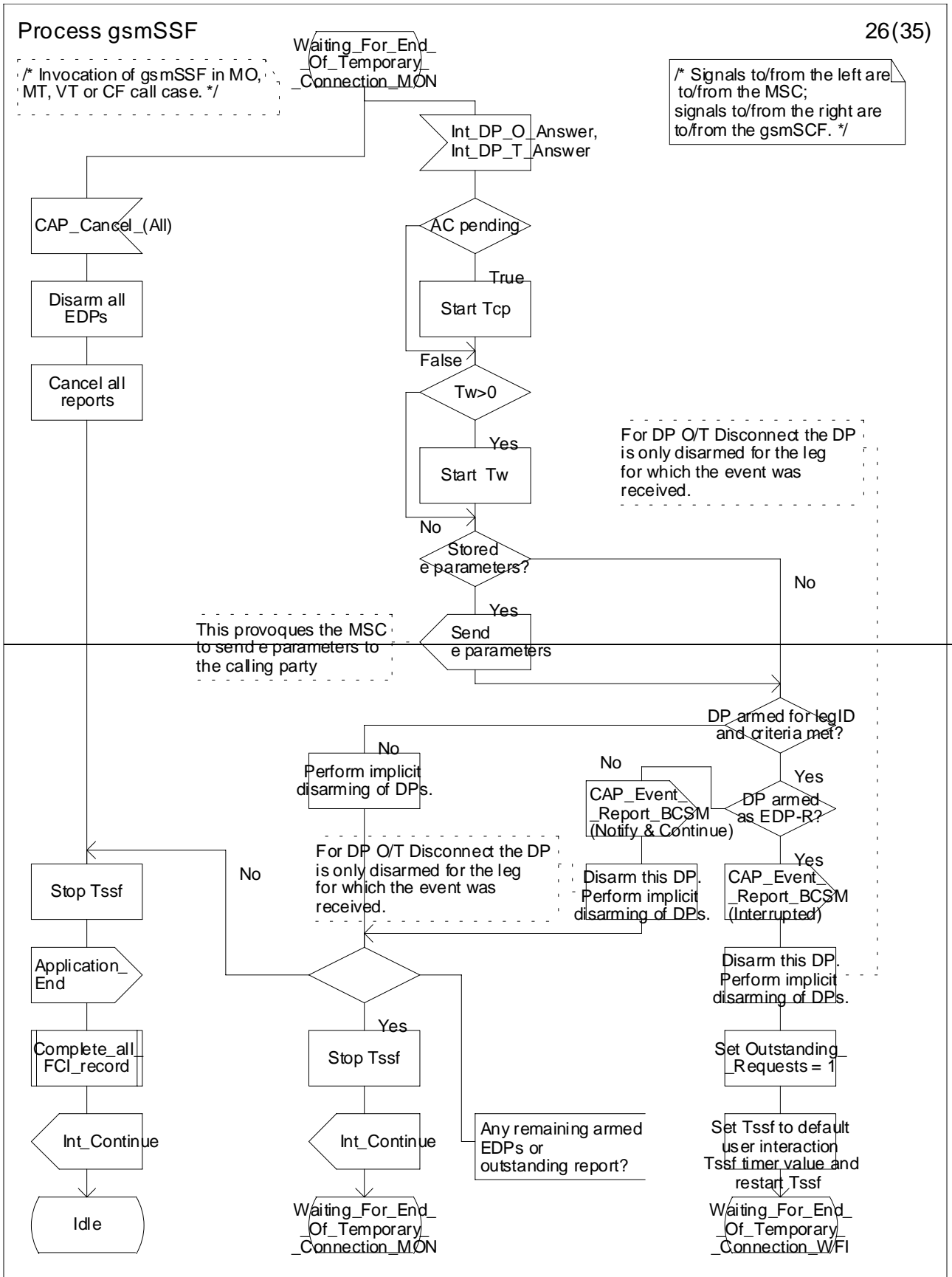


Figure 4.57z: Process gsmSSF (sheet 26)