

## CHANGE REQUEST

⌘ **23.083 CR 007** ⌘ rev **1** ⌘ Current version: **4.0.0** ⌘

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

**Proposed change affects:** ⌘ (U)SIM  ME/UE  Radio Access Network  Core Network

<b>Title:</b>	⌘ Enhancement of CW procedures		
<b>Source:</b>	⌘ Vodafone		
<b>Work item code:</b>	⌘ TEI	<b>Date:</b>	⌘ 8 <sup>th</sup> March 2001
<b>Category:</b>	⌘ C	<b>Release:</b>	⌘ REL-4
Use <u>one</u> of the following categories: <b>F</b> (essential correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (Addition of feature), <b>C</b> (Functional modification of feature) <b>D</b> (Editorial modification)		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)	
Detailed explanations of the above categories can be found in 3GPP TR 21.900.			

<b>Reason for change:</b>	⌘ To provide better interworking with Basic Call Handling – 3G TS 23.018.		
<b>Summary of change:</b>	⌘ Removal of old, out of date CW SDLs and insertion of the Process_Call_Waiting_MSC procedure (which has been renamed to just Process_Call_Waiting) from 23.018. The references section has been updated to reflect the new documents referred to by this procedure.		
<b>Consequences if not approved:</b>	⌘		

<b>Clauses affected:</b>	⌘ 0.1, 1.2		
<b>Other specs affected:</b>	⌘ <input checked="" type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘	Linked to 23.018 (CR 067)
<b>Other comments:</b>	⌘		

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

## 0.1 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

- [1] [3GPP TR 21.905: "3G Vocabulary"](#).
- [2] [3GPP TS 22.082: "Call Forwarding \(CF\) Supplementary Services - Stage 1"](#).
- [3] [3GPP TS 23.011: "Technical realization of supplementary services - General Aspects"](#).
- [4] [3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols - Stage3"](#).
- [5] [3GPP TS 23.018: "Basic call handling"](#).
- [6] [3GPP TS 23.078: "Customized Applications for Mobile network Enhanced Logic \(CAMEL\) - Phase 3; Stage 2"](#).
- [7] [3GPP TS 23.135: "Multicall supplementary service; Technical Realisation; Stage 2"](#).
- [8] [3GPP TS 23.087: "User-to-User Signalling \(UUS\) - Stage 2"](#).
- [9] [3GPP TS 23.093: "Technical realisation of Completion of Calls to Busy Subscriber \(CCBS\) - Stage 2"](#).
- [10] [3GPP TS 23.072: "Call Deflection \(CD\) supplementary service - Stage2"](#).

**\*\*\* Next Modified Section \*\*\***

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## 1 Call waiting (CW)

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### 1.2 Functions and information flows

TS 24.008 specifies the procedures for call control. These shall also be used for waiting calls when applicable.

The following Mobile Additional Function has been identified for the call waiting service:

#### MAF013

Call waiting related authorizations examination

The ability of a PLMN component to determine the authorizations relating to call waiting. See figure 1.4.

Location: VLR

Definitions:

**Subscriber B:**

The subscriber who is provided by the network with the call waiting supplementary service. The subscriber B is always a mobile subscriber.

**User B:**

The user who reacts to call waiting at subscriber B. The user B is always a mobile user.

**User C:**

The user who has originated a call to subscriber B which causes the call waiting supplementary service to be invoked. The user C may be a mobile user.

**User A:**

The user who is engaged in a call with user B. The user A may be a mobile user.

**Timer T1:**

This timer corresponds to T303 + T310 (as defined in TS 24.008).

**Timer T2:**

Call Waiting Timer. This shall limit the duration of the call in the waiting condition.

**Timer T3:**

No Reply Condition Timer (see TS 22.082).

**CFNRc:**

Call Forwarding on Not Reachable (see TS 22.082).

**CFNRy:**

Call Forwarding on No Reply (see TS 22.082).

**CW:**

Call Waiting.

The overall SDL diagram of procedure Process\_eCall-wWaiting is shown in figure 1.5. ~~This represents the network as a whole.~~

Sheet 1: the procedure Set\_CLIP\_Info\_MSC is specific to CLIP; it is specified in 3GPP TS 23.018 [5].

Sheet 1: the procedure Derive\_CS\_BC\_MSC is specified in 3GPP TS 23.018 [5].

Sheet 1: the VMSC and the MS may negotiate the bearer capability to be used for the call by the exchange of information in the Set-up and Call Confirmed messages.

Sheet 1: the Call Confirmed message indicates "busy" for the successful case.

Sheet 1: the procedure Establish\_Terminating\_TCH\_Multicall1 is specific to Multicall; it is specified in 3GPP TS 23.135 [7]. If the VMSC does not support Multicall, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 1: the procedure UUS\_ICH\_UUS1\_Implicit\_Active is specific to UUS; it is specified in 3GPP TS 23.087 [8].

Sheet 1: the procedure CCBS\_Report\_Not\_Idle is specific to CCBS; it is specified in 3GPP TS 23.093 [9].

Sheet 2, sheet 3, sheet 5: the procedure UUS\_ICH\_Check\_Support is specific to UUS; it is specified in 3GPP TS 23.087 [8]. If the VMSC does not support UUS, processing continues from the "Yes" exit of the test "Result=Pass?" where the test follows the procedure call.

Sheet 2: the procedure CCBS\_ICH\_MSC\_Report\_Success is specific to CCBS; it is specified in 3GPP TS 23.093 [9].

Sheet 2: the task "UTU2Cnt:=0" is executed only if the VMSC supports UUS.

Sheet 2: the procedure CAMEL\_Start\_TNRy is called if the VMSC supports CAMEL phase 3 or later; it is specified in 3GPP TS 23.078 [6].

Sheet 2: the procedure Send\_ACM\_If\_Required is specified in 3GPP TS 23.018 [5].

Sheet 2, sheet 8: the processing in the branch starting with the input "CD Request" is specific to Call Deflection; if the VMSC does not support Call Deflection the input is discarded.

Sheet 2, sheet 8: the procedure Handling\_CD\_MSC is specific to Call Deflection; it is specified in 3GPP TS 23.072 [10].

Sheet 2, sheet 3, sheet 6, sheet 7: the procedure CAMEL\_MT\_GMSC\_DISC4 is called if the VMSC supports CAMEL phase 3 or later; it is specified in 3GPP TS 23.078 [6]. If the VMSC does not support CAMEL phase 3 or later, processing continues from the "No" exit of the test "Result=Reconnect?".

Sheet 2, sheet 3, sheet 4, sheet 8: the procedure CCBS\_ICH\_MSC\_Report\_Failure is specific to CCBS; it is specified in 3GPP TS 23.093 [9].

Sheet 3, sheet 7: the Release transaction (reject) message covers all unsuccessful cases not otherwise indicated.

Sheet 4, sheet 7: the procedure UUS\_MSC\_Check\_UUS1\_UII is specific to UUS; it is specified in 3GPP TS 23.087 [8].

Sheet 4, sheet 8: the procedure CAMEL\_MT\_GMSC\_DISC6 is called if the VMSC supports CAMEL phase 3 or later; it is specified in 3GPP TS 23.078 [6].

Sheet 5: the procedure CAMEL\_Stop\_TNRy is called if the VMSC supports CAMEL phase 3 or later; it is specified in 3GPP TS 23.078 [6].

Sheet 5: the procedure Establish\_Terminating\_TCH\_If\_Required is specified in 3GPP TS 23.018 [5].

Sheet 5: the procedure Establish\_Terminating\_TCH\_Multicall is specific to Multicall; it is specified in 3GPP TS 23.135 [7].

Sheet 6: the procedure Handle\_AoC\_MT\_MSC is specific to AoC; it is specified in 3GPP TS 23.018 [5]. If the VMSC does not support AoC, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 6: the procedure CAMEL\_MT\_GMSC\_ANSWER is called if the VMSC supports CAMEL phase 3 or later; it is specified in 3GPP TS 23.078 [6]. If the VMSC does not support CAMEL phase 3 or later, processing continues from the "Yes" exit of the test "Result=Pass?" on sheet 6.

Sheet 6: the procedure Set\_COL\_Presentation\_Indicator\_MSC is specific to COLP; it is specified in 3GPP TS 23.018 [5].

Sheet 6: the procedure Send\_Answer\_If\_Required is specified in 3GPP TS 23.018 [5].

Sheet 7: the input signal "CAMEL TNRy expired" will be received only if the VMSC supports CAMEL phase 3 or later.

Sheet 7: the procedure CAMEL\_MT\_GMSC\_DISC5 is called if the VMSC supports CAMEL phase 3 or later; it is specified in 3GPP TS 23.078 [6]. If the VMSC does not support CAMEL phase 3 or later, processing continues from the "No" exit of the test "Result=Reconnect?".

Sheet 7, sheet 8: the procedure UUS\_ICH\_Check\_Forwarding is specific to UUS; it is specified in 3GPP TS 23.087 [8]. If the VMSC does not support UUS, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 7, sheet 8, sheet 9: the procedure UUS\_MSC\_Check\_UUS1\_UII is specific to UUS; it is specified in 3GPP TS 23.087 [8].

Sheet 8: the procedures UUS\_MSC\_Check\_UUS2\_UII to\_MS and UUS\_MSC\_Check\_UUS2\_UII to\_NW are specific to UUS; they are specified in 3GPP TS 23.087 [8].

Sheet 8: the procedure CD\_UUS\_Interaction is specific to Call Deflection; it is specified in GSM 23.072 [10].

Sheet 9: the procedure CCBS\_ICH\_MSC\_Report\_Failure is specific to CCBS; it is specified in 23.093 [9].

Sheet 9: the procedure CAMEL\_MT\_GMSC\_DISC6 is specific to CAMEL; it is specified in 23.078 [6].

The information flows are shown in figure 1.6. In these flows it is assumed that user A and user C are fixed users and that user B is a mobile user. Functions to be performed by the fixed ISDN are not shown in the information flows. Only the functions to be performed by the PLMN are shown.

## ~~1.2.1 Description of overall SDL-diagram of call waiting~~

~~In the SDL diagrams the states are dimensioned in two dimensions. The first dimension is a normal basic call state, e.g. null or active. The second dimension is an auxiliary state associated with hold, e.g. idle or held. Active call is represented by (active, idle) state, held call by (active, held) state.~~

~~When call waiting is active and the subscriber is connected to at least one call (active or held), the arrival of a subsequent incoming call from user C to user B shall, if no other call is waiting, be signalled to the mobile equipment at B as described in TS 24.008. The network shall then await an acknowledgement from the mobile termination at user B within a specific time period T1. In figure 1.5, the mobile terminated call from user C is described as being in the "Pending Ack" state during this period. The call waiting service is suspended for further incoming calls.~~

### ~~1.2.1.1 Behaviour during the "Pending Ack" state~~

#### Expiry of call control timers in T1

~~If no acknowledgement is received by the network from the mobile termination at user B within the time period T1 (timer T1 expires) then the network shall initiate clearing towards the calling user C and served user B in accordance with TS 24.008. Following the expiry of call control timers in T1 the call waiting service shall be resumed for further incoming calls.~~

#### Release of active call

~~User A or B may release the active call between them in the normal manner. This does not change the state of the call from user C. Note that the MS has to indicate a normal ringing tone to the served subscriber.~~

#### Release of call by user C

~~User C may release the call to user B. In this case, call clearing shall take place in the normal manner, and the call waiting service shall be resumed for further incoming calls.~~

#### Call hold service

~~User B can operate the call hold service on any active calls in the normal manner.~~

#### Indication of UDUB

~~User B may release the call from user C using the indication of UDUB. In this case, if CFB is active the call from user C shall be forwarded, if CFB is not active the call from user C shall be cleared. The call waiting service is resumed for further incoming calls.~~

#### Rejection of call from user C

~~User B may reject the call from user C. In this case, the call from user C shall be cleared. The call waiting service is resumed for further incoming calls.~~

#### Acknowledgement of call from user C

~~If the mobile termination at user B acknowledges the incoming call within the time period T1, a call is waiting indication shall be sent towards calling user C. Timer T1 is stopped. Upon reception of alerting the network shall await an acceptance from the controlling user B within the time period T2. In figure 1.5, the mobile terminated call is described as being in the "Waiting" state during this period. In case the controlling subscriber B has call forwarding on no reply active the network shall await an acceptance from user B within the time period T3 < T2. The call waiting service is still suspended for further incoming calls.~~

### ~~1.2.1.2 Behaviour during the "Waiting" State~~

#### ~~Expiry of Timer T3~~

~~If no acceptance is received by the network within the time period T3 (timer T3 expires) the waiting call shall be forwarded on no reply and clearing shall be initiated towards the controlling user B. The call waiting service is resumed for further incoming calls.~~

#### ~~Expiry of Timer T2~~

~~If call forwarding on no reply is not active and no acceptance is received within the time period T2 (timer T2 expires), the waiting call shall be cleared by the network towards the controlling user B and the calling user C. The call waiting service is resumed for further incoming calls.~~

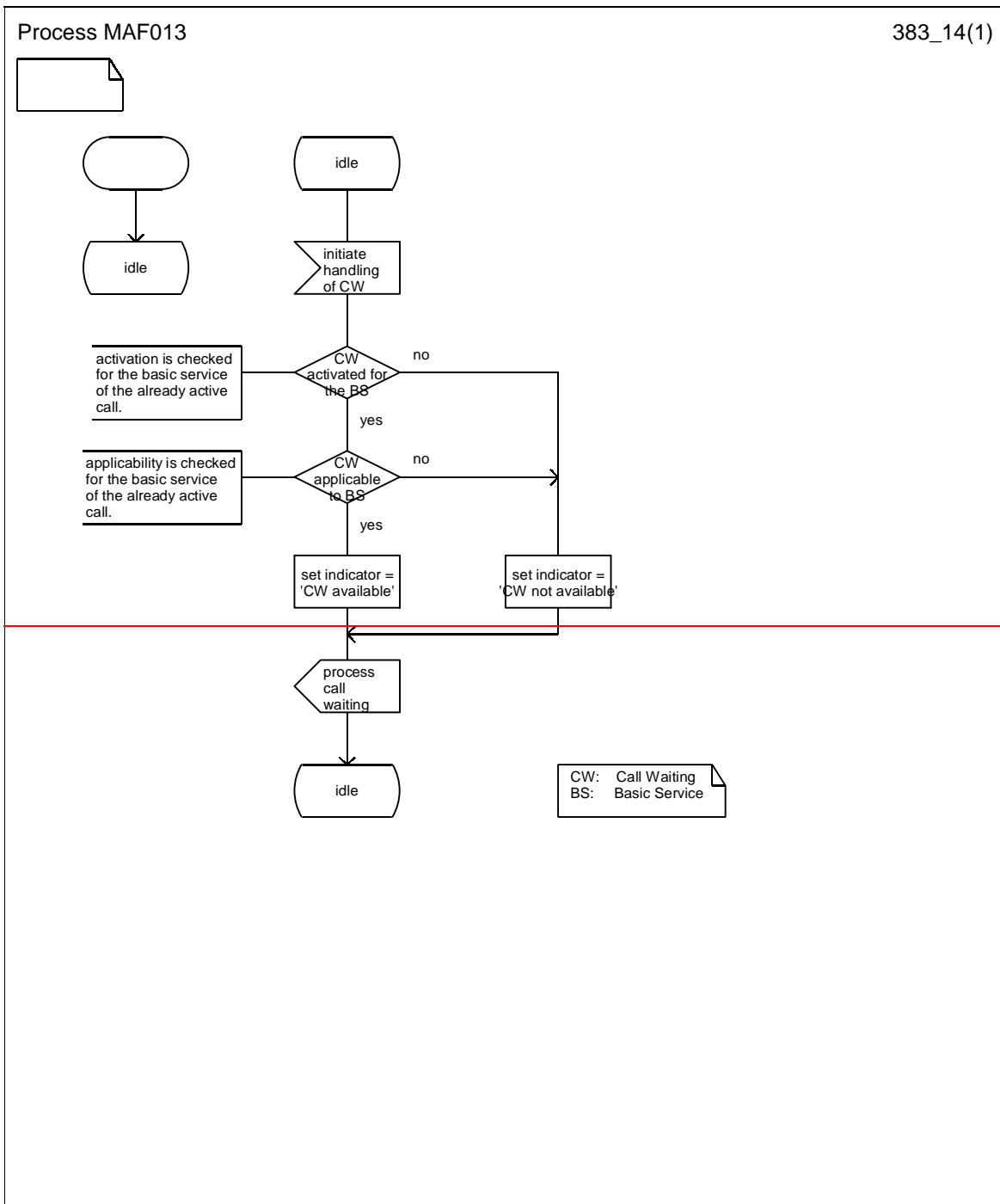
#### ~~Other Events~~

~~The following events are treated as described in subclause 1.2.1.1:~~

- ~~— release of active call;~~
- ~~— release of call by user C;~~
- ~~— call hold service;~~
- ~~— indication of UDUB;~~
- ~~— rejection of call from user C.~~

#### ~~Acceptance of waiting call~~

~~A precondition for the acceptance of the waiting call is that there is no other call in the (active, idle) state. The user can achieve this by releasing active calls, or using the call hold service. When user B accepts the call from user C it becomes the (active, idle) call. Timer T2 or T3 is stopped. The call waiting service is resumed for further incoming calls.~~



### Process MAF013

383\_14(1)

Process in the VLR to check subscription for CW.

Signals to/from the left are to/from the VLR.

activation is checked for the basic service of the already active call.

applicability is checked for the basic service of the already active call.

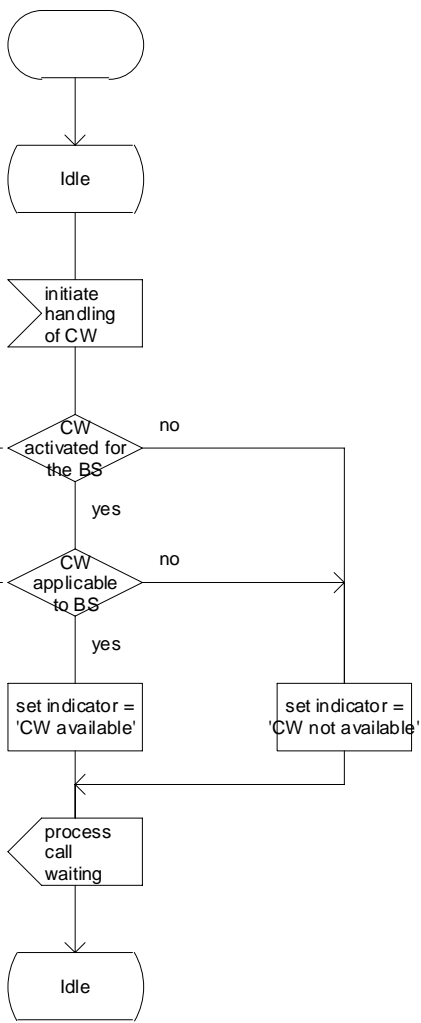
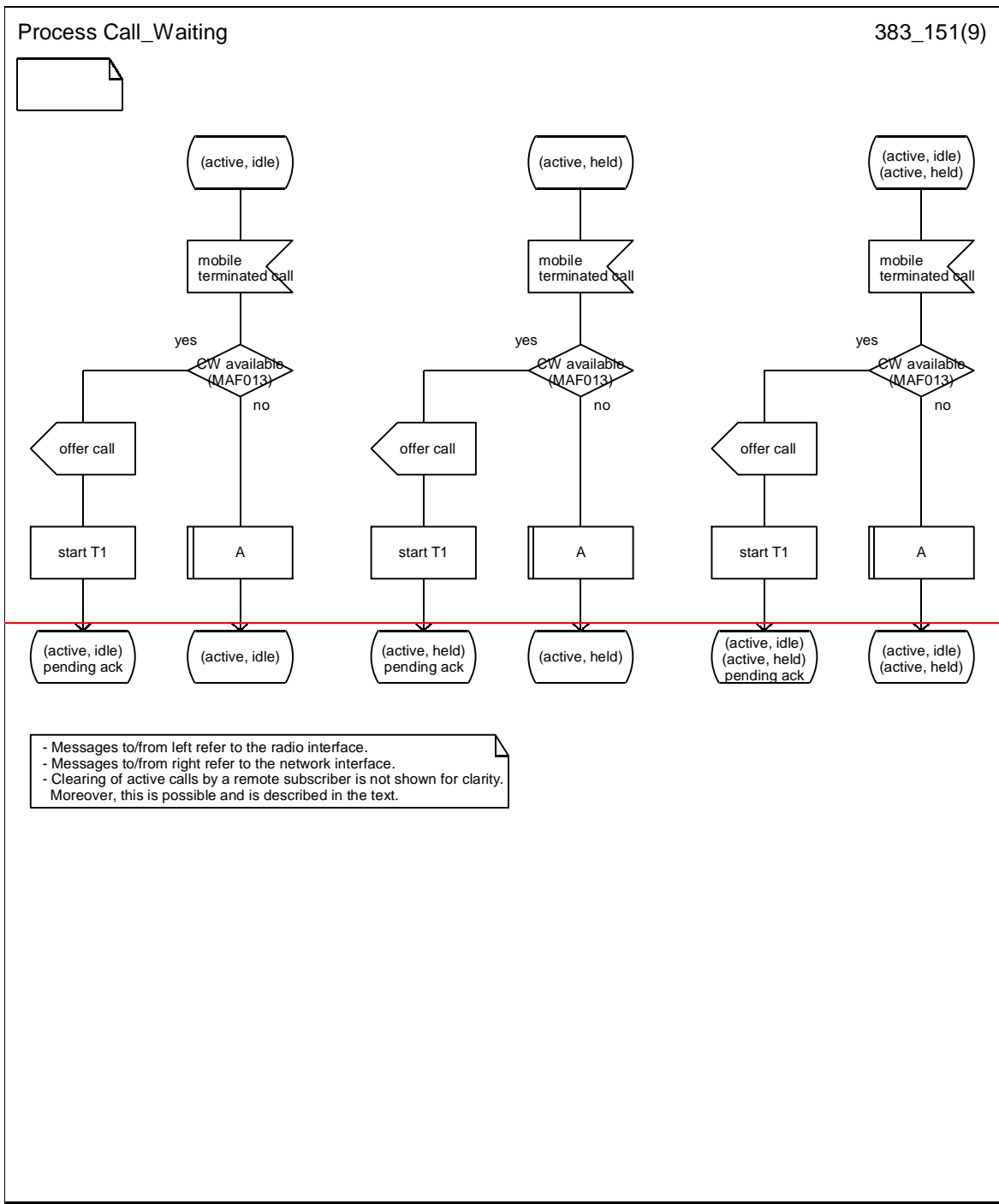


Figure 1.4: MAF013 Call waiting related authorisations examination (VLR)





### Procedure Process\_Call\_Waiting

PCW1(9)

Procedure in the MSC to handle a Process Call Waiting request from the VLR

Signals to/from the left are to/from the BSS; signals to/from the right are to/from the VLR unless marked otherwise

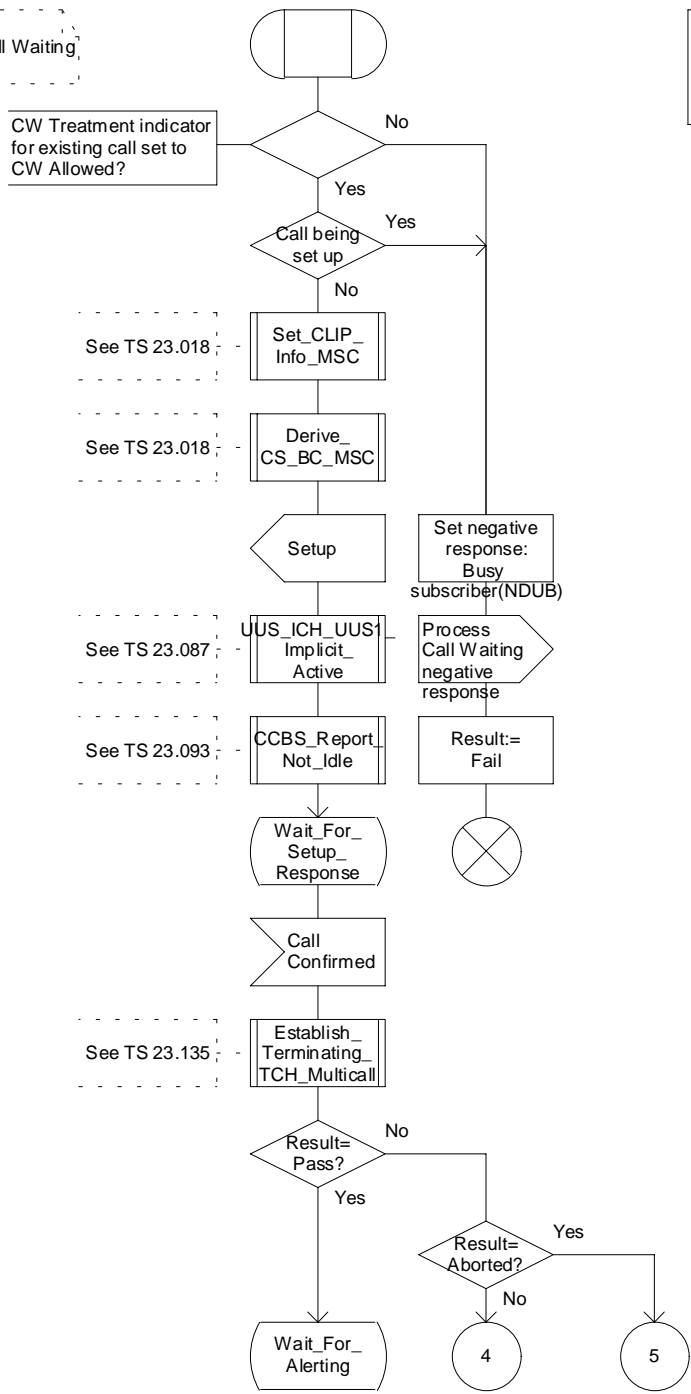
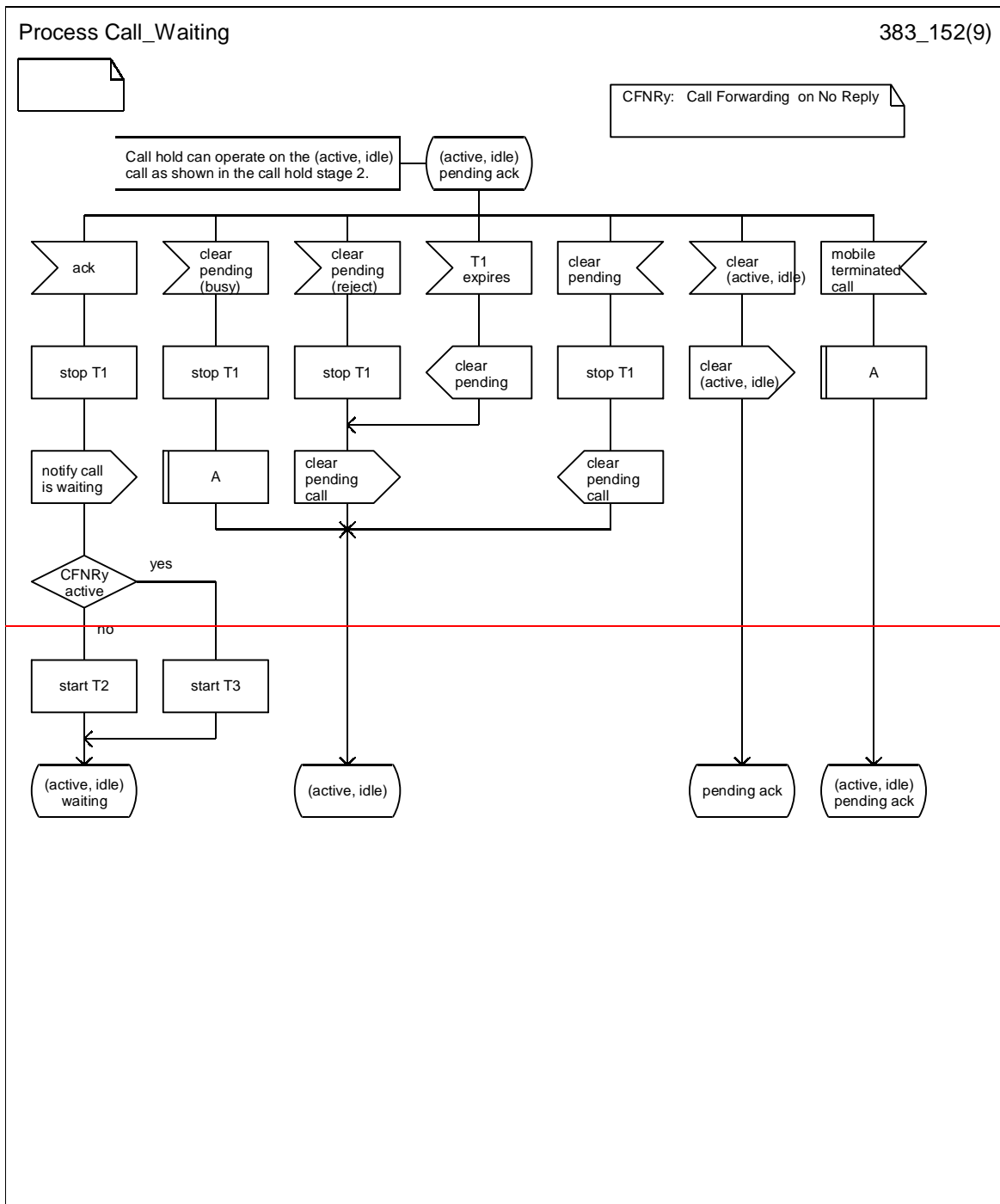


Figure 1.5 (sheet 1 of 940): Procedure Process Call Waiting Overall SDL diagram of call waiting



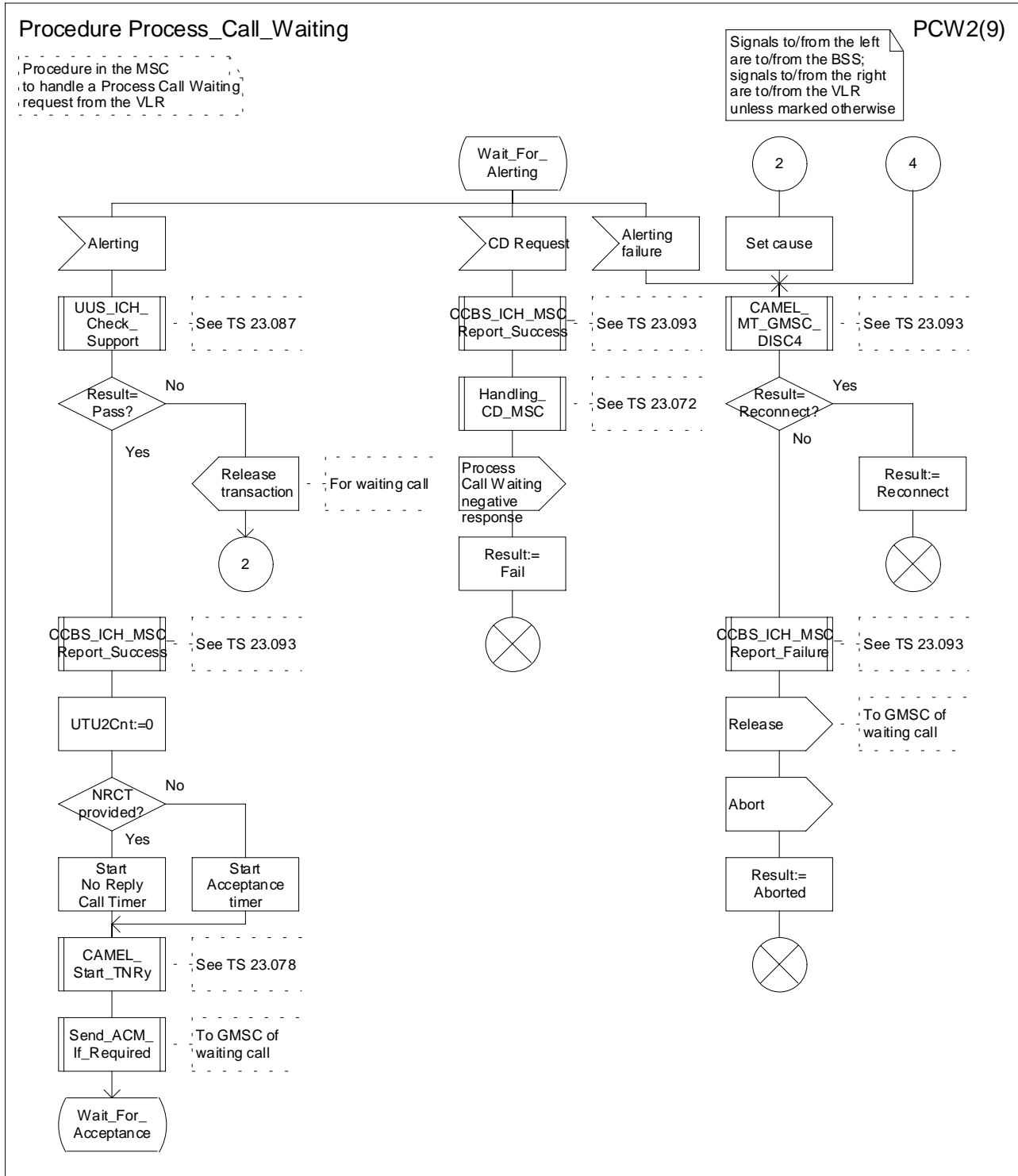
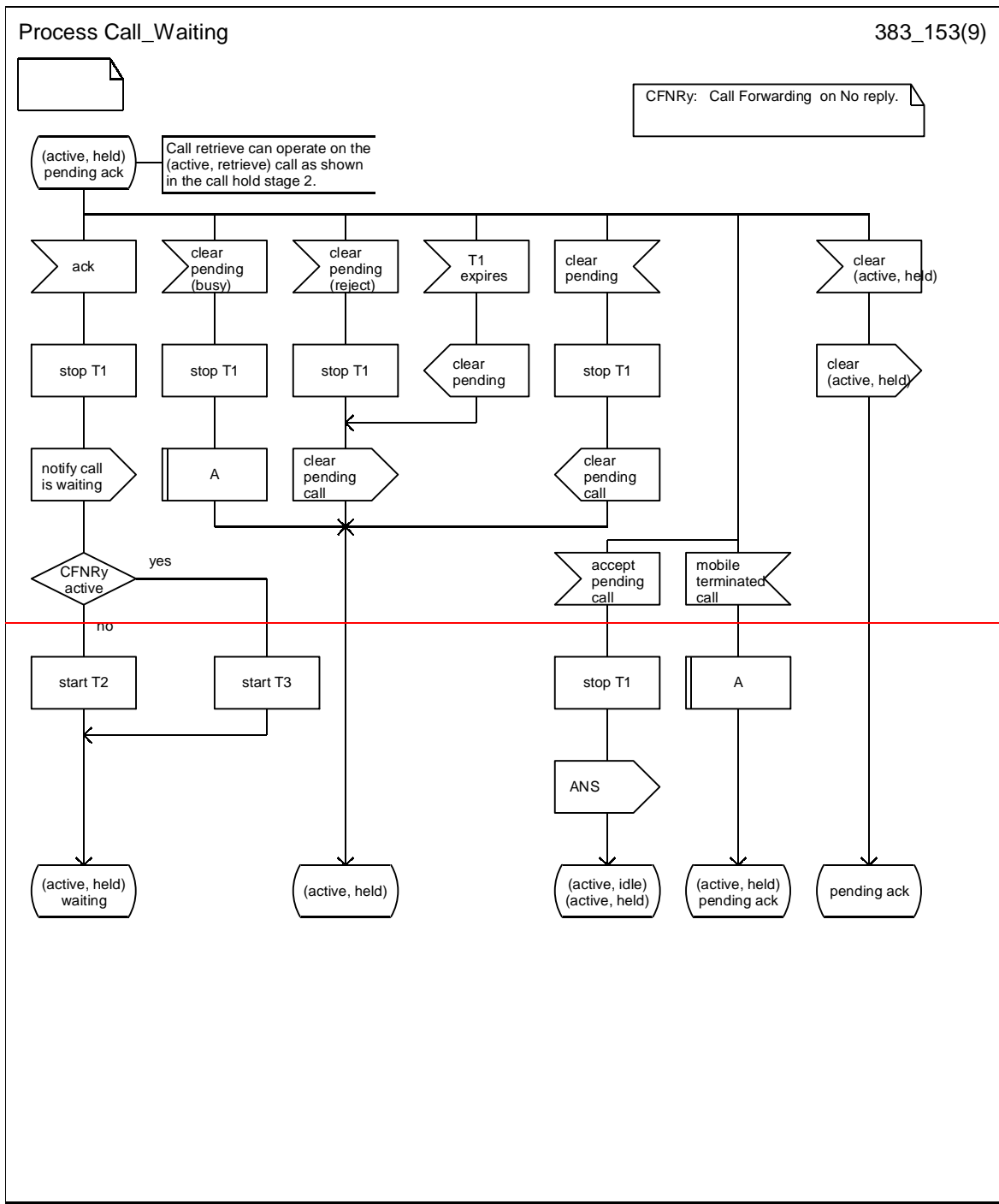


Figure 1.5 (sheet 2 of 940): Procedure Process Call Waiting Overall-SDL diagram of call-waiting



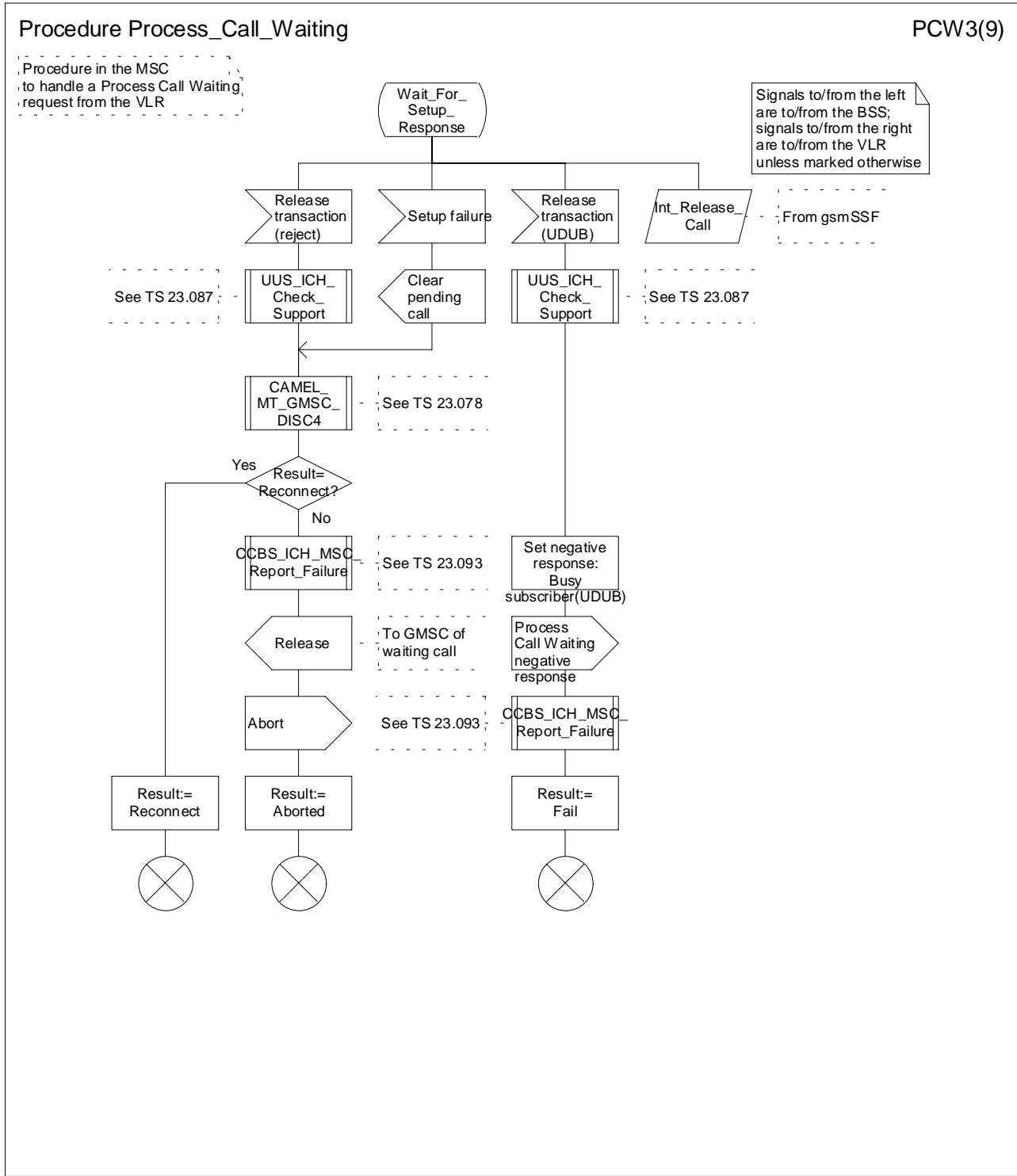
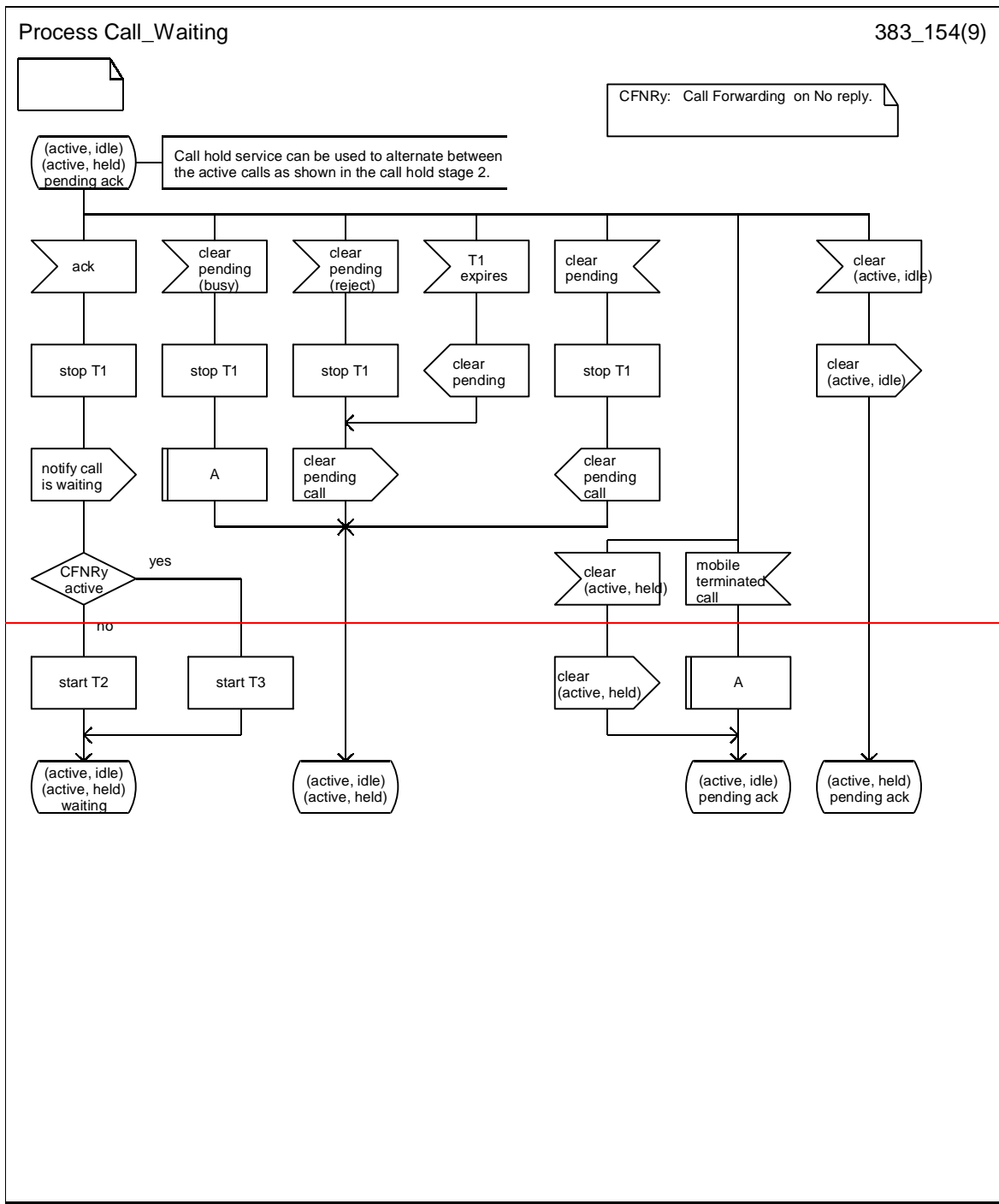


Figure 1.5 (sheet 3 of 940): Procedure Process Call Waiting Overall SDL diagram of call-waiting



### Procedure Process\_Call\_Waiting

PCW4(9)

Procedure in the MSC to handle a Process Call Waiting request from the VLR

Signals to/from the left are to/from the BSS; signals to/from the right are to/from the VLR unless marked otherwise

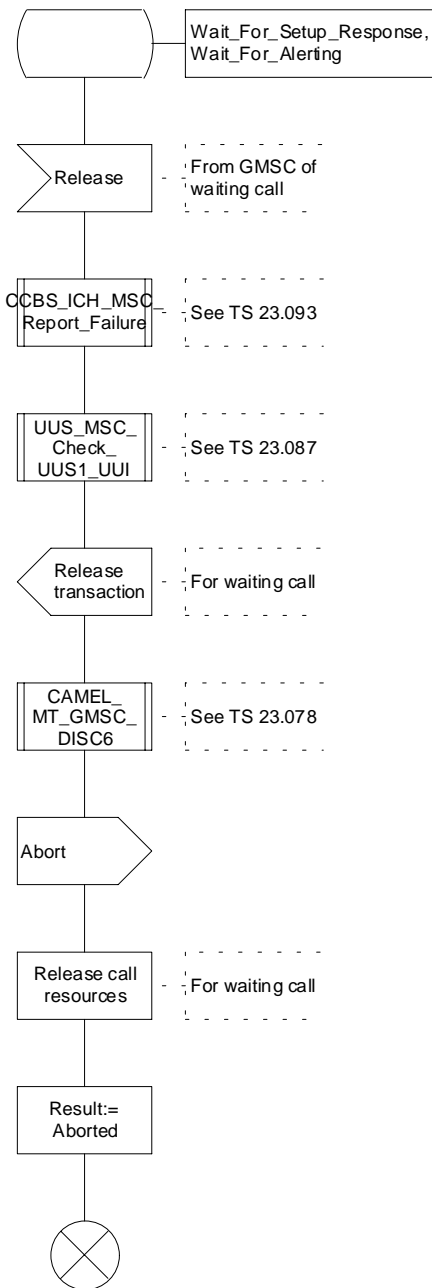
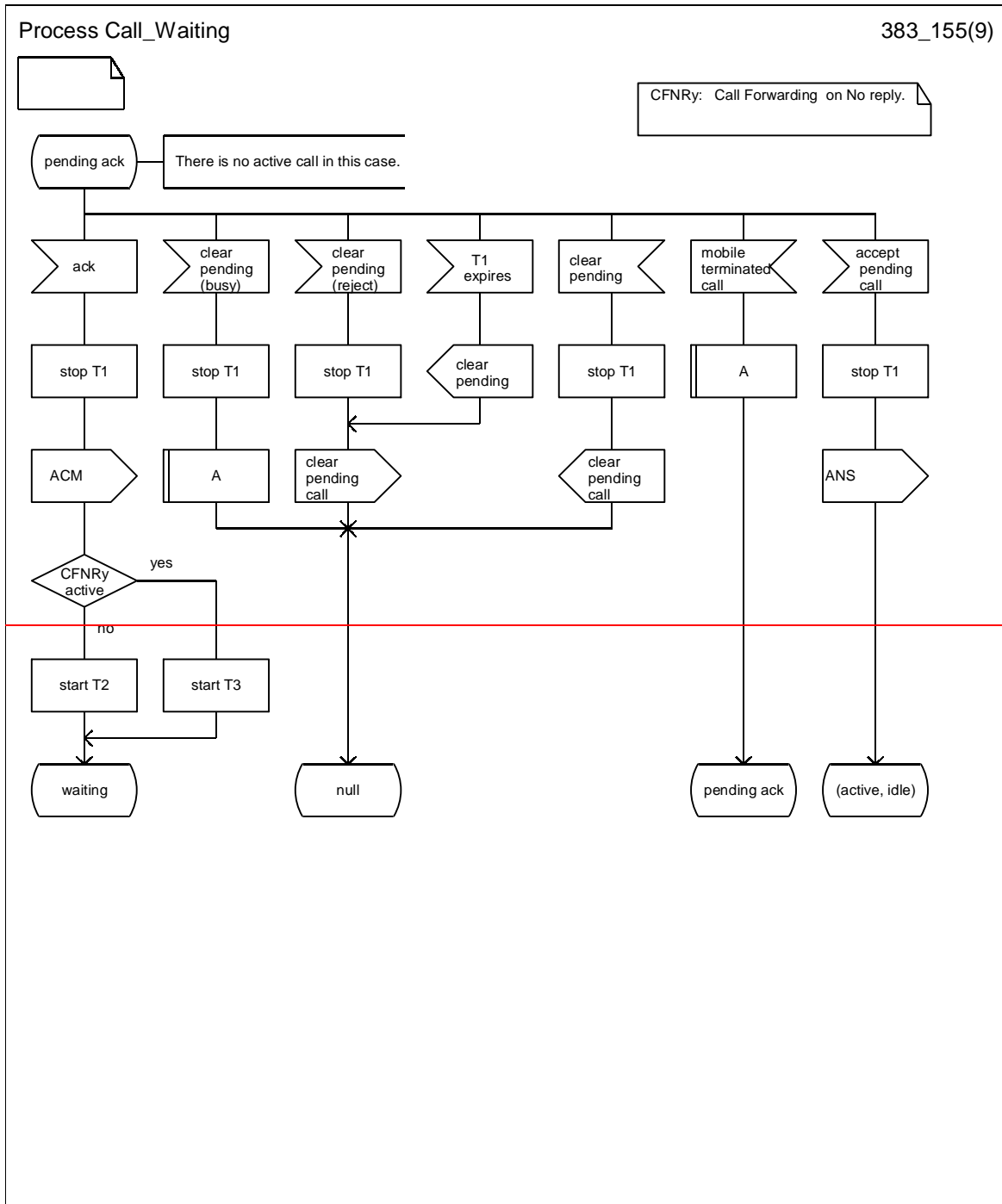


Figure 1.5 (sheet 4 of 940): Procedure Process Call Waiting Overall-SDL diagram of call-waiting





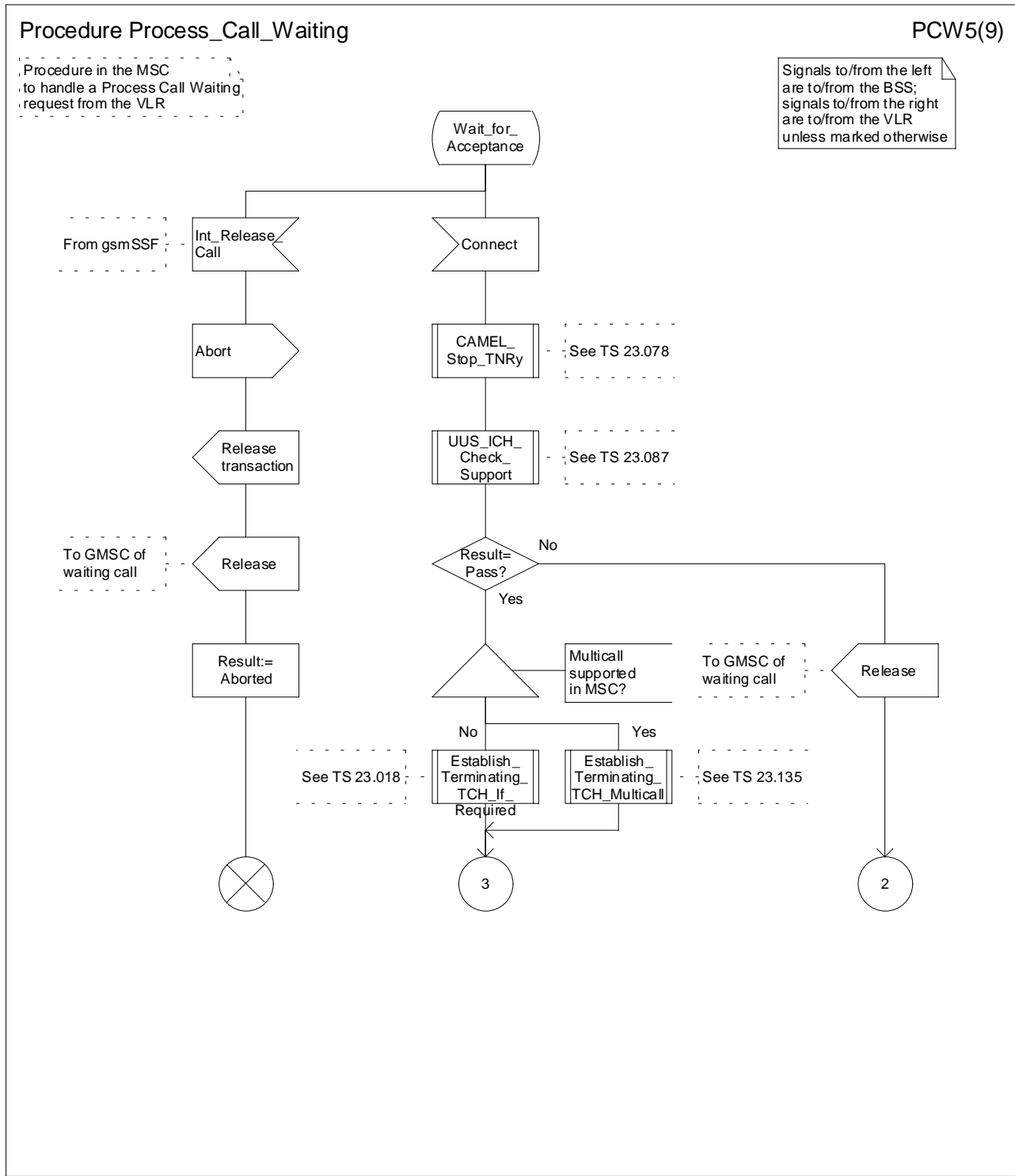
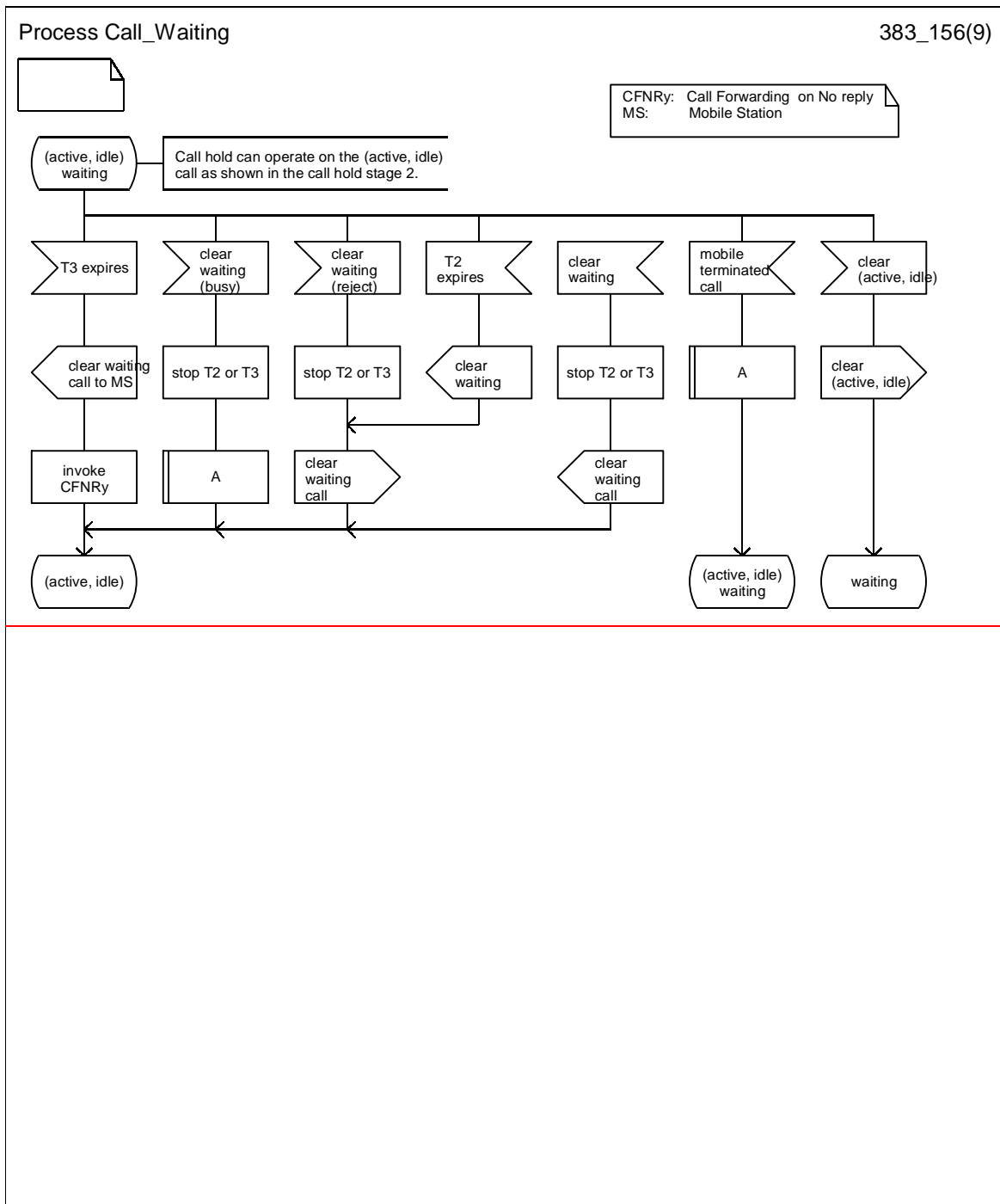


Figure 1.5 (sheet 5 of 940): Procedure Process\_Call\_WaitingOverall-SDL diagram of call-waiting



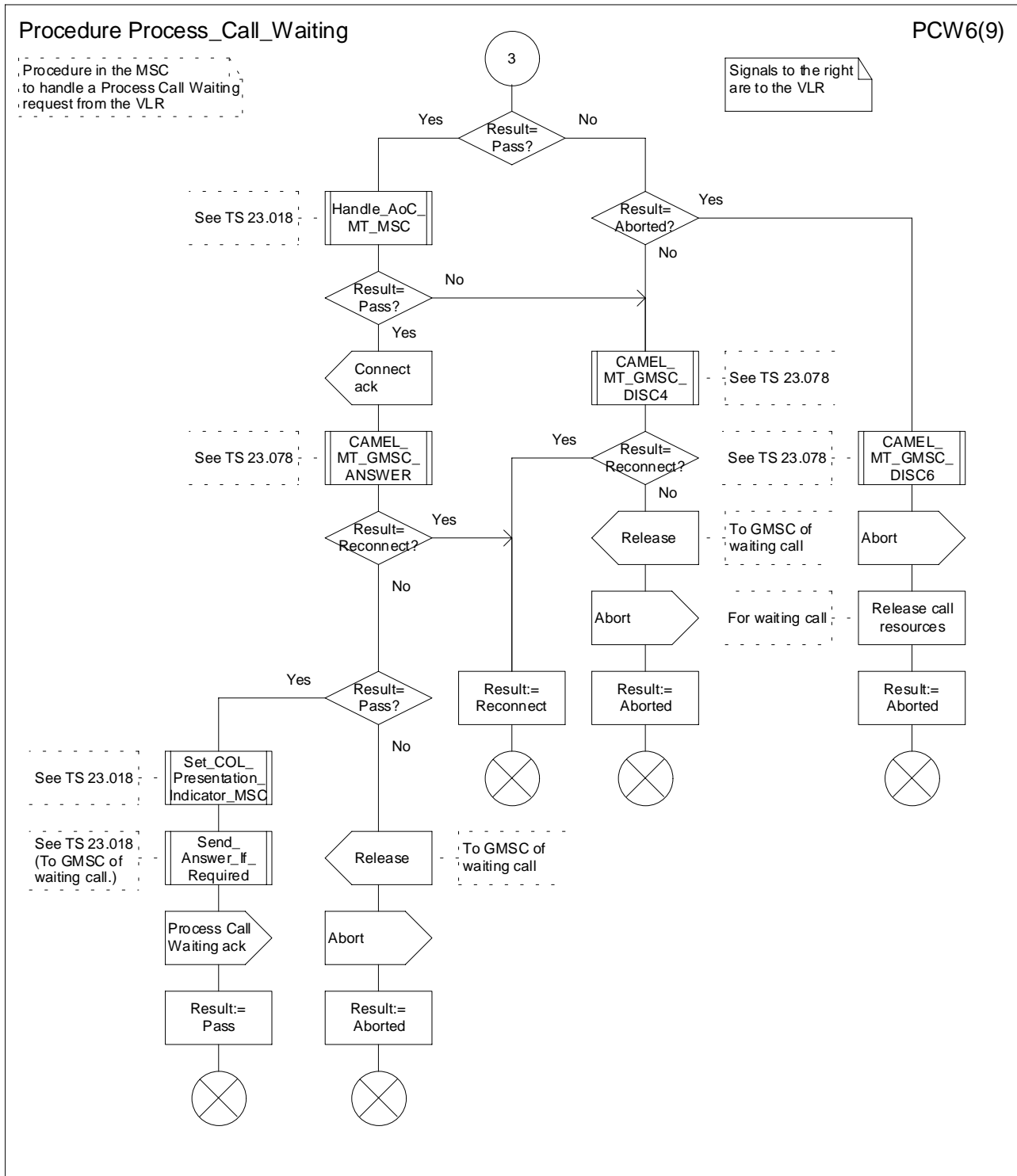
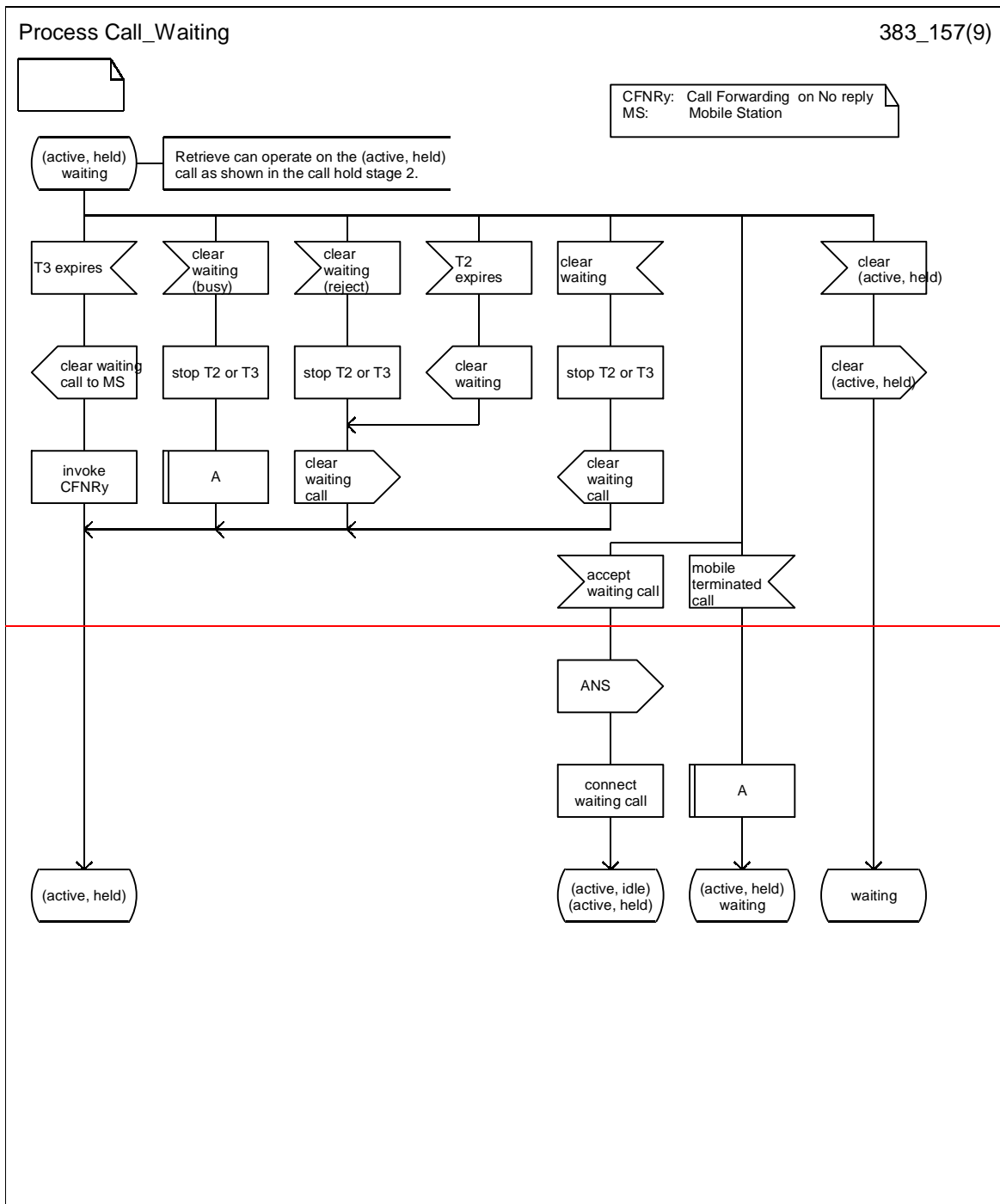


Figure 1.5 (sheet 6 of 940): Procedure Process\_Call\_Waiting Overall SDL diagram of call waiting



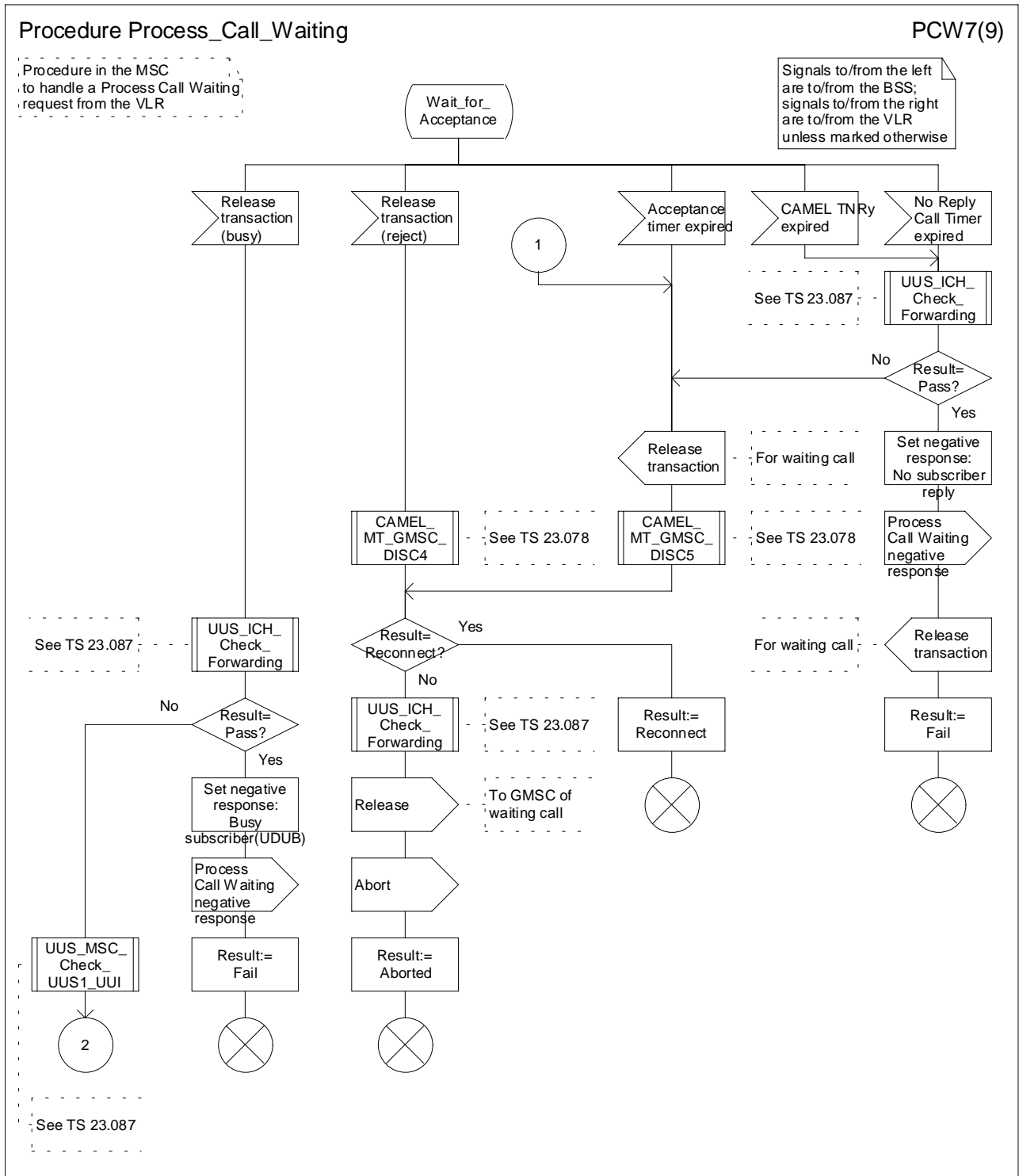
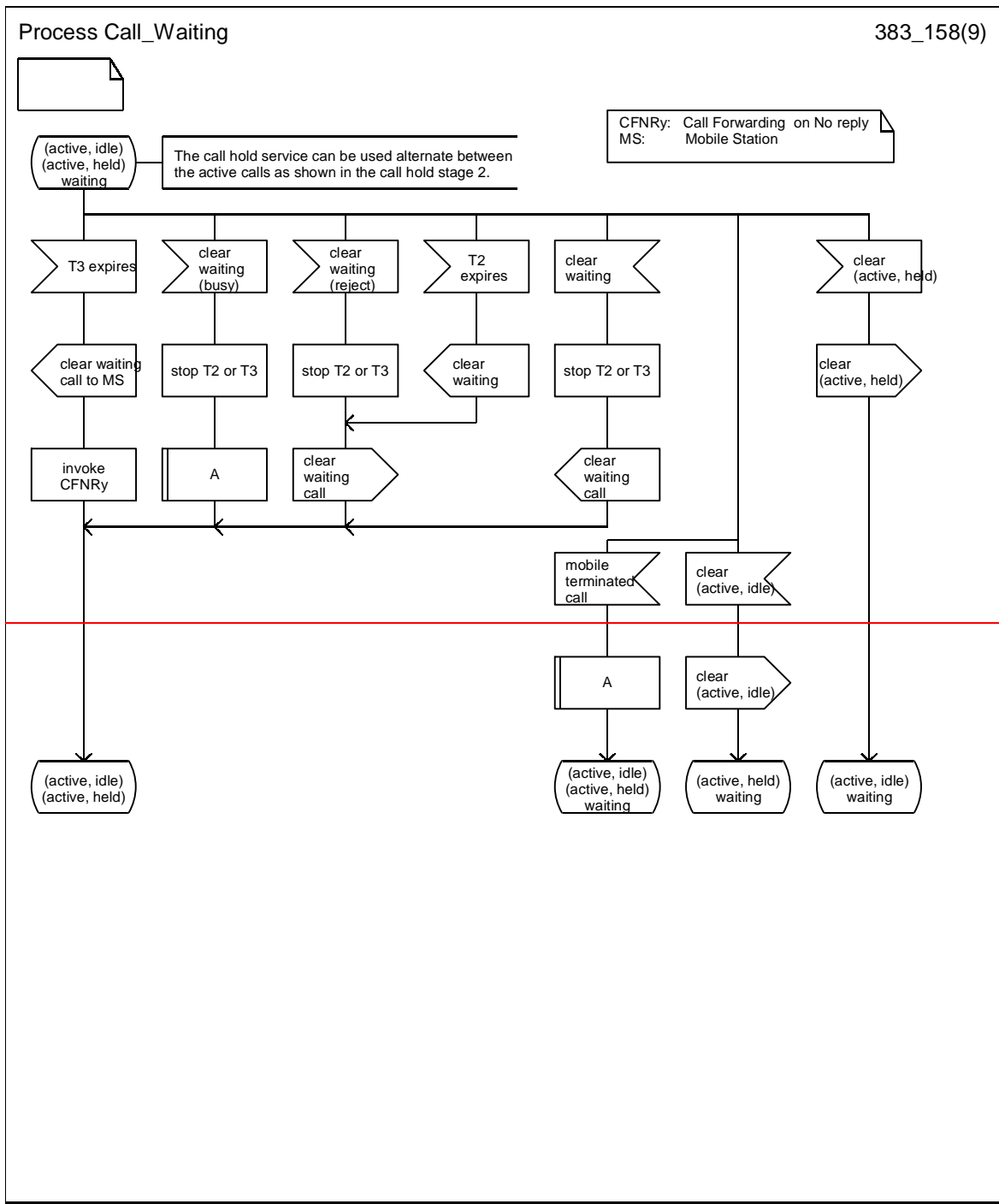


Figure 1.5 (sheet 7 of 940): Procedure Process Call Waiting Overall SDL diagram of call waiting



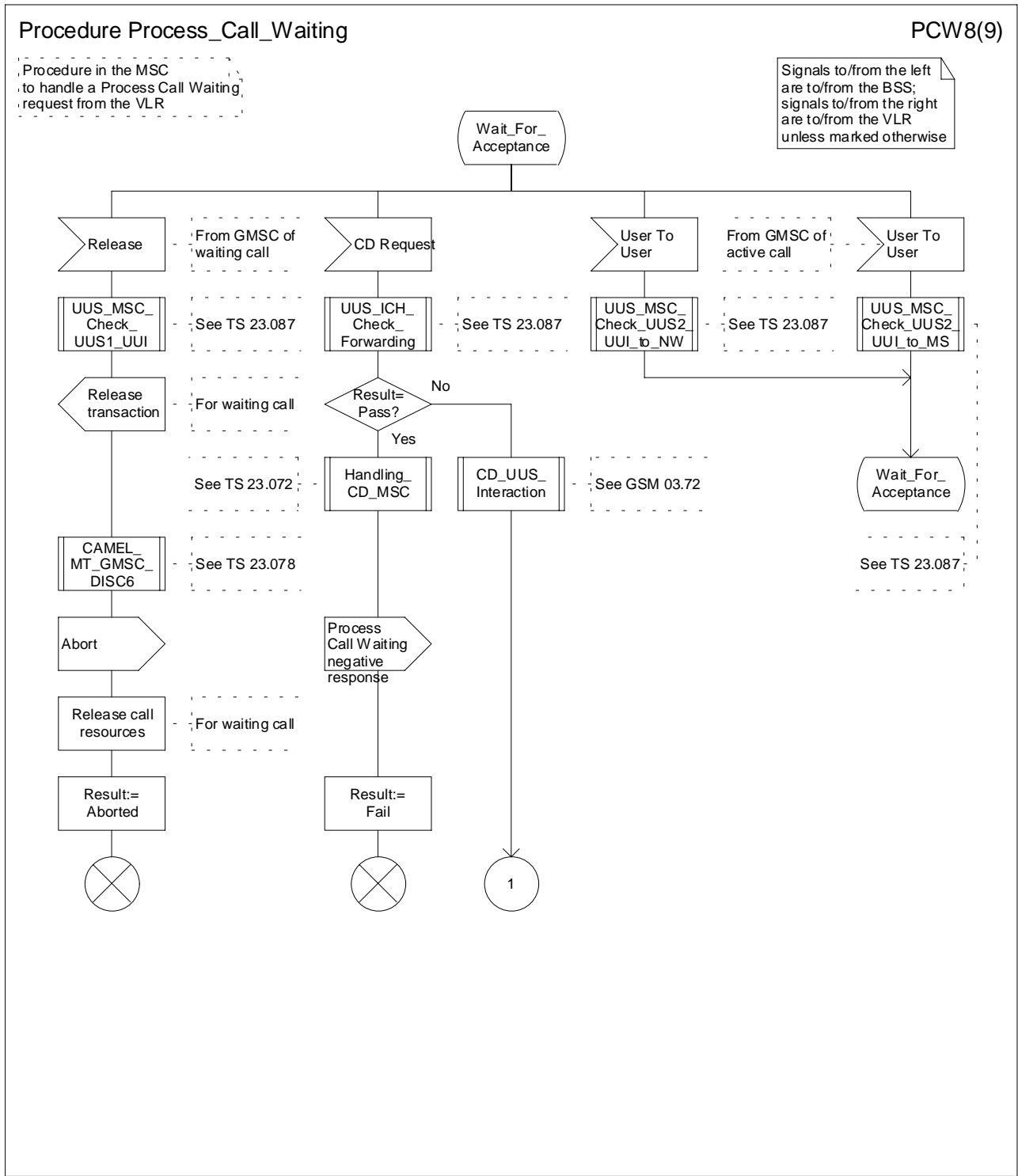
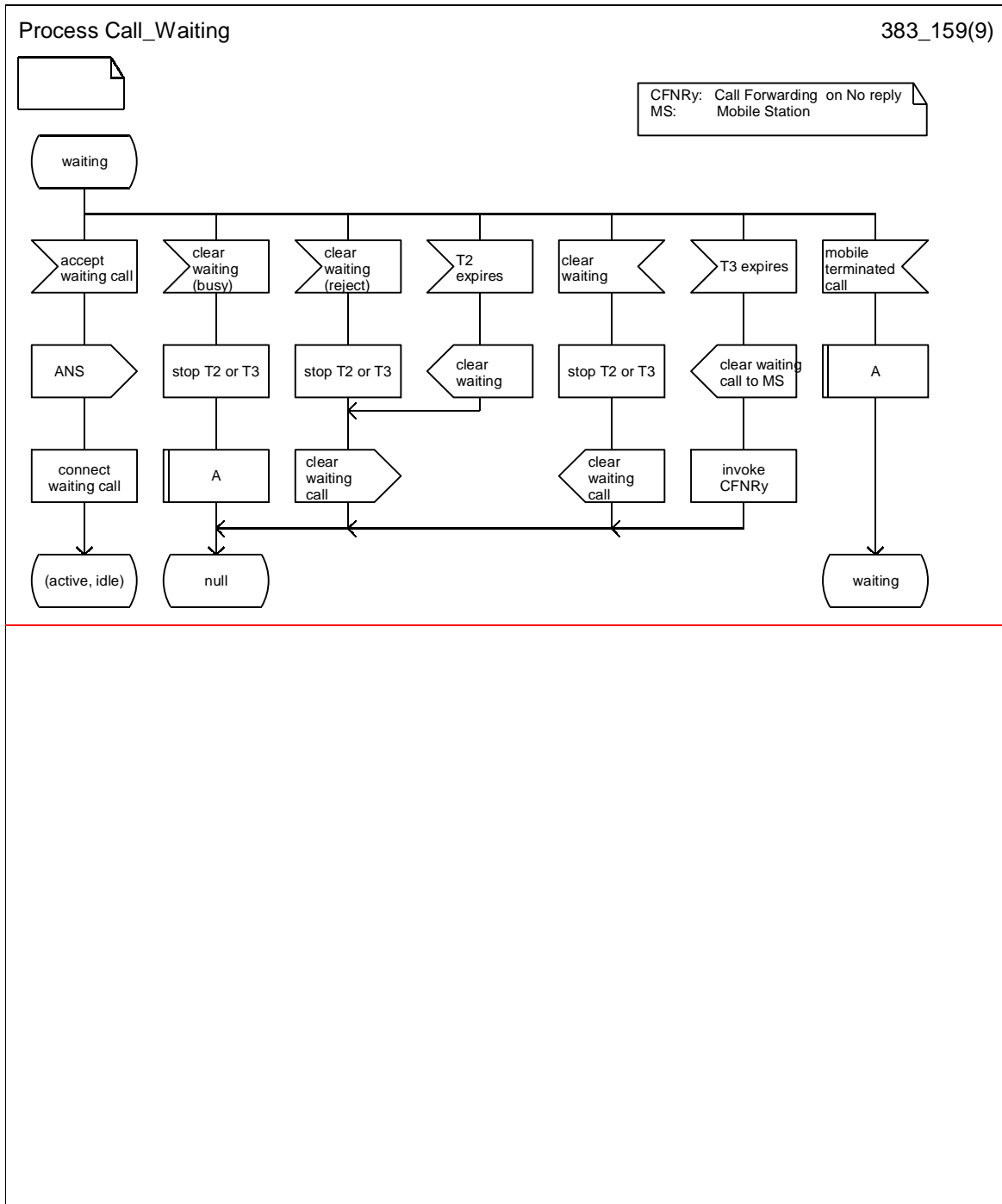


Figure 1.5 (sheet 8 of 940): Procedure Process Call Waiting Overall-SDL diagram of call waiting





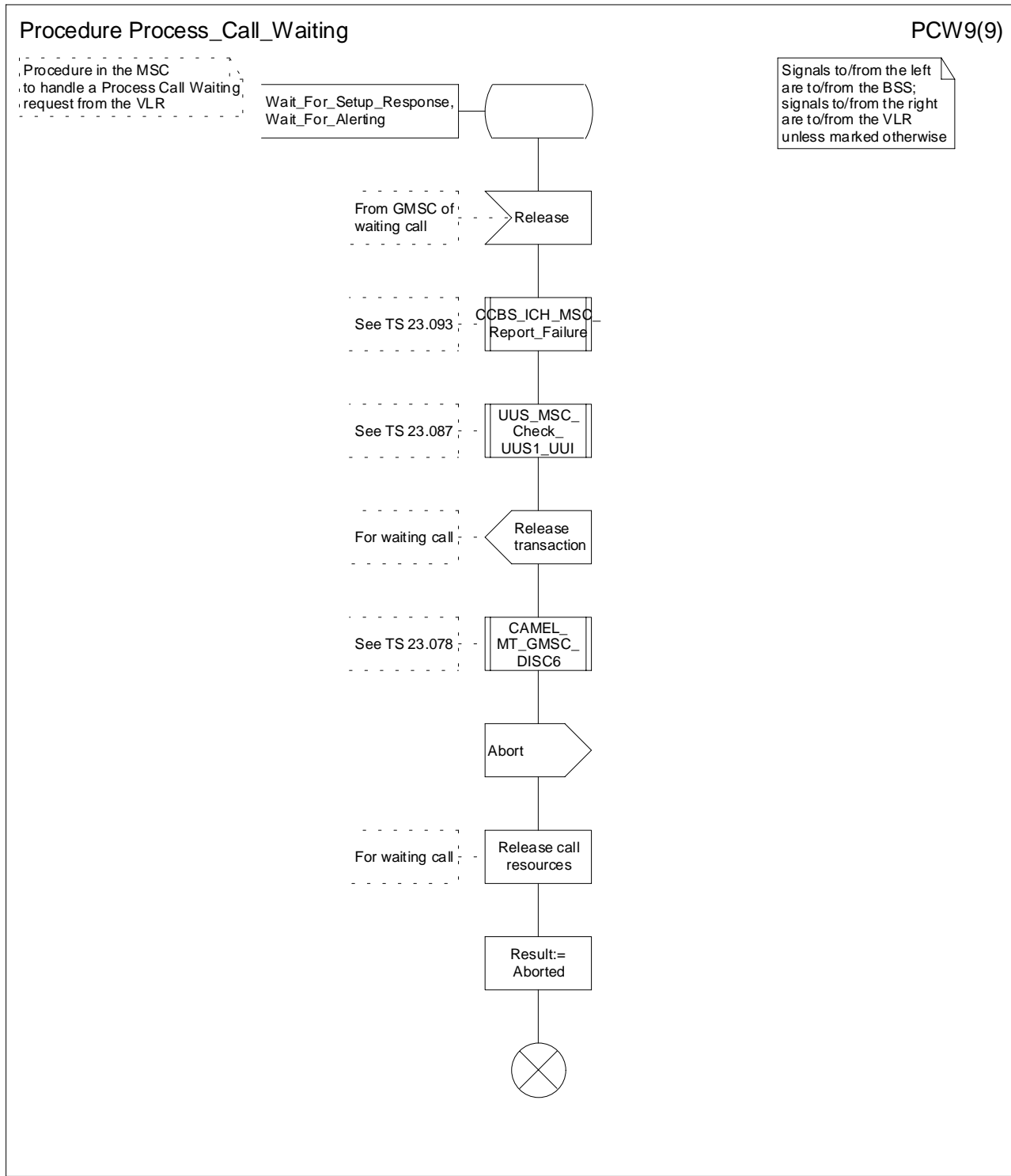
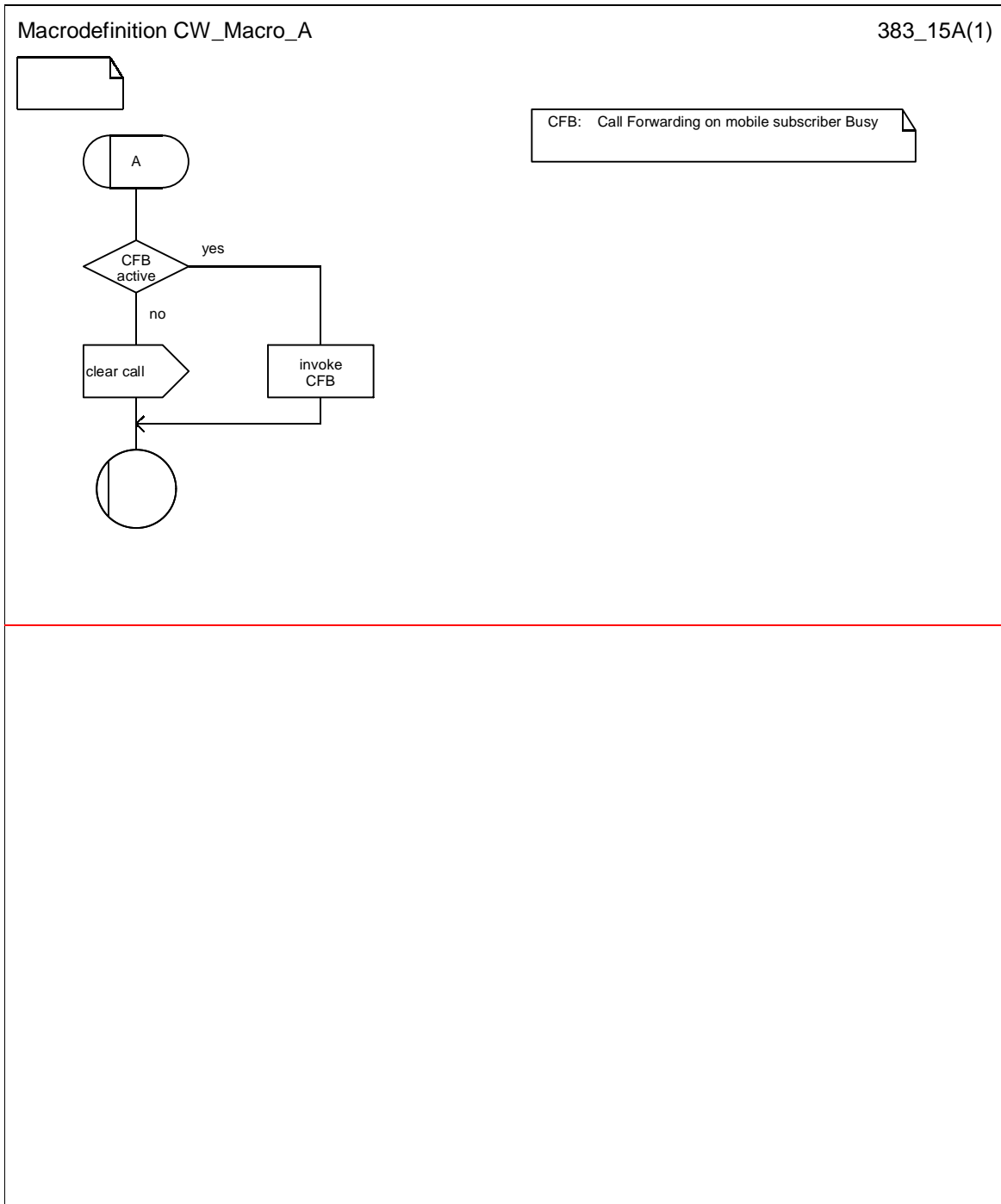


Figure 1.5 (sheet 9 of 940): Procedure Process Call Waiting Overall-SDL diagram of call-waiting



**Figure 1.5 (sheet 10 of 10): Overall SDL diagram of call waiting**

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