3GPP TSG CN Plenary
Meeting #10, Bangkok, Thailand
6th – 8th December 2000

Tdoc NP-000650

Source: **TSG_CN WG 4**

Title: **CR to Rel-4 Work Item TEI**

Agenda item: **8.19**

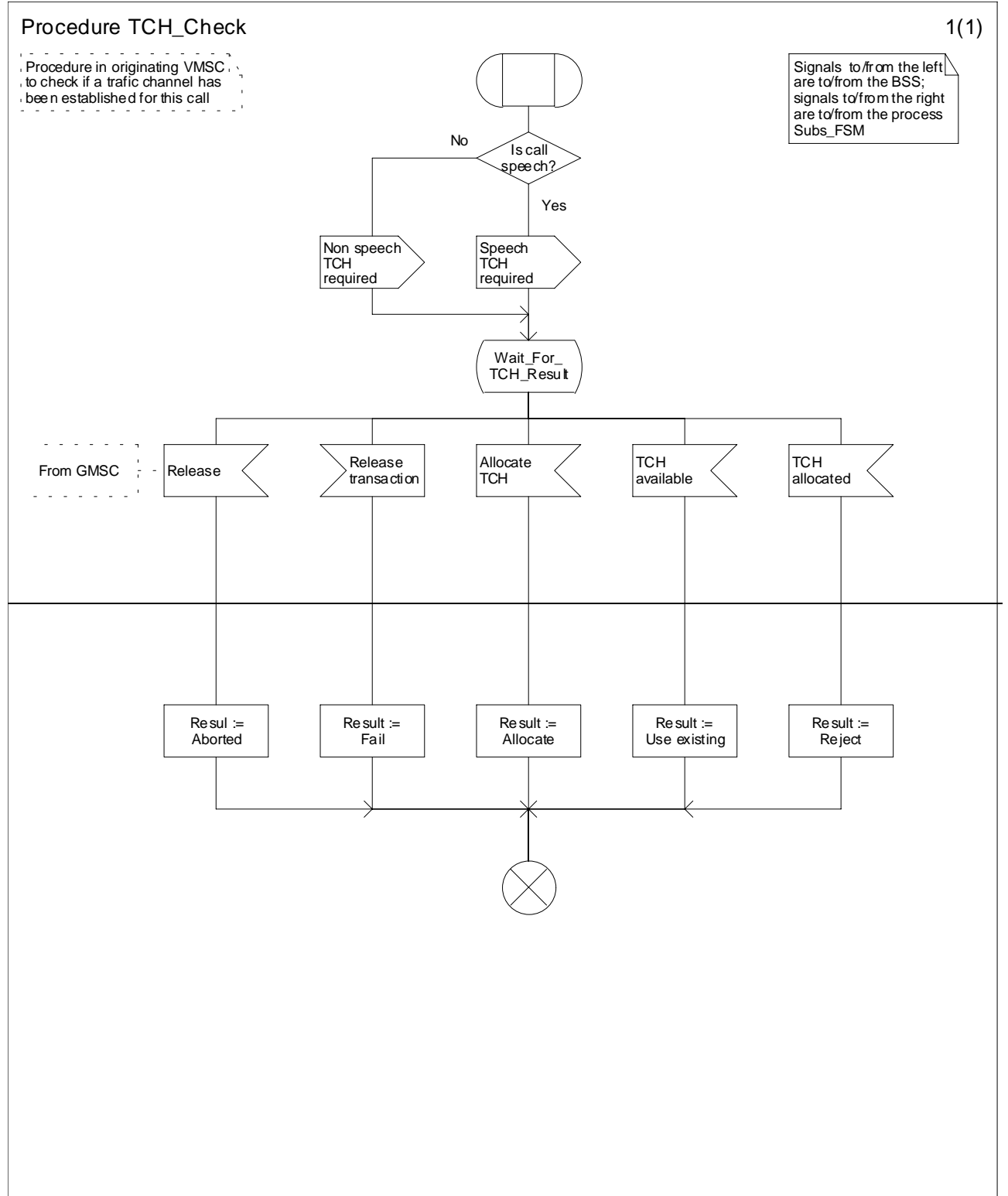**Document for:**   **APPROVAL**

Introduction:

This document contains 1 CR on Rel-4 Work Item TEI, that have been agreed by TSG_CN WG4, and is forwarded to TSG_CN Plenary meeting #10 for approval.

SMG#	TDoc	SPEC	CR	RE	PHAS	VERS	SUBJECT	CAT
CN10	N4-000944	23.018	064		Rel-4	4.0.0	Tidying up of Process Subs_FSM and inter-process signals.	C

CHANGE REQUEST

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

23.018 CR **064**	Current Version:	4.0.0

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

For submission to: **TSG-N#9**   for approval **X**   strategic ☐   *(for SMG*
list expected approval meeting # here ↑   for information ☐   non-strategic ☐   *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 **X**
(at least one should be marked with an X)

Source:	CN4		**Date:**	31/10/00

Subject:	Tidying up of Process Subs_FSM and inter-process signals.

Work item:	TEI

Category: F Correction
          A Corresponds to a correction in an earlier release
(only one category   B Addition of feature
shall be marked   C Functional modification of feature   **X**
with an X)   D Editorial modification

Release: Phase 2 ☐
          Release 96 ☐
          Release 97 ☐
          Release 98 ☐
          Release 99 ☐
          Release 00   **X**

Reason for change:	To tidy up and enhance the Subs_FSM process.

Clauses affected:	7.1.1, 7.3.1, 7.4.1

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.

**** First Modified Section ****

7.1 MO call

7.1.1 Functional requirements of serving MSC

Procedure TCH_Check   1(1)

Procedure in originating VMSC
to check if a trafic channel has
been established for this call

Signals to/from the left
are to/from the BSS;
signals to/from the right
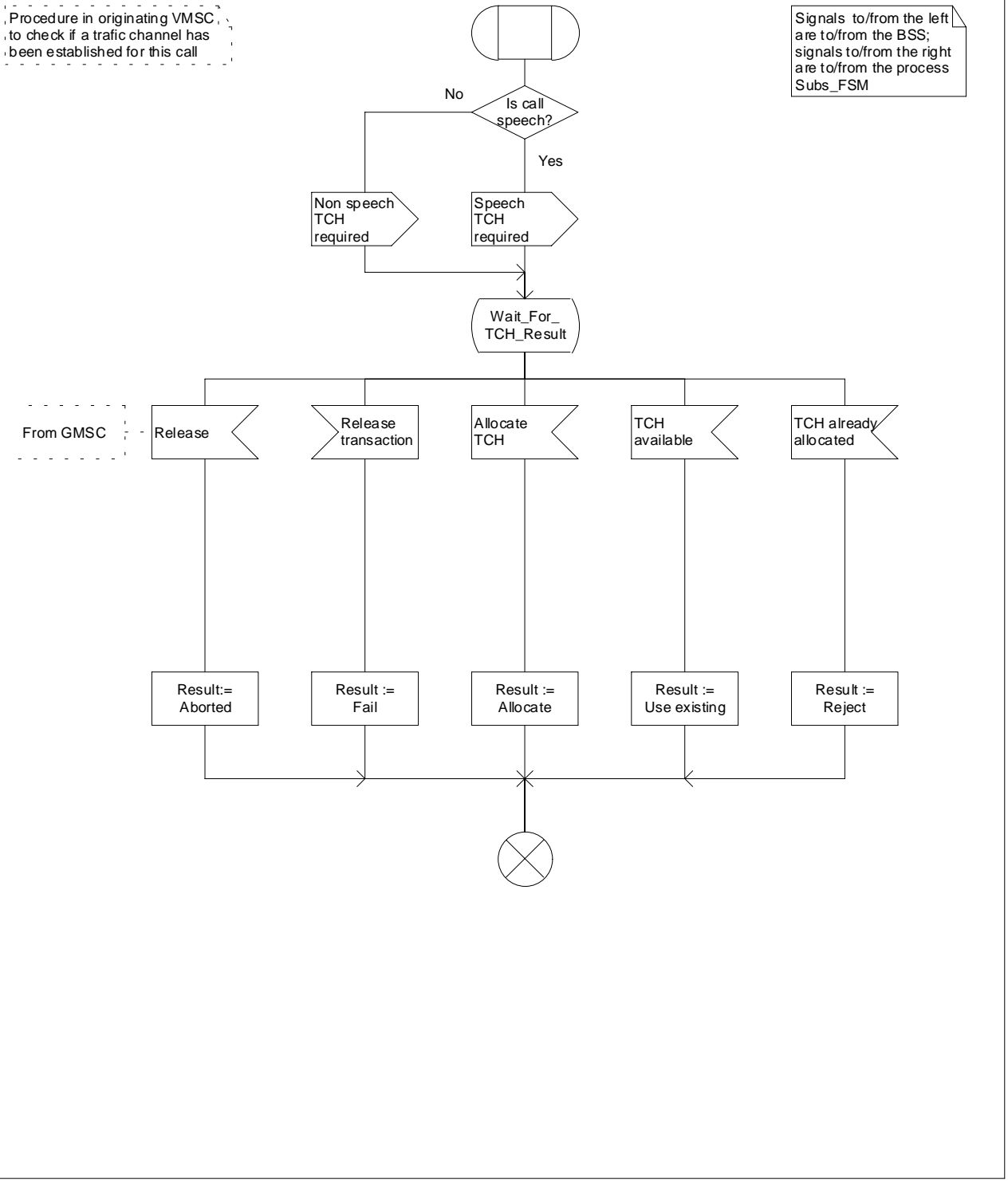are to/from the process
Subs_FSM

No ← Is call speech?

Yes

Non speech TCH required

Speech TCH required

Wait_For_TCH_Result

From GMSC

Release

Release transaction

Allocate TCH

TCH available

TCH already allocated

Result:= Aborted

Result := Fail

Result := Allocate

Result := Use existing

Result := Reject

Figure 19: Procedure ~~OCH_VLR~~TCH_Check

**** Next Modified Section ****

7.3   MT call
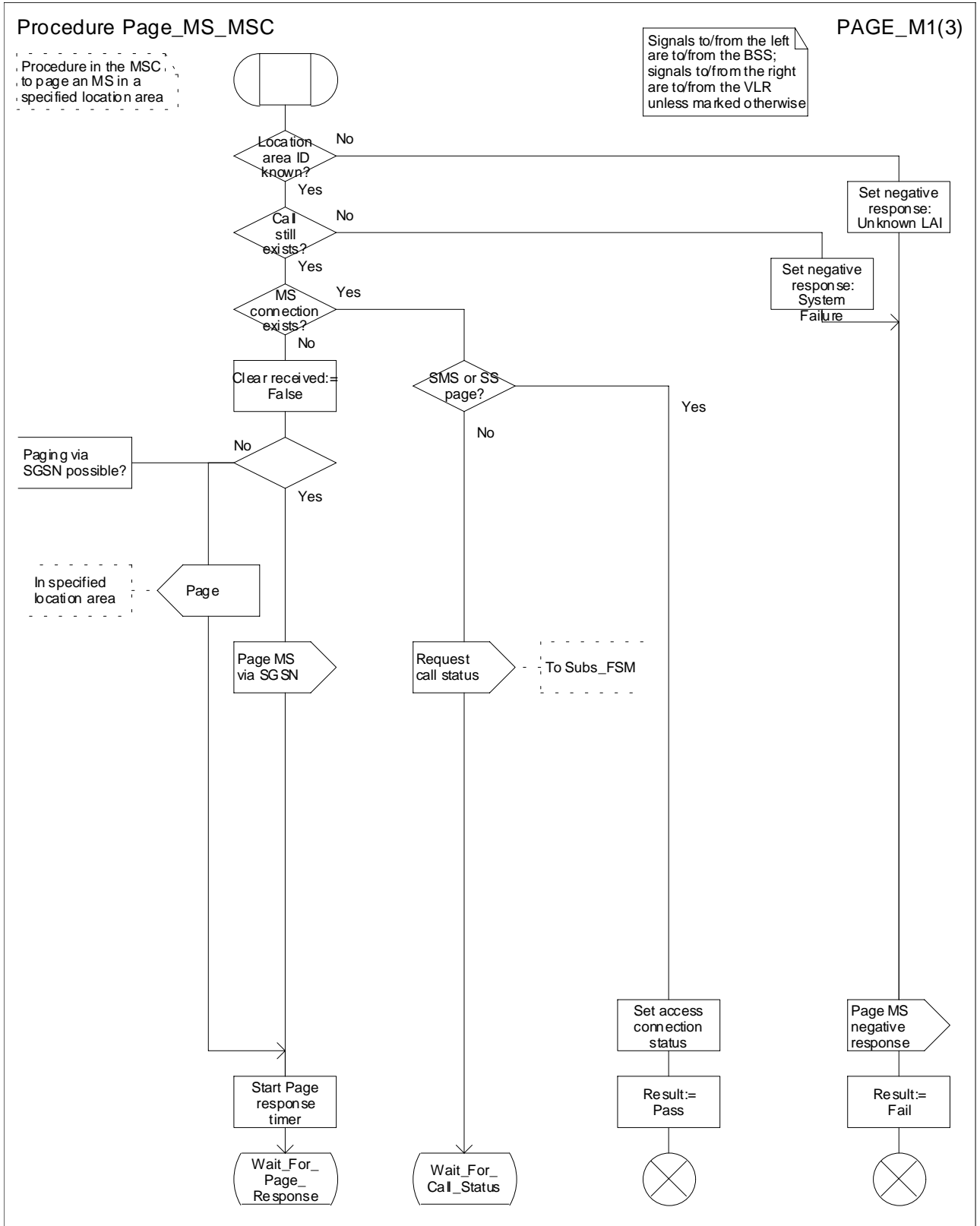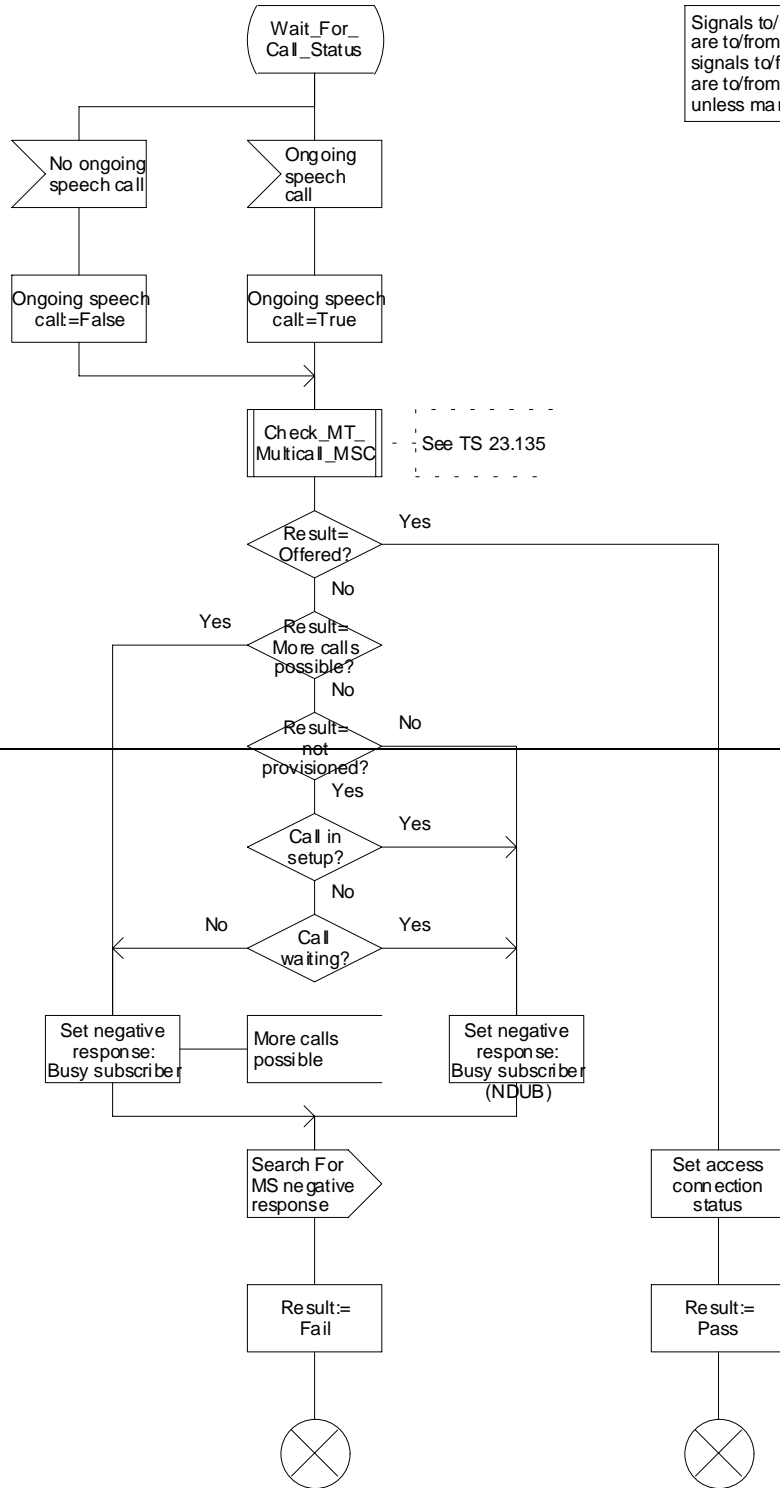
7.3.1   Functional requirements of serving MSC

….

Procedure Page_MS_MSC

PAGE_M1(3)

Procedure in the MSC
to page an MS in a
specified location area

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

Location
area ID
known? — No

Yes

Call
still
exists? — No

Yes

MS
connection
exists? — Yes

No

Clear received:=
False

SMS or SS
page? — Yes

No

Set negative
response:
Unknown LAI

Set negative
response:
System
Failure

Paging via
SGSN possible? — No

Yes

In specified
location area — Page

Page MS
via SGSN

Request
call status — To Subs_FSM

Set access
connection
status

Page MS
negative
response

Start Page
response
timer

Result:=
Pass

Result:=
Fail

Wait_For_
Page_
Response

Wait_For_
Call_Status

Figure 68a: Procedure Page_MS_MSC (sheet 1)

Procedure Page_MS_MSC   PAGE_M2(3)

Procedure in the MSC
to page an MS in a
specified location area

Wait_For_
Call_Status

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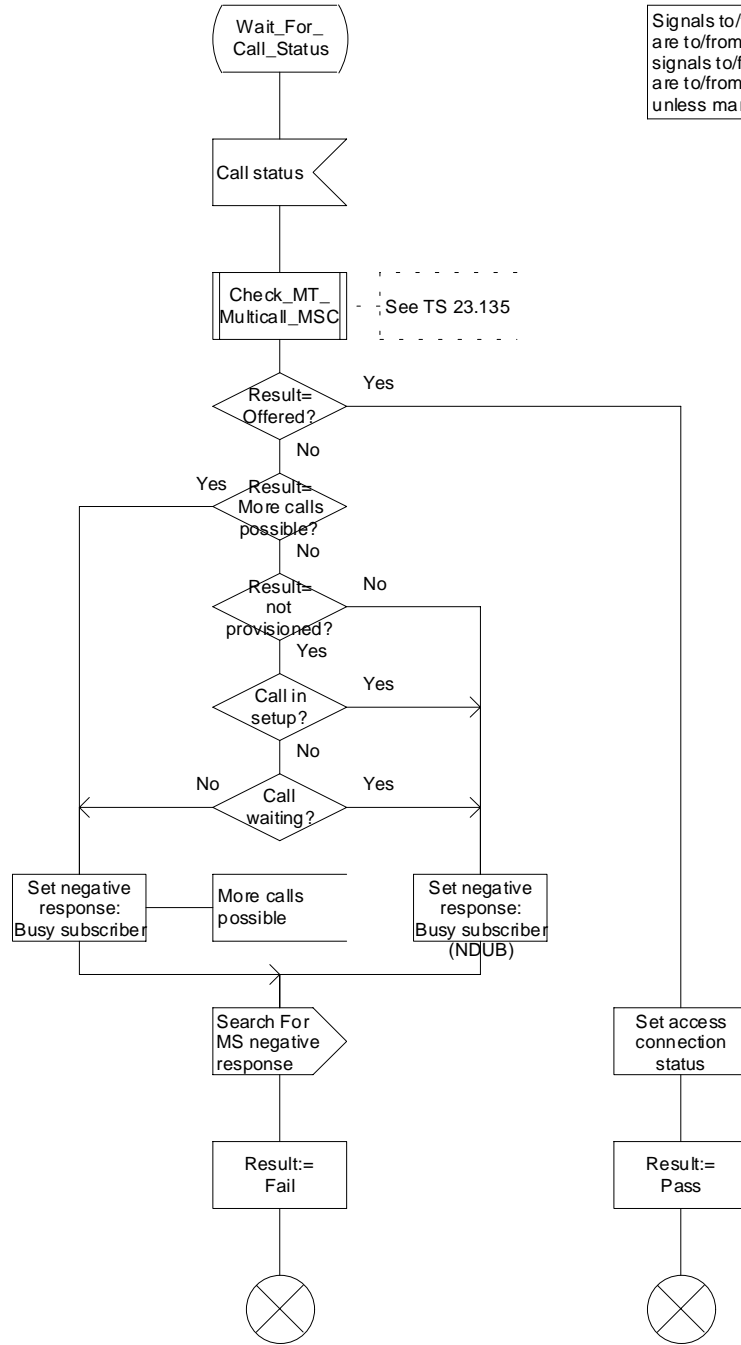signals to/from the right
are to/from the VLR
unless marked otherwise

No ongoing
speech call

Ongoing
speech
call

Ongoing speech
call:=False

Ongoing speech
call:=True

Check_MT_
Multicall_MSC   See TS 23.135

Result=
Offered?   Yes

No

Yes   Result=
More calls
possible?

No

Result=   No
not
provisioned?

Yes

Call in   Yes
setup?

No

No   Call   Yes
waiting?

Set negative
response:
Busy subscriber

More calls
possible

Set negative
response:
Busy subscriber
(NDUB)

Set access
connection
status

Search For
MS negative
response

Result:=
Fail

Result:=
Pass

⊗

⊗

Procedure Page_MS_MSC   PAGE_M2(3)

Figure 68b: Procedure Page_MS_MSC (sheet 2)

Procedure Page_MS_MSC   PAGE_M3(3)
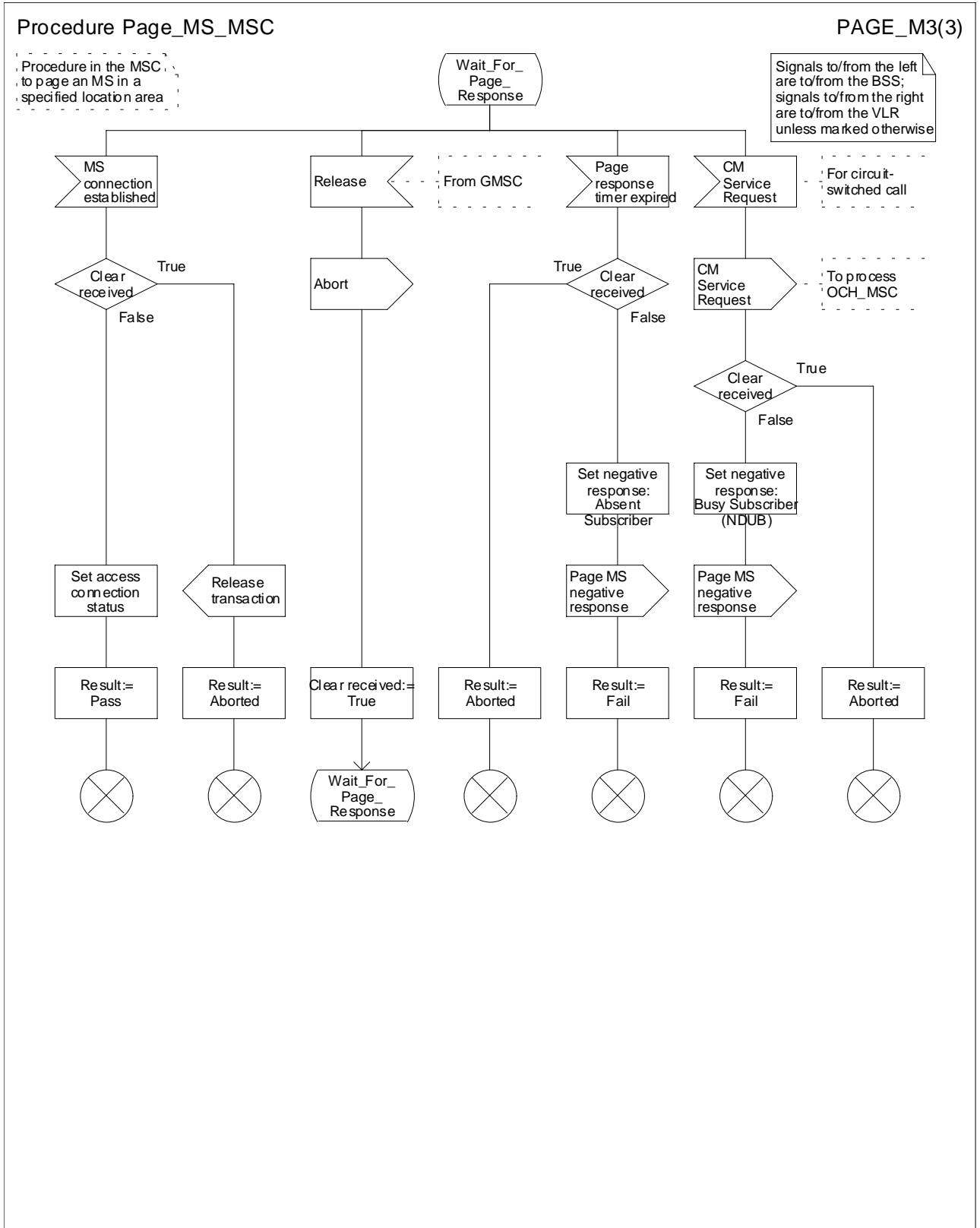
Figure 68c: Procedure Page_MS_MSC (sheet 3)

Procedure Search_For_MS_MSC   SRCH_M1(3)

Procedure in the MSC
to search for an MS
(page in all location areas)

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

Call still exists? — No

Yes

MS connection exists? — Yes

No

Clear received:= False

SMS or SS page? — Yes

No

Paging via SGSN possible? — No

Yes

Search for MS via SGSN

Request call status — To Subs_FSM

Set negative response: System Failure

In all location areas — Page

Set access connection status

Search For MS negative response

Start Page response timer

Result:= Pass

Result:= Fail

Wait_For_ Search_ Response

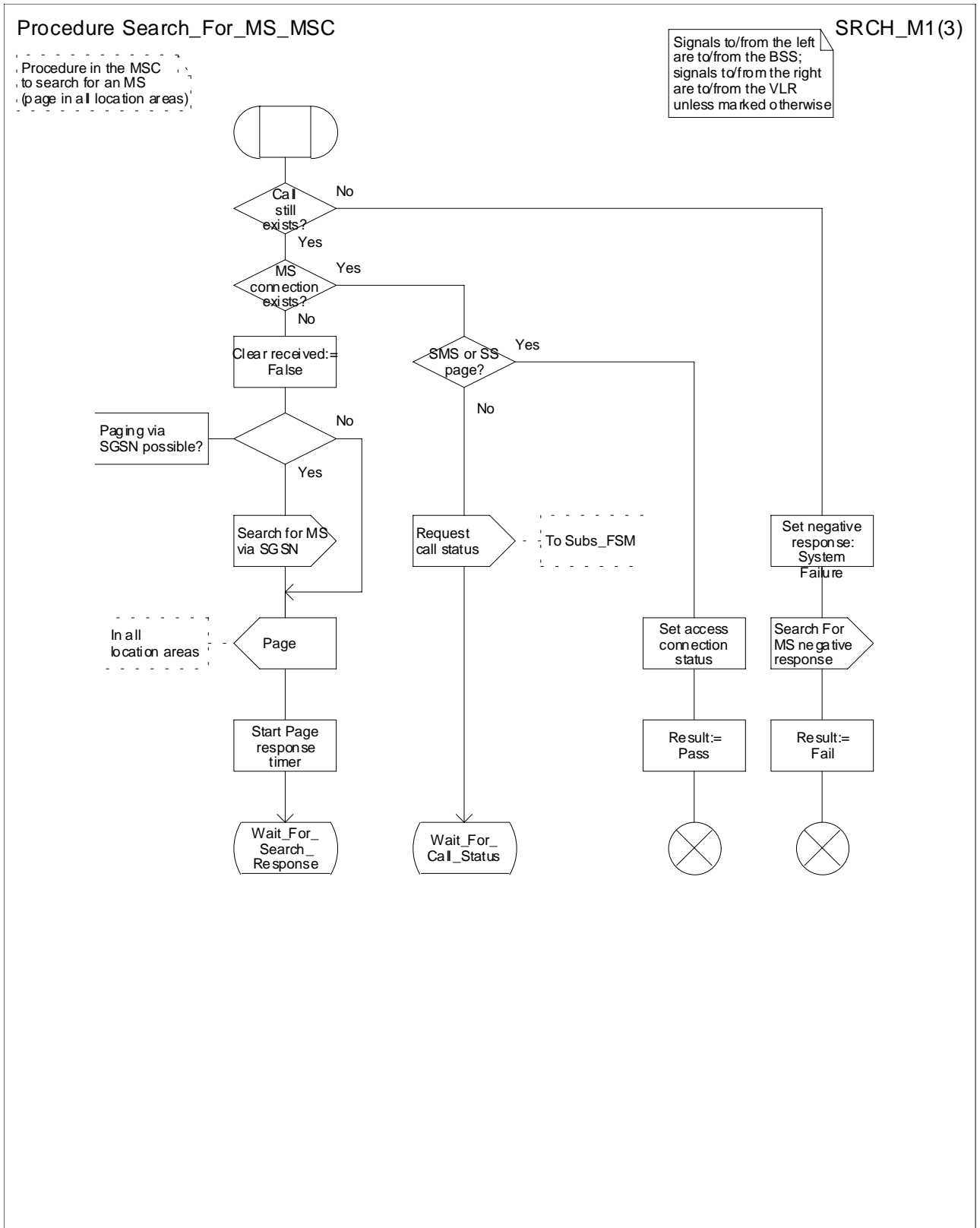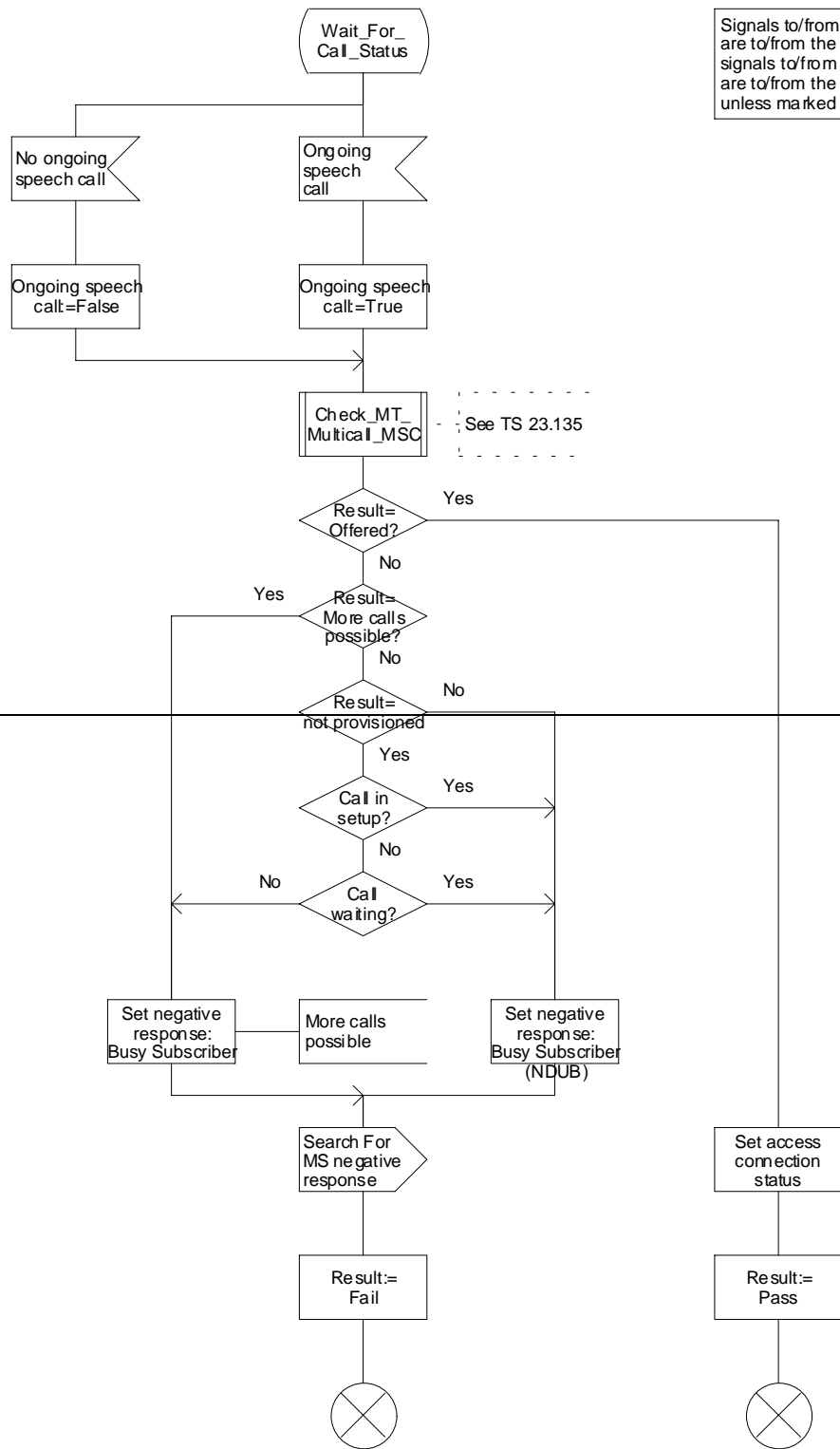Wait_For_ Call_Status

Figure 69a: Procedure Search_For_MS_MSC (sheet 1)

Procedure Search_For_MS_MSC   SRCH_M2(3)

Procedure in the MSC
to search for an MS
(page in all location areas)

Wait_For_
Call_Status

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

No ongoing
speech call

Ongoing
speech
call

Ongoing speech
call:=False

Ongoing speech
call:=True

Check_MT_
Multicall_MSC   - - - See TS 23.135

Result=
Offered?   —— Yes

No

Yes —— Result=
More calls
possible?

No

Result=
not provisioned   —— No

Yes

Call in
setup?   —— Yes

No

No —— Call
waiting?   —— Yes

Set negative
response:
Busy Subscriber

More calls
possible

Set negative
response:
Busy Subscriber
(NDUB)

Search For
MS negative
response

Set access
connection
status

Result:=
Fail

Result:=
Pass

Procedure Search_For_MS_MSC SRCH_M2(3)

Procedure in the MSC
to search for an MS
(page in all location areas)

Wait_For_
Call_Status

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

Call status

Check_MT_
Multicall_MSC — See TS 23.135

Result=
Offered? — Yes

No

Yes — Result=
More calls
possible?

No

Result=
not provisioned — No

Yes

Call in
setup? — Yes

No

No — Call
waiting? — Yes

Set negative
response:
Busy Subscriber

More calls
possible

Set negative
response:
Busy Subscriber
(NDUB)

Search For
MS negative
response

Set access
connection
status

Result:=
Fail

Result:=
Pass

Figure 69b: Procedure Search_For_MS_MSC (sheet 2)

Procedure Search_For_MS_MSC   SRCH_M3(3)

Procedure in the MSC
to search for an MS
(page in all location areas)

Wait_For_
Search_
Response

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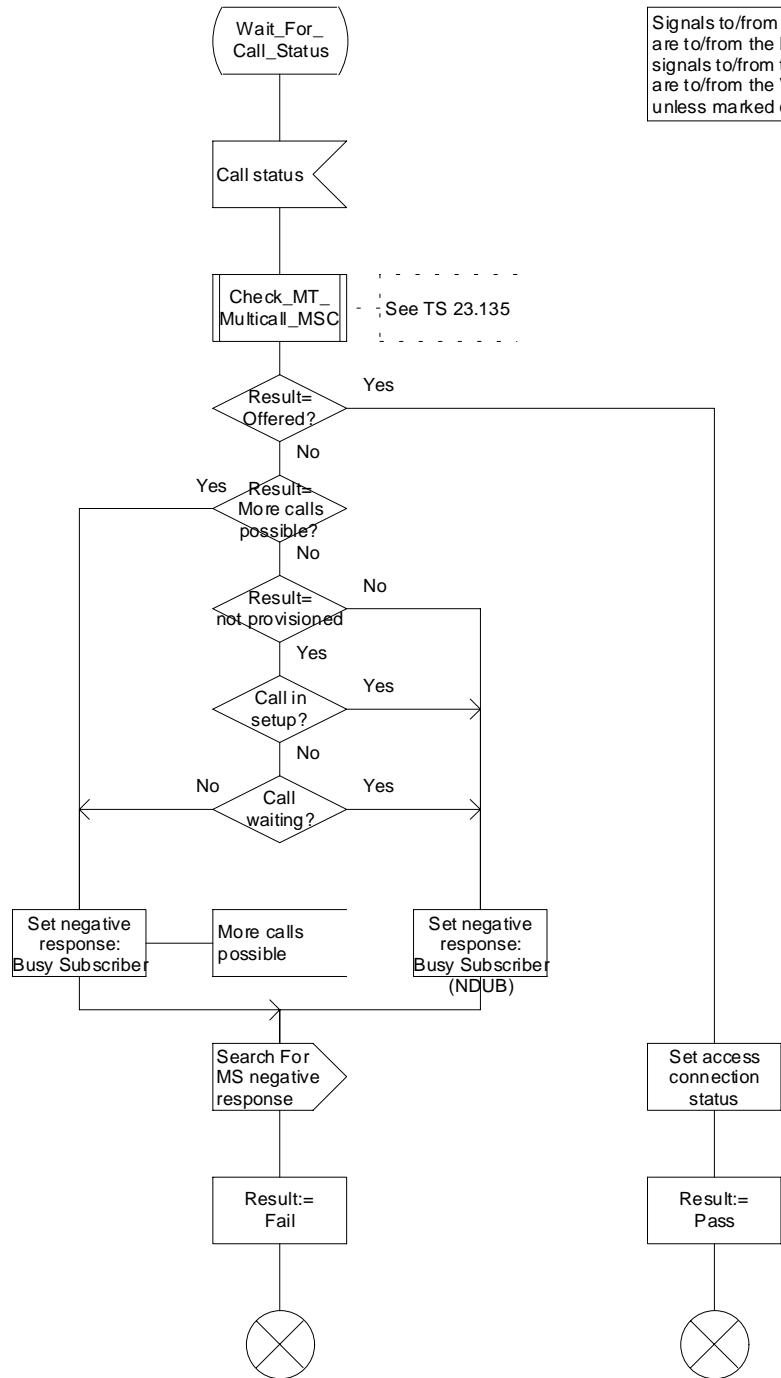signals to/from the right
are to/from the VLR
unless marked otherwise

MS
connection
established

Release ◁ ⸺ From GMSC

Page
response
timer expired

CM
Service
Request

For circuit-
switched call

Clear
received

True

False

Abort

True

Clear
received

False

CM
Service
Request

To process
OCH_MSC

Search
For MS ack

Release
transaction

Clear
received

True

False

Set negative
response:
Absent
Subscriber

Set negative
response:
Busy Subscriber
(NDUB)

Set access
connection
status

Search
For MS
negative
response

Search
For MS
negative
response

Result:=
Pass

Result:=
Aborted

Clear received:=
True

Result:=
Aborted

Result:=
Fail

Result:=
Fail

Result:=
Aborted

⊗   ⊗

Wait_For_
Search_
Response

⊗   ⊗   ⊗   ⊗
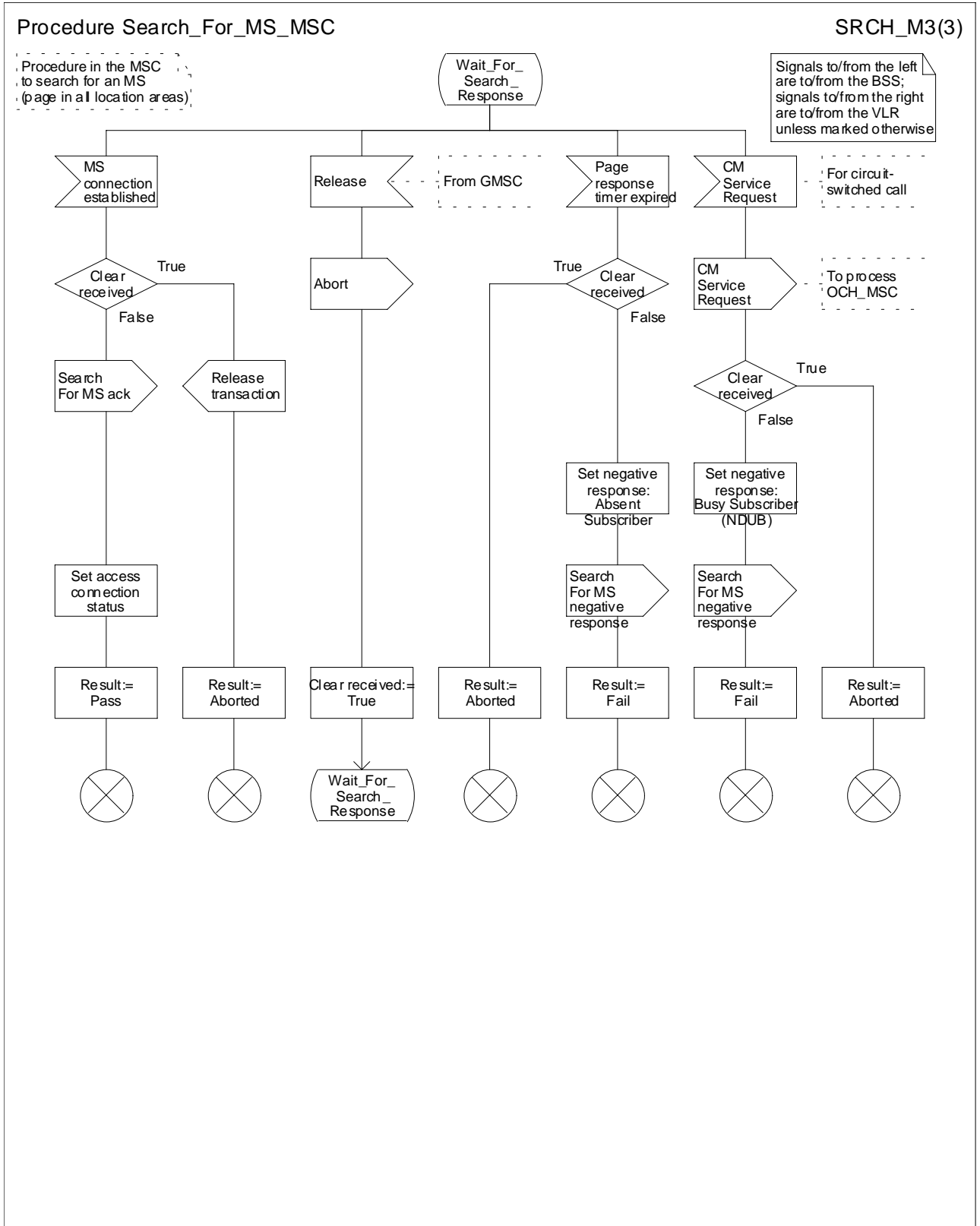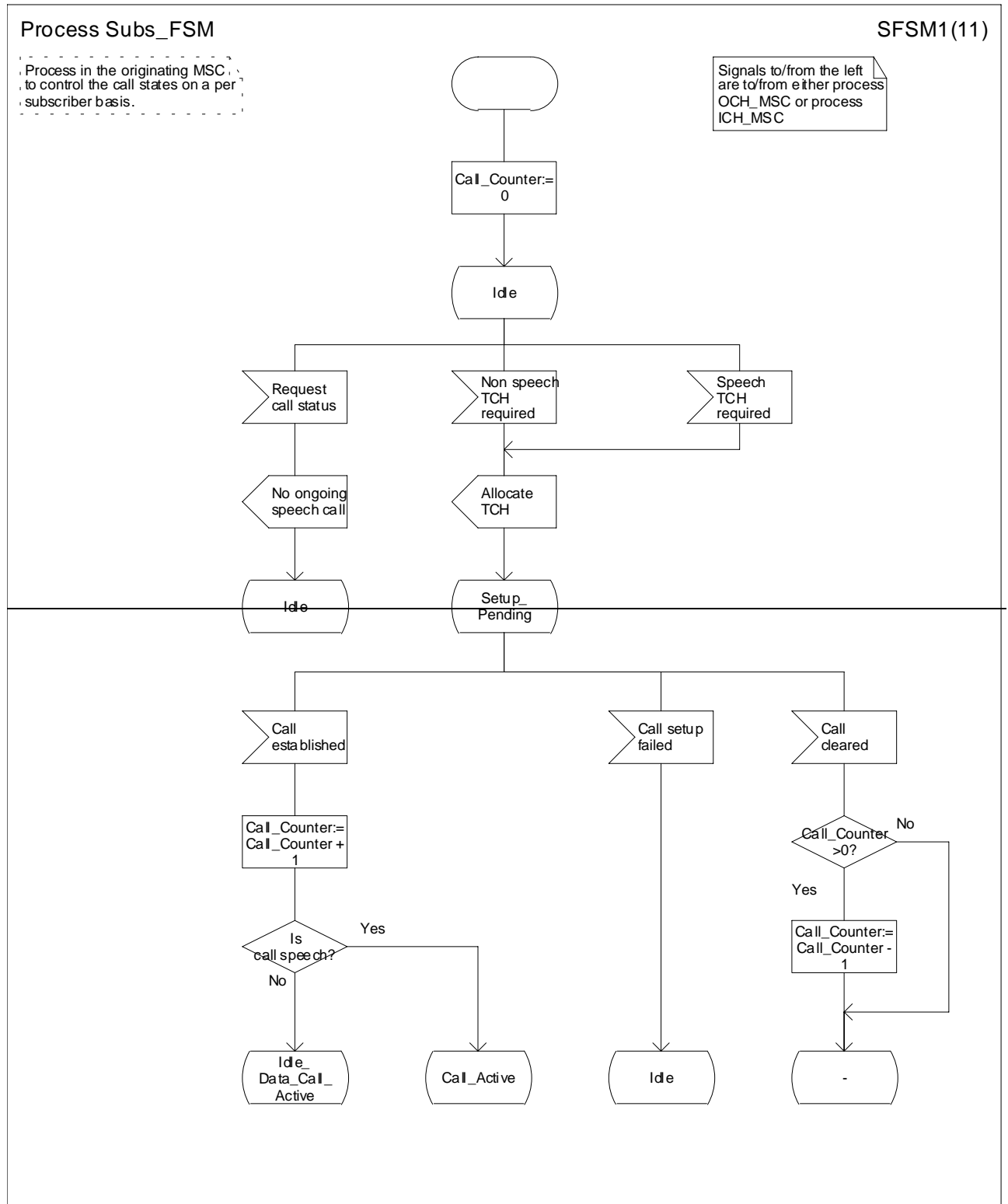
Figure 69b̶c̲: Procedure Search_For_MS_MSC (sheet 3)

**** Last Modified Section ****

7.4   Subs_FSM

7.4.1   Functional requirements of serving MSC

....

Process Subs_FSM	SFSM1(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC

Call_Count:=0
Speech_CallA:=Null
Speech_CallB:=Null
Non_Speech_Call:=Null

Idle

Non speech
TCH
required

Speech
TCH
required

Non_Speech_
_Call:=Setup

Speech_CallA:=
Setup

Allocate
TCH

Setup_
Pending
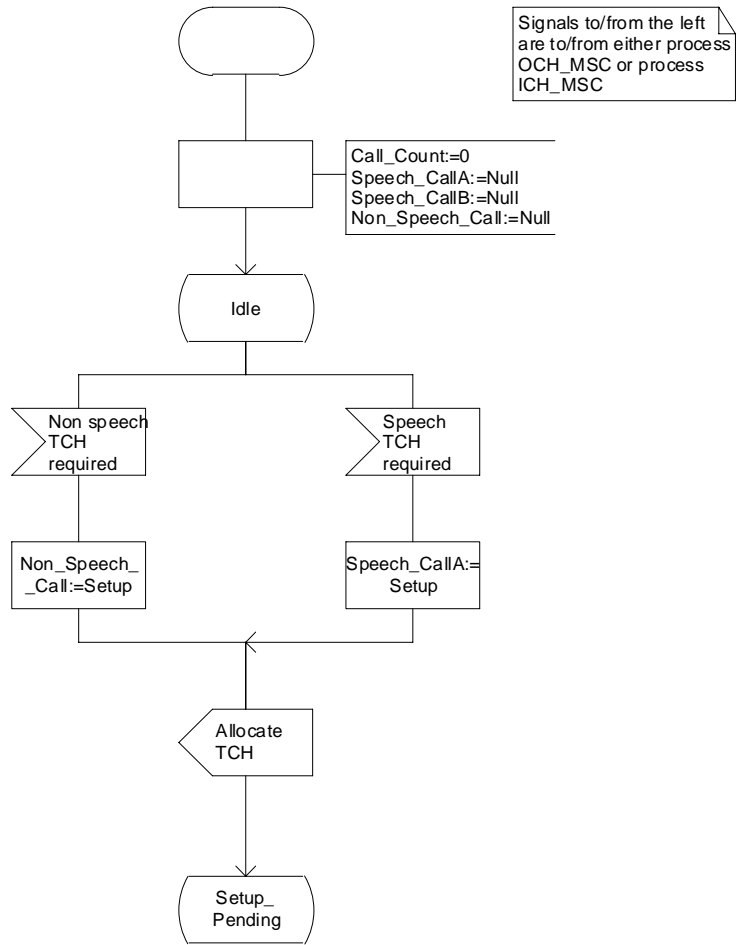
Figure 84a: Process Subs_FSM (sheet 1)

Process Subs_FSM   SFSM2(11)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC

Idle_
Data_Call_
Active

Request
call status

Non speech
TCH
required

Speech
TCH
required

Call
cleared

No ongoing
speech call

Allocate
TCH

Call_Counter:=
Call_Counter -
1

Idle_
Data_Call_
Active

Data_Call_
Active_
Setup_Pending

Call
cleared

Call
established

Call setup
failed

Call_Counter:=
Call_Counter -
1

Call_Counter:=
Call_Counter +
1

No   Call_Counter
= 0?

No   Call_
counter =
0?

Yes

Is
call speech?

No

Yes

Yes

Data_Call_
Active_
Setup_Pending

Setup_
Pending

Call_Active

Idle_
Data_Call_
Active

Idle

Process Subs_FSM   SFSM2(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC

```
                              ┌─────────┐
                             (  Setup_   )
                              \ Pending /
                               └────┬────┘
                  ┌─────────────────┴──────────────────┐
           ╱──────┴──────╲                       ╱──────┴──────╲
          <     Call       |                    <  Call setup    |
           ╲ established  ╱                      ╲   failed     ╱
            └──────┬──────┘                       └──────┬──────┘
          ┌────────┴────────┐                  ┌────────┴────────┐      Speech_CallA:=Null
          │   Call_Count:=  │                  │                 │──────Speech_CallB:=Null
          │  Call_Count + 1 │                  │                 │      Non_Speech_Call:=Null
          └────────┬────────┘                  └────────┬────────┘
                   │                                     │
             ╱─────┴─────╲       Yes                     │
            ╱     Is      ╲──────────────┐               │
            ╲ call speech?╱              │               │
             ╲───┬───────╱               │               │
              No │                       │               │
         ┌───────┴───────┐      ┌────────┴──────┐  ┌──────┴──────┐
        (    Idle_         )   (   Call_Active   )(     Idle      )
        (  Data_Call_      )    └───────────────┘  └─────────────┘
        (    Active        )
         └─────────────────┘
```

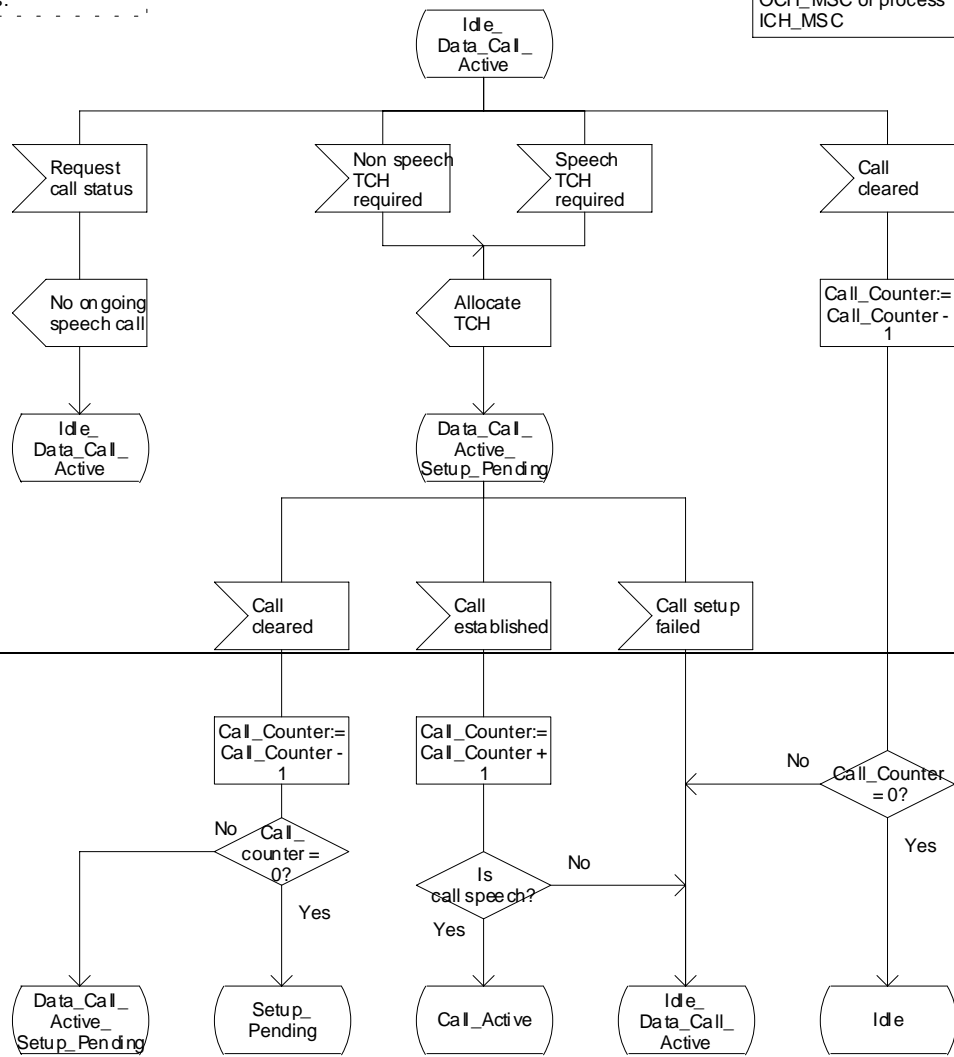**Figure 84b: Process Subs_FSM (sheet 2)**

Process Subs_FSM   SFSM3(11)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
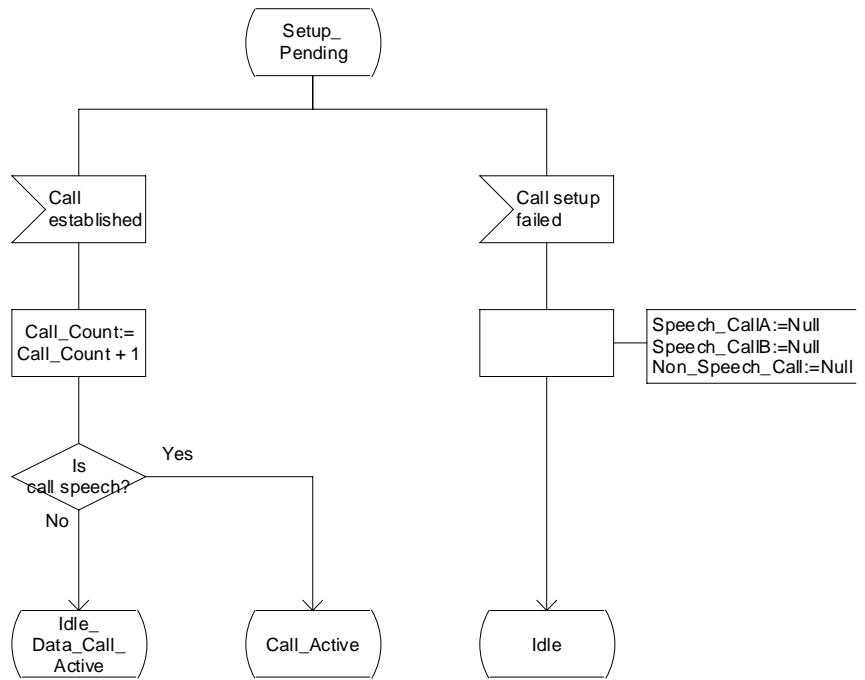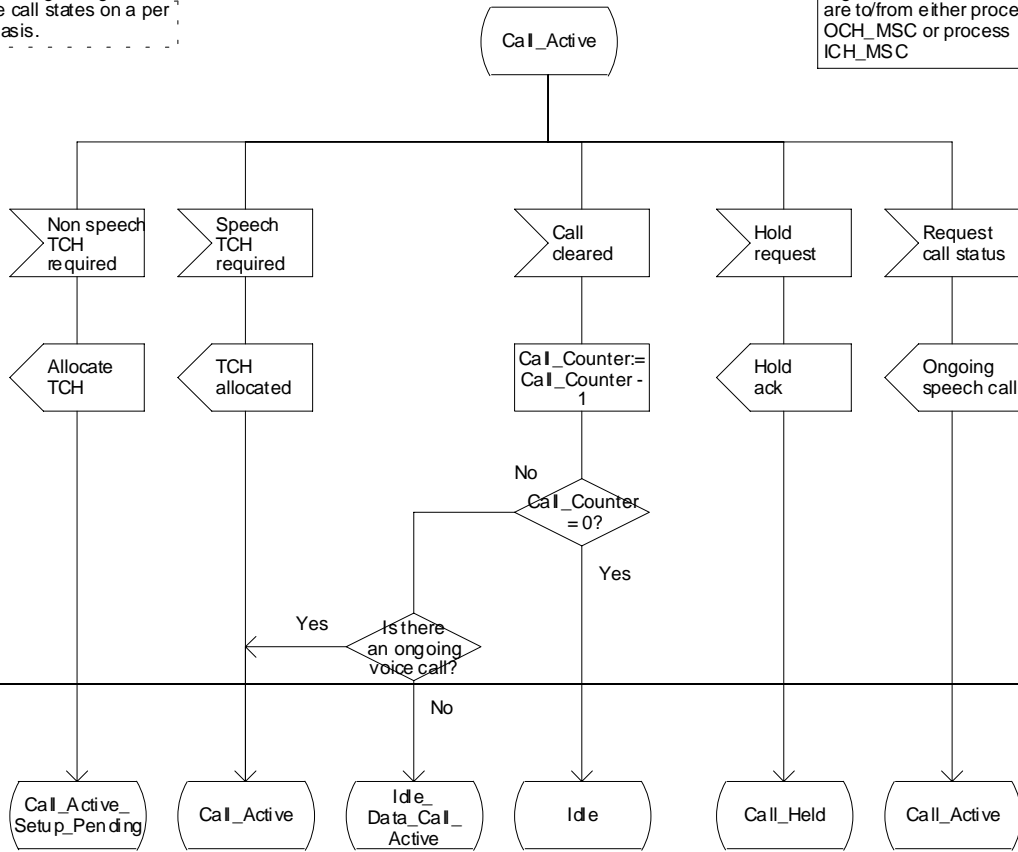are to/from either process
OCH_MSC or process
ICH_MSC

Call_Active

| Non speech TCH required | Speech TCH required | | Call cleared | Hold request | Request call status |

| Allocate TCH | TCH allocated | | Call_Counter:= Call_Counter - 1 | Hold ack | Ongoing speech call |

No

Call_Counter = 0?

Yes

Yes

Is there an ongoing voice call?

No

| Call_Active_ Setup_Pending | Call_Active | Idle_ Data_Call_ Active | Idle | Call_Held | Call_Active |

Process Subs_FSM   SFSM3(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC

Figure 84c: Process Subs_FSM (sheet 3)

Process Subs_FSM   SFSM4(11)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC
unless marked otherwise

Process Subs_FSM   SFSM4(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
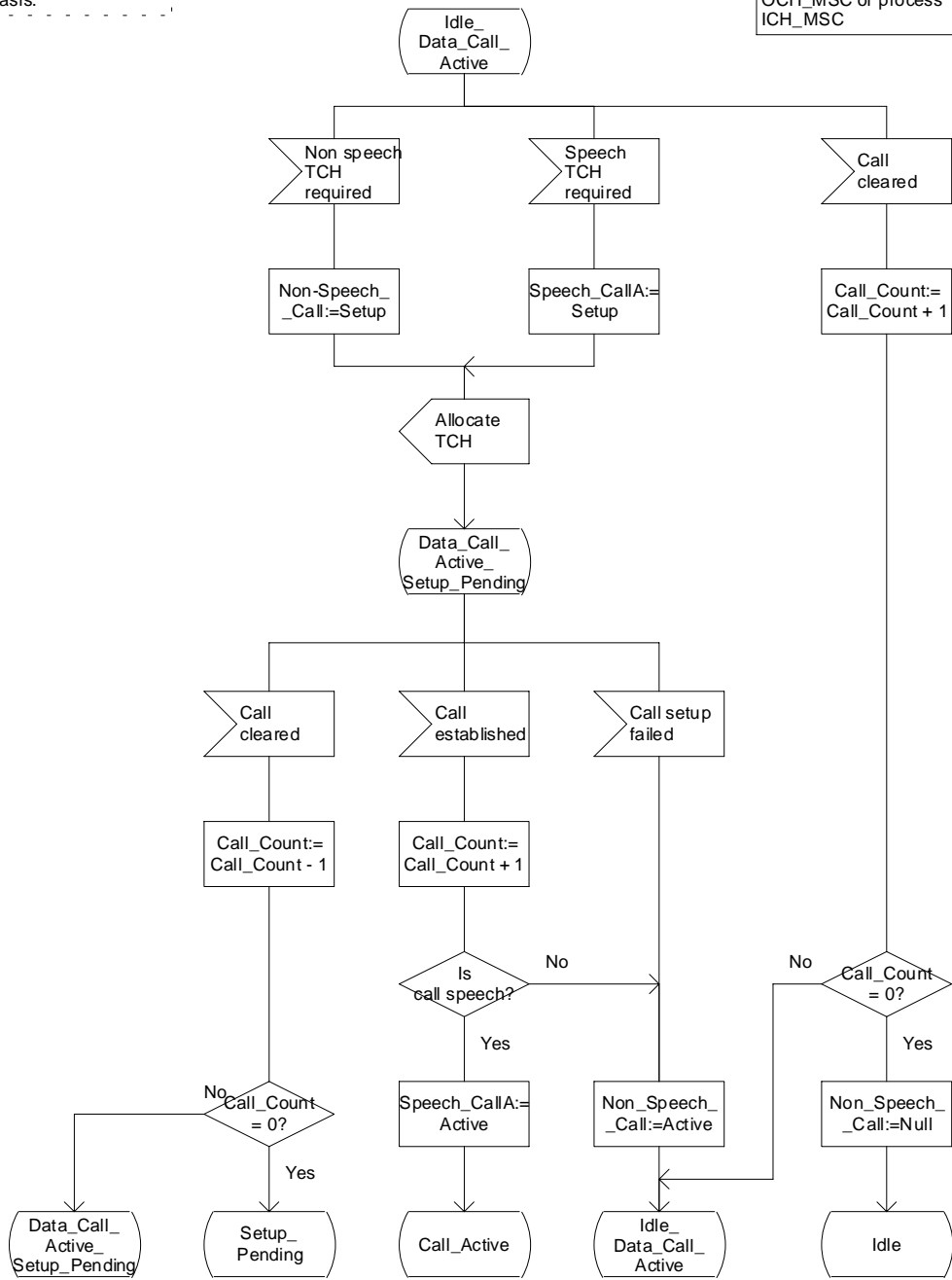are to/from either process
OCH_MSC or process
ICH_MSC

Call_Active

| Hold request | Non speech TCH required | Speech TCH required | | Call cleared |

| Hold ack | Allocate TCH | TCH already allocated | | Call_Count:= Call_Count - 1 |

No

Call_Count = 0?

Yes

Yes — Ongoing speech call?

No

Yes — Ongoing non-speech call?

No

| Speech_CallA:= Held | Non_Speech_ _Call:=Setup | Non_Speech_ _Call:=Null | Speech_CallA:= Null | | Speech_CallA:=Null Speech_CallB:=Null Non_Speech_Call:=Null |

| Call_Held | Call_Active_ Setup_Pending | Call_Active | Idle_ Data_Call_ Active | Idle |

Figure 84d: Process Subs_FSM (sheet 4)

Process Subs_FSM   SFSM5(11)

Process in the originating MSC
to control the call states on a per
subscriber basis.

```
                              ┌──────────┐
                              │ Call_Held│
                              └────┬─────┘
           ┌───────────────────────┼───────────────────────┐
      ┌────┴─────┐            ┌─────┴────┐            ┌──────┴──────┐
      │ Request  │            │  Speech  │            │ Non speech  │
      │call status│           │   TCH    │            │    TCH      │
      └────┬─────┘            │ required │            │  required   │
           │                  └─────┬────┘            └──────┬──────┘
           │                        │                        │
           │                        │                   ╱ Is non- ╲        No
           │                        │                  ╱  speech call ╲──────────┐
           │                        │                  ╲  using TCH? ╱           │
           │                        │                   ╲         ╱              │
           │                        │                     Yes                    │
           │                        │                      │                     │
      ┌────┴─────┐            ┌─────┴────┐            ┌─────┴────┐          ┌─────┴────┐
      │ Ongoing  │            │   TCH    │            │ Allocate │          │   TCH    │
      │ speech   │            │available │            │   TCH    │          │available │
      │  call    │            └─────┬────┘            └─────┬────┘          └─────┬────┘
      └────┬─────┘                  │                       │                     │
           │                        │                       ├─────────────────────┘
           │                        │                       │
    ───────┼────────────────────────┼───────────────────────┼──────────────────
       ┌───┴────┐              ┌─────┴─────┐           ┌──────┴──────┐
       │Call_Held│             │ Call_Held_│           │ Call_Held_  │
       └────────┘              │Setup_Pending│         │ Data_Call_  │
                               └───────────┘           │Setup_Pending│
                                                       └─────────────┘
```

Process Subs_FSM   SFSM5(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
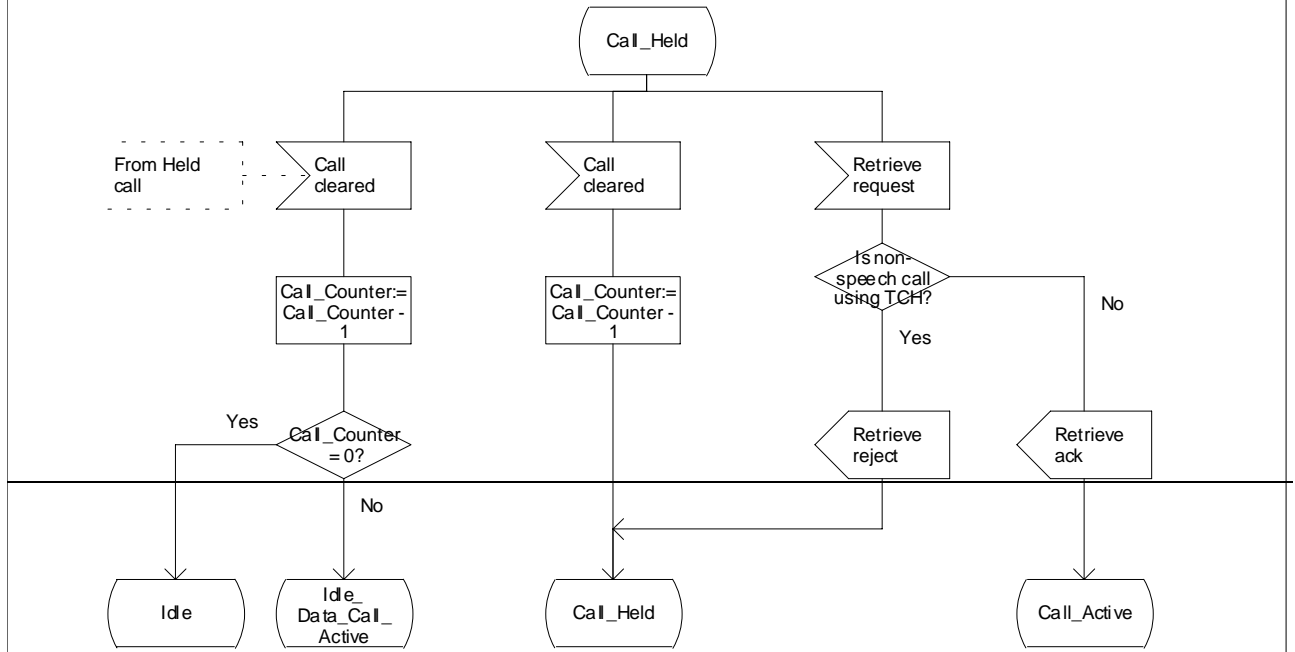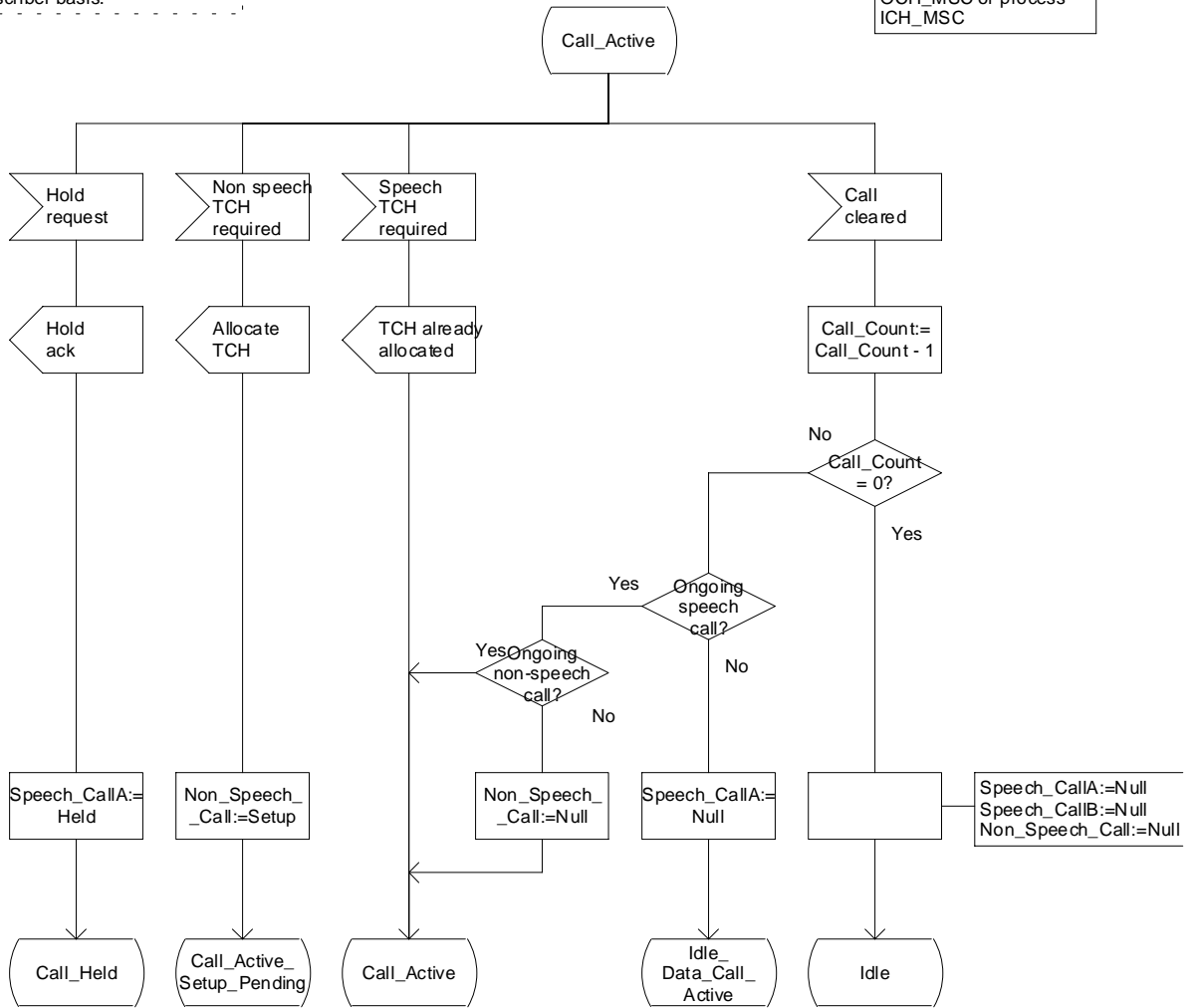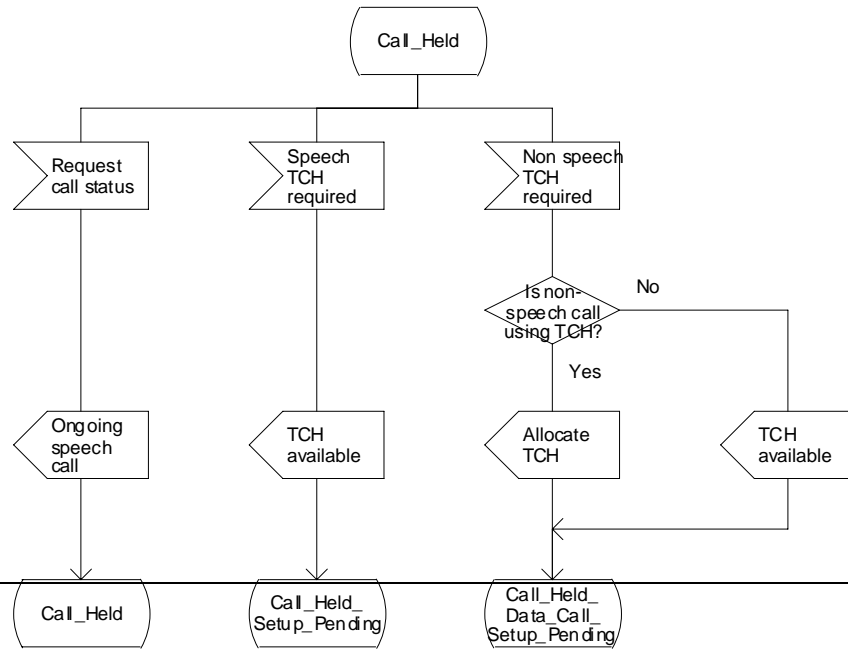are to/from either process
OCH_MSC or process
ICH_MSC
unless marked otherwise

Call_Held

From Held
call

Call
cleared

Call
cleared

Retrieve
request

Call_Count:=
Call_Count - 1

Call_Count:=
Call_Count - 1

Non-
speech call
using TCH?   No

Yes   Yes
        Call_Count
        = 0?

No

Non-speech
call ongoing?   No

Yes

Retrieve
reject

Retrieve
ack

Speech_CallA:=Null
Speech_CallB:=Null
Non_Speech_Call:=Null

Speech_CallA:=
Null

Non_Speech_
_Call:=Null

Call_StatusA:=
Active

Idle

Idle_
Data_Call_
Active

Call_Held

Call_Active
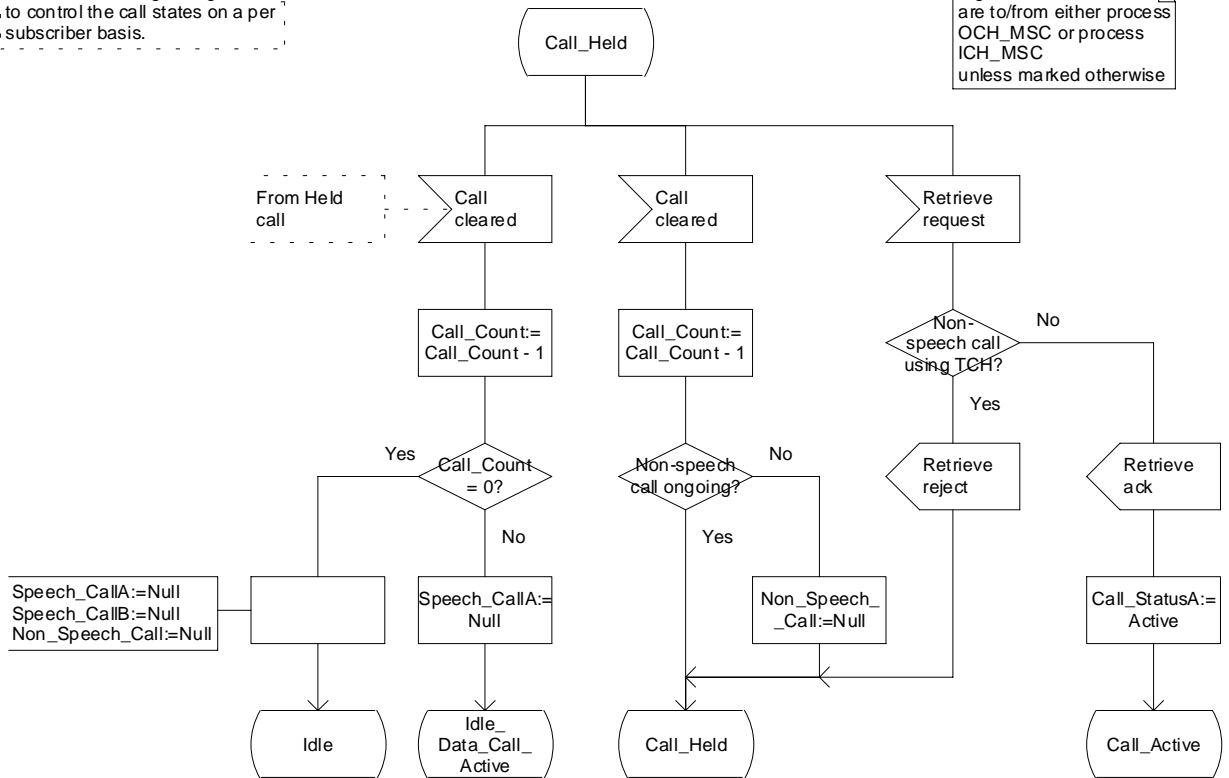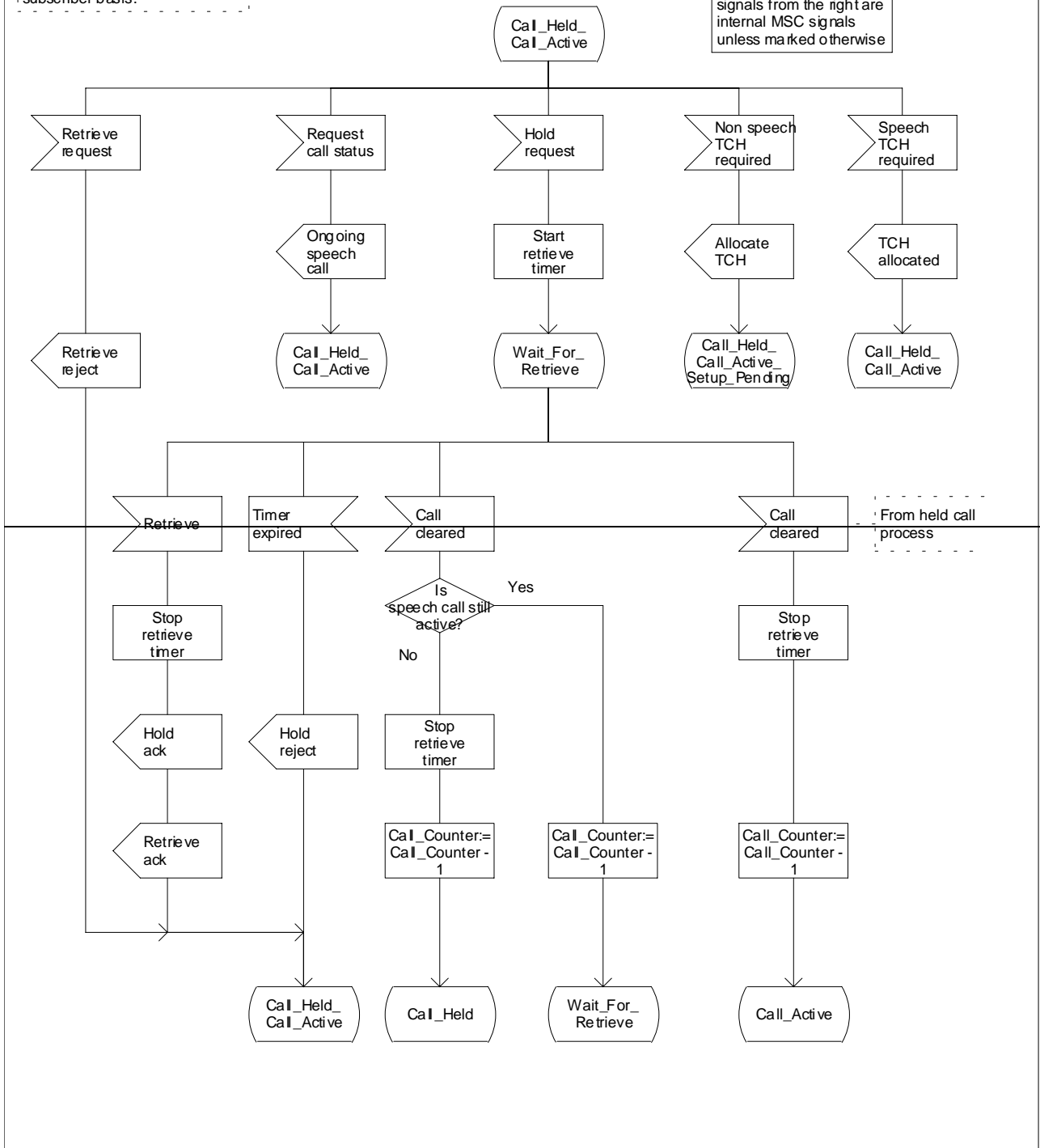
Figure 84e: Process Subs_FSM (sheet 5)

Process Subs_FSM   SFSM6(11)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC;
signals from the right are
internal MSC signals
unless marked otherwise

Call_Held_
Call_Active

Retrieve
request

Request
call status

Hold
request

Non speech
TCH
required

Speech
TCH
required

Ongoing
speech
call

Start
retrieve
timer

Allocate
TCH

TCH
allocated

Retrieve
reject

Call_Held_
Call_Active

Wait_For_
Retrieve

Call_Held_
Call_Active_
Setup_Pending

Call_Held_
Call_Active

Retrieve

Timer
expired

Call
cleared

Call
cleared

From held call
process

Stop
retrieve
timer

Is
speech call still
active?

Yes

Stop
retrieve
timer

No

Hold
ack

Hold
reject

Stop
retrieve
timer

Retrieve
ack

Call_Counter:=
Call_Counter -
1

Call_Counter:=
Call_Counter -
1

Call_Counter:=
Call_Counter -
1

Call_Held_
Call_Active

Call_Held

Wait_For_
Retrieve

Call_Active

Process Subs_FSM SFSM6(14)

Process in the originating MSC to control the call states on a per subscriber basis.

Call_Held

Speech TCH required

Non speech TCH required

Non-speech call using TCH? — No

Yes

TCH available

Allocate TCH

TCH available

Speech_CallB:= Setup

Non_Speech_ _Call:=Setup

Call_Held_ Setup_Pending

Call_Held_ Data_Call_ Setup_Pending
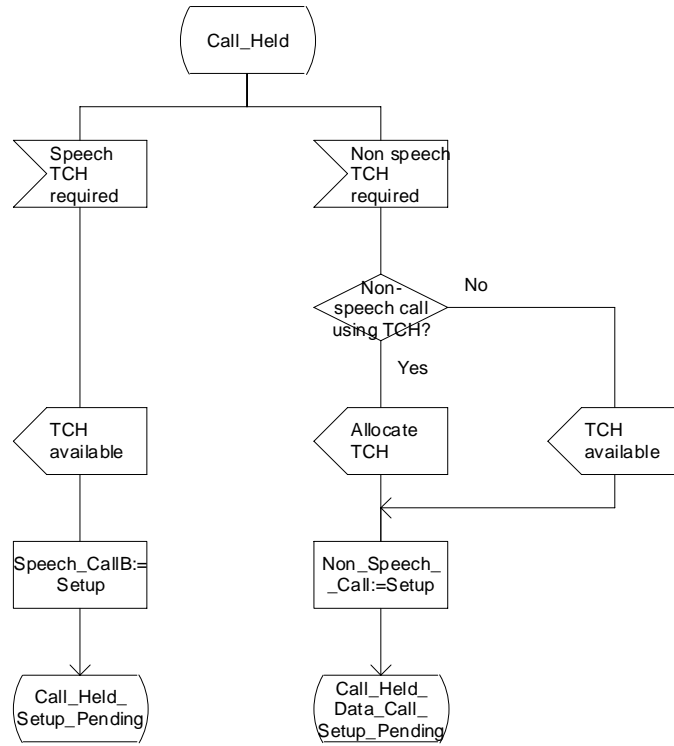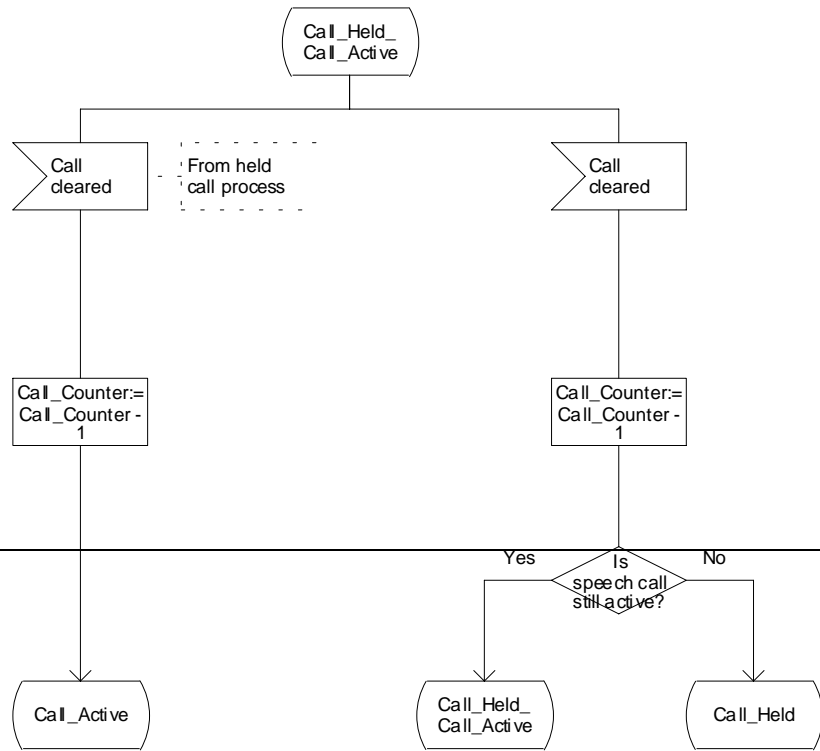
Figure 84f: Process Subs_FSM (sheet 6)

Process Subs_FSM   SFSM7(11)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC
unless marked otherwise

```
                            ┌──────────┐
                            │ Call_Held_│
                            │ Call_Active│
                            └──────────┘
            ┌──────────────────┴──────────────────┐
      ╲ Call            ┌ ─ ─ ─ ─ ─ ─ ┐      ╲ Call
       ╲ cleared          From held           ╲ cleared
       ╱                 │ call process │      ╱
      ╱                   └ ─ ─ ─ ─ ─ ─ ┘      ╱

   ┌───────────┐                          ┌───────────┐
   │Call_Counter:=│                        │Call_Counter:=│
   │Call_Counter -│                        │Call_Counter -│
   │1          │                           │1          │
   └───────────┘                           └───────────┘
        │                                       │
────────┼───────────────────────────────────────┼──────────
        │                          Yes    ◇       No
        │                               Is
        │                           speech call
        │                          still active?
        │                     ┌────────┘       └────────┐
        │                     │                         │
   ┌────────┐          ┌────────────┐            ┌──────────┐
   │Call_Active│        │ Call_Held_ │            │ Call_Held │
   └────────┘          │ Call_Active │            └──────────┘
                       └────────────┘
```

Process Subs_FSM   SFSM7(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC;
signals from the right are
internal MSC signals
unless marked otherwise

Call_Held_
Call_Active

| Retrieve | Non speech TCH required | Hold request | Speech TCH required |

| Retrieve reject | Allocate TCH | Start retrieve timer | TCH already allocated |

Non_Speech_
_Call:=Setup

Call_Held_
Call_Active_
Setup_Pending

Wait_For_
Retrieve

Call_Held_
Call_Active

| Retrieve | Timer expired | Call cleared | From held call process | Call cleared |

Speech call
ongoing?   → Yes

No

Non-speech call
ongoing?   → No

Stop
retrieve
timer

Hold
ack

Hold
reject

Stop
retrieve
timer

Yes

Non_Speech_
_Call:=Null

Stop
retrieve
timer

Retrieve
ack

Call_Count:=
Call_Count - 1

Call_Count:=
Call_Count - 1

Call_Count:=
Call_Count - 1

Speech_CallB:=
Null

Speech_CallA:=Active
Speech_CallB:=Null

Call_Held_
Call_Active

Call_Held

Wait_For_
Retrieve

Call_Active

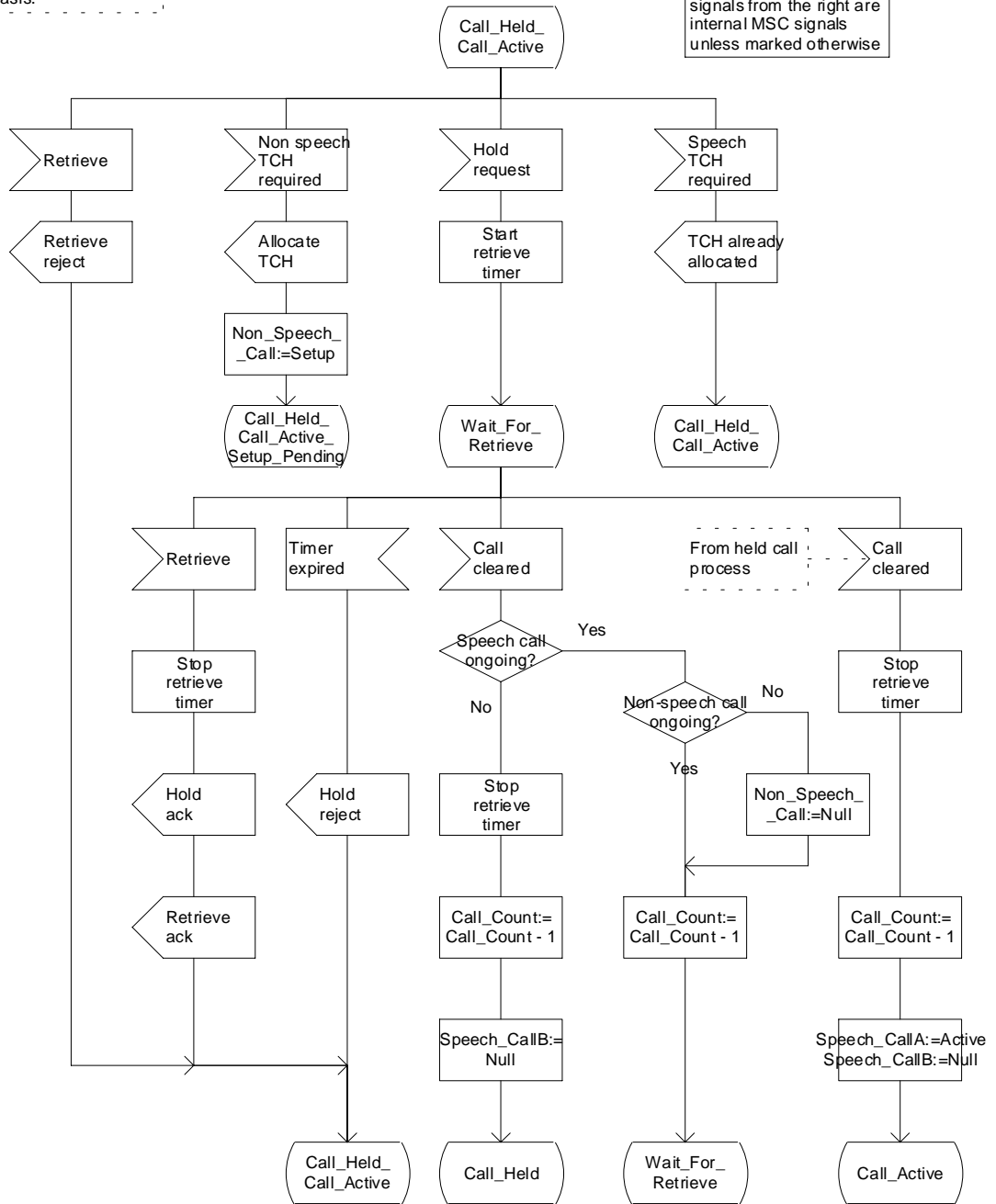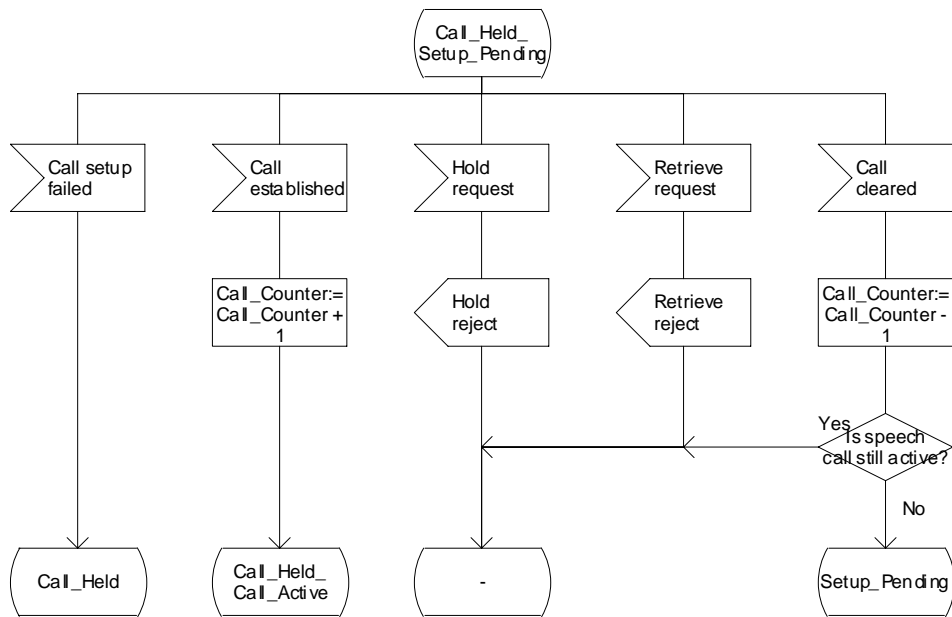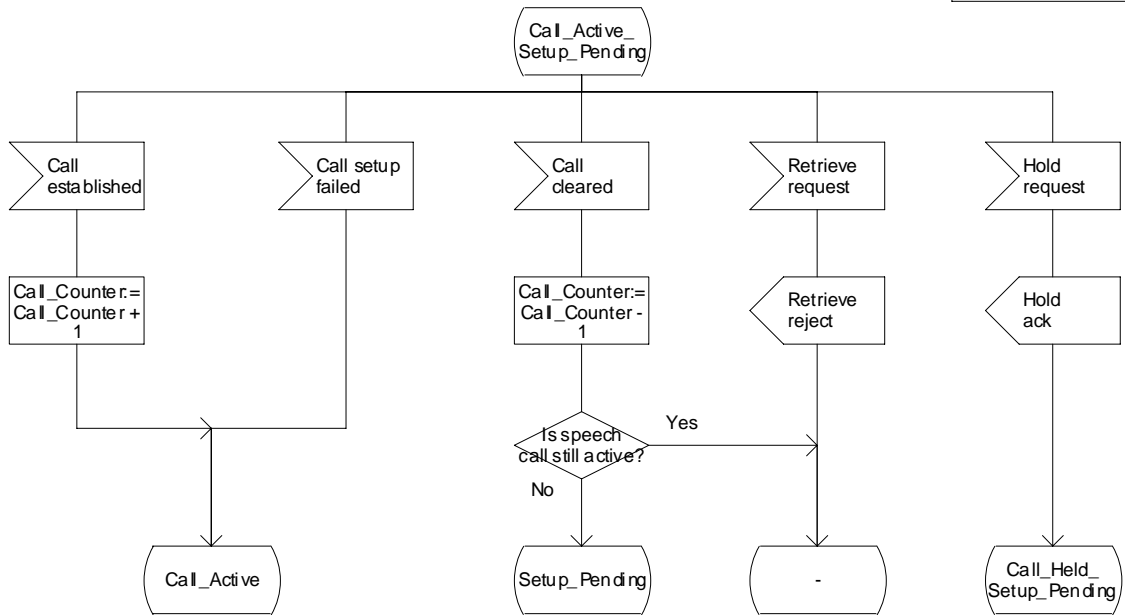**Figure 84g: Process Subs_FSM (sheet 7)**

Process Subs_FSM   SFSM8(11)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC

Call_Active_
Setup_Pending

| Call established | Call setup failed | Call cleared | Retrieve request | Hold request |

Call_Counter:=
Call_Counter +
1

Call_Counter:=
Call_Counter -
1

Retrieve
reject

Hold
ack

Is speech
call still active?   Yes

No

Call_Active   Setup_Pending   -   Call_Held_
Setup_Pending

Call_Held_
Setup_Pending

| Call setup failed | Call established | Hold request | Retrieve request | Call cleared |

Call_Counter:=
Call_Counter +
1

Hold
reject

Retrieve
reject

Call_Counter:=
Call_Counter -
1

Yes Is speech
call still active?

No

Call_Held   Call_Held_
Call_Active   -   Setup_Pending

Process Subs_FSM   SFSM8(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC
unless marked otherwise

Call_Held_
Call_Active

Call
cleared   From held
                 call process

Call
cleared

Call_Count:=
Call_Count - 1

Call_Count:=
Call_Count -1

Speech_CallA:=Active
Speech_CallB:=Null

Yes   Speech call
      ongoing?

                                              No

      Yes Non-speech
           call ongoing?

                 No

Non_Speech_
_Call:=Null

Speech_CallB:=
Null

Call_Active

Call_Held_
Call_Active

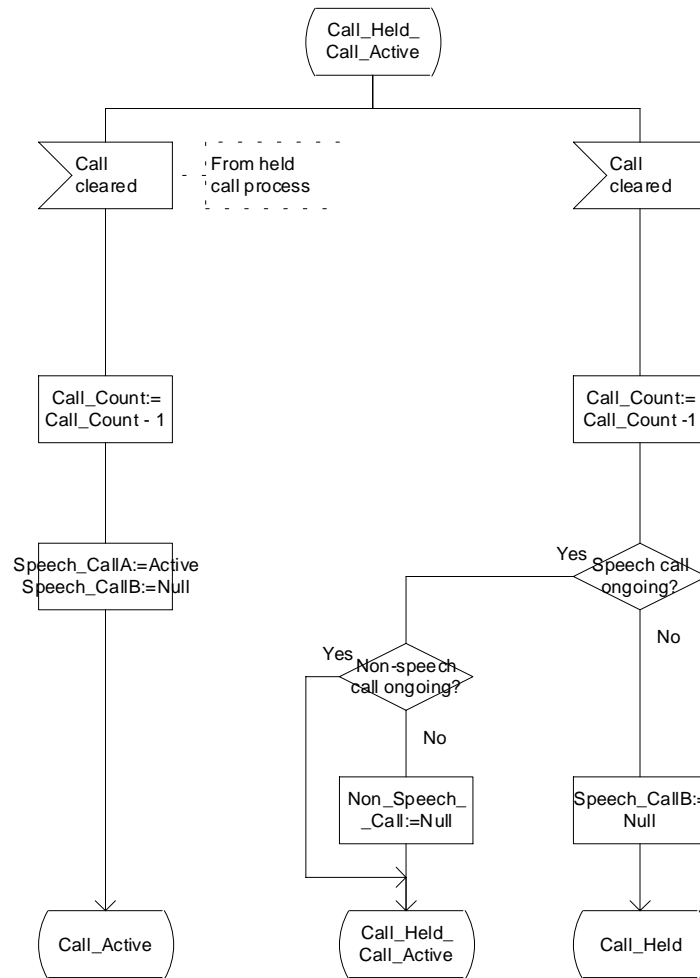Call_Held

Figure 84h: Process Subs_FSM (sheet 8)

Process Subs_FSM   SFSM9(11)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Call_Held_
Call_Active_
Setup_Pending

| Call established | Call setup failed | Hold request | Retrieve request |

Call_Counter:=
Call_Counter +
1

Start
retrieve
timer

Retrieve
reject

Call_Held_
Call_Active

Wait_For_
Hold_Retrieve

-

| Retrieve | Timer expired | Call cleared | Call cleared | From held call process |

Stop
retrieve
timer

Call_Counter:=
Call_Counter -
1

Stop
retrieve
timer

Hold
ack

Hold
reject

Is
speech call still
active?   Yes

No

Retrieve
ack

Stop
retrieve
timer

Call_Counter:=
Call_Counter -
1

Call_Held_
Call_Active_
Setup_Pending

Call_Held_
Setup_Pending

Wait_For_
Hold_Retrieve

Call_Active_
Setup_Pending

Process Subs_FSM   SFSM9(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC

Call_Active_
Setup_Pending

| Call established | Call setup failed | Call cleared | Retrieve request | Hold request |

Call_Count:=
Call_Count + 1

Non_Speech_
_Call:=Null

Call_Count:=
Call_Count - 1

Retrieve
reject

Hold
ack

Non_Speech_
_Call:=Active

Speech
call ongoing?   Yes

No

Call_Count
= 0?   No

Yes

Speech_CallA:=
Null

Call_Active

Data_Call_
Active_
Setup_Pending

Setup_Pending

Call_Active_
Setup_Pending

Call_Held_
Setup_Pending

Figure 84i: Process Subs_FSM (sheet 9)

Process Subs_FSM   SFSM10(11)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Process Subs_FSM   SFSM10(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
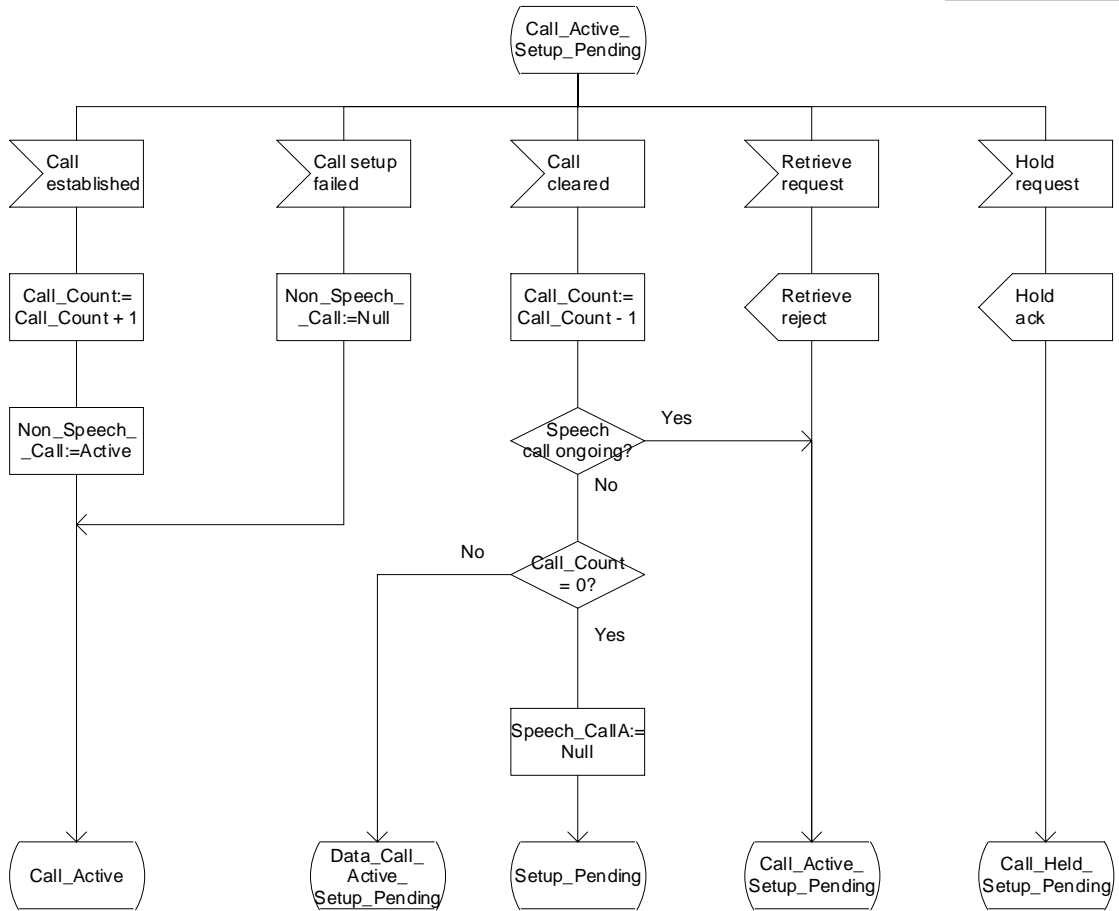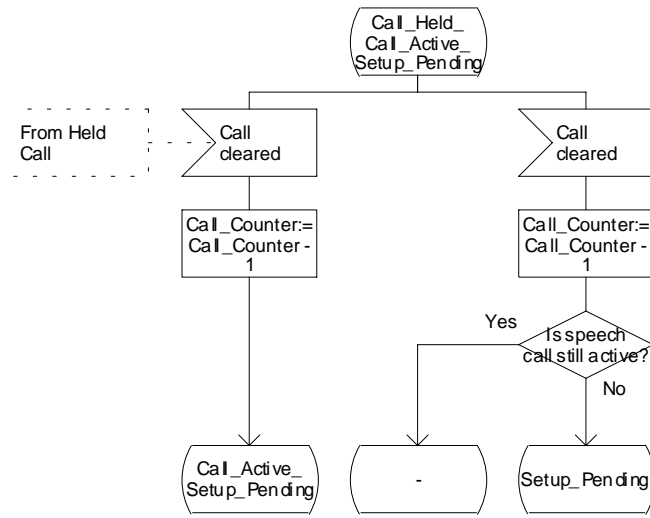are to/from either process
OCH_MSC or process
ICH_MSC

Call_Held_
Setup_Pending

Call setup
failed

Call
established

Hold
request

Retrieve
request

Call
cleared

Call_Count:=
Call_Count + 1

Hold
reject

Retrieve
reject

Call_Count:=
Call_Count - 1

Yes

Speech
call ongoing?

No

Yes

Non-speech
call ongoing?

No

Non_Speech_
_Call:=Null

No   Call_Count
= 0?

Yes

Speech_CallB:=
Null

Speech_CallB:=
Active

Speech_CallA:=Setup
Speech_CallB:=Null

Call_Held

Call_Held_
Call_Active

Call_Held_
Setup_Pending

Data_Call_
Active_
Setup_Pending

Setup_Pending

Figure 84j: Process Subs_FSM (sheet 10)

Process Subs_FSM   SFSM11(11)

Process in the originating MSC
to control the call states on a per
subscriber basis.

```
                          ┌─────────────┐
                          │ Call_Held_  │
                          │Data_Call_Setup_│
                          │   Pending   │
                          └──────┬──────┘
       ┌───────────┬─────────────┼─────────────┬──────────────┐
   ╱────────╲   ╱────────╲   ╱────────╲     ╱────────╲     ╱────────╲
  ╱  Call setup╲ ╱  Call    ╲ ╱  Call    ╲   ╱  Hold    ╲   ╱ Retrieve ╲
  ╲  failed    ╱ ╲established╱ ╲ cleared  ╱   ╲ request  ╱   ╲ request  ╱
   ╲────────╱   ╲────────╱   ╲────────╱     ╲────────╱     ╲────────╱
       │            │             │              │              │
       │       ┌────────┐    ┌────────┐      ╱────────╲    ╱──────────╲  No
       │       │Call_Counter:=│ │Call_Counter:=│   ╱   Hold  ╲   ╱ Is non-   ╲────────┐
       │       │Call_Counter +│ │Call_Counter -│   ╲  reject ╱   ╲speech call ╱      │
       │       │     1    │    │     1    │      ╲────────╱    ╲using TCH? ╱       │
       │       └────┬───┘    └────┬───┘          │          ╲──────╱        │
       │            │          ╱────────╲         │          Yes │          │
       │            │         ╱ Is speech ╲  Yes   │         ╱────────╲      │
       │            │         ╲call still active?╱───────→    ╱ Retrieve ╲  ╱ Retrieve ╲
       │            │          ╲────────╱         │         ╲  reject  ╱   ╲   ack    ╱
       │            │            │ No             │          ╲────────╱     ╲────────╱
───────┼────────────┼────────────┼────────────────┼───────────────┼──────────────┼────
       │         ┌──────┐    ┌──────────┐      ┌──────┐                      ┌──────────┐
       └────────→│Call_Held│   │Data_Call_Setup_│   │   -  │                      │Call_Active_│
                 └──────┘    │   Pending   │   └──────┘                      │Setup_Pending│
                             └──────────┘                                    └──────────┘
```

Process Subs_FSM   SFSM11(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
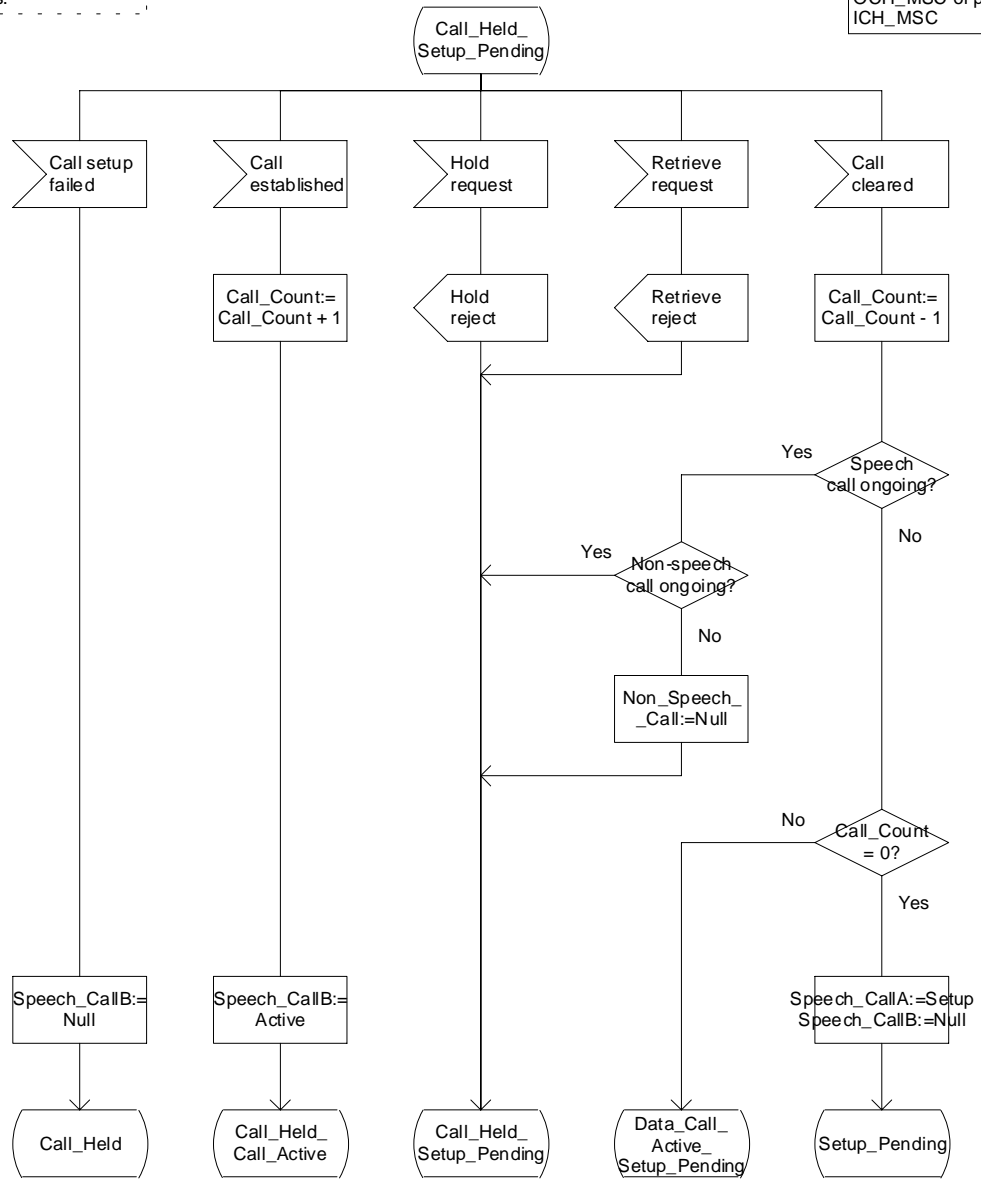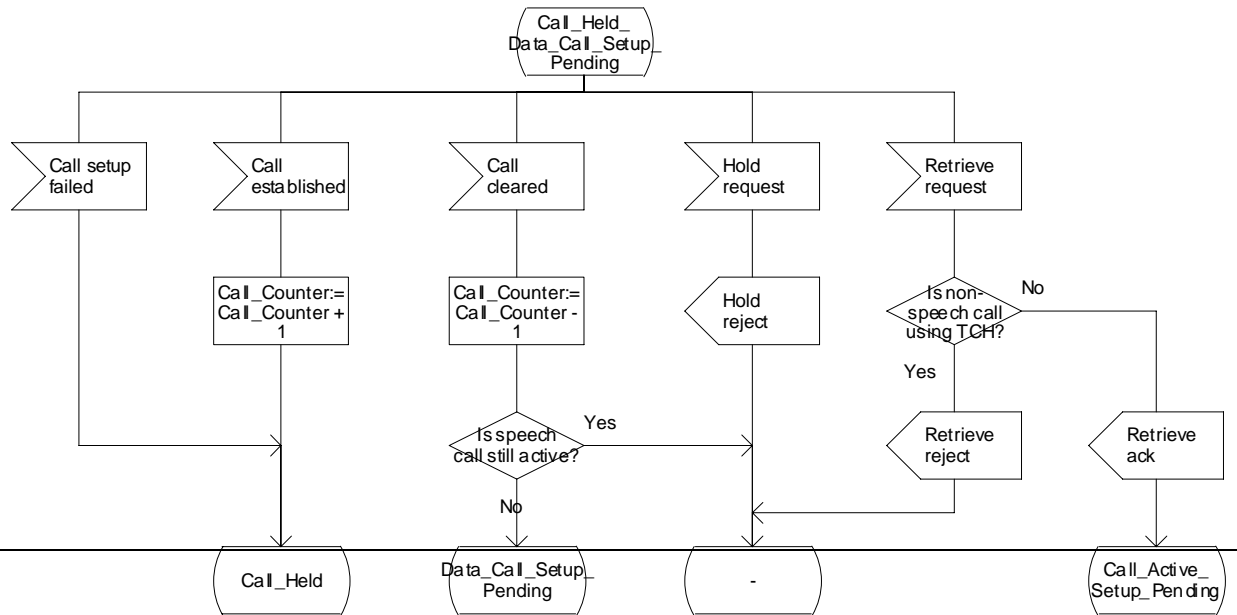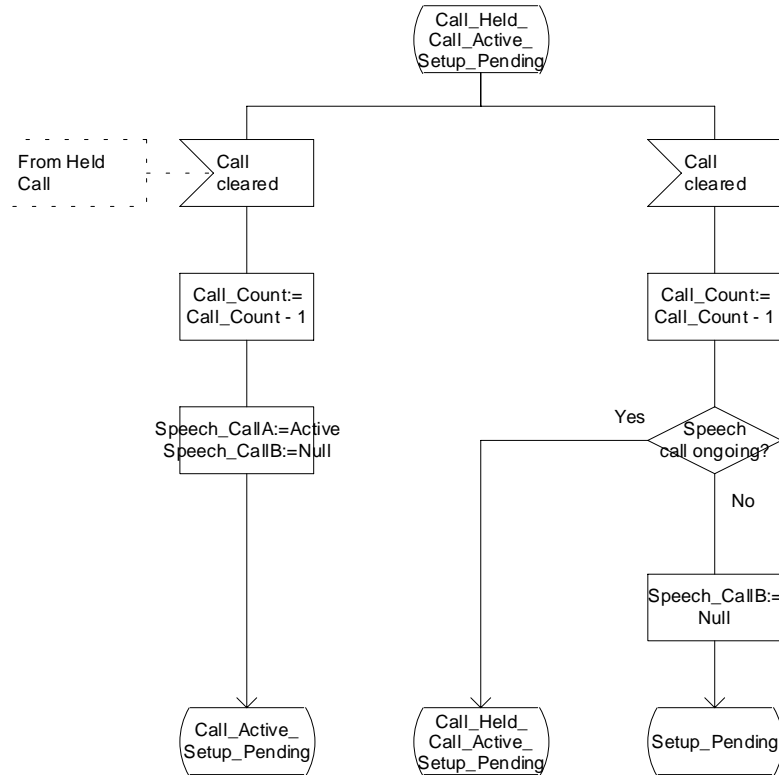are to/from either process
OCH_MSC or process
ICH_MSC

Call_Held_
Call_Active_
Setup_Pending

Call
established

Call setup
failed

Hold
request

Retrieve
request

Call_Count:=
Call_Count + 1

Yes   Non-speech
         call ongoing?
                    No

Start
retrieve
timer

Retrieve
reject

Non_Speech_
_Call:=Active

Non_Speech_
_Call:=Null

Call_Held_
Call_Active

Wait_For_
Hold_Retrieve

Call_Held_
Call_Active_
Setup_Pending

Retrieve

Timer
expired

Call
cleared

Call
cleared

From held call
process

Stop
retrieve
timer

Call_Count:=
Call_Count - 1

Stop
retrieve
timer

Hold
ack

Hold
reject

Is
speech call still
active?   Yes
        No

Call_Count:=
Call_Count - 1

Retrieve
ack

Stop
retrieve
timer

Speech_CallA:=Active
Speech_CallB:=Null

Speech_CallB:=
Null

Call_Held_
Call_Active_
Setup_Pending

Call_Held_
Setup_Pending

Wait_For_
Hold_Retrieve

Call_Active_
Setup_Pending

Figure 84k: Process Subs_FSM (sheet 11)

Process Subs_FSM   SFSM12(14)

Process in the originating MSC, to control the call states on a per subscriber basis.

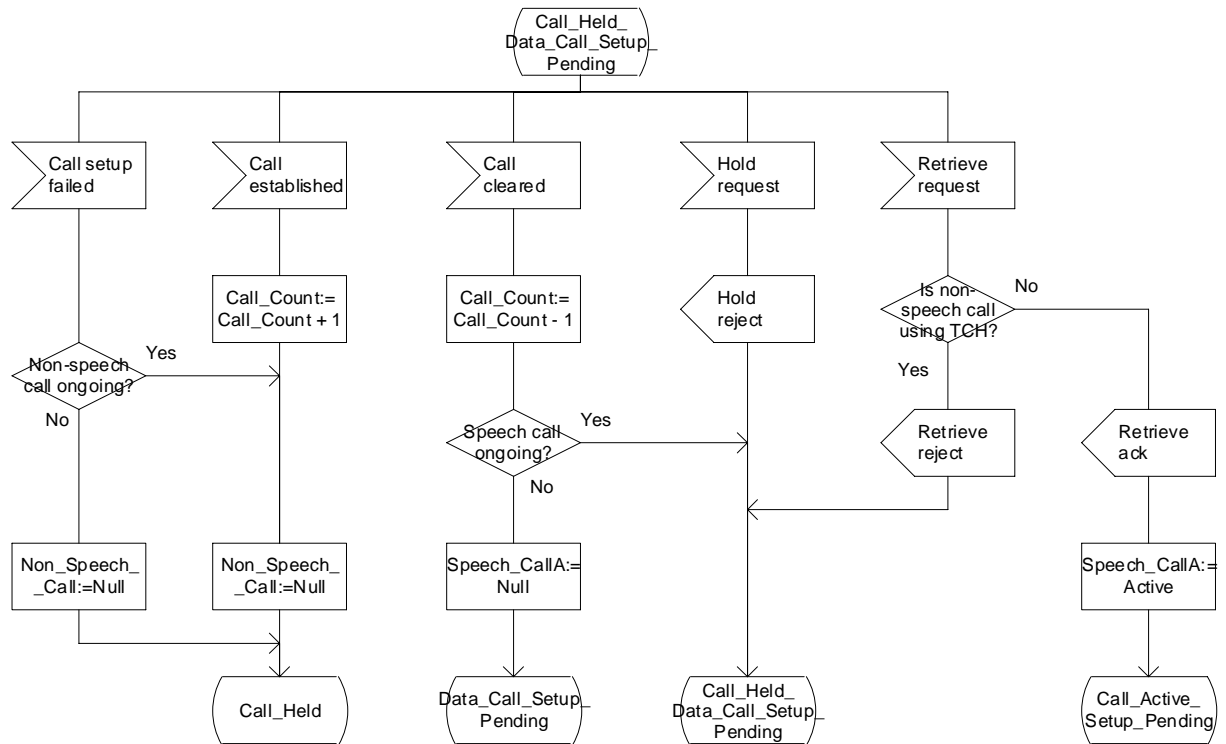Signals to/from the left are to/from either process OCH_MSC or process ICH_MSC

Call_Held_
Call_Active_
Setup_Pending

From Held Call

Call cleared

Call cleared

Call_Count:=
Call_Count - 1

Call_Count:=
Call_Count - 1

Speech_CallA:=Active
Speech_CallB:=Null

Yes

Speech call ongoing?

No

Speech_CallB:=
Null

Call_Active_
Setup_Pending

Call_Held_
Call_Active_
Setup_Pending

Setup_Pending

Figure 84I: Process Subs_FSM (sheet 12)

Process Subs_FSM   SFSM13(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
OCH_MSC or process
ICH_MSC

Call_Held_
Data_Call_Setup_
Pending

| Call setup failed | Call established | Call cleared | Hold request | Retrieve request |

Call_Count:=
Call_Count + 1

Call_Count:=
Call_Count - 1

Hold
reject

Is non-
speech call
using TCH?   No

Non-speech
call ongoing?   Yes

No

Speech call
ongoing?   Yes

No

Yes

Retrieve
reject

Non_Speech_
_Call:=Null

Non_Speech_
_Call:=Null

Speech_CallA:=
Null

Speech_CallA:=
Active

Call_Held

Data_Call_Setup_
Pending

Call_Held_
Data_Call_Setup_
Pending

Call_Active_
Setup_Pending

Figure 84m: Process Subs_FSM (sheet 13)

Process Subs_FSM   SFSM14(14)

Process in the originating MSC
to control the call states on a per
subscriber basis.

Signals to/from the left
are to/from either process
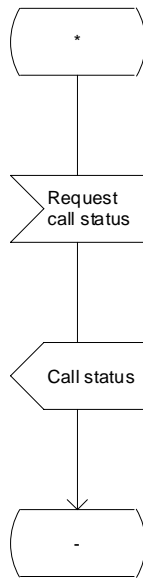OCH_MSC or process
ICH_MSC

*

Request
call status

Call status

-

Figure 84n: Process Subs_FSM (sheet 14)