3GPP TSG_CN **Tdoc NP-000298**
Plenary Meeting #8, Dusseldorf, Germany
21st – 23rd June 2000.

Source: **TSG_N WG4**

Title: **CRs to 3G Work Item "Multicall"**

Agenda item: **6.19.4**

Document for: **APPROVAL**

Introduction:

This document contains **"4"** CRs on **Work Item "Multicall",** that have been agreed by **TSG_N WG4,** and are forwarded to **TSG_N Plenary** meeting #8 for approval.

TDoc	SPEC	CR	REV	PHAS	VERS	SUBJECT	CAT	NEW_VERS
N4-000395	23.135	001	1	R99	3.0.0	Cleanup and corrections for Multicall Stage 2	F	3.1.0
N4-000401	24.135	001	2	R99	3.0.0	Clarifications of the Multicall procedures	F	3.1.0
N4-000349	29.002	142	1	R99	3.4.0	Addition of a parameter in the subsequent Handover from	C	3.5.0
N4-000278	29.002	143		R99	3.4.0	Editorial correction to MSC-A handover SDLs	D	3.5.0

3GPP/SMG TSG-CN WG4 Meeting #2
Rotenburg, Germany, 22 MAY - 26 May.2000

N4-000395
Document Rev. of N4-000221
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

23.135	**CR**	**001r1**	Current Version:	3.1.0

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

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

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

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

Source: Ericsson **Date:** 2000-06-09

Subject: Clean-up and corrections for Multicall Stage 2

Work item: Supplementary Services

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

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

Reason for change:

Several errors have been corrected, as folows:
CR has been in e-mail approval procedure. Comments from the e-mail discussion have been taken into account.

- Chapter 3.1. Definitions, Voice Group Call Service and Voice Broadcast Service have been removed as they are not applicable in UMTS
- Table 1 has been updated with more precise text.
- Flow Process Register_Multicall_HLR has been corrected. Nbr_User should take values in range from 1 to Nbr_SB, as required in MC stage 1. From the old flow it was not clear that value 0 is not allowed.
- Flow Procedure Check_MT_Multicall_MSC has been simplified. NcsMT is used instead of 7.
- Flow Procedure Establish_Terminating_TCH_Multicall1 has been corrected to align with stage 3 and 24.008.
- Flow Procedure Establish_Terminating_TCH_Multicall1 has been corrected. An additional check has been added. It checks if the UE is allowed to ask for a new bearer.
- Flow Procedure Establish_Terminating_TCH_Multicall2 has been corrected. An additional check has been added. It checks if the UE is allowed to ask for a new bearer.
- Chapter 6.6 has been removed

Clauses affected: 1.1, 4, Annex A

3G TS 23.135 V3.0.0 (2000-03)

Technical Specification

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: The category for the eMLPP in the Table 4.1 has been revised on the TS 22.067.

3rd Generation Partnership Project;
Technical Specification Group Core Network;
Multicall supplementary service - Stage 2
(Release 1999)

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Contents

Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).

The present document gives the stage 2 description of the Multicall service within the 3GPP system.

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document gives the stage 2 description of the Multicall supplementary service.

2 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] 3G TR 21.905: "3GPP Vocabulary".

[2] 3G TS 22.100: "UMTS Phase 1".

[3] 3G TS 22.105: "Services & Service capabilities".

[4] 3G TS 22.135: "Multicall Stage 1".

[5] 3G TS 23.009: "Handover procedures".

[6] 3G TS 23.011: "Technical realisation of supplementary services".

[7] 3G TS 23.018: "Basic call handling; Technical realization".

[8] 3G TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Service - Stage 2".

[9] 3G TS 24.008: "Mobile radio interface layer 3 specification Core Network Protocol – Stage 3".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 22.135 and the following apply.

Speech Call: speech call means one of TS11 (Telephony), TS12 (Emergency call), TS61 (Alternate speech and facsimile group 3)~~., TS91 (Voice Group Call Service) and TS92 (Voice Broadcast Service).~~

3.2 Abbreviations

Abbreviations used in the present document are listed in TR 21.905.

4 Descriptions

4.1 Handling of Multicall

4.1.1 Provision

No special signalling procedures apply.

4.1.2 Withdrawal

No special signalling procedures apply.

4.1.3 Registration

The information flow for registration is shown in figure 1. The registration process is shown in figure 2.

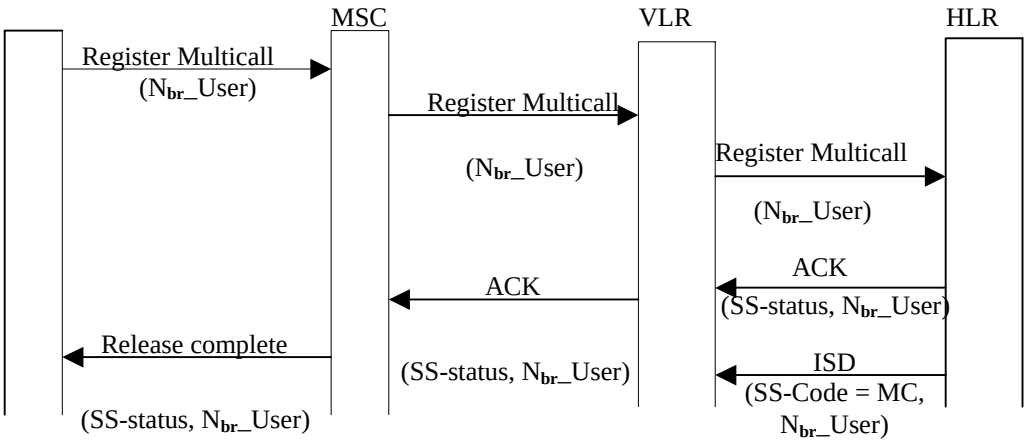
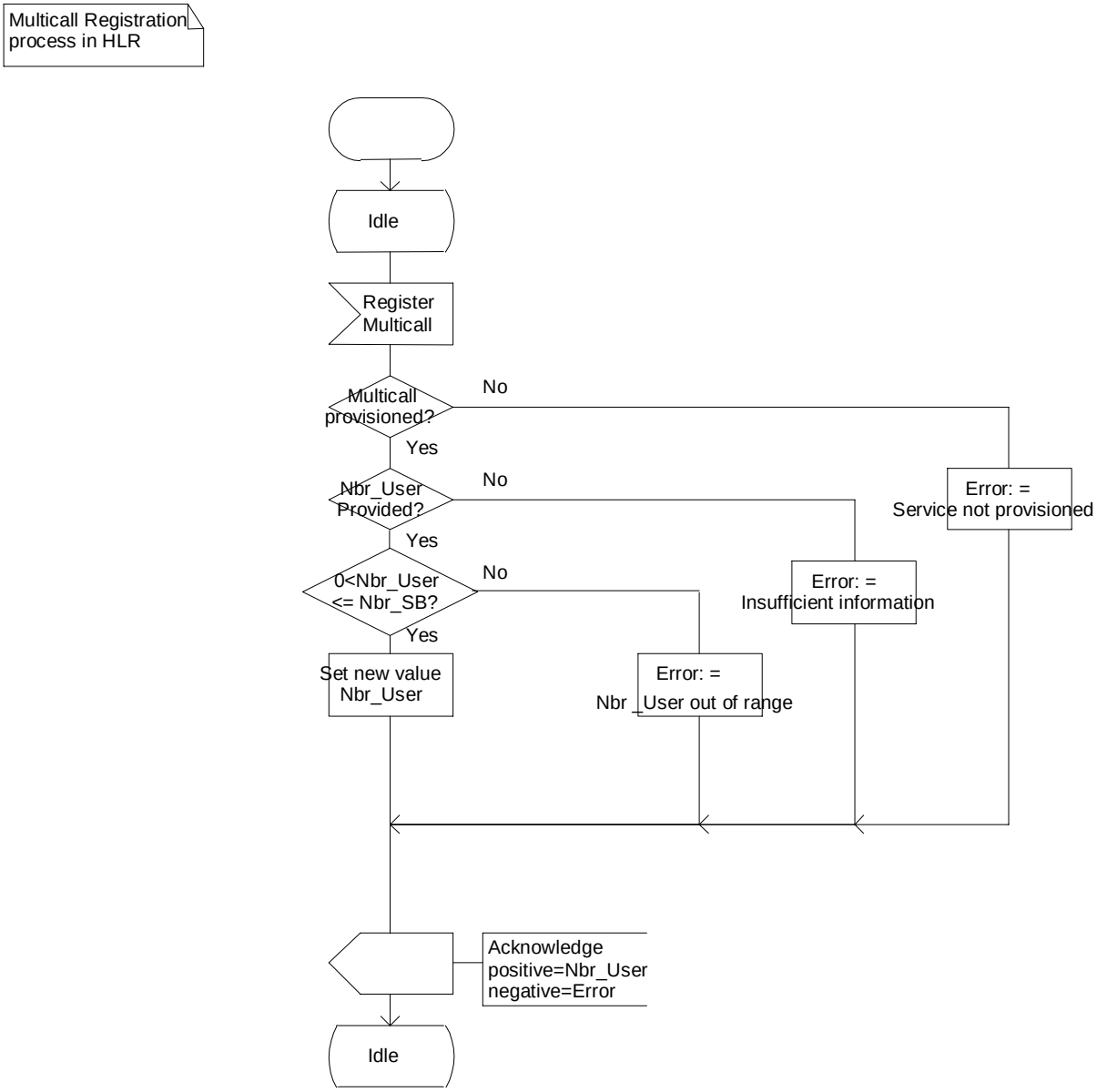


Figure 1: Registration of Multicall

Process Register_Multicall_HLR RM_HLR1(1)



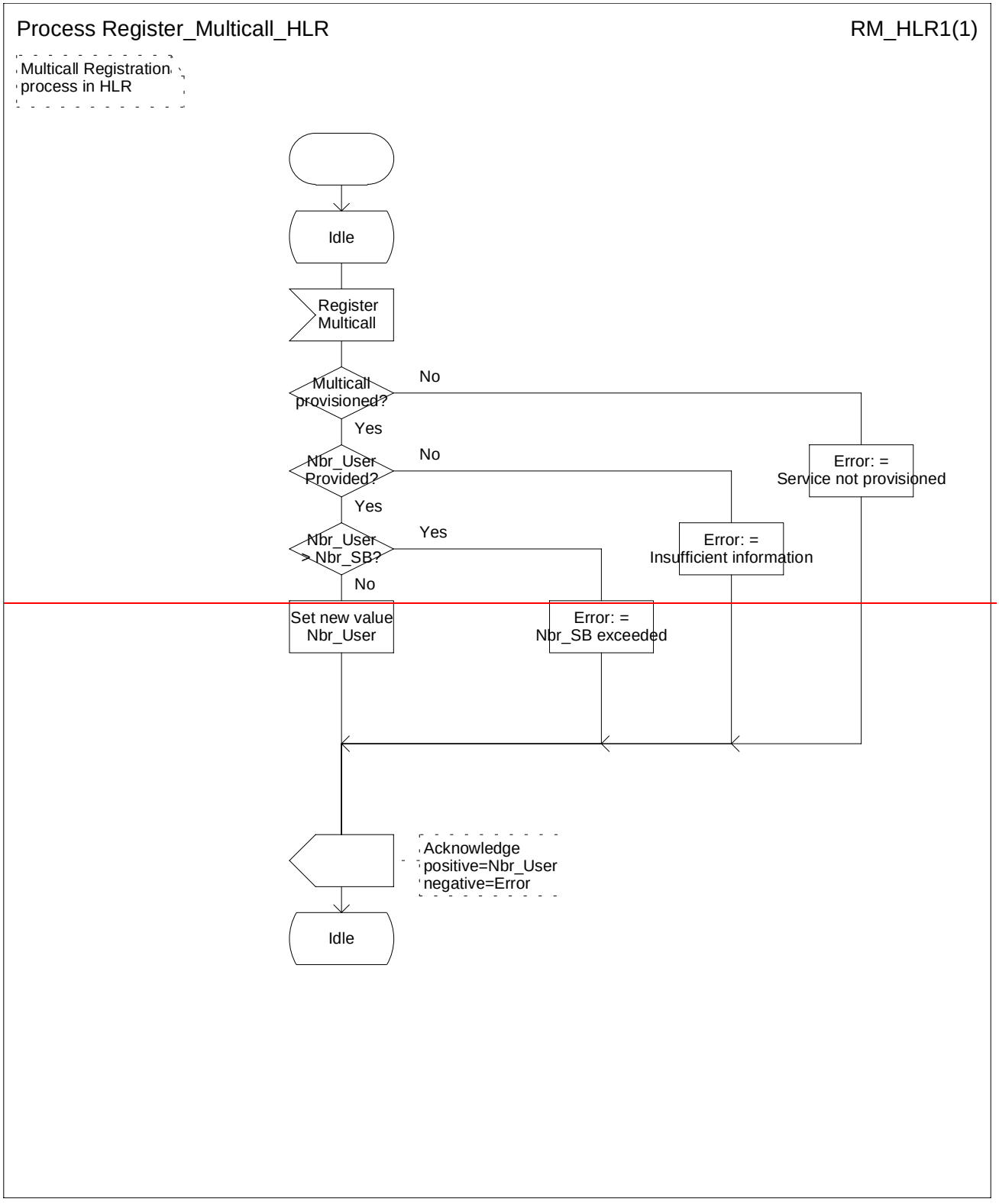


Figure 2: Process Register_Multicall_HLR

4.1.4 Erasure

No special signalling procedures apply.

4.1.5 Activation

The service provider shall provide an initial value for N_{br}_User when activating the service. No special signalling procedures apply.

4.1.6 Deactivation

No special signalling procedures apply.

4.1.7 Interrogation

The information flow for interrogation is shown in figure 3. The interrogation process is shown in figure 4.

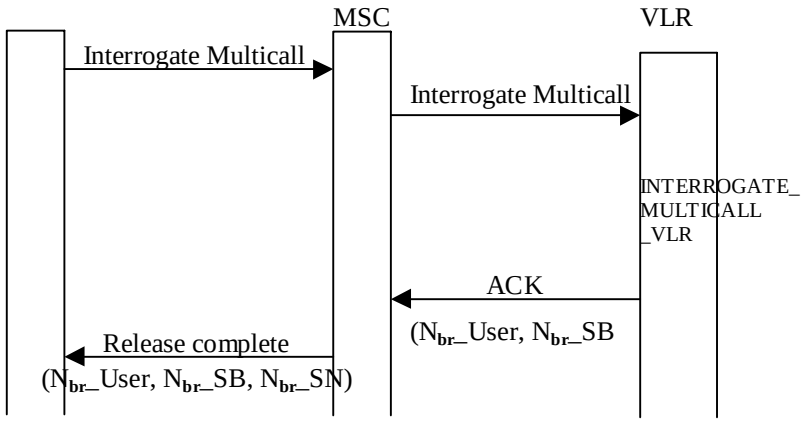


Figure 3: Interrogation of Multicall

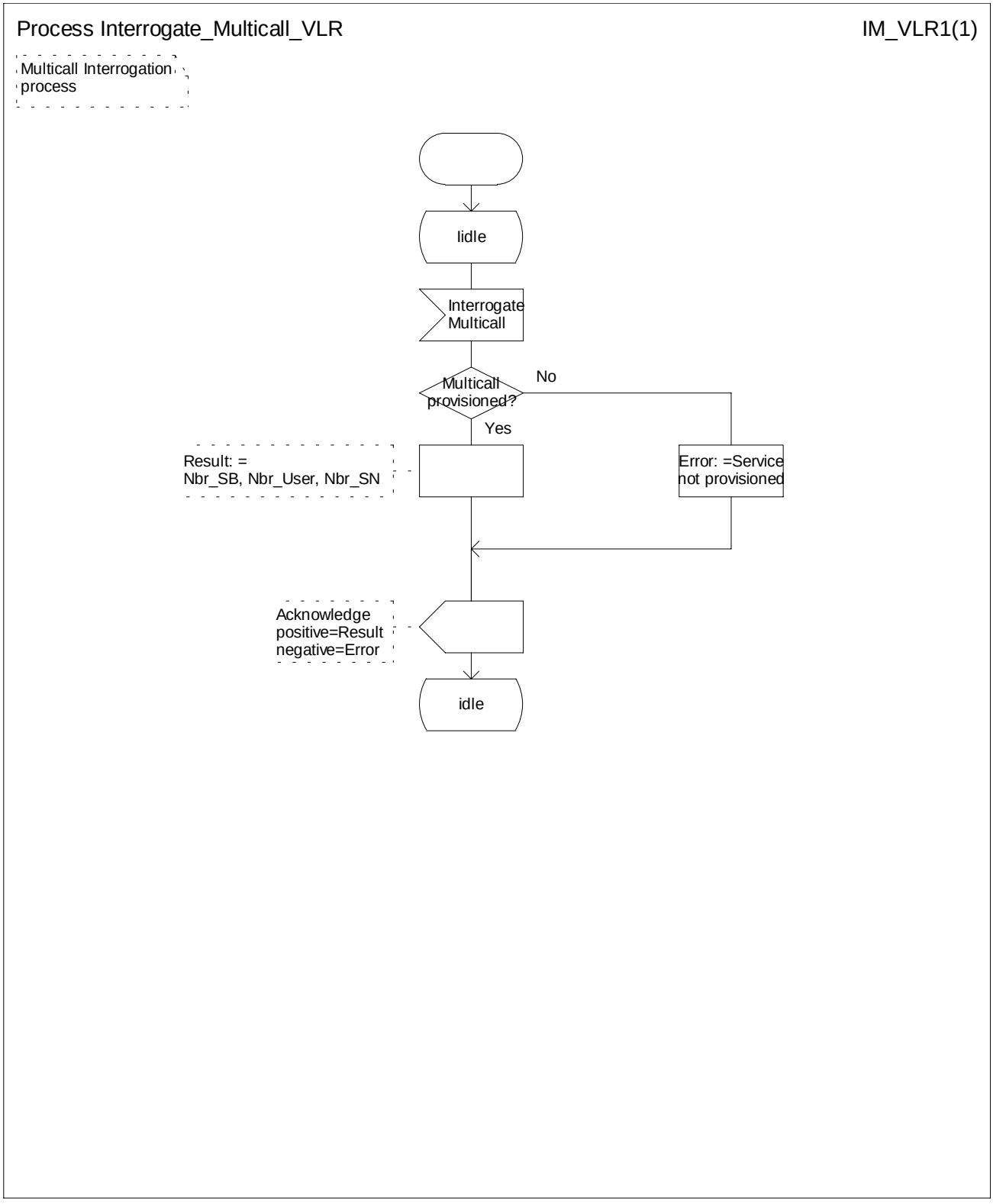


Figure 4: Process Interrogate_Multicall_VLR

4.2 Call related procedures

The procedures for basic call handling are specified in TS 23.018. These shall also be used for Multicall.

4.2.1 MO call

Figure 5 shows the flow of information between network elements for an MO call:

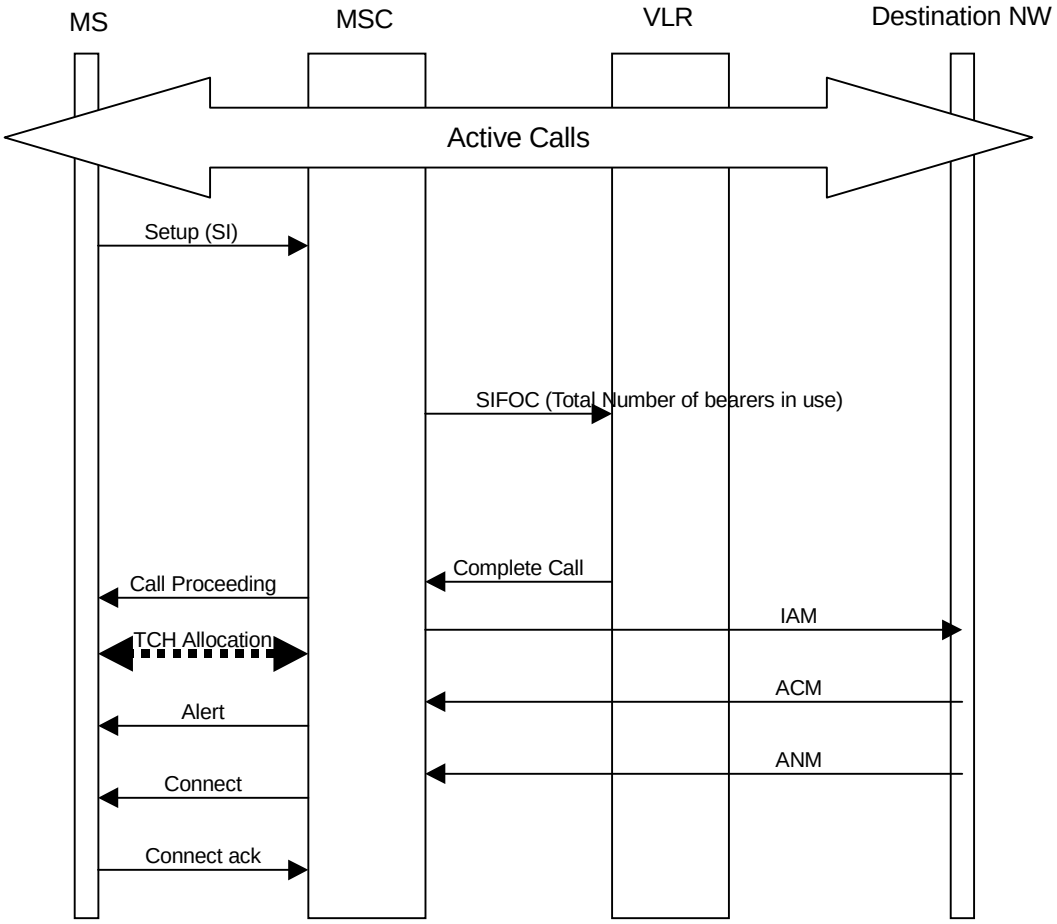


Figure 5: Information flow for mobile originating call

4.2.2 MT call

Figure 6 and Figure 7 show the flow of information between network elements for an MT call:

- Case 1: When the MS requests a new bearer in call confirmed. (Figure 6).
- Case 2: When the MS requests a new bearer in Connect. (Figure 7).

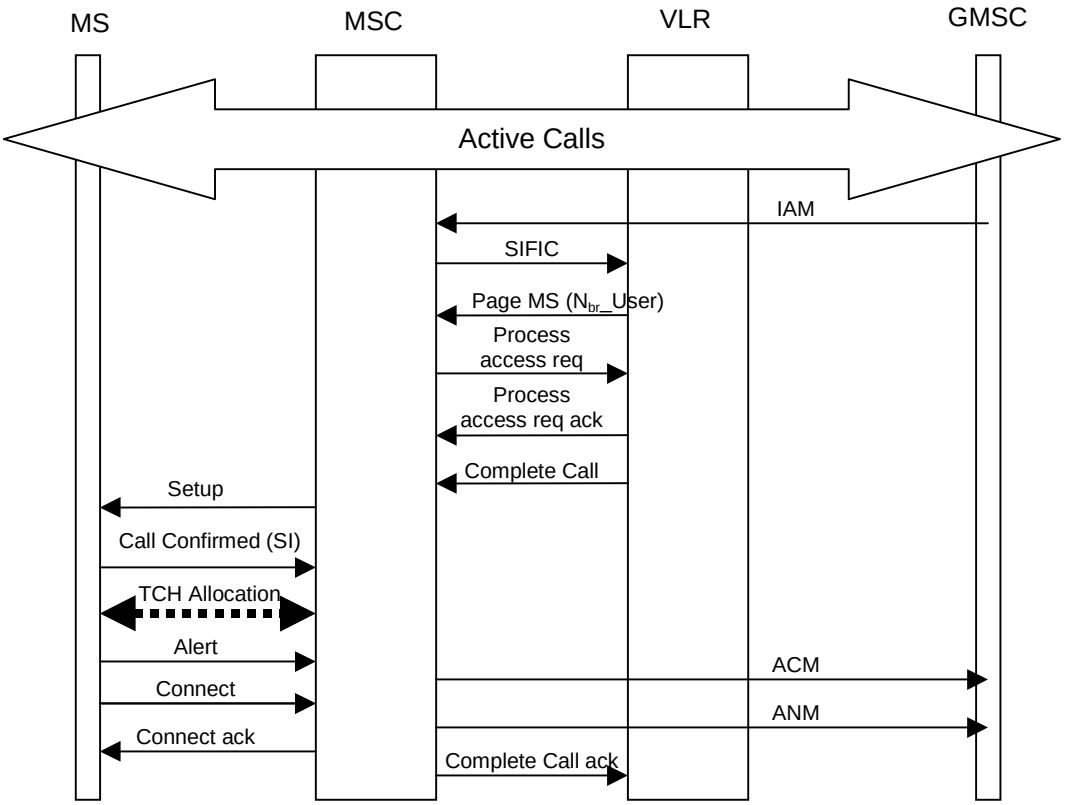


Figure 6: Information flow for mobile terminating call (Case1)

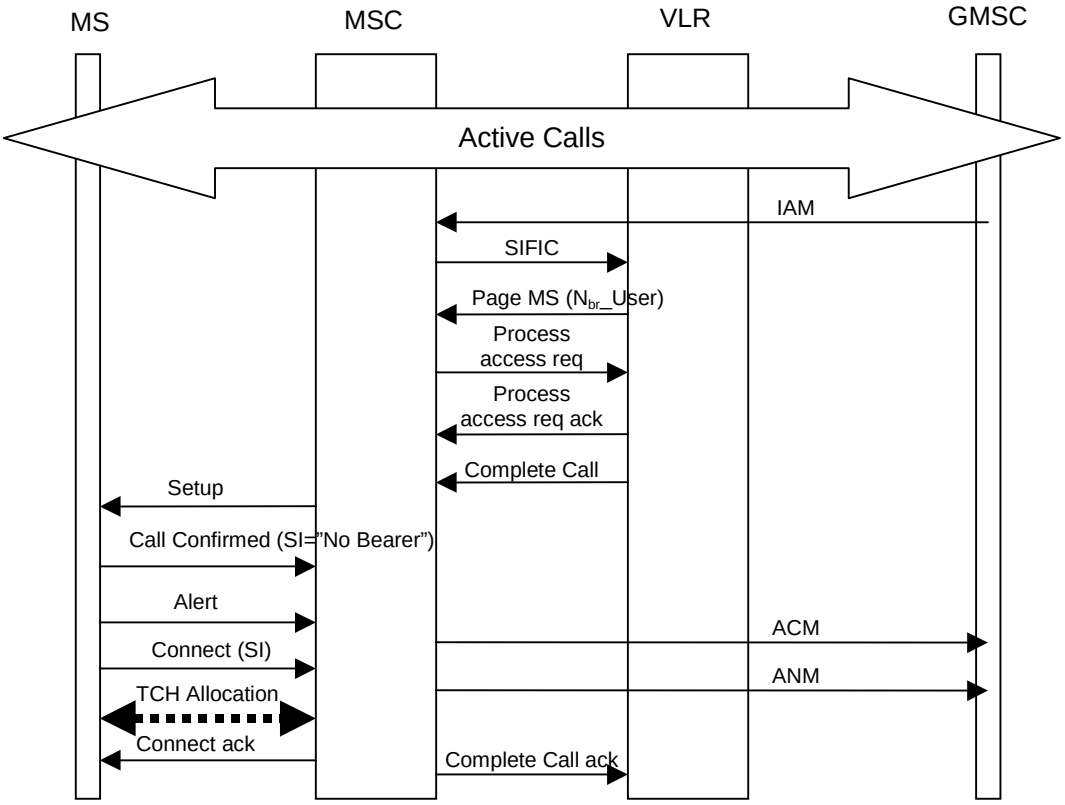


Figure 7: Information flow for mobile terminating call (Case2)

4.3 Messages and their contents

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

Each Information Element, IE, is marked as (M) Mandatory, (C) Conditional or (O) Optional. A mandatory information element shall always be present. A conditional information shall be present if certain conditions are fulfilled; if those conditions are not fulfilled it shall be absent. An optional information element may be present or absent, at the discretion of the application at the sending entity. This categorisation is a functional classification, i.e., stage 2 information and not a stage 3 classification to be used for the protocol.

The stage 2 and stage 3 message and information element names are not necessarily identical.

4.3.1 Messages between MS and MSC

Table 1 indicates messages between the MS and the MSC for mobile originating calls and mobile terminating calls. (Refer to TS 24.008).

The MS shall indicate the maximum number of bearers supported by the MS in the CC capabilities IE. The MS shall also indicate the maximum number of simultaneous speech bearers supported by the MS for future compatibility. For Release 99, the maximum number of simultaneous speech bearers is 1. If the MS does not indicate the maximum number of bearers the network shall assume it does not support Multicall.

The network supporting Multicall shall indicate the capability in the NW CC capabilities IE. If the NW CC capabilities IE is not sent from the network, the MS supporting Multicall shall assume that the network doesn't support Multicall. If an MS initiating an emergency call is located in a network that does not support Multicall, the MS shall release one or more existing call to ensure that the emergency call can be established.

Table 1: Messages between MS and MSC

Message	Message sender	Information element name	Information element Required	Information element description
Setup (MO)	MS	Stream Identifier	M	This information element indicates which bearer (new or existing) shall be used for the call.
		CC Capabilities	C	For the first call, this information element shall be included to indicate the maximum number of bearers supported by the MS.
Emergency Setup	MS	Stream Identifier	M	This information element indicates which bearer (new or existing) shall be used for the call.
Call Confirmed	MS	Stream Identifier	M	This information element indicates whether a new bearer is requested, i.e. SI=value which is not used by any of the existing bearers , or no bearer is requested at that point in time, i.e. SI="no bearer". ~~which bearer (new or existing) shall be used for the call.~~
		CC Capabilities	C	For the first call, this information element shall be included to indicate the maximum number of bearers supported by the MS.
Connect (MT)	MS	Stream Identifier	C	This IE shall be present in the Connect message if the SI contained "No bearer" in the Call Confirmed message, otherwise shall be absent.
Setup (MT)	NW	NW CC Capabilities	C	This information element shall be present for the first call.
Call Proceeding	NW	NW CC Capabilities	C	

4.3.2 Messages on B interface (MSC-VLR)

4.3.2.1 Send Info For Outgoing Call

This message is specified in TS 23.018. The following additional information element is required:

Information element name	Required	Description
Total number of bearers in use	M	~~This IE~~ Total number includes the new bearer if requested for the call.

4.3.2.2 Send Info For Outgoing Call negative response

This message is specified in TS 23.018. The following additional information element is required:

Information element name	Required	Description
Negative response information element	M	If the VLR detects that the OG call can not be permitted because Multicall limit set by the user is exceeded, it shall indicate " N_{br}_User is exceeded" as the negative response information element value. If the VLR detects that the OG call can not be permitted because the user is not provisioned with Multicall, it shall indicate "Multicall not provisioned" as the negative response information element value.

4.3.2.3 Send Info For Incoming Call

This message is specified in TS 23.018.

4.3.2.4 Send Info For Incoming Call ack

This message is specified in TS 23.018.

4.3.2.5 Send Info For Incoming Call negative response

This message is specified in TS 23.018.

4.3.2.6 Complete Call

This message is specified in TS 23.018.

4.3.2.7 Complete Call ack

This message is specified in TS 23.018.

4.3.2.8 Page MS

This message is specified in TS 23.018. The following additional information element is required:

Information element name	Required	Description
N_{br}_User	M	Shall be present if the subscriber is provisioned with Multicall.

4.3.2.9 Page MS negative response

This message is specified in TS 23.018. The following additional information element is required:

Information element name	Required	Description
Basic service list	C	If the MSC detects subscriber busy (More Calls Possible), the Basic service list shall be included, see Table 2.

Table 2: Basic Service List setting

Condition		Setting
The terminating call type is speech	There exists an active or held speech call	Basic service of active call via the same bearer as the existing speech call. If an active call does not exist via the same bearer as the existing speech call "speech" shall be indicated.
	There exists no speech call	All basic services of ongoing calls
The terminating call type is not speech		All basic services of ongoing calls

4.3.2.10 Process Access Request

This message is specified in TS 23.018.

4.3.2.11 Process Access Request ack

This message is specified in TS 23.018.

4.3.2.12 Process Access Request negative response

This message is specified in TS 23.018.

4.3.2.13 Search For MS

This message is specified in TS 23.018. The following additional information element is required:

Information element name	Required	Description
N_{br}_User	M	Shall be present if the subscriber is provisioned with Multicall.

4.3.2.14 Search For MS ack

This message is specified in TS 23.018.

4.3.2.15 Search For MS negative response

This message is specified in TS 23.018. The following additional information element is required:

Information element name	Required	Description
Basic service list	C	If the MSC detects subscriber busy (More Calls Possible), the Basic service list shall be included, see Table 2.

5 Network entity functions

The following SDL diagrams describe the procedures within individual network entities for handling Multicall.

5.1 General

The MSC shall check whether the maximum number of bearers has been reached for both MO and MT call. In counting of the current number of bearers for the target subscriber, the following situations are counted as an active bearer.

- Call in setup.
- Established call.
- Call on hold.
- Call on hold and established call on the same bearer.
- Call on hold and MO call in setup on the same bearer.

5.2 MO call

5.2.1 Functional requirements of serving MSC

Figure 8: Procedure Check_OG_Multicall_MSC.

This procedure is called when the MSC receives a Setup message from the MS. After handover procedure completion to another MSC, N_{br}_SN as defined for the target MSC shall overwrite the previous N_{br}_SN.

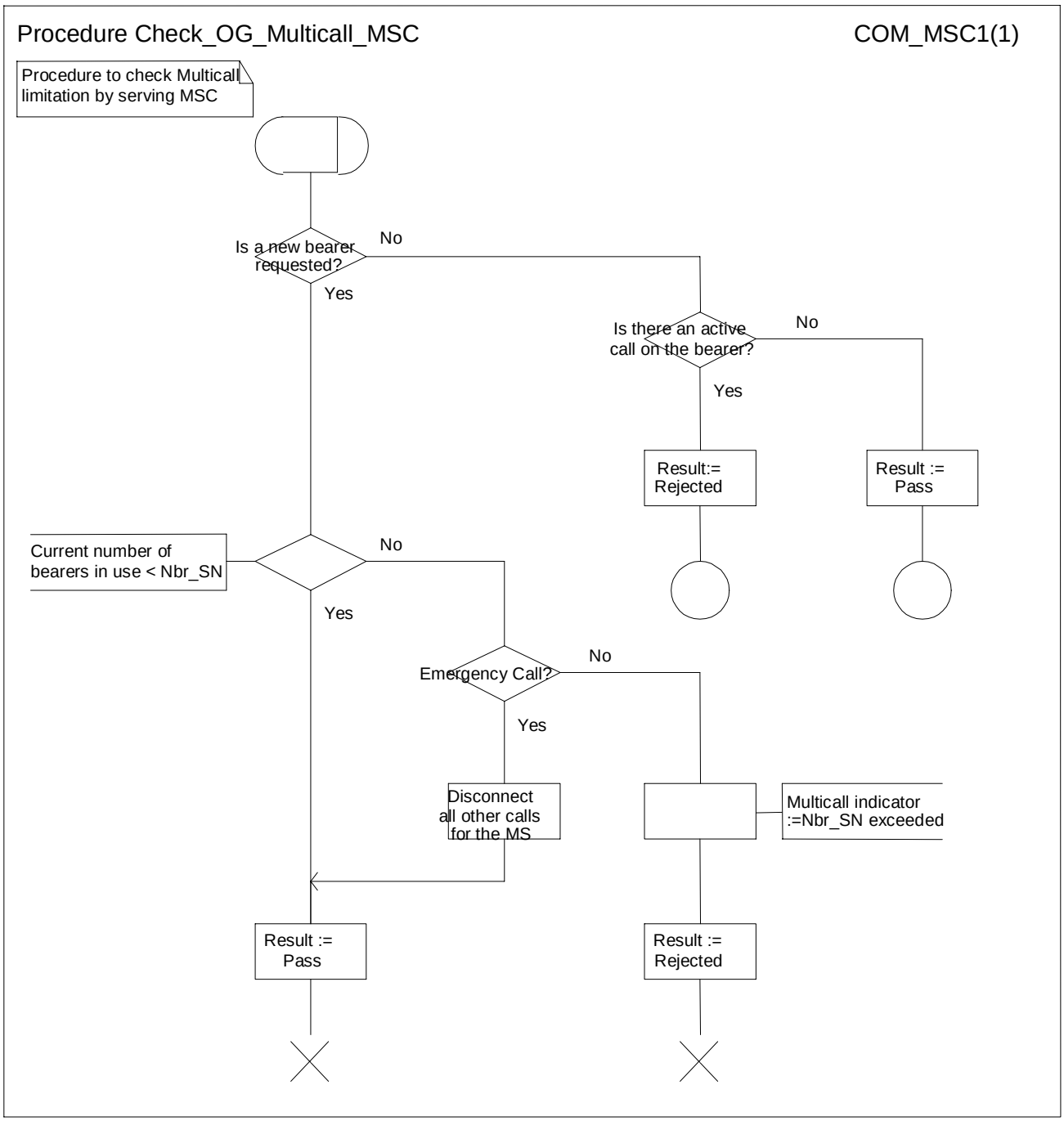


Figure 8: Procedure Check_OG_Multicall_MSC

5.2.2 Functional requirements of VLR

Figure 9: Procedure Check_OG_Multicall_VLR.

This procedure is called when the VLR receives a Send Info For Outgoing Call message from the MSC.

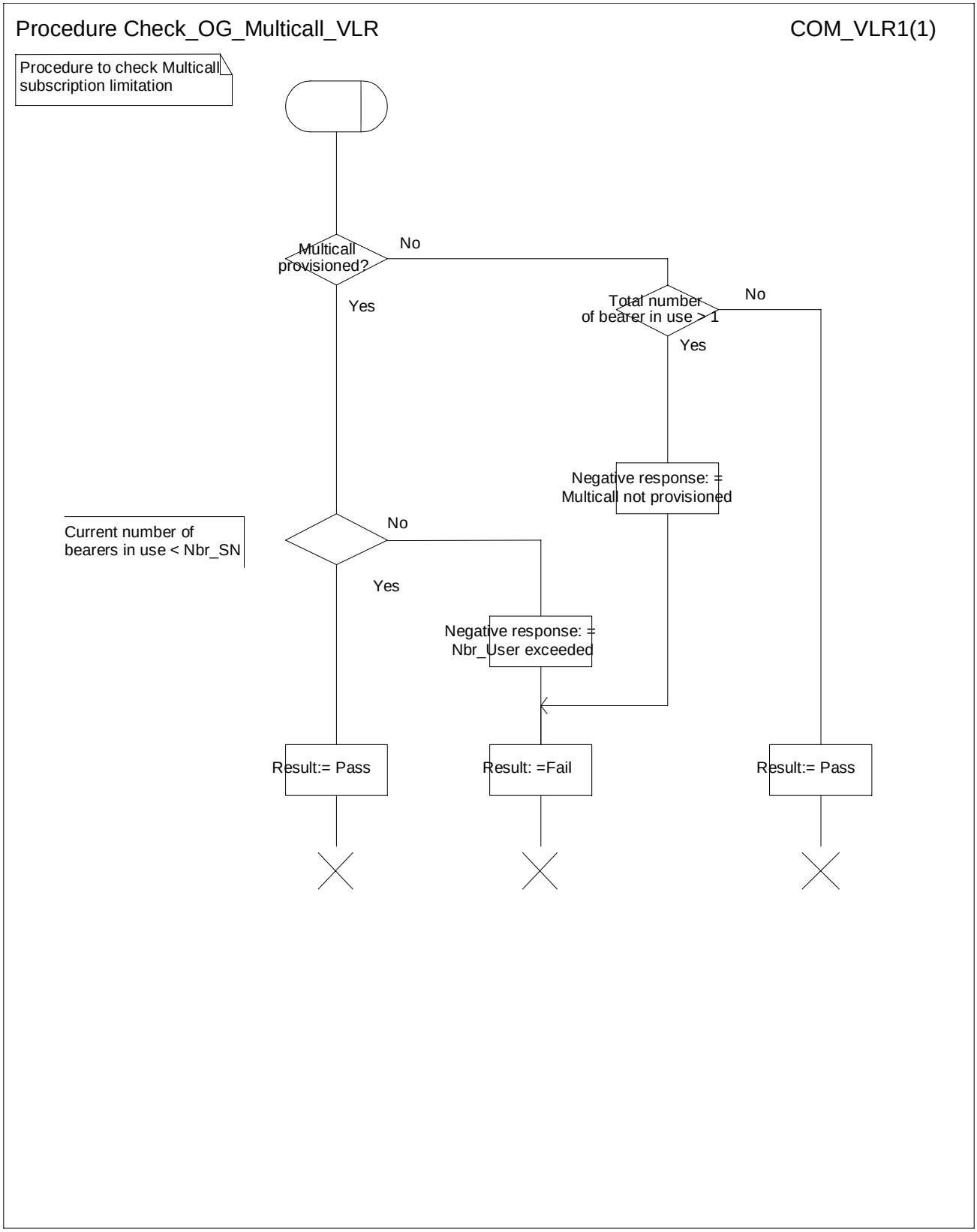


Figure 9: Procedure Check_OG_Multicall_VLR

5.3 MT call

5.3.1 Functional requirements of serving MSC

Figure 10: Procedure Check_MT_Multicall_MSC.

This procedure is called when the MSC receives a Page MS message or a Search For MS message from the VLR. The maximum number of bearers (N_{br}) indicates the minimum value of N_{br}_User, N_{br}_SN and N_{br}_UE. After handover to another MSC is completed, N_{br}_SN, as defined for the target MSC, shall overwrite the previous N_{br}_SN.

"Call in setup" means that the MS is engaged in at least one call that has not reached the established phase (called party answer).

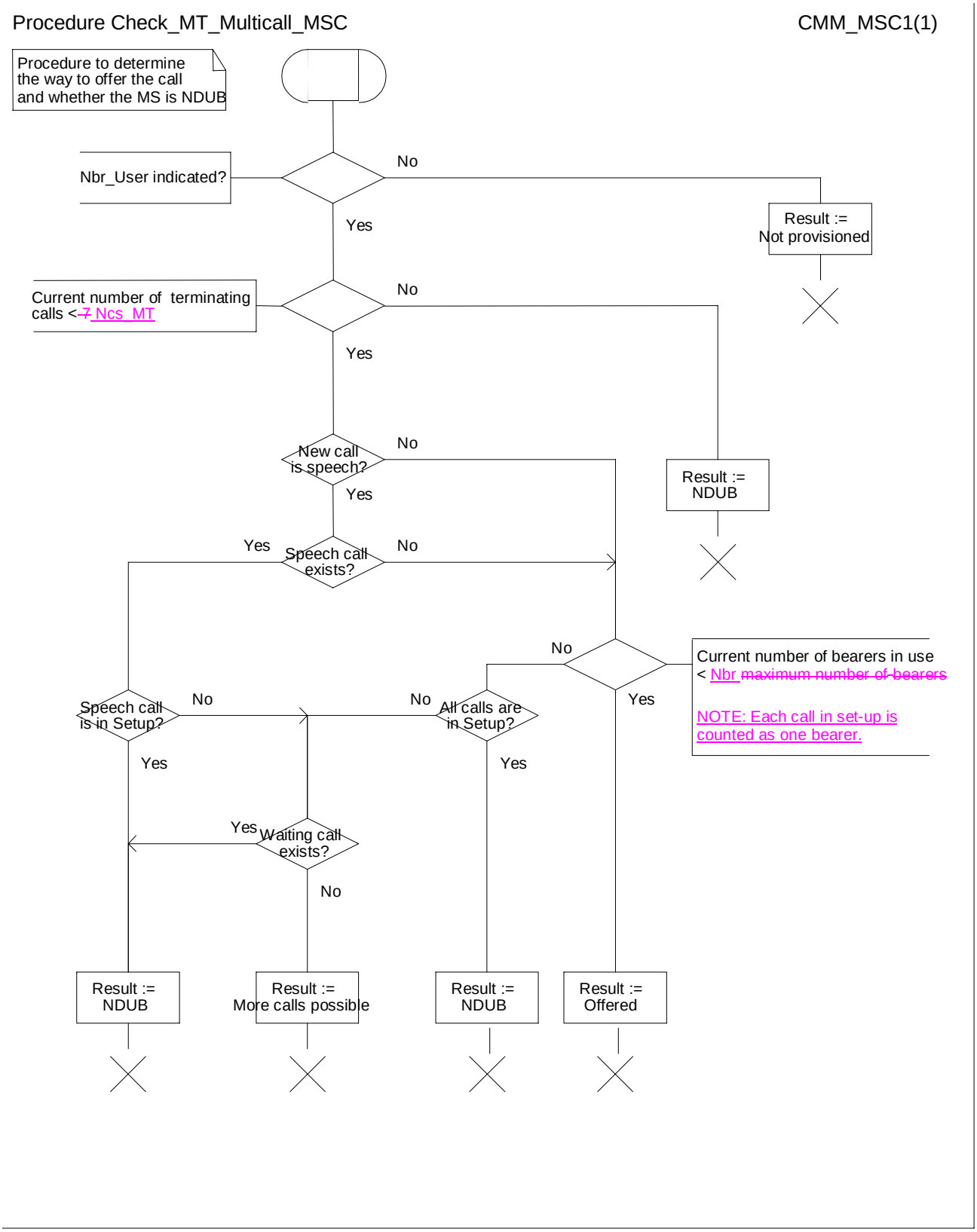
The test "Call waiting" takes the "Yes" exit if a waiting call has been offered to the subscriber but the outcome of offering the call has not been determined.

Figure 11: Procedure Establish_Terminating_TCH_Multicall1.

This procedure is called when the MSC receives a Call Confirmed message from the MS. If the MS indicates "No bearer" as the value of the Stream Identifier in the Call Confirmed message the test "Bearer allocation pending" takes the "Yes" exit.

Figure 12: Procedure Establish_Terminating_TCH_Multicall2.

This procedure is called when the MSC receives a Connect message from the MS.


Procedure Check_MT_Multicall_MSC
CMM_MSC1(1)
Procedure to determine the way to offer the call and whether the MS is NDUB
Nbr_User indicated?
No
Yes
Result := Not provisioned
Current number of terminating calls < ~~7~~ Ncs_MT
No
Yes
New call is speech?
No
Yes
Result := NDUB
Yes
Speech call exists?
No
No
Current number of bearers in use < Nbr ~~maximum number of bearers~~
NOTE: Each call in set-up is counted as one bearer.
Yes
Speech call is in Setup?
No
No
All calls are in Setup?
Yes
Yes
Yes
Waiting call exists?
No
Result := NDUB
Result := More calls possible
Result := NDUB
Result := Offered

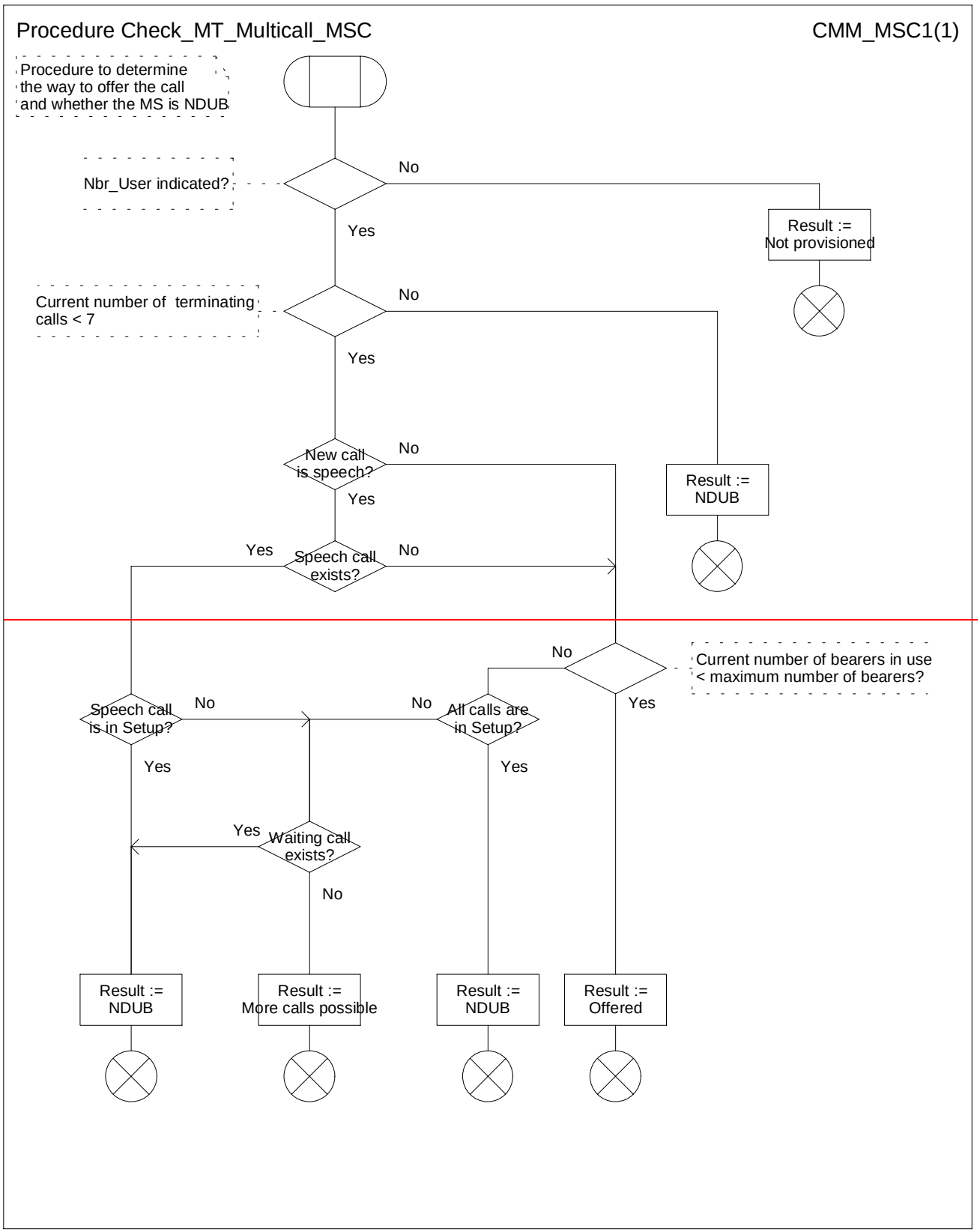
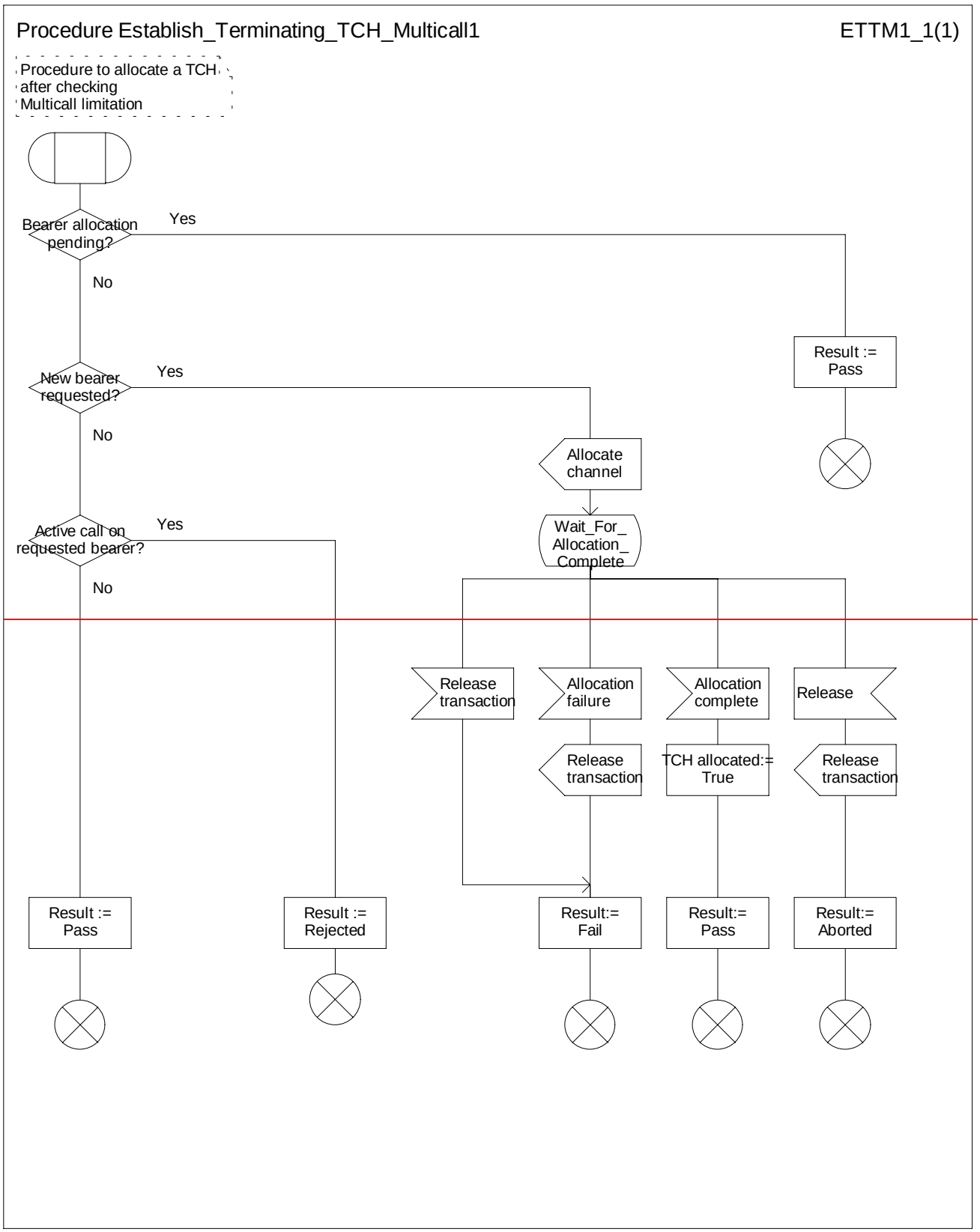


Figure 10: Procedure Check_MT_Multicall_MSC


Procedure Establish_Terminating_TCH_Multicall1
ETTM1_1(1)
Procedure to allocate a TCH after checking Multicall limitation
Bearer allocation pending?
Yes
No
Result := Pass
New bearer requested?
Yes
No
Allocate channel
Active call on requested bearer?
Yes
No
Wait_For_ Allocation_ Complete
Release transaction
Allocation failure
Allocation complete
Release
Release transaction
TCH allocated:= True
Release transaction
Result := Pass
Result := Rejected
Result:= Fail
Result:= Pass
Result:= Aborted

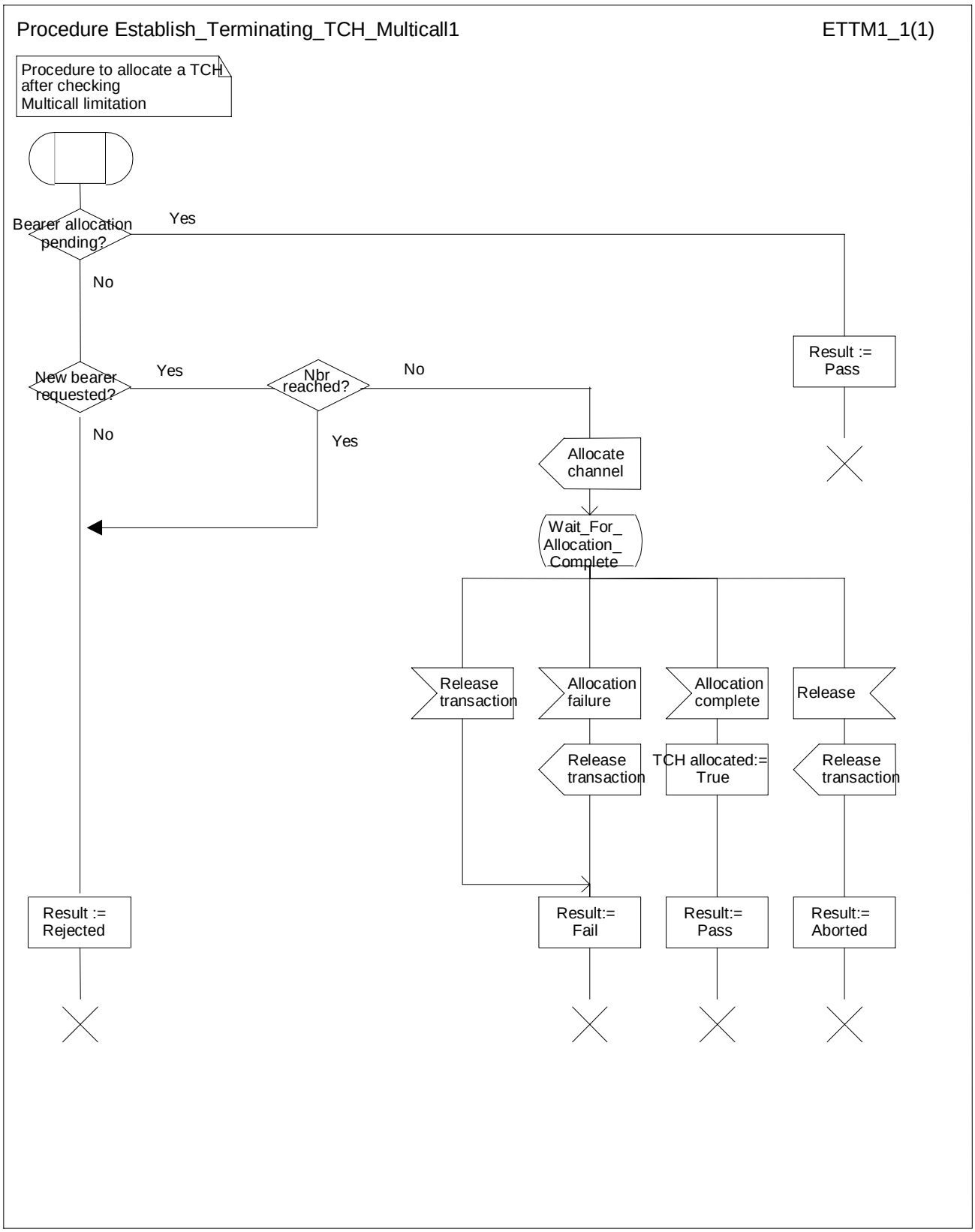
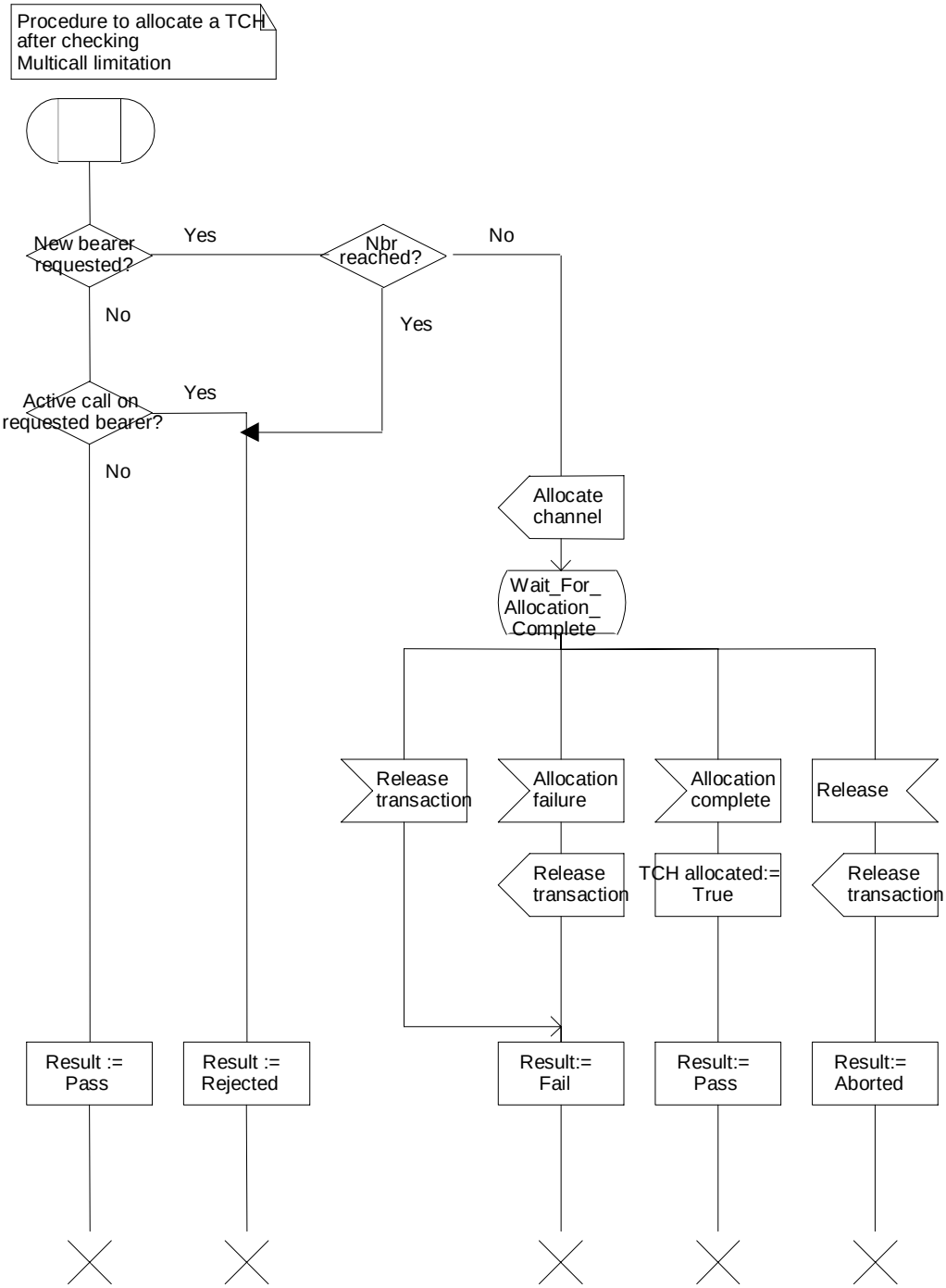


Figure 11: Procedure Establish_Terminating_TCH_Multicall1

Procedure Establish_Terminating_TCH_Multicall2 ETTM2_1(1)



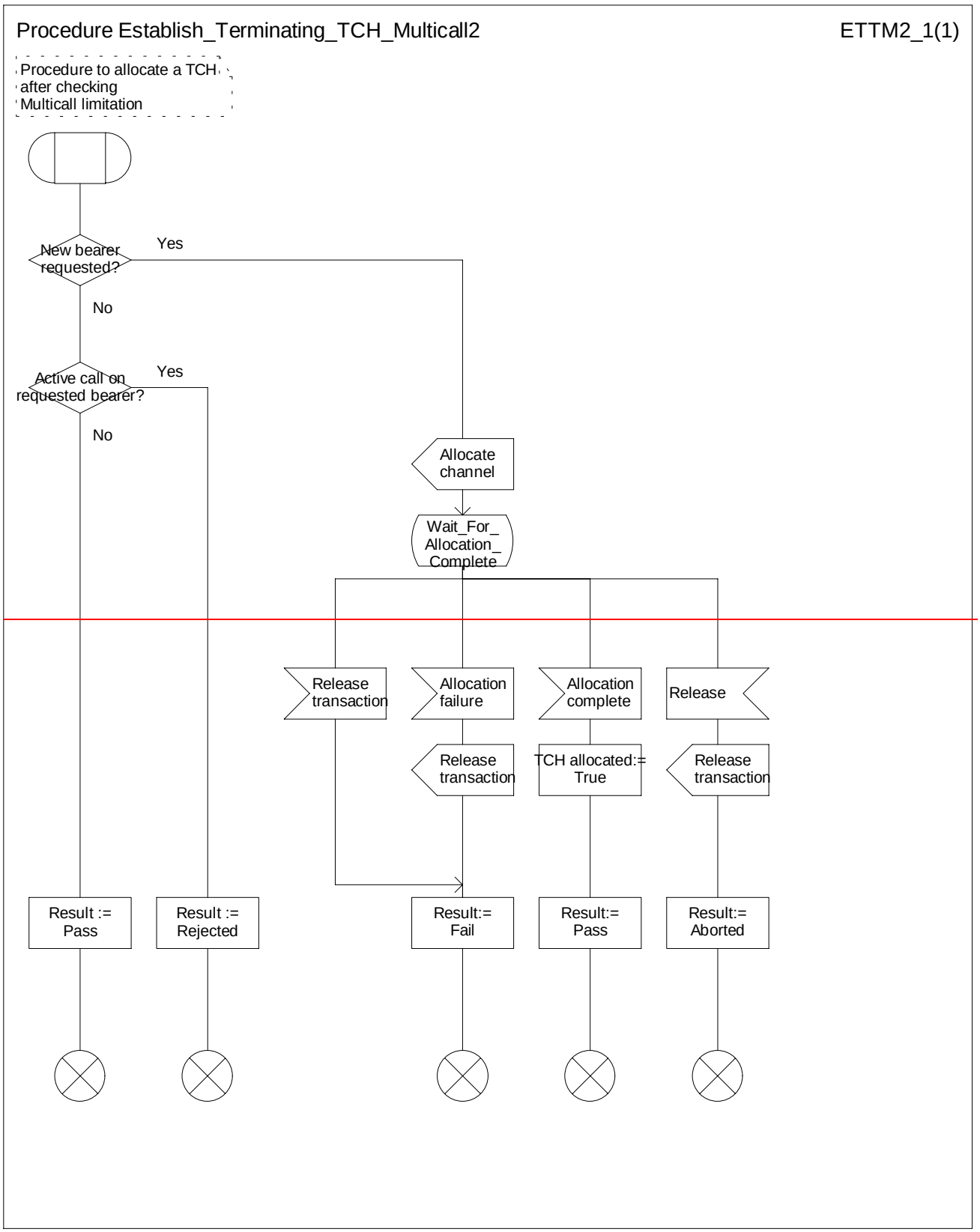


Figure 12: Procedure Establish_Terminating_TCH_Multicall2

5.3.2 Functional requirements of VLR

Figure 13: Procedure Get_CW_Subscription_Info_Multicall_VLR.

This procedure is called when the VLR receives a Page MS negative response message or a Search For MS negative response message with the negative response IE set to "Busy (More Calls Possible)".

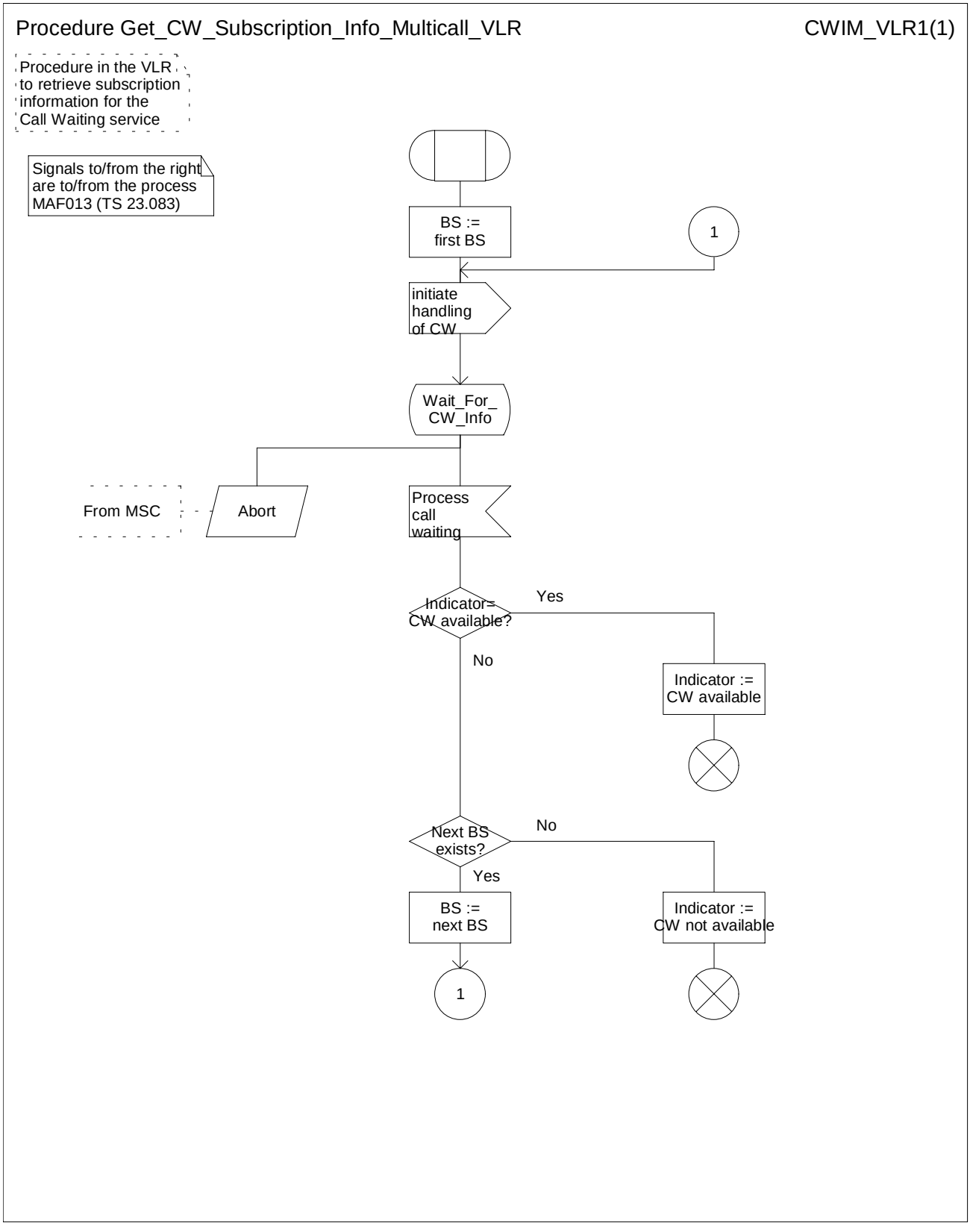


Figure 13: Procedure Get_CW_Subscription_Info_Multicall_VLR

6 Interaction with telecommunication services

6.1 Speech

The Multicall supplementary service does not provide multiple traffic channels for speech calls. Refer to Procedure Check_OG_Multicall_MSC and Procedure Check_MT_Multicall_MSC.

If N_{br}_UE is greater than N_{br}_SN, the mobile station may initiate an Emergency call even if N_{br}_SN has been reached. When the network receives an Emergency call setup message from the mobile station:

- if N_{br}_SN has not been reached, the network shall accept it regardless of N_{br}_SB or N_{br}_User;
- if N_{br}_SN has been reached, the network shall accept the emergency call after tearing down all other active calls.

The MS shall ensure that an emergency call setup request is acceptable to a serving network which does not support multicall, if necessary by releasing one or more existing calls.

6.2 Short message service

No impact.

6.3 Facsimile service

The Multicall supplementary service provides multiple traffic channels for facsimile service except for alternate speech and facsimile group 3.

6.4 Data circuit asynchronous

The Multicall supplementary service provides multiple traffic channels for data circuit asynchronous.

6.5 Data circuit synchronous

The Multicall supplementary service provides multiple traffic channels for data circuit synchronous.

~~6.6 Voice group service~~

~~The Multicall supplementary service doesn't provide multiple traffic channels for Voice group service.~~

6.7 GPRS

No impact.

7 Interaction with other supplementary services

7.1 Line Identification services

No impact.

7.2 Call forwarding unconditional (CFU)

No impact.

7.3 Call forward on busy (CFB)

The condition NDUB occurs in accordance with the definition for multicall. (See TS 22.135).

7.4 Call forwarding on no reply (CFNRy)

No impact.

7.5 Call forwarding on MS not reachable (CFNRc)

No impact.

7.6 Call Hold (CH)

No impact.

7.7 Call Waiting (CW)

Call Waiting SS will be invoked under the conditions described in TS 22.135.

7.8 Multiparty service (MPTY)

No impact.

7.9 Closed user group (CUG)

No impact.

7.10 Advice Of Charge (AoC)

No impact.

7.11 Call Barring services

No impact.

7.12 Explicit call transfer (ECT)

No impact.

7.13 Call Deflection (CD)

No impact.

7.14 Completion of calls to busy subscriber (CCBS)

The NDUB condition occurs in accordance with the definition for multicall. (See TS 22.135).

A subscriber provisioned with multicall is in the idle state when the subscriber has no ongoing (active or held) calls. CCBS requests in the destination B CCBS queue shall be processed if destination B is idle.

8 Interaction with network features

8.1 Customised Applications for Mobile network Enhanced Logic (CAMEL)

No impact.

8.2 Support of Optimal Routeing (SOR)

No impact.

8.3 Operator Determined Barring (ODB)

No impact.

9 Information stored in the HLR

The following logical states are applicable for Multicall (refer to TS 23.011 for an explanation of the notation):

Provisioning State	**Registration State**	**Activation State**	**HLR Induction State**
(Not Provisioned,	Not Applicable,	Not Active,	Not Induced)
(Provisioned,	Registered,	Active and Operative,	Not Induced)

The HLR shall store:

- The state of Multicall (which shall be one of the valid states listed above) per subscriber.
- The subscription option "maximum number of bearers N_{br}_SB" per subscriber:
  - This subscription option takes a value in the range (2 – 7).
- The subscription option “maximum number of bearers N_{br}_User” per subscriber:
  - This subscription option takes a value in the range (1 – N_{br}_SB).

10 State transition model

Figure 14 shows the successful cases of transition between the applicable logical states of Multicall. The state changes are caused by actions of the service provider.

Note that error cases are not shown in the diagram, as they normally do not cause a state change. Additionally, some successful requests may not cause a state change. Hence they are not shown in the diagram.

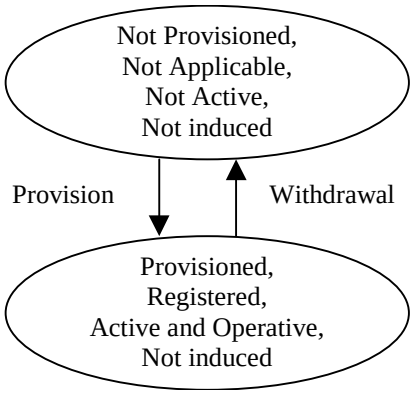


Figure 14: State transition model for Multicall

11 Transfer of information from HLR to VLR

If the provisioning state for Multicall is "Provisioned" then when the subscriber registers on a VLR the HLR shall send that VLR information about the logical state of Multicall, N_{br}_User and N_{br}_SB.

If the logical state of Multicall, the subscription options N_{br}_SB or N_{br}_User are changed while a subscriber is registered on a VLR then the HLR shall inform the VLR of the new logical state of Multicall, the new N_{br}_User or the new N_{br}_SB.

12 Information stored in VLR

The VLR shall store the service state information, N_{br}_SB and N_{br}_User as received from the HLR.

13 Handover

In the case that the network supports Multicall, it shall be possible to handover multiple bearers (See TS 23.009).

Annex A (informative): Examples

The following table shows some examples:

1 Mobile Originating Call (MO call).

- As an example: N_{br}=2.

Current Status				Additional MO call	
No	Status	Number of bearers	Number of calls	Speech	Data
1	None	0	0	Acceptable	Acceptable
2	1 Speech call(active)	1	1	Rejected	Acceptable
3	1 Speech call(on hold)	1	1	Acceptable (with same SI) Rejected (with another SI)	Acceptable
4	1 Data call(active)	1	1	Acceptable	Acceptable
5	1 Speech call(on hold) 1 Speech call(active)	1	2	Rejected	Acceptable
6	1 Speech call(on hold) 1 Data call(active)	1	2	Rejected	Acceptable
7	Multiparty (2-5 remote parties: active)	1	2 - 5	Rejected	Acceptable
8	Multiparty (2-5 remote parties: on hold)	1	2 - 5	Acceptable (with same SI) Rejected (with another SI)	Acceptable
9	1 Speech call(active) 1 Data call(active)	2	2	Rejected	Rejected
10	1 Speech call(on hold) 1 Data call(active)	2	2	Acceptable (with same SI as speech call) Rejected (with another SI)	Acceptable (with same SI as speech call) Rejected (with another SI)
11	1 Speech call(on hold) 1 Speech call(active) 1 Data call(active)	2	3	Rejected	Rejected
12	2 Data call(active)	2	2	Rejected	Rejected
13	1 Speech call(on hold) 2 Data call(active)	2	3	Rejected	Rejected
14	Multiparty (2-5 remote parties: active) 1 Data call(active)	2	3 - 6	Rejected	Rejected
15	Multiparty (2-5 remote parties: on hold) 1 Data call(active)	2	3 - 6	Acceptable (with same SI as speech call) Rejected	Acceptable (with same SI as speech call) Rejected

Current Status				Additional MO call	
No	Status	Number of bearers	Number of calls	Speech	Data
				(with another SI)	(with another SI)

2 Mobile Terminated Call (MT call).

- As an example: N_{br}=2 (CW is not active).

Current Status				Additional MT call	
No	Status	Number of bearers	Number of calls	Speech	Data
1	None	0	0	Offered	Offered
2	1 Speech call(active)	1	1	Busy	Offered
3	1 Speech call(on hold)	1	1	Busy	Offered
4	1 Data call(active)	1	1	Offered	Offered
5	1 Speech call(on hold) 1 Speech call(active)	1	2	Busy	Offered
6	1 Speech call(on hold) 1 Data call(active)	1	2	Busy	Offered
7	Multiparty (2-5 remote parties: active)	1	2 - 5	Busy	Offered
8	Multiparty (2-5 remote parties: on hold)	1	2 - 5	Busy	Offered
9	1 Speech call(active) 1 Data call(active)	2	2	Busy	Busy
10	1 Speech call(on hold) 1 Data call(active)	2	2	Busy	Busy
11	1 Speech call(on hold) 1 Speech call(active) 1 Data call(active)	2	3	Busy	Busy
12	2 Data call(active)	2	2	Busy	Busy
13	1 Speech call(on hold) 2 Data call(active)	2	3	Busy	Busy
14	Multiparty (2-5 remote parties: active) 1 Data call(active)	2	3 - 6	Busy	Busy
15	Multiparty (2-5 remote parties: on hold) 1 Data call(active)	2	3 - 6	Busy	Busy

3 Call Waiting (CW).

- As an example: N_{br}=2 (CW is provisioned).

Current Status				Additional MT call	
No	Status	CW status for speech	CW status for data	Speech	Data
1	None	-	-	-	-
2	1 Speech call(active)	active	-	CW offered	MT offered
		Not active	-	busy	MT offered
3	1 Speech call(on hold)	active	-	CW offered	MT offered
		Not active		busy	MT offered
4	1 Data call(active)	-	active	MT offered	MT offered
			Not active	MT offered	MT offered
5	1 Speech call(on hold) via bearer A 1 Speech call(active) via bearer A	active	active	CW offered	MT offered
		active	Not active	CW offered	MT offered
		Not active	active	busy	MT offered
		Not active	Not active	busy	MT offered
6	1 Speech call(on hold) via bearer A 1 Data call(active) via bearer A	active	active	CW offered	MT offered
		active	Not active	busy	MT offered
		Not active	active	CW offered	MT offered
		Not active	Not active	busy	MT offered
7	Multiparty via bearer A (2-5 remote parties: active)	active	-	CW offered	MT offered
		Not active	-	Busy	MT offered
8	Multiparty via bearer A (2-5 remote parties: on hold)	active	-	CW offered	MT offered
		Not active	-	busy	MT offered
9	1 Speech call(active) via bearer A 1 Data call(active) via bearer B	active	active	CW offered	CW offered
		active	Not active	CW offered	CW offered
		Not active	active	busy	CW offered
		Not active	Not active	busy	busy
10	1 Speech call(on hold) via bearer A 1 Data call(active) via bearer B	active	active	CW offered	CW offered
		active	Not active	CW offered	CW offered
		Not active	active	busy	CW offered
		Not active	Not active	busy	busy
11	1 Speech call(on hold) via bearer A 1 Speech call(active) via bearer A 1 Data call(active) via bearer B	active	active	CW offered	CW offered
		active	Not active	CW offered	CW offered
		Not active	active	busy	CW offered
		Not active	Not active	busy	busy
12	2 Data call(active)	-	active	CW offered	CW offered
		-	Not active	busy	busy

Current Status				Additional MT call	
No	Status	CW status for speech	CW status for data	Speech	Data
13	1 Speech call(on hold) via bearer A 2 Data call(active) via bearer A and B	-	active	CW offered	CW offered
		-	Not active	Busy	Busy
14	Multiparty via bearer A (2-5 remote parties: active) 1 Data call(active) via bearer B	active	active	CW offered	CW offered
		active	Not active	CW offered	CW offered
		Not active	active	busy	CW offered
		Not active	Not active	busy	busy
15	Multiparty via bearer A (2-5 remote parties: on hold) 1 Data call(active) via bearer B	active	active	CW offered	CW offered
		active	Not active	CW offered	CW offered
		Not active	active	busy	CW offered
		Not active	Not active	busy	busy

Annex B (informative): Change history

Change history						
TSG CN#	**Spec**	**Version**	**CR**	**<Phase>**	**New Version**	**Subject/Comment**
CN#07	23.135	1.0.0			3.0.0	Approved at TSGN#07

3GPP/SMG TSG-CN WG4 Meeting #2
Rotenburg, Germany, 22 MAY - 26 May.2000

Document N4-000401
revision of N4-000396

CHANGE REQUEST

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

24.135	CR	001r2	Current Version:	3.0.0

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

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

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	X	UTRAN / Radio		Core Network	X

Source: N4 **Date:** 2000-06-09

Subject: Clarifications of the Multicall procedures

Work item: Multicall

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

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

Reason for change:

This CR proposes some clarifications of the Multicall procedure in TS 24.135.

1) There are more error handling cases added for SI handling.

2) The case whether a network initiates call clearing with cause #50 in the mobile terminating call procedure shall be removed. Before sending a SETUP message for an additional mobile terminating call, the network shall analyse whether the mobile subscriber is provisioned with the Multicall supplementary service or not.

3) Some editorial corrections are needed.

Clauses affected:

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:

4 Multicall (MC)

4.1 Normal operation

All of the radio signalling specific to Multicall is at the served mobile subscriber side. The radio signalling on the other side uses basic call signalling procedures only.

The mobile subscriber supporting Multicall shall include the stream identifier (SI) information element. The purpose of the stream identifier (SI) information element is to associate a particular call with a Radio Access Bearer (RAB), and to identify ~~to indicate~~ whether a new traffic channel is requested for the call. Refer to TS 24.008 for the rules on allocating stream identifiers.

4.1.1 Mobile originating call (request a new traffic channel)

If the served mobile subscriber initiates an outgoing call (A-B), the mobile subscriber shall include the stream identifier (SI) information element in the SETUP message. ~~For the first call, i.e. w~~When there are no other ongoing calls, the following rules apply:

- The stream identifier value shall be equal to 1.
- CC capabilities that indicate N_{br} UE shall be included in the SETUP message.
- NW CC capabilities that indicate the network supports Multicall shall be included in the CALL PROCEEDING message.
- If the NW CC capabilities is not sent from the network, the mobile station ~~subscriber~~ shall assume that the network does not ~~n't~~ support Multicall, and shall not initiate an additional mobile originating call via a new bearer.
- If the network receives the SETUP message with a stream identifier including an invalid content (SI~~= no bearer),~~ value indicates other than 1 for the first call), the network shall initiate call clearing with cause #95 "semantically incorrect message".

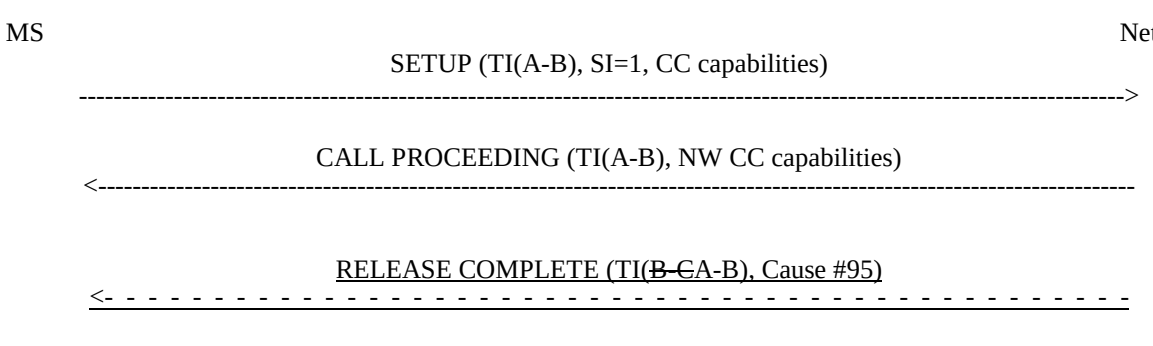


Figure 1: The first mobile originating call

When ~~If~~ there are~~is~~ one or more ~~active~~ ongoing call(s) ~~(A-B)~~ and the served mobile subscriber B wants to initiate another call (B-C) via a new bearer, the mobile station ~~subscriber~~ B shall include a stream identifier (B-C) in the SETUP message. If there are several active calls and the mobile subscriber B wants to initiate another call via a new bearer, the mobile station ~~subscriber~~ B shall include a stream identifier that is not used for the active calls.

- ~~——~~If the network receives a SETUP message with a stream identifier including an invalid content (SI= no bearer ~~or the value is already used by other active call~~), the network shall initiate call clearing with cause #95 "semantically incorrect message".
- If the network receives a SETUP message with a stream identifier including the requesting entity cannot be provided (SI value is already used by other active call), the network shall initiate call clearing with cause #44 "requested circuit/channel not available".

- If the network can not permit the call because the mobile subscriber is not provisioned with the Multicall supplementary service, the network shall initiate call clearing with cause #50 "requested facility not subscribed".

- If the network can not permit the call because the Multicall limit (N_{br}_SN or N_{br}_User) is exceeded, the network shall initiate call clearing with cause #63 "service or option not available". In this case, a NotifySS operation containing the Multicall-indicator that indicates the number of active bearers in use would exceed the maximum value will be sent to the served mobile subscriber B in a clearing message. Multicall-indicator includes:

- N_{br}_SN exceeded.

- N_{br}_User exceeded.

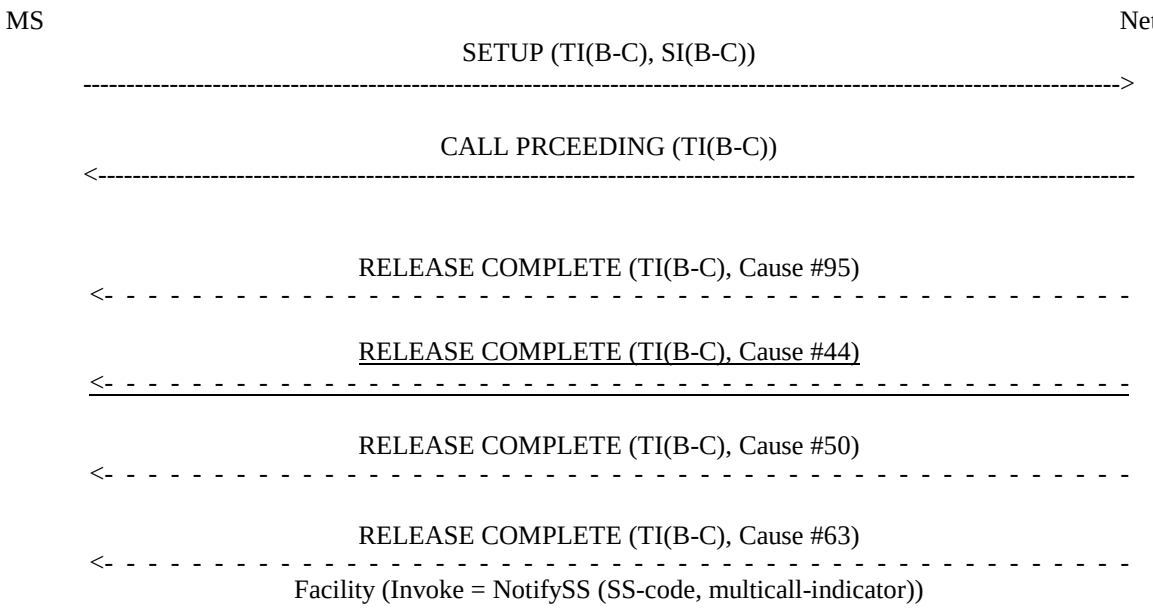


Figure 2: The additional mobile originating call

4.1.2 Mobile originating call (reuse an existing traffic channel)

When ~~If~~ there are~~is~~ one or more ongoing ~~active~~ call(s) ~~(A-B)~~ and the served mobile subscriber B wants to initiate another call (B-C) via the existing bearer, the subscriber will put one of the active calls (A-B) on hold first, and initiate the additional mobile originating call (B-C).

The hold function shall be initiated by the mobile subscriber B and the transaction identifier (TI) shall have the same value as the transaction identifier (A-B) of the existing call.

For the initiation of another call (B-C), the mobile station ~~subscriber~~ B shall include the stream identifier (SI) in the SETUP message and the stream identifier shall have the same value as the stream identifier (A-B) of the existing call.

- ~~———~~If the network receives a SETUP message with a stream identifier including an invalid content (SI value indicates “no bearer”~~, “used for other active call(s) except held call” or “SI element is missing”~~), the network shall initiate call clearing with cause #95 "semantically incorrect message".

- If the network receives a SETUP message with a stream identifier including the requesting entity cannot be provided (SI value indicates “used for other active call(s) except held call” or “SI element is missing”), the network shall initiate call clearing with cause #44 "requested circuit/channel not available".

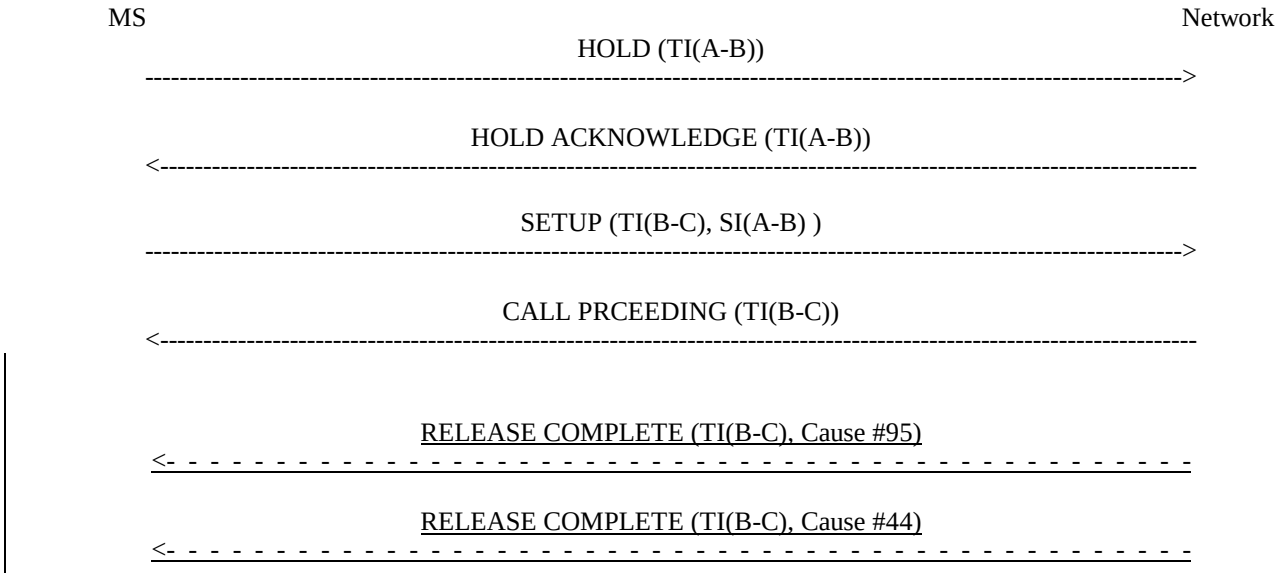


Figure 3: The mobile originating call via an existing traffic channel

4.1.3 Mobile terminating call (request a new traffic channel)

If the served mobile subscriber accepts the arrival of an incoming call (A-B), the mobile station~~subscriber~~ shall include the stream identifier (SI) information element in the CALL CONFIRMED message. ~~For the first call, i.e. w~~When there are no other ongoing calls, the following rules apply:

- NW CC capabilities that indicate the network supports Multicall shall be included in the ~~CALL PROCEEDING~~ SETUP message.
- The stream identifier value shall be equal to 1.
- CC capabilities that indicate N_{br} UE shall be included in the CALL CONFIRMED message.
- If the NW CC capabilities is not sent from the network, the mobile station ~~subscriber~~ shall assume that the network does no~~²~~t support Multicall, and shall not initiate a mobile originating call via a new bearer.
- If the network receives a CALL CONFIRMED message with a stream identifier including an invalid content (SI= ~~no bearer),~~value indicates other than 1 for the first call), the network shall initiate call clearing with cause #95 "semantically incorrect message".

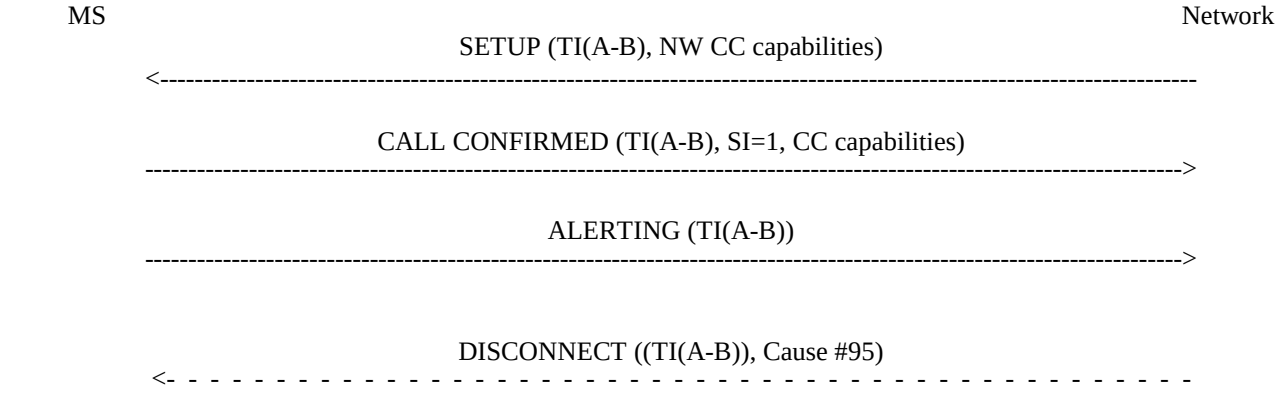


Figure 4: The first mobile terminating call

~~If~~When there are~~is~~ one or more ongoing~~active~~ call(s) ~~(A-B)~~ and the served mobile subscriber B wants to accept another incoming call (B-C) via a new bearer, the mobile station~~subscriber~~ B shall include the stream identifier with either of the following value in the CALL CONFIRMED message.

- SI = new value (not used for any of the active calls) (Case1).
- SI = "No Bearer" (Case2).

If the mobile station ~~subscriber~~ B includes the stream identifier with "No Bearer" in the CALL CONFIRMED message, the mobile station~~subscriber~~ B shall include the stream identifier with a new value in the CONNECT message.

- If the network receives a CALL CONFIRMED message with a stream identifier including the request entity cannot be provided ~~an invalid content (SI element is missing or~~ SI value is already in use)~~-~~the network shall initiate call clearing with cause #44 "requested circuit/channel not available".~~#95 "semantically incorrect message".~~
- If the network receives a CONNECT message with a stream identifier after receiving a CALL CONFIRMED message with an indicator to initiate a new bearer (Case 1), the network shall initiate call clearing with cause #95 "semantically incorrect message".
- ~~——~~If the network receives a CONNECT message with a stream identifier including an invalid content (~~SI element is missing,~~ SI = no bearer~~ or SI value is used for other active call(s) except held call~~) after receiving CALL CONFIRMED message with SI = no bearer (Case 2), the network shall initiate call clearing with cause #95 "semantically incorrect message".
- If the network receives a CONNECT message with a stream identifier including the requested entity cannot provided (~~SI element is missing or~~ SI value is used for other active call(s) except held call) after receiving CALL CONFIRMED message with SI = no bearer (Case 2), the network shall initiate call clearing with cause #44 "requested circuit/channel not available".

~~If the network can not permit the call because the mobile subscriber is not provisioned with the Multicall supplementary service, the network shall initiate call clearing with cause #50 "requested facility not subscribed".~~

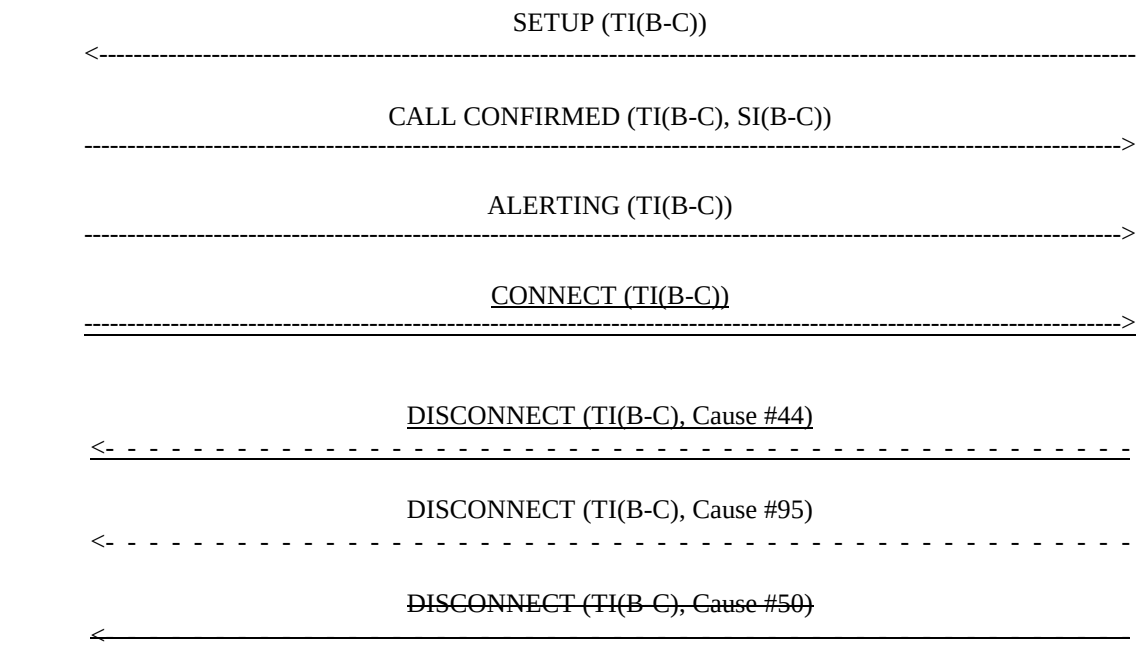


Figure 5: The additional mobile terminating call (Case1)

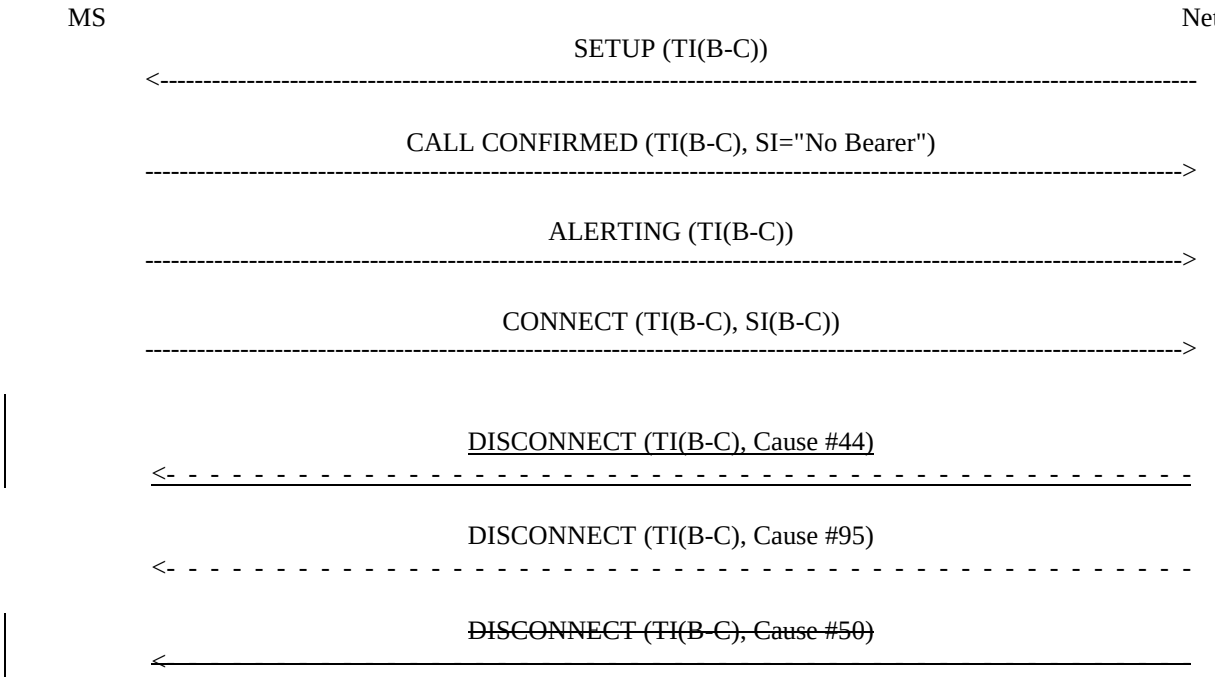


Figure 6: The additional mobile terminating call (Case2)

4.1.4 Mobile terminating call (reuse an existing traffic channel)

When ~~If~~ there are ~~is~~ one or more active call(s) ~~(A-B)~~ and the served mobile subscriber B wants to accept another incoming call (B-C) via the existing bearer, the subscriber will put one of the active calls (A-B) on hold first, and accept the additional mobile terminating call (B-C).

The hold function shall be initiated by the mobile subscriber B and the transaction identifier (TI) shall be the transaction identifier (A-B) of the existing call.

To accept the other incoming call (B-C), the mobile station~~subscriber~~ B shall include the stream identifier (SI) with value "No bearer" in the CALL CONFIRMED message. Mobile station ~~subscriber~~ B shall include the stream identifier (A-B) in the CONNECT message. (See Figure 7~~6~~).

If the Call waiting SS is invoked and the mobile subscriber B wants to accept the waiting call, the mobile subscriber B can put an existing call on hold and then accept the waiting call. In this case the mobile station ~~subscriber~~ B shall include the stream identifier (SI) with value "No bearer" in the CALL CONFIRMED message, and include the stream identifier value which is used for the held call in the CONNECT message.

- If the network receives a CALL CONFIRMED message with a stream identifier including the request entity cannot be provided ~~an invalid content~~ (~~SI element is missing or~~ SI value is already in use) the network shall initiate call clearing with cause #44 "requested circuit/channel not available". ~~#95 "semantically incorrect message".~~

- ~~——~~If the network receives a CONNECT message with a stream identifier including an invalid content (~~SI element is missing,~~ SI = no bearer ~~or SI value is used for other active call(s) except held call~~) after receiving CALL CONFIRMED message with SI = no bearer, the network shall initiate call clearing with cause #95 "semantically incorrect message".

- If the network receives a CONNECT message with a stream identifier including the requested entity cannot provided (~~SI element is missing or~~ SI value is used for other active call(s) except held call) after receiving CALL CONFIRMED message with SI = no bearer (Case 2), the network shall initiate call clearing with cause #44 "requested circuit/channel not available".

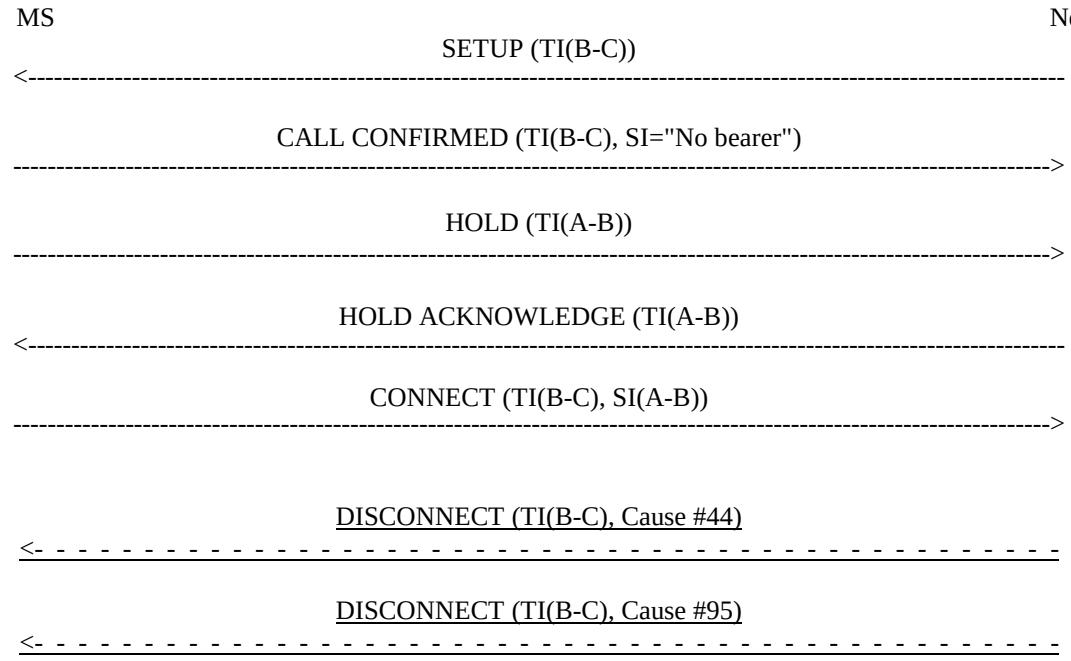


Figure 7: The mobile terminating call via an existing traffic channel

4.1.5 Mobile terminating call (unsuccessful simultaneous Call in Setup case)

If there is one call (A-B) that has not reached the established phase and the served mobile station ~~subscriber~~ B receives another incoming call (B-C), the served mobile subscriber B may not be able to accept the additional incoming call (B-C). In this case, the mobile subscriber B can initiate call clearing with cause #47 "no resources available, unspecified".

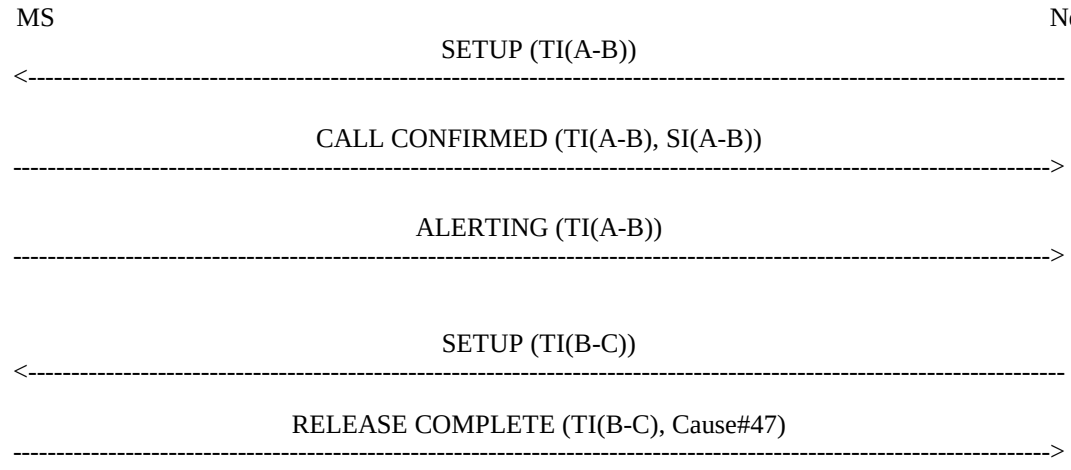


Figure 8: The mobile terminating call in the unsuccessful case of simultaneous Call in Setup

4.2 Registration

The following information has to be registered in the network:

- The maximum number of bearers chosen by the user, N_{br}_User.

4.2.1 Registration by the served mobile subscriber

A Multicall registration request from a mobile user shall include the SS-Code of Multicall. The request applies to all basic services.

If the registration is successful, the Multicall service will be registered. The network will then send a return result indicating acceptance of the request including the value of N_{br}_User.

If the MS does not send an SS Version Indicator in the invocation request then the network shall send an SS-Status in the result.

If the MS does send an SS Version Indicator in the invocation request then the inclusion of SS-Status in the result is optional. If the SS-Status is included the network shall set it to reflect the state of the service. The MS shall ignore the contents of the SS-Status parameter if one is received. See figure 9.

If the system cannot accept a registration request, a corresponding error indication is returned to the served mobile subscriber that Multicall registration was not successful. Error values are specified in 3G TS 24.080.

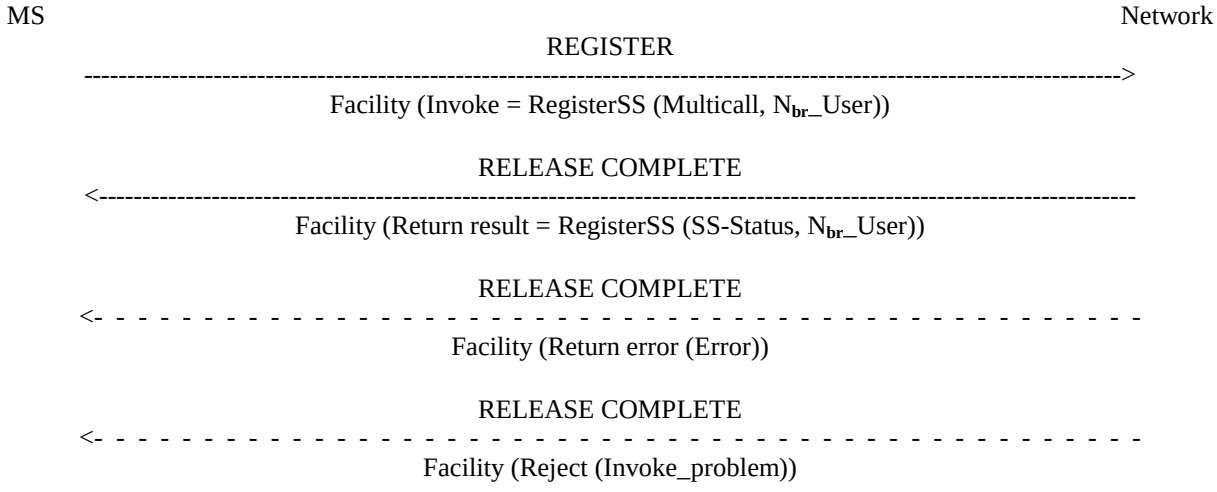


Figure 9: Registration of Multicall

4.3 Interrogation

The interrogation procedure enables the mobile subscriber to obtain information about the data stored in the PLMN. The network shall return the following information:

- The maximum number of bearers set by the user, N_{br}_User.
- The maximum number of bearers defined by Multicall subscription, N_{br}_SB.
- The maximum number of bearers supported by serving network, N_{br}_SN.

See figure 10.

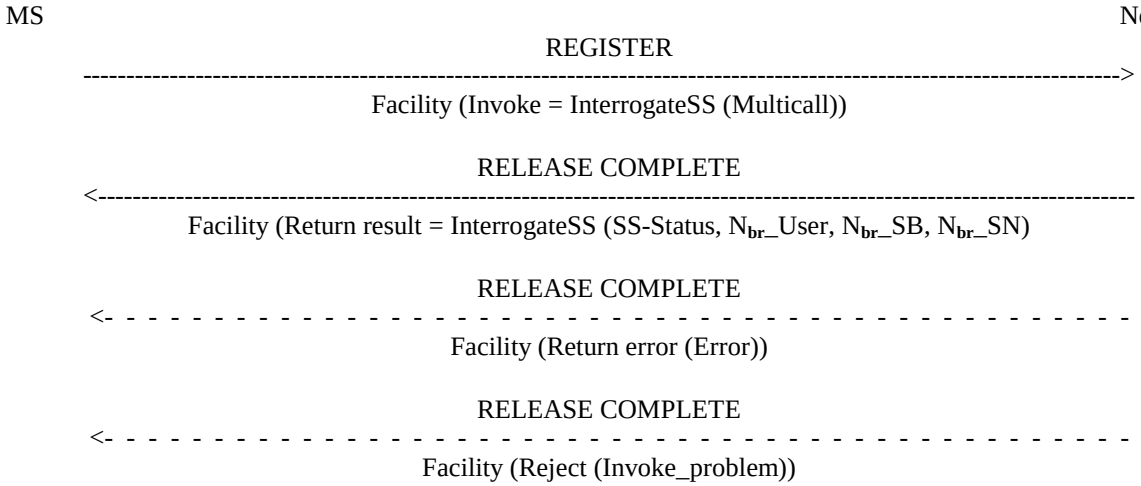


Figure 10: Interrogation of Multicall

3GPP TSG-CN4 meeting #2
Routhenburg, Germany, 22-26 May 2000

Document N4-000349

CHANGE REQUEST

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

29.002	CR	142r1	Current Version:	3.4.0

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

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

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: N4 **Date:** 2000-05-24

Subject: Addition of a parameter in the subsequent Handover from UMTS to GSM with Multicall

Work item: Multicall

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

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

Reason for change: 3G_MSC-A needs to know which one RAB has been selected in 3G_MSC-B in the subsequent handover from UMTS to GSM to release some calls not to be handed over after handover completion.

Clauses affected: 7.6, 7.6.2.55 (new), 8.4.5, 17.7.1

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	23.009-002r4
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments: This CR is releated to the concern which has been raised in CN#7 and aligned to the new CR against 23.009-002r4 which will solve the concern.


help.doc

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

First Change

7.6 Definition of parameters

Following is an alphabetic list of parameters used in the common MAP-services in subclause 7.3:

Application context name	7.3.1	Refuse reason	7.3.1
Destination address	7.3.1	Release method	7.3.2
Destination reference	7.3.1	Responding address	7.3.1
Diagnostic information	7.3.4	Result	7.3.1
Originating address	7.3.1	Source	7.3.5
Originating reference	7.3.1	Specific information	7.3.1/7.3.2/7.3.4
Problem diagnostic	7.3.6	User reason	7.3.4
Provider reason	7.3.5		

Following is an alphabetic list of parameters contained in this clause:

CUG interlock	7.6.3.24
CUG Outgoing Access indicator	7.6.3.8
CUG subscription	7.6.3.23
CUG Subscription Flag	7.6.3.37
Current location area Id	7.6.2.6
Current password	7.6.4.21
eMLPP Information	7.6.4.41
Encryption Information	7.6.6.9
Equipment status	7.6.3.2
Extensible Basic Service Group	7.6.3.5
Extensible Bearer service	7.6.3.3
Extensible Call barring feature	7.6.3.21
Extensible Call barring information	7.6.3.20
Extensible Call barring information for CSE	7.6.3.79
Extensible Forwarding feature	7.6.3.16
Extensible Forwarding info	7.6.3.15
Extensible Forwarding information for CSE	7.6.3.80
Extensible Forwarding Options	7.6.3.18
Extensible No reply condition timer	7.6.3.19
Extensible QoS-Subscribed	7.6.3.74
Extensible SS-Data	7.6.3.29
Extensible SS-Info	7.6.3.14
Extensible SS-Status	7.6.3.17
Extensible Teleservice	7.6.3.4
External Signal Information	7.6.9.4
Failure Cause	7.6.7.9
Forwarded-to number	7.6.2.22
Forwarded-to subaddress	7.6.2.23
Forwarding feature	7.6.4.16
Forwarding information	7.6.4.15
Forwarding Options	7.6.4.6
GGSN address	7.6.2.40
GGSN number	7.6.2.41
GMSC CAMEL Subscription Info	7.6.3.34
GPRS enhancements support indicator	7.6.3.73
GPRS Node Indicator	7.6.8.14
GPRS Subscription Data	7.6.3.46
GPRS Subscription Data Withdraw	7.6.3.45
GPRS Support Indicator	7.6.8.15
Group Id	7.6.2.33
GSM bearer capability	7.6.3.6
Guidance information	7.6.4.22
Handover number	7.6.2.21
High Layer Compatibility	7.6.3.43
HLR Id	7.6.2.15
HLR number	7.6.2.13
HO-Number Not Required	7.6.6.7
IMEI	7.6.2.3
IMSI	7.6.2.1
Integrity Protection Information	7.6.6.8
Inter CUG options	7.6.3.27
Intra CUG restrictions	7.6.3.28
Requested Subscription Info	7.6.3.86
Roaming number	7.6.2.19
Roaming Restricted In SGSN Due To Unsupported Feature	7.6.3.49
Roaming Restriction Due To Unsupported Feature	7.6.3.13
Current Security Context	7.6.7.8
Selected RAB ID	7.6.2.55
Service centre address	7.6.2.27
Serving Cell Id	7.6.2.37
SGSN address	7.6.2.39
SGSN CAMEL Subscription Info	7.6.3.75
SGSN number	7.6.2.38
SIWF Number	7.6.2.35
SoLSA Support Indicator	7.6.3.57
SM Delivery Outcome	7.6.8.6
SM-RP-DA	7.6.8.1
SM-RP-MTI	7.6.8.16
SM-RP-OA	7.6.8.2
SM-RP-PRI	7.6.8.5
SM-RP-SMEA	7.6.8.17
SM-RP-UI	7.6.8.4
Sres	7.6.7.3
SS-Code	7.6.4.1
SS-Data	7.6.4.3
SS-Event	7.6.4.42
SS-Event-Data	7.6.4.43
SS-Info	7.6.4.24
SS-Status	7.6.4.2
Stored location area Id	7.6.2.5
Subscriber State	7.6.3.30
Subscriber Status	7.6.3.7
Super-Charger Supported in HLR	7.6.3.70
Super-Charger Supported in Serving Network Entity	7.6.3.71
Supported CAMEL Phases in VLR	7.6.3.36
Supported CAMEL Phases in SGSN	7.6.3.36A
Suppress T-CSI	7.6.3.33
Suppression of Announcement	7.6.3.32
Target cell Id	7.6.2.8
Target location area Id	7.6.2.7
Target RNC Id	7.6.2.8A
Target MSC number	7.6.2.12
Teleservice	7.6.4.39
TMSI	7.6.2.2
Trace reference	7.6.10.2
Trace type	7.6.10.3
User error	7.6.1.4
USSD Data Coding Scheme	7.6.4.36
USSD String	7.6.4.37
UU Data	7.6.5.12
UUS CF Interaction	7.6.5.13
VBS Data	7.6.3.40
VGCS Data	7.6.3.39
VLR CAMEL Subscription Info	7.6.3.35
VLR number	7.6.2.14
VPLMN address allowed	7.6.3.48
Zone Code	7.6.2.28

Next Change

7.6.2.52 Multicall Bearer Information

This parameter refers to the number of simultaneous bearers supported per user by the serving network.

7.6.2.53 Multiple Bearer Requested

This patrameter indicates whether multiple bearers are requested for a relocation.

7.6.2.54 Multiple Bearer Not Supported

This parameter indicates whether multiple bearers are supported.

7.6.2.55 Selected RAB ID

The selected radio access bearer to be kept at subsequent inter-MSC handover from UMTS to GSM.

Next Change

8.4 Handover services

It should be noted that the handover services used on the B-interface have not been updated for Release 99. The B-interface is not fully operational specified. It is strongly recommended not to implement the B-interface as an external interface.

8.4.5 MAP_PREPARE_SUBSEQUENT_HANDOVER service

8.4.5.1 Definition

This service is used between MSC-B and MSC-A (E-interface) to inform MSC-A that it has been decided that a handover or relocation to either MSC-A or a third MSC (MSC-B') is required.

The MAP_PREPARE_SUBSEQUENT_HANDOVER service is a confirmed service using the primitives from table 8.4/5.

8.4.5.2 Service primitives

Table 8.4/5: MAP_PREPARE_SUBSEQUENT_HANDOVER

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
Target Cell Id	C	C(=)		
Target RNC Id	C	C(=)		
Target MSC Number	M	M(=)		
Selected RAB ID	C	C(=)		
AN-APDU	M	M(=)	C	C(=)
User error			C	C(=)
Provider error				O

8.4.5.3 Parameter use

Invoke Id

For definition of this parameter see subclause 7.6.1.

Target Cell Id

For definition of this parameter see subclause 7.6.2. This parameter shall be excluded if the service is a part of the Inter-MSC SRNS Relocation procedure described in 3G TS 23.009.

Target RNC Id

For definition of this parameter see subclause 7.6.2. This parameter shall be included if the service is a part of the Inter-MSC SRNS Relocation procedure described in 3G TS 23.009.

Target MSC Number

For definition of this parameter see subclause 7.6.2.

Selected RAB ID

For definition of this parameter see subclause 7.6.2.

AN-APDU

For definition of this parameter see subclause 7.6.9.

User error

For definition of this parameter see subclause 7.6.1. The following error causes defined in subclause 7.6.1 may be used, depending on the nature of the fault:

- Unknown MSC;
- Subsequent handover failure;
- Unexpected data value;
- Data Missing.

Provider error

For definition of this parameter see subclause 7.6.1.

Next Change

17.7 MAP constants and data types

[Omitted]

```
-- handover types

ForwardAccessSignalling-Arg ::= SEQUENCE {
    an-APDU                         AccessNetworkSignalInfo,
    extensionContainer              [0]  ExtensionContainer          OPTIONAL,
    ...}

PrepareHO-Arg ::= [3] SEQUENCE {
    targetCellId                    [0] GlobalCellId                 OPTIONAL,
    ho-NumberNotRequired            NULL                             OPTIONAL,
    targetRNCId                     [1] RNCId                        OPTIONAL,
    an-APDU                         [2] AccessNetworkSignalInfo      OPTIONAL,
    multipleBearerRequested         [3] NULL                         OPTIONAL,
    imsi                            [4] IMSI                         OPTIONAL,
    integrityProtectionInfo         [5] IntegrityProtectionInformation OPTIONAL,
    encryptionProtectionInfo        [6] EncryptionProtectionInformation  OPTIONAL,
    radioResourceInformation        [7] RadioResourceInformation     OPTIONAL,
    extensionContainer              [8] ExtensionContainer           OPTIONAL,
    ...}
```

```
PrepareHO-Res ::= [3] SEQUENCE {
     handoverNumber                    [0] ISDN-AddressString           OPTIONAL,
     relocationNumberList              [1]  RelocationNumberList        OPTIONAL,
     an-APDU                           [2]  AccessNetworkSignalInfo     OPTIONAL,
     multicallBearerInfo               [3]  MulticallBearerInfo         OPTIONAL,
     multipleBearerNotSupported        NULL                             OPTIONAL,
     extensionContainer                [4]  ExtensionContainer          OPTIONAL,
     ...}
```

```
PrepareSubsequentHO-Arg ::= [3] SEQUENCE {
     targetCellId                      [0] GlobalCellId,
     targetMSC-Number                  [1] ISDN-AddressString,
     targetRNCId                       [2] RNCId                        OPTIONAL,
     an-APDU                           [3]  AccessNetworkSignalInfo     OPTIONAL,
     selectedRab-Id                    [4]  RAB-Id                      OPTIONAL,
     extensionContainer                [54] ExtensionContainer          OPTIONAL,
     ...}
```

```
PrepareSubsequentHO-Res ::= SEQUENCE {
     an-APDU                           AccessNetworkSignalInfo,
     extensionContainer                [0]  ExtensionContainer          OPTIONAL,
     ...}
```

```
ProcessAccessSignalling-Arg ::= SEQUENCE {
     an-APDU                           AccessNetworkSignalInfo,
     extensionContainer                [0]  ExtensionContainer          OPTIONAL,
     ...}
```

```
SendEndSignal-Arg ::= SEQUENCE {
     an-APDU                           AccessNetworkSignalInfo,
     extensionContainer                [0]  ExtensionContainer          OPTIONAL,
     ...}
```

```
SendEndSignal-Res ::= SEQUENCE {
     extensionContainer                [0]  ExtensionContainer          OPTIONAL,
     ...}
```

```
RNCId ::= OCTET STRING (SIZE (5))
     -- Refers to the Target RNC-ID in the Target ID in 3G TS 25.413.
     -- The internal structure is defined as follows:
     -- octet 1 bits 4321                Mobile Country Code 1st digit
     --         bits 8765                Mobile Country Code 2nd digit
     -- octet 2 bits 4321                Mobile Country Code 3rd digit
     --         bits 8765                Mobile Network Code 3rd digit
     --                                  or filler (1111) for 2 digit MNCs
     -- octet 3 bits 4321                Mobile Network Code 1st digit
     --         bits 8765                Mobile Network Code 2nd digit
     -- octets 4 and 5                   RNC ID
```

```
RelocationNumberList ::= SEQUENCE SIZE (1..maxNumOfRelocationNumber) OF
                                        RelocationNumber
```

```
MulticallBearerInfo ::= INTEGER (1..maxNumOfRelocationNumber)
```

```
RelocationNumber ::= SEQUENCE {
     handoverNumber                    ISDN-AddressString,
     rab-Id                            RAB-Id,
     -- RAB Identity is needed to relate the calls with the radio access bearers.
     ...}
```

```
RAB-Id ::= INTEGER (1..maxNrOfRABs)
```

```
maxNrOfRABs INTEGER ::= 256
```

```
maxNumOfRelocationNumber  INTEGER ::= 7
```

```
RadioResourceInformation ::= OCTET STRING (SIZE (5..10))
     -- Octets are coded according the Channel Type information element in GSM 08.08
```

```
IntegrityProtectionInformation ::= OCTET STRING (SIZE (17..maxNumOfIntegrityInfo))
     -- Octets are coded according to 3G TS 25.413
```

```
maxNumOfIntegrityInfo INTEGER ::= 100
```

```
EncryptionProtectionInformation ::= OCTET STRING (SIZE (17..maxNumOfEncryptionInfo))
     -- Octets are coded according to 3G TS 25.413
```

```
maxNumOfEncryptionInfo INTEGER ::= 100
```

[Omitted]

3GPP TSG-CN4 meeting #2
Routhenburg, Germany, 22-26 May 2000

Document N4-000278

CHANGE REQUEST

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

29.002	CR	143	Current Version:	3.4.0

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

For submission to: TSG-CN #8 *list expected approval meeting # here ↑*

for approval [X] for information [ ]

strategic [ ] non-strategic [X] *(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 [X]

Source: N4 **Date:** 2000-05-16

Subject: Editorial correction to MSC-A handover SDLs

Work item: Multicall

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

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

Reason for change: Some editorial correction to SDL 1/13.
Renumbering of 2/12-12/12 to 3/13-13/13.

Clauses affected: 19.2.2.5

Other specs affected:

Other 3G core specifications	[X]	→ List of CRs:	23.009-002r4
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 Change

19.2.2 Handover procedure in MSC-A

This subclause describes the handover or relocation procedure in MSC-A, including the request for a basic handover or relocation to another MSC (MSC-B), subsequent handover or relocation to a third MSC (MSC-B') or back to the controlling MSC (MSC-A).

19.2.2.1 Basic handover

When MSC-A has decided that a call has to be handed over or relocated to MSC-B, the Handover Control Application in MSC-A requests the MAP application to initiate the MAP_PREPARE_HANDOVER request to MSC-B.

MSC-A opens the dialogue to MSC-B with a MAP_OPEN request containing no user specific parameters and sends a MAP_PREPARE_HANDOVER request. This request may optionally contain an indication that a handover number allocation is not required, targetCellId, for compatibility reasons if handover, and all information required by MSC-B to allocate the necessary radio resources. The request may also contain IMSI, UMTS encryption information and UMTS integrity protection information that are necessary parameters for inter-system handover from GSM to UMTS. GSM radio resource information (channel type) may be included for inter-system handover from UMTS to GSM. The conditions when these parameters shall be included are described in detail in 3G TS 23.009.

If MSC-B accepts the dialogue, it returns a MAP_PREPARE_HANDOVER confirmation containing a handover number or one or several relocation numbers, unless the request has included the HO-NumberNotRequired parameter, and BSSAP or RANAP information which is forwarded to and handled by the Handover Control Application in MSC-A.

Optionally MSC-A can receive, after a MAP_PREPARE_HANDOVER confirmation, a MAP_PROCESS_ACCESS_SIGNALLING indication containing BSSAP or RANAP information.

When the connection has been established between the MS and MSC-B, MSC-A will be informed by a MAP_SEND_END_SIGNAL indication.

When MSC-A wants to clear the connection with BSS-B, an indication from the Handover Control Application is received in the Map Application to send the MAP_SEND_END-SIGNAL response to MSC-B to close the MAP dialogue.

MSC-A may abort the handover or relocation procedure at any time (e.g. if the call is cleared).

19.2.2.2 Handling of access signalling

If required, the Handover Control Application in MSC-A requests the MAP application to invoke the MAP_FORWARD_ACCESS_SIGNALLING request containing the information to be transferred to the A-interface or the Iu-interface of MSC-B (e.g. call control information).

MAP_FORWARD_ACCESS_SIGNALLING is a non-confirmed service.

MSC-B will then forward the required information to the Handover Control Application. The MAP_FORWARD_ACCESS_SIGNALLING is composed in such a way that the information can be passed transparently to the A-interface or the Iu-interface for call control and mobility management information. Any response received in MSC-B from the A-interface or the Iu-interface that should be brought to MSC-A will require a new independent request from the Handover Control Application in MSC-B to MSC-A by invoking a MAP_PROCESS_ACCESS_SIGNALLING request.

19.2.2.3 Other procedures in stable handover situation

During a call and after handover or relocation, a number of procedures between MSC-A and BSS-B or RNS-B controlled by or reported to MSC-A may be initiated in both directions by invoking a

MAP_FORWARD_ACCESS_SIGNALLING request and reception of a MAP_PROCESS_ACCESS_SIGNALLING indication.

19.2.2.4 Subsequent handover

When MSC-A receives a MAP_PREPARE_SUBSEQUENT_HANDOVER request, it will start the procedure of handing or relocating the call over to a third MSC (MSC-B'), or back to the controlling MSC (MSC-A). If the new handover or relocation procedure towards MSC-B' or MSC-A is successful, the handover control application in MSC-A will request the release of the dialogue towards MSC-B by sending the MAP_SEND_END_SIGNAL confirmation.

19.2.2.5 SDL Diagrams

The SDL diagrams on the following pages describe the user processes in MSC-A for the procedures described in this subclause.

The services used are defined in subclause 8.4.

NOTE: The message primitives HO_CA_MESSAGE used in the SDL-Diagrams are used to show the internal co-ordination between the MAP application and the Handover Control Application. For a detailed description of the co-ordination between the applications for the handover or relocation procedure, see 3G TS 23.009.

Note that in case of reception of errors from the MSCs (see the Handover error handling macro), the MAP user reports them to the Handover Control Application and does not take any action except in cases explicitly mentioned in the SDL diagrams.

Figure 19.2 2/1: HO in MSC-A

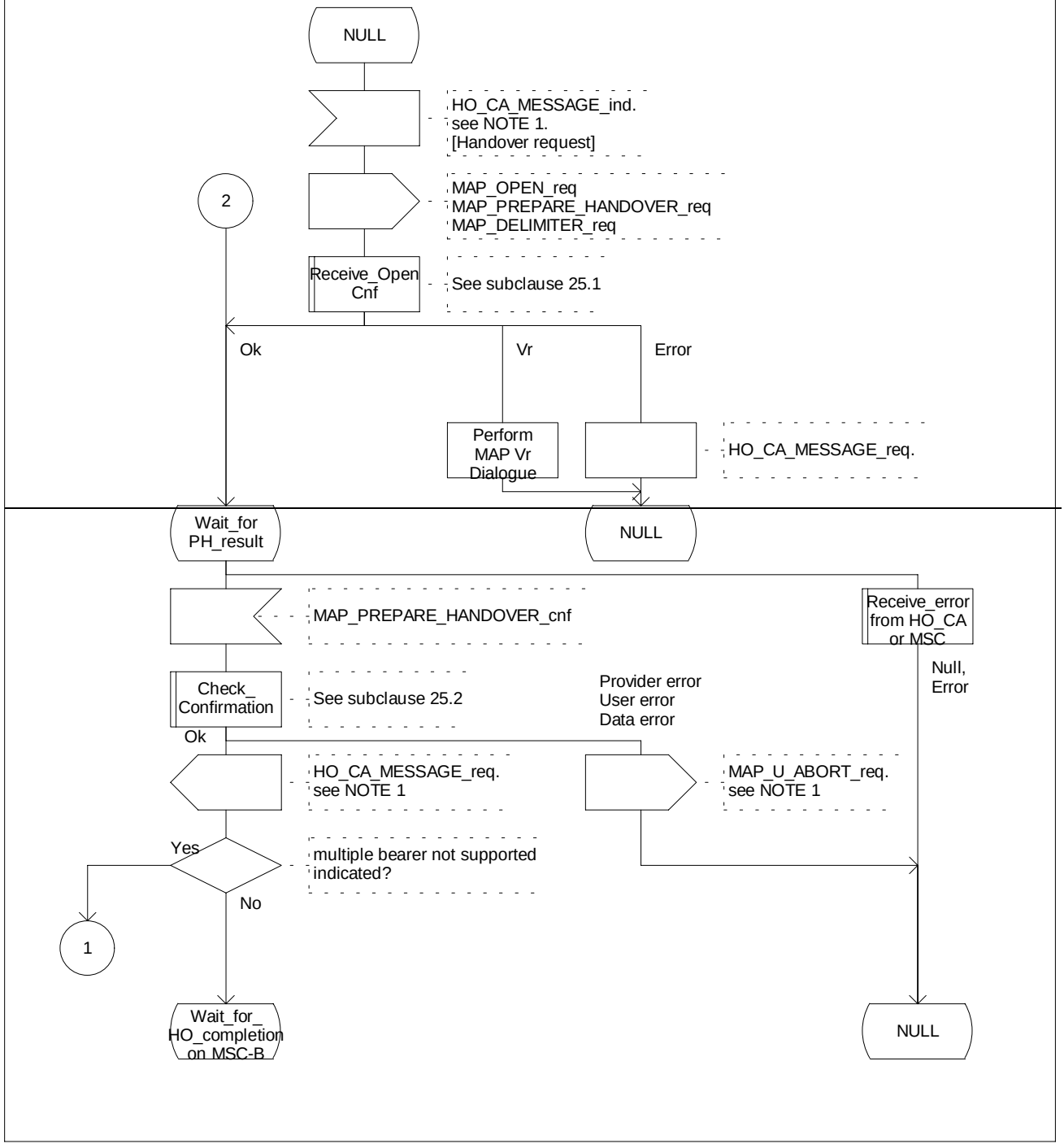


Figure 19.2 2/1: HO in MSC-A

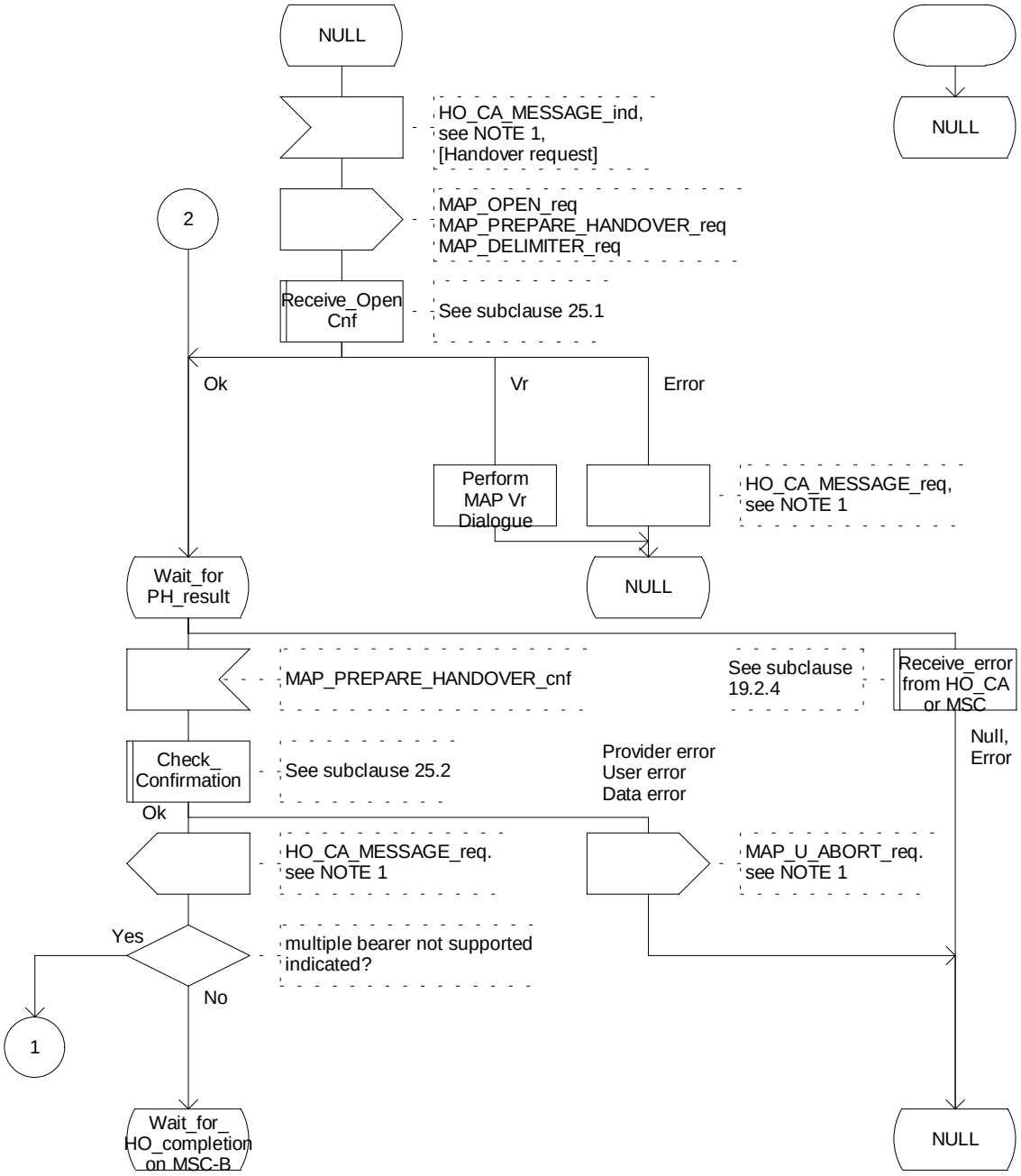


Figure 19.2.2/1 (sheet 1 of 13): Process MSC_A_HO

Figure 19.2 2/1: HO in MSC-A

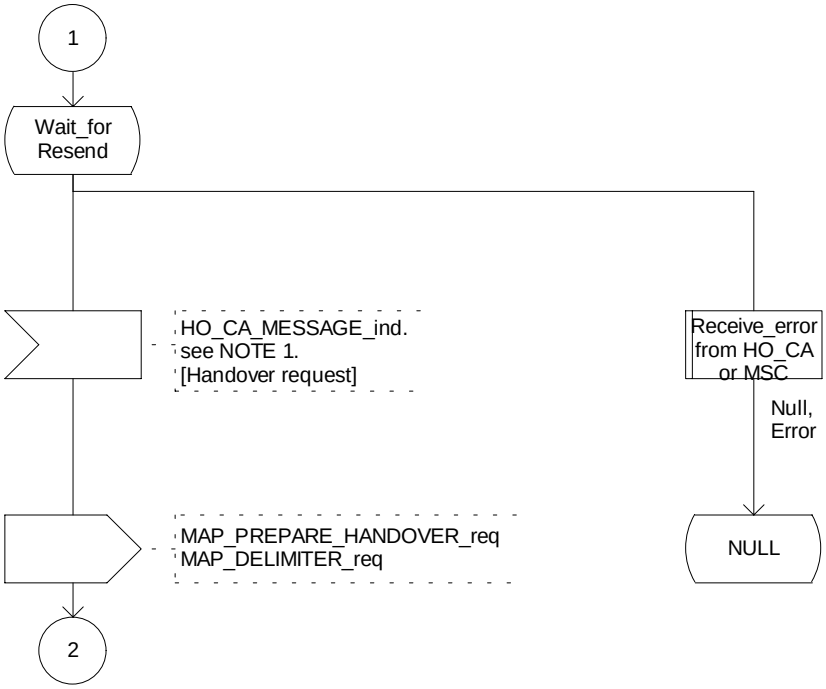


Figure 19.2.2/1 (sheet 2 of 13): Process MSC_A_HO

Figure 19.2.2/1: HO in MSC-A

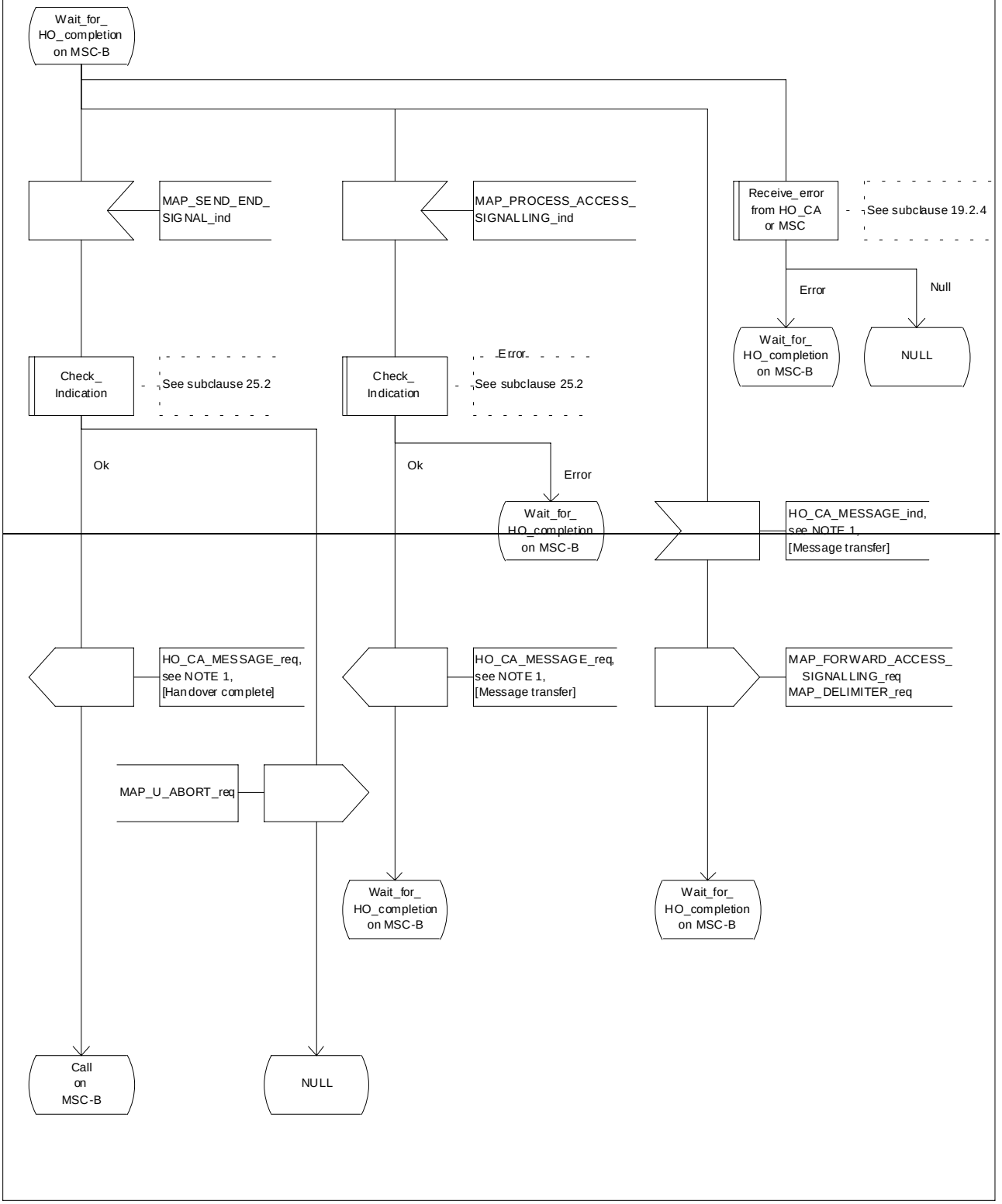


Figure 19.2 2/1: HO in MSC-A

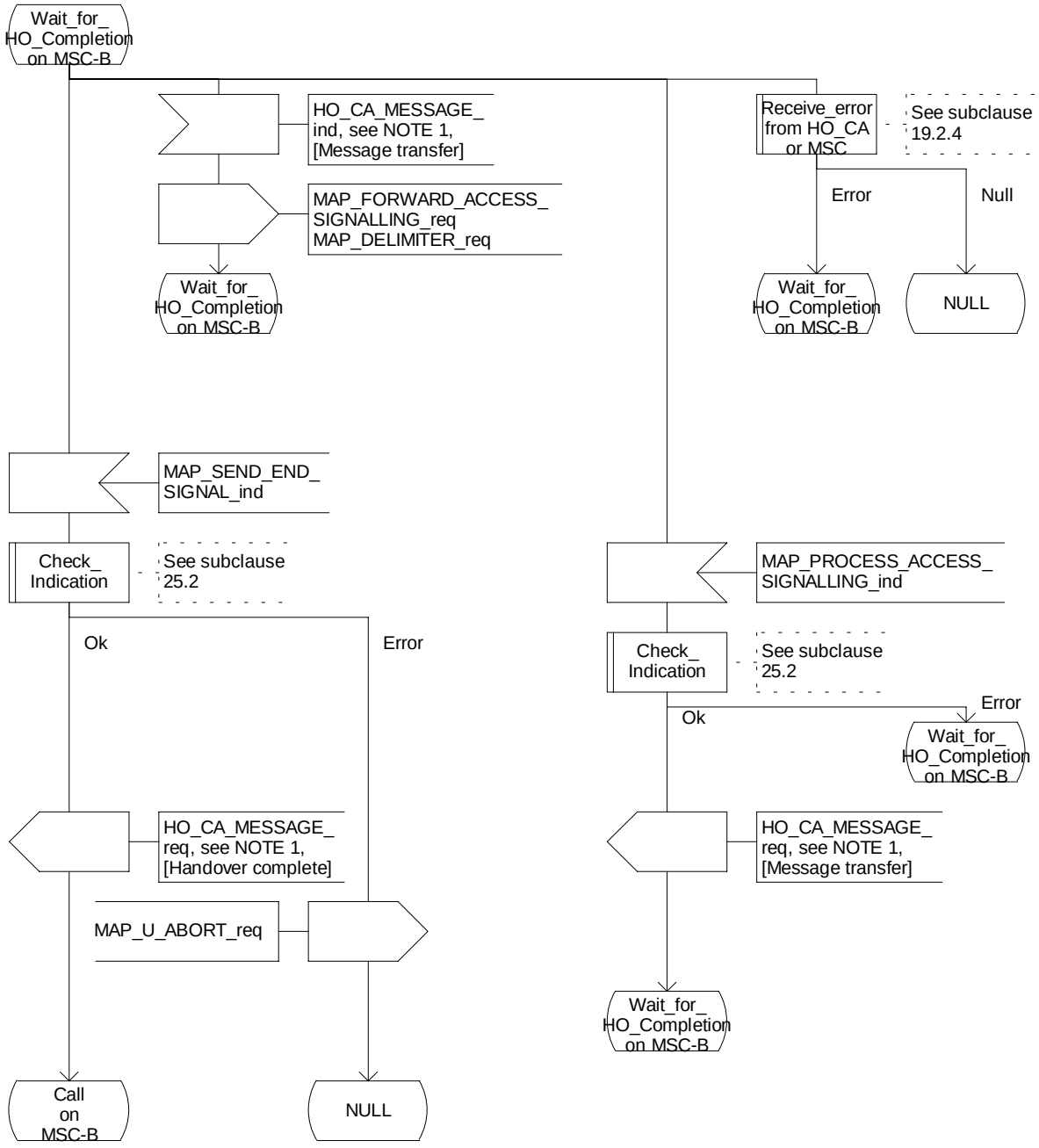


Figure 19.2.2/1 (sheet 3 of 13): Process MSC_A_HO

Figure 19.2.2/1: HO in MSC-A

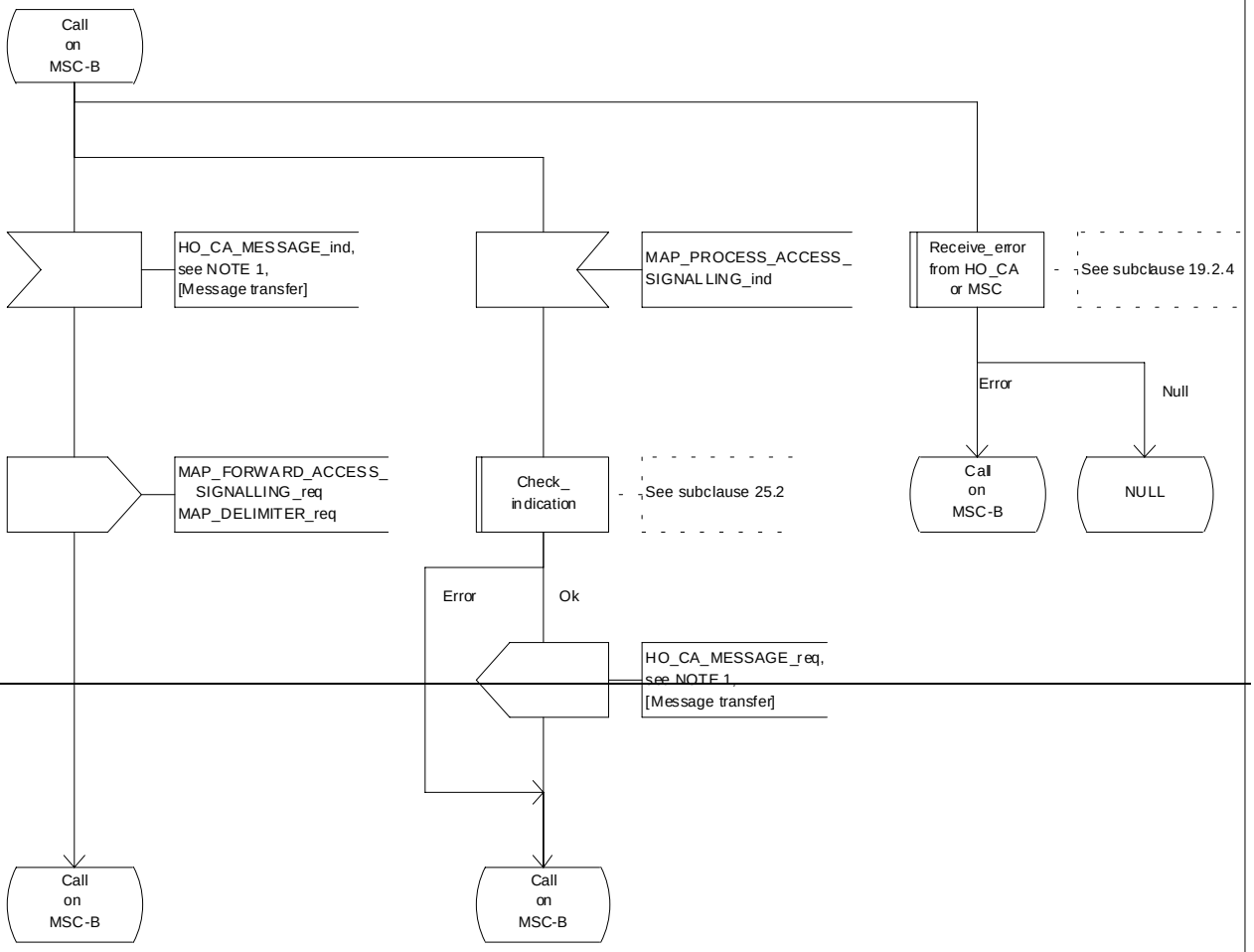


Figure 19.2 2/1: HO in MSC-A

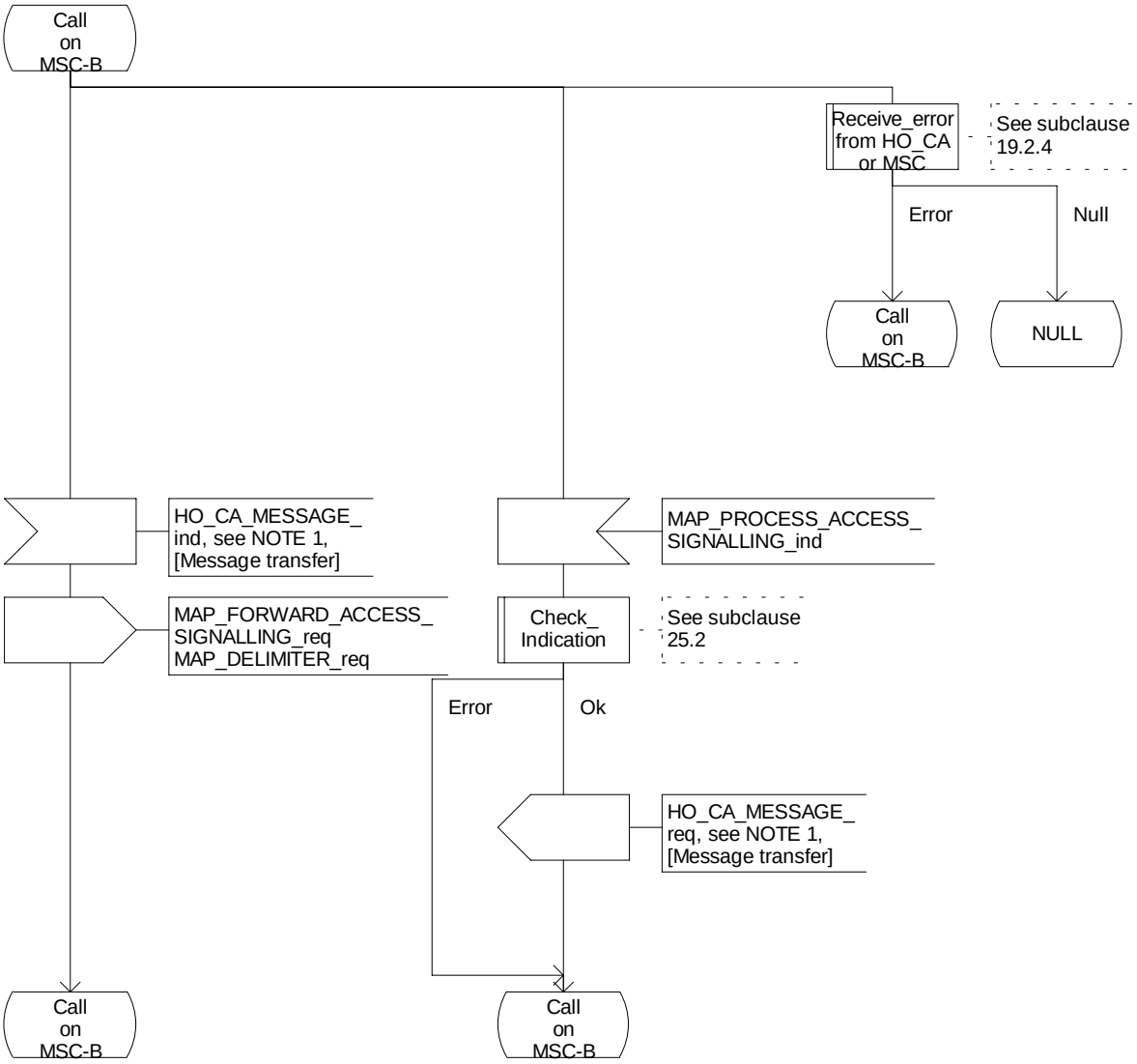


Figure 19.2.2/1 (sheet 4 of 13): Process MSC_A_HO

Figure 19.2.2/1: HO in MSC-A

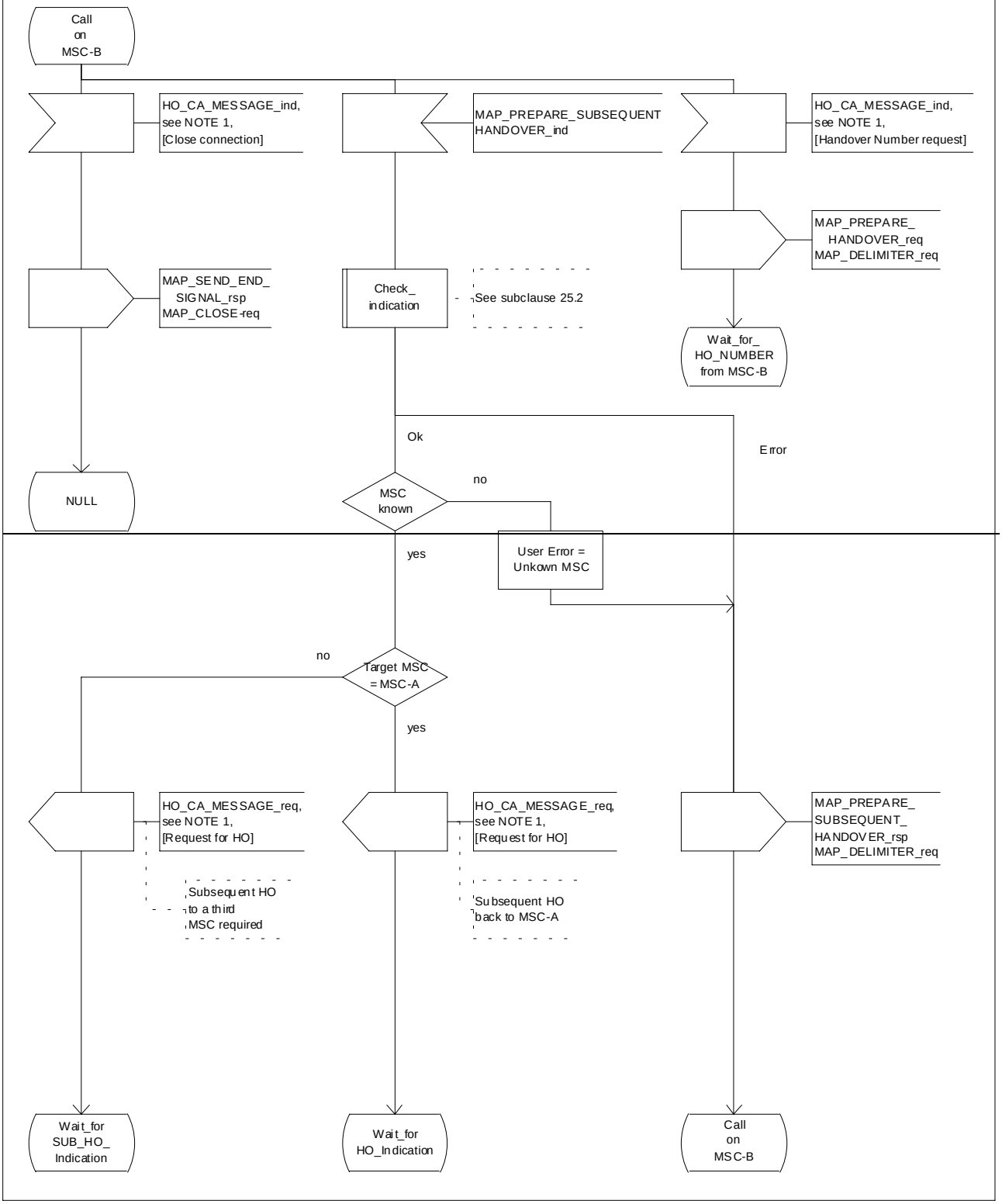


Figure 19.2 2/1: HO in MSC-A

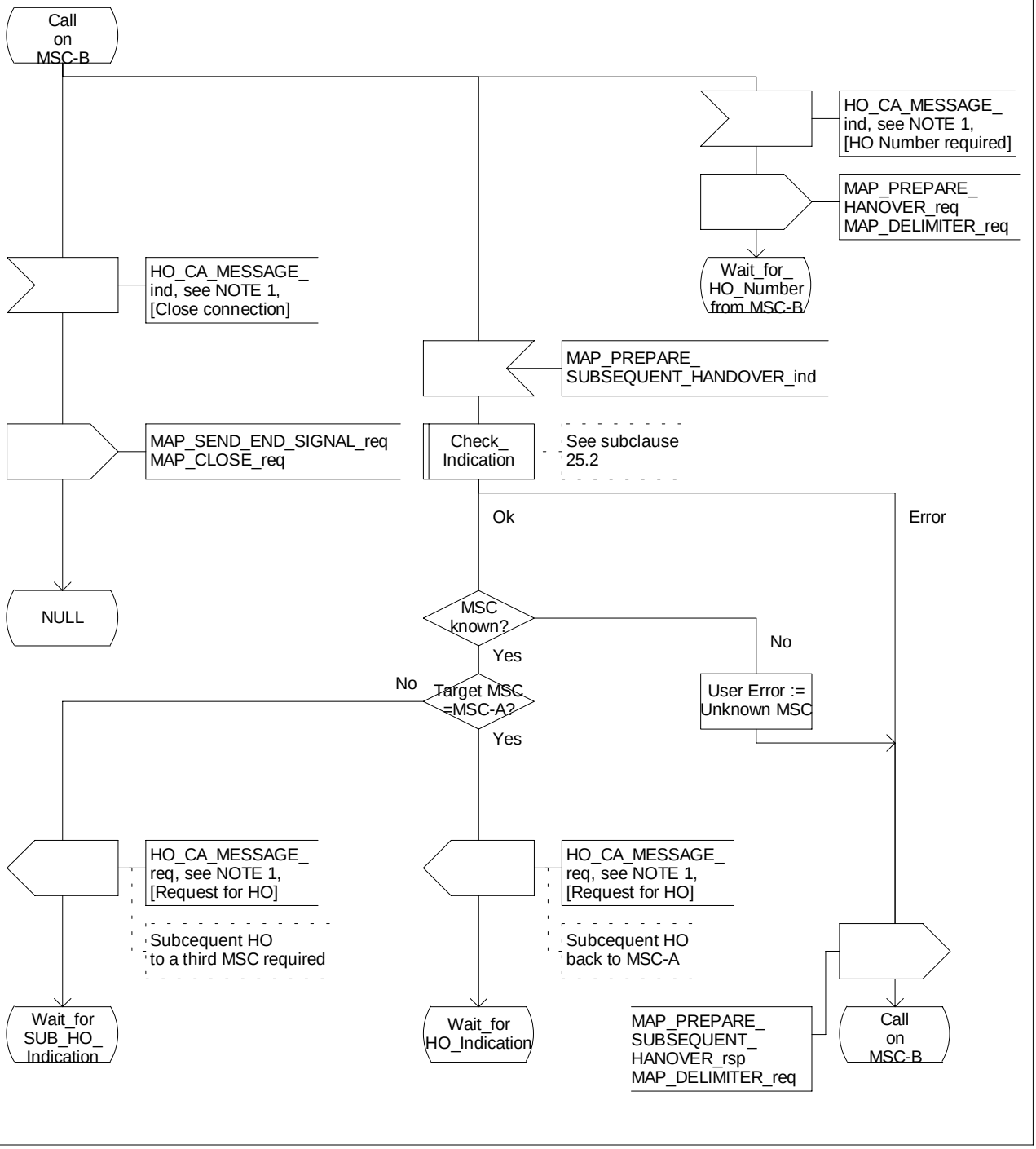
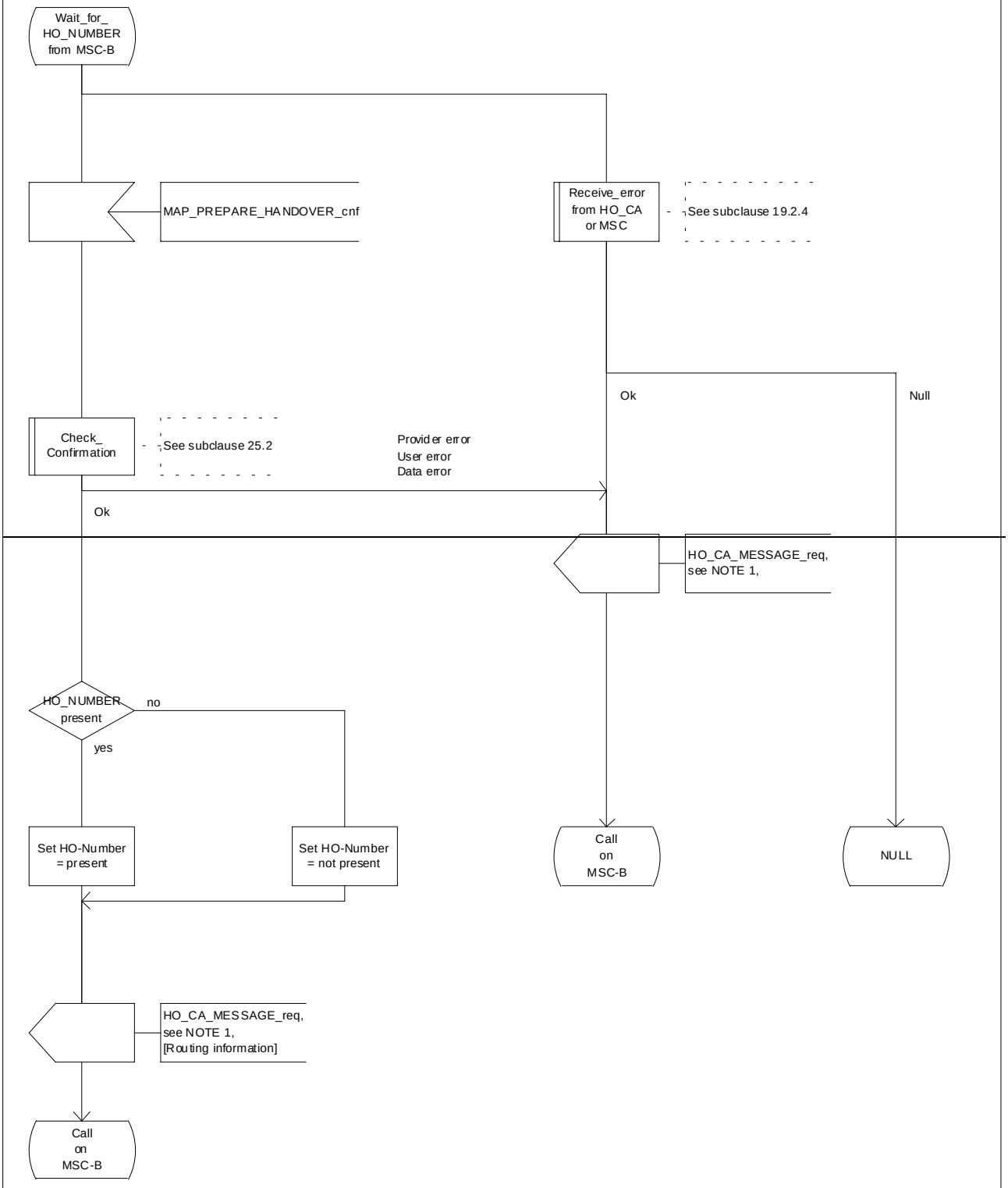


Figure 19.2.2/1 (sheet 5 of 13): Process MSC_A_HO

Figure 19.2.2/1: HO in MSC-A



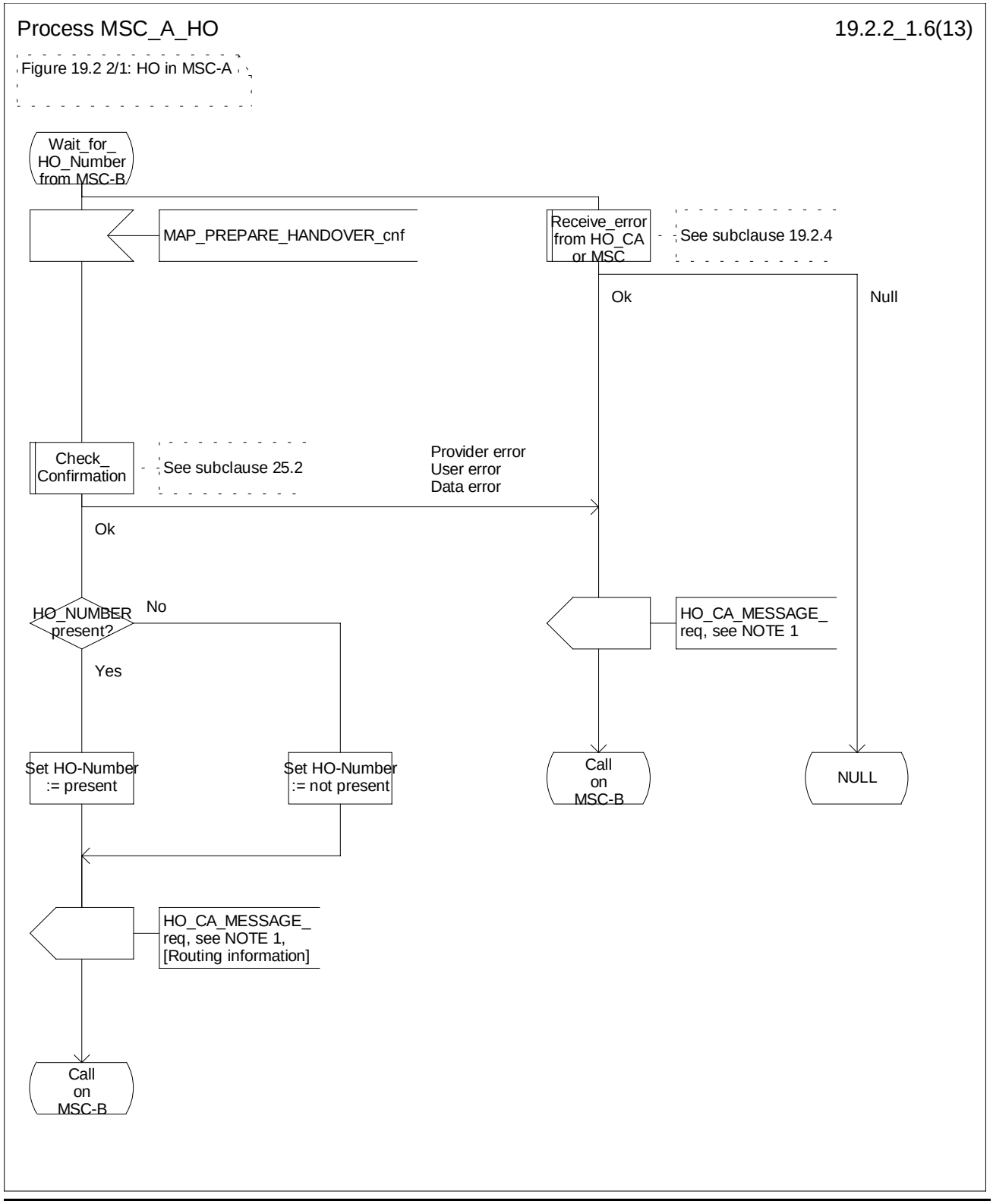


Figure 19.2.2/1 (sheet 6 of 13): Process MSC_A_HO

Figure 19.2.2/1: HO in MSC-A

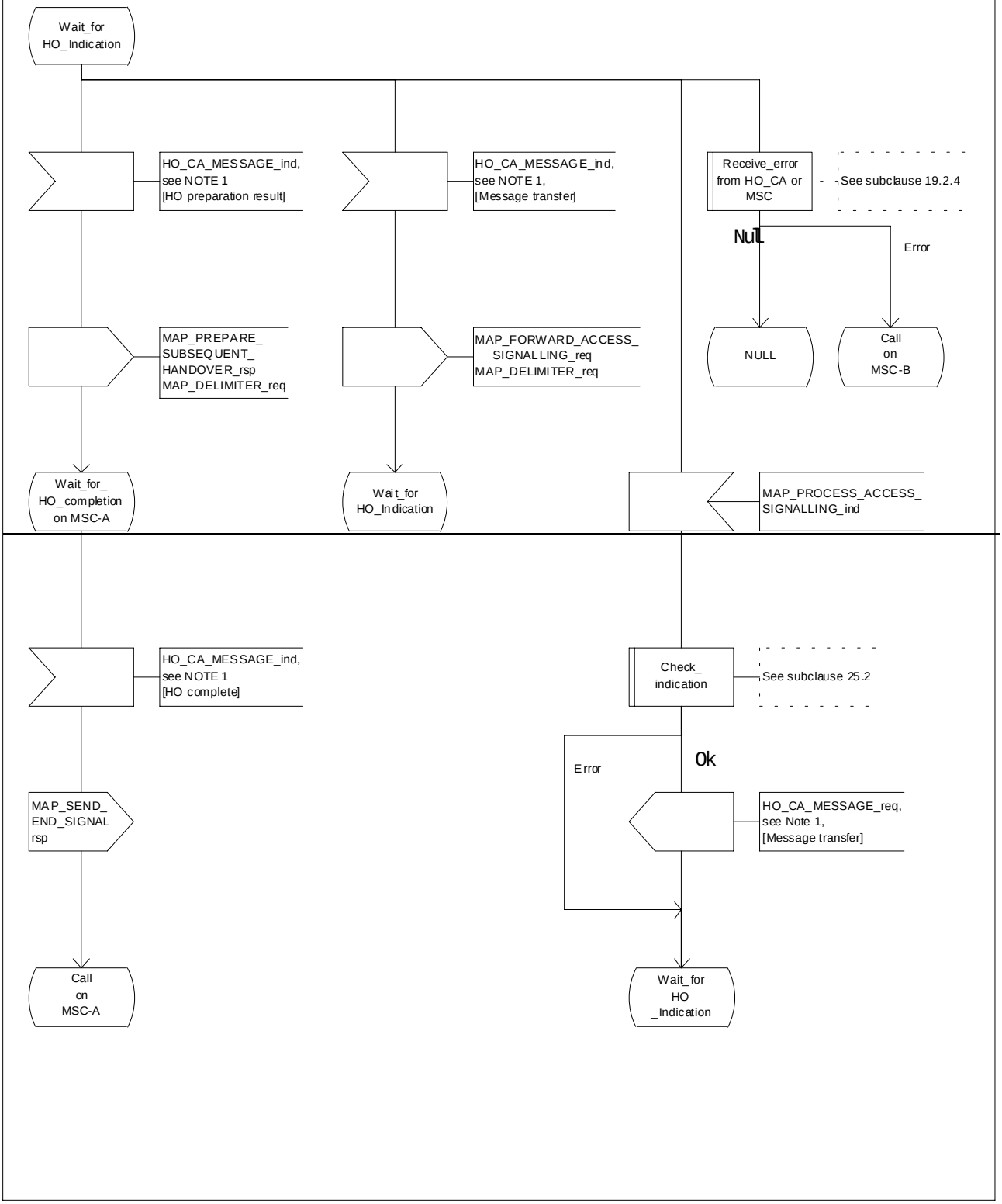


Figure 19.2 2/1: HO in MSC-A

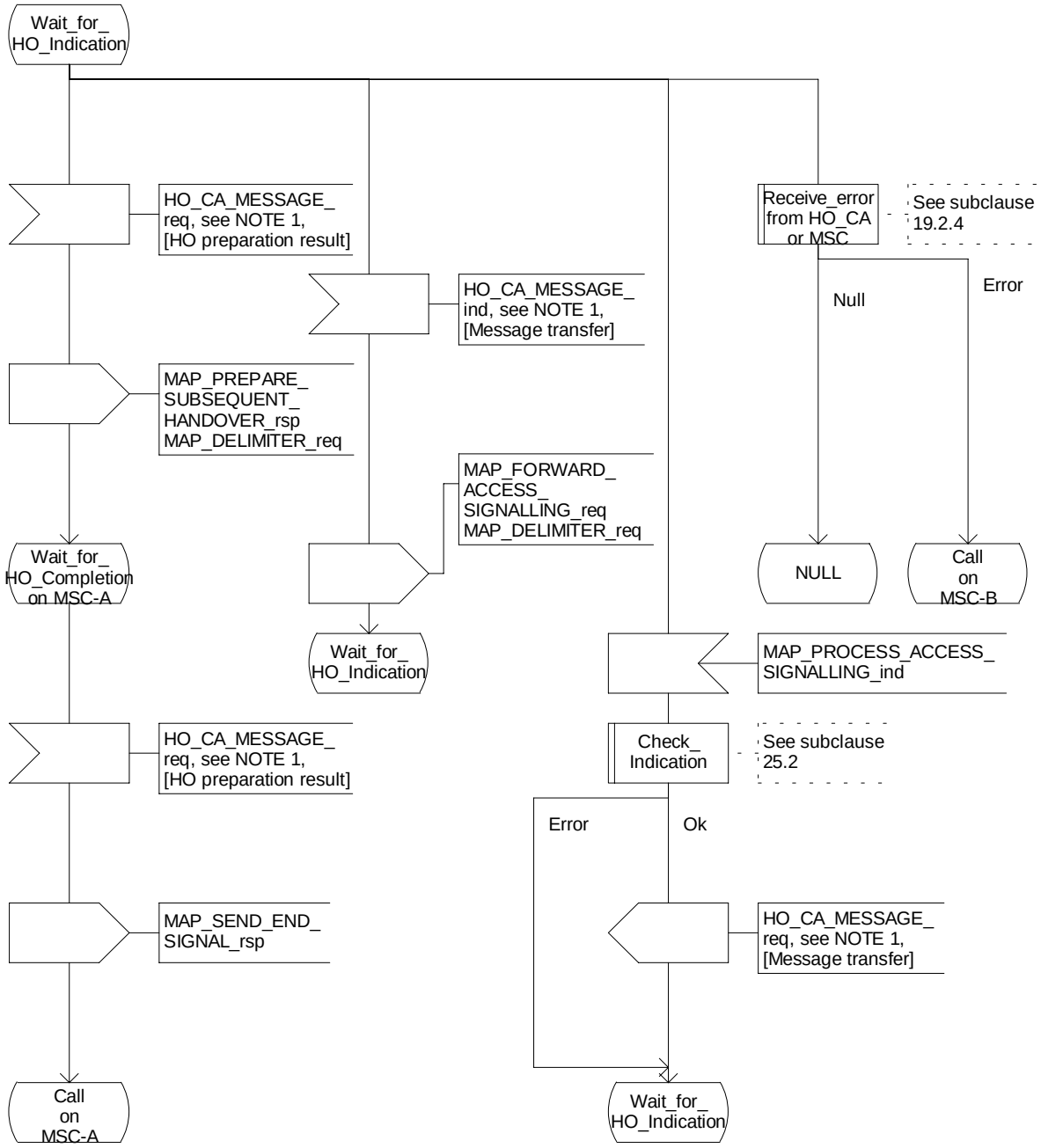
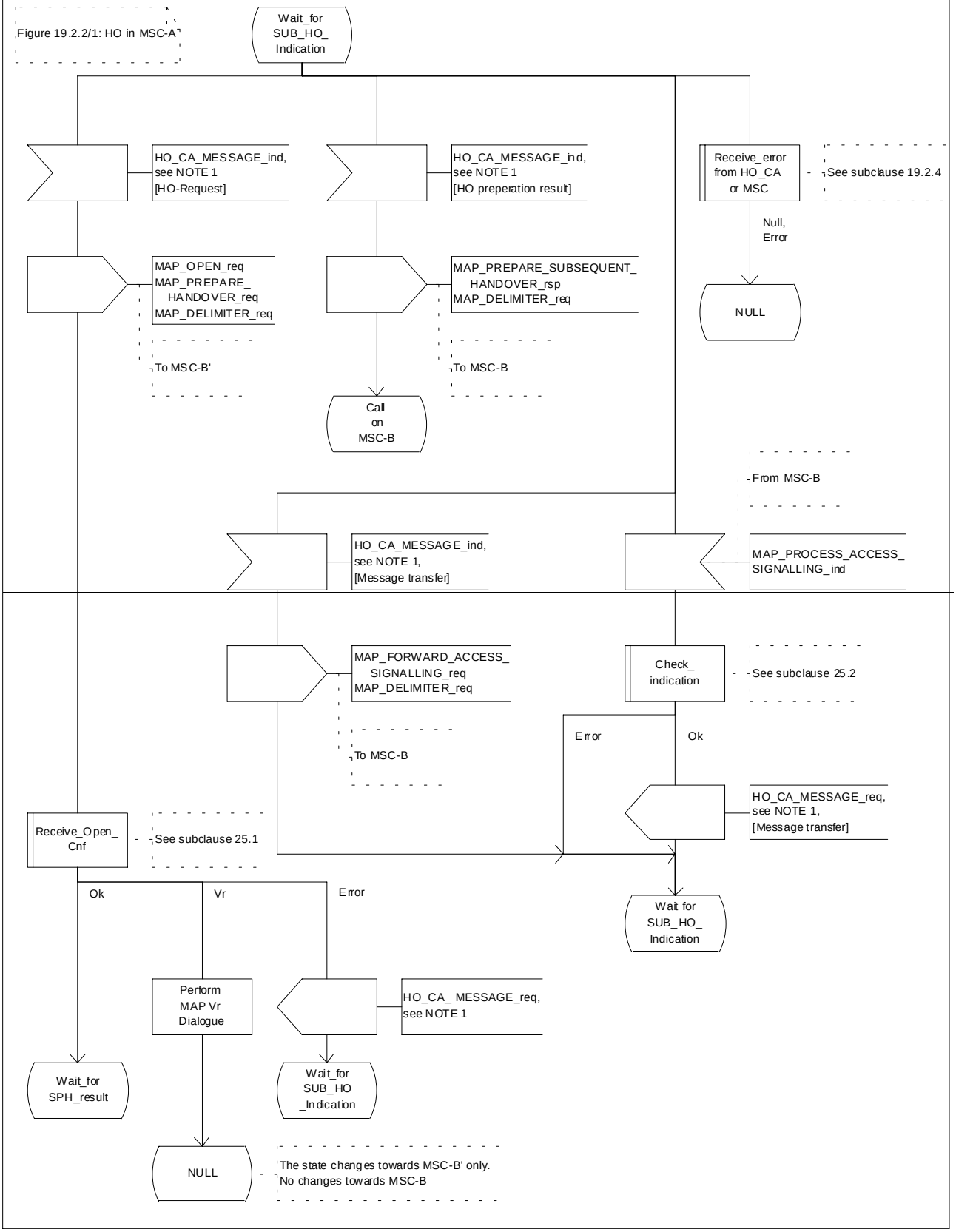


Figure 19.2.2/1 (sheet 7 of 13): Process MSC_A_HO

Figure 19.2.2/1: HO in MSC-A



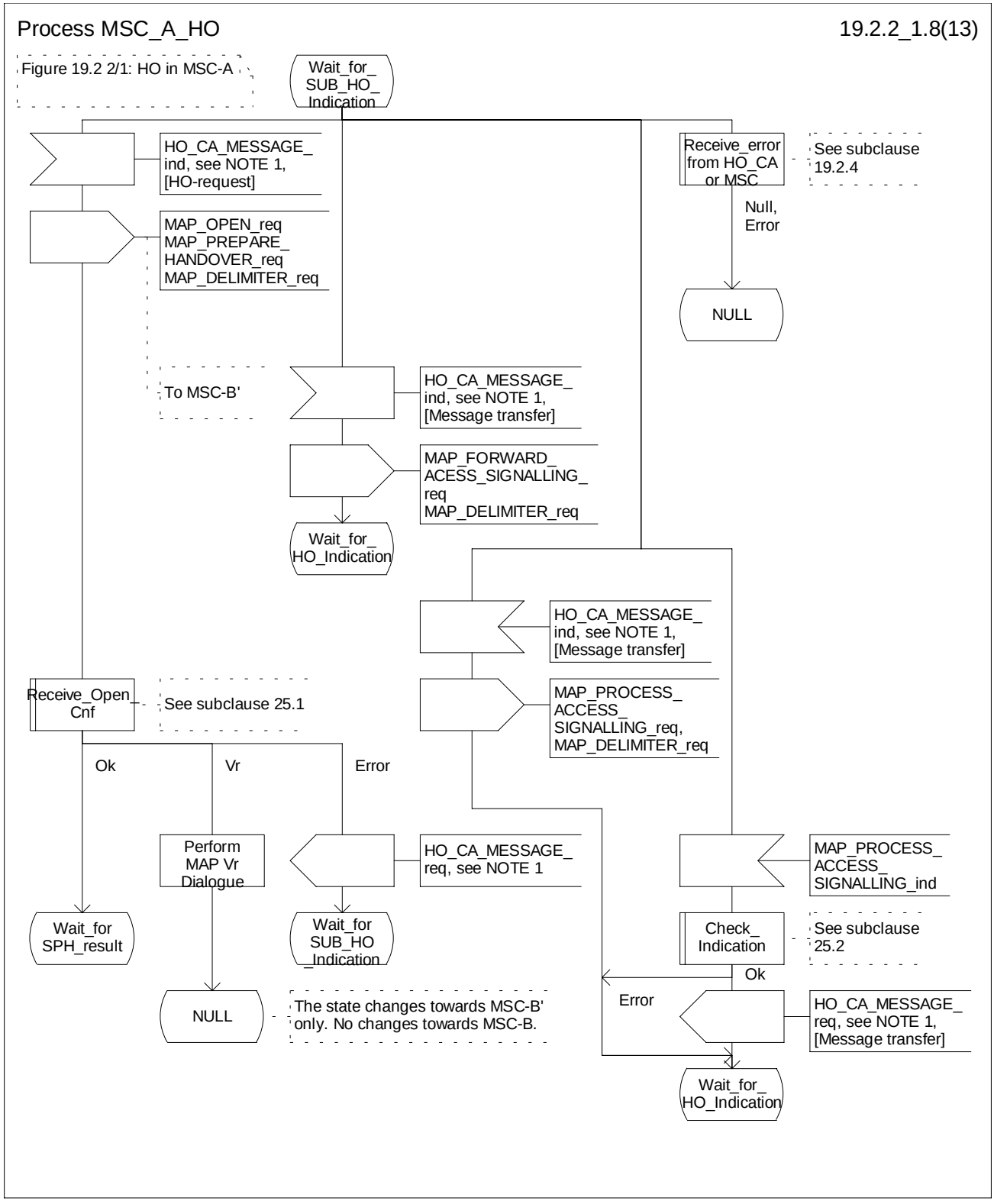


Figure 19.2.2/1 (sheet 8 of 13): Process MSC_A_HO

Figure 19.2.2/1: HO in MSC-A

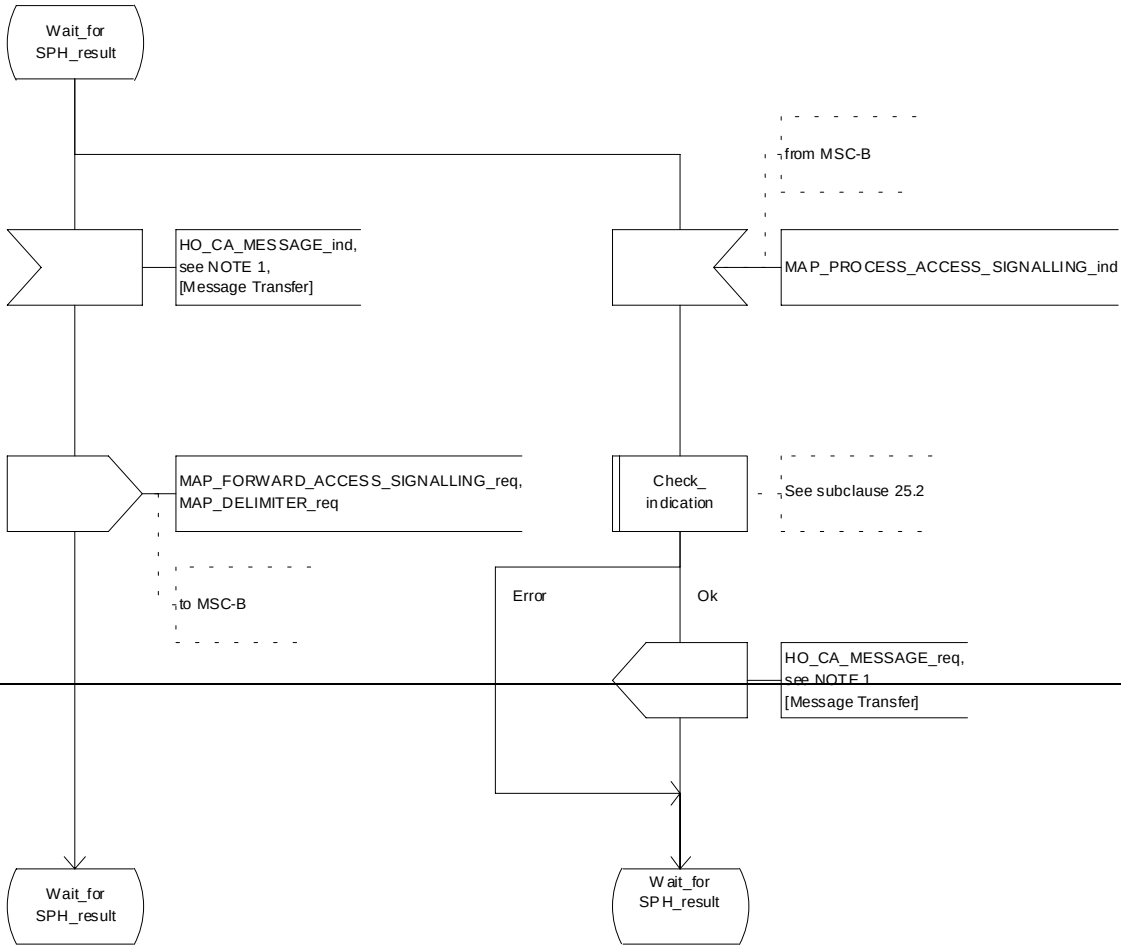


Figure 19.2 2/1: HO in MSC-A

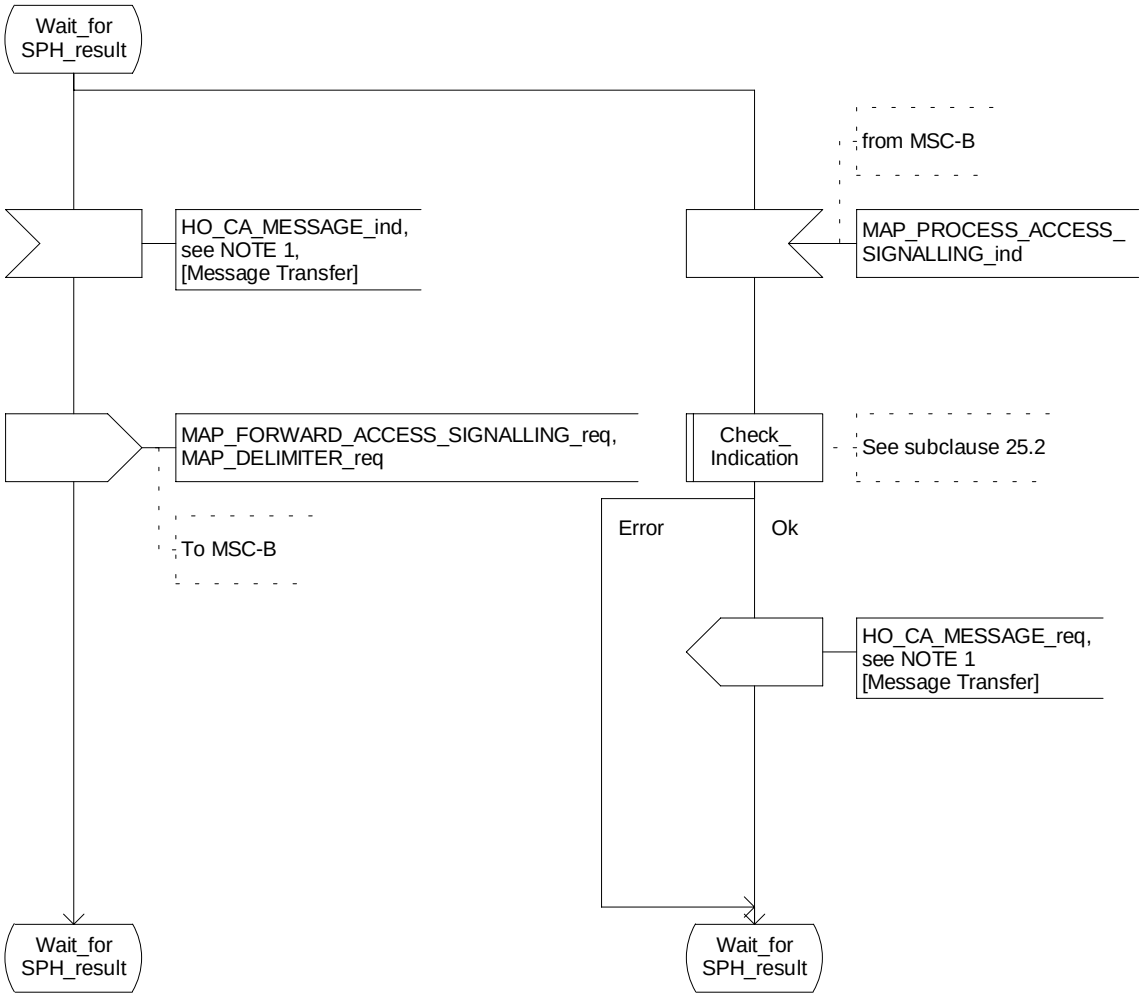


Figure 19.2.2/1 (sheet 9 of 13): Process MSC_A_HO

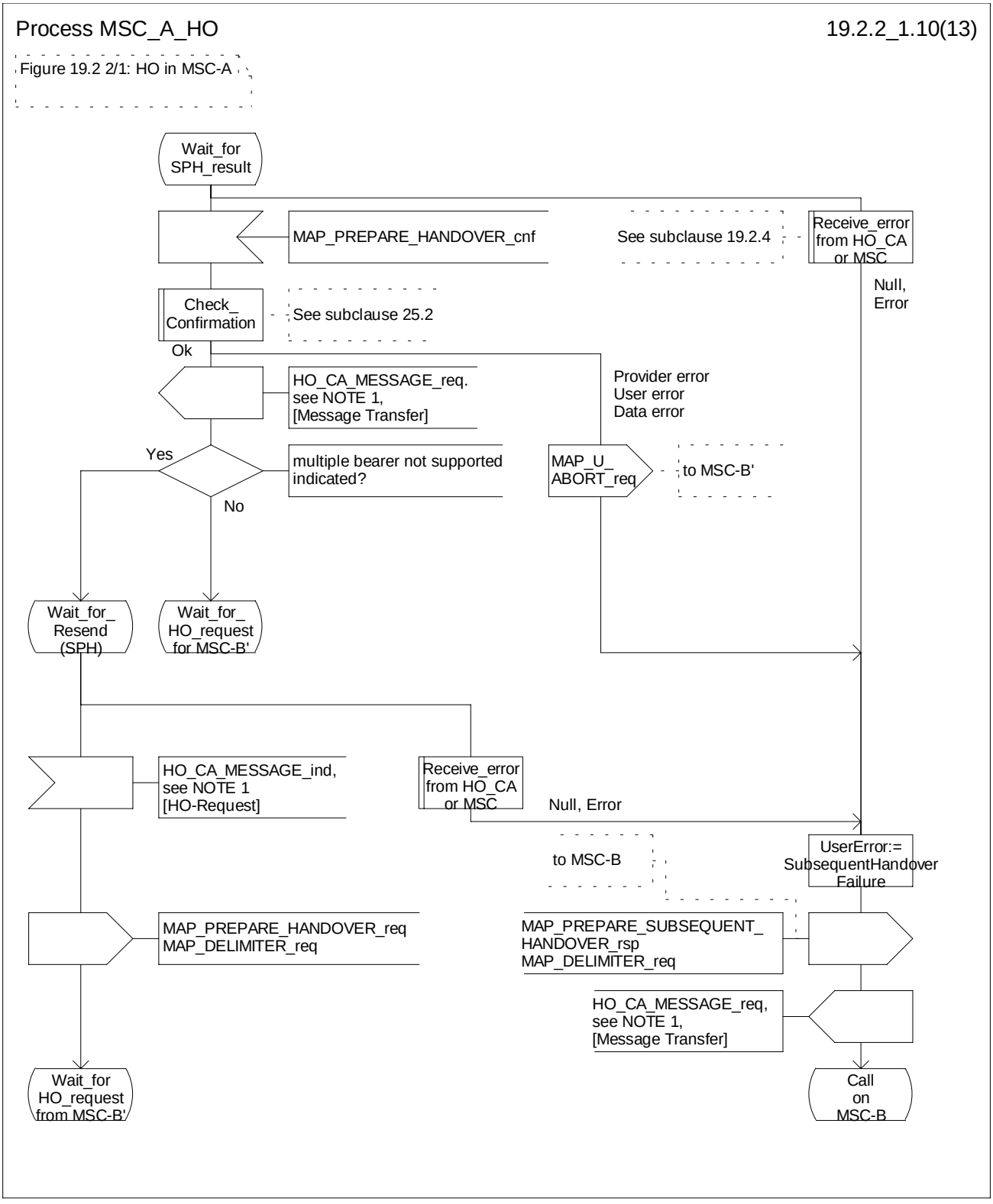
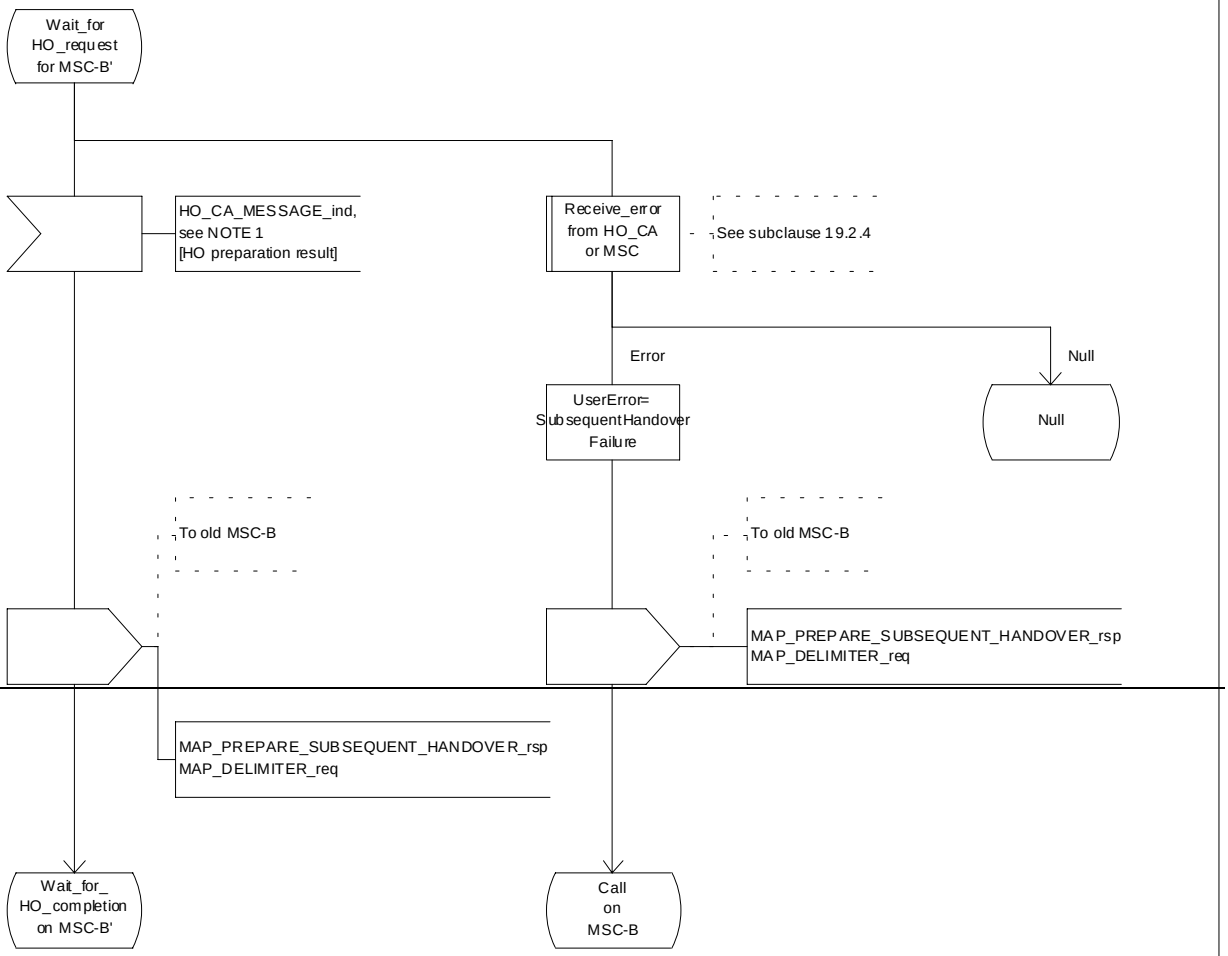


Figure 19.2.2/1 (sheet 10 of 13): Process MSC_A_HO

Figure 19.2.2/1: HO in MSC-A



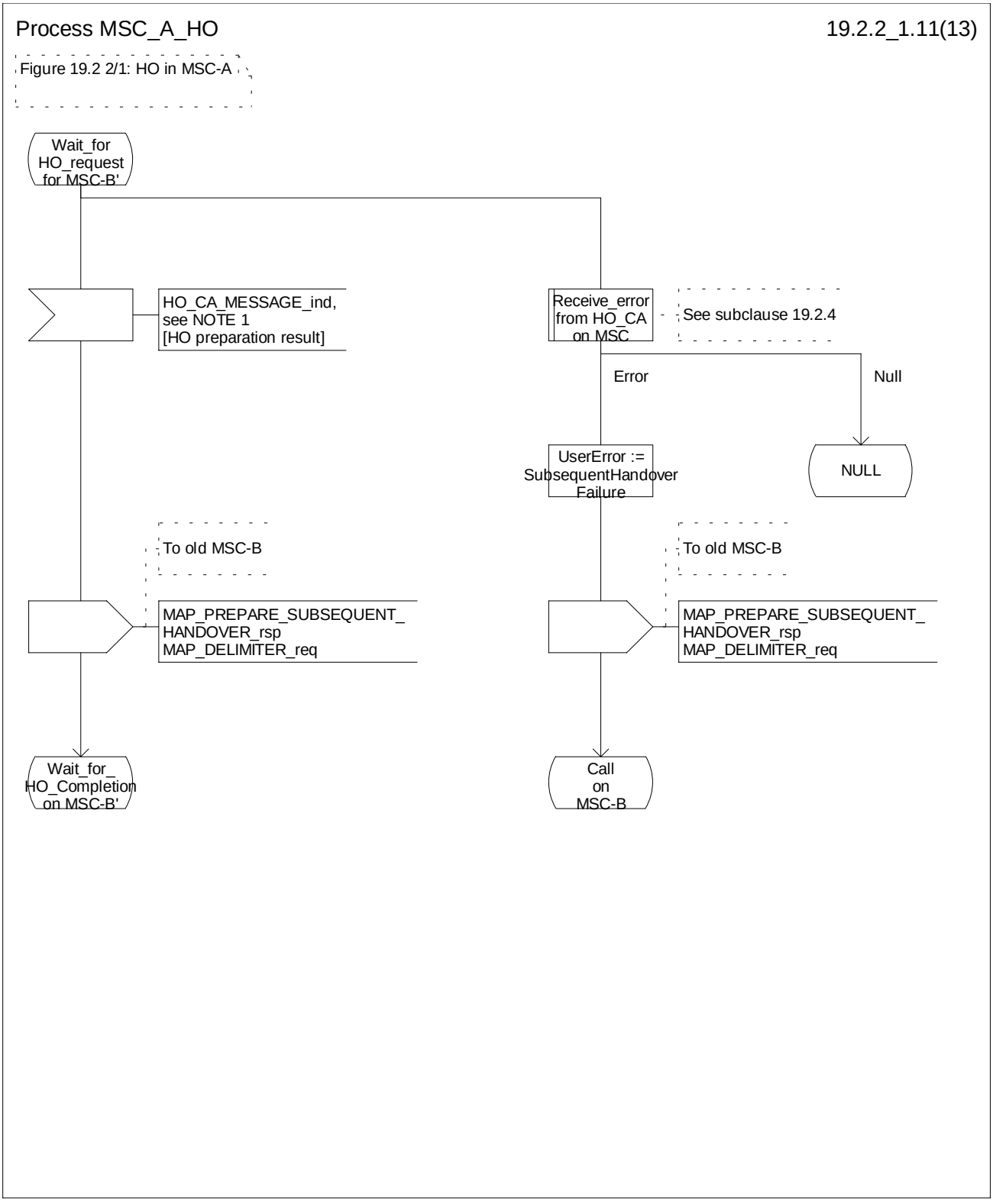


Figure 19.2.2/1 (sheet 11 of 13): Process MSC_A_HO

Figure 19.2.2/1: HO in MSC-A

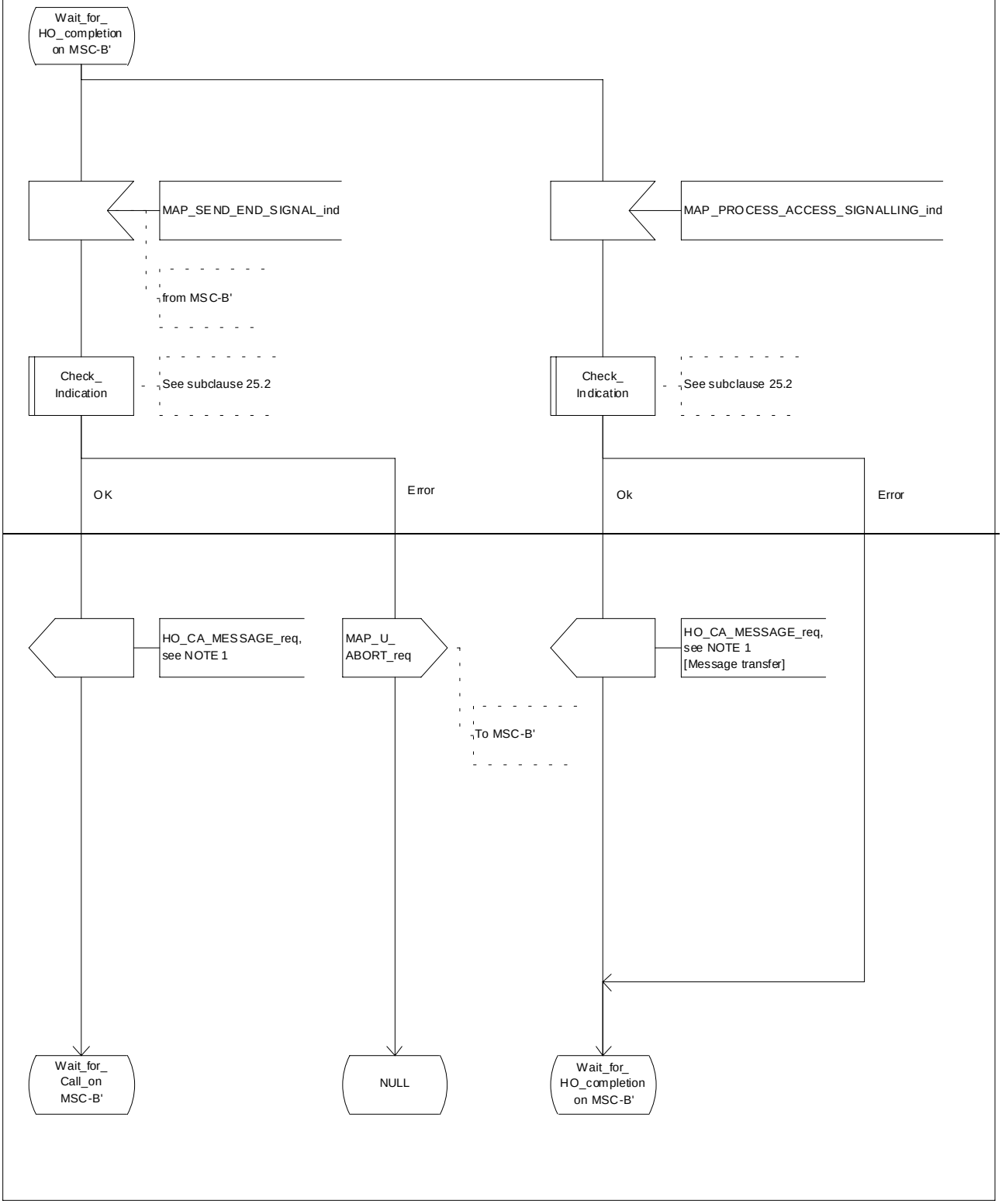


Figure 19.2 2/1: HO in MSC-A

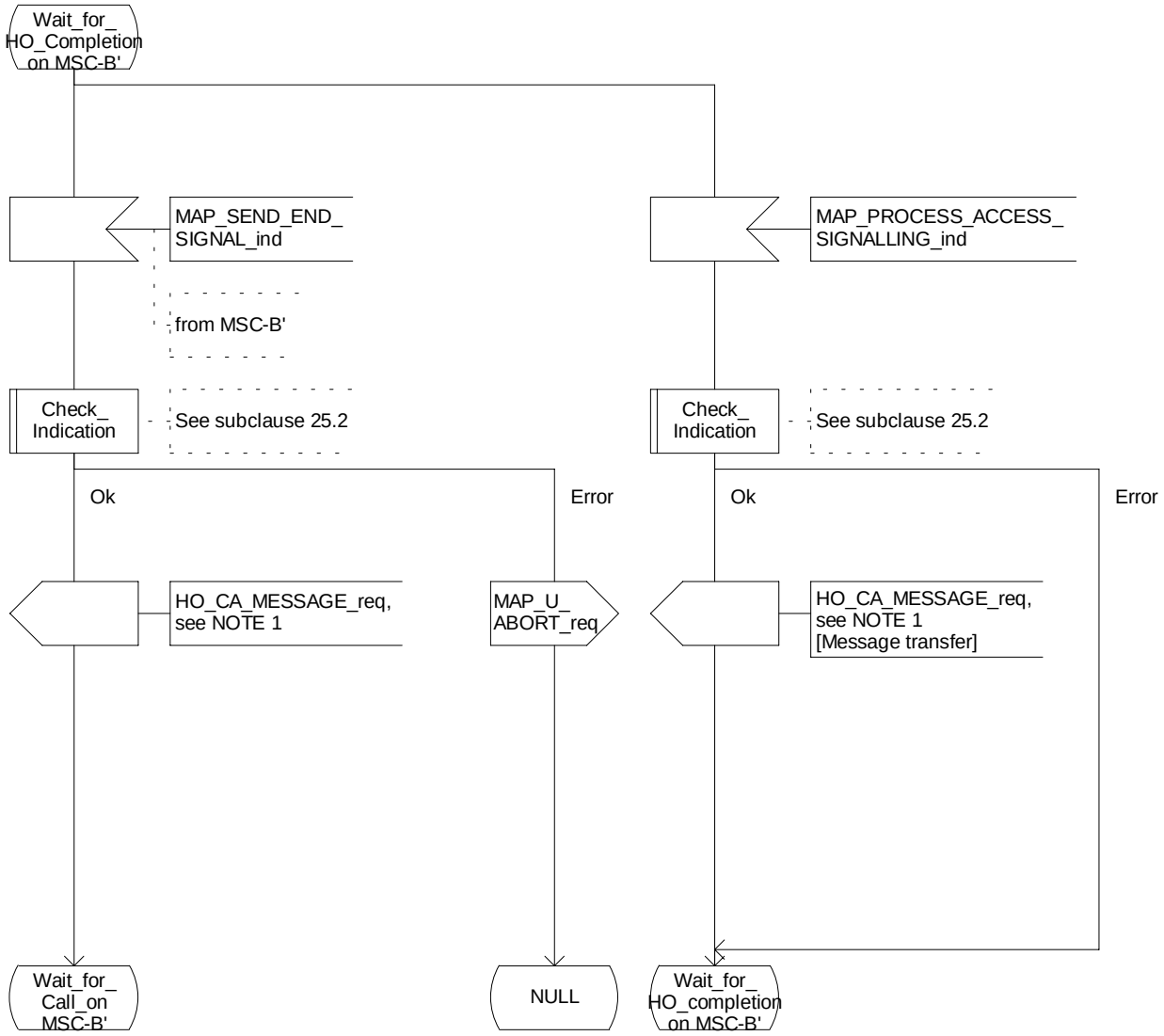
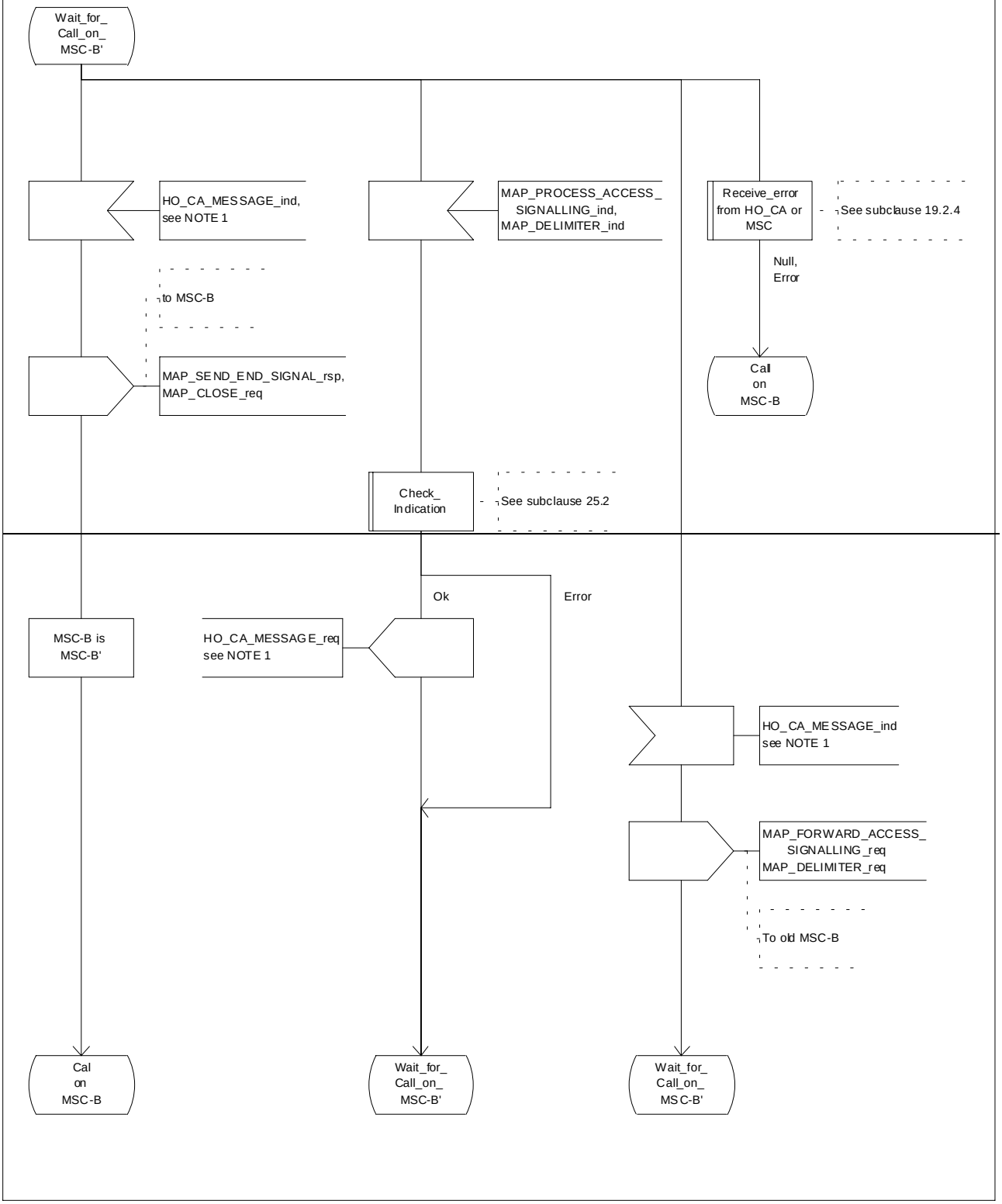


Figure 19.2.2/1 (sheet 12 of 13): Process MSC_A_HO

Figure 19.2.2/1: HO in MSC-A



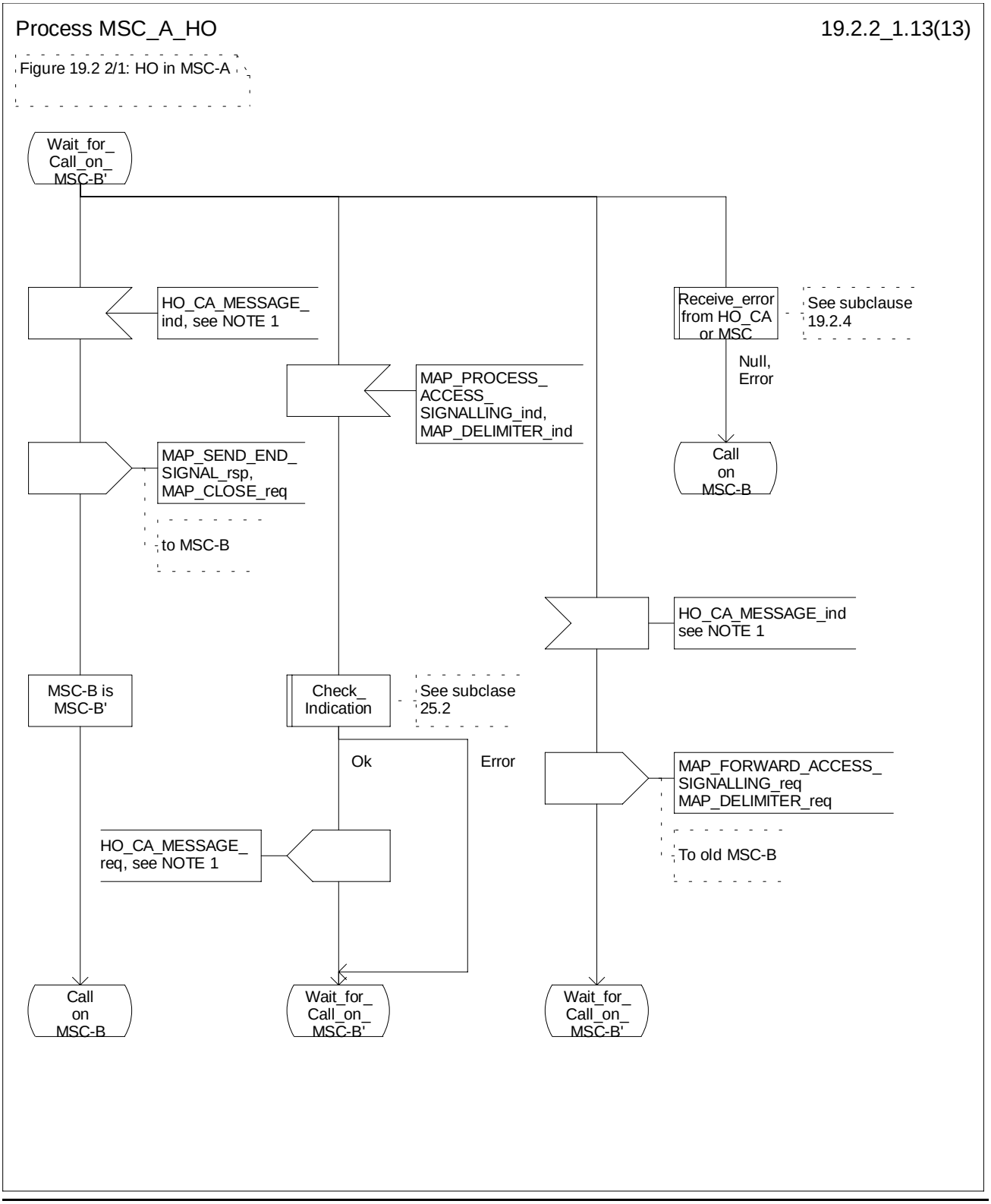


Figure 19.2.2/1 (sheet 13 of 13): Process MSC_A_HO