3GPP TSG_CN#7 **NP-000073**

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

Agenda item: **5.2.3**

Source: **TSG_N WG2**

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

Introduction:

This document contains **"5"** CRs on **Work Item Multicall,** that have been agreed by **TSG_N WG2,** and are forwarded to **TSG_N Plenary** meeting #7 for approval.

TDoc	SPEC	CR	REV	CAT	Rel	Old vers	New vers	SUBJECT
N2B000440	23.008	015	1	B	R99	3.3.0		Introduction of Multicall
N2B000467	23.016	012	2	B	R99	3.3.0		Introduction of subscriber data for Multicall
N2B000435	23.018	025	7	B	R99	3.3.0		Addition of the description for Multicall
N2B000466	29.002	100	5	C	R99	3.3.1		Support of 3G Handover, including Multicall
N2B000464	29.002	048	5	B	R99	3.3.1		Introduction of Multicall

3GPP TSG-N2 SWG B #5
Kista, Sweden, 2-3 March 2000

Document N2B000440
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

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23.008	CR	015r1	Current Version:	3.2.0

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

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list expected approval meeting # here ↑		for information	X	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		UTRAN / Radio		Core Network	X

Source: N2 **Date:** 2000-03-02

Subject: Introduction of 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	X		Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: This CR provides the changes necessary to introduce Multicall.

Clauses affected: 0.1, 2.6

Other specs affected:				
	Other 3G core specifications	X	→ List of CRs:	23.016, 23.011, 23.018, 29.002, 24.008, 24.010, 24.080
	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:

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0 Scope

The scope of this specification is to provide details concerning information to be stored in home location registers, visitor location registers and GPRS Support Nodes concerning mobile subscriber.

Clause 2 contains all details concerning the definition of the parameters, often given by reference to other specifications, and where the parameter is to be stored.

Table 1 in clause 3 gives a summary overview and clause 4 identifies the reference information required for accessing the information.

0.1 Normative 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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2] GSM 02.02: "Digital cellular telecommunications system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[3] GSM 02.03: "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[4] GSM 02.04: "Digital cellular telecommunications system (Phase 2+); General on supplementary services".

[5] GSM 03.03: "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".

[6] GSM 03.07: "Digital cellular telecommunications system (Phase 2+); Restoration procedures".

[7] GSM 03.09: "Digital cellular telecommunications system (Phase 2+); Handover procedures".

[8] GSM 03.12: "Digital cellular telecommunications system (Phase 2+); Location registration procedures".

[9] GSM 03.15: "Digital cellular telecommunications system (Phase 2+); Technical realization of operator determined barring".

[10] GSM 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".

[11] GSM 03.40: "Digital cellular telecommunications system (Phase 2+); Technical realization of the Short Message Service (SMS) Point-to-Point (PP)".

[12] GSM 03.67: "Digital cellular telecommunications system (Phase 2+); enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 2".

[13] GSM 03.68: "Digital cellular telecommunications system (Phase 2+); Voice Group Call Service (VGCS) - Stage 2".

[14] GSM 03.69: "Digital cellular telecommunications system (Phase 2+); Voice Broadcast Service (VBS) - Stage 2".

[15] GSM 03.71: “Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Functional Description; Stage 2”.

[16] GSM 03.78: " Digital cellular telecommunications system (Phase 2+); Customised Applications for Mobile network Enhanced Logic (CAMEL) - Stage 2".

[17] GSM 03.81: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 2".

[18] GSM 03.82: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 2".

[19] GSM 03.83: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2".

[20] GSM 03.84: "Digital cellular telecommunications system (Phase 2+); Multi Party (MPTY) supplementary services - Stage 2".

[21] GSM 03.85: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 2".

[22] GSM 03.86: "Digital cellular telecommunications system (Phase 2+); Advice of Charge (AoC) supplementary services - Stage 2".

[23] GSM 03.88: "Digital cellular telecommunications system (Phase 2+); Call Barring (CB) supplementary services - Stage 2".

[24] GSM 03.90: "Digital cellular telecommunications system (Phase 2+); Unstructured Supplementary Service Data (USSD) - Stage 2".

[25] GSM 04.08: "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".

[26] GSM 09.02: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[27] GSM 09.07: "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[28] GSM 12.03: "Digital cellular telecommunications system (Phase 2); Security management".

[29] GSM 12.08: "Digital cellular telecommunications system (Phase 2); Subscriber and Equipment Trace".

[30] CCITT Recommendation Q.763: "Specifications of Signalling System No.7; Formats and codes".

[31] ANSI T1.113 "Signalling System No7 (SS7) Integrated Services Digital Network (ISDN) User Part"

[32] GSM 02.60: "Digital cellular telecommunications system (Phase 2+); "General Packet Radio Service (GPRS) Stage 1".

[33] GSM 03.60: "Digital cellular telecommunications system (Phase 2+); "General Packet Radio Service (GPRS) Stage 2".

[34] GSM 02.32: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Service Description - Stage 1".

[35] GSM 03.35: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Stage 2".

[36] TS 23.116: "3GPP; Technical Specification Group Core Network; Super-Charger Technical Realisation; Stage 2."

[37] 3G TS 23.135: “Multicall supplementary service; Stage 2”.

2.6 Data related to supplementary services

Subscriber data related to supplementary services are contained in the ~~GSM 03.8x~~3GPP 23.08x and ~~03.9x~~23.09x series of Technical Specifications, that is ~~GSM 03.81~~TS 23.081 and following describing the network functionality of supplementary services. Additionally, subscriber data related to the Multicall (MC) supplementary service are contained in TS 23.135.

There is no data type which is mandatory for all supplementary services; note that the provision status is mandatory for all supplementary services except CUG, GSM 03.85. All other data are conditional depending on the provision. The data settable but by O&M are the permanent data while the temporary data are those that can be modified by subscriber control in the mobile station.

3GPP TSG-N2 SWG B #5
Kista, Sweden, 2-3 March 2000

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23.016	CR	012r2	Current Version:	3.3.0

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

For submission to:	CN#7	for approval		strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information	X	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		UTRAN / Radio		Core Network	X

Source: N2 **Date:** 2000-03-03

Subject: Introduction of subscriber data for 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	X		Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: This CR provides the changes necessary to introduce Multicall.

Clauses affected: 2, 3.2, 4.5.4 (Figure 7)

Other specs affected:				
	Other 3G core specifications	X	→ List of CRs:	23.008, 23.011, 23.018, 29.002, 24.008, 24.010, 24.080
	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:	

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1 Scope

This specification gives the stage 2 description of the subscriber data management handling between:

- the Home Location Register (HLR) and the Visitor Location Register (VLR);
- the Home Location Register (HLR) and the Serving GPRS Support Node (SGSN).

A number of procedures require updating of subscriber information:

- location updating;
- restoration;
- modification of data by the operator;
- modification of data by the subscriber via the Mobile Station (MS).

Updating of subscriber information from HLR to SGSN is required in the following situations:

- GPRS location updating;
- modification of data by the operator.

Only the rules for the updating of subscriber data from the HLR to the VLR and from the HLR to the SGSN are described in this specification. Public Land Mobile Network (PLMN) specific and Unstructured Supplementary Service Data (USSD) subscriber data are out of scope of this specification. The GPRS context update from the SGSN to the GGSN is out of scope of this specification.

2 Normative 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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

[1] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2] GSM 02.01: "Digital cellular telecommunications system (Phase 2+); Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN)".

[3] GSM 02.02: "Digital cellular telecommunications system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[4] GSM 02.03: "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[5] GSM 02.04: "Digital cellular telecommunications system (Phase 2+); General on supplementary services".

[6] GSM 03.07: "Digital cellular telecommunications system (Phase 2+); Restoration procedures".

[7] GSM 03.08: "Digital cellular telecommunications system (Phase 2+); Organization of subscriber data".

[8] GSM 03.11: "Digital cellular telecommunications system (Phase 2+); Technical realization of supplementary services".

[9] GSM 03.15: "Digital cellular telecommunications system (Phase 2+); Technical realization of operator determined barring".

[10] GSM 02.32: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Service Description - Stage 1".

[11] GSM 03.35: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Stage 2".

[12] GSM 03.60 : "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS) - Stage 2".

[13] GSM 03.67: "Digital cellular telecommunications system (Phase 2+);"enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 2".

[14] GSM 03.68: "Digital cellular telecommunications system (Phase 2+);Voice Group Call Service (VGCS) - Stage 2".

[15] GSM 03.69: "Digital cellular telecommunications system (Phase 2+);Voice Broadcast Service (VBS) - Stage 2".

[16] GSM 03.71: “Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Functional Description; Stage 2”.

[17] GSM 03.78: "Digital cellular telecommunications system (Phase 2+); Customised Applications for Mobile network Enhanced Logic (CAMEL) - Phase 2 Stage 2".

[18] GSM 03.81: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 2".

[19] GSM 03.82: "Digital cellular telecommunications system (Phase 2+); Call Forwarding (CF) supplementary services - Stage 2".

[20] GSM 03.83: "Digital cellular telecommunications system (Phase 2+); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2".

[21] GSM 03.84: "Digital cellular telecommunications system (Phase 2+); MultiParty (MPTY) supplementary services - Stage 2".

[22] GSM 03.85: "Digital cellular telecommunications system (Phase 2+); Closed User Group (CUG) supplementary services - Stage 2".

[23] GSM 03.86: "Digital cellular telecommunications system (Phase 2+); Advice of Charge (AoC) supplementary services - Stage 2".

[24] GSM 03.88: "Digital cellular telecommunications system (Phase 2+); Call Barring (CB) supplementary services - Stage 2".

[25] GSM 03.90: "Digital cellular telecommunications system (Phase 2+); Unstructured supplementary services operation - Stage 2".

[26] GSM 03.91: "Digital cellular telecommunications system (Phase 2+); "Explicit Call Transfer (ECT) supplementary service - Stage 2".

[27] GSM 03.93: "Digital cellular telecommunications system (Phase 2+); Completion of Calls to Busy Subscriber (CCBS) - Stage 2".

[28] GSM 03.96: "Digital cellular telecommunications system (Phase 2+); "Calling Name Presentation (CNAP) supplementary service - Stage 2".

[29] GSM 09.02: "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[30] GSM 09.60 : "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface;"

[31] 3G TS 23.116: "~~3GPP; Technical Specification Group Core Network;~~ Super-Charger Technical Realisation; Stage 2."

[32] 3G TS 23.135: "Multicall supplementary service; Stage 2".

3.2 Definitions

Subscriber data to be stored in the HLR, VLR and SGSN are defined in ~~GSM 03.08~~TS 23.008, GSM 03.71, TS 23.135 and in ~~GSM 03.6x~~TS 23.06x, ~~GSM 03.8x~~TS 23.08x and ~~GSM 03.9x~~TS 23.09x-series of technical specifications.

Voice Broadcast Service (VBS), Voice Group Call Service (VGCS) and enhanced Multi Level Precedence and Pre-emption Service (eMLPP) Data related to group call area, cell or dispatcher attributes is only stored in the Group Call Register (GCR) which is linked to each MSC/VLR.

The GCR and it's stored data is out of scope of this specification.

Subscriber related VBS, VGCS and eMLPP Data only concerns entitlement data for these-services and is seen as shared non-GPRS subscriber data.

GPRS and non-GPRS subscriber data:

The HLR has to download data to the VLR and to the SGSN. In this specification those data sent to the VLR are called non-GPRS subscriber data and those data sent to the SGSN are called GPRS subscriber data.

Whenever the refining identifier non-GPRS or GPRS is missing a common rule is addressed which hold for both kinds of subscriber data.

Subscriber data specific to non-GPRS shall only be sent from the HLR to the VLR. Subscriber data specific to GPRS shall only be sent from the HLR to the SGSN.

Subscriber data common to both non-GPRS and GPRS (regional subscription information) are downloaded from the HLR to both entities.

Shared non-GPRS subscriber data:

Common subset of subscriber data defined to be stored in both the HLR and VLR. Subscriber data only stored in the HLR is not part of shared subscriber data. Shared subscriber data includes:

BS: Bearer Service (see GSM 02.02);

TS: Teleservice (see GSM 02.03);

BSG: Basic Service Group (see GSM 02.01, GSM 02.04 and GSM 03.11);

EBSG: Elementary Basic Service Group (see GSM 03.11);

CBSG: Collective Basic Service Group (see GSM 03.11);

LSA Information: Localised Service Area Information (see GSM 03.73);

SC Information: Super-Charger Information (see TS 23.116);

IST Information: Immediate Service Termination Information (see GSM 03.35).

Shared GPRS subscriber data:

Common subset of subscriber data defined to be stored in both the HLR and SGSN. Subscriber data only stored in the HLR is not part of shared subscriber data. Shared GPRS subscriber data includes:

TS: Teleservice (see GSM 02.03);

PDP Context (see GSM 03.60);

LSA Information: Localised Service Area Information (see GSM 03.73);

SC Information: Super-Charger Information (see TS 23.116).

Mandatory data:

Data required to form a self-consistent set of subscriber data. The context governs whether a specific parameter is mandatory, e.g. the data set for a specific service may be optional, however if data for this service is present, then parameters within this data set may be mandatory.

Mandatory data is defined by the service description (see e.g. ~~GSM 03.6x~~TS 23.06x, ~~GSM 03.8x~~TS 23.08x and ~~GSM 03.9x~~TS 23.09x-series of technical specifications ~~and~~, ~~GSM 03.15~~TS 23.015, GSM 03.71 and TS 23.135) and by PLMN defined requirements.

NOTE: The above definition is seen from a semantic point of view. Semantically, mandatory parameters may be defined as syntactically optional or mandatory by the protocol.

Optional data:

Data which is defined as subscriber data, but which is not required to form a self-consistent set of subscriber data; the context governs whether a specific parameter is optional.

Optional data is data which is defined by the service description (see e.g. ~~GSM 03.6x~~TS 23.06x, ~~GSM 03.8x~~TS 23.08x and ~~GSM 03.9x~~TS 23.09x-series of technical specifications ~~and~~, ~~GSM 03.15~~TS 23.015, GSM 03.71 and TS 23.135) or by PLMN defined requirements but is not defined as mandatory data.

NOTE: The above definition is seen from a semantic point of view. Semantically optional parameters are always defined as syntactically optional by the protocol.

Missing data:

Data which is mandatory in a given context but is not received nor is valid data available locally.

Unexpected data:

Data which is received and cannot be further processed. This may be either:

- optional data not required in a given context; or
- optional or mandatory data, required in this context but received with an unexpected value.

Overlapping data:

Two different cases of overlapping within subscriber data are possible:

- two or more parameters are to be stored at the same address in the data structure (see subclause 4.4);
- two or more BSGs within a BSG list include or are identical with one and the same EBSG.

The following **groups of non-GPRS subscriber information** are defined:

- Subscriber information (Group A):
  - International Mobile Subscriber Identity (IMSI);
  - basic Mobile Station International ISDN Number (MSISDN);
  - category;
  - subscriber status,
  - LMU identifier
- Basic service information (Group B):
  - Bearer Service list;
  - Teleservice list.

NOTE: VBS and VGCS entitlement data are subsumed under Teleservices

- Supplementary Service (SS) information (Group C):
  - forwarding information;
  - call barring information;
  - Closed User Group (CUG) information;
  - eMLPP data;
  - MC data;
  - SS Data;
- Operator Determined Barring (ODB) information (Group D):
  - ODB Data for non-GPRS services;
- Roaming restriction information (Group E):
  - roaming restriction due to unsupported feature;
- Regional subscription information (Group F):
  - regional subscription data.
- VBS/VGCS subscription information (Group G):
  - VBS subscription data;
  - VGCS subscription data.
- CAMEL subscription information (Group H):
  - Originating CAMEL Subscription Information (O-CSI);
  - Dialled Service CAMEL Subscription Information (D-CSI);
  - VMSC Terminating CAMEL Subscription Information (VT-CSI);
  - Supplementary Service Invocation Notification CAMEL Subscription Information (SS-CSI);
  - Translation Information Flag CAMEL Subscription Information (TIF-CSI);
  - SMS CAMEL Subscription Information (SMS-CSI);
  - Mobility Management Event Notification CAMEL Subscription Information (M-CSI).
- LSA Information (Group I):
  - LSA data.
- Super-Charger (SC) Information (Group K):
  - Age Indicator
- Location Services (LCS) information (Group X)
  - GMLC List
  - LCS Privacy Exception List
  - MO-LR List
- IST Information (Group J):
  - IST data.

The following **groups of GPRS subscriber information** are defined:

- Subscriber information (Group P1):
  - International Mobile Subscriber Identity (IMSI);
  - basic Mobile Station International ISDN Number (MSISDN);
  - subscriber status;
- Basic service information (Group P2):
  - Teleservice list.
- Operator Determined Barring (ODB) information (Group P3):
  - ODB Data for GPRS services;
- Roaming restriction information (Group P4):
  - roaming restriction in SGSN due to unsupported feature;
- Regional subscription information (Group P5):
  - regional subscription data.
- GPRS subscription information (Group P6):
  - GPRS subscription data.
- SGSN CAMEL subscription information (Group P7):
  - GPRS CAMEL subscription information;
  - SMS CAMEL subscription information.
- LSA Information (Group P8):
  - LSA data.
- Super-Charger (SC) Information (Group P9):
  - Age Indicator.

4.5.4 Consistency of Supplementary Service data

...

```
••Calling Line Identification Presentation (CLIP)
•   ••Provisioning State
•   ••Activation State
•   ••Override Category
•
••Calling Line Identification Restriction (CLIR)
•   ••Provisioning State
•   ••Activation State
•   ••Presentation Mode
•
••Connected Line identification Presentation (COLP)
•   ••Provisioning State
•   ••Activation State
•   ••Override Category
•
••Connected Line identification Restriction (COLR)
•   ••Provisioning State
•   ••Activation State
•
••Call Waiting (CW)
•   ••Provisioning State
•   ••BSG(1)
•   •   ••Activation State
•   ••.....
•   •
•   ••BSG(n)
•       ••Activation State
•
••Call Hold (HOLD)
•   ••Provisioning State
•   ••Activation State
•
••Multi Party (MPTY)
•   ••Provisioning State
•   ••Activation State
•
••Advice of Charge Information (AoCI)
•   ••Provisioning State
•   ••Activation State
•
••Advice of Charge Charging (AoCC)
•   ••Provisioning State
•   ••Activation State
•
••Explicit Call Transfer (ECT)
•   ••Provisioning State
•   ••Activation State
•
••Calling Name Presentation (CNAP)
•   ••Provisioning State
•   ••Activation State
•   ••Override Category
•
••enhanced Multi-Level Precedence Pre-Emption (eMLPP)
•   ••Provisioning State
•   ••Activation State
•   ••Maximum Entitled Priority
•   ••Default
•
••Multicall (MC)
•   ••Provisioning State
•   ••Activation State
•   ••Registration State
•   ••Subscribed maximum CS bearers
•   ••User defined maximum CS bearers
•
••Completion of Calls to Busy Subscriber (CCBS)-
originating NW
•    ••Provisioning State
•    ••Activation State
•
••Completion of Calls to Busy Subscriber (CCBS)-
destination NW
   ••Provisioning State
   ••Activation State
```

NOTE: For detailed information see ~~GSM 03.67~~TS 23.067, ~~GSM 03.81~~TS 23.081, ~~GSM 03.83~~TS 23.083, ~~GSM 03.84~~TS 23.084, ~~GSM 03.86~~3TS 23.086, ~~GSM 03.91~~TS 23.091, ~~GSM 03.93~~TS 23.093, ~~GSM 03.96~~3TS 23.096, TS 23.135 and ~~GSM 09.02~~TS 29.002.

Figure 7: SS Data

3GPP TSG- CN2 SWG B #5
Kista, Sweden, 2-3 March 2000

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23.018	CR	025r7	Current Version:	3.3.0

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

For submission to:	CN#7	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		UTRAN / Radio		Core Network	X

Source: N2 **Date:** 02/03/00

Subject: Addition of the description for 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	X		Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: This CR provides the changes necessary to introduce Multicall, according to the result of MC ad hoc.

Clauses affected: 2, 5.1, 6.13 (new), 7.1.1, 7.1.2, 7.3.1, 7.3.2

Other specs affected:				
	Other 3G core specifications	X	→ List of CRs:	23.008, 23.011, 23.016, 24.008, 24.010, 24.080, 29.002
	Other GSM core specifications		→ List of CRs:	
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	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:


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2 Normative 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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1999 document, references to 3G documents are for Release 1999 versions (version 3.x.y).

[1] GSM 02.01: "Digital cellular telecommunications system (Phase 2+); Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN)".

[2] 3G TS 23.003: "Numbering, addressing & identification".

[3] GSM 03.20: " Digital cellular telecommunications system (Phase 2+); Security related network functions".

[4] 3G TS 23.054: "Shared Inter Working Function (SIWF) - Stage 2 ".

[5] 3G TS 23.060: "General Packet Radio Service; Service description; Stage 2".

[6] 3G TS 23.066: "Support of Mobile Number Portability (MNP); Technical Realization – Stage 2"

[7] 3G TS 23.072: "Call Deflection (CD) Supplementary Service; Stage2"

[8] 3G TS 23.078: "Customized Applications for Mobile network Enhanced Logic (CAMEL) -Phase 3 Stage 2".

[9] 3G TS 23.078: "Customized Applications for Mobile network Enhanced Logic (CAMEL) - Phase 3; Stage 2".

[10] 3G TS 23.079: "Support of Optimal Routeing (SOR); Technical Realization".

[11] 3G TS 23.081: "Line identification Supplementary Services - Stage 2 ".

[12] 3G TS 23.082: "Call Forwarding (CF) Supplementary Services - Stage 2".

[13] 3G TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 2".

[14] 3G TS 23.084: "Digital cellular telecommunications system (Phase 2+); Multi Party (MPTY) Supplementary Service - Stage 2".

[15] 3G TS 23.085: "Closed User Group (CUG) Supplementary Service - Stage 2".

[16] 3G TS 23.086: "Advice of Charge (AoC) Supplementary Service - Stage 2".

[17] 3G TS 23.087: "User –to-User Signalling (UUS) - Stage 2".

[18] 3G TS 23.088: "Call Barring (CB) Supplementary Service - Stage 2".

[19] 3G TS 23.093: "Technical realization of Completion of Calls to Busy Subscriber (CCBS) - Stage 2".

[20] 3G TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols-Stage 3".

[21] 3G TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[22] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile-services Switching Centre - Base Station System (MSC - BSS) interface Layer 3 specification".

[23] 3G TS 29.002: "Mobile Application Part (MAP) specification".

[24] 3G TS 29.007: "General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[25] 3G TS 29.010: "Information element mapping between Mobile Station - Base Station System (MS - BSS) and Base Station System - Mobile-services Switching Centre (BSS - MSC) Signalling procedures and the Mobile Application Part (MAP)".

[26] GSM 12.08: "Digital cellular telecommunications system (Phase 2+); Subscriber and equipment trace (GSM 12.08)".

[27] 3G TS 23.072: "Technical Specification Group Core Network; Call Deflection (CD) supplementary service; Stage2".

[28] 3G TS 23.078: "Technical Specification Group Core Network; Customized Applications for Mobile network Enhanced Logic (CAMEL) - Phase 3; Stage 2".

[29] 3G TS 23.079: " Technical Specification Group Core Network; Support of Optimal Routeing (SOR); Technical Realization".

[30] 3G TS 23.116: "3GPP; Technical Specification Group Core Network; Super-Charger Technical Realization; Stage 2".

[31] ETS 300 356-1 (1995): "Integrated Services Digital Network (ISDN); Signalling System No. 7; ISDN User Part (ISUP) version 2 for the international interface; Part 1: Basic services".

[32] ITU-T Q.763, December 1999: "Signalling System No. 7 – ISDN user part formats and codes".

[33] ITU-T Recommendation Q.850 (1996): "Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part".

[34] 3G TS 23.135: " Multicall supplementary service – Stage 2".

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

5.1 Information flow for an MO call

An example information flow for an MO call is shown in figure 1; many variations are possible. Signalling over the radio interface between MSA and BSSA or VMSCA is shown by dotted lines; signalling over the "A" interface between BSSA and VMSCA is shown by dashed lines; signalling over the B interface between VMSCA and VLRA is shown by chain lines; and ISUP signalling between VMSCA and the destination exchange is shown by solid lines.

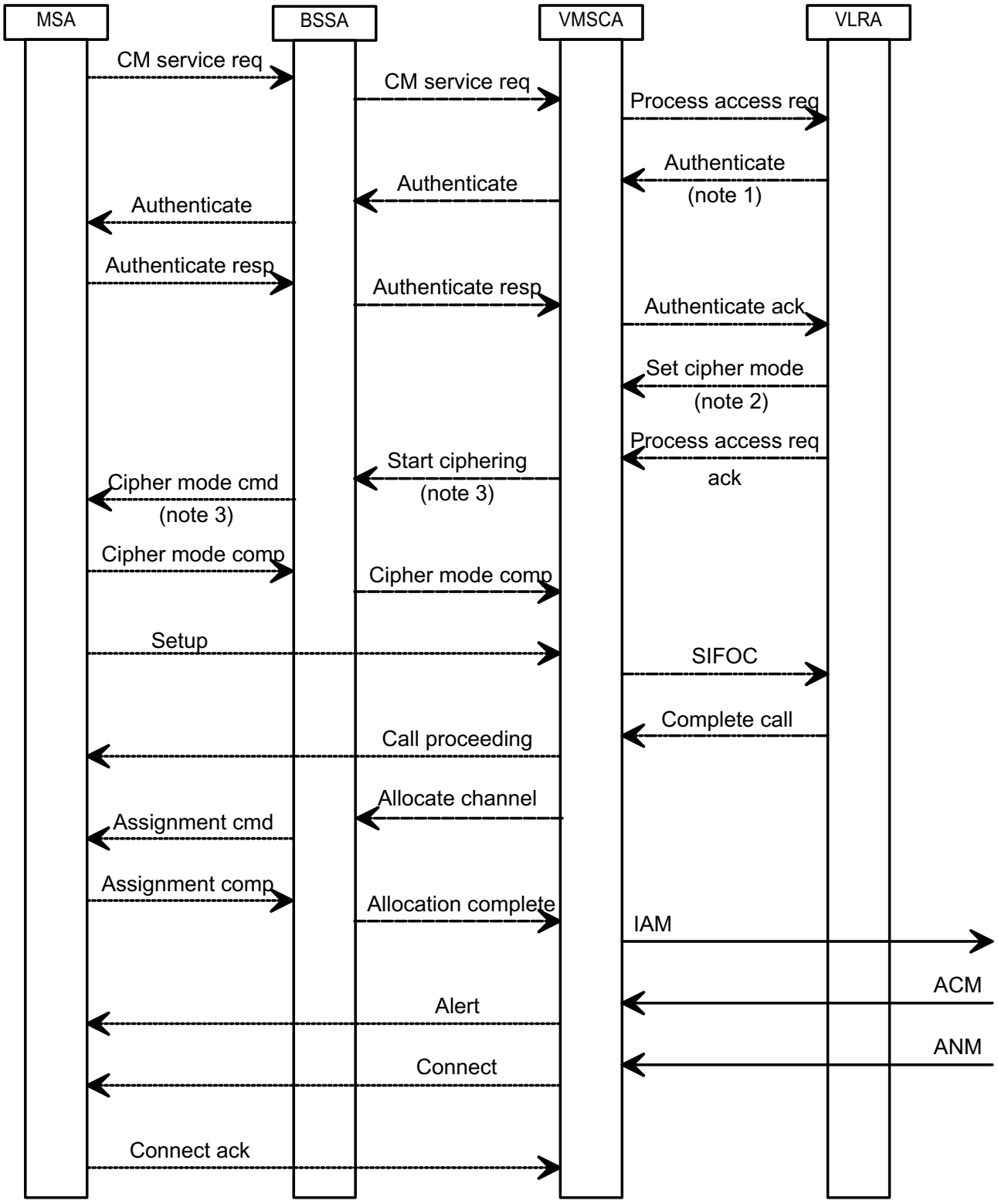


Figure 1: Information flow for a basic mobile originated call

NOTE 1: Authentication may occur at any stage during the establishment of an MO call; its position in this message flow diagram is an example.

NOTE 2: Ciphering may be initiated at any stage after authentication; its position in this message flow diagram is an example.

NOTE 3: If ciphering is not required, the MSC may send a CM service accept towards the MS; optionally it may instead send a "start ciphering" request indicating that no ciphering is required.

NOTE 4: The network may request the IMEI from the MS, and may check the IMEI, at any stage during the establishment of an MO call, either as part of the procedure to start ciphering or explicitly after ciphering has started; this is not shown in this message flow diagram.

When the user wishes to originate a call, MSA establishes a signalling connection with BSSA, and sends a Connection Management (CM) service request to BSSA, which relays it to VMSCA. VMSCA sends a Process access request to VLRA. VLRA may then initiate authentication, as described in GSM 03.20 [3]. VLRA may also initiate ciphering at this stage, as described in GSM 03.20 [3]. If the user originates one or more new MO calls in a multicall configuration, MSA sends a CM service request through the existing signalling connection for each new call.

If VLRA determines that MSA is allowed service, it sends a Process access request ack to VMSCA. If VMSCA has received a Set cipher mode message from VLRA, the Process access request ack message triggers a Start ciphering command message towards BSSA; otherwise VMSCA sends a CM service accept message towards BSSA.

If BSSA receives a Start ciphering command from VMSCA, it initiates ciphering as described in GSM 03.20 [3]; when ciphering is successfully initiated, MSA interprets this in the same way as a CM service accept. If ciphering is not required at this stage, BSSA relays the CM service accept to MSA.

When MSA has received the CM service accept, or ciphering has been successfully initiated, MSA sends a Setup message containing the B subscriber address via BSSA to VMSCA. MSA also uses the Setup message to indicate the bearer capability required for the call; VMSCA translates this bearer capability into a GSM basic service, and determines whether an interworking function is required. VMSCA sends to VLRA a request for information to handle the outgoing call, using a Send Info For Outgoing Call (SIFOC) message containing the B subscriber address.

If VLRA determines that the call should be connected, it sends a Complete Call message to VMSCA. VMSCA sends a Call Proceeding message via BSSA to MSA, to indicate that the call request has been accepted, and sends an Allocate channel message to BSSA, to trigger BSSA and MSA to set up a traffic channel over the radio interface. The Call Proceeding message includes bearer capability information if any of the negotiable parameters of the bearer capability has to be changed. When the traffic channel assignment process is complete (indicated by the Allocation complete message from BSSA to VMSCA), VMSCA constructs an ISUP IAM using the B subscriber address, and sends it to the destination exchange.

When the destination exchange returns an ISUP Address Complete Message (ACM), VMSCA sends an Alert message via BSSA to MSA, to indicate to the calling user that the B subscriber is being alerted.

When the destination exchange returns an ISUP ANswer Message (ANM), VMSCA sends a Connect message via BSSA to MSA, to instruct MSA to connect the speech path.

The network then waits for the call to be cleared.

For an emergency call, a different CM service type (emergency call) is used, and the mobile may identify itself by an IMEI. It is a network operator option whether to allow an emergency call when the mobile identifies itself by an IMEI. Details of the handling are shown in clause.

**** Next Modified Section ****

6.13 Multicall (TS 23.135)

The basic call handling processes OCH_MSC, OCH_VLR, ICH_MSC & ICH_VLR interacts with the Multicall supplementary service as described in subclauses 7.1.1, 7.1.2, 7.3.1 & 7.3.2.

**** Next Modified Section ****

7.1.1.3 Procedure OG_Call_Setup_MSC

Sheet 1: the variables Alerting sent, MS connected and Reconnect are global data, accessible to the procedures CCBS_Check_OG_Call, CCBS_OCH_Report_Failure, CCBS_OCH_Report_Success, CCBS_Check_If_CCBS_Possible, Send_Alerting_If_Required and Send_Access_Connect_If_Required.

Sheet 1: the VMSC converts the GSM bearer capability negotiated between the VMSC and the MS to a GSM basic service according to the rules defined in GSM 07.01 [21].

Sheet 1: the variable UUS1 result sent is specific to UUS. This variable is accessible to all UUS specific procedures.

Sheet 1: the procedure UUS_OCH_Check_Setup is specific to UUS; it is specified in GSM 03.87 [17].

Sheet 1, sheet 2, sheet 5: the procedure CCBS_OCH_Report_Failure is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 1, sheet 5, sheet 6, sheet 8: at any stage after the Setup has been received, the MS may terminate the transaction with the network by sending a Release transaction request.

Sheet 1: the procedure Check_OG_Multicall_MSC is specific to Multicall; it is specified in TS 23.135 [34]. If the VMSC does not support Multicall, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 2: the procedure Set_CLI_Presentation_Indicator_MSC is specific to CLIR. If the VMSC does not support CLIR, processing continues from the "Yes" exit of the test "Result=Call allowed?".

Sheet 2: the procedure CAMEL_OCH_MSC_INIT is specific to CAMEL; it is specified in GSM 03.78 for CAMEL Phase 1 [8] and GSM 03.78 for CAMEL Phase 2 [9]. If the VMSC does not support CAMEL, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 2: the procedure CAMEL_MO_Dialled_Services is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28]. If the VMSC does not support CAMEL phase 3, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 2: the procedure CCBS_Check_OG_Call is specific to CCBS; it is specified in GSM 03.93 [19]. If the VMSC does not support CCBS, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 2: the procedure MOBILE_NUMBER_PORTABILITY_IN_OQoD is specific to Mobile Number Portability; it is specified in GSM 03.66 [6].

Sheet 2: the procedure UUS_OCH_Set_Info_In_IAM is specific to UUS; it is specified in GSM 03.87 [17].

Sheet 2: the procedure CAMEL_Store_Destination_Address is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28].

Sheet 3: the procedure CCBS_OCH_Report_Success is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 3, sheet 6: the procedures CAMEL_Start_TNRy and CAMEL_Stop_TNRy are specific to CAMEL phase 2; they are specified in GSM 03.78 for CAMEL Phase 2 [9].

Sheet 3: the task "UTU2Cnt := 0" is executed only if the VMSC supports UUS

Sheet 4: the procedure CAMEL_OCH_MSC_ANSWER is specific to CAMEL; it is specified in GSM 03.78 for CAMEL Phase 1 [8] and GSM 03.78 for CAMEL Phase 2 [9]. If the VMSC does not support CAMEL, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 4: the procedure Set_COLP_Info_MSC is specific to COLP.

Sheet 4: the procedure Handle_AoC_MO_MSC is specific to AoC.

Sheet 4: the task "Store CW treatment indicator for this call if received in SII2" is executed only if the VMSC supports CAMEL phase 3.

Sheet 5: the procedures CCBS_Check_If_CCBS_Possible and CCBS_Activation_MSC are specific to CCBS; they are specified in GSM 03.93 [19]. The task "Store CCBS Result" is executed only if the VMSC supports CCBS. If the VMSC does not support CCBS, processing continues from the "CCBS Not Possible" exit of the test "CCBS Result".

Sheet 5, sheet 6: the procedures CAMEL_OCH_MSC_DISC3 and CAMEL_OCH_MSC_DISC4 are specific to CAMEL; they are specified in GSM 03.78 for CAMEL Phase 1 [8] and GSM 03.78 for CAMEL Phase 2 [9] respectively.

Sheet 5, sheet 6: the procedure CAMEL_OCH_MSC1 is specific to CAMEL phase 2; it is specified in GSM 03.78 for CAMEL Phase 2 [9]. If the VMSC does not support CAMEL phase 2, processing continues from the "No" exit of the test "Result=Reconnect?"

Sheet 5, sheet 6, sheet 8: the processing in the branch beginning with the Int_Release_Call input will occur only if the MSC supports CAMEL.

Sheet 6, sheet 8: the procedure UUS_MSC_Check_UUS1_UUI is specific to UUS; it is specified in GSM 03.87 [17].

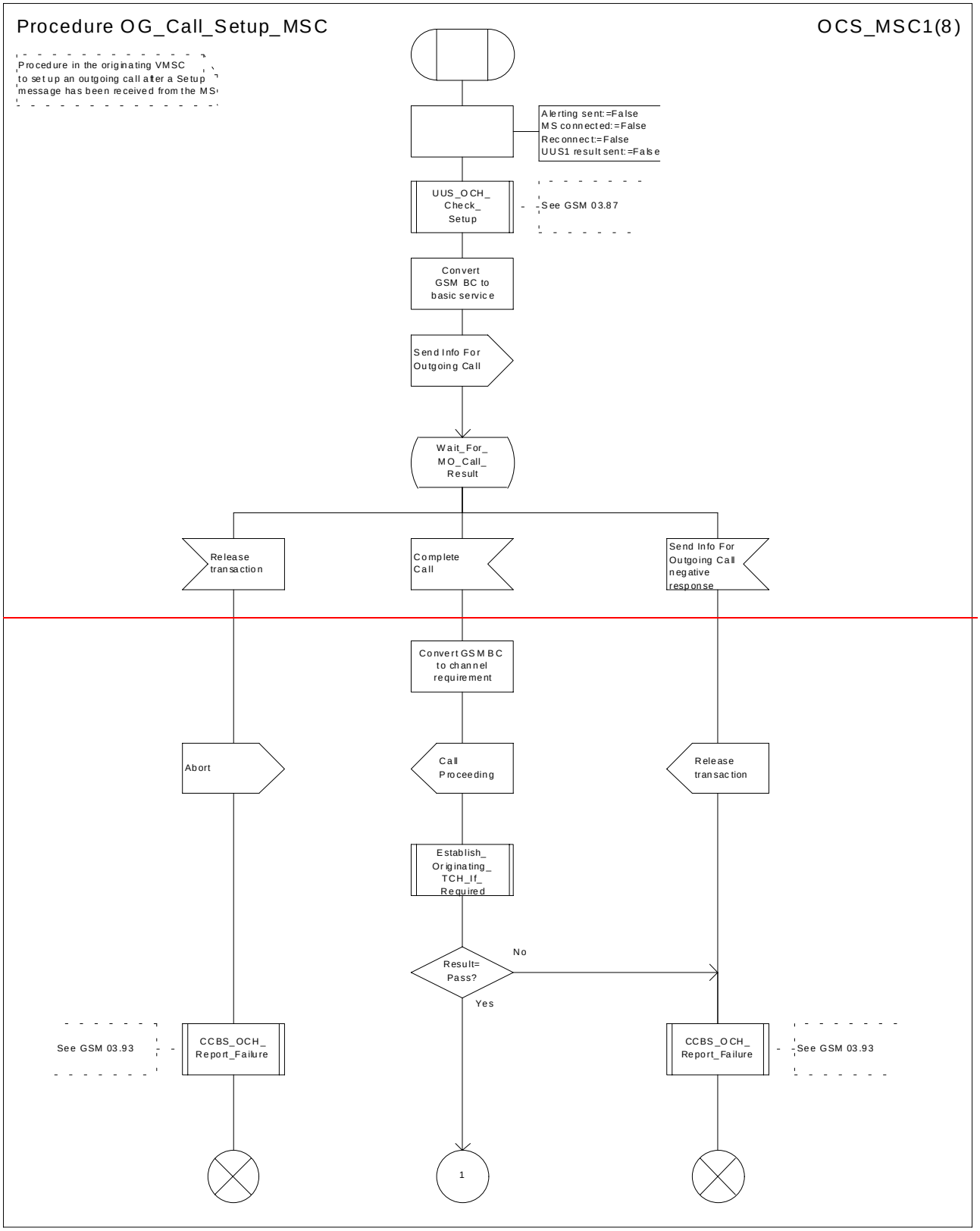
Sheet 7: the input signal TNRy expired and all the subsequent processing are specific to CAMEL phase 2, and will occur only if the VMSC supports CAMEL phase 2. The procedure CAMEL_OCH_MSC2 is specified in GSM 03.78 for CAMEL Phase 2 [9].

Sheet 7: the input signal User To User is specific to UUS; it is discarded if the VMSC does not support UUS.

Sheet 7: the procedures UUS_MSC_Check_UUS2_UUI_to_MS and UUS_MSC_Check_UUS2_UUI_to_NW are specific to UUS; they are specified in GSM 03.87 [17].

Sheet 8: the procedure CAMEL_OCH_MSC_DISC1 is specific to CAMEL; it is specified in GSM 03.78 for CAMEL Phase 1 [8] and GSM 03.78 for CAMEL Phase 2 [9]. If the VMSC does not support CAMEL, processing continues from the "No" exit of the test "Result=CAMEL handling?".

Sheet 8: the procedure CAMEL_OCH_MSC_DISC2 is specific to CAMEL; it is specified in GSM 03.78 for CAMEL Phase 1 [8] and GSM 03.78 for CAMEL Phase 2 [9]. If the VMSC does not support CAMEL, processing continues from the "No" exit of the test "Result=CAMEL handling?".



~~Figure 8a: Procedure Outgoing_Call_Setup_MSC (sheet 1)~~

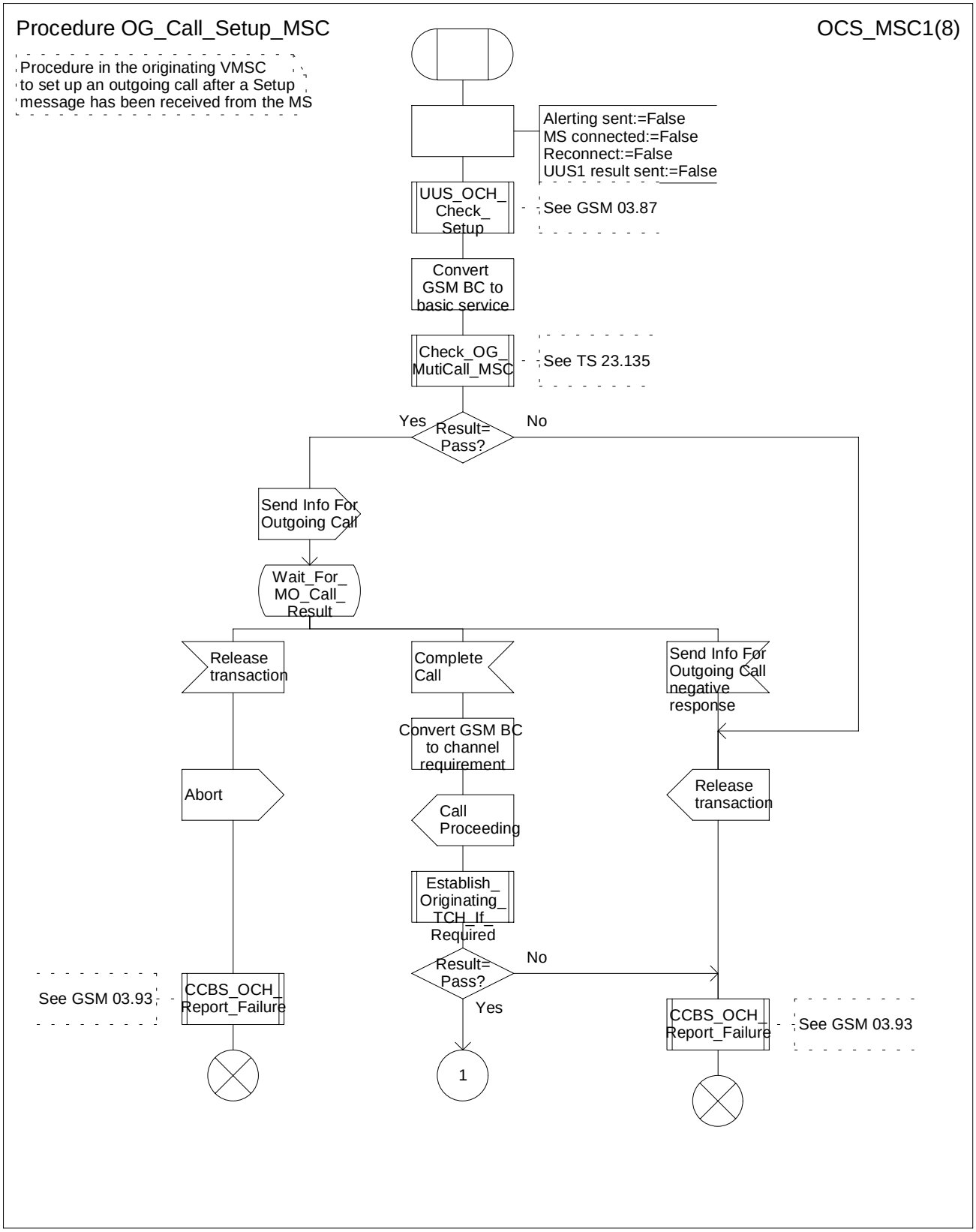


Figure 8a: Procedure Outgoing_Call_Setup_MSC (sheet 1)

**** Next Modified Section ****

7.1.2.3 Procedure OG_Call_Subscription_Check_VLR

Sheet 1: it is an implementation option to carry out the check for operator determined barring of all outgoing calls before the check on provisioning of the requested basic service.

Sheet 1: the procedure OG_CUG_Check is specific to CUG. If the VLR does not support CUG, processing continues from the "Yes" exit of the test "Result=Call allowed?".

Sheet 1: the procedure Get_LI_Subscription_Info_MO_VLR is specific to CLIR and COLP. If the VLR supports neither CLIR nor COLP, the procedure call is omitted.

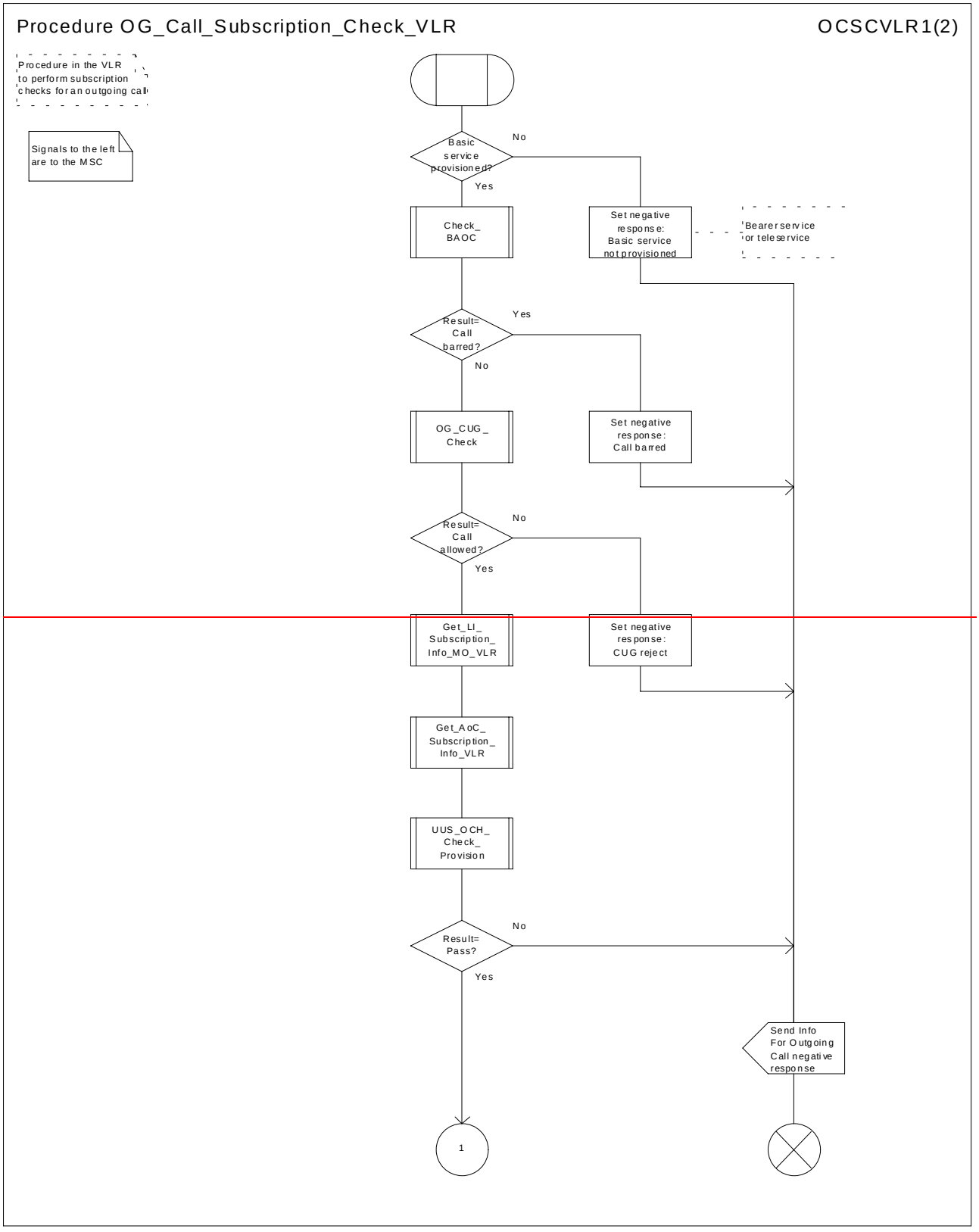
Sheet 1: the procedure Get_AoC_Subscription_Info_VLR is specific to AoC.

Sheet 1: the procedure UUS_OCH_Check_Provision is specific to UUS; it is specified in GSM 03.87 [17]. If the VMSC does not support UUS, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 1: the procedure Check_OG_Multicall_VLR is specific to Multicall; it is specified in 3G TS 23.135 [34]. If the VMSC does not support Multicall, processing continues from the “Yes” exit of the test “Result=Pass?”

Sheet 2: the procedure CAMEL_OCH_VLR is specific to CAMEL; it is specified in GSM 03.78 for CAMEL Phase 1 [8] and GSM 03.78 for CAMEL Phase 2 [9]. If the VLR does not support CAMEL, processing continues from connector 1 to the call to the procedure Check_OG_Barring.

Sheet 2: the negative response "call barred" indicates whether the reason is operator determined barring or supplementary service barring, according to the result returned by the procedure Check_OG_Barring.



~~Figure 21a: Procedure OG_Call_Subscription_Check_VLR (sheet 1)~~

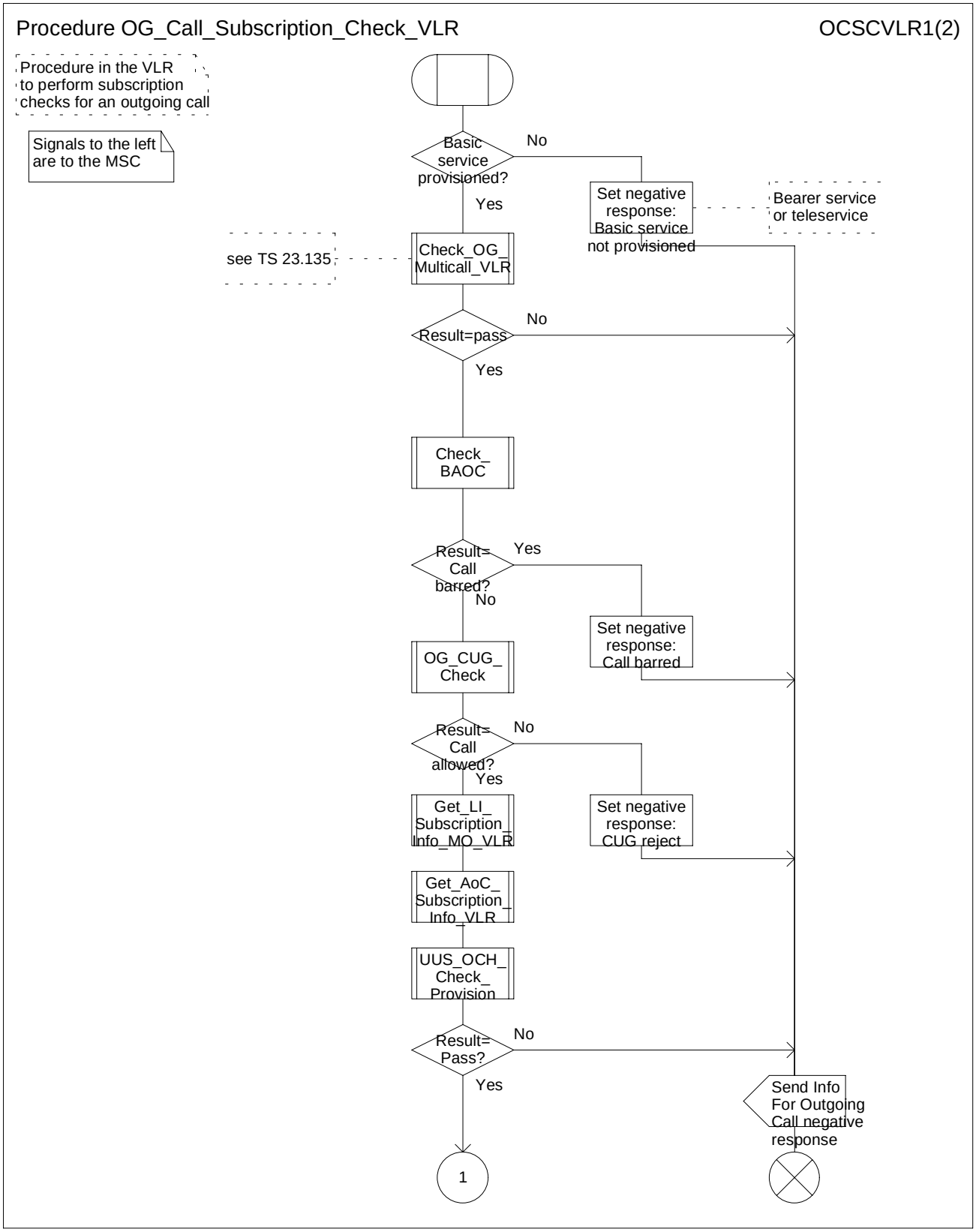


Figure 4a: Procedure OG_Call_Subscription_Check_VLR (sheet 1)

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

7.3 MT call

7.3.1 Functional requirements of serving MSC

7.3.1.2 Procedure Page_MS_MSC

Sheet 1: the test "MS connection exists" takes the "Yes" exit if there is a radio connection established between the MS and the network.

Sheet 1: for an SMS or SS page, the test "Call still exists" takes the "Yes" exit if the SMS or SS transaction which led to the page still exists.

Sheet 1: the test "SMS or SS page" is not required for the handling of circuit-switched calls, because the VLR will always use a page type of "circuit-switched call", but the more generalized procedure Page_MS_MSC is equally applicable to paging for SMS delivery or network-initiated SS procedures.

Sheet 1: the test "MS busy" takes the "Yes" exit if the MS is engaged on a circuit-switched call.

Sheet 1: the procedure Check_MT_Multicall_MSC is specific to Multicall; it is specified in 3G TS 23.135 [34]. If the VMSC does not support Multicall, processing continues from the “Yes” exit of the test “Result= Not provisioned?”.

Sheet 1: the test "Call in setup" takes the "Yes" exit if the call on which the MS is engaged has not reached the established phase (called party answer).

Sheet 1: 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.

Sheet 1: if there is one established call, the negative response Busy Subscriber (More calls possible) includes the basic service which applies for the established call. If there are two or more established calls (the Multicall case), the negative response Busy Subscriber (More calls possible) includes the basic service list which applies for the established calls (See TS 23.135 [34]).

Sheet 2: the signal input "MS connection established" indicates that the MS has responded to paging, or sent a CM service request for anything other than a circuit-switched call, or completed the location registration procedure.

7.3.1.3 Procedure Search_For_MS_MSC

Sheet 1: the test "MS connection exists" takes the "Yes" exit if there is a radio connection established between the MS and the network.

Sheet 1: for an SMS or SS page, the test "Call still exists" takes the "Yes" exit if the SMS or SS transaction which led to the page still exists.

Sheet 1: the test "SMS or SS page" is not required for the handling of circuit-switched calls, because the VLR will always use a page type of "circuit-switched call", but the more generalized procedure Search_For_MS_MSC is equally applicable to paging for SMS delivery or network-initiated SS procedures.

Sheet 1: the test "MS busy" takes the "Yes" exit if the MS is engaged on a circuit-switched call.

Sheet 1: the procedure Check_MT_Multicall_MSC is specific to Multicall; it is specified in 3G TS 23.135 [34]. If the VMSC does not support Multicall, processing continues from the “Yes” exit of the test “Result= Not provisioned?”.

Sheet 1: the test "Call in setup" takes the "Yes" exit if the call on which the MS is engaged has not reached the established phase (called party answer).

Sheet 1: 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.

Sheet 1: if there is one established call, the negative response Busy Subscriber (More calls possible) includes the basic service which applies for the established call. If there are two or more established calls (the Multicall case), the negative response Busy Subscriber (More calls possible) includes the basic service list which applies for the established calls (See 23.135 [34]).

Sheet 2: the signal input "MS connection established" indicates that the MS has responded to paging, or sent a CM service request for anything other than a circuit-switched call, or completed the location registration procedure.

7.3.1.4 Procedure Complete_Call_In_MSC

Sheet 1: the procedure Set_CLIP_Info_MSC is specific to CLIP.

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

Sheet 1: the procedure UUS_ICH_UUS1_Implicit_Active is specific to UUS, it is specified in GSM 03.87 [17].

Sheet 1: the procedure CCBS_Report_Not_Idle is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 1: the procedure Establish_Terminating_TCH_Multicall1 is specific to Multicall; it is specified in 3G TS 23.135 [34].

Sheet 1: the test "Result=Rejected?" can take the "Yes" exit only if the procedure Establish_Terminating_TCH_Multicall1 was called.

Sheet 1, sheet 2, sheet 3, sheet 4, sheet 5: the procedure CAMEL_MT_GMSC_DISC4 is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28]. If the VMSC does not support CAMEL phase 3, processing continues from the "No" exit of the test "Result=Reconnect?".

Sheet 1, sheet 2, sheet 7~~6~~: the procedure CAMEL_MT_GMSC_DISC6 is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28].

Sheet 1, sheet 4~~3~~, sheet 7~~6~~: the procedure CCBS_ICH_MSC_Report_Failure is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 2: the procedure CCBS_ICH_MSC_Report_Success is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 2, sheet 6~~4~~, sheet 9~~8~~: the procedure Check_CD_SII2 is specific to Call Deflection; it is specifi~~c~~ed in TS 23.072 [27]. If the VMSC does not support Call Deflection, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 2: the procedure CAMEL_Start_TNRy is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28].

~~Sheet 2, sheet 4: the procedure CAMEL_MT_GMSC_ANSWER is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28]. If the VMSC does not support CAMEL phase 3, processing continues from the "Yes" exit of the test "Result=Pass?".~~

Sheet 2, sheet 5~~4~~: the procedure UUS_ICH_Check_Support is specific to UUS, it is specified in GSM 03.87 [17]. If the VMSC does not support UUS, processing continues from the “Yes” exit of the test “Result=Pass?”.

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

Sheet 2: the procedure Send_ACM_If_Required is specified in subclause 7.2.1.3.

~~Sheet 2, sheet 4: the procedure Handle_AoC_MT_MSC is specific to AoC. If the VMSC does not support AoC, processing continues from the "Yes" exit of the test "Result=Pass?".~~

~~Sheet 2, sheet 4: the procedure Set_COL_Presentation_Indicator_MSC is specific to COLP.~~

~~Sheet 2: the procedure Send_Network_Connect_If_Required is specified in subclause 7.2.1.5.~~

Sheet 2, sheet5: the procedure Establish_Terminating_TCH_Multicall2 is specific to Multicall; it is specified in 3G TS 23.135 [34]. If the VMSC does not support Multicall, processing continues from the “Yes” exit of the test “Result=Pass?”.

Sheet 3, sheet 5: the procedure CAMEL_MT_GMSC_ANSWER is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28]. If the VMSC does not support CAMEL phase 3, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 3, sheet 5: the procedure Handle_AoC_MT_MSC is specific to AoC. If the VMSC does not support AoC, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 3, sheet 5: the procedure Set_COL_Presentation_Indicator_MSC is specific to COLP.

Sheet 3: the procedure Send_Network_Connect_If_Required is specified in subclause 7.2.1.5.

Sheet 43, sheet 98: the processing in the branch starting with the input "CD Request" is specific to Call Deflection; if the VMSC does not support Call Deflection the input is discarded.

Sheet 43, sheet 98: the procedure Handling_CD_MSC is specific to Call Deflection; it is specified in GSM 03.72 [7].

Sheet 25: the procedure CAMEL_Stop_TNRy is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28].

Sheet 54: the procedure Send_Answer_If_Required is specified in subclause 7.2.1.4.

Sheet 65: the input signal "CAMEL TNRy expired" will be received only if the VMSC supports CAMEL phase 3.

Sheet 65, sheet 98: the procedure UUS_ICH_Check_Forwarding is specific to UUS, it is specified in GSM 03.87 [17]. If the VMSC does not support UUS, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 76, sheet 87: the procedure UUS_MSC_Check_UUS1_UUI is specific to UUS; it is specified in GSM 03.87 [17].

Sheet 98: the procedures UUS_MSC_Check_UUS2_UUI_to MS and UUS_MSC_Check_UUS2_UUI_to NW are specific to UUS, they are specified in GSM 03.87 [17].

Sheet 98: the procedure CD_UUS_Interaction is specific to Call Deflection; it is specified in GSM 03. 72 [7].

7.3.1.5 Procedure Process_Call_Waiting_MSC

Sheet 1: the procedure Set_CLIP_Info_MSC is specific to CLIP.

Sheet 1, sheet 2: the VMSC and the MS may negotiate the bearer capability to be used for the call by the exchange of information in the Setup and Call Confirmed messages.

Sheet 1: the procedure UUS_ICH_UUS1_Implicit_Active is specific to UUS; it is specified in GSM 03.87 [17].

Sheet 1: the procedure CCBS_Report_Not_Idle is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 2: the procedure Establish_Terminating_TCH_Multicall1 is specific to Multicall; it is specified in 3G TS 23.135 [34]. If the VMSC does not support Multicall, processing continues from the “Yes” exit of the test “Result=Pass?”.

Sheet 2, sheet 3, sheet 5: the procedure UUS_ICH_Check_Support is specific to UUS; it is specified in GSM 03.87 [17]. If the VMSC does not support UUS, processing continues from the "Yes" exit of the test "Result=Pass?" where the test follows the procedure call.

Sheet 2: the procedure CCBS_ICH_MSC_Report_Success is specific to CCBS; it is specified in GSM 03.93 [19].

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

Sheet 2, sheet 8: the procedure Handling_CD_MSC is specific to Call Deflection; it is specified in GSM 03.72 [7].

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

Sheet 2, sheet 3, sheet 5, sheet 7: the procedure CAMEL_MT_GMSC_DISC4 is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28]. If the VMSC does not support CAMEL phase 3, processing continues from the "No" exit of the test "Result=Reconnect?".

Sheet 2, sheet 3, sheet 4, sheet 8: the procedure CCBS_ICH_MSC_Report_Failure is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 2: the Call Confirmed message indicates "busy" for the successful case.

Sheet 2: the procedure CAMEL_Start_TNRy is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28].

Sheet 2: the procedure Send_ACM_If_Required is specified in subclause.

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

Sheet 4, sheet 8: the procedure CAMEL_MT_GMSC_DISC6 is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28].

Sheet 4, sheet 7: the procedure UUS_MSC_Check_UUS1_UUI is specific to UUS; it is specified in GSM 03.87 [17].

Sheet 5: the procedure CAMEL_Stop_TNRy is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28].

Sheet 5: the procedure Establish_Terminating_TCH_Multicall2 is specific to Multicall; it is specified in 3G TS 23.135 [34].

Sheet 5: the procedure Handle_AoC_MT_MSC is specific to AoC. If the VMSC does not support AoC, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 5: the procedure CAMEL_MT_GMSC_ANSWER is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28]. If the VMSC does not support CAMEL phase 3, processing continues from the "Yes" exit of the test "Result=Pass?" on sheet 6.

Sheet 6: the procedure Set_COL_Presentation_Indicator_MSC is specific to COLP.

Sheet 6: the procedure Send_Answer_If_Required is specified in subclause.

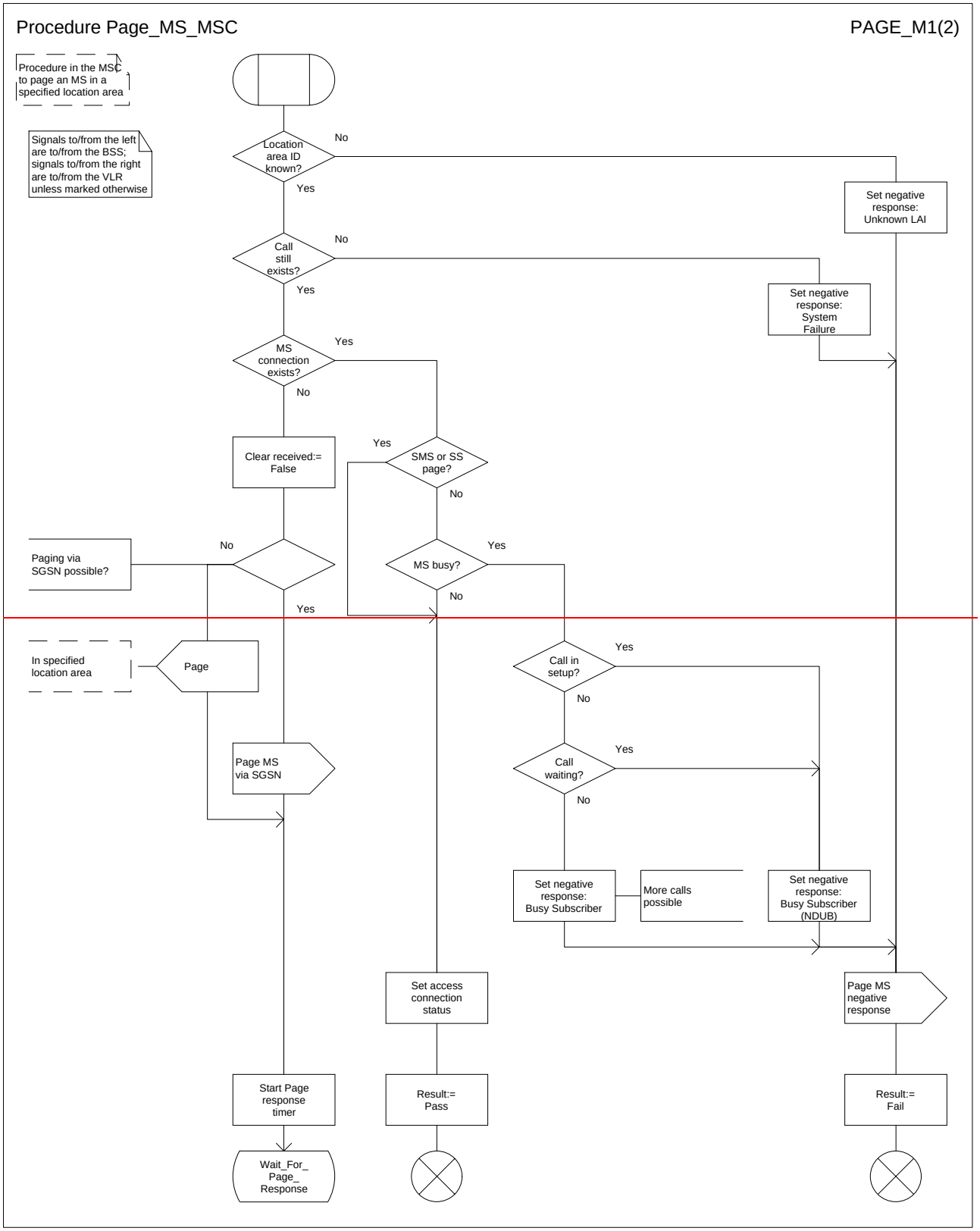
Sheet 7: the input signal "CAMEL TNRy expired" will be received only if the VMSC supports CAMEL phase 3.

Sheet 7: the procedure CAMEL_MT_GMSC_DISC5 is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28]. If the VMSC does not support CAMEL phase 3, processing continues from the "No" exit of the test "Result=Reconnect?".

Sheet 7, sheet 8: the procedure UUS_ICH_Check_Forwarding is specific to UUS; it is specified in GSM 03.87 [17]. If the VMSC does not support UUS, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 8: the procedures UUS_MSC_Check_UUS2_UUI_to_MS and UUS_MSC_Check_UUS2_UUI_to_NW are specific to UUS; they are specified in GSM 03.87 [17].

Sheet 8: the procedure CD_UUS_Interaction is specific to Call Deflection; it is specified in GSM 03. 72 [7].



~~Figure 63a: Procedure Page_MS_MSC (sheet 1)~~

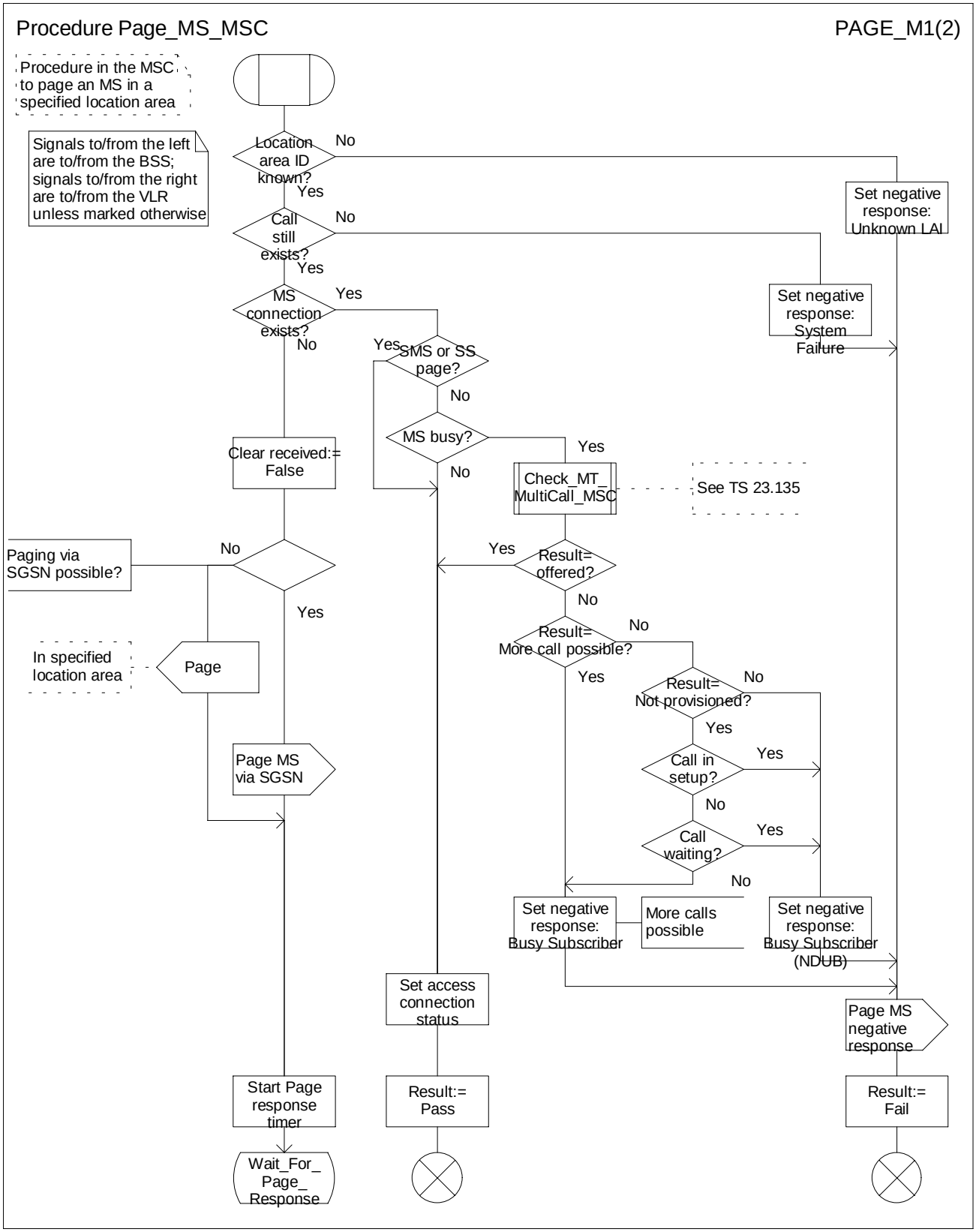
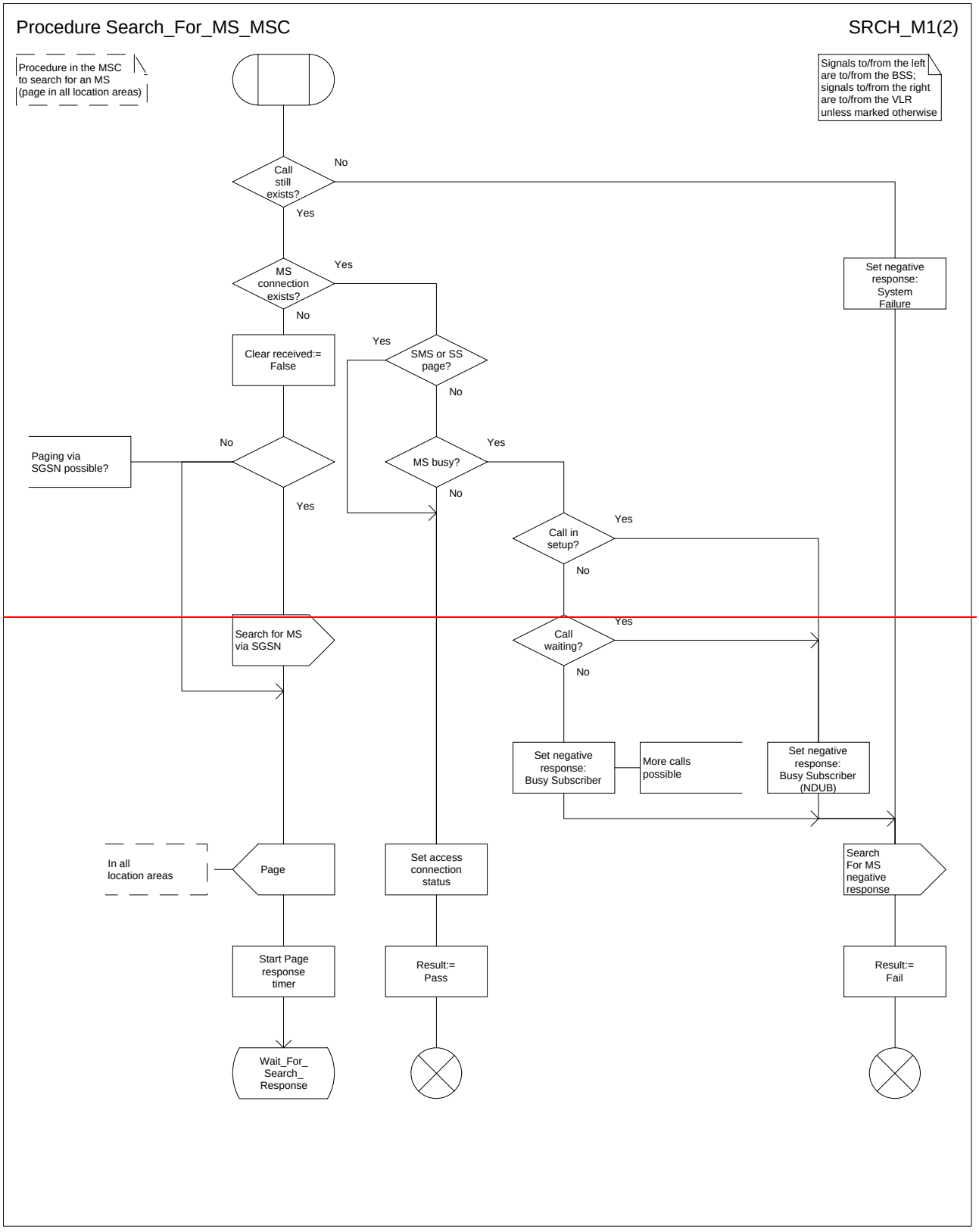


Figure 63a: Procedure Page_MS_MSC (sheet 1)



~~Figure 64a: Procedure Search_For_MS_MSC (sheet 1)~~

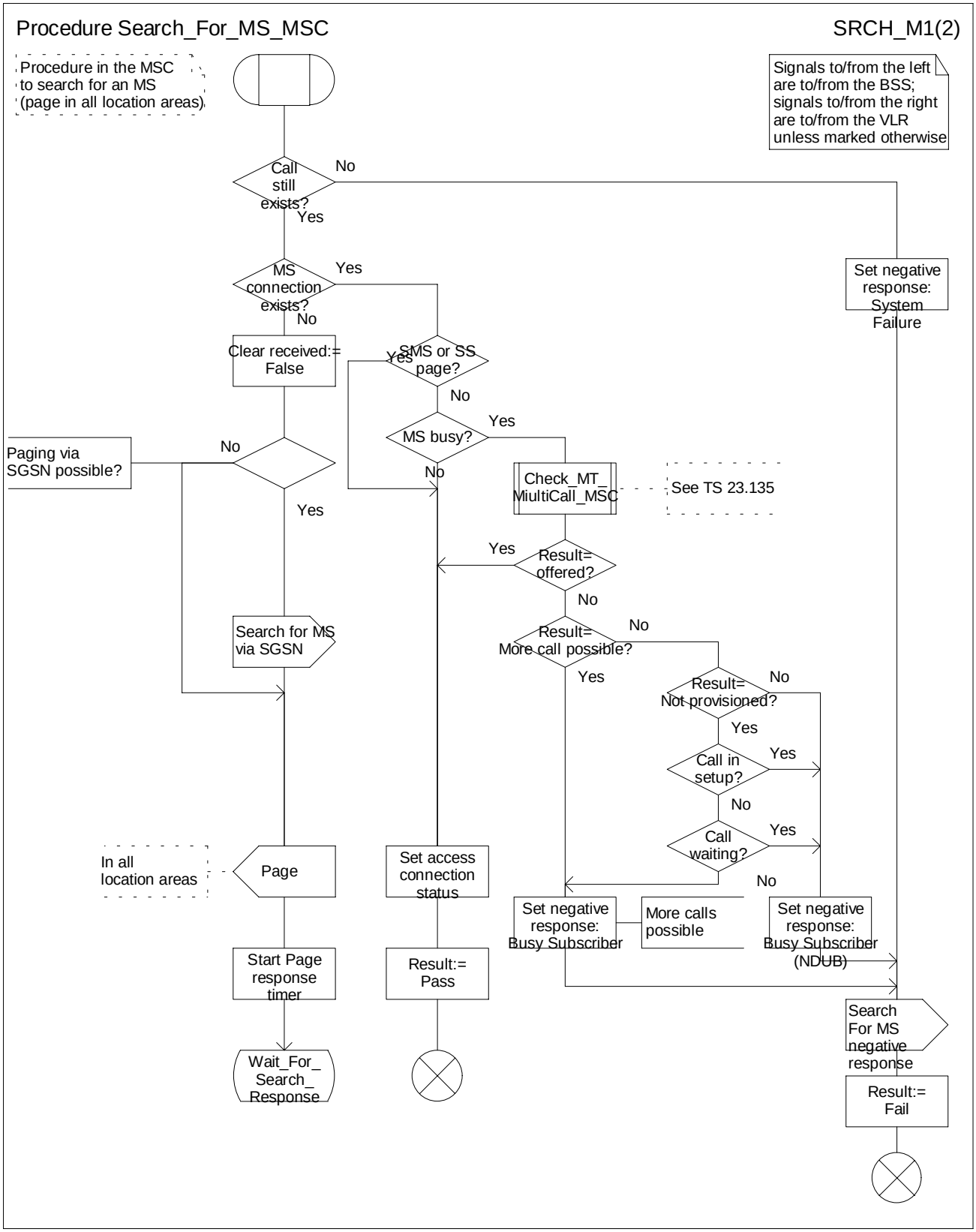
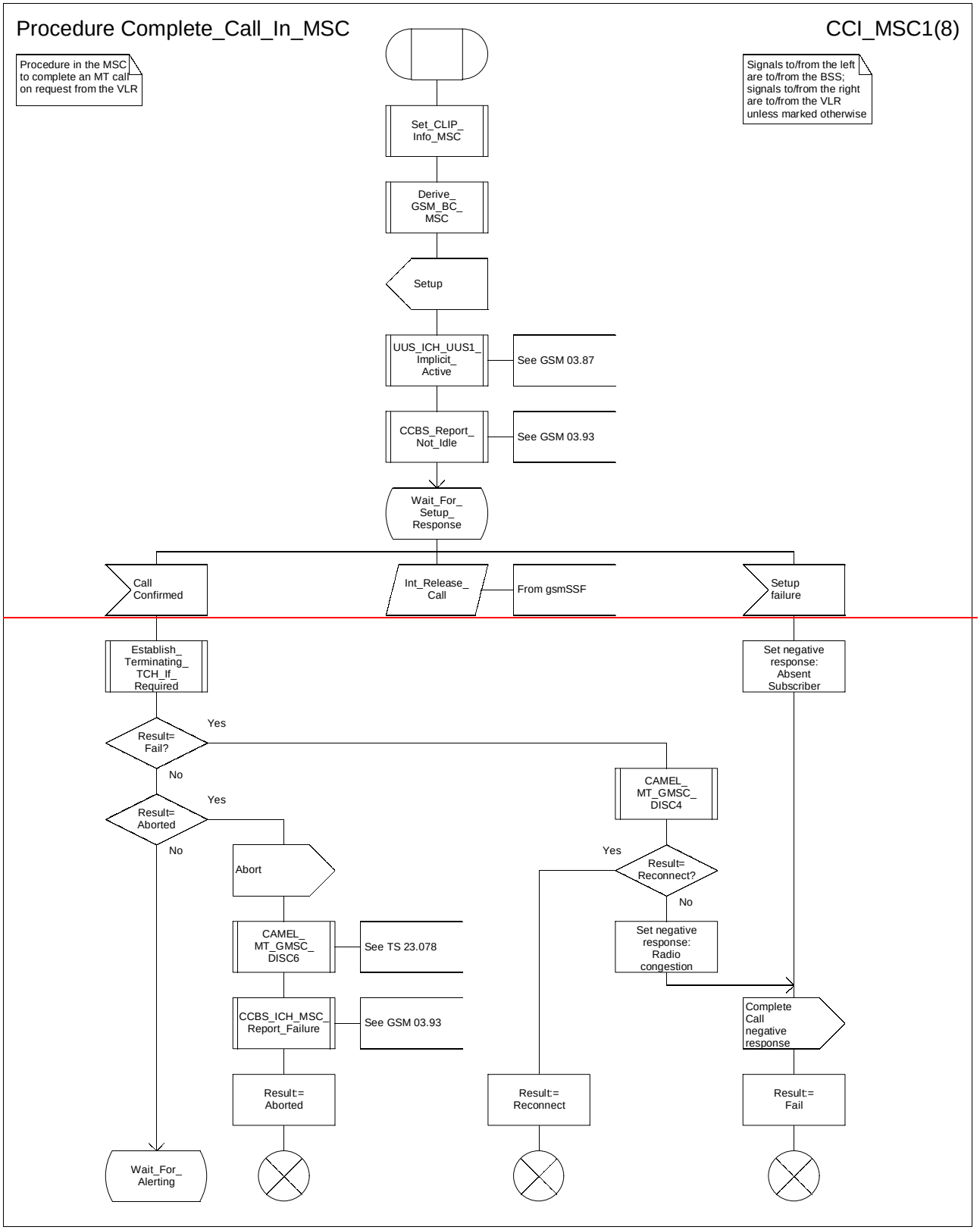


Figure 64a: Procedure Search_For_MS_MSC (sheet 1)



~~Figure 65a: Procedure Complete_Call_In_MSC (sheet 1)~~

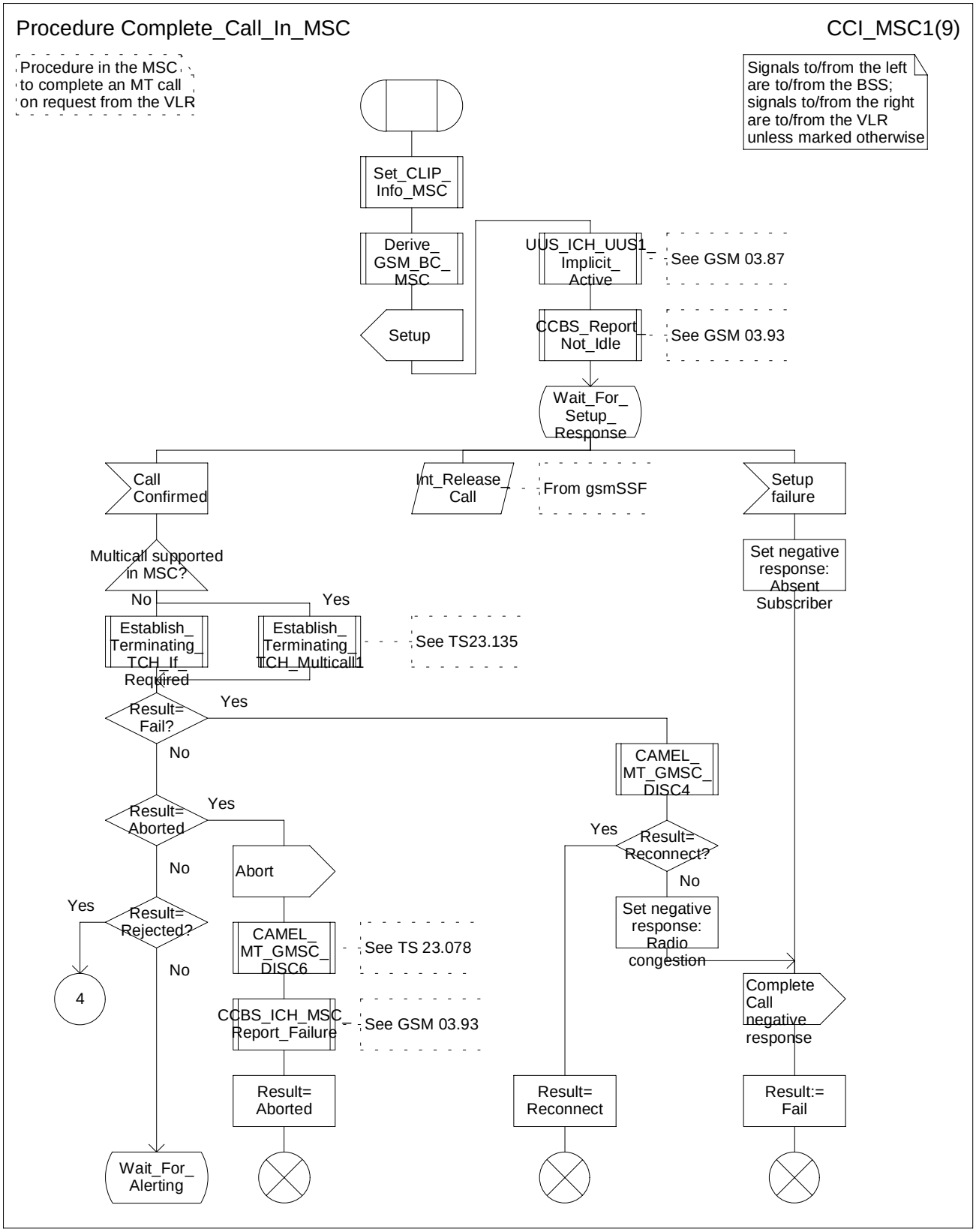
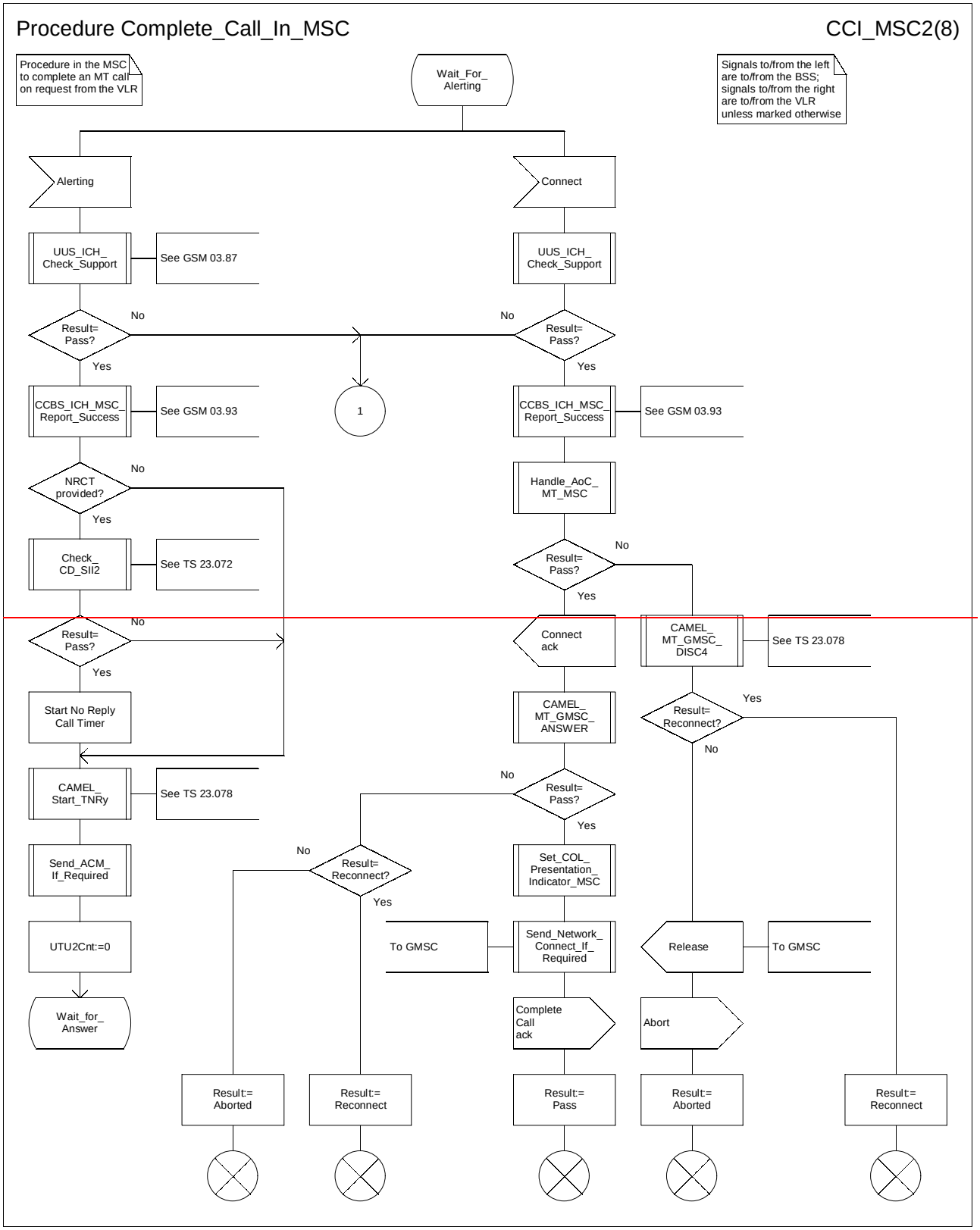


Figure 65a: Procedure Complete_Call_In_MSC (sheet 1)



~~Figure 65b: Procedure Complete_Call_In_MSC (sheet 2)~~

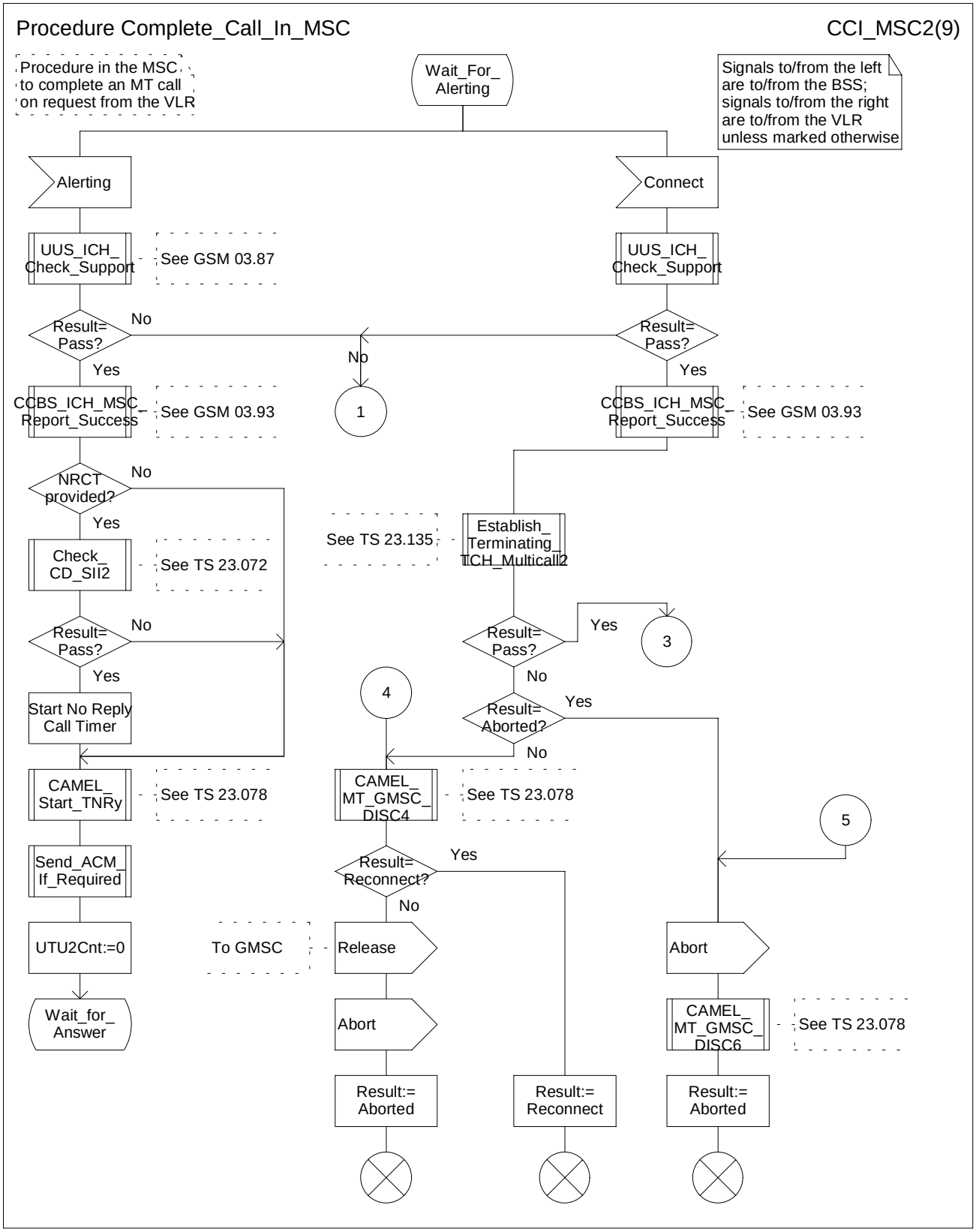


Figure 65b: Procedure Complete_Call_In_MSC (sheet 2)

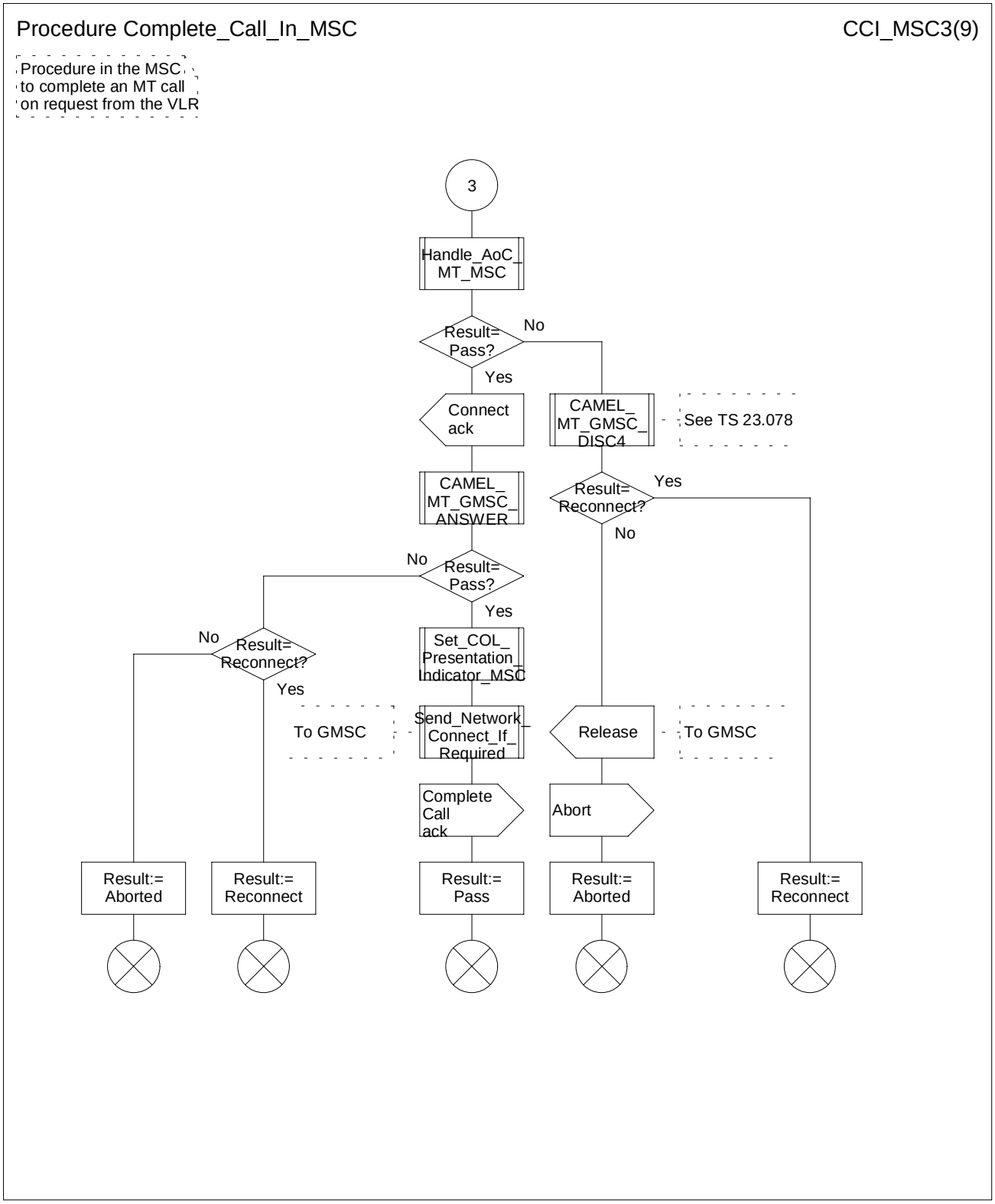
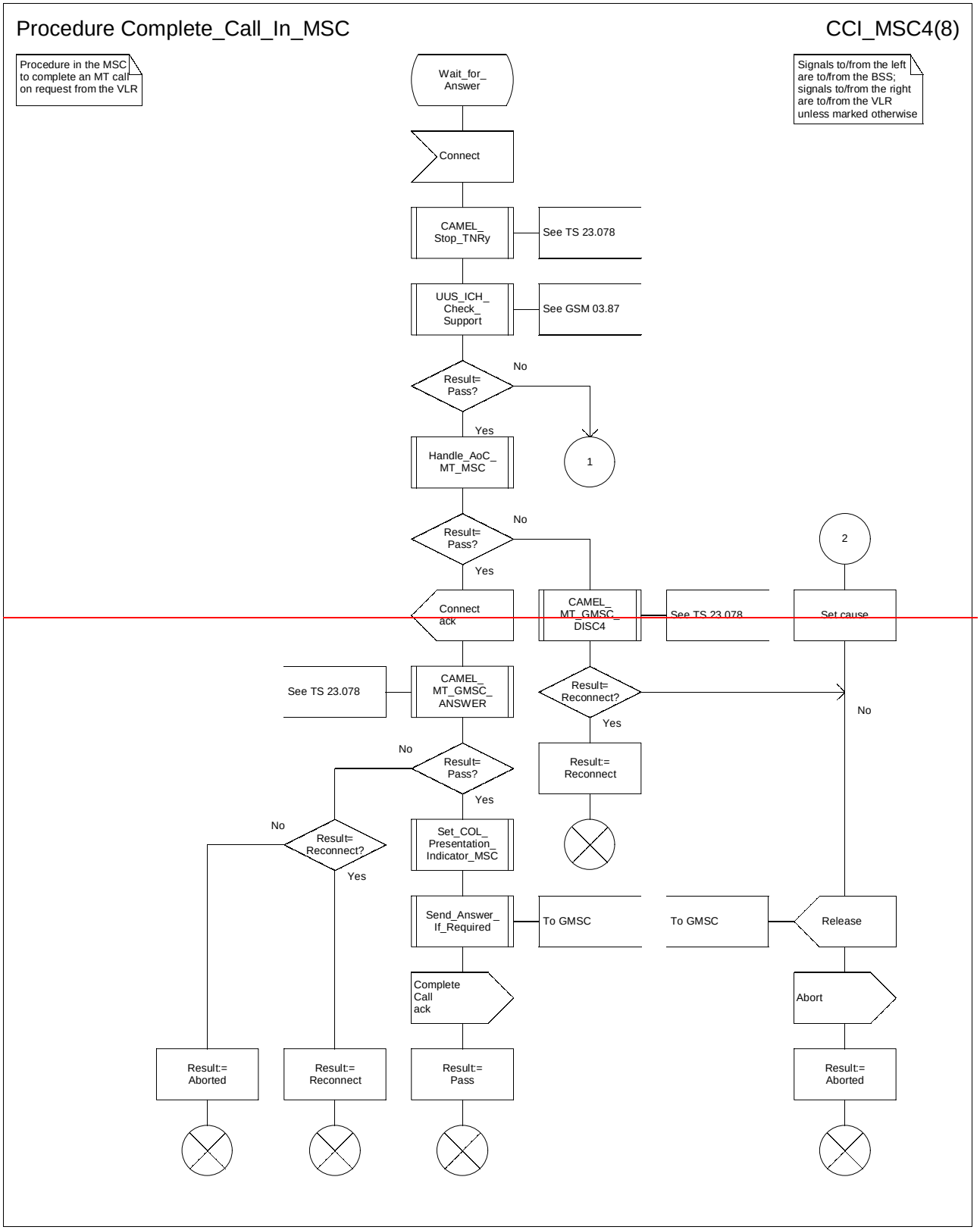


Figure 65c: Procedure Complete_Call_In_MSC (sheet 3)



~~Figure 65d: Procedure Complete_Call_In_MSC (sheet 4)~~

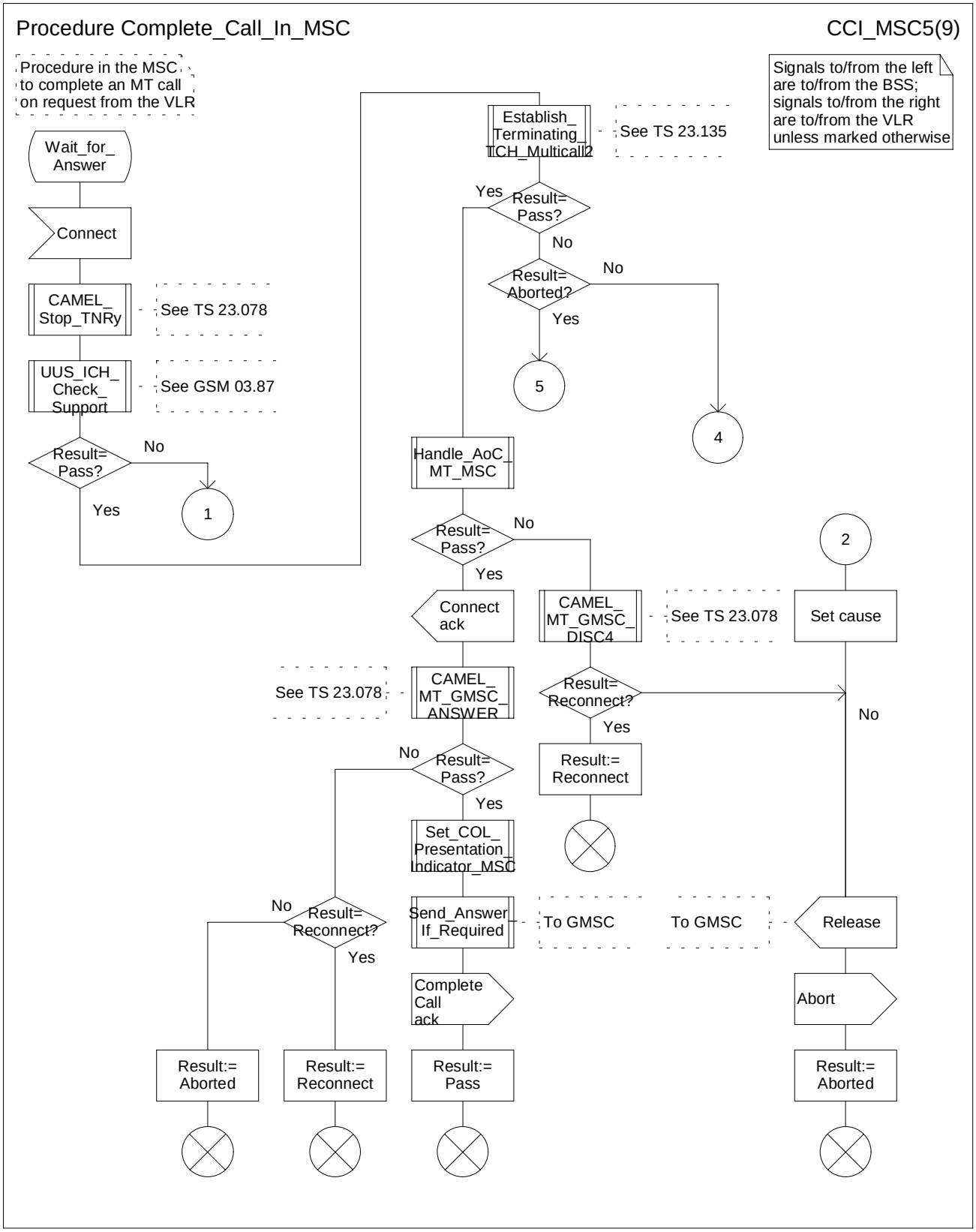
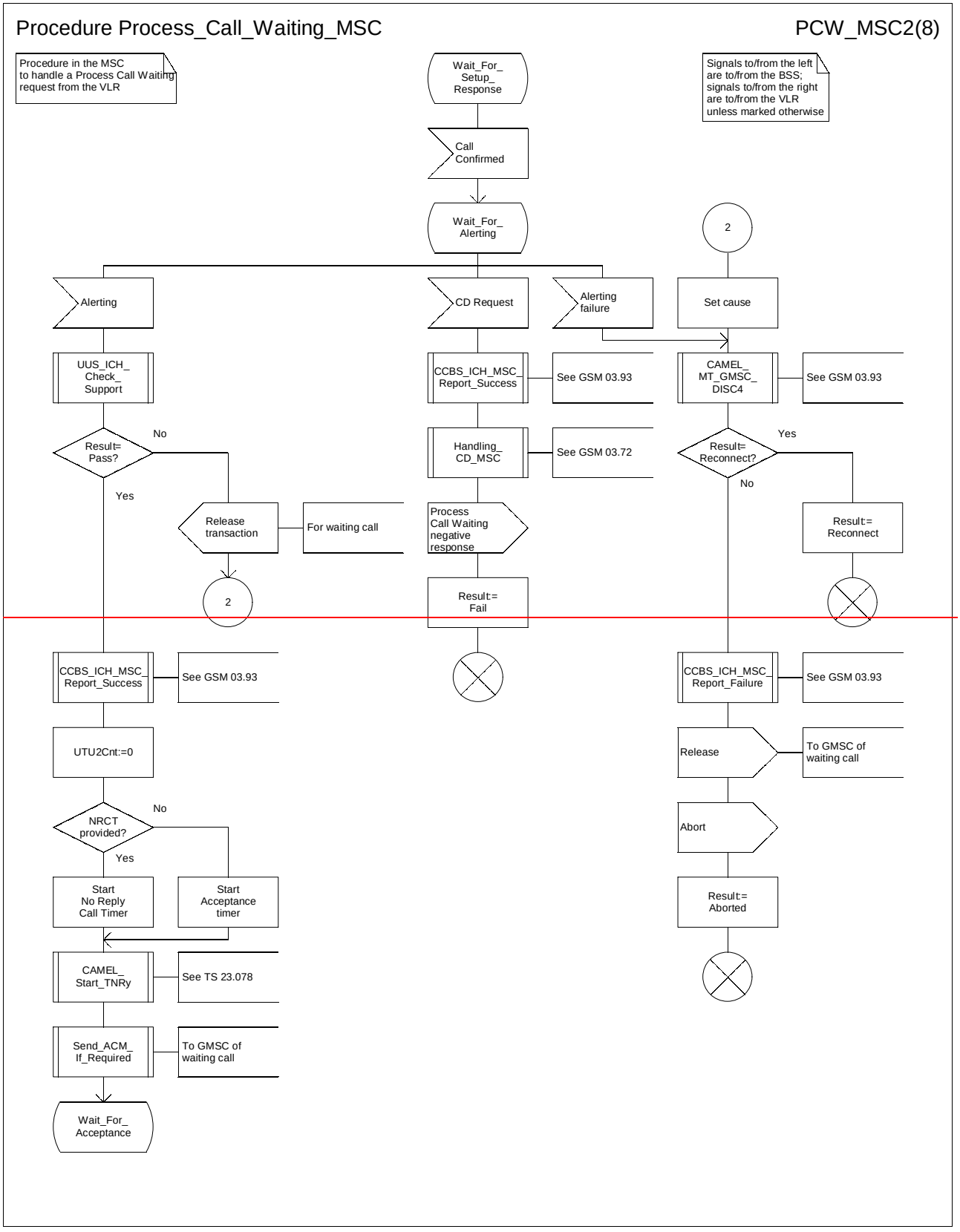


Figure 65e: Procedure Complete_Call_In_MSC (sheet 5)



~~Figure 66b: Procedure Process_Call_Waiting_MSC (sheet 2)~~

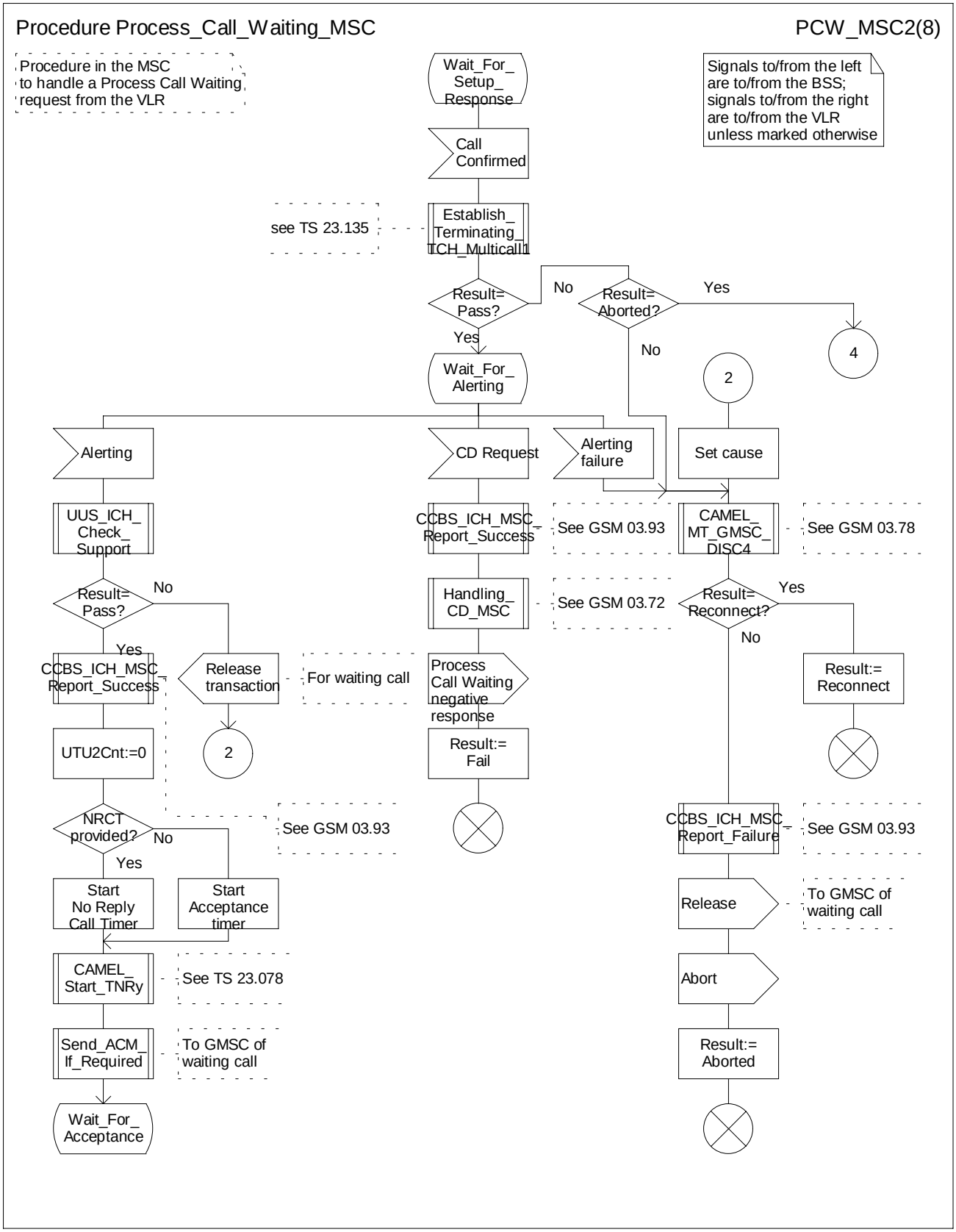
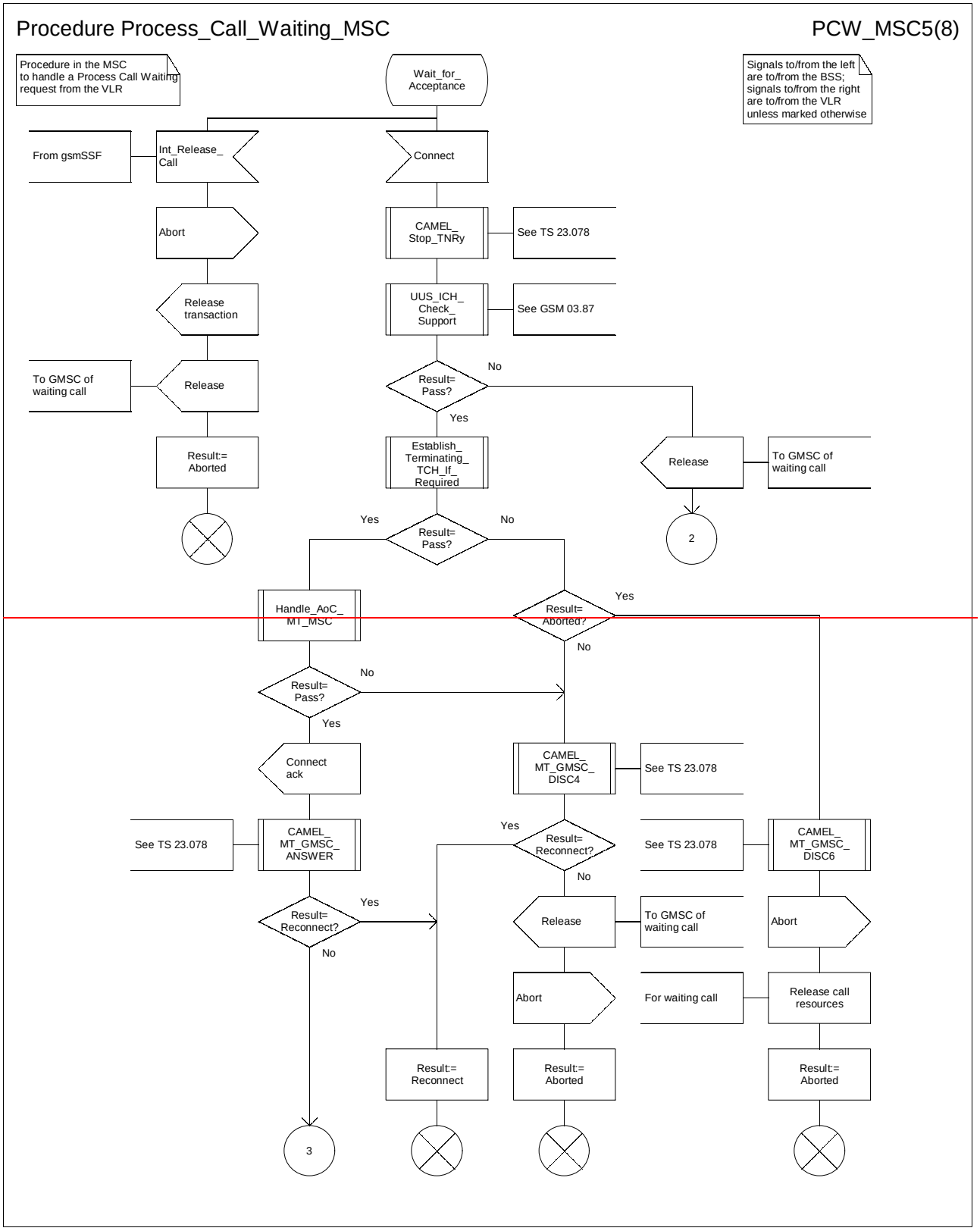


Figure 66b: Procedure Process_Call_Waiting_MSC (sheet 2)



~~Figure 66e: Procedure Process_Call_Waiting_MSC(sheet 5)~~

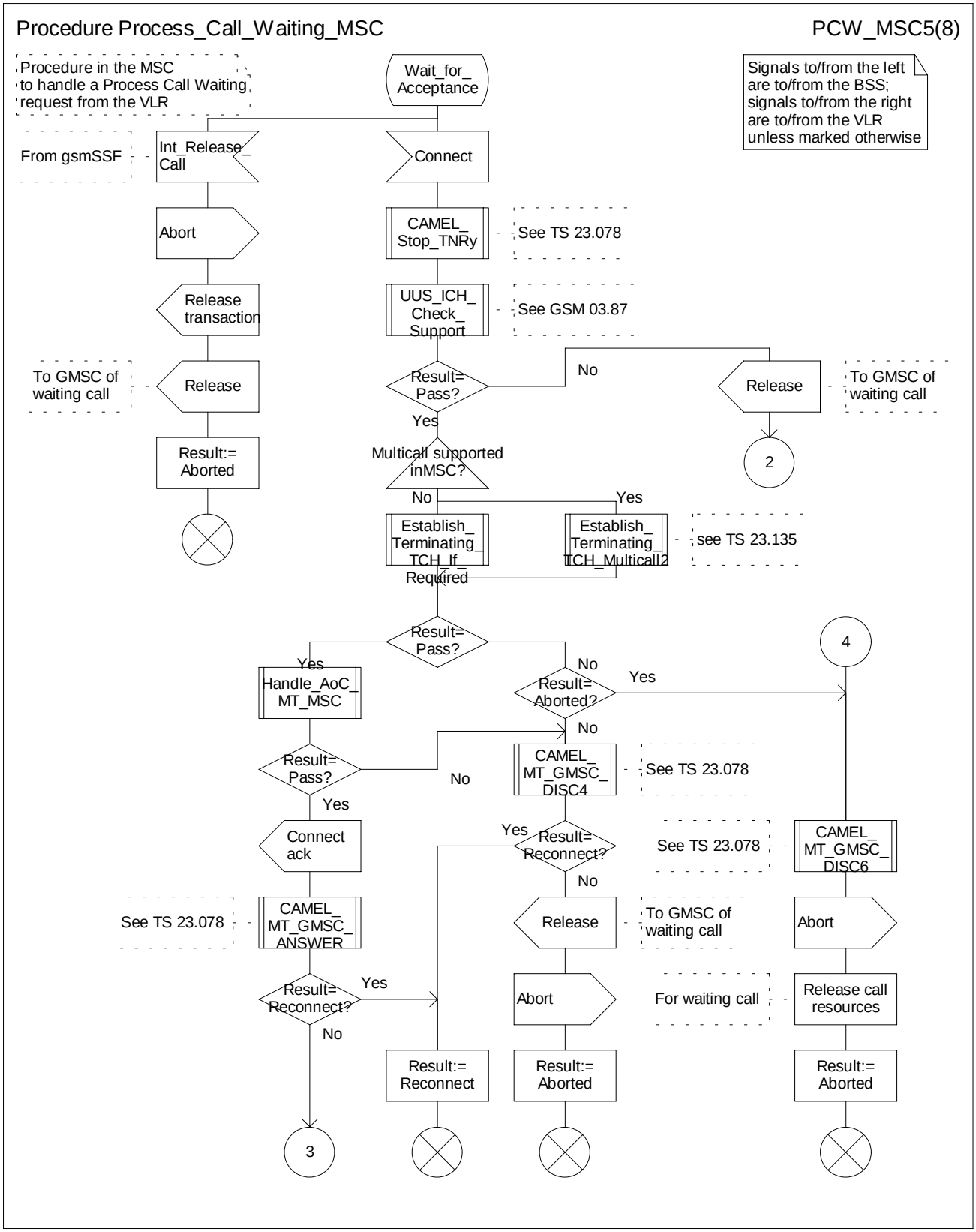


Figure ~~Error! Reference source not found.~~ 66e: Procedure Process_Call_Waiting_MSC(sheet 5)

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

7.3.2.1 Process ICH_VLR

Sheet 1: if the MSRN received in the Send Info For Incoming Call is not allocated or there is no IMSI record for the IMSI identified by the MSRN, this is treated as an unknown MSRN.

Sheet 1: the procedure CAMEL_ICH_VLR is specific to CAMEL phase 3; it is specified in TS 23.078 for CAMEL Phase 3 [28]. If the VLR does not support CAMEL phase 3, processing continues from the "No" exit of the test "Result=CAMEL Active?".

Sheet 1: the procedure CCBS_ICH_Set_CCBS_Call_Indicator is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 1, sheet 2, sheet 4: the procedure CCBS_ICH_VLR_Report_Failure is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 1, sheet 3: the procedure CCBS_ICH_Report_Not_Reachable is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 2: this process communicates with the matching instance of the process PRN_VLR, which is linked by the MSRN.

Sheet 2: the test "Paging via SGSN possible" takes the "yes" exit if:

- the Gs interface is implemented; and
- there is an association established for the MS between the MSC/VLR and the SGSN.

Sheet 3: the test "NDUB?" takes the "Yes" exit if the Page MS negative response or the Search for MS negative response had the value Busy Subscriber (NDUB).

Sheet 3: the procedure Get_CW_Subscription_Info_VLR is specific to Call Waiting. If the VLR does not support Call Waiting, processing continues from the "No" exit of the test "CW available?".

Sheet 3: the procedure Get_CW_Subscription_Info_Multicall_VLR is specific to Multicall; it is specified in TS 23.135 [34]. If the VLR does not support both Multicall and Call Waiting, processing continues from the "No" exit of the test "CW available?".

Sheet 3: the VLR uses the basic service returned in the Page MS negative response or the Search for MS negative response Busy Subscriber (More calls possible) to determine whether call waiting is available.

Sheet 3: the procedure Get_LI_Subscription_Info_MT_VLR is specific to CLIP and COLR. If the VLR supports neither CLIP nor COLR, the procedure call is omitted.

Sheet3: the procedure Get_AoC_Subscription_Info_VLR is specific to AoC; it is specified in subclause.

Sheet 3 sheet 5: the procedure CLI_ICH_VLR_Add_CLI is specific to Enhanced CLI Handling. It is specified in GSM 03.81 [11].

Sheet 3: the procedure CCBS_ICH_Handle_NDUB is specific to CCBS; it is specified in GSM 03.93 [19]. If the VLR does not support CCBS, processing continues from the "Forward" exit of the test "Result".

Sheet 3: the procedure Process_Access_Request_VLR is specified in subclause.

Sheet 3: the output signal Page MS towards the SGSN includes the Location area identity parameter.

Sheet 3: if the VLR does not support CUG, handling continues from the "No" exit of the test "CUG info present?".

Sheet 4, sheet 5: the procedure CD_Authorization is specific to Call Deflection, it is specified in GSM 03.72 [7]. If the VLR does not support Call Deflection, processing continues from the "Yes" exit of the test "Result=Aborted?".

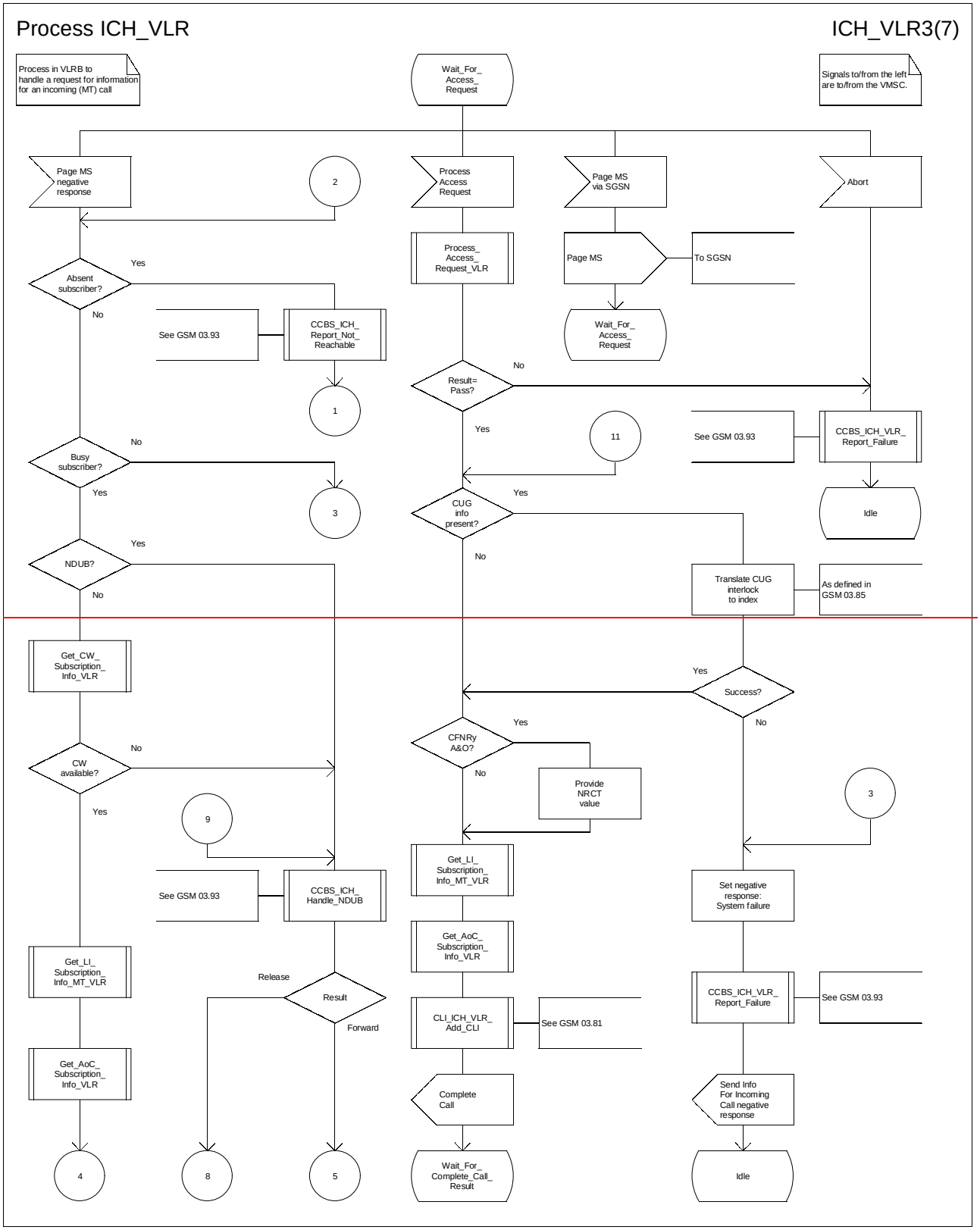
Sheet 4, sheet 5: the procedure CCBS_ICH_Handle_UDUB is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 5: the test "NDUB?" is executed only if the VLR supports CCBS. If the VLR does not support CCBS, processing continues from connector 5.

Sheet 6: the procedure CCBS_ICH_Set_CCBS_Target is specific to CCBS; it is specified in GSM 03.93 [19].

Sheet 6: the procedure Handle_CFNRc is specified in subclause.

Sheet 7: the procedure Forward_CUG_Check is specific to CUG; it is specified in subclause. If the VLR does not support CUG, processing continues from the "Yes" exit of the test "Result=Call allowed?".



~~Figure 72c: Process ICH_VLR (sheet 3)~~

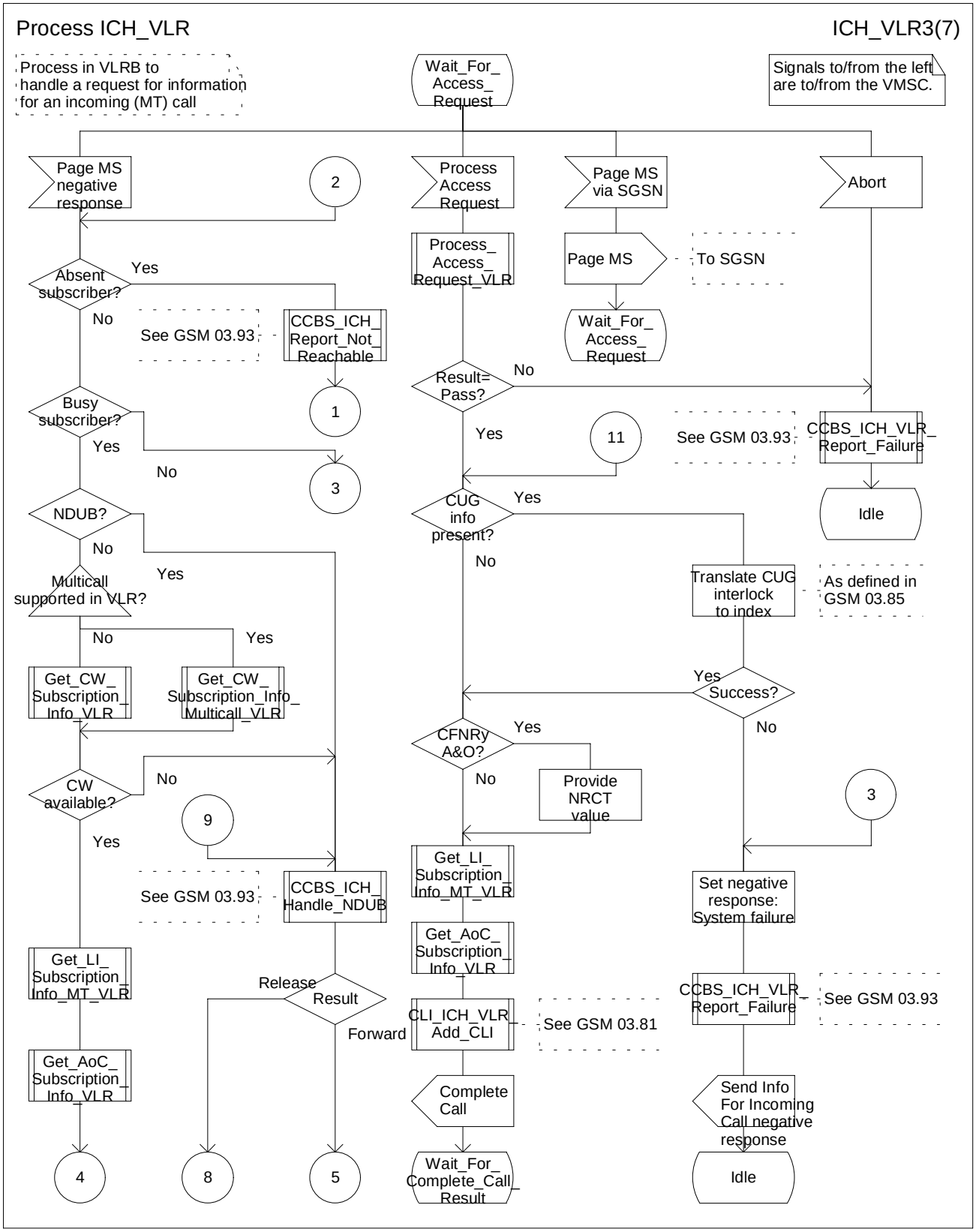


Figure72c: Process ICH_VLR (sheet 3)

3GPP TSG CN2 SWG B #5
Kista, Sweden, 2-3 March 2000

Document N2B000436
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.

29.002	**CR**	**048r5**	Current Version:	3.3.1

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

For submission to:	CN#7	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		UTRAN / Radio		Core Network	X

Source: N2 **Date:** 2000-03-02

Subject: Introduction of 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	X		Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: This CR provides the changes necessary to introduce Multicall, according to the result of MC ad hoc.

Clauses affected: 2, 7.6, 7.6.4, 8.8.1, 11.1, 11.5, 17.7.1, 17.7.4, 17.7.5, 17.7.8

Other specs affected:				
	Other 3G core specifications	X	→ List of CRs:	23.008, 23.011, 23.016, 23.018, 24.008, 24.010, 24.080,
	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.

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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1999 document, references to GSM documents are for Release 1999 versions (version 3.x.y).

[1] 3G TS 21.905: "3G Vocabulary".

[2] GSM 02.01: "Digital cellular telecommunications system (Phase 2+); Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN)".

[3] 3G TS 22.002: "Bearer Services Supported by a GSM Public Land Mobile Network (PLMN)".

[4] GSM 02.03: "Digital cellular telecommunications system (Phase 2+); Teleservices Supported by a GSM Public Land Mobile Network (PLMN)".

[5] 3G TS 22.004: "General on Supplementary Services".

[6] GSM 02.09: "Digital cellular telecommunications system (Phase 2+); Security aspects".

[7] 3G TS 22.016: "International Mobile station Equipment Identities (IMEI)".

[8] 3G TS 22.041: "Operator Determined Barring".

[9] 3G TS 22.081: "Line identification supplementary services - Stage 1".

[10] 3G TS 22.082: "Call Forwarding (CF) supplementary services - Stage 1".

[11] 3G TS 22.083 : "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 1".

[12] 3G TS 22.084: "Multi Party (MPTY) Supplementary Services - Stage 1".

[13] 3G TS 22.085: "Closed User Group (CUG) supplementary services - Stage 1".

[14] 3G TS 22.086: "Advice of charge (AoC) Supplementary Services - Stage 1".

[15] 3G TS 22.088: "Call Barring (CB) supplementary services - Stage 1".

[16] 3G TS 22.090: "Unstructured Supplementary Service Data (USSD); - Stage 1".

[17] 3G TS 23.003: "Numbering, addressing and identification".

[18] GSM 03.04: "Digital cellular telecommunications system (Phase 2+); Signalling requirements relating to routeing of calls to mobile subscribers".

[19] 3G TS 23.007: "Restoration procedures".

[20] 3G TS 23.008: "Organisation of subscriber data".

[21] 3G TS 23.009: "Handover procedures".

[22] 3G TS 23.011: "Technical realization of Supplementary Services - General Aspects".

[23] 3G TS 23.012: "Location registration procedures".

[24] GSM 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".

[25] 3G TS 23.038: "Alphabets and language".

[26] 3G TS 23.040: "Technical realization of the Short Message Service (SMS) Point to Point (PP)".

[26a] GSM 03.71: “Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Functional Description; Stage 2”.

[27] 3G TS 23.081: "Line Identification Supplementary Services - Stage 2".

[28] 3G TS 23.082: "Call Forwarding (CF) Supplementary Services - Stage 2".

[29] 3G TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 2".

[30] 3G TS 23.084: "Multi Party (MPTY) Supplementary Services - Stage 2".

[31] 3G TS 23.085: "Closed User Group (CUG) Supplementary Services - Stage 2".

[32] 3G TS 23.086: "Advice of Charge (AoC) Supplementary Services - Stage 2".

[33] 3G TS 23.088: "Call Barring (CB) Supplementary Services - Stage 2".

[34] 3G TS 23.090: "Unstructured Supplementary Services Data (USSD) - Stage 2".

[35] 3G TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols - Stage 3".

[36] 3G TS 24.010: "Mobile radio interface layer 3 Supplementary Services specification - General aspects".

[37] 3G TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[37a] GSM 04.71: “Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 location services specification.

[38] 3G TS 24.080: "Mobile radio interface layer 3 supplementary services specification - Formats and coding".

[39] 3G TS 24.081: "Line identification supplementary services - Stage 3".

[40] 3G TS 24.082: "Call Forwarding (CF) Supplementary Services - Stage 3".

[41] 3G TS 24.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3".

[42] 3G TS 24.084: "Multi Party (MPTY) Supplementary Services - Stage 3".

[43] 3G TS 24.085: "Closed User Group (CUG) Supplementary Services - Stage 3".

[44] 3G TS 24.086: "Advice of Charge (AoC) Supplementary Services - Stage 3".

[45] 3G TS 24.088: "Call Barring (CB) Supplementary Services - Stage 3".

[46] 3G TS 24.090: "Unstructured Supplementary Services Data - Stage 3".

[47] GSM 08.02: "Digital cellular telecommunications system (Phase 2+); Base Station System - Mobile-services Switching Centre (BSS - MSC) interface Interface principles".

[48] GSM 08.06: "Digital cellular telecommunications system (Phase 2+); Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[49] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile Switching Centre - Base Station System (MSC - BSS) interface Layer 3 specification".

[49a] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile Switching Centre - Base Station System (MSC - BSS) interface Layer 3 specification".

[49a1] GSM 08.31: “Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Serving Mobile Location Center (SMLC) – Serving Mobile Location Center (SMLC); SMLC Peer Protocol (SMLCPP).”

[49b] GSM 08.71: "Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Serving Mobile Location Centre - Base Station System (SMLC - BSS) interface Layer 3 specification".

[50] GSM 09.01: "Digital cellular telecommunications system (Phase 2+); General network interworking scenarios".

[51] 3G TS 29.002: "Mobile Application Part (MAP) specification".

[52] GSM 09.03: "Digital cellular telecommunications system (Phase 2+); Signalling requirements on interworking between the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) and the Public Land Mobile Network (PLMN)".

[53] GSM 09.04: "Digital cellular telecommunications system (Phase 2+); Interworking between the Public Land Mobile Network (PLMN) and the Circuit Switched Public Data Network (CSPDN)".

[54] GSM 09.05: "Digital cellular telecommunications system (Phase 2+); Interworking between the Public Land Mobile Network (PLMN) and the Packet Switched Public Data Network (PSPDN) for Packet Assembly/Disassembly facility (PAD) access".

[55] 3G TS 29.006: "Interworking between a Public Land Mobile Network (PLMN) and a Packet Switched Public Data Network/Integrated Services Digital Network (PSPDN/ISDN) for the support of Packet Switched data transmission services".

[56] 3G TS 29.007: "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[57] GSM 09.08: "Digital cellular telecommunications system (Phase 2+); Application of the Base Station System Application Part (BSSAP) on the E-interface".

[58] 3G TS 29.010: "Information element mapping between Mobile Station - Base Station System and BSS - Mobile-services Switching Centre (MS - BSS - MSC) Signalling procedures and the Mobile Application Part (MAP)".

[59] 3G TS 29.011: "Signalling interworking for Supplementary Services".

[59a] GSM 09.31: "Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Base Station System Application Part LCS Extension (BSSAP-LE)".

[60] GSM 09.90: "Digital cellular telecommunications system (Phase 2+); Interworking between Phase 1 infrastructure and Phase 2 Mobile Stations (MS)".

[61] GSM 12.08: "Digital cellular telecommunications system (Phase 2); Subscriber and Equipment Trace".

[62] ETS 300 102-1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3 specifications for basic call control".

[63] ETS 300 136 (1992): "Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service description".

[64] ETS 300 138 (1992): "Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service Digital Subscriber Signalling System No.one (DSS1) protocol".

[65] ETS 300 287: "Integrated Services Digital Network (ISDN); Signalling System No.7; Transaction Capabilities (TC) version 2".

[66] ETR 060: "Signalling Protocols and Switching (SPS); Guide-lines for using Abstract Syntax Notation One (ASN.1) in telecommunication application protocols".

[67] ITU-T Recommendation E.164: "Numbering plan for the ISDN era".

[68] ITU-T Recommendation E.212: "Identification plan for land mobile stations".

[69] ITU-T Recommendation E.213: "Telephone and ISDN numbering plan for land mobile stations".

[70] ITU-T Recommendation E.214: "Structuring of the land mobile global title for the signalling connection control part".

[71] CCITT Recommendation Q.669: "Interworking between the Digital Subscriber Signalling System Layer 3 protocol and the Signalling System No.7 ISDN User part".

[72] ITU-T Recommendation Q.711: "Specifications of Signalling System No.7; Functional description of the Signalling Connection Control Part".

[73] ITU-T Recommendation Q.712: "Definition and function of SCCP messages".

[74] ITU-T Recommendation Q.713: "Specifications of Signalling System No.7; SCCP formats and codes".

[75] ITU-T Recommendation Q.714: "Specifications of Signalling System No.7; Signalling Connection Control Part procedures".

[76] ITU-T Recommendation Q.716: "Specifications of Signalling System No.7; Signalling connection control part (SCCP) performances".

[77] ITU-T Recommendation Q.721 (1988): "Specifications of Signalling System No.7; Functional description of the Signalling System No.7 Telephone user part".

[78] ITU-T Recommendation Q.722 (1988): "Specifications of Signalling System No.7; General function of Telephone messages and signals".

[79] ITU-T Recommendation Q.723 (1988): "Specifications of Signalling System No.7; Formats and codes".

[80] ITU-T Recommendation Q.724 (1988): "Specifications of Signalling System No.7; Signalling procedures".

[81] ITU-T Recommendation Q.725 (1988): "Specifications of Signalling System No.7; Signalling performance in the telephone application".

[82] ITU-T Recommendation Q.761 (1988): "Specifications of Signalling System No.7; Functional description of the ISDN user part of Signalling System No.7".

[83] ITU-T Recommendation Q.762 (1988): "Specifications of Signalling System No.7; General function of messages and signals".

[84] ITU-T Recommendation Q.763 (1988): "Specifications of Signalling System No.7; Formats and codes".

[85] ITU-T Recommendation Q.764 (1988): "Specifications of Signalling System No.7; Signalling procedures".

[86] ITU-T Recommendation Q.767: "Specifications of Signalling System No.7; Application of the ISDN user part of CCITT signalling System No.7 for international ISDN interconnections".

[87] ITU-T Recommendation Q.771: "Specifications of Signalling System No.7; Functional description of transaction capabilities".

[88] ITU-T Recommendation Q.772: "Specifications of Signalling System No.7; Transaction capabilities information element definitions".

[89] ITU-T Recommendation Q.773: "Specifications of Signalling System No.7; Transaction capabilities formats and encoding".

[90] ITU-T Recommendation Q.774: "Specifications of Signalling System No.7; Transaction capabilities procedures".

[91] ITU-T Recommendation Q.775: "Specifications of Signalling System No.7; Guide-lines for using transaction capabilities".

[92] ITU-T Recommendation X.200: "Reference Model of Open systems interconnection for CCITT Applications".

[93] ITU-T Recommendation X.208 (1988): "Specification of Abstract Syntax Notation One (ASN.1)".

[94] ITU-T Recommendation X.209 (1988): "Specification of basic encoding rules for Abstract Syntax Notation One (ASN.1)".

[95] ITU-T Recommendation X.210: "Open systems interconnection layer service definition conventions".

[97] 3G TS 23.018: "Basic Call Handling".

[98] 3G TS 23.078: " Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 - Stage 2".

[99] 3G TS 23.079: "Support of Optimal Routeing (SOR) - Stage 2".

[100] GSM 03.68: "Digital cellular telecommunications system (Phase 2+); - Stage 2".

[101] GSM 03.69: "Digital cellular telecommunications system (Phase 2+); - Stage 2".

[102] ANSI T1.113: "Signaling System No. 7 (SS7) - ISDN User Part".

[103] 3G TS 23.054 "Shared Inter Working Function (SIWF) - Stage 2".

[104] 3G TS 23.060: "General Packet Radio Service (GPRS) Description; Stage 2".

[105] 3G TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

[106] 3G TS 29.018: "General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface layer 3 specification".

[107] 3G TS 23.093: "Technical Realization of Completion of Calls to Busy Subscriber (CCBS); Stage 2".

[108] 3G TS 23.066: "Support of Mobile Number Portability (MNP); Technical Realisation Stage 2".

[109] ANSI T1.112 (1996): "Telecommunication – Signalling No. 7 – Signaling Connection Control Part (SCCP)".

[110] 3G TS 23.116: "Super-Charger Technical Realisation; Stage 2."

[111] ITU-T Recommendation Q.711: “Specifications of Signalling System No.7; Signalling System No. 7 – Functional Description of the Signalling Connection Control Part“.

[112] ITU-T Recommendation Q.712: “Specifications of Signalling System No.7; Signalling System No. 7 – Definition and Function of SCCP Messages“.

[113] ITU-T Recommendation Q.713: “Specifications of Signalling System No.7; Signalling System No. 7 – SCCP formats and codes“.

[114] ITU-T Recommendation Q.714: “Specifications of Signalling System No.7; Signalling System No. 7 – Signalling Connection Control Part Procedures“.

[115] ITU-T Recommendation Q.716: “Specifications of Signalling System No.7; Signalling System No. 7 – Signalling Connection Control Part (SCCP) Performance“.

[116] ITU-T Q.850, May 1998: "Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part".

[117] 3G TS 22.135: "Multicall; Service description; Stage 1".

[118] 3G TS 23.135: "Multicall supplementary service; Stage 2".

[119] 3G TS 24.135: "Multicall supplementary service; Stage 3".

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

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		

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

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

7.6.4 Supplementary services parameters

7.6.4.1 SS-Code

This parameter may refer to one supplementary service or a set of supplementary services as defined in 3G TS ~~GSM 02.04~~22.004. For MAP Release ~~'98~~ '99 this includes:

- Calling Line Identification Presentation service (CLIP);
- Calling Line Identification Restriction service (CLIR);
- Connected Line Identification Presentation service (COLP);
- Connected Line Identification Restriction service (COLR);
- Calling Name Presentation (CNAP)
- All Call Forwarding services;
- Call Waiting (CW);
- Call Hold (HOLD);
- Multi-Party service (MPTY);
- Closed User Group (CUG);
- All Charging services;
- All Call Restriction services;
- Explicit Call Transfer service (ECT);
- enhanced Multi-Level Precedence and Pre-emption service (eMLPP);
- Completion of Calls to Busy Subscriber, originating side (CCBS-A);
- Completion of Calls to Busy Subscriber, destination side (CCBS-B);
- All LCS privacy exceptions (see subclause 7.6.4.44);
- Mobile Originating Location Request (MO-LR) (see subclause 7.6.4.44A~~).~~);
- Multicall (MC).

7.6.4.2 SS-Status

This parameter refers to the state information of individual supplementary services as defined in ~~GSM 03.11~~3G TS 23.011.

7.6.4.3 SS-Data

This parameter refers to the necessary set of information required in order to characterise one supplementary service:

- SS-Code (see subclause 7.6.4.1);
- SS-Status (if applicable) (see subclause 7.6.4.2);
- Override subscription option (see subclause 7.6.4.4);
- CLI Restriction (see subclause 7.6.4.5);
- Basic Service Group Code (see subclause 7.6.4.40).

7.6.4.4 Override Category

This parameter refers to the subscription option Override Category attached to a supplementary service. It can take the following two values:

- Enabled;
- Disabled.

7.6.4.5 CLI Restriction Option

This parameter refers to the subscription option Restriction mode attached to the CLIR supplementary service. It can take the following three values:

- Permanent;
- Temporary (Default Restricted);
- Temporary (Default Allowed).

7.6.4.6 Forwarding Options

This parameter refers to a forwarding option attached to a supplementary service. It can take one of the following values:

- notification to forwarding party (see GSM 02.82 for the meaning of this parameter);
- notification to calling party (see GSM 02.82 for the meaning of this parameter);
- redirecting presentation (see GSM 02.82 for the meaning of this parameter);
- Forwarding reason (see GSM 02.82 for the meaning of this parameter).

7.6.4.7 No reply condition timer

This parameter refers to the no reply condition timer for call forwarding on no reply.

7.6.4.8 - 7.6.4.14 Void

7.6.4.15 Forwarding information

This parameter represents the information related to each call forwarding service:

- the SS-Code of the relevant call forwarding service (see subclause 7.6.4.1);
- if required, a list of forwarding feature parameters (see subclause 7.6.4.16).

  The list may contain one item per Basic Service Group.

7.6.4.16 Forwarding feature

This parameter applies to each combination of call forwarding service and Basic Service Group and contains the following information, as required:

- Basic Service Group (see subclause 7.6.4.40);
- SS-Status (see subclause 7.6.4.2);
- forwarded-to number (see subclause 7.6.2.22);
- forwarded-to subaddress (see subclause 7.6.2.23);
- forwarding options (see subclause 7.6.4.6);
- no reply condition timer (see subclause 7.6.4.7).

7.6.4.17 Void

7.6.4.18 Call barring information

This parameter contains for each call barring service:

- SS-Code (see subclause 7.6.4.1);
- a list of call barring feature parameters (see subclause 7.6.4.19).

  The list may contain one item per Basic Service Group.

7.6.4.19 Call barring feature

This parameter gives the status of call barring services as applicable to each Basic Service Group. The parameter contains the following information:

- Basic Service Group (see subclause 7.6.4.40);
- SS-Status (see subclause 7.6.4.2).

7.6.4.20 New password

This parameter refers to the password which the subscriber just registered in the network.

This parameter refers to a password used by the subscriber for supplementary service control.

7.6.4.21 Current password

This parameter refers to a password used by the subscriber for supplementary service control.

7.6.4.22 Guidance information

This parameter refers to guidance information given to a subscriber who is requested to provide a password. One of the following information may be given:

- "enter password";

  This information is used for checking of the old password.

- "enter new password";

  This information is used during password registration for the request of the first new password.

- "enter new password again";

  This information is used during password registration for the request of the new password again for verification.

7.6.4.23 Void

7.6.4.24 SS-Info

This parameter refers to all the information related to a supplementary service and is a choice between:

- forwarding information (see subclause 7.6.4.15);
- call barring information (see subclause 7.6.4.18);
- CUG info (see subclause 7.6.4.8);
- SS-Data (see subclause 7.6.4.3).
- eMLPP information (see subclause 7.6.4.41).

7.6.4.25 - 7.6.4.35 Void

7.6.4.36 USSD Data Coding Scheme

This parameter contains the information of the alphabet and the language used for the unstructured information in an Unstructured Supplementary Service Data operation. The coding of this parameter is according to the Cell Broadcast Data Coding Scheme as specified in GSM 03.38.

7.6.4.37 USSD String

This parameter contains a string of unstructured information in an Unstructured Supplementary Service Data operation. The string is sent either by the mobile user or the network. The contents of a string sent by the MS are interpreted by the network as specified in GSM 02.90.

7.6.4.38 Bearer service

This parameter may refer to a single bearer service, a set of bearer services or to all bearer services as defined in TS GSM 02.02. This parameter is used only for supplementary service management.

7.6.4.39 Teleservice

This parameter may refer to a single teleservice, a set of teleservices or to all teleservices as defined in TS GSM 02.03. This parameter is used only for supplementary service management.

7.6.4.40 Basic Service Group

This parameter refers to the Basic Service Group either as a bearer service (see subclause 7.6.4.38) or a teleservice (see subclause 7.6.4.39). This parameter is used only for supplementary service management. The null value (i.e. neither bearer service nor teleservice) is used to denote the group containing all bearer services and all teleservices.

7.6.4.41 eMLPP information

This parameter contains two parameters which are associated with the eMLPP service. The following two parameters are included:

- maximum entitled priority:

  indicates the highest priority level the subscriber is allowed to apply for an outgoing call set-up;

- default priority:

  defines the priority level which shall be assigned to a call if no explicit priority is indicated during call set-up.

7.6.4.42 SS-event

This parameter indicates the Supplementary Service for which an invocation notification is sent towards the gsmSCF. It can indicate one of the following services:

- Explicit Call Transfer (ECT)
- Call Deflection (CD)
- Multi-Party call (MPTY)
- Completion of Calls to Busy Subscriber (CCBS)

7.6.4.43 SS-event data

This parameter contains additional information related to Supplementary Service invocation. Depending on the service invoked it can contain the following information:

ECT A list with all Called Party Numbers involved.

CD The called Party number involved.

7.6.4.44 LCS Privacy Exceptions

Distinct SS codes are assigned to the following classes of LCS client in a target MS subscriber's privacy exception list.

- Universal Class
- Call related value added class
- Non-Call related value added class
- PLMN operator class

7.6.4.44A Mobile Originating Location Request (MO-LR)

Distinct SS codes are assigned to the following classes of MO-LR:

- Basic Self Location
- Autonomous Self Location
- Transfer to Third Party

7.6.4.45 NbrUser

This parameter indicates the maximum number of parallel bearers that may be used as defined by the user at registration of the MC SS.

7.6.4.46 MC Subscription Data

This parameter contains two parameters which are associated with the MC service. The following two parameters are included:

- NbrUser:

  indicates the maximum number of parallel bearers that may be used as defined by the user at registration of the MC SS

- NbrSB:

indicates the maximum number of parallel bearers that may be used as defined by the user's subscription

7.6.4.47 MC Information

This parameter contains three parameters which are associated with the MC service. The following parameters are included:

- NbrSB
- NbrUser
- NbrSN

Definitions of these parameters are provided in 3G TS 23.135.

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

8.8 Subscriber management services

8.8.1 MAP-INSERT-SUBSCRIBER-DATA service

8.8.1.1 Definition

This service is used by an HLR to update a VLR with certain subscriber data in the following occasions:

- the operator has changed the subscription of one or more supplementary services, basic services or data of a subscriber. Note that in case of withdrawal of a Basic or Supplementary service this primitive shall not be used;
- the operator has applied, changed or removed Operator Determined Barring;
- the subscriber has changed data concerning one or more supplementary services by using a subscriber procedure;
- the HLR provides the VLR with subscriber parameters at location updating of a subscriber or at restoration. In this case, this service is used to indicate explicitly that a supplementary service is not provisioned, if the supplementary service specification requires it. The only supplementary services which have this requirement are the CLIR and COLR services. Network access mode is provided only in restoration. If the Super-Charger functionality is supported the HLR may not need to provide the VLR with subscriber parameters at location updating of a subscriber. See TS 23.116.

Also this service is used by an HLR to update a SGSN with certain subscriber data in the following occasions:

- if the GPRS subscription has changed;
- if the network access mode is changed;
- the operator has applied, changed or removed Operator Determined Barring;
- the HLR provides the SGSN with subscriber parameters at GPRS location updating of a subscriber. If the Super-Charger functionality is supported the HLR may not need to provide the SGSN with subscriber parameters. See TS 23.116.

It is a confirmed service and consists of the primitives shown in table 6.8/1.

8.8.1.2 Service primitives

Table 8.8/1: MAP-INSERT-SUBSCRIBER-DATA

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
IMSI	C	C(=)		
MSISDN	C	C(=)		
Category	C	C(=)		
Subscriber Status	C	C(=)		
Bearer service List	C	C(=)	C	C(=)
Teleservice List	C	C(=)	C	C(=)
Forwarding information List	C	C(=)		
Call barring information List	C	C(=)		
CUG information List	C	C(=)		
SS-Data List	C	C(=)		
eMLPP Subscription Data	C	C(=)		
MC Subscription Data	C	C(=)		
Operator Determined Barring General data	C	C(=)	C	C(=)
Operator Determined Barring HPLMN data	C	C(=)		
Roaming Restriction Due To Unsupported Feature	C	C(=)		
Regional Subscription Data	C	C(=)		
VLR CAMEL Subscription Info	C	C(=)		
Voice Broadcast Data	C	C(=)		
Voice Group Call Data	C	C(=)		
Network access mode	C	C(=)		
GPRS Subscription Data	C	C(=)		
Roaming Restricted In SGSN Due To Unsupported Feature	C	C(=)		
North American Equal Access preferred Carrier Id List	U	C(=)		
SGSN Camel Subscription Info	C	C(=)		
LSA Information	C	C(=)		
IST Alert Timer	C	C(=)		
SS-Code List			C	C(=)
LMU Identifier	C	C(=)		
LCS Information	C	C(=)		
Super-Charger Supported In HLR	C	C(=)		
Regional Subscription Response			C	C(=)
Supported CAMEL Phases			C	C (=)
User error			U	C(=)
Provider error				O

8.8.1.3 Parameter use

Network access mode

This parameter defines if the subscriber has access to MSC/VLR and/or to SGSN. This parameter is used by SGSN and MSC/VLR. In VLR, the parameter is used only as part of Restore Data Procedure and the parameter is not stored in the VLR.

All parameters are described in subclause 7.6. The following clarifications are applicable:

IMSI

It is only included if the service is not used in an ongoing transaction (e.g. location updating). This parameter is used by the VLR and the SGSN.

MSISDN

It is included either at location updating or when it is changed. The MSISDN sent shall be the basic MSISDN. This parameter is used by the VLR and the SGSN.

Category

It is included either at location updating or when it is changed. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

Subscriber Status

It is included either at location updating or when it is changed.

To apply, remove or update Operator Determined Barring Categories the Subscriber Status is set to Operator Determined Barring. In this case ODB General Data shall also be present. If the Operator Determined Barring applies and the subscriber is registered in the HPLMN and HPLMN specific Operator Determined Barring applies then ODB HPLMN Specific Data shall also be present.

To remove all Operator Determined Barring Categories the Subscriber Status shall be set to "Service Granted". This parameter is used by the VLR and the SGSN.

Bearer service List

A list of Extensible Bearer service parameters (Extensible Bearer service is defined in subclause 7.6). An Extensible Bearer service parameter must be the code for an individual Bearer service, except in the cases described below.

The codes for the Bearer service groups "allAlternateSpeech-DataCDA" and "allAlternateSpeech-DataCDS" shall, if applicable, be sent from the HLR to the VLR as a pair. The codes for the Bearer service groups "allSpeechFollowedByDataCDA" and "allSpeechFollowedByDataCDS" shall, if applicable, be sent from the HLR to the VLR as a pair.

If it is included in the Request/Indication, it includes either all Extensible Bearer services subscribed (at location updating or at restoration) or only the ones added (at subscriber data modification).

If the VLR receives an Indication containing any Extensible Bearer service parameters which it does not support/allocate it returns them in the response to the HLR and discards the unsupported Extensible Bearer services (no error is sent back), except in the cases described below.

If the VLR receives the codes for the Bearer service groups "allSpeechFollowedByDataCDA" and "allSpeechFollowedByDataCDS" and supports one or more of the circuit-switched synchronous or asynchronous data rates specified for simple data bearer services, it shall accept the bearer service codes, and not return them in the response to the HLR. If the VLR does not support any of the circuit-switched synchronous or asynchronous data rates specified for simple data bearer services, and receives the pair of codes for "allAlternateSpeech-DataCDA" and "allAlternateSpeech-DataCDS" or the pair of codes for "allSpeechFollowedByDataCDA" and "allSpeechFollowedByDataCDS", it shall reject the pair of codes by returning them in the response to the HLR. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

Teleservice List

A list of Extensible Teleservice parameters (Extensible Teleservice is defined in subclause 7.6). An Extensible Teleservice parameter must be the code for an individual Teleservice.

If it is included in the Request/Indication, it contains either all Extensible Teleservices subscribed (at location updating or at restoration) or the ones added (at subscriber data modification). Only the Extensible Teleservices that are relevant to the node at which the message is received should be included in the Teleservice List.

If the VLR or the SGSN receives an Indication containing any Extensible Teleservice parameters which it does not support/allocate it returns them in the response to the HLR and discards the unsupported Extensible Teleservices (no error is sent back). This parameter is used by the VLR and the SGSN.

Forwarding information List

A list of Extensible Forwarding information parameters (Extensible Forwarding information is defined in subclause 7.6). It includes Call Forwarding services either at location updating or at restoration or when they are changed. Each Extensible Forwarding information parameter shall be treated independently of all other parameters in the primitive.

The Extensible Forwarding information shall include the SS-Code for an individual call forwarding supplementary service. The Extensible Forwarding information shall contain one or more Extensible Forwarding Features (Extensible Forwarding Feature is defined in subclause 7.6).

The Extensible Forwarding Feature may include an Extensible Basic Service Group. This shall be interpreted according to the rules in subclause 8.8.1.4.

The Extensible Forwarding Feature shall contain an Extensible SS-Status parameter.

If the Extensible SS-Status indicates that call forwarding is registered then (except for call forwarding unconditional) the Extensible Forwarding Feature shall contain a forwarded-to number and, if available, the forwarded-to subaddress. In other states the forwarded-to number and, if applicable, the forwarded-to subaddress shall not be included. For call forwarding unconditional the forwarded-to number and, if applicable, the forwarded-to subaddress shall not be included. If the VLR does not receive a forwarded-to subaddress then it shall assume that a forwarded-to subaddress has not been registered.

The Extensible Forwarding Feature shall contain the extensible forwarding options (except for call forwarding unconditional where the extensible forwarding options shall not be included). Bits 3 and 4 of the extensible forwarding options shall be ignored by the VLR, and may be set to any value by the HLR.

For call forwarding on no reply: If the extensible SS-Status indicates that call forwarding is registered then the Extensible Forwarding Feature shall contain an extensible no reply condition timer. In other states the no reply condition timer shall not be included.

For call forwarding services other than call forwarding on no reply: The Extensible Forwarding Feature shall not contain a no reply condition timer.

If the VLR receives an Indication containing any Call Forwarding service codes which it does not support/allocate it returns them to the HLR in the parameter SS-Code List and discards the unsupported Call Forwarding service codes (no error is sent back). This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

Call barring information List

A list of Extensible Call barring information parameters (Extensible Call barring information is defined in subclause 7.6). It includes Call Barring services either at location updating or at restoration or when they are changed. Each Extensible Call barring information parameter shall be treated independently of all other parameters in the primitive.

The Extensible Call barring information shall include the SS-Code for an individual call barring supplementary service. The Extensible Call barring information shall contain one or more Extensible Call Barring Features (Extensible Call Barring Feature is defined in subclause 7.6).

The Extensible Call Barring Feature may include an Extensible Basic Service Group. This shall be interpreted according to the rules in subclause 8.8.1.4.

The Extensible Call Barring Feature shall contain an extensible SS-Status parameter.

If the VLR receives an Indication containing any Extensible Call Barring service codes which it does not support/allocate it returns them to the HLR in the parameter SS-Code List and discards the unsupported Extensible Call Barring service codes (no error is sent back). This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

CUG information List

A list of CUG information list parameters (CUG information is defined in subclause 7.6). It includes CUG information either at location updating or at restoration or when it is changed.

At location updating, restoration or when there is a change in CUG data, the HLR shall include the complete CUG-SubscriptionList and, if there are options per basic group, it shall also include the complete CUG-FeatureList. If there are not options per extensible basic service group the CUG-FeatureList shall not be included.

In any dialogue, the first insertSubscriberData message which contains CUG information shall include a non-empty CUG-SubscriptionList.

When the VLR receives CUG data it shall replace the stored CUG data with the received data set.

If CUG-FeatureList is omitted in the Insert Subscriber Data operation VLR shall interpret that no options per extensible basic service group exist, and then it shall apply the default values i.e. no outgoing access, no incoming access, no preferential CUG exists.

If CUG-Feature is received without preferential CUG, the VLR shall interpret that no preferential CUG applies.

If the VLR detects that there is overlapping in the information received within a dialogue, it shall send the error Unexpected Data Value.

Note that data consistency between CUG subscription data and CUG feature data is the responsibility of the HLR.

If the VLR does not support the CUG service it returns its code to the HLR in the parameter SS-Code List and discards the received information (no error is sent back). This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

SS-Data List

A list of Extensible SS-Data parameters (Extensible SS-Data is defined in subclause 7.6). It is sent for any other supplementary service than Call Forwarding, Call Barring, CUG and eMLPP either at location updating or at restoration or when they are changed. Each SS-Data parameter shall be treated independently of all other parameters in the primitive.

The Extensible SS-Data shall include the SS-Code for an individual supplementary service.

The Extensible SS-Data shall contain an Extensible SS-Status parameter and any subscription options that are applicable to the service defined by the SS-Code.

The SS-Data may include a Basic Service Group List. This shall be interpreted according to the rules in subclause 8.8.1.4.

If the VLR receives an Indication containing any supplementary service codes which it does not support/allocate it returns them to the HLR in the parameter SS-Code List and therefore discards the unsupported service codes received (no error is sent back). This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

Operator Determined Barring General data

If it is included in a Request/Indication, it includes all the Operator Determined Barring categories that may be applied to a subscriber registered in any PLMN. This parameter is only included in a Request/Indication when the parameter Subscriber Status is set to the value Operator Determined Barring. Note that all General Operator Determined Barring Categories shall be set to their actual status.

If the VLR or the SGSN receives an Indication containing Operator Determined Barring General Data which shows that the subscriber is subject to barring not supported / not allocated by the VLR or by the SGSN, it returns Operator Determined Barring General Data in the response to the HLR to show the barring categories which are not supported / not allocated by the VLR or by the SGSN. This parameter is used by the VLR and the SGSN.

Operator Determined Barring HPLMN data

It includes all the Operator Determined Barring categories that may be applied only to a subscriber registered in the HPLMN. Therefore, it shall only be transferred to the VLR or to the SGSN when the subscriber is roaming into the HPLMN and when the parameter Subscriber Status is set to the value Operator Determined Barring. Note that all HPLMN Operator Determined Barring Categories shall be set to their actual status.

If Subscriber Status is set to the value Operator Determined Barring and no Operator Determined Barring HPLMN data is present then the VLR or the SGSN shall not apply any HPLMN specific ODB services to the subscriber. This parameter is used by the VLR and the SGSN.

eMLPP Subscription Data

If included in the Insert Subscriber Data request this parameter defines the priorities the subscriber might apply for a call (as defined in subclause 7.6). It contains both subparameters of eMLPP.

If the VLR does not support the eMLPP service it returns its code to the HLR in the parameter SS-Code List and therefore discards the received information (no error is sent back).

eMLPP subscription data that have been stored previously in a subscriber data record in the VLR are completely replaced by the new eMLPP subscription data received in a MAP_INSERT_SUBSCRIBER_DATA during either an Update Location or Restore Data procedure or a stand alone Insert Subscriber data procedure. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

MC Subscription Data

If included in the Insert Subscriber Data request, this parameter provides the MC Subscription Data as defined in subclause 7.6.

If the VLR does not support the MC service, it returns its code to the HLR in the parameter SS-Code List and therefore discards the received information (no error is sent back).

MC subscription data that have been stored previously in a subscriber data record in the VLR are completely replaced by the new MC subscription data received in a MAP_INSERT_SUBSCRIBER_DATA during either an Update Location or Restore Data procedure or a stand alone Insert Subscriber data procedure. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

Roaming Restriction Due To Unsupported Feature

The HLR may decide to include this parameter in the request if certain services or features are indicated as not supported by the MSC/VLR (e.g. Advice of Charge Charging Level).

If this parameter is sent to the VLR the MSC area is restricted by the HLR and the VLR. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

Regional Subscription Data

If included in the Insert Subscriber Data request this parameter defines the subscriber's subscription area for the addressed VLR or for the addressed SGSN (as defined in subclause 7.6). It contains the complete list of up to 10 Zone Codes that apply to a subscriber in the currently visited PLMN. The HLR shall send only those Zone Codes which are stored against the CC and NDC of the VLR or the CC and NDC of the SGSN to be updated.

NOTE: Support of this parameter is a network operator option and it will not be sent to networks which do not support Regional Subscription.

Regional subscription data that have been stored previously in a subscriber data record in the VLR or in the SGSN are completely replaced by the regional subscription data received in an Insert Subscriber Data indication during either an Update Location or Restore Data procedure or a stand alone Insert Subscriber data procedure.

After the regional subscription data are inserted the VLR or the SGSN shall derive whether its location areas are allowed or not. If the whole MSC or SGSN area is restricted it will be reported to HLR by returning the Regional Subscription Response.

The VLR or the SGSN returns a Regional Subscription Response indicating that a problem with the Zone Code has been detected in one of the following cases:

- Too Many Zone Codes: more than 10 Zone Codes are to be stored in the VLR or in the SGSN;
- Regional Subscription Not Supported by the VLR or the SGSN;
- Zone Codes Conflict: the VLR or the SGSN detects that the zone codes indicate conflicting service permission for a location area.

Zone codes which have no mapping to location areas shall be ignored.

If a sequence of MAP_INSERT_SUBSCRIBER_DATA services is used during a dialogue, Regional Subscription Data shall be accepted only in one service. Regional Subscription Data received in a subsequent service shall be rejected with the error Unexpected Data Value.

If Regional Subscription Data are not included in any MAP_INSERT_SUBSCRIBER_DATA service, there is no restriction of roaming due to Regional Subscription. This parameter is used by the VLR and the SGSN.

Voice Broadcast Data

This parameter contains a list of group id's a user might have subscribed to; (VBS-Data is defined in subclause 7.6). It includes VBS information either at location updating or at restoration or when it is changed.

At location updating, restoration or when there is a change in VBS data, the HLR shall include the complete VBS-Data.

When the VLR receives VBS-Data within a dialogue it shall replace the stored VBS-data with the received data set. All subsequent VBS-dta received within this dialogue shall be interpreted as add-on data.

If VBS-data is omitted in the Insert Subscriber Data operation the VLR shall keep the previously stored VBS data.

If the VLR detects that there is overlapping in the information received within a dialogue, it shall send the error Unexpected Data Value. . This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

Voice Group Call Data

This parameter contains a list of group id's a user might have subscribed to; see subclause 7.6.

At location updating, restoration or when there is a change in VGCS data, the HLR shall include the complete VGCS-Data.

When the VLR receives VGCS-Data within a dialogue it shall replace the stored VGCS-Data with the received data set. All VGCS-Data received within this dialogue shall be interpreted as add-on data.

If VBCS-Data is omitted in the Insert Subsciber Data operation the VLR shall keep the previously stored VGCS-Data.

If the VLR detects that there is overlapping in the information received within a dialogue, it shall send the error Unexpected Data Value. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

North American Equal Access preferred Carrier Id List

A list of the preferred carrier identity codes that are subscribed to.

When the VLR receives this parameter from the HLR, it shall replace the previously stored preferred carrier identity codes with the received ones. It is not possible to delete all the preferred carrier identity codes from the VLR using this service. To delete all the preferred carrier identity codes from the VLR, the HLR shall use the MAP_CANCEL_LOCATION service.

LSA Information

If included in the ISD request, this parameter contains a list of localised service area identities a user might have subscribed to together with the priority of each localised service area; see subclause 7.6. The access right outside these localised service areas is also indicated. In all cases mentioned below, the LSA information shall only include LSA Data applicable to the VPLMN where the Subscriber is located. The VLR number, received in the MAP-UPDATE_LOCATION primitive, or the SGSN number, received in the MAP_UPDATE_GPRS_LOCATION primitive, can be used, alongside data stored in the HLR, to determine the LSA Data applicable to the VPLMN.

At restoration, location updating or GPRS location updating the HLR shall include the complete set of applicable LSA Information.

When there is a change in LSA data the HLR shall include at least the new and/or modified LSA data.

When there is a change in the access right outside the localised service areas the HLR shall include the LSA only access indicator.

When the SGSN or the VLR receives LSA information within a dialogue it shall check if the received data has to be considered as the entire LSA information. If so, it shall replace the stored LSA information with the received data set, otherwise it shall replace the data only for the modified LSA data (if any) and/or access right, and add the new LSA data (if any) to the stored LSA Information.

If the entire LSA information is received, it shall always include the LSA only access indicator value together with the LSA data applicable for the PLMN (if any).

If LSA Information is omitted in the Insert Subscriber Data operation the SGSN or the VLR shall keep the previously stored LSA Information.

If the SGSN or the VLR detects that there is overlapping in the information received within a dialogue, it shall send the error Unexpected Data Value. This parameter is used by the VLR and the SGSN.

IST Alert Timer

This parameter contains the IST Alert timer value that must be used to inform the HLR about the call activities that the subscriber performs.

At Location Updating, restoration, or when there is a change in the IST data defined for the Subscriber, the HLR shall include the IST Alert timer.

LMU Identifier

This parameter indicates the presence of an LMU. This parameter is used only by the VLR and shall be ignored if received by an SGSN.

LCS Information

This parameter provides the following LCS related information for an MS subscriber:

- list of GMLCs in the HPLMN
- privacy exception list
- MO-LR list

At restoration and location updating, the HLR shall include the complete LCS data of the subscriber.

When there is a change in LCS subscriber data the HLR shall include at least the new and/or modified LCS data. LCS data that is not modified need not be included.

The VLR shall keep any previously stored LCS Information that is not included in an Insert Subscriber Data operation.

If the VLR detects that there is overlapping in the LCS information received within a dialogue, it shall send the error Unexpected Data Value.

This parameter is used only by the VLR and shall be ignored if received by an SGSN.

Super-Charger Supported In HLR

This parameter is used by the HLR to indicate support for the Super-Charger functionality. If this parameter is present it shall include an indication of the age of the subscription data stored in the HLR.

If this parameter is absent then the HLR does not support the Super-Charger functionality.

SS-Code List

The list of SS-Code parameters that are provided to a subscriber but are not supported/allocated by the VLR (SS-Code is defined in subclause 7.6). The list can only include individual SS-Codes that were sent in the service request. This parameter is used only by the VLR.

Regional Subscription Response

If included in the response this parameter indicates one of:

- MSC Area Restricted entirely because of regional subscription;
- SGSN Area Restricted entirely because of regional subscription;
- Too Many Zone Codes to be inserted;
- Zone Codes Conflict;
- Regional Subscription not Supported by the VLR or by the SGSN.

If the VLR determines after insertion of Regional Subscription Data that the entire MSC area is restricted, the VLR shall respond with a Regional Subscription Response indicating MSC Area Restricted. Otherwise MSC Area Restricted is not sent. The HLR shall check whether the current MSC area is no longer restricted.

If the SGSN determines after insertion of Regional Subscription Data that the entire SGSN area is restricted, the SGSN shall respond with a Regional Subscription Response indicating SGSN Area Restricted. Otherwise SGSN Area Restricted is not sent. The HLR shall check whether the current SGSN area is no longer restricted. This parameter is used by the VLR and by the SGSN.

VLR CAMEL Subscription Info

This parameter is sent for subscribers who have CAMEL services which are invoked in the MSC. In CAMEL phase 1, this parameter contains only the O-CSI. In CAMEL Phase 2, this parameter may contain OCSI and SS-CSI. In CAMEL Phase 3, this parameter may contain O-CSI, D-CSI, SS-CSI, VT-CSI, SMS-CSI and M-CSI.If an O-CSI and/or VT-CSI is contained, TDP-Criteria may also be present in CAMEL Phase 2 or 3. The VLR CAMEL Subscription Info is sent at location updating or when any information in the applicable CAMEL Subscription Info in the HLR has been changed. The entire set of CAMEL Subscription Info is sent within one dialogue. If a set of CAMEL Subscription Info is already stored in the VLR it is replaced by the received data. If the VLR CAMEL Subscription Info is omitted in the Insert Subscriber Data operation the VLR shall keep the previously stored VLR CAMEL Subscription Info. Within one dialogue subsequent received data are interpreted as add-on data. If the VLR detects that there is overlapping in the information received within a dialogue, it shall send the error Unexpected Data Value. This parameter is used only by the VLR and if the SGSN receives this parameter it shall ignore it.

The VLR CAMEL Subscription Info may contain the TIF-CSI (Translation Information Flag). for CAMEL Phase 2 and 3 See 3G TS 23.072 for the use of this parameter and the conditions for its presence.

Supported CAMEL Phases

The use of this parameter and the requirements for its presence are specified in 3G TS 23.078. This parameter is used by the VLR and SGSN.

A VLR or SGSN not supporting any CAMEL.Phase may omit this parameter.

GPRS Subscription Data

This parameter contains a list of PDP-contexts a user has subscribed to; see subclause 7.6.

At GPRS location updating the HLR shall include the complete GPRS Subscription Data.

When there is a change in GPRS subscriber data the HLR shall include only the new and/or modified PDP contexts.

When the SGSN receives GPRS Subscription Data within a dialogue it shall check if the received data has to be considered as the entire GPRS subscription data. If so, it shall replace the stored GPRS Subscription Data with the received data set, otherwise it shall replace the data only for the modified PDP contexts (if any) and add the new PDP contexts (if any) to the stored GPRS Subscription Data.

If GPRS Subscription Data is omitted in the Insert Subscriber Data operation the SGSN shall keep the previously stored GPRS Subscription Data.

If the SGSN detects that there is overlapping in the information received within a dialogue, it shall send the error Unexpected Data Value. This parameter is used only by the SGSN and if the VLR receives this parameter it shall ignore it.

SGSN CAMEL Subscription Info

The SGSN CAMEL Subscription Info is sent at GPRS location updating or when any information in the applicable SGSN CAMEL Subscription Info in the HLR has been changed. In CAMEL Phase 3, this parameter may contain GPRS-CSI or/and SMS-CSI. The entire set of SGSN CAMEL Subscription Info is sent. If a set of SGSN CAMEL Subscription Info is already stored in the SGSN it is replaced by the received data. This parameter is used only by the SGSN and if the VLR receives this parameter it shall ignore it.

Roaming Restricted In SGSN Due To Unsupported Feature

The HLR may decide to include this parameter in the request if certain services or features are indicated as not supported by the SGSN. This parameter is used only by the SGSN and if the VLR receives this parameter it shall ignore it.

User error

Only one of the following values is applicable:

- Unidentified subscriber;
- Data missing;
- Unexpected data value.

8.8.1.4 Basic service information related to supplementary services

A number of parameters that relate to supplementary services can be qualified by a Basic Service Group (or a Basic Service Group List). This subclause explains how this information is to be interpreted. Supplementary service parameters to which this subclause is applicable only apply to the basic service groups described in this subclause, and only those basic service groups shall be overwritten at the VLR.

The Basic Service Group (or Basic Service Group List) is optional.

If present the Basic Service Group (or the elements of the Basic Service Group List) shall be one of:

- an Elementary Basic Service Group for which the supplementary service is applicable to at least one basic service in the group; and to which the subscriber has a subscription to at least one basic service in the group;
- the group "All Teleservices" provided that the service is applicable to at least one teleservice and that the subscriber has a subscription to at least one teleservice that is in the same Elementary Basic Service Group as a teleservice to which the service is applicable;
- the group "All Bearer Services" provided that the service is applicable to at least one bearer service and that the subscriber has a subscription to at least one bearer service that is in the same Elementary Basic Service Group as a basic service to which the service is applicable.

If the Basic Service Group (or Basic Service Group List) is not present then the parameter shall apply to all Basic Service Groups.

If the basic service information is not a single Elementary Basic Service Group then the parameter shall be taken as applying individually to all the Elementary Basic Service Groups for which:

- the supplementary service is applicable to at least one basic service in the Basic Service Group; and
- the subscriber has a subscription to at least one basic service in the Basic Service Group.

The VLR is not required to store supplementary services data for Basic Service Groups that are not supported at the VLR.

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

11 Supplementary services related services

11.1 MAP_REGISTER_SS service

11.1.1 Definition

This service is used between the MSC and the VLR and between the VLR and the HLR to register data related to a supplementary service. The VLR will relay the message to the HLR.

The service is a confirmed service and consists of four service primitives.

11.1.2 Service primitives

The service primitives are shown in table 11.1/1.

Table 11.1/1: MAP_REGISTER_SS parameters

Parameter name	Request	Indication	Response	Confirm
Invoke id	M	M(=)	M(=)	M(=)
SS-Code	M	M(=)		
Basic service	C	C(=)		
Forwarded-to number with subaddress	C	C(=)		
No reply condition time	C	C(=)		
EMLPP default priority	C	C(=)	C	C(=)
NbrUser	C	C(=)	C	C(=)
Forwarding information			C	C(=)
User error			C	C(=)
Provider error				O

11.1.3 Parameter use

Invoke id

See subclause 7.6.1 for the use of this parameter.

SS-Code

This parameter indicates the supplementary service which the mobile subscriber wants to register.

Basic service

This parameter indicates for which basic service group the supplementary service is to be registered. If it is not included, the registration request applies to all basic services.

Forwarded-to number with subaddress

This parameter is obligatory if the registration applies to one or more call forwarding supplementary services. It can optionally include a sub-address.

No reply condition time

This parameter is included if the registration applies to the Call Forwarding on No Reply supplementary service (or a superset of this service) and the mobile subscriber supplies a value for this time.

EMLPP default priority

This parameter is sent by the initiator to register the eMLPP default priority level and is returned by the responder at successful outcome of the service.

NbrUser

This parameter is sent by the initiator to register the MC maximum number of user defined circuit switched bearers to be used.

Forwarding information

This parameter is returned by the responder at successful outcome of the service, if the registration request concerned one or a group of Call Forwarding supplementary services.

User error

This parameter is sent by the responder upon unsuccessful outcome of the service, and then takes one of the following values defined in subclause 7.6.1:

- System failure;
- Data missing;
- Unexpected data value;
- Call Barred;
- Bearer service not provisioned;

  This error is returned only if not even a subset of the requested bearer service group has been subscribed to.
- Teleservice not provisioned;

  This error is returned only if not even a subset of the requested teleservice group has been subscribed to.
- Illegal SS operation;
- SS error status;
- SS incompatibility.

Provider error

See subclause 7.6.1 for the use of this parameter.

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

11.5 MAP_INTERROGATE_SS service

11.5.1 Definitions

This service is used between the MSC and the VLR and between the VLR and the HLR to retrieve information related to a supplementary service. The VLR will relay the message to the HLR if necessary.

The service is a confirmed service and consists of four service primitives.

11.5.2 Service primitives

The service primitives are shown in table 11.5/1.

Table 11.5/1: MAP_INTERROGATE_SS parameters

Parameter name	Request	Indication	Response	Confirm
Invoke id	M	M(=)	M(=)	M(=)
SS-Code	M	M(=)		
Basic service	C	C(=)		
SS-Status			C	C(=)
Basic service Group LIST			C	C(=)
Forwarding feature LIST			C	C(=)
CLI restriction Info			C	C(=)
EMLPP Info			C	C(=)
MC Information			C	C(=)
CCBS Feature LIST			C	C(=)
User error			C	C(=)
Provider error				O

11.5.3 Parameter use

For additional information on parameter use refer to the GSM 04.8x and 04.9x-series of technical specifications.

Invoke id

See subclause 7.6.1 for the use of this parameter.

SS-Code

The mobile subscriber can only interrogate a single supplementary service per service request.

Basic service

This parameter indicates for which basic service group the given supplementary service is interrogated. If it is not included, the interrogation request applies to all basic services.

SS-Status

This parameter is included by the responder if:

- the interrogated supplementary service can only be subscribed for all applicable basic services simultaneously; or
- the interrogated supplementary service is not active for any of the interrogated basic services, or
- the interrogation was for the CCBS supplementary service and no CCBS request is active or the service is not provisioned.

Basic service group LIST

This parameter LIST is used to include one or a series of basic service groups for which the interrogated supplementary service is active. If the interrogated supplementary service is not active for any of the interrogated (and provisioned) basic service groups, the SS-Status parameter is returned.

Forwarding feature LIST

The forwarding feature parameter is described in subclause 7.6.4. A list of one or more forwarding features is returned by the responder when the interrogation request applied to Call Forwarding supplementary service.

If no basic service code parameter is provided within this sequence, the forwarding feature parameter applies to all provisioned basic services.

CLI restriction Info

The CLI-RestrictionInfo parameter is returned by the responder when the interrogation request applies to the CLIR supplementary service.

EMLPP Info

The eMLPP info (maximum entitled priority and default priority) is returned by the responder if the interrogation request applies to the eMLPP supplementary service.

MC Information

- The MC information (NbrSB, NbrUser and NbrSN) is returned by the responder if the interrogation request applies to the MC supplementary service. For a definition of these 3 components, refer to 3G TS 23.135 and 3G TS 24.135.

CCBS Feature LIST

The CCBS feature parameter is described in subclause 7.6. A list of one or more CCBS features is returned by the responder when the interrogation request applied to the CCBS supplementary service. See GSM 03.93 [107] for the conditions for the presence of the parameters included in the CCBS feature.

User error

This error is sent by the responder upon unsuccessful outcome of the interrogation service, and then takes one of the following values, defined in subclause 7.6.1:

- System failure;
- Data Missing;
- Unexpected data value;
- Bearer Service not provisioned;

  This error is returned only if not even a subset of the interrogated bearer services are provided.
- Teleservice not provisioned;

  This error is returned only if not even a subset of the interrogated teleservices are provided.
- Call Barred;
- Illegal SS operation;
- SS not available.

Provider error

See subclause 7.6.1 for the use of this parameter.

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

17.7 MAP constants and data types

17.7.1 Mobile Service data types

```
MAP-MS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version6 (6)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS

      -- location registration types
      UpdateLocationArg,
      UpdateLocationRes,
      CancelLocationArg,
      CancelLocationRes,
      PurgeMS-Arg,
      PurgeMS-Res,
      SendIdentificationArg,
      SendIdentificationRes,
      UpdateGprsLocationArg,
      UpdateGprsLocationRes,
      IST-SupportIndicator,


      -- handover types
      PrepareHO-Arg,
      PrepareHO-Res,
      PrepareSubsequentHO-Arg,

      -- authentication management types
      SendAuthenticationInfoArg,
      SendAuthenticationInfoRes,

      -- security management types
      EquipmentStatus,
      Kc,

      -- subscriber management types
      InsertSubscriberDataArg,
      InsertSubscriberDataRes,
      DeleteSubscriberDataArg,
      DeleteSubscriberDataRes,
      SubscriberData,
      ODB-Data,
      SubscriberStatus,
      ZoneCodeList,
      maxNumOfZoneCodes,
      O-CSI,
   D-CSI,
      O-BcsmCamelTDPCriteriaList,
      T-BCSM-CAMEL-TDP-CriteriaList,
      SS-CSI,
      ServiceKey,
      DefaultCallHandling,
      CamelCapabilityHandling,
      BasicServiceCriteria,
      SupportedCamelPhases,
      maxNumOfCamelTDPData,
      CUG-Index,
      CUG-Interlock,
      InterCUG-Restrictions,
      IntraCUG-Options,
   IST-AlertTimerValue,
      T-CSI,
      T-BcsmTriggerDetectionPoint,

      -- fault recovery types
      ResetArg,
```

```
      RestoreDataArg,
      RestoreDataRes,

      -- subscriber information enquiry types
      ProvideSubscriberInfoArg,
      ProvideSubscriberInfoRes,
      SubscriberInfo,
      LocationInformation,
      SubscriberState,

      -- any time information enquiry types
      AnyTimeInterrogationArg,
      AnyTimeInterrogationRes,

      -- any time information handling types
      AnyTimeSubscriptionInterrogationArg,
      AnyTimeSubscriptionInterrogationRes,
      AnyTimeModificationArg,
      AnyTimeModificationRes,

      -- subscriber data modification notification types
      NoteSubscriberDataModifiedArg,
      NoteSubscriberDataModifiedRes,

      -- gprs location information retrieval types
      SendRoutingInfoForGprsArg,
      SendRoutingInfoForGprsRes,

      -- failure reporting types
      FailureReportArg,
      FailureReportRes,

      -- gprs notification types
      NoteMsPresentForGprsArg,
      NoteMsPresentForGprsRes,

      -- Mobility Management types
   NoteMM-EventArg,
      NoteMM-EventRes



;

IMPORTS
      maxNumOfSS,
      SS-SubscriptionOption,
      SS-List,
      SS-ForBS-Code,
      Password
FROM MAP-SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-DataTypes (14) version6 (6)}

      SS-Code
FROM MAP-SS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-Code (15) version6 (6)}

      Ext-BearerServiceCode
FROM MAP-BS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-BS-Code (20) version6 (6)}

      Ext-TeleserviceCode
FROM MAP-TS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-TS-Code (19) version6 (6)}


      AddressString,
   ISDN-AddressString,
      ISDN-SubaddressString,
      ExternalSignalInfo,
      IMSI,
      TMSI,
      HLR-List,
      LMSI,
      Identity,
```

```
      GlobalCellId,
      CellIdOrLAI,
      Ext-BasicServiceCode,
      NAEA-PreferredCI,
      EMLPP-Info,
      MC-SS-Info,
      SubscriberIdentity,
      AgeOfLocationInformation,
      LCSClientExternalID,
      LCSClientInternalID


FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version6 (6)}

      ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version6 (6)}

      AbsentSubscriberDiagnosticSM
FROM MAP-ER-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ER-DataTypes (17) version6 (6)}


;


-- location registration types

UpdateLocationArg ::= SEQUENCE {
     imsi                                IMSI,

     msc-Number                          [1] ISDN-AddressString,
     vlr-Number                          ISDN-AddressString,
     lmsi                                [10] LMSI OPTIONAL,
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ... ,
     vlr-Capability                      [6] VLR-Capability                OPTIONAL }

VLR-Capability ::= SEQUENCE{
     supportedCamelPhases                [0] SupportedCamelPhases          OPTIONAL,
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ... ,
     solsaSupportIndicator               [2] NULL                          OPTIONAL,
     istSupportIndicator                 [1] IST-SupportIndicator          OPTIONAL,
     superChargerSupportedInServingNetworkEntity   [3] SuperChargerInfo    OPTIONAL }

SuperChargerInfo ::= CHOICE {
     sendSubscriberData                  [0] NULL,
     subscriberDataStored                [1] AgeIndicator }

AgeIndicator ::= OCTET STRING (SIZE (1..6))
     -- The internal structure of this parameter is implementation specific.


IST-SupportIndicator ::=  ENUMERATED {
     basicISTSupported                   (0),
     istCommandSupported                 (1), ...}
-- exception handling:
-- reception of values > 1 shall be mapped to ' istCommandSupported '


UpdateLocationRes ::= SEQUENCE {
     hlr-Number                          ISDN-AddressString,

     extensionContainer                  ExtensionContainer                OPTIONAL,
     ... }

CancelLocationArg ::= [3] SEQUENCE {
     identity                            Identity,
     cancellationType                    CancellationType                  OPTIONAL,
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
CancellationType ::= ENUMERATED {
    updateProcedure                     (0),
    subscriptionWithdraw                (1),
    ...}
    -- The HLR shall not send values other than listed above
```

```
CancelLocationRes ::= SEQUENCE {
    extensionContainer                  ExtensionContainer              OPTIONAL,
    ...}
```

```
PurgeMS-Arg ::= [3] SEQUENCE {
    imsi                                IMSI,
    vlr-Number                          [0] ISDN-AddressString          OPTIONAL,
    sgsn-Number                         [1]  ISDN-AddressString         OPTIONAL,
    extensionContainer                  ExtensionContainer              OPTIONAL,
    ...}
```

```
PurgeMS-Res ::= SEQUENCE {
    freezeTMSI                          [0]  NULL                       OPTIONAL,
    freezeP-TMSI                        [1]  NULL                       OPTIONAL,
    extensionContainer                  ExtensionContainer              OPTIONAL,
    ...}
```

```
SendIdentificationArg ::= SEQUENCE {
    tmsi                                TMSI,
    numberOfRequestedVectors            NumberOfRequestedVectors,
    segmentationProhibited              NULL                            OPTIONAL,
    -- if segmentation is prohibited the previous VLR shall not send the result
    -- within a TC-CONTINUE message.
    extensionContainer                  ExtensionContainer              OPTIONAL,
    ...}
```

```
SendIdentificationRes ::= [3] SEQUENCE {
    imsi                                IMSI                            OPTIONAL,
    -- IMSI must be present if SendIdentificationRes is not segmented.
    -- If the TC-Continue segmentation option is taken the IMSI must be
    -- present in one segmented transmission of SendIdentificationRes.
    authenticationSetList               AuthenticationSetList           OPTIONAL,
    extensionContainer                  [2] ExtensionContainer          OPTIONAL,
    ...}
```

```
AuthenticationSetList ::= CHOICE {
    tripletList                         [0] TripletList,
    quintupletList                      [1] QuintupletList }
```

```
TripletList ::= SEQUENCE SIZE (1..5) OF
                                        AuthenticationTriplet
```

```
QuintupletList ::= SEQUENCE SIZE (1..5) OF
                                        AuthenticationQuintuplet
```

```
AuthenticationTriplet ::= SEQUENCE {
    rand                                RAND,
    sres                                SRES,
    kc                                  Kc,
    ...}
```

```
AuthenticationQuintuplet ::= SEQUENCE {
    rand                                RAND,
    xres                                XRES,
    ck                                  CK,
    ik                                  IK,
    autn                                AUTN,
    ...}
```

```
RAND ::= OCTET STRING (SIZE (16))
```

```
SRES ::= OCTET STRING (SIZE (4))
```

```
Kc ::= OCTET STRING (SIZE (8))
```

```
XRES ::= OCTET STRING (SIZE (4..16))
```

```
CK ::= OCTET STRING (SIZE (16))
```

```
IK ::= OCTET STRING (SIZE (16))
```

```
AUTN ::= OCTET STRING (SIZE (14..18))
```

```
AUTS ::= OCTET STRING (SIZE (12..16))
```

-- gprs location registration types

```
UpdateGprsLocationArg ::= SEQUENCE {
    imsi                                IMSI,
    sgsn-Number                         ISDN-AddressString,
    sgsn-Address                        GSN-Address,
    extensionContainer                  ExtensionContainer                  OPTIONAL,
    ... ,
    sgsn-Capability                     [0] SGSN-Capability                 OPTIONAL }
```

```
SGSN-Capability ::= SEQUENCE{
    solsaSupportIndicator               NULL                                OPTIONAL,
    extensionContainer                  [1] ExtensionContainer              OPTIONAL,
    ... ,
    superChargerSupportedInServingNetworkEntity   [2] SuperChargerInfo      OPTIONAL ,
    gprsEnhancementsSupportIndicator    [3] NULL                            OPTIONAL,
    supportedCamelPhases                [4] SupportedCamelPhases            OPTIONAL }
```

```
GSN-Address ::= OCTET STRING (SIZE (5..17))
    -- Octets are coded according to TS GSM 03.03
```

```
UpdateGprsLocationRes ::= SEQUENCE {
    hlr-Number                          ISDN-AddressString,
    extensionContainer                  ExtensionContainer                  OPTIONAL,
    ...}
```

-- handover types

```
PrepareHO-Arg ::= SEQUENCE {
    targetCellId                        GlobalCellId                        OPTIONAL,
    ho-NumberNotRequired                NULL                                OPTIONAL,
    bss-APDU                            ExternalSignalInfo                  OPTIONAL,
    ...}
```

```
PrepareHO-Res ::= SEQUENCE {
    handoverNumber                      ISDN-AddressString                  OPTIONAL,
    bss-APDU                            ExternalSignalInfo                  OPTIONAL,
    ...}
```

```
PrepareSubsequentHO-Arg ::= SEQUENCE {
    targetCellId                        GlobalCellId,
    targetMSC-Number                    ISDN-AddressString,
    bss-APDU                            ExternalSignalInfo,
    ...}
```

-- authentication management types

```
SendAuthenticationInfoArg ::= SEQUENCE {
    imsi                                [0] IMSI,
    numberOfRequestedVectors            NumberOfRequestedVectors,
    segmentationProhibited              NULL                                OPTIONAL,
    -- if segmentation is prohibited the HLR shall not send the result within
    -- a TC-CONTINUE message.
    immediateResponsePreferred          [1] NULL                             OPTIONAL,
    -- if present, the HLR may send an immediate response with the available authentication
    -- vectors (see § 8.5.2 for more information).
    re-synchronisationInfo              Re-synchronisationInfo              OPTIONAL,
    extensionContainer                  [2] ExtensionContainer              OPTIONAL,
    ...}
```

```
NumberOfRequestedVectors ::= INTEGER (1..5)
```

```
Re-synchronisationInfo ::= SEQUENCE {
    rand                                RAND,
    rand-ms                             RAND,
    auts                                AUTS,
    ...}
```

```
SendAuthenticationInfoRes ::= [3] SEQUENCE {
    authenticationSetList               AuthenticationSetList               OPTIONAL,
```

```
    extensionContainer                  ExtensionContainer              OPTIONAL,
    ...}
```

-- security management types

```
EquipmentStatus ::= ENUMERATED {
    whiteListed  (0),
    blackListed  (1),
    greyListed  (2)}
```

-- subscriber management types

```
InsertSubscriberDataArg ::= SEQUENCE {
    imsi                                [0] IMSI                        OPTIONAL,
    COMPONENTS OF                       SubscriberData,
    extensionContainer                  [14] ExtensionContainer         OPTIONAL,
    ... ,
    naea-PreferredCI                    [15] NAEA-PreferredCI           OPTIONAL,
    -- naea-PreferredCI is included at the discretion of the HLR operator.
    gprsSubscriptionData                [16] GPRSSubscriptionData       OPTIONAL,
    roamingRestrictedInSgsnDueToUnsupportedFeature [23]                 NULL
                                                                        OPTIONAL,
    networkAccessMode                   [24] NetworkAccessMode          OPTIONAL,
    lsaInformation                      [25] LSAInformation             OPTIONAL,
    lmu-Indicator                       [21] NULL                       OPTIONAL,
    lcsInformation                      [22] LCSInformation             OPTIONAL,
    istAlertTimer                       [26] IST-AlertTimerValue        OPTIONAL,
    superChargerSupportedInHLR          [27] AgeIndicator               OPTIONAL,
    mc-SS-Info                          [28] MC-SS-Info                 OPTIONAL
    }
    -- If the Network Access Mode parameter is sent, it shall be present only in
    -- the first sequence if the seqmentation is used
```

17.7.4 Supplementary service data types

```
MAP-SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-DataTypes (14) version6 (6)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS
      RegisterSS-Arg,
      SS-Info,
      SS-Status,
      SS-SubscriptionOption,
      SS-ForBS-Code,
      InterrogateSS-Res,
      USSD-Arg,
      USSD-Res,
      USSD-DataCodingScheme,
      USSD-String,
      Password,
      GuidanceInfo,
      SS-List,
      SS-InfoList,
      OverrideCategory,
      CliRestrictionOption,
      NoReplyConditionTime,
      ForwardingOptions,
      maxNumOfSS,
      SS-Data,
      SS-InvocationNotificationArg,
      SS-InvocationNotificationRes,
      CCBS-Feature,
      RegisterCC-EntryArg,
      RegisterCC-EntryRes,
      EraseCC-EntryArg,
      EraseCC-EntryRes
;

IMPORTS
      AddressString,
      ISDN-AddressString,
      ISDN-SubaddressString,
      IMSI,
      BasicServiceCode,
      AlertingPattern,
      EMLPP-Priority,
      MaxMC-Bearers,
      MC-Bearers,
      ExternalSignalInfo

FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version6 (6)}

      ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version6 (6)}

      SS-Code
FROM MAP-SS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-Code (15) version6 (6)}
;
```

```
RegisterSS-Arg ::= SEQUENCE{
    ss-Code                         SS-Code,
    basicService                    BasicServiceCode                OPTIONAL,
    forwardedToNumber               [4] AddressString               OPTIONAL,
    forwardedToSubaddress           [6] ISDN-SubaddressString       OPTIONAL,
    noReplyConditionTime            [5] NoReplyConditionTime        OPTIONAL,
    ...,
    defaultPriority                 [7] EMLPP-Priority              OPTIONAL,
    nbrUser                         [8] MC-Bearers                  OPTIONAL }

NoReplyConditionTime ::= INTEGER (5..30)

SS-Info ::= CHOICE {
    forwardingInfo                  [0] ForwardingInfo,
    callBarringInfo                 [1] CallBarringInfo,
    ss-Data                         [3] SS-Data}

ForwardingInfo ::= SEQUENCE {
    ss-Code                         SS-Code                         OPTIONAL,
    forwardingFeatureList           ForwardingFeatureList,
    ...}

ForwardingFeatureList ::=
    SEQUENCE SIZE (1..maxNumOfBasicServiceGroups) OF
                                    ForwardingFeature

ForwardingFeature ::= SEQUENCE {
    basicService                    BasicServiceCode                OPTIONAL,
    ss-Status [4] SS-Status         OPTIONAL,
    forwardedToNumber               [5] ISDN-AddressString          OPTIONAL,
    forwardedToSubaddress           [8] ISDN-SubaddressString       OPTIONAL,
    forwardingOptions               [6] ForwardingOptions           OPTIONAL,
    noReplyConditionTime            [7] NoReplyConditionTime        OPTIONAL,
    ...}

SS-Status ::= OCTET STRING (SIZE (1))

    -- bits 8765: 0000 (unused)
    -- bits 4321: Used to convey the "P bit","R bit","A bit" and "Q bit",
    --            representing supplementary service state information
    --            as defined in TS GSM 03.11

    -- bit 4: "Q bit"

    -- bit 3: "P bit"

    -- bit 2: "R bit"

    -- bit 1: "A bit"

ForwardingOptions ::= OCTET STRING (SIZE (1))

    -- bit 8: notification to forwarding party
    --   0  no notification
    --   1  notification

    -- bit 7: redirecting presentation
    --   0 no presentation
    --   1  presentation

    -- bit 6: notification to calling party
    --   0  no notification
    --   1  notification

    -- bit 5: 0 (unused)

    -- bits 43: forwarding reason
    --   00  ms not reachable
    --   01  ms busy
    --   10  no reply
    --   11  unconditional when used in a SRI Result,
    --       or call deflection when used in a RCH Argument
    -- bits 21: 00 (unused)
```

```
CallBarringInfo ::= SEQUENCE {
     ss-Code                          SS-Code                          OPTIONAL,
     callBarringFeatureList           CallBarringFeatureList,
     ...}

CallBarringFeatureList ::= SEQUENCE SIZE (1..maxNumOfBasicServiceGroups) OF
                                      CallBarringFeature

CallBarringFeature ::= SEQUENCE {
     basicService                     BasicServiceCode                 OPTIONAL,
     ss-Status [4] SS-Status          OPTIONAL,
     ...}

SS-Data ::= SEQUENCE {
     ss-Code                          SS-Code                          OPTIONAL,
     ss-Status                        [4] SS-Status                    OPTIONAL,
     ss-SubscriptionOption            SS-SubscriptionOption            OPTIONAL,
     basicServiceGroupList            BasicServiceGroupList            OPTIONAL,
     ...,
     defaultPriority                  EMLPP-Priority                   OPTIONAL,
     nbrUser                          MC-Bearers                       OPTIONAL }

SS-SubscriptionOption ::= CHOICE {
     cliRestrictionOption             [2] CliRestrictionOption,
     overrideCategory                 [1] OverrideCategory}

CliRestrictionOption ::= ENUMERATED {
     permanent  (0),
     temporaryDefaultRestricted  (1),
     temporaryDefaultAllowed  (2)}

OverrideCategory ::= ENUMERATED {
     overrideEnabled  (0),
     overrideDisabled  (1)}

SS-ForBS-Code ::= SEQUENCE {
     ss-Code                          SS-Code,
     basicService                     BasicServiceCode                 OPTIONAL,
     ...}

GenericServiceInfo ::= SEQUENCE {
     ss-Status SS-Status,
     cliRestrictionOption             CliRestrictionOption             OPTIONAL,
     ...,
     maximumEntitledPriority          [0] EMLPP-Priority               OPTIONAL,
     defaultPriority                  [1] EMLPP-Priority               OPTIONAL,
     ccbs-FeatureList                 [2] CCBS-FeatureList             OPTIONAL
     nbrSB                            [3] MaxMC-Bearers                OPTIONAL,
     nbrUser                          [4] MC-Bearers                   OPTIONAL,
     nbrSN                            [5] MC-Bearers                   OPTIONAL }

CCBS-FeatureList ::= SEQUENCE SIZE (1..maxNumOfCCBS-Requests) OF
                                      CCBS-Feature

maxNumOfCCBS-Requests  INTEGER ::= 5

CCBS-Feature ::= SEQUENCE {
     ccbs-Index                       [0] CCBS-Index                   OPTIONAL,
     b-subscriberNumber               [1] ISDN-AddressString           OPTIONAL,
     b-subscriberSubaddress           [2] ISDN-SubaddressString        OPTIONAL,
     basicServiceGroup                [3] BasicServiceCode             OPTIONAL,
     ...}

CCBS-Index  ::= INTEGER (1..maxNumOfCCBS-Requests)

InterrogateSS-Res ::= CHOICE {
     ss-Status [0] SS-Status,
     basicServiceGroupList            [2] BasicServiceGroupList,
     forwardingFeatureList            [3] ForwardingFeatureList,
     genericServiceInfo               [4]  GenericServiceInfo }
```

```
USSD-Arg ::= SEQUENCE {
    ussd-DataCodingScheme               USSD-DataCodingScheme,
    ussd-String                         USSD-String,
    ... ,
    alertingPattern                     AlertingPattern                 OPTIONAL,
    msisdn                              [0] ISDN-AddressString          OPTIONAL }

USSD-Res ::= SEQUENCE {
    ussd-DataCodingScheme               USSD-DataCodingScheme,
    ussd-String                         USSD-String,
    ...}

USSD-DataCodingScheme ::= OCTET STRING (SIZE (1))
    -- The structure of the USSD-DataCodingScheme is defined by
    -- the Cell Broadcast Data Coding Scheme as described in
    -- TS GSM 03.38

USSD-String ::= OCTET STRING (SIZE (1..maxUSSD-StringLength))
    -- The structure of the contents of the USSD-String is dependent
    -- on the USSD-DataCodingScheme as described in TS GSM 03.38.

maxUSSD-StringLength  INTEGER ::= 160

Password ::= NumericString
    (FROM ("0"|"1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"))
    (SIZE (4))

GuidanceInfo ::= ENUMERATED {
    enterPW  (0),
    enterNewPW  (1),
    enterNewPW-Again  (2)}
    -- How this information is really delivered to the subscriber
    -- (display, announcement, ...) is not part of this
    -- specification.

SS-List ::= SEQUENCE SIZE (1..maxNumOfSS) OF
                                        SS-Code

maxNumOfSS  INTEGER ::= 30

SS-InfoList ::= SEQUENCE SIZE (1..maxNumOfSS) OF
                                        SS-Info

BasicServiceGroupList ::= SEQUENCE SIZE (1..maxNumOfBasicServiceGroups) OF
                                        BasicServiceCode

maxNumOfBasicServiceGroups  INTEGER ::= 13

SS-InvocationNotificationArg ::= SEQUENCE {
    imsi                                [0] IMSI,
    msisdn                              [1] ISDN-AddressString,
    ss-Event                            [2] SS-Code,
    -- The following SS-Code values are allowed :
    -- ect                              SS-Code ::= '00110001'B
    -- multiPTY                         SS-Code ::= '01010001'B
    -- cd                               SS-Code ::= '00100100'B
    -- ccbs                             SS-Code ::= '01000100'B
    ss-EventSpecification               [3] SS-EventSpecification       OPTIONAL,
    extensionContainer                  [4] ExtensionContainer          OPTIONAL,
    ...}

SS-InvocationNotificationRes ::= SEQUENCE {
    extensionContainer                  ExtensionContainer              OPTIONAL,
    ...
    }

SS-EventSpecification ::= SEQUENCE SIZE (1..maxEventSpecification) OF
                                        AddressString

maxEventSpecification  INTEGER ::= 2

RegisterCC-EntryArg ::= SEQUENCE {
    ss-Code                             [0]  SS-Code,
    ccbs-Data [1]                       CCBS-Data OPTIONAL,
    ...}
```

```
CCBS-Data ::= SEQUENCE {
     ccbs-Feature                        [0]  CCBS-Feature,
     translatedB-Number                  [1]  ISDN-AddressString,
     serviceIndicator                    [2]  ServiceIndicator             OPTIONAL,
     callInfo                            [3]  ExternalSignalInfo,
     networkSignalInfo                   [4]  ExternalSignalInfo,
     ...}
```

```
ServiceIndicator ::= BIT STRING {
     clir-invoked (0),
     camel-invoked (1)} (SIZE(2..32))
-- exception handling:
-- bits 2 to 31 shall be ignored if received and not understood
```

```
RegisterCC-EntryRes ::= SEQUENCE {
     ccbs-Feature                        [0] CCBS-Feature                  OPTIONAL,
     ...}
```

```
EraseCC-EntryArg ::= SEQUENCE {
     ss-Code                             [0]  SS-Code,
     ccbs-Index                          [1]  CCBS-Index                   OPTIONAL,
     ...}
```

```
EraseCC-EntryRes ::= SEQUENCE {
     ss-Code                             [0]  SS-Code,
     ss-Status [1] SS-Status             OPTIONAL,
     ...}
```

```
END
```

17.7.5 Supplementary service codes

```
MAP-SS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-Code (15) version6 (6)}

DEFINITIONS

::=

BEGIN
```

```
SS-Code ::= OCTET STRING (SIZE (1))
     -- This type is used to represent the code identifying a single
     -- supplementary service, a group of supplementary services, or
     -- all supplementary services. The services and abbreviations
     -- used are defined in TS GSM 02.04. The internal structure is
     -- defined as follows:
     --
     -- bits 87654321: group (bits 8765), and specific service
     -- (bits 4321)
```

```
allSS                                    SS-Code ::= '00000000'B
     -- reserved for possible future use
     -- all SS
```

```
allLineIdentificationSS                  SS-Code ::= '00010000'B
     -- reserved for possible future use
     -- all line identification SS
clip                                     SS-Code ::= '00010001'B
     -- calling line identification presentation
clir                                     SS-Code ::= '00010010'B
     -- calling line identification restriction
colp                                     SS-Code ::= '00010011'B
     -- connected line identification presentation
colr                                     SS-Code ::= '00010100'B
     -- connected line identification restriction
mci                                      SS-Code ::= '00010101'B
     -- reserved for possible future use
     -- malicious call identification

allNameIdentificationSS                  SS-Code ::= '00011000'B
     -- all name identification SS
cnap                                     SS-Code ::= '00011001'B
     -- calling name presentation

     -- SS-Codes '00011010'B to '00011111'B are reserved for future
     -- NameIdentification Supplementary Service use.
```

```
allForwardingSS                          SS-Code ::= '00100000'B
     -- all forwarding SS
cfu                                      SS-Code ::= '00100001'B
     -- call forwarding unconditional
allCondForwardingSS                      SS-Code ::= '00101000'B
     -- all conditional forwarding SS
cfb                                      SS-Code ::= '00101001'B
     -- call forwarding on mobile subscriber busy
cfnry                                    SS-Code ::= '00101010'B
     -- call forwarding on no reply
cfnrc                                    SS-Code ::= '00101011'B
     -- call forwarding on mobile subscriber not reachable
cd                                       SS-Code ::= '00100100'B
     -- call deflection
```

```
allCallOfferingSS                        SS-Code ::= '00110000'B
     -- reserved for possible future use
     -- all call offering SS includes also all forwarding SS
ect                                      SS-Code ::= '00110001'B
          -- explicit call transfer
mah                                      SS-Code ::= '00110010'B
     -- reserved for possible future use
     -- mobile access hunting
```

```
allCallCompletionSS                      SS-Code ::= '01000000'B
     -- reserved for possible future use
     -- all Call completion SS
cw                                       SS-Code ::= '01000001'B
     -- call waiting
hold                                     SS-Code ::= '01000010'B
     -- call hold
ccbs-A                                   SS-Code ::= '01000011'B
     -- completion of call to busy subscribers, originating side
ccbs-B                                   SS-Code ::= '01000100'B
     -- completion of call to busy subscribers, destination side
     -- this SS-Code is used only in InsertSubscriberData
mc                                       SS-Code ::= '01000101'B
     -- multicall
```

```
allMultiPartySS                          SS-Code ::= '01010000'B
     -- reserved for possible future use
     -- all multiparty SS
multiPTY                                 SS-Code ::= '01010001'B
     -- multiparty
```

```
allCommunityOfInterest-SS                SS-Code ::= '01100000'B
     -- reserved for possible future use
     -- all community of interest SS
cug                                      SS-Code ::= '01100001'B
     -- closed user group
```

```
allChargingSS                           SS-Code ::= '01110000'B
     -- reserved for possible future use
     -- all charging SS
aoci                                    SS-Code ::= '01110001'B
     -- advice of charge information
aocc                                    SS-Code ::= '01110010'B
     -- advice of charge charging
```

```
allAdditionalInfoTransferSS             SS-Code ::= '10000000'B
     -- reserved for possible future use
     -- all additional information transfer SS
uus1                                    SS-Code ::= '10000001'B
     -- UUS1 user-to-user signalling
uus2                                    SS-Code ::= '10000010'B
     -- UUS2 user-to-user signalling
uus3                                    SS-Code ::= '10000011'B
     -- UUS3 user-to-user signalling
```

```
allBarringSS                            SS-Code ::= '10010000'B
     -- all barring SS
barringOfOutgoingCalls                  SS-Code ::= '10010001'B
     -- barring of outgoing calls
baoc                                    SS-Code ::= '10010010'B
     -- barring of all outgoing calls
boic                                    SS-Code ::= '10010011'B
     -- barring of outgoing international calls
boicExHC                                SS-Code ::= '10010100'B
     -- barring of outgoing international calls except those directed
     -- to the home PLMN
barringOfIncomingCalls                  SS-Code ::= '10011001'B
     -- barring of incoming calls
baic                                    SS-Code ::= '10011010'B
     -- barring of all incoming calls
bicRoam                                 SS-Code ::= '10011011'B
     -- barring of incoming calls when roaming outside home PLMN
     -- Country
```

```
allPLMN-specificSS                      SS-Code ::= '11110000'B
plmn-specificSS-1                       SS-Code ::= '11110001'B
plmn-specificSS-2                       SS-Code ::= '11110010'B
plmn-specificSS-3                       SS-Code ::= '11110011'B
plmn-specificSS-4                       SS-Code ::= '11110100'B
plmn-specificSS-5                       SS-Code ::= '11110101'B
plmn-specificSS-6                       SS-Code ::= '11110110'B
plmn-specificSS-7                       SS-Code ::= '11110111'B
plmn-specificSS-8                       SS-Code ::= '11111000'B
plmn-specificSS-9                       SS-Code ::= '11111001'B
plmn-specificSS-A                       SS-Code ::= '11111010'B
plmn-specificSS-B                       SS-Code ::= '11111011'B
plmn-specificSS-C                       SS-Code ::= '11111100'B
plmn-specificSS-D                       SS-Code ::= '11111101'B
plmn-specificSS-E                       SS-Code ::= '11111110'B
plmn-specificSS-F                       SS-Code ::= '11111111'B
```

```
allCallPrioritySS                       SS-Code ::= '10100000'B
     -- reserved for possible future use
     -- all call priority SS
emlpp                                   SS-Code ::= '10100001'B
     -- enhanced Multilevel Precedence Pre-emption (EMLPP) service
```

```
allLCSPrivacyException                  SS-Code ::= '10110000'B
     -- all LCS Privacy Exception Classes
universal                               SS-Code ::= '10110001'B
     -- allow location by any LCS client
callrelated                             SS-Code ::= '10110010'B
     -- allow location by any value added LCS client to which a call
     -- is established from the target MS
callunrelated                           SS-Code ::= '10110011'B
     -- allow location by designated external value added LCS clients
plmnoperator                            SS-Code ::= '10110100'B
     -- allow location by designated PLMN operator LCS clients
```

```
allMOLR-SS                                SS-Code ::= '11000000'B
     -- all Mobile Originating Location Request Classes
basicSelfLocation                         SS-Code ::= '11000001'B
     -- allow an MS to request its own location
autonomousSelfLocation                    SS-Code ::= '11000010'B
     -- allow an MS to perform self location without interaction
     -- with the PLMN for a predetermined period of time
transferToThirdParty                      SS-Code ::= '11000011'B
     -- allow an MS to request transfer of its location to another LCS client

END
```

17.7.8 Common data types

```
MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version6 (6)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS

      -- general data types and values
      AddressString,
      ISDN-AddressString,
      maxISDN-AddressLength,
      ISDN-SubaddressString,
      ExternalSignalInfo,
      Ext-ExternalSignalInfo,
      SignalInfo,
      maxSignalInfoLength,
      AlertingPattern,

      -- data types for numbering and identification
      IMSI,
      TMSI,
      Identity,
      SubscriberId,
      IMEI,
      HLR-List,
      LMSI,
      GlobalCellId,
      NetworkResource,
      NAEA-PreferredCI,
      NAEA-CIC,
      ASCI-CallReference,
      SubscriberIdentity,

      -- data types for CAMEL
      CellIdOrLAI,

      -- data types for subscriber management
      BasicServiceCode,
      Ext-BasicServiceCode,
      EMLPP-Info,
      EMLPP-Priority,
      MC-SS-Info,
      MaxMC-Bearers,
      MC-Bearers,

      -- data types for geographic location
      AgeOfLocationInformation,
      LCSClientExternalID,
      LCSClientInternalID
;

IMPORTS
      TeleserviceCode,
      Ext-TeleserviceCode
FROM MAP-TS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-TS-Code (19) version6 (6)}

      BearerServiceCode,
      Ext-BearerServiceCode
FROM MAP-BS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-BS-Code (20) version6 (6)}

      ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version6 (6)}
```

```
;


-- general data types

TBCD-STRING ::= OCTET STRING
     -- This type (Telephony Binary Coded Decimal String) is used to
     -- represent several digits from 0 through 9, *, #, a, b, c, two
     -- digits per octet, each digit encoded 0000 to 1001 (0 to 9),
     -- 1010 (*), 1011 (#), 1100 (a), 1101 (b) or 1110 (c); 1111 used
     -- as filler when there is an odd number of digits.

     -- bits 8765 of octet n encoding digit 2n
     -- bits 4321 of octet n encoding digit 2(n-1) +1

AddressString ::= OCTET STRING (SIZE (1..maxAddressLength))
     -- This type is used to represent a number for addressing
     -- purposes. It is composed of
     --   a)   one octet for nature of address, and numbering plan
     --        indicator.
     --   b)   digits of an address encoded as TBCD-String.

     -- a)    The first octet includes a one bit extension indicator, a
     --       3 bits nature of address indicator and a 4 bits numbering
     --       plan indicator, encoded as follows:

     -- bit 8: 1  (no extension)

     -- bits 765: nature of address indicator
     --   000  unknown
     --   001  international number
     --   010  national significant number
     --   011  network specific number
     --   100  subscriber number
     --   101  reserved
     --   110  abbreviated number
     --   111  reserved for extension

     -- bits 4321: numbering plan indicator
     --   0000  unknown
     --   0001  ISDN/Telephony Numbering Plan (Rec CCITT E.164)
     --   0010  spare
     --   0011  data numbering plan (CCITT Rec X.121)
     --   0100  telex numbering plan (CCITT Rec F.69)
     --   0101  spare
     --   0110  land mobile numbering plan (CCITT Rec E.212)
     --   0111  spare
     --   1000  national numbering plan
     --   1001  private numbering plan
     --   1111  reserved for extension

     --   all other values are reserved.

     -- b)    The following octets representing digits of an address
     --       encoded as a TBCD-STRING.

maxAddressLength  INTEGER ::= 20

ISDN-AddressString ::=
              AddressString (SIZE (1..maxISDN-AddressLength))
     -- This type is used to represent ISDN numbers.

maxISDN-AddressLength  INTEGER ::= 9

```

```
ISDN-SubaddressString ::=
              OCTET STRING (SIZE (1..maxISDN-SubaddressLength))
     -- This type is used to represent ISDN subaddresses.
     -- It is composed of
     --   a)   one octet for type of subaddress and odd/even indicator.
     --   b)   20 octets for subaddress information.

     --   a)   The first octet includes a one bit extension indicator, a
     --        3 bits type of subaddress and a one bit odd/even indicator,
     --        encoded as follows:

     --   bit 8: 1  (no extension)

     --   bits 765: type of subaddress
     --        000  NSAP (X.213/ISO 8348 AD2)
     --        010  User Specified
     --        All other values are reserved

     --   bit 4: odd/even indicator
     --        0  even number of address signals
     --        1  odd number of address signals
     --        The odd/even indicator is used when the type of subaddress
     --        is "user specified" and the coding is BCD.

     --   bits 321: 000 (unused)

     --   b) Subaddress information.
     --   The NSAP X.213/ISO8348AD2 address shall be formatted as specified
     --   by octet 4 which contains the Authority and Format Identifier
     --   (AFI). The encoding is made according to the "preferred binary
     --   encoding" as defined in X.213/ISO834AD2. For the definition
     --   of this type of subaddress, see CCITT Rec I.334.

     --   For User-specific subaddress, this field is encoded according
     --   to the user specification, subject to a maximum length of 20
     --   octets. When interworking with X.25 networks BCD coding should
     --   be applied.

maxISDN-SubaddressLength  INTEGER ::= 21

ExternalSignalInfo ::= SEQUENCE {
     protocolId                         ProtocolId,
     signalInfo                         SignalInfo,
     -- Information about the internal structure is given in
     -- subclause 7.6.9.
     extensionContainer                 ExtensionContainer              OPTIONAL,
     -- extensionContainer must not be used in version 2
     ...}

SignalInfo ::= OCTET STRING (SIZE (1..maxSignalInfoLength))

maxSignalInfoLength  INTEGER ::= 200
     -- This NamedValue represents the theoretical maximum number of
     -- octets which are available to carry a single data type,
     -- without requiring segmentation to cope with the network layer
     -- service. However, the actual maximum size available for a data
     -- type may be lower, especially when other information elements
     -- have to be included in the same component.

ProtocolId ::= ENUMERATED {
     gsm-0408  (1),
     gsm-0806  (2),
     gsm-BSSMAP  (3),
     -- Value 3 is reserved and must not be used
     ets-300102-1  (4)}

Ext-ExternalSignalInfo ::= SEQUENCE {
     ext-ProtocolId                     Ext-ProtocolId,
     signalInfo                         SignalInfo,
     -- Information about the internal structure is given in
     -- subclause 7.6.9.10
     extensionContainer                 ExtensionContainer              OPTIONAL,
     ...}
```

```
Ext-ProtocolId ::= ENUMERATED {
    ets-300356  (1),
    ...
     }
-- exception handling:
-- For Ext-ExternalSignalInfo sequences containing this parameter with any
-- other value than the ones listed the receiver shall ignore the whole
-- Ext-ExternalSignalInfo sequence.
```

```
AlertingPattern ::= OCTET STRING (SIZE (1) )
    -- This type is used to represent Alerting Pattern

    --   bits 8765 : 0000 (unused)

    --   bits 43 : type of Pattern
    --        00 level
    --        01 category
    --        10 category
    --        all other values are reserved.

    --   bits 21 : type of alerting

alertingLevel-0   AlertingPattern ::= '00000000'B
alertingLevel-1   AlertingPattern ::= '00000001'B
alertingLevel-2   AlertingPattern ::= '00000010'B
    -- all other values of Alerting level are reserved
    -- Alerting Levels are defined in GSM 02.07

alertingCategory-1   AlertingPattern ::= '00000100'B
alertingCategory-2   AlertingPattern ::= '00000101'B
alertingCategory-3   AlertingPattern ::= '00000110'B
alertingCategory-4   AlertingPattern ::= '00000111'B
alertingCategory-5   AlertingPattern ::= '00001000'B
    -- all other values of Alerting Category are reserved
    -- Alerting categories are defined in GSM 02.07
```

```
-- data types for numbering and identification
```

```
IMSI ::= TBCD-STRING (SIZE (3..8))
    -- digits of MCC, MNC, MSIN are concatenated in this order.
```

```
Identity ::= CHOICE {
    imsi                                IMSI,
    imsi-WithLMSI                       IMSI-WithLMSI}
```

```
IMSI-WithLMSI ::= SEQUENCE {
    imsi                                IMSI,
    lmsi                                LMSI,
    -- a special value 00000000 indicates that the LMSI is not in use
    ...}
```

```
ASCI-CallReference ::= TBCD-STRING (SIZE (1..8))
    -- digits of VGCS/VBC-area,Group-ID are concatenated in this order.
```

```
TMSI ::= OCTET STRING (SIZE (1..4))
```

```
SubscriberId ::= CHOICE {
    imsi                                [0] IMSI,
    tmsi                                [1] TMSI}
```

```
IMEI ::= TBCD-STRING (SIZE (8))
    --   Refers to International Mobile Station Equipment Identity
    --   and Software Version Number (SVN) defined in TS GSM 03.03.
    --   If the SVN is not present the last octet shall contain the
    --   digit 0 and a filler.
    --   If present the SVN shall be included in the last octet.
```

```
HLR-Id ::= IMSI
    -- leading digits of IMSI, i.e. (MCC, MNC, leading digits of
    -- MSIN) forming HLR Id defined in TS GSM 03.03.
```

```
HLR-List ::= SEQUENCE SIZE (1..maxNumOfHLR-Id) OF
                                        HLR-Id
```

```
maxNumOfHLR-Id  INTEGER ::= 50
```

```
LMSI ::= OCTET STRING (SIZE (4))
```

```
GlobalCellId ::= OCTET STRING (SIZE (5..7))
    -- Refers to Cell Global Identification defined in TS GSM 03.03.
    -- 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                   Location Area Code according to TS GSM 04.08
    -- octets 6 and 7                   Cell Identity (CI) according to TS GSM 04.08
```

```
NetworkResource ::= ENUMERATED {
    plmn  (0),
    hlr  (1),
    vlr  (2),
    pvlr  (3),
    controllingMSC  (4),
    vmsc  (5),
    eir  (6),
    rss  (7)}
```

```
NAEA-PreferredCI ::= SEQUENCE {
    naea-PreferredCIC                   [0] NAEA-CIC,
    extensionContainer                  [1] ExtensionContainer          OPTIONAL,
    ...}
```

```
NAEA-CIC ::= OCTET STRING (SIZE (3))
    -- The internal structure is defined by the Carrier Identification
    -- parameter in ANSI T1.113.3. Carrier codes between “000” and “999” may
    -- be encoded as 3 digits using “000” to “999” or as 4 digits using
    -- “0000” to “0999”. Carrier codes between “1000” and “9999” are encoded
    -- using 4 digits.
```

```
SubscriberIdentity ::= CHOICE {
    imsi                                [0] IMSI,
    msisdn                              [1] ISDN-AddressString
    }
```

```
LCSClientExternalID ::= SEQUENCE {
    externalAddress                     [0] AddressString               OPTIONAL,
    extensionContainer                  [1] ExtensionContainer          OPTIONAL,
    ... }
```

```
LCSClientInternalID ::= ENUMERATED {
    broadcastService                    (0),
    o-andM-HPLMN                        (1),
    o-andM-VPLMN                        (2),
    anonymousLocation                   (3),
    targetMSsubscribedService           (4),
    ... }
```

```
-- data types for CAMEL
```

```
CellIdOrLAI ::= CHOICE {
    cellIdFixedLength                   [0] CellIdFixedLength,
    laiFixedLength                      [1] LAIFixedLength}
```

```
CellIdFixedLength ::= OCTET STRING (SIZE (7))
    -- Refers to Cell Global Identification defined in TS GSM 03.03.
    -- 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                   Location Area Code according to TS GSM 04.08
    -- octets 6 and 7                   Cell Identity (CI) according to TS GSM 04.08
```

```
LAIFixedLength ::= OCTET STRING (SIZE (5))
     -- Refers to Location Area Identification defined in TS GSM 03.03.
     -- 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                   Location Area Code according to TS GSM 04.08


-- data types for subscriber management

BasicServiceCode ::= CHOICE {
     bearerService                      [2] BearerServiceCode,
     teleservice                        [3] TeleserviceCode}

Ext-BasicServiceCode ::= CHOICE {
     ext-BearerService                  [2] Ext-BearerServiceCode,
     ext-Teleservice                    [3] Ext-TeleserviceCode}

EMLPP-Info ::= SEQUENCE {
     maximumentitledPriority            EMLPP-Priority,
     defaultPriority                    EMLPP-Priority,
     extensionContainer                 ExtensionContainer              OPTIONAL,
     ...}

EMLPP-Priority ::= INTEGER (0..15)
     -- The mapping from the values A,B,0,1,2,3,4 to the integer-value is
     -- specified as follows where A is the highest and 4 is the lowest
     -- priority level
     -- the integer values 7-15 are spare and shall be mapped to value 4

priorityLevelA                          EMLPP-Priority ::= 6
priorityLevelB                          EMLPP-Priority ::= 5
priorityLevel0                          EMLPP-Priority ::= 0
priorityLevel1                          EMLPP-Priority ::= 1
priorityLevel2                          EMLPP-Priority ::= 2
priorityLevel3                          EMLPP-Priority ::= 3
priorityLevel4                          EMLPP-Priority ::= 4

MC-SS-Info ::= SEQUENCE {
     ss-Code                            [0] SS-Code,
     ss-Status                          [1] Ext-SS-Status,
     nbrSB                              [2] MaxMC-Bearers,
     nbrUser                            [3] MC-Bearers,
     extensionContainer                 [4] ExtensionContainer          OPTIONAL,
     ...}

MaxMC-Bearers ::= INTEGER (2..maxNumofMC-Bearers)

MC-Bearers ::= INTEGER (1..maxNumofMC-Bearers)

maxNumOfMC-Bearers  INTEGER ::= 7



      -- data types for geographic location

AgeOfLocationInformation ::= INTEGER (0..32767)
-- the value represents the elapsed time in minutes since the last
-- network contact of the mobile station (i.e. the actuality of the
-- location information).
-- value “0” indicates that the MS is currently in contact with the
--           network
-- value “32767” indicates that the location information is at least
--               32767 minutes old

END
```

3GPP TSG-CN 2 SWGB meeting #4
Kista, Sweden, 02-03 March 2000

Document N2B000466
Revised N2B000437

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	100r5	Current Version:	3.3.1

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

For submission to:	TSG-CN #7	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 [ ] UTRAN / Radio [ ] Core Network [X]

Source: N2 **Date:** 2000-03-03

Subject: Support of 3G Handover, including 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: Additions of mechanisms in 29.002 to be able to handle multiple bearer case.

Clauses affected: 7.6, 7.6.2.53 (new), 7.6.2.54 (new), 8.4.1.2, 17.7.1, 19.2.2, 19.2.3

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	23.009-002r2
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 following changes have been introduced to CR29.002-100r3 (N2B000377):
For the Inter MSC handover with multiple bearer, it has been agreed the following scenario is adopted and relevant CR against 23.009 (input from N1 as N2B000424) has been approved in N1 meeting in Umea;

- MSC-A tries to handover all bearers to MSC-B. MSC-A shall include Multiple Bearer Requested parameter if it requests multiple bearers at relocation.
- If MSC-B does not support multiple bearer MSC-B shall return Multiple Bearer Not Supported parameter which indicates MSC-B does not support multiple bearers.

For this requirement some additional parameters are needed in MAP-PREPARE-HANDOVER service and modification is needed in SDL diagrams for the negotiation•capability between MSC-A and MSC-B.

The following changes have been introduced to CR29.002-100r4 (N2B000437):
In the SDL 19.2.3/1 sheet 1, “diamond” is modified to “triangle” for the test “mutliple bearer supported?”.

help.doc

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

First Change

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.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1999 document, references to GSM documents are for Release 1999 versions (version 3.x.y).

[1] 3G TS 21.905: "3G Vocabulary".

[2] GSM 02.01: "Digital cellular telecommunications system (Phase 2+); Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN)".

…… ETC. ETC. ……

[116] ITU-T Q.850, May 1998: "Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part".

[117] 3G TS 25.413: "UTRAN Iu Interface RANAP Signalling ".

Next Change

4.4.7 Interface between MSCs (E-interface)

When a MS moves from one MSC area to another during a call, a handover or relocation procedure has to be performed in order to continue the communication. For that purpose the MSCs involved have to exchange data to initiate and then to realize the operation.

This interface is also used to forward short messages, to perform location for a target MS for which handover or relocation has occurred on an established call and to transfer LCS messages to and from an LMU for which handover or relocation of a signalling channel has occurred.

This interface is also used to transfer information for inter-MSC VBS/VGCS calls .

Next Change

Table 5.1/2: Priorities of Application Contexts for MSC/VLR as Responder

Responder = MSC/VLR	Initiating Entity
Priority high	
Handover	
handoverControl (prepareHandover/v2/v3), (performHandover/v1)	MSC
Mobility and Location Register Management	
locationCancel (cancelLocation)	HLR
reset (reset)	HLR
immediateTermination (istCommand/v3)	HLR
interVlrInfoRetrieval (sendIdentification/v2/v3), (sendParameters/v1)	VLR
subscriberDataMngt (insertSubscriberData), (deleteSubscriberData)	HLR
tracing (activateTraceMode), (deactivateTraceMode)	HLR
Short Message Service	
shortMsgMO-Relay (MO-ForwardSM v3) (forwardSM v1/v2)	MSC/SGSN
shortMsgMT-Relay (MT-ForwardSM v3) (forwardSM v1/v2)	MSC
shortMsgAlert (alertServiceCentre/v2), (alertServiceCentreWithoutResult/v1)	HLR
Mobile Terminating Traffic	
roamingNbEnquiry (provideRoamingNumber)	HLR
callControlTransfer (resumeCallHandling)	MSC
subscriberInfoEnquiry (provideSubscriberInformation)	HLR
reporting (remoteUserFree) (SetReportingState)	HLR
Location Services	
locationSvcEnquiry (provideSubscriberLocation v3)	GMLC
Network-Initiated USSD	
networkUnstructuredSs (unstructuredSS-Request/v2), (unstructuredSS-Notify/v2)	HLR
Priority low	

NOTE: The application context name is the last component but one of the object identifier.
Operation names are given in brackets for information with "/vn" appended to vn only operations.

Next Change

6.1.3.2 The Mobile-services Switching Centre (MSC)

There are several cases where it is necessary to address the MSC.

6.3.2.1 MSC interaction during handover or relocation

The address is derived from the target Cell id or from the target RNC id.

Next 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:

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
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
Inter CUG options	7.6.3.27
Intra CUG restrictions	7.6.3.28
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 MSC number	7.6.2.12
Target RNC Id	7.6.2.9
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

7.6.1.4 User error

This parameter can take values as follows:

NOTE: The values are grouped in order to improve readability; the grouping has no other significance.

a) Generic error:

- system failure, i.e. a task cannot be performed because of a problem in another entity. The type of entity or network resource may be indicated by use of the network resource parameter;

- data missing, i.e. an optional parameter required by the context is missing;

- unexpected data value, i.e. the data type is formally correct but its value or presence is unexpected in the current context;
- resource limitation;
- initiating release, i.e. the receiving entity has started the release procedure;
- facility not supported, i.e. the requested facility is not supported by the PLMN;
- incompatible terminal, i.e. the requested facility is not supported by the terminal.

b) Identification or numbering problem:

- unknown subscriber, i.e. no such subscription exists;
- number changed, i.e. the subscription does not exist for that number any more;
- unknown MSC;
- unidentified subscriber, i.e. if the subscriber is not contained in the database and it has not or cannot be established whether or not a subscription exists;
- unallocated roaming number;
- unknown equipment;
- unknown location area.

c) Subscription problem:

- roaming not allowed, i.e. a location updating attempt is made in an area not covered by the subscription;
- illegal subscriber, i.e. illegality of the access has been established by use of authentication procedure;
- bearer service not provisioned;
- teleservice not provisioned;
- illegal equipment, i.e. the IMEI check procedure has shown that the IMEI is blacklisted or not whitelisted.

d) Handover problem:

- no handover number available, i.e. the VLR cannot allocate a number for handover or cannot allocate the required amount of numbers for relocation;
- subsequent handover failure, i.e. handover to a third MSC failed for some reason.

Next Change

7.6.2.9 Target RNC Id

This parameter refers to the identity of the RNC to which a call has to be relocated.

Next Change

7.6.2.20 Relocation Number List

This parameter refers to the number(s) used for routing one call or several calls between MSCs during relocation.

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.

Next Change

7.6.6.7 HO-Number Not Required

This parameter indicates that no handover or relocation number allocation is necessary.

Next Change

7.6.9 Access and signalling system related parameters

7.6.9.1 ~~BSS~~AN-apdu

This parameter includes one or two concatenated complete 3G TS 25.413 or GSM 08.06 messages, as described in ~~GSM~~ 3G TS ~~0~~2~~0~~3.0~~0~~9 and ~~GSM~~3G TS 2~~0~~9.0~~1~~0. The access network p~~P~~rotocol ID indicates that the message or messages are according to either GSM 08.06 or 3G TS 25.413. For the coding of the messages see 3G TS 25.413, GSM 08.06 and GSM 08.08.

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.

8.4.1 MAP_PREPARE_HANDOVER service

8.4.1.1 Definition

This service is used between MSC-A and MSC-B (E-interface) when a call is to be handed over or relocated from MSC-A to MSC-B.

The MAP_PREPARE_HANDOVER service is a confirmed service using the primitives from table 8.4/1.

8.4.1.2 Service primitives

Table 8.4/1: MAP_PREPARE_HANDOVER

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
Target Cell Id	C	C(=)		
Target RNC Id	C	C(=)		
HO-NumberNotRequired	C	C(=)		
~~BSS~~AN-APDU	C	C(=)	C	C(=)
Handover Number			C	C(=)
Relocation Number List			C	C(=)
Multicall Bearer Information			C	C(=)
Multiple Bearer Requested	C	C(=)		
Multiple Bearer Not Supported			C	C(=)
User error			C	C(=)
Provider error				O

8.4.1.3 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 is only included if the service is not in an ongoing transaction. This parameter shall also 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.

HO-Number Not Required

For definition of this parameter see subclause 7.6.6.

~~BSS~~AN-APDU

For definition of this parameter see subclause 7.6.9.

Handover Number

For definition of this parameter see subclause 7.6.2. This parameter shall be returned at handover, unless the parameter HO-NumberNotRequired is sent. If the parameter Handover Number is returned, the parameter Relocation Number List shall not be returned.

Relocation Number List

For definition of this parameter see subclause 7.6.2. This parameter shall be returned at relocation, unless the parameter HO-NumberNotRequired is sent. If the parameter Relocation Number List is returned, the parameter Handover Number shall not be returned

Multicall Bearer Information

For a definition of this parameter see subclause 7.6.2.

Multiple Bearer Requested

For a definition of this parameter see subclause 7.6.2. This parameter shall be sent when MSC-A requests multiple bearers to MSC-B.

Multiple Bearer Not Supported

For a definition of this parameter see subclause 7.6.2. This parameter shall be returned at relocation when MSC-B receives Multiple Bearer Requested parameter and MSC-B does not support multiple bearers.

User error

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

- No handover number available;
- System failure;
- Unexpected data value;
- DataMissing.

Provider error

See definition of provider errors in subclause 7.6.1.

8.4.2 MAP_SEND_END_SIGNAL service

8.4.2.1 Definition

This service is used between MSC-B and MSC-A (E-interface) indicating that the radio path has been established by MSC-B to the MS. MSC-A retains then the main control of the call until it clears.

The response is used by MSC-A to inform MSC-B that all resources for the call can be released in MSC-B, either because the call has been released in MSC-A or because the call has been successfully handed over or relocated from MSC-B to another MSC.

The MAP_SEND_END_SIGNAL service is a confirmed service using the primitives from table 8.4/2.

8.4.2.2 Service primitives

Table 8.4/2: MAP_SEND_END_SIGNAL

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
~~BSS~~AN-APDU	M	M(=)		
Provider error				O

8.4.2.3 Parameter use

Invoke Id

For definition of this parameter see subclause 7.6.1.

~~BSS~~AN-APDU

For definition of this parameter see subclause 7.6.9.

Provider error

For definition of this parameter see subclause 7.6.1.

8.4.3 MAP_PROCESS_ACCESS_SIGNALLING service

8.4.3.1 Definition

This service is used between MSC-B and MSC-A (E-interface) to pass information received on the A-interface or Iu-interface in MSC-B to MSC-A.

The MAP_PROCESS_ACCESS_SIGNALLING service is a non-confirmed service using the primitives from table 8.4/3.

8.4.3.2 Service primitives

Table 8.4/3: MAP_PROCESS_ACCESS_SIGNALLING

Parameter name	Request	Indication
Invoke Id	M	M(=)
~~BSS~~AN-APDU	M	M(=)

8.4.3.3 Parameter use

Invoke Id

For definition of this parameter see subclause 7.6.1.

~~BSS~~AN-APDU

For definition of this parameter see subclause 7.6.9.

8.4.4 MAP_FORWARD_ACCESS_SIGNALLING service

8.4.4.1 Definition

This service is used between MSC-A and MSC-B (E-interface) to pass information to be forwarded to the A-interface or Iu-interface of MSC-B.

The MAP_FORWARD_ACCESS_SIGNALLING service is a non-confirmed service using the primitives from table 8.4/4.

8.4.4.2 Service primitives

Table 8.4/4: MAP_FORWARD_ACCESS_SIGNALLING

Parameter name	Request	Indication
Invoke Id	M	M(=)
~~BSS~~AN-APDU	M	M(=)

8.4.4.3 Parameter use

For the definition and use of all parameters and errors, see subclause 7.6.1

Invoke Id

For definition of this parameter see subclause 7.6.1.

~~BSS~~AN-APDU

For definition of this parameter see subclause 7.6.9.

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~~M~~	C~~M~~(=)		
Target RNC Id	C	C(=)		
Target MSC Number	M	M(=)		
~~BSS~~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.

~~BSS~~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

17.1.6 Application Contexts

The following informative table lists the latest versions of the Application Contexts used in this specification, with the operations used by them and, where applicable, whether or not the operation description is exactly the same as for previous versions. Information in sections 17.6 & 17.7 relates only to the ACs in this table.

AC Name	AC Version	Operations Used	Comments *
locationCancellationContext	v3	cancelLocation	
equipmentMngtContext	v2	checkIMEI	
imsiRetrievalContext	v2	sendIMSI	
infoRetrievalContext	v3	sendAuthenticationInfo	
interVlrInfoRetrievalContext	v3	sendIdentification	
handoverControlContext	~~v2~~v3	prepareHandover forwardAccessSignalling sendEndSignal processAccessSignalling prepareSubsequentHandover	the syntax of this operation has been extended in comparison with release 98 version
mwdMngtContext	v3	readyForSM	
msPurgingContext	v3	purgeMS	
shortMsgAlertContext	v2	alertServiceCentre	
resetContext	v2	reset	
networkUnstructuredSsContext	v2	processUnstructuredSS-Request unstructuredSS-Request unstructuredSS-Notify	
tracingContext	v3	activateTraceMode deactivateTraceMode	
networkFunctionalSsContext	v2	registerSS eraseSS activateSS deactivateSS registerPassword interrogateSS getPassword	
shortMsgMO-RelayContext	v3	mo-forwardSM	
shortMsgMT-RelayContext	v3	mt-forwardSM	
shortMsgGatewayContext	v3	sendRoutingInfoForSM reportSM-DeliveryStatus InformServiceCentre	the syntax of this operation has been extended in comparison with release 96 version
networkLocUpContext	v3	updateLocation forwardCheckSs-Indication restoreData insertSubscriberData activateTraceMode	the syntax is the same in v1 & v2
gprsLocationUpdateContext	v3	updateGprsLocation insertSubscriberData activateTraceMode	
subscriberDataMngtContext	v3	insertSubscriberData deleteSubscriberData	
roamingNumberEnquiryContext	v3	provideRoamingNumber	
locationInfoRetrievalContext	v3	sendRoutingInfo	
gprsNotifyContext	v3	noteMsPresentForGprs	

gprsLocationInfoRetrievalContext	v3	sendRoutingInfoForGprs	
failureReportContext	v3	failureReport	
callControlTransferContext	v4	resumeCallHandling	
subscriberInfoEnquiryContext	v3	provideSubscriberInfo	
anyTimeEnquiryContext	v3	anyTimeInterrogation	
anyTimeInfoHandlingContext	v3	anyTimeSubscriptionInterrogation anyTimeModification	
ss-InvocationNotificationContext	v3	ss-InvocationNotification	
sIWFSAllocationContext	v3	provideSIWFSNumber sIWFSSignallingModify	
groupCallControlContext	v3	prepareGroupCall processGroupCallSignalling forwardGroupCallSignalling sendGroupCallEndSignal	
reportingContext	v3	setReportingState statusReport remoteUserFree	
callCompletionContext	v3	registerCC-Entry eraseCC-Entry	
istAlertingContext	v3	istAlert	
ImmediateTerminationContext	v3	istCommand	
locationSvcEnquiryContext	v3	provideSubscriberLocation subscriberLocationReport	
locationSvcGatewayContext	v3	sendRoutingInfoForLCS	
mm-EventReportingContext	v3	noteMM-Event	
subscriberDataModificationNotificationContext	v3	noteSubscriberDataModified	

NOTE (*): The syntax of the operations is not the same as in previous versions unless explicitly stated

Next Change

17.2.2.12 Handover Control

This operation package includes the operations required for handover procedures between MSCs.

```
HandoverControlPackage-v32 ::= OPERATION-PACKAGE
     -- Supplier is MSCB if Consumer is MSCA
     CONSUMER INVOKES {
          prepareHandover,
          forwardAccessSignalling}
     SUPPLIER INVOKES {
          sendEndSignal,
          processAccessSignalling,
          prepareSubsequentHandover}
```

The v2-equivalent package can be determined according to the rules described in subclause 17.2.1.

The v1-equivalent package is defined as follows.

```
HandoverControlPackage-v1 ::= OPERATION-PACKAGE
     -- Supplier is MSCB if Consumer is MSCA
     CONSUMER INVOKES {
          performHandover,
          forwardAccessSignalling,
          traceSubscriberActivity}
     SUPPLIER INVOKES {
          sendEndSignal,
          noteInternalHandover,
          processAccessSignalling,
          performSubsequentHandover}
```

Next Change

17.3.2.12 Handover control

This application context is used for handover procedures between MSCs.

```
handoverControlContext-v32 APPLICATION-CONTEXT
     -- Responder is MSCB if Initiator is MSCA
     INITIATOR CONSUMER OF {
          HandoverControlPackage-v32}
::= {map-ac handoverControl(11) version32(32)}
```

The following application-context-name is assigned to the v2-equivalent application-context:

```
{map-ac handoverControl(11) version2(2)}
```

The following application-context-name is assigned to the v1-equivalent application-context:

```
{map-ac handoverControl(11) version1(1)}
```

Next Change

17.3.3 ASN.1 Module for application-context-names

The following ASN.1 module summarizes the application-context-name assigned to MAP application-contexts.

```
MAP-ApplicationContexts {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ApplicationContexts (2) version6 (6)}

DEFINITIONS

::=

BEGIN


-- EXPORTS everything


IMPORTS
   gsm-NetworkId,
   ac-Id
FROM MobileDomainDefinitions {
   ccitt (0) identified-organization (4) etsi (0) mobileDomain (0)
   mobileDomainDefinitions (0) version1 (1)}
;

-- application-context-names

map-ac  OBJECT IDENTIFIER ::= {gsm-NetworkId ac-Id}

networkLocUpContext-v3  OBJECT IDENTIFIER ::=
     {map-ac networkLocUp(1) version3(3)}

locationCancellationContext-v3  OBJECT IDENTIFIER ::=
     {map-ac locationCancel(2) version3(3)}

roamingNumberEnquiryContext-v3  OBJECT IDENTIFIER ::=
     {map-ac roamingNbEnquiry(3) version3(3)}

locationInfoRetrievalContext-v3  OBJECT IDENTIFIER ::=
     {map-ac locInfoRetrieval(5) version3(3)}

resetContext-v2  OBJECT IDENTIFIER ::=
     {map-ac reset(10) version2(2)}
```

```
handoverControlContext-v32  OBJECT IDENTIFIER ::=
     {map-ac handoverControl(11) version32(32)}

equipmentMngtContext-v2  OBJECT IDENTIFIER ::=
     {map-ac equipmentMngt(13) version2(2)}

infoRetrievalContext-v3  OBJECT IDENTIFIER ::=
     {map-ac infoRetrieval(14) version3(3)}

interVlrInfoRetrievalContext-v3  OBJECT IDENTIFIER ::=
     {map-ac interVlrInfoRetrieval(15) version3(3)}

subscriberDataMngtContext-v3  OBJECT IDENTIFIER ::=
     {map-ac subscriberDataMngt(16) version3(3)}

tracingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac tracing(17) version3(3)}

networkFunctionalSsContext-v2  OBJECT IDENTIFIER ::=
     {map-ac networkFunctionalSs(18) version2(2)}

networkUnstructuredSsContext-v2  OBJECT IDENTIFIER ::=
     {map-ac networkUnstructuredSs(19) version2(2)}

shortMsgGatewayContext-v3  OBJECT IDENTIFIER ::=
     {map-ac shortMsgGateway(20) version3(3)}

shortMsgMO-RelayContext-v3  OBJECT IDENTIFIER ::=
     {map-ac shortMsgMO-Relay(21) version3(3)}

shortMsgAlertContext-v2  OBJECT IDENTIFIER ::=
     {map-ac shortMsgAlert(23) version2(2)}

mwdMngtContext-v3  OBJECT IDENTIFIER ::=
     {map-ac mwdMngt(24) version3(3)}

shortMsgMT-RelayContext-v3  OBJECT IDENTIFIER ::=
     {map-ac shortMsgMT-Relay(25) version3(3)}

imsiRetrievalContext-v2  OBJECT IDENTIFIER ::=
     {map-ac imsiRetrieval(26) version2(2)}

msPurgingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac msPurging(27) version3(3)}

subscriberInfoEnquiryContext-v3  OBJECT IDENTIFIER ::=
     {map-ac subscriberInfoEnquiry(28) version3(3)}

anyTimeInfoEnquiryContext-v3  OBJECT IDENTIFIER ::=
     {map-ac anyTimeInfoEnquiry(29) version3(3)}

callControlTransferContext-v4  OBJECT IDENTIFIER ::=
     {map-ac callControlTransfer(6) version4(4)}

ss-InvocationNotificationContext-v3  OBJECT IDENTIFIER ::=
     {map-ac ss-InvocationNotification(36) version3(3)}

sIWFSAllocationContext-v3  OBJECT IDENTIFIER ::=
     {map-ac sIWFSAllocation(12) version3(3)}

groupCallControlContext-v3  OBJECT IDENTIFIER ::=
     {map-ac groupCallControl(31) version3(3)}

gprsLocationUpdateContext-v3  OBJECT IDENTIFIER ::=
     {map-ac gprsLocationUpdate(32) version3(3)}

gprsLocationInfoRetrievalContext-v3  OBJECT IDENTIFIER ::=
     {map-ac gprsLocationInfoRetrieval(33) version3(3)}

failureReportContext-v3  OBJECT IDENTIFIER ::=
     {map-ac failureReport(34) version3(3)}

gprsNotifyContext-v3  OBJECT IDENTIFIER ::=
     {map-ac gprsNotify(35) version3(3)}
```

```
reportingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac reporting(7) version3(3)}

callCompletionContext-v3  OBJECT IDENTIFIER ::=
     {map-ac callCompletion(8) version3(3)}

istAlertingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac istAlerting(4) version3(3)}

serviceTerminationContext-v3  OBJECT IDENTIFIER ::=
     {map-ac immediateTermination(9) version3(3)}

locationSvcGatewayContext-v3  OBJECT IDENTIFIER ::=
     {map-ac locationSvcGateway(37) version3(3)}

locationSvcEnquiryContext-v3  OBJECT IDENTIFIER ::=
     {map-ac locationSvcEnquiry(38) version3(3)}

mm-EventReportingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac mm-EventReporting(42) version3(3)}

anyTimeInfoHandlingContext-v3  OBJECT IDENTIFIER ::=
     {map-ac anyTimeInfoHandling(43) version3(3)}

subscriberDataModificationNotificationContext-v3  OBJECT IDENTIFIER ::=
     {map-ac subscriberDataModificationNotification(22) version3(3)}

-- The following Object Identifiers are reserved for application-
-- contexts existing in previous versions of the protocol
```

-- AC Name & Version	Object Identifier	
--		
-- networkLocUpContext-v1	map-ac networkLocUp (1)	version1 (1)
-- networkLocUpContext-v2	map-ac networkLocUp (1)	version2 (2)
-- locationCancellationContext-v1	map-ac locationCancellation (2)	version1 (1)
-- locationCancellationContext-v2	map-ac locationCancellation (2)	version2 (2)
-- roamingNumberEnquiryContext-v1	map-ac roamingNumberEnquiry (3)	version1 (1)
-- roamingNumberEnquiryContext-v2	map-ac roamingNumberEnquiry (3)	version2 (2)
-- locationInfoRetrievalContext-v1	map-ac locationInfoRetrieval (5)	version1 (1)
-- locationInfoRetrievalContext-v2	map-ac locationInfoRetrieval (5)	version2 (2)
-- resetContext-v1	map-ac reset (10)	version1 (1)
-- handoverControlContext-v1	map-ac handoverControl (11)	version1 (1)
-- handoverControlContext-v2	map-ac handoverControl (11)	version2 (2)
-- equipmentMngtContext-v1	map-ac equipmentMngt (13)	version1 (1)
-- infoRetrievalContext-v1	map-ac infoRetrieval (14)	version1 (1)
-- infoRetrievalContext-v2	map-ac infoRetrieval (14)	version2 (2)
-- interVlrInfoRetrievalContext-v2	map-ac interVlrInfoRetrieval (15)	version2 (2)
-- subscriberDataMngtContext-v1	map-ac subscriberDataMngt (16)	version1 (1)
-- subscriberDataMngtContext-v2	map-ac subscriberDataMngt (16)	version2 (2)
-- tracingContext-v1	map-ac tracing (17)	version1 (1)
-- tracingContext-v2	map-ac tracing (17)	version2 (2)
-- *networkFunctionalSsContext-v1*	*map-ac networkFunctionalSs (18)*	*version1 (1)*
-- shortMsgGatewayContext-v1	map-ac shortMsgGateway (20)	version1 (1)
-- shortMsgGatewayContext-v2	map-ac shortMsgGateway (20)	version2 (2)
-- shortMsgRelayContext-v1	map-ac shortMsgRelay (21)	version1 (1)
-- shortMsgAlertContext-v1	map-ac shortMsgAlert (23)	version1 (1)
-- *mwdMngtContext-v1*	*map-ac mwdMngt (24)*	*version1 (1)*
-- mwdMngtContext-v2	map-ac mwdMngt (24)	version2 (2)
-- shortMsgMT-RelayContext-v2	map-ac shortMsgMT-Relay (25)	version2 (2)
-- msPurgingContext-v2	map-ac msPurging (27)	version2 (2)
-- callControlTransferContext-v3	map-ac callControlTransferContext (6)	version3 (3)

```
END
```

Next Change

17.6 MAP operation and error types

17.6.1 Mobile Service Operations

```
MAP-MobileServiceOperations {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MobileServiceOperations (5)
   version6 (6)}

DEFINITIONS

::=

BEGIN

EXPORTS

   -- location registration operations
   UpdateLocation,
   CancelLocation,
   PurgeMS,
   SendIdentification,

   -- gprs location registration operations
   UpdateGprsLocation,

   -- subscriber information enquiry operations
   ProvideSubscriberInfo,

   -- any time information enquiry operations
   AnyTimeInterrogation,

   -- any time information handling operations
   AnyTimeSubscriptionInterrogation,
   AnyTimeModification,

   -- subscriber data modification notification operations
   NoteSubscriberDataModified,


   -- handover operations
   PrepareHandover,
   SendEndSignal,
   ProcessAccessSignalling,
   ForwardAccessSignalling,
   PrepareSubsequentHandover,

   -- authentication management operations
   SendAuthenticationInfo,

   -- IMEI management operations
   CheckIMEI,

   -- subscriber management operations
   InsertSubscriberData,
   DeleteSubscriberData,

   -- fault recovery operations
   Reset,
   ForwardCheckSS-Indication,
   RestoreData,

-- gprs location information retrieval operations
   SendRoutingInfoForGprs,

   -- failure reporting operations
   FailureReport,
```

```
   -- gprs notification operations
   NoteMsPresentForGprs,

   -- Mobility Management operations
   NoteMM-Event



;

IMPORTS
   OPERATION
FROM TCAPMessages {
   ccitt recommendation q 773 modules (2) messages (1) version2 (2)}

   SystemFailure,
   DataMissing,
   UnexpectedDataValue,
   UnknownSubscriber,
   UnknownMSC,
   UnidentifiedSubscriber,
   UnknownEquipment,
   RoamingNotAllowed,
   ATI-NotAllowed,
   NoHandoverNumberAvailable,
   SubsequentHandoverFailure,
   AbsentSubscriber,
   MM-EventNotSupported,
   ATSI-NotAllowed,
   ATM-NotAllowed,
   BearerServiceNotProvisioned,
   TeleserviceNotProvisioned,
   CallBarred,
   IllegalSS-Operation,
   SS-ErrorStatus,
   SS-NotAvailable,
   SS-Incompatibility,
   SS-SubscriptionViolation,
   InformationNotAvailable


FROM MAP-Errors {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-Errors (10) version6 (6)}

   UpdateLocationArg,
   UpdateLocationRes,
   CancelLocationArg,
   CancelLocationRes,
   PurgeMS-Arg,
   PurgeMS-Res,
   SendIdentificationArg,
   SendIdentificationRes,
   UpdateGprsLocationArg,
   UpdateGprsLocationRes,
   PrepareHO-Arg,
   PrepareHO-Res,
   ForwardAccessSignallingArg,
   ProcessAccessSignallingArg,
   SendEndSignallingArg,
   SendEndSignallingRes,
   PrepareSubsequentHO-Res,
   PrepareSubsequentHO-Arg,
   SendAuthenticationInfoArg,
   SendAuthenticationInfoRes,
   EquipmentStatus,
   InsertSubscriberDataArg,
   InsertSubscriberDataRes,
   DeleteSubscriberDataArg,
   DeleteSubscriberDataRes,
   ResetArg,
   RestoreDataArg,
   RestoreDataRes,
   ProvideSubscriberInfoArg,
   ProvideSubscriberInfoRes,
```

```
   AnyTimeSubscriptionInterrogationArg,
   AnyTimeSubscriptionInterrogationRes,
   AnyTimeModificationArg,
   AnyTimeModificationRes,
   NoteSubscriberDataModifiedArg,
   NoteSubscriberDataModifiedRes,
   AnyTimeInterrogationArg,
   AnyTimeInterrogationRes,
   SendRoutingInfoForGprsArg,
   SendRoutingInfoForGprsRes,
   FailureReportArg,
   FailureReportRes,
   NoteMsPresentForGprsArg,
   NoteMsPresentForGprsRes,
   NoteMM-EventArg,
   NoteMM-EventRes


FROM MAP-MS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version6 (6)}

   ExternalSignalInfo,
   IMEI
FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version6 (6)}
;


-- location registration operations

UpdateLocation ::= OPERATION                                          --Timer m
    ARGUMENT
         updateLocationArg              UpdateLocationArg
    RESULT
         updateLocationRes              UpdateLocationRes
    ERRORS {
         SystemFailure,
         DataMissing,
         UnexpectedDataValue,
         UnknownSubscriber,
         RoamingNotAllowed}

CancelLocation ::= OPERATION                                          --Timer m
    ARGUMENT
         cancelLocationArg              CancelLocationArg
    RESULT
         cancelLocationRes              CancelLocationRes
             -- optional
    ERRORS {
         DataMissing,
         UnexpectedDataValue}

PurgeMS ::= OPERATION                                                 --Timer m
    ARGUMENT
         purgeMS-Arg                    PurgeMS-Arg
    RESULT
         purgeMS-Res                    PurgeMS-Res
              -- optional
    ERRORS{
         DataMissing,
         UnexpectedDataValue,
         UnknownSubscriber}
```

```
SendIdentification ::= OPERATION                                    --Timer s
     ARGUMENT
          sendIdentificationArg               SendIdentificationArg
     RESULT
          sendIdentificationRes          SendIdentificationRes
     ERRORS {
          DataMissing,
          UnidentifiedSubscriber}
```

-- gprs location registration operations

```
UpdateGprsLocation ::= OPERATION                                    --Timer m
     ARGUMENT
          updateGprsLocationArg          UpdateGprsLocationArg
     RESULT
          updateGprsLocationRes          UpdateGprsLocationRes
     ERRORS {
          SystemFailure,
          UnexpectedDataValue,
          UnknownSubscriber,
          RoamingNotAllowed}
```

-- subscriber information enquiry operations

```
ProvideSubscriberInfo ::= OPERATION                                 --Timer m
     ARGUMENT
          provideSubscriberInfoArg       ProvideSubscriberInfoArg
     RESULT
          provideSubscriberInfoRes       ProvideSubscriberInfoRes
     ERRORS {
          DataMissing,
          UnexpectedDataValue}
```

-- any time information enquiry operations

```
AnyTimeInterrogation ::= OPERATION                                  --Timer m
     ARGUMENT
          anyTimeInterrogationArg        AnyTimeInterrogationArg
     RESULT
          anyTimeInterrogationRes        AnyTimeInterrogationRes
     ERRORS {
          SystemFailure,
          ATI-NotAllowed,
          DataMissing,
          UnexpectedDataValue,
          UnknownSubscriber}
```

-- any time information handling operations

```
AnyTimeSubscriptionInterrogation ::= OPERATION                      --Timer m
     ARGUMENT
          anyTimeSubscriptionInterrogationArg  AnyTimeSubscriptionInterrogationArg
     RESULT
          anyTimeSubscriptionInterrogationRes  AnyTimeSubscriptionInterrogationRes
     ERRORS {
          ATSI-NotAllowed,
          DataMissing,
          UnexpectedDataValue,
          UnknownSubscriber,
          BearerServiceNotProvisioned,
          TeleserviceNotProvisioned,
          CallBarred,
          IllegalSS-Operation,
          SS-NotAvailable,
          InformationNotAvailable}
```

```
AnyTimeModification ::= OPERATION                                    --Timer m
    ARGUMENT
        anyTimeModificationArg          AnyTimeModificationArg
    RESULT
        anyTimeModificationRes          AnyTimeModificationRes
    ERRORS {
        ATM-NotAllowed,
        DataMissing,
        UnexpectedDataValue,
        UnknownSubscriber,
        BearerServiceNotProvisioned,
        TeleserviceNotProvisioned,
        CallBarred,
        IllegalSS-Operation,
        SS-SubscriptionViolation,
        SS-ErrorStatus,
        SS-Incompatibility,
        InformationNotAvailable}
```

-- subscriber data modification notification operations

```
NoteSubscriberDataModified ::= OPERATION                             --Timer m
    ARGUMENT
        noteSubscriberDataModifiedArg   NoteSubscriberDataModifiedArg
    RESULT
        noteSubscriberDataModifiedRes   NoteSubscriberDataModifiedRes
            -- optional
    ERRORS {
        UnexpectedDataValue,
        UnknownSubscriber}
```

-- handover operations

```
PrepareHandover ::= OPERATION                                        --Timer m
    ARGUMENT
        prepareHO-Arg                   PrepareHO-Arg
    RESULT
        prepareHO-Res                   PrepareHO-Res
    ERRORS {
        SystemFailure,
        DataMissing,
        UnexpectedDataValue,
        NoHandoverNumberAvailable}
```

```
SendEndSignal ::= OPERATION                                          --Timer l
    ARGUMENT
        sendEndSignalArg                SendEndSignalArgbss-APDU          ExternalSignalInfo
    RESULT
        sendEndSignalRes                SendEndSignalRes
```

```
ProcessAccessSignalling ::= OPERATION                --Timer s
    ARGUMENT
        processAccessSignallingArg      ProcessAccessSignallingArgbss-APDUExternalSignalInfo
```

```
ForwardAccessSignalling ::= OPERATION                --Timer s
    ARGUMENT
        forwardAccessSignallingArg      ForwardAccessSignallingArgbss-APDUExternalSignalInfo
```

```
PrepareSubsequentHandover ::= OPERATION              --Timer m
    ARGUMENT
        prepareSubsequentHO-Arg         PrepareSubsequentHO-Arg
    RESULT
        prepareSubsequentHO-Res         PrepareSubsequentHO-Resbss-APDU   ExternalSignalInfo
    ERRORS {
        UnexpectedDataValue,
        DataMissing,
        UnknownMSC,
        SubsequentHandoverFailure}
```

Next Change

17.7 MAP constants and data types

17.7.1 Mobile Service data types

```
MAP-MS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version6 (6)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS

   -- location registration types
   UpdateLocationArg,
   UpdateLocationRes,
   CancelLocationArg,
   CancelLocationRes,
   PurgeMS-Arg,
   PurgeMS-Res,
   SendIdentificationArg,
   SendIdentificationRes,
   UpdateGprsLocationArg,
   UpdateGprsLocationRes,
   IST-SupportIndicator,


   -- handover types
   ForwardAccessSignallingArg,
   PrepareHO-Arg,
   PrepareHO-Res,
   PrepareSubsequentHO-Arg,
   PrepareSubsequentHO-Res,
   ProcessAccessSignallingArg,
   SendEndSignallingArg,
   SendEndSignallingRes,


   -- authentication management types
   SendAuthenticationInfoArg,
   SendAuthenticationInfoRes,

   -- security management types
   EquipmentStatus,
   Kc,

   -- subscriber management types
   InsertSubscriberDataArg,
   InsertSubscriberDataRes,
   DeleteSubscriberDataArg,
   DeleteSubscriberDataRes,
   SubscriberData,
   ODB-Data,
   SubscriberStatus,
   ZoneCodeList,
   maxNumOfZoneCodes,
   O-CSI,
   D-CSI,
   O-BcsmCamelTDPCriteriaList,
   T-BCSM-CAMEL-TDP-CriteriaList,
   SS-CSI,
   ServiceKey,
   DefaultCallHandling,
   CamelCapabilityHandling,
   BasicServiceCriteria,
   SupportedCamelPhases,
   maxNumOfCamelTDPData,
   CUG-Index,
   CUG-Interlock,
   InterCUG-Restrictions,
```

```
   IntraCUG-Options,
   IST-AlertTimerValue,
   T-CSI,
   T-BcsmTriggerDetectionPoint,

   -- fault recovery types
   ResetArg,
   RestoreDataArg,
   RestoreDataRes,

   -- subscriber information enquiry types
   ProvideSubscriberInfoArg,
   ProvideSubscriberInfoRes,
   SubscriberInfo,
   LocationInformation,
   SubscriberState,

   -- any time information enquiry types
   AnyTimeInterrogationArg,
   AnyTimeInterrogationRes,

   -- any time information handling types
   AnyTimeSubscriptionInterrogationArg,
   AnyTimeSubscriptionInterrogationRes,
   AnyTimeModificationArg,
   AnyTimeModificationRes,

   -- subscriber data modification notification types
   NoteSubscriberDataModifiedArg,
   NoteSubscriberDataModifiedRes,

   -- gprs location information retrieval types
   SendRoutingInfoForGprsArg,
   SendRoutingInfoForGprsRes,

   -- failure reporting types
   FailureReportArg,
   FailureReportRes,

   -- gprs notification types
   NoteMsPresentForGprsArg,
   NoteMsPresentForGprsRes,

   -- Mobility Management types
   NoteMM-EventArg,
   NoteMM-EventRes



;

IMPORTS
   maxNumOfSS,
   SS-SubscriptionOption,
   SS-List,
   SS-ForBS-Code,
   Password
FROM MAP-SS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-DataTypes (14) version6 (6)}

   SS-Code
FROM MAP-SS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-SS-Code (15) version6 (6)}

   Ext-BearerServiceCode
FROM MAP-BS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-BS-Code (20) version6 (6)}

   Ext-TeleserviceCode
FROM MAP-TS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-TS-Code (19) version6 (6)}
```

```
   AddressString,
   ISDN-AddressString,
   ISDN-SubaddressString,
   AccessNetwork~~External~~SignalInfo,
   IMSI,
   TMSI,
   HLR-List,
   LMSI,
   Identity,
   GlobalCellId,
   CellIdOrLAI,
   Ext-BasicServiceCode,
   NAEA-PreferredCI,
   EMLPP-Info,
   SubscriberIdentity,
   AgeOfLocationInformation,
   LCSClientExternalID,
   LCSClientInternalID



FROM MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version6 (6)}

   ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version6 (6)}

   AbsentSubscriberDiagnosticSM
FROM MAP-ER-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ER-DataTypes (17) version6 (6)}


;


-- location registration types

UpdateLocationArg ::= SEQUENCE {
    imsi                              IMSI,

    msc-Number                        [1] ISDN-AddressString,
    vlr-Number                        ISDN-AddressString,
    lmsi                              [10] LMSI OPTIONAL,
    extensionContainer                ExtensionContainer                OPTIONAL,
    ... ,
    vlr-Capability                    [6] VLR-Capability                OPTIONAL }

VLR-Capability ::= SEQUENCE{
    supportedCamelPhases              [0] SupportedCamelPhases          OPTIONAL,
    extensionContainer                ExtensionContainer                OPTIONAL,
    ... ,
    solsaSupportIndicator             [2] NULL                          OPTIONAL,
    istSupportIndicator               [1] IST-SupportIndicator          OPTIONAL,
    superChargerSupportedInServingNetworkEntity   [3] SuperChargerInfo     OPTIONAL }

SuperChargerInfo ::= CHOICE {
    sendSubscriberData                [0] NULL,
    subscriberDataStored              [1] AgeIndicator }

AgeIndicator ::= OCTET STRING (SIZE (1..6))
    -- The internal structure of this parameter is implementation specific.

IST-SupportIndicator ::=  ENUMERATED {
    basicISTSupported                 (0),
    istCommandSupported               (1), ...}
-- exception handling:
-- reception of values > 1 shall be mapped to ' istCommandSupported '
```

```
UpdateLocationRes ::= SEQUENCE {
     hlr-Number                          ISDN-AddressString,

     extensionContainer                  ExtensionContainer              OPTIONAL,
     ... }
```

```
CancelLocationArg ::= [3] SEQUENCE {
     identity                            Identity,
     cancellationType                    CancellationType                OPTIONAL,
     extensionContainer                  ExtensionContainer              OPTIONAL,
     ...}
```

```
CancellationType ::= ENUMERATED {
     updateProcedure                     (0),
     subscriptionWithdraw                (1),
     ...}
     -- The HLR shall not send values other than listed above
```

```
CancelLocationRes ::= SEQUENCE {
     extensionContainer                  ExtensionContainer              OPTIONAL,
     ...}
```

```
PurgeMS-Arg ::= [3] SEQUENCE {
     imsi                                IMSI,
     vlr-Number                          [0] ISDN-AddressString          OPTIONAL,
     sgsn-Number                         [1]  ISDN-AddressString         OPTIONAL,
     extensionContainer                  ExtensionContainer              OPTIONAL,
     ...}
```

```
PurgeMS-Res ::= SEQUENCE {
     freezeTMSI                          [0]  NULL                       OPTIONAL,
     freezeP-TMSI                        [1]  NULL                       OPTIONAL,
     extensionContainer                  ExtensionContainer              OPTIONAL,
     ...}
```

```
SendIdentificationArg ::= SEQUENCE {
     tmsi                                TMSI,
     numberOfRequestedVectors            NumberOfRequestedVectors,
     segmentationProhibited              NULL                            OPTIONAL,
     -- if segmentation is prohibited the previous VLR shall not send the result
     -- within a TC-CONTINUE message.
     extensionContainer                  ExtensionContainer              OPTIONAL,
     ...}
```

```
SendIdentificationRes ::= [3] SEQUENCE {
     imsi                                IMSI                            OPTIONAL,
     -- IMSI must be present if SendIdentificationRes is not segmented.
     -- If the TC-Continue segmentation option is taken the IMSI must be
     -- present in one segmented transmission of SendIdentificationRes.
     authenticationSetList               AuthenticationSetList           OPTIONAL,
     extensionContainer                  [2] ExtensionContainer          OPTIONAL,
     ...}
```

```
AuthenticationSetList ::= CHOICE {
     tripletList                         [0] TripletList,
     quintupletList                      [1] QuintupletList }
```

```
TripletList ::= SEQUENCE SIZE (1..5) OF
                                         AuthenticationTriplet
```

```
QuintupletList ::= SEQUENCE SIZE (1..5) OF
                                         AuthenticationQuintuplet
```

```
AuthenticationTriplet ::= SEQUENCE {
     rand                                RAND,
     sres                                SRES,
     kc                                  Kc,
     ...}
```

```
AuthenticationQuintuplet ::= SEQUENCE {
    rand                                RAND,
    xres                                XRES,
    ck                                  CK,
    ik                                  IK,
    autn                                AUTN,
    ...}
```

```
RAND ::= OCTET STRING (SIZE (16))
```

```
SRES ::= OCTET STRING (SIZE (4))
```

```
Kc ::= OCTET STRING (SIZE (8))
```

```
XRES ::= OCTET STRING (SIZE (4..16))
```

```
CK ::= OCTET STRING (SIZE (16))
```

```
IK ::= OCTET STRING (SIZE (16))
```

```
AUTN ::= OCTET STRING (SIZE (14..18))
```

```
AUTS ::= OCTET STRING (SIZE (12..16))
```

-- gprs location registration types

```
UpdateGprsLocationArg ::= SEQUENCE {
    imsi                                IMSI,
    sgsn-Number                         ISDN-AddressString,
    sgsn-Address                        GSN-Address,
    extensionContainer                  ExtensionContainer              OPTIONAL,
    ... ,
    sgsn-Capability                     [0] SGSN-Capability             OPTIONAL }
```

```
SGSN-Capability ::= SEQUENCE{
    solsaSupportIndicator               NULL                            OPTIONAL,
    extensionContainer                  [1] ExtensionContainer          OPTIONAL,
    ... ,
    superChargerSupportedInServingNetworkEntity   [2] SuperChargerInfo  OPTIONAL ,
    gprsEnhancementsSupportIndicator    [3] NULL                        OPTIONAL,
    supportedCamelPhases                [4] SupportedCamelPhases        OPTIONAL }
```

```
GSN-Address ::= OCTET STRING (SIZE (5..17))
    -- Octets are coded according to TS GSM 03.03
```

```
UpdateGprsLocationRes ::= SEQUENCE {
    hlr-Number                          ISDN-AddressString,
    extensionContainer                  ExtensionContainer              OPTIONAL,
    ...}
```

-- handover types

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

```
PrepareHO-Arg ::= [3] SEQUENCE {
    targetCellId                        [0] GlobalCellId                OPTIONAL,
    ho-NumberNotRequired                NULL                            OPTIONAL,
    targetRNC-Id                        [1] RNC-Id                       OPTIONAL,
    an-APDU                             [2] AccessNetworkSignalInfo     OPTIONAL,
    multipleBearerRequested             NULL                            OPTIONAL,
    extensionContainer                  [3] ExtensionContainer          OPTIONAL,bss-APDU
    ExternalSignalInfo                  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,bss-APDU
    ExternalSignalInfo              OPTIONAL,
    ...}
```

```
PrepareSubsequentHO-Arg ::= [3] SEQUENCE {
    targetCellId                    [0]  GlobalCellId,
    targetMSC-Number                [1]  ISDN-AddressString,
    targetRNC-Id                    [2] RNC-Id                        OPTIONAL,
    an-APDU                         [3]  AccessNetworkSignalInfo     OPTIONAL,
    extensionContainer              [4]  ExtensionContainer          OPTIONAL,bss-APDU
    ExternalSignalInfo,
    ...}
```

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

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

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

```
SendEndSignalRes ::= SEQUENCE {
    extensionContainer              [0]  ExtensionContainer          OPTIONAL,
    ...}
```

```
RNC-Id ::= 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
```

Next Change

17.7.8 Common data types

```
MAP-CommonDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version6 (6)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS

   -- general data types and values
   AddressString,
   ISDN-AddressString,
   maxISDN-AddressLength,
   ISDN-SubaddressString,
   ExternalSignalInfo,
   Ext-ExternalSignalInfo,
   AccessNetworkSignalInfo,
   SignalInfo,
   maxSignalInfoLength,
   AlertingPattern,

   -- data types for numbering and identification
   IMSI,
   TMSI,
   Identity,
   SubscriberId,
   IMEI,
   HLR-List,
   LMSI,
   GlobalCellId,
   NetworkResource,
   NAEA-PreferredCI,
   NAEA-CIC,
   ASCI-CallReference,
   SubscriberIdentity,

   -- data types for CAMEL
   CellIdOrLAI,

   -- data types for subscriber management
   BasicServiceCode,
   Ext-BasicServiceCode,
   EMLPP-Info,
   EMLPP-Priority,

   -- data types for geographic location
   AgeOfLocationInformation,
   LCSClientExternalID,
   LCSClientInternalID
;

IMPORTS
   TeleserviceCode,
   Ext-TeleserviceCode
FROM MAP-TS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-TS-Code (19) version6 (6)}

   BearerServiceCode,
   Ext-BearerServiceCode
FROM MAP-BS-Code {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-BS-Code (20) version6 (6)}

   ExtensionContainer
FROM MAP-ExtensionDataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version6 (6)}
;
```

```
-- general data types

TBCD-STRING ::= OCTET STRING
     -- This type (Telephony Binary Coded Decimal String) is used to
     -- represent several digits from 0 through 9, *, #, a, b, c, two
     -- digits per octet, each digit encoded 0000 to 1001 (0 to 9),
     -- 1010 (*), 1011 (#), 1100 (a), 1101 (b) or 1110 (c); 1111 used
     -- as filler when there is an odd number of digits.

     -- bits 8765 of octet n encoding digit 2n
     -- bits 4321 of octet n encoding digit 2(n-1) +1

AddressString ::= OCTET STRING (SIZE (1..maxAddressLength))
     -- This type is used to represent a number for addressing
     -- purposes. It is composed of
     --   a)   one octet for nature of address, and numbering plan
     --        indicator.
     --   b)   digits of an address encoded as TBCD-String.

     -- a)     The first octet includes a one bit extension indicator, a
     --        3 bits nature of address indicator and a 4 bits numbering
     --        plan indicator, encoded as follows:

     -- bit 8: 1  (no extension)

     -- bits 765: nature of address indicator
     --   000  unknown
     --   001  international number
     --   010  national significant number
     --   011  network specific number
     --   100  subscriber number
     --   101  reserved
     --   110  abbreviated number
     --   111  reserved for extension

     -- bits 4321: numbering plan indicator
     --   0000  unknown
     --   0001  ISDN/Telephony Numbering Plan (Rec CCITT E.164)
     --   0010  spare
     --   0011  data numbering plan (CCITT Rec X.121)
     --   0100  telex numbering plan (CCITT Rec F.69)
     --   0101  spare
     --   0110  land mobile numbering plan (CCITT Rec E.212)
     --   0111  spare
     --   1000  national numbering plan
     --   1001  private numbering plan
     --   1111  reserved for extension

     --   all other values are reserved.

     -- b)     The following octets representing digits of an address
     --        encoded as a TBCD-STRING.

maxAddressLength  INTEGER ::= 20

ISDN-AddressString ::=
              AddressString (SIZE (1..maxISDN-AddressLength))
     -- This type is used to represent ISDN numbers.

maxISDN-AddressLength  INTEGER ::= 9
```

```
ISDN-SubaddressString ::=
              OCTET STRING (SIZE (1..maxISDN-SubaddressLength))
     -- This type is used to represent ISDN subaddresses.
     -- It is composed of
     --   a)   one octet for type of subaddress and odd/even indicator.
     --   b)   20 octets for subaddress information.

     --   a)   The first octet includes a one bit extension indicator, a
     --        3 bits type of subaddress and a one bit odd/even indicator,
     --        encoded as follows:

     --   bit 8: 1  (no extension)

     --   bits 765: type of subaddress
     --        000  NSAP (X.213/ISO 8348 AD2)
     --        010  User Specified
     --        All other values are reserved

     --   bit 4: odd/even indicator
     --        0  even number of address signals
     --        1  odd number of address signals
     --        The odd/even indicator is used when the type of subaddress
     --        is "user specified" and the coding is BCD.

     --   bits 321: 000 (unused)

     --   b) Subaddress information.
     --   The NSAP X.213/ISO8348AD2 address shall be formatted as specified
     --   by octet 4 which contains the Authority and Format Identifier
     --   (AFI). The encoding is made according to the "preferred binary
     --   encoding" as defined in X.213/ISO834AD2. For the definition
     --   of this type of subaddress, see CCITT Rec I.334.

     --   For User-specific subaddress, this field is encoded according
     --   to the user specification, subject to a maximum length of 20
     --   octets. When interworking with X.25 networks BCD coding should
     --   be applied.
```

```
maxISDN-SubaddressLength  INTEGER ::= 21
```

```
ExternalSignalInfo ::= SEQUENCE {
     protocolId                          ProtocolId,
     signalInfo                          SignalInfo,
     -- Information about the internal structure is given in
     -- subclause 7.6.9.
     extensionContainer                  ExtensionContainer                OPTIONAL,
     -- extensionContainer must not be used in version 2
     ...}
```

```
SignalInfo ::= OCTET STRING (SIZE (1..maxSignalInfoLength))
```

```
maxSignalInfoLength  INTEGER ::= 200
     -- This NamedValue represents the theoretical maximum number of
     -- octets which are available to carry a single data type,
     -- without requiring segmentation to cope with the network layer
     -- service. However, the actual maximum size available for a data
     -- type may be lower, especially when other information elements
     -- have to be included in the same component.
```

```
ProtocolId ::= ENUMERATED {
     gsm-0408  (1),
     gsm-0806  (2),
     gsm-BSSMAP  (3),
     -- Value 3 is reserved and must not be used
     ets-300102-1  (4)}
```

```
Ext-ExternalSignalInfo ::= SEQUENCE {
     ext-ProtocolId                      Ext-ProtocolId,
     signalInfo                          SignalInfo,
     -- Information about the internal structure is given in
     -- subclause 7.6.9.10
     extensionContainer                  ExtensionContainer                OPTIONAL,
     ...}
```

```
Ext-ProtocolId ::= ENUMERATED {
     ets-300356  (1),
     ...
      }
-- exception handling:
-- For Ext-ExternalSignalInfo sequences containing this parameter with any
-- other value than the ones listed the receiver shall ignore the whole
-- Ext-ExternalSignalInfo sequence.
```

```
AccessNetworkSignalInfo ::= SEQUENCE {
     accessNetworkProtocolId              AccessNetworkProtocolId,
     signalInfo                           SignalInfo,
     -- Information about the internal structure is given in
     -- subclause 7.6.9.4
     extensionContainer                   [0] ExtensionContainer              OPTIONAL,
     ...}
```

```
AccessNetworkProtocolId ::= ENUMERATED {
     gsm-0806   (1),
     ts3G-25413 (2),
     ...}
     -- exception handling:
     -- For AccessNetworkSignalInfo sequences containing this parameter with any
     -- other value than the ones listed the receiver shall ignore the whole
     -- AccessNetworkSignalInfo sequence.
```

Next Change

19.2 Handover procedure

It should be noted that procedures related to 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.

19.2.1 General

The handover or relocation between different MSCs is called Inter-MSC handover. The interfaces involved for Inter-MSC handover are shown in figure 19.2/1. Following two Inter-MSC handover procedures apply:

1) Basic Inter-MSC handover:

   The call is handed over from the controlling MSC, called MSC-A to another MSC, called MSC-B (figure 19.2/1a).

   Figure 19.2/2 shows a successful handover between MSC-A and MSC-B including a request for handover number allocation by MSC-B to VLR-B.

2) Subsequent Inter-MSC handover:

   After the call has been handed over from MSC-A to MSC-B, a handover to either MSC-A (figure 19.2/1a) or to a third MSC (MSC-B') (figure 19.2/1b) is necessary in order to continue the connection.

Figure 19.2/1: Interface structure for handover

The MAP handover procedures achieve the functionality required to set up an MSC-MSC dialogue, to optionally allocate a handover number or one or several relocation numbers and to transport BSSAP or RANAP messages.

The transported BSSAP or RANAP messages are controlled and handled by the Handover Control Application in the MSCs. This information will be transparent to the MAP protocol. If the MSC receives via the MAP protocol BSSAP or RANAP messages, this information will be forwarded to the Handover Control Application (shown in the handover SDL diagrams with the internal HO_CA signalling, it is an internal process in the MSC) and vice versa if the Handover Control Application requires the sending of BSSAP or RANAP messages via the MAP protocol.

For detailed interworking between the A-interface and MAP procedures or the Iu-interface and MAP procedures, see ~~GSM~~3G TS ~~0~~2~~3~~.0~~0~~9 and ~~GSM~~ 3G TS 2~~0~~9.0~~1~~0.

NOTE: This can be sent at any time after the connection between MSC-A and MSC-B is established.

Figure 19.2/2: Example of a successful basic handover procedure to MSC-B

NOTE: This can be sent at any time after the connection between MSC-A and MSC-B is established.

Figure 19.2/3: Example of a handover towards a third MSC

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.

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 relocate 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.

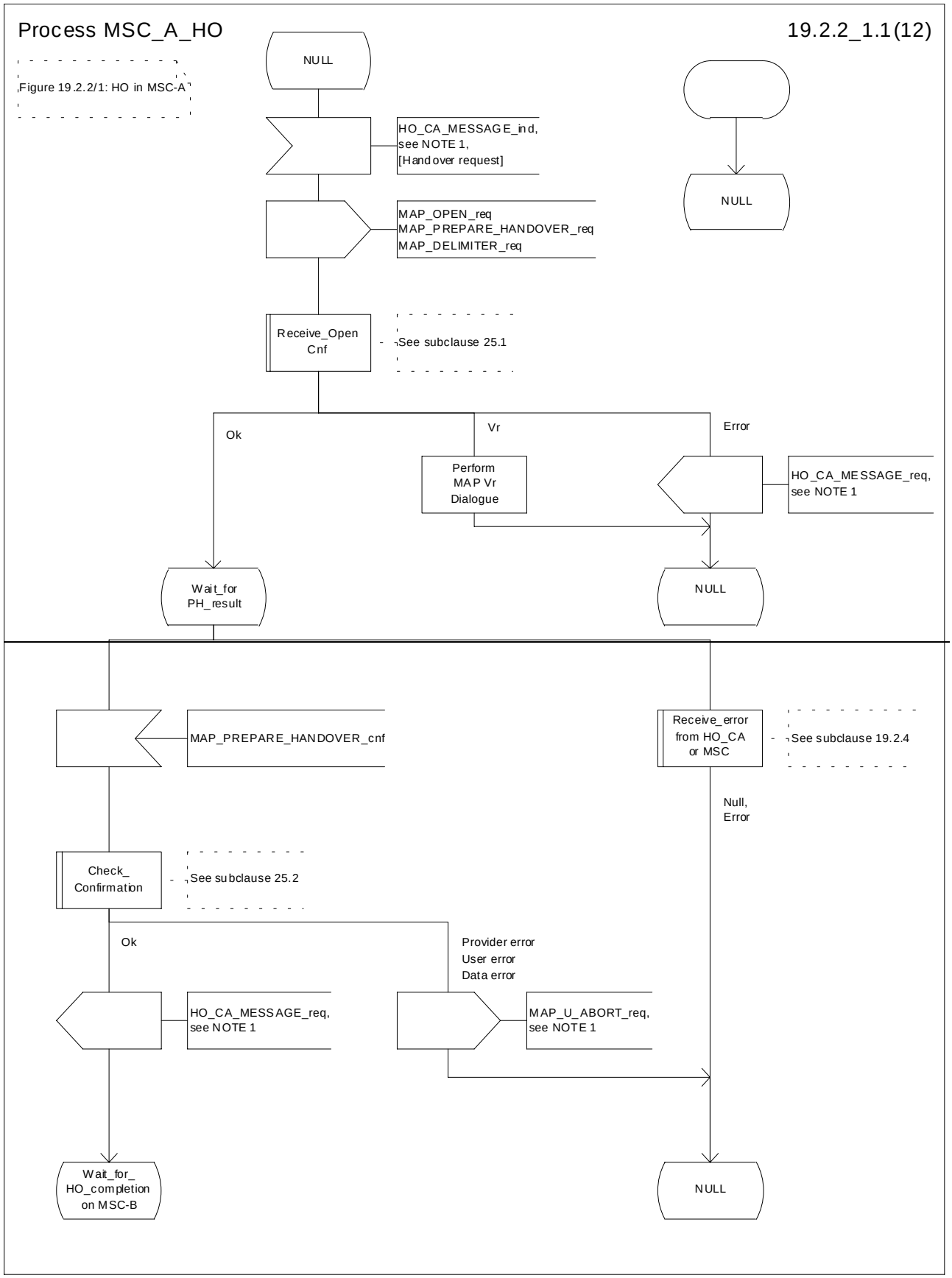
19.2.2.5 SDL Diagrams

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 ~~GSM~~ 3G TS ~~0~~2.0.09.

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 (sheet 1 of 12): Process MSC_A_HO~~

Figure 19.2 2/1: HO in MSC-A

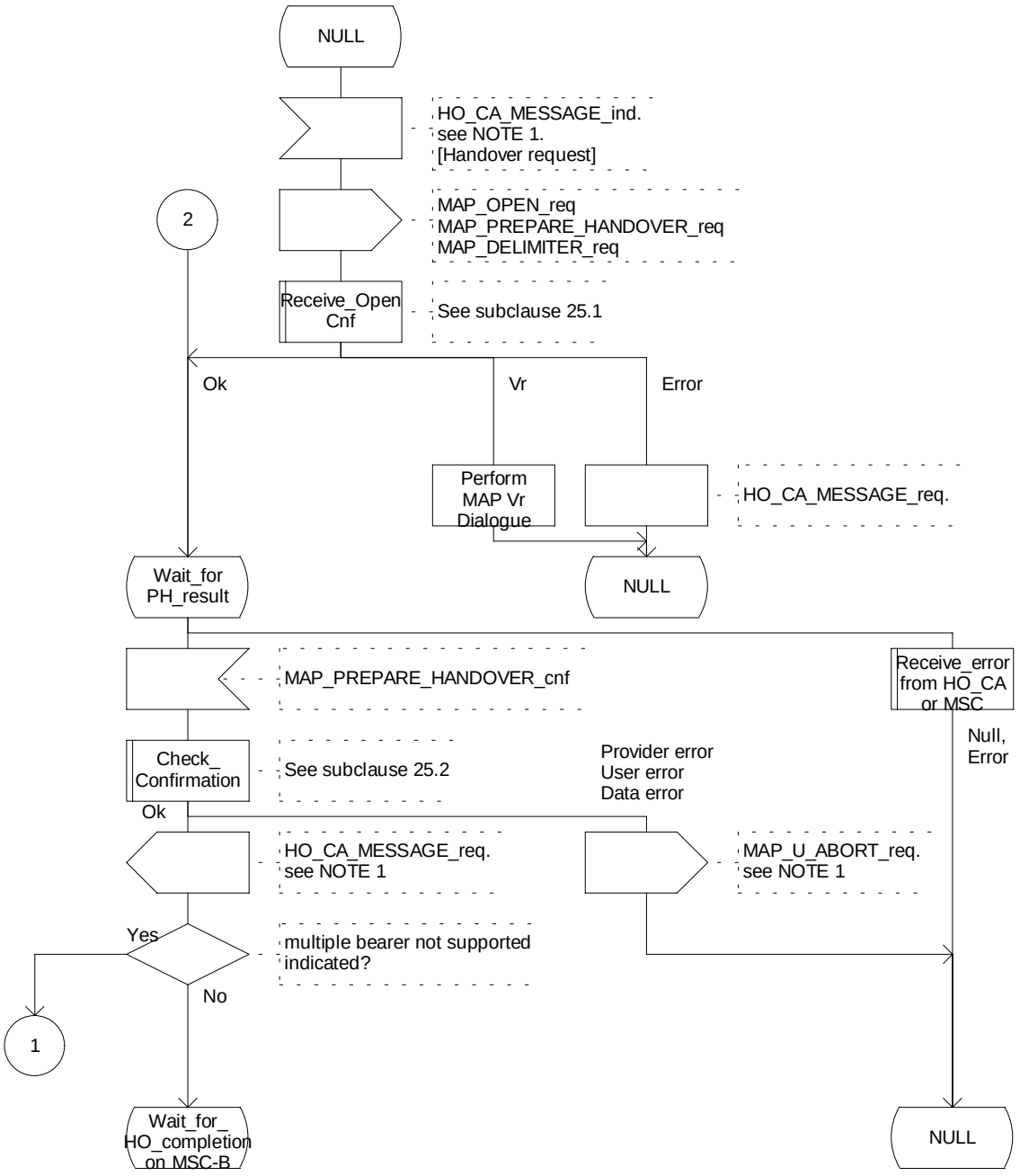


Figure 19.2.2/1 (sheet 1 of 13): Process MSC_A_HO

Figure 19.2 2/1: HO in MSC-A

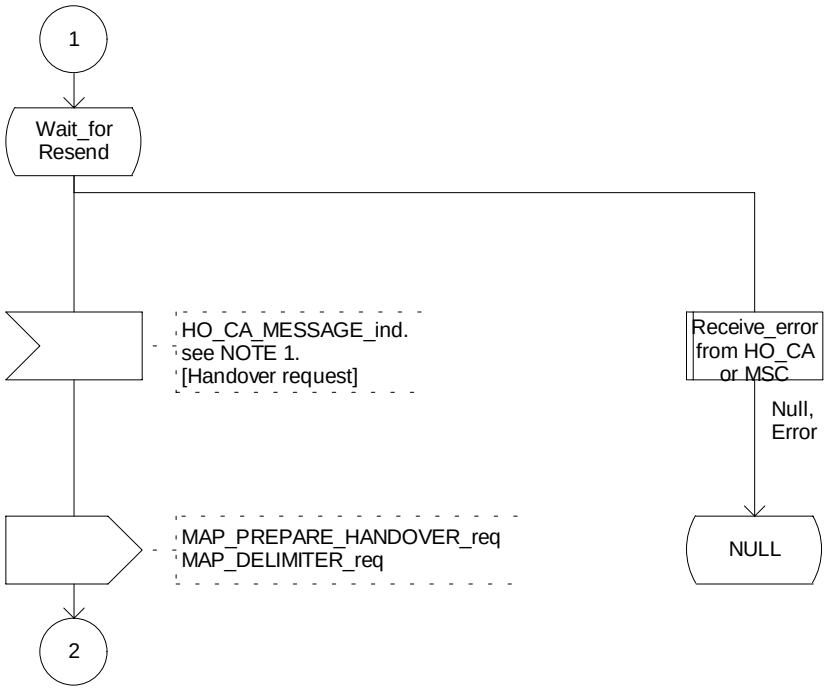


Figure 19.2.2/1 (sheet 2 of 13): Process MSC_A_HO

[Editor's note: not modifed as Figure 19.2.2/1 (sheet 3 of 13): Process MSC_A_HO]

Figure 19.2.2/1 (sheet 2 of 12): Process MSC_A_HO

[Editor’s note: not modifed as Figure 19.2.2/1 (sheet 4 of 13): Process MSC_A_HO]

Figure 19.2.2/1 (sheet 3 of 12): Process MSC_A_HO

[Editor’s note: not modifed as Figure 19.2.2/1 (sheet 5 of 13): Process MSC_A_HO]

Figure 19.2.2/1 (sheet 4 of 12): Process MSC_A_HO

[Editor’s note: not modifed as Figure 19.2.2/1 (sheet 6 of 13): Process MSC_A_HO]

Figure 19.2.2/1 (sheet 5 of 12): Process MSC_A_HO

[Editor’s note: not modifed as Figure 19.2.2/1 (sheet 7 of 13): Process MSC_A_HO]

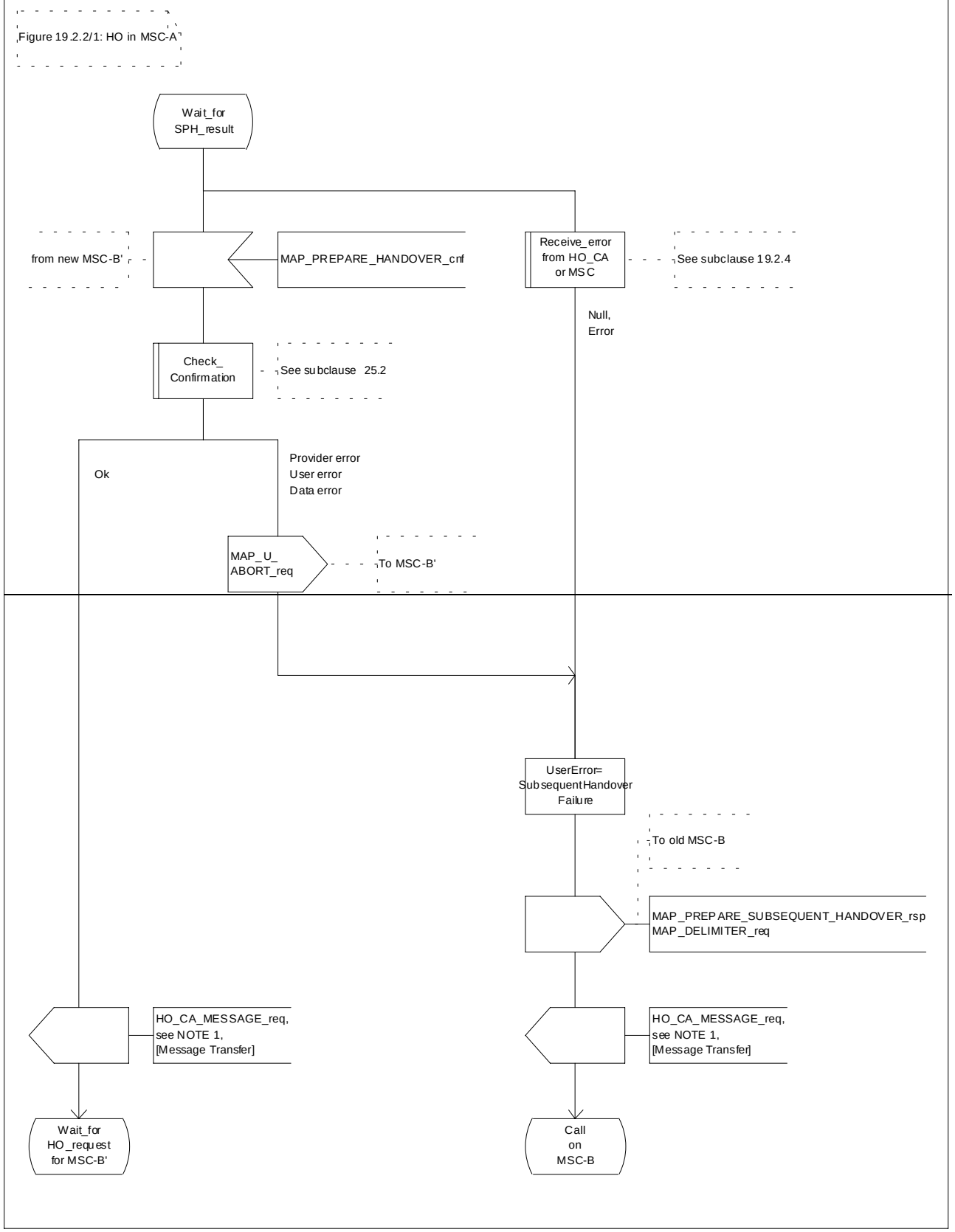
Figure 19.2.2/1 (sheet 6 of 12): Process MSC_A_HO

[Editor’s note: not modifed as Figure 19.2.2/1 (sheet 8 of 13): Process MSC_A_HO]

Figure 19.2.2/1 (sheet 7 of 12): Process MSC_A_HO

[Editor’s note: not modifed as Figure 19.2.2/1 (sheet 9 of 13): Process MSC_A_HO]

Figure 19.2.2/1 (sheet 8 of 12): Process MSC_A_HO



~~Figure 19.2.2/1 (sheet 9 of 12): Process MSC_A_HO~~

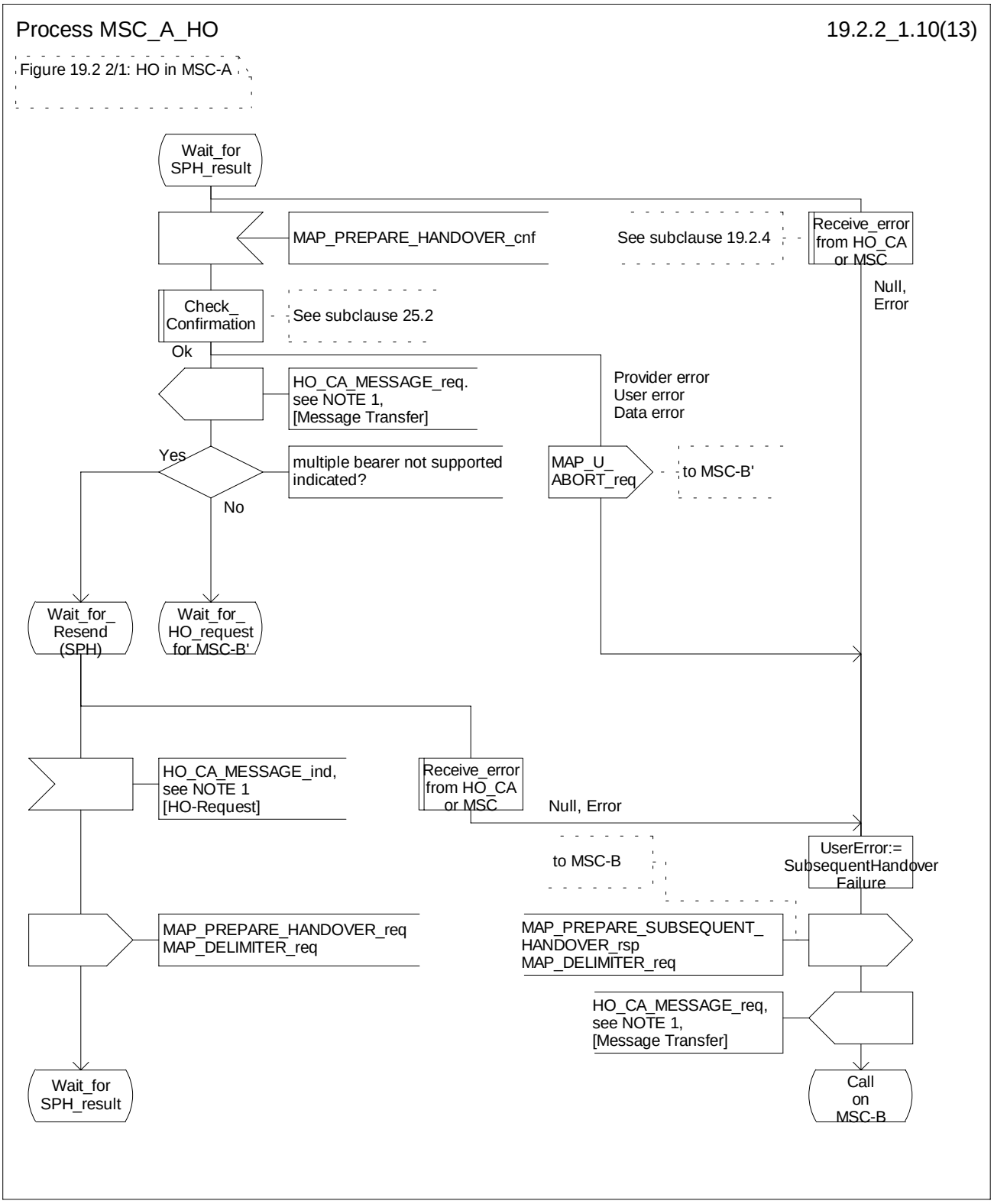


Figure 19.2.2/1 (sheet 10 of 13): Process MSC_A_HO

[Editor's note: not modifed as Figure 19.2.2/1 (sheet 11 of 13): Process MSC_A_HO]

Figure 19.2.2/1 (sheet 10 of 12): Process MSC_A_HO

[Editor's note: not modifed as Figure 19.2.2/1 (sheet 12 of 13): Process MSC_A_HO]

Figure 19.2.2/1 (sheet 11 of 12): Process MSC_A_HO

[Editor's note: not modifed as Figure 19.2.2/1 (sheet 13 of 13): Process MSC_A_HO]

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

19.2.3 Handover procedure in MSC-B

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

19.2.3.1 Basic handover

Opening of the dialogue is described in the macro Receive_Open_Ind in subclause 25.1.

When MSC-B process receives a MAP_PREPARE_HANDOVER indication from MSC-A, MSC-B requests its associated VLR to provide a handover number, unless the parameter HO-NumberNotRequired is received in the indication.

When the connection between the MS and MSC-B is established on MSC-B, the Handover Control Application will request the MAP application to indicate this event to MSC-A by invoking the MAP_SEND_END_SIGNAL request. When a call is released, MSC-A will inform MSC-B by MAP_SEND_END_SIGNAL response and the MAP dialogue between MSC-A and MSC-B is closed.

19.2.3.2 Allocation of handover number

When a handover number is required, a MAP_ALLOCATE_HANDOVER_NUMBER request will be sent to the VLR. The handover number is received in the MAP_SEND_HANDOVER_REPORT request, and will be included in the MAP_PREPARE_HANDOVER response to MSC-A.

When relocation numbers are required, one or several MAP_ALLOCATE_HANDOVER_NUMBER requests will be sent to the VLR. Each relocation number is received in a MAP_SEND_HANDOVER_REPORT request, and the collected relocation numbers will be included in the MAP_PREPARE_HANDOVER response to MSC-A.

As soon as the call from MSC-A using the handover number arrives in MSC-B, MSC-B shall release the handover number in the VLR using the MAP_SEND_HANDOVER_REPORT response.

As soon as a call from MSC-A using a relocation number arrives in MSC-B, MSC-B shall release the relocation number in the VLR using the MAP_SEND_HANDOVER_REPORT response.

19.2.3.3 Handling of access signalling

If required by the Handover Control Application, MSC-B invokes the MAP_PROCESS_ACCESS_SIGNALLING request containing the information received on the A-interface or the Iu-interface that should be transferred to MSC-A (e.g. call control information).

MAP_PROCESS_ACCESS_SIGNALLING is a non-confirmed service and any response from MSC-A will require a MAP_FORWARD_ACCESS_SIGNALLING request.

19.2.3.4 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 by involving access signalling transfer in both directions.

19.2.3.5 Subsequent handover

The procedure is used when the Handover Control Application in MSC-B has decided that a call is to be handed over or relocated to another MSC (either back to the controlling MSC (MSC-A) or to a third MSC (MSC-B')).

After the MAP_PREPARE_SUBSEQUENT_HANDOVER response is received from MSC-A, MSC-B will await the disconnection of the call. Once the disconnect is complete, MSC-B will inform its VLR by invoking the MAP_SEND_HANDOVER_REPORT confirmation. VLR-B will then release the allocated handover number.

The subsequent handover procedure is shown in figure 19.2/3.

19.2.3.6 SDL Diagrams

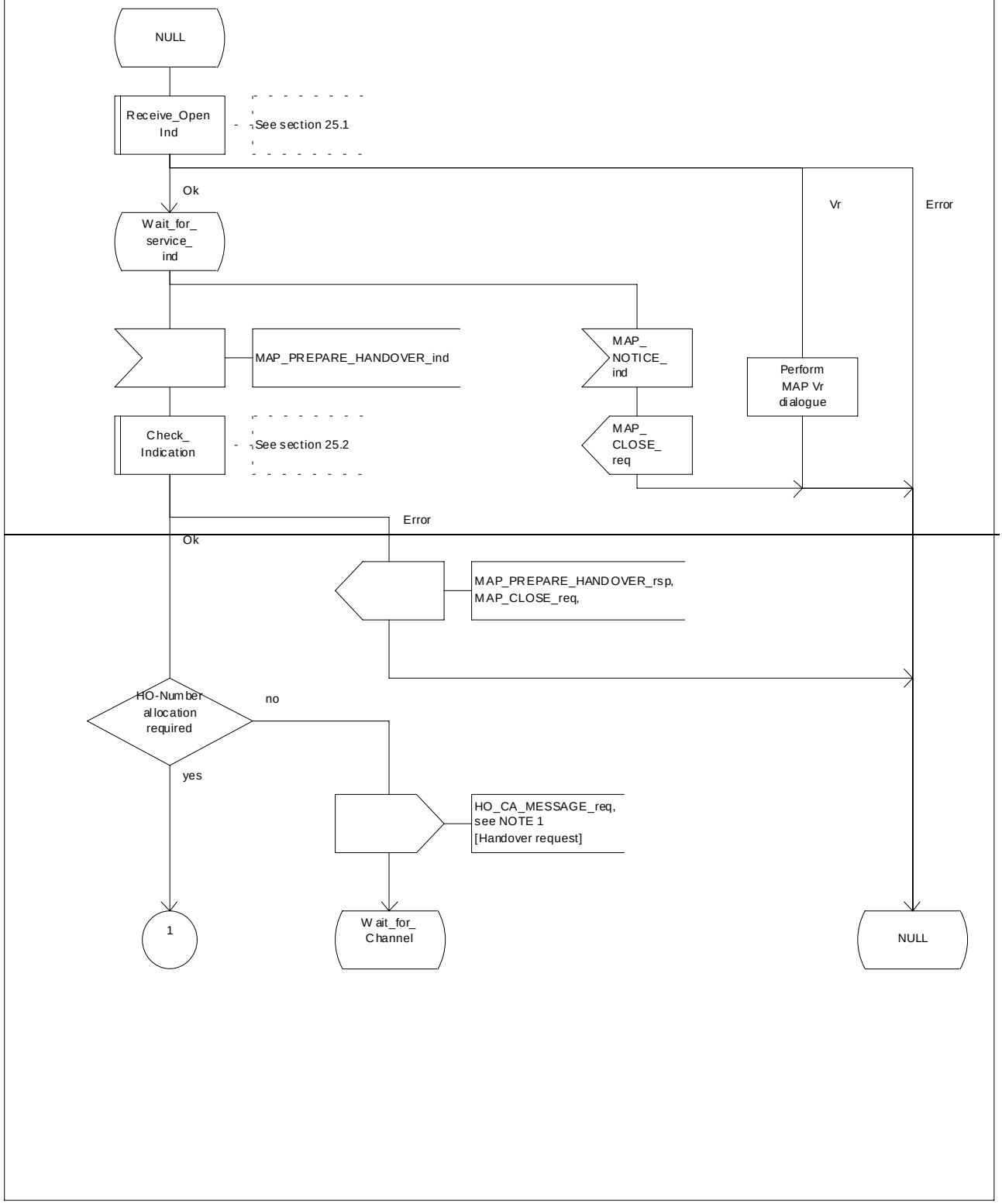
The SDL diagrams on the following pages describe the user process in MSC-B for the procedures described in this subclause.

The services used are defined in subclause 8.4.

NOTE 1: The message primitives HO_CA_MESSAGE 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 procedure, see ~~GSM~~ 3G TS ~~0~~2.0.09.

NOTE 2: The order in the SDL diagrams to allocate first the handover number and then the radio resources is not binding.

Figure 19.2.3/1: HO in MSC-B



~~Figure 19.2.3/1 (sheet 1 of 11): Process MSC_B_HO~~

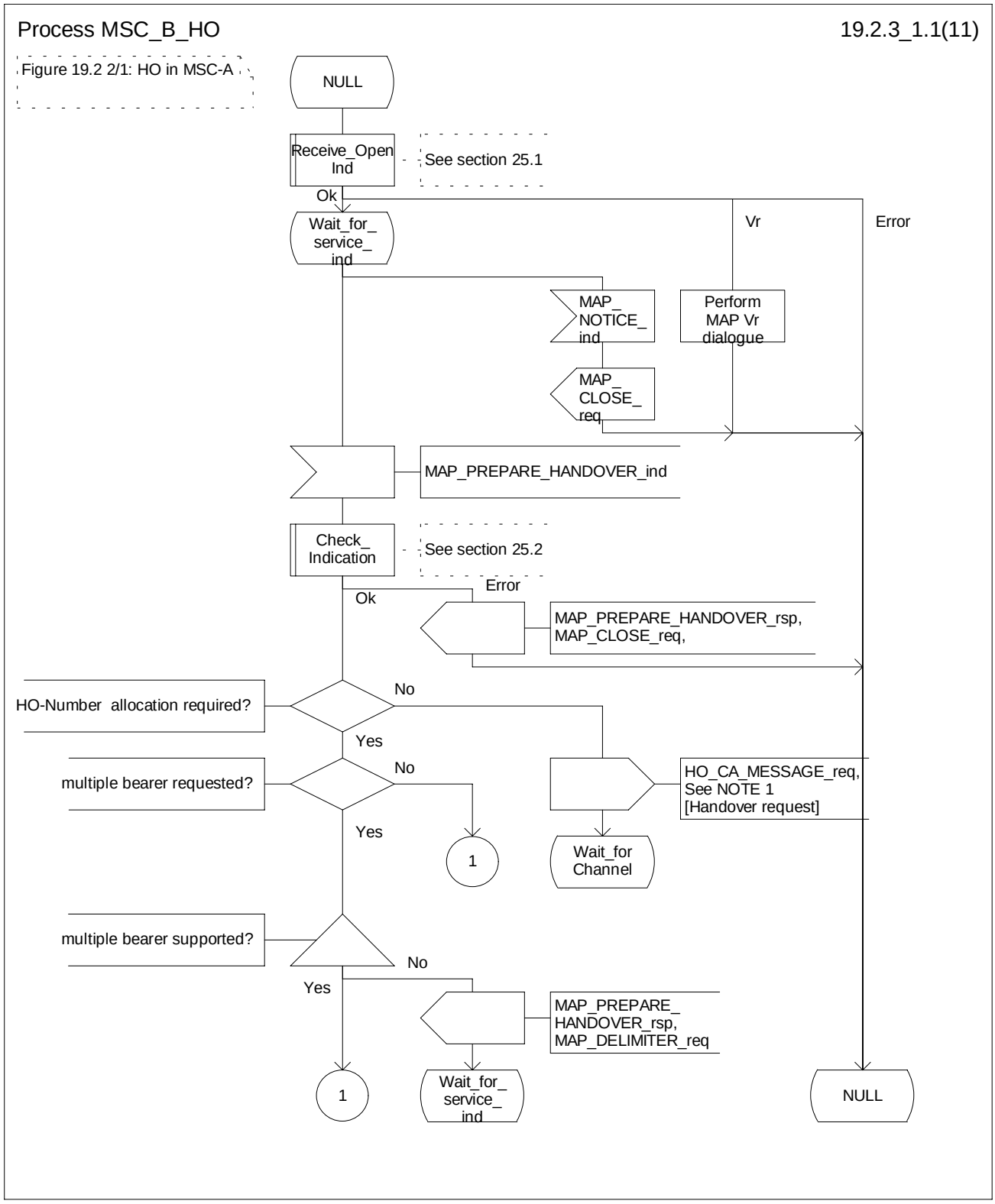


Figure 19.2.3/1 (sheet 1 of 11): Process MSC_B_HO

[Omitted]

19.2.4 Handover error handling macro

This macro is used for the handover procedures to receive errors from the MSCs and from the Handover Control Application at any state of a handover process.

If a MAP_NOTICE indication is received, the Handover Control Application is informed and the actual situation is kept and the Handover Control Application decides how the handover or relocation process should continue. In all other cases the MSC is returned to a "NULL" state.