3GPP TSG_CN#6 **NP-99496**
Nice, France
13th – 15th December 1999

Agenda item:

Source: **TSG_N WG2**

Title: **CRs to 3G TS 23.008, 23.016, 23.018, 29.002 (Work Item Multicall)**

Introduction:

This document contains **4** CRs on **Work Item Multicall** agreed by **TSG_N WG2** and forwarded to **TSG_N Plenary** meeting #6 for approval.

TDoc	Spec	CR	Rev	Ph.	Cat	Old v.	New v.	Subject
N2-99H20	23.008	005	1	R99	B	3.1.0	3.2.0	Introduction of maximum number for CS
N2-99H21	23.016	005	1	R99	B	3.2.1	3.3.0	Introduction of maximum number for CS
N2-99H19	23.018	025	2	R99	B	3.2.0	3.3.0	Addition of the description for Multicall
N2-99J54	29.002	048	2	R99	B	3.2.0	3.3.0	Introduction of maximum number for CS

3GPP TSG-CN WG2
Phoenix, USA, 15-19 November 1999

Document N2-99H20
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	005r1	Current Version:	3.1.0

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

For submission to: CN#06	for approval	X	strategic	X	*(for SMG use only)*
list expected approval meeting # here ↑	for information		non-strategic		

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

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

Source: TSG N2 **Date:** 08/11/99

Subject: Introduction of maximum number for CS

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: Regarding the stage1 specification for Multicall, we studied the necessity of additional data. It should be possible for the number of active calls supported simultaneously to be restricted by user subscription. The user subscription of the maximum number is stored in HLR, and sent to VLR when the Update Location procedure is raised.

Clauses affected:

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	23.016, 23.018, 29.002
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: According to the LS(S2-99C41), we have considered the deletion of the subscriber data for PS Multicall as an assumption.

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2 Definition of subscriber data

2.5 Data related to basic services

2.5.1 Provision of bearer service

Provision of bearer service is a parameter identifying whether a bearer service is provisioned to the mobile subscriber or not. This provision can be achieved through subscription of the mobile subscriber or the bearer service can be generally available. The parameter "provision of bearer service" must be set for the bearer service defined in GSM 02.02 for which a subscription is required.

Provision of bearer service is permanent subscriber data and is stored in the HLR and VLR.

2.5.2 Provision of teleservice

Provision of teleservice is a parameter identifying whether a teleservice is provisioned to the mobile subscriber or not. This provision can be achieved through subscription of the mobile subscriber or the teleservice can be generally available. The parameter "provision of teleservice" must be set for the teleservices defined in GSM 02.03 for which a subscription is required.

Provision of teleservice is permanent subscriber data and is stored in the HLR, SGSN and VLR.

2.5.3 Bearer capability allocation

Bearer capability allocation is a parameter stored against each ISDN number in the case when the Home PLMN allocates one directory number per teleservice and bearer service. In this case it is used to permit the establishment of the correct bearer capability on the connection to the MS. (See GSM 09.07). The bearer capability allocation is not required when the Home PLMN only allocates one directory number per subscriber for all bearer services and teleservices. It is permanent data stored conditionally in both HLR and VLR.

2.5.4 Transfer of SM option

Transfer of SM option is a parameter indicating which path should be used for transfer of Terminating Short Message when GPRS is not supported by the GMSC. Two options are possible :

- « transfer of SM via the MSC when GPRS is not supported in the GMSC » : this option is used to indicate that SM shall always be sent via the MSC when the GMSC does not support the GPRS functionality.
- « transfer of SM via the SGSN when GPRS is not supported in the GMSC » : this option is used to indicate that SM shall always be sent via the SGSN when the GMSC does not support the GPRS functionality.

Transfer of SM option is permanent subscriber data stored in HLR for a GPRS subscription.

The data has an interim nature since in the final solution, the decision on SM Transfer is taken in the SMS-GMSC.

2.5.5 Maximum call number

Maximum call number is a parameter identifying whether a multicall is provisioned to the mobile subscriber or not and indicating the number of active calls supported simultaneously as subscription option. This provision can be achieved through subscription of the mobile subscriber. The maximum call number is permanent data stored conditionally in both VLR and HLR.

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

4 Accessing subscriber data

It shall be possible to retrieve or store subscriber data concerning a specific MS from the HLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Mobile Station ISDN Number (MSISDN)

It shall be possible to retrieve or store subscriber data concerning a specific MS from the VLR by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);
- Temporary Mobile Subscriber Identity (TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the SGSN by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);

  Packet Temporary Mobile Subscriber identity (P-TMSI).

It shall be possible to retrieve or store subscriber data concerning a specific MS from the GGSN by use of each of the following references:

- International Mobile Subscriber Identity (IMSI);

See clause 3 for explanation of M, C, T and P in table 1 and table 2.

Table 1: Overview of data stored for non-GPRS Network Access Mode

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE	
IMSI	2.1.1.1	M	M	P	Note
Network Access Mode	2.1.1.2	M	-	P	Note
International MS ISDN number	2.1.2	M	M	P	
multinumbering MSISDNs	2.1.3	C	-	P	Note
Basic MSISDN indicator	2.1.3.1	C	-	P	
MSISDN-Alert indicator	2.1.3.2	C	-	P	
TMSI	2.1.4	-	C	T	
LMSI	2.1.8	C	C	T	Note
Mobile Station Category	2.2.1	M	M	P	
RAND, SRES and Kc	2.3.1	M	M	T	
Ciphering Key Sequence Number	2.3.2	-	M	T	
MSRN	2.4.1	-	C	T	Note
Location Area Identity	2.4.2	-	M	T	
VLR number	2.4.5	M	-	T	Note
MSC number	2.4.6	M	C	T	
HLR number	2.4.7	-	C	T	
Subscription restriction	2.4.9	C	-	P	
RSZI lists	2.4.10.1	C	-	P	
Zone Code List	2.4.10.2	-	C	P	
MSC area restricted flag	2.4.11	M	-	T	
LA not allowed flag	2.4.12	-	M	T	
ODB-induced barring data	2.4.15.1	C	-	T	
Roaming restriction due to unsupported feature	2.4.15.2	M	M	T	
Cell ID	2.4.16	-	C	T	
LSA Identity	2.4.X.1	C	C	P	
LSA Priority	2.4.X.2	C	C	P	
LSA Only Access Indicator	2.4.X.3	C	C	P	
LSA Active Mode Indicator	2.4.X.4	C	C	P	
VPLMN Identifier	2.4.X.5	C	-	P	
Provision of bearer service	2.5.1	M	M	P	
Provision of teleservice	2.5.2	M	M	P	
BC allocation	2.5.3	C	C	P	
Maximum call number	2.5.5	C	C	P	
IMSI detached flag	2.7.1	-	C	T	
Confirmed by Radio Contact indicator	2.7.4.1	-	M	T	
Subscriber Data Confirmed by HLR indicator	2.7.4.2	-	M	T	
Location Information Confirmed in HLR indicator	2.7.4.3	-	M	T	
Check SS indicator	2.7.4.4	M	-	T	
MS purged for non-GPRS flag	2.7.5	M	-	T	
MNRR	2.7.7	C	-	T	
Subscriber status	2.8.1	C	C	P	
Barring of outgoing calls	2.8.2.1	C	C	P	
Barring of incoming calls	2.8.2.2	C	-	P	
Barring of roaming	2.8.2.3	C	-	P	
Barring of premium rate calls	2.8.2.4	C	C	P	
Barring of supplementary service management	2.8.2.5	C	C	P	
Barring of registration of call forwarding	2.8.2.6	C	-	P	
Barring of invocation of call transfer	2.8.2.7	C	C	P	
Operator determined barring PLMN-specific data	2.8.3	C	C	P	
Handover Number	2.9.1	-	C	T	
Messages Waiting Data	2.10.1	C	-	T	
Mobile Station Not Reachable Flag	2.10.2	C	M	T	
Memory Capacity Exceeded Flag	2.10.3	C	-	T	

(continued)

Table 1 (concluded): Overview of data stored for non-GPRS Network Access Mode

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE	
Trace Reference	2.11.1	C	C	P	
Trace Type	2.11.2	C	C	P	
Operations Systems Identity	2.11.3	C	C	P	
HLR Trace Type	2.11.4	C	-	P	
MAP Error On Trace	2.11.5	C	-	T	
Trace Activated in VLR	2.11.6	C	C	T	
Foreign Subscriber Registered in VLR	2.11.7	-	C	P	Note
VGCS Group Membership List	2.12.1	C	C	P	
VBS Group Membership List	2.12.2	C	C	P	
Broadcast Call Initiation Allowed List	2.12.2.1	C	C	P	
Originating CAMEL Subscription Information	2.14.1.1	C	C	P	
Terminating CAMEL Subscription Information	2.14.1.2	C	-	P	
Location Information/Subscriber state Information	2.14.1.3	C	-	P	
USSD CAMEL subscription information(U-CSI)	2.14.1.4	C	-	P	
SS invocation notification (SS-CSI)	2.14.1.5/3.2	C	C	P	
FTN translation information flag(TIF-CSI)	2.14.1.6	C	-	P	
USSD General CAMEL service information (UG-CSI)	2.14.2	C	-	P	
Negotiated CAMEL Capability Handling	2.14.2	C	-	T	

Table 2: Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE	
IMSI	2.1.1.1	M	M	M	M	P	Note
Network Access Mode	2.1.1.2	M	-	C (a)	-	P	Note
International MS ISDN number	2.1.2	M	M	M	-	T	
multinumbering MSISDNs	2.1.3	C	-	-	-	T	Note
Basic MSISDN indicator	2.1.3.1	C	-	-	-	T	.
MSISDN-Alert indicator	2.1.3.2	C	-	-	-	T	
P-TMSI	2.1.5	-	-	C	-	T	Note
TLLI	2.1.6	-	-	C	-	T	
Random TLLI	2.1.7	-	-	C	-	T	Note
IMEI	2.1.9	-	-	C	-	T	
RAND/SRES and Kc	2.3.1	M	-	M	-	T	
Ciphering Key Sequence Number	2.3.2	-	-	M	-	T	
Selected Ciphering Algorithm	2.3.3	-	-	M	-	T	
Current Kc	2.3.4	-	-	M	-	T	
P-TMSI Signature	2.3.5	-	-	C	-	T	
Routing Area Identity	2.4.3	-	-	M	-	T	
Cell Global Identification	2.4.4	-	-	C	-	T	
SGSN Number	2.4.8.1	M	C (Gs)	-	-	T	Note
GGSN Number	2.4.8.2	©	-	-	-	P	Note
VLR Number	2.4.5	M	-	C (Gs)	-	T	
RSZI Lists	2.4.10.1	C	-	-	-	P	
Zone Code List	2.4.10.2	-	-	C	-	P	
LA not allowed flag	2.4.12	-	-	M	-	T	
SGSN area restricted flag	2.4.13	M	-	-	-	T	
Roaming Restriction in the SGSN ..	2.4.15.2	M	-	M	-	T	
Cell ID	2.4.16	-	-	C	-	T	
LSA Identity	2.4.X.1	C	C	C	-	P	
LSA Priority	2.4.X.2	C	C	C	-	P	
LSA Only Access Indicator	2.4.X.3	C	C	C	-	P	
LSA Active Mode Indicator	2.4.X.4	C	C	C	-	P	
VPLMN Identifier	2.4.X.5	C	-	-	-	P	
Provision of teleservice	2.5.2	C	-	C	-	P	
Transfer of SM option	2.5.4	M	-	-	-	P	
Subscriber Status	2.8.1	C	-	C	-	P	
Barring of outgoing calls	2.8.2.1	C	-	C	-	P	
Barring of roaming	2.8.2.3	C	-	C	-	P	
ODB PLMN-specific data	2.8.3	C	-	C	-	P	
MM State	2.7.3	-	-	M	-	T	
Subscriber Data Confirmed by HLR Indicator	2.7.4.2	-	-	M	-	T	
Location Info Confirmed by HLR Indicator	2.7.4.3	-	-	M	-	T	
MS purged for GPRS flag	2.7.6	M	-	-	-	T	
MNRG	2.7.2	M	-	M	M	T	
MNRR	2.7.7	C	-	-	-	T	
Trace Activated in SGSN	2.11.7	C	-	C	-	P	
PDP Type	2.13.1	C	-	C	M	P	
PDP Address	2.13.2	C	-	C	M	P	
NSAPI	2.13.3	-	-	C	C	T	
PDP State	2.13.4	-	-	C	-	T	
New SGSN Address	2.13.5	-	-	C	-	T	
Access Point Name	2.13.6	C	-	C	C	P/T	Note
GGSN Address in Use	2.13.7	-	-	C	-	T	
VPLMN Address Allowed	2.13.8	C	-	C	-	P	
Dynamic Address	2.13.9	-	-	-	C	T	
SGSN Address	2.13.10	-	-	-	M	T	
GGSN-list	2.13.11	M	-	-	-	T	

(continued)

Table 2 (concluded): Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
Quality of Service Subscribed	2.13.12	C	-	C	-	P
Quality of Service Requested	2.13.13	-	-	C	-	T
Quality of Service Negotiated	2.13.14	-	-	C	M	T
SND	2.13.15	-	-	C	C	T
SNU	2.13.16	-	-	C	C	T
DRX Parameters	2.13.17	-	-	M	-	T
Compression	2.13.18	-	-	C	-	T
NGAF	2.13.19	-	-	C (Gs)	-	T
Classmark	2.13.20	-	-	M	-	T
TID	2.13.21	-	-	C	C	T
Radio Priority	2.13.22	-	-	C	-	T
Radio Priority SMS	2.13.23	-	-	C	-	T

NOTE: The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.
(Gs): The VLR column is applicable if Gs interface is installed. It only indicates GPRS related data to be stored and is only relevant to GPRS subscribers registered in VLR.

a): This parameter is relevant in the SGSN only when the Gs interface is installed.

NOTE: For special condition of storage see in the clauses 2.x.y referred-to.
See clause 3 for explanation of M,C,T and P in table 2.

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Phoenix, USA, 15-19 November 1999

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23.016	CR	005r1	Current Version:	3.2.1

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

For submission to:	CN#06	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

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

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

Source: TSG N2 **Date:** 08/11/99

Subject: Introduction of maximum number for CS

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: Regarding the stage1 specification for Multicall, we studied the necessity of additional data. It should be possible for the number of active calls supported simultaneously to be restricted by user subscription. The user subscription of the maximum number is stored in HLR, and sent to VLR when the Update Location procedure is raised.

Clauses affected:

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	23.008, 23.018, 29.002
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: According to the LS(S2-99C41), we have considered the deletion of the subscriber data for PS Multicall as an assumption.

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3 Definitions and abbreviations

3.1 Abbreviations

Abbreviations used in this specification are listed in GSM 01.04.

3.2 Definitions

Subscriber data to be stored in the HLR, VLR and SGSN are defined in GSM 03.08, and in GSM 03.6x, GSM 03.8x and GSM 03.9x-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).

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).

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, GSM 03.8x and GSM 03.9x-series of technical specifications and GSM 03.15) and by PLMN defined requirements.

NOTE 1: 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, GSM 03.8x and GSM 03.9x-series of technical specifications and GSM 03.15) or by PLMN defined requirements but is not defined as mandatory data.

NOTE 2: 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;
- basic service information (Group B):
  - Bearer Service list;
  - Teleservice list.

NOTE 3: 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;
  - 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.
- LSA Information (Group I):
  - LSA data.
- Multicall Information (Group J):
  - maximum call number

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.
- LSA Information (Group P7):
  - LSA data.

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

4 General on handling of subscriber information

4.3 Order of information and distribution over message boundaries

4.3.1 Order of information sent by the HLR

The order of information is defined by the order in which the transfer syntax is generated by the HLR. This includes a sequence of messages as well as the syntax within a message (first to last message, component, operation, parameter, etc.).

With the above definitions, the following rules shall apply for non-GPRS subscriber data for the order of information within an HLR-VLR dialogue:

- Group A information (subscriber status) shall be sent first;
- Group B information shall be sent after Group A information and before any Group C, E, F, G, ~~or~~ H or J information;
- Group D information shall be sent after Group A information and in any order with respect to Group B, C, E, F, G, ~~and~~ H and J information.
- a specific order of Group C, E, F, G, ~~or~~ H or J information is not required.

There is no requirement for the sending of subscriber information groups in the same message.

With the above definitions, the following rules shall apply for GPRS subscriber data for the order of information within a dialogue:

- Group P1 information (subscriber status) shall be sent first;
- Group P2 information shall be sent after P1 information and before P4 and P5 information
- Group P3 information shall be sent after Group P1 information and in any order with respect to Group P2, P4, P5 and P6 information.
- a specific order of Group P4, P5 and P6 information is not required.

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

4.5 Handling of supplementary service data with respect to basic service data

4.5.4 Consistency of supplementary service data

In some cases, the protocol used between the HLR and VLR encodes some data that is not EBSG-related SS data with an EBSG qualifier. In this case, the HLR shall ensure that when this data is sent it is always the same for all EBSGs. If this data is modified, the HLR must send the supplementary service data to the VLR for all EBSGs which meet all the following criteria:

- at least one basic service in the EBSG is supported; and
- the supplementary service is applicable to at least one (possibly different) basic service in the EBSG; and
- the subscriber has a subscription to at least one (possibly different) basic service in the EBSG.

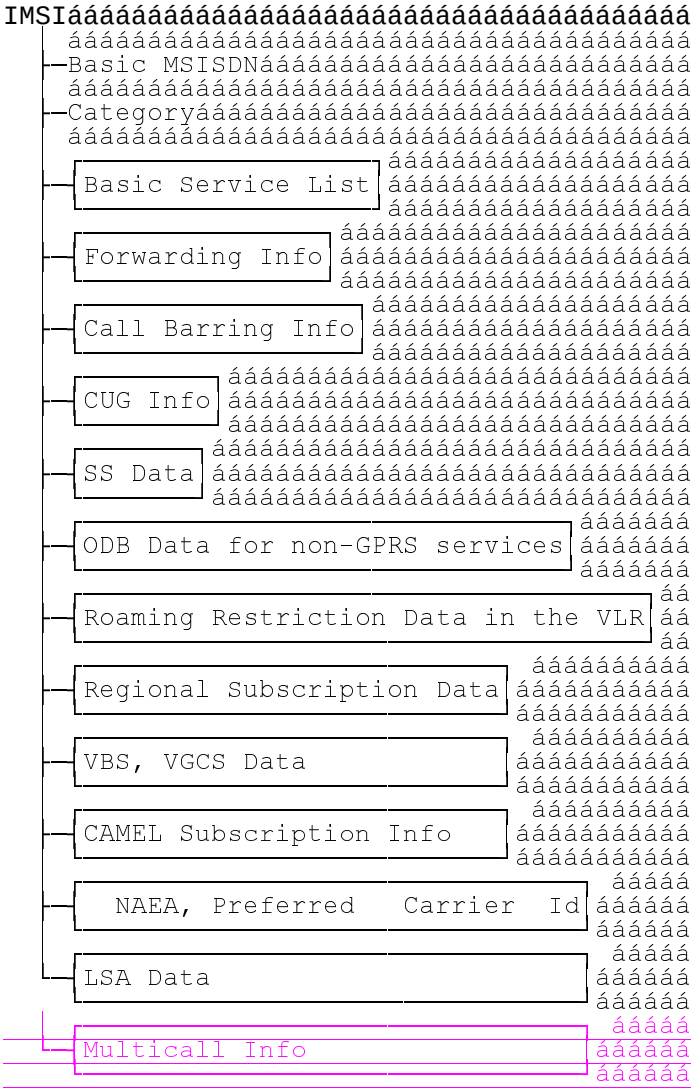


Figure 1: Abstract data structure of non-GPRS Subscriber Data (Data sent to the VLR)

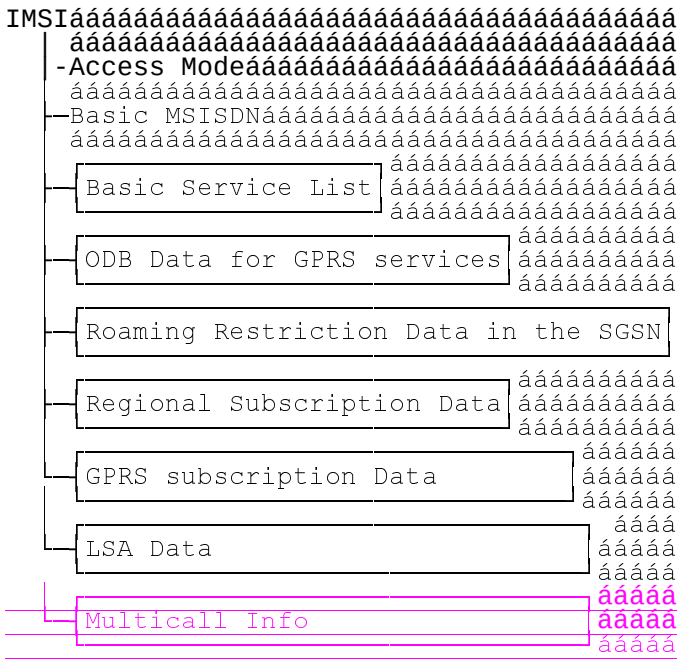


Figure 1a: Abstract data structure of GPRS Subscriber Data (Data sent to the SGSN)

NOTE: For detailed information see TS 29.002.

Figure 15: Multicall Info in the VLR

3GPP TSG-CN WG2
Phoenix, USA, 15-19 November 1999

***Document* N2-99H19**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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

23.018	CR	025r2	Current Version:	3.0.0

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

For submission to: CN#06 *list expected approval meeting # here ↑*

for approval	X		strategic	X	*(for SMG use only)*
for information			non-strategic		

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

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

Source: TSG N2 **Date:** 08/11/99

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: Regarding the stage1 specification for Multicall, we studied the necessity of multicall subscription check procedure. The number of active calls supported simultaneously shall be restricted by user subscription. The maximum number of CS calls is set in VLR and multicall subscription check procedure in VLR is applied to both MO and MT.

Clauses affected:

Other specs affected:

Other 3G core specifications	X	→ List of CRs:	23.008, 23.016, 29.002
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.

5 Information flows

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.

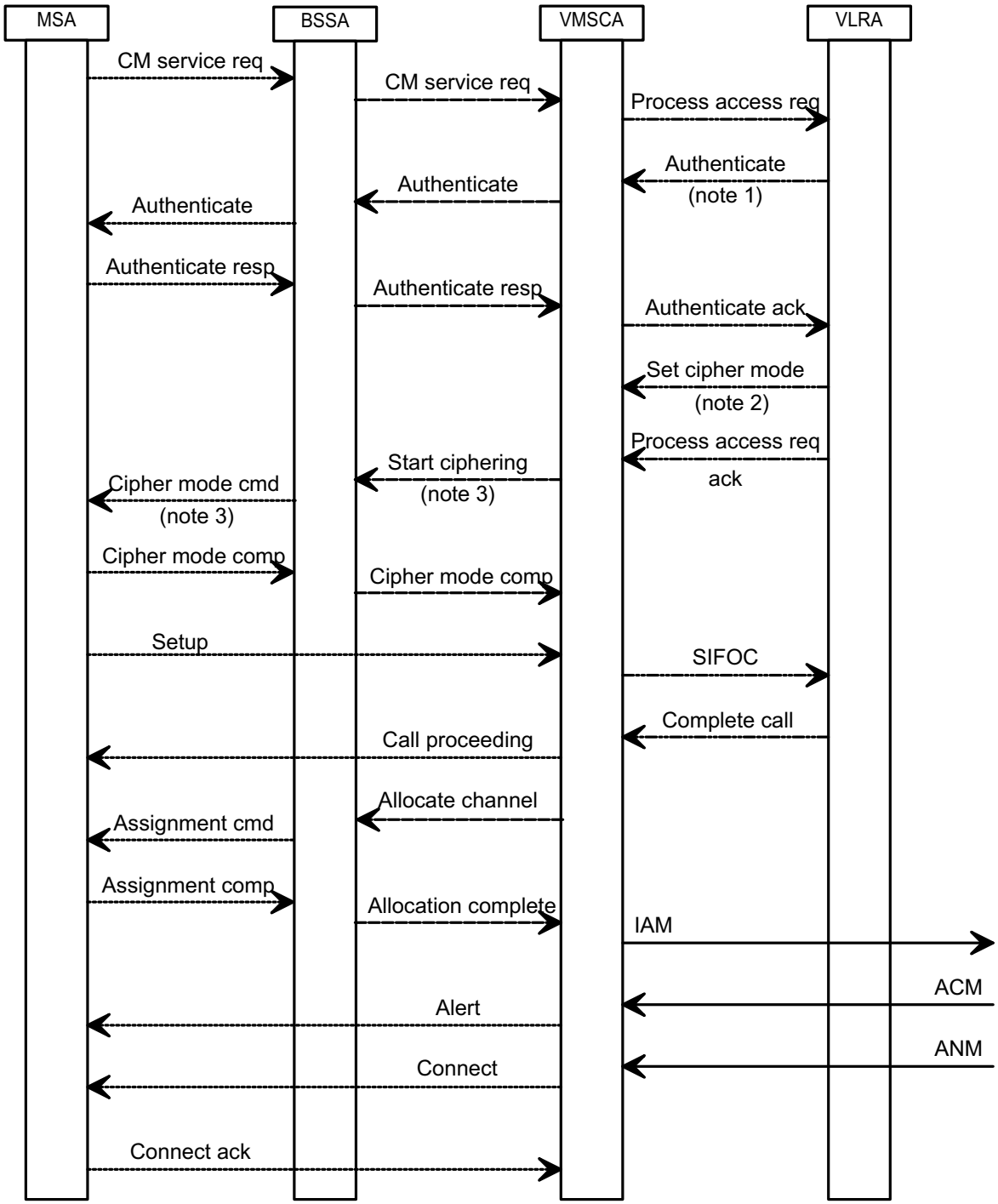


Figure 1: Information flow for a basic mobile originated call

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. VLRA may also initiate ciphering at this stage, as described in GSM 03.20. 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 ; 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 ******

7 Functional requirements of network entities

7.1 MO call

7.1.2 Functional requirements of VLR

7.1.2.3 Procedure OG_Call_Subscription_Check_VLR

Sheet 1: the procedure Check_OG_Multicall is implementation option. If the VLR does not support Multicall, processing continues from the "Yes" exit of the test "Result=Call allowed?".

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. If the VMSC does not support UUS, 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 and GSM 03.78 for CAMEL Phase 2 . 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.

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

7.1.2.17 Procedure Check_OG_Multicall

If the VLR doesn’t have multicall subscription data, the maximum number of simultaneous bearer is regarded as one.

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

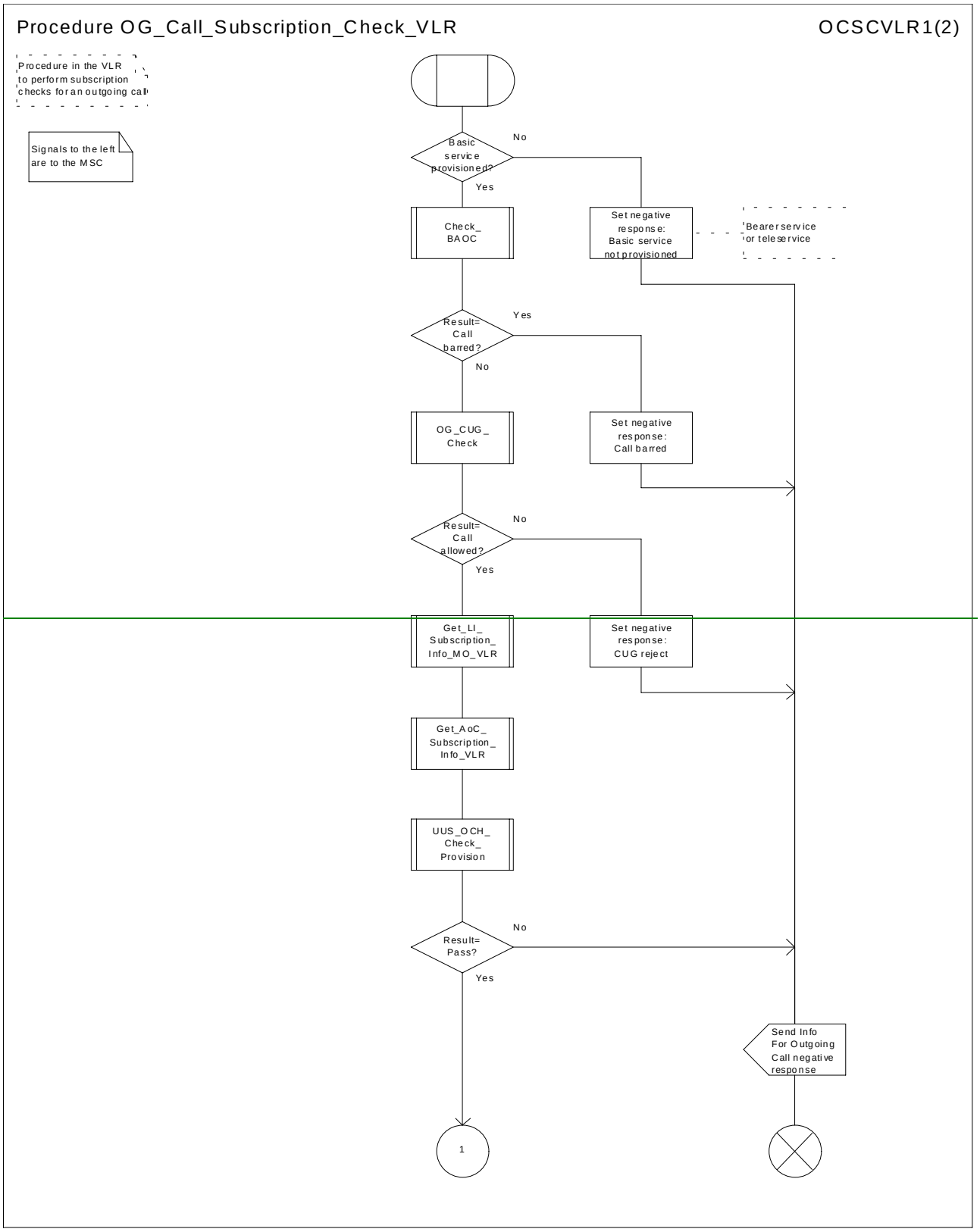


Figure 21a: Procedure OG_Call_Subscription_Check_VLR (sheet 1)

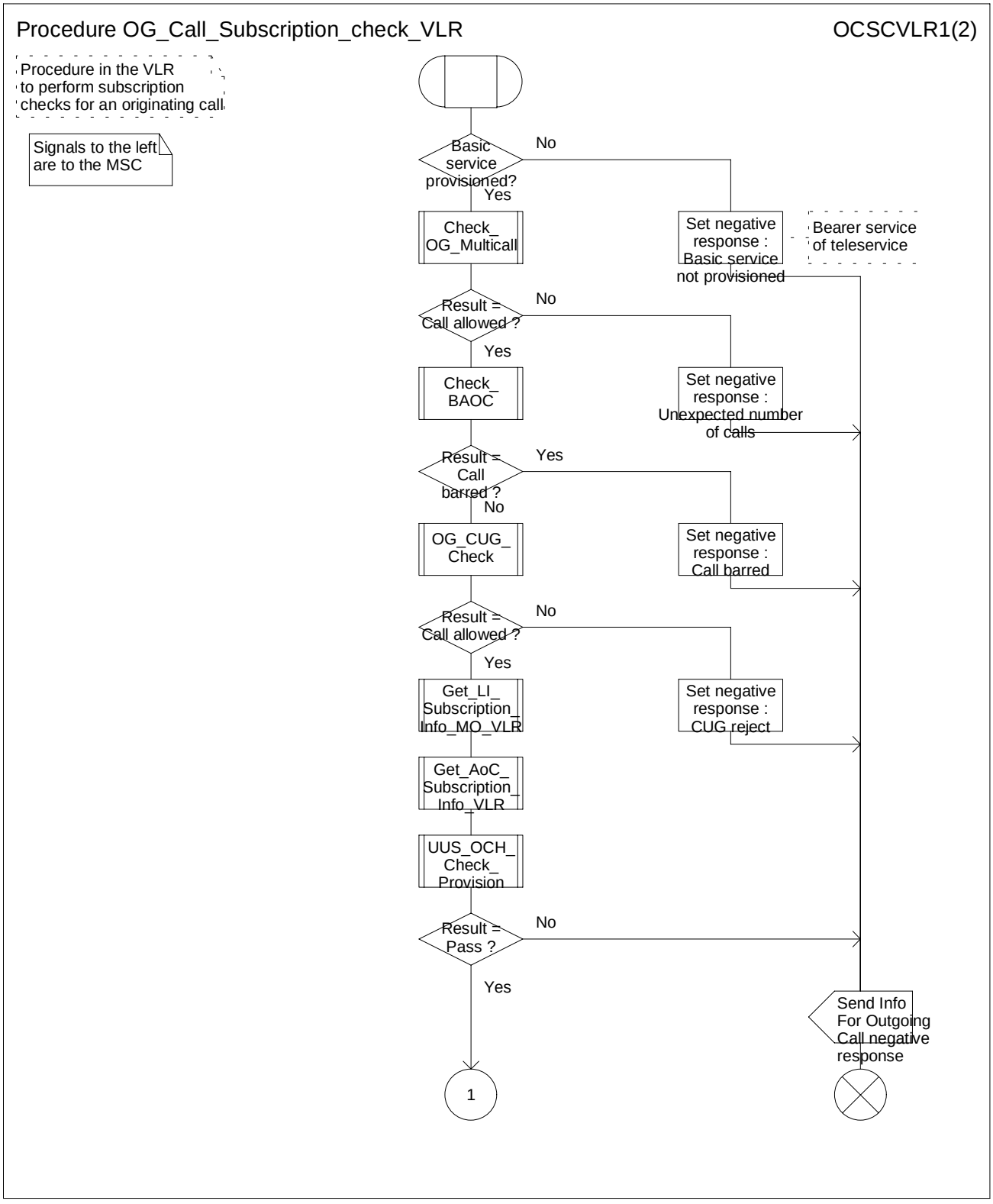


Figure 21a: Procedure OG_Call_Subscription_Check_VLR (sheet 1)

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

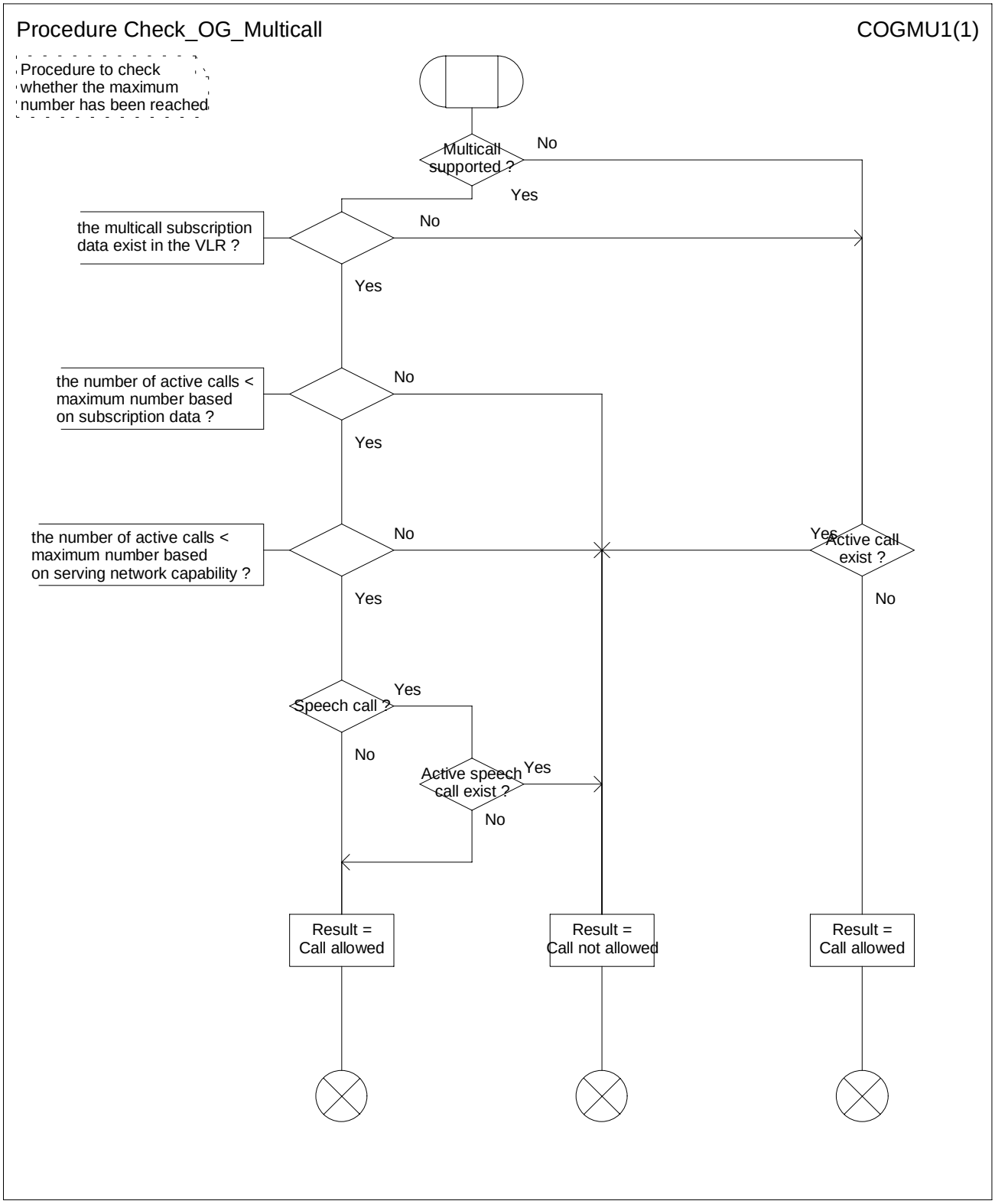


Figure XX: Procedure Check_OG_Multicall

****** 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: If the MSC support Multicall service, the MSC shall send the number of active calls to VLR.

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: the negative response Busy Subscriber (More calls possible) includes the basic service which applies for the established call.

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.

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

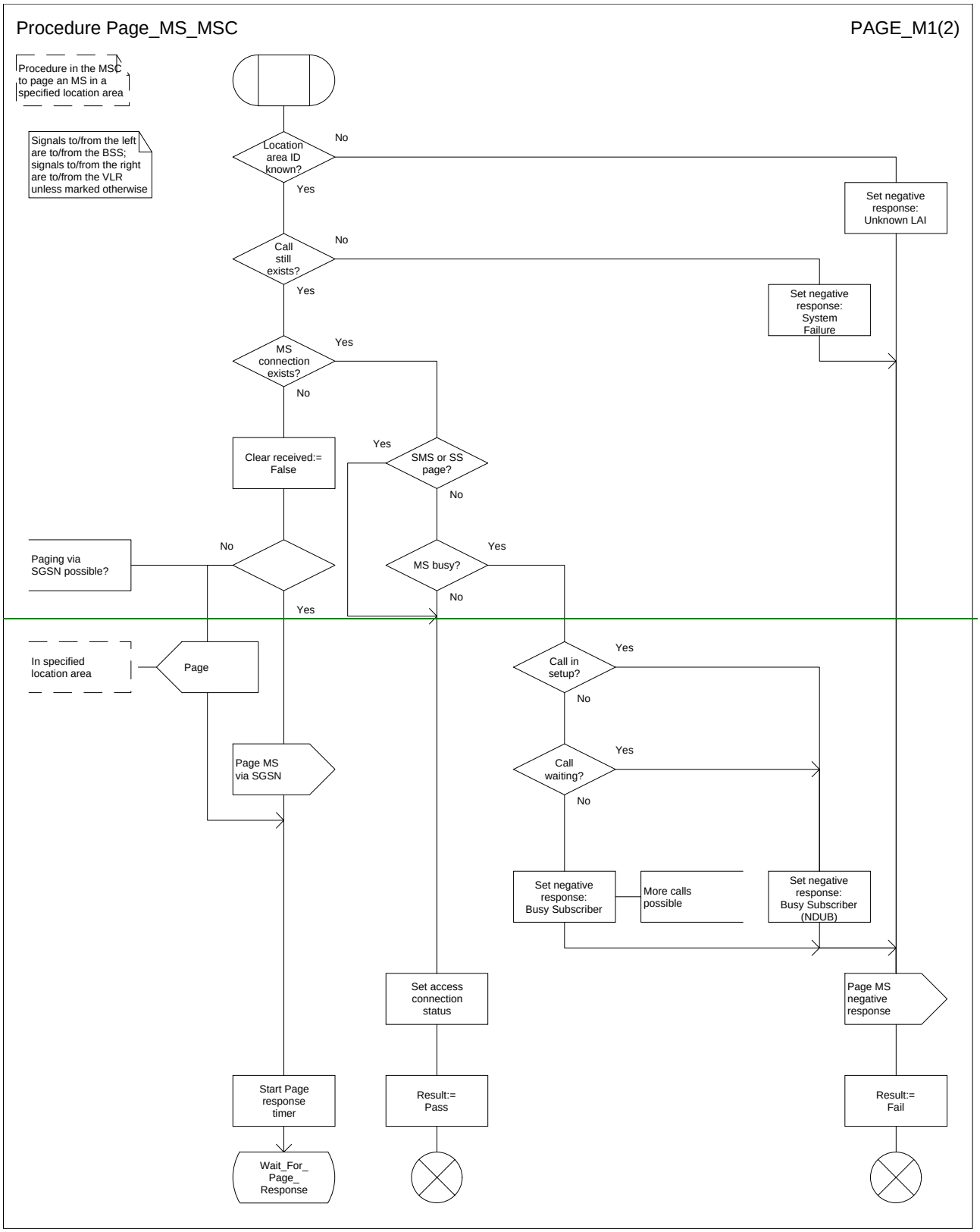


Figure 59a: Procedure Page_MS_MSC (sheet1)

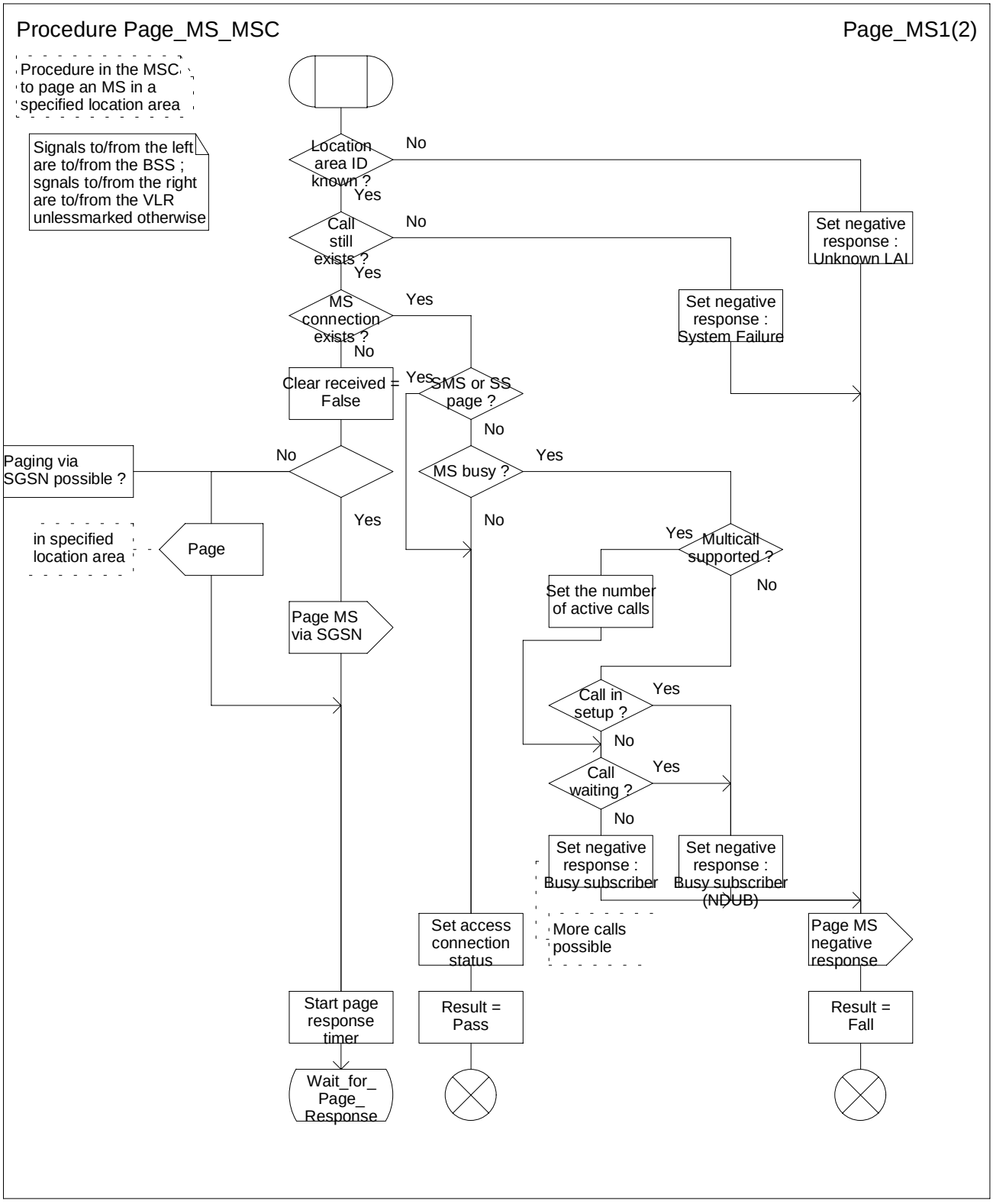


Figure 59a: Procedure Page_MS_MSC (sheet 1)

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

7.3.2 Functional requirements of VLR

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 CCBS_ICH_Set_CCBS_Call_Indicator is specific to CCBS; it is specified in GSM 03.93.

Sheet 1: 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 1, sheet 2, sheet 3: the procedure CCBS_ICH_VLR_Report_Failure is specific to CCBS; it is specified in GSM 03.93.

Sheet 1, sheet 2: the procedure CCBS_ICH_Report_Not_Reachable is specific to CCBS; it is specified in GSM 03.93.

Sheet 2: the procedure Check_MT_Multicall_VLR is implementation option. If the maximum number has been reached, the test "NDUB?" shall take .

Sheet 2: 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 2: 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 2: 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 2: 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.

Sheet 2: the procedure Get_AoC_Subscription_Info_VLR is specific to AoC; it is specified in subclause 7.1.2.15.

Sheet 2 sheet 4: the procedure CLI_ICH_VLR_Add_CLI is specific to Enhanced CLI Handling. It is specified in GSM 03.81.

Sheet 2: the procedure CCBS_ICH_Handle_NDUB is specific to CCBS; it is specified in GSM 03.93. If the VLR does not support CCBS, processing continues from the "Forward" exit of the test "Result".

Sheet 2: the procedure Process_Access_Request_VLR is specified in subclause.

Sheet 2: the output signal Page MS towards the SGSN includes the Location area identity parameter.

Sheet 2: if the VLR does not support CUG, handling continues from the "No" exit of the test "CUG info present?".

Sheet 3, sheet 4: the procedure CD_Authorization is specific to Call Deflection, it is specified in GSM 03.72. If the VLR does not support Call Deflection, processing continues from the "Yes" exit of the test "Result=Aborted?".

Sheet 3, sheet 4: the procedure CCBS_ICH_Handle_UDUB is specific to CCBS; it is specified in GSM 03.93.

Sheet 4: the test "NDUB?" is executed only if the VLR supports CCBS. If the VLR does not support CCBS, processing continues from connector 5.

Sheet 5: the procedure CCBS_ICH_Set_CCBS_Target is specific to CCBS; it is specified in GSM 03.93.

Sheet 5: the procedure Handle_CFNRc is specified in subclause.

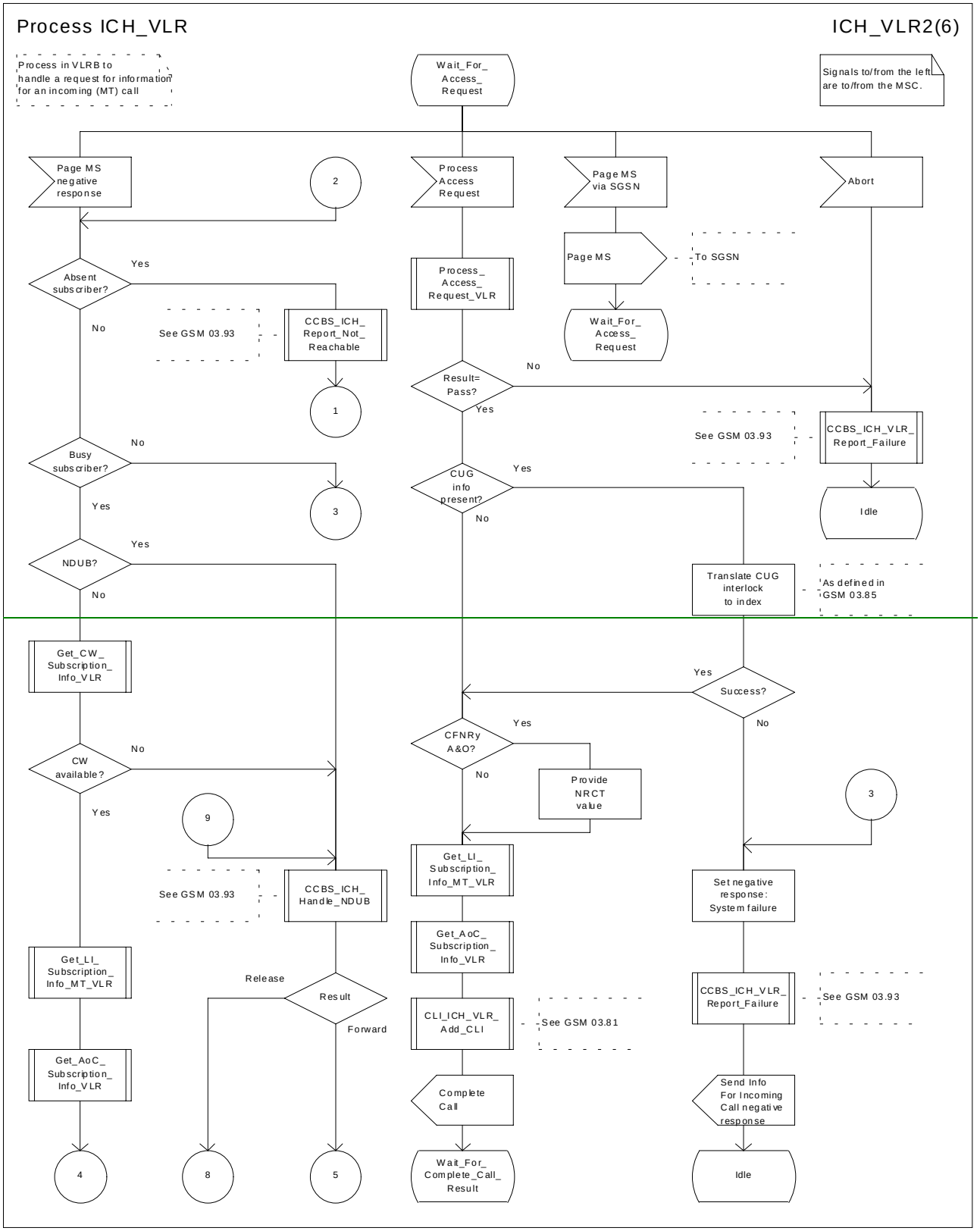
Sheet 6: the procedure Forward_CUG_Check is specific to CUG; it is specified in subclause. If the VLR does not support CUG, processing continues from the "Yes" exit of the test "Result=Call allowed?".

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

7.3.2.8 Procedure Check_MT_Multicall_VLR

If the VLR doesn’t have multicall subscription data, the maximum number of simultaneous bearer is regarded as one.

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



~~Figure 68b: Process ICH_VLR (sheet 2)~~

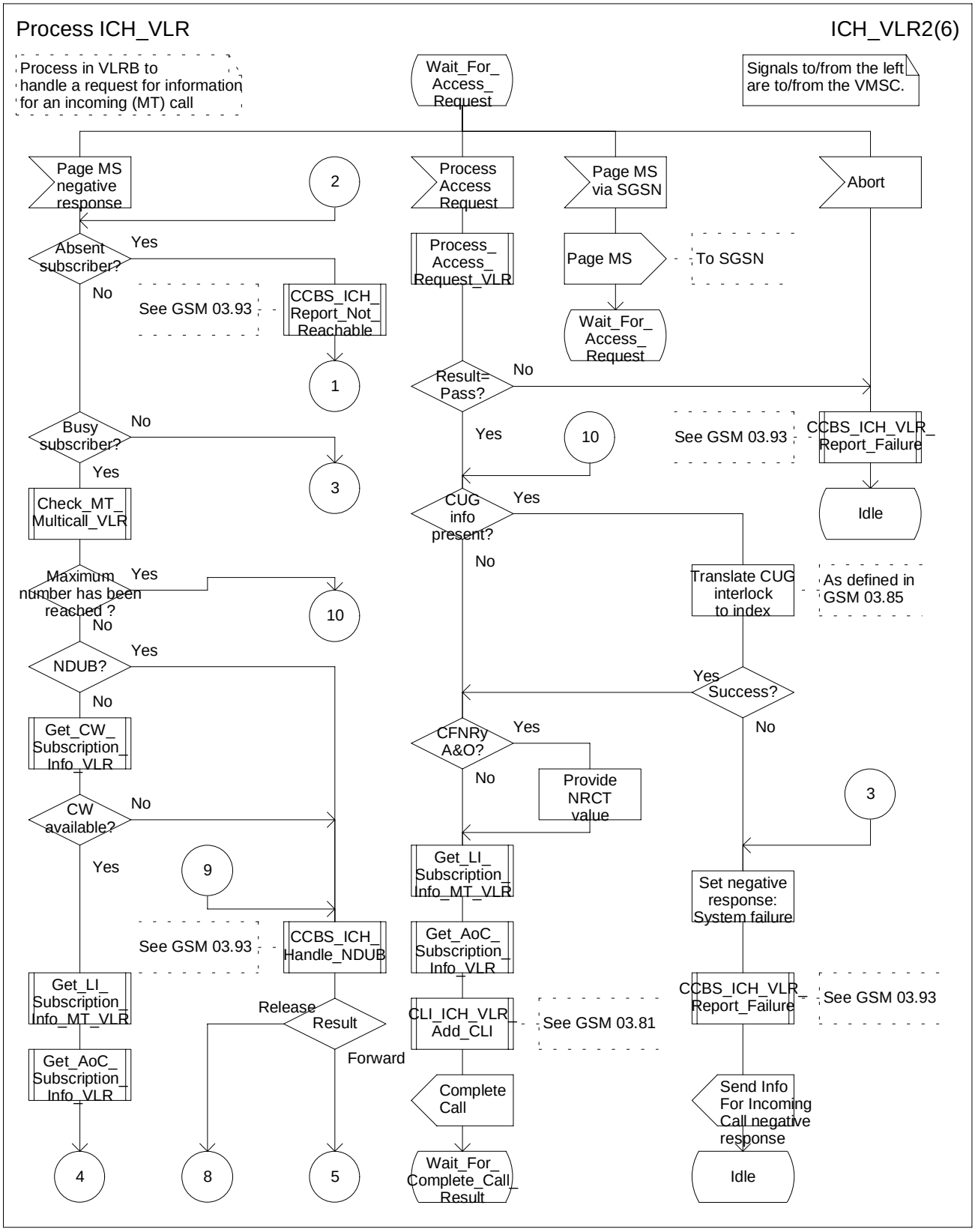


Figure 68b: Process ICH_VLR (sheet 2)

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

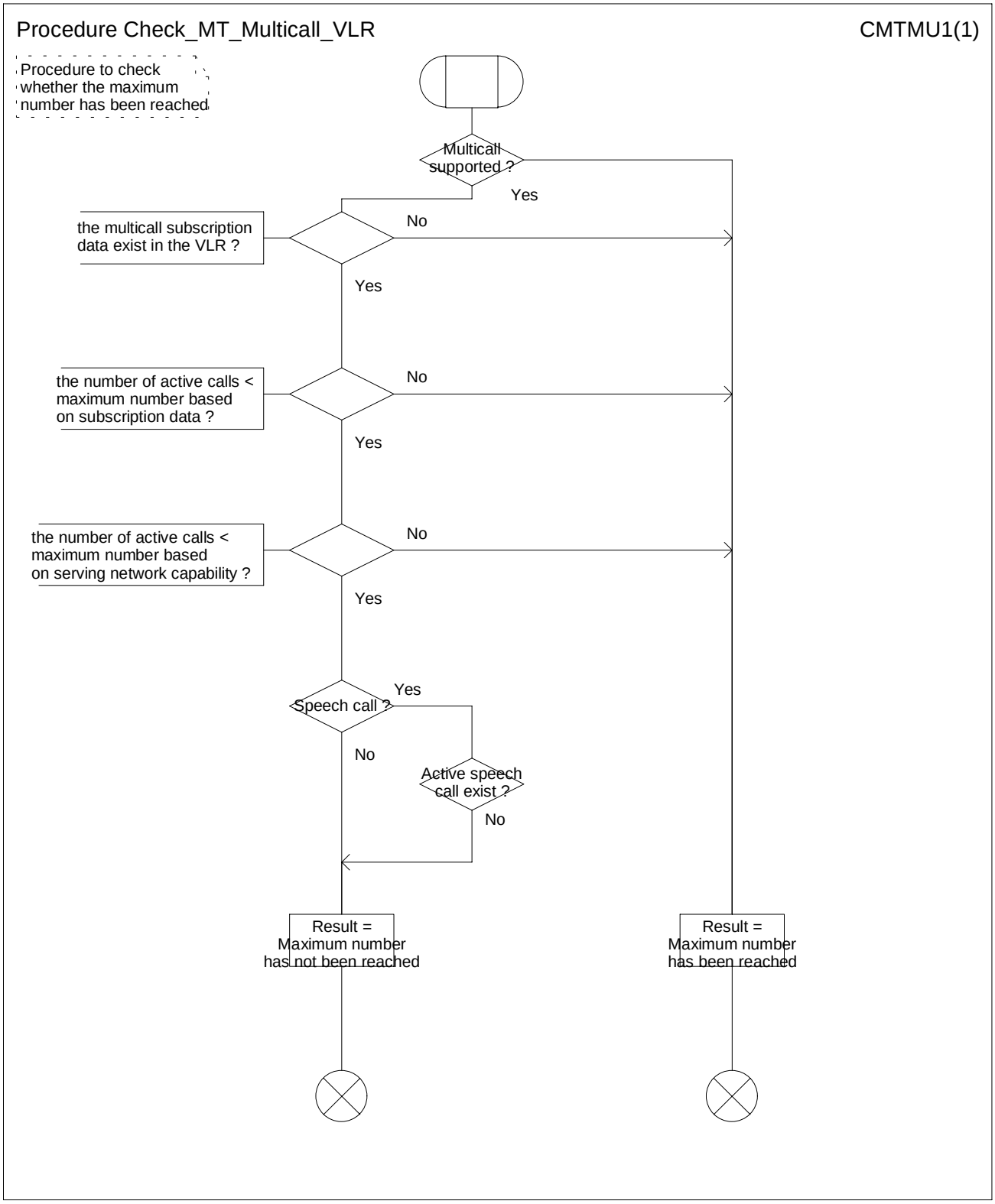


Figure XX: Process Check_MT_Multicall_VLR (sheet 1)

3GPP TSG-CN WG2
Phoenix, USA, 15-19 November 1999

Document N2-99J54
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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29.002	**CR**	**048r2**	Current Version:	3.2.0

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

For submission to:	CN#06	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:	TSG N2	**Date:**	16/11/99

Subject: Introduction of maximum number for CS

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: Regarding the stage1 specification for Multicall, we studied the necessity of additional data. It should be possible for the number of active calls supported simultaneously to be restricted by user subscription. The user subscription of the maximum number is stored in HLR, and sent to VLR when the Update Location procedure is raised.

Clauses affected:

Other specs affected:				
Other 3G core specifications	X	→ List of CRs:	23.008, 23.016, 23.018
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: According to the LS(S2-99C41), we have considered the deletion of the subscriber data for PS Multicall as an assumption.

help.doc

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

7 General on MAP services

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		

7

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

Absent Subscriber Diagnostic SM	7.6.8.9	Invoke Id	7.6.1.1
Access connection status	7.6.9.3	ISDN Bearer Capability	7.6.3.41
Access signalling information	7.6.9.5	Kc	7.6.7.4
Additional Absent Subscriber Diagnostic SM	7.6.8.12	Linked Id	7.6.1.2
Additional number	7.6.2.46	LMSI	7.6.2.16
Additional signal info	7.6.9.10	Location Information	7.6.2.30
Additional SM Delivery Outcome	7.6.8.11		
Alert Reason	7.6.8.8	Location update type	7.6.9.6
Alert Reason Indicator	7.6.8.10	Lower Layer Compatibility	7.6.3.42
		LSA Information	7.6.3.56
		LSA Information Withdraw	7.6.3.58
		Maximum Call Number	7.6.3.66
Alerting Pattern	7.6.3.44	Mobile Not Reachable Reason	7.6.3.51
All GPRS Data	7.6.3.53	More Messages To Send	7.6.8.7
All Information Sent	7.6.1.5	MS ISDN	7.6.2.17
APN	7.6.2.42	MSC number	7.6.2.11
Authentication set list	7.6.7.1	MSIsdn-Alert	7.6.2.29
B-subscriber Address	7.6.2.36	MWD status	7.6.8.3
B subscriber Number	7.6.2.48	Network Access Mode	7.6.3.50
B subscriber subaddress	7.6.2.49	Network node number	7.6.2.43
Basic Service Group	7.6.4.40	Network resources	7.6.10.1
Bearer service	7.6.4.38	Network signal information	7.6.9.8
BSS-apdu	7.6.9.1	New password	7.6.4.20
Call barring feature	7.6.4.19	No reply condition timer	7.6.4.7
Call barring information	7.6.4.18	North American Equal Access preferred Carrier Id	7.6.2.34
Call Direction	7.6.5.8	Number Portability Status	7.6.5.14
Call Info	7.6.9.9	ODB General Data	7.6.3.9
Call reference	7.6.5.1	ODB HPLMN Specific Data	7.6.3.10
Called number	7.6.2.24	OMC Id	7.6.2.18
Calling number	7.6.2.25	Originally dialled number	7.6.2.26
CAMEL Subscription Info Withdraw	7.6.3.38		
Cancellation Type	7.6.3.52	Originating entity number	7.6.2.10
Category	7.6.3.1	Override Category	7.6.4.4
CCBS Feature	7.6.5.8	P-TMSI	7.6.2.47
Channel Type	7.6.5.9	PDP-Address	7.6.2.45
Chosen Channel	7.6.5.10	PDP-Context identifier	7.6.3.55
Ciphering mode	7.6.7.7	PDP-Type	7.6.2.44
Cksn	7.6.7.5	Previous location area Id	7.6.2.4
CLI Restriction	7.6.4.5	Protocol Id	7.6.9.7
CM service type	7.6.9.2	Provider error	7.6.1.3
Complete Data List Included	7.6.3.54		
CUG feature	7.6.3.26	QoS-Subscribed	7.6.3.47
CUG index	7.6.3.25	Rand	7.6.7.2
CUG info	7.6.3.22	Regional Subscription Data	7.6.3.11
CUG interlock	7.6.3.24	Regional Subscription Response	7.6.3.12
CUG Outgoing Access indicator	7.6.3.8	Requested Info	7.6.3.31
CUG subscription	7.6.3.23	Roaming number	7.6.2.19
CUG Subscription Flag	7.6.3.37	Roaming Restricted In SGSN Due To Unsupported Feature	7.6.3.49
Current location area Id	7.6.2.6	Roaming Restriction Due To Unsupported Feature	7.6.3.13
Current password	7.6.4.21	Service centre address	7.6.2.27
eMLPP Information	7.6.4.41	Serving Cell Id	7.6.2.37
Equipment status	7.6.3.2	SGSN address	7.6.2.39
Extensible Basic Service Group	7.6.3.5	SGSN number	7.6.2.38
Extensible Bearer service	7.6.3.3	SIWF Number	7.6.2.35
		SoLSA Support Indicator	7.6.3.57
Extensible Call barring feature	7.6.3.21	SM Delivery Outcome	7.6.8.6
Extensible Call barring information	7.6.3.20	SM-RP-DA	7.6.8.1
Extensible Forwarding feature	7.6.3.16	SM-RP-MTI	7.6.8.16
Extensible Forwarding info	7.6.3.15	SM-RP-OA	7.6.8.2
Extensible Forwarding Options	7.6.3.18	SM-RP-PRI	7.6.8.5
Extensible No reply condition timer	7.6.3.19	SM-RP-SMEA	7.6.8.17
Extensible SS-Data	7.6.3.29	SM-RP-UI	7.6.8.4
Extensible SS-Info	7.6.3.14	Sres	7.6.7.3
Extensible SS-Status	7.6.3.17	SS-Code	7.6.4.1

Extensible Teleservice	7.6.3.4	SS-Data	7.6.4.3
External Signal Information	7.6.9.4	SS-Event	7.6.4.42
Forwarded-to number	7.6.2.22	SS-Event-Data	7.6.4.43
Forwarded-to subaddress	7.6.2.23	SS-Info	7.6.4.24
Forwarding feature	7.6.4.16	SS-Status	7.6.4.2
Forwarding information	7.6.4.15	Stored location area Id	7.6.2.5
Forwarding Options	7.6.4.6	Subscriber State	7.6.3.30
GGSN address	7.6.2.40	Subscriber Status	7.6.3.7
GGSN number	7.6.2.41	Supported CAMEL Phases	7.6.3.36
GMSC CAMEL Subscription Info	7.6.3.34	Suppress T-CSI	7.6.3.33
GPRS Node Indicator	7.6.8.14	Suppression of Announcement	7.6.3.32
GPRS Subscription Data	7.6.3.46	Target cell Id	7.6.2.8
GPRS Subscription Data Withdraw	7.6.3.45	Target location area Id	7.6.2.7
GPRS Support Indicator	7.6.8.15	Target MSC number	7.6.2.12
Group Id	7.6.2.33	Teleservice	7.6.4.39
GSM bearer capability	7.6.3.6	TMSI	7.6.2.2
Guidance information	7.6.4.22	Trace reference	7.6.10.2
Handover number	7.6.2.21	Trace type	7.6.10.3
High Layer Compatibility	7.6.3.43	User error	7.6.1.4
HLR Id	7.6.2.15	USSD Data Coding Scheme	7.6.4.36
HLR number	7.6.2.13	USSD String	7.6.4.37
HO-Number Not Required	7.6.6.7	UU Data	7.6.5.12
IMEI	7.6.2.3	UUS CF Interaction	7.6.5.13
IMSI	7.6.2.1	VBS Data	7.6.3.40
Inter CUG options	7.6.3.27	VGCS Data	7.6.3.39
Intra CUG restrictions	7.6.3.28	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 Modified Section ******

7.6.3 Subscriber management parameters

7.6.3.66 Maximum Call Number

This parameter indicates the maximum number of active calls supported simultaneously.

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

8 Mobility services

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.

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.

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(=)		
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(=)		
LSA Information	C	C(=)		
SS-Code List			C	C(=)
LMU Identifier	C	C(=)		
LCS Information	C	C(=)		
Maximum Call Number	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.

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.

LMU Identifier

This parameter indicates the presence of an LMU.

LCS Information

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

- list of GMLCs in the HPLMN
- privacy exception list

Maximum Call Number

This parameter indicates the maximum number of active calls supported simultaneously. It is included either at location updating or when it is changed. This parameter is used by the VLR.

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 contains the SS-CSI and/or the O-CSI. 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. If a set of CAMEL Subscription Info is already stored in the VLR it is replaced by the received data. 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). See GSM 03.72 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 GSM 03.78. This parameter is used only by the VLR.

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.

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 ******

17 Abstract syntax of the MAP protocol

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