

CAI Interface Specification for HLR Components

Ericsson Dynamic Activation 1

SYSTEM INTERFACE

Copyright

© Ericsson AB 2017. All rights reserved. No part of this document may be reproduced in any form without the written permission of the copyright owner.

Disclaimer

The contents of this document are subject to revision without notice due to continued progress in methodology, design and manufacturing. Ericsson shall have no liability for any error or damage of any kind resulting from the use of this document.

Trademark List

All trademarks mentioned herein are the property of their respective owners. These are shown in the document Trademark Information.



Contents

1	Introduction	1
1.1	Purpose and Scope	1
1.2	Target Group	1
1.3	Typographic Conventions	2
1.4	Prerequisites	2
2	CAI Overview	2
2.1	General	3
3	Communication Protocol	5
3.1	General	5
3.2	Transport and Network Layer	6
3.2.1	Direct Socket Communication	6
3.2.2	Telnet	7
3.3	Session and Presentation Layer	8
3.3.1	Opening a Session	8
3.3.2	Closing a Session	9
3.3.3	Ending a Session	9
4	Message Formats	10
4.1	Character Representation	10
4.1.1	Examples	10
4.2	Message Request Format	11
4.3	Message Response Format	13
5	Control Commands	14
5.1	Login	14
5.1.1	Request Syntax	14
5.1.2	Response Syntax	14
5.1.3	Examples	15
5.2	Logout	15
5.2.1	Request Syntax	15
5.2.2	Response Syntax	15
5.2.3	Examples	15
5.3	Message Response	16
6	HLR Subscription	17
6.1	Composite Parameter Definitions	17
6.1.1	Customer Service Orders (CSO)	17



6.1.2	Subscriber Data	32
6.1.3	Profiles	37
6.1.4	Additional MSISDN	40
6.1.5	CAMEL	42
6.1.6	Closed User Groups	59
6.1.7	Mobility Management Related IN Triggering	63
6.1.8	Remove References of IMSI Changeover	66
6.1.9	GPRS	66
6.1.10	Gateway Mobile Location Center (GMLC) Address	70
6.1.11	Location Services (LOC SERVICES)	72
6.1.12	Spatial Trigger Support (SPATIAL TRIGGER)	78
6.1.13	SMS Spam Control	79
6.1.14	Multiple SIM	80
6.2	Request and Response Parameters	81
6.2.1	HLR GPRS Quality of Service Parameters	94
6.2.2	HLR Message Waiting Parameters	96
6.3	HLR Subscriber Data Abbreviations	96
6.3.1	Bearer Services	96
6.3.2	Tele Services	97
6.3.3	Barring Services	97
6.3.4	Call Forwarding Services	98
6.3.5	Line Identification Services	98
6.3.6	Operator Determined barring Services	98
6.3.7	Subscription Options	99
6.3.8	Closed User Groups	99
6.3.9	CAMEL	100
6.3.10	GPRS Services	101
6.3.11	Location Print Services	101
6.3.12	GMLC Address	101
6.3.13	Location Services (LOC SERVICES)	102
6.3.14	Supplementary Service Groups	102
6.3.15	Others	103
6.4	HLRSUB Message Response	105
7	MNP Subscription	116
7.1	Customer Service Orders	116
7.1.1	NPSUB	116
7.1.2	FNSUB	119
7.2	Request and Response Parameters	124
7.2.1	NP Subscription Parameters	125
7.2.2	FN Subscription Parameters	125
7.3	MNP Subscriber Data Abbreviations	125
7.4	FNSUB and NPSUB Message Response	126
7.4.1	FNSUB and NPSUB	126
8	IMSI Changeover	127
8.1	Customer Service Orders	127
8.1.1	Create IMSICH	128



8.1.2	Set IMSICH	130
8.1.3	Get IMSICH	131
8.1.4	Delete IMSICH	133
8.2	Request and Response Parameters	135
8.3	IMSICH Message Response	136
9	AUC Subscription	138
9.1	Composite Parameter Definitions	138
9.1.1	Decrypting Algorithm	138
9.1.2	Authentication Algorithms	139
9.2	Customer Service Orders	139
9.2.1	Create AUCSUB	140
9.2.2	Set AUCSUB	141
9.2.3	Get AUCSUB	142
9.2.4	Delete AUCSUB	145
9.3	Request and Response Parameters	146
9.4	AUCSUB Message Response	148
10	Appendix	150
10.1	Graphical Structure	150
10.1.1	Example 1	150
10.1.2	Example 2	151
10.2	Error Recovery	151
	Reference List	153





1 Introduction

This document is a specific description of the interface between a Business Support System (BSS) and Ericsson™ Dynamic Activation (EDA) for management of Home Location Register (HLR), Authentication Center (AUC), and other Network Elements (NEs) of their respective relevant versions.

1.1 Purpose and Scope

This document describes the supported methods in CAI for NEs, the attributes used, and the format of input parameters. It aims to provide information for the integration of a BSS with Dynamic Activation.

The following core network databases are supported:

- Home Location Register (HLR)

The HLR application based on a modular concept provides flexibility in various networks. It offers not only common maintenance and development methodology and well-proven process for introducing new and enhanced functionality, but also trouble-free and seamless inter-working between different nodes.

- Authentication Center (AUC)

The AUC generates authentication and ciphering data.

- Mobile Number Portability (MNP)

The MNP node is a high capacity entity designed to cope with the handling of large number series and minimal call setup delays.

The NE redundancy concept in Dynamic Activation support redundant HLRs as well as paired NEs such as MNP and AUC.

For further information, see *Function Specification Resource Activation*, Reference [2].

Note: This document is not intended to be used for M2M subscriptions.

1.2 Target Group

The target group for this document is as follows:

- System Integrator

For information about different target groups, see *Library Overview*, Reference [1]



1.3 **Typographic Conventions**

Typographic conventions are described in *Library Overview*, Reference [1].

1.4 **Prerequisites**

Users of this document must meet the following requirements:

- Have basic knowledge of Dynamic Activation.
- Have proper authority to use Dynamic Activation.
- Have common knowledge of Ericsson systems.
- Have sound knowledge of NEs.

2 **CAI Overview**

The CAI is the interface between a Business Support System (BSS) and Dynamic Activation. The interface simplifies the access to the Centralized User Database (CUDb) and different kinds of HLR-FE NEs by introducing one homogenous interface.

CAI controls all protocol conversions for the specific NE.

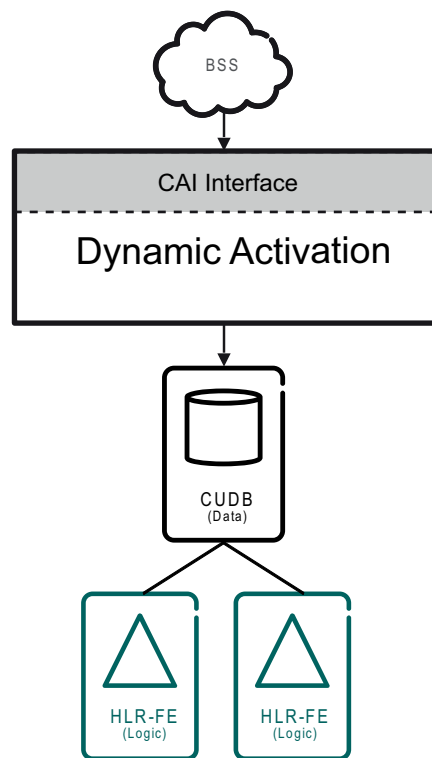


Figure 1 CAI Concept

2.1 General

The CAI can handle independent multiple sessions towards the Business System. From each session, all authorized NEs are accessible.

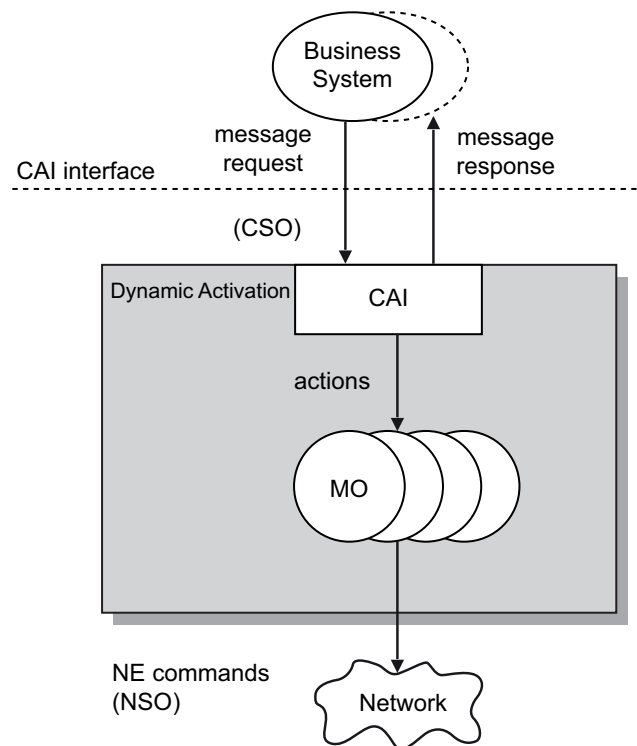


Figure 2 Dynamic Activation Message Flow

A provisioning operation initiated from the Business System to Dynamic Activation is referred as a Customer Service Order (CSO).

A CSO contains a Managed Object (MO) and one of the following actions:

- GET (to display an MO)
- CREATE (to create an MO)
- DELETE (to delete an MO)
- SET (to modify an MO)

The MO contains the information to be transferred to or fetched from the NE. Each MO type corresponds to a specific NE function.

Actions that influence network data are called provisioning operations and are logged by CAI. It is possible to see Network Service Orders (NSOs) that have been sent, NE responses and the result of the complete provisioning operation.

CAI has a security system which can be used to prevent non-authorized operators from accessing data in the networks. This is implemented by access control. Any hostile attempt results in an error response to the Business System.

All provisioning operations are synchronized, which means that there are no provisioning operation queues in CAI.



In general, CAI supports the full set of MOs. A site can be configured not to have support for certain NEs. In such a case, an error explaining that the configuration did not allow the action is responded when CAI is trying to access non-supported MOs.

3 Communication Protocol

3.1 General

The CAI is based on proprietary Ericsson presentation and session layers.

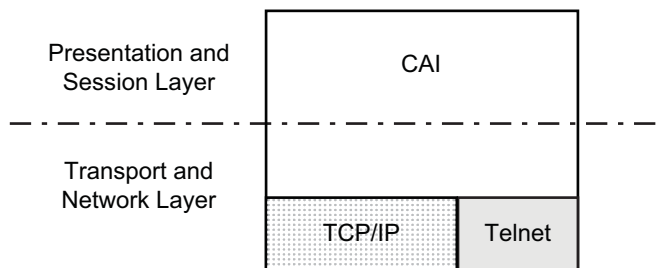


Figure 3 Communication Stack Layers

Basic features of the CAI are:

- Semi-permanent connection

The connection remains open until a logout procedure is initiated by BSS. Otherwise, if the idle time is triggered (time-out), the connection is closed by Dynamic Activation.

- Synchronous, one message always followed by its response
- ASCII-character-based presentation and session layer
- Multiple concurrent sessions

The following standards can be used as transport and network layers:

- TCP/IP
- Telnet

A connection is always initiated from BSS. First the transport layer is set up, either TCP/IP or Telnet. If it is possible to open a connection, a session is created using a login sequence. After a successful login, data can be transferred.



To terminate a session, a logout sequence is used followed by a disconnection of the transport layer.

3.2 Transport and Network Layer

The type of transport and network layers to be used are decided upon software installation. If more than one protocol are used, the number of concurrent sessions on each protocol is dependent upon the number of sessions the other protocol is using.

Depending on the type of protocol, a set of configuration parameters are available. Reconfigurations of these parameters are possible without a new software installation. At time of reconfiguration, ongoing sessions must be disconnected.

From BSS point of view each Dynamic Activation is associated with a specific network address. This address can be used for all parallel sessions initiated from BSS.

3.2.1 Direct Socket Communication

TCP/IP used in Dynamic Activation means TCP over IP. It is a connection-oriented protocol providing a reliable, full-duplex, and byte stream for a user process. TCP takes care of communication details such as acknowledgments, time-outs, and retransmissions.

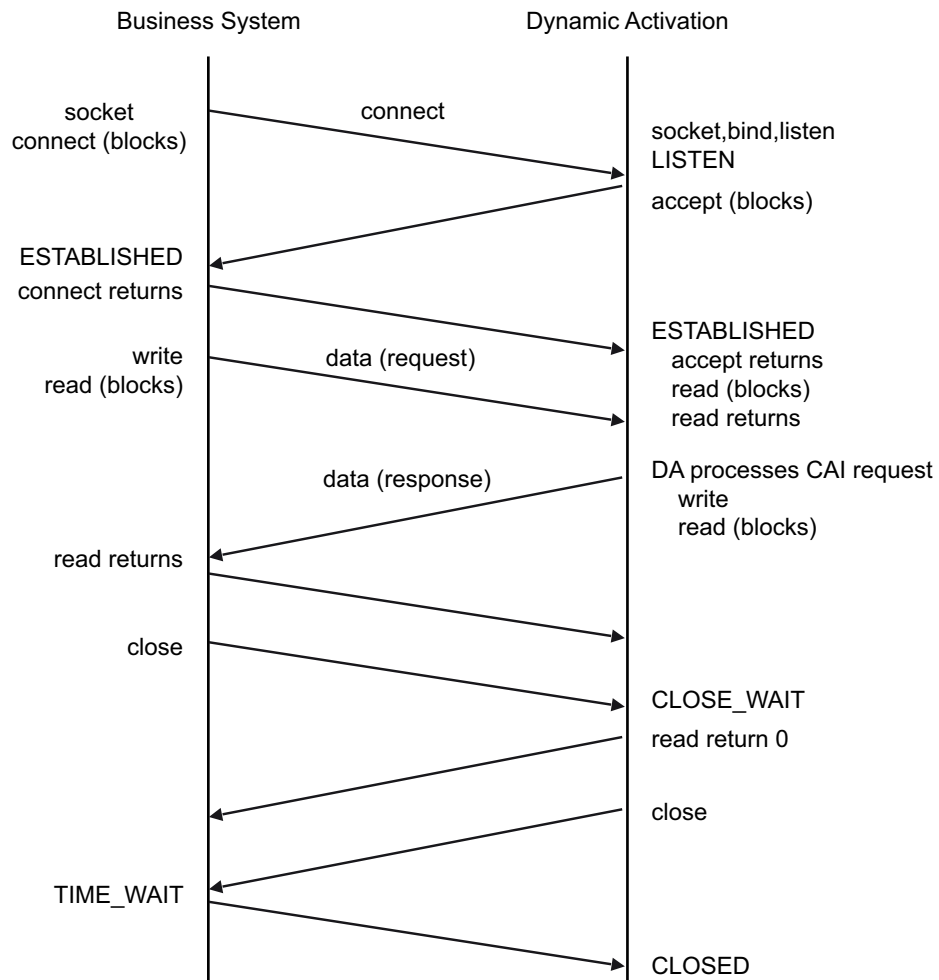


Figure 4 Packet Exchange for TCP Connection

BSS can communicate with Dynamic Activation by TCP/IP using an IP address with the following format: `<ip_address>:<port_number>`. The default value of `port_number` is 3300.

If the Dynamic Activation server has been set up correctly, Dynamic Activation listens to this port.

As for Figure 4, once a connection between BSS and Dynamic Activation is established, BSS can form a request and send it to Dynamic Activation. Dynamic Activation processes the request and responds to BSS. Status such as `ESTABLISHED`, `LISTEN`, `CLOSE_WAIT`, and `TIME_WAIT`, can be printed.

3.2.2

Telnet

Standard telnet procedures are used to open a connection and it is assumed that each end acts as network virtual terminals. The BSS is always the initiating side and option negotiation can take place within the structure of telnet Protocol, see RFC854. The CAI interface only supports the telnet options `Suppress`

GO Ahead and Echo. Any side can choose to clear the connection. Once a connection is established, it is preferred that each message is sent as one string.

Negotiation telnet options are as follows:

- Suppress GO Ahead

When this option is effective on the connection, both parties can send data at the same time, without any Go Ahead message from the opposite party.

This option is enabled by default. Inbound telnet requests the client to use this option always.

- Echo

This option is sent by the client or server for the use of telnet echo. The echo party is to return the received data characters to the other party. It is normally used by clients to not show password as plain text on the screen. The echo party instead replaces the password characters in the echoing with stars "*" that are printed on the client side.

This option is disabled by default but can be initiated by the client.

3.3 Session and Presentation Layer

The session and presentation layers are proprietary Ericsson and support two types of messages:

- Control messages
- Data messages (CSO)

A message is coded using standard 8-bit ASCII characters.

A number of concurrent sessions can be established on each of the port on every processing node. The maximum number of connections allowed can be configured by system administrators.

Each session is independent of any previous opened sessions. Interference between two sessions must be handled by the BSS. Dynamic Activation does not guarantee a mutual exclusion. For example, if two sessions are concurrently operating on the same subscriber identity, one of the sessions can or cannot receive an error code back.

3.3.1 Opening a Session

BSS is the party which initializes a session. First, a channel is allocated by the transport layer. Thereafter BSS continues with sending a LOGIN control



message (see Section 5.1 on page 14). Dynamic Activation answers with a response message.

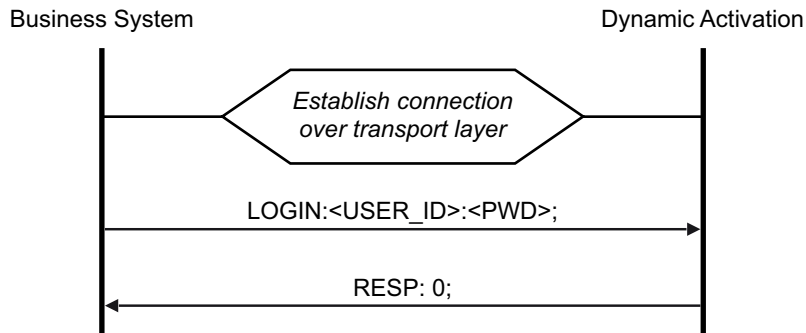


Figure 5 Successful Opening of a Session

Table 1 Successful Opening of a Session

Parameter	Type	Occurrence	Description
USER_ID	String, up to 16 characters	Mandatory	User ID
PWD	String, up to 16 characters	Mandatory	Password

3.3.2 Closing a Session

When BSS needs to logout from Dynamic Activation, it sends a LOGOUT control message (see Section 5.2 on page 15) and in turn Dynamic Activation replies with a response message. Then BSS clears the channel. If BSS does not clear the channel within a configurable time-out time, Dynamic Activation clears the channel.

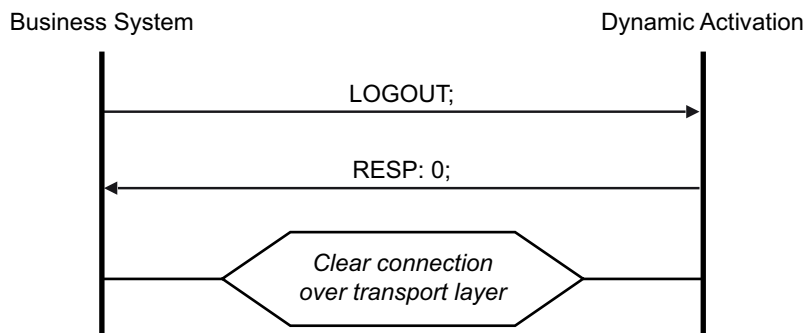


Figure 6 Successful Logout Sequence

3.3.3 Ending a Session

When Dynamic Activation needs to be terminated because of system maintenance, reconfiguration, and so on, Dynamic Activation can clear any ongoing sessions. If there is an ongoing message request, Dynamic Activation must execute it and reply with a response before Dynamic Activation can disconnect the transport layer.

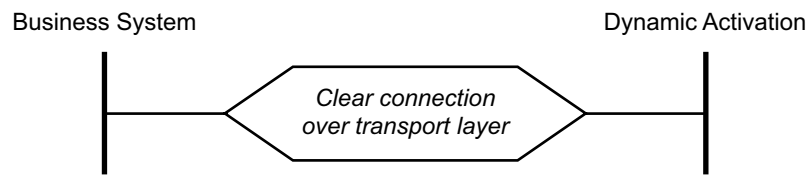


Figure 7 Ending Ongoing Session

4 Message Formats

The communication between BSS and Dynamic Activation consists of messages, BSS sends message requests which are answered by Dynamic Activation with message responses.

4.1 Character Representation

All values - strings and numbers - is to be in coded ASCII, that is, the decimal number 1285 is to be transferred as four ASCII characters ("1", "2", "8" and "5").

String values using unprintable characters (for example, ASCII value 0, LineFeed ASCII value 19) is to use standard C conventions ("`<ascii value>`") or the standard names for C (for example "`\n`") to specify the character. String values must be quoted if they contain other characters than A-Z, a-z, 0-9, "-", or "_", for example, "string value". This type of string is further on called "`<full_string>`".

If "`\`" is part of the string, then the ASCII value or "`\\`" must be used. If "`\"`" is part of the string, then the ASCII value must be used or use "`\"`".

Operations and attribute names are case-sensitive. They must be in upper case.

4.1.1 Examples

String	String in Message Request/Message Response	Comment
AZ_09_az	AZ_09_az	String without "other" characters
AZ-09-ax<CR>	AZ-09-ax\x0D	<CR> represented by a hexadecimal ASCII value



String	String in Message Request/Message Response	Comment
\home\user<CR>	\\home\\user\r	<CR> represented by a standard C character constant
"quotes"<CR>	\042quotes\042\r	quotes (") and <CR> represented by octal ASCII values

4.2 Message Request Format

Message requests contain a message operation identifier, that is, the commands which shall be executed, see Section 1 on page 1. It is possible to identify a request uniquely, except for login/logout requests, with a transaction identifier. Each transaction identifier can have a string up to 32 characters to identify the provisioning operations. It is possible to reuse the transaction identifier, if the BSS system wants to group a number of provisioning operations.

All message requests (provisioning operations) that cause data changes in the network are logged.

In a case where a parameter occurs more than once within a command, the following priorities applies:

- If possible (by nature of parameter) do append.
- Otherwise, let the last supplied parameter be valid.

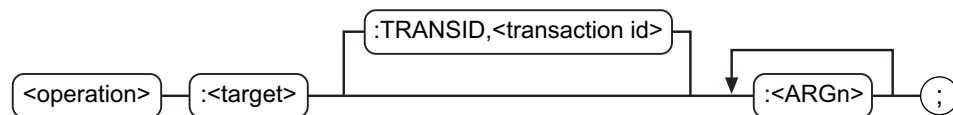


Figure 8 Message Request

Table 2 Message Request

Parameter	Type	Occurrence	Description
operation	One of the following strings: <ul style="list-style-type: none"> • CREATE • SET • DELETE • GET 	Mandatory	Indicates what action that will be taken towards a target.
target	Managed object or an operator ID (login name), see Table 3.	Mandatory	Operation target
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	The Transaction ID of the provisioning operation
ARGn	[1-n], parameters separated by colon :, see Table 4.	Mandatory	

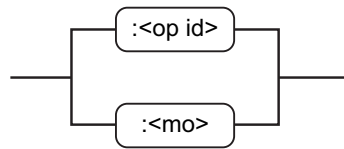


Figure 9 Target Command

Table 3 Target Command

Parameter	Type	Occurrence	Description
op_id	String, up to 16 characters A number of characters which is to be in the intervals A-Z, a-z, 0-9 or an _ (underscore).	Optional	Operator ID
mo	A number of characters which is to be in the intervals A-Z, a-z, 0-9 or an _ (underscore).	Optional	The Managed Object to operate on

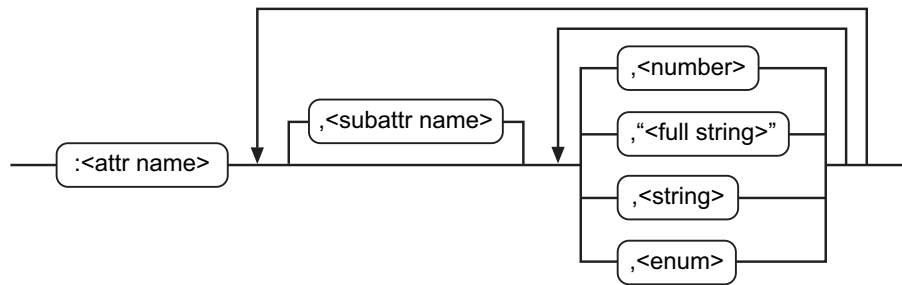


Figure 10 ARGn Command

Table 4 ARGn Command

Parameter	Type	Occurrence	Description
attr_name	String Upper case letters	Mandatory	Name of the Attribute
subattr_name	String Upper case letters	Optional	Name of the subattribute
number	An unsigned Integer	Optional	
full_string	String Characters, including white spaces and other unprintable characters enclosed in " "	Optional	
string	String Characters which is to be in the intervals A-Z, a-z, 0-9 or an _ (underscore).	Optional	
enum	String with defined values	Optional	Enumeration type

The whole message is terminated with a semicolon (";"). Between the separators (":" and ";") there can be an optional number of white spaces (tabs and spaces).

4.3 Message Response Format

Message responses contain a message response code `<resp_code>` which is a number, where “0” stands for a successful response, and any other value for an unsuccessful response. The request can also contain a transaction identifier `<trans_id>` depending on if there was a transaction identifier attached with the message request. The transaction identifier is only sent together with the response if the message request does not contain any syntactical errors.

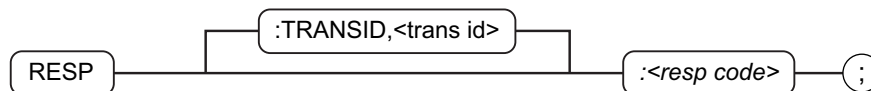


Figure 11 Provisioning Operation Response

Table 5 Provisioning Operation Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request	Optional	Transaction identifier of the provisioning operation
RESP	See Message Response section of each section.	Mandatory	Message Response

As with the message request format, the whole message is terminated with a semicolon (;) and between the separators (“:” and “;”) there can be an optional number of white spaces (tabs and spaces).



Figure 12 Get Response

Table 6 Get Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request	Optional	Transaction identifier of the provisioning operation
RESP	See “Message Response” section of each section.	Mandatory	Message Response
attr_name	String Upper case letters	Optional	The name of the Attribute
value		Optional	The attribute Value

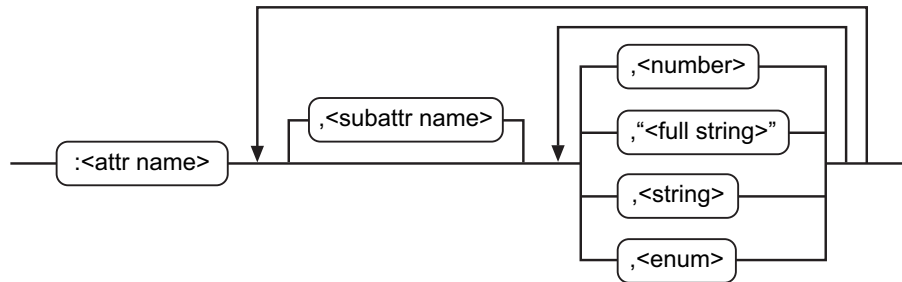


Figure 13 Attribute Value Response

If a requested attribute name has no values attached, only the `<attr_name>` are printed. Parameters and attached values is only printed if the response code `<resp_code>` indicates a successful message response.

5 Control Commands

5.1 Login

The LOGIN command will log in the user on Dynamic Activation. The login passwords and User ID are stored in Dynamic Activation parameter database.

5.1.1 Request Syntax



Figure 14 Login Command

Table 7 Login Command

Parameter	Type	Occurrence	Description
user_id	String, up to 16 characters	Mandatory	User ID
pwd	String, up to 16 characters	Mandatory	Password

5.1.2 Response Syntax

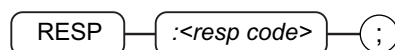


Figure 15 Response



Table 8 Response

Parameter	Type	Occurrence	Description
RESP		Mandatory	Response code, see Section 5.3 on page 16 for response codes.

5.1.3 Examples

Login request for user ID “EMA_OPER” with the password “SECRET”:

LOGIN:EMA_OPER:SECRET;

Response to a successful login:

RESP:0;

Unsuccessful response to a login attempt with an invalid user ID or password:

RESP:3006;

5.2 Logout

This command will log out the user from Dynamic Activation. The request is rejected if no user is logged on.

5.2.1 Request Syntax

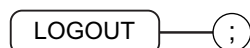


Figure 16 Logout Command

5.2.2 Response Syntax

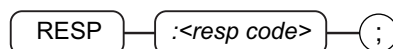


Figure 17 Response

Table 9 Response

Parameter	Type	Occurrence	Description
RESP		Mandatory	Response code, see Section 5.3 on page 16 for response codes.

5.2.3 Examples

Logout request:

**LOGOUT;**

Successful logout:

RESP:0;

Unsuccessful response to a logout attempt without logging in first:

RESP:3007;

5.3 Message Response

Here follows a description of the possible message response codes that can be received in a message response. The tables contain a column Type, indicating the seriousness/category of each response. The following categories are available:

- Syntax error (S)
- Temporary error (T)
- Faulty data (D)
- Fatal error (F)

These categories can be used as a guide line in error management procedures. Suitable actions are indicated in Section 10.2 on page 151.

Table 10 Control Commands

Descriptions	Response Code	Type	Log In	Log Out
Successful	0		x	x
Dynamic Activation FATAL ERRORS (2001 -2100)				
Dynamic Activation database error	2001	F	x	x
Internal Dynamic Activation error	2002	F	x	x
CAI ERRORS (3001-3100)				
Invalid command	3001	S	x	x
Insufficient parameters	3004	S	x	
User ID/password invalid or expired	3006	D	x	
Rejection, must login first	3007	S		x
Invalid command sequence	3008	S	x	x



6 HLR Subscription

Note: If the user has chosen the split HLR and MNP license during installation, when doing provisioning towards HLR, Dynamic Activation causes no data update in MNP and cannot query MNP for any information. So, in this case, if there is any data that is to be updated in MNP for HLRSUB, the Operator updates them through NPSUB in addition. Refer to Section 7 on page 116 for detailed information about MNP provisioning.

If the user has not chosen the split HLR and MNP license during installation, when doing provisioning towards HLR, Dynamic Activation updates data in MNP also, but the physical implementation of MNP behind HLR is hidden for the user.

6.1 Composite Parameter Definitions

6.1.1 Customer Service Orders (CSO)

Note: The parameter sequence in CAI command is independent of the parameter sequence in MML command.

6.1.1.1 Create HLRSUB

Subscriber Data can be assigned values according to Section 6.2 on page 81. The subscriber is set in-service upon definition.

6.1.1.1.1

Request Syntax

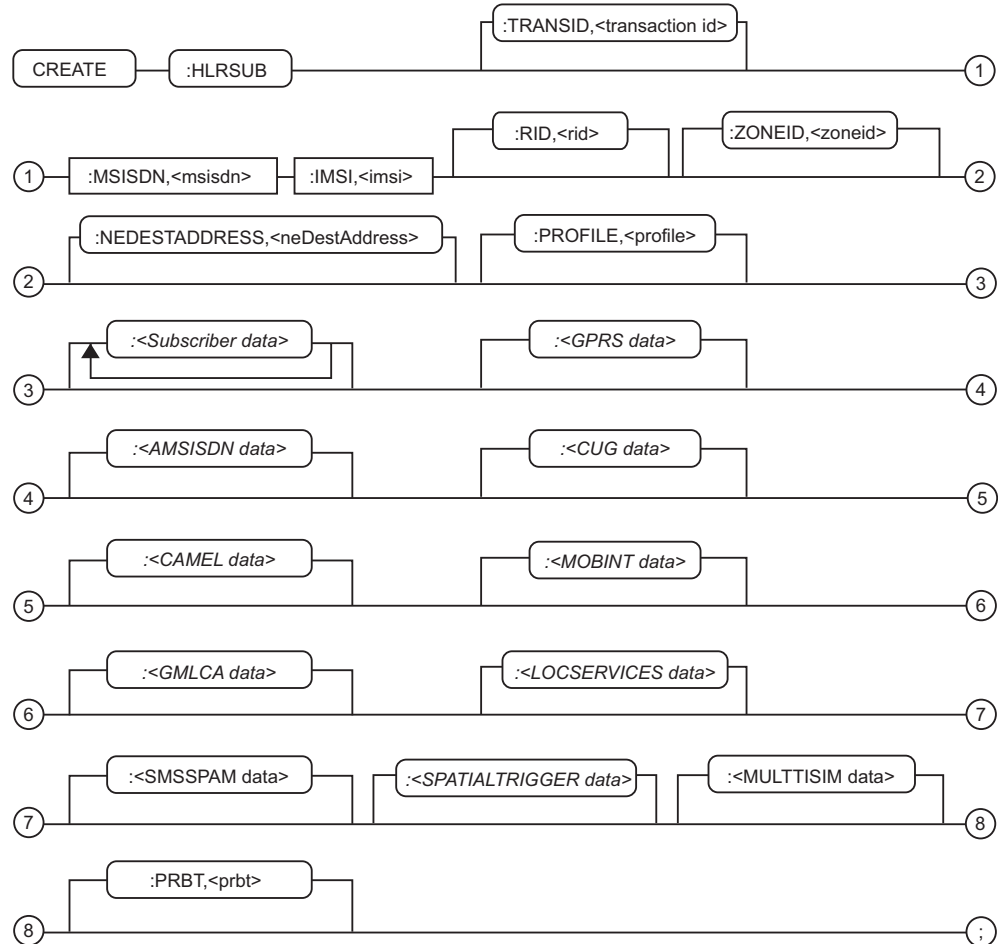


Figure 18 Create HLRSUB Command

Table 11 Create HLRSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	The Transaction ID of the CREATE provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN)
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Mandatory	International Mobile Subscriber Identity
RID	Integer 0-31	Optional	Region Identifier
ZONEID	Integer 0-65535	Optional	This attribute indicates to what geographical area the MultiSC or the association belongs
PROFILE	User-defined type	Optional	Profile containing the data that is to be copied to the new subscription, see Section 6.1.3 on page 37.



Parameter	Type	Occurrence	Description
Subscriber data	User-defined type	Optional	Subscriber data, see Section 6.1.2 on page 32.
GPRS data	User-defined type	Optional	GPRS data, see Section 6.1.9 on page 66.
AMSISDN data	User-defined type	Optional	AMSISDN data, see Section 6.1.4 on page 39.
CUG data	User-defined type	Optional	CUG data, see Section 6.1.6 on page 59.
CAMEL data	User-defined type	Optional	CAMEL data, see Section 6.1.5 on page 42.
MOBINT data	User-defined type	Optional	MOBINT data, see Section 6.1.7 on page 63.
GMLCA data	User-defined type	Optional	GMLCA data, see Section 6.1.10 on page 70.
LOCSERVIECS data	User-defined type	Optional	LOCSERVIECS data, see Section 6.1.11 on page 72.
prbt	Values are 0–1: <ul style="list-style-type: none"> 0 = disabling PRBT support 1 = enabling PRBT support 	Optional	Personal Ring Back Tone
SMSSPAM data	User-defined type	Optional	SMSSPAM data, see Section 6.1.13 on page 79.
SPATIALTRIGGER data	User-defined type	Optional	Spatial Trigger Support data, see Section 6.1.12 on page 78.
MULTISIM data	User-defined type	Optional	Multiple SIM data, see Section 6.1.14 on page 80

6.1.1.1.2

Response Syntax

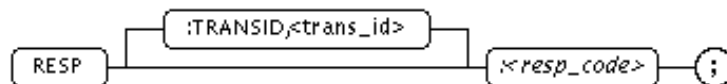


Figure 19 Create HLRSUB Response

Table 12 Create HLRSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	The Transaction ID of the CREATE provisioning operation
RESP		Mandatory	Response code, Section 6.4 on page 105 for response codes.

6.1.1.1.3

Examples

Message request to define a subscription with the following properties:

MSISDN 46455381234



IMSI	12345678933333
RID	13
PROFILE	1
NAM	0
CAT	2
CFU	Provided and active for TS10, Forwarded-to number 0241930203
AMISDN	Number 46455383456, BC=20
PRBT	1

CREATE:HLRSUB:MSISDN,46455381234:IMSI,12345678933333:RID,13:

PROFILE,1:NAM,0:GPRS,DEF,PDPCONTEXT,APNID,99,PDPADD,

78.54.125.8,EQOSID,4,VPAA,1:CAT,2:CFU,1,1,0241930203,TS10:

AMISDN,DEF,4645538456,20:PRBT,1;

Successful message response:

RESP:0;

Unsuccessful message response, the MSISDN is already in use:

RESP:2;



6.1.1.2

Set HLRSUB

6.1.1.2.1

Request Syntax

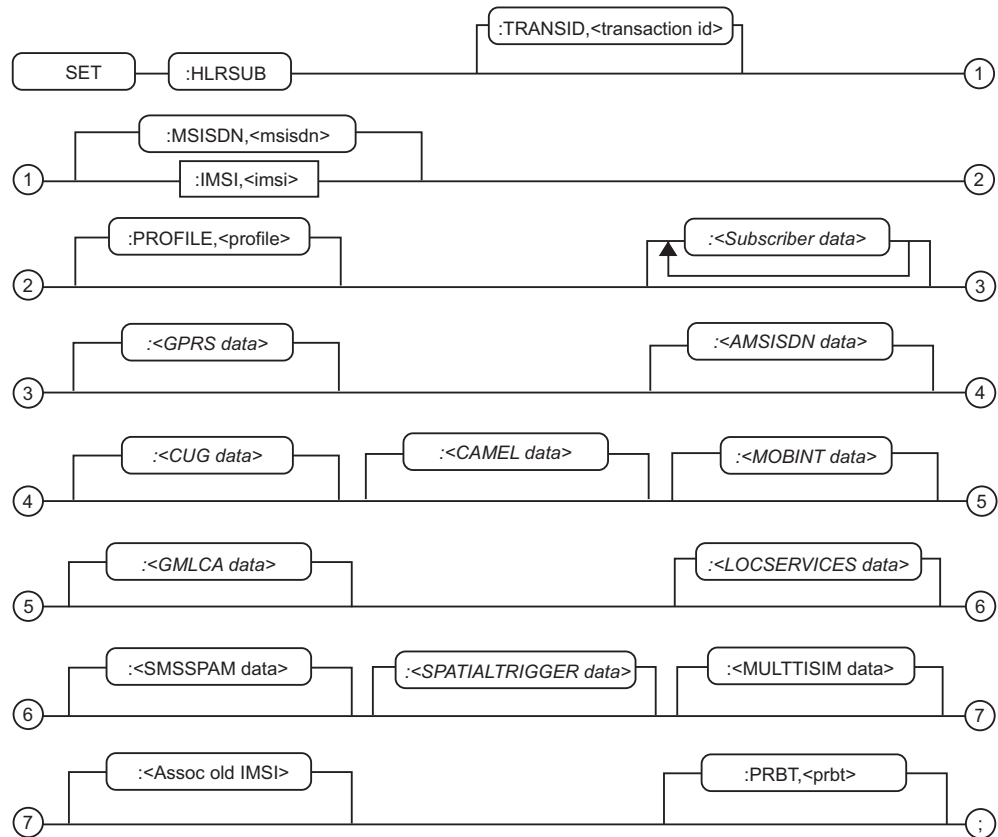


Figure 20 Set HLRSUB Command

Table 13 Set HLRSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	The Transaction ID of the CREATE provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Mobile Subscriber ISDN Number (MSISDN)
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Mandatory	International Mobile Subscriber Identity
PROFILE	User-defined type	Optional	Profile containing the data that should be copied to the new subscription, see Section 6.1.3 on page 37.
Subscriber data	User-defined type	Optional	Subscriber data, see Section 6.1.2 on page 32.
GPRS data	User-defined type	Optional	GPRS data, see Section 6.1.9 on page 66.
AMISDN data	User-defined type	Optional	AMISDN data, see Section 6.1.4 on page 39.

Parameter	Type	Occurrence	Description
CUG data	User-defined type	Optional	CUG data, see Section 6.1.6 on page 59.
Assoc old IMSI		Optional	Associated old IMSI, see Section 6.1.8 on page 66.
CAMEL data	User-defined type	Optional	CAMEL data, see Section 6.1.5 on page 42.
MOBINT data	User-defined type	Optional	MOBINT data, see Section 6.1.7 on page 63.
LOCSEVIECS data	User-defined type	Optional	LOCSEVIECS data, see Section 6.1.11 on page 72.
prbt	Values are 0-1: • 0 = disabling PRBT support • 1 = enabling PRBT support	Optional	Personal Ring Back Tone
SMSSPAM data	User-defined type	Optional	SMSSPAM data, see Section 6.1.13 on page 79.
SPATIALTRIGGER data	User-defined type	Optional	Spatial Trigger Support data, see Section 6.1.12 on page 78.
MULTISIM data	User-defined type	Optional	Multiple SIM data, see Section 6.1.14 on page 80

6.1.1.2.2

Response Syntax

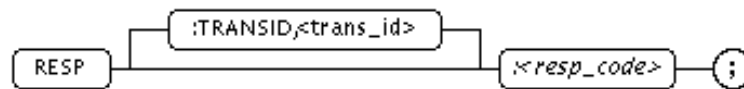


Figure 21 Set HLRSUB Response

Table 14 Set HLRSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	The Transaction ID of the CREATE provisioning operation
RESP		Mandatory	Response code, see Section 6.4 on page 105 for response codes.

6.1.1.2.3

Examples

Message request to modify the following attributes of the subscription with MSISDN 46455381234:

CFU Not active for TS10, keep Forwarded-to number as 0241930203

CFNRC Not active for TS10, keep the original Forwarded-to number



CFNRY Active for all Basic Services, Forwarded-to number 0241930203

BAOC Provided

AMSISDN Delete number 46455380001

AMSISDN Define number 46455380002, BC=20

```
SET:HLRSUB:MSISDN,46455381234:CFU,1,0,0241930203,TS10:
CFNRC,1,0,KEEP,TS10:CFNRY,1,1,0241930203:  BAO,1:AMSISDN,
DEL, 46455380001, DEF,46455380002, 20;
```

Successful message response:

```
RESP:0;
```

Unsuccessful message response, the AMSISDN which is to be deleted is not defined:

```
RESP:48;
```

6.1.1.3

Get HLRSUB

Subscriber Data parameters can take values as defined in Section 6.2 on page 81.

Some Subscriber Data values can differ from those applicable for the setting of Subscriber Data. Namely, the differences are:

- a The activation status of Supplementary Services, when applicable, can have three statuses:
 - 0 - Not active
 - 1 - Active operational
 - 2 - Active quiescent
- b If call forwarding services a Forwarded-to number *<fnum>* is displayed if registered. Additionally, for CFNRY the No-reply-time are displayed.
- c The password can have a barred status. If so, then it is returned in the message response as shown in Figure 22.
- d When using the service SOCB it is possible to get one of following values: 0-3 (0-1 when setting the service).

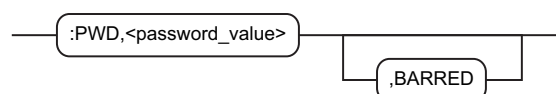


Figure 22 Password Response

Note: Handle the Get request so that BSS is not affected by new HLR releases. This can be done by sending only used services in the Get request. If a full response syntax is used, the results are different depending on which release of the HLR the request have been sent to.

6.1.1.3.1

Request Syntax

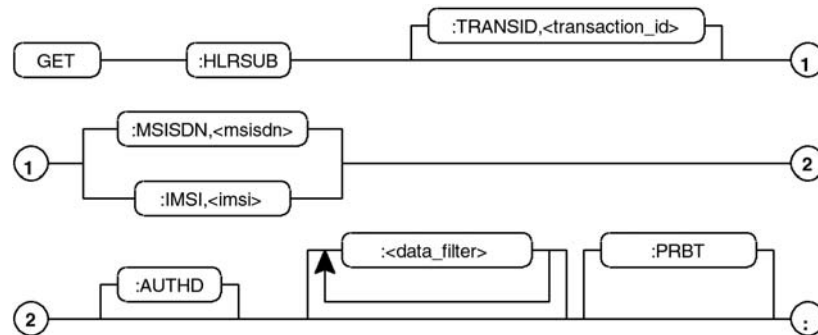


Figure 23 Get HLRSUB Command

Table 15 Get HLRSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	The Transaction ID of the GET provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Mobile Subscriber ISDN Number (MSISDN)
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Optional	International Mobile Subscriber Identity
data_filter		Optional	Abbreviated name of the requested Subscriber Data

Without any given Data Filter all Subscriber Data are displayed, otherwise only the requested attributes are displayed. A table of possible Subscriber Data parameters can be found in Section 6.2 on page 81.

6.1.1.3.2

Response Syntax

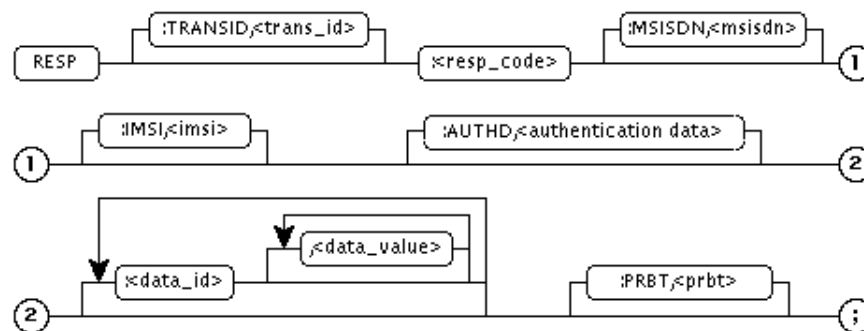


Figure 24 Get HLRSUB Specified Response



Table 16 Get HLRSUB Specified Response

Parameter	Type	Occurrence	Description
RESP		Mandatory	Response Code, see Section 6.4 on page 105 for response codes.
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Mobile Subscriber ISDN Number (MSISDN). It is only displayed if the response code is equal to 0.
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Optional	International Mobile Subscriber Identity. It is only displayed if the response code is equal to 0.
AUTHD	Values are AVAILABLE, NO IMSI IN AUC, NO ACCESS TO AUC, STORAGE SHORTAGE.	Optional	Authentication data
data_id		Optional	Abbreviated name of the requested Subscriber Data, see Section 6.3 on page 96. It is only displayed if the response code is equal to 0.
data_value		Optional	Retrieved value(s), see Section 6.3 on page 96 for value formats. It is only displayed if the response code is equal to 0.
PRBT	Values are 0-1: • 0 = disabling PRBT support • 1 = enabling PRBT support		Personal Ring Back Tone

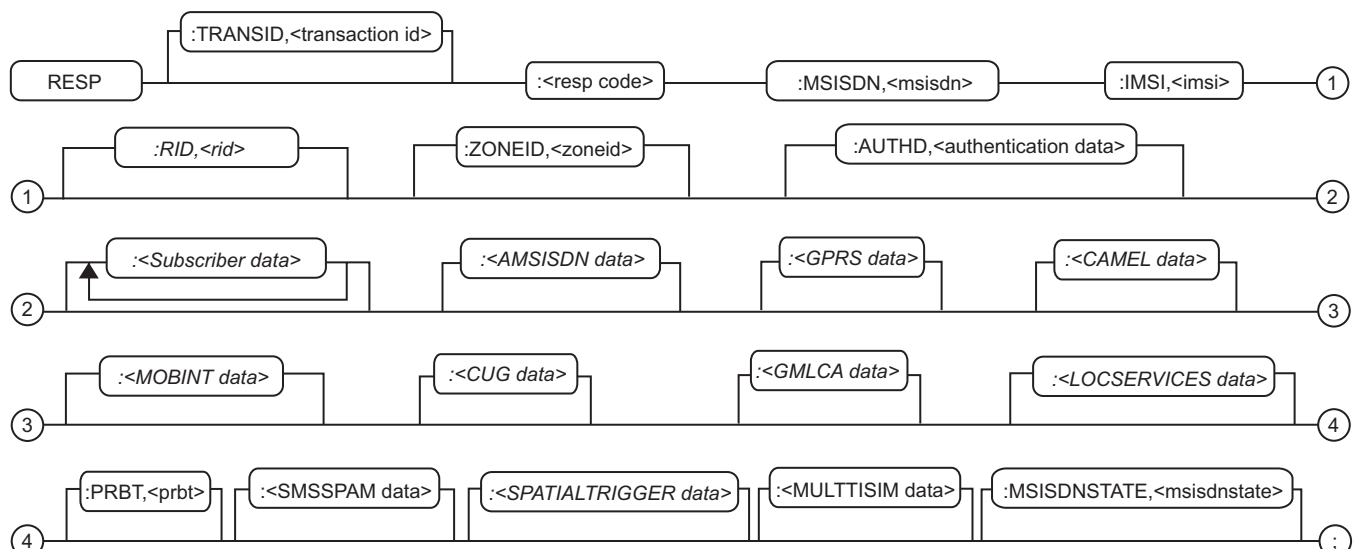


Figure 25 Get HLRSUB Complete Response

Table 17 *Get HLRSUB Complete Response*

Parameter	Type	Occurrence	Description
RESP		Mandatory	Response Code, see Section 6.4 on page 105 for response codes.
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Mobile Subscriber ISDN Number (MSISDN). It is only displayed if the response code is equal to 0.
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Optional	International Mobile Subscriber Identity. It is only displayed if the response code is equal to 0.
RID	Integer 0-31	Optional	Region Identifier, only displayed if rid exists
ZONEID	Integer 0-65535	Optional	This attribute indicates to what geographical area the MultiSC or the association belongs
AUTHD	Values are AVAILABLE, NO IMSI IN AUC, NO ACCESS TO AUC, STORAGE SHORTAGE.	Optional	Authentication data
AMISDN data	User-defined type	Optional	AMISDN data, see Section 6.1.4 on page 39.
GPRS data	User-defined type	Optional	GPRS data, see Section 6.1.9 on page 66.
CUG data	User-defined type	Optional	CUG data, see Section 6.1.6 on page 59.
Subscriber data	User-defined type	Optional	Subscriber Data, see Section 6.2 on page 81 for possible Subscriber Data. It is only displayed if the response code is equal to 0.
CAMEL data	User-defined type	Optional	CAMEL data, see Section 6.1.5 on page 42.
MOBINT data	User-defined type	Optional	MOBINT data, see Section 6.1.7 on page 63.
GMLCA data	User-defined type	Optional	GMLCA data, see Section 6.1.10 on page 70.
LOCSEVIECS data	User-defined type	Optional	LOCSEVIECS data, see Section 6.1.11 on page 72.
prbt	Values are 0-1: <ul style="list-style-type: none"> 0 = disabling PRBT support 1 = enabling PRBT support 	Optional	Personal Ring Back Tone
SMSSPAM data	User-defined type	Optional	SMSSPAM data, see Section 6.1.13 on page 79.
SPATIALTRIGGER data	User-defined type	Optional	Spatial Trigger Support data, see Section 6.1.12 on page 78.
MULTISIM data	User-defined type	Optional	Multiple SIM data, see Section 6.1.14 on page 80



If there is no value attached to a subscriber attribute, only the attribute name is shown, for example,

```
RESP: 0: . . . : AMSISDN: . . . ;
```

6.1.1.3.3 Examples

To get selected data of a subscriber with MSISDN, 46455381234:

```
GET:HLRSUB:MSISDN,46455381234:AMISDN:CFU:CFNRC:
CFNRY:CUG:CUGSUB:CAMEL:GMLCA:LCS;
```

Successful message response from Dynamic Activation is to display selected data:

```
RESP: 0: MSISDN, 46455381234: IMSI,12345678933333:
AMISDN,46455381223,20, BS33
```

```
:CFU,1,0,TS10,0,TS60:CFNRC,1,0,TS10,0,TS60: CFNRY,1,0,,20
,,TS10,0,TS60: CUG, 1, OA, 123, TS10, IA, 321, TS20:
```

```
:CUGSUB, 343, 1234-21, ICB, TS10, TS60: CAMEL,OCTDP,2,G
SA,
```

```
49101924112,SK,0,DEH,0,CCH,1,OCAMEL,GCSO,0,MCSO,0,SSLO,0,G
C2SO,0
```

```
:GMLCA,GMLCID,125,GMLCADD,345678:LCSD,UNIV,CREL,,NOTF,1
,MOCL,BSL;
```

This describes a subscriber defined in the HLR as follows:

MSISDN	46455381234
IMSI	12345678933333
RID	13
AMISDN	46455381223, BC number 20, BS33
CFU	Provided but deactivated for TS10 (Speech) and TS60 (Fax)
CFNRC	Provided but deactivated for TS10 (Speech) and TS60 (Fax)
CFNRY	Provided but deactivated for TS10 (Speech) and TS60 (Fax)



CUG	Provided with: <ul style="list-style-type: none">* Outcoming access and preferential cug index 123 for TS10 (Speech)* Incoming access and preferential cug index 321 for TS20 (Short message)
CUGSUB	Connected with following values: <ul style="list-style-type: none">* Index = 343 * interlock code = 1234-21* Incoming calls barred within the closed user group* Basic service groups = TS10 (Speech) and TS60 (Fax)
CAMEL	OCTDP value 2, GSA value 49101924112, SK value 0, DEH value 0, CAMEL phase 1, GCSO value 0, MCSO value 0, SSLO value 0, GC2SO value 0, MC2SO value 0, TIF value 0.
GMLCA	GMLCID value 125, GMLCADD value 345678.
LCSD	NOTF value 1, MOCL, basic self location.
PRBT	1.

To get all data of a subscriber with MSISDN 46455381234:

GET:HLRSUB:MSISDN, 46455381234;

Successful message response from Dynamic Activation is to show all subscriber data:

```
RESP: 0: MSISDN, 46455381234: IMSI,12345678933333:RID
,13: AUTHD,"NO ACCESS TO AUC":AMSISDN, 46455381223,20,
BS33: AOC,2: BAIC, 1:BAOC,1: BOIEXH,1,1,TS10,1,TS20:
BS33,1: CAT,11: CAW,1: CFB,1,0,TS10: CFNRC,1,0,TS10:
CFNRY,1,2,46304823310,20, TS10,2,46304823310,20,TS60:
CFU,1,1,46101912000,TS10,1,46101912000,TS60: CLIP,1:
COLP,1: CUG, 1, OA, 123, TS10, IA, 321, TS20:
CUGSUB, 343, 1234-21, ICB, TS10, TS60: DBSG,1:
HOLD,1: OBOPRE,1: OBOPRI,1: OCSI,1: OFA,1: PWD,
0876, BARRED: REGSER, 5678: SOCB,3: SOSDCF,7:
TIN,1: TS11,1: TS21,1: TS22,1: TS62,1: VLRID,
3-53463598972: CAMEL,OCTDP,2,GSA,49101924112,SK,0,D
EH,0,CCH,1: DEMLPP,2: EMLPP,1: MEMLPP,4: NAM, 2:
GPRS,PDPCONTEXT,APNID,1,PDPADD, 136.225.1.1,EQOSID,1,
PDPCONTEXT,APNID,2,PDPADD,136.225.1.2,EQOSID,2, VPAA,0,PD
PCONTEXT,APNID,2047,PDPADD,136.225.1.2,EQOSID,31,VPAA,1:
MOBINT,DP,1,GSA,49100000,SK,12345,ACT,1:PRBT,1;
```



A display message request containing requests to print some of a subscribers call forwarding and barring services:

GET:HLRSUB:MSISDN, 46455381234: CFU: CFB: CFNRY: CFNRC: BAIC: BOIC;

Successful message response: RESP: 0: MSISDN, 46455381234: CFU,1,1: CFB, 1,1, 045574587: CFNRY,0:BAIC, 0: BOIC, 1,1;

This defines a HLR subscriber with following requested data:

MSISDN	46455381234
CFU	Provided
CFB	Provided and activated with Forwarded-to number 045574587
CFNRY	Not provided
BAIC	Not provided
BOIC	Provided and activated

Unsuccessful message response, no subscription with this MSISDN is defined:
RESP: 14;

6.1.1.4 Delete HLRSUB

Previously defined subscriptions can be deleted together with all data associated to the subscription.

6.1.1.4.1 Request Syntax

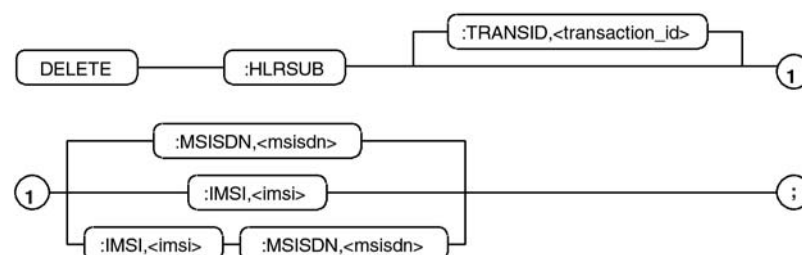


Figure 26 Delete HLRSUB Command

Table 18 *Delete HLRSUB*

Parameter	Type	Occurrence	Description
RESP		Mandatory	Response Code, see Section 6.4 on page 105 for response codes.
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Mobile Subscriber ISDN Number (MSISDN)
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Optional	International Mobile Subscriber Identity

6.1.1.4.2

Response Syntax

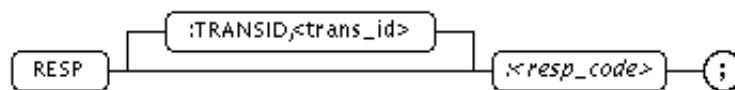


Figure 27 *Delete HLRSUB Response*

Table 19 *Delete HLRSUB Response*

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Response Code, see Section 6.4 on page 105 for response codes.

6.1.1.4.3

Examples

Request to delete the subscription with the MSISDN 46455381234 and identify the provisioning operation with the number 12345:

DELETE:HLRSUB:TRANSID, 12345:MSISDN, 46455381234;

Successful message response:

RESP:TRANSID, 12345: 0;

Unsuccessful message response, no subscription with this MSISDN is defined:

RESP:TRANSID, 12345: 14;

6.1.1.5

Get HLRMWINFO

The CSO can print all service center address stored in the message data waiting list for the given subscriber.



6.1.1.5.1 Request Syntax

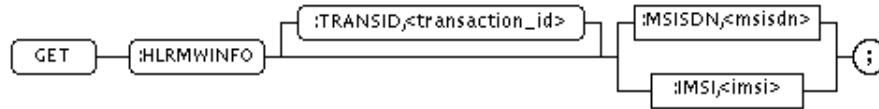


Figure 28 Get HLRMWINFO Command

Table 20 Get HLRMWINFO

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Mobile Subscriber ISDN Number (MSISDN)
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Optional	International Mobile Subscriber Identity

6.1.1.5.2 Response Syntax

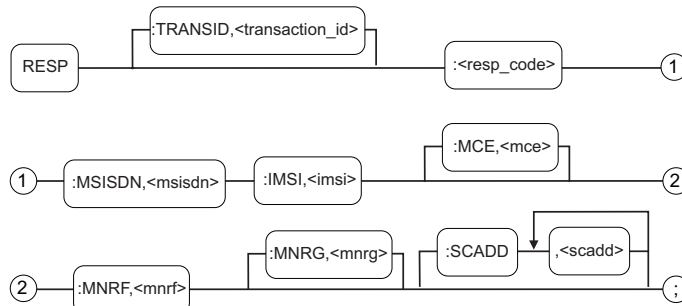


Figure 29 Get HLRMWINFO Response

Table 21 Get HLRMWINFO Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Response Code, see Table 86.
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN). It is only displayed if the response code is 0.
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Mandatory	International Mobile Subscriber Identity. It is only displayed if the response code is 0.
MCE	One of the following two values: <ul style="list-style-type: none"> YES = indicates that the mobile station memory capacity is exceeded NO = indicates that the mobile station memory is not exceeded 	Optional	Mobile station memory Capacity Exceeded.



Parameter	Type	Occurrence	Description
MNRF	One of the following two values: <ul style="list-style-type: none">REACH = mobile station is reachableNREACH = mobile station not reachable through the Mobile Switch Center (MSC)	Mandatory	Mobile station Not Reachable
MNRG	One of the following two values: <ul style="list-style-type: none">REACH = mobile station is reachableNREACH = mobile station not reachable through the Mobile Switch Center (MSC)	Optional	Mobile station not reachable through the Serving General Packet Radio Service Support Node.
SCADD	String expressed as <na> - <ai>: <ul style="list-style-type: none"><na> is Nature of Address, and can have value 3 for National and 4 for International.<ai> is address information, digit string with acceptable characters 0-9.	Optional	Service Center (SC) Address

6.1.1.5.3

Examples

GET:HLRMWINFO:MSISDN,3344556677;

All service center addresses contained in the message waiting data list corresponding to the subscriber whose MSISDN is 3344556677 are displayed.

RESP:0:MSISDN,3344556677:MCE,YES:SCADD,3-121212,4-232323;

or:

RESP:14; MSISDN not defined.

6.1.2

Subscriber Data

Each Subscriber Data parameter, either included in a message request or in a message response, is to be made up of an identifier followed by one or more attributes (for example, provision status, Basic Service Group, activation status, Forwarded-to number), defining the value of the parameter. Attributes are separated by commas and parameters are separated by colons.

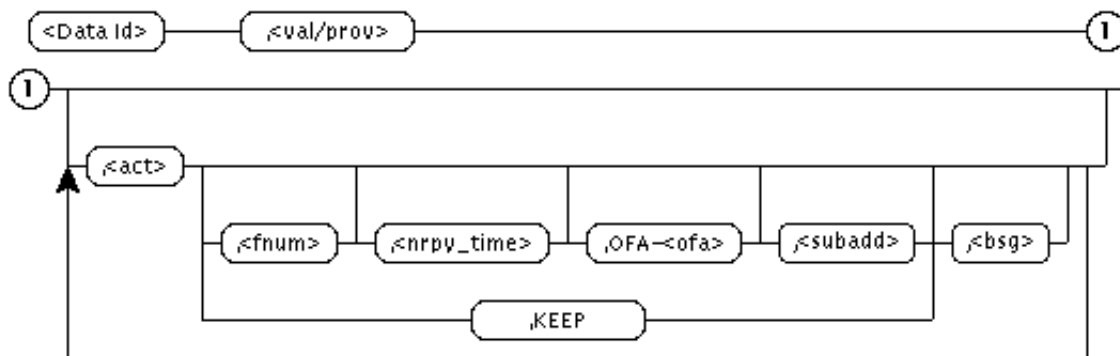


Figure 30 Subscriber Data Parameter

Table 22 Get HLRMWINFO Response

Parameter	Type	Occurrence	Description
Data id		Mandatory	Abbreviated name of the Subscriber Data or service, see Section 6.3 on page 96.
val/prov		Mandatory	Value of the Subscriber Data argument or provision state of a service.
act		Optional	Activation state of a service.
fnum		Optional	Forwarded-to number applicable for call forwarding services.
nrpy_time		Optional	No-reply-time, only applicable for the service 'Call Forwarding on No Reply' (CFNRY).
OFA		Optional	Origin Forward to number Analysis
subadd		Optional	Subaddress, can be added to the Forwarded-to number.
KEEP		Optional	Keeps the original Forwarded-to number. Only can be used when the value of act is 0.
bsg		Optional	Basic Service Group for which the service is to be (de)activated.

The Subscriber Data parameter must follow the rules defined as follows. A table of all possible Subscriber Data parameter together with their applicable values can be found in Section 6.2 on page 81 and abbreviations are explained in Section 6.3 on page 96.

6.1.2.1

Set Subscriber Data/Providing Services

- If a Supplementary Service is only to be provided and not activated, only then its provision status is given. This deactivates the activated service and leaving it provided, for example, CAW, 1 - provide call waiting, not activated.

- If a services provision is being withdrawn, it cannot be activated or registered, for example, `CFNRY, 0` - do not provide CFNRY.
- If a service is only to be activated or deactivated regardless of the original provision state, "-" can be used in the provision state (only applicable for the `Set` operation). For example, `CFNRY, -, 1` means to ignore the provision state and only activate CFNRY.

6.1.2.2 Activate Supplementary Services

- Supplementary services can be activated independently for each Basic Service Group or for all subscribed BSGs. For example, `BAIC, 1, 1, TS10-` provide and activate BAIC only for the Basic Service Group 'Speech transmission services'.
- If a service is to be activated, it must be provided irrespective of its previous provision status. If no BSG is specified the service is activated for all applicable BSGs. For example, `BAIC, 1, 1` - provide and activate BAIC for all BSGs subscribed.
- A service can be activated for several BSGs at the same time by repeating the required attributes for the different BSG identifiers. For example, `BAIC, 1, 1, TS10, 1, TS60` - provide and activate BAIC for the BSGs 'Speech transmission services' and 'Facsimile transmission services'.

6.1.2.3 Register Forwarded-to Numbers

- When activating (by registration) call forwarding services and single personal number Supplementary Service, a Forwarded-to number must be provided. For example, `CFNRC, 1, 1, 46455381234, TS10` - provide, activate, and register CFNRC for Basic Service Group 'Speech transmission services' with Forwarded-to number 491019120000. It is also possible to supply a subaddress with the Forwarded-to number, which is of the format: `a-b` - where `a` is 0.1 or 2 and `b` is 2 - 40 characters (in octet pairs). Each character representing a hexadecimal value 0-9, A-F, for example, `CFNRC, 1, 1, 46455381234, 1-0AFBE01C001A`
- When activating (by registration) 'Call forwarding on no reply', a No-reply-time may be specified (5 s - 30 s in 5 s steps). If the No-reply-time is not given, then the HLR default No-reply-time are taken, for example, `CFNRY, 1, 1, 46455381234, 20` - a 20 sec. No-reply-time is set.

6.1.2.4 Origin for Forwarded-to Number Analysis

Each time a subscriber registers a forwarding-to-number, a check is performed in the HLR that this number is not restricted. Restricted numbers are those which are not allowed to be used for call forwarding for example, the number to a police station. For example, `OFA, 1 - 1` is origin for forwarding-to number analysis. When parameter OFA is required, and has not been specified in the command, a value assigned as default to the mobile subscriber is used.



6.1.2.5 Deactivate/Keep Registration

- A Supplementary Service can be explicitly deactivated for a certain Basic Service Group without the withdrawal of the service. For example, `BAIC, 1, 0, TS10` - Deactivate BAIC only for Basic Service Group 'Speech transmission services' and leave it provided.
- If no BSG is specified the service is deactivated for all applicable BSGs, for example, `BAIC, 1, 0` - deactivate BAIC for all applicable BSGs but leave it provided.
- If a service is withdrawn it is automatically deactivated for all Basic Service Groups, for example `BAIC, 0` - do not provide BAIC and therefore deactivate.
- Upon the deactivation of a Supplementary Service the registered Forwarded-to number (and No-reply-time if applicable) is lost if it is not included in the deactivation request. When the service shall be reactivated it must be specified again, for example, `CFNRC, 1, 0, TS10` - deactivate CFNRC, the Forwarded-to number is not kept. `CFNRC, 1, 1, 491019120000, TS10` - reactivate CFNRC, the Forwarded-to number must be specified again.
- The Forwarded-to number (and No-reply-time if applicable) are kept upon deactivation of a service, if the Forwarded-to number is given in the deactivation command. For example, `CFNRC, 1, 0, 491019120000, TS10` - deactivate CFNRC but keep the Forwarded-to number as 491019120000. `CFNRC, 1, 1, TS10` - activate CFNRC again, using the "old" Forwarded-to number.
- There is another way to keep the Forwarded-to number upon deactivation of a service, if "KEEP" is given in the deactivation command. For example, `CFNRC, 1, 0, KEEP, TS10` - deactivate CFNRC but keep the original Forwarded-to number. `CFNRC, 1, 1, TS10` - activate CFNRC again, using the "old" Forwarded-to number.

6.1.2.6 Supplementary Service Groups

- A Supplementary Service Group is a bundle of several related supplementary services. For example, the Supplementary Service Group CFS is a group of Call Forwarding services, which includes CFU, CFNRC, CFNRY, CFB. See Section 6.3.14 on page 102 for the descriptions of these services.
- The Supplementary Service Group ALLSS only support the provision state and activation state. The activation state can only be set to 0, that is, only the commands `"ALLSS, 1, 0"`, `"ALLSS, 0"`, `"ALLSS, 1"`, and `"ALLSS, -, 0"` are valid.

6.1.2.7 Restrictions and Deviations

There are a number of Supplementary Service interactions possible in the network that should be kept in mind when working with Subscriber Data. Interaction means that the activation/registration of service might be influenced by the provision/activation/registration of other Supplementary Services or the roaming of the mobile subscriber.

The applicability of some services is limited (see Section 6.2 on page 81). Furthermore, exceptional cases are:

SPN This service can only be activated or deactivated. Therefore it is not possible to keep the registered forwarded-to number. Allowed requests are:

SPN, 0

Deactivated

SPN, -, 0

Deactivated

SPN, 1, 1, <fnum>

Activated/Registered

SPN, -, 1

Activated/Registered

DCF This service can only be activated or deactivated. Therefore it is not possible to keep the registered forwarded-to number. Allowed requests are:

DCF, 0

Deactivated

DCF, -, 0

Deactivated

DCF, 1, 1, <fnum>, <bsg>

Activated/Registered, for example:

...DCF, 1, 1, 46455381233, TS10, 1, 46455381234, TS60:...

DCF, -, 1, 46455381233, TS10, 1, 46455381234, TS60:...

**TSD1**

The teleservice “Auxiliary Telephony” is automatically provided if a dual MSISDN is defined for a subscription. A dual number is an additional MSISDN with BC 1 associated to it. Therefore TSD1 cannot be provided, it is a ‘read-only’ subscriber data.

6.1.3**Profiles**

All Subscriber Data excluding password, MSISDN, and IMSI may be set in a HLR profile. For Supplementary Services (for example, cfu) only the provision status can be set.

HLR GPRS Subscriber Data or HLR CAMEL Subscriber Data can be set into a HLR GPRS profile or a HLR CAMEL profile.

HLR GPRS Roaming Distribution Subscriber Data or HLR non-GPRS Roaming Distribution Subscriber Data can be set in a HLR GPRS Roaming Distribution profile or a HLR non-GPRS Roaming Distribution profile.

A GSM HLR has up to 8192 profiles. In earlier versions, a GSM HLR had up to 256 profiles. These profiles can be defined through the GSM HLR Administration application.

A GSM HLR has up to 8161 GPRS profiles and CAMEL profiles respectively. In earlier versions, a GSM HLR had up to 256 GPRS profiles and CAMEL profiles respectively. These profiles can be defined through the GSM HLR Administration application. Users can also use GPRS or CAMEL profile to define or modify a subscriber.

A GSM HLR has up to 255 gsmSCF profiles. These profiles can be defined through the GSM HLR Administration application. Users can also use gsmSCF profile to define or modify a subscriber.

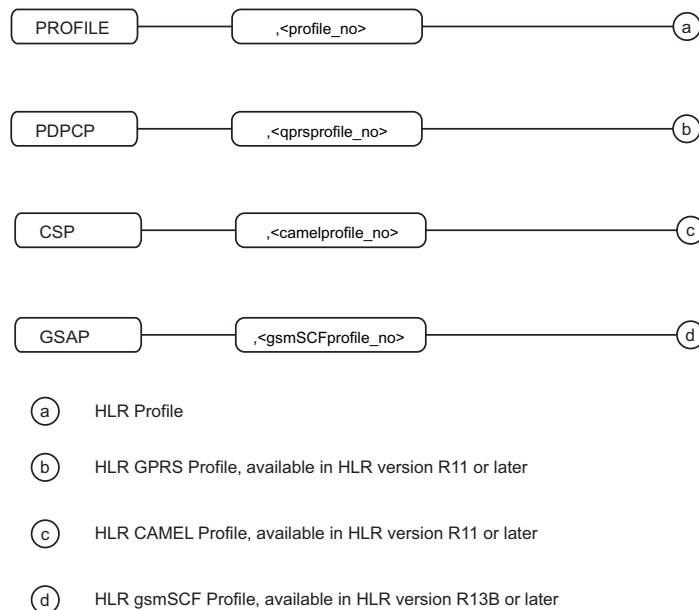


Figure 31 Profile Command

Table 23 Profiles

Parameter	Type	Occurrence	Description
profile_no	Values are 0-8191 for HLR UDC.	Optional	Profile number
gprsprofile_no	Values are 0-8160 for HLR UDC.	Optional	HLR GPRS Profile Number
camelprofile_no	Values are 0-8160 for HLR UDC.	Optional	HLR CAMEL Profile Number
gsmSCFprofile_no	Values are 0-255 for HLR UDC.	Optional	HLR gsmSCF Profile Number

The use of profiles for creation and modification of subscriptions is highly recommended because the requests can then be executed much faster. The HLR profile data is copied to the subscription data within the HLR in one step. Without the HLR profile, Dynamic Activation sends at least one Man-machine Language (MML) command per argument (provided service) to the HLR.

Additional parameter in the message request is only necessary if they are not contained in the profile (for example, activation of a service), or if profile parameter values shall be replaced. Any additional argument generates additional MML commands, increasing the time needed to create or to modify a subscription in the HLR.

6.1.3.1 Use of Profiles When Creating a Subscriber

- a If a profile is used, in the service request to define a subscriber the profile data is copied. Assume Profile number 1 contains the following data:

OFA 1



CAT 10

SOCB 1

CAW 1

CFB 1

CFU 0

A message request to define a subscriber with profile number 1 might be: `...MSISDN,46455381234: IMSI,12345678912345: PROFILE,1...` Hence, a request to get the Subscriber Data return: `...MSISDN,46455381234 : IMSI, 12345678912345: CAT,10: CAW, 1: CFB,1,0,TS10:CFU, 0: OFA,1:SOCB, 1:...`

- b Profile number 0 is the default profile in the HLR. When a subscriber is defined in the HLR, all the services and Subscriber Data specified in profile 0 are allocated if no profile is specified in the request.

Note: One should exercise with great care when changing profile number 0, since a CREATE operation always uses profile number 0 if no other profile is selected. This might cause operations like copying of old subscriptions (for example, IMSI Changeover) to generate unexpected result.

- c To minimize the time required for defining a subscriber, only parameters specifying different data to that in the relevant HLR profile should be included when creating a subscriber.

6.1.3.2

Use of Profiles When Setting a Subscriber

- a A profile may also be specified in a subscriber data setting request (using operation SET). Thus, the profile data are copied to the subscription.
- b There is no default profile for a setting request: If no profile is shown, none are used.
- c If a profile is used in a subscription setting request, then all previously assigned services and Subscriber Data are reset, excluding the subscriber password.

Note: This means that all services are deactivated and previously defined Forwarded-to numbers are lost.

- d Because of the fact that the profile data is copied when it is used, there is no coupling between profile and subscription after the operation. This means that already created/modified subscribers is not affected by an updated profile.

6.1.4

Additional MSISDN

The HLR makes use of several MSISDNs called “Additional MSISDNs” (AMSISDNs), so that each of them are uniquely associated with a specific Bearer Capability (BC). Up to 15 AMSISDNs can be defined per subscription. Each of them has an associated BC. AMSISDNs can be defined and deleted but not modified for a certain subscriber.

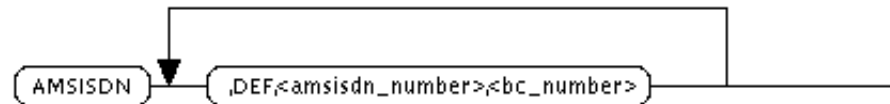


Figure 32 Create AMSISDN When a Subscription Is Created

Table 24 Create AMSISDN

Parameter	Type	Occurrence	Description
AMSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Additional MSISDN
bc_number	Values are 0, 1, 2, 3, 8-65534.	Mandatory	Bearer Capability Number

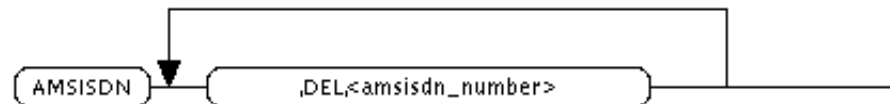


Figure 33 Delete AMSISDN When a Subscription Is Modified

Table 25 Delete AMSISDN

Parameter	Type	Occurrence	Description
AMSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Additional MSISDN

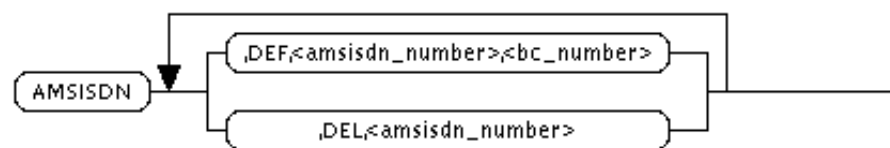


Figure 34 AMSISDN in a Combined Request (Create, Set, and Delete)

Table 26 AMSISDN Combined Request

Parameter	Type	Occurrence	Description
AMSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Additional MSISDN
bc_number	Values are 0, 1, 2, 3, 8-65534.	Optional	Bearer Capability Number

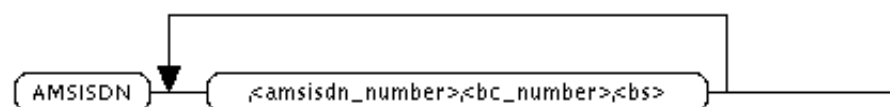


Figure 35 Get Subscription AMSISDN Response



Table 27 *Get Subscription AMSISDN Response*

Parameter	Type	Occurrence	Description
AMISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Additional MSISDN
bc_number	Values are 0, 1, 2, 3, 8-65534.	Mandatory	Bearer Capability Number
bs		Mandatory	Basic Service identifier. The Basic Service is represented by an associated Bearer Capability number. The connection between the Basic Service and its associated Bearer Capability number is done in the HLR.

6.1.4.1

Create Additional MSISDNs

- a AMSISDN data can be defined with the same message request to create a subscriber: for example, `CREATE:HLRSUB:MSISDN,46455381234:IMSI,1234567893333:PROFILE,1:AMISDN,DEF,46455381222,0,DEF,46455381223,10...` - Creates a subscriber and defines the AMSISDN 46455381222 associated with Bearer Capability number 0 and the AMSISDN 46455381223 associated with Bearer Capability number 10 for the new subscriber.
- b The Bearer Capability which shall be associated with an AMSISDN must be already defined in the HLR. The value range for GSM Bearer Capabilities is 0, 1, 2, 3, 8-65534. The BC number 1 is predefined and reserved for the teleservice 'Auxiliary Speech'. BC number 8 and number 9 are predefined and reserved for the teleservice 'Automatic Facsimile group 3'. The BC number 2 is used to define a dual subscription and BC number 3 is used to change the master subscription in a dual subscription that is defined previously.

6.1.4.2

Delete of Additional MSISDNs

- a AMSISDNs can be deleted with the message request to modify a subscriber, for example, `:SET:HLRSUB:MSISDN,46455381234:AMISDN,DEL,46455381222,DEL,46455381223,...` - Both AMSISDNs for the subscription are deleted.
- b It is possible to delete and create AMSISDNs with the same message request, for example, `SET:HLRSUB:MSISDN,46455381234:AMISDN,DEL,46455381222,DEL,46455381223,DEF,46455381225,25,DEF,46455381226,26...` - Deletes the AMSISDNs 46455381222 and 46455381223. The AMSISDNs 46455381225 and 46455381226 are defined and associated with the Bearer Capabilities number 25 and number 26.

- c The DEL . . . and DEF . . . parts can occur in any order. However, place the DEL . . . parts before the DEF . . . parts in order not to surpass the allowed numbers of AMSISDNs.

6.1.5 CAMEL

The CAMEL services are predefined in the HLR, each subscriber can have one service for originating calls, one for terminating calls and one for GPRS calls.

6.1.5.1 Create CAMEL Subscription Data

Create CAMEL Subscription Trigger Detection Points

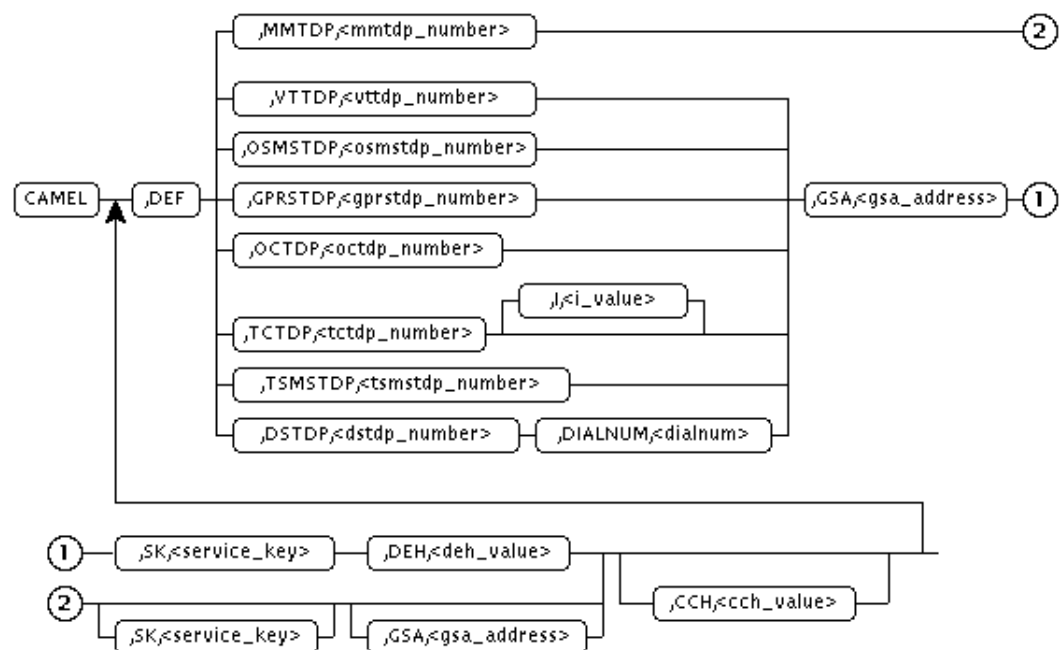


Figure 36 Create CAMEL Subscription Trigger Detection Points

Table 28 Create CAMEL Subscription Trigger Detection Points

Parameter	Type	Occurrence	Description
MMTDP ⁽¹⁾	Values are 0-4.	Optional	Mobility Management CAMEL subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 3.
VTDP ⁽¹⁾	Values are 12, 13, 14.	Optional	Visitor MSC Terminating CAMEL subscription data Trigger Detection Point This parameter is valid only for CAMEL phase 3.



Parameter	Type	Occurrence	Description
OSMSTDP ⁽¹⁾	Value is 1.	Optional	Originating SMS CAMEL Subscription data Trigger Detection Point. DP SMS Collected information. This parameter is valid only for CAMEL phase 3.
OCTDP ⁽¹⁾	Values are 2, 4.	Optional	Originating CAMEL subscription data Trigger Detection Point
TCTDP ⁽¹⁾	Values are 12, 13, 14.	Optional	Terminating CAMEL subscription data Trigger Detection Point
GPRSTDP ⁽¹⁾	Values are 1, 2, 11, 12, 14.	Optional	GPRS CAMEL Subscription data Trigger Detection Point, Application system-dependent parameter If GPRSTDP is set in the command, the CAMEL subscription data are applicable in the GPRS network. This parameter is valid only for CAMEL phase 3.
I	Values: <ul style="list-style-type: none"> • Y • N (default) 	Optional	Inhibition indicator. Application System dependent parameter. This parameter is only valid for TCTDP.
TSMSTDP ⁽¹⁾	Value is 2 (SMS Delivery Request).	Optional	Terminating SMS CAMEL Subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 4.
DSTDP ⁽¹⁾	Values are 1-10.	Optional	Dialled service CAMEL Subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 4.
DIALNUM	Expressed as na-dial where: na: Nature of address indicator: <ul style="list-style-type: none"> • 0 = Unknown • 1, 2 = Not used • 3 = National number • 4 = International number dial: Dialled number series. Text string 1-15 characters. Only digits 0-9, *, #, a, b, and c are allowed as characters.	Optional	Dialled Number This parameter is only valid for DSTDP.
GSA	Digit string 3-15 digits	Mandatory It is not mandatory for MMTDP.	GSM SCF Address



Parameter	Type	Occurrence	Description
SK	Values are 0-2147483647.	Mandatory It is not mandatory for MMTDP.	Service Key number
DEH	Values are 0-1.	Mandatory	Default Error Handling value This parameter is not valid for MMTDP.
CCH	Values are 1-4: If OCTDP is set as 4 or TCTDP is set as 13 or 14 in the command, or VTTPD/MMTDP is set, CCH can accept value 3 only. Default value 1 is assigned when CCH is not present. If GPRSTDP or OSMSTDP is set in the command, CCH can accept value 3 only. Default value 3 is assigned when CCH is not present. If DSTDP is set in the command, CCH can accept value 3 only. Default value 3 is assigned when CCH is not present. If TSMSTDP is set in the command, CCH can accept value 4 only. Default value 4 is assigned when CCH is not present.	Optional	CAMEL Capability Handling. Application system-dependent parameter.

(1) At least one of these parameters with respective value has to be mandatory.

Create CAMEL Conditional Triggering Criteria Data

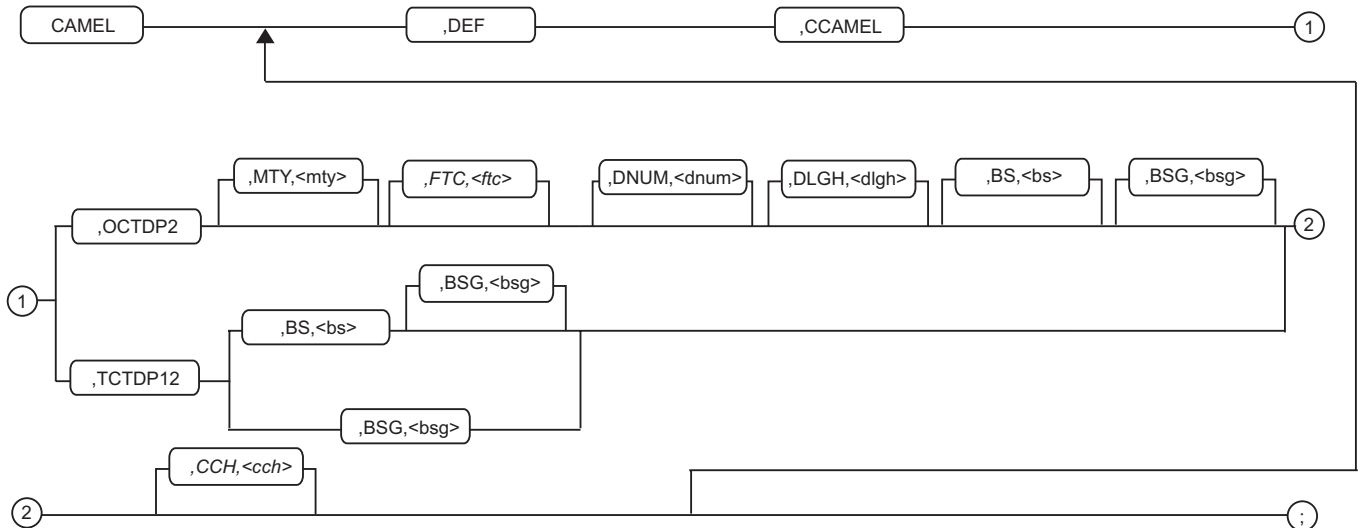


Figure 37 Create CAMEL Conditional Triggering Criteria Data



Table 29 Create CAMEL Conditional Triggering Criteria Data

Parameter	Type	Occurrence	Description
MTY	Values are: <ul style="list-style-type: none"> E = Enabling I = Inhibiting 	Optional ⁽¹⁾	Match Type
DNUM	Expressed as na-nb format where na can be 0-4 and nb can be 1-15 digits, *, #.	Optional	Destination Number
DLGH	Values are 1-15.	Optional Mandatory, if DNUM is not set.	Destination number Length
FTC	Values are: <ul style="list-style-type: none"> N = Not forwarding F = Forwarding 	Optional	Forwarding Triggering Criteria
BS	Values are TS11, TS61, TS62, TSD1, BS21, BS22, BS23, BS24, BS25, BS26, BS2G, BS31, BS32, BS33, BS34, BS3G.	Optional	Basic Service. It is used to define basic service triggering criteria.
BSG	Values are TS10, TS60, TSD0, TS20, TS30.	Optional ⁽²⁾	Basic Service Group identifier. It is used to define basic service triggering criteria.
CCH	Values are 1-4.	Optional	CAMEL Capability Handling. Application system-dependent parameter.

(1) This parameter is mandatory when setting the parameter DNUM and DLGH for the first time, and it shall NOT be used again when setting other values of DNUM and DLGH.

(2) For TCTDP12, this parameter is mandatory if BS is not set.

- a CAMEL subscriber data can be created by defining either one or two or all the followings: Originating CAMEL Subscription Trigger Detection Points (OCTDP), Terminating CAMEL Subscription Trigger Detection Points (TCTDP), GPRS CAMEL Subscription Trigger Detection Points, Terminating SMS CAMEL subscription data Trigger Detection Point and Dialed service CAMEL subscription data Trigger Detection Point:

```
CREATE:HLRSUB:IMSI,12345678933333:MSISDN,46455381234:
CAMEL,DEF,OCTDP,2,GSA,45000000,SK,1234,DEH,1,DEF,TCTDP,
12,GSA,45000000,SK,3234,DEH,1,DEF,GPRSTDP,1,GSA,987654
32,
SK,1234333,DEH,0,CCH,3,DEF,TSMSTDP,2,SK,1234,GSA,8888,D
EH,1,CCH,4,DEF,DSTDP,1,DIALNUM,3-1234,SK,1234,GSA,8
888.DEH,1,CCH,3:...
```

The previous example shows how to create a subscriber in HLR with a CAMEL service. One for originating calls on detection point 2, one for

terminating calls on detection point 12, one for GPRS calls on detection point 1, one for terminating SMS calls on detection point 2 and one for dialled service calls on detection point 1.

- b To create CAMEL Conditional Triggering Criteria Data, for example:

```
CREATE:HLRSUB:MSISDN,46455381234:CAMEL,DEF,CCAMEL,
OCTDP2,FTC,F,CCH,2,...
```

This example creates Conditional Triggering Criteria Data for originating calls on detection point 2, and forwarding triggering criteria on CAMEL phase 2.

6.1.5.2

Set CAMEL Subscription Data

Set Data in CAMEL Subscription Trigger Detection Points

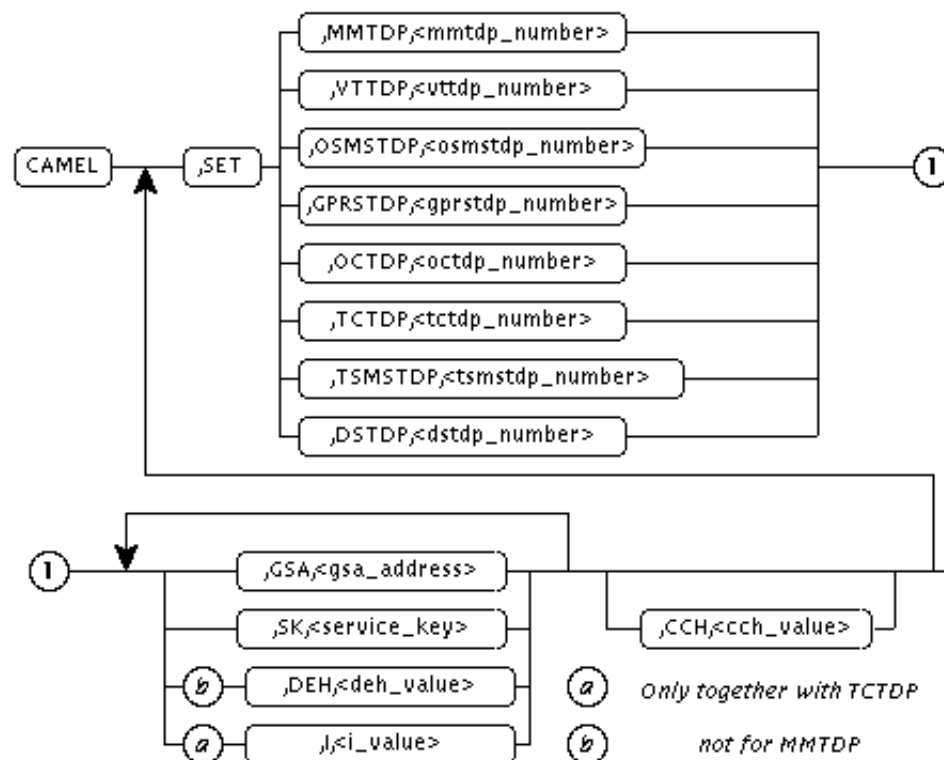


Figure 38 Set Data in CAMEL Subscription Trigger Detection Points

Table 30 Set Data in CAMEL Subscription Trigger Detection Points

Parameter	Type	Occurrence	Description
MMTDP	Values are 0-4.	Optional	Mobility Management CAMEL subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 3.



Parameter	Type	Occurrence	Description
VTTDP	Values are 12, 13, 14.	Optional	Visitor MSC Terminating CAMEL subscription data Trigger Detection Point This parameter is valid only for CAMEL phase 3.
OSMSTDP	Value is 1.	Optional	Originating SMS CAMEL Subscription data Trigger Detection Point. DP SMS Collected information. This parameter is valid only for CAMEL phase 3.
OCTDP	Values are 2, 4.	Optional	Originating CAMEL subscription data Trigger Detection Point
TCTDP	Values are 12, 13, 14.	Optional	Terminating CAMEL subscription data Trigger Detection Point
TSMSTDP	Value is 2 (SMS Delivery Request).	Optional	Terminating SMS CAMEL Subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 4.
DSTDP	Values are 1-10.	Optional	Dialled service CAMEL Subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 4.
GPRSTDP	Values are 1, 2, 11, 12, 14.	Optional	GPRS CAMEL Subscription data Trigger Detection Point. Application system-dependent parameter. If GPRSTDP is set in the command, the CAMEL subscription data are applicable in the GPRS network. This parameter is valid only for CAMEL phase 3.
I	Values: <ul style="list-style-type: none"> • Y • N (default) 	Optional	Inhibition indicator. Application System dependent parameter.
GSA	Digit string 3-15 digits	Optional	GSM SCF Address
SK	Values are 0-2147483647.	Optional	Service Key number

Parameter	Type	Occurrence	Description
DEH	Values are 0-1.	Optional	Default Error Handling value
CCH	Values are 1-4: If OCTDP is set as 4 or TCTDP is set as 13 or 14 in the command, or VTTDP/MMTDP is set, CCH can accept value 3 only. Default value 1 is assigned when CCH is not present. If GPRSTDP or OSMSTDP is set in the command, CCH can accept value 3 only. Default value 3 is assigned when CCH is not present. If DSTDP is set in the command, CCH can accept value 3 only. Default value 3 is assigned when CCH is not present. If TSMSTDP is set in the command, CCH can accept value 4 only. Default value 4 is assigned when CCH is not present.	Optional	CAMEL Capability Handling. Application system-dependent parameter.

Set Extended CAMEL Data for a Subscriber

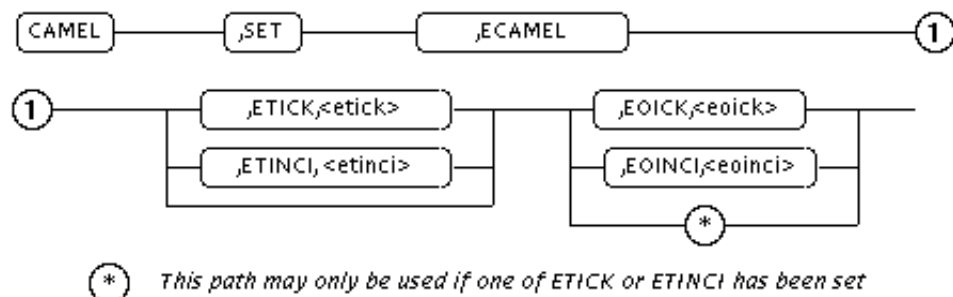


Figure 39 Set Extended CAMEL Data for a Subscriber

Table 31 Set Extended CAMEL Data for a Subscriber

Parameter	Type	Occurrence	Description
ETICK	Values are 0-999.	Optional	Extended Terminating In Category Key
ETINCI	Values are 0-255.	Optional	Extended Terminating In Capability Indicator
EOICK	Values are 0-999.	Optional	Extended Originating In Category Key
EOINCI	Values are 0-255.	Optional	Extended Originating In Capability Indicator

Set Optional CAMEL Subscription Data

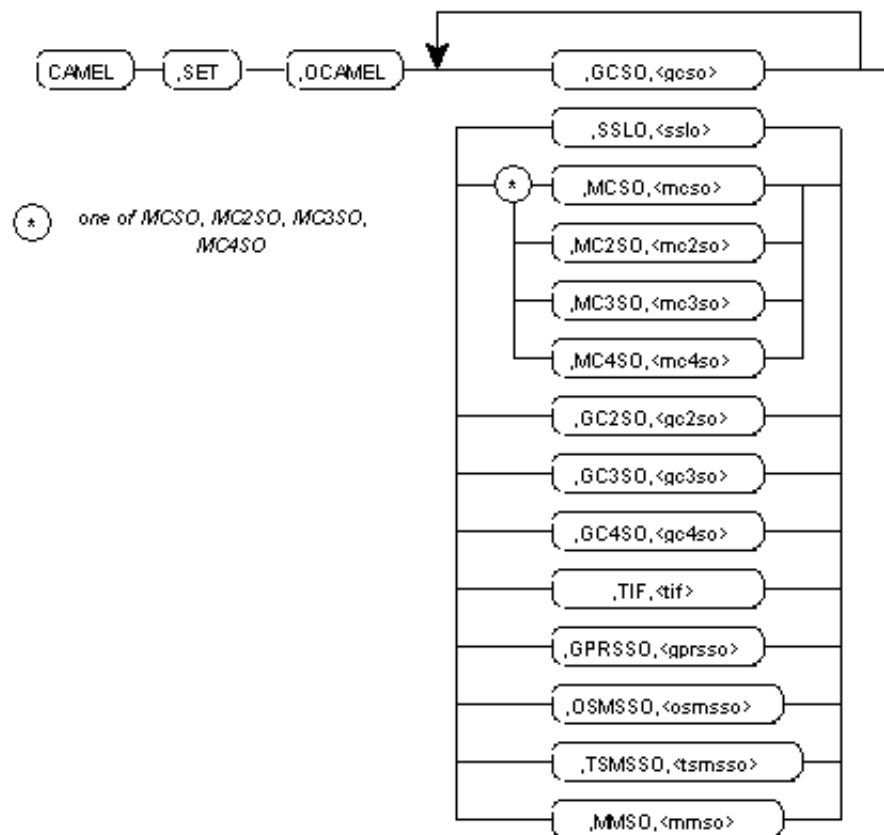


Figure 40 Set the Optional CAMEL Subscription Data

Table 32 Set the Optional CAMEL Subscription Data

Parameter	Type	Occurrence	Description
GCSO	Values are 0-1.	Mandatory	CAMEL Subscription Option when CAMEL phase 1 is not supported in the interrogating GMSC
SSLO	Values are 0-1.	Optional	CAMEL Subscription Option Subscriber State and Location Information
MCSO	Values are 0-2.	Optional	MSC/VLR CAMEL Support subscription Option when CAMEL phase 1 is not supported in the servicing MSC/VLR
MC2SO	Values are 0-2.	Optional	MSC/VLR CAMEL Support subscription Option when CAMEL phase 2 is not supported in the servicing MSC/VLR
MC3SO	Values are 0-2.	Optional	MSC/VLR CAMEL Support subscription Option when CAMEL phase 3 is not supported in the servicing MSC/VLR



Parameter	Type	Occurrence	Description
MC4SO	Values are 0-2.	Optional	MSC/VLR CAMEL Support subscription Option when CAMEL phase 4 is not supported in the servicing MSC/VLR
GC2SO	Values are 0-1.	Optional	CAMEL subscription Option when CAMEL phase 2 is not supported in the interrogating GMSC
GC3SO	Values are 0-1.	Optional	CAMEL subscription Option when CAMEL phase 3 is not supported in the interrogating GMSC
GC4SO	Values are 0-1.	Optional	GMSC/gsmSCF CAMEL Support subscription Option when CAMEL phase 4 is supported in the servicing GMSC/gsmSCF
TIF	Values are 0-1.	Optional	Translation Information Flag
GPRSSO	Values are 0-1.	Optional	GPRS CAMEL phase3 denied Subscription Option. Application system-dependent parameter.
OSMSSO	Values are 0-2.	Optional	Originating SMS CAMEL denied Subscription Option. Application system-dependent parameter.
TSMSSO	Values are 0-2.	Optional	Terminating SMS CAMEL phase 4 denied Subscription Option. Application system-dependent parameter.
MMSO	Values are 0-1.	Optional	Mobility Management CAMEL denied Subscription Option. Application system-dependent parameter.

- a To set the subscription data for either one or two or all the followings: Originating Trigger Detection Points, Terminating Trigger Detection Points, GPRS Trigger Detection Points, Terminating SMS CAMEL subscription data Trigger Detection Point and Dialed service CAMEL subscription data Trigger Detection Point. This is done per detection point. For example:

```
SET:HLRSUB:MSISDN,46455381234:CAMEL,SET,OCTDP,2,  
  
SK,9876:...
```

The example shows how to set the service key for the Originating CAMEL Subscription Data Trigger Detection Point 2–9876.

- b To set the Optional CAMEL Subscription Data. For example:

```
SET:HLRSUB:MSISDN,46455381234:CAMEL,SET,OCAMEL,
```




```
GCSO, 1, MCSO, 0, GC2SO, 0: . . .
```

This request changes the GSM CAMEL Subscription Options. Apply ODB of all incoming calls when no CAMEL phase is supported in the interrogating GMSC. Allow mobile subscribers registration in the serving MSC/VLR without sending any CAMEL data when no CAMEL data is allowed to be sent to the MSC/VLR. Allow call terminating handling with CAMEL phase 1 invocation when CAMEL phase 2 is not supported in the interrogating GMSC.

- c To set the Extended CAMEL Subscription Data. For example:

```
SET:HLRSUB:MSISDN,46455381234:CAMEL,SET,ECAMEL,  
ETINCI,123,EOICK,9: . . .
```

The previous example sets the Extended Terminating IN Capability Indicator to 123 and the Extended Originating IN Capability Key to 9.

Note: It is only possible to set an Extended Originating CAMEL service if an Originating CAMEL Subscription Data Trigger Detection Point is already created for the subscriber. The same behavior goes for the Extended Terminating CAMEL data.

- d DEF, DEL, and SET requests may occur in any order. For example:

```
SET:HLRSUB:MSISDN,46455381234:CAMEL,DEF,OCTDP,2,  
GSA,451000000,SK,123,DEH,1,SET,OCAMEL,GCSO,1,  
SET,ECAMEL,EOICK,123,DEL,TCTDP,12: . . .
```

This example defines an Originating Trigger Detection Point 2, sets the optional CAMEL data attribute GCSO to 1 and the extended CAMEL attribute EOICK to 123. The TCTDP 12 is removed from the subscription data.

Note: It is possible to combine different CAMEL operations in one command by using the SET, DEL, and DEF delimiter. That means it is possible to combine one ECAMEL, one OCAMEL, one or more OCTDP, TCTDP and GPRSTDP requests in one command.

6.1.5.3

Delete CAMEL Subscription Data

Delete CAMEL Subscription Trigger Detection Points

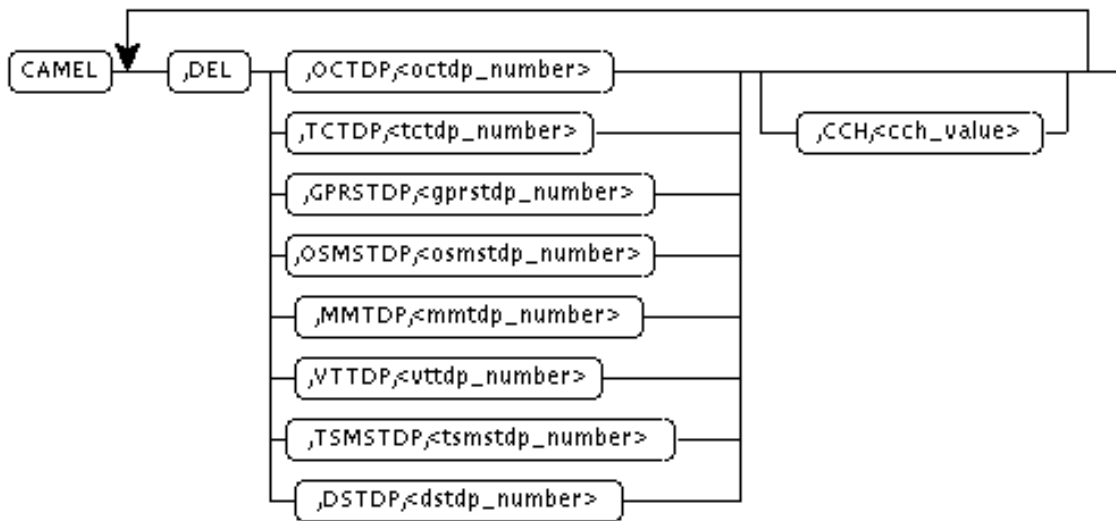


Figure 41 Delete CAMEL Subscription Trigger Detection Points

Table 33 Delete CAMEL Subscription Trigger Detection Points

Parameter	Type	Occurrence	Description
OCTDP	Values are 2, 4 and ALL.	Optional	Originating CAMEL subscription data Trigger Detection Point
TCTDP	Values are 12, 13, 14 and ALL.	Optional	Terminating CAMEL subscription data Trigger Detection Point
GPRSTDP	Values are 1, 2, 11, 12, 14 and ALL.	Optional	GPRS CAMEL Subscription data Trigger Detection Point, Application system-dependent parameter If GPRSTDP is set in the command, the CAMEL subscription data are applicable in the GPRS network. This parameter is valid only for CAMEL phase 3.
OSMSTDP	Value is 1 and ALL.	Optional	Originating SMS CAMEL Subscription data Trigger Detection Point. DP SMS Collected information. This parameter is valid only for CAMEL phase 3.
MMTDP	Values are 0-4 and ALL.	Optional	Mobility Management CAMEL subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 3.
VTTP	Values are 12, 13, 14 and ALL.	Optional	Visitor MSC Terminating CAMEL subscription data Trigger Detection Point This parameter is valid only for CAMEL phase 3.



Parameter	Type	Occurrence	Description
TSMSTDP	Value is 2 (SMS Delivery Request) and ALL.	Optional	Terminating SMS CAMEL Subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 4.
DSTDP	Values are 1-10 and ALL.	Optional	Dialled service CAMEL Subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 4.
CCH	<p>Values are 1-4:</p> <p>If OCTDP is set as 4 or TCTDP is set as 13 or 14 in the command, or VTDP/MMTDP is set, CCH can accept value 3 only. Default value 1 is assigned when CCH is not present.</p> <p>If GPRSTDP or OSMSTDP is set in the command, CCH can accept value 3 only. Default value 3 is assigned when CCH is not present.</p> <p>If DSTDP is set in the command, CCH can accept value 3 only. Default value 3 is assigned when CCH is not present.</p> <p>If TSMSTDP is set in the command, CCH can accept value 4 only. Default value 4 is assigned when CCH is not present.</p> <p>If the parameter CCH is given in the command but TDP is omitted, all CAMEL subscription data for the specified phase is removed for the mobile subscriber or for the CAMEL subscription profile.</p>	Optional	CAMEL Capability Handling. Application system-dependent parameter.

Delete CAMEL Conditional Triggering Criteria Data

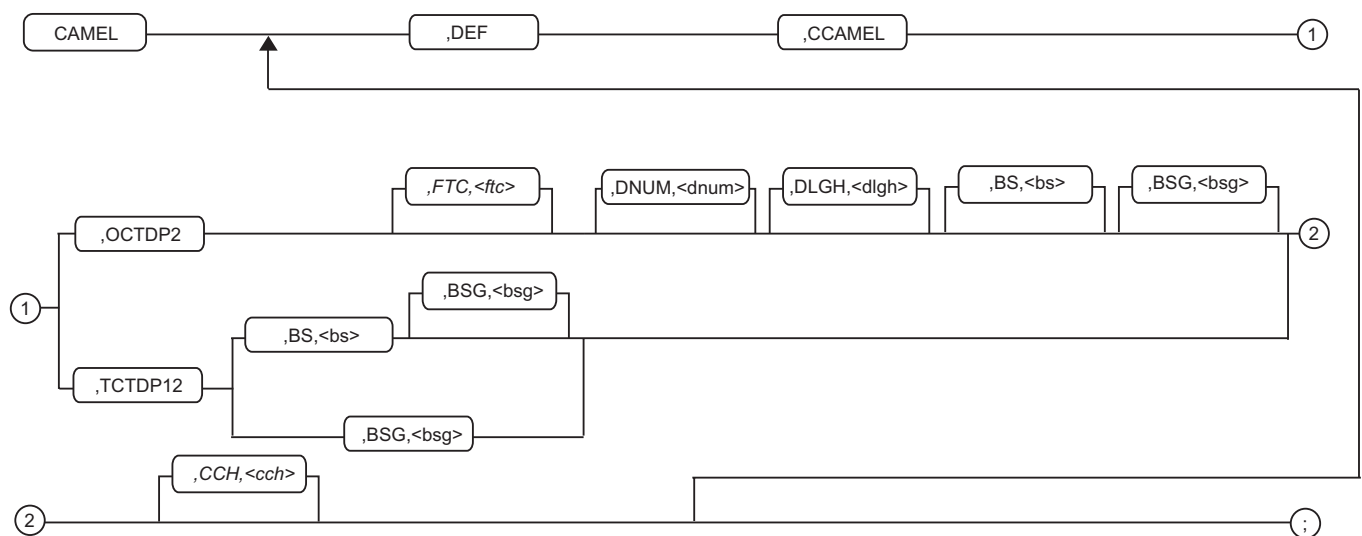


Figure 42 Delete CAMEL Conditional Triggering Criteria Data

Table 34 Delete CAMEL Conditional Triggering Criteria Data

Parameter	Type	Occurrence	Description
DNUM	Expressed as na-nb format where na can be 0-4 and nb can be 1-15 digits, *, #.	Optional	Destination Number
DLGH	Values are 1-15 or ALL.	Optional	Destination number Length
FTC	Values are: <ul style="list-style-type: none"> N = Not forwarding F = Forwarding 	Optional	Forwarding Triggering Criteria
BS	Values are TS11, TS61, TS62, TSD1, BS21, BS22, BS23, BS24, BS25, BS26, BS2G, BS31, BS32, BS33, BS34, BS3G and ALL.	Optional	Basic Service. It is used to define basic service triggering criteria.
BSG	Values are TS10, TS60, TSD0, TS20, TS30 and ALL.	Optional	Basic Service Group identifier. It is used to define basic service triggering criteria.

a The deletion of the CAMEL subscription data is done for each CAMEL Subscription Data Trigger Detection Point. For example:
SET:HLRSUB:MSISDN,46455381234:CAMEL,DEL,OCTDP,2:...

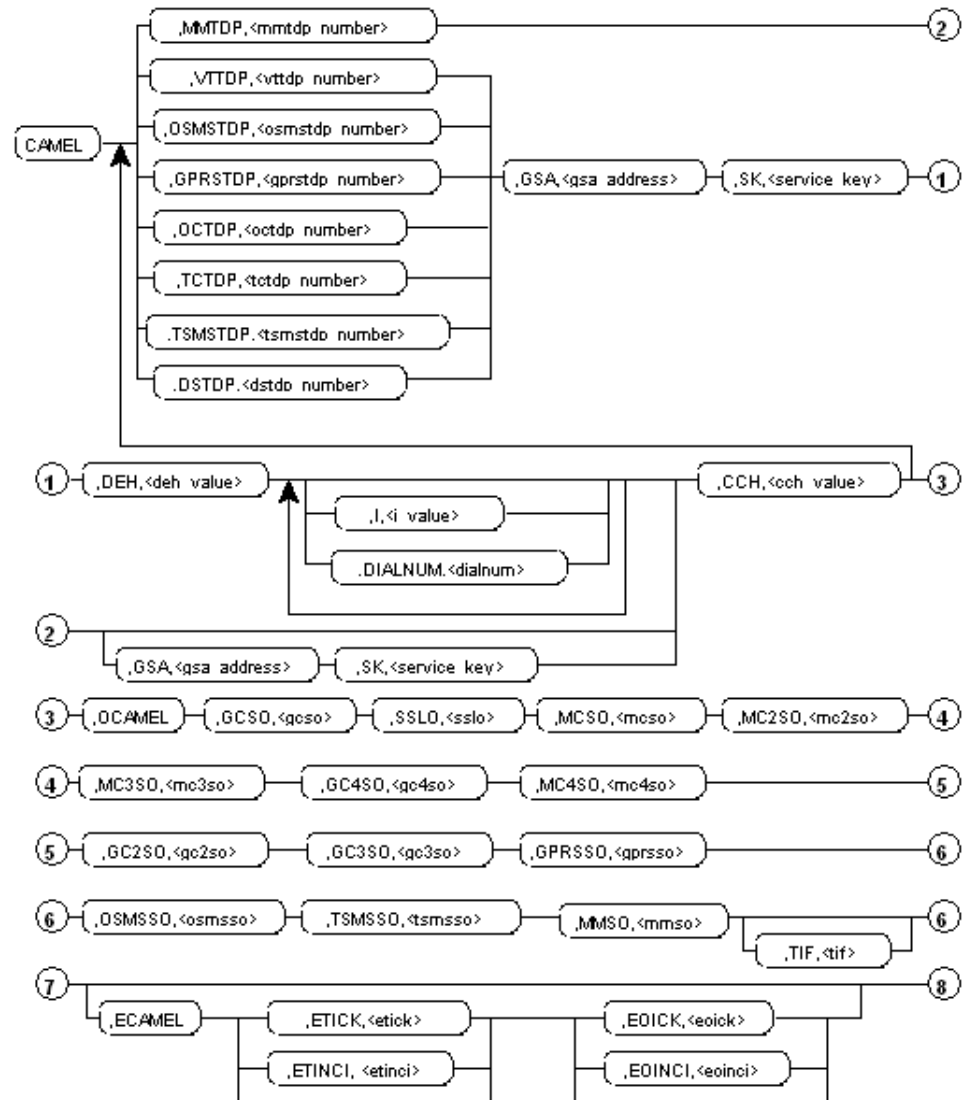
b If the parameter OCTDP or TCTDP is used followed by specified ALL, all the originating or termination CAMEL subscription data of the specified phase are removed.

If the parameter GPRSTDP is used followed by specified ALL, all the GPRS CAMEL subscription data are removed.



6.1.5.4

Get CAMEL Subscription



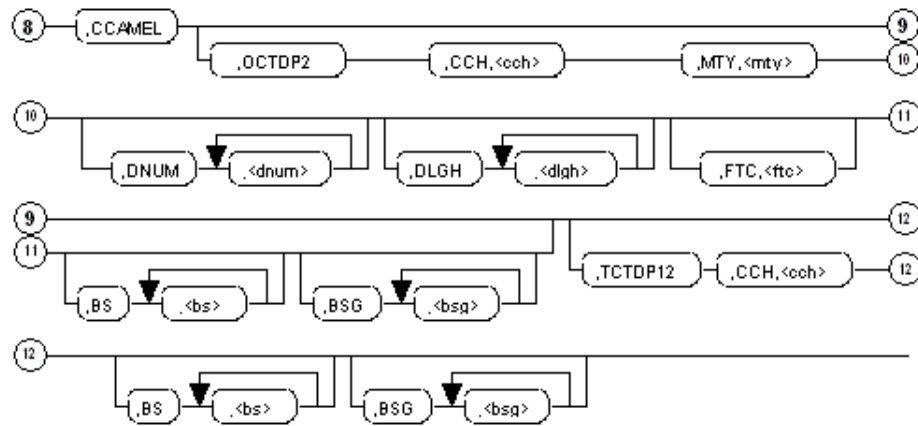


Figure 43 Get CAMEL Subscription Response

Table 35 Get CAMEL Subscription Trigger Detection Points

Parameter	Type	Occurrence	Description
MMTDP	Values are 0 - 4.	Optional	Mobility Management CAMEL subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 3.
VTTDP	Values are 12, 13, 14.	Optional	Visitor MSC Terminating CAMEL subscription data Trigger Detection Point This parameter is valid only for CAMEL phase 3.
OSMSTDP	Value is 1.	Optional	Originating SMS CAMEL Subscription data Trigger Detection Point. DP SMS Collected information. This parameter is valid only for CAMEL phase 3.
OCTDP	Values are 2, 4.	Optional	Originating CAMEL subscription data Trigger Detection Point
TSMSTDP	Value is 2 (SMS Delivery Request).	Optional	Terminating SMS CAMEL Subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 4.
DSTDP	Values are 1 - 10.	Optional	Dialled service CAMEL Subscription data Trigger Detection Point. This parameter is valid only for CAMEL phase 4.
TCTDP	Values are 12, 13, 14.	Optional	Terminating CAMEL subscription data Trigger Detection Point



Parameter	Type	Occurrence	Description
GPRSTDP	Values are 1, 2, 11, 12, 14.	Optional	GPRS CAMEL Subscription data Trigger Detection Point, Application system-dependent parameter If GPRSTDP is set in the command, the CAMEL subscription data are applicable in the GPRS network. This parameter is valid only for CAMEL phase 3.
I	Values are: • Y • N (default)	Optional	Inhibition indicator. Application System dependent parameter.
DIALNUM	Expressed as na-dial where: na: Nature of address indicator: • 0 = Unknown • 1, 2 = Not used • 3 = National number • 4 = International number dial: Dialed number series. Text string 1-15 characters. Only digits 0-9, *, #, a, b, and c are allowed as characters.	Optional	Dialed Number
GSA	Digit string 3-15 digits	Mandatory Optional for MMTDP.	GSM SCF Address
SK	Values are 0-2147483647.	Mandatory Optional for MMTDP.	Service Key number
DEH	Values are 0-1.	Mandatory	Default Error Handling value This parameter is invalid for MMTDP.
CCH	Values are 1-4.	Mandatory	CAMEL Capability Handling. Application system-dependent parameter.
ETICK	Values are 0-999.	Mandatory	Extended Terminating In Category Key
ETINCI	Values are 0-255.	Mandatory	Extended Terminating In Capability Indicator
EOICK	Values are 0-999.	Mandatory	Extended Originating In Category Key
EOINCI	Values are 0-255.	Mandatory	Extended Originating In Capability Indicator
GCSO	Values are 0-1.	Optional	CAMEL Subscription Option when CAMEL phase 1 is not supported in the interrogating GMSC



Parameter	Type	Occurrence	Description
SSLO	Values are 0-1.	Optional	CAMEL Subscription Option Subscriber State and Location Information
MCSSO	Values are 0-2.	Optional	MSC/VLR CAMEL Support subscription Option when CAMEL phase 1 is not supported in the servicing MSC/VLR
MC2SO	Values are 0-2.	Optional	MSC/VLR CAMEL Support subscription Option when CAMEL phase 2 is not supported in the servicing MSC/VLR
MC3SO	Values are 0-2.	Optional	MSC/VLR CAMEL Support subscription Option when CAMEL phase 3 is not supported in the servicing MSC/VLR
MC4SO	Values are 0-2.	Optional	MSC/VLR CAMEL Support subscription Option when CAMEL phase 4 is not supported in the servicing MSC/VLR
GC2SO	Values are 0-1.	Optional	CAMEL subscription Option when CAMEL phase 2 is not supported in the interrogating GMSC
GC3SO	Values are 0-1.	Optional	CAMEL subscription Option when CAMEL phase 3 is not supported in the interrogating GMSC
GC4SO	Values are 0-1.	Optional	GMSC/gsmSCF CAMEL Support subscription Option when CAMEL phase 4 is supported in the servicing GMSC/gsmSCF
TIF	Values are 0-1.	Optional	Translation Information Flag
GPRSSO	Values are 0-1.	Optional	GPRS CAMEL phase3 denied Subscription Option. Application system-dependent parameter.
OSMSSO	Values are 0-2.	Optional	Originating SMS CAMEL denied Subscription Option. Application system-dependent parameter.
TSMSSO	Values are 0-2.	Optional	Terminating SMS CAMEL phase 4 denied Subscription Option. Application system-dependent parameter.
MMSO	Values are 0-1.	Optional	Mobility Management CAMEL denied Subscription Option. Application system-dependent parameter.



Parameter	Type	Occurrence	Description
MTY	Values are: • E = Enabling • I = Inhibiting	Optional	Match Type
DNUM	Expressed as na-nb format where na can be 0-4 and nb can be 1-15 digits, *, #.	Optional	Destination Number
DLGH	Values are 1-15.	Optional	Destination number Length
FTC	Values are: • N = Not forwarding • F = Forwarding	Optional	Forwarding Triggering Criteria
BS	Values are TS11, TS61, TS62, TSD1, BS21, BS22, BS23, BS24, BS25, BS26, BS2G, BS31, BS32, BS33, BS34, BS3G.	Optional	Basic Service. It is used to define basic service triggering criteria.
BSG	Values are TS10, TS60, TSD0, TS20, TS30.	Optional	Basic Service Group identifier. It is used to define basic service triggering criteria.

Example:

```
RESP:0:MSISDN,22220000:IMSI,11110000:AUTHD,"NO ACCESS TO AUC":CAMEL,TSMSTDP,2,GS
A,8888,SK,1234,DEH,1,CCH,4,ECAMEL,ETICK,0,ETINCI,0,EOICK,0,EOINCI,0:NAM,1:CAT
,10:DBSG,1:OFA,0:PWD,0000:SCHAR,0-0;
```

6.1.6 Closed User Groups

Closed User Group (CUG) is an Ericsson-specific feature that makes it possible to group a number of subscribers with equal restrictions/possibilities.

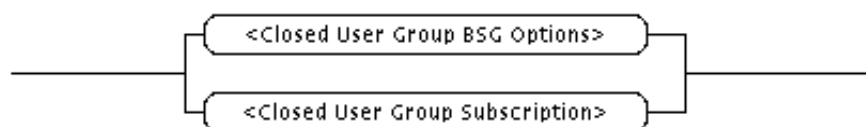


Figure 44 CUG Data Command

6.1.6.1 Closed User Group Subscription

A subscriber can be a member of up to 10 CUGs. A subscriber can join or form a Closed User Group. A Closed User Group can have different restrictions for different groups of members.

Each Closed User Group is defined by a unique Interlock Code (IC). Following restrictions are possible to attach to the CUG subscription:

- a Incoming Calls Barred within CUG (ICB)
- b Outgoing Calls Barred within CUG (OCB)

c No restrictions within CUG (NONE)

To create a CUGSUB attribute, the following syntax is applied:

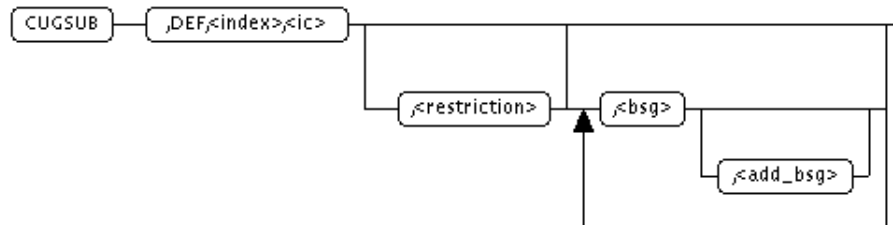


Figure 45 Create CUGSUB

Table 36 Create CUGSUB

Parameter	Type	Occurrence	Description
index	Values are 0-32767.	Mandatory	CUG Index
ic	Value format falls into two parts that are connected with a -. The range starts from 0000-0 to 9999-65535.	Mandatory	Interlock Code
restriction	Values are ICB, OCB, or NONE.	Optional	CUG Restriction
bsg	Values are BS20, BS30, TS10, TS60 or TSD0.	Optional	Basic Service Group identifier. It is attached by CUG membership.
add_bsg	Only the default value set 1 could be specified indicating that BSG is added to the CUG.	Optional	Add BSG flag

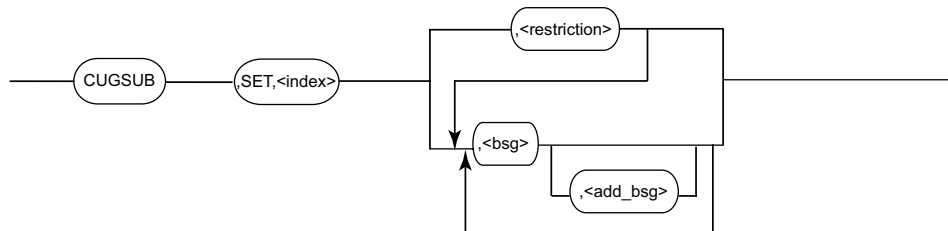


Figure 46 Set CUGSUB

Table 37 Set CUGSUB

Parameter	Type	Occurrence	Description
index	Values are 0-32767.	Mandatory	CUG Index
restriction	Values are ICB, OCB, or NONE.	Optional	CUG Restriction
bsg	Values are BS20, BS30, TS10, TS60, or TSD0.	Optional	Basic Service Group identifier. It is attached by CUG membership.
add_bsg	If set 1 the specified BSG is added to the CUG, else if reset 0 the BSG is removed. Default value is 1.	Optional	Add BSG flag

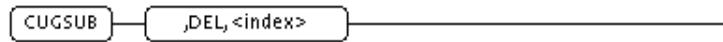


Figure 47 Delete CUGSUB

Table 38 Delete CUGSUB

Parameter	Type	Occurrence	Description
index	Values are 0-32767.	Mandatory	CUG Index

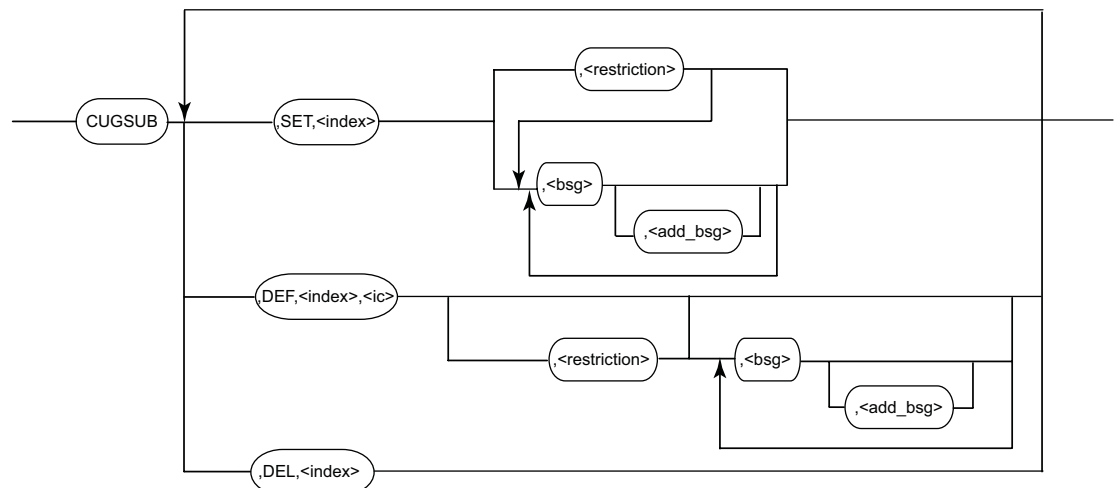


Figure 48 Create, Set, and Delete CUGSUBs

Table 39 Create/Set/Delete CUGSUBs

Parameter	Type	Occurrence	Description
index	Values are 0-32767.	Mandatory	CUG Index
ic	Value format falls into two parts that are connected with a -. The range starts from 0000-0 to 9999-65535.	Mandatory	Interlock Code
restriction	Values are ICB, OCB, or NONE.	Mandatory	CUG Restriction
bsg	Values are BS20, BS30, TS10, TS60, or TSD0.	Optional	Basic Service Group identifier. It is attached by CUG membership.
add_bsg	If set 1 the specified BSG is added to the CUG, else if reset 0 the BSG is removed. Default value is 1.	Optional	Add BSG flag

If there is a modifying message request, creating/setting/deleting of CUGSUBs can be combined in any order.

For example: SET:HLRSUB: :CUGSUB,DEF,12,0017-2871,ICB,BS20,DEL,1,DEL38,SET,34,OCB,TS60,0: . . .

The message response of a request to get a subscriber contains the CUGSUB data in following format:

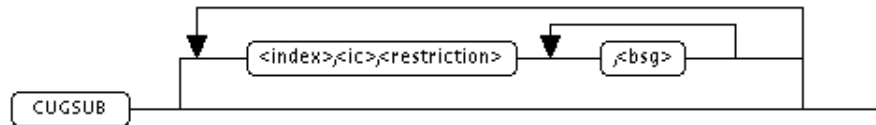


Figure 49 Get Subscriber Response

Table 40 Get Subscriber Response

Parameter	Type	Occurrence	Description
index	Values are 0-32767.	Optional	CUG Index
ic	Value format falls into two parts that are connected with a - . The range starts from 0000-0 to 9999-65535.	Optional	Interlock Code
restriction	Values are ICB, OCB, or NONE.	Optional	CUG Restriction
bsg	Values are BS20, BS30, TS10, TS60, or TSD0.	Optional	Basic Service Group identifier. It is attached by CUG membership.

For example: **RESP:0:::CUGSUB, 12, 0007-98, ICB, BS20, TS20, 78, 0089-457, OCB, TS10:::**

6.1.6.2 Closed User Group BSG Options

It is possible to set a HLR subscribers CUG Basic Service Group options by the attribute CUG. The options that can be attached to a CUG BSG are:

- Access, determines the specific access for a BSG. Can be one of following:
- Outgoing Access (OA) - Incoming Access (IA) - Outgoing and Incoming Access (OIA) - No access (NONE)
- Preferential CUG index, determines the default CUG to be used by the network when no explicit CUG index is received from the mobile subscriber.

The CUG BSG options argument syntax is defined as follows:

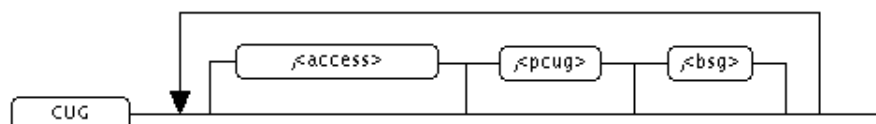


Figure 50 Closed User Group Options

Table 41 Closed User Group Options

Parameter	Type	Occurrence	Description
access	Values are OA, IA, OIA, or NONE.	Optional	Access attribute



Parameter	Type	Occurrence	Description
pcug	Values are 0-32767, NONE.	Optional	Preferential CUG index
bsg	Values are BS20, BS30, TS10, TS60, or TSD0.	Optional	Basic Service Group

A CUG BSG options set can be used in an ordinary CREATE/SET operation, for example, SET:HLRSUB:...:CUG, IA, TS10, OA, 76, TS60:...

The message response of a request to get a subscription contains the CUG data in following format:

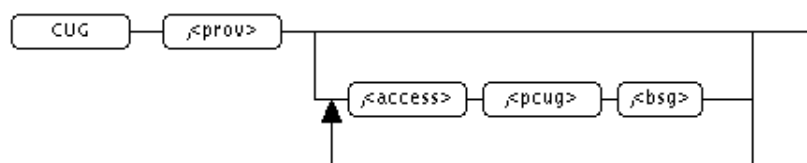


Figure 51 CUG Response

Table 42 CUG Response

Parameter	Type	Occurrence	Description
prov	Values are 0-1. If set to 0, the other values is not displayed.	mandatory	The Provision state of the Closed User Group BSG options.
access	Values are OA, IA, OIA, or NONE.	Optional	Access attribute
pcug	Values are 0-32767, NONE.	Optional	Preferential CUG index
bsg	Values are BS20, BS30, TS10, TS60, or TSD0.	Optional	Basic Service Group

6.1.7

Mobility Management Related IN Triggering

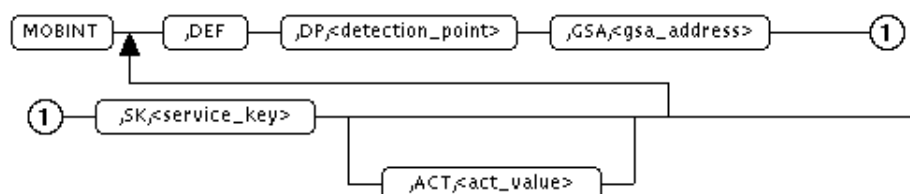


Figure 52 Create Mobility Management Related IN Triggering Data

Table 43 Create Mobility Management Related IN Triggering Data

Parameter	Type	Occurrence	Description
DP	Values are 0-1.	Mandatory	The Detection Point which should be triggered
GSA	Digit string, 5-15 digits	Mandatory	The GSM SCF Address which points out the SCF node

Parameter	Type	Occurrence	Description
SK	Values are 0-2147483647.	Mandatory	The Service Key value which points out the IN service in the SCF node
ACT	Values are 0-1.	Optional	Activate/deactivate the Mobility Management Related IN Trigger data for a specific Detection Point

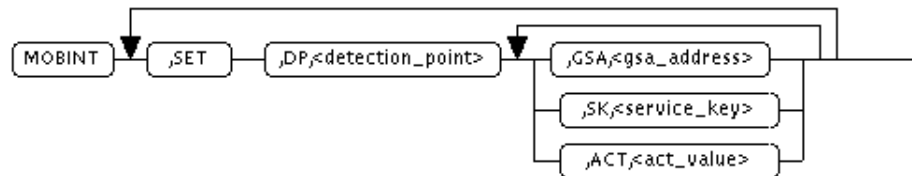


Figure 53 Set Data for a Mobility Management Related IN Trigger Detection Point

Table 44 Set Mobility Management Related IN Triggering Data

Parameter	Type	Occurrence	Description
DP	Values are 0-1.	Mandatory	The Detection Point which should be triggered
GSA	Digit string, 5-15 digits	Optional	The GSM SCF Address which points out the SCF node
SK	Values are 0-2147483647.	Optional	The Service Key value which points out the IN service in the SCF node
ACT	Values are 0-1.	Optional	Activate/deactivate the Mobility Management Related IN Trigger data for a specific Detection Point

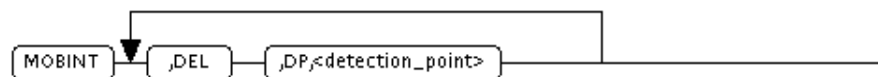


Figure 54 Delete Mobility Management Related IN Trigger Data

Table 45 Delete Mobility Management Related IN Triggering Data

Parameter	Type	Occurrence	Description
DP	Values are 0-1.	Mandatory	The Detection Point which should be triggered



Figure 55 Get Subscription Mobility Management Related IN Trigger Response



Table 46 Set Mobility Management Related IN Triggering Data

Parameter	Type	Occurrence	Description
DP	Values are 0-1.	Mandatory	The Detection Point which should be triggered
GSA	Digit string, 5-15 digits	Mandatory	The GSM SCF Address which points out the SCF node
SK	Values are 0-2147483647.	Mandatory	The Service Key value which points out the IN service in the SCF node
ACT	Values are 0-1.	Mandatory	Activate/deactivate the Mobility Management Related IN Trigger data for a specific Detection Point

6.1.7.1

Create a Mobility Management Related IN Trigger

- a When defining the Mobility Management Related IN Trigger data, the Detection Point, the GSM SCF address, and the service key is to be provided in the request. For example:

```
SET:HLRSUB:MSISDN,46455381234:MOBINT,DEF,DP,1,
```

```
GSA,491000000,SK,12345:...
```

This example defines a Mobility Management Related IN Trigger on the Detection Point 1 for the subscriber with MSISDN 46455381234. The GSM SCF address to the IN service is 491000000 and the Service Key is 12345.

6.1.7.2

Set Mobility Management Related IN Trigger Data

- a It is possible to set the Mobility Management Related IN Trigger data which should be used for a specific Detection Point. It is also possible to activate/deactivate a specific Detection Point. For example:

```
SET:HLRSUB:MSISDN,46455381234:MOBINT,
```

```
SET,DP,1,SK,565656,ACT,1:...
```

The Mobility Management Related IN Trigger data which points out the IN service that should be used when Detection Point 1 is triggered points on the new Service Key value 565656 and are activated.

6.1.7.3

Delete Mobility Management Related IN Trigger Data

- a The deletion of the Mobility Management Related IN Trigger data is done by using the Detection Point as an identifier. For example:

```
SET:HLRSUB:MSISDN,46455381234:MOBINT,DEL,DP,1:...
```

This example removes the Mobility Management Related IN Trigger data for Detection Point 1.

6.1.8 Remove References of IMSI Changeover

If the Changeover procedure, (see Section 8.1 on page 127) is in the state 'Executed' or 'Forced' the new IMSI is being in operation but the reference to the old IMSI is still being kept. This reference can be removed to complete the whole procedure and to free the old IMSI for further use. If the Changeover procedure is not in the state 'Executed' or 'Forced' this request fails.

A delete associated old IMSI argument is defined as follows:

```
Assoc old IMSI = ASSOCOLDIMSI, DEL
```

This argument can only be assigned to a SET operation, for example,
SET:HLRSUB:.....:ASSOCOLDIMSI, DEL:...;

6.1.9 GPRS

GPRS is a set of GSM phase 2+ bearer services that allow subscribers to send and receive data in an end-to-end packet transfer mode. It enables efficient use of network resources for packet mode data applications that exhibit characteristics such as non-periodic data transmission, frequent transmission of small volumes of data, or infrequent transmission of larger volumes of data. The permanent subscriber data for a GPRS subscription is stored in the HLR. A Network Access Mode (NAM) decides what type of network access the subscriber has. It can be:

- Access to non-GPRS network only
- Access to GPRS network only
- Access to both non-GPRS network and GPRS network

The GPRS subscription data is handled in the HLRSUB MO in Dynamic Activation. To differentiate the GPRS data from non-GPRS as well as to provide a future-proof solution, two tags are defined: GPRS, starting tag of all GPRS subscription data and PDPCONTEXT, starting tag of the contents of PDP context. Below the syntax of GPRS subscription data administration is described. Definition of attributes and their value is described in Table 63.

Create GPRS Subscription Data

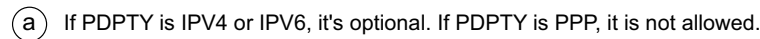


Table 47 Create GPRS Subscription Data

Parameter	Type	Occurrence	Description
APNID	Integer 0-16383 or NS (Not Subscribed)	Mandatory	Access Point Name Identifier
PDPADD	IP address	Optional	Packet Data Protocol Address
PDPID	Values are 1-50.	Mandatory	Subscriber PDP Context Identifier
VPAA	Values are 0-1.	Optional	Visited Public Land Mobile Network Address Allowed
EQOSID	Integer 0-4095	Mandatory	Extended Quality of Service Identifier
PDPTY	Values are IPv4, IPv6 address or ERASE	Optional	PDP Context Type
PDPCH	The format is <code>pdppi [-pdpgb]:</code> <code>pdppi</code> = PDP context Profile Index (Integer 0-15) Optional value <code>pdpgb</code> = PDP context GSN Behavior index (Integer 0-4095).	Optional	PDP Context Charging Characteristics

```
PDPADD,136.225.1.2,EQOSID,4095,PDPCH,15,VPAA,1,PDPID,1;
```

Creating a subscriber with both GPRS and non-GPRS Subscription data:

```
CREATE:HLRSUB:MSISDN,46455381234:IMSI,12345678933333:
AMSISDN,DEF,46455381235,9:CAT,10:CAW,1:NAM,0:TSMO,1:GPRS,
DEF,PDPCONTEXT,APNID,1,PDPADD,136.225.1.1,EQOSID,1,PDPCH
,1,
PDPTY,IPV4,DEF,PDPCONTEXT,APNID,2,PDPCH,2,PDPTY,PPP,
VPAA,0,DEF,PDPCONTEXT,APNID,2047,PDPADD,
136.225.1.2,EQOSID,4095,PDPCH,15,VPAA,1,PDPID,1;
```

6.1.9.2

Set GPRS Subscription Data

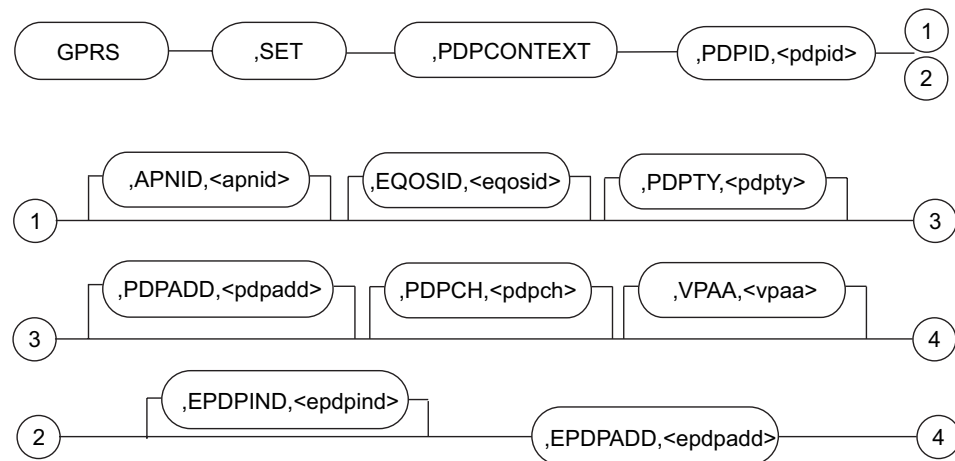


Figure 57 Set GPRS Subscription Data

Note:

- At least one parameter in {APNID, EQOSID, PDPTY, PDPADD, PDPCH, VPAA} should be provided in the GPRS Set operation.
- EPDPIND and EPDPADD is valid since HLR UDC 11B.

Table 48 Set GPRS Subscription Data

Parameter	Type	Occurrence	Description
APNID	Integer 0-16383, NS (Not Subscribed)	Optional	Access Point Name Identifier
EPDPIND	Boolean	Optional	Extend PDP Context Indicator
EPDPADD	Values are IPv4, IPv6 address, or ERASE	Mandatory	Extend PDP Context Address
PDPADD	Possible values are IP Address or ERASE	Optional	Packet Data Protocol Address



Parameter	Type	Occurrence	Description
PDPID	Values are 1-50.	Mandatory	Subscriber PDP Context Identifier
VPAA	Values are 0-1.	Optional	Visited Public Land Mobile Network Address Allowed
EQOSID	Integer 0-4095	Optional	Extended Quality of Service Identifier
PDPTY	Values are IPV4, IPV6, or PPP.		PDP Context Type
PDPCH	The format is <code>pdppi [-pdpgb]</code> : <p><code>pdppi</code> = PDP context Profile Index (Integer 0-15) Optional value <code>pdpgb</code> = PDP context GSN Behavior index (Integer 0-4095).</p>	Optional	PDP Context Charging Characteristics

Examples:

```
SET:HLRSUB:MSISDN,22220000:GPRS,SET,PDPCONTEXT,PDPID,1,APN
ID,1,PDPADD,1.1.1.1,EQOSID,1,PDPCH,1-1,PDPTY,IPV4,VPAA,0;
```

```
SET:HLRSUB:MSISDN,22220000:GPRS,SET,PDPCONTEXT,PDPID,1,APN
ID,WILDCARD,PDPCH,ERASE,PDPADD,ERASE;
```

```
SET:HLRSUB:MSISDN,22220000:GPRS,SET,PDPCONTEXT,PDPID,1,EPD
PIND,0,EPDPADD,1A25.FFD2.23BC.121d.78ee.3EE0.1eee.652A;
```

6.1.9.3

Delete GPRS Subscription Data

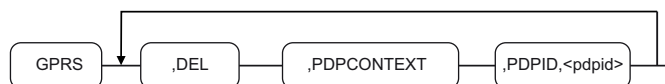


Figure 58 Delete GPRS Subscription Data

Table 49 Delete GPRS Subscription Data

Parameter	Type	Occurrence	Description
PDPID	Values are 1-50.	Mandatory	Subscriber PDP Context Identifier

Deleting GPRS Subscription data for a PDP context matching one PDPID:

```
SET:HLRSUB:MSISDN,46455381234: GPRS,DEL,PDPCONTEXT,PDPID
,1;
```

6.1.9.4

Get GPRS Subscription Data

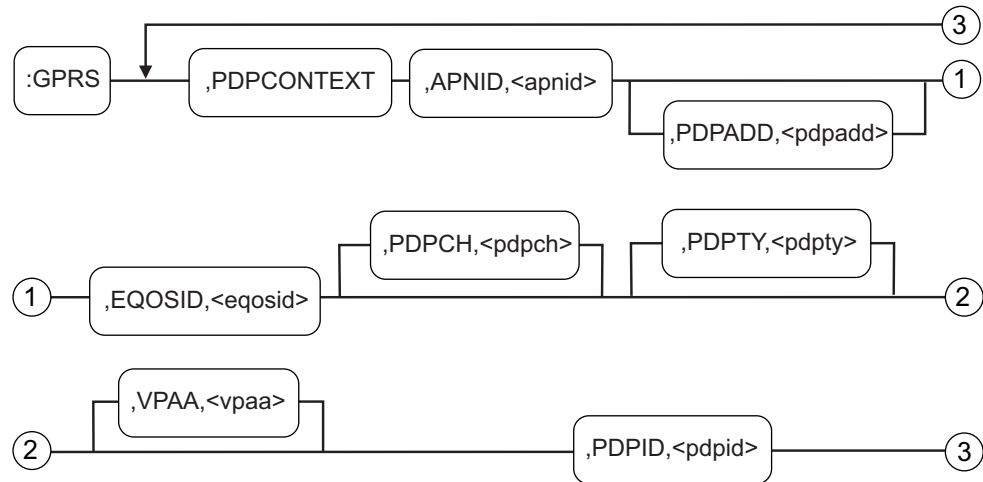


Figure 59 Get GPRS Subscription Data

Table 50 Get GPRS Subscription Data

Parameter	Type	Occurrence	Description
APNID	Integer 0-16383 or NS (Not Subscribed).	Mandatory	Access Point Name Identifier
PDPADD	IP address	Optional	Packet Data Protocol Address
VPAA	Values are 0-1.	Optional	Visited Public Land Mobile Network Address Allowed
EQOSID	Integer 0-4095	Mandatory	Extended Quality of Service Identifier
PDPTY	Values are IPV4, IPV6, or PPP.	Optional	PDP Context Type
PDPCH	The format is <code>pdppi[-pdpgb]</code> : <code>pdppi</code> = PDP context Profile Index (Integer 0-15) Optional value <code>pdpgb</code> = PDP context GSN Behavior index (Integer 0-4095).	Optional	PDP Context Charging Characteristics
PDPID	Values are 1-50.	Mandatory	Subscriber PDP Context Identifier

6.1.10

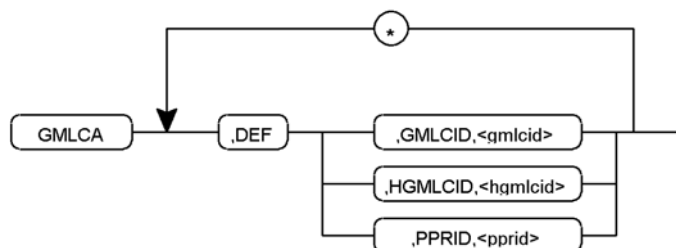
Gateway Mobile Location Center (GMLC) Address

Gateway Mobile Location Center is the PLMN node that interfaces to location applications which request GSM Location Services (LCS) for a specific subscriber. The GMLC can perform location application authorizations to check the validity of the requesting application. There is wide range of location applications for the geographical positioning services, such as positioning of vehicles for transport and taxi companies, positioning of emergency calls, positioning of stolen vehicles, detection of hot spots for micro-cells and so on.



6.1.10.1

Create Subscriber GMLC Address



⊛ The loop is only valid for GMLCID.

Figure 60 Create Subscriber GMLC Address

Table 51 Create Subscriber GMLC Address

Parameter	Type	Occurrence	Description
GMLCID	Values are 0-255.	Mandatory	GMLC Address Identifier
HGMLCID	Values are 0-255.	Optional	Home GMLC address Identifier
PPRID	Values are 0-255.	Optional	Privacy Profile Register address Identifier

- a A mobile subscriber in the HLR can be assigned GMLC address.

```
CREATE:HLRSUB:IMSI,12345678933333:MSISDN,3417429013:
```

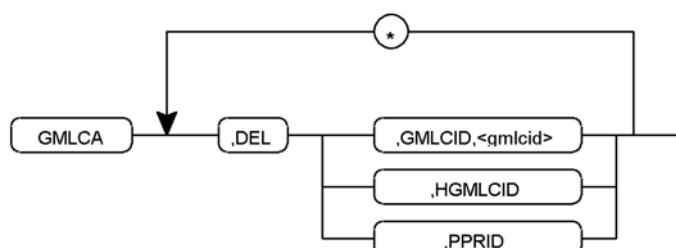
```
GMLCA,DEF,GMLCID,33:...
```

GMLC address with identifier 33 is assigned to the mobile subscriber with MSISDN 3417429013.

Note: Up to 5 GMLC addresses can be assigned to a mobile subscriber.

6.1.10.2

Delete Subscriber GMLC Address



⊛ The loop is only valid for GMLCID.

Figure 61 Delete Subscriber GMLC Address

Table 52 Delete Subscriber GMLC Address

Parameter	Type	Occurrence	Description
GMLCID	Values are 0-255 or ALL.	Mandatory	GMLC Address Identifier

- a A mobile subscriber's GMLC address data previously defined can be removed in the HLR.

```
SET:HLRSUB:MSISDN,49513789000:GMLCA,DEL,PPRID;
```

```
SET:HLRSUB:MSISDN,49513789000:GMLCA,DEL,GMLCID,125;
```

GMLC address with identifier 125 is removed from the GMLC addresses of the mobile subscriber with MSISDN 49513789000.

Note: It is possible to remove all GMLC addresses for a mobile subscriber when GMLCID takes a value ALL.

6.1.10.3

Get Subscriber GMLC Address Response

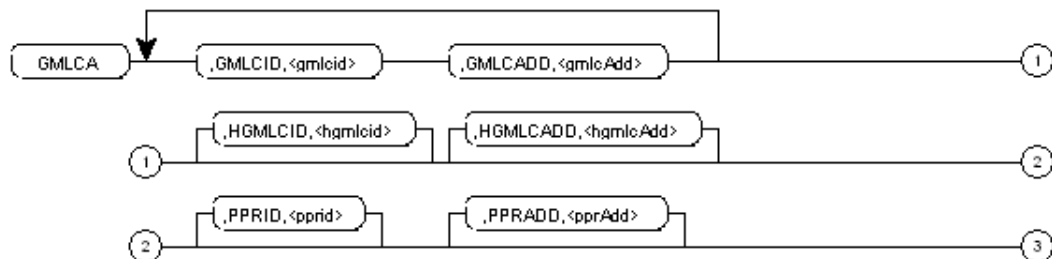


Figure 62 Get Subscriber GMLC Address Response

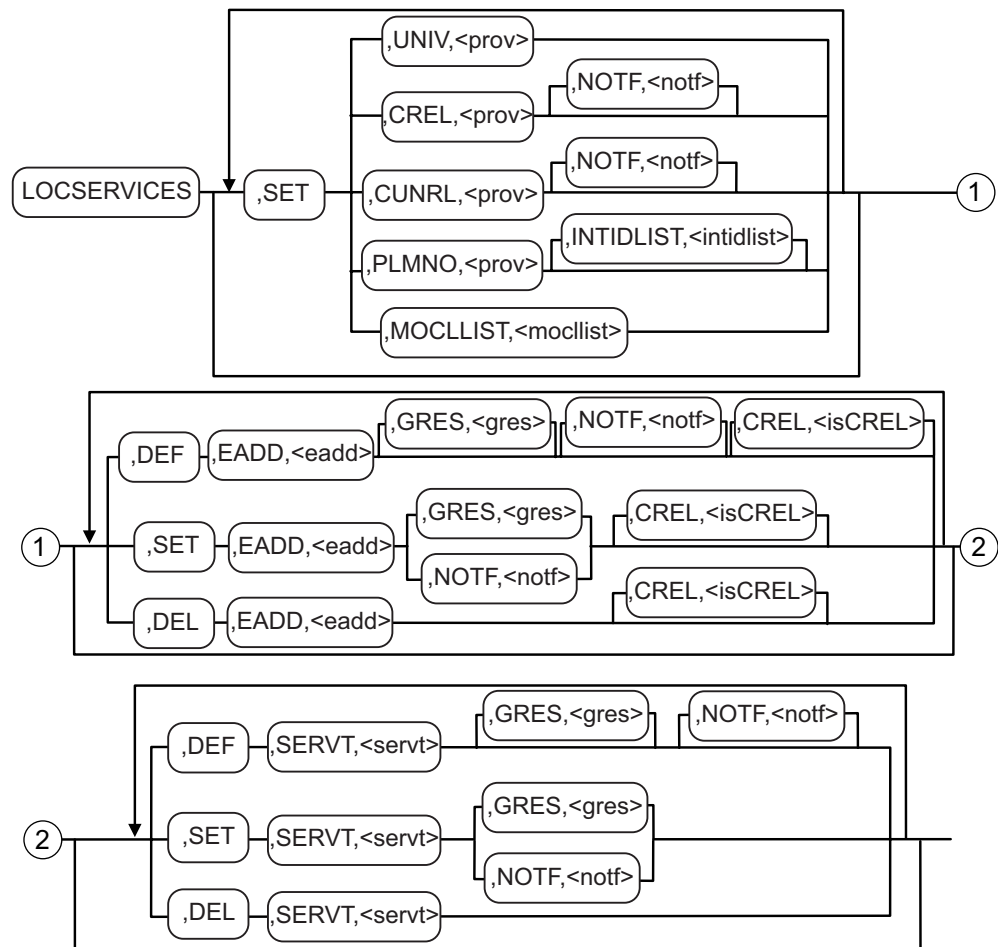
Table 53 Get Subscriber GMLC Address

Parameter	Type	Occurrence	Description
GMLCID	Values are 0-255.	Mandatory	GMLC Address Identifier
GMLCADD	Digit string, 3-15 digits	Mandatory	GMLC Address Data
HGMLCID	Values are 0-255.	Optional	Home GMLC address Identifier
HGMLCADD		Optional	Home GMLC Address
PPRID	Values are 0-255.	Optional	Privacy Profile Register address Identifier
PPRADD		Optional	Privacy Profile Register Address

6.1.11

Location Services (LOC SERVICES)

Location Services are services related to the location of subscribers in the PLMN. For example, universal type service, related call service, unrelated call service, and related operator privacy .



SERVT can only be used in HLR version 11 or higher.

Figure 63 Create, Set, and Delete Subscriber Location Services Data

Table 54 Create, Set, and Delete Subscriber Location Services Data

Parameter	Type	Occurrence	Description
prov	Values are: <ul style="list-style-type: none"> 0 = not activated 1 = activated 	Optional	
intidlist	To add value use +0, +1, +2, +3, +4, to remove value use -0, -1, -2, -3, -4.	Optional	Internal Identity List value. A list of one or more types of LOC SERVICES clients that are allowed to locate the mobile subscriber.
mocllist	The possible values are +ASL, +BSL, +TTP in definition, and -ASL, -BSL, -TTP, or -ALL in deletion.	Optional	LOC SERVICES Mobile Originating Class List



Parameter	Type	Occurrence	Description
eadd	Digit string, 3–15 digits <ul style="list-style-type: none"> If parameter EADD is entered, one external address is added either for call/session unrelated LCS privacy class (CUNRL) or call/session related LCS privacy class (CREL). If parameter EADD is entered and both optional parameters CREL and CUNRL are omitted, then the external address is added to call/session unrelated LCS privacy class. 	Mandatory	External LOC SERVICES client Address
gres	Values are 0, 1, 9.	Optional	Restriction on the Gateway Mobile Location Center
notf	Values are 0–4. Default is 0.	Optional	Location request restriction related to the Notification to the mobile subscriber
isCREL	Values are: 1 = CREL 0 = CUNRL (default)	Optional	
servt	Values are 0–20 or 64–127.	Optional	Service Type. List of one or more service types for which an LCS client is allowed to locate the mobile subscriber.

- 0** Emergency services
- 1** Emergency alert services
- 2** Person tracking
- 3** Fleet management
- 4** Asset management
- 5** Traffic congestion reporting
- 6** Roadside assistance
- 7** Routing to nearest commercial enterprise
- 8** Navigation
- 9** City sightseeing
- 10** Localized advertising
- 11** Mobile yellow pages
- 12** Traffic and public transportation
- 13** Weather



14	Asset and service finding
15	Gaming
16	Find your friend
17	Dating
18	Chatting
19	Route finding
20	Where-am-I
64-127	Operator-specific service types
ALL	All service (only used in DEL suboperation).

Note: For CREL and CUNRL initialization and update, the same CAI requests are used:

```
SET:HLRSUB:MSISDN,msisdn:LOCSERVICE,SET,CREL,1,NOTF,<notf>;
```

```
SET:HLRSUB:MSISDN,msisdn:LOCSERVICE,SET,CUNRL,1,NOTF,<notf>;
```

Dynamic Activation first sends the MML update request. If it is successful, no more MML request is sent. If it fails, Dynamic Activation sends the MML initialization request.

6.1.11.1 Create Subscriber Location Services Data

External Location Services data for a mobile subscriber can be defined.

```
CREATE:HLRSUB:IMSI,12345678933333:MSISDN,12345678:
```

```
LOCSERVICES,SET,MOCLLIST,+ASL,+BSL,
```

```
DEF,EADD,333,SET,SERV,1,GRES,1,NOTF,1...
```

The External LOCSERVICES client address 333 and the LOCSERVICES mobile originating classes ASL and BSL for the mobile subscriber with MSISDN 12345678 are defined.

6.1.11.2 Set Subscriber Location Services Data

Location Services classes data for a mobile subscriber can be set.

```
SET:HLRSUB:IMSI,12345678933333:MSISDN,12345678:
```

```
LOCSERVICES,SET,CREL,1,NOTF,1:...
```

Location request restriction for the call-related privacy class already defined for the subscriber with MSISDN 12345678 is set to location request allowed with notification.

6.1.11.3 Delete Subscriber Location Services Data

Location Services classes data for a mobile subscriber can be removed.

```
SET:HLRSUB:IMSI,12345678933333:MSISDN,12345678:
```

```
LOCSERVICES,DEL,EADD,333,CREL,1...
```

Call related Location Services privacy class for the mobile subscriber with MSISDN 12345678 and external LOCSERVICES address 333 is ended.

6.1.11.4 Get Subscriber Location Services Data Response

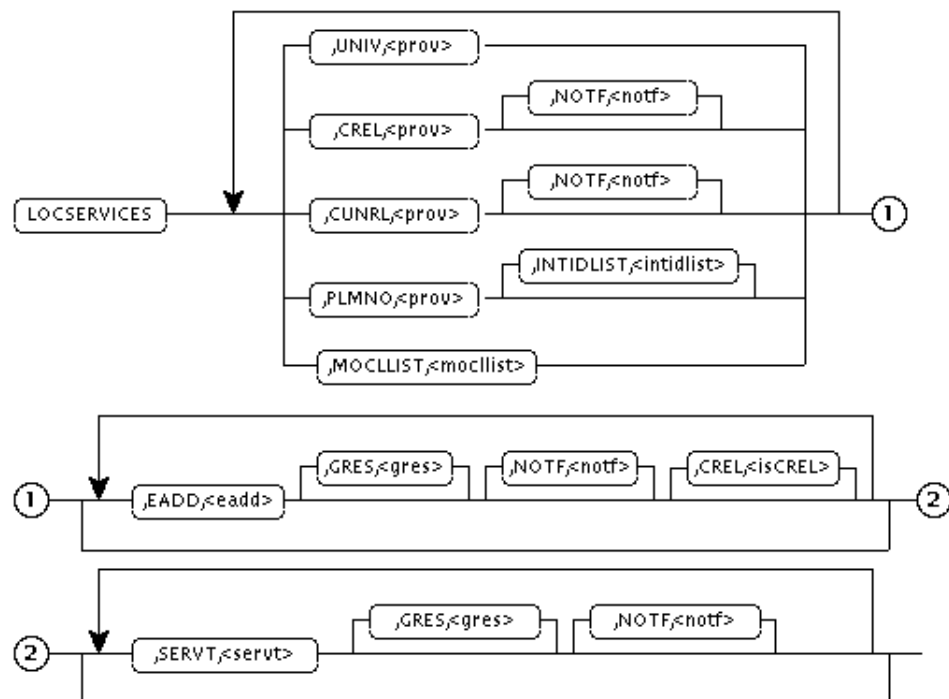


Figure 64 Get Subscriber LCOSERVICES Data Response

Table 55 Get Subscriber LCOSERVICES Data Response

Parameter	Type	Occurrence	Description
prov	Values are: <ul style="list-style-type: none"> 0 = not activated 1 = activated 	Optional	
intidlist	Values are 0-4.	Optional	Internal Identity List value



Parameter	Type	Occurrence	Description
moclist	Values are ASL, BSL, TTP.	Optional	LCS Mobile Originating Class List
eadd	Digit string, 3–15 digits	Mandatory	External LOC SERVICES client Address
gres	Values are 0, 1, 9.	Optional	Restriction on the Gateway Mobile Location Center
notf	Values are 0–4. Default is 0.	Optional	Location request restriction related to the Notification to the mobile subscriber
isCREL	Values are: 1 = CREL 0 = CUNRL (default)	Optional	
servt	Values are 0–20 or 64–127.	Optional	Service Type. List of one or more service types for which an LCS client is allowed to locate the mobile subscriber.

- 0** Emergency services
- 1** Emergency alert services
- 2** Person tracking
- 3** Fleet management
- 4** Asset management
- 5** Traffic congestion reporting
- 6** Roadside assistance
- 7** Routing to nearest commercial enterprise
- 8** Navigation
- 9** City sightseeing
- 10** Localized advertising
- 11** Mobile yellow pages
- 12** Traffic and public transportation
- 13** Weather
- 14** Asset and service finding
- 15** Gaming
- 16** Find your friend

17	Dating
18	Chatting
19	Route finding
20	Where-am-I
64-127	Operator-specific service types
ALL	All service (only used in DEL suboperation).

6.1.12 Spatial Trigger Support (SPATIALTRIGGER)

6.1.12.1 Create/Set/Delete Subscriber Spatial Trigger Data

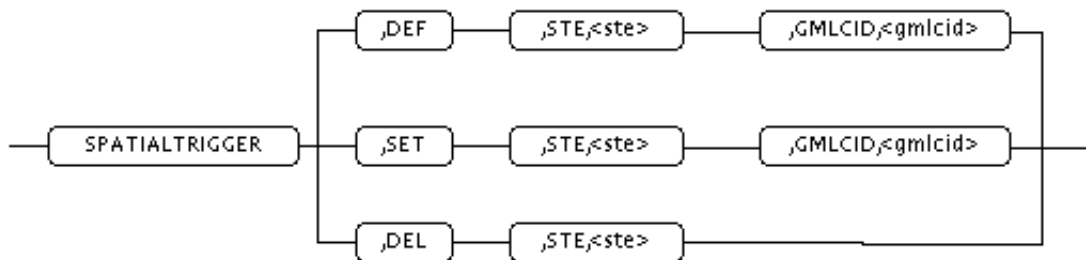


Figure 65 Create/Set/Delete Subscriber Spatial Trigger Data

Table 56 Create/Set/Delete Subscriber Spatial Trigger Data

Parameter	Type	Occurrence	Description
STE	Numeral 0–15	Mandatory	Spatial Triggers Event
GMLCID	Numeral 0–255	Mandatory	Gateway Mobile Location Center (GMLC) address Identifier

Examples:

...:SPATIALTRIGGER,DEF,STE,12,GMLCID,200:...

...:SPATIALTRIGGER,SET,STE,12,GMLCID,201:...

6.1.12.2 Syntax of Retrieved Subscriber Spatial Trigger Data

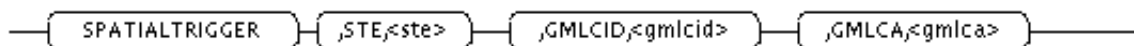


Figure 66 Syntax of Retrieved Subscriber Spatial Trigger Data

Table 57 Retrieve Subscriber Spatial Trigger Data

Parameter	Type	Occurrence	Description
STE	Numeral 0–15	Mandatory	Spatial Triggers Event



Parameter	Type	Occurrence	Description
GMLCID	Numerical 0-255	Mandatory	Gateway Mobile Location Center (GMLC) address Identifier
GMLCA		Mandatory	Gateway Mobile Location Center (GMLC) address

Example:

RESP:0:...:SPATIALTRIGGER,STE,12,GMLCID,200,GMLCA,491019
24113:...

6.1.13 SMS Spam Control

SMS Spam control prevents undesired SMS from reaching the subscriber.

6.1.13.1 Create and Delete Subscriber SMS Spam Data

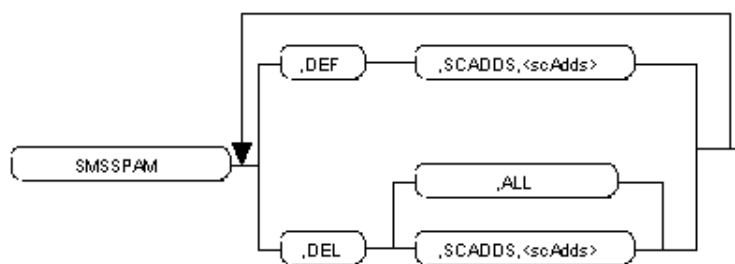


Figure 67 Create and Delete Subscriber SMS Spam Data

Table 58 Create and Delete Subscriber SMS Spam Data

Parameter	Type	Occurrence	Description
SCADD\$		Mandatory	Short Message Service Center (SMSC) Address Series

6.1.13.2 Syntax of Retrieved Subscriber SMS Spam Data

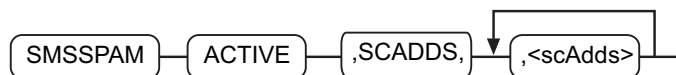


Figure 68 Syntax of Retrieved Subscriber SMS Spam Data

Table 59 Retrieve Subscriber SMS Spam Data

Parameter	Type	Occurrence	Description
SCADD\$		Mandatory	Short Message Service Center (SMSC) Address Series
ACTIVE		Mandatory	Active status

6.1.14 Multiple SIM

Multiple SIM defines multiple subscription data in the HLR.

Note:

- If MCH is included, the multiple SIM group is created. If the group exists, a new subscription is added to the multiple SIM group.
- If MCH is not included, a new subscription is added to the multiple SIM group.

6.1.14.1 Create Subscriber Multiple SIM Data

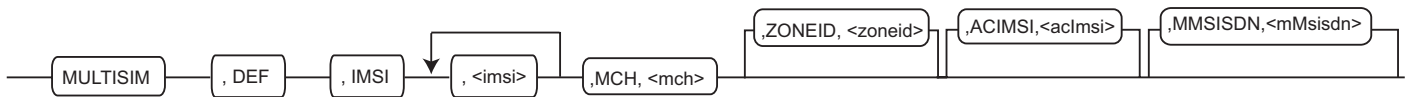


Figure 69 Create Subscriber Multiple SIM Data

Table 60 Create Subscriber Multiple SIM Data

Parameter	Type	Occurrence	Description
imsi	String, 6-15 digits	Mandatory	The IMSI number of the subscription to be defined
mch	Enumeration value <ul style="list-style-type: none"> • LOC • USSD 	Mandatory	Multiple subscription activation mechanism
zoneid	Integer 0-65535	Optional	This attribute indicates to what geographical area the MultiSC or the association belongs
acimsi	String, 6-15 digits, each digit 0-9.	Optional	Active IMSI
mmsisdn	String, 6-15 digits, each digit 0-9.	Optional	Master MSISDN

6.1.14.2 Set and Delete Subscriber Multiple SIM Data

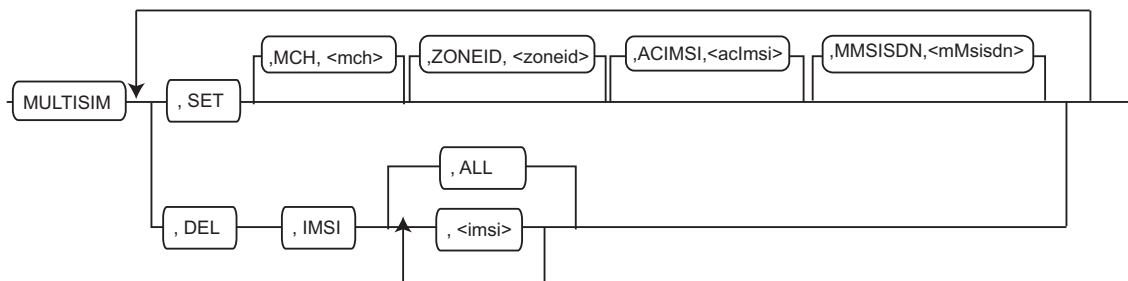


Figure 70 Set and Delete Subscriber Multiple SIM Data



Table 61 Set and Delete Subscriber Multiple SIM Data

Parameter	Type	Occurrence	Description
imsi	String, 6-15 digits	Mandatory	The IMSI number of the subscription to be defined
mch	Enumeration value <ul style="list-style-type: none"> • LOC • USSD 	Optional	Multiple subscription activation mechanism
zoneid	Integer 0-65535	Optional	This attribute indicates to what geographical area the MultiSC or the association belongs
acimsi	String, 6-15 digits, each digit 0-9.	Optional	Active IMSI
mMsisdn	String, 6-15 digits, each digit 0-9.	Optional	Master MSISDN

6.1.14.3

Subscriber Multiple SIM Data Response

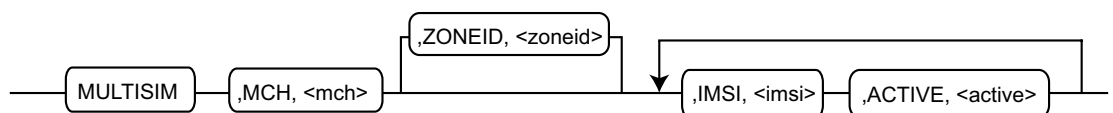


Figure 71 Subscriber Multiple SIM Data Response

Table 62 Subscriber Multiple SIM Data Response

Parameter	Type	Occurrence	Description
imsi	String, 6-15 digits	Mandatory	The IMSI number of the subscription to be defined.
active	String	Mandatory	Active Status
mch	Enumeration value: <ul style="list-style-type: none"> • LOC • USSD 	Mandatory	Multiple subscription activation mechanism
zoneid	Integer 0-65535	Optional	This attribute indicates to what geographical area the MultiSC or the association belongs

6.2

Request and Response Parameters

Use Case specifies in which cases the parameter can be applied:

C - (Create) Parameter can take a value when a subscription/equipment is created.

S - (Set) Parameter can take a value when a subscription/equipment is modified.

D - (Delete) Parameter can take a value when a subscription/equipment is deleted.

G - (Get) Parameter can take a value in the Get request for retrieving a subscription/equipment.

F - (Filter) Parameter can be used as filter in a Get request to indicate that we want to retrieve the current value of this parameter.

R - (Returned) Parameter may be returned with a value in the answer to a Get request (depends on request issued and filter specified).

If a certain parameter, is belonging to a Sub-MO the use case could also show in which suboperation(s) the parameter can be used:

c - (Define (create)) Parameter can be used in a DEF suboperation.

s - (Set) Parameter can be used in a SET suboperation.

d - (Delete) Parameter can be used in a DEL suboperation.

These three suboperation use case identifiers (c, s, d) will always appear directly after a Create or Set use case identifier (C, S). This shows which suboperations that are allowed in corresponding main operation.

If a certain parameter is belonging to a list value which can be seen as a simplified sub-MO the use case could also show in which suboperation(s) the parameter can be used:

+ Parameter as a value can be added to a list attribute.

- Parameter as a value can be deleted from a list attribute.

These two suboperation use case identifiers (+, -) will always appear directly after a Create or Set use case identifier (C, S). This shows which suboperations that are allowed in corresponding main operation.

For example, use case: "CcScsdR" indicates that in a Create operation the parameter is allowed in a DEF suboperation, in Set the parameter is allowed in DEF, SET, or DEL suboperation, in Delete it is not allowed at all and the parameter may be returned in the answer to a Get request.

For example, use case: "C+S-R" indicates that in a Create operation the parameter is allowed to be added to a list attribute, in a Set operation the parameter is allowed to be deleted from a list attribute, and the parameter may be returned in the answer to a Get request.

The parameter/values are valid for all supported versions of actual NE type if otherwise is not stated in the tables.



Table 63 HLR Subscription Parameters

Parameters	Attribute Values	Use Case
ACC	0–2	CSRF
ACR	0–2 0 = Not provided 1 = Provided not active 2 = Provided and active	CSRF
ALLSS	Provision: 0–1, ⁽¹⁾ Activation: 0–1	CS
ARD	0 = UTRAN/GERAN access allowed 1 = UTRAN access not allowed 2 = GERAN access not allowed	CSRF
ASSOCOLDIMSI	DEL	S
AMISDN	5–15 digits BearerCapability: 0–1, 9–65534	CSRF
AOC	0–2	CSRF
ASL	0–1 0 = Not provided 1 = Provided	R
AUTHD	“AVAILABLE”, “NO IMSI IN AUC”, “NO ACCESS TO AUC”, “STORAGE SHORTAGE”	RF
BAC	Provision: 0–1, ⁽¹⁾ Activation: 0–1 BSG:TS10, TS20, TS60, TSD0, BS20, BS30	CS
BAIC	Provision: 0–1 Activation: 0–1 BSG:TS10, TS20, TS60, TSD0, BS20, BS30	CSRF
BAOC	Provision: 0–1 Activation: 0–1 BSG:TS10, TS20, TS60, TSD0, BS20, BS30	CSRF
BIC	Provision: 0–1, ⁽¹⁾ Activation: 0–1 BSG:TS10, TS20, TS60, TSD0, BS20, BS30	CS
BICRO (excluded in GSM1900)	Provision: 0–1 Activation: 0–1 BSG:TS10, TS20, TS60, TSD0, BS20, BS30	CSRF
BOC	Provision: 0–1, ⁽¹⁾ Activation: 0–1 BSG:TS10, TS20, TS60, TSD0, BS20, BS30	CS

Parameters	Attribute Values	Use Case
BOIC (excluded in GSM1900)	Provision: 0–1 Activation: 0–1 BSG:TS10, TS20, TS60, TSD0, BS20, BS30	CSRF
BOIEXH (excluded in GSM1900)	Provision: 0–1 Activation: 0–1 BSG:TS10, TS20, TS60, TSD0, BS20, BS30	CSRF
BS21	0–1	CSRF
BS22	0–1	CSRF
BS23	0–1	CSRF
BS24	0–1	CSRF
BS25	0–1	CSRF
BS26	0–1	CSRF
BS2F	0–5	CSRF
BS2G	0–1	CSRF
BS31	0–1	CSRF
BS32	0–1	CSRF
BS33	0–1	CSRF
BS34	0–1	CSRF
BS3F	0–4	CSRF
BS3G	0–1	CSRF
BSL	0–1 0 = Not provided 1 = Provided	R
CAMEL		CSRF
CCFS	Provision: 0–1, ⁽¹⁾ Activation: 0–1 Forwarded-to number: 1–18 digits No-reply-time: 5, 10, 15, 20, 25, 30 OFA:OFA-<0–511> Subaddress: expressed as a–b: a: 0.1 b: 2–40 hexadecimal octets in pair BSG:TS10, TS60, TSD0, BS20, BS30	CS
- CCH	1–4	CcScsdR



Parameters	Attribute Values	Use Case
CFS	Provision: 0–1, ⁽¹⁾ Activation: 0–1 Forwarded-to number: 1–18 digits No-reply-time: 5, 10, 15, 20, 25, 30 OFA:OFA-<0–511> Subaddress: expressed as a–b: a: 0.1 b: 2–40 hexadecimal octets in pair BSG:TS10, TS60, TSD0, BS20, BS30	CS
- DEH	0–1	CcScsR
- DIALNUM	Expressed as na-dial where: na: Nature of address indicator: <ul style="list-style-type: none"> 0 = Unknown 1, 2 = Not used 3 = National number 4 = International number dial: Dialed number series. Text string 1-15 characters. Only digits 0-9, *, #, a, b, and c are allowed as characters.	CcScsdR
- DSTDP	1–10, ALL (in DELETE only)	CcScsdR
- GSA	3–15 digits	CcScsR
- I	Y/N	CcScsR
- MMTDP	0–4, ALL (in DELETE only)	CcScsdR
- VTTPDP	12, 13, 14, ALL (in DELETE only)	CcScsdR
- SK	0–2147483647	CcScsR
- OCTDP	2, 4	CcScsdR
- TCTDP	12, 13, 14	CcScsdR
- GPRSTDP	1, 2, 11, 12, 14, ALL (in DELETE only)	CcScsdR
- OSMSTDP	1, ALL (in DELETE only)	CcScsdR
- TSMSTDP	2, ALL (in DELETE only)	CcScsdR
- ECAMEL	Composite Parameter	SsR
- - EOICK	0–999	SsR
- - EOINCI	0–255	SsR
- - ETICK	0–999	SsR
- - ETINCI	0–255	SsR
- OCAMEL	Composite Parameter	SsR
- - GCSO	0–1	SsR
- - GC2SO	0–1	SsR
- - GC3SO	0–1	SsR

Parameters	Attribute Values	Use Case
-- GC4SO	0–1	SsR
-- GPRSSO	0–1	SsR
-- OSMSSO	0–2	SsR
-- MCSO	0–2	SsR
-- MC2SO	0–2	SsR
-- MC3SO	0–2	SsR
-- MC4SO	0–2	SsR
-- MMSO	0–1	SsR
-- SSLO	0–1	SsR
-- TSMSSO	0–2	SsR
-- TIF	0–1	SsR
- CCAMEL	Composite Parameter	SsR
-- BS	TS11, TS61, TS62, TSD1, BS21, BS22, BS23, BS24, BS25, BS26, BS2G, BS31, BS32, BS33, BS34, BS3G, ALL(in DELETE only)	cd
-- BSG	TS10, TS60, TSD0, BS20, BS30, ALL	cd
-- DLGH	1–15, ALL(in DELETE only)	SsdR
-- DNUM	format: na-nb, ALL (in DELETE only) na: (0–4) nb: 1–15 digits or * or #	SsdR
-- FTC	N (Not forwarding) or F (forwarding)	cd
-- MTY	E or I	SsR
CAPL	0–15	CSRF
CAT	0–13, 15, 224–254	CSRF
CAW	Provision: 0–1 Activation: 0–1, 0–2 (when displaying a subscriber) BSG: TS10, TS60, TSD0, BS20, BS30	CSRF
CFB	Provision: 0–1 Activation: 0–1, 0–2 (when displaying a subscriber) Forwarded-to number: 1–18 digits OFA:OFA-<0–511> Subaddress: expressed as a-b, where a is 0.1 or 2 and b is 2–40 hexadecimal octets in pair BSG:TS10, TS60, TSD0, BS20, BS30	CSRF



Parameters	Attribute Values	Use Case
CFNRC	Provision: 0–1 Activation: 0–1, 0–2 (when displaying a subscriber) Forwarded-tonumber: 1–18 digits OFA:OFA-<0–511> Subaddress: expressed as a-b, where a is 0,1 or 2 and b is 2–40 hexadecimal octets in pair BSG:TS10, TS60, TSD0, BS20, BS30	CSRF
CFNRY	Provision: 0–1 Activation: 0–1, 0–2 (when displaying a subscriber) Forwarded-to number: 1–18 digits No-reply-time: 5, 10, 15, 20, 25, 30 OFA:OFA-<0–511> Subaddress: expressed as a-b where a is 0.1 or 2 and b is 2–40 hexadecimal octets in pair BSG:TS10, TS60, TSD0, BS20, BS30	CSRF
CFU	Provision: 0–1 Activation:0–1, 0–2 (when displaying a subscriber) Forwarded-to number: 1–18 digits OFA:OFA-<0–511> Subaddress: expressed as a-b, where a is 0.1 or 2 and b is 2–40 hexadecimal octets in pair BSG: TS10, TS60, TSD0, BS20, BS30	CSRF
CLIP	0–1	CSRF
CLIR	0–1	CSRF
COLP	0–1	CSRF
COLR	0–1	CSRF
CSP	0-8160 CAMEL profile in HLR can be retrieved if its value larger than 0.	CSRF
CUG (excluded in GSM1900)	Preferential cug index: 0–32767, NONE Access:OA, IA, OIA, NONE BSG:TS10, TS60, TSD0, BS20, BS30	CSRF
CUGSUB (excluded in GSM1900)	Index: 0–32767 ic: 0000–0 to 9999–65535 Restriction: ICB, OCB, NONE BSG: BS20, BS30, TS10, TS60, TSD0 AddBSG flag: 0–1	CSRF
DBSG	1,3,5,6	CSRF

Parameters	Attribute Values	Use Case
DCF	Provision: 0–1 Activation: 0–1, 0–2 (when displaying a subscriber) Forwarded-to number: 1–18 digits No-reply-time: 5, 10, 15, 20, 25, 30 OFA:OFA-<0–511> Subaddress: expressed as a-b, where a is 0.1 or 2 and b is 2–40 hexadecimal octets in pair BSG: TS10, TS60, TSD0, BS20, BS30	CSRF
DEMLPP	0–6	CSRF
ECT	0–1	CSRF
EMLPP	0–1	CSRF
GMLCA		CSRF
- GMLCADD	3–15 digits	R
- GMLCID	0–255, ALL (only applicable in deletion)	CcScdR
- HGMLCADD	String	R
- PPRID	0–255	SsR
- PPRADD	String	R
GPRCSI	0–1	R
GPRS		CSRF
- PDPCONTEXT	Composite Parameter	CcScdR
- - APNID	Integer 0–16383 or NS = Not Subscribed, or WILDCARD=WILDCARD, ALL = All APN assigned to the subscriber, only used when deleting PDP context(s).	CcScdR
- - PDPADD	IP Address or ERASE For IPv4: oc1.oc2.oc3.oc4 oc1:Numeral 0–255; oc2:Numeral 0–255; oc3:Numeral 0–255; oc4:Numeral 0–255) For IPv6 (is used in HLR R10 and later): hex1.hex2.hex3.hex4. hex5.hex6.hex7.hex8 hex1: 0000-FFFF hex2: 0000-FFFF hex3: 0000-FFFF hex4: 0000-FFFF hex5: 0000-FFFF hex6: 0000-FFFF hex7: 0000-FFFF hex8: 0000-FFFF	CcScdR
- - PDPID ⁽²⁾	1–50 ***	CcScdR
- - EQOSID	Integer 0–4095	CcScR
- - PDPCH	Format: pdppi[-pdpgb] or ERASE pdppi: 0–15 pdpgb: 0–4095	CcScR



Parameters	Attribute Values	Use Case
- - PDPTY	String (size 3–4), three possible values IPv4, IPv6, and PPP	CcScR
- - VPAA	0 = Not allowed, 1 = Allowed	CcScR
GSAP	0–255	CSRF
HOLD	0–1	CSRF
ICI	0–1	CSRF
IMSI	6–15 digits	CDSGRF
IST	0, 15–255 0 = Subscriber not under IST condition. 15–255 = Subscriber under IST condition, IST alert timer in minutes.	CSRF
ISTCSO	0–1 0 = Call allowed when the IST Alert message is received from G(MSC-VLR). 1 = Call not allowed when the IST Alert message is received from G(MSC-VLR).	CSRF
ISTGSO	0–1 0 = Service allowed when IST is not supported in the interrogated GMSC 1 = Only Operator Determined Barring of all incoming calls when IST is not supported in the interrogated GMSC.	CSRF
ISTVSO	0–1 0 = Service allowed when IST is not supported in the serving VLR 1 = Network induced activation of supplementary service Barring of All Outgoing Calls (BAOC) performed when IST is not supported in the serving VLR.	CSRF
LOC SERVICES		CSRF
- CREL	0–1	CsSsR
- - NOTF	0-4 (default is 0) 0-3 (default is 0, for HLR R9.1)	CcScsR
- CUNRL	0–1	CsSsR
- - NOTF	0-3 (default is 0)	CcScsR
- EADD	3–15 digits	CcScdsR
- - GRES	0, 1, 9 (value 9 removes GRES)	CcScsR
- - NOTF	0-3 (default is 0)	CcScsR
- - CREL	0, CUNRL; 1, CREL (default is 0)	CcScsR
- MOCLLIST	" +ASL", "+BSL", "+TTP" in definition, "-ASL", "-BSL", "-TTP", "-ALL" in deletion.	Cs+Ss+-R
- PLMNO	0-1	CsSsR
- - INTIDLIST	" +0", "+1", "+2", "+3", "+4" in definition, "-0", "-1", "-2", "-3", "-4" in deletion.	Cs+Ss+-R



Parameters	Attribute Values	Use Case
- SERV	0–3 digits.	CcScds
- - GRES	0, 1, 9 (value 9 removes GRES)	CcScsR
- - NOTF	0-3	CcScsR
- UNIV	0–1	CsSsR
LOC	vladdress: expressed as na-ai, UNKNOWN, RESTRICTED, or BARRED, where na is 3 or 4, ai is up to 20 digits msn: up to 15 digits mscnumber: up to 20 digits lmsid: 8 digits sgsnumber: expressed as na-ai, UNKNOWN, RESTRICTED, or BARRED, where na is 3 or 4, ai is up to 20 digits locState: expressed as string combined with MSPURGED IN VLR, MSC-AREA RESTRICTED, or MS PURGED IN SGSN.	RF
MCA	0–1	CSRF
MEMLPP	0–6	CSRF
MOBINT	DP:0–255 GSA:3–15 digits SK:0–2147483647 ACT:0–1	CSRF
MPTY	0–1	CSRF
MRDMCH ⁽³⁾	1–2	CSRF
MRDPID ⁽³⁾	Format: [<i>Redundancy Group</i>]- <i>HLR identity</i> Redundancy Group: 1–15 HLR identity: 1–32	RF
MSISDN	5–15 digits	CDSGRF
NAM	Integer: 0-2	CSRF
	0 = Both non-GPRS and GPRS	
	1 = Only non-GPRS	
	2 = Only GPRS	
	KEEP: Retain/Not retain subscriber data related to the network, to which access is not allowed.	S
	0 = Do not keep subscriber data, default value.	
	1 = Keep subscriber data.	
OBA	0–1	CS
OBCT	0–4	CSRF
OBDCT	0–1	CSRF
OBI	0–2	CSRF
OBMCT	0–1	CSRF



Parameters	Attribute Values	Use Case
OBO	0–4	CSRF
OBOPRE	0–1	CSRF
OBOPRI	0–1	CSRF
OBP	0–3	CSRF
OBR	0–99 (0-2 in normal cases)	CSRF
OBRF	0–5	CSRF
OBSSM	0–1	CSRF
OBZI	0–1	CSRF
OBZO	0–5 (0-3 in normal cases)	CSRF
OFA	0–511	CSRF
OICK	0–999	CSRF
OIN	0–1	CSRF
ORA ⁽⁴⁾	0–255	CSRF
OSB1	0–1	CSRF
OSB2	0–1	CSRF
OSB3	0–1	CSRF
OSB4	0–1	CSRF
PDPCP	0-8160 GPRS profile in HLR can be retrieved if its value larger than 0.	CSRF
PICI (excluded in GSM1900)	Format: a [-b] a: 0–255 b: 0–2 (included in R10)	CSRF
PICI2	Format: a [-b] a: 0–255 b: 0–2	CSRF
PICI3	Format: a [-b] a: 0–255 b: 0–2	CSRF
PROFILE	0–255	CS
PRBT	0, 1	CSR
PWD	0000–9999 barredstatus: BARRED (only GET)	CSRF
REGSER	0–65534	CSRF
RSA	0–4096 since HLR UDC 11B 0–128 in earlier versions	CSRF
RTCA	0–1	CSRF

Parameters	Attribute Values	Use Case
SCHAR	Format: <i>pdppi</i> [- <i>pdpgb</i>] pdppi: 0–15 pdpgb: 0–4095	CSRF
DCSI	0–1 ⁽⁵⁾	G
GPRCSI	0–1 ⁽⁵⁾	G
OCSI	0–1 ⁽⁵⁾	G
MCSI	0–1 ⁽⁵⁾	G
OSMCSI	0–1 ⁽⁵⁾	G
TCSI	0–1 ⁽⁵⁾	G
TSMCSI	0–1 ⁽⁵⁾	G
VTCSI	0–1 ⁽⁵⁾	G
SMSHR1	Format: <i>v1</i> [- <i>v2</i>] <i>v1</i> : 0–128 (SMS-R node address and MT-SMS screening activation status) <i>v2</i> : 0–31 (MT-SMS screening profile identifier)	CSRF
SMHR2	Format: <i>v1</i> [- <i>v2</i>] <i>v1</i> : 0–128 (SMS-R node address and MT-SMS screening activation status) <i>v2</i> : 0–31 (MT-SMS screening profile identifier)	CSRF
SMSPAM	0–1	CSRF
SMSSPAM		CSRF
- SCADDS	Digit string 1–15, each one 0–9	CcSsR
- ACTIVE	String value, 0-1 • 1=ACTIVE • 0=NACTIVE = Inactive	R
SOCB	0–1, 0–3 (when displaying a subscriber)	CSRF
SOCFB	0–3	CSRF
SOCFRC	0–1	CSRF
SOCFRY	0–3	CSRF
SOCFU	0–1	CSRF
SOCLIP	0–1	CSRF
SOCLIR	0–2	CSRF
SOCOLP (excluded in GSM1900)	0–1	CSRF
SODCF	0–3	CSRF
SOPLCS	0–1	CSRF
SOSDCF	1–7	CSRF
SPATIALTRIGGER		CSRF



Parameters	Attribute Values	Use Case
- STE	0–15	CcScdsR
- GMLCID	0–255	cScsR
- GMLCA	0–3 digits	R
SPN	Provision: 0–1 Activation: 0–1, 0–2 (when displaying a subscriber) Forwarded-tonumber: 1–18 digits OFA: OFA-<0–512> BSG: TS10	CSRF
STYPE	0–127	CSRF
TICK	0-999	CSRF
TIN	0–1	CSRF
TS11	0–1	CSRF
TS21	0–1	CSRF
TS22	0–1	CSRF
TS61	0–1	CSRF
TS62	0–1	CSRF
TSD1	0–1	RF
TSMO	Integer: 0–1 0 = Transfer of SM by the MSC 1 = Transfer of SM by the SGSN	CSRF
TTP	0–1 0 = Not provided 1 = Provided	R
VLRID	UNKNOWN RESTRICTED BARRED 3-<nationalVLR address> (up to 16 digits) 4-<internationalVLR address>(up to 16 digits)	RF
ACTYPE	0–1 0 = Location updating 1 = Subscriber procedure	SR
OBCC	0–1 0= Not active 1= Active	CSRF
CBNF	0–1	CSRF
CFNF	0–1	CSRF
CHNF	0–1	CSRF
CLIPNF	0–1	CSRF



Parameters	Attribute Values	Use Case
CLIRNF	0–1	CSRF
CWNF	0–1	CSRF
DCSINF	0–1	CSRF
DCSIST	0–1 ⁽⁶⁾	CSRF
ECTNF	0–1	CSRF
GPRSCSINF	0–1	CSRF
GPRSCSIST	0–1 ⁽⁶⁾	CSRF
MCSINF	0–1	CSRF
MCSIST	0–1 ⁽⁶⁾	CSRF
ODBNF	0–1	CSRF
OCSINF	0–1	CSRF
OCSIST	0–1 ⁽⁶⁾	CSRF
OSMCSINF	0–1	CSRF
OSMCSIST	0–1 ⁽⁶⁾	CSRF
TCSINF	0–1	CSRF
TCSIST	0–1 ⁽⁶⁾	CSRF
TIFCSINF	0–1	CSRF
TSMCSINF	0–1	CSRF
TSMCSIST	0–1 ⁽⁶⁾	CSRF
VTCSINF	0–1	CSRF
VTCSIST	0–1 ⁽⁶⁾	CSRF
ICS	0–1	CSRF

(1) "-" is not applicable in the Create operation.

(2) The use of parameter PDPID is dependent of if the HLR has the PDPID patch or not. If HLR has the patch installed, PDPID is a mandatory parameter otherwise it is not allowed.

(3) Applicable for HLR in N+1 HLR Redundancy cluster only.

(4) Only valid since HLR UDC 11B

(5) This parameter is printed only if its value is 1.

(6) Parameter is printed only if corresponding xCSI is provided in HLR CAMEL Subscription Information or HLR CAMEL Profile.

6.2.1

HLR GPRS Quality of Service Parameters

Table 64 RC - Reliability Class

RC Number	Description
1	Acknowledged General Packet Radio Service Tunneling Protocol (GTP), Logical Link Control, (LLC) and Radio Link Control (RLC); protected data.
2	Unacknowledged GTP; acknowledged LLC and RLC; protected data.
3	Unacknowledged GTP and LLC; acknowledged RLC; protected data.



RC Number	Description
4	Unacknowledged GTP, LLC, and RLC; protected data.
5	Unacknowledged GTP, LLC, and RLC; unprotected data

Table 65 DC - Delay Classes

DC Number	Description
1	Delay class 1
2	Delay class 2
3	Delay class 3
4	Delay class 4

Table 66 PC - Precedence Classes

PC Number	Description
1	High priority
2	Normal priority
3	Low priority

Table 67 PT - Peak Throughput

PT Number	Description
1	Up to 1000 octet/s
2	Up to 2000 octet/s
3	Up to 4000 octet/s
4	Up to 8000 octet/s
5	Up to 16000 octet/s
6	Up to 32000 octet/s
7	Up to 64000 octet/s
8	Up to 128000 octet/s
9	Up to 256000 octet/s

Table 68 MT - Mean Throughput

MT Number	Description
1	100 octet/h
2	200 octet/h
3	500 octet/h
4	1000 octet/h
5	2000 octet/h
6	5000 octet/h
7	10000 octet/h
8	20000 octet/h



MT Number	Description
9	50000 octet/h
10	100000 octet/h
11	200000 octet/h
12	500000 octet/h
13	1000000 octet/h
14	2000000 octet/h
15	5000000 octet/h
16	10000000 octet/h
17	20000000 octet/h
18	50000000 octet/h
31	Best effort

6.2.2 HLR Message Waiting Parameters

Table 69 HLR Message Waiting Parameters

Parameters	Attribute Values	Use Case
MSISDN	Digit string 5-15 digits. Each digit is 0 - 9.	GRF
IMSI	6-15 digits	GRF
MCE	Mobile station memory capacity exceeded, should be one of the two values : YES, NO	RF
MNRF	Mobile station not reachable, should be one of the two values: REACH, NREACH	RF
MNRG	Mobile station not reachable through SGSN , should be one of the two values: REACH, NREACH	RF
SCADD	Service center address list expressed as na-ai.	RF

6.3 HLR Subscriber Data Abbreviations

6.3.1 Bearer Services

Table 70 Bearer Services

SUD	Descriptions
BS20	All Data Circuit Asynchronous
BS21	Data circuit asynchronous 300 baud
BS22	Data circuit asynchronous 1200 baud
BS23	Data circuit asynchronous 1200-75 baud
BS24	Data circuit asynchronous 2400 baud
BS25	Data circuit asynchronous 4800 baud



SUD	Descriptions
BS26	Data circuit asynchronous 9600 baud
BS2F	Fall-back asynchronous bearer service
BS2G	General asynchronous bearer service
BS30	All Data Circuit Synchronous
BS31	Data circuit synchronous 1200 baud
BS32	Data circuit synchronous 2400 baud
BS33	Data circuit synchronous 4800 baud
BS34	Data circuit synchronous 9600 baud
BS3F	Fall-back synchronous bearer service
BS3G	General synchronous bearer service

6.3.2 Tele Services

Table 71 Tele Services

SUD	Descriptions
NAM	Network Access Mode
TS10	All speech transmission services
TS11	Telephony
TS21	Short message MT/PP
TS22	Short message MO/PP
TS60	Facsimile Basic Service Group
TS61	Alternative speech/fax group 3 transparent
TS62	Automatic facsimile group 3
TSD0	Auxiliary speech services
TSD1	Auxiliary telephony
TSMO	Transfer of Short Message Option
SMSHR1	SMS Home Routing Screening 1
SMSHR2	SMS Home Routing Screening 2

6.3.3 Barring Services

Table 72 Barring Services

SUD	Descriptions
BAIC	Barring of All Incoming Calls
BAOC	Barring of All Outgoing Calls
BICRO	Barring of All Incoming Calls when Roaming Outside the home PLMN country

SUD	Descriptions
BOIC	Barring of All Outgoing International Calls
BOIEXH	Barring of All Outgoing International Calls Except those directed to the Home PLMN country

6.3.4 Call Forwarding Services

Table 73 Call Forwarding Services

SUD	Descriptions
CFB	Call Forwarding on mobile subscriber Busy
CFNRC	Call Forwarding on mobile subscriber Not Reachable
CFNRY	Call Forwarding on No Reply
CFU	Call Forwarding Unconditional
DCF	Default Call Forwarding
SPN	Single Personal Number

6.3.5 Line Identification Services

Table 74 Line Identification Services

SUD	Descriptions
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
COLP	Connected Line identification Presentation
COLR	Connected Line identification Restriction

6.3.6 Operator Determined barring Services

Table 75 Operator Determined barring Services

SUD	Descriptions
OBA	All incoming and outgoing calls
OBI	All incoming calls
OBO	All outgoing calls
OBOPRE	Outgoing Premium Rate calls (Entertainment)
OBOPRI	Outgoing Premium Rate calls (Information)
OBSSM	Supplementary Service Management
OBR	Roaming
OBRF	Registration of Forwarded-to number
OBZI	Incoming Inter-Zonal calls



SUD	Descriptions
OBZO	Outgoing Inter-Zonal calls
OSB1	Specific Barring in HPLMN (Type 1)
OSB2	Specific Barring in HPLMN (Type 2)
OSB3	Specific Barring in HPLMN (Type 3)
OSB4	Specific Barring in HPLMN (Type 4)

6.3.7

Subscription Options

Table 76 Subscription Options

SUD	Descriptions
SOCB	Control Of Barring services
SOCFB	Call Forwarding on mobile subscriber Busy
SOCFRC	Call Forwarding on mobile subscriber not Reachable
SOCFRY	Call Forwarding on no Reply
SOCFU	Call Forwarding Unconditional
SOCLIP	Calling Line Identification Presentation
SOCLIR	Calling Line Identification Restriction
SOCOLP	Connected Line identification Presentation
SODCF	Default Call Forwarding
SOPLCS	Subscription Option for LCS
SOSDCF	Supplementary Default Call Forwarding

6.3.8

Closed User Groups

Table 77 Closed User Groups

SUD	Descriptions
INDEX	CUG Index
IC	Interlock Code
RESTRICTION	CUG Restriction
BSG	Basic Service Group
ADD BSG	Add BSG Flag
ACCESS	Access attribute
PCUG	Preferential CUG

6.3.9

CAMEL

Table 78 CAMEL

SUD	Descriptions
OCTDP	Originating CAMEL Subscription Data Trigger Detection Point
TCTDP	Terminating CAMEL Subscription Data Trigger Detection Point
GPRSTDP	GPRS CAMEL Trigger Detection Point
OSMSTDP	Originating SMS Trigger Detection Point
MMTDP	Mobility Management Trigger Detection Point
MTY	Match Type
FTC	Forwarding Triggering Criteria
VTTDP	Visitor MSC Terminating Trigger Detection Point
OSMSSO	Originating SMS CAMEL denied subscription option
GSA	GSM SCF Address
SK	Service Key
DEH	Default Error Handling
GCSO	GMSC CAMEL Support subscription Option
MC3SO	MSC/VLR CAMEL Support subscription Option
MM3SO	Mobility Management CAMEL denied Subscription Option
SSLO	Subscription State and Location
ETICK	Extended Terminating IN Category Key
ETINCI	Extended Terminating IN Capability Indicator
EOICK	Extended Originating IN Category Key
EOINCI	Extended Originating IN Capability Indicator
MC2SO	MSC/VLR CAMEL phase 2 Support
MC3SO	MSC/VLR CAMEL phase 3 Support
MC4SO	MSC/VLR CAMEL phase 4 Support
GC2SO	GMSC CAMEL phase 2 Support
GC3SO	GMSC CAMEL phase 3 Support
GC4SO	GMSC CAMEL phase 4 Support
TIF	Translation Information Flag
GPRSSO	GPRS Subscription Option
I	Inhibitor Indicator
CCH	CAMEL Capability Handling



6.3.10 GPRS Services

Table 79 GPRS Services

SUD	Descriptions
APNID	Access Point Name IDentifier
PDPADD	Packet Data Protocol ADDRESS
EQOSID	Extended Quality of Service identifier
OBP	Operator Determined Barring of Packet Oriented Services
SCHAR	GPRS Subscriber Charging Characteristic
VPAA	Visited Public Land Mobile Network Address Allowed
PDPID	Subscriber PDP context identifier
PDPCH	PDP Context Charging Characteristics
PDPTY	PDP Context Type

6.3.11 Location Print Services

Table 80 Location Print Services

SUD	Descriptions
MSCNUMBER	Mobile Switching Center (MSC) number
MSM	Mobile Station Roaming Number (MSRN)
LMSID	Local Mobile Station Identity (LMSID)
SGSNNUMBER	Serving General Packet Radio Service (GPRS) Support Node (SGSN) number
VLRADDRESS	Visitor Location Register (VLR) address

6.3.12 GMLC Address

Table 81 GMLC Address

SUD	Descriptions
GMLCID	GMLC Identifier
GMLCADD	GMLC Address data
HGMLCADD	Home GMLC Address
HGMLCID	Home GMLC Address Identifier
PPRID	Privacy Profile Register Address Identifier
PPRADD	Privacy Profile Register Address



6.3.13 Location Services (LOCSERVICES)

Table 82 Location Services

SUD	Descriptions
UNIV ⁽¹⁾	Universal location services privacy class
CREL ⁽¹⁾	Call Related location services privacy class
CUNRL ⁽¹⁾	Call Unrelated location services privacy class
PLMNO ⁽¹⁾	PLMN Operator location services privacy class
INTIDLIST	Internal Identity List
MOCLLIST	LOCSERVICES Mobile Originating Class List
-ASL	Autonomous Self Location
-BSL	Basic Self Location
-TTP	Transfer to Third Party
-ALL	All LOCSERVICES mobile originating classes
EADD	External LOCSERVICES client Address
GRES	Restriction on the Gateway Mobile Location Center (GMLC)
NOTF	Location request restriction related to the Notification to the mobile subscriber

(1) When the parameters *UNIV*, *CREL*, *CUNRL*, and *PLMNO* are not applied in the location services, they are received by Dynamic Activation but not processed if they are passed on to the location service for the *Create* and *Set* operation. (For example, in this command **SET:HLRSUB:IMSI,12345678933333:MSISDN,12345678:CREL,1**; the parameter *CREL* can be received but ignored by Dynamic Activation.) However, for the *Get* operation, Dynamic Activation receives and processes these parameters. (For example, in the command **GET:HLRSUB:IMSI,12345678933333:MSISDN,12345678:CREL**; the parameter *CREL* is a valid filter name and its value can be retrieved.) See Section 6.1.11 on page 72 for more information about how to handle the parameters applied in the location services.

6.3.14 Supplementary Service Groups

Table 83 Supplementary Service Groups

SS Identifier	Descriptions
ALLSS	All Supplementary Services Includes the services BAIC, BAOC, BICRO, BOIC, BOIEXH, CFU, CFNRC, CFNRY, CFB, CAW, DCF, and SPN.
BAC	Barring of all calls Includes the services BAIC, BAOC, BICRO, BOIC, and BOIEXH.
BIC	Barring of all incoming calls Includes the services BAIC and BICRO.
BOC	Barring of all outgoing calls Includes the services BAOC, BOIC, and BOIEXH.



SS Identifier	Descriptions
CCFS	All Conditional Call Forwarding services Includes the services CFB, CFNRC, and CFNRY.
CFS	All Call Forwarding services Includes the services CFU, CFNRC, CFNRY, and CFB.

6.3.15

Others

Table 84 Others

SUD	Descriptions
ACC	Account Code
ACTYPE	Dual IMSI activation type
AMSIDN	Additional MSISDN
AOC	Advice of Charge
ARD	Access Restriction Data
ASL	Semi-Autonomous Self Location Mobile Originating LCS Class
AUTHD	Authentication Data
BSL	Basic Self Location Mobile Originating LCS Class
CAPL	Channel Allocation Priority Level
CAT	Subscriber Category
CAW	Call Waiting
CBNF	CB Notification Flag
CFNF	CF Notification Flag
CHNF	Call Hold SS Data Notification Flag
CLIPNF	Calling Line Identification Presentation SS Data Notification Flag
CLIRNF	Calling Line Identification Restriction SS Data Notification Flag
CUG	Closed User Group
CWNF	Call Waiting SS Data Notification Flag
DBSG	Default Basic Service Group
DCSI	Dialed services CAMEL Subscription Information
DCSINF	CAMEL D-CSI Notification Flag
DCSIST	CAMEL Support for Dialed Services in HLR
DEMLPP	Default Enhanced Multi-Level Precedence and Preemption
ECT	Explicit Call Transfer
ECTNF	Explicit Call Transfer SS Data Notification Flag
EMLPP	Enhanced Multi-Level Precedence and Preemption
GPRCSI	GPRS CAMEL Subscription Information
GPRSCSINF	CAMEL GPRS-CSI Notification Flag



SUD	Descriptions
GPRSCSIST	CAMEL for GPRS in HLR
GSAP	GSM SCF Profile
HOLD	Call Hold
ICI	Immediate Call Itemization
MCSI	Mobility management CAMEL Subscription Information
MCSINF	CAMEL M-CSI Notification Flag
MCSIST	CAMEL Support in HLR for Mobility Management
MEMLPP	Enhanced Multi-Level Precedence and Preemption. Maximum priority level.
MOBINT	Mobility Management IN Triggering Data
MPTY	Multi Party Service
MRDMCH	Multiple Redundancy Mechanism
MRDPID	Multiple Redundant Primary HLR Identity
OBCT	Operator Barring of Invocation of Call Transfer
OBDC	Operator Barring of Invocation of Call Transfer where both calls are charged to the served subscriber
OBMCT	Operator Barring of Invocation of Call Transfer if there is already one ongoing transferred call for the served subscriber in the serving MSC/VLR
OCSI	Originating CAMEL Subscription Information
OCSINF	CAMEL O-CSI Notification Flag
OCSIST	CAMEL Support for Circuit-Switched Call Control in HLR
ODBNF	ODB Notification Flag
OFA	Origin for Forwarded-to Number Analysis
OICK	Originating Intelligent Network Category Key
OIN	Originating Intelligent Network
ORA	Origin for Restriction in Number Series Analysis
OSMCSI	Originating SMS CAMEL Subscription Information
OSMCSINF	CAMEL MO-SMS CSI Notification Flag
OSMCSIST	CAMEL for MO-SMS in HLR
PICI	Primary Interexchange Carrier Identity (highest priority)
PICI2	Primary Interexchange Carrier Identity (medium priority)
PICI3	Primary Interexchange Carrier Identity (lowest priority)
PRBT	Personal Ring Back Tone
PWD	Subscriber Password
REGSER	Regional Service
RSA	Roaming Service Area
STYPE	Subscription Type
TCSI	Terminating CAMEL Subscription Information
TCSINF	CAMEL T-CSI Notification Flag



SUD	Descriptions
TCSIST	CAMEL Support for Circuit-Switched Call control in HLR
TICK	Terminating Intelligent Network Category Key
TIFCSINF	CAMEL TIF-CSI Notification Flag
TIN	Terminating Intelligent Network
TSMCSI	Terminating SMS CAMEL Subscription Information
TSMCSINF	CAMEL MT-SMS Notification Flag
TSMCSIST	CAMEL ph4
TTP	Transfer to Third Party Mobile Originating LCS Class
VTCSI	Visited MSC Terminating CAMEL Subscription Information
VTCSINF	CAMEL VT-CSI Notification Flag
VTCSIST	CAMEL Support for Circuit-Switched Call Control in HLR
ICS	IMS Centralized Services (ICS) indicator

6.4 HLRSUB Message Response

Here follows a description of the possible message response codes that can be received in a message response. The tables contain a column Type, indicating the seriousness/category of each response. The following are the available categories:

- Syntax error (S)
- Temporary error (T)
- Faulty data (D)
- Fatal error (F)

Note: For HLR provisioning with MNP, response codes of MNP are also supported. See Table 106 for additional response codes.

They can be used as a guide line in error management procedures. Suitable actions are indicated in Section 10.2 on page 151.

Table 85 HLRSUB

Descriptions	Response Code	Type	Create	Set	Delet e	Get
Successful	0		x	x	x	x
NE ANSWERS (1-200, 10201-10999, 12001-12014)						
IMSI already defined	1	D	x			
MSISDN already defined	2	D	x			
Subscriber authentication data not found	6	F	x			



Descriptions	Response Code	Type	Create	Set	Delete	Get
IMSI is not defined	13	D	x	x	x	x
MSISDN is not defined	14	D	x	x	x	x
Subscriber data not recognized	15	S		x		
Supplementary service not recognized	16	S	x		x	
Supplementary service not applicable	17	S	x		x	
Supplementary service not provided	18	S	x		x	
Forwarded-to number restricted	19	D/S	x			
Parameter not applicable	25	S	x		x	
Forwarded-to number missing	26	D/S	x			
Operation not allowed because of interaction	27	S	x			
Subscriber data included more than once	31	S		x		
Subscriber data not applicable	32	S	x	x		
Operation not allowed because of current location	33	T	x	x	x	
No BS subscribed within specified BSG	41	S	x	x	x	
Date not acceptable	42	S/D	x	x		
BSG not recognized	43	S	x	x	x	
SS not applicable to specified BSG	44	S	x		x	
No pending changeover	46	D			x	
Subscription limit of numbers reached	47	F	x			
MSISDN is not an additional MSISDN	48	D/S			x	
IMSI type incorrect	52	S/D	x	x	x	
MSISDN type incorrect	53	S/D	x	x	x	x
BC not defined	55	D/S	x			
BS not supported	56	S/D	x		x	
BC out of range	57	S	x			
SS not applicable to any subscribed BSG	61	D/S	x		x	
Supplementary service not registered	62	S/D	x			
Changeover already initiated	63	D	x			
Changeover not initiated	64	D/S	x	x	x	
Changeover already executed	65	T		x	x	
Changeover still pending	66	T/S	x			
BC represents a BS not supported	68	S	x			
Functionality not supported by this exchange	75	S	x	x	x	
Closed user group not applicable to BSG	76	S	x	x		
Index already defined	77	S/D	x			
Interlock code already defined	78	S/D	x			



Descriptions	Response Code	Type	Create	Set	Delet e	Get
Basic service group included more than once	79	S	x	x		
Closed user group not applicable to any bsg	81	S	x			
Maximum number of closed user groups reached	82	S	x			
Basic service group erasure not allowed	83	S		x		
Index not defined	84	S/D		x	x	
MSISDN not defined as closed user group member	85	S/D		x	x	x
BSG not defined within any closed user group	86	S/D		x		
BSG not defined within a given PCUG	87	S/D		x		
PCUG not defined as index	88	S/D		x		
PCUG not allowed	89	S		x		
ZONE code set not defined	96	S/D		x		
Odd number of characters in subaddress	102	D/S	x			
Restriction not allowed	115	S		x		
Index erasure not allowed	116	S			x	
Collective basic service group not allowed	117	S	x	x	x	
PICI-IXC Relation does not exist	122	D		x		
No translation defined for the IMSI /Storage shortage in GPRS data file	149	S/T		x		
Storage shortage in MSISDN analysis file for flexible numbering/Storage shortage in PDP context data file	150	F	x			
Storage shortage in routing data file for flexible numbering /Storage shortage in facsimile transmission data file	151	T		x		
Storage shortage in data circuit asynchronous data file	153	T		x		
Storage shortage in data circuit synchronous data file	154	T		x		
Bearer Capability number is not permitted	159	S/D	x			
Detection point already defined	168	S/D	x			
Detection point not defined	169	S/D	x	x	x	
The Detection point is activated for the subscriber	170	S/D	x	x	x	
The Detection point is not activated for the subscriber	171	S/D			x	
Detection point value not allowed	172	S/D	x	x	x	
Maximum number of Detection points has been reached for the subscriber	173	D	x			
Too many detection points specified	174	S/D	x		x	
GSM Service Control Function address is not defined	175	D	x	x		
New subscriber data value incompatible	176	S		x		



Descriptions	Response Code	Type	Create	Set	Delete	Get
General bearer service not subscribed	182	F		x		
Parameter not supported by this exchange	183	D	x	x	x	
Updating CAMEL subscription data in progress for the subscriber	187	T	x	x	x	
CAMEL subscription data not defined	188	S/D		x	x	
Parameter value not supported by this exchange	189	S/D	x	x	x	
MSISDN is defined as an additional MSISDN /TCTDP not defined	190	S/D	x	x	x	
OCTDP not defined	191	S/D		x	x	
Too many TCTDP specified	192	S/D			x	
TCTDP value not allowed	193	S/D	x	x	x	
OCTDP value not allowed	194	S/D	x	x	x	
IMSI does not belong to an operator /TCTDP already defined	195	S/D	x			
OCTDP already defined	196	S/D	x			
MSISDN not connected to an IMSI in the FNR, probably exported or other number/Maximum number of TCTDP reached	197	T/S/D	x			
Maximum number of OCTDP reached	198	S/D	x			
Too many OCTDP specified	10202	S/D			x	
No originating CAMEL subscription defined	10203	S/D		x		
No terminating CAMEL subscription defined	10204	S/D		x		
BS2G for BS2F not defined in the profile	10207	D		x		
BS3G for BS3F not defined in the profile	10208	D		x		
APN not defined	10211	S/D	x	x		
Maximum number of subscriber PDP contexts reached	10215	S/D	x			
Subscriber PDP context already defined	10216	S/D	x	x		
Subscriber PDP context with non subscribed APN already defined	10217	S/D	x	x		
Updating of subscriber PDP context in progress	10218	T	x	x		
PDP context identifier included more than once	10219	S/D		x		
SubscriberNAM already has that value	10220	S/D		x		
Subscriber data incompatible with stored subscriber data	10221	D		x		
Subscriber PDP context not defined	10222	D		x	x	
GMLC address not defined	10240	S/D	x	x		
Storage shortage in subaddress data file for speech	10242	T	x			
Storage shortage in subaddress data file for data circuit asynchronous	10243	T	x			



Descriptions	Response Code	Type	Create	Set	Delet e	Get
Storage shortage in subaddress data file for data circuit synchronous	10244	T	x			
Storage shortage in subaddress data file for facsimile	10245	T	x			
Storage shortage in subaddress data file for auxiliary speech	10246	T	x			
OFA value not allowed	10259	D	x			
Storage shortage in originating CAMEL phase 2 data file	10260	T	x			
Storage shortage in terminating CAMEL phase 2 data file	10261	T	x			
Last OCTDP phase 2 removal not allowed	10263	S			x	
Storage shortage in BSG for auxiliary speech service data file	10265	T	x			
Storage shortage in originating CAMEL phase 1 data file	10267	T	x			
Storage shortage in terminating CAMEL phase 1 data file	10268	T	x			
Storage shortage in GPRS CAMEL phase 3 data file	10271	T	x			
GPRS TDP already defined	10272	S/D	x			
Maximum number of GPRSTDP reached	10273	T	x			
I not applicable for this type of TDP	10274	S//D		x		
CCH VALUE not allowed for this type of TDP	10275	S/D	x	x	x	
GPRSTDP value not allowed	10276	S/D	x	x	x	
GPRSTDP not defined	10277	S/D		x	x	
Too many GPRSTDP specified	10278	S/D			x	
Operation not applicable to an LMU subscriber	10279	S/D	x			
Storage shortage in LCS data file	10280	T	x			
No subscriber LCS data defined	10283	S/D			x	
No subscriber LCS privacy classes defined	10284	S/D			x	
No subscriber LCS MO classes defined	10285	S/D			x	
Subscriber LCS data not defined	10286	S/D		x		
No subscriber GMLC addresses defined	10287				x	
Subscriber LCS privacy class already defined	10291	S/D	x			
Subscriber LCS MO class already defined	10292	S/D	x			
Subscriber internal identity already defined	10293	S/D	x			
Call unrelated LCS class not defined	10295	S/D	x	x	x	
Subscriber LCS privacy class not defined	10296	S/D			x	
Subscriber LCS MO class not defined	10297	S/D			x	
Internal identity not defined	10299	S/D			x	



Descriptions	Response Code	Type	Create	Set	Delete	Get
Maximum number of subscriber GMLC addresses exceeded	10301	T	x			
Subscriber GMLC address already defined	10302	S/D	x			
Subscriber GMLC address not defined	10303	S/D			x	
Storage shortage in originating SMS CAMEL data file	10304	T	x			
OSMSTDP already defined	10305	S/D	x			
Maximum number of OSMSTDP reached	10306	S/D	x			
OSMSTDP value not allowed	10307	S/D	x	x	x	
OSMSTDP not defined	10308	D		x	x	
Too many OSMSTDP specified	10309	S/D			x	
Extended QOS not defined	10314	S/D	x	x		
PDP type incompatible with extended QOS	10315	D	x	x		
Static addressing not allowed for PDP context type	10316	D	x	x		
Call related LCS class not defined	10324	D	x	x	x	
TSMSTDP value not allowed	10325	S/D	x	x	x	
TSMSTDP already defined	10326	D	x			
Maximum number of TSMSTDP reached	10327	D	x			
storage shortage in terminating SMS CAMEL data file	10328	T	x			
Too many TSMSTDP specified	10329	S/D			x	
TSMSTDP not defined	10330	S/D		x	x	
Service key already defined	10331	D	x			
MMTDP value not allowed	10332	S/D	x		x	
MMTDP already defined	10333	D	x			
Maximum number of MMTDP reached	10334	D	x			
Storage shortage in mobility management CAMEL data file	10335	T	x			
GSA not specified	10336	S/D	x			
Service key not specified	10337	S/D	x			
GSA already defined	10338	D	x			
MMTDP not defined	10339	S/D			x	
DIALNUM already defined	10340	D	x			
Too many MMTDPs specified	10341	S/D	x		x	
DSTDP already defined	10342	D	x			
Storage shortage in dialled services CAMEL data file	10344	T	x			
DSTDP not defined	10345	S/D		x	x	
Match type not defined	10349	S/D	x			



Descriptions	Response Code	Type	Create	Set	Delet e	Get
Match type already defined	10350	D	x			
Too many destination numbers given in command	10351	S/D	x			
Destination number already given in command	10352	D	x			
Destination number already defined	10353	D	x			
Maximum number of destination numbers reached	10354	D	x			
Too many destination number lengths given in command	10355	D	x			
Destination number length already given in command	10356	D	x			
Destination number length already defined	10357	D	x			
Maximum number of destination number lengths reached	10358	D	x			
Too many triggering basic services given in command	10359	S/D	x			
Triggering basic service already given in command	10360	D	x			
Triggering basic service already defined	10361	D	x			
Triggering basic service not allowed	10362	D	x		x	
Maximum number of triggering basic services reached	10363	D	x			
Storage shortage in CAMEL TCTDP12 criteria data file	10364	D	x			
Storage shortage in CAMEL OCTDP2 criteria data file	10365	D	x			
Forwarding triggering criteria already defined	10366	D	x			
DEH not applicable for this type of TDP	10367	D		x		
Triggering criteria data not defined	10368	D			x	
Destination number not defined	10369	D			x	
Destination number length not defined	10370	D			x	
Forwarding triggering criteria not defined	10371	D			x	
No triggering basic service defined	10372	D			x	
BS not defined as triggering basic service	10373	D			x	
BSG not defined as triggering basic service	10374	D			x	
Maximum numbers of subscriber call related external identities reached	10375	D	x			
Maximum numbers of subscriber call unrelated external identities reached	10376	D	x			
Call related external address not defined	10377	D		x	x	
Call unrelated external address not defined	10378	D		x	x	
Call related external address already defined	10379	D	x			
Call unrelated external address already defined	10380	D	x			



Descriptions	Response Code	Type	Create	Set	Delete	Get
Call related GMLC restriction not defined	10381	D		x	x	
Call unrelated GMLC restriction not defined	10382	D		x	x	
NAM value not allowed because of functionality not supported	10383	D	x	x		
Storage shortage in call unrelated external address data file	10385	D	x			
Storage shortage in call related external address data file	10386	D	x			
Internal identity already given in command	10387	D	x		x	
Subscriber LCS MO class already given in command	10388	D	x		x	
Storage shortage in IPv6 address data file	10389	D	x	x		
Storage shortage in external address data file	10390	D	x			
CCH value not allowed for this TDP value	10391	D	x	x	x	
VTTDP already defined	10392	D	x			
VTTDP value not allowed	10393	S/D	x	x	x	
Storage shortage in originating CAMEL phase 3 data file	10394	D	x			
Storage shortage in terminating CAMEL phase 3 data file	10395	D	x			
Storage shortage in VMSC terminating CAMEL phase 3 data file	10396	D	x			
VTTDP not defined	10397	D		x	x	
Too many VTTDP specified	10398	D			x	
Maximum number of VTTDP reached	10399	D	x			
Trigger detection point included more than once	10400	D	x		x	
No MMTDP defined	10411	S/D		x		
No valid originating CAMEL subscription defined	10413	S/D		x		
Subscriber GMLC address already given	10415	D	x		x	
No destination number defined	10417	D			x	
No destination number length defined	10418	D			x	
Storage shortage in external address analysis file	10419	D	x			
Spatial triggers data is already defined	10420	S/D	x			
Storage shortage in spatial triggers data file	10421	T	x			
Subscriber spatial trigger data not defined	10422	S/D		x	x	
Subscriber service type already defined	10424	S/D	x			
Too many service types specified for the subscriber	10426	S/D	x			
Subscriber service type already given in command	10427	S/D	x			
No subscriber service type defined	10428	S/D			x	



Descriptions	Response Code	Type	Create	Set	Delet e	Get
Subscriber service type not defined	10429	S/D		x	x	
Service type GMLC restriction not defined	10430	S/D		x	x	
NO subscriber internal identities defined	10436	D			x	
PDP context identifier in use	10437	S/D	x			
PDP address incompatible with PDP type	10438	S/D		x		
Last PDP context removal not allowed	10439	S/D		x		
Updating of PDP context profile in progress	10441	S/D		x		x
Extended QOS not specified	10442	S/D		x		
Charging characteristics erasure not allowed	10443	S/D		x		
Spatial trigger event value not allowed	10444	S/D	x	x	x	
FNUM value not allowed	10446	S/D	x			
Subscription belongs to a multiple subscription	10456	F	x	x	x	
IMSI corresponds to master subscription	10457	F	x	x		
Storage shortage in multiple subscription data file	10461	F	x			
Subscription is not a master subscription	10462	F		x	x	
Subscription does not belong to the multiple subscription	10463	F		x		
Maximum number of subscriptions in multiple subscription exceeded	10464	F		x		
Minimum number of subscriptions in multiple subscription exceeded	10465	F		x		
Change of active subscription not allowed	10466	F		x		
Subscriber SMSC address series already defined	10469	D	x			
Series is prefix of existing series	10470	D	x			
There is a series prefix of the given series	10471	D	x			
Maximum number of subscriber SMSC addresses series reached	10473	D	x			
Storage shortage in subscriber SPAM SMS data file	10474	D	x			
Storage shortage in SPAM SMSC address series data file	10475	D	x			
No SPAM SMS data defined	10476	D			x	
Subscriber SMSC address series not defined	10477	D			x	
LCS address not defined	10478	D	x			
Subscriber has an HGMLC address already defined	10479	D	x			
Subscriber has a PPR address already defined	10480	D	x			
No subscriber HGMLC address defined	10481	D			x	
No subscriber PPR address defined	10482	D			x	
Storage shortage in originating CAMEL phase 4 data file	10485	D	x			



Descriptions	Response Code	Type	Create	Set	Delete	Get
Storage shortage in terminating CAMEL phase 4 data file	10486	D	x			
Storage shortage in VMSC terminating CAMEL phase 4 data file	10487	D	x			
FNUM value incompatible with OFA value	10489	S/D	x			
IMSI belongs to a different home PLMN	10504	D	x	x		
Centralized user database not reachable	10534	D	x	x	x	
Resource limitation	10535	D	x	x	x	
Storage shortage in additional MSISDN data files	10537	D	x			
Storage shortage in detection point data file	10538	D	x			
Storage shortage in closed user group data files	10539	D	x			
Old IMSI exists	10541	D	x			
Profile does not exist in centralized user database	10542	D	x			
IP address incompatible with IP type	10585	D	x	x		
URL not valid	10586	D	x	x		
Too many subscriptions within multiple IMSI subscription	10589	D			x	
Changeover not allowed	10804	D	x			
gsmSCF profile not defined	10806	D	x	x		
Identifier not defined	12001			x	x	
Subscriber not defined	12002				x	
Identifier in use	12003				x	
Identifier already exists	12004		x			
Database locked for backup	12006	D	x		x	
Subscriber used by application	12007				x	
Operation failed, rollback has been performed successfully	12013	T	x			
Operation failed, rollback was unsuccessful	12014	T	x			
NE FATAL ERRORS (1001-1100)						
Ext. system communication link failure	1001	T/F	x	x	x	x
External system error	1002	F	x	x	x	x
Inconsistency in NE data	1003	F	x	x	x	x
EDA FATAL ERRORS (2001-2100)						
Internal Dynamic Activation error	2002	F	x	x	x	x
NE does not exist	2003	F	x	x	x	x
CAI ERRORS (3001-3100)						
Invalid command	3001	S	x	x	x	x
Operation not supported	3002	S	x	x	x	x
Unknown NE object	3003	F	x	x	x	x



Descriptions	Response Code	Type	Create	Set	Delet e	Get
Insufficient parameters	3004	S	x	x	x	x
Invalid argument or out of range	3005	S	x	x	x	x
Rejection, must login first	3007	S	x	x	x	x
Invalid command sequence	3008	S	x	x	x	x
Licensed subscriber number overruns	3009	F	x			
Invalid license	3010	F	x	x	x	x
License expired	3011	F	x	x	x	x
Not authorized	3012	F	x	x	x	x

Table 86 HLRMWINFO

Descriptions	Response Code	Type	Create	Set	Delet e	Get
NE ANSWERS (1 -199)						
IMSI is not defined	13	D				x
MSISDN is not defined	14	D				x
NE FATAL ERRORS (1001-1100)						
Ext. system communication link failure	1001	T/F	x	x	x	x
External system error	1002	F	x	x	x	x
Inconsistency in NE data	1003	F	x	x	x	x
EDA FATAL ERRORS (2001-2100)						
Internal Multi Activation error	2002	F	x	x	x	x
NE does not exist	2003	F	x	x	x	x
CAI ERRORS (3001-3100)						
Invalid command	3001	S	x	x	x	x
Operation not supported	3002	S	x	x	x	x
Unknown NE object	3003	F	x	x	x	x
Insufficient parameters	3004	S	x	x	x	x
Invalid argument or out of range	3005	S	x	x	x	x
Rejection, must login first	3007	S	x	x	x	x
Invalid command sequence	3008	S	x	x	x	x
Licensed subscriber number overruns	3009	F	x			
Invalid license	3010	F	x	x	x	x
License expired	3011	F	x	x	x	x
Not authorized	3012	F	x	x	x	x



7 MNP Subscription

7.1 Customer Service Orders

Note: The parameter sequence in CAI command is independent of the parameter sequence in MML command.

7.1.1 NPSUB

The number portability feature enables mobile subscriber to retain the MSISDN number when changing network operator.

NP requires a high level communication between the operators. Subscribers that are moving from one network to another must be reported to the network the MSISDN belongs to, which is the network where the subscriber was created.

The NP functionality is included in the MNP NE.

Note: If the user has chosen the split HLR and MNP license during installation, when doing provisioning towards HLR, only the data in HLR is affected. If there is any operation towards MNP needed, the user should do the provisioning on MNP in addition. And this MO provides CREATE, SET, DELETE, and GET operations, which only affect the data in MNP.

7.1.1.1 Create NPSUB

7.1.1.1.1 Request Syntax

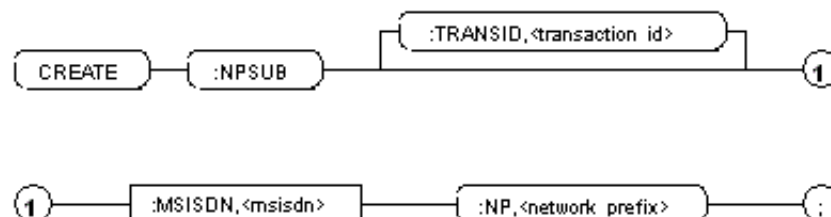


Figure 72 Create NPSUB Command

Table 87 Create NPSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN)
NPSUB		Mandatory	Network Prefix



7.1.1.1.2 Response Syntax

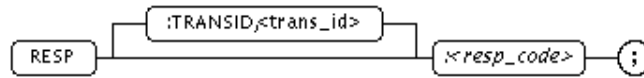


Figure 73 Create NPSUB Response

Table 88 Create NPSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 7.4.1 on page 126.

7.1.1.2 Set NPSUB

7.1.1.2.1 Request Syntax

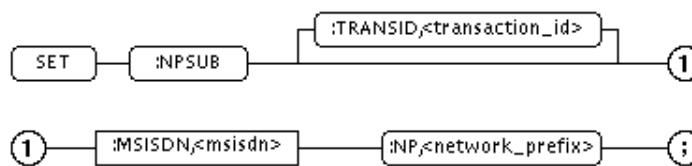


Figure 74 Set NPSUB Command

Table 89 Set NPSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN)
NPSUB		Mandatory	Network Prefix

7.1.1.2.2 Response Syntax

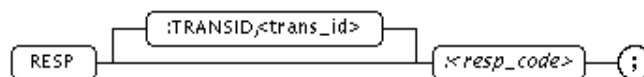


Figure 75 Set NPSUB Response

Table 90 Set NPSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 7.4.1 on page 126.

7.1.1.3 Get NPSUB

7.1.1.3.1 Request Syntax

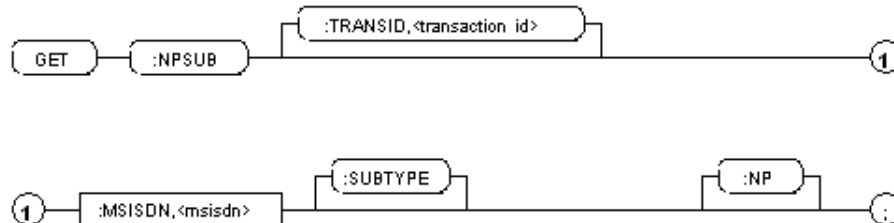


Figure 76 Get NPSUB Command

Table 91 Get NPSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN)

7.1.1.3.2 Response Syntax

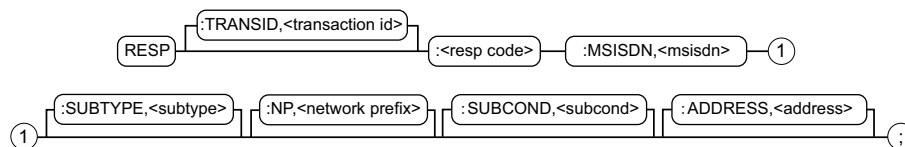


Figure 77 Get a Number of Specified Data Response

Table 92 Get NPSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 7.4.1 on page 126.
NP	Digit string 1-10 digits. Each digit 0-9 or #10-#14	Optional	Network Prefix
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN)
SUBTYPE	HOME, ⁽¹⁾ IMPORTED, EXPORTED, OTHER	Optional	Subscriber Type
SUBCOND	GSM/WCDMA, PSTN/ISDN	Optional	Subscriber Condition
ADDRESS ⁽²⁾	Digit string, 5-28 digits, 0-9 or #10-#14 for each digit	Optional	Network Address

(1) HOME is only possible if MSISDN belongs to a FAM subscription.

(2) This parameter is returned if MSISDN belongs to a FAM subscription.



7.1.1.4 Delete NPSUB

7.1.1.4.1 Request Syntax

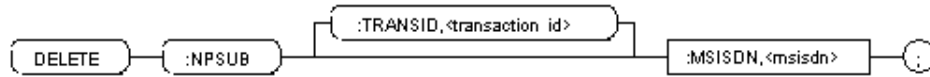


Figure 78 Delete NPSUB Command

Table 93 Delete NPSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN)

7.1.1.4.2 Response Syntax

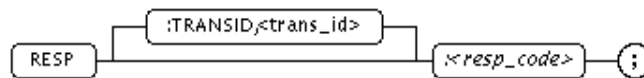


Figure 79 Delete NPSUB Response

Table 94 Delete NPSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 7.4.1 on page 126.

7.1.2 FNSUB

The Flexible Numbering feature enables the mobile subscriber to choose the MSISDN much more free when the IMSI is fixed.

7.1.2.1 Create FNSUB

Note: IMSI is not used as part of the provisioning request. It is only supported for backward compatibility reasons in the incoming request.

7.1.2.1.1

Request Syntax

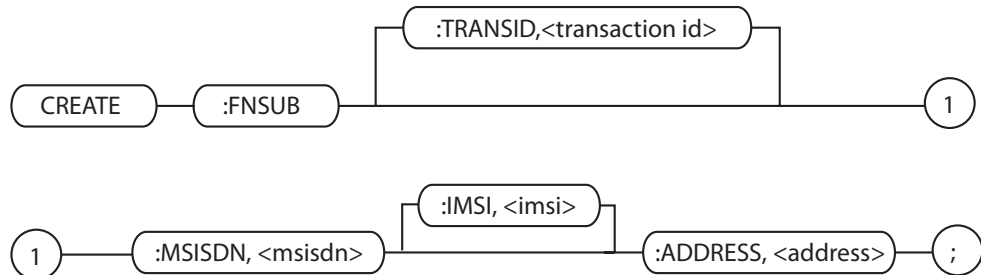


Figure 80 Create FNSUB Command

Table 95 Create FNSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN)
IMSI	Digit string 6-15 digits. Each digit is 0-9	Optional	International Mobile Subscriber Identity ⁽¹⁾
ADDRESS	Digit string, 5-28 digits, 0-9 or #10-#14 for each digit	Mandatory	Network Address

(1) Not used, only supported for backward compatibility reasons.

7.1.2.1.2

Response Syntax

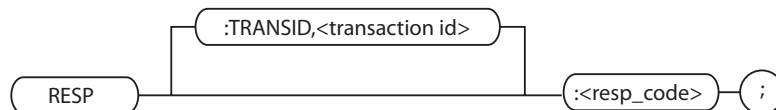


Figure 81 Create FNSUB Response

Table 96 Create FNSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 7.4.1 on page 126.

7.1.2.2

Set FNSUB

Note: IMSI is not used as part of the provisioning request. It is only supported for backward compatibility reasons in the incoming request.

7.1.2.2.1 Request Syntax

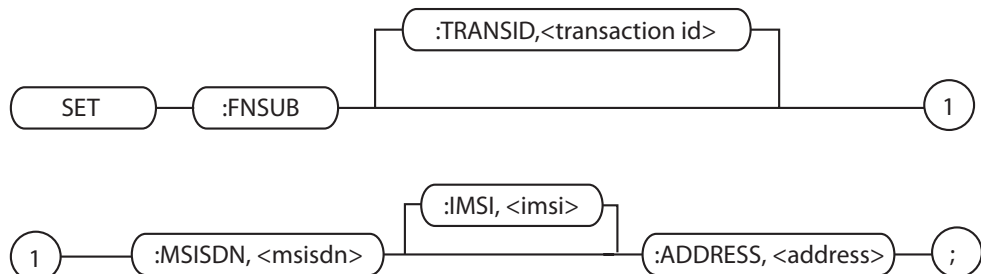


Figure 82 Set FNSUB Command

Table 97 Set FNSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN)
IMSI	Digit string 6-15 digits. Each digit is 0-9	Optional	International Mobile Subscriber Identity ⁽¹⁾
ADDRESS	Digit string, 5-28 digits, 0-9 or #10-#14 for each digit	Mandatory	Network Address

(1) Not used, only supported for backward compatibility reasons.

7.1.2.2.2 Response Syntax

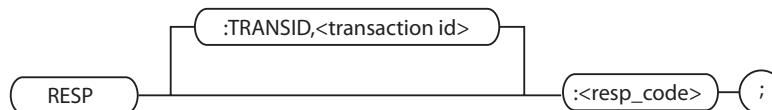


Figure 83 Set FNSUB Response

Table 98 Set FNSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 7.4.1 on page 126.

7.1.2.3 Get FNSUB

Note: IMSI and ADDRESS are not used as part of the provisioning request. They are only supported for backward compatibility reasons in the incoming request.

7.1.2.3.1

Request Syntax

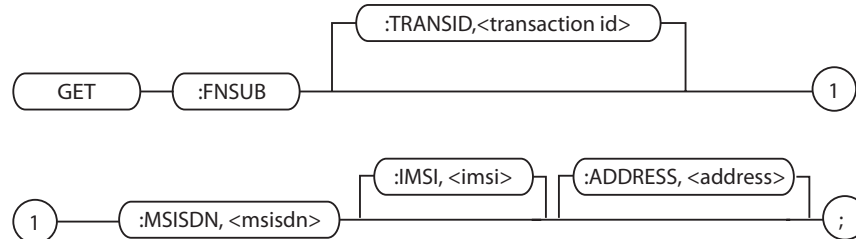


Figure 84 Get FNSUB Command

Table 99 Get FNSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN)
IMSI	Digit string 6-15 digits. Each digit is 0-9	Optional	International Mobile Subscriber Identity ⁽¹⁾
ADDRESS	Digit string, 5-28 digits, 0-9 or #10-#14 for each digit	Optional	Network Address ⁽¹⁾

(1) Not used, only supported for backward compatibility reasons.

7.1.2.3.2

Response Syntax

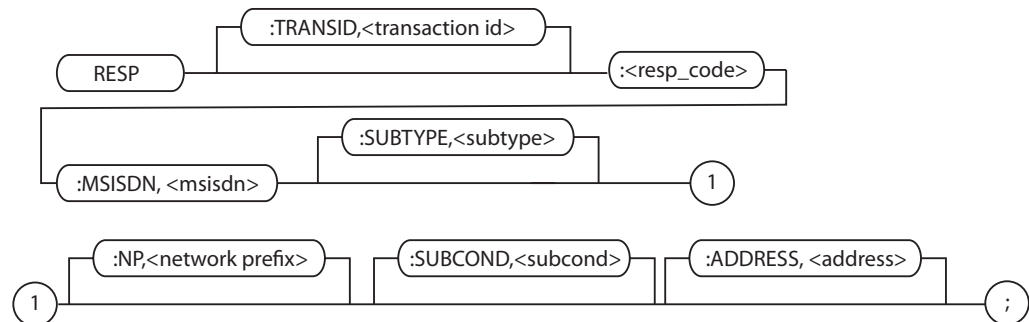


Figure 85 Get FNSUB Response

Table 100 Get FNSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 7.4.1 on page 126.
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN)
SUBTYPE	HOME, IMPORTED, EXPORTED, OTHER	Optional	Subscriber Type



Parameter	Type	Occurrence	Description
NP	Digit string 1-10 digits. Each digit 0-9 or #10-#14	Optional	Network Prefix
SUBCOND	GSM/WCDMA, PSTN/ISDN	Optional	Subscriber Condition
ADDRESS	Digit string, 5-28 digits, 0-9 or #10-#14 for each digit	Optional	Network Address

7.1.2.4

Delete FNSUB

Note: DELADDR is not used as part of the provisioning request. It is only supported for backward compatibility reasons in the incoming request.

7.1.2.4.1

Request Syntax

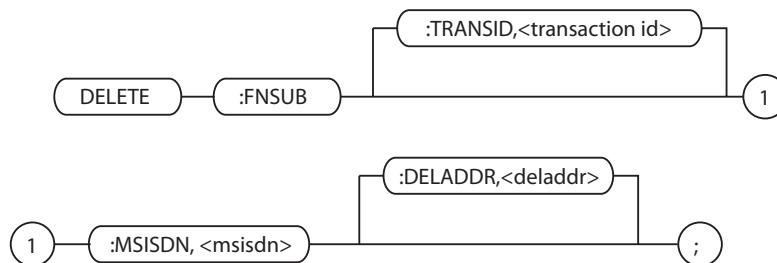


Figure 86 Delete FNSUB Command

Table 101 Delete FNSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Mandatory	Mobile Subscriber ISDN Number (MSISDN)
DELADDR	Values are 0-1	Optional	Not used, only supported for backward compatibility reasons

7.1.2.4.2

Response Syntax

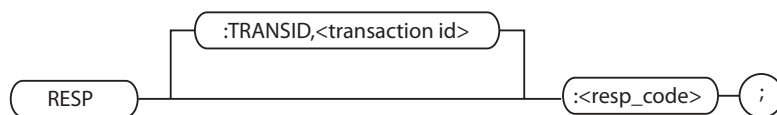


Figure 87 Delete FNSUB Response

Table 102 Delete FNSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 7.4.1 on page 126.

7.2 Request and Response Parameters

Use Case specifies in which cases the parameter can be applied:

C - (Create) Parameter can take a value when a subscription/equipment is created.

S - (Set) Parameter can take a value when a subscription/equipment is modified.

D - (Delete) Parameter can take a value when a subscription/equipment is deleted.

G - (Get) Parameter can take a value in the Get request for retrieving a subscription/equipment.

F - (Filter) Parameter can be used as filter in a Get request to indicate that we want to retrieve the current value of this parameter.

R - (Returned) Parameter may be returned with a value in the answer to a Get request (depends on request issued and filter specified).

If a certain parameter is belonging to a Sub-MO, the use case could also show in which suboperation(s) the parameter can be used:

c - (Define (create)) Parameter can be used in a DEF suboperation.

s - (Set) Parameter can be used in a SET suboperation.

d - (Delete) Parameter can be used in a DEL suboperation.

These three suboperation use case identifiers (c, s, d) will always appear directly after a Create or Set use case identifier (C, S). This shows which suboperations that are allowed in corresponding main operation.

If a certain parameter is belonging to a list value which can be seen as a simplified sub-MO the use case could also show in which suboperation(s) the parameter can be used:

+ Parameter as a value can be added to a list attribute.

- Parameter as a value can be deleted from a list attribute.

These two suboperation use case identifiers (+, -) will always appear directly after a Create or Set use case identifier (C, S). This shows which sub-operations that are allowed in corresponding main operation.

For example, use case: "CcScsdR" indicates that in a Create operation the parameter is allowed in a DEF sub-operation, in Set the parameter is allowed in DEF, SET, or DEL sub-operation, in Delete it is not allowed at all and the parameter may be returned in the answer to a Get request.



For example, use case: "C+S-R" indicates that in a Create operation the parameter is allowed to be added to a list attribute, in a Set operation the parameter is allowed to be deleted from a list attribute, and the parameter may be returned in the answer to a Get request.

7.2.1 NP Subscription Parameters

Table 103 NP Subscription Parameters

Parameters	Attribute Values	Use Case
MSISDN	Digit string 5-15 digits. Each digit is 0-9	CSDGRF
IMSI	6-15 digits	RF
NP	Digit string 1-10 digits. Each digit 0-9 or #10-#14	CSRF
SUBTYPE	HOME, IMPORTED, EXPORTED, OTHER	RF
SUBCOND	GSM/WCDMA, PSTN/ISDN	RF

7.2.2 FN Subscription Parameters

Table 104 FN Subscription Parameters

Parameters	Attribute Values	Use Case
MSISDN	Digit string 5-15 digits. Each digit is 0-9	CSDGRF
IMSI	Only supported for backward compatibility reasons	CSG
ADDRESS	Digit string, 5-28 digits, 0-9 or #10-#14 for each digit	CSGR
NP	Digit string 1-10 digits. Each digit 0-9 or #10-#14	R
SUBTYPE	HOME, IMPORTED, EXPORTED, OTHER	R
SUBCOND	GSM/WCDMA, PSTN/ISDN	R
DELADDR	Only supported for backward compatibility reasons	D

7.3 MNP Subscriber Data Abbreviations

Table 105 NP Subscriber Data Abbreviations

SUD	Descriptions
SUBTYPE	Subscriber Type
NP	Network Prefix
SUBCOND	Subscriber Condition

7.4 FNSUB and NPSUB Message Response

Here follows a description of the possible message response codes that can be received in a message response. The tables contain a column Type, indicating the seriousness/category of each response. Available categories are

- Syntax error (S)
- Temporary error (T)
- Faulty data (D)
- Fatal error (F)

and they can be used as a guide line in error management procedures. Suitable actions are indicated in Section 10.2 on page 151.

7.4.1 FNSUB and NPSUB

Table 106 FNSUB, NPSUB

Descriptions	Response Code	Type	Create	Set	Delete	Get
Successful	0		x	x	x	x
NE ANSWERS						
MSISDN is not defined	14	T	x	x	x	x
Functionality not supported by this exchange	75	S	x	x		
MSISDN does not belong to own country	194	D	x	x	x	x
NPREFIX has not got the proper length	196	D	x	x		
Illegal combination of parameter values	520	S/D	x	x		
NE FATAL ERRORS (1001-1100)						
Ext. system communication link failure	1001	T/F	x	x	x	x
External system error	1002	F	x	x	x	x
Inconsistency in NE data	1003	F	x	x	x	x
EDA FATAL ERRORS (2001-2100)						
Internal Multi Activation error	2002	F	x	x	x	x
NE does not exist	2003	F	x	x	x	x
CAI ERRORS (3001-3100)						
Invalid command	3001	S	x	x	x	x
Operation not supported	3002	S	x	x	x	x
Unknown NE object	3003	F	x	x	x	x
Insufficient parameters	3004	S	x	x	x	x
Invalid argument or out of range	3005	S	x	x	x	x
Rejection, must login first	3007	S	x	x	x	x



Descriptions	Response Code	Type	Create	Set	Delete	Get
Invalid command sequence	3008	S	x	x	x	x
Licensed subscriber number overruns	3009	F	x			
Invalid license	3010	F	x	x	x	x
License expired	3011	F	x	x	x	x
Not authorized	3012	F	x	x	x	x

8 IMSI Changeover

In layered data architecture, IMSI changeover procedure affects all services provisioned for this subscriber. If the subscriber has services other than AUC, HLR or EPS, execute IMSI changeover according to *Layered Identity Changeover Provisioning over CA/3G*, Reference [4]. And if an immediate IMSI changeover executes on an subscribe that have services other than AUC and HLR, it will failed.

Note: If the user has chosen the split HLR and MNP license during installation, when doing provisioning towards HLR, Dynamic Activation causes no data update in MNP and is not query MNP for any information. So, in this case, if there is any data that is to be updated in MNP for HLRSUB, the Operator should update them through NPSUB in addition. Refer to Section 7 on page 116 for detailed information about MNP provisioning.

If the user has not chosen the split HLR and MNP license during installation, when doing provisioning towards HLR, Dynamic Activation updates data in MNP also. But the physical implementation of MNP behind HLR is hidden for the user.

8.1 Customer Service Orders

An IMSI Changeover procedure is used to replace the subscribers SIM-card which has the IMSI burned in. A changeover procedure goes through some different states before being considered executed with no reference to the old IMSI:

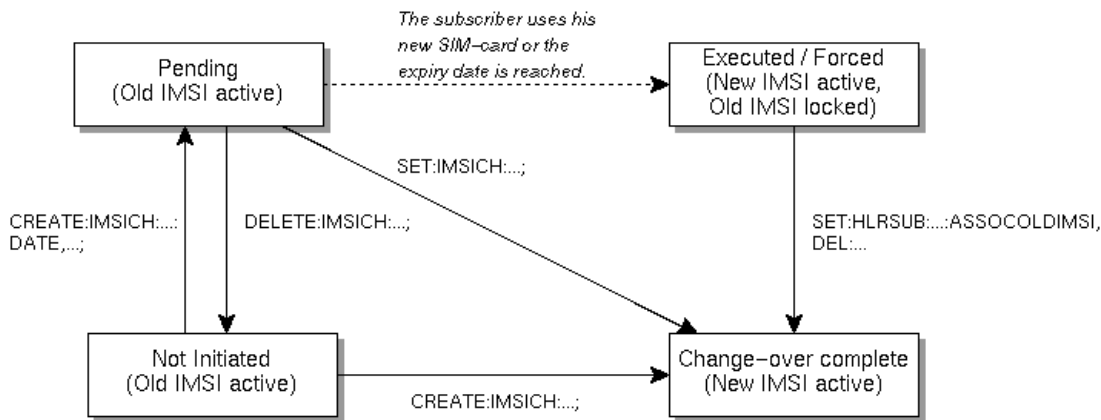


Figure 88 Flowchart of the IMSI Changeover Process

Note:

- IMSI Changeover procedures now support AUC, HLR, and EPS services.
- If a delayed IMSI Changeover, Dynamic Activation is not able to remove the old IMSI reference automatically. That has to be done in a separate command after the changeover command has triggered. Removal of old IMSI references can not be done through the IMSICH MO. It has to be done as a SET operation on MO HLRSUB. See Section 6.1.8 on page 66.
- In a flexible network, when a delayed IMSI Changeover with expiry date is created for a subscriber where the MSISDN is not flexible and the new IMSI is flexible, a new MNP connection is created at the time of initiation. If a Dynamic Activation user tries to delete the subscriber before the pending IMSI Changeover is executed, the new MNP connection is not deleted by Dynamic Activation. In this case, a separate command is needed to delete the new MNP connection.

8.1.1

Create IMSICH

The Changeover procedure can be initiated with an activation date (State: 'Pending'). If no date is set, the Changeover takes place immediately and Dynamic Activation also takes care of deleting associated old IMSI automatically.



8.1.1.1

Request Syntax

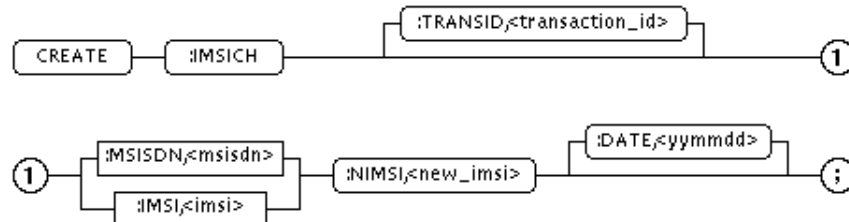


Figure 89 Create IMSICH Command

Table 107 Create IMSICH

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Mobile Subscriber ISDN Number (MSISDN)
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Optional	International Mobile Subscriber Identity
NIMSI	Digit string 6-15 digits. Each digit is 0-9.	Mandatory	IMSI number which is associated to the subscription when the Changeover is performed
DATE	Format: <i>yyymmdd</i> where <i>yy</i> (year) is a numeral 00 - 99 <i>mm</i> (month) is a numeral 01 - 12 <i>dd</i> (day) is a numeral 01 - 31	Optional	Activation date for the new IMSI. The date should be not earlier than today and not later than a year from today date.

8.1.1.2

Response Syntax

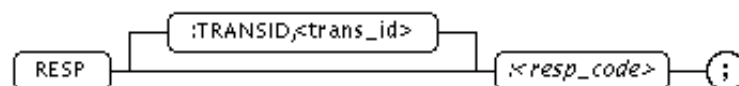


Figure 90 Create IMSICH Response

Table 108 Create IMSICH Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 8.3 on page 136 for response codes.

8.1.1.3

Examples

Message request to initiate an IMSI Changeover for the subscription with MSISDN 46455381234. The Changeover leads to the new IMSI 12345678944444 and will be performed latest 1st of March 2003:



```
CREATE:IMSICH:MSISDN, 46455381234: NIMSI,12345678944444:  
DATE,030301;
```

Unsuccessful message response, there is already a Changeover procedure defined for this subscription: RESP:63;

Message request to initiate the same IMSI Changeover immediately:

```
CREATE:IMSICH: MSISDN, 46455381234: NIMSI,12345678944444;
```

Successful message response:

```
RESP: 0;
```

8.1.2 Set IMSICH

If the Changeover procedure is in the state 'Pending', the expiry date may be set. In all other states, this request fails. If no date is given, this forces the Changeover procedure to be executed immediately.

8.1.2.1 Request Syntax

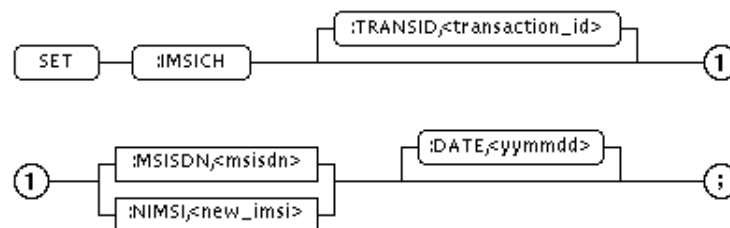


Figure 91 Set IMSICH Command

Table 109 Set IMSICH

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Mobile Subscriber ISDN Number (MSISDN)
NIMSI	Digit string 6-15 digits. Each digit is 0-9.	Optional	IMSI number which is associated to the subscription when the Changeover is performed
DATE	Format: <i>yymmdd</i> where <i>yy</i> (year) is a numeral 00 - 99 <i>mm</i> (month) is a numeral 01 - 12 <i>dd</i> (day) is a numeral 01 - 31	Optional	Activation date for the new IMSI. The date should be not earlier than today and not later than a year from today date.



8.1.2.2

Response Syntax

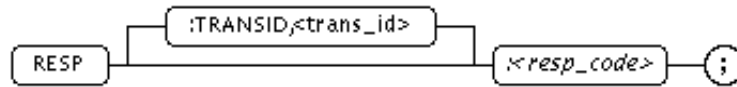


Figure 92 Set IMSICH Response

Table 110 Set IMSICH Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 8.3 on page 136 for response codes.

8.1.2.3

Examples

Message request to set the activation date of an IMSI Changeover for the subscription with MSISDN 46455381234. Now the Changeover will be performed latest 1st of April 2001:

```
SET:IMSICH: MSISDN, 46455381234:DATE,010401;
```

Unsuccessful message response, the date is not acceptable (already passed):

```
RESP: 42;
```

Message request to force the execution of the still pending Changeover procedure:

```
SET:IMSICH: MSISDN, 46455381234;
```

Successful message response:

```
RESP: 0;
```

8.1.3

Get IMSICH

Note: Handle the Get request so that BSS is not affected by new HLR releases. This can be done by sending only used services in the Get request. If a full response syntax is used, the results are different depending on which release of the HLR the request have been sent to.

To Get Changeover data the procedure must be either in state Pending, Forced or Executed.

8.1.3.1

Request Syntax

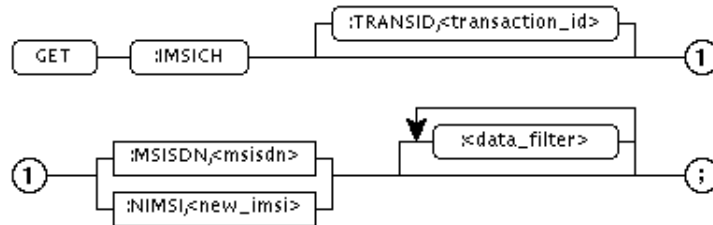


Figure 93 Get IMSICH Command

Table 111 Get IMSICH

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Mobile Subscriber ISDN Number (MSISDN)
NIMSI	Digit string 6-15 digits. Each digit is 0-9.	Optional	IMSI number which is associated to the subscription when the Changeover is performed
data_filter		Optional	Name of parameters wanted back in response

8.1.3.2

Response Syntax

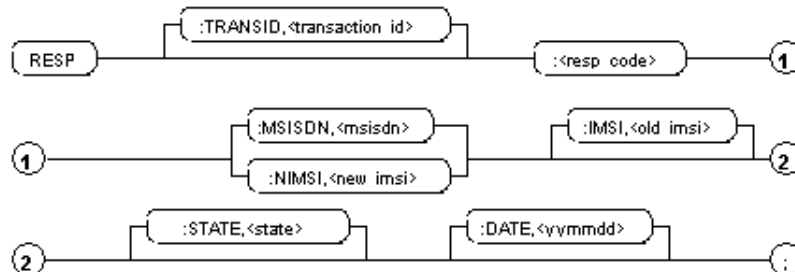


Figure 94 Get IMSICH Response

Table 112 Get IMSICH Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 8.3 on page 136 for response codes.
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Mobile Subscriber ISDN Number (MSISDN)
NIMSI	Digit string 6-15 digits. Each digit is 0-9.	Optional	IMSI number which is associated to the subscription when the Changeover is performed



Parameter	Type	Occurrence	Description
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Optional	Old IMSI number which are associated to the subscription before the Changeover is performed
STATE	⁽¹⁾	Optional	State of the IMSI Changeover
DATE	Format: <i>yyymmdd</i> where <i>yy</i> (year) is a numeral 00 - 99 <i>mm</i> (month) is a numeral 01 - 12 <i>dd</i> (day) is a numeral 01 - 31	Optional	Activation date for the new IMSI

(1) For information about the different states possible to receive, see Function Specification Identity Changeover for Layered Applications, Reference [3]

8.1.3.3 Examples

Request to get the ongoing IMSI Changeover of the subscription with the MSISDN 46455381234:

GET:IMSICH: MSISDN, 46455381234;

Successful message response:

The Changeover leads to the new IMSI 12345678955555 is pending to the 1st of March 2001.

RESP:0: IMSI,123456789012: NIMSI,12345678955555:
MSISDN,46455381234: STATE,PEND:DATE,010301;

Unsuccessful message response:

No IMSI Changeover procedure is defined for the specified subscription:

RESP:14;

8.1.4 Delete IMSICH

This request stops the IMSI Changeover if it is still pending, otherwise the request fails.

When flexible numbering is used in the network this command must be followed by a manual rollback of the flexible numbering database. New IMSI must be changed back to the old IMSI.

8.1.4.1 Request Syntax

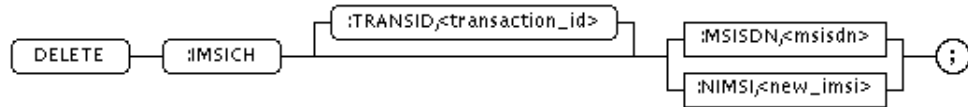


Figure 95 Delete IMSICH Command

Table 113 Delete IMSICH

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
MSISDN	Digit string 5-15 digits. Each digit is 0-9.	Optional	Mobile Subscriber ISDN Number (MSISDN)
NIMSI	Digit string 6-15 digits. Each digit is 0-9.	Optional	IMSI number which is associated to the subscription when the Changeover is performed

8.1.4.2 Response Syntax

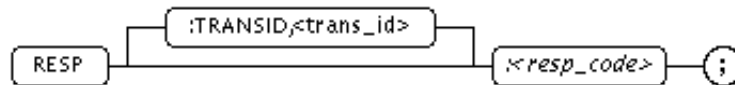


Figure 96 Delete IMSICH Response

Table 114 Delete IMSICH Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 8.3 on page 136 for response codes.

8.1.4.3 Examples

Message request to delete the pending IMSI Changeover for the subscription with MSISDN 46455381234:

DELETE:IMSICH:MSISDN, 46455381234;

Successful message response:

RESP: 0;

Unsuccessful message response, there is no Changeover pending:

RESP:14;



8.2 Request and Response Parameters

Use Case specifies in which cases the parameter can be applied:

C - (Create) Parameter can take a value when a subscription/equipment is created.

S - (Set) Parameter can take a value when a subscription/equipment is modified.

D - (Delete) Parameter can take a value when a subscription/equipment is deleted.

G - (Get) Parameter can take a value in the Get request for retrieving a subscription/equipment.

F - (Filter) Parameter can be used as filter in a Get request to indicate that we want to retrieve the current value of this parameter.

R - (Returned) Parameter may be returned with a value in the answer to a Get request (depends on request issued and filter specified).

If a certain parameter is belonging to a Sub-MO, the use case could also show in which sub-operation(s) the parameter can be used:

c - (Define (create)) Parameter can be used in a DEF sub-operation.

s - (Set) Parameter can be used in a SET sub-operation.

d - (Delete) Parameter can be used in a DEL sub-operation.

These three sub-operation use case identifiers (c, s, d) will always appear directly after a Create or Set use case identifier (C, S). This shows which sub-operations that are allowed in corresponding main operation.

If a certain parameter is belonging to a list value which can be seen as a simplified sub-MO the use case could also show in which sub-operation(s) the parameter can be used:

+ Parameter as a value can be added to a list attribute.

- Parameter as a value can be deleted from a list attribute.

These two sub-operation use case identifiers (+, -) will always appear directly after a Create or Set use case identifier (C, S). This shows which sub-operations that are allowed in corresponding main operation.

For example, use case: "CcScsdR" indicates that in a Create operation the parameter is allowed in a DEF sub-operation, in Set the parameter is allowed in DEF, SET, or DEL sub-operation, in Delete it is not allowed at all and the parameter may be returned in the answer to a Get request.

For example, use case: "C+S-R" indicates that in a Create operation the parameter is allowed to be added to a list attribute, in a Set operation the parameter is allowed to be deleted from a list attribute, and the parameter may be returned in the answer to a Get request.

Table 115 IMSI Changeover Parameters

Parameters	Attribute Values	Use Case
DATE	date:yyymmdd where: yy is a numeral 00 - 99 mm is a numeral 01 - 12 dd is a numeral 01 - 31	CSRF
IMSI	6-15 digits	CRF
MSISDN	5-15 digits	CSDGRF
NIMSI	6-15 digits	CSDGRF
STATE	PEND EXEC FORC	RF

8.3 IMSICH Message Response

Here follows a description of the possible message response codes that can be received in a message response. The tables contain a column Type, indicating the seriousness/category of each response. Available categories are

- Syntax error (S)
- Temporary error (T)
- Faulty data (D)
- Fatal error (F)

and they can be used as a guide line in error management procedures. Suitable actions are indicated in Section 10.2 on page 151.

Table 116 IMSICH

Descriptions	Response Code	Type	Create	Set	Delete	Get
Successful	0		x	x	x	x
NE ANSWERS (1 - 199, 10000 - 12006)						
IMSI already defined	1	D	x			
Subscriber authentication data not found	6	F	x			
IMSI is not defined	13	D	x	x	x	x
MSISDN is not defined	14	D	x	x	x	x



Descriptions	Response Code	Type	Create	Set	Delete	Get
Date not acceptable	42	D	x	x		
No pending Changeover	46	D/S		x	x	
IMSI type incorrect	52	D/S	x	x	x	
MSISDN type incorrect	53	D/S	x	x	x	
Changeover already initiated	63	D/S	x			
Changeover not initiated	64	D/S		x	x	x
Changeover already executed	65	D/S		x	x	
Storage shortage in Changeover data file	70	F	x			
Subscriber disconnection in process	73	S/D	x	x	x	
Centralized user database not reachable	10534	D	x	x	x	
Resource limitation	10535	D	x	x	x	
Old IMSI exists	10541	D	x			
Database locked for backup	10546	D	x		x	
Changeover not allowed	10804	D	x			
Database locked for backup	12006	D	x		x	
NE FATAL ERRORS (1001-1100)						
Ext. system communication link failure	1001	T/F	x	x	x	x
External system error	1002	F	x	x	x	x
Inconsistency in NE data	1003	F	x	x	x	x
EDA FATAL ERRORS (2001-2100)						
Internal Multi Activation error	2002	F	x	x	x	x
NE does not exist	2003	F	x	x	x	x
CAI ERRORS (3001-3100)						
Invalid command	3001	S	x	x	x	x
Operation not supported	3002	S	x	x	x	x
Unknown NE object	3003	F	x	x	x	x
Insufficient parameters	3004	S	x	x	x	x
Invalid argument or out of range	3005	S	x	x	x	x
Rejection, must login first	3007	S	x	x	x	x
Invalid command sequence	3008	S	x	x	x	x
Licensed subscriber number overruns	3009	F	x			
Invalid license	3010	F	x	x	x	x
License expired	3011	F	x	x	x	x
Not authorized	3012	F	x	x	x	x

9 AUC Subscription

9.1 Composite Parameter Definitions

This section explains the details of different parameters that can be used in CSOs. Because of editorial reasons this is a section of its own to simplify the readability of Section 9.2 on page 139.

9.1.1 Decrypting Algorithm

The decrypting algorithm is used when decrypting the subscribers authentication key (Ki).

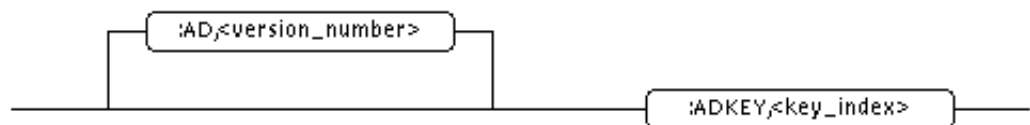


Figure 97 Decrypting Algorithm

Table 117 Decrypting Algorithm

Parameter	Type	Occurrence	Description
AD		Optional	The version number of the Ad algorithm used to decrypt Ki
ADKEY		Mandatory	The index of the key to be used in association with the DEA 1 version of the algorithm Ad

Note: **AD** is mandatory for SEMA AUC and not valid for AUC-10. However, BSS can still send this parameter to Dynamic Activation where action is taken automatically to ignore it if the affected NE is an AUC-10.

9.1.1.1 Set Decrypting Algorithm

The setting of the decrypting algorithm is done when creating an AUC subscriber (operation CREATE on the MO object AUCSUB), for example,

```
CREATE:AUCSUB:....: ADKEY, 1:....
```

This indicates the AUC point to key number 1.

9.1.2 Authentication Algorithms

The authentication algorithm is used to generate the ciphering key (Kc) and the authentication response (SRES), which are used during call setup and call decrypting.

A ciphering algorithm argument is defined as follows:

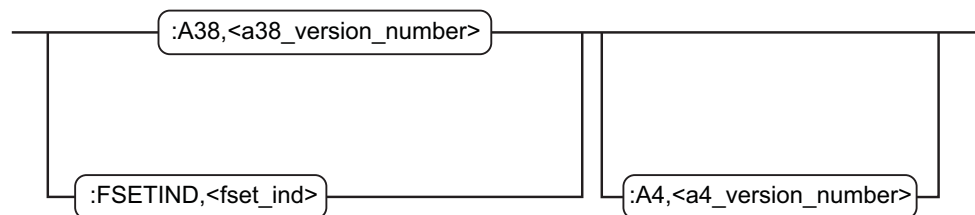


Figure 98 Authentication Algorithm

Table 118 Authentication Algorithm

Parameter	Type	Occurrence	Description
A4		Optional	The version number of the A38 algorithm
A38		Mandatory	The version number of the A38 algorithm
FSETIND		Optional	Function SET Indicator (only for WCDMA)

9.1.2.1 Set Authentication Algorithm

The setting of the authentication algorithm is done when creating a AUC subscription (operation CREATE on the NE object AUCSUB), for example, `CREATE:AUCSUB:...:A38,3:...`

This indicates the AUC uses A38 algorithm version 3 to generate SRES.

9.2 Customer Service Orders

Note: The parameter sequence in CAI command is independent of the parameter sequence in MML command.

9.2.1 Create AUCSUB

9.2.1.1 Request Syntax

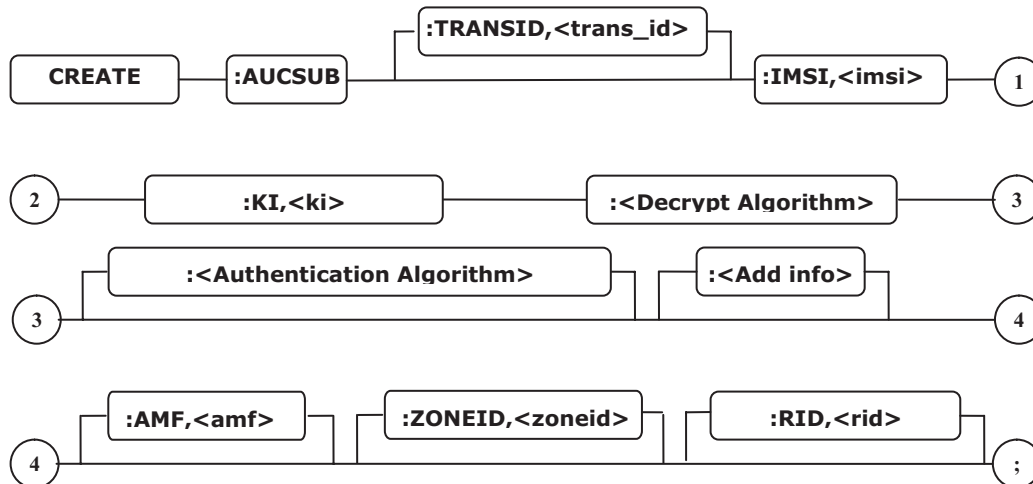


Figure 99 Create AUCSUB Command

Table 119 Create AUCSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Mandatory	International Mobile Subscriber Identity
Decrypt Algorithm		Mandatory	The Decrypting Algorithm that should be used to decrypt Ki, see Section 9.1.1 on page 138.
Authentication Algorithm		Optional	The ciphering algorithm that should be used to generate the ciphering key (Kc) and the signed response (SRES), see Section 9.1.2 on page 138.
KI		Mandatory	Encrypted Subscriber Authentication key
AMF	Values are 0-65535	Optional	Authentication Management Field
ZONEID	Integer 0-65535	Optional	This attribute indicates to what geographical area the MultiSC or the association belongs
RID ⁽¹⁾	Integer 0-31	Optional	Region Identifier

(1) rid is only valid for AUC UDC 11B and 12A.

9.2.1.2 Response Syntax

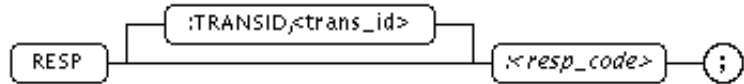


Figure 100 Create AUCSUB Response

Table 120 Create AUCSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 9.4 on page 148 for response codes.

9.2.1.3 Examples

Message request to define an AUC subscription with the following properties:

IMSI 123456789012345

Ki 12345678901234567890123456789012

Ad key 1

A38 version 2

CREATE:AUCSUB:IMSI,123456789012345:KI,12345678901234567890123456789012:ADKEY,1:A38,2;

Successful message response: **RESP: 0;**

Unsuccessful message response, the subscriber exists:

RESP:301;

9.2.2 Set AUCSUB

9.2.2.1 Request Syntax

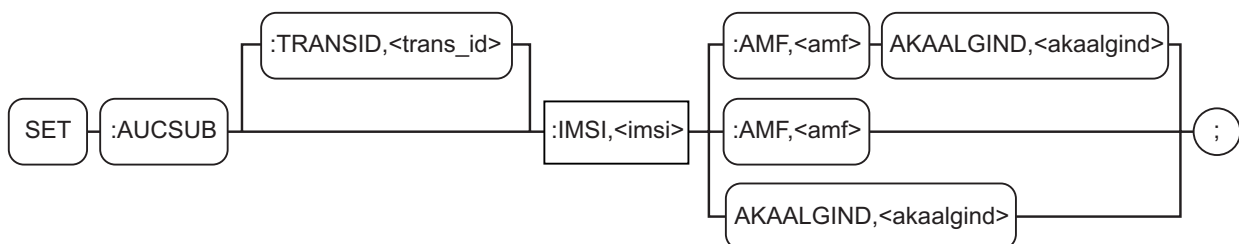


Figure 101 Set AUCSUB Command

Table 121 *Set AUCSUB*

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Mandatory	International Mobile Subscriber Identity
AMF	Values are 0-65535	Optional	Authentication Management Field
AKAALGIND,		Optional	Authentication and Key Agreement (AKA) algorithm indicator

9.2.2.2

Response Syntax

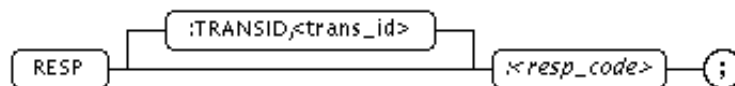


Figure 102 *Set AUCSUB Response*

Table 122 *Set AUCSUB Response*

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 9.4 on page 148 for response codes.

9.2.2.3

Examples

Message request to set the Authentication Management Field of an AUC for the subscriber with IMSI 123456789012345:

```
SET:AUCSUB: IMSI, 123456789012345:AMF,34741;
```

Successful message response:

```
RESP: 0;
```

Unsuccessful message response, if no WCDMA subscriber is defined:

```
RESP: 336;
```

9.2.3

Get AUCSUB

Note: Handle the Get request so that BSS is not affected by new AUC releases. This can be done by sending only used services in the Get request. If a full response syntax is used, the results are different depending on which release of the AUC the request have been sent to.

9.2.3.1 Request Syntax

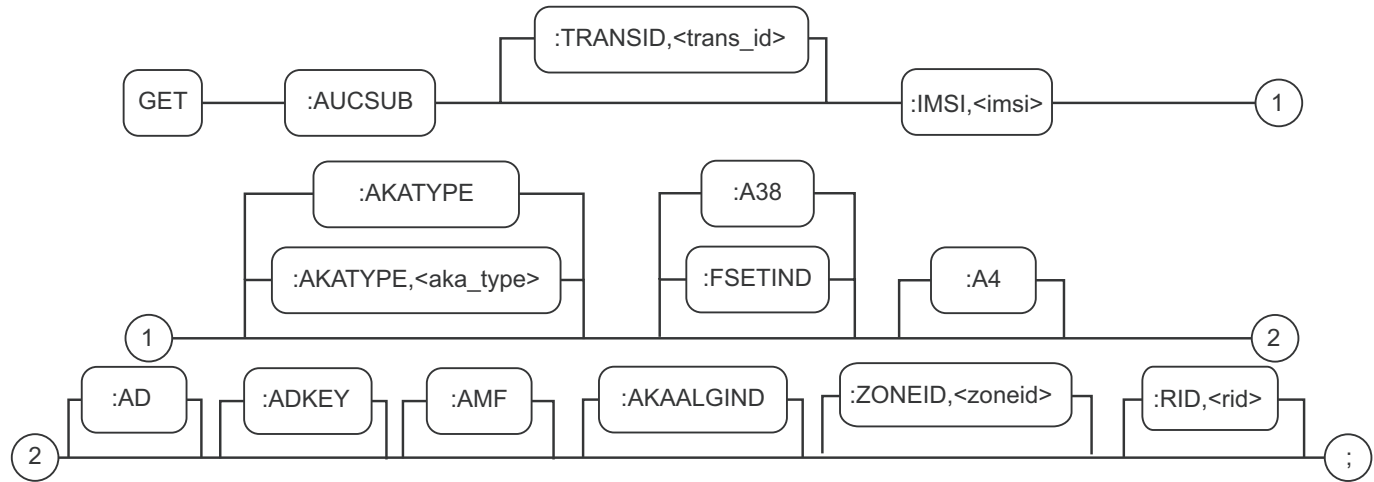


Figure 103 Get AUCSUB Command

Table 123 Get AUCSUB

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Mandatory	International Mobile Subscriber Identity
AKATYPE		Optional	Authentication and Key Agreement (AKA) type
AMF	Values are 0-65535.	Optional	Authentication Management Field
AKAALGIND,		Optional	Authentication and Key Agreement (AKA) algorithm indicator
ZONEID	Integer 0-65535	Optional	This attribute indicates to what geographical area the MultiSC or the association belongs
RID ⁽¹⁾	Integer 0-31	Optional	Region Identifier

(1) rid is only valid for AUC UDC 11B and 12A.

Note: AD is not applicable for AUC-10.

9.2.3.2 Response Syntax

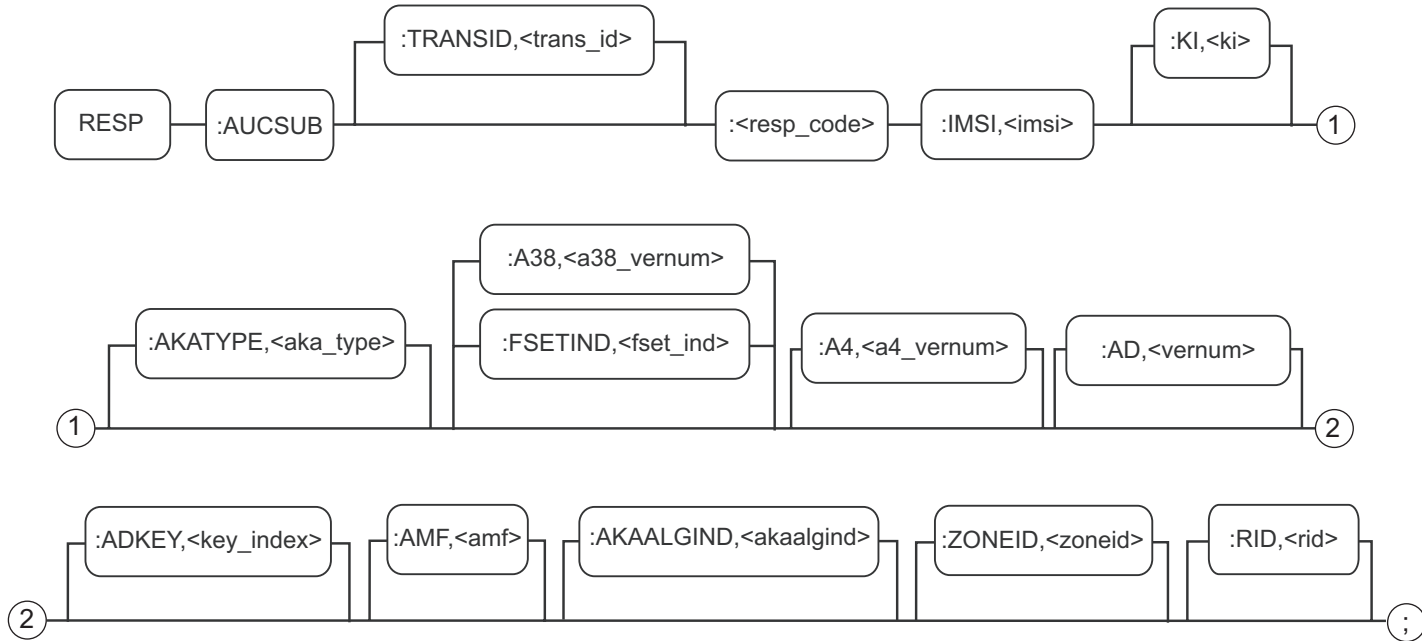


Figure 104 Get AUCSUB Response

Table 124 Get AUCSUB Response

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 9.4 on page 148 for response codes.
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Mandatory	International Mobile Subscriber Identity
AKATYPE		Optional	Authentication and Key Agreement (AKA) type
A4		Optional	A4 algorithm version number
A38		Optional	A38 algorithm version number
AD		Optional	Ad algorithm version
ADKEY		Optional	The index of the key to be used in association with the DEA 1 version of the algorithm Ad
KI		Optional	Encrypted Subscriber Authentication key
FSETIND		Optional	Function Set Indicator (only for WCDMA)
AMF	Values are 0-65535	Optional	Authentication Management Field



Parameter	Type	Occurrence	Description
AKAALGIND,		Optional	Authentication and Key Agreement (AKA) algorithm indicator
ZONEID	Integer 0-65535	Optional	This attribute indicates to what geographical area the MultiSC or the association belongs
RID	Integer 0-31	Optional	Region Identifier

Note: AD is not applicable for AUC-10.

`rid` is only valid for AUC UDC 11B and 12A.

9.2.3.3

Examples

Message request to get an AUC subscription with the following properties:

IMSI 123456789012345

GET:AUCSUB:IMSI,123456789012345;

Successful message response:

RESP: 0:IMSI,123456789012345:A38,1:ADKEY,1;

IMSI 123456789012345

A38 2

Ad key 1

Unsuccessful message response, the subscriber does not exists:

RESP:302;

9.2.4

Delete AUCSUB

9.2.4.1

Request Syntax

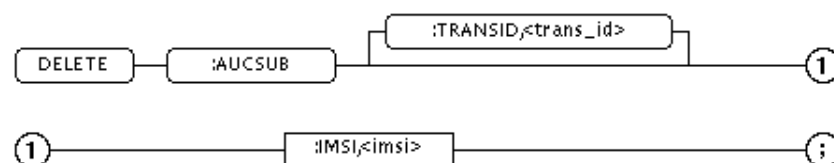


Figure 105 Delete AUCSUB Command

Table 125 *Delete AUCSUB*

Parameter	Type	Occurrence	Description
TRANSID	String, 1-32 characters in the intervals A-Z, a-z and 0-9.	Optional	Transaction identifier of the provisioning operation
IMSI	Digit string 6-15 digits. Each digit is 0-9.	Mandatory	International Mobile Subscriber Identity

9.2.4.2

Response Syntax

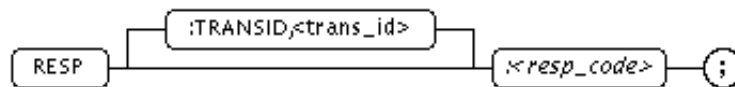


Figure 106 *Delete AUCSUB Response*

Table 126 *Delete AUCSUB Response*

Parameter	Type	Occurrence	Description
TRANSID	Same value as in the message request.	Optional	Transaction identifier of the provisioning operation
RESP		Mandatory	Message Response, see Section 9.4 on page 148 for response codes.

9.2.4.3

Examples

Message request to delete an AUC subscription with the IMSI
123456789012345:

DELETE:AUCSUB:IMSI, 123456789012345;

Successful message response:

RESP: 0;

Unsuccessful message response, the subscriber does not exist:

RESP:302;

9.3

Request and Response Parameters

Use Case specifies in which cases the parameter can be applied:

C - (Create) Parameter can take a value when a subscription/equipment is created.

S - (Set) Parameter can take a value when a subscription/equipment is modified.

D - (Delete) Parameter can take a value when a subscription/equipment is deleted.



G - (Get) Parameter can take a value in the Get request for retrieving a subscription/equipment.

F - (Filter) Parameter can be used as filter in a Get request to indicate that we want to retrieve the current value of this parameter.

R - (Returned) Parameter may be returned with a value in the answer to a Get request (depends on request issued and filter specified).

If a certain parameter is belonging to a Sub-MO, the use case could also show in which sub-operation(s) the parameter can be used:

c - (Define (create)) Parameter can be used in a DEF sub-operation.

s - (Set) Parameter can be used in a SET sub-operation.

d - (Delete) Parameter can be used in a DEL sub-operation.

These three sub-operation use case identifiers (c, s, d) will always appear directly after a Create or Set use case identifier (C, S). This shows which sub-operations that are allowed in corresponding main operation.

If a certain parameter is belonging to a list value which can be seen as a simplified sub-MO the use case could also show in which sub-operation(s) the parameter can be used:

+ Parameter as a value can be added to a list attribute.

- Parameter as a value can be deleted from a list attribute.

These two sub-operation use case identifiers (+, -) will always appear directly after a Create or Set use case identifier (C, S). This shows which sub-operations that are allowed in corresponding main operation.

For example, use case: "CcScsdR" indicates that in a Create operation the parameter is allowed in a DEF sub-operation, in Set the parameter is allowed in DEF, SET, or DEL sub-operation, in Delete it is not allowed at all and the parameter may be returned in the answer to a Get request.

For example, use case: "C+S-R" indicates that in a Create operation the parameter is allowed to be added to a list attribute, in a Set operation the parameter is allowed to be deleted from a list attribute, and the parameter may be returned in the answer to a Get request.

Table 127 AUC Subscription Parameters

Parameters	Attribute Values	Use Case
IMSI	6–15 digits	CDGRFS
KI	32 hexadecimal digits	CRF
A4	0–7 (only for Ericsson AUC)	CRF

Parameters	Attribute Values	Use Case
AKATYPE	Integer 0–1. Default value is: a. 0 if only GSM AKA type is supported by the exchange. b. 1 if only WCDMA AKA type supported by the exchange. c. Default value is determined by an AXE parameter if both GSM and WCDMA AKA types are supported by the exchange.	GFR
	0 = GSM	
	1 = WCDMA	
AMF	0-65535)	CSRF
A38	0–15	CRF
FSETIND	0–31	CRF
AKAALGIND	1–2, “DEFAULT”, “N/A”	SRF
RID	0–31	CSRF

9.4 AUCSUB Message Response

Here follows a description of the possible message response codes that can be received in a message response. The tables contain a column Type, indicating the seriousness/category of each response. Available categories are

- Syntax error (S)
- Temporary error (T)
- Faulty data (D)
- Fatal error (F)

and they can be used as a guide line in error management procedures. Suitable actions are indicated in Section 10.2 on page 151.

Table 128 AUCSUB

Descriptions	Response Code	Type	Create	Set	Delete	Get
Successful	0		x	x	x	x
NE ANSWERS (301 - 356, 12001 - 12014)						
Data already exist for key	301	D	x			
Subscriber does not exist	302	D				x
Unknown algorithm version number	303	S/D	x			
Command Restricted During Dump	307	F	x	x	x	x
Key data operation in progress	312	S/D	x		x	
Subscription operation in progress	313	D	x	x		
A4IND not supported	315	D	x			
Key data change in progress	316	T			x	



Descriptions	Response Code	Type	Create	Set	Delete	Get
Key data change pending	317	T			x	
Customer key operation in progress	320	T			x	
The subscriber defined is not WCDMA	321	D				x
Centralized user database not reachable	323	D	x	x		
Functionality not supported by this exchange	324	D	x	x		
Parameter not supported by this exchange	325	D	x			
Parameter value not supported by this exchange	326	D	x			
FSETIND only supported for AUC WCDMA	327	T/F				x
OP change in process	330	T	x			
AKA Algorithm change in progress	332	D	x	x		
AKA Algorithm changes pending	333	D	x	x		
No WCDMA subscribers defined	336	D	x	x		
No WCDMA subscribers defined for specified FSET	337	D	x	x		
Subscription data change in progress	339	T		x		
Subscription data change pending	340	D	x	x		
No subscription data change pending	341	D	x	x		
BOP change in progress	345	T	x	x		
Database locked for backup	346	D	x		x	
The WCDMA subscriber defined has not the specified FSET	356	D		x		
Operation failed, rollback has been performed successfully	12013	T	x			
Operation failed, rollback was unsuccessful	12014	T	x			
NE FATAL ERRORS (1001-1100)						
Ext. system communication link failure	1001	T/F	x	x	x	x
External system error	1002	F	x	x	x	x
Inconsistency in NE data	1003	F	x	x	x	x
EDA FATAL ERRORS (2001-2100)						
Internal Multi Activation error	2002	F	x	x	x	x
NE does not exist	2003	F	x	x	x	x
CAI ERRORS (3001-3100)						
Invalid command	3001	S	x	x	x	x
Operation not supported	3002	S	x	x	x	x
Unknown NE object	3003	F	x	x	x	x
Insufficient parameters	3004	S	x	x	x	x
Invalid argument or out of range	3005	S	x	x	x	x



Descriptions	Response Code	Type	Create	Set	Delete	Get
Rejection, must login first	3007	S	x	x	x	x
Invalid command sequence	3008	S	x	x	x	x
Licensed subscriber number overruns	3009	F	x			
Invalid license	3010	F	x	x	x	x
License expired	3011	F	x	x	x	x
Not authorized	3012	F	x	x	x	x

10 Appendix

10.1 Graphical Structure

To simplify the algorithms for the user in Customer Service Orders, the structure is displayed graphically. In this appendix, the structure is explained in detail with the help of the following examples.

10.1.1 Example 1

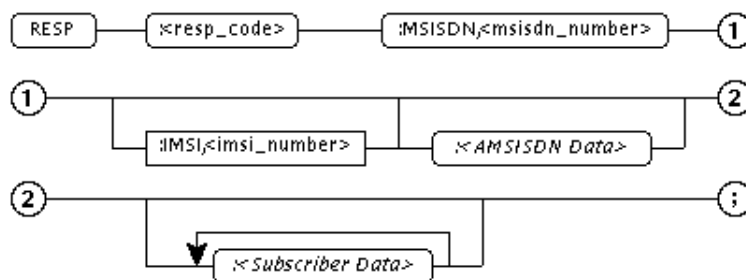


Figure 107 An Example of the Algorithm Structure Use

The first row in this figure is translated as follows:

RESP:<resp_code>:MSISDN, <msisdn_number>

In the second row it is possible to do either:

- Nothing
- IMSI AND AMSISDN
- IMSI OR AMSISDN



In the last row it is possible to do either:

- a Nothing
- b Subscriber data (1 to x times)

10.1.2

Example 2

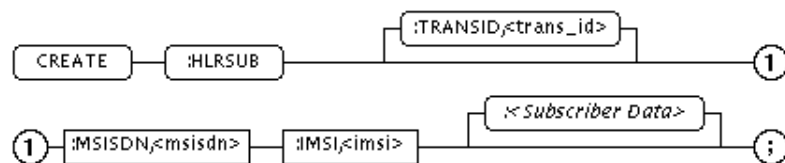


Figure 108 An Example Showing the Use for Special Parameter

In the second row of this figure, both parameters MSISDN and IMSI are surrounded by square boxes, that are Dynamic Activation routes this command to corresponding NE based on these two key identifiers of the HLR subscription.

In the second row of this figure, the optional parameter Subscriber Data is italicized, that is this parameter refers to more detailed description from another place in this document. The referred section has been listed as follows.

10.2

Error Recovery

The CAI message responses are closely corresponding with each specific NE type (compare HLRSUBs message responses with those found in HLR).

The CAI message responses have been categorized into different types of errors and each type has there own preferred action or error management procedure.

Note: A specific error may be caused by several reasons and therefore belong to several categories.

Table 129 Error Categories and Preferred Actions

Type of Error	Preferred Action/Description
Syntax error	Occurs because of inconsistent use of CAI. Caused by syntax error or semantic error in BSS. Write fault report on BSS.
Temporary error	Caused by simultaneous actions (from the network or from BSS) performed on the subscribers data or temporary faults in the network. Repeat the provisioning operation, either immediately or after some time.
Data fault	Faulty data has been submitted from BSS. Change the particular data and try again.
Fatal error	Manual intervention needed. Use the error log to find the cause of the problem.

Also remember that the processing log provides valuable information when seeking the root of a problem.

In the processing log, the complete provisioning operation is logged. Each provisioning operation entry contains an incoming CSO from BSS, all NSOs sent to the NE plus each NSOs response. With the help of the responses, it is possible to find suitable procedures by the help of the NE specific user documentation.

For instance, consider the following print-out from the processing log:

```
CAS: SET:HLRSUB:MSISDN,46455395388:OBI,1:CFNRY,1,1,4645559075:CAT,11;
RESP:27;

HLR1: HGSDC:MSISDN=46455395388,SUD=CAT-11;
EXECUTED;

HLR1: HGSDC:MSISDN=46455395388,SUD=CFNRY-1;
EXECUTED;

HLR1: HGSSI:MSISDN=46455395388,SS=CFNRY,FNUM=4645559075;
FAULT CODE 27
OPERATION NOT ALLOWED DUE TO INTERACTION
```

Figure 109 Print-out from Processing Log

This scenario happens if the subscriber for instance has the CFU already activated. According to the log, after this provisioning operation the CAT has the new value of 11, but OBI has not been changed.

Preferred action here would be (according to the table in Section 6.4 on page 105) to write a fault report on BSS since BSS allows the user to use the CFNRY without turning off the CFU. It can also be corrected by first removing the CFU before setting the CFNRY.

To ensure data consistency, remove the CFNRY from the SET operation and issue it again or issue a GET requesting the status of OBI and CAT to retrieve correct status.



Reference List

Ericsson Documents

- [1] *Library Overview*, 18/1553-CSH 109 628 Uen
- [2] *Function Specification Resource Activation*, 3/155 17-CSH 109 628 Uen
- [3] *Function Specification Identity Changeover for Layered Applications*, 14/155 17-CSH 109 628 Uen
- [4] *Layered Identity Changeover Provisioning over CAI3G*, 27/155 19-CSH 109 628 Uen

Protocol Specifications

- [5] *TELNET Protocol Specification*, RFC 854 ISI May 1983 J.Postel and J. Reynolds