

Intel[®] NetStructure[™] SS7 Protocols MAP Programmer's Manual

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1. INTRODUCTION

The MAP module is a portable software implementation of the GSM Mobile Application Part (MAP). It implements the “MAP Provider” parts of MAP as specified in GSM 09.02.

The module uses the services provided by the underlying Transaction Capabilities (TCAP) service for the transfer of operations between peer MAP entities. It provides services to “MAP User” applications whilst remaining independent of both the TCAP layer and the MAP User application.

This Programmer's Manual is intended for users developing their own applications that interface to and make use of the functionality provided by the MAP module.

The MAP module is an event driven task that uses standard structured message types for communication with other layers of the protocol stack. These messages are used to convey the protocol primitives between MAP and the MAP User application and MAP and TCAP. Each message contains the primitive parameters as defined in the ETSI & ITU-T recommendations thereby ensuring that the module can easily be interfaced to other vendor implementations of adjacent layers. Typically the module is used in conjunction with the TCAP module.

The MAP software is written entirely using the ‘C’ programming language. It is fully portable and makes no operating system or compiler specific references.

This manual provides an overview of the internal operation of the MAP module and defines the structure of all messages used to interface to the MAP module.

2. ABBREVIATIONS

ANSI	American National Standards Institute.
APDU	Application Protocol Data Unit.
CCITT	The International Telegraph & Telephone Consultative Committee.
GPRS	General Packet Radio Service.
ITU-T	International Telecommunication Union (formerly CCITT).
MAP	Mobile Application Part.
MTP	Message Transfer Part.
SCCP	Signalling Connection Control Part.
SMS	Short message service
TCAP	Transaction Capabilities Application Part.
USSD	Unstructured Supplementary Service Data.

3. RELATED DOCUMENTATION

- [1] ETSI ETS 300 599 - Mobile Application Part (MAP) Specification (GSM 09.02)
- [2] ETSI ETS 300 974 - Mobile Application Part (MAP) Specification (GSM 09.02)
- [3] ETSI TS 100 974 - Mobile Application Part (MAP) Specification (GSM 09.02)
- [4] ITU-T recommendations Q.771 – Q.775 (TCAP)
- [5] ITU-T recommendations Q.711 - Q.714 (SCCP)
- [6] U06SSS, TCAP Programmer's Manual.
- [7] U10SSS, Software Environment Programmer's Manual.
- [8] U01SIU, Signalling Interface Unit DSC 131/231 User Manual
- [9] U08SSP, SS7 Programmer's Manual for PCCS6
- [10] U03HSP, SS7 Programmer's Manual for SPC12S, SPC14 & CPM8

4. FEATURE OVERVIEW

Key features of the MAP module include:

- Full implementation of MAP-Provider block Common Services for dialogue control. - GSM 09.02 (ETS 300 599 and ETS 300 974).
- Implementation of a number of MAP services, including Short Message Service (SMS) and Unstructured Supplementary Service Data (USSD).
- Phase 1, Phase 2 and Phase 3 versions of supported services.
- Full error handling for supported services.
- Class 1, 2, 3, and 4 operations.
- Dialogue support for application context, user information and components.
- Message oriented interface.

5. GENERAL DESCRIPTION

5.1 Module Overview

The MAP module is an implementation of the MAP-Provider Block specified in GSM 09.02. The MAP module provides a full implementation of the MAP-Provider Block Common Services which permit control of dialogues with peer MAP entities. The MAP module also provides a full implementation of a number of the MAP-Provider Block services, including those required for SMS and USSD. See Appendix C for a full list of MAP service supported.

The functions of the MAP-User Block specified GSM 09.02 form part of the user's application and are not implemented here.

MAP-Provider Block Common Services: The MAP module implements all the Common Services of the MAP protocol. These services permit handling of dialogues between MAP User entities. Whenever a MAP User wishes to request a service of a remote peer the MAP User must first establish a dialogue with the peer. All subsequent service requests and responses (MAP Protocol Data Units) exchanged with the peer are transferred via this dialogue. The MAP Provider Block Common Services allow the MAP User to open (MAP-OPEN), close (MAP-CLOSE) and abort (MAP-U-ABORT) dialogues with the remote peer. They also permit the MAP module to report problems (MAP-NOTICE) and permit the MAP user to explicitly request the transfer (MAP-DELIMITER) of any MAP Protocol Data Units.

MAP-Provider Block User Specific Services: The MAP User is provided with a primitive interface by which the MAP User may request and receive services from the remote peer.

The module is event driven. It has a single input queue into which events from other modules (TCAP, MAP-User, management etc.) are written. The module processes each event in turn until the input queue is empty in which case it will do nothing until the next event is received. Output from the module is directed depending on the type of event to either the TCAP module, the MAP-User module, the Management module or the Maintenance module.

In addition the module requires a periodic timer tick notification to be issued to it via the input queue. Typically this is required every tenth of a second. This can either be generated by a timer module or using the services of the selected operating system.

5.2 Module Configuration

The module provides maximum flexibility by allowing a number of user configuration options to be set up at run time. This allows the users to customise the operation of the module to suit the requirements of the final application. All configuration parameters are sent to the module's input event queue in the same manner as MAP protocol messages.

The first message sent to the module must be the global configuration message. Any messages received prior to the global configuration message will be discarded. The global configuration message specifies the module id for all modules to which MAP issues messages. It also supplies values for the maximum number of dialogues (incoming and outgoing), base values for the incoming and outgoing ranges of dialogue ids available to MAP-User and TCAP and the maximum number of active invocations that are required. The module checks that the values requested are compatible with the internal dimensions it has been built with.

The MAP module may also be sent a timer configuration message. The time for which the MAP module will wait for a MAP-User response may be supplied as a message parameter. The message may also be sent without parameters in order to use a default value.

A configuration utility is provided which may (or must for some products) be used to configure this module. If using this utility it is not necessary to send the above mentioned messages since this will be done by the utility. Please refer to [8], [9] and [10].

5.3 Dialogue ID assignment

The MAP module may support a number of active dialogues at a time. MAP-User primitives are associated with a particular dialogue using a Dialogue ID.

The Dialogue ID is assigned when the opening primitive is exchanged between the MAP-User and MAP. For a dialogue initiated by the MAP-User (an 'outgoing dialogue'), the value is selected by the MAP-User. For a dialogue initiated by a remote MAP-User peer (an 'incoming dialogue'), the value is selected by the MAP module. Once a dialogue has started, all user primitives that refer to this dialogue must include its Dialogue ID value.

The dialogue ID is a 16-bit value. Separate ranges of values must be used for outgoing and incoming dialogues. The global configuration message sent to the module on initialisation specifies the range of IDs available to MAP for incoming dialogues, as well as the range of IDs available to the MAP User for outgoing dialogues.

The Dialogue ID is of purely local significance between the MAP-User and MAP.

Maximum values for the number of incoming and outgoing dialogues that the MAP module can support is set up at configuration time. These values are then fixed for both TCAP and MAP-User interfaces.

The dialogue ID selected by the MAP-User for an outgoing dialogue must lie within the configured range of outgoing dialogue IDs. Dialogue IDs for incoming dialogues are allocated automatically by the MAP module (from the configured range of incoming dialogue IDs) so that the dialogue ID that has been unused for the longest period is used next. It is important that MAP and the MAP User use separate ranges of IDs so that it is not possible for the MAP-User to select an ID for an outgoing dialogue at the same instant that MAP selects the same ID for use with an incoming dialogue.

Dialogue ID values also exist on the MAP–TCAP interface but the MAP-User is not generally concerned with these. However both MAP and TCAP must be configured to use separate ranges of values for incoming and outgoing dialogue IDs on this interface. The Dialogue IDs used on this interface are of purely local significance to MAP and TCAP.

5.4 Application Context

When the MAP-User requests the establishment of a dialogue with a peer, the MAP-User must provide the application context for that dialogue. The application context identifies the mobile network entities (HLR, GMSC etc.) at which the MAP peers reside and the services that may be requested.

The use of application context is mandatory under the MAP GSM 09.02 Phase 2 specifications.

The use of application context is not specified under the MAP GSM 09.02 Phase 1 specifications but is required by the MAP module to identify those dialogues for which the MAP User requires MAP Phase 1 compatible messaging. The MAP User should supply the version 1 contexts specified in MAP GSM 09.02 Phase 2 to obtain MAP Phase 1 compatible messaging.

5.5 Invoke ID

When the MAP-User has established a dialogue with a peer, it may request a service from the remote peer by sending a specific service request primitive to the MAP module.

Requests for service from the remote peer are sent to the MAP-User in a specific service indication primitive. This may require the MAP-User to respond with a specific service response primitive, which the peer MAP-User will receive as a specific service confirmation primitive.

Each request for service is termed an invocation of the service. Each primitive associated with a particular invocation of a service must carry the invoke ID of that invocation. The invoke ID is supplied by the MAP-User and must be unique for each outgoing service invocation on the dialogue. Each incoming service invocation will also have a unique invoke ID – in this case the ID is supplied by the remote peer.

5.6 Operation timeout

The timer value to be used when waiting for a response to an operation may be specified by including a parameter in the service request primitive. If the parameter is not included, a default value is used.

5.7 Constant definitions.

To assist the user when writing an application, a 'C' language header file (*map_inc.h*) is available containing all the definitions and constants necessary to interface with the MAP module. This file contains definitions for all the mnemonics listed in this Programmer's Manual.

5.8 Module Dimensions.

Internally there are a number of data structures used by the module.

The maximum dimensions of these structures are determined by compile time constants. The two constants of importance to the user are:

- a) The maximum number of simultaneous dialogues supported by the module.
- b) The maximum number of simultaneous invocations supported by the module.

6. INTERFACE TO SYSTEM SERVICES

6.1 System Functions

In addition to the primitive interface and the management interface to the TCAP module (which are described in later sections) the module requires a few basic system services to be supplied by the underlying operating system.

The following functions are required for inter-task communication:

GCT_send	Sends a message to another task.
GCT_receive	Accept next message from input event queue, blocking the task if no message is ready.
GCT_grab	As receive but not blocking if no message is ready.

The following functions are required for allocation of inter-task messages

getm()	Allocate a message from the system.
relm()	Release block of memory to partition.

These functions are described in the Software Environment Programmers Manual.

6.2 Timer Operation

The MAP module requires a periodic tick timer message "TIM_EXP" to drive its internal timer mechanism.

This message should be sent to the MAP module's input queue at periods that may be selected at compile time. Normally a default period of 100ms is used.

The format of this message is given in Appendix A.

7. INTERFACE TO TCAP

The MAP module is usually used in conjunction with the TCAP module. However, the use of primitives in accordance with Q.771 ensures that it can also be integrated with other Transaction Capabilities implementations if required.

The MAP module communicates with the TCAP using the following primitives, all of which are defined in CCITT Recommendation Q.771:

7.1 Dialogue handling

UNI-REQ	UNI-IND
BEGIN-REQ	BEGIN-IND
CONTINUE-REQ	CONTINUE-IND
END-REQ	END-IND
U-ABORT-REQ	U-ABORT-IND
	P-ABORT-IND
	NOTICE-IND

The message format used to convey these primitives is defined in the TCAP Programmer's Manual. The following messages are used:

TCP_MSG_DLG_REQ	Messages issued by MAP
TCP_MSG_DLG_IND	Messages issued to MAP

7.2 Component handling

	NULL-IND
INVOKE-REQ	INVOKE-IND
RESULT-L-REQ	RESULT-L-IND
RESULT-NL-REQ	RESULT-NL-IND
U-ERROR-REQ	U-ERROR-IND
U-CANCEL-REQ	L-CANCEL-IND
U-REJECT-REQ	L-REJECT-IND
	R-REJECT-IND
	U-REJECT-IND

The message format used to convey these primitives is defined in the TCAP Programmer's Manual. The following messages are used:

TCP_MSG_CPT_REQ	Messages issued by MAP
TCP_MSG_CPT_IND	Messages issued to MAP

8. INTERFACE TO MAP-USER

8.1 Introduction

All primitives at the MAP-User MAP-Provider interface are passed by sending messages between the MAP-User and MAP modules.

Request and Response primitives are sent by the MAP-User. These request MAP to control dialogues and issue MAP service requests.

Indication and Confirmation primitives are sent by MAP to indicate received MAP dialogue events and MAP service events to the MAP-User.

The following messages are used:

- MAP-DIALOGUE-REQ Transfers dialogue request primitives and dialogue response primitives from MAP-User to MAP.
- MAP-DIALOGUE-IND Transfers dialogue indication primitives and dialogue confirmation primitives from MAP to MAP-User.
- MAP-SERVICE-REQ Transfers service request primitives and service response primitives from MAP-User to MAP.
- MAP-SERVICE-IND Transfers service indication primitives and service confirmation primitives from MAP to MAP-User.

The basic structure of each message (irrespective of the MAP primitive contained within it) is the same and is described in the 'Software Environment Programmer's Manual'.

The message must be contained in a single buffer which should be allocated by the sending module (using the **getm** function) and either released (using the **relm** function) or passed to another module by the receiving module. The **getm** and **relm** functions are described in Section 6.

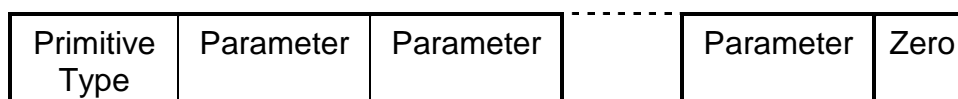
The message header contains a 'type', the value of this parameter indicating the primitive that is being conveyed by the message. The following message types have been defined:

Primitive	Message type	Value
MAP-SERVICE-REQ	MAP_MSG_SRV_REQ	0xc7e0
MAP-SERVICE-IND	MAP_MSG_SRV_IND	0x87e1
MAP-DIALOGUE-REQ	MAP_MSG_DLG_REQ	0xc7e2
MAP-DIALOGUE-IND	MAP_MSG_DLG_IND	0x87e3

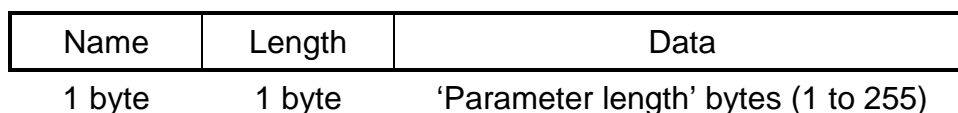
8.2 Primitive parameters

Each MAP-User primitive includes a number of parameters. These parameters are conveyed in the parameter area of the message that conveys the primitive.

The first byte in the parameter area is the primitive type octet and the last byte is a zero byte to indicate that there are no further parameters in the parameter area. Any parameters associated with the message are placed between the message type code and the final (zero) byte. Therefore the parameter area is formatted as follows:



The parameters may be placed in any order. The first byte of a parameter is the parameter name, the second byte is the length of the parameter data to follow (excluding the parameter name and the length byte itself), this is followed by the parameter data. The encoding of the parameter data aligns exactly with the parameter format specified in the appropriate ETSI recommendation whenever possible. Therefore each parameter is formatted as follows:



Within each message there are mandatory parameters which must always be present and optional parameters which may or may not be present.

8.3 Dialogue Primitive Types

Dialogue handling primitives provide the mechanism by which service requests etc. may be exchanged with peer MAP-User entities.

Dialogue primitives sent by the MAP-User to MAP. These convey a dialogue request or response:

Primitive	Mnemonic	Value (dec)	Value (hex)
MAP-OPEN-REQ	MAPDT_OPEN_REQ	1	0x01
MAP-CLOSE-REQ	MAPDT_CLOSE_REQ	3	0x03
MAP-DELIMITER-REQ	MAPDT_DELIMITER_REQ	5	0x05
MAP-U-ABORT-REQ	MAPDT_U_ABORT_REQ	7	0x07
MAP-OPEN-RSP	MAPDT_OPEN_RSP	129	0x81

Dialogue primitives sent by the MAP to MAP-User. These convey a dialogue indication or confirmation:

Primitive	Mnemonic	Value (dec)	Value (hex)
MAP-OPEN-IND	MAPDT_OPEN_IND	2	0x02
MAP-CLOSE-IND	MAPDT_CLOSE_IND	4	0x04
MAP-DELIMITER-IND	MAPDT_DELIMITER_IND	6	0x06
MAP-U-ABORT-IND	MAPDT_U_ABORT_IND	8	0x08
MAP-OPEN-CNF	MAPDT_OPEN_CNF	130	0x82
MAP-P-ABORT-IND	MAPDT_P_ABORT_IND	9	0x09
MAP-NOTICE-IND	MAPDT_NOTICE_IND	10	0x0a

The following sections define the message format and content of the parameter area for each of the messages exchanged between the MAP-User and MAP.

8.4 Service Primitive Types

Once a dialogue is established between two MAP peers, they may request services from each other.

Only services belonging to the application context that was specified at the establishment of the dialogue may be requested.

The following table details service primitives sent by the MAP-User to MAP. These convey a request to perform a service, or a response to a service request from the peer entity.

Primitive	Mnemonic	Value (dec)	Value (hex)
MAP-ALERT-SC-WITHOUT-RESULT-REQ	MAPST_ALERT_SC_WO_RESULT_REQ	17	0x11
MAP-ALERT-SERVICE-CENTRE-REQ	MAPST_ALERT_SC_REQ	9	0x09
MAP-ALERT-SERVICE-CENTRE-RSP	MAPST_ALERT_SC_RSP	137	0x89
MAP-ANYTIME-INTERROGATION-REQ	MAPST_ANYTIME_INT_REQ	29	0x1d
MAP-ANYTIME-INTERROGATION-RSP	MAPST_ANYTIME_INT_RSP	151	0x97
MAP-CANCEL-LOCATION-REQ	MAPST_CANCEL_LOCATION_REQ	41	0x29
MAP-CANCEL-LOCATION-RSP	MAPST_CANCEL_LOCATION_RSP	163	0xa3
MAP-DELETE-SUBSCRIBER-DATA-REQ	MAPST_DEL_SUBS_DATA_REQ	49	0x31
MAP-DELETE-SUBSCRIBER-DATA-RSP	MAPST_DEL_SUBS_DATA_RSP	171	0xab
MAP-FORWARD-SHORT-MESSAGE-REQ (version 2)	MAPST_MO_FWD_SM_REQ	3	0x03
MAP-FORWARD-SHORT-MESSAGE-RSP (version 2)	MAPST_MO_FWD_SM_RSP	131	0x83
MAP-INFORM-SERVICE-CENTRE-REQ	MAPST_INF_SC_REQ	11	0x0b

Primitive	Mnemonic	Value (dec)	Value (hex)
MAP-INSERT-SUBSCRIBER-DATA-REQ	MAPST_INS_SUBS_DATA_REQ	43	0x2b
MAP-INSERT-SUBSCRIBER-DATA-RSP	MAPST_INS_SUBS_DATA_RSP	165	0xa5
MAP-INTERROGATE-SS-REQ	MAPST_INTERROGATE_SS_REQ	73	0x49
MAP-INTERROGATE-SS-RSP	MAPST_INTERROGATE_SS_RSP	195	0xc3
MAP-MO-FORWARD-SHORT- MESSAGE-REQ (version 3 onwards)	MAPST_MO_FWD_SM_REQ	3	0x03
MAP-MO-FORWARD-SHORT- MESSAGE-RSP (version 3 onwards)	MAPST_MO_FWD_SM_RSP	131	0x83
MAP-MT-FORWARD-SHORT- MESSAGE-REQ (version 3 onwards)	MAPST_MT_FWD_SM_REQ	69	0x45
MAP-MT-FORWARD-SHORT- MESSAGE-RSP (version 3 onwards)	MAPST_MT_FWD_SM_RSP	191	0xbf
MAP-NOTEMM-EVENT-REQ	MAPST_NOTE_MM_EVENT_REQ	65	0x41
MAP-NOTEMM-EVENT-RSP	MAPST_NOTE_MM_EVENT_RSP	187	0xbb
MAP-NOTE-SUBSCRIBER- PRESENT-REQ	MAPST_NOTE_SUB_PRESENT_ REQ	19	0x13
MAP-PROCESS-UNSTRUCTURED- SS-REQUEST-REQ	MAPST_PRO_UNSTR_SS_REQ_ REQ	27	0x1b
MAP-PROCESS-UNSTRUCTURED- SS-REQUEST-RSP	MAPST_PRO_UNSTR_SS_REQ_ RSP	149	0x95
MAP-PROVIDE-ROAMING-NUMBER- REQ	MAPST_PROV_ROAM_NUM_REQ	37	0x25
MAP-PROVIDE-ROAMING-NUMBER- RSP	MAPST_PROV_ROAM_NUM_RSP	159	0x99
MAP-PROVIDE-SUBSCRIBER-INFO – RSP	MAPST_PROV_SUB_INFO_RSP	153	0x99
MAP-PROVIDE-SUBSCRIBER-INFO- REQ	MAPST_PROV_SUB_INFO_REQ	31	0x1f
MAP-READY-FOR-SM-REQ	MAPST_RDY_FOR_SM_REQ	7	0x07
MAP-READY-FOR-SM-RSP	MAPST_RDY_FOR_SM_RSP	135	0x87
MAP-REPORT-SM-DELIVERY- STATUS-REQ	MAPST_RPT_SMDST_REQ	5	0x05
MAP-REPORT-SM-DELIVERY- STATUS-RSP	MAPST_RPT_SMDST_RSP	133	0x85
MAP-SEND-AUTHENTICATION-INFO- REQ	MAPST_SEND_AUTH_INFO_REQ	71	0x47
MAP-SEND-AUTHENTICATION-INFO- RSP	MAPST_SEND_AUTH_INFO_RSP	193	0xc1
MAP-SEND-IDENTIFICATION-REQ	MAPST_SEND_IDENT_REQ	47	0x2f
MAP-SEND-IDENTIFICATION-RSP	MAPST_SEND_IDENT_RSP	169	0xa9
MAP-SEND-IMSI-REQ	MAPST_SEND_IMSI_REQ	33	0x21
MAP-SEND-IMSI-RSP	MAPST_SEND_IMSI_RSP	155	0x9b

Primitive	Mnemonic	Value (dec)	Value (hex)
MAP-SEND-ROUTING-INFO-FOR-GPRS-REQ	MAPST_SND_RTIGPRS_REQ	35	0x23
MAP-SEND-ROUTING-INFO-FOR-GPRS-RSP	MAPST_SND_RTIGPRS_REQ	157	0x9d
MAP-SEND-ROUTING-INFO-FOR-SM-REQ	MAPST_SND_RTISM_REQ	1	0x01
MAP-SEND-ROUTING-INFO-FOR-SM-RSP	MAPST_SND_RTISM_RSP	129	0x81
MAP-SEND-ROUTING-INFO-REQ	MAPST_SEND_ROUTING_INFO_REQ	21	0x15
MAP-SEND-ROUTING-INFO-RSP	MAPST_SEND_ROUTING_INFO_RSP	143	0x8f
MAP-UNSTRUCTURED-SS-NOTIFY-REQ	MAPST_UNSTR_SS_NOTIFY_REQ	25	0x19
MAP-UNSTRUCTURED-SS-NOTIFY-RSP	MAPST_UNSTR_SS_NOTIFY_RSP	147	0x93
MAP-UNSTRUCTURED-SS-REQUEST-REQ	MAPST_UNSTR_SS_REQ_REQ	23	0x17
MAP-UNSTRUCTURED-SS-REQUEST-RSP	MAPST_UNSTR_SS_REQ_RSP	145	0x91
MAP-UPDATE-LOCATION-REQ	MAPST_UPDATE_LOCATION_REQ	39	0x27
MAP-UPDATE-LOCATION-RSP	MAPST_UPDATE_LOCATION_RSP	161	0xa1

The following table details service primitives received by the MAP-User from MAP. These convey a service indication, or a confirmation to a service request from the peer entity:

Primitive	Mnemonic	Value (dec)	Value (hex)
MAP-ALERT-SC-WITHOUT-RESULT-IND	MAPST_ALERT_SC_WO_RESULT_IND	18	0x12
MAP-ALERT-SERVICE-CENTRE-CNF	MAPST_ALERT_SC_CNF	138	0x8a
MAP-ALERT-SERVICE-CENTRE-IND	MAPST_ALERT_SC_IND	10	0x0a
MAP-ANYTIME-INTERROGATION-CNF	MAPST_ANYTIME_INT_CNF	152	0x98
MAP-ANYTIME-INTERROGATION-IND	MAPST_ANYTIME_INT_IND	30	0x1e

Primitive	Mnemonic	Value (dec)	Value (hex)
MAP-CANCEL-LOCATION-CNF	MAPST_CANCEL_LOCATION_CNF	164	0xa4
MAP-CANCEL-LOCATION-IND	MAPST_CANCEL_LOCATION_IND	42	0x2a
MAP-DELETE-SUBSCRIBER-DATA-CNF	MAPST_DEL_SUBS_DATA_CNF	172	0xac
MAP-DELETE-SUBSCRIBER-DATA-IND	MAPST_DEL_SUBS_DATA_IND	50	0x32
MAP-FORWARD-SHORT- MESSAGE-CNF (version 2)	MAPST_FWD_SM_CNF	132	0x84
MAP-FORWARD-SHORT- MESSAGE-IND (version 2)	MAPST_FWD_SM_IND	4	0x04
MAP-INFORM-SERVICE-CENTRE- IND	MAPST_INF_SC_IND	12	0x0c
MAP-INSERT-SUBSCRIBER-DATA- CNF	MAPST_INS_SUBS_DATA_CNF	166	0xa6
MAP-INSERT-SUBSCRIBER-DATA- IND	MAPST_INS_SUBS_DATA_IND	44	0x2c
MAP-INTERROGATE-SS-CNF	MAPST_INTERROGATE_SS_CNF	196	0xc4
MAP-INTERROGATE-SS-IND	MAPST_INTERROGATE_SS_IND	74	0x4a
MAP-MO-FORWARD-SHORT- MESSAGE-CNF (version 3 onwards)	MAPST_FWD_SM_CNF	132	0x84
MAP-MO-FORWARD-SHORT- MESSAGE-IND (version 3 onwards)	MAPST_FWD_SM_IND	4	0x04
MAP-MT-FORWARD-SHORT- MESSAGE-CNF (version 3 onwards)	MAPST_MT_FWD_SM_CNF	192	0xc0
MAP-MT-FORWARD-SHORT- MESSAGE-IND (version 3 onwards)	MAPST_MT_FWD_SM_IND	70	0x46
MAP-NOTEMM-EVENT-CNF	MAPST_NOTE_MM_EVENT_CNF	188	0xbc
MAP-NOTEMM-EVENT-IND	MAPST_NOTE_MM_EVENT_IND	66	0x42
MAP-NOTE-SUBSCRIBER- PRESENT-IND	MAPST_NOTE_SUB_PRESENT_I ND	20	0x14
MAP-PROCESS_UNSTRUCTURED- SS-REQUEST-IND	MAPST_PRO_UNSTR_SS_REQ_I ND	28	0x1c
MAP-PROCESS-UNSTRUCTURED- SS-REQUEST-CNF	MAPST_PRO_UNSTR_SS_REQ_ CNF	150	0x96
MAP-PROVIDE-ROAMING- NUMBER-CNF	MAPST_PROV_ROAM_NUM_ CNF	160	0xa0
MAP-PROVIDE-ROAMING- NUMBER-IND	MAPST_PROV_ROAM_NUM_ IND	38	0x26
MAP-PROVIDE-SUBSCRIBER-INFO -CNF	MAPST_PROV_SUB_INFO_CNF	154	0x9a
MAP-PROVIDE-SUBSCRIBER-INFO- IND	MAPST_PROV_SUB_INFO_IND	32	0x20

Primitive	Mnemonic	Value (dec)	Value (hex)
MAP-READY-FOR-SM-CNF	MAPST_RDY_FOR_SM_CNF	136	0x88
MAP-READY-FOR-SM-IND	MAPST_RDY_FOR_SM_IND	8	0x08
MAP-REPORT-SM-DELIVERY-STATUS-CNF	MAPST_RPT_SMDST_CNF	134	0x86
MAP-REPORT-SM-DELIVERY-STATUS-IND	MAPST_RPT_SMDST_IND	6	0x06
MAP-SEND-AUTHENTICATION-INFO-RSP	MAPST_SEND_AUTH_INFO_CNF	194	0xc2
MAP-SEND-AUTHENTICATION-INFO-REQ	MAPST_SEND_AUTH_INFO_IND	72	0x48
MAP-SEND-IDENTIFICATION-CNF	MAPST_SEND_IDENT_CNF	170	0xaa
MAP-SEND-IDENTIFICATION-IND	MAPST_SEND_IDENT_IND	48	0x30
MAP-SEND-IMSI-CNF	MAPST_SEND_IMSI_CNF	156	0x9c
MAP-SEND-IMSI-IND	MAPST_SEND_IMSI_IND	34	0x22
MAP-SEND-ROUTING-INFO-CNF	MAPST_SND_RI_CNF	144	0x90
MAP-SEND-ROUTING-INFO-FOR-GPRS-CNF	MAPST_SND_RTIGPRS_CNF	158	0x9e
MAP-SEND-ROUTING-INFO-FOR-GPRS-IND	MAPST_SND_RTIGPRS_IND	36	0x24
MAP-SEND-ROUTING-INFO-FOR-SM-CNF	MAPST_SND_RTISM_CNF	130	0x82
MAP-SEND-ROUTING-INFO-FOR-SM-IND	MAPST_SND_RTISM_IND	2	0x02
MAP-SEND-ROUTING-INFO-IND	MAPST_SND_RI_IND	22	0x16
MAP-UNSTRUCTURED-SS-NOTIFY-CNF	MAPST_UNSTR_SS_NOTIFY_CNF	148	0x94
MAP-UNSTRUCTURED-SS-NOTIFY-IND	MAPST_UNSTR_SS_NOTIFY_IND	26	0x1a
MAP-UNSTRUCTURED-SS-REQUEST-CNF	MAPST_UNSTR_SS_REQ_CNF	146	0x92
MAP-UNSTRUCTURED-SS-REQUEST-IND	MAPST_UNSTR_SS_REQ_IND	24	0x18
MAP-UPDATE-LOCATION-CNF	MAPST_UPDATE_LOCATION_CNF	162	0xa2
MAP-UPDATE-LOCATION-IND	MAPST_UPDATE_LOCATION_IND	40	0x28

8.5 MAP Dialogue Request

Synopsis:

Message sent from the MAP-User to MAP containing a dialogue request primitive. Used by MAP-User to open and close dialogues with the remote peer MAP-User.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
Type	MAP_MSG_DLG_REQ (0xc7e2)	
Id	dialogue_ID	
Src	Sending module_id	
Dst	MAP_TASK_ID	
rsp_req	0	
Hclass	0	
Status	0	
err_info	0	
Len	Number of bytes of user data	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Dialogue primitive type octet.
1	len - 2	Parameters in Name-Length-Data format.
len - 1	1	Set to zero indicating end of message.

Description:

This message is used by the MAP-User to send dialogue primitives to MAP.

The MAP-User makes use of MAP to establish dialogues with MAP-User peers. The dialogue may then be used to send and receive service requests.

All dialogue primitives contain a dialogue ID which is encoded in the message header. It does not form part of the parameter area. It must be provided by the MAP-User with the MAP-OPEN primitive and used in the message header of all subsequent dialogue and service primitives associated with that dialogue. Dialogues initiated remotely will have a dialogue id assigned by MAP.

Parameter area contents:

The dialogue primitive type octet is coded as defined in Section 8.3, Dialogue Primitive Types.

The following table lists the parameters associated with each dialogue request primitive and shows whether the parameter is Mandatory (M), in which case the message will be discarded if the parameter is omitted, or Optional (O), in which case the parameter is not essential.

Parameter	MAP Primitive				
	O P E N - R E Q	C L O S E - R E Q	D E L I M I T E R - R E Q	U - A B O R T - R E Q	O P E N - R S P
Destination address	M			O	O
Destination reference	O				
Originating address	O			O	O
Originating reference	O				
Result					M
Refuse reason					O*
Release method		M			
User reason				M	
Provider reason					
Diagnostic information				O	
Application context name	M				O
Source					
Problem diagnostic					

* May only be used with MAP V2 and V3 dialogues.

8.6 MAP Dialogue Indication

Synopsis:

Protocol message sent from MAP to the MAP-User containing a MAP dialogue primitive.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	MAP_MSG_DLG_IND (0x87e3)	
id	Dialogue_ID	
src	MAP_TASK_ID	
dst	Sending module_id	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	Number of bytes of user data	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Dialogue primitive type octet.
1	len - 2	Parameters in Name-Length-Data format.
len - 1	1	Set to zero indicating end of message.

Description:

The MAP sends dialogue indication and confirmation primitives to the MAP-User. The primitives that may be sent are detailed in section 8.3 Dialogue Primitive Types.

Indication primitives are sent to indicate incoming dialogue control and problem reports. The MAP-Provider indicates incoming dialogue open, close, abort, notice (problem report) and delimiter (end of a group of service indications) primitives.

The MAP-User must confirm the open dialogue primitive with the remote peer before accepting service requests from it.

All dialogue primitives must contain the dialogue ID of the dialogue to which they refer. This is encoded in the message header. It does not form part of the parameter area.

Parameter area contents:

The dialogue primitive type octet is coded as defined in Section 8.3 Dialogue Primitive Types.

The coding of the dialogue primitive parameters is given in section 8.7.

The following table lists the parameters associated with each dialogue indication primitive and shows whether the parameter is Mandatory (M), in which case the message will be discarded if the parameter is omitted, or Optional (O), in which case the parameter is not essential.

Parameter	MAP Primitive						
	O P E N - I N D	C L O S E - I N D	D E L I M I T E R - I N D	U - A B O R T - I N D	P - A B O R T - I N D	O P E N - C N F	N O T I C E - I N D
Destination address	M			O		O	
Destination reference	O						
Originating address	O			O		O	
Originating reference	O						
Result						M	
Refuse reason						O*	
Release method							
User reason				M			
Provider reason					M	O	
Diagnostic information				O			
Application context name	M					O	
Source					M		
Problem diagnostic							M

* May only be used with MAP V2 and V3 dialogues.

8.7 MAP Dialogue Primitive Parameters

The following parameter names are defined for use in dialogue primitive messages:

Parameter	Mnemonic	Value (dec)	Value (hex)
Destination address	MAPPN_dest_address	1	0x01
Destination reference	MAPPN_dest_ref	2	0x02
Originating address	MAPPN_orig_address	3	0x03
Originating reference	MAPPN_orig_ref	4	0x04
Result	MAPPN_result	5	0x05
Refuse reason	MAPPN_refuse_rsn	6	0x06
Release method	MAPPN_release_method	7	0x07
User reason	MAPPN_user_rsn	8	0x08
Provider reason	MAPPN_prov_rsn	9	0x09
Diagnostic information	MAPPN_diag_inf	10	0x0a
Application context name	MAPPN_applic_context	11	0x0b
Source	MAPPN_source	12	0x0c
Problem diagnostic	MAPPN_prob_diag	13	0x0d

The coding for each parameter type is given in the following tables:

Parameter name	MAPPN_applic_context
Parameter length	Fixed, set to 9
Parameter data	Application Context Name. Encoded as specified in Q.773 commencing with the Object Identifier Name tag.

Parameter name	MAPPN_dest_address
Parameter length	Variable, in the range 2 to 18
Parameter data	Destination address parameter encoded in the format expected by the network layer (e.g. when using SCCP, in accordance with Q.713 definition of "Called party address", starting with the address indicator and containing, optionally, signalling point code, subsystem number and global title).

Parameter name	MAPPN_dest_ref
Parameter length	Variable, in the range 1 to 20
Parameter data	<p>MAP version 2:</p> <p>Content octets of the destination reference parameter encoded as specified in ETS 300-599, i.e. starting with the octet containing nature of address indicator and numbering plan indicator.</p> <p>MAP version 1:</p> <p>Coded as above except that the first octet (containing nature of address indicator and numbering plan indicator) is omitted.</p>

Parameter name	MAPPN_diag_inf
Parameter length	Variable, in the range 1 to 200
Parameter data	<p>MAP version 2:</p> <p>Single octet coded as follows:</p> <ul style="list-style-type: none"> 0 – short term resource limitation 1 – long term resource limitation 2 – handover cancellation 3 – radio channel release 4 – network path release 5 – call release 6 – associated procedure release 7 – tandem dialogue release 8 – remote operations failure <p>MAP version 1:</p> <p>The contents of the parameter is up to the operator.</p>

Parameter name	MAPPN_orig_address
Parameter length	Variable, in the range 2 to 18
Parameter data	<p>Origination address parameter encoded in the format expected by the network layer (e.g. when using SCCP, in accordance with Q.713 definition of “Called party address”, starting with the address indicator and containing, optionally, signalling point code and global title).</p>

Parameter name	MAPPN_orig_ref
Parameter length	Variable, in the range 1 to 20
Parameter data	<p>Content octets of the destination reference parameter encoded as specified in ETS 300-599, i.e. starting with the octet containing nature of address indicator and numbering plan indicator.</p>

Parameter name	MAPPN_prob_diag
Parameter length	Fixed, set to 1
Parameter data	0 – abnormal event detected by peer 1 – response rejected by peer 2 – abnormal event received from peer 3 – message cannot be delivered to the peer

Parameter name	MAPPN_prov_rsn
Parameter length	Fixed, set to 1
Parameter data	0 – provider malfunction 1 – supporting dialogue/transaction released 2 – resource limitation 3 – maintenance activity 4 – version incompatibility 5 – abnormal MAP dialogue

Parameter name	MAPPN_refuse_rsn
Parameter length	Fixed, set to 1
Parameter data	Single octet coded as follows: 0 – no reason given 1 – invalid destination reference 2 – invalid originating reference 3 – application context not supported 4 – potential version incompatibility 5 – remote node not reachable

Parameter name	MAPPN_release_method
Parameter length	Fixed, set to 1
Parameter data	0 – normal release 1 – prearranged end

Parameter name	MAPPN_result
Parameter length	Fixed, set to 1
Parameter data	0 – accept 1 – dialogue refused

Parameter name	MAPPN_source
Parameter length	Fixed, set to 1
Parameter data	0 – MAP problem 1 – TC problem 2 – network service problem

Parameter name	MAPPN_user_rsn
Parameter length	Fixed, set to 1
Parameter data	<p>MAP version 2:</p> <p>Single octet coded as follows:</p> <ul style="list-style-type: none"> 0 – user specific reason 1 – user resource limitation 2 – resource unavailable 3 – application procedure cancelled 4 – procedure error <p>MAP version 1:</p> <p>Single octet coded as follows:</p> <ul style="list-style-type: none"> 0 – unspecified reason 1 – version not supported 2 – user resource limitation 3 – resource unavailable (long term problem) 4 – resource unavailable (temporary problem) 5 – radio channel release 6 – network path release 7 – call release 8 – associated procedure failed 9 – remote operation failed

8.8 MAP Service Request

Synopsis:

Protocol message sent from the MAP-User to MAP containing a single specific service request primitive.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	MAP_MSG_SRV_REQ (0xc7e0)	
id	Dialogue_ID	
src	Sending module_id	
dst	MAP_TASK_ID	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	Number of bytes of user data	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type octet.
1	len – 2	Parameters in Name-Length-Data format.
len – 1	1	Set to zero indicating end of message.

Description:

The MAP-User uses this message to send specific service request and response primitives to MAP. The primitives that may be sent are detailed in this section.

Once a dialogue has been opened with the peer, the MAP user may send specific service primitives to MAP. MAP buffers the service primitives until a dialogue primitive capable of transferring the requests to the peer is issued to MAP by the MAP-User. Only the **MAP-CLOSE** and **MAP-DELIMITER** dialogue primitives may be used to transfer the service primitives.

Note that although many service primitives may be transferred using one **MAP-CLOSE** or **MAP-DELIMITER** dialogue primitive, only one service primitive may be present in each **MAP_MSG_SRV_REQ** message.

All specific service request primitives must contain the dialogue ID of the dialogue to which they belong. This is encoded in the message header and does not form part of the parameter area.

Parameter area contents:

The specific service primitive type octet is coded as defined in section 8.4 Service Primitive Types.

The following tables show the parameters associated with each service request primitive and whether the parameter is

- M - MANDATORY in which case the message will be discarded if the parameter is omitted.
- C - CONDITIONAL in which case the parameter is mandatory in some circumstances only.
- O - OPTIONAL in which case the parameter is not essential.
- V1 – Only for use with version 1 application contexts.
- V2 – Only for use with version 2 application contexts.
- V3– Only for use with version 3 application contexts.

The “ACK” table for each service indicates parameters for the Response primitive.

Where a primitive has all its parameters shown, for example, as V1 this implies that the primitive is only ever used with version 1 application contexts.

ALERT-SC-WITHOUT-RESULT		
Parameter	Class	Context
Primitive type octet	M	V1
Timeout	O	V1
Invoke ID	M	V1
MSISDN	M	V1
Service centre address	M	V1
Ellipsis	O	V1

ALERT-SERVICE-CENTRE		
Parameter	Class	Context
Primitive type octet	M	V2,V3
Timeout	O	V2,V3
Invoke ID	M	V2,V3
MSISDN	M	V2,V3
Service centre address	M	V2,V3
Ellipsis	O	V2,V3

ALERT-SERVICE-CENTRE-ACK		
Parameter	Class	Context
Primitive type octet	M	V2,V3
Invoke ID	M	V2,V3
Where user error included:		
User error	O	V2,V3
Network resource	O	V2,V3

ANY_TIME_INTERROGATION_REQUEST		
Parameter	Class	Context
Primitive type octet	M	V3
Timeout	O	V3
Invoke ID	M	V3
Requested info	M	V3
GsmSCF address	M	V3
IMSI	C ¹	V3
MSISDN	C ¹	V3
Requested info ellipsis	O	V3
Ellipsis	O	V3

1. Either include IMSI or MSISDN.

ANY_TIME_INTERROGATION_ACK		
Parameter	Class	Context
Primitive type octet	M	V3
Invoke ID	M	V3
Where user error not included:		
Age of location information	C ¹	V3
Geographical information	C ¹	V3
VLR number	C ¹	V3
Location number	C ¹	V3
Cell ID	C ¹	V3
Subscriber state	C ²	V3
Not reachable reason	C ³	V3
Subscriber info ellipsis	O	V3
Location info ellipsis	O	V3
Ellipsis	O	V3
Where user error included:		
User error	M	V3
Network resource	O	V3

1. At least one of these parameters should be included if the Location information was requested.
2. The parameter should be included if the Subscriber state was requested.
3. The parameter should be included if the Subscriber state is set to “not reachable”.

CANCEL-LOCATION		
Parameter	Class	Context
Primitive type octet	M	Any
Timeout	O	Any
Invoke ID	M	Any
IMSI	M	Any
LMSI	O	Any
Cancellation Type	O	V3
IMSI with LMSI ellipsis	O	Any
Ellipsis	O	V3

CANCEL-LOCATION-ACK		
Parameter	Class	Context
Primitive type octet	M	Any
Invoke ID	M	Any
Where user not error included:		
Ellipsis	O	V3
Where user error included:		
User error	M	Any
Ellipsis	O	V3

DELETE-SUBSCRIBER-DATA		
Parameter	Class	Context
Primitive type octet	M	Any
Timeout	O	Any
Invoke ID	M	Any
IMSI	M	Any
Subscriber data	O	Any

DELETE-SUBSCRIBER-DATA-ACK		
Parameter	Class	Context
Primitive type octet	M	V2,V3
Invoke ID	M	V2,V3
Where user error not included:		
Regional subscription response	O	V2,V3
Ellipsis	O	V3
Where user error included:		
User error	M	V2,V3
Ellipsis	O	V3

FORWARD-SHORT-MESSAGE		
Parameter	Class	Context
Primitive type octet	M	Any
Timeout	O	Any
Invoke ID	M	Any
SM RP DA	M	Any
SM RP OA	M	Any
SM RP UI	M	Any
More messages to send	O	V2

FORWARD-SHORT-MESSAGE-ACK		
Parameter	Class	Context
Primitive type octet	M	All
Invoke ID	M	All
User error	O	Any
Network resource	O	Any
SM delivery failure cause	C ¹	Any

1. Must be included where the user error is "SM delivery failure".
2. Can only be included if "SM enumerated delivery failure cause" is present.

INFORM-SERVICE-CENTRE		
Parameter	Class	Context
Primitive type octet	M	V2
Timeout	O	V2
Invoke ID	M	V2
MSISDN	O	V2
MWD status	O	V2
Ellipsis	O	V2

INSERT-SUBSCRIBER-DATA		
Parameter	Class	Context
Primitive type octet	M	Any
Timeout	O	Any
Invoke ID	M	Any
IMSI	O	Any
MSISDN	O	Any
Subscriber data	O	Any

INSERT-SUBSCRIBER-DATA-ACK		
Parameter	Class	Context
Primitive type octet	M	V2,V3
Invoke ID	M	V2,V3
Where user error not included:		
Subscriber data	O	V2,V3
Where user error included:		
User error	M	V2,V3
Ellipsis	O	V3

MAP-INTERROGATE-SS		
Parameter	Class	Context
Primitive type octet	M	V2
Timeout	O	V2
Invoke ID	M	V2
SS code	M	V2
Teleservice code	O	V2
Bearer service code	O	V2
Ellipsis	O	V2

MAP-INTERROGATE-SS-ACK		
Parameter	Class	Context
Primitive type octet	M	V2
Invoke ID	M	V2
Where user error not included:		
SS status	C ¹	V2
Basic service group list	C ²	V2
Forwarding feature list	C ³	V2
CLI restriction option	O	V2
Maximum entitled priority	O	V2
Default priority	O	V2
CCBS feature list	O	V2
Where user error included:		
User error	O	V2
Network resource	O	V2
Call barring cause	O	V2

MO-FORWARD-SHORT-MESSAGE		
Parameter	Class	Context
Primitive type octet	M	V3
Timeout	O	V3
Invoke ID	M	V3
SM RP DA	M	V3
SM RP OA	M	V3
SM RP UI	M	V3
IMSI	O	V3

MO-FORWARD-SHORT-MESSAGE-ACK		
Parameter	Class	Context
Primitive type octet	M	V3
Invoke ID	M	V3
Where user error not included:		
SM RP UI	O	V3
Where user error included:		
User error	O	V3
Network resource	O	V3
SM delivery failure cause	C ¹	V3
Diagnostic info	O ²	V3

1. Must be included where the user error is "SM delivery failure".
2. Can only be included if "SM delivery failure cause" is present.

MT-FORWARD-SHORT-MESSAGE		
Parameter	Class	Context
Primitive type octet	M	V3
Timeout	O	V3
Invoke ID	M	V3
SM RP DA	M	V3
SM RP OA	M	V3
SM RP UI	M	V3
More messages to send	O	V3

MT-FORWARD-SHORT-MESSAGE-ACK		
Parameter	Class	Context
Primitive type octet	M	V3
Invoke ID	M	V3
Where user error not included:		
SM RP UI	O	V3
Where user error included:		
User error	M	V3
Network resource	O	V3
GPRS connection suspended	O	V3
SM enumerated delivery failure cause	C ¹	V3
Diagnostic info	O ²	V3
Absent subscriber diagnostic SM	O	V3
Additional absent subscriber diagnostic SM	O	V3

1. Must be included where the user error is "SM delivery failure".
2. Can only be included if "SM enumerated delivery failure cause" is present.

NOTE-MM-EVENT		
Parameter	Class	Context
Primitive type octet	M	V3
Timeout	O	V3
Invoke ID	M	V3
Service Key	M	V3
Event Met	M	V3
IMSI	M	V3
MSISDN	M	V3
Age of Location Information	O	V3
Geographical Information	O	V3
VLR Number	O	V3
Location Number	O	V3
Cell ID	C ¹	V3
LAI	C	V3
Selected LSA ID	O	V3
MSC Number	O	V3
Geodetic Information	O	V3
Current Location Retrieved	O	V3
SAI Present	O	V3
Supported Camel Phases	O	V3

1. Cell ID or LAI may be present.

NOTE-MM-EVENT-ACK		
Parameter	Class	Context
Primitive type octet	M	V3
Invoke ID	M	V3
Where User error not included:		
SM-RP-UI	O	V3
Where User error included:		
User error	M	V3
Unknown subscriber diagnostic	O	V3

NOTE-SUBSCRIBER-PRESENT		
Parameter	Class	Context
Primitive type octet	M	V1
Timeout	O	V1
Invoke ID	M	V1
IMSI	M	V1

PROCESS_UNSTRUCTURED_SS_REQUEST¹		
Parameter	Class	Context
Primitive type octet	M	Any
Timeout	O	Any
Invoke ID	M	Any
USSD Data Coding Scheme	M	V2,V3
USSD String	M	Any

1. This primitive is used for the Version 1 "Process unstructured SS data" service.

PROCESS_UNSTRUCTURED_SS_REQUEST_ACK		
Parameter	Class	Context
Primitive type octet	M	Any
Invoke ID	M	Any
Where user error not included:		
USSD Data Coding Scheme	M	V2,V3
USSD String	M	Any
Where user error included:		
User Error	M	Any
Network Resource	O	Any
Call barring cause	O	V2,V3
Unauthorised message originator	O	V3

PROVIDE-ROAMING-NUMBER		
Parameter	Class	Context
Primitive type octet	M	Any
Timeout	O	Any
Invoke ID	M	Any
IMSI	M	Any
MSC number	M ¹	Any
MSISDN	O	Any
Previous roaming number	O	V1,V2
LMSI	O	Any
GSM Bearer capability	O	Any
Network signal info	O	Any
Suppression of announcement	O	V3
Call reference number	O	V3
GMSC address	O	V3
OR interrogation	O	V3
OR not supported in GMSC	O	V3
Alerting pattern	O	V3
CCBS call	O	V3
Supported CAMEL phases in GMSC	O	V3
Additional signal info	O	V3
Ellipsis	O	Any

1. Optional in V2.

PROVIDE-ROAMING-NUMBER-ACK		
Parameter	Class	Context
Primitive type octet	M	Any
Where user error not included:		
Roaming number	M	Any
Where user error included:		
User error	M	Any
Network resource	O	Any
Absent subscriber reason	O	V3

PROVIDE_SUBSCRIBER_INFO_REQUEST		
Parameter	Class	Context
Primitive type octet	M	V3
Timeout	O	V3
Invoke ID	M	V3
Requested info	M	V3
IMSI	M	V3
LMSI	O	V3
Requested info ellipsis	O	V3
Ellipsis	O	V3

PROVIDE_SUBSCRIBER_INFO_ACK		
Parameter	Class	Context
Primitive type octet	M	V3
Invoke ID	M	V3
Where user error not included:		
Age of location information	C ¹	V3
Geographical information	C ¹	V3
VLR number	C ¹	V3
Location number	C ¹	V3
Cell ID	C ¹	V3
Subscriber state	C ²	V3
Not reachable reason	C ³	V3
Subscriber info ellipsis	O	V3
Location info ellipsis	O	V3
Ellipsis	O	V3
Where user error included:		
User error	M	V3
Ellipsis	O	V3

1. At least one of these parameters should be included if the Location information was requested.
2. The parameter should be included if the Subscriber state was requested.
3. The parameter should be included if the Subscriber state is set to “not reachable”.

READY-FOR-SM		
Parameter	Class	Context
Primitive type octet	M	V2,V3
Timeout	O	V2,V3
Invoke ID	M	V2,V3
IMSI	M	V2,V3
Alert reason	M	V2,V3
Alert reason indicator	O	V3

READY-FOR-SM-ACK		
Parameter	Class	Context
Primitive type octet	M	Any
Invoke ID	M	Any
Where user error included:		
User error	O	Any
Unknown subscriber diagnostic	O	V3

REPORT-SM-DELIVERY-STATUS		
Parameter	Class	Context
Primitive type octet	M	Any
Timeout	O	Any
Invoke ID	M	Any
MSISDN	M	Any
Service centre address	M	Any
SM delivery outcome	M ¹	V2,V3
Absent subscriber diagnostic SM	M	V3
GPRS support indicator	O	V3
Delivery outcome indicator	O	V3
Additional SM delivery outcome	O	V3
Additional absent subscriber diagnostic SM	O	V3
Ellipsis	O	Any

1. Optional in V3

REPORT-SM-DELIVERY-STATUS-ACK		
Parameter	Class	Context
Primitive type octet	M	Any
Invoke ID	M	Any
Where user error not included:		
MSISDN	O	V2,V3
Where user error included:		
User error	M	V3
Unknown subscriber diagnostic	O	V3

SEND-AUTHENTICATION-INFO		
Parameter	Class	Context
Primitive type octet	M	V2
Timeout	O	V2
Invoke ID	M	V2
IMSI	M	V2

SEND-AUTHENTICATION-INFO-ACK		
Parameter	Class	Context
Primitive type octet	M	V2
Invoke ID	M	V2
Where user error not included:		
Rand	O	V2
Sres	O	V2
Kc	O	V2
Authentication set ellipsis	O	V2
Where user error included:		
User error	O	V2
Network resource	O	V2

SEND-IDENTIFICATION		
Parameter	Class	Context
Primitive type octet	M	Any
Timeout	O	Any
Invoke ID	M	Any
TMSI	M	Any

SEND-IDENTIFICATION-ACK		
Parameter	Class	Context
Primitive type octet	M	Any
Invoke ID	M	Any
Where user error not included:		
IMSI	M	Any
RAND	O	Any
SRES	O	Any
KC	O	Any
Authentic set ellipsis	O	Any
Ellipsis	O	Any
Where user error included:		
User error	M	Any
Ellipsis	O	V3

SEND_IMSI_REQUEST		
Parameter	Class	Context
Primitive type octet	M	V2
Timeout	O	V2
Invoke ID	M	V2
MSISDN	M	V2

SEND_IMSI_ACK		
Parameter	Class	Context
Primitive type octet	M	V2
Invoke ID	M	V2
Where user error not included:		
IMSI	C ¹	V2
Where user error included:		
User error	C ¹	V2

1. At least one of these parameters should be included.

SEND-INFO-FOR-MO-SMS		
Parameter	Class	Context
Primitive type octet	M	V1,V2
Timeout	O	V1,V2
Invoke ID	M	V1,V2
Service centre address	M	V1,V2

SEND-INFO-FOR-MO-SMS-ACK		
Parameter	Class	Context
Primitive type octet	M	V1,V2
Invoke ID	M	V1,V2
Where user error not included:		
MSISDN	C ¹	V1,V2
Where user error included:		
User error	C ¹	V1,V2
Call barring cause	O	V1,V2

1. Either include MSISDN or User error.

SEND-INFO-FOR-MT-SMS		
Parameter	Class	Context
Primitive type octet	M	V1,V2
Timeout	O	V1
Invoke ID	M	V1,V2
SM RP DA	M	V1,V2

SEND-INFO-FOR-MT-SMS-ACK		
Parameter	Class	Context
Primitive type octet	M	V1,V2
Invoke ID	M	V1,V2
Where user error not included:		
MSISDN	C ¹	V1,V2
Where user error included:		
User error	C ¹	V1,V2
Network resource	O	V1,V2

1. Either include MSISDN or User error.

SEND-ROUTING-INFO		
Parameter	Class	Context
Primitive type octet	M	Any
Timeout	O	Any
Invoke ID	M	Any
MSISDN	M	Any
CUG Interlock	O	V2,V3
CUG Outgoing_Access	O ¹	V2,V3
Number of Forwarding	O	Any
Interrogation type	M	V3
Or-interrogation	O	V3
Or-capability	O	V3
GMSC address	M	V3
Call reference number	O	V3
Forwarding reason	O	V3
Teleservice	C	V3
Bearer service	C	V3
Network Signal Info	O	Any
Supported camel phases	O	V3
Suppress t csi	O ²	V3
Supression of announcement	O	V3
Alerting pattern	O	V3
CCBS call	O	V3
Supported CCBS phase	O	V3
Additional signal info	O	V3
CUG CI ellipsis	O	V2,V3
CAMEL info ellipsis	O	V3
Ellipsis	O	Any

1. May only be present if CUG Interlock is present.
2. May only be present if Supported camel phases is present.

SEND-ROUTING-INFO-ACK		
Parameter	Class	Context
Primitive type octet	M	Any
Invoke ID	M	Any
Where User error included:		
User error	M	Any
Network resource	O	Any
Mwd set	O	V1
Call barring cause	O	V1,V2
CUG reject cause	O	V2,V3
Unknown subscriber diagnostic	O	V3
Absent subscriber reason	O	V3
CCBS possible	O	V3
CCBS busy	O	V3
Call barring cause	O	V3
Unauthorised message originator	O	V3
Where User error not included: (version1)		
IMSI	M	V1
Roaming Number	C ¹	V1
Forwarded to Number	C ¹	V1
Forwarding Options	O ²	V1
Forwarding data ellipsis	O	V1
Ellipsis	O	V1
Where User error not included: (version 2)		
IMSI	M	V2
Roaming Number	C ³	V2
Forwarded to Number	O	V2
Forwarded to Sub Address	O	V2
Forwarding Options	O	V2
CUG Interlock	O	V2
CUG Outgoing_Access	O ⁴	V2
Forwarding data ellipsis	O	V2
CUG CI ellipsis	O	V2
Ellipsis	O	V2

Continued on next page

Where User error not included: (version 3)		
IMSI	O	V3
Roaming Number	C ³	V3
Forwarded to Number	O	V3
Forwarded to Sub Address	O	V3
Forwarding Options	O	V3
GMSC Camel Subscription Info	O ⁵	V3
CUG Interlock	O	V3
CUG Outgoing_Access	O ⁴	V3
CUG Subscription Flag	O	V3
Age of Location Information	O	V3
Geographical Information	O	V3
VLR Number	O	V3
Location Number	O	V3
Cell ID	C ⁶	V3
LAI	C ⁶	V3
Subscriber State	C ⁷	V3
Not Reachable Reason	C ⁷	V3
SS-List	O	V3
Teleservice	C	V3
Ext bearer service	C	V3
Forwarding interrogation required	O	V3
VMSC address	O	V3
NAEA Preferred CIC	O	V3
CCBS Possible	O	V3
Keep CCBS Call Indicator	O	V3
MSISDN	O	V3
Number Portability Status	O	V3
Subscriber info ellipsis	O	V3
Location info ellipsis	O	V3
CCBS indicator ellipsis	O	V3
CAMEL routing ellipsis	O	V3
NAEA preferred CI ellipsis	O	V3
Forwarding data ellipsis	O	V3
CUG CI ellipsis	O	V3
Ellipsis	O	V3

1. Either Roaming Number or Forwarded to Number must be included.
2. May only be present if Forwarded to Number is present.
3. If present, neither Forwarded to Number, Forwarded to Sub Address nor Forwarding Options are present.
4. May only be present if CUG Interlock is present.
5. Can only be present if Roaming Number is absent
6. Only one may be present
7. Only one may be present

SEND-ROUTING-INFO-FOR-GPRS		
Parameter	Class	Context
Primitive type octet	M	V3
Timeout	O	V3
Invoke ID	M	V3
IMSI	M	V3
GGSN address	O	V3
GGSN number	M	V3

SEND-ROUTING-INFO-FOR-GPRS-ACK		
Parameter	Class	Context
Primitive type octet	M	V3
Invoke ID	M	V3
Where User error not included:		
SGSN address	M	V3
GGSN address	O	V3
Absent subscriber diagnostic	O	V3
Where User error included:		
User error	M	V3
Unknown subscriber diagnostic	O	V3
Absent subscriber reason	O	V3

SEND-ROUTING-INFO-FOR-SM		
Parameter	Class	Context
Primitive type octet	M	Any
Timeout	O	Any
Invoke ID	M	Any
MSISDN	M	Any
SM-RP-PRI	M	Any
Service centre address	M	Any
CUG Interlock	O	V1
Teleservice	O	V1
GPRS support indicator	O	V3
SM RP MTI	O	V3
SM RP SMEA	O	V3

SEND-ROUTING-INFO-FOR-SM-ACK		
Parameter	Class	Context
Primitive type octet	M	Any
Invoke ID	M	Any
Where User error not included:		
IMSI	M	Any
Roaming number	C	V1,V2
MSC number	C	V1,V2
LMSI	O	Any
MWD set	O	V1
GPRS node indicator	O	V3
Additional number	O	V3
Location with LMSI ellipsis	O	Any
Ellipsis	O	Any
Where User error included:		
User error	M	Any
Network resource	O	Any
Mwd set	O	V1
Unknown subscriber diagnostic	O	V3
Call barring cause	O	Any
Unauthorised message originator	O	V3
Absent subscriber diagnostic SM	O	V3
Additional absent subscriber diagnostic SM	O	V3

UNSTRUCTURED_SS_NOTIFY		
Parameter	Class	Context
Primitive type octet	M	V2,V3
Timeout	O	V2,V3
Invoke ID	M	V2,V3
USSD Data Coding Scheme	M	V2,V3
USSD String	M	V2,V3

UNSTRUCTURED_SS_NOTIFY_ACK		
Parameter	Class	Context
Primitive type octet	M	V2,V3
Invoke ID	M	V2,V3
Where user error included:		
User Error	M	V2,V3
Network resource	O	V2,V3
Absent subscriber reason	O	V3

UNSTRUCTURED_SS_REQUEST		
Parameter	Class	Context
Primitive type octet	M	V2,V3
Timeout	O	V2,V3
Invoke ID	M	V2,V3
USSD Data Coding Scheme	M	V2,V3
USSD String	M	V2,V3
Alerting pattern	O	V3
MSISDN	O	V3

UNSTRUCTURED_SS_REQUEST_ACK		
Parameter	Class	Context
Primitive type octet	M	V2,V3
Invoke ID	M	V2,V3
Where user not error included:		
USSD Data Coding Scheme	M	V2,V3
USSD String	M	V2,V3
Where user error included:		
User Error	M	V2,V3
Network resource	O	V2,V3
Absent subscriber reason	O	V3

UPDATE-LOCATION		
Parameter	Class	Context
Primitive type octet	M	Any
Timeout	O	Any
Invoke ID	M	Any
IMSI	M	Any
Roaming number	C ¹	V1
MSC number	C ¹	Any
VLR number	M	Any
LMSI	O	Any
Supported CAMEL phases in GMSC	O	V3
VLR capability ellipsis	O	V3
Solsa support indicator	O	V3
Ellipsis	O	Any

1. The selection is a choice between Roaming number and MSC number in MAP V1. MSC number is mandatory in MAP V2 and V3 and Roaming number is not allowed.

UPDATE-LOCATION-ACK		
Parameter	Class	Context
Primitive type octet	M	Any
Where user error not included:		
HLR number	M	Any
Ellipsis	O	V2, V3
Where user error included:		
User error	M	Any
Network resource	O	Any
Roaming not allowed cause	C ²	V2, V3
Unknown subscriber diagnostic	O	V3
Ellipsis	O	V3

2. If the user error is set to 'roaming not allowed', then 'roaming not allowed cause' is mandatory.

8.9 MAP Service Indication

Synopsis:

Protocol message sent from the MAP to the MAP-User containing a specific service primitive.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	MAP_MSG_SRV_IND (0x87e1)	
id	Dialogue_ID	
src	MAP_TASK_ID	
dst	Sending module_id	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	Number of bytes of user data	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type octet.
1	len - 2	Parameters in Name-Length-Data format.
len - 1	1	Set to zero indicating end of message.

Description:

MAP uses this message to send specific service indication and confirmation primitives to the MAP-User. The primitives that may be sent are detailed in section 8.4 Service Primitive Types.

All specific service indication primitives contain the dialogue ID of the dialogue to which they belong. It is encoded in the message header and does not form part of the parameter area.

Parameter area contents:

The parameter area is coded as defined for the MAP-SERVICE-REQUEST message.

The coding of service primitive parameters is given in section 8.10 MAP Service Primitive Parameters.

The parameters included in each primitive are as defined for the MAP-SERVICE-REQUEST. The parameters for the Indication primitive are exactly the same as the Request primitive. The parameters for the Confirmation primitive are the same as the Response primitive with the addition of an optional Provider error parameter.

8.10 MAP Service Primitive Parameters

The following parameter names are defined for use in service primitive messages:

Parameter	Mnemonic	Value (dec)	Value (hex)
Absent Subscriber Diagnostic SM	MAPPN_abs_sub_diag	63	0x3f
Absent Subscriber Reason	MAPPN_abs_sub_rsn	62	0x3e
Additional Absent Subscriber Diagnostic SM	MAPPN_add_abs_sub_diag	168	0xa8
Additional Signal Info	MAPPN_addition_siginfo	79	0x4f
Additional SM Delivery Outcome	MAPPN_add_sm_deliv_outcome	215	0xd7
Age Of Location Information	MAPPN_age_loc_info	48	0x30
Alert Reason	MAPPN_alert_reason	28	0x1c
Alert Reason Indicator	MAPPN_alert_reason_ind	213	0xd5
Alerting Pattern	MAPPN_alert_pattern	70	0x46
Authentic Set Ellipsis	MAPPN_authentic_set_ellipsis(i)	104 to 108	0x68 to 0x6c
Basic Service Group List	MAPPN_basic_svc_grp_list	220	0xdc
Bearer Service	MAPPN_ext_bearerservice	114	0x72
Call Barring Cause	MAPPN_call_bar_cse	32	0x20
Call Reference Number	MAPPN_callref_num	74	0x4a
Camel Info Ellipsis	MAPPN_camel_info_ellipsis	136	0x88
Camel Routing Ellipsis	MAPPN_camel_route_ellipsis	132	0x84
Cancellation Type	MAPPN_canceltype	80	0x50
CCBS Busy	MAPPN_ccbs_busy	167	0xa7
CCBS Call	MAPPN_ccbs_call	71	0x47
CCBS Feature List	MAPPN_ccbs_feat_list	225	0xe1
CCBS Indicator Ellipsis	MAPPN_ccbs_ind_ellipsis	131	0x83
CCBS Possible	MAPPN_ccbs_possible	127	0x7f
Cell ID	MAPPN_cell_id	49	0x31
CLI Restriction Option	MAPPN_cli_restrict_option	222	0xde

Parameter	Mnemonic	Value (dec)	Value (hex)
Closed User Group Interlock Code	MAPPN_CUG_interlock	36	0x24
CUG CI Ellipsis	MAPPN_CUG_CI_ellipsis	135	0x87
CUG Outgoing Access	MAPPN_CUG_outgo_access	37	0x25
CUG Reject Cause	MAPPN_CUG_reject_cse	38	0x26
CUG Subscription Flag	MAPPN_CUG_subscript_flag	116	0x74
Current Location Retrieved	MAPPN_current_loc_retrieved	164	0xa4
Default Priority	MAPPN_default_priority	224	0xe0
Delivery Outcome Indicator	MAPPN_deliv_outcome_ind	214	0xd6
Diagnostic Information	MAPPN_diag_inf	10	0x0a
Ellipsis	MAPPN_ellipsis	57	0x39
Event Met	MAPPN_event_met	159	0x9f
Forward Data Ellipsis	MAPPN_fwd_data_ellipsis	134	0x86
Forward Interrogation Request	MAPPN_fwd_interrog_req	216	0xd8
Forwarded To Number	MAPPN_fwd_to_num	41	0x29
Forwarded To Subaddress	MAPPN_fwd_to_subaddr	42	0x2a
Forwarding Options	MAPPN_fwding_opt	43	0x2b
Forwarding Feature List	MAPPN_fwd_feature_list	221	0xdd
Forwarding Reason	MAPPN_forwarding_reason	112	0x70
Geodetic Information	MAPPN_geodetic_info	163	0xa3
Geographical Information	MAPPN_geog_info	50	0x32
GGSN Address	MAPPN_ggsn_address	58	0x3a
GGSN Number	MAPPN_ggsn_number	60	0x3c
GMSC Address	MAPPN_gmsc_address	68	0x44
GMSC Camel Subscriber Information	MAPPN_GMSC_camel_subs_info	129	0x81
GPRS Connection Suspended	MAPPN_gprs_connect_susp	169	0xa9
GPRS Node Indicator	MAPPN_gprs_node_ind	123	0x7b

Parameter	Mnemonic	Value (dec)	Value (hex)
GPRS Support Ind	MAPPN_gprs_support_ind	118	0x76
GSM Bearer Capability	MAPPN_gsm_bearercap	77	0x4d
GSM SCF Address	MAPPN_gmscf_addr	51	0x33
Home Location Register	MAPPN_hlr_number	81	0x51
IMSI	MAPPN_imsi	18	0x12
IMSI With LMSI Ellipsis	MAPPN_imsi_imsi_ellipsis	101	0x65
Interrogation Type	MAPPN_interrogation_type	110	0x6e
Invoke Id	MAPPN_invoke_id	14	0x0e
KC	MAPPN_kc(i)	94 to 98	0x5e to 0x62
Keep CCBS Call Indicator	MAPPN_keep_ccbs_call_ind	128	0x80
LAI	MAPPN_lai	160	0xa0
Linked Id	MAPPN_linked_id	44	0x2c
LMSI	MAPPN_imsi	20	0x14
Location Info Ellipsis	MAPPN_locinfo_ellipsis	66	0x42
Location LMSI Ellipsis	MAPPN_loc_imsi_ellipsis	121	0x79
Location Number	MAPPN_loc_num	52	0x34
Maximum Entitled Priority	MAPPN_max_priority	223	0xdf
Message Waiting Data File Status	MAPPN_mwd_status	29	0x1d
Message Waiting Data Flag Set	MAPPN_mwd_set	34	0x22
More Messages To Send	MAPPN_more_msgs	26	0x1a
MSC Number	MAPPN_msc_num	19	0x13
MSISDN	MAPPN_msisdn	15	0x0f
NAEA Preferred CI Ellipsis	MAPPN_naea_pref_ci_ellipsis	133	0x85
NAEA Preferred CIC	MAPPN_naea_preferred_cic	126	0x7e
Network Resource Class	MAPPN_ntwk_res	30	0x1e
Network Signal Info	MAPPN_net_sig_info	40	0x28
Network Signal Info	MAPPN_network_siginfo	78	0x4e

Parameter	Mnemonic	Value (dec)	Value (hex)
Not Reachable Reason	MAPPN_not_reach_rsn	56	0x38
Number Of Forwarding	MAPPN_num_of_fwding	39	0x27
Number Port Status	MAPPN_number_port_status	124	0x7c
Or Capability	MAPPN_or_capability	111	0x6f
Or Interrogation	MAPPN_or_interrogation	69	0x45
Or Not Supported In GMSC	MAPPN_ornotsupp_gmsc	73	0x49
Previous Roaming Number	MAPPN_previous_roam_num	76	0x4c
Provider Error	MAPPN_prov_err	22	0x16
Rand	MAPPN_rand(i)	84 to 88	0x54 to 0x58
Regional Subscription Response	MAPPN_region_subscript_resp	155	0x9b
Requested Info Ellipsis	MAPPN_reqinfo_ellipsis	64	0x40
Requested Information	MAPPN_req_info	53	0x35
Roaming Not Allowed Cause	MAPPN_roam_not_allowed_cse	103	0x67
Roaming Number	MAPPN_roaming_num	35	0x23
SAI Present	MAPPN_sai_present	165	0xa5
Selected LSA ID	MAPPN_selectedlsa_id	162	0xa2
Service Key	MAPPN_service_key	109	0x6d
SGSN Address	MAPPN_sgsn_address	59	0x3b
SGSN Number	MAPPN_sgsn_number	82	0x52
Short Message Delivery Priority	MAPPN_sm_rp_pri	16	0x10
Short Message Destination Address	MAPPN_sm_rp_da	23	0x17
Short Message Entity Address	MAPPN_sm_rp_smea	120	0x78
Short Message Originating Address	MAPPN_sm_rp_oa	24	0x18
Short Message Service Centre Address	MAPPN_sc_addr	17	0x11
Short Message User Information Field	MAPPN_sm_rp_ui	25	0x19

Parameter	Mnemonic	Value (dec)	Value (hex)
SM Delivery Failure Cause	MAPPN_deliv_fail_cse	31	0x1f
SM Delivery Outcome	MAPPN_sm_deliv_outcome	27	0x1b
SM RP MTI	MAPPN_sm_rp_mti	119	0x77
Solsa Support Indicator	MAPPN_solsa_supp_ind	75	0x4b
SRES	MAPPN_sres(i)	89 to 93	0x59 to 0x5d
SS Code	MAPPN_ss_code	218	0xda
SS List	MAPPN_ss_list	130	0x82
SS Status	MAPPN_ss_status	219	0xdb
Subscriber Data Component	MAPPN_subscriber_data_comp	99	0x63
Subscriber Info Ellipsis	MAPPN_subinfo_ellipsis	65	0x41
Subscriber State	MAPPN_sub_state	54	0x36
Supported Camel Phase	MAPPN_suppcamelphase	72	0x48
Suppress CCBS Phase	MAPPN_suppress_ccbs_phase	113	0x71
Suppress T CSI	MAPPN_suppress_t_csi	115	0x73
Suppression Of Announcement	MAPPN_suppress_announce	67	0x43
Teleservice	MAPPN_teleservice	33	0x21
Timeout	MAPPN_timeout	45	0x2d
TMSI	MAPPN_tmsi	83	0x53
Unauthorised Message Origination	MAPPN_unauth_msg_orig	166	0xa6
Unknown Subscriber Diagnostic	MAPPN_unk_sub_diag	61	0x3d
User Error	MAPPN_user_err	21	0x15
USSD Coding Scheme	MAPPN_USSD_coding	46	0x2e
USSD String	MAPPN_USSD_string	47	0x2f
VLR Capability Ellipsis	MAPPN_vlr_cap_ellipsis	102	0x66
VLR Number	MAPPN_vlr_number	55	0x37
VMSC Address	MAPPN_vmesc_address	117	0x75

The coding for each parameter type is given in the following tables:

Parameter name	MAPPN_abs_sub_diag
Parameter length	Variable, in the range 1 to 2
Parameter data	Coded as a 2's complement number. Values as defined in ETS 300 536 (GSM 03.40)

Parameter name	MAPPN_abs_sub_rsn
Parameter length	Fixed, set to 1
Parameter data	Single octet encoded as specified in ETS 300 974 i.e.: 0 – IMSI detach 1 – restricted area 2 – no page response

Parameter name	MAPPN_add_abs_sub_diag
Parameter length	Variable, in the range 1 to 2
Parameter data	Coded as a 2's complement number. Values as defined in ETS 300 536 (GSM 03.40)

Parameter name	MAPPN_addition_siginfo
Parameter length	Variable, in the range 1 to 201
Parameter data	First octet showing the protocol ID encoded as specified in TS 100 974 i.e.: 1 – GSM 0408 2 – GSM 0806 4 – ETS 300 102-1 Followed by up to 200 octets of signal information.

Parameter name	MAPPN_add_sm_deliv_outcome
Parameter length	Fixed, set to 1
Parameter data	Single octet encoded as specified in ETS 300-599, i.e.: 0 – memory capacity exceeded 1 – absent subscriber 2 – successful transfer

Parameter name	MAPPN_age_loc_info
Parameter length	Variable, in the range 1 to 2
Parameter data	Age of location information in minutes. Coded as a 2's complement number.

Parameter name	MAPPN_alert_pattern
Parameter length	Fixed, set to 1
Parameter data	Single octet encoded as specified in ETS 100-974

Parameter name	MAPPN_alert_reason
Parameter length	Fixed, set to 1
Parameter data	Single octet encoded as specified in ETS 300-599, i.e.: 0 – MS-present 1 – memory available

Parameter name	MAPPN_alert_reason_ind
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_authentic_set_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_basic_svc_grp_list
Parameter length	Variable, in the range 1 to 220
Parameter data	Coded as specified for the BasicServiceGroupList in TS 100 974.

Parameter name	MAPPN_call_bar_cse
Parameter length	Fixed, set to 1
Parameter data	Single octet encoded as specified in ETS 300-599, i.e.: 0 – barring service active 1 – operator barring

Parameter name	MAPPN_callref_num
Parameter length	Variable, in the range 1 to 8
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_camel_info_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_camel_route_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_canceltype
Parameter length	Fixed, set to 1
Parameter data	Encoded as specified in TS 100 974 i.e. 0 – update procedure 1 – subscription withdraw

Parameter name	MAPPN_ccbs_busy
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_ccbs_call
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_ccbs_feat_list
Parameter length	Variable, in the range 1 to 220
Parameter data	Coded as specified for the CCBS-FeatureList in TS 100 974.

Parameter name	MAPPN_ccbs_ind_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_ccbs_possible
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_cell_id
Parameter length	Variable, set to 5 or 7
Parameter data	Encoded as specified for the Cell Global Identification defined in TS GSM 04.08. First 5 octets (containing the Mobile country code, the Mobile network code, and the Location area code) must be present; last 2 octets (containing the Cell ID) are optional

Parameter name	MAPPN_cli_restrict_option
Parameter length	Fixed, set to 1
Parameter data	Coded as specified in TS 100 974 i.e.: 0 – permanent 1 – temporary default restricted 2 – temporary default allowed

Parameter name	MAPPN_cug_CI_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_CUG_interlock
Parameter length	Variable, in the range 1 to 4
Parameter data	Encoded as specified in GSM 09.02 Phase 1.

Parameter name	MAPPN_CUG_outgo_access
Parameter length	Fixed, set to 0
Parameter data	No Data

Parameter name	MAPPN_CUG_reject_cse
Parameter length	Fixed, set to 1
Parameter data	Single octet encoded as specified in ETS 300-599, i.e.: 0 – incoming calls barred within CUG 1 – subscriber not member of CUG 5 – requested basic service violates CUG constraints 7 – called party SS – interaction violation

Parameter name	MAPPN_CUG_subscript_flag
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_current_loc_retrieved
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_default_priority
Parameter length	Fixed, set to 1
Parameter data	Value in the range 0 to 15

Parameter name	MAPPN_deliv_fail_cse
Parameter length	Fixed, Variable in the range 1 to 201
Parameter data	First octet showing delivery failure cause encoded as specified in ETS 300-599, i.e.: 0 – memory capacity exceeded 1 – equipment protocol error 2 – equipment not SM equipped 3 – unknown service centre 4 – SC congestion 5 – invalid SME address 6 – subscriber not SC subscriber Followed by up to 200 bytes of diagnostic information.

Parameter name	MAPPN_deliv_outcome_ind
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_diag_inf
Parameter length	Variable, in the range 1 to 200
Parameter data	<p>MAP version 2:</p> <p>Single octet coded as follows:</p> <ul style="list-style-type: none"> 0 – short term resource limitation 1 – long term resource limitation 2 – handover cancellation 3 – radio channel release 4 – network path release 5 – call release 6 – associated procedure release 7 – tandem dialogue release 8 – remote operations failure <p>MAP version 1:</p> <p>The contents of the parameter is up to the operator.</p>

Parameter name	MAPPN_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_event_met
Parameter length	Fixed, set to 1
Parameter data	<p>Encoded as specified in TS 129 002 i.e,</p> <ul style="list-style-type: none"> 0 – Location update in same VLR 1 - Location update in other VLR 2 – IMSI attach 3 - MS initiated IMSI detach 4 - Network initiated IMSI detach

Parameter name	MAPPN_ext_bearerservice
Parameter length	Variable, in the range 1 to 5
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_forwarding_reason
Parameter length	Fixed, set to 1
Parameter data	Encoded as specified in TS 100 974 i.e. 0 – Not reachable 1 – Busy 2 – No reply

Parameter name	MAPPN_fwd_feature_list
Parameter length	Variable, in the range 1 to 220
Parameter data	Coded as specified for the CCBS-FeatureList in TS 100 974.

Parameter name	MAPPN_fwding_opt
Parameter length	Fixed, set to 1
Parameter data	Encoded as specified in ETS 300-599, i.e.: V1: bits 87: notification to forwarding party 00 – no notification 01 – notification 10 – notification V2: bit 8: notification to forwarding party 0 – no notification 1 – notification V2: bit 7: 0 (unused) V1: bits 65: notification to calling party 00 – no notification 01 – notification 10 – notification V2: bits 6: notification to calling party 0 – no notification 1 – notification V2: bit 5: 0 (unused) V2: bits 43: forwarding reason 00 – ms not reachable 01 – ms busy 10 – no reply 11 – unconditional bits 21: 00 (unused)

Parameter name	MAPPN_fwd_data_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_fwd_interrog_req
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_fwd_to_num
Parameter length	Variable, in the range 1 to 9
Parameter data	Encoded as specified in GSM 09.02 Phase 1.

Parameter name	MAPPN_fwd_to_subaddr
Parameter length	Variable, in the range 1 to 21
Parameter data	Encoded as specified in GSM 09.02 Phase 1.

Parameter name	MAPPN_geodetic_info
Parameter length	Fixed, set to 10
Parameter data	Encoded as specified in TS 129 002

Parameter name	MAPPN_geog_info
Parameter length	Fixed, set to 8
Parameter data	Encoded as specified in TS GSM 03.32.

Parameter name	MAPPN_ggsn_address
Parameter length	Variable, in the range 5 to 17
Parameter data	Encoded as specified in TS GSM 03.03.

Parameter name	MAPPN_ggsn_number
Parameter length	Variable, in the range 1 to 9
Parameter data	Content octets of the GGSN number parameter encoded as specified in ETS 300-974, i.e. starting with the octet containing nature of address indicator and numbering plan indicator.

Parameter name	MAPPN_gmsc_address
Parameter length	Variable, in the range 1 to 9
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_GMSC_camel_subs_info
Parameter length	Variable, in the range 1 to 200
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_gprs_connect_susp
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_gprs_node_ind
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_gprs_support_ind
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_gsmscf_addr
Parameter length	Variable, in the range 1 to 9
Parameter data	Content octets of the gsmSCF parameter encoded as specified in ETS 300-974, i.e. starting with the octet containing nature of address indicator and numbering plan indicator.

Parameter name	MAPPN_gsm_bearercap
Parameter length	Variable, in the range 1 to 201
Parameter data	First octet showing the protocol ID encoded as specified in TS 100 974 i.e.: 1 – GSM 0408 2 – GSM 0806 4 – ETS 300 102-1 Followed by up to 200 octets of signal information.

Parameter name	MAPPN_hlr_number
Parameter length	Variable, in the range 1 to 9
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_imsi
Parameter length	Variable, in the range 3 to 8
Parameter data	Content octets of the IMSI parameter encoded as specified in ETS 300-599.

Parameter name	MAPPN_imsi_Imei_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_interrogation_type
Parameter length	Fixed, set to 1
Parameter data	Encoded as specified in TS 100 974 i.e. 0 – Basic call 1 – Forwarding

Parameter name	MAPPN_invoke_id
Parameter length	Fixed, set to 1
Parameter data	Single octet representing the invoke ID encoded as specified in the TCAP Programmer's Manual i.e. in the range -128 to +127

Parameter name	MAPPN_kc
Parameter length	Fixed, set to 8
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_keep_ccbs_call_ind
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_lai
Parameter length	Fixed, set to 5
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_linked_id
Parameter length	Fixed, set to 1
Parameter data	The linked id should be the same as the invoke id of the service which it is linked to.

Parameter name	MAPPN_lmsi
Parameter length	Fixed, set to 4
Parameter data	Content octets of the LMSI parameter encoded as specified in ETS 300-599.

Parameter name	MAPPN_locinfo_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_loc_lmsi_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_loc_num
Parameter length	Variable, in the range 2 to 10
Parameter data	Encoded as specified in ITU-T Q.763.

Parameter name	MAPPN_max_priority
Parameter length	Fixed, set to 1
Parameter data	Value in the range 0 to 15

Parameter name	MAPPN_more_msgs
Parameter length	Fixed, set to 1
Parameter data	Single octet set to 0 if there are more messages to follow and set to 1 if this is the last message.

Parameter name	MAPPN_msc_num
Parameter length	Variable, in the range 1 to 9
Parameter data	Content octets of the MSC number parameter encoded as specified in ETS 300-599, i.e. starting with the octet containing nature of address indicator and numbering plan indicator.

Parameter name	MAPPN_msisdn
Parameter length	Variable, in the range 1 to 9
Parameter data	Content octets of the msisdh parameter encoded as specified in ETS 300-599, i.e. starting with the octet containing nature of address indicator and numbering plan indicator.

Parameter name	MAPPN_mwd_set
Parameter length	Fixed, set to 1
Parameter data	Encoded as specified in GSM 09.02 Phase 1.

Parameter name	MAPPN_mwd_status
Parameter length	Fixed, set to 1
Parameter data	<p>Bit 0 is used as the least significant bit.</p> <p>bit 0: memory capacity exceeded flag 0 – memory capacity sufficient 1 – memory capacity exceeded</p> <p>bit 1: mobile subscriber not reachable flag 0 – mobile subscriber is reachable 1 – mobile subscriber not reachable</p> <p>bit 2: service centre address not included flag 0 – service centre address included 1 – service centre address not included</p> <p>bits 3-7 - not used</p>

Parameter name	MAPPN_naea_preferred_cic
Parameter length	Fixed, set to 3
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_naea_pref_ci_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_net_sig_info
Parameter length	Variable, in the range 1 to 200
Parameter data	Encoded as specified in GSM 09.02 Phase 1.

Parameter name	MAPPN_network_sig_info
Parameter length	Variable, in the range 1 to 200
Parameter data	Encoded as specified in ETS 100 974

Parameter name	MAPPN_not_reach_rsn
Parameter length	Fixed, set to 1
Parameter data	Encoded as specified in ETS 300 974 i.e. a single octet as follows: 0 – Mobile subscriber purged 1 – IMSI detached 2 – Restricted area 3 – Not registered

Parameter name	MAPPN_ntwk_res
Parameter length	Fixed, set to 1
Parameter data	Single octet encoded as specified in ETS 300-599, i.e.: 0 – PLMN 1 – HLR 2 – VLR 3 – PVLR 4 – controlling MSC 5 – VMSC 6 – EIR 7 – RSS

Parameter name	MAPPN_number_port_status
Parameter length	Fixed, set to 1
Parameter data	Encoded as specified in TS 100 974 i.e. 0 – Not known to be ported 1 – Own number ported out 2 – Foreign number ported to foreign network

Parameter name	MAPPN_num_of_fwding
Parameter length	Fixed, set to 1
Parameter data	Encoded as specified in GSM 09.02 Phase 1 i.e. in the range 1 to 5.

Parameter name	MAPPN_odb_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_ornotsupp_gmsc
Parameter length	Fixed, set to 0
Parameter data	Not applicable

Parameter name	MAPPN_or_capability
Parameter length	Fixed, set to 1
Parameter data	Integer, in the range 1 to 127

Parameter name	MAPPN_or_interrogation
Parameter length	Fixed, set to 0
Parameter data	Not applicable

Parameter name	MAPPN_previous_roam_num
Parameter length	Variable, in the range 1 to 9
Parameter data	Content octets of the previous roaming number encoded as specified in ETS 300 599 i.e. starting with the octet containing the nature of address indicator and the numbering plan indicator

Parameter name	MAPPN_prov_err
Parameter length	Fixed, set to 1
Parameter data	Single octet coded as follows: 1 – duplicated invoke ID 2 – not supported service 3 – mistyped parameter 4 – resource limitation 5 – initiating release 6 – unexpected response from peer 7 – service completion failure 8 – no response from peer 9 – invalid response received

Parameter name	MAPPN_rand
Parameter length	Fixed, set to 16
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_region_subscript_resp
Parameter length	Fixed, set to 1
Parameter data	0 – Network node-area restricted 1 – Too many zone codes 2 – Zone codes conflict 3 – Regional subscription not supported

Parameter name	MAPPN_reqinfo_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_req_info
Parameter length	Fixed, set to 1
Parameter data	Single octet indicating the information that is being requested as follows (where bit 0 is the least significant bit): bit 0: 0 – location information not requested 1 – location information requested bit 1: 0 – subscriber state not requested 1 – subscriber state requested bits 2-7: reserved for future use

Parameter name	MAPPN_roaming_num
Parameter length	Variable, in the range 1 to 9
Parameter data	Encoded as specified in GSM 09.02 Phase 1.

Parameter name	MAPPN_roam_not_allowed_cse
Parameter length	Fixed, set to 1
Parameter data	0 – plmnRoamingNotAllowed 1 - operatorDeterminedBarring

Parameter name	MAPPN_sai_present
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_sc_addr
Parameter length	Variable, in the range 1 to 20
Parameter data	Content octets of the service centre address parameter encoded as specified in ETS 300-599, i.e. starting with the octet containing nature of address indicator and numbering plan indicator.

Parameter name	MAPPN_selectedlsa_id
Parameter length	Fixed, set to 3
Parameter data	Encoded as specified in TS 129 002

Parameter name	MAPPN_service_key
Parameter length	Variable, in the range 1 to 3
Parameter data	Integer in the range 0 to 2147483647

Parameter name	MAPPN_sgsn_address
Parameter length	Variable, in the range 5 to 17
Parameter data	Encoded as specified in TS GSM 03.03.

Parameter name	MAPPN_sgsn_number
Parameter length	Variable, in the range 1 to 9
Parameter data	Encoded as specified in TS 100 974.

Parameter name	MAPPN_sm_deliv_outcome
Parameter length	Fixed, set to 1
Parameter data	Single octet encoded as specified in ETS 300-599, i.e.: 0 – memory capacity exceeded 1 – absent subscriber 2 –successful transfer

Parameter name	MAPPN_sm_rp_da
Parameter length	Variable, in the range 3 to 22
Parameter data	<p>First octet showing type of address encoded as specified in ETS 300-599, i.e.:</p> <ul style="list-style-type: none"> 0 – IMSI 1 – LMSI 4 – Service centre address 5 – no SM-RP-DA <p>Second octet, indicating the number of octets that follow.</p> <p>Subsequent octets containing the content octets of the IMSI, LMSI, or address string encoded as specified in ETS 300-599.</p>

Parameter name	MAPPN_sm_rp_mti
Parameter length	Fixed, set to 1
Parameter data	<p>Encoded as specified in TS 100 974, i.e.</p> <ul style="list-style-type: none"> 0 – SMS Deliver 1 - SMS Status Report

Parameter name	MAPPN_sm_rp_oa
Parameter length	Variable, in the range 3 to 22
Parameter data	<p>First octet showing type of address encoded as specified in ETS 300-599, i.e.:</p> <ul style="list-style-type: none"> 2 – MSISDN 4 – Service centre address 5 – no SM-RP-OA <p>Second octet, indicating the number of octets that follow.</p> <p>Subsequent octets containing the content octets of the MSISDN or address string encoded as specified in ETS 300-599.</p>

Parameter name	MAPPN_sm_rp_pri
Parameter length	Fixed, set to 1
Parameter data	<p>Single octet encoded as specified in ETS 300-599, i.e.:</p> <ul style="list-style-type: none"> 0 – priority is low 1 – priority is high

Parameter name	MAPPN_sm_rp_smea
Parameter length	Variable, in the range 1 to 12
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_sm_rp_ui
Parameter length	Variable, in the range 1 to 200
Parameter data	Encoded as specified in ETS 300-599.

Parameter name	MAPPN_solisa_supp_ind
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_sres
Parameter length	Fixed, set to 4
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_ss_code
Parameter length	Fixed, set to 1
Parameter data	Contains the code identifying a single supplementary service

Parameter name	MAPPN_ss_list
Parameter length	Variable, in the range 1 to 90
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_ss_status
Parameter length	Fixed, set to 1
Parameter data	Gives supplementary service status information as defined in TS GSM 03.11

Parameter name	MAPPN_subinfo_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_subscriber_data_comp
Parameter length	Variable, in the range 0 to 200
Parameter data	Encoded as TS 100 974. Includes all other parameters in the MAP-INSERT-SUBSCRIBER-DATA AND MAP-DELETE-SUBSCRIBER-DATA operations.

Parameter name	MAPPN_sub_state
Parameter length	Fixed, set to 1
Parameter data	Single octet indicating the subscriber's state as follows: 0 – assumed idle 1 – Camel busy 2 - not reachable 3 – not provided from VLR

Parameter name	MAPPN_suppcamelphase
Parameter length	Variable, in the range 1 to 2
Parameter data	0 – phase 1 1 – phase 2 Only bit 0 is used at this time.

Parameter name	MAPPN_suppress_t_csi
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_supp_announce
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_supp_ccbs_phase
Parameter length	Fixed, set to 1
Parameter data	Encoded as specified in TS 100 974 i.e. Can take values in the range 1 to 127. Currently only 1 is used, but this may change.

Parameter name	MAPPN_teleservice
Parameter length	Fixed, set to 1
Parameter data	Encoded as specified in GSM 09.02 Phase 1.

Parameter name	MAPPN_timeout
Parameter length	Fixed, set to 2
Parameter data	Specifies the timer value to be used when waiting for a response. The timer value is given in seconds in the range 0..1800. The first octet is the least significant byte of the timeout. Note that the maximum permitted time-out value is 1800 seconds (i.e. 30 minutes).

Parameter name	MAPPN_tmsi
Parameter length	Variable, in the range 1 to 4
Parameter data	Encoded as specified in TS 100 974

Parameter name	MAPPN_unauth_msg_orig
Parameter length	Fixed, set to 0
Parameter data	Not Applicable

Parameter name	MAPPN_unk_sub_diag
Parameter length	Fixed, set to 1
Parameter data	Single octet encoded as specified in ETS 300 974 i.e.: 0 – IMSI unknown 1 – GPRS subscription unknown

Parameter name	MAPPN_user_err
Parameter length	Fixed, set to 1
Parameter data	Single octet. Values as specified for “error codes” in ETS 300-974.

Parameter name	MAPPN_USSD_coding
Parameter length	Fixed, set to 1
Parameter data	Encoded as specified in GSM 09.02 Phase 2

Parameter name	MAPPN_USSD_string
Parameter length	Variable, in the range 1 to 160
Parameter data	Encoded as specified in GSM 09.02 Phase 2.

Parameter name	MAPPN_vce_grp_call_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_vlr_cap_ellipsis
Parameter length	Variable, in the range 2 to 220
Parameter data	Series of parameters in tag, length, data format as defined by the users.

Parameter name	MAPPN_vlr_num
Parameter length	Variable, in the range 1 to 9
Parameter data	Content octets of the VLR number parameter encoded as specified in ETS 300-974, i.e. starting with the octet containing nature of address indicator and numbering plan indicator.

Parameter name	MAPPN_vmesc_address
Parameter length	Variable, in the range 1 to 9
Parameter data	Encoded as specified in TS 100 974

9. NON-PRIMITIVE INTERFACE

In addition to the primitive interface for passing MAP protocol messages between the MAP module and the MAP-User, the MAP module supports a non-primitive interface for implementation-specific functionality.

The non-primitive interface permits the configuration of the MAP module.

It also allows the MAP module to supply diagnostic information, protocol error events and software error events to the local system management and maintenance modules.

This section describes the formats of all the messages used in the non-primitive interface.

All of the messages handled by MAP may request a confirmation by setting the `rsp_req` field in the message header. The confirmation message is the received message echoed back to the sending module.

Mnemonic	Value	Description
	0	Success
MAPE_BAD_ID	1	Inappropriate or invalid id in request message
MAPE_BAD_STATE	2	Inappropriate or unrecognised message type .
MAPE_BAD_MSG	5	Unsupported message received.
MAPE_BAD_PARAM	6	Invalid parameters contained in message.
MAPE_NO_RESOURCES	7	Insufficient internal message resources.

9.1 MAP Configuration Request

Synopsis:

Message used to configure the MAP module for operation.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	MAP_MSG_CONFIG (0x77e4)	
id	0	
src	Sending module_id	
dst	MAP_TASK_ID	
rsp_req	Used to request a confirmation	
hclass	0	
status	0	
err_info	0	
len	25	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	cnf_ver
1	1	user_id
2	1	TCAP_id
3	1	mngt_id
4	1	maint_id
5	1	trace_id
6	2	base_usr_ogdlg_id
8	2	base_usr_icdlg_id
10	2	base_tc_ogdlg_id
12	2	base_tc_icdlg_id
14	2	nog_dialogues
16	2	nic_dialogues
18	2	num_invokes
20	4	options

Description:

This message is used to configure the MAP module for operation. It should be the first message sent to the module. (Any messages received before a valid configuration message will be discarded). It should only be issued once.

The message parameters relate to the environment in which the MAP module is operating.

Confirmation Message:

The module sending the message can optionally request that a confirmation message is returned by the MAP module after the message has been processed. This is achieved by setting the **rsp_req** field in the message header. This will cause a confirmation message of the same format to be returned. The **status** field in this message is zero on success or an error code otherwise.

Parameter Description:

cnf_ver

Version of this configuration message. (Currently only version zero).

user_id

MAP-User module ID.

TCAP_id

TCAP module ID.

mngt_id

Management module ID.

maint_id

Maintenance module ID.

trace_id

Trace module ID.

base_usr_ogdlg_id

The first dialogue ID for outgoing dialogues that the user wishes to be handled by this module. The subsequent (**nog_dialogues** - 1) dialogue IDs will also be handled by the module. The user must ensure that the values used in the dialogue ID field of all protocol messages pertaining to outgoing dialogues lie within the correct range.

base_usr_icdlg_id

The first dialogue ID for incoming dialogues that the user wishes to be handled by this module. The subsequent (**nic_dialogues** - 1) dialogue IDs will also be handled by the module. The most significant bit (i.e. bit 15) of the dialogue ID must be set to one for incoming dialogues. The MAP module allocates the dialogue ID for each incoming dialogue. It uses values in the range **base_icdlg_id** (**base_icdlg_id** + **nic_dialogues** - 1) for this purpose.

base_tc_ogdlg_id

The first dialogue ID for outgoing dialogues between MAP and TCAP. The subsequent (**nog_dialogues** - 1) dialogue IDs will also be handled by the module. The MAP module allocates the dialogue ID for each outgoing TCAP dialogue. It uses values in the range **base_tc_ogdlg_id** (**base_tc_ogdlg_id** + **nog_dialogues** - 1) for this purpose.

base_tc_icdlg_id

The first dialogue ID for incoming dialogues between TCAP and MAP. The subsequent (**nic_dialogues** - 1) dialogue IDs will also be handled by the module. The most significant bit (i.e. bit 15) of the dialogue ID must be set to one for incoming dialogues. TCAP allocates the dialogue ID for each incoming dialogue. It must use values in the range **base_tc_icdlg_id** (**base_tc_icdlg_id** + **nic_dialogues** - 1) for this purpose.

nog_dialogues

The maximum number of simultaneous outgoing dialogues that the module is required to support. This value is compared with a compile time constant to ensure that the module has sufficient internal resources to handle the requested maximum number of outgoing dialogues.

nic_dialogues

The maximum number of simultaneous incoming dialogues that the module is required to support. This value is compared with a compile time constant to ensure that the module has sufficient internal resources to handle the requested maximum number of incoming dialogues.

num_invokes

The maximum number of simultaneous invocations that the module is required to support. This value is compared with a compile time constant to ensure that the module has sufficient internal resources to handle the requested number of simultaneous invocations.

options

Reserved for future use.

9.2 MAP Timer Configuration Request

Synopsis:

Message used to configure the MAP module timer values.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	MAP_MSG_CNF_TIM (0x77e5)	
id	0	
src	Sending module_id	
dst	MAP_TASK_ID	
rsp_req	Used to request a confirmation	
hclass	0	
status	0	
err_info	0	
reserved	0	
len	3	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	tim_ver
1	2	t0

Description:

This message is used to configure the MAP protocol timers for operation. It should be sent to the module before any protocol messages are sent or received. It should only be issued once.

Confirmation Message:

The module sending the message can optionally request that a confirmation message is returned by the MAP module after the message has been processed. This is achieved by setting the **rsp_req** field in the message header. This will cause a confirmation message of the same format to be returned. See appendix A1. The **status** field in this message is zero on success or an error code otherwise.

Parameter Description:**tim_ver**

Version of this configuration message. (Currently only version zero).

t0

Timer waiting for a response from the MAP-User. The timer value should be specified in seconds with a minimum value of 5 seconds. (If the Configure Timers message is not sent, a default value of 5 seconds will be used.)

9.3 MAP Software Event Indication

Synopsis:

Message used by MAP to indicate an implementation specific software related event to the local management module.

Message Format:

MESSAGE HEADER	
FIELD NAME	MEANING
type	MAP_MSG_ERROR_IND (0x07e9)
id	See below
src	MAP_TASK_ID
dst	Management module id
rsp_req	Used to request a confirmation
hclass	0
status	Software event code (see below)
err_info	0
reserved	0
len	0

Software event code

The **Software event code** contained in the **status** field of the message indicates the type of event. Possible values are listed in the following table that also lists the meaning of the **id** field in each case.

Mnemonic	Code	Id	Description
MAPSWE_NO_MSSM	1	0	Maximum number of active invocations exceeded.
MAPSWE_NO_DLG	2	0	No internal resource to handle dialogue.
MAPSWE_NO_MAPM	3	0	Internal pool of structured messages exhausted.
MAPSWE_MAPM_LOW	4	0	Internal pool of structured messages running low.
MAPSWE_BAD_MSG	5	msg_type	Unrecognised inter task message received.
MAPSWE_TX_FMT_ERR	6	0	Internal error during message formatting.
MAPSWE_USER_BAD_FMT	7	0	Badly formatted message received from MAP User.
MAPSWE_TCAP_BAD_FMT	8	0	Badly formatted MAP message received from TCAP.
MAPSWE_INVALID_DLG_ID	10	0	Message received from TCAP or application with unrecognised dialogue id.
MAPSWE_USER_MAND_MISSING	11	0	Missing mandatory parameter in message received from the user
MAPSWE_TCAP_MAND_MISSING	12	0	Missing mandatory parameter in message received from TCAP
MAPSWE_BAD_USER_PRIM	13	0	Unknown primitive received from the user
MAPSWE_BAD_TCAP_PRIM	14	0	Unknown primitive received from TCAP
MAPSWE_USER_PAR_FMT_ERR	15	0	Formatting error in a parameter received from the user
MAPSWE_TCAP_PAR_FMT_ERR	16	0	Formatting error in a parameter received from TCAP
MAPSWE_USER_UNREC_PARAM	17	0	Unrecognised parameter received from the user
MAPSWE_TCAP_UNREC_PARAM	18	0	Unrecognised parameter received from TCAP

9.4 Management Event Indication

Synopsis:

This message is issued by the MAP module to notify system management of general software events that under normal operating conditions should not occur. These events may be due to lack of system resources or errors within the software.

Message Format:

MESSAGE HEADER	
FIELD NAME	MEANING
type	MAP_MSG_EVENT_IND (0x0008)
id	0
src	MAP_TASK_ID
dst	Management module ID
rsp_req	0
hclass	0
status	Management event code (see below)
err_info	Time-stamp
reserved	0
len	0

Management event code

The **Management event code** contained in the **status** field of the message indicates the type of event. Possible values are listed in the following table which also lists the meaning of the id field in each case.

Mnemonic	Value		id	Description
ERR_SDLSIG_LOW	47	0x2f	0	The internal signal queue is running short of entries. If this fault persist the software should be re-built with more signals allocated to the signal queue.
ERR_NO_SDLSIG	46	0x2e	0	The internal signal queue has been exhausted. If this event occurs then correct operation of the module is not guaranteed.

9.5 MAP Trace Mask Request

Synopsis:

Message used to configure MAP to send a trace message to the trace module whenever a specific message type is sent or received. The trace module is identified in the MAP configuration request message.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	MAP_MSG_TRACE_MASK (0x57e6)	
id	0	
src	Sending module ID	
dst	MAP_TASK_ID	
rsp_req	Used to request a confirmation	
hclass	0	
status	0	
err_info	0	
reserved	0	
len	12	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	4	op_evt_mask - Output event trace mask
4	4	ip_evt_mask - Input event trace mask
8	4	non_prim_mask - Non-primitive trace mask

op_evt_mask

The output event trace mask. This is a 32-bit value with bits set to 1 to cause a trace message to be sent to the system trace module when MAP sends the associated protocol message.

31	30	29	28	27	26	25	24
0	0	0	0	0	0	0	0
23	22	21	20	19	18	17	16
0	0	0	0	0	0	0	0
15	14	13	12	11	10	9	8
0	0	0	0	0	0	0	0
7	6	5	4	3	2	1	0
0	0	0	0	TCCMP	TCDLG	MAPSRV	MAPDLG
				_REQ	_REQ	_IND	_IND

MAPDLG_IND – Dialogue indication primitive from Map to MAP-User

MAPSRV_IND – Service indication primitive from Map to MAP-User

TCDLG_REQ – Dialogue request primitive from MAP to TCAP

TCCMP_REQ – Component request primitive from MAP to TCAP

ip_evt_mask

The input event trace mask. This is a 32-bit value with bits set to 1 to cause a trace message to be sent to the system trace module when MAP receives the associated protocol message.

31	30	29	28	27	26	25	24
0	0	0	0	0	0	0	0
23	22	21	20	19	18	17	16
0	0	0	0	0	0	0	0
15	14	13	12	11	10	9	8
0	0	0	0	0	0	0	0
7	6	5	4	3	2	1	0
0	0	0	0	TCCMP	TCDLG	MAPSRV	MAPDLG
				_IND	_IND	_REQ	_REQ

MAPDLG_REQ – Dialogue request primitive from Map-User to MAP

MAPSRV_REQ – Service request primitive from Map-User to MAP

TCDLG_IND – Dialogue Indication primitive from TCAP to MAP

TCCMP_IND – Component Indication primitive from TCAP to MAP

non_prim_mask

The non-primitive trace mask. This is a 32-bit value with bits set to 1 to cause a trace message to be sent to the system trace module when MAP receives the associated non-primitive message.

31	30	29	28	27	26	25	24
0	0	0	0	0	0	0	0
23	22	21	20	19	18	17	16
0	0	0	0	0	0	0	0
15	14	13	12	11	10	9	8
0	0	0	0	0	0	0	0
7	6	5	4	3	2	1	0
0	0	0	SSW MSK	0	SW_ EVT	0	CNF _TIM

CNF_TIM – Timer Configuration Message received by MAP

SW_EVT– Software Error Event indication message sent by MAP to the management module.

SSW_MSK– Software Event Mask Request received by MAP.

9.6 Set Selective Trace Mask Request

Synopsis:

Enables extra information to be reported along with selected software events for debug purposes.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	MAP_MSG_S_SELTRACE_MASK (0x57ec)	
id	0	
src	Sending module id	
dst	MAP module ID	
rsp_req	used to request a confirmation	
class	0	
status	0	
err_info	0	
len	9	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	9	mask - Bits set to indicate selective trace events which should be active

Description:

Sends a mask indicating which selective trace events should be active to the MAP module. No selective trace events are active when the module is initialised. This message can be used to turn on some or all selective trace events or turn them back off again. The message may be sent at any time after the initial per-module configuration message has been sent to the MAP module.

mask

A bit mask indicating the selective trace events which are active. A '1' indicates that an event is active and a '0' indicates that it is not active. The first octet sent is for selective trace event codes 0-7, the second octet for selective trace event codes 8-15, etc. See the description of the Selective Trace Event Indication for a list of the events that may be traced.

9.7 Trace Event Indication

Synopsis:

The MAP trace event masks are used to enable and disable tracing of all protocol and non primitive messages received or sent by MAP. The traced messages are reported as event indications as shown below:

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	MGT_MSG_TRACE_EV (0x0003)	
id	0	
src	MAP module id	
dst	Trace module id	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	18 + length of traced data	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	source module id
1	1	destination module id
2	2	id
4	2	type
6	2	status
8	4	timestamp
12	4	pointer to the message being traced
16	2	data length
18	0 .. 280	data - Data taken from the contents of the MSG parameter area.

9.8 Selective Trace Event Indication

Synopsis:

Optionally provides extra information to be reported along with selected software and maintenance events for debug purposes.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	MGT_MSG_SEL_TRACE (0x0f16)	
id	0	
src	MAP module id	
dst	trace module id	
rsp_req	0	
class	0	
status	Reason for trace	
err_info	0	
len	18 + length of traced data	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	source module id
1	1	destination module id
2	2	id
4	2	type
6	2	status
8	4	timestamp
12	4	pointer to the message being traced
16	2	data length
18	0 .. 280	contents of the MSG parameter area.

Description:

When certain software events are reported the module may be configured to also send, to the trace module, a Selective Trace Event Indication containing the message that caused the report to be made.

The **Reason for trace** contained in the **status** field of the message indicates the type of event. Possible values are listed in the following table:

Status		Mnemonic	Description
0	0x00	MAPt_tx_fmt_err	Refer to Software Event Indication 6.
1	0x01	MAPt_user_bad_fmt	Refer to Software Event Indication 7
2	0x02	MAPt_tcap_bad_fmt	Refer to Software Event Indication 8
3	0x03	MAPt_invalid_dlg_id	Refer to Software Event Indication 10.
4	0x04	MAPt_user_mand_missing	Refer to Software Event Indication 11.
5	0x05	MAPt_tcap_mand_missing	Refer to Software Event Indication 12
6	0x06	MAPt_bad_user_prim	Refer to Software Event Indication 13.
7	0x07	MAPt_bad_tcap_prim	Refer to Software Event Indication 14.
8	0x08	MAPt_user_par_fmt_err	Refer to Software Event Indication 15.
9	0x09	MAPt_tcap_par_fmt_err	Refer to Software Event Indication 16.
10	0x0a	MAPt_user_unrec_param	Refer to Software Event Indication 17.
11	0x0b	MAPt_tcap_unrec_param	Refer to Software Event Indication 18.

9.9 MAP Software Event Mask Request

Synopsis:

Message used to configure which software error events MAP will send a software event indication message for.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	MAP_MSG_S_ERROR_MASK (0x57e7)	
id	0	
src	Sending module ID	
dst	MAP_TASK_ID	
rsp_req	Used to request a confirmation	
hclass	0	
status	0	
err_info	0	
reserved	0	
len	9	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	9	mask

mask

A bit mask indicating the software events which are active. A '1' indicates that an event is active and a '0' indicates that it is not active. The first octet sent is for software event codes 0-7 (bit 0 for event code 0), the second octet for software event codes 8-15 (bit 0 for event code 8), etc.

Pad unused bits with zeros.

All software events currently reported in the MAP_MSG_ERROR_IND message detailed in section 9.3 MAP Software Event Indication are enabled by default.

9.10 Read Revision Request

Synopsis:

Message used to request the module type and software revision number.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	GEN_MSG_MOD_IDENT (0x6111)	
id	0	
src	Originating module ID	
dst	MAP module ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	28	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	2	type Currently undefined.
2	1	maj_rev Major version number
3	1	min_rev Minor version number
4	24	text Null terminated string giving textual module identity

Description:

This message is provided to request a reply indicating the software version used for the MAP module. The parameter areas are filled in by the MAP module and do not need to be included by the user. On receipt of this request the module returns the message with status "SUCCESS" to the sender including the information requested.

APPENDIX A

A.1 Tick Timer message format

The MAP module requires a periodic “tick timer” message. This must be sent at the required frequency, nominally every tenth of a second. This message is usually generated by the timer module supplied by ???.

The format of the required message is shown below:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	TM_EXP (0xc002)	
id	Index to timer table (set to zero)	
src	Sending module ID	
dst	MAP_TASK_ID	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
reserved	0	
len	4	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	4	Timer type (set to zero)

APPENDIX B

B.1 Message Type Table

The following table lists, by message type, all the messages described in this manual:

Message Type	Mnemonic	Description
0x0003	MGT_MSG_TRACE_EV	Trace Event Indication
0x0008	MGT_MSG_EVENT_IND	Management Event Indication
0x07e9	MAP_MSG_ERROR_IND	MAP Software Event Indication
0x0f16	MGT_MSG_SEL_TRACE	Selective Trace Event Indication
0x17e6		Confirmation For Set Trace Mask
0x17e7		Confirmation For Set Software Event Mask
0x17e8		Confirmation For Set Maintenance Trace Mask
0x2111		Confirmation For Read Revision
0x37e4		Confirmation For MAP Configuration
0x37e5		Confirmation For MAP Timer Configuration
0x57e6	MAP_MSG_TRACE_MASK	Set Trace Mask Request
0x57e7	MAP_MSG_S_ERROR_MASK	Set Software Event Mask Request
0x57e8	MAP_MSG_S_MAINT_MASK	Set Maintenance Trace Mask Request
0x57ec	MAP_MSG_S_SELTRACE_MASK	Set Selective Trace Mask Request
0x6111	GEN_MSG_MOD_IDENT	Read Revision Request
0x77e4	MAP_MSG_CONFIG	MAP Configuration Request
0x77e5	MAP_MSG_CNF_TIM	MAP Timer Configuration Request
0x87e0		Confirmation For MAP Service Request
0x87e1	MAP_MSG_SRV_IND	MAP Service Indication
0x87e2		Confirmation For MAP Dialogue Request
0x87e3	MAP_MSG_DLG_IND	MAP Dialogue Indication
0xc002	TM_EXP	Timer Expiry
0xc7e0	MAP_MSG_SRV_REQ	MAP Service Request
0xc7e2	MAP_MSG_DLG_REQ	MAP Dialogue Request

NOTE: The message type for the confirmation message is set as described in the Software Environment Programmer's Manual Issue 3. Only a request message may have a confirmation message associated.

APPENDIX C

C.1 Services supported

The following table lists all the services supported by the MAP module and indicates for which MAP version they have been implemented.

Service	Version
Short message service management services:	
MAP-ALERT-SC-WITHOUT-RESULT	1
MAP-ALERT-SERVICE-CENTRE	2,3
MAP-FORWARD-SHORT-MESSAGE	1,2
MAP-INFORM-SERVICE-CENTRE	2
MAP-NOTE-SUBSCRIBER-PRESENT	1
MAP-READY-FOR-SM	2,3
MAP-REPORT-SM-DELIVERY-STATUS	1,2,3
MAP-SEND-ROUTING-INFO-FOR-SM	1,2,3
MAP-MO-FORWARD-SHORT-MESSAGE	3
MAP-MT-FORWARD-SHORT-MESSAGE	3
Supplementary services related services:	
MAP-PROCESS-UNSTRUCTURED-SS-DATA	1
MAP-PROCESS-UNSTRUCTURED-SS-REQUEST	2,3
MAP-UNSTRUCTURED-SS-REQUEST	2,3
MAP-UNSTRUCTURED-SS-NOTIFY	2,3
Mobility services:	
MAP-ANY-TIME-INTERROGATION	3
MAP-PROVIDE-SUBSCRIBER-INFO	3
SEND-ROUTING-INFO-FOR-GPRS	3
MAP-UPDATE-LOCATION	1,2,3
MAP-CANCEL-LOCATION	1,2
MAP-SEND-IDENTIFICATION	2,3
MAP-INSERT-SUBSCRIBER-DATA	1,2,3
MAP-DELETE-SUBSCRIBER-DATA	1,2,3
MAP-NOTE-MM-EVENT	3
Call Handling Operations:	
MAP-SEND-ROUTING-INFORMATION	1,2,3

Service	Version
MAP-PROVIDE-ROAMING-NUMBER	1,2,3
Location service operations:	
MAP-PROVIDE-SUBSCRIBER-LOCATION	3
Operation and maintenance services:	
MAP-SEND-IMSI	2