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Short Message Service Centre (SMSC) External Machine Interface (EMI) Description

Version 4.3d

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Contents

Preface

This manual describes the interface used between the SMSC System and other computer systems and applications on the fixed network side. It is based on [1] and has been adapted to the requirements and characteristics of VF D2's SMSC. The interface is based on the ERMES UCP (Universal Computer Protocol) with some SMSC-specific extensions.

References

[1]   ETS 300 536, Technical realisation of the Short Message Service (SMS) Point-to-Point, GSM 03.40, version 7.1.0

[2]   Alphabets and language-specific information, GSM 03.38, version 7.0.0

[3]   Short Message Service Centre External Machine Interface, CMG Informatietechniek b. v., Version 4.0, February 2001

[4]   ETS 300 133-3, Paging Systems; European Radio Message System (ERMES) Part 3: Network aspects, Section 9

Intended Audience

All persons involved in the design and implementation of applications on external computer systems that have to interact with the SMSC.

For professional systems that require high performance and extra functionality please refer to [2]. Provision of this extra functionality is a matter of contracts. Please refer to Annex G for contact persons.

Abbreviations used in this document

ACK	Positive Acknowledgement
ADT	Abstract Data Types
CLI	Calling Line Identity
CMG	Computer Management Group
EMI	External Machine Interface
ERMES	European Radio Messaging System
ETS	European Technical Standard
FAX	Facsimile
GSM	Global System for Mobile communications
UDH	User Data Header
LA	Large Account
ME	Mobile Equipment
VF D2	Vodafone D2
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
NAK	Negative Acknowledgement
NPI	Numbering Plan Identification
O&M	Operations and Maintenance
PC	Personal Computer
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephone Network
SM	Short Message
SME	Short Message Entity
SMS	Short Message Service
SMSC	Short Message Service Centre
SMT	Short Message Terminal
TON	Type Of Number
UCP	Universal Computer Protocol
UD	User Data
VMS	Voice Mail System
VSMSC	Virtual Short Message Service Centre

1 <u>INTRODUCTION</u>

For submission and reception of Short Messages the Short Message Service Centre (SMSC) can interface with (among others):

> VF D2 or other GSM Mobile subscribers with SM capable mobile stations (MSs) in the PLMN,
> Applications on external machines (e.g. PCs, UNIX based machines), on which we will focus in this document.

The SM transaction must involve, however, at least one MS.

An example of such a dedicated PC application would be a system that monitors the status of a computer system. It can generate a short message to alert support staff if something goes wrong.

The External Machine will be referred to as 'PC', but it can, of course, be any application system.

In order to allow any service provider to develop dedicated applications an interface was developed to access SMSC functions. This manual describes that interface.

<u>CONTRACT ISSUE</u>

It is important to note that all the options explained may not be valid or available for each and every customer. The validity of these options depends upon the type of contract signed with Vodafone D2. All of them are clear marked as a 'contract issue option' in the document.

For queries and further information please contact the Key-Account-Manager Vodafone-Corporate SMS as mentioned in Annex G.

<u>IMPORTANT NOTE</u>

As new requirements and improvements may be taken into account, the interface may change, backward compatibility shall be given.

The information in this document is subject to change without notice and should not be construed as a commitment by Vodafone D2 (VF D2). VF D2 takes no responsibility whatsoever for disadvantages caused by such changes or any errors that may appear in this document.

1.1 Position of interface

When viewed from the external application, the EMI provides access to the SMSC functions: submission of Short Messages, and reception of Short Messages and notifications. The SMSC can be viewed as a Black Box: Short Messages are directed to the GSM mobile telephone of the recipient. The SMSC and the PLMN only function as relay mechanisms for those messages. The only visible action of the SMSC apart from this is the provision of notifications: upon request the SMSC will notify the originator of the SM regarding the delivery status of the SM.
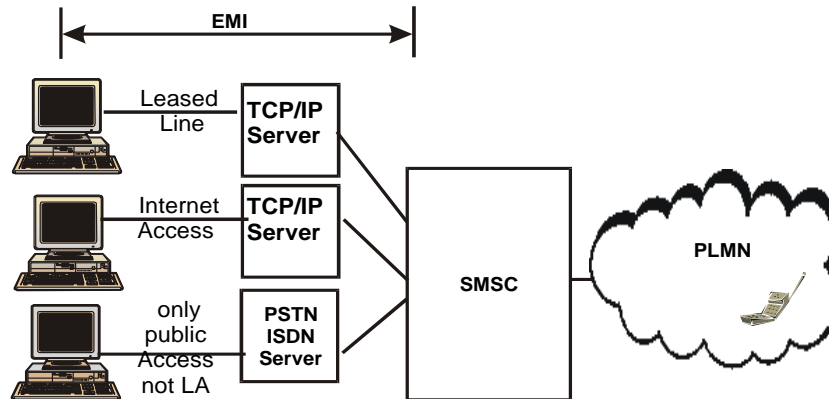
(Note: PAD access (X.29) is not foreseen as a general user access to the SMSC)

Figure 1.2   EMI: Internal view

The EMI can use the following lower level protocols as a carrier:

> TCP/IP via Leased Line – for LA mandatory
> TCP/IP via Public Internet – for LA mandatory
> PSTNa (analog modem lines) – public access only
> ISDN (V.110 and transparent X.75) - public access only

The setup of the connection between the SMSC Platform and the remote machine depends on the carrier used. Once the connection is established, the EMI commands can be used.

Please note that correct interworking with the SMSC can be guaranteed just for the case if error-control (MNP4 or LAPM) is used for the PSTNa access. Refer to Annex F for further information.

Please note that correct interworking with the SMSC can be guaranteed just for the case that transparent X.75 and not any protocol derived of X.75 or set on top of X.75 is used for the ISDN access.

1.2 Interface history

The SMSC External Machine Interface (EMI) is based on an extended subset of the UCP protocol defined for the ERMES paging system in ETS 300 133-3 [6]. When referring to 'UCP' in the context of the SMSC, the EMI, the extended subset of the ERMES UCP, is meant. In the SMSC the UCP protocol was chosen as the basis for the EMI because

1. it saves the trouble of having to re-invent a protocol structure for an interface that is very similar to the ERMES interface to external machines.

2. it allows application developers to use a single mechanism to interface to both ERMES based paging systems and the SMS.

In order to provide access to the more extensive set of SMS commands, it was necessary to extend the UCP definition with some additional, SMSC specific commands, such as 'Submit Short Message Operation' and 'SMT alert operation'.

1.3 Access numbers

The SMSC can be accessed for use with the EMI protocol on the following numbers:

PSTN/Modem (public)	ISDN (public)	TCP/IP Leased Line (LA) [1)]	TCP/IP Internet Access (LA) [2)]
01722278020	01722278000	distributed on request	distributed on request
01722278025	01722278010		

(LA = Large Account)

Note:
[1)] The encryption mechanism is by Leased Line optional.
[2)] The used encryption mechanism has to be IPSEC.

1.4 Session Management

If a connection is established to the SMSC via PSTNa/Modem the following session management is used:

The session management uses a delay between the submission and the acknowledgement of messages in order to regulate the throughput. After the 'Connect' message has been received by the SMSC a timer is started. When a message is submitted to the SMSC the ACK shall be sent at timer expiry and the timer is then reset. Any message which is submitted to the SMSC between a previous message submission and its acknowledgement shall simply be discarded. ***Therefore, the external application must wait for an acknowledgement before sending a new message****.* A value between 40 and 60 seconds as a maximum should be appropriate. If the connection is released before the acknowledgement has been sent to the application, the message submitted shall be discarded.

For customers, which are connected via a leased Line or Internet over TCP/IP (TCP/IP LA) have a possibility to submit large numbers of messages in a short amount of time.

This is a **Contract Issue** option (please refer to the earlier mentioned contract note).
Please keep in mind that to apply for a LA, the customer must obtain a definite volume of short messages.

1.5 Virtual Short Message Service Centre concept (VSMSC)

Large accounts that access the SMSC on a CLI session (TCP/IP) may use the VFD2 SMSC as virtual SMSC. This means that the LA can use the SMSC as if it is its own SMSC.

The virtual SMSC (VSMSC) is characterised by a specific SMSC address defined by a three digit suffix, hence every address has the following structure: +49 172 227 0xyz. It uniquely identifies the Large Account and the CLI of the system accessing the SMSC, so there is a one to one relationship between virtual SMSC address and CLI.

Every mobile originated short message (SM-MO) is sent to the LA through their virtual SMSC address. The recipient address of this SM-MO is not being evaluated by the SMSC and forwarded to the application transparently.

In the case of mobile terminated messages the virtual SMSC address shall be transmitted to the MS as the SC address.

This is a **<u>Contract Issue</u>** option. Further information on the VSMSCs can be given on request.

1.6 Short numbering

This option is a combination of the standard SMSC address and a so-called 'Short Number' as destination address to route mobile originated Short Messages to their application. The 'Short Number' is a 4 or 5 digit number which uniquely identifies the LA and appears as an originating address of the LA on the MS.

This again is a **<u>Contract Issue</u>** option. Further information on Short Numbers can be given on demand.

1.7 Multiple Address Large Account (MULA)

This option offers the customers high availability and specific throughput requirements for their LA.

With this option the customer with a LA can:

- Use more than one access method simultaneously (e.g. TCP/IP-Sessions) and/or remote address to access the SMSC system
- Optimize the usage of a link, by introducing windowing into the UCP protocol
- Mix slow and fast links as the load balancing feature will optimize the throughput
- Use session provisioning provides options to simultaneously submit session (refer to section 1.4)
- Access to the SMSC system as LA requires a mandatory password

<u>Setting up a session:</u>

A MULA must always start his session with a UCP60 message (refer to chapter 4.6), where the open session message contains the LA-ID instead of the large account's physical address to identify the LA and a password. The LA-ID is assigned by VF D2 and is a 4 or 5 digit number. In case the Short Numbering option is enabled for the LA, the Short Number and the LA-ID would be the same.

Access failover:

In case a link goes down, all traffic is handled immediately via the remaining links. No messages will be lost. Messages can reach the large account over any active link (e.g. a notification will not necessarily come via the same link that was used for the message submission).

Optimised link usage:

The MULA can exploit the available link capacity effectively, by submitting the next message before the previous message has been acknowledged (windowing). The optimization here is that the next message is available directly after the system has transmitted its response. In a non windowing system the LA can send the next message only after the acknowledgement to the previous one is received.

Furthermore, the SMSC also makes better use of the available link capacity by performing deliveries in a windowed fashion. The available links for message submission are used cyclically, based on the originator address of the Short Message.

The input and output window can be adjusted independently to allow for optimum resource usage in case of large accounts with unbalanced throughput requirements.

Please note that the MULA can only make use of the UCP51 message type to submit Short Messages.

This is a **Contract Issue** option and setting of all system parameters depend upon the type of contract signed.

1.8 Single Address Large Account

This option is similar to MULA (as explained in Chapter 1.7) but offers the customer only a single LA-Address. The session setup for this type of account also requires a mandatory authorization (UCP60) as described in the case of MULA.

This again is a **Contract Issue** option. As for MULA the parameter settings are also dependant on the type of contract signed.

1.9 Sending messages to other operators

Since 01.10.2002 Vodafone D2 offers each LA customer a possibility to send SMS to other operators (national as well as international networks, depending upon the international roaming contract with foreign networks).

Please note that due to Mobile Number Portability (MNP, introduced on 01.11.2002 in Germany), a MSISDN with VFD2 NDCs may not always be a VFD2 customer. Therefore, a short message sent to this particular customer would not be delivered, if the option b) has been chosen. For all the customers with this option it is recommended that the application used should send a notification request with a submission operations (e.g. OT-51, refer to chapter 4.5.2) to the SMSC. In case of delivery failure, an appropriate error-message (refer to Annex C) would be sent.

This is typical **<u>Contract Issue</u>** option. The details of the key-account manager are mentioned in Annex G.

1.10 Dialogue and Premium Services

It is possible for customers to offer special premium- and/or dedicated- services by sending and receiving replies directly from the MS or external devices. (e.g.: chat-services).

This option is a **<u>Contract Issue</u>** option and in order to opt for this option following rules must be followed compulsorily:

1. Only the 5x- and 6x- Series UCP strings (Extended Operations refer to Chapter 4.5) should be used.

2. During the SMS-submission (OT-51), the OTOA Field must be left empty. As otherwise, the SMSC might not accept the reply message from the MS.

2 Structure of the EMI messages

In the ERMES/UCP-based EMI protocol, the message structure is as follows:

STX Header/Data/Checksum ETX

- stx = 02(hex)
- etx = 03(hex)

Note that in the examples the strings 'stx' and 'etx' each represent only one character. As separator between header and data, between data and checksum, as well as between parameters, a '/' (2F$_{hex}$) is used. In parameters that contain a list, the items are separated by a ',' (2C$_{hex}$). Numeric characters (0...F) are encoded as in IA5. Alphanumeric characters are encoded as two numeric IA5 characters, the higher 3 bits (0...7) first, the lower 4 bits (0...F) thereafter.

The Header consists of the following 4 mandatory fields:

Parameter	Type	Description
TRN	2 num. char.	Transaction reference number : Right justified with leading zero.
LEN	5 num. char.	Length Indicator : Total number of IA5 characters contained between stx and etx, right justified with leading zeros.
O/R	Char 'O' or 'R'	Transaction Indicator : 'O' indicates operation, 'R' indicates result
OT	2 num. char.	Operation Type : 01, 31, 51, 52, 53, 55, 56, 57, 58, 60 or 61

The Data fields depend on the Operation Type. For each Operation Type they are listed in the next chapter.

The Checksum is derived by the addition of all bytes of the header, data field separators and data fields (i.e. all characters after the stx-character, up to and including the last '/' before the checksum field). The 8 Least Significant Bits (LSB) of the result are then represented as two printable characters. The character containing the 4 Most Significant Bits (MSB) (of those 8 LSB) shall be transmitted first. For example, if the checksum is 3A$_{hex}$ the representation shall be the characters '3' (33$_{hex}$) and 'A' (41$_{hex}$) (please refer to Annex B).

Note: If an error occurs in the TRN or O/R-field, no response (ACK/NAK) is returned by the SMSC. The message is then discarded. This is due to the necessity of repeating the TRN or "O/R" in the response of the SMSC, an information that is not there in the first place. If the LEN field is wrong, a syntax error (code '02') is returned.

2.1 Example

Below you will find an example of the Submit Short Message operation (OT 51) and its acknowledgement by the SMSC. The alphanumeric message sent to the subscriber with the MSISDN 01727654321 is "D2 Message". An authentication code for the message is declared and the (generic) originator address is 12345:

stx03/00107/O/51/01727654321/12345/55555/1/01720123445

TRN
LEN
Operation
Operation Type
Recipient Address
Originator Address
Authentication Code
Notification Requested
Notification Address

//0100////////////3//4432204D657373616765////////////90etx

Notification PID=Mobile
MessageType
Message Text : D2 Message
Checksum
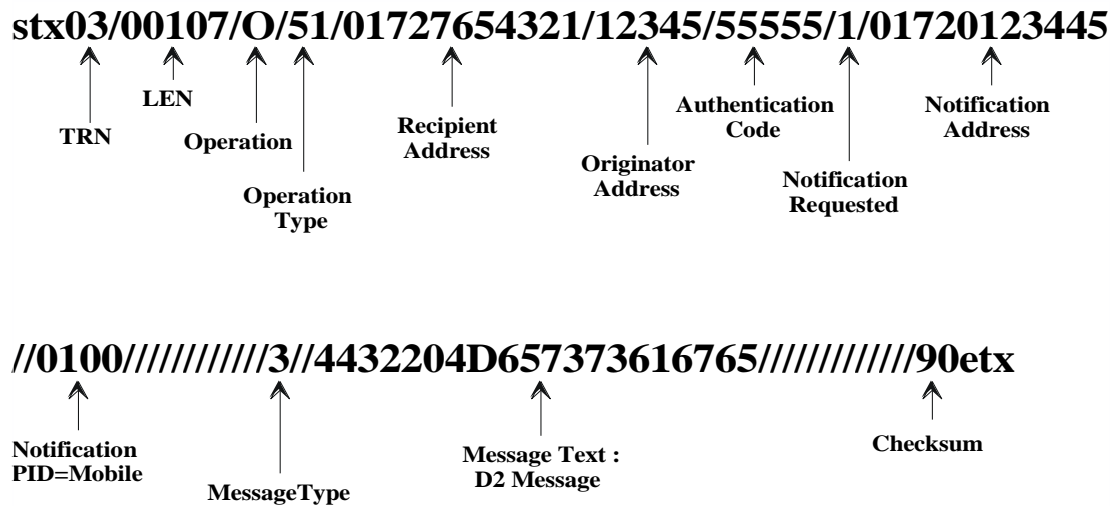
Figure 2.1   Example of a Submit Short Message operation

The Notification requested in the example will be sent to a Mobile Station. This means that after the first delivery attempt, a short message (Notification) shall be generated and sent to the MS with the subscriber number 01720123445. It shall inform the MS about the outcome of the delivery attempt, indicating either a successful delivery, a permanent error cause for non delivery (e. g. the recipient doesn't exist) or a temporary error cause (e. g. subscriber absent, subscriber's SIM full, subscriber's MS not capable of receiving the SM), after which a retry mechanism is started. Let's assume that the recipient has switched off his MS at the time the first delivery is attempted. The 'notification' short message sent to 01720123445 shall inform the MS that the SM has been stored in the SMSC. As soon as the recipient switches his MS on he shall receive the SM, and a second 'notification' short message shall be sent to 01720123445, informing about the successful final delivery. If the recipient does not switch-on his MS for 2 days (48 hours), the SM shall be deleted in the SMSC. A notification shall then inform the MS '01720123445' about the non-delivery with a specific reason code (in this case 'Validity Period expired').

Notifications can also be sent to the application itself. The NPID must then either be left empty, or be set to 0539 (TCP/IP). They will be sent as 'delivery notification' (see chapter 4.5.4) and have to be acknowledged. Note that if no notification address (NAd) and Notification PID (NPID) are indicated, notifications shall only be sent during the active session. Furthermore, for notifications sent to users which do not automatically provide their CLI (SMSC accessed via PSTNa and modem) and for which no subscription is possible with the SMSC, notifications shall be sent only during the first active session, during which the message to the MS was submitted (i. e. the SMSC shall never call the application via PSTN/Modem).

stx03/00044/R/51/A//01727654321:311096100853/6Fetx

TRN
LEN
Operation
Operation Type
Ack
Recipient Address
SC Time Stamp
Checksum

Figure 2.2   Example of a Submit Short Message operation ACK

3 EMI operation overview

EMI commands can be initiated either from the Application, or from the SMSC. Each command will be acknowledged, either with an ACK or a NAK.

Please consider in your applications that reserved and unused information fields in UCP messages are subject to changes (with respect to the allowed format described in this specification)!

Please ensure that your applications can handle modifications of these fields due to introduction of new SMS features.

3.1 Application initiated commands

The following Short Message Terminal (SMT) initiated operations are available:

Operation Type	Operation
01	Call input operation[1]
31	SMT alert operation
51	Submit Short Message operation
55	Inquiry Message operation
56	Delete Message operation
60	Session Management

[1] For SMS submission it is recommended to use the 51-operations only.

The *'Submit Short Message'* operation (OT-51) is the recommended mean of submitting a short message. Several GSM phase 2 features are taken into account and in future, parameters for new functionalities will be implemented here. The *'SMT Alert'* operation (OT-31) is a mean to trigger a new delivery attempt of messages, buffered in the SMSC, to a particular mobile station or application. The '*Inquiry Message'* (OT-55) and *'Delete Message'* (OT-56) operations enable the user to keep control over messages that were already submitted to the SMSC but are not delivered yet. Those operations are, however, only possible if the connection to the SMSC uses the Calling Line Identification (TCP/IP) or authentication codes were associated with the messages. Refer to chapter 4.7 for a detailed functional specification of those commands. Finally, the *'Call Input'* (OT-01) operation is a simple operation type that offers just the basic functionality for submitting a short message. Not all new features will support this operation type in the future.

Note: If the message length of a message submitted to the SMSC exceeds 160 characters it is segmented in the SMSC before being delivered to the MS. *LONG# is added as first characters of the user data in the first messages, *LAST# is added to the last short message. Messages are split in the SMSC at the last 'space' character that appears in a segment of 160 characters. Up to 640 chars can be used as maximum length in the SMSC. This holds true for Operation types 01, 51 and 52.

Transparent messages have a maximum length of 140 bytes. No 'long message' functionality applies here.

Only IA5 characters (Codes 0x00 - 0x7F) are supported for the submission of EMI messages to the SMSC. The characters Ä, Ö, Ü, ä, ö, ü, ß can be submitted using the German national replacement codes (see annex B). In the other direction,

however, the SMSC may submit characters whose code exceeds 0x7F according to the table in Annex B.

If the SMSC is accessed using the UCP operations (OT-51, -55, -56) it shall respond with the operations (OT-53, -57, -58) respectively.

If the SMSC is accessed by a CLI session (TCP/IP), the SMSC shall include the CLI in the originator field of the SMS-MT, in case the originator address field OAdC is left empty in the UCP operation. Therefore, the OAdC must contain at least a dummy address, if the CLI is not to be shown to the mobile end user. Note that the OAdC has to be included in the operations 5x.

3.2 SMSC initiated operations

SMSC initiated operations (used to deliver Notifications or Mobile Originated Short Messages) are:

Operation Type	Operation
01	Call input operation
52	Delivery short message operation
53	Delivery notification operation
57	Response inquiry operation
58	Response delete message operation

Important Note:

Mobile originated Short Messages are *always* submitted to the LA within the 52-operation type. This is in contrary to the past where GSM Phase1 MO-messages were transmitted within OT-01 and messages containing GSM Phase2 parameters within OT-52.

Note: There are various alternatives to address the application. These options are mentioned and described in chapter 1.5 (VSMSC), 1.6 (Short numbering) and 1.7 (MULA).

4 <u>EMI operations Syntax</u>

This chapter shows the syntax of the *data fields* of the EMI commands. For the syntax of the complete messages, please refer to chapter 2, structure of the EMI message.

For the data field syntax one has to differentiate between the basic commands (OT-01, OT-31) and the extended OT-5x operations. The basic commands have individual data field structures for each command and response. For the 5x-operations a generic Abstract Data Type (ADT) has been introduced. This leads to a higher maintainability in the case of protocol improvements.

4.1 Address syntax

For all addresses used in the EMI-messages the following syntax rules are valid:

The address syntax should have the following format:

00<Country Code><National Destination Code><Subscriber Number>
Or
0<National Destination Code><Subscriber Number>;

E.g.:   0172<Subscriber Number>   or
          0049172<Subscriber Number>

Notes:
In case the above syntax is not followed, messages may not get delivered. Due to MNP, other nationals NDCs (0160, 0170, etc.) are also allowed.

Prefixes can be omitted if the originator is a VFD2 mobile subscriber using the asynchronous mobile data services to access the SMSC.

4.2 Parameters used in operations

This section gives an introduction to all the parameters of the data-field used in the EMI operations. They apply as well for the basic commands as for the 5x-operations. If some of the parameters are restricted in their range for one particular command, it is explicitly mentioned in the command description. The general structure of the data-field is described in chapter 4.5.1

Parameter	X: only restricted to LA	Meaning
AdC		Address code recipient for the SM
OAdC		Address code originator (**only numeric**)
AC		Authentication code originator; this parameter can be used to mark one message. The AC must be used? for the inquiry/delete function in no CLI sessions; see chapter 4.7 for more details. The AC has to consist of at least 4 numeric digits.
NRq		Notification Request If set to '1' notification message shall be generated. If the fields NAdC, NT, NPID are left empty, notifications shall be sent to the application during the active session only. No notifications will be sent to the application via PSTNa/modem in a subsequent session.

NAdC	Notification Address code(**only** VF D2 customer's address allowed) If the notification shall be send to a MS, the NAdC is <0172> (or 0173) + <recipient address of the notification>
NT	Notification type: Buffered Notification (BN), Delivery Notification (DN) or Non Delivery Notification (ND) 0 Default 1 DN 2 ND 3 ND+DN 4 BN 5 BN+DN 6 BN+ND 7 BN+DN+ND Default setting is 7 (BN+DN+ND).
NPID	Notification PID value: 0100 Mobile Station 0539 PC application. over TCP/IP
DD	Deferred Delivery Requested 1 DD is requested empty no DD requested
DDT	Deferred Delivery time in DDMMYYhhmm
VP	Validity period in DDMMYYhhmm The maximum validity period is set to 2 days at the moment.
RPID	Relay PID value. Used to transparently pass a PID to a MS. (0064..0071) Refer to annex E i) and [1] for further Information.
SCTS	Service Centre Time Stamp in DDMMYYhhmmss. For a Short Message this is the time stamp of the Short message itself. For a notification this is the time stamp of the Short message to which the notification belongs to.
DSt	Delivery Status: 0 Delivered 1 Buffered (See parameter Rsn) 2 Not delivered (See parameter Rsn)
Rsn	Reason code, value "000"..."255" Indicates for what reason a short message was not delivered. Refer to annex C.
DSCTS	Delivery Service Centre Time Stamp in DDMMYYhhmmss. Indicates when the Short Message has been delivered/when a SM delivery attempt takes place.
MT	Message type. Associated parameters depend on the value of the message type: 2 Numeric message 3 Alphanumeric message 4 Transparent message

NB		No. of bits in Transparent Data (TD) message. This field is always left empty (but present) if MT ≠ 4. Transparent data means, that no data conversion from/to SMS alphabet takes place in the SMSC. The user data is transparently passed to/from the mobile station.
Msg		Numeric (NMsg)-/alphanumeric (AMsg)-/transparent (TMsg) message depending on the message type.
MMS	X	More messages to send to the same SME Values: empty No more messages 1 More messages or notifications from SMSC to come
DCS		Data Coding Scheme (used in OT-52 only) 0 Default Alphabet 1 User defined data (transparent data)
MCI		Message Class Type, if MT=4 and no XSer "GSM DCS information is used (Refer to [2] for further information). 0 Immediate Display on the MS. SM may not be stored. 1 Message stored in the mobile. 2 Message stored on the SIM. 3 Message to be sent to terminal equipment.
OTOA[1]	X	Originator Type Of Address Set this field to ´1139´ if the OAdC should be set to NPI 'ISDN' and TON 'international' else leave this field empty.

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[1] <u>IMPORTANT</u>: In case the SMS submitted is replied back by the mobile, it is mandatory to leave this field empty. As otherwise, SMSC might not accept the return message from the mobile.

XSer	restricted for LA in OT-52	Extra Services With the XSer field one or more additional services can be specified. These services consist of IA5 encoded data constructed in the following common format: TTLLDD… where
		TT = 01; with this service type **GSM UDH** information can be specified
		TT = 02; with this service type **GSM DCS** information can be specified
		TT = 0D; with this service type **GSM Single Shot** information can be specified
		TT = 00 is not used, and 03...0C and 0E...FF are reserved
		LL represents two HEX characters defining the number of octets present in the data field DD. (Note that the number of *HEX characters* in the data DD is twice the number of *octets*)
		DD represents a stream of HEX characters defining the service specific data itself.
		If more than one additional service is to be specified in one message, this service information is concatenated without any separators, i.e. $TT_1LL_1DD_1…DD_1TT_2LL_2DD_2...DD_2$
		Note. This feature is only available for LA connections and is a **Contract Issue** option. Refer to annex E ii) /iii) for further information.

4.3 Parameters used in responses

This section gives an introduction to all the parameters used in the EMI responses. That means all messages sent from/to the SMSC indicate the acceptation of a command with an acknowledge message (ACK) or the rejection of an invalid command with a negative acknowledgement message (NAK). They apply for the basic commands as well as for the 5x-operations. If some of the parameters are restricted in their range for one particular command, it is explicitly mentioned in the command description

Parameter	Meaning
ACK	Positive acknowledgement: Char "A" Indicator for an acknowledgement.
NAK	Negative acknowledgement: Char "N" Indicator for a negative acknowledgement.
EC	Error Code The list of all error codes can be found in annex A.
SM	System message A description of the SM parameter is given below.
MVP	Modified validity period Returns the maximum allowed validity period if the requested VP exceeds the maximum allowed value for VP.

The SM parameter contains the following three fields:

Parameter	Meaning
AdC	Address code recipient
SEP	Separator Char ':'
SCTS	Service Centre time-stamp in DDMMYYhhmmss

Note: If the response is a NAK so the **SM parameter** could also contain the error description (optional), e.g. stx05/00035/R/51/N/02/ **Syntax error**/FFetx

4.4 Basic operations

4.4.1 Call input operations (OT-01)

This message can be used to submit an alphanumeric or numeric message to the SMSC. Please take note of the fact that we recommend to make use of the 51-operations instead. The functionality of the 01-operations will *not* be extended with further GSM Phase2 features in the future. The following list shows the parameters in the operation data field:

Parameter	Presence	Description/Remarks
AdC	M[1]	Address code recipient
OAdC	O[2]	Address code originator
N.A.	-	Not Applied (but present)
MT	M	Message type (only MT 2/3 supported)
MSG	O	Numeric/alphanumeric message

Call input operation (positive result)

The following list shows the parameters in the positive result data field:

Parameter	Presence	Description/Remarks
ACK	M	Positive acknowledgement
SM	O	System message

Call input operation (negative result)

The following list shows the parameters in the negative result data field:

Parameter	Presence	Description/Remarks
NAK	M	Negative acknowledgement
EC	M	Error code
SM	O	System message

The error codes can be found in annex A.

Example

Of a **call input operation,** the alphanumeric message is: ´Test´:

> **stx01/00044/O/01/01720123445/2323//3/54657374/55etx**

The call input operation **positive result** of this message is:

> **stx01/00042/R/01/A/01720123445:091198080245/0Detx**

Of a call input operation **negative result** of a message with a (faulty) message type (MT=1) is:

> **stx01/00059/O/01/N/23/ Message type not supported by system/09etx**

---

[1] Mandatory
[2] Optional

4.4.2 SMT alert operation (OT-31)

The SMT alert operation can be used by a SMT to alert the SC. This leads to a new delivery attempt, independent from the current retry schedule. That can be done not just for the own LA, but for any recipient by indicating the AdC in combination with an appropriate PID in the command. The following list shows the parameters in the operation data field:

Parameter	Presence	Description/Remarks
AdC	M	Address code recipient
PID	M	compare NPID

<u>SMT alert Operation (positive result)</u>

The following list shows the parameters in the positive result data field:

Parameter	Presence	Description/Remarks
ACK	M	Positive acknowledgement
SM	O	all four digits are zero

<u>SMT alert operation (negative result)</u>

The following list shows the parameters in the negative result data field:

Parameter	Presence	Description/Remarks
NAK	M	Negative acknowledgement
EC	M	Error code
SM	O	System message

The error codes can be found in annex A.

Example of a **SMT alert operation** to the mobile subscriber 01720123445:

> **stx23/00032/O/31/01720123445/0100/E7etx**

The SMT alert operation **positive result** of this message is:

> **stx23/00023/O/31/A/0000/28etx**

4.5 Extended operations

This chapter introduces the extended UCP operations. The following table gives an overview about the available operation types:

Message	UCP operation	Name
SUBS	51	Submit_short_message
DELS	52	Delivery_short_message
DELN	53	Delivery_notification
INQM	55	Inquiry_message
DELM	56	Delete_message
RINQ	57	Response_inquiry_message
RDEL	58	Response_delete_message

These extended operation types have been introduced in order to provide more facilities to the SMSC users.

To new implementations it is advised to use the operations defined in this chapter if they want to make use of the extended features such as transparent data transfer, inquiry and deletion, replacement of obsolete messages etc.

Implementations based on the Abstract Data Types introduced in this chapter will be easily adaptable to extensions of the protocol due to new GSM features.

4.5.1 Abstract Data Types

This chapter describe the structure of the data-field. For a higher maintainability a new generic Abstract Data Type (ADT) is introduced for all these new UCP operations. *All 5x series UCP strings including responses contain all fields listed; fields not appropriate are left empty.*

The following table shows the type of data for each member of the generic ADT.

Member	Max. Length	Type
AdC	16	String of numeric char
OAdC	16	String of numeric char
AC	16	String of numeric char
NRq	1	1 numeric char
NAdC	16	String of numeric char
NT	1	1 numeric char
NPID	4	4 numeric char
N.A.	x	String of char
N.A.	x	String of char
N.A.	x	String of char
DD	1	1 numeric char
DDT	10	10 numeric char
VP	10	10 numeric char
RPID	4	4 numeric char
SCTS	12	12 numeric char
DSt	1	1 numeric char
Rsn	3	3 numeric char
DSCTS	12	12 numeric char
MT	1	1 numeric char

NB	4	max 4 numeric char
AMsg[1]	160	String of alphanumeric char
TMsg[1]	140	String of transparent char
NMsg[1]	160	String of numeric char
MMS	1	1 numeric char
N.A.	1	1 numeric char
DCS	1	1 numeric char
MCl	1	1 numeric char
N.A.	1	1 numeric char
N.A.	x	String of char
N.A.	x	String of char
OTOA	4	String numeric char
N.A.	x	String of char
XSer	400	String of char
RES4	x	String of char
RES5	x	String of char

[1]Only one message contents field is present in the UCP string depending on the message type (MT).

All reserved (RES) or not applied (N.A.) fields must be present in the UCP string *but* shall remain empty.

A generic ADT for the UCP response is defined as follows:

For a positive response:

Member	Type
ACK	Positive Acknowledgement
MVP	Modified Validity Period
SM	System Message

Note: The MVP field is always present in the responses to the 5x operations. It is only used in the ACK for operation 51. The application should leave this field empty.

For a negative response:

Member	Type
NAK	Negative Acknowledgement
EC	Error Code
SM	System Message

The advantage of using the generic ADT for all extended UCP operations is that one standard UCP string can be used for all operations. The UCP string is build as defined in chapter 2.

The data field always contains ALL fields listed in the 5x series generic ADT. These fields are separated by a '/'. If one member of the ADT is not used in a specific message type, its place in the data string is empty but the field separators will be present in the UCP string (see examples).
This format provides a high degree of flexibility as well as upwards compatibility to future UCP operations.
This does also apply for the responses. For example the positive response message contains the MVP field. This field is only used for the SUBS message positive response, in all other cases this field is left empty, but it does exist. Of course, non 5x operations are still acknowledged the usual way.

4.5.2 Submit short message operation (OT-51)

This message is used to submit a short message to the SMSC. It also supports the additional features:

Notification request	Authentication code
Deferred delivery	Validity period
Replace short message	Message classes
Binary messages	Transparent PID
Originator Type Of Address	User Data Header information

Parameter	Presence	Description/Remarks
AdC	M	Address code recipient
OAdC	M	Address code originator
AC	O	Authentication code originator
NRq	O	Notification requested
NAdC	O	Notification address
NT	O	Notification type
NPID	O	Notification interworking type
DD	O	Deferred delivery requested
DDT	O	Deferred delivery time
VP	O	Validity period
RPID	O	Relay PID
MT	M	Message type
NB	M	Number of bits (just for transparent message with MT=4)
MSG	O	Numeric/alphanumeric/transparent message
MCI	O, (M)	Message class. Shall be supplied when MT=4 and XSer "GSM DCS information" is <u>not</u> supplied (so mandatory for transparent message)
OTOA [1]	O	Originator Type Of Address
XSer [2]	O	Extra Service

Notes:
Please refer to Chapter 4.1 for Address syntax in AdC field
Inquire and Delete operations on a message that has OTOA content are not possible.

<u>Submit short message operation (positive result)</u>

The following list shows the parameters in the positive result data field:

Parameter	Presence	Description/Remarks
ACK	M	Positive acknowledgement
MVP	M	Modified validity period
SM	O	System message

Note: The MVP field shall return the maximum allowed validity period if the requested VP exceeds the maximum allowed VP.

---

[1] <u>IMPORTANT</u>: In case the SMS submitted is replied back by the mobile, it is mandatory to leave this field empty. As otherwise, SMSC might not accept the return message from the mobile.
[2] XSer: More details can be found in annex E ii), iii) and iv)

Submit short message operation (negative result)

The following list shows the parameters in the negative result data field:

Parameter	Presence	Description/Remarks
NAK	M	Negative acknowledgement
EC	M	Error code
SM	O	System message

The error codes can be found in annex A.

Examples

1.) Of **submit short message operation** with a notification request that will be sent to another mobile subscriber 01720123445 only if the message is delivered; the Text Message is ´§D2 Message´:

**stx00/00104/O/51/0172123456/111111//1/01720123445/0/0100/////////
///3//5E4432204D657373616765/////////////E6etx**

Submit short message operation **positive result** of this message is:

stx00/00043/R/51/A//0172123456:091198081547/47etx

2.) Of **submit short message operation** with a deferred delivery requested (DD=1) at the time 05.11.98 10.22 h. A notification request will be sent to a PC application over TCP/IP only if the message is buffered in the SMSC; the Text Message is ´Switched-Off-MS´:

**stx12/00121/O/51/0172223322/5555//1/0212123456/4/0539////1/0511981022///
////3//53776974636865642D4F66662D4D53////////////7Eetx**

3.) Of **submit short message operation** with a deferred delivery requested at the time 06.11.98 10.45 h and a faulty (the VP-Time is of recent time than the DD-Time) validity period at 06.11.98 10.43 h; the message is ´VALIDITY´:

**stx36/00101/O/51/0172123456/1111/////////1/0611981045/0611981043//////3/
/56414C4944495459////////////66etx**

Submit short message operation **negative result** of this message is:

stx36/00059/R/51/N/22/ Not accepted - Invalid delivery time/4Betx

4.) Of **submit short message operation** with transparent Message which is 160 octet long (> 140 octet (!)). Therefore two Message must be send to the Mobile (the Messages are stored in the mobile -> MCI = 1). To mark the messages as concatenated the XSer field must be used:

> **stx00/00356/O/51/0173223322/223344//1///////////////4/1080/12345678901234567 89012345678901234567890123456789012345678901234567890123456789012345678901 23456789012345678901234567890123456789012345678901234567890123456789012345 67890123456789012345678901234567890123456789012345678901234567890123456789 012345678901234567890123456789012345678901234567890123456789012345678901234567890////1/ /////01050400220201///78etx**

> **stx00/00136/O/51/0173223322/223344//1///////////////4/0200/12345678901234567 89012345678901234567890123456789012345678901234567890////1//////01050400220202///50etx**

Note: The XSer field has the value ´01050400220202´, whereas the third to last octet ´0105**0400220202**´ marks that a UDH is uses; e.g. 00 marks it as concatenated and 22 is the conc. SM reference number.

More details can be found in annex E ii) and iii)

4.5.3 Delivery short message operation (OT-52)

This message (DELS) contains the information for a delivery attempt of a short message. A DELS operation is sent from the SMSC to the SME.
This UCP message is only restricted to Large Accounts.

Parameter	Presence	Description/Remarks
AdC	M	Address code recipient
OAdC	M	Address code originator
RPID	M	Relay Protocol Identifier
SCTS	M	Service Centre Time Stamp
MT	M	Message type
NB	O	Number of bits (just for transparent message with MT=4)
MSG	O	Numeric/alphanumeric/transparent message
MMS	O	More messages to send
DCS	O	Data coding scheme
MCI	O	Message class (mandatory for transparent message)
XSer[1]	O	Extra Service

[1] In case that **no** User Data Header message is submitted to a LA, it could be that the value of this field is ´0000´. More details can be found in annex E ii), iii) and iv)

Delivery short message operation (positive result)

The following list shows the parameters in the positive result data field:

Parameter	Presence	Description/Remarks
ACK	M	Positive acknowledgement
MVP	M	N.A.
SM	O	System message

Note that the empty MVP field is present.

Delivery short message operation (negative result)

The following list shows the parameters in the negative result data field:

Parameter	Presence	Description/Remarks
NAK	M	Negative acknowledgement
EC	M	Error Code
SM	O	System message

The error codes can be found in annex A.

Examples of a **delivery short message**:

The alphanumeric message ´Test OT-52´ is received from originator 01720123445:

> **stx40/00105/O/52/003333/01720123445/////////////0000/061198112237////3/
> /54657374204F542D203532//////////////31etx**

The delivery short message **'positive result'** of this message is:

> **stx40/00039/R/52/A//003333:061198112224/6Eetx**

If a User Data Header Message is used in a **delivery short message**, the XSer field contains some octets:

> **stx02/00377/O/52/0211591750/01726813735/////////////0000/290799101514////4
> /1024/3000000568616C6C6F02010000481C010000000000001C0000000000
> 07E0007200000000003C1001C10000000001E010FE03E00000001F000BFF
> 8FF8000000F00007FFDFFC00000080000FEDFFDC000000602A0F7FEFCE
> 0000001FD41E7FF7EE00000000601CFFF7EE00000007801CFFF3FE00000
> 004001CFFFBFE0000000305///1/1//////010C0B0504158A00000003030301///
> 5Fetx**

The value in the XSer field ´010C0B0504158A00000003030301´ marks the first message of overall three concatenated short messages and application port addressing scheme 16 bit.

Examples of a **delivery short message**:

4.5.4 Delivery notification operation (OT-53)

This message (DELN) is sent from the SMSC to the SME and contains the information concerning the delivery of a short message. This notification has now its own specific operation code.

Parameter	Presence	Description/Remarks
AdC	M	Address code recipient
OAdC	M	Address code originator
SCTS	M	Service Centre Time Stamp
DSt	M	Delivery Status
Rsn	M	Reason Code
DSCTS	M	Delivery Service Centre Time Stamp
MT	M	Message Type (always 3)
AMsg	O	Alphanumeric message
MMS	O	More messages to send

Notifications may be sent whenever a state transition buffered/delivered/deleted takes place for a submitted message. Notifications shall not be sent if two subsequent delivery attempts return different error messages which both lead to the buffering of messages.

Delivery notification operation (positive result)

The following list shows the parameters in the positive result data field:

Parameter	Presence	Description/Remarks
ACK	M	Positive acknowledgement
MVP	M	N.A.
SM	O	System message

Note that the empty MVP field is present (see last section of 4.5.1).

Delivery notification operation (negative result)

The following list shows the parameters in the negative result data field:

Parameter	Presence	Description/Remarks
NAK	M	Negative acknowledgement
EC	M	Error Code
SM	O	System message

The error codes can be found in annex A.

Example of **delivery notification operation** which belongs to the notification request in chapter 4.5.2, example 2.):

> **stx12/00376/O/53/0211123456/0172223322//////////////051198101841/1/107/051198102**
> **200/3//4E61636872696368742066756572203031373236383133373335352C204964656**
> **E746966697A696572756E672039383131303531303138343132C20697374206765737**
> **06569636865727420776F7264656E2C20646120456D706661656E67657220766F727**
> **565626572676568656E64206E69636874206572726569636861722028436F646520**
> **313037292E////////////9Detx**

This message (AMsg) ´*Nachricht fuer 0172223322, Identifizierung 981105101841, ist gespeichert worden, da Empfaenger voruebergehend nicht erreichbar (Code 107).*´ was sent to the PC application over TCP/IP, because the MS was not available so the submitted short message was buffered in the SMSC.

The delivery notification operation **positive result** is:

> **stx12/00020/R/53/A///99etx>**

4.5.5 Inquiry message operation (OT-55)

This message is sent by the SME to the SMSC inquiring about a buffered message.

Parameter	Presence	Description/Remarks
AdC	M	Address code recipient
OAdC	M	Address code originator
AC	O	Authentication Code

Note: Refer to chapter 4.7 for a detailed specification of this functionality

Inquiry message operation (positive result)

The following list shows the parameters in the positive result data field:

Parameter	Presence	Description/Remarks
ACK	M	Positive acknowledgement
MVP	M	N.A.
SM	O	System message

Note that the empty MVP field is present.

Inquiry message operation (negative result)

The following list shows the parameters in the negative result data field:

Parameter	Presence	Description/Remarks
NAK	M	Negative acknowledgement
EC	M	Error Code
SM	O	System message

The error codes can be found in annex A.

Example of an **inquiry message operation** on recipient 01720123445 from originator 5555:

   stx49/00063/O/55/01720123445/5555///////////////////////////////////BDetx

The inquiry message operation **positive result** is:

   stx49/00020/O/55/A///A2etx

4.5.6 Delete message operation (OT-56)

This message is sent by the PC to the SMSC requesting the deletion of one or more messages which are still buffered. These messages are submitted by the PC destined to a certain recipient.

Parameter	Presence	Description/Remarks
AdC	M	Address code recipient
OAdC	M	Address code originator
AC	O	Authentication Code
MT	M	Message type (always 3)
AMsg	O	Alphanumeric message
MMS	O	More messages to send

The alphanumeric message field (AMsg) contains the timestamps of the messages to be deleted. The format is YYMMDDhhmmss. Timestamps are separated by spaces.

Note: The format of the SCTS in inquiry/delete operations differs from the format used in other commands described before.

Refer to chapter 4.7 for a detailed specification of the inquiry/delete functionality.

Delete message operation (positive result)

The following list shows the parameters in the positive result data field:

Parameter	Presence	Description/Remarks
ACK	M	Positive acknowledgement
MVP	M	N.A.
SM	O	System message

Note that the empty MVP field is present.

Delete message operation (negative result)

The following list shows the parameters in the negative result data field:

Parameter	Presence	Description/Remarks
NAK	M	Negative acknowledgement
EC	M	Error Code
SM	O	System message

The error codes can be found in annex A.

Example of **delete message operation** with timestamp ´981106153700´ is:

**stx77/00088/O/56/0172223322/2222//////////////////3//39383131303631353337303/////
/////////B3etx**

The delete message operation **positive result** is:

stx77/00020/O/56/A///A4etx

4.5.7 Response inquiry message operation (OT-57)

The Response inquiry (RINQ) message contains a short message which is the response of the SMSC to an inquiry message. A RINQ is sent by the SMSC to the PC.

Parameter	Presence	Description/Remarks
AdC	M	Address code recipient
MT	M	Message type (always 3)
AMsg	O	Alphanumeric message
MMS	O	More messages to send

The alphanumeric message field contains the timestamps (format YYMMDDhhmmss) of the buffered messages for the specified recipient. The format of the message is:

> Nachricht für <AdC>, Identifizierung [SCTS1] [SCTS2] [...]

If no messages are buffered in the SMSC for that recipient, the [SCTS] fields are left empty.

Note: The format of the SCTS in inquiry/delete operations differs from the format used in other commands described earlier.

Response inquiry operation (positive result)

The following list shows the parameters in the positive result data field:

Parameter	Presence	Description/Remarks
ACK	M	Positive acknowledgement
MVP	M	N.A.
SM	O	System message

Note that the empty MVP field is present.

Response inquiry operation (negative result)

The following list shows the parameters in the negative result data field:

Parameter	Presence	Description/Remarks
NAK	M	Negative acknowledgement
EC	M	Error Code
SM	O	System message

The error codes can be found in annex A.

Example of a **response inquiry message operation** that belongs to the example in Chapter 4.5.5 (OT-55):

> **stx/02/00176/O/57/02111234//////////////////3//4E61636872696369687420667565722020203**
> **031373230313233334343435202C204964656E746966696697A696572756E672020393831**
> **313036313330373534/////////////F7/etx**

The alphanumeric message is:
´Nachricht fuer 01720123445, Identifizierung 981106130754´.

The response inquiry operation **positive result** of this message is:

> **stx02/00041/O/57/A//02111234:061198130855/D3etx**

4.5.8 Response delete message operation (OT-58)

The Response delete message (RDEL) contains a short message which is the response of the SMSC on a Delete short message (DELS). A RDEL is sent by the SMSC to the PC.

Parameter	Presence	Description/Remarks
AdC	M	Address code recipient
MT	M	Message type (always 3)
AMsg	O	Alphanumeric message
MMS	O	More messages to send

The alphanumeric message field contains the timestamps (format YYMMDDhhmmss) of the deleted messages for the specified recipient. The format of the message is:

> Nachricht für <AdC>, Identifizierung [SCTS1] [SCTS2] [..] ist gelöscht worden.

If no messages were deleted in the SMSC for that recipient, the [SCTS] fields are left empty.

Note: Be aware that the format of the SCTS in inquiry/delete operations differs from the format used in other commands described before.

Response delete operation (positive result)

The following list shows the parameters in the positive result data field:

Parameter	Presence	Description/Remarks
ACK	M	Positive acknowledgement
MVP	M	N.A.
SM	O	System message

Note that the empty MVP field is present.

Response delete operation (negative result)

The following list shows the parameters in the negative result data field:

Parameter	Presence	Description/Remarks
NAK	M	Negative acknowledgement
EC	M	Error Code
SM	O	System message

The error codes can be found in annex A.

Example of **response delete message operation** that belongs to the OT-56:

> **stx09/00220/O/58/02111234/////////////////3//4E61636872696368674206675657220202030303
> 13732323233333232202C204964656E746966669697A696572756E67202039383131303
> 631353332343120206973742067656C6F65736368674207766F7264656E2E/////////////53e
> tx**

The alphanumeric message is:
´Nachricht fuer 0172223322, Identifizierung 981106153241 ist geloescht worden. ´

The response delete message operation **positive result** of this message is:

stx09/00041/O/58/A//02111234:061198153456/DDetx

4.6 Additional extended operation

This extended UCP operation is required for authorization of a specific LA at the SMSC.

Due to security reasons, the password is mandatory of all LA connections, who have signed a contract with VF D2. The only expection here is the anonymous connections

The password shall have a minimum length of eight digits and contain at least 2 alphanumeric and 2 numeric characters. IA5 encoding (refer to Annex B) doubles the length of the PWD field, hence a password ABCD0123 is encoded '4142434430313233'.

4.6.1 Parameters used in operations

This section gives an introduction to all the parameters used in the EMI operations of the 60 range. If some of the parameters are restricted in their range for one particular command, it is explicitly mentioned in the command description.

Parameter	Meaning
OAdC	Address code originator, **without prefixes** Important note : For multiple address Large Accounts the Large Account ID has to be indicated here instead. The Large Account should also use OTON=6 and ONPI=5 (see example 4.6.5)
OTON	Originator type of number 1 International number 2 National number (default) 6 Abbreviated
ONPI	Originator numbering plan indicator 1 ISDN/E.164 address (default) 3 X.121 address 5 Private
STYP	Subtype of operation STYP values differ according to the operation used. They are explained in further detail in the following chapters.
PWD	Current password encoded as IA5 characters (Note 1)
NPWD	New password encoded as IA5 characters (Note 1)
VERS	Version number (always set to 0100)

4.6.2 Parameters used in responses

This section gives an introduction to all the parameters used in the EMI responses of the 60 operation. That means all messages sent from the SMSC to indicate the acceptance of a command with an acknowledge message (ACK) or the rejection of an invalid command with

a negative acknowledgement message (NAK). If some of the parameters are restricted in their range for one particular command, it is explicitly mentioned in the command description

Parameter	Meaning
ACK	Positive acknowledgement Indicator for an acknowledgement.
NAK	Negative acknowledgement Indicator for a negative acknowledgement.
EC	Error Code The list of all error codes can be found in annex A.
SM	System message The system either contains an error description or is left empty.

4.6.3 Abstract Data Types

An abstract data type has been defined for operations 60 according to the same principles that apply for operations 5x (refer to section 4.5).

The following fields have been defined for the operation 60:

Member	Max. Length	Type
OAdC	16	String of numeric char
OTON	1	Numeric char
ONPI	1	Numeric char
STYP	1	Numeric char
PWD	16	String of char
NPWD	16	String of char
VERS	4	String of numeric char
N.A.	x	String of numeric char
N.A.	x	Numeric char
N.A.	x	Numeric char
RES1	x	String of numeric char
RES2	x	String of numeric char

A generic ADT for the UCP response is defined as follows:

For a positive response:

Member	Max. Length	Type
ACK	1	Char
SM	x	System message

Note: No MVP field is present in this message!

For a negative response:

Member	Max. Length	Type
NAK	1	Char

EC	1	Numeric char
SM	x	System message

4.6.4 Session management operation (OT-60)

This operation allows the LA to open a session and to modify submit and provisioning passwords.

Parameter	Presence	Description/Remarks
OAdC	M	Address code originator
OTON	O	Originator type of number (Note 3)
ONPI	O	Originator numbering plan indicator (Note 3)
STYP	M	Subtype of operation (Note 1)
PWD	(C)	Current password (Note 2)
NPWD	C	New password
VERS	M	Version number

Note 1   For operation type 60 there are three subtypes of operation available :

1   open session
2   reserved
3   change password

Note 2   The PWD and NPWD fields are used only if the password option is chosen by the Large Account

Note 3   The Large Account should set OTON=6 and ONPI=5

If the Large Account wants to submit messages he shall use the 'STYP' 1 when opening the session. If, however, he wants to perform list operations, he shall open the session with the 'STYP' 4. No messages can be submitted in a provisioning session.

For ordinary Large Accounts the combination of CLI, OAdC and PWD shall authenticate the Large Account. Therefore, OAdC and CLI must match. This does not necessarily apply to multiple address Large Accounts (refer to chapter 1.7).

The following list shows the parameters in the positive result data field:

Parameter	Presence	Description/Remarks
ACK	M	Positive acknowledgement
SM	O	System message

The following list shows the parameters in the negative result data field:

Parameter	Presence	Description/Remarks
NAK	M	Negative acknowledgement
EC	M	Error Code
SM	O	System message

The error codes can be found in annex A.

4.6.5 Examples

- **Large Account with an ISDN CLI connection:**

A provisioning session is opened and after setting up the connection, the following message can be submitted

STX 00/00061/O/60/2115990683/2/1/4/4142434430313233//0100//////8C ETX

The message is acknowledged by the SMSC in the following way:

STX 00/00019/R/60/A//6D ETX

- **Large Account with TCP/IP connection:**

For a "Large Account: 40547" and "Session Password: 40547See5" the following message can be submitted

STX 00/00058/O/60/40547/6/5/1/343035343753656535//0100//////0C ETX

The message is acknowledged by the SMSC in the following way:

STX 00/00019/R/60/A//6D ETX

4.7 Examples of the extended UCP messages

4.7.1 Transparent data message

The following example shows the transmission of a type 51 operation with a notification request and transparent data transfer.

stx01/00092/O/51/01721234567/7777777//1//////////////4/

TRN · LEN · Operation · Operation Type · Recipient Address · Originator Address · Notification Requested · MessageType

80/30313233343536373839////3/////////9E etx

Number of Bits · Message Text : 0123456789 · Message Class · Checksum
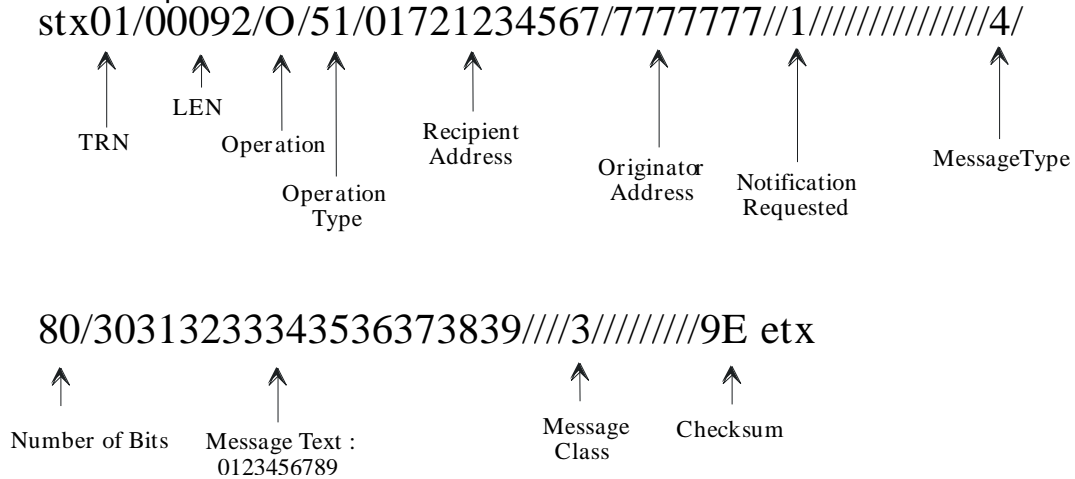
4.7.2 Alphanumeric message

The following example shows the transmission of a type 51 operation with a notification request to a mobile.

stx03/00107/O/51/01727654321/12345/55555/1/01720123445

TRN · LEN · Operation · Operation Type · Recipient Address · Originator Address · Authentication Code · Notification Requested · Notification Address

//0100////////////3//4432204D657373616765/////////////99etx

Notification PID=Mobile · MessageType · Message Text : D2 Message · Checksum
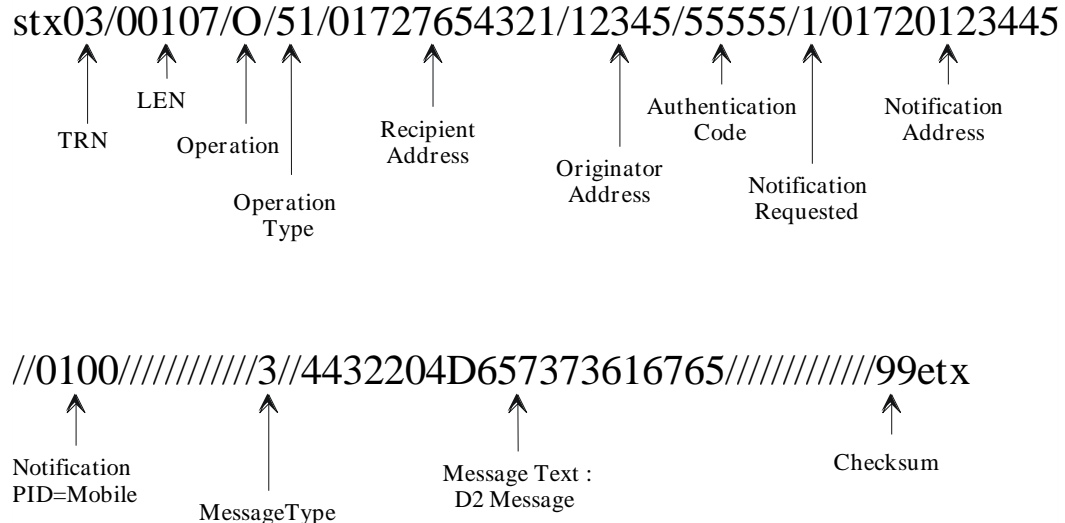
4.8 Inquiry and Delete functionality

This chapter gives a complete overview of the specifications on which the implementation of the inquiry/deletion functionality is based. All scenarios described below assume that a message has been submitted to the SMSC via UCP which has been buffered and on which an inquiry/deletion attempt is being performed.

Note: In all scenarios described below it is assumed that the original message submitted to the SMSC is buffered and the AdC of the original and the inquiry/deletion messages are the same.

1. *Functionality of Inquiry/Delete if CLI available:*

    The originator of the message shall be identified by the CLI <u>only</u>. Therefore, the following scenarios shall apply:

    a. A message is submitted for a mobile subscriber and is buffered in the SMSC. The OAdC field corresponds to the CLI or is left empty (i. e if the OAdC field is left empty, the SMSC shall assume that OAdC=CLI). The AC field is left empty.
        In this case, an inquiry/deletion of this message shall be possible <u>from the same CLI only</u>, if the OAdC in the inquiry/deletion message contains the CLI or is left empty.

    b. A message is submitted for a mobile subscriber and buffered in the SMSC. The OAdC field contains an address that is different from the CLI. The AC field is left empty.
        The inquiry/deletion of this message shall be possible only if the OAdC, and CLI for the original and the inquiry/delete messages <u>all</u> match. If the OAdC contains a different value or the CLI is different, an inquiry message shall return an empty inquiry notification. Deletion of the original message shall then not be possible.

        Note: This behaviour is not in contradiction with 1a. It means that there is no necessary relationship between the CLI and the OAdC. The OAdC may indicate a customer of the CLI-node. Nevertheless, even the external customer should be able to inquire upon/delete messages.

    c. *The AC field is used.* A message inquiry/delete shall be possible only if OAdC, AC and CLI match. If the AC, CLI or OAdC of the original message and the subsequent inquiry/deletion message do not match, an empty inquiry notification shall be returned.

        Note: The use of the AC field shall only be possible with operation 51.

2. *Functionality of Inquiry/Delete if <u>no</u> CLI available:*

    a. If the AC field of the original buffered message is left empty no subsequent inquiry/deletion shall be possible, neither during the session in which the original message was submitted nor during any other subsequent sessions.

    b. No OAdC indicated in the original buffered message, AC present. No inquiry/ deletion shall be possible for this message.

    c. OAdC and AC both present in the original buffered message. If the OAdC and the AC of both the original and the inquiry/deletion messages match, inquiry and deletion shall be possible.
        If the AC or the OAdC fields do not match an empty inquiry notification message shall be returned.

Annex A

Error Codes Overview

Error codes which can be returned in the operations negative result are listed in ETS 300 133 paragraph 9.2.6. All operations defined in the ERMES standard which are not implemented in the SMSC EMI return with error code 03 ("Operation not supported by system").

6.1 Error codes

01	Checksum error
02	Syntax error *
03	Operation not supported by system
04	Operation not allowed *
05	Call barring active *
06	AdC invalid
07	Authentication failure *
08	Legitimisation code for all calls, failure
09	GA not valid
10	Repetition not allowed
11	Legitimisation code for repetition, failure
12	Priority call not allowed
13	Legitimisation code for priority call, failure
14	Urgent message not allowed
15	Legitimisation code for urgent message, failure
16	Reverse charging not allowed
17	Legitimisation code for reverse charging, failure
18	Deferred delivery not allowed
19	New AC not valid *
20	New legitimisation code not valid
21	Standard text not valid
22	Time Period not valid
23	Message type not supported by system
24	Message too long
25	Requested Standard Text not valid
26	Message type not valid for the pager type
27	Message not found in SMSC
30	Subscriber hang-up
31	Fax group not supported
32	Fax message type not supported
33	Address already in list (60 series)
34	Address not in list (60 series)
35	List full, cannot add address to list (60 series)
36	RPID already in use
37	Delivery in progress
38	Message forwarded

* **Special occurance** of following error codes:

02 Error in NPID Parameter (SMS Message Transfer) or in the PID parameter (SMT alert)
04 Any internal error often of temporary nature (e.g. if the RAd:s (number of addresses) parameter contained more addresses that the specified maximum)
05 One of the addresses is on the blacklist
07 Authentication failure (PWD parameter in 60 series)
19 New AC not valid (NPWD parameter in 60 series)

Annex B

IA5 Character Sets used in the SMSC

Character	GSM 7 bit Alphabet	AT	AO	Character	GSM 7 bit Alphabet	AT	AO
@	00	40	40	+	2B	2B	2B
£	01	A3	01	,	2C	2C	2C
$	02	24	24	-	2D	2D	2D
¥	03	A5	03	.	2E	2E	2E
è	04	E8	04	/	2F	2F	2F
é	05	E9	05	0	30	30	30
ù	06	F9	06	1	31	31	31
ì	07	EC	07	2	32	32	32
ò	08	F2	08	3	33	33	33
Ç	09	C7	09	4	34	34	34
LF	0A	0A	0A	5	35	35	35
Ø	0B	D8	0B	6	36	36	36
∅	0C	F8	0C	7	37	37	37
CR	0D	0A	0D	8	38	38	38
Å	0E	C5	0E	9	39	39	39
å	0F	E5	0F	:	3A	3A	3A
Δ	10	81	10	;	3B	3B	3B
_	11	11	11	<	3C	3C	3C
Φ	12	82	12	=	3D	3D	3D
Γ	13	83	13	>	3E	3E	3E
Λ	14	84	14	?	3F	3F	3F
Ω	15	85	15	¡	40	A1	A1
Π	16	86	16	A	41	41	41
Ψ	17	87	17	B	42	42	42
Σ	18	88	18	C	43	43	43
Θ	19	89	19	D	44	44	44
Ξ	1A	8A	1A	E	45	45	45
1)	*1B*	*1B*	*1B*	F	46	46	46
Æ	1C	C6	1C	G	47	47	47
æ	1D	E6	1D	H	48	48	48
ß	**1E**	**7E**	**7E**	I	49	49	49
É	1F	C9	1F	J	4A	4A	4A
SP	20	20	20	K	4B	4B	4B
!	21	21	21	L	4C	4C	4C
"	22	22	22	M	4D	4D	4D
#	23	23	23	N	4E	4E	4E
¤	24	A4	02	O	4F	4F	4F
%	25	25	25	P	50	50	50
&	26	26	26	Q	51	51	51
'	27	27	27	R	52	52	52
(	28	28	28	S	53	53	53
)	29	29	29	T	54	54	54
*	2A	2A	2A	U	55	55	55

Character	GSM 7 bit Alphabet	AT	AO
V	56	56	56
W	57	57	57
X	58	58	58
Y	59	59	59
Z	5A	5A	5A
Ä	**5B**	**5B**	**5B**
Ö	**5C**	**5C**	**5C**
Ñ	5D	5F	5F
Ü	**5E**	**5D**	**5D**
§	**5F**	**A7**	**5E**
¿	60	BF	60
a	61	61	61
b	62	62	62
c	63	63	63
d	64	64	64
e	65	65	65
f	66	66	66
g	67	67	67
h	68	68	68
i	69	69	69
j	6A	6A	6A
k	6B	6B	6B
l	6C	6C	6C
m	6D	6D	6D
n	6E	6E	6E
o	6F	6F	6F
p	70	70	70
q	71	71	71
r	72	72	72
s	73	73	73
t	74	74	74
u	75	75	75
v	76	76	76
w	77	77	77
x	78	78	78
y	79	79	79
z	7A	7A	7A
ä	**7B**	**7B**	**7B**
ö	**7C**	**7C**	**7C**
ñ	7D	F1	1E
ü	**7E**	**7D**	**7D**
à	7F	E0	7F

Notes: The GSM 7 bit Alphabet is defined in the GSM recommendation 03.38 [2].

The SMSC uses the German National Replacement Codes (NRCs, s. ISO 21 German) for the representation of the characters ä, Ä, ö, Ö, ü, Ü, ß, §. They are highlighted in the IA5 character set table.

The column **AT** (Application Terminating: message character sent by the SMSC to the application over UCP) indicates the character mapping of GSM-alphabet to ISO8859-1.

The column **AO** (Application Originating: message character submitted by an application to the SMSC over UCP) indicates the character mapping from ISO8859-1 to GSM-alphabet.

Please note that the inexistent characters Δ, Φ, Γ, Λ, Ω, Π, Ψ, Σ, Θ and Ξ, are coded from Hex 81 to Hex 88.

Only IA5 characters coded Hex 00 to Hex 7F shall be accepted by the SMSC in the user data of UCP operations 01 and 51, whereas, the characters coded up to Hex FF may be submitted to the external application according to this table.

The table below depicts the coding of other supported characters, which do not exist in ISO8859-1:

Character	GSM 7 bit Alphabet	AT	AO
€	1B65	1B65	1B65
[	1B3C	1B3C	1B3C
]	1B3E	1B3E	1B3E
{	1B28	1B28	1B28
}	1B29	1B29	1B29
~	1B3D	1B3D	1B3D
\	1B2F	1B2F	1B2F
^	1B14	1B84	1B14
|	1B40	1BA1	1BA1

These characters are defined in the 7 bit default alphabet extension table of the 3GPP recommendation TS 23.038 [2]. This table also contain certain characters, which are only currently only supported over UCS2 and not as 7bit alphabet

Note: The character coding is subject to changes.

Annex C

Reason codes with the error messages reported in notifications

0x00000	0d000	—	Nachricht ausgeliefert (Message Delivered)
0x00001	0d001	T	Dienst vouebergehend nicht verfuegbar (Service temporary not available)
0x00002	0d002	T	Dienst vouebergehend nicht verfuegbar (Service temporary not available)
0x00003	0d003	T	Dienst vouebergehend nicht verfuegbar (Service temporary not available)
0x00004	0d004	T	Dienst vouebergehend nicht verfuegbar (Service temporary not available)
0x00005	0d005	T	Dienst vouebergehend nicht verfuegbar (Service temporary not available)
0x00006	0d006	T	Dienst vouebergehend nicht verfuegbar (Service temporary not available)
0x00007	0d007	T	Auslieferungsfehler: Unbekanntes Mobiltelefon (Unknown Mobile)
0x00008	0d008	T	Dienst vouebergehend nicht verfuegbar (Service temporary not available)
0x00009	0d009	T	Auslieferungsfehler: Verbotenes Mobiltelefon (Barred Mobile)
0x0000A	0d010	T	Auslieferungsfehler (Network timeout)
0x0000B	0d011	T	Auslieferungsfehler (Unknown error)
0x0000C	0d012	P	Auslieferungsfehler: Unbekanntes Mobiltelefon (Unknown Mobile)
0x00019	0d025	T	Empfaenger vouebergehend nicht erreichbar (Absent subscriber)
0x0001A	0d026	T	Systemfehler (System failure)
0x0001B	0d027	T	Empfaenger vouebergehend nicht erreichbar (Absent subscriber)
0x0001F	0d031	T	Auslieferungsfehler (Subscriber busy for MT SMS)
0x00022	0d034	T	Auslieferungsfehler (Unknown error)
0x00032	0d050	T	Speicherzeit abgelaufen (Validity Period Expired)
0x00064	0d100	P	Operation nicht unterstuetzt (Facility not supported)
0x00065	0d101	P	Empfaenger unbekannt (Unknown Subscriber)
0x00066	0d102	P	Dienst nicht verfuegbar (Service unavailable)
0x00067	0d103	T	Anrufsperre (Call barred)
0x00068	0d104	P	Operation gesperrt (Operation barred)
0x00069	0d105	T	Service Centre ueberlastet (SC congestion)
0x0006A	0d106	P	Dienst nicht unterstuetzt (Service not supported)
0x0006B	0d107	T	Empfaenger vouebergehend nicht erreichbar (Absent subscriber)
0x0006C	0d108	P	Auslieferungsfehler (Delivery failure)
0x0006D	0d109	T	Kein freier Speicher beim Empfaenger (Memory Capacity Exceeded)
0x0006E	0d110	T	Protokollfehler (Protocol error)
0x0006F	0d111	T	Mobiltelefon des Empfaengers ohne SMS (SMS not supported by Mobile)
0x00070	0d112	P	Service Centre unbekannt (Unknown SC)
0x00071	0d113	T	Service Centre ueberlastet (SC congestion)
0x00072	0d114	P	Auslieferungsfehler (Illegal MS)
0x00073	0d115	T	Empfaenger unbekannt (MS not a subscriber)
0x00074	0d116	T	Auslieferungsfehler (Error in MS)
0x00075	0d117	T	Auslieferungsfehler (SMS lower layer not provisioned)
0x00076	0d118	T	Systemfehler (System failure)
0x00077	0d119	T	Systemfehler (PLMN error)
0x00078	0d120	T	Systemfehler (HLR error)
0x00079	0d121	T	Systemfehler (VLR error)
0x0007A	0d122	T	vorheriger VLR Systemfehler (VLR error)
0x0007B	0d123	T	Auslieferungsfehler (Delivery failure)
0x0007C	0d124	T	Systemfehler (VMSC error)
0x0007D	0d125	T	Systemfehler (EIR error)
0x0007E	0d126	T	Systemfehler (System failure)
0x0007F	0d127	T	Unerwartete Daten (Unexpected data value)
0x00082	0d130	T	SMS Empfang gesperrt (Barring service active)
0x00083	0d131	P	SMS Empfang gesperrt (Operator barring)
0x00096	0d150	P	Empfaenger unbekannt (IMSI unknown)
0x00097	0d151	P	Empfaenger unbekannt (GPRS subscription unknown)
0x0009F	0d159	P	Operation Verboten (MNP other operator not allowed)
0x000C8	0d200	T	Fehler bei der Adressierung des Service Centers (Service Center error)
0x000C9	0d201	T	Ungueltige absolute Speicherzeit (Invalid value of Validity Period)
0x000CA	0d202	T	Nachricht groesser als Maximum (Maximum message length exceeded)
0x000CB	0d203	T	GSM-Nachricht kann nicht ausgepackt werden (GSM Message read error)
0x000CC	0d204	T	Uebersetzung in IA5 ALPHABET nicht moeglich (IA5 ALAPHABET translation error)
0x000CD	0d205	T	Ungueltiges Format der Speicherzeit (Invalid Validity Period format)
0x000CE	0d206	T	Ungueltige Empfaengeradresse (Invalid Recipient address)
0x000CF	0d207	T	Nachricht zweimal gesendet (Message sent twice)
0x000D0	0d208	T	Ungueltiger Nachrichtentyp (Invalid Message Type)

T = temporary error, retry schedule applies
P = permanent error, short message discarded

Annex D

Contents of Control messages

The contents of the notification messages are the following:

Nachricht fuer <Empfängernummer>, Identifizierung <Identifizierung>, ist gespeichert worden, da <Fehlermeldung> (Code <Code>).

for <u>temporary</u> errors,

Nachricht fuer <Empfängernummer>, Identifizierung <Identifizierung> konnte nicht ausgeliefert werden, da <Fehlermeldung> (Code <Code>).

for <u>permanent</u> errors, and

Nachricht fuer <Empfängernummer>, Identifizierung <Identifizierung>, ist am <Datum> um <Uhrzeit> ausgeliefert worden.

for <u>successful</u> message deliveries.

The contents of <u>inquiry</u> response messages have the following syntax:

Nachricht fuer <Empfängernummer>, Identifizierung <Identifizierung>

<Identifizierung> is left empty when there are no messages buffered for the recipient in the SMSC.

The contents of <u>deletion</u> response messages have the following syntax:

Nachricht fuer <Empfängernummer>, Identifizierung <Identifizierung> ist geloescht worden.

<Identifizierung> is left empty when no message has been deleted for the recipient in the SMSC.

Annex E

Explanation of the RPID field and Extra Service XSer field

i) Relay Protokol-Identifier RPID

RPID code	RPID meaning	Explanation
0064	Short Message Type 0	This Type indicates that the ME must acknowledge receipt of the short message but may discard it contents
0065...0071	Replace Short Message Type 1 to Type 7 [1]	If one of these Types is present, then the MS will check the associated SC address and originating address and replace any existing stored messages having the same PID code, SC address and orig. address with the new short message and other parameter values. If there is no message to be replaced or if one of these codes is not present, then the MS shall store the message in the normal way.

[1] This feature is optional for the ME and the SIM.

ii) Extra Service XSer - Type of service TT=01, GSM UDH information

With this service type *GSM User Data Header information* can be specified. The data field DD of this service type has the structure and contains the octets (in hex) as the follows:

UDHL   Length of User Data Header, 1 oct.
IEIa   Information-Element-Identifier "A", 1 oct.:
        00 Concatenated short message
        01...02 N.A.
        03 value not used avoid misinterpretation as <LF> character
        04...05 Application port addressing scheme 8 or 16 bit address, Mobile specific
        06...FF reserved for further use
IEIDLa Length of Information-Element Data "A", 1 oct.
IEIDa   Information-Element Data "A", 1...n oct.
IEIb   Information-Element-Identifier "B", 1 oct.:
        See above
IEIDLb Length of Information-Element Data "B", 1 oct.
IEIDb   Information-Element Data "B"
IEIn   Information-Element-Identifier "n", 1 oct.:
        See above
IEIDLn Length of Information-Element Data "n", 1 oct.
IEIDn   Information-Element Data "n"

If the IEIx is use for concatenated short message then the appropriate Information Element Data octets shall be coded as follows.
Octet 1   Concatenated short message reference number
        This octet shall contain modulo 256 counters indicating the reference number for a particular concatenated short message. This reference number shall remain constant for every short message which makes up a particular concatenated short message.
Octet 2   Maximum number of short messages in the concatenated short message.

This octet shall contain a value in the range 0 to 255 indicating the total number of short messages within the concatenated short message. The value shall start at 1 and remain constant for every short message which makes up the concatenated short message. If the value is zero then the receiving entity shall ignore the whole Information Element.

Octet 3   Sequence number of the current short message.

This octet shall contain a value in the range 0 to 255 indicating the sequence number of a particular short message within the concatenated short message. The value shall start at 1 and increment by one for every short message sent within the concatenated short message. If the value is zero or the value is greater than the value in octet 2 then the receiving entity shall ignore the whole Information Element

Every UDH octet is encoded in two IA5 hex characters, as used in UCP. An example is given below.

The length of the UDH information, related to the length of the Msg field content, is restricted to the maximum length of the GSM TP-UD field: 140 octets c.q. 160 septets. Depending on the MT field this is checked as follows:

- If MT = 2 or 3 then: The length of the UDH field (in octets), multiplied by 8/7, rounded up to the nearest integer value, plus the length of the NMsg/AMsg field (in octets) must not exceed 160 (septets).
- If MT = 4 then: The length of the UDH field (in octets) plus the length of the TMsg field (in octets) must not exceed 140 (octets).

There must be only one occurrence of *Type of service 01, GSM UDH information* in XSer.

Example encoding of XSer Type of service **01**, GSM UDH information:

A GSM UDH consisting of the following two UDH information elements is to be encoded:
1. Concatenated short messages, Concatenated short message reference number = 64, Maximum number of short messages in the concatenated short message = 4, Sequence number of the current short message = 2
2. Application Port Addressing 8 bit address, destination port = 240, originator port = 250

TTLLDD... Encoding in IA5 characters: 010A0900034004020402F0FA

This same TTLLDD... encoding annotated:
01 = TT, specifies XSer Type of service 01, GSM UDH information
0A = LL, specifies that DD part contains 10 octets
09 = DD,   UDHL,   Length of user data header = 9 octets
00 = DD,   IEIa,   Information-Element-Identifier a, Concatenated short messages
03 = DD,   IEIDLa, Length of information element a = 3 octets
40 = DD,   IEDa,   Concatenated short message reference number = 64
04 = DD,   IEDa,   Max number of short messages in the concatenated message = 4
02 = DD,   IEDa,   Sequence number of the current short message = 2
04 = DD,   IEIb,   Information-Element-Identifier b, Application Port Addressing 8 bit
02 = DD,   IEIDLb, Length of information element b = 2 octets
F0 = DD,   IEDb,   destination port = 240
FA = DD,   IEDb,   originator port = 250

iii) XSer Type of service 02, GSM DCS information

The type of service always has a total length of 6 numeric characters. So the sequence TTLLDD is set to:
TT = 02
LL = 01
DD = 00...FF.

The meaning of the DCS values is explained in GSM 03.38.

Use the GSM DCS information field to send UCS2 coded short messages. The MT field must be set to the value 4.

Use the GSM DCS information field to send 8-bit data coded short messages. The MT field must be set to the value 4. If the GSM DCS information field is not specified, MT=4 indicates an 8-bit coded short message and the MCLs (Message Class) must be specified.

Use the GSM DCS information field to send "Message Waiting Indication" updates to the mobile station.

Use the GSM DCS information field to send "Message Class Meaning". If the MCLs field is specified too, the GSM DCS information field overrules the MCLs field.

The use of the GSM DCS information field in the XSER field is limited to the UCP 51 and UCP 52 messages.

Example encoding of XSer Type of service **02**, GSM DCS information:
020100, meaning that the DCS value 00 (0000 0000 binary) is used.
According to the GSM03.38 specification, this means 7-bit default alphabet, no compression, no message class meaning.

The following example show how **both examples** of Type of service **01** and **02** are working together if they should submitted in OT-51 or delivered in OT-52:
        ...**01**0A0900034004020402F0FA**02**0100\\...

iv) XSer Type of service 0D,

This type of Service indicates whether a short message is treated as Single Shot or not. Submitted messages indicating Single Shot will have <u>one</u> delivery attempt. If a Single Shot message is accepted by the system, <u>no</u> retry scheme will be used when the first delivery attempt of the Single Shot message fails. Additionally, pending Single Shot messages will be removed from the system when a negative delivery acknowledgement of any short message sent to the same recipient is received by the system.
Only Single Shot indications in OT-51 and OT-52 messages will be supported.
The type of service always has a total length of 6 numeric characters; the size of the data element (DD) is one octet. So the sequence TTLLDD is set to:
TT = 0D
LL = 01
DD = 00 non-Single Shot short message (Default), or
DD = 01 Single Shot short message,
DD = 02-FF reserved

The meaning of the DCS values is explained in GSM 03.40.

Annex F

SMSC Modem settings

You may use the following settings for your modem:

Baud rate: 2400... 14400 Bit/s
Standard settings: 8 data bits, no parity, 1 stop bit

Error-Control MNP4 or V.42 (LAPM) <u>must</u> be used.

Example to configure the error-control MNP4:
- MicroLink 28.8: activate: **AT\N2**&W (&W store setup)
- ZyXEL V.34: activate: AT&K1 or AT&K2

These are the complete SMSC modem settings

NOKIA ECM FAST Software release: BA Active Setup : 1

S0 Rings to answ 1	*W Protection	!T Terminal rate 5
S2 <ESC> char... 128	A Online Answer	&C DCD options 1
S3 <CR> char... 13	B Answ tone.... 2	&D DTR options.. 2
S4 <LF> char... 10	E Cmd echo..... ON	&F Load preset
S5 <BS> char... 8	F Line rate.... 0	&G Guard tone... 0
S6 Wait dialtone 10	H Hook ctrl	&L Line type.... 0
S7 Wait carrier. 60	I Info query	&M Command set 0
S8 Pause time... 2	L Loudspeaker vol 2	&S DSR options 1
S10 Disconn time. 28	M Speaker control 0	&T Response to RL ON
S12 <ESC> time... 50	O Online Orig..	&T Use of 140/141 OFF
S17 Inact timeout 0	Q Result codes ON	&W Store setup
S18 Test timer... 0	V Result form.. 1	&X Sync clock... 0
S25 DTR delay.... 5	X Result set... 4	&Z Store number
S26 CTS delay.... 1	Z Restore setup	\F Disp cmd dir
*C Call back 0	!B Dial back up. 0	\K Break ctrl... 1
*D Prefix	!D Rate deviation 0	\N Error ctrl... 3
*F Handshake opt. 3	!F LL- rate 7	\Q Flow control 2
*M Call back mess.	!H Answ/orig sel. 2	\V CONNECT res.. 4
*P D asy chr frm 0	!M Max line rate 7	%A Async char... 13
*R Redialling 0	!N Retrain 2	%C Compression.. OFF
*Y Call back del 20	!P Parity 4	

Annex G

Contact persons

For queries and further information regarding **Commercial** and **Contract Issues** options please contact:

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Updates on this document and other information on the Short Message Service can be found at the Internet-Website:

http://www.vodafone.de

Annex H
Revision marks

Chapter	Description of modification [EMI V1.0 -> EMI V1.1]
0	new cover sheet
Preface	Revision numbers of references updated
1.1	It is pointed out that just transparent X.75 shall be used to communicate with the SMSC
2.1	There was an error in the second example of a UCP-string. An 'R' for 'response' had to be inserted in the message instead of 'O' for 'operation
4.5.2	It was pointed out that MCI is a mandatory field for MT=4
4.5.3	It was pointed out that MCI is a mandatory field for MT=4
Annex B	The character set tables within the SMSC have been improved. They have been corrected for one character ('_') in the MO direction and several characters have been added for the MT case (special characters, Greek characters etc.).

Chapter	Description of modification [EMI V1.1 -> EMI V2.0]
-	Editorial modifications and clarifications
0	Revision of references
3.2	Additional information 'Short numbering'
4.2 / 4.5.1 / 4.5.2	Introduction of Priority parameter (PR)

The following section shall give a short indication about changes in the D2 network or in the SMSC behaviour that might have relevant impact on SMS applications.

Changes since [EMI V1.1 -> EMI V2.0]
The SMSC now supports true FIFO (First-in-first-out) delivery. No message will be received by the mobile in advance to an older message. FIFO delivery can be bypassed by using priority messages (refer to chapter 4.5.2).
The MMS (More messages to send) bit in the SMS TPDU will now be used according to [1]. If more messages are waiting to be delivered to a mobile subscriber originated by a particular Service Centre Address the MMS bit is used to indicate this.
The SMSC now supports the Phase 2 Status Report (refer to [1] for more detailed information). This gives a mean to the user to request notifications even for binary mobile originated messages.
For mobile->mobile Short Messages the TP-UDHI field is now accepted by the SMSC and passed through transparently.

Chapter	Description of modification [EMI V2.0 -> EMI V2.1]
4.2	New and different number area of the PID value; New XSer field
4.4 and 4.5	examples for every operation type
4.5.1 and 4.5.2	New XSer field
new annex E	Detailed explanation of the Relay-Protokoll-Identifier RPID; detailed explanation to the Extra Service field XSer; old annex E -> annex F, old annex F -> annex G, old annex G -> annex H
annex G	New contact persons

Chapter	Description of modification [EMI V2.1 -> EMI V2.1.1]
4.5.4	correction of the example

Chapter	Description of modification [EMI V2.1.1 -> EMI V2.1.2]
4.2	change of the restriction of the XSer field
4.5.3	add Xser field and a new example
annex E ii	some correction

Chapter	Description of modification [EMI V2.1.2 -> EMI V2.1.3]
4.2, 4.5.1 and 4.5.2	new OTOA field
annex B	using of the EURO currency symbol ´€'
annex C	two new reason codes (0x82, 0x83)
annex G	new contact person

Chapter	Description of modification [EMI V2.1.3 -> EMI V2.1.4]
1.1	some corrections
4.1	correction in address syntax
annex C	correction: 0x83 T->P
annex F	using of error-control MNP
annex G	new contact person; new web-address

Chapter	Description of modification [EMI V2.1.4 -> EMI V2.1.5]
1.3	new PSTN access number

Chapter	Description of modification [EMI V2.1.5 -> EMI V2.2]
1.3	new access number
1.5	BL/WL list management can no longer performed by LA itself
4.1	additional prefix in address syntax XSer
4.5.2	MCIs optional
annex E iii)	detailed explanation to the Extra Service field XSer "GSM DCS information"
annex G	new contact person, new Web-address

Chapter	Description of modification [EMI V2.2 -> EMI V3.0]
Preface	update the references
all	ISDN, X.25 and X.31 will not be supported for LAs anymore
1.3	TCP/IP access is introduced instead
4.2 and 4.5.1/2/3	RPI and PR will not be supported anymore due to the fact that these parameters are inconsistent with MNP
annex G	new email address

Chapter	Description of modification [EMI V3.0 -> EMI V3.1]
all	Mannesmann Mobilfunk -> D2 Vodafone

Chapter	Description of modification [EMI V3.1 -> EMI V3.2]
4.2, 4.5.2/3 and Annex E	*Single Shot* short message in XSer

Chapter	Description of modification [EMI V3.2 -> EMI V4.0]
all	The whole document has been re-worked; few corrections; new examples; a new chapter "additional extended operation (UCP 60)"; new access number; new contact persons (annex G), with new addresses; new reason-codes (annex C); additional option (1.6 to 1.9)

Chapter	Description of modification [EMI V4.0 -> EMI V4.1]
2.1, 4.6	correction of an example 2.1 and 4.6.5; supplementation of error messages in reason code 0d050 description (Annex C); new examples in 4.6.5

Chapter	Description of modification [EMI V4.1 -> EMI V4.2]
2.1	correction of an example 2.1
4.5.1	Change on max. length from 640 to 160 in the 'Msg' field of Abstract Data type
4.6.4	addition of note 3 in 4.6.4
Annex B	supplementation of additional characters in Annex B

Chapter	Description of modification [EMI V4.2 -> EMI V4.3]
Annex B	Correction of coding for character "¡" (reversed exclamation mark)
Annex C	New Description of Errorcodes: descriptions are now in German & English
Annex G	New email address of developer support

Chapter	Description of modification [EMI V4.3 -> EMI V4.3a]
Annex B	Correction of coding for characters: "\", "Ñ", "_", "CR", "^"

Chapter	Description of modification [EMI V4.3a -> EMI V4.3b]
Annex G	Contacts have been updated

Chapter	Description of modification [EMI V4.3b -> EMI V4.3c]
Annex G	Contacts have been updated

Chapter	Description of modification [EMI V4.3c -> EMI V4.3d]
4.1	Addition made to the notes in 4.1
4.5.2	Addition made to the notes in 4.5.2
Annex B	Addition of character encoding for character: "|"
Annex G	Contacts have been updated