



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

Version 4.4a

May 2013

Contents

| | | |
|----------|--|-----------|
| 1 | INTRODUCTION | 5 |
| 1.1 | Position of interface | 6 |
| 1.2 | Interface history | 6 |
| 1.3 | Access numbers | 7 |
| 1.4 | Session Management | 7 |
| 1.5 | Virtual Short Message Service Centre concept (VSMSC) | 7 |
| 1.6 | Short numbering | 7 |
| 1.7 | Multiple Session Large Account (MULA) | 8 |
| 1.8 | Single Session Large Account | 9 |
| 1.9 | Sending messages to other operators | 9 |
| 1.10 | Dialogue and Premium Services | 9 |
| 2 | Structure of the EMI messages | 10 |
| 2.1 | Example | 10 |
| 3 | EMI operation overview | 12 |
| 3.1 | Application initiated commands | 12 |
| 3.2 | SMSC initiated operations | 13 |
| 4 | EMI operations Syntax | 14 |
| 4.1 | Address syntax | 14 |
| 4.2 | Parameters used in operations | 14 |
| 4.3 | Parameters used in responses | 18 |
| 4.4 | Basic operations | 19 |
| 4.4.1 | Call input operations (OT-01) | 19 |
| 4.4.2 | SMT alert operation (OT-31) | 20 |
| 4.5 | Extended operations | 21 |
| 4.5.1 | Abstract Data Types | 21 |
| 4.5.2 | Submit short message operation (OT-51) | 23 |
| 4.5.3 | Delivery short message operation (OT-52) | 26 |
| 4.5.4 | Delivery notification operation (OT-53) | 28 |
| 4.5.5 | Inquiry message operation (OT-55) | 30 |
| 4.5.6 | Delete message operation (OT-56) | 31 |
| 4.5.7 | Response inquiry message operation (OT-57) | 32 |
| 4.5.8 | Response delete message operation (OT-58) | 33 |
| 4.6 | Additional extended operation | 34 |
| 4.6.1 | Parameters used in operations | 34 |
| 4.6.2 | Parameters used in responses | 35 |
| 4.6.3 | Abstract Data Types | 35 |
| 4.6.4 | Session management operation (OT-60) | 36 |
| 4.6.5 | Examples | 37 |
| 4.7 | Examples of the extended UCP messages | 38 |
| 4.7.1 | Transparent data message | 38 |
| 4.7.2 | Alphanumeric message | 38 |
| 4.8 | Inquiry and Delete functionality | 39 |

| | | |
|---------|--|----|
| Annex A | Error Codes Overview | 40 |
| Annex B | Character Sets used in the SMSC | 41 |
| Annex C | Error messages and codes reported in notifications | 43 |
| Annex D | Contents of Control messages | 44 |
| Annex E | Explanation of the RPID field and the new Extra Service XSer field | 45 |
| Annex F | Contact persons | 48 |
| Annex G | Revision marks | 49 |

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
- [5] Short Message Service Centre 4.6 EMI - UCP Interface

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 F 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 INTRODUCTION

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.

CONTRACT ISSUE

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 F.

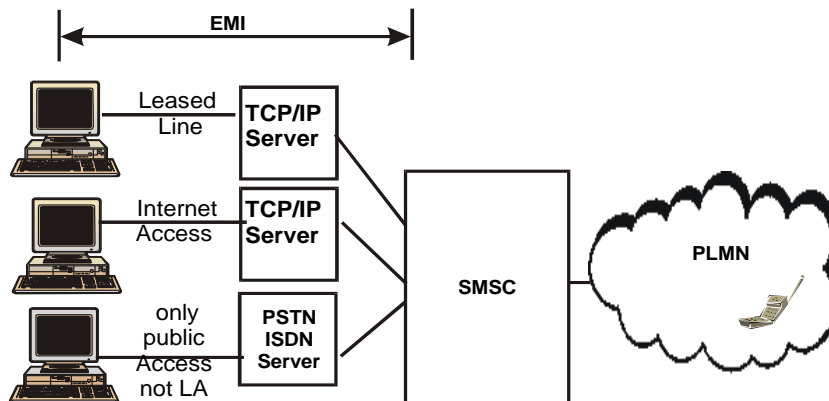
IMPORTANT NOTE

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
- ISDN (V.110 and transparent X.75) - for LA mandatory

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 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 via:

| ISDN Access (LA) | TCP/IP Leased Line (LA)¹⁾ | TCP/IP Internet Access (LA)²⁾ |
|-------------------------|---|---|
| distributed on request | distributed on request | distributed on request |

(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

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.

Please keep in mind that to apply for appropriate amount of sessions and throughput for a LA, the customer must specify the required volume of short messages.

This is a **Contract Issue** option (please refer to the earlier mentioned contract note).

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 **Contract Issue** 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 **Contract Issue** option. Further information on Short Numbers can be given on demand.

1.7 Multiple Session 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

Setting up a session:

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 Session 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 **Contract Issue** option. The details of the key-account manager are mentioned in Annex F.

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 **Contract Issue** 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:

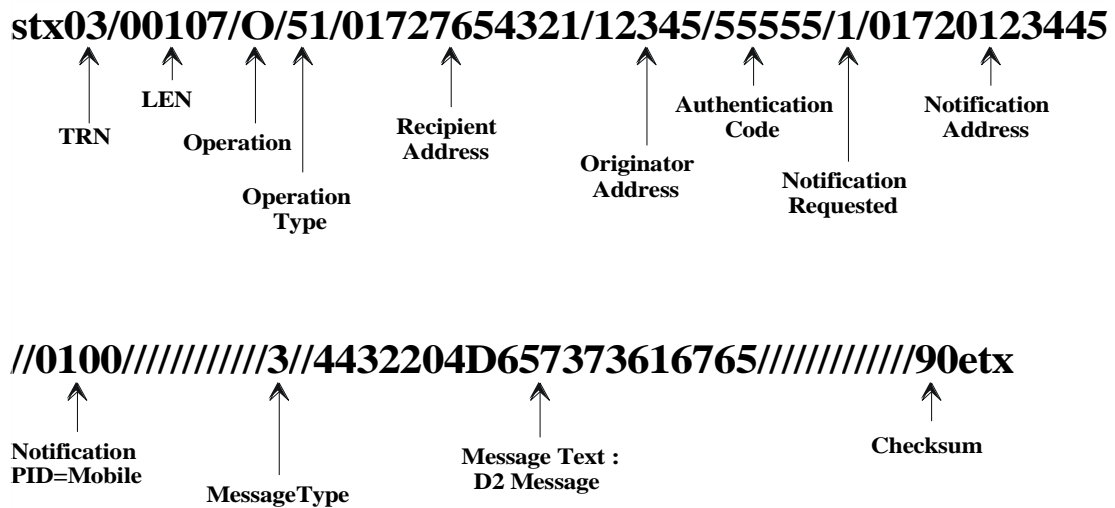


Figure 2.1 Example of a Submit Short Message operation



Figure 2.2 Example of a Submit Short Message operation ACK

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). The messages will be sent as 'delivery notification' (see chapter 4.5.4) and have to be acknowledged by the application. If notification address (NAd) and Notification PID (NPID) are left empty, the notifications shall be sent back to the application during the active session. In case the session is closed, SMSC but will store the notification messages. The application has to re-open the session in order to receive them.

Please note that for notifications sent to users which do not automatically provide their CLI and for which no subscription is possible with the SMSC, notifications shall be sent only during the active session. If the session is closed, the messages may be discarded.

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.

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.

For message content encoding please refer to Annex B. If IA5 character-sets (Codes 0x00 - 0x7F) are used 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 EMI operations Syntax

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 recipient 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> or

Notes:

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

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. SMSC does not perform dial-out in case the active session is closed. So, the application has to reconnect for receiving notifications |

| | |
|--------------|---|
| 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. |
| OTOA¹ | 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. |

¹ **IMPORTANT:** In case the LA is expecting a reply of the submitted SMS by the mobile, then it is mandatory to put OAdC as LA Short number and to keep OTOA field empty.

| | | |
|-------------|----------------------------|---|
| XSer | restricted for LA in OT-52 | <p data-bbox="622 150 829 179">Extra Services</p> <p data-bbox="622 190 1402 324">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</p> <p data-bbox="638 358 1340 425">TT = 01; with this service type GSM UDH information can be specified</p> <p data-bbox="638 436 1340 504">TT = 02; with this service type GSM DCS information can be specified</p> <p data-bbox="638 504 1292 571">TT = 0D; with this service type GSM Single Shot information can be specified</p> <p data-bbox="638 571 1292 638">TT = 00 is not used, and 03...0C and 0E...FF are reserved</p> <p data-bbox="638 672 1402 806">LL represents two HEX characters defining the number of octets present in the data field DD. (Note that the number of <i>HEX characters</i> in the data DD is twice the number of <i>octets</i>)</p> <p data-bbox="638 840 1402 907">DD represents a stream of HEX characters defining the service specific data itself.</p> <p data-bbox="638 940 1402 1041">If more than one additional service is to be specified in one message, this service information is concatenated without any separators, i.e.</p> <p data-bbox="638 1041 1085 1075">TT₁LL₁DD₁...DD₁TT₂LL₂DD₂...DD₂</p> <p data-bbox="638 1108 1402 1205">Note. This feature is only available for LA connections and is a <u>Contract Issue</u> option. Refer to annex E ii) /iii) for further information.</p> |
|-------------|----------------------------|---|

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 acceptance 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 |

SMT alert 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 | all four digits are zero |

SMT alert 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 **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 |
| MCI | 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 |

¹Only 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 built 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 |
| MCLs | 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:

The above table only highlights the relevant fields in an OT-51 UCP string. Other non-appropriate fields are to be left empty in the UCP string. For complete string syntax please refer to the ADT shown in Chapter 4.5.1 and UCP-examples below.

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.

Submit 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 | 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 **IMPORTANT:** 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 01620430238 only if the message is delivered;

The Text Message is 'Test EMI-Message äöüßÄÖÜñÑ\$§€[]~\|':

UCP String with GSM 7-bit encoding:

```
stx22/00158/O/51/01620430238/9000//1//////////3//5465737420454D492D4D657373
616765207B7C7E1E5B5C5E7D5D025F1B651B3C1B3E1B281B291B3D1B2F1B141
B40//////////73etx
```

UCP String with ISO-8859 encoding:

```
stx26/00159/O/51/01620430238/9000//1//////////3//5465737420454D492D4D657373
616765207B7C7D7E5B5C5D1E5F245E1B651B3C1B3E1B281B291B3D1B2F1B141
B40//////////ABetx
```

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

```
stx22/00044/R/51/A//01620430238:300812144842/6Aetx
```

- 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:

```
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
8901234567890123456789012345678901234567890123456789012345678901
2345678901234567890123456789012345678901234567890123456789012345
6789012345678901234567890123456789012345678901234567890123456789
01234567890123456789012345678901234567890123456789012345678901/
////01050400220201///78etx
```

```
stx00/00136/O/51/0173223322/223344//1//////////4/0200/12345678901234567
8901234567890123456789012345678901234567890123456789012345678901
////01050400220202///50etx
```

Note: The XSer field has the value '01050400220202', whereas the third to last octet '01050400220202' 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) |
| XSer¹⁾ | 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)

Notes:

The above table only highlights the relevant fields in an OT-52 UCP string. Other non-appropriate fields are to be left empty in the UCP string. For complete string syntax please refer to the ADT shown in Chapter 4.5.1 and UCP-examples below.

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
```

Another example of **delivery short message** received from the SMSC;

The Text Message is 'Test EMI-Message äöüßÄÖÜñÑ\$§€[]~\|'

UCP String with GSM 7-bit encoding:

```
stx01/00179/O/52/9000/01620430238//////////0000/160413131132////3//5465737420454D49
2D4D657373616765207B7C7E1E5B5C5E7D5D025F1B651B3C1B3E1B281B291B3D1B2F
1B141B40//////////020100///80etx
```

If ISO-8859 encoding is used, the example below highlights the different encoding of certain characters as compared to the encoding used in submit short message (refer to Annex B and the bold marked characters in the table)

UCP String with ISO-8859 encoding:

```
stx01/00175/O/52/9000/01620430238//////////0000/160413131132////3//5465737420454D49
2D4D657373616765207B7C7D7E5B5C5DF15F24A71B651B3C1B3E1B281B291B3D1B14
1B40//////////020100///94etx
```

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

```
stx02/00409/O/52/9000/01620430238//////////0000/300812134840////3//4D686
E67642E6A70612E742E646D616A7774646D2E64616D77677065616D7767
70646D642E642E6D67642E676A702B746764672E6764676D646D6A642E6
7646A6D67646A6D6764616A6D2E676D67646A64676D6A642E646174676D
616A642E64676D616A642E676D6764616A646764676D616A6D68772E656
16D67772E6D61646D676D67646A642E6D6A61676D2E6D616A642E64676
D64616D//////////0106050003D40201020100///9Cetx
```

The value in the XSer field '0106050003D40201020100' marks the first message segment of total two concatenated short messages. The second segment looks like:

```
stx03/00153/O/52/9000/01620430238//////////0000/300812134842////3//676
D676D2E646164676D2E642E64616D2E64616D67616D6464//////////010605
0003D40202020100///66etx
```

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 |

Notes:

The above table only highlights the relevant fields in an OT-53 UCP string. Other non-appropriate fields are to be left empty in the UCP string. For complete string syntax please refer to the ADT shown in Chapter 4.5.1 and UCP-examples below.

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 1.):

```
stx06/00303/O/53/9000/01620430238//////////300812144842/1/107/300812144843/3//  
4D65737361676520666F722030313632303433303233382C206964656E74696666963  
61746966F6E20333030383132313434383432206973206275666665726564206265636  
1757365206F6620416273656E7420737562736372696265722028436F646520313037  
292E//////////07etx
```

This message (AMsg) *‘Message for 01620430238, identification 300812144842 is buffered because of Absent subscriber (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.

Other examples of delivery notification texts can be found in **Annex D**.

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

```
stx06/00037/R/53/A//9000:300812144843/0Detx
```

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 |

Notes:

The above table only highlights the relevant fields in an OT-55 UCP string. Other non-appropriate fields are to be left empty in the UCP string. For complete string syntax please refer to the ADT shown in Chapter 4.5.1 and UCP-examples below.

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 **01620430238** from originator 9000:

```
stx00/00064/O/55/01620430238/9000////////////////////////////////////D4etx
```

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

```
stx00/00020/R/55/A//98etx
```

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 |

Notes:

The above table only highlights the relevant fields in an OT-56 UCP string. Other non-appropriate fields are to be left empty in the UCP string. For complete string syntax please refer to the ADT shown in Chapter 4.5.1 and UCP-examples below.

The alphanumeric message field (AMsg) contains the timestamps of the messages to be deleted. The format is YYMMDDhhmmss. Timestamps are separated by spaces. Please note that the format of the SCTS in inquiry/delete operations differs from 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 '120912115813' is:

```
stx00/00089/O/56/01620430238/9000//////////3//313230393132313135383133////////
////D5etx
```

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

```
stx00/00020/R/56/A//99etx
```

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 |

Notes:

The above table only highlights the relevant fields in an OT-57 UCP string. Other non-appropriate fields are to be left empty in the UCP string. For complete string syntax please refer to the ADT shown in Chapter 4.5.1 and UCP-examples below.

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

Message for <AdC>, Identification [SCTS1] [SCTS2] [...]

If no messages are buffered in the SMSC for that recipient, the [SCTS] fields are left empty. Please note that 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** and format of 'System message' in **Annex D**.

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

```
stx07/00160/O/57/9000//////////3//4D65737361676520666F72203031363230343
330323338202C206964656E746966696361746966F6E203132303931323131353831
33//////////BFetx
```

The alphanumeric message is:

'Message for 01620430238 , identification: 120912115813'.

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

```
stx07/00020/R/57/A//A1etx
```


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 |

Notes:

The above table only highlights the relevant fields in an OT-58 UCP string. Other non-appropriate fields are to be left empty in the UCP string. For complete string syntax please refer to the ADT shown in Chapter 4.5.1 and UCP-examples below.

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

Message for <AdC>, Identification [SCTS1] [SCTS2] [...] has been deleted.

If no messages were deleted in the SMSC for that recipient, the [SCTS] fields are left empty. Please note 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** and format of 'System message' in **Annex D**.

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

```
stx01/00196/O/58/9000//////////3//4D65737361676520666F72203031363230343330323
338202C206964656E74696669636174696F6E203132303931323131353831332068617320
6265656E2064656C657465642E//////////51etx
```

The alphanumeric message is:

'Message for 01620430238 , identification: 120912115813 has been deleted.'

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

stx01/00037/R/58/A/9000:120912120413/01etx

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 exception 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 <u>Important note :</u> 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 TCP/IP or ISDN 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

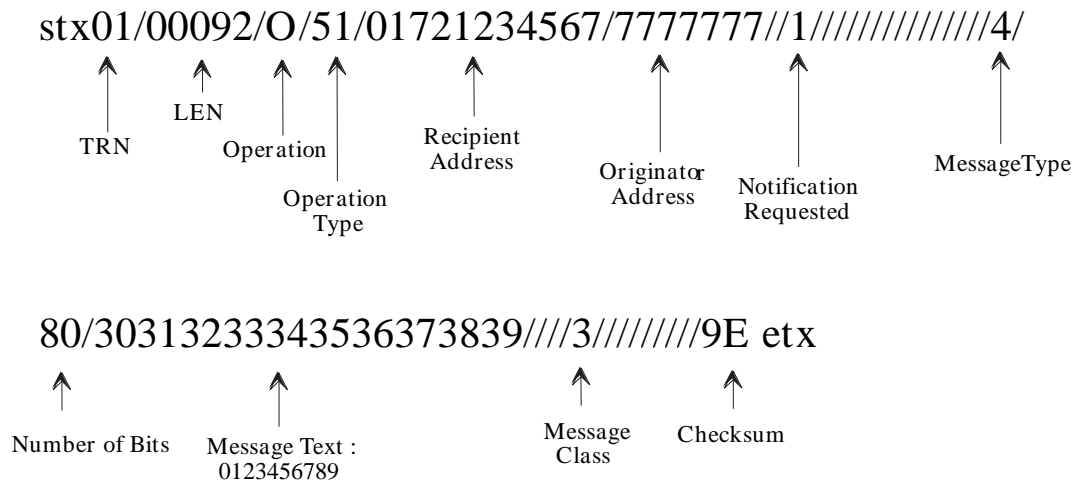
The message is acknowledged by the SMSC in the following way:

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

4.7 Examples of the extended UCP messages

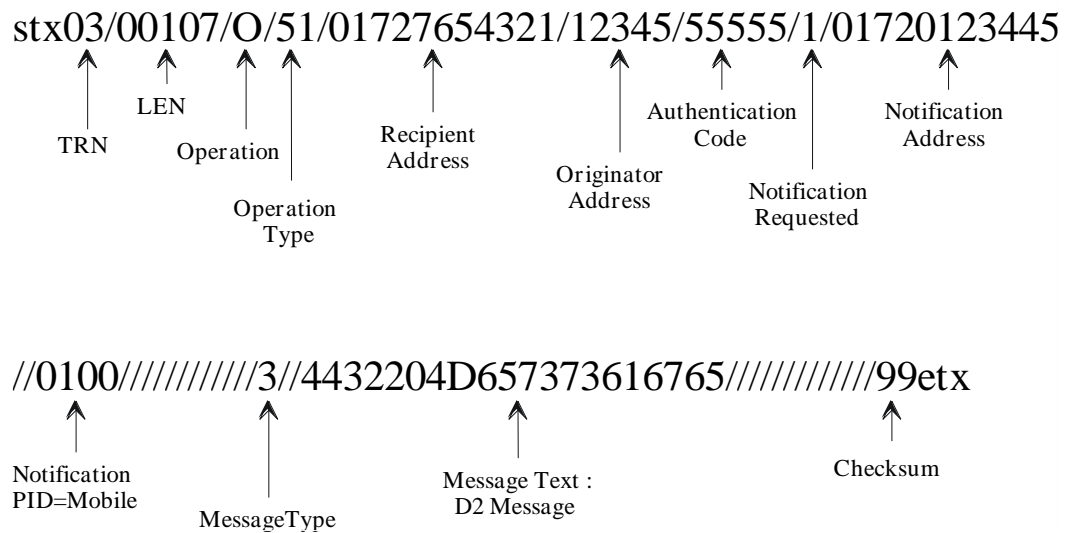
4.7.1 Transparent data message

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



4.7.2 Alphanumeric message

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



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 only. 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 from the same CLI only, 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 all 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 no 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 that can be returned in the operations negative result are also listed in ETS 300 133 paragraph 9.2.6. All operations defined in the ERMES standard which are not implemented on SMSC may result in error code 03 ("Operation not supported by system").

6.1 Error codes

| | |
|----|---|
| 00 | Unknown error |
| 01 | Checksum error |
| 02 | Syntax error * |
| 03 | Operation not supported by system |
| 04 | Operation not allowed * |
| 05 | Call barring active * |
| 06 | Invalid Recipient |
| 07 | Authentication failure * |
| 08 | Legitimation code for all calls, failure |
| 09 | GA not valid |
| 10 | Repetition not allowed |
| 11 | Legitimation code for repetition, failure |
| 12 | Priority call not allowed |
| 13 | Legitimation code for priority call, failure |
| 14 | Urgent message not allowed |
| 15 | Legitimation code for urgent message, failure |
| 16 | Reverse charging not allowed |
| 17 | Legitimation code for reverse charging, failure |
| 18 | Deferred delivery not allowed |
| 19 | New AC not valid * |
| 20 | New legitimation 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 |
| 99 | Not enough resources |

* **Special occurrence** of following error codes:

- 02 Errors in values of other Parameters like NPID, PID, Validity Period, DCS etc.
- 04 Other errors include Window size violation, Throughput exceeded etc.
- 05 Message barred if one of the addresses is on the blacklist
- 07 Authentication failures (PWD parameter in 60 series)
- 19 New AC not valid (NPWD parameter in 60 series)

Annex B

From 2013 onwards, Vodafone SMSC will set GSM 7-bit encoding for AO and AT messages per default. In case you prefer to use the legacy ISO-8859 (ISO) encoding for AO and AT messages, please request it explicitly in the large account application. In case of queries, please contact our technical support as mentioned in Annex F.

Character Sets used in the SMSC

| Character | GSM 7-bit AT & AO | ISO AT | ISO AO | Character | GSM 7-bit AT & AO | ISO AT | ISO 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 |
| ø | 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 | i | 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 |
| β | 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 AT & AO | ISO AT | ISO 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 |

The column GSM 7-bit depicts the encoding of characters in **AT** (Application Terminating: message character sent by SMSC to application over UCP) and **AO** (Application Originating: message character submitted by application to SMSC over UCP) messages. The encoding of characters is same in both the directions.

The column ISO **AT** indicates the character mapping of GSM-alphabet to ISO8859-1.

The column ISO **AO** indicates the character mapping from ISO8859-1 to GSM-alphabet.

In case of ISO, the encoding of characters can be different in AO and AT directions. These have been marked boldly in the above table.

The table below depicts encoding of other supported characters, which do not exist in ISO and thus use same encoding as in the GSM 7-bit:

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

Notes:

The GSM 7-bit character-encoding is defined in 3GPP recommendation TS23.038 [2].

The character coding is subject to changes.

Annex C

Reason codes with the error messages reported in OT-53 notifications

| UCP Rsn Code | Error Type | Error Text |
|--------------|------------------|-------------------------|
| 0 | N.A | No error |
| 10 | Temporary | Network time-out |
| 11 | Temporary | Unknown error |
| 31 | Temporary | Subscriber busy for SMS |
| 26 | Temporary | System failure |
| 50 | <i>Permanent</i> | <i>Message expired</i> |
| 101 | Permanent | Unknown subscriber |
| 103 | Temporary | Call barred |
| 106 | Temporary | Facility not supported |
| 107 | Temporary | Absent subscriber |
| 108 | <i>Permanent</i> | <i>Delivery failure</i> |
| 111 | Temporary | MS not equipped |
| 114 | <i>Permanent</i> | <i>Illegal MS</i> |
| 115 | Temporary | MS not a subscriber |
| 118 | Temporary | System fail |
| 120 | Temporary | HLR system failure |
| 126 | Temporary | System failure |
| 127 | Temporary | Unexpected data value |
| 131 | <i>Permanent</i> | <i>Operator barring</i> |
| 200 | Temporary | Service center error |

Temporary = Temporary error; retry schedule applies on the SMSC

Permanent = Permanent error; short message is discarded by the SMSC; LA Application may apply its own retry if feasible

Annex D

Contents of Control notification messages

The contents of the notification messages (OT-53) are the following:

Message for <AdC>, identification <DDMMYYhhmmss> is expired (Code 50).
for message expiry due to validity period.

Message for <AdC>, identification < DDMMYYhhmmss > is buffered because of <ErrorText> (Code <UCP Rsn Code>).
for temporary errors, see Annex C for details on Error text and UCP Rsn Code

Message for <AdC>, identification < DDMMYYhhmmss > could not be delivered because of <ErrorText> (Code <UCP Rsn Code>).
for permanent errors, see Annex C for details on Error text and UCP Rsn Code

Message for <AdC>, identification < DDMMYYhhmmss > is delivered on <DD/MM/YY> at <hh:mm:ss>.
for successful message deliveries.

The contents of inquiry response messages (OT-57) have the following syntax:

Message for <AdC> , identification < DDMMYYhhmmss >

< DDMMYYhhmmss > is left empty when there are no messages buffered for the recipient (AdC) in the SMSC.

The contents of deletion response messages (OT-58) have the following syntax:

Message for <AdC> , identification < DDMMYYhhmmss > has been deleted.

<DDMMYYhhmmss> 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-Identifizier 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 its 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 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 used 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

TTLDD... Encoding in IA5 characters: 010A0900034004020402F0FA

This same TTLDD... 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, IEIDL a, 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, IEIDL b, 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 TTLDD 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:

...\010A0900034004020402F0FA**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 one delivery attempt. If a Single Shot message is accepted by the system, no 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 TTLDD 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

Contact persons

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

Claudio Dipadova

Fax: +49 211533 1819

Email: claudio.dipadova@vodafone.com

Vodafone GmbH
Ferdinand-Braun-Platz 1
D-40549 Düsseldorf

Further **technical information** can be obtained by

Developer Support

Email: developer.support@vodafone.com

For queries and information on Vodafone Corporate SMS product please contact:

Sönke Peters

Fax: +49-211-533-3833

Email: soenke.peters@vodafone.com

Vodafone GmbH
Ferdinand-Braun-Platz 1
D-40549 Düsseldorf

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

<http://www.vodafone.de>

Annex G

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 | MCI's 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 | <i>Single Shot</i> 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", "A" |

| 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 |

| Chapter | Description of modification [EMI V4.3d -> EMI V4.4] |
|----------------|--|
| Annex A | Error code list updated |
| Annex B | SMSC supports GSM 7bit encoding for AO and AT messages. Hence, support for AO and AT messages in GSM 7bit encoding added |
| Annex C | Reason codes and error messages reported in notifications have been updated. Old table was obsolete. |
| Annex D | Text of notification messages updated |
| Annex F | Contacts are moved from Annex G to Annex F. Old Annex F is obsolete as support of PSTNa is no more supported |
| 4.5 | Examples of UCP-Strings updated |

| Chapter | Description of modification [EMI V4.4 -> EMI V4.4a] |
|-----------------|---|
| Annex B | SMSC supports GSM 7bit encoding for AO and AT messages per default. |
| 4.5.2 and 4.5.3 | Examples of UCP-Strings updated with GSM 7-bit and ISO-8859 encoding. |
| Annex F | Contacts have been updated |