

NOKIA

SMSCDOC8000.00
Nokia SMS Center 8.0

CIMD Interface Specification

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1 About this document

This document describes the CIMD2 interface, that transfers messages between applications and the Nokia Short Message Service Center (SMS Center). CIMD2 is version 2 of the Computer Interface to Message Distribution protocol.

This document is intended for operator personnel involved in daily operations of the Nokia SMS Center and for application developers.

1.1 Summary of changes

Date Release	Document identifier Issue	Changes
Sep 2005 SMSC8.0	dn03305755 4-0 en	<p>Updated for SMS Center release 8.0 after internal testing.</p> <p>The description of <code>deliver message response</code> has been updated in section <i>5.7 Deliver message (20)</i>.</p> <p>Information that ascii character '-' is supported has been deleted from <i>7.1 Parameter types</i>.</p> <p>Information that spaces are not allowed has been added to IDS 010 and 011 in <i>7.1 Parameters</i>.</p> <p>Error codes 323 'Online closed user group rejection' and 324 'Licence exceeded' added to section <i>8 Error Codes</i></p> <p>Support for AO-AT traffic has been deleted.</p>
April 2005 SMSC8.0	dn03305755 3-0 en	<p>Updated for SMS Center release 8.0.</p> <p>The description of parameter 900 for <code>deliver message response</code> (070) updated, in section <i>Deliver message (20)</i>.</p>
December 2004 SMSC7.0	dn03305755 2-0 en	<p>Updated for release SMS Center 7.0.</p>

Date Release	Document identifier Issue	Changes
December 2003 SMSC6.0	dn03305755 1-0 en	<p>Updated for release SMS Center 6.0.</p> <p>The document identification number has changed.</p> <p>The document has been restructured to make information easier to find.</p> <p><i>Changes made:</i></p> <p>Use case examples added to Appendix.</p> <p>Parameters: information of + usage (sets TON=145 in AO messages) has been added to the description of parameter Originating Address.</p> <p>All information related to USSCD has been removed.</p>

1.2 References

Nokia SMS Center documents

External Applications Configuration Guide, dn03325626

Configuration Files, dn03299531

Other documents

3GPP specification 23.038: Alphabets and language-specific information, Release 6.0

Forum Nokia at www.forum.nokia.com

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CIMD2 interface overview

Nokia SMS Center includes the CIMD2 interface, that transfers messages between applications and the Nokia Short Message Service Center (SMS Center). CIMD2 is version 2 of the Computer Interface to Message Distribution protocol. The CIMD2 interface is suitable for client applications that send and retrieve messages over TCP/IP sockets.

An application is interconnected through the CIMD2 connection to a SMS Center. The main purpose of this interconnection is to transfer messages from the applications to the mobile stations (MS) and from the MSs to the applications. Other kind of information can also be conveyed over the interconnection, for example, status reports from the GSM/GPRS network to the applications.

The system architecture discussed in this document thus consists of the application and the SMS Center, and the purpose of this document is to specify the interface between the two.

When a message has been submitted to the SMS Center using the CIMD2, the SMS Center uses its own retry policy to attempt to deliver the message. If the delivery fails, the message is stored in the SMS Center database until a delivery attempt succeeds. If a permanent error occurs, or the validity period of the message expires, the message is deleted.

The CIMD2 operations are specified in *CIMD operations* and *Parameters related to CIMD operations* in *CIMD Interface Specification* (PDF). Each CIMD2 operation carries a number of parameters with it, that is, data items specifying the subscriber, some facts about the operation itself, and so on.

The coding of information related to the operations and parameters, that is, how the SMS Center communicates with the applications, is introduced in *CIMD protocol messages* in *CIMD Interface Specification* (PDF).

The parameters are specified in *Parameters related to CIMD operations* in *CIMD Interface Specification* (PDF).

Note

In some cases the operator may want to restrict the use of some parameters. These are configured by the operator in the interface profiles.

In this interface specification, the operations and the parameters specified for each operation represent the maximum amount of information the application or the SMS Center may provide. It is very important to notice that in most cases it is not reasonable for the application to send all the possible parameters.

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CIMD operations

The operations are divided into operations originated by the application, operations originated by the SMS Center, and operations that can be originated by both the application and the SMS Center. The parameters related to each operation are specified in *Parameters related to CIMD operations*, and the values of the parameters are specified in *CIMD parameters* in *CIMD Interface Specification* (PDF).

3.1 Application types

The type of the application must be specified before the application may operate. The type, along with other information about the application, is stored in the SMS Center. When defining the operations the different applications might use, three basic types of applications can be distinguished:

1. *Send-only applications* that can only submit messages to the SMS Center.

The messages can be destined to mobile stations. Status reports of the sent messages must be explicitly requested by the application.

2. *Querying applications* that do not receive anything from the SMS Center automatically, but make queries if there is something to be retrieved.

The application can retrieve messages coming from mobile stations, but only on demand. The application is typically connected to the SMS Center every now and then to submit a message and may at the same time also check if there is something to be received. An example of this kind of application is a PC application with a modem connection to the SMS Center. Status reports, if desired, must be explicitly requested by the application.

3. *Receiving applications* that are always ready to receive messages if the SMS Center has something to send to it (that is, messages or status reports).

A receiving application can automatically receive messages stored in the SMS Center, when logging in to the SMS Center. This allows fast two-way message exchange between the application and SMS Center. The receiving applications can also be set up in such a way that when connected to an SMS Center, messages stored in the SMS Center are not automatically sent when the application logs in. In such a case, the application receives new incoming messages, but it has to query for any old messages stored in the SMS Center.

3.2 Operations from application to the SMS Center

The following table lists the operations that are possible from an application to the SMS Center.

Table 1. Operations from application to the SMS Center

Operation	Definition
Login	This operation is used by all applications before any operations.
Logout	This operation is used by all applications to indicate the end of the session. The logout operation does not release the connection. Therefore, a disconnect must be explicitly performed after the logout.
Submit	This operation is used by the application to send messages to MSs and/or other applications. In the submit operation, the application can request transmission of status reports for the message.
Delivery request	This operation is used by the application to retrieve messages.
Cancel	This operation is used by the application to cancel messages it has sent.
Enquire message status	This operation is used by the application to request a status report for a previously submitted message.
Set	This operation is used by the application to change the values of those interface parameters that it is allowed to change.
Get	This operation is used by the application to inquire the values of the interface parameters.

Table 1. Operations from application to the SMS Center (cont.)

Operation	Definition
Alive	This operation is used by the application to check whether the link to the SMS Center is alive, and to keep the connection alive during long idle periods. The alive operation prevents automatic logout of the application.

3.3 Operations from the SMS Center to application

The following table lists operations from the SMS Center to an application.

Table 2. Operations from the SMS Center to application

Operation	Definition
Deliver message	This operation is used by the SMS Center for automatically delivering a message to the application.
Deliver status report	This operation is used by the SMS Center to send a status report describing the current status of a message sent by the application.

3.4 Operations supported by the SMS Center and different types of applications

The following table lists operations supported by different types of applications and by the SMS Center.

Table 3. Operations supported by different types of applications and the SMS Center

Operation	Application type		
	Send-only	Querying	Receiving
Login	+	+	+
Logout	+	+	+

Table 3. Operations supported by different types of applications and the SMS Center (cont.)

Operation	Application type		
	Send-only	Querying	Receiving
Submit	+	+	+
Enquire message status	+	+	+
Delivery request	-	+	+
Cancel	+	+	+
Deliver message	-	+	+
Deliver status report	-	-	+
Set parameters	+	+	+
Get parameters	+	+	+
Alive	+	+	+

+ supported

- not supported

3.5 Operation codes

All available operations are listed in the following tables, showing both the request and the response operation code.

Table 4. Operation codes (Application request — SMS Center response)

Application request →	← SMS Center response
login request (01)	login response (51)
logout request (02)	logout response (52)
submit message request (03)	submit message response (53)
enquire message status request (04)	enquire message status response (54)

Table 4. Operation codes (Application request — SMS Center response) (cont.)

Application request →	← SMS Center response
delivery request (05)	delivery request response (55)
cancel message request (06)	cancel message response (56)
set message request (08)	set response (58)
get message request (09)	get response (59)
alive request (40)	alive response (90)
	general error response (98)
	nack (99)

Table 5. Operation codes (SMS Center request — application response)

SMS Center request →	← Application response
deliver message (20)	deliver message response (70)
deliver status report (23)	deliver status report response (73)
	nack (99)

4 CIMD protocol messages

4.1 Message format

Each message, operation, or response consists of a header, data, and trailer part of the message, as shown in the following figure.

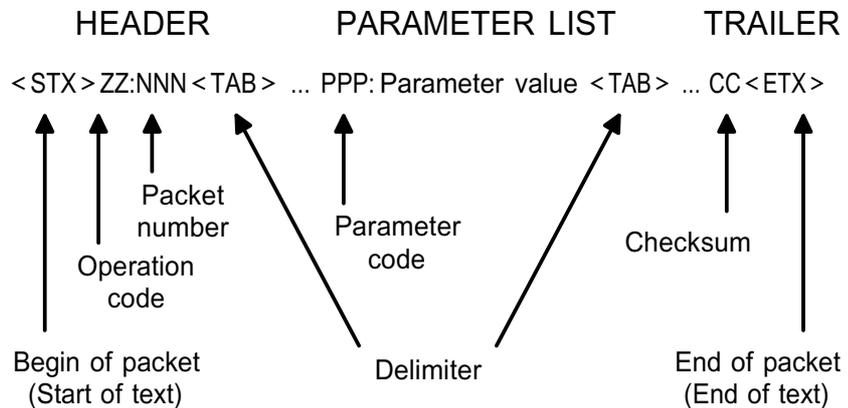


Figure 1. CIMD protocol message format

Note

Any data transmitted between packets can be ignored. This data can originate from modems, terminal drivers and so on.

The coding of the message parts is explained in *Header, Data and Trailer* in *CIMD Interface Specification* (PDF).

4.1.1 Header

The header has the following format:

```
<stx>ZZ:NNN<tab>
```

where

- <stx> is the start-of-text indicator, which consists of a single byte containing the decimal value 2.
- ZZ defines the operation code and consists of two bytes containing the ASCII characters of the digits 0 to 9, which range from 48 to 57.
- NNN represents the message packet number, which consists of 3 bytes containing the ASCII characters of the digits 0 to 9, which range from 48 to 57.

The ZZ and NNN fields are separated by one byte containing the ASCII code of a colon, which is 58. The header is terminated by one byte containing the ASCII code of <tab>, which is 9.

An example of the decimal values for each byte of a header is given below:

```
2 48 49 58 48 48 49 9
```

In the notation used in the rest of this document, the header looks as follows:

```
<stx>01:001<tab>
```

4.1.2 Data

The data fields consist of a list of parameters each terminated by the <tab> character. All parameter fields have the following format:

```
PPP:value of the parm<tab>
```

where PPP indicates the parameter type and consists of 3 bytes containing the ASCII values of the digits 0 to 9 (values 48 to 57). After the single byte containing the ASCII value for the colon (58) the value of the parameter is coded with a variable number of bytes. The parameter is terminated by a single byte containing the ASCII value for tab (9).

The coding of the parameter value is dependent on the type of the parameter and is explained in *CIMD parameters* in *CIMD Interface Specification* (PDF).

All parameters consist of the ASCII equivalents of digits or the characters of the alphabet. The parameter for the user data (033), however, can also consist of other characters, which will enable the use of all characters in the default GSM character set. The reserved characters 0x00 (NUL) 0x02 (STX), 0x03 (ETX), 0x09 (TAB) are not allowed in any parameter.

The parameters allowed in a packet depend on the operation and sometimes the user profile. The order of parameters is free, and many parameters may be omitted.

Examples of the decimal values of the bytes for a few parameters are given below, together with the notation used in this document.

Example 1. Password parameter (11)

```
48 49 49 58 83 101 51 114 83 116 9
011:SeCrEt<tab>
```

Example 2. Userdata parameter (33)

```
48 51 51 58 104 105 32 116 104 101 114
101 32 33 9
033:hi there !<tab>
```

4.1.3 Trailer

The format of the trailer of a packet is:

```
CC<etx>
```

where CC consists of two bytes containing the checksum of the packet, and <etx> is a single byte containing the end-of-text character, which has the value 3.

The use of the CC field is optional, in which case the trailer merely consists of the single <etx> byte.

An example of the decimal values of the bytes in a trailer is given below, together with the notation used in this document.

Example 3. Decimal values of the bytes in a trailer

```
51 65 3
3A<etx>
```

All parts combined give the following typical message:

```
<stx>ZZ:NNN<tab>PPP:parameter1<tab>QQQ:parm2<tab><etx>
```

When real values for ZZ, NNN and so on, are used, you get a message such as:

```
<stx>01:001<tab>010:wwwstat<tab>011:wwwstat<tab><etx>
```

or:

```
<stx>03:011<tab>021:123456789<tab>033:hi there<tab><etx>
```

4.2 Message packet numbering

All CIMD2 messages are assigned a packet sequence number. This packet sequence number is used for detecting duplicate packets or missing packets. The number is assigned according to the following rules:

- Operations from the application to the SMS Center are assigned an odd packet number, starting from one. Subsequent packet numbers are incremented by two. After reaching 255, the number wraps back to one again. Using the coding described before the three-character NNN field (see the previous example), the message packet numbering for a list of application-originated packets is as follows: 001, 003, 005, ... 253, 255, 001, 003, ...
- Operations from the SMS Center to the application are assigned an even packet number starting from zero. Subsequent packet numbers are incremented by two. After reaching 254, the number wraps back to zero again. This means that the message packet numbering for SMS Center-originated packets is as follows: 000, 002, 004, ... 252, 254, 000, 002, 004, ...
- All response messages are assigned the same packet number as the request. Thus, the responses from the application to the SMS Center have even numbers and the responses from the SMS Center to the application have odd numbers.

Note

Applications may not use the same packet sequence number more than once. The applications must always increment the sequence number by two for a new message.

If an application erroneously uses the same packet sequence number repeatedly for several messages, ASE will repeat the first response to all the requests that use the same sequence number

4.3 Checksum

The checksum is an optional field, but when it is used you can calculate it according to the following procedure:

1. At the beginning of the message, set the checksum to 0.
2. Retrieve the first byte of the message.
3. Add the value of the byte to the checksum.
4. Truncate the checksum so that it contains only the least significant byte.
5. If available, retrieve the next byte from the message and repeat step 3. The process stops when the <etx> field is found 2 bytes further in the message.

Example 4. Checksum calculation using C language

```
int GetChecksum( char *pstx,
char *petx )
/*****
/* pstx points to the in the message */
/* petx points to the in the message */
*****/
{
    int checksum = 0;

    char *p = pstx;

    while (petx - p >= 2 ){

        checksum
        += *p;

        checksum
        &= 0xFF;

        p++;

    }

    return( checksum );
}
```

The previous example shows that all characters from the first character to the last character before the checksum characters are included in the sum. Thus, <stx> is the first character in the checksum calculation and the last <tab> before the checksum is the last character. The checksum characters and the <ETX> are not included in the calculation.

The following line indicates the characters included in the checksum calculation:

```
<stx>ZZ:NNN<TAB>PPP:value1<tab>QQQ:val2<tab>
```

The coding of the checksum value into the two bytes of field CC is done as follows. The most significant 4 bits of the checksum are coded in the first byte and the least significant 4 bits are coded into the second byte of the checksum field CC. The ASCII representation of the digits `0" to `9" and `A" to `F" are used for coding the hexadecimal value of the four bits into the message.

For example, if the checksum is 58 (decimal) which is 0x3A (hexadecimal), the most significant 4 bits give us the value 3, and the ASCII representation `3" has the value 51 (decimal) or 0x33 (hex). The second value gets the value `A" which is 65.

The use of the checksum is optional for the application. The SMS Center will always include a checksum to the packets it sends to the application.

4.4 Response messages

The interaction between an application and the SMS Center involves the sending of request messages, to which the other party responds with response messages. Depending on the situation, the response message can be one of the following:

- Positive response message
- Negative response message
- Nack message
- General error response message.

4.4.1 Positive response message

After processing the request message, the application or SMS Center sends back a positive response message. The operation code of the response packet is fixed to be 50 more than the operation code of the request packet. The packet number is the same as the request message.

A positive response message informs the initiator of the operation that the request message was received correctly and the operation was performed successfully.

In some exceptional cases (for example, cancel message), the response message assures only that the request message was received correctly and the operation will be performed, but the result of the operation is not available.

4.4.2 Negative response message

If the request contains invalid parameters or cannot be performed, a negative response message is sent back to the initiator of the operation. Positive and negative responses have the same operation code and packet number, but the negative response message has an error code and optionally an error text parameter. The usage of error texts is set in the interface profile.

A negative response message informs the initiator of the operation that the request message was received correctly, but the operation could not be performed successfully.

4.4.3 Nack message

A nack message is a special case that performs either one of the following actions:

1. It can be used to trigger a retransmission of the request message in case the checksum calculated by the receiver does not match the checksum found in the packet.
2. It can be used to indicate that the packet number used is not the expected number. The packet number of the nack message always contains the expected packet number.

Note

The SMS Center will never change the packet number because of the nack message. The SMS Center always assumes that the packet number confusion should be corrected by the application.

4.4.4 General error response message

This response message is used if an unknown operation has been received by the SMS Center. It indicates the correct reception of a request with a correct checksum and packet number, but an illegal operation code (for example operation code 7).

5 Parameters related to CIMD operations

The following table lists the symbols used. See descriptions for the parameters in *CIMD parameters* in *CIMD Interface Specification* (PDF).

Table 6. Parameter symbols

Symbol	Meaning
M	Mandatory parameter
O	Optional

5.1 Login (01)

A login operation must always be done before any other operation. The SMS Center selects the interface profile based on the user identity given in the login operation.

Table 7. Login parameters

Number	Login parameters	Presence
010	User identity	M
011	Password	M
012	Subaddr	O
019	Window size	O

Positive response for login contains no parameters.

Table 8. Negative response parameters for login

Number	Negative response parameters
900	Error code
901	Error text (optional)

Negative response may follow if the user is already logged in or the User identity or Password or Subaddr is incorrect. It can also follow if the window size exceeds the allowed limits for login.

5.2 Logout (02)

The logout operation closes the session, but not the connection. This allows an application connected via a modem to login again without having to re-establish the modem connection to the SMS Center. In most cases, the application can close the connection without performing an explicit logout.

The logout operation does not need any parameters.

Positive response for logout contains no parameters.

Table 9. Negative response parameters for logout

Number	Negative response parameters
900	Error code
901	Error text (optional)

5.3 Submit message (03)

Submit in its simplest mode just passes the message text and destination address to the SMS Center, which takes care of delivery. There are, however, also some special features that may be requested with the submit operation, for example first delivery time, or message to many recipients.

When the application wants to submit a message, it builds the message text and places it into the parameter user data in the submit operation. The text is sent with other necessary parameters to the SMS Center. The SMS Center then sends the message to the MS or another application.

The submitted message can be identified afterwards by using a time stamp generated by the SMS Center (returned in a submit response) and the destination address.

Table 10. Submit parameters

Number	Submit parameters	Presence
021	Destination address (multi)	M
023	Originating address	O
027	Alphanumeric originating address	O
030	Data coding scheme	O
032	User data header (bin)	O
033	User data ¹	O
034	User data binary ¹	O
044	More Messages to Send ²	O
050	Validity period relative ³	O
051	Validity period absolute ³	O
052	Protocol identifier	O
053	First delivery time relative ⁴	O
054	First delivery time absolute ⁴	O
055	Reply path	O
056	Status report request	O
058	Cancel enabled	O
064	Tariff class	O
065	Service description	O
067	Priority	O

- 1 either user data (033) or user data binary (034) field
- 2 parameters First delivery time relative or First delivery time absolute affect the value -> 0
- 3 either relative or absolute validity period
- 4 either relative or absolute first delivery time

For using the user data parameters (032, 033, and 034), refer to the parameter description in section *CIMD parameters*.

If an originating address is given in the submit message, it is regarded as a sub-address and it is appended to the end of the address that is set in the interface profile.

Table 11. Positive response parameters for submit

Number	Positive response parameters
021	Destination address
060	Service centre time stamp

Table 12. Negative response parameters for submit

Number	Negative response parameters
021	Destination address *
900	Error code
901	Error text (optional)

* The destination address(es) is included only if the SMS Center could interpret the address in the request correctly.

Note

A submit to multiple destinations is responded to with a single submit response message. This submit response contains an element, formed of a destination address and a time stamp (positive response) or of a destination address and an error code (negative response) for each destination address in the submit message.

Example 5. Submit operation to multiple destinations

```
Submit Request --->
<STX>03:007<TAB>021:11111<TAB>021:22222<TAB>021:333<TAB>033:UserData<TAB><ETX>
<-- Submit Response
<STX>53:007<TAB>021:11111<TAB>060:971107131212<TAB>
>021:22222<TAB>060:971107131212<TAB>021:333<TAB>
>900:300<TAB><ETX>
```

Note

As the CIMD interface allows the parameters to be in any order, note that the decoding ends right after the first erroneous parameter is received. So the addresses are returned only if the error occurs after the address parameters. See examples below.

Example 6. Addresses are returned even if there is an erroneous parameter

In the following case, the 056 (that is, SR request) is wrongly set (too big value). Despite that, all addresses (021) are returned before an error code (900:310).

Submit:

```
03:005 021:123 021:12345          021:1234567890 033:hi there
056:321
```

Submit response:

```
53:005 021:123 021:12345          021:1234567890 900:310 D6
```

Example 7. Addresses are not returned because of an erroneous

parameter

In the following case, the 056 (that is, SR request) is wrongly set (too big value). Because the second address (021:456) comes after the erroneous parameter, it is never decoded, thus it is not added to the response at all.

Submit:

```
03:007 021:123 033:hello 056:333 021:456
```

Submit response:

```
53:007 021:123 900:310 20
```

Likewise, if the erroneous parameter happens to be before the first address, none of the addresses will be returned.

5.4 Enquire message status (04)

This operation is used to request a status report for a previously submitted message.

An enquire message status operation can be performed independently of the status report request parameter used in the submit message operation. However, a returned status code usually indicates that the status is unknown, because the SMS Center will not keep track of statuses unless requested at submission time for performance reasons.

No multiple enquiries are allowed in one enquire message status message packet, so applications have to request each status report separately.

Table 13. Enquire message status parameters

Number	Enquire message status parameters	Presence
021	Destination address	M
060	Service centre time stamp	M

The information in the enquire message status response is the same as in the message status delivery.

Table 14. Positive response parameters for enquire message status

Number	Positive response parameters
021	Destination address
060	Service centre time stamp
061	Status code
062	Status error code (optional)
063	Discharge time

Table 15. Negative response parameters for enquire message status

Number	Negative response parameters
900	Error code
901	Error text (optional)

Example 8. Enquire message status

```

Enquire Message Status --->
<STX>04:003<TAB>021:DestAddr<TAB>060:ServiceCentreTimeStamp<TAB>cs<ETX>
<--- Positive response
<STX>54:003<TAB>021:DestAddr<TAB>060:ServiceCentreTimeStamp<TAB>061:
StatusCode<TAB>063:DischargeTime<TAB>cs<ETX>
<--- Negative response
<STX>54:003<TAB>900:ErrorCode<TAB>checksum<ETX>
    
```

5.5 Delivery request (05)

This operation is used by the client (application) to retrieve a message sent to the client. The usage of this operation depends on the type of message centre and type of application.

For the SMS Center, the usage depends on the application type.

The querying type of application must always poll for messages using this delivery request operation.

For the receiving type of application, this operation is optional as normally messages are delivered immediately to the application using the deliver message operation (020). This operation can still be useful for querying the count of messages waiting for the application.

This operation cannot be used by send-only applications.

If the response to the delivery request with mode 1 or 2 is positive, one or more deliver short message operations will follow until all the messages are delivered.

Table 16. Delivery request

Number	Delivery request	Presence
068	Mode	○

Mode can have one of the following values (default value = 1):

- 0 Number of messages waiting. The response contains the number of messages waiting to be retrieved, no actual messages are transferred after this request.
- 1 Deliver one message. The oldest message is delivered.
- 2 Deliver all messages (receiving applications only!). All messages are delivered.

Table 17. Positive response parameters for delivery request

Number	Positive response parameters
066	Number of messages waiting*

* Positive response contains the parameter only if the mode parameter in the request was used with value zero.

Table 18. Negative response parameters for delivery request

Number	Negative response parameters
900	Error code
901	Error text (optional)

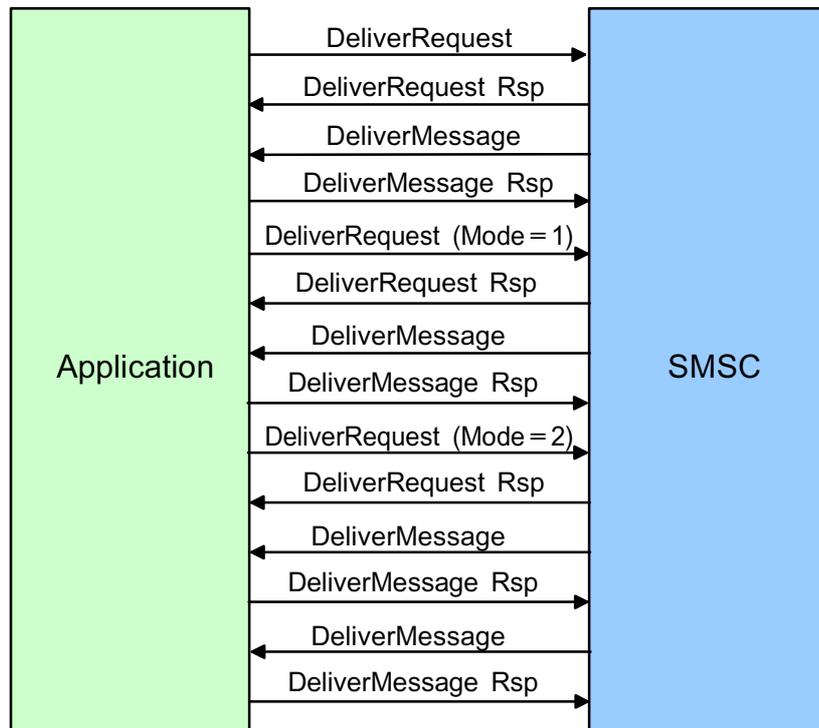


Figure 2. Flow of delivery request operations

Example 9. A querying application using the delivery request for retrieving messages

```

Delivery Request ----->
<STX>05:007<TAB><ETX>
<--- Positive response
<STX>55:007<TAB><checksum><ETX>

<----- Deliver message
<STX>20:002<TAB>021:DestAddr<TAB>060:ServiceCentreTimeStamp
<TAB>023:OrigAddr<TAB>033:Data<TAB><checksum><ETX>
    
```

```
Deliver message response ----->
<STX>70:002<TAB><ETX>

Delivery Request ----->
<STX>05:009<TAB><ETX>

<--- Positive response
<STX>55:009<TAB><chksum><ETX>

<----- Deliver message<STX>20:004<TAB>021:DestAddr<TAB>060:ServiceCentreTimeStamp
<TAB>023:OrigAddr<TAB>033:Data<TAB><chksum><ETX>

Deliver message response ----->
<STX>70:004<TAB>chksum<ETX>
```

Example 10. A querying or receiving application asks for the number of messages waiting

```
Delivery Request (mode=0) --->
<STX>05:011<TAB>068:0<TAB><ETX>
<--- Positive response
<STX>55:011<TAB>066:26<TAB><chksum><ETX>
```

5.6 Cancel message (06)

This operation is used to cancel a message sent earlier by the subscriber. It is possible to cancel more than one message with one operation. If the message has already been delivered to its destination, it cannot be cancelled.

Note

When an application is using setting `multi-instance mode = 2`, each instance of the application can only cancel messages that itself has sent.

Cancelling may be disabled in the submit operation. Disabling is useful, for example, in cases where there are such messages to a certain destination that should not be cancelled, but the cancellation is made according to the destination address.

Table 19. Cancel message parameters

Number	Cancel message parameters	Presence
060	Service centre time stamp	O
021	Destination address	O
059	Cancel mode	M

The mode parameter can have three different values:

- 0 Cancel all messages with the same destination address. This is only valid for MT messages.
- 1 Cancel all sent messages. This is only valid for MT messages.
- 2 Cancel a message where the destination address and the time stamp match with a short message submitted earlier.

In mode 0, the destination address is mandatory. In mode 1, only the cancel mode parameter is needed, and in mode 2, all three parameters are mandatory.

Positive response for cancel message does not contain any parameters.

Table 20. Negative response parameters for cancel message operation

Number	Negative response parameters
900	Error code
901	Error text (optional)

A cancel message response is positive even if the message cannot be cancelled. A positive response only means that the cancel request was received correctly by the SMS Center. Status reports can be used to find out about the actual success of the cancel message operation.

5.7 Deliver message (20)

This operation is used by the SMS Center to deliver a message to an application. Only receiving-type applications will get this message.

Table 21. Deliver message parameters

Number	Deliver message parameters	Presence
021	Destination address	M
023	Originator address	M
060	Service centre time stamp	M
032	User data header *	O
033	User data **	O
034	User data binary **	O
052	Protocol identifier	O
030	Data coding scheme	O
026	Originated IMSI	O
028	Originated Visited MSC address	O
069	Service Center Address	O

* The user data header parameter is present only if the message contains a user data header.

** Either the user data (033) or user data binary (034) is used, depending on the value of the data coding scheme (030).

If the data coding scheme indicates that the data is using the default GSM character set, the common user data parameter is used. For UCS2 or other binary data, the user data binary (034) parameter is used.

Other optional parameters are normally present, unless suppressed via the user interface profile.

Response for a deliver message does not need to contain any parameters, but parameter 900 (error code) is supported. See the following options.

- If the parameter is missing, the message is considered to be successfully delivered.
- If the parameter's value is between range 700-799, the SMS Center handles the message as a failed delivery.

This functionality has to be enabled in the applications's user profile file with parameter `sm deliver nack enabled`. See *s2aupsamplemx.cf* in *Configuration Files (PDF)*.

The following values are defined:

700-709 delivery OK but pending

700 - delivery OK until the next network element.

The SMS Center sends the originator a positive SR with log success indicator (LSI) 12, 'waiting for delivery'. This can be used for example with gateway type of applications.

710-729 delivery not OK, message level error

- 710 - generic failure; the SMS Center sends a negative SR.
- 711 - unsupported DCS; the SMS Center sends a negative SR
- 712 - unsupported UDH; the SMS Center sends a negative SR.

730-750 delivery not OK, service level error

730 - unknown subscriber; the SMS Center sends a negative SR.

Error codes bigger than 700 can be seen in the CIMD2 operator session traces, but are not visible in event logs, and they are mapped as permanent errors.

- If the parameter's value is other than between range 700-799, the SMS Center retries message delivery after a certain period of time.

Table 22. Negative response parameter for delivery message

Number	Negative response parameters
900	Error code

5.8 Deliver status report (23)

This operation is used by the SMS Center to send a status report describing the delivery status of a previously submitted message. The generation of status reports for a particular message is requested in the submit operation.

The delivery of status reports to the application depends also on the type of application. Querying applications, connecting to an SMS Center, always have to request the delivery of a status report using the enquire message status operation (04). Receiving applications will receive the status report whenever it is available.

After a successful delivery of the status report, the status report will be removed from the SMS Center if it describes the final status of the message.

The information in the deliver status report message is the same as in the enquire message status response.

Table 23. Deliver status report parameters

Number	Deliver status report parameters	Presence
021	Destination address	M
060	Service centre time stamp	M
061	Status code	M
062	Status Error code	O
063	Discharge time	M
023	Originator address	O

Response for deliver status report does not contain any parameters.

Example 11. Deliver status report

```
<--- Deliver Status Report
<STX>23:012<TAB>021:destAddr<TAB>060:scts
<TAB>061:statusCode<TAB>063:dis_time<TAB><chksum><ETX>
Response --->
<STX>73:012<TAB><chksum><ETX>
```

5.9 Set (08)

This operation is used by the application to change those parameters of the interface profile that it is allowed to change.

At the moment, only the password can be changed by applications.

Table 24. Set parameter

Number	Set parameters
011	Password

Positive response for set does not contain any parameters.

Table 25. Negative response parameters for set

Number	Negative response parameters
900	Error code
901	Error text (optional)

Example 12. Set

```
Set (password) --->
<STX>08:011<TAB>011:myNewpasWord<TAB><chksum><ETX>
<--- Response
<STX>58:011<TAB><chksum><ETX>
```

5.10 Get (09)

This operation is used by the application to retrieve specific parameters from the SMS Center.

In the get operation, the parameter 500 is used in all get operations and the value of the parameter 500 is the number of the parameter (or information) the application is requesting.

Currently the only supported value for get parameters is 501, which returns the time of the SMS Center.

Table 26. Positive response parameters for get

Number	Positive response parameters
501	Time of the SMS Center

Positive response contains the value parameter (or information) requested and the real value of that parameter.

Negative response will follow if the parameter value is not available.

Table 27. Negative response parameters for get

Number	Negative response parameters
900	Error code
901	Error text (optional)

Example 13. Get

```
Get (system time)--->
<STX>09:009<TAB>500:501<TAB><checksum><ETX>
<----- response
<STX>59:009<TAB>501:990814154512<TAB><checksum><ETX>
```

5.11 Alive (40)

This operation can be used to check whether the link between the application and the SMS Center is still alive. The receiving entity sends an acknowledgement back to the originator if the alive operation is received correctly.

The SMS Center does not initiate the alive operation, so it is the application's responsibility to keep the link alive by invoking the alive operation periodically. The SMS Center then responds with an acknowledgement if it receives the alive operation correctly from an application.

The alive operation does not need any parameters. Positive response for alive does not contain any parameters.

Example 14. Application-originated Alive request

```

Alive request ----->
<STX>40:009<TAB><Chksum><ETX>
<----- response
<STX>90:009<TAB><Chksum><ETX>
    
```

5.12 Additional operations

This section lists the additional response packages used in certain error situations as described in the previous chapter.

5.12.1 General error response (98)

This operation is used by the SMS Center to respond to illegal, unexpected, or unsupported operations sent by the application.

Table 28. Operation parameters

Number	Operation parameters
900	Error code
901	Error text (optional)

Example 15. General error response

```

Request ---->
<STX>07:007<TAB><checksum><ETX>
<----- response
<STX>98:007<TAB>900:ErrorCode<TAB><checksum><ETX>

```

5.12.2 Nack (99)

The nack operation is used to reject an operation due to an incorrect checksum or an incorrect sequence number. The nack operation causes retransmission of the message. The packet sequence number in a nack message is always the expected sequence number.

There are no operation parameters.

Example 16. Corrupted message retransmission

```

SME sends ----->
<STX>03:007<TAB>021:daddr<TAB>033:data<TAB>3A<ETX>
SMS Center Receives
<STX>03:007<TAB>021:daddr<TAB>033:XXXX<TAB>3A<ETX>

<----- response with the nack
<STX>99:007<TAB><checksum><ETX>

SME retransmits ----->
<STX>03:007<TAB>021:daddr<TAB>033:data<TAB>3A<ETX>

<----- SMS Center response
<STX>53:007<TAB>021:daddr<TAB>060:scts<TAB><CS><ETX>

```

Example 17. Wrong packet number

```

SME sends unexpected packet number ----->
<STX>03:001<TAB>021:daddr<TAB>033:Data<TAB><CS><ETX>
<----- SMS Center responds with nack
<STX>99:009<TAB><CS><ETX>

SME recovers ---->
<STX>03:009<TAB>021:daddr<TAB>033:Data<TAB><CS><ETX>

<----- SMS Center responds
<STX>53:009<TAB>021:daddr<TAB>060:60:scts<TAB><CS><ETX>

```

The SMS Center expects a packet number 007, but the client sends something else. After the Nack, the client recovers and normal operation continues.

6 Windowing for applications

The windowing for applications feature enables the CIMD2 applications to initiate more than one operation before receiving responses. The feature also activates multiple SM and SR deliveries from the application server (ASE) to the application, which application can acknowledge preferably in the received order.

This feature is reasonable to use, for example, when the application connects to the ASE through a slow link. Then the application is able to speed up the transactions by submitting more than one SM before waiting for submit responses.

6.1 Windowing scenarios

In the following, some scenarios between the application and the ASE are presented.

6.1.1 Submitting more than one short message from application

Suppose X is the window size allowed for the considered application. The application is allowed to submit up to X SMs to the ASE before it waits for the responses. The ASE ignores any SMs submitted with a sequence number outside the window range and a nack (negative acknowledge) is returned. So there is no retransmission of responses once windowing is enabled. This behaviour is enabled only when the application logs in with parameter 019. The application is forced to use the sequence numbers in strict increasing order.

If an application submits with a window size 3, and if 007 is the current sequence number for submit, the following scenario is possible, see the following table.

Table 29. Windowing scenario 1

ASE	Direction	Application
	< — — —	007:<submit>

Table 29. Windowing scenario 1 (cont.)

ASE	Direction	Application
007:<submit response>	---->	
	<----	005:<submit>
--- Ignore (NACK) ---		
	<----	011:<submit>
--- Ignore (NACK) ---		
	<----	009:<submit>
	<----	011:<submit>
	<----	013:<submit>
009:<submit response>	---->	
011:<submit response>	---->	
013:<submit response>	---->	

ASE delivers more than one SM/SR to application

If an application has logged in with a window size of X, and the ASE has accepted it, the ASE is entitled to deliver up to X SMs or SRs to the application before waiting for the response from the application. This is valid only if the application is configured as auto deliver. If the delivery is not acknowledged during the delivery timeout period, then the ASE retransmits the packet. The application can acknowledge the delivery packets it has received in any order, but the preferred way is to acknowledge them in the order they are received.

If the ASE is retrieving messages from the message poller, then the ASE uses only a window size of 1. The scenario can be explained with an application which has a window size of 3, see the following table.

Table 30. Windowing scenario 2

ASE	Direction	Application
000:<SM delivery>	---->	
002:<SM delivery>	---->	

Table 30. Windowing scenario 2 (cont.)

ASE	Direction	Application
004:<SM delivery>	— — —>	
	< — — —	000:<SM ack>
006:<SM delivery>	— — —>	
	< — — —	002:<SM ack>
	< — — —	006:<SM ack>
...		
...		
Time out for 004 — retransmit	— — —>	
004:<SM delivery>	< — — —	004:<SM ack>

6.2 Windowing restrictions

The CIMD2 windowing does not distinguish between different operations initiated by the application. This means that an application can have X outstanding operations (submit, message count request, cancel and so on) if it has been granted a window size of X.

All the windowing features are enabled if the application logs with parameter 019. If not, then submit and delivery behaviour is the same as in the previous version of CIMD. But an application can use windowing only after it has received a login response from the ASE.

For polling applications, it is recommended not to use a window size higher than 1. This is because more than one poll-request simultaneously for a short message can cause duplicate deliveries.

7

CIMD parameters

7.1 Parameter types

The parameter type selects the allowed values of characters in the CIMD2 messages.

Integer (int)

Integer is the most common type of parameter. The allowed values are the ASCII representation of the digits 0 to 9. This means that only decimal values from 48 to 57 are allowed.

Example 18. Integer

```
064:3<tab>050:167<tab>030:0<tab>055:1<tab>056:63
```

Address (addr)

The Address parameter type is used for passing GSM addresses to and from the SMS Center. This field can contain digits like the integer field, but also some extra characters. What characters are actually accepted depends on the configuration of the address conversion done in the SMS Center. The ASCII representation of '+' is currently allowed. This means that besides the values 48 to 57 (digits 0 to 9) also value 43 ('+') is allowed.

Example 19. Address

```
021:+35812345678<tab>023:13131
```

Hexadecimal (hex)

The Hexadecimal parameter type is used for passing binary data to and from the SMS Center. This field can contain the ASCII representation of the digits 0 to 9 and the ASCII representation of the characters 'A' to 'F' and 'a' to 'f'. This means that the following decimal values are allowed: 48 to 57 (0 to 9); 65 to 70 ('A' to 'F') and 97 to 102 ('a' to 'f') in the CIMD2 parameters of this type.

Example 20. Sending six bytes of binary data

```
034:0500032a0301<tab>
```

User data (ud)

The User data parameter type is used to exchange user data between the SMS Center and an application. The application can use most of the printable ASCII character set, and can combine them to select the characters of the default GSM character set. The exact configuration of this conversion is selected by the user profile. See the default character conversion table in *Default character conversion* in *CIMD Interface Specification* (PDF).

The following example shows the first few characters of the default GSM character set that can be entered using the default character conversion over an 8-bit wide link using a system with the ISO-Latin character set.

Example 21. Default character conversion over 8-bit wide link

```
033:@£$¥èéùìòÇ
```

```
which is from the iso latin1 character set.  
48, 51, 51, 58, 64, 163, 36, 165, 232, 233, 249, 236, 242, 199
```

For a 7-bit link, only values under 128 can be used. Example 20 shows how to enter the same data as before (see the previous example) from a system with a different character set.

Example 22. Default character conversion over 7-bit link

```
033:_a0_L-$_Y-_e`_e"_u`_i`_o`_C,
```

String (str)

The String parameter type is used to exchange general printable characters from the ASCII character table. Parameters of this type can have the decimal values from 32 (space) to 126 (~).

Example 23. String

```
010:MyUserId<tab>011:my ()<pass;+\wo%=rd<tab>
```

7.2 Parameters

The table below specifies the CIMD parameters and their values.

Table 31. Parameters

Name	ID	Max Length	Type	Values	Description
User Identity	010	32	String	-	Identity used to login. Max. 32 characters. Spaces are not allowed.
Password	011	32	String	-	Password used to login. Max. 32 characters. Spaces are not allowed.
Subaddr	012	3	Integer	0 - 9	Defines a unique index for application instance. This is useful for correct delivery of status reports when multiple instances of the same application are connected.
Window size	019	3	Integer	1 - 128	Defines the window size used by the application for submitting messages.
Destination Address	021	20	Address	-	Destination address in the GSM network. The prefix '+' indicates address type 145 which means international address. This parameter is valid only for AT type of messages.
Originating Address	023	20	Address	-	Originating address. This value is appended to the prefix in the ASE subscriber database. The total length can be 20 characters at the most. The + character can be used in front of the originating address in AO and AT messages to set the corresponding type of number to International (145). Note that the '+' is only allowed in combination with the 'free submit originator address' feature.
Originating IMSI	026	20	Address	-	Originating International Mobile Subscriber Identity number.
Alphanumeric Originating Address	027	11	String	-	Originating address in alphanumeric format. This parameter is a string of maximum 11 characters, where each character byte can have the following values: 32-126 inclusive, BUT NOT ALLOWED: 36, 64, 93, 95, 96, 125, that is, included are a few punctuation marks, space, a-z, A-Z and 0-9.

Table 31. Parameters (cont.)

Name	ID	Max Length	Type	Values	Description
Originated Visited MSC address	028	20	Address	-	The ISDN number of the serving MSC network element of the originating subscriber.
Data Coding Scheme	030	3	Integer	0 - 255	As defined in GSM 03.38.
User Data Header	032	280 - 320	Hexadecimal	-	This is an optional part of the user data of the message transferred. The maximum length of the header is 140 bytes. The maximum length of the user data header is reduced by the length of user data or user data binary. 140 bytes result in a coded length of 280 characters.
User Data	033	480 - 546	User Data	-	This parameter can be used to transfer the user data of the short message using the default character set. Special 3-character sequences can be used to select, for example, some Greek characters. The maximum length of the User Data in the message itself can be 160 septets at the most. This corresponds to 140 octets or bytes.
User Data Binary	034	280-320	Hexadecimal	-	This field can be used to transfer the user data of the short message. As it uses the simple hexadecimal coding, any bit pattern can be sent to another application. By selecting an appropriate value for the data coding scheme (030) binary data or UCS2 user data can be transferred. The maximum length of the user data binary is 140 bytes. This maximum length is reduced by the length of user data header (032).

Table 31. Parameters (cont.)

Name	ID	Max Length	Type	Values	Description
More messages to send	044	1	Integer	0 or 1	<p>This parameter indicates if there will be more messages to the same destination immediately after this message. This will allow faster delivery of many messages to the same destination. Values:</p> <p>0 - No subsequent messages 1 - More messages will follow</p> <p>NOTE!</p> <p>This parameter's value turns to 0 if either one of parameters First Delivery Time Relative (053) or First Delivery Time Absolute (054) appears in the submit.</p>
Validity Period Relative	050	3	Integer	-1 - 255	<p>The length of the validity period of the message, counted from the time the message is received by the SMS Center. The value is converted to a time period according to the GSM 03.40 specification.</p> <p>This parameter can not be combined with the Validity Period Absolute (051).</p>
Validity Period Absolute	051	12	Integer	-	<p>The absolute termination time of the validity period of the message; value consists of year, month, day, hour, minute, second in the format 'yymmddhhmmss'.</p> <p>This parameter can not be combined with the validity period relative (050).</p>
Protocol Identifier	052	3	Integer	0 - 255	<p>The Protocol Identifier (PID) can be used to control GSM phase 2 features, such as "replace message". Setting the PID to 65 (decimal) sets the message type to "Replace Message Type 1", adding 1..6 gives the replace message types 2 to 7, as defined in <i>GSM 03.40</i>.</p> <p>This parameter can also select the routing to applications instead of GSM mobile stations, as defined in the SMS Center routing table.</p>
First Delivery Time Relative	053	3	Integer	-1 - 255	<p>This parameter selects the time period waited before the first delivery attempt of the message will be made. The value is converted like the validity period relative.</p>

Table 31. Parameters (cont.)

Name	ID	Max Length	Type	Values	Description
First Delivery Time Absolute	054	12	Integer	-	Time for the first delivery attempt of the message. Representation in format 'yymmddhhmmss'.
Reply Path	055	1	Integer	0 or 1	This parameter selects whether the reply path feature is enabled (1) or not (0).
Status Report Request	056	3	Integer	See Description.	<p>Defines in what cases the status report shall be returned.</p> <p>Value of the parameter is the sum of the cases where automatic status report shall be produced. For example, value 62 means that status report is created for all events except for 'temporary error' and 'first temporary result'.</p> <p>Possible flags for SMS Center connections:</p> <ul style="list-style-type: none"> 1 - temporary error 2 - validity period expired 4 - delivery failed 8 - delivery successful 16 - message cancelled 32 - message deleted by the operator 64 - first temporary result <p>Resulting in SRR values from 0 - 127.</p>
Cancel Enabled	058	1	Integer	0 or 1	<p>This parameter selects whether the submitted MT message can later be cancelled (1) or not (0).</p> <p>AT messages can be cancelled regardless of this setting.</p>
Cancel Mode	059	1	Integer	0, 1 or 2	<p>Cancel mode:</p> <ul style="list-style-type: none"> 0 - Cancel all messages with the same destination address. 1 - Cancel all sent messages. 2 - Cancel a message where the destination address and the time stamp match with a message submitted earlier.

Table 31. Parameters (cont.)

Name	ID	Max Length	Type	Values	Description
Service Centre Time Stamp	060	12	Integer	-	Time of message arrival at the SMS Centre. In the SMS Center connection the format is 'yymmddhhmmss'.
Status Code	061	2	Integer	See Description.	Status of the message delivery. Passed to the application in the inquire message status response and deliver status report messages. The following values apply to SMS Center connections: 0 - no status available 1 - in process 2 - validity period expired 3 - delivery failed 4 - delivery successful 5 - no response 6 - last no response 7 - message cancelled 8 - message deleted 9 - message deleted by cancel
Status Error Code	062	3	Integer	0 - 999	Detailed error code of the message delivery status. The values are listed in section <i>Status Error Code values</i> .
Discharge Time	063	12	Integer	-	Time of the last delivery attempt in format 'yymmddhhmmss'.
Tariff Class	064	2	Integer	0 - 99	Defines the tariff class of the message.
Service Description	065	2	Integer	0 - 99	Defines the service description of the message, which can be used for billing.
Message Count	066	3	Integer	0 - 999	Number of messages waiting to be retrieved.
Priority	067	1	Integer	1 - 9	Priority of the message. Lower value means higher priority.
Delivery Request Mode	068	1	Integer	0, 1 or 2	Selects the Mode in the Delivery Request operation

Table 31. Parameters (cont.)

Name	ID	Max Length	Type	Values	Description
Service Center Address	069	20	Address	-	The ISDN number of an SMS Center element
Get parameter	500	3	Integer	501 - 999	The value is the parameter number or information item that the application wants to retrieve. Currently only the value 501 is supported.
SMS Center Time	501	12	Integer	-	The local time of the SMS Center in the format 'yymmddhhmmss' for year, month, day, hours, minutes and seconds.
Error Code	900	3	Integer	0 - 999	The identifier of the error. The error codes are listed in section <i>Error codes</i> .
Error Text	901	64	String	-	Text describing the error. These merely help so that the client application developer does not have to look up the coded error.

8

Error codes

The following table lists the values of the parameter 900 'error code' together with the error texts.

Table 32. Parameter error codes and error texts

Error code	Error text
0	No error
1	Unexpected operation
2	Syntax error
3	Unsupported parameter error
4	Connection to SMS Center lost
5	No response from SMS Center
6	General system error
7	Cannot find information
8	Parameter formatting error
9	Requested operation failed
10	Temporary congestion error
LOGIN error codes:	
100	Invalid login
101	Incorrect access type
102	Too many users with this login ID
103	Login refused by SMS Center

Table 32. Parameter error codes and error texts (cont.)

Error code	Error text
104	Invalid window size
105	Windowing disabled
106	Virtual SMS Center-based barring
107	Invalid subaddr
108	Alias account, login refused
SUBMIT MESSAGE error codes:	
300	Incorrect destination address
301	Incorrect number of destination addresses
302	Syntax error in user data parameter
303	Incorrect bin/head/normal user data parameter combination
304	Incorrect dcs parameter usage
305	Incorrect validity period parameters usage
306	Incorrect originator address usage
307	Incorrect PID parameter usage
308	Incorrect first delivery parameter usage
309	Incorrect reply path usage
310	Incorrect status report request parameter usage
311	Incorrect cancel enabled parameter usage
312	Incorrect priority parameter usage
313	Incorrect tariff class parameter usage
314	Incorrect service description parameter usage
315	Incorrect transport type parameter usage
316	Incorrect message type parameter usage
318	Incorrect MMS parameter usage

Table 32. Parameter error codes and error texts (cont.)

Error code	Error text
319	Incorrect operation timer parameter usage
320	Incorrect dialogue ID parameter usage
321	Incorrect alpha originator address usage
322	Invalid data for alpha numeric originator
323	Online closed user group rejection
324	Licence exceeded
ENQUIRE MESSAGE STATUS error codes:	
400	Incorrect address parameter usage
401	Incorrect scts parameter usage
DELIVERY REQUEST error codes:	
500	Incorrect scts parameter usage
501	Incorrect mode parameter usage
502	Incorrect parameter combination
CANCEL MESSAGE error codes:	
600	Incorrect scts parameter usage
601	Incorrect address parameter usage
602	Incorrect mode parameter usage
603	Incorrect parameter combination
DELIVER MESSAGE error codes:	
700	Delivery OK/ waiting for delivery
710	Generic failure
711	Unsupported DCS
712	Unsupported UDH
730	Unknown subscriber

Table 32. Parameter error codes and error texts (cont.)

Error code	Error text
SET error codes:	
800	Changing password failed
801	Changing password not allowed
GET error codes:	
900	Unsupported item requested

8.1 Status Error Code values

The following table lists the values and meanings of the parameter Status Error Code (062) for SMS Center connections.

Table 33. Status Error Code parameter for SMS Center connections

Value	Meaning
0	No error
1	Unknown subscriber
9	Illegal subscriber
11	Teleservice not provisioned
13	Call barred
15	OCUG reject
19	No SMS support in MS
20	Error in MS
21	Facility not supported
22	Memory capacity exceeded
29	Absent subscriber

Table 33. Status Error Code parameter for SMS Center connections (cont.)

Value	Meaning
30	MS busy for MT SMS
36	Network/Protocol failure
44	Illegal equipment
60	No paging response
61	GMSC congestion
63	HLR timeout
64	MSC/SGSN_timeout
70	SMRSE/TCP error
72	MT congestion
75	GPRS suspended
80	No paging response via MSC
81	IMSI detached
82	Roaming restriction
83	Deregistered in HLR for GSM
84	Purged for GSM
85	No paging response via SGSN
86	GPRS detached
87	Deregistered in HLR for GPRS
88	The MS purged for GPRS
89	Unidentified subscriber via MSC
90	Unidentified subscriber via SGSN
112	Originator missing credit on prepaid account
113	Destination missing credit on prepaid account
114	Error in prepaid system

9 Character conversion for user data

The user data can use the default character set and the characters from the extension table defined in the *3GPP TS 23.038 Specification*. The character conversion is made based on these character tables.

9.1 Default character conversion

The following table shows how the characters of the default character set table are converted in short message user data.

The three columns on the left show the value, symbol, and name of the character of the 7-bit default GSM character set.

The fourth column shows the possible character of the ISO-Latin character set and in brackets the decimal value. Computers using another character table can also send the value from this column, even though it will look like a different character on their system. The fifth column shows the combination of ISO-Latin characters which results in the intended GSM character. The characters used in this column also match the corresponding characters of the common ASCII table.

Table 34. Default character conversion for user data

GSM character			Iso-Latin	Special combination
0	@	COMMERCIAL AT	@ (64)	_Oa
1	£	POUNDS STERLING		_L-
2	\$	DOLLAR SIGN	\$ (36)	
3	¥	YEN		_Y-
4	è	e WITH GRAVE ACCENT		_e`
5	é	e WITH ACUTE ACCENT		_e'

Table 34. Default character conversion for user data (cont.)

GSM character			Iso-Latin	Special combination
6	ù	u WITH GRAVE ACCENT		_u`
7	ì	i WITH GRAVE ACCENT		_i`
8	ò	o WITH GRAVE ACCENT		_o`
9	ç	C WITH CEDILLA		_C,
10		LINE FEED	(10)	
11	ø	O WITH SLASH		_O/
12	ø	o WITH SLASH		_o/
13		CARRIAGE RETURN	(13)	
14	Å	A WITH RING] (93)	_A*
15	å	a WITH RING	} (125)	_a*
16	Δ	GREEK ALPHABET DELTA		_gd
17	_	UNDERSCORE		_--
18	Φ	GREEK ALPHABET PHI		_gf
19	Γ	GREEK ALPHABET GAMMA		_gg
20	Λ	GREEK ALPHABET LAMBDA		_gl
21	Ω	GREEK ALPHABET OMEGA		_go
22	Π	GREEK ALPHABET PI		_gp
23	Ψ	GREEK ALPHABET PSI		_gi
24	Σ	GREEK ALPHABET SIGMA		_gs
25	Θ	GREEK ALPHABET THETA		_gt
26	Ξ	GREEK ALPHABET XI		_gx
27		RESERVED		_XX
28	Æ	AE DIPHTHONG		_AE
29	æ	ae DIPHTHONG		_ae

Table 34. Default character conversion for user data (cont.)

GSM character			Iso-Latin	Special combination
30	ß	GERMAN DOUBLE-S		_ss
31	É	E WITH ACUTE ACCENT		_E'
32		SPACE	(32)	
33	!	EXCLAMATION MARK	! (33)	
34	"	QUOTATION MARK	" (34)	_qq
35	#	NUMBER SIGN	# (35)	
36	¤	CURRENCY SYMBOL		_ox
37	%	PERCENT SIGN	% (37)	
38	&	AMPERSAND	& (38)	
39	'	APOSTROPHE	' (39)	
40	(LEFT PARENTHESIS	((40)	
41)	RIGHT PARENTHESIS) (41)	
42	*	ASTERISK	* (42)	
43	+	PLUS SIGN	+ (43)	
44	,	COMMA	, (44)	
45	-	HYPHEN	- (45)	
46	.	FULL STOP (PERIOD)	. (46)	
47	/	SOLIDUS (SLASH)	/ (47)	
48	0	DIGIT ZERO	0 (48)	
49	1	DIGIT ONE	1 (49)	
50	2	DIGIT TWO	2 (50)	
51	3	DIGIT THREE	3 (51)	
52	4	DIGIT FOUR	4 (52)	
53	5	DIGIT FIVE	5 (53)	

Table 34. Default character conversion for user data (cont.)

GSM character			Iso-Latin	Special combination
54	6	DIGIT SIX	6 (54)	
55	7	DIGIT SEVEN	7 (55)	
56	8	DIGIT EIGHT	8 (56)	
57	9	DIGIT NINE	9 (57)	
58	:	COLON	: (58)	
59	;	SEMICOLON	; (59)	
60	<	LESS-THAN SIGN	< (60)	
61	=	EQUALS SIGN	= (61)	
62	>	GREATER-THAN SIGN	> (62)	
63	?	QUESTION MARK	? (63)	
64	¡	INVERTED !		_!!
65	A	CAPITAL LETTER A	A (65)	
66	B	CAPITAL LETTER B	B (66)	
67	C	CAPITAL LETTER C	C (67)	
68	D	CAPITAL LETTER D	D (68)	
69	E	CAPITAL LETTER E	E (69)	
70	F	CAPITAL LETTER F	F (70)	
71	G	CAPITAL LETTER G	G (71)	
72	H	CAPITAL LETTER H	H (72)	
73	I	CAPITAL LETTER I	I (73)	
74	J	CAPITAL LETTER J	J (74)	
75	K	CAPITAL LETTER K	K (75)	
76	L	CAPITAL LETTER L	L (76)	
77	M	CAPITAL LETTER M	M (77)	

Table 34. Default character conversion for user data (cont.)

GSM character			Iso-Latin	Special combination
78	N	CAPITAL LETTER N	N (78)	
79	O	CAPITAL LETTER O	O (79)	
80	P	CAPITAL LETTER P	P (80)	
81	Q	CAPITAL LETTER Q	Q (81)	
82	R	CAPITAL LETTER R	R (82)	
83	S	CAPITAL LETTER S	S (83)	
84	T	CAPITAL LETTER T	T (84)	
85	U	CAPITAL LETTER U	U (85)	
86	V	CAPITAL LETTER V	V (86)	
87	W	CAPITAL LETTER W	W (87)	
88	X	CAPITAL LETTER X	X (88)	
89	Y	CAPITAL LETTER Y	Y (89)	
90	Z	CAPITAL LETTER Z	Z (90)	
91	Ä	A WITH DIERESIS	[(91)	_A"
92	Ö	O WITH DIERESIS	\ (92)	_O"
93	Ñ	N WITH TILDE		_N~
94	Ü	U WITH DIERESIS	^ (94)	_U"
95	§	SECTION MARK		_so
96	¿	INVERTED ?		_??
97	a	SMALL LETTER a	a (97)	
98	b	SMALL LETTER b	b (98)	
99	c	SMALL LETTER c	c (99)	
100	d	SMALL LETTER d	d (100)	
101	e	SMALL LETTER e	e (101)	

Table 34. Default character conversion for user data (cont.)

GSM character			Iso-Latin	Special combination
102	f	SMALL LETTER f	f (102)	
103	g	SMALL LETTER g	g (103)	
104	h	SMALL LETTER h	h (104)	
105	i	SMALL LETTER i	i (105)	
106	j	SMALL LETTER j	j (106)	
107	k	SMALL LETTER k	k (107)	
108	l	SMALL LETTER l	l (108)	
109	m	SMALL LETTER m	m (109)	
110	n	SMALL LETTER n	n (110)	
111	o	SMALL LETTER o	o (111)	
112	p	SMALL LETTER p	p (112)	
113	q	SMALL LETTER q	q (113)	
114	r	SMALL LETTER r	r (114)	
115	s	SMALL LETTER s	s (115)	
116	t	SMALL LETTER t	t (116)	
117	u	SMALL LETTER u	u (117)	
118	v	SMALL LETTER v	v (118)	
119	w	SMALL LETTER w	w (119)	
120	x	SMALL LETTER x	x (120)	
121	y	SMALL LETTER y	y (121)	
122	z	SMALL LETTER z	z (122)	
123	ä	a WITH DIERESIS	{ (123)	_a"
124	ö	o WITH DIERESIS	(124)	_o"
125	ñ	n WITH TILDE		_n~

Table 34. Default character conversion for user data (cont.)

GSM character			Iso-Latin	Special combination
126	ü	u WITH DIERESIS	~ (126)	_u"
127	à	a WITH GRAVE ACCENT		_a`

9.2 Extension character conversion

The following table shows how the characters of the extension table defined in 3GPP TS 23.038 are converted in short message user data.

In the CIMD user data parameter, the special combination character `_XX` (named Reserved) is reserved as an escape to an extension of the GSM 7-bit default alphabet table. If a receiving mobile station does not understand the meaning of this escape mechanism, it should display it as a space character.

When defining the CIMD Reserved escape character (i.e. `_XX`) and the second CIMD character, type them immediately after each other (no space between them) in the CIMD user data parameter.

Table 35. Extension character conversion for user data

Symbol	Character name	CIMD special combination	Combination's name
	Vertical bar	<code>_XX_!!</code>	Reserved, Inverted !
^	Caret	<code>_XX_g!</code>	Reserved, Greek Alphabet Lambda
<euro symbol>	Euro symbol *	<code>_XXe</code>	Reserved, Small Letter e
{	Opening brace	<code>_XX(</code>	Reserved, Left Parenthesis
}	Closing brace	<code>_XX)</code>	Reserved, right Parenthesis
	Page break	<code>_XXascii(10)</code>	Reserved, Line Feed ascii(10)

Table 35. Extension character conversion for user data (cont.)

Symbol	Character name	CIMD special combination	Combination's name
[Opening bracket	_XX<	Reserved, Less Than Sign
]	Closing bracket	_XX>	Reserved, Greater Than Sign
~	Tilde	_XX=	Reserved, Equals Sign
\	Backslash	_XX/	Reserved, Slash

* The euro symbol is defined in the 7-bit default alphabet extension table in the 3GPP TS 23.038. The code value is the one used for character ‘e’ in the 7-bit default GSM character set. Therefore, a receiving entity which is incapable of displaying the euro currency symbol will display the character ‘e’ instead.

The euro symbol is displayed correctly only on mobile terminals that support it.

9.3 Traffic direction specific character conversion

It is possible that some language-specific special characters are not converted correctly in application-terminated (AT) messages when the default conversion files are used. This happens if the same character conversion table is used for both AO and AT direction. The ASE consults first the default character conversion table and then the special character conversion table in the AT direction. If the ASE finds a value in the default character conversion table, it sends the value to the application. However, if the expected character should have been taken from the special character conversion table, the conversion produces an unexpected result.

To avoid the misconversions, it is possible to define different character conversion tables to be used in AO and in AT directions instead of the default conversion files. This is done by enabling the direction-specific character conversion files in the user profile file as follows:

```
#Character conversion tables
#character table file=/etc/opt/nokia/smsc/conf/xtm_isolat_mx.cf
#special character table file=/etc/opt/nokia/smsc/conf/xtm_specia_mx.cf
AO character table file=/etc/opt/nokia/smsc/conf/xtm_isolatmx.cf
AO special character table file=/etc/opt/nokia/smsc/conf/xtm_speciamx.cf
AT character table file=/etc/opt/nokia/smsc/conf/xtm_ATisolatmx.cf
AT special character table file=/etc/opt/nokia/smsc/conf/xtm_ATspeciamx.cf
```

In case some characters still cause problems in translation, it is also possible to edit also the AT file contents and to comment out those characters that are not correctly converted.

Note

You have to define all the 4 settings for AO and AT character conversions. Otherwise the ASE will use the default conversion files.

The AO direction can still use the default files, there is no need to customise them.

Remember to comment out the default files!

See the configuration instructions in *Adding traffic direction-specific character conversion tables* in *External Applications Configuration Guide (PDF)*.

Appendix A Examples

A.1 CIMD application use cases

The following examples show how different application-originated message types are handled in the CIMD interface. The messages are sent by applications to mobile stations (AO-MT). The examples include messages with binary data, concatenation and Unicode characters.

Note

The examples show the user data on several lines to fit it on the page. In real life, the user data on lines 033 and 034 is on one line.

More information and examples on CIMD applications are available at Forum Nokia at forum.nokia.com.

Encoding a picture message to CIMD2 message (binary data)

A CIMD2 application sends a picture message to a mobile station. The main components are the user data header (UDH), user data binary (UDB) and data coding scheme (DCS). The content is longer than 140 octets, so concatenation is needed. The picture consists of an image and a short text.

The DCS is coded as defined in *ETSI GSM 03.38*. For binary data, it is set to 245.

The UDH contains information about the user data. In this case it indicates that this is a picture message and concatenation is used.

Number	UDH information
0B	Length of the User Data Header

Number	UDH information
05	Information Element Identifier (IEI; application port addressing scheme, 16-bit port address)
04	Information Element Data Length (IEDL)
158A	Information Element Data (octets 4 & 5 --> 158A - destination port)
0000	Information Element Data (octets 6 & 7 --> 0000 - originator port)
00	Information Element Identifier (IEI; concatenated short messages, 8 bit reference number)
03	Information Element Data Length (IEDL)
00	Modulo 256 reference number
03	Total amount of message parts
01/02/03	Sequence number of concatenated message

The UDB contains the data using hexadecimal coding.

The total message in terms of the CIMD2 protocol:

```
<stx>03:003<tab>
021:358503360378<tab>
032:0B0504158A00000003010301<tab>
034:300000045465737402010000481C01666666666666666666
9999999999999999980000000000000001400000006000E000
024000000E900310000280000031080CF3B8018000004004110
4440140000FFFE2F8B12024000000000538CAA028000000000
6289C40180000000004141400140000000001428002400020000<tab>
030:245<tab><etx>
```

```
<stx>03:005<tab>
021:358503360378<tab>
032:0B0504158A00000003010302<tab>
034:014280028001F0000000A28001800FFE000000A500015FFF
FFFFFFFFEA57FFA400AAA00000005500028201500440015D08A1
881024800040FF0201404100010003ABE00244000008200D5558
8280101440001AAAAC0180000000003555560140010000806AAA
AB024000000005555550280000000000000001999999999999999<tab>
030:245<tab><etx>
```

```
<stx>03:007<tab>
021:358503360378<tab>
032:0B0504158A00000003010303<tab>
034:99996666666666666666666666666666<tab>
030:245<tab><etx>
```



```
<stx>03:003<tab>
021:1234567890<tab>
030:8<tab>
034:0074006500730074<tab><etx>
```

Sending a concatenated message containing text data with mms hinting

A message containing 180 characters of text is sent from an application to a mobile station. The application is responsible for performing the concatenation before sending the data to the SMS Center. The mobile station then reassembles the original message based on the concatenation information delivered in the user data header.

The main components are the user data header (UDH), user data (UD) and more messages to send (MMS).

The maximum length of one message is 160 characters. The user data header that is needed to indicate concatenation is also considered as part of the user data when calculating the message length. This means that the first part can contain: maximum length - (udh length * 8bits / 7bits) characters. In this example the first part has $160 - (6 * 8 / 7) = 153$ characters.

The more messages to send parameter indicates that there will be more messages to the same destination immediately after this message. This will allow faster delivery of many messages to the same destination. The first CIMD2 message has the parameter set to 1, and the second one to 0.

The UDH (in this example: 050003000201 and 050003000202) indicates that this is a concatenated message

Number	UDH information
05	Length of the User Data Header
00	Information element identifier (IEI; concatenated short messages, 8 bit reference number
03	Information Element Data Length (IEDL)
00	Modulo 256 reference number
02	Total amount of message parts
01/02	Sequence number of concatenated message

The messages in terms of the CIMD2 protocol:

```
<stx>03:003<tab>
```

```

021:1234567890<tab>
032:050003000201<tab>
033:<153 characters of user data><tab>
044:1<tab><etx>

<stx>03:005<tab>
021:1234567890<tab>
032:050003000202<tab>
033:<27 characters of user data><tab>
044:0<tab><etx>

```

A.2 Example sessions

A.2.1 Example session for a send-only application

The example session given here contains the operations login, submit message, and logout.

Note

In the submit operation example, only parameters destination address, validity period and user data are given by the application. Note also that packets are split at special characters like <TAB> for printing purposes only.

```

SME <--> SMSC
Connect <-->
Greeting <--
Login -->
<STX>01:001<TAB>010:MyUserId<TAB>011:MySecretPassWOrD<TAB><CS><ETX>
Login response <--
<STX>51:001<TAB><CS><ETX>

Submit -->
<STX>03:003<TAB>021:1234567890<TAB>050:167<TAB>033:Hi
there !<TAB> <CS><ETX>

Submit response (positive) <--
<STX>53:003<TAB>021:1234567890<TAB>060:971111131245<TAB><CS><ETX>

Submit -->
<STX>03:005<TAB>050:167<TAB>033:Hi
there ! How are you doing ?<TAB><CS><ETX>

Submit response (negative) //destination was missing!! <--
<STX>53:005<TAB>900:301<TAB><CS><ETX>

Enquiry message status-->

```

```
<STX>04:007<TAB> 060:971111131245<TAB>021:1234567890<TAB><CS><ETX>
```

Enquiry message status response <--

```
<STX>54:007<TAB>021:1234567890<TAB>060:971111131245<TAB>061:0<TAB>-  
>063:971111131245<TAB><CS><ETX>
```

Disconnect <-->

A.2.2 Example session for querying application

SME <--> SMSC

Connect <-->

Greeting <--

Login -->

```
<STX>01:001<TAB>010:MyUserId<TAB>011:MySecretPassWOrD<TAB><CS><ETX>
```

Login response <--

```
<STX>51:001<TAB><CS><ETX>
```

Submit -->

```
<STX>03:003<TAB>021:1234567890<TAB>050:167<TAB>033:Hi  
there !<TAB><CS><ETX>
```

Submit response (positive) <--

```
<STX>53:003<TAB>021:1234567890<TAB>060:971111131245<TAB><CS><ETX>
```

Delivery Request Message -->

```
<STX>05:005<TAB>068:1<TAB><CS><ETX>
```

Delivery Request Response (positive) <--

```
<STX>55:005<TAB><CS><ETX>
```

Deliver Message <--

```
<STX>20:000<TAB>021:1234567890<TAB>023:987654321<TAB>060:971111121245 033:Call  
me.<TAB><CS><ETX>
```

Deliver Message Response -->

```
<STX>70:000<TAB><CS><ETX>
```

Disconnect <-->

A.2.3 Example session for receiving application

SME <--> MC

Connect <-->

Greeting <--

Login -->

```
<STX>01:001<TAB>010:MyUserId<TAB>011:MySecretPassWOrD<TAB><CS><ETX>
```

Login response <--

```
<STX>51:001<TAB><CS><ETX>
```

Submit -->

```
<STX>03:003<TAB>021:1234567890<TAB>050:167<TAB>033:Hi  
there!<TAB><CS><ETX>
```

```
Deliver Message //delivery before submit response
received <--
<STX>20:000<TAB>021:9876<TAB>023:1234567890<TAB>060:971111080045<TAB->033:Call
me!<TAB>052:0<TAB>030:0<TAB><CS><ETX>
```

```
Deliver Message Response -->
<STX>70:000<TAB><CS><ETX>
```

```
Submit response (positive) <--
<STX>53:003<TAB>021:1234567890<TAB>060:971111131245<TAB><CS><ETX>
```

```
Deliver Message <--
<STX>20:002<TAB>021:98765<TAB>023:1234567890<TAB>060:971111121245<TAB>033:Why
dont you call me<TAB>052:0 030:0<TAB><CS><ETX>
```

```
Deliver Message Response -->
<STX>70:002<TAB><CS><ETX>
```

```
Deliver StatusReport <--
<STX>23:005<TAB>021:1234567890<TAB>060:971111131245<TAB>061:3<-
TAB>063:971111131354<TAB><CS><ETX>
```

```
Deliver StatusReport Response -->
<STX>73:005<TAB><CS><ETX>
```

```
Disconnect <-->
```