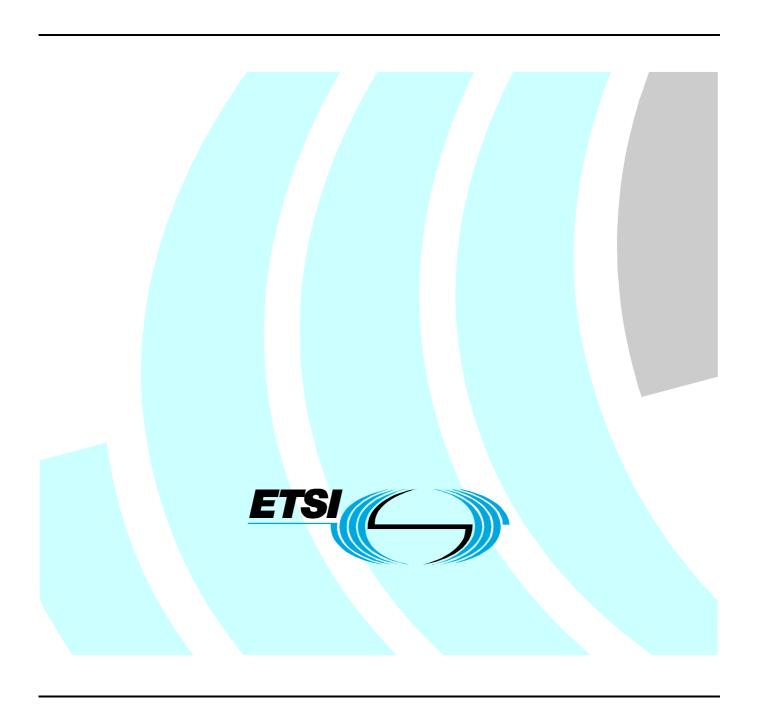# ETSI ES 202 060-4 V1.1.1 (2003-05)

**Short Message Service (SMS) for fixed networks;
Network Based Solution (NBS);
Part 4: Interworking between Signalling System No.7 and
Digital Subscriber Signalling System No. one (DSS1)**

ETSI

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Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

The present document is part 4 of a multi-part standard covering the Short Message Services (SMS) for fixed networks; Networks Based Solution (NBS), as described below:

Part 1:   "Overview";

Part 2:   "Architecture and functional entities";

Part 3:   "Integrated Services Digital Network (ISDN) access protocol";

Part 4:   "Interworking between Signalling System No.7 (SS7) and Digital Subscriber Signalling System No. one (DSS1)";

Part 5:   "Network access protocol".

NOTE: The choice of a multi-part format for this deliverable is to facilitate maintenance and future enhancements.

In accordance with ITU-T Recommendation I.130 [6], the following three level structure is used to describe the supplementary telecommunication services as provided by European public telecommunications operators under the pan-European ISDN:

-     Stage 1 is an overall service description, from the user's standpoint;

-     Stage 2 identifies the functional capabilities and information flows needed to support the service described in stage 1; and

-     Stage 3 defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

Introduction

The present document specifies the interworking between Signalling System No.7 (SS7) and the Digital Subscriber Signalling System No. one (DSS1) for the Short Message Service.

The interworking between the above signalling protocols occurs in an exchange with ISDN local exchange functionality and is specified in the context of a bearer unrelated connectionless or connection-oriented transaction in a pure ISDN.

1 Scope

Within the present document, only those functions are described, which are relevant for the specific interworking for SMS. The standard UNI and NNI interworking procedures are not repeated here.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

[1]   ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[2]   ETSI ES 202 060-3: "Short Message Service (SMS) for fixed networks; Network Based Solution (NBS); Part 3: Integrated Services Digital Network (ISDN) access protocol".

[3]   ETSI ES 202 060-5: "Short Message Service (SMS) for fixed networks; Network Based Solution (NBS); Part 5: Network access protocol".

[4]   ETSI EN 300 196-1: "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[5]   ITU-T Recommendation I.112: "Vocabulary of terms for ISDNs".

[6]   ITU-T Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Integrated Services Digital Network (ISDN): See ITU-T Recommendation I.112 [5].

invoke component: where reference is made to a "xxxx" invoke component, an invoke component is meant with its operation value set to the value of the operation "xxxx"

NOTE: See EN 300 196-1 [4], clause 8.2.2.1.

ISDN number: number conforming to the numbering plan and structure specified in ITU-T Recommendation E.164

originating SMS user: user that originates and sends the SM

receiving SMS user: user that receives the Short Message and who may also deactivate the reception of SMs and reactivate the reception later on

receiving user number: ISDN number of the user, that receives the Short Message

return error component: where reference is made to a "xxxx" return error component, a return error component is meant which is related to a "xxxx" invoke component

NOTE: See EN 300 196-1 [4], clause 8.2.2.3.

return result component: where reference is made to a "xxxx" return result component, a return result component is meant which is related to a "xxxx" invoke component

NOTE: See EN 300 196-1 [4], clause 8.2.2.2.

served user number: ISDN number of the user who subscribes to, activates, deactivates or interrogates the Short Message services

Short Message (SM): information, that may be conveyed by means of the SMS described in the present document

Short Message Service Centre (SM-SC): function unit, which is responsible for the relaying and store-and-forwarding of a short message (SM) between two SM-TE

NOTE: The SM-SC can functionally be separated from or integrated in the network.

Short Message Service Centre Number (SM-SCNr): ISDN number of the Short Message Service Centre

Short Message Terminal (SM-TE): terminal which may send or receive short messages

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ASMR	Anonymous SM Rejection
DSS1	Digital Subscriber Signalling System No. one
ISDN	Integrated Services Digital Network
MSMID	Malicious SM Identification
SM	Short Message
SMS	Short Message Service
SM-SC	Short Message Service Centre
SMSUIR	Short Message Sending User Identification Restriction
SM-TE	Short Message Terminal

4   Description

4.1   Sending a Short Message (SM-TE -> SMSC)

4.1.1   Interworking from DSS1 to #7 at the Originating Local Exchange

Table 1: Mapping DSS1-SS7 messages of originating

DSS1 messages →	#7 messages →
FACILITY [DCR]	**SCCP: called party address: SMSC_Nr** **TC-BEGIN**

Facility information element
   SMSSubmit invoke
     servedUserNr
       receivingUserNr
     sMSC_Nr
       sMSData
	SMSFacility invoke
	     sMSAdditionalOriginatingAddress
	     sMSAdditionalDestinationAddress
	   sMSDestinationAddress
	     sMSProtocolData
	
	     sMSOriginatingAddress (optional)

additions	additions

The sMSC_Nr within the Submit invoke component shall be taken as called party address for the SCCP. If the sMSC_Nr is absent, the default SMSC_Nr stored in the local exchange shall be taken.

When sending a SMS, the sending user shall always provide the servedUserNr. If the sending user does not provide this identification, the SMS shall be rejected by the network (see ES 202 060-3 [2]).

The sMSAdditionalOriginatingAddress contains the indication "*user provided, verified and passed*".

The sending user may request to restrict the presentation of the identification to the receiving user on a per SMS basis (Short Message Sending User Identification Restriction – SMSUIR). In this case, the sMSAdditionalOriginatingAddress contains the indication "*presentation restricted*".

If the sMSC_Nr is absent, the sMSDestinationAddress shall contain the default SMSC_Nr stored in the originating local exchange.

As an option, the originating local exchange may provide in addition sMSOriginatingAddress containing a network provided number of the served user with the indication "*presentation restricted*".

4.1.2 Reception of a SM from the Originating Local Exchange and sending of SM by the Short Message Service Centre to the Destination Local Exchange

4.1.2.1 Mapping

Table 2: Mapping SS7-SS7 messages

#7 messages → **SCCP [called party address: SMSC_Nr]** **TC-BEGIN**	#7 messages → **SCCP [called party address]** **TC-BEGIN**

SMSFacility invoke
    sMSAdditionalOriginatingAddress
sMSAdditionalDestinationAddress
    sMSProtocolData
	SMSFacility invoke
	    sMSAdditionalOriginatingAddress
	sMSAdditionalDestinationAddress
	    sMSProtocolData
	
	sMSOriginatingAddress
	
	sMSDestinationAddress (optional)

additions	additions

The called party address within the outgoing SCCP message contains e.g. the address of the destination local exchange or the receivingUserNr as Global Title (depending on the SCCP routeing mechanism).

A received sMSAdditionalOriginatingAddress is passed on unchanged by the SMSC, unless supplementary services require a different handling, i.e. see clauses 4.1.2.2 to 4.1.2.6.

A received sMSAdditionalDestinationAddress is passed on unchanged by the SMSC, unless supplementary services require a different handling, i.e. see clauses 4.1.2.2 to 4.1.2.6.

A received sMSProtocolData is passed on unchanged by the SMSC, unless supplementary services require a different handling, i.e. see clauses 4.1.2.2 to 4.1.2.6.

A received sMSOriginatingAddress (optional, see clause 4.1.1, containing a network provided number of the served user) may be analysed by the SMSC but shall not be passed on (therefore not shown in the table).

A received sMSDestinationAddress (containing the SMSC-Nr.) is analysed by the SMSC but shall not be passed on (therefore not shown in table 2).

The sMSOriginating Address shall be generated by the SMSC and shall contain the ITU-T Recommendation E.164 [1] number of the SMSC, unless supplementary services require a different handling, i.e. see clauses 4.1.2.2 to 4.1.2.6.

As an option, the SMSC may generate sMSDestinationAddress containing a network provided number of the receiving user with the indication "*presentation restricted*", unless supplementary services require a different handling, i.e. see clauses 4.1.2.2 to 4.1.2.6.

4.1.2.2 Interaction with SMSUIR

The sMSAdditionalOriginatingAddress containing the servedUserNr shall only be sent to the destination local exchange/to the receiving user, if no SMSUIR indication (restriction indication of the served user number) has been received by the SMSC from the served user (sMSAdditionalOriginatingAddress contains the indication "*presentation restricted*"); if this SMSUIR indication has been received by the SMSC from the served user, then no servedUserNr is sent to the destination local exchange, i.e. the sMSAdditionalOriginatingAddress is omitted.

4.1.2.3 Interaction with SM Forwarding

In case of SM Forwarding, the received sMSAdditionalDestinationAddress may be changed by the SMSC.

4.1.2.4 Interaction with ASMR

The service provider can offer a subscription option to the served user that all anonymous SMS are rejected. ASMR applies if the sending user requests that his/her identification shall be restricted to the receiving user and if the receiving user has subscribed to ASMR service. If a SMS sending user does not provide the own identification information (sMSAdditionalOriginatingAddress set to "*presentation restricted*") and the SMS destination user has subscribed to the ASMR service option, the service provider will reject the received SMS and will inform the sending user about the rejection (see ES 202 060-3 [2] and ES 202 060-5 [3]).

> NOTE: The SMSC handling the profile of the receiving user detects that ASMR applies and rejects the SMS, i.e. the received SMS is discarded and the appropriate rejection information is returned towards the sending user.

It may be needed to allow certain SMS sending users that their identification is not made available to the receiving user and that ASMR is overridden. The originating service provider has to check whether the sending user falls in this category. If the sending user is allowed to do so, the service provider shall not reject the SMS but shall deliver it to the destination user.

4.1.2.5 Interaction with MSMID

The service provider can offer the service to the served user that a malicious SMS can be identified. Usually, a received SMS contains an identification of the sending user which enables the receiver of a malicious SMS to take appropriate measures. However, an identification of the sending user may not be contained in the received malicious SMS (see e.g. Interaction with SMSUIR). In this case, it should still be possible to identify the sender. If the sending user requests that the presentation of his/her identification shall be restricted to the receiving user (see clause 4.1.1 and 4.1.2.2) and if the receiving user has subscribed to the MSMID service, then a special SMS-ID is sent from the SMSC serving the receiving user to the receiving user instead of the served user number of the sending user. In this case, the special SMS-ID shall be contained in the outgoing sMSAdditionalOriginatingAddress sent towards the receiving user/destination local exchange.

> NOTE: A feature like ASMR does not help because it rejects all anonymous SMS but the receiving user may accept or even wish to receive anonymous SMS. Only malicious SMS are an issue.

4.1.2.6 Interaction with SM Whitelist or SM Blacklist

The service provider can offer the service to the served sending user that only certain destinations for SMS are allowed (white list) and/or that certain destinations for SMS are not allowed (black list). If the SMSC serving the sending user receives a SMS it has to check the white list/black list associated to the sending user whether the indicated destination is allowed or not. If it is allowed then the SMS is forwarded towards the receiving user. No further exceptions to clause 4.1.2.1 are applicable.

If it is not allowed then the SMS is not forwarded towards the receiving user but discarded. The sending user receives an rejection indication (see ES 202 060-3 [2] and ES 202 060-5 [3]).

The service provider can offer the service to the served receiving user that only certain origins for SMS are allowed (white list) and/or that certain origins for SMS are not allowed (black list).

If the SMSC serving the receiving user receives a SMS it has to check the white list/black list associated to the receiving user whether the indicated origin is allowed or not. If it is allowed then the SMS is forwarded towards the receiving user. No further exceptions to clause 4.1.2.1 are applicable.

If it is not allowed then the SMS is not forwarded towards the receiving user but discarded. The sending user receives an rejection indication (see ES 202 060-3 [2] and ES 202 060-5 [3]).

4.1.3   Interworking from #7 to DSS1 at the Destination Local Exchange

Table 3: Mapping SS7-DSS1 messages of destination

#7 messages →	DSS1 messages →
SCCP [called party address] **TC-BEGIN**	**FACILITY [DCR]**

SMSFacility invoke
    sMSOriginatingAddress
        sMSAdditionalOriginatingAddress
    sMSAdditionalDestinationAddress
        sMSProtocolData
    additions
	Facility information element
	SMSDeliver invoke
	    sMSC_Nr
	    servedUserNr
	    receivingUserNr
	    sMSData
	    additions

The called party address within the SCCP contains e.g. the address of the destination local exchange (depending on the SCCP routeing mechanism), to which the receiving SMS user belongs.

The sMSAdditionalOriginatingAddress containing the servedUserNr is only received at the destination local exchange, if no SMSUIR indication has been received by the SMSC from the served user; if this SMSUIR indication has been received by the SMSC from the served user, then no servedUserNr is received at the destination local exchange (see clauses 4.1.2.1 and 4.1.2.2).

In case of MSMID, the sMSAdditionalOriginatingAddress contains a special SMS-ID, see clauses 4.1.2.1 and 4.1.2.5, which is mapped as shown in table 3.

As an option, the sMSDestinationAddress may be received (see clause 4.1.2.1). It shall not be used for addressing the SM to the receiving user. It shall not be mapped to DSS1 (therefore, it is not shown in the table 3).

4.2   Confirmation of SM reception

4.2.1   Interworking from DSS1 to #7 at the Destination Local Exchange

Table 4: Mapping DSS1-SS7 at destination

← #7 messages	← DSS1 messages
SCCP [called party address: SMSC_Nr] **TC-END**	**FACILITY [DCR]**

SMSFacility
    sMSDestinationAddress
        sMSProtocolData
    additions
	Facility information element
	SMSDeliver return result
	    sMSC_Nr
	    sMSData
	    additions

4.2.2   Actions by the Short Message Service Centre

The SMSC receives and processes the #7 message described in clause 4.2.1 but shall not pass on it.

Table 5: SM-SC action

← #7 messages	← #7 messages
NOTE5	**SCCP [called party number: SMSC_Nr]** **TC-END**

	SMSFacility
	    sMSDestinationAddress
	        sMSProtocolData
	    additions

4.2.3   Interworking from #7 to DSS1 at the Originating Local Exchange

Independently of the actions described in clauses 4.2.1 and 4.2.2, the SMSC generates a #7 message as specified in the right (#7) column of the following table. This #7 message shall be mapped to DSS1 as shown in table 6.

Table 6: Mapping SS7-DSS1 at originating

← DSS1 messages	← #7 messages
FACILITY [DCR]	**SCCP [called party number: Address of Originating Local Exchange]** **TC-END**

Facility information element
    SMSSubmit return result
        servedUserNr
        sMSC_Nr
        sMSData
        additions
	SMSFacility return result
	        sMSAdditionalOriginatingAddress
	        sMSOriginatingAddress (SMSC_Nr.)
	        sMSProtocolData
	        additions

4.3   Sending a Short message (PABX -> SMSC)

4.3.1   Interworking from DSS1 to #7

Clause 4.1.1 applies with the only exception that in this case "REGISTER [CR]" message is used by DSS1 instead of "FACILITY [DCR]" message.

4.3.2   Reception of a SM from the Originating Local Exchange and sending of SM by the Short Message Service Centre to the Destination Local Exchange

See clause 4.1.2.

4.3.3   Interworking from #7 to DSS1

Clause 4.1.3 applies with the only exception that in this case "REGISTER [CR]" message is used by DSS1 instead of "FACILITY [DCR]" message.

4.4   Confirmation of SM reception (PABX)

Clause 4.2 applies with the only exception that in this case "REGISTER [CR]" message is used by DSS1 instead of "FACILITY [DCR]" message.

Annex A (informative):
Bibliography

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History

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