



SLOVENSKI STANDARD

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Digitalni celil'ni telekomunikacijski sistem (faza 2) ű Uporaba vmesnika za podatkovno terminalsko opremo űopremo za zaklju'evanje podatkovnih vodov (DTE-DCE) za storitev kratkih sporo'il (SMS) in storitev celil'ne radiodifuzije (GSM 07.05)

Digital cellular telecommunications system (Phase 2) (GSM); Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS) (GSM 07.05)

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33.070.50	Globalni sistem za mobilno telekomunikacijo (GSM)	Global System for Mobile Communication (GSM)
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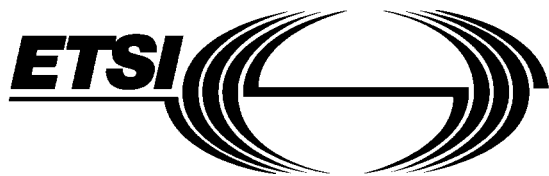
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GSM

GLOBAL SYSTEM FOR
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**Digital cellular telecommunications system (Phase 2);
Use of Data Terminal Equipment - Data Circuit terminating;
Equipment (DTE - DCE) interface for
Short Message Service (SMS) and Cell Broadcast Service (CBS)
(GSM 07.05)**

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Foreword

This second edition European Telecommunication Standard (ETS) was produced by the Special Mobile Group (SMG) Technical Committee (TC) of the European Telecommunications Standards Institute (ETSI).

This ETS defines a protocol for use of the V series DTE/DCE interface over the R reference point for SMS and CBS procedures within the European digital cellular telecommunications system (Phase 2).

This ETS correspond to GSM 07.05 version 4.5.0.

The specification from which this ETS has been derived was originally based on CEPT documentation, hence the presentation of this ETS may not be entirely in accordance with the ETSI/PNE rules.

Reference is made within this ETS to GSM Technical Specifications (GSM-TS) (note).

NOTE: TC-SMG has produced documents which give the technical specifications for the implementation of the European digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TSs). These TSs may have subsequently become I-ETTs (Phase 1), or ETSS (Phase 2), whilst others may become ETSI Technical Reports (ETRs). GSM-TSs are, for editorial reasons, still referred to in current GSM ETSS.

Transposition dates	
Date of adoption of this ETS:	30 April 1996
Date of latest announcement of this ETS (doa):	20 August 1996
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0 Scope

This European Telecommunication Standard (ETS) defines three interface protocols for control of SMS functions within a GSM mobile telephone from a remote terminal via an asynchronous interface.

Section 2 defines a binary protocol ("Block Mode"). The protocol includes error protection and is suitable for use where the link may not be completely reliable. It will be of particular use where control of remote devices is required. Efficient transfer of binary encoded user data is possible.

Section 3 defines a character-based interfaced based on "AT" commands ("Text Mode"). This mode is suitable for unintelligent terminals or terminal emulators, and for application software built on command structures like those defined in V.25ter. Some of the commands defined in Section 3 will also be useful for implementations of Section 2 and/or Section 4, for example enabling an indication of incoming SMS messages.

Section 4 defines a character-based interface with hex-encoded binary transfer of message blocks ("PDU Mode"). This mode is suitable for software drivers based on AT command structures which do not understand the content of the message blocks and can only pass them between the MT and "upper level" software resident in the TE.

In all three modes, the terminal is considered to be in control for SMS/CBS transactions.

This specification considers the mobile termination to be a single entity. Other GSM Technical Specifications describe the split of functionality between the mobile equipment and SIM.

0.1 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

- [1] GSM 01.04 (ETR 100): "European digital cellular telecommunication system (Phase 2); Abbreviations and acronyms".
- [2] GSM 03.38 (ETS 300 628): "European digital cellular telecommunication system (Phase 2); Alphabet and language specific information".
- [3] GSM 03.40 (ETS 300 536): "European digital cellular telecommunication system (Phase 2); Technical realization of the Short Message Service (SMS) Point to Point (PP)".
- [4] GSM 03.41 (ETS 300 537): "European digital cellular telecommunication system (Phase 2); Technical realization of Short Message Service Cell Broadcast (SMSCB)".
- [5] GSM 04.08 (ETS 300 557): "European digital cellular telecommunication system (Phase 2); Mobile radio interface layer 3 specification".
- [6] GSM 04.11 (ETS 300 559): "European digital cellular telecommunication system (Phase 2); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".
- [7] GSM 04.12 (ETS 300 560): "European digital cellular telecommunication system (Phase 2); Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".

- [8] GSM 07.01 (ETS 300 582): "European digital cellular telecommunication system (Phase 2); General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".
- [9] GSM 07.07 (ETS 300 642): "European digital cellular telecommunication system (Phase 2); AT command set for GSM Mobile Equipment (ME)".
- [10] GSM 11.11 (ETS 300 608): "European digital cellular telecommunication system (Phase 2); Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".
- [11] CCITT Recommendation V.25ter: "Serial Asynchronous Automatic Dialling And Control"
- [12] CCITT Recommendation V.24: "List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment".
- [13] CCITT Recommendation E.164: "Numbering plan for the ISDN era".
- [14] CCITT Recommendation E.163: "Numbering plan for the international telephone service".

0.2 Definitions and abbreviations

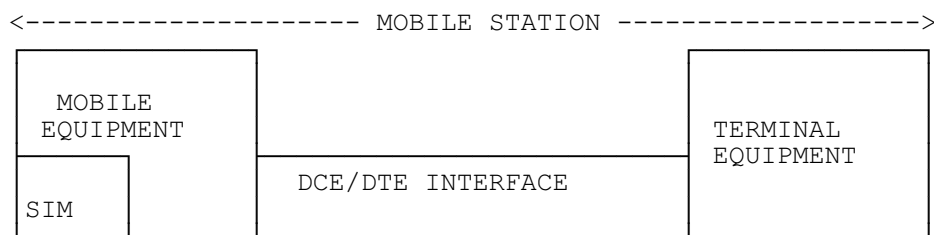
Abbreviations used in this specification are listed in GSM 01.04 [1].

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1 Reference configuration



MOBILE TERMINATION (MT2)

Figure 1: Reference configuration

The mobile termination consists of the mobile equipment (ME) and the SIM. Messages may be stored in either, but this specification does not distinguish between messages stored in the SIM or in the ME. The management of message storage in the two parts of the mobile termination is a matter for the mobile termination implementation.

1.1 V.24 Interface Circuits

The operation of the CCITT V.24 blue book interface circuits for SMS is shown in table 1.1/GSM 07.05.

Table 1.1/GSM 07.05:: Use of V.24 interface circuits

V.24 CIRCUIT	DESCRIPTION	TE to MT	MT to TE
CT102	signal ground	x	x
CT103	TXD	x	
CT104	RXD		x
CT105	RTS	x	
CT106	CTS		x
CT107	DSR		x
CT108.2	DTR	x	
CT109	DCD		x

NOTE: CT105 at the TE is connected to CT133 at the MT

CT103

All commands from the TE to the MT are transferred across this circuit. Inband flow control is not permitted during Block Mode.

CT104

All responses/indications from the MT to the TE are transferred across this circuit. Inband flow control is not permitted during Block Mode.

CT105

This circuit allows the TE to flow control the MT when in the Block Mode and at other times if hardware flow control is enabled.

CT106

This circuit allows the MT to flow control the TE when in the Block Mode and at other times if hardware flow control is enabled.

CT107

This circuit shall be set to the ON condition before entry into the Block Mode, and shall remain in the ON condition during Block Mode. If the TE detects that this circuit returns to the OFF condition during the block mode then the TE shall return CT108.2 to the OFF condition and exit the Block Mode.

CT108.2

This circuit shall be set in the ON condition before the AT+CESP command is sent from the TE to begin the Block Mode, and shall be maintained in the ON condition during the Block Mode. It shall be returned to the OFF condition after the command 'END SMS MODE' has been accepted and acknowledged by the MT. If the MT detects that this circuit returns to the OFF condition during the Block Mode then the MT shall exit the Block Mode.

CT109

This circuit shall be set to the ON condition before entry into the Block Mode and remain in the ON condition during the Block Mode. If the TE detects that this circuit returns to the OFF condition during the Block Mode then the TE shall return CT108.2 to the OFF condition and shall exit the Block Mode.

2 SMS Block Mode

2.1 Beginning and ending of SMS/CBS Block Mode

2.1.1 Beginning SMS/CBS Block Mode

As described in TS GSM 07.01, the DTE/DCE interface is normally associated with the terminal adaptation function (TAF), if such a function is available. When no data connection is in progress, and the terminal equipment wishes to enter SMS/CBS mode, the command 'AT+CESP' shall be issued by the TE through the DTE/DCE interface requesting that the Block mode protocol described in this specification is to be used. The syntax of this command is further described in section 3.2.4 later. The syntax for these commands is derived from V.25ter, i.e. the command is encoded as an IA5 character string together with delimiters as described in V.25ter.

Upon receipt of this command, the mobile termination shall respond as follows:

If the mobile termination supports SMS/CBS block mode commands, responses and indications as described in this technical specification, it shall respond with 'OK' and enter the SMS/CBS mode.

If the mobile termination does not support SMS/CBS block mode commands, responses and indications as described in this technical specification, it shall respond with 'ERROR' and remain in the current mode..

If the SMS/CBS block mode command is accepted by the mobile termination, then all further commands, responses and indications shall be as defined in section 2 of this technical specification. These SMS/CBS mode commands, responses and indications use 8-bit encoded data and not IA5 characters.

2.1.2 Returning from SMS/CBS Block Mode To Default Mode

When the terminal equipment wishes to return to default mode from SMS/CBS mode, it shall issue the command 'END SMS MODE', described in section 2.4.1.11. The mobile termination shall respond with 'OK' to indicate that the DTE/DCE interface has returned to default mode. The TE shall change back to default mode whether or not such a response is received.

The TE may also indicate that it has exit from the SMS/CBS mode through the use of CT 108/2 (see section 1.1)

If an incoming data call arrives while the DTE/DCE interface is set to SMS/CBS mode, then the mobile termination may autonomously issue the 'END SMS MODE' indication (section 2.4.2.11) and revert to default mode in order to connect the data call through the TAF.

The MT may exit from SMS/CBS mode autonomously if the power to the MT is switched off and then on again. In addition, the MT manufacturer may provide MMI to change the mode back to the default mode. In the latter case, the MT shall issue the 'END SMS MODE' indication (section 2.4.2.11) and exit the SMS/CBS mode immediately.

The MT may also indicate that it has exit from the SMS/CBS mode through the use of CT 107 and CT 109 (see section 1.1).

A BREAK condition in either direction at the DTE/DCE interface shall cause the TE and the MT to exit from the SMS/CBS block mode and return to the default mode.

In the event where the TE or the MT find themselves unable to recover from a protocol error then either entity may exit the SMS/CBS mode using any of the mechanisms described above. Confirmation of default mode operation will be achieved through the use of AT commands and responses.

2.2 Protocol description

The communication path between the MT and the TE across the DTE/DCE interface should be quite reliable if it uses a short wire link. However, to ensure that the low error rate does not cause malfunction, the following error protection scheme is provided.

Each message sent from the MT to the TE or vice-versa consists of a data block (DATA) and block check sum (BCS, see figure 2.2.1). In the following description the notation DLE, STX, NUL and ETX refer to control characters having the values 10 02 00 and 03 hexadecimal respectively.

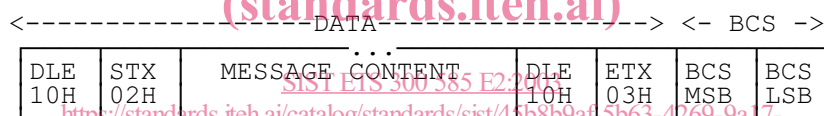


Figure 2.2.1/GSM 07.05: Format of DTE/DCE interface messages

The data block consists of a start transmission sequence, set to 00010000 00000010 (10 02 hex), the message content as defined below and an end transmission sequence, set to 00010000 00000011 (10 03 hex). The least significant bit of each octet is always transmitted first.

The block check sum is calculated at the transmitter by adding all of the octets in the message content modulo 65536. Each bit of the 16-bit result is then inverted, and 1 is added to the answer.

During transmission of the message content and the BCS octets, any occurrence of the value 10 hex (DLE) shall result in an additional 'stuffing' octet of value 00 hex (NUL) being transmitted immediately following the octet containing 10 hex. This is to ensure that the start and end markers are unambiguous. The receiver shall remove stuffing octets by discarding any octet of value 00 hex (NUL) which immediately follows an octet of value 10 hex (DLE).

After removal of any stuffing octets, the receiver can check the BCS by adding all of the octets in the message content and the 16-bit BCS modulo 65536. The correct result is 0000 hex. If any message is received with an incorrect BCS, then the message is discarded. No response is sent over the DTE/DCE interface, but an indication may be provided to higher layers within the receiving entity.

The transmitter shall only send DLE when it is followed by STX, NUL or ETX. Therefore, if the receiver sees a DLE followed by anything else then the receiver shall assume that some data has been lost, and shall start to search for the start marker. An unexpected end marker at the receiver shall also result in a search for a start marker. A start marker shall always be treated as the start of a new block, regardless of which state the receiver is in.

Examples of state diagrams for a block receiver to implement this procedure are given in Annex B, together with an example of coding and decoding a message.

Only one Command/Response transaction shall be permitted at any one time from any sending or receiving entity. It shall however be possible for a Command/Response transaction from one entity to be initiated even if there is a Command/Response transaction in progress from the other entity.

If an immediate response is expected to a message sent over the DTE/DCE interface, then the sending entity shall wait 10 seconds. If no response is received within this time, the sending entity shall repeat the message. The message shall be repeated a maximum of 3 times, after which the sending entity shall exit from the SMS/CBS mode and provide an error indication to the user.

If a message cannot be understood by the receiving entity even though it has a correct BCS, then it shall return an UNABLE TO PROCESS message with cause value 'Command not understood'. The receipt of an UNABLE TO PROCESS message should not in itself initiate re-transmission although re-transmission may take place due to the timeout mechanism described earlier since an UNABLE TO PROCESS is deemed to be an invalid response. The 'Cause' may however be referred to a higher layer. An UNABLE TO PROCESS shall not be sent as the result of an incorrect BCS.

2.3 Requesting messages already held in the Mobile Termination

The TE may request the MT to provide SMS or CBS messages already stored. The TE will either request all messages, or request a list of messages and subsequently ask for specific messages.

At the start of the SMS/CBS mode session, the MT shall number all messages contiguously, starting with message number 1. These "Short Message References" are only valid for a single SMS/CBS MODE session and should not be confused with the GSM 03.40 TP-Message-Reference. Each message retains its Short Message Reference for the duration of the SMS/CBS mode session. New messages will normally be given the lowest previously-unused Short Message Reference. However, if all Short Message References have been used then the MT may reallocate Short Message References previously allocated to now-deleted messages.

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Short Message Reference 0 signifies that there are no messages in the MT. The value of 0 is used under the following conditions:

- When an INSERT SMS command is used to transfer an SM over the air interface and not store it in the MT then the MT will return a Short Message Reference of 0 in the REQUEST CONFIRMED response and the ensuing INSERT SMS COMPLETE / INSERT SMS FAILURE indications.
- For Class 0 SM's which are not stored in the MT
- For TE specific SM's which are not stored in the MT

If Message number 0 is requested by the TE, the MT will always return an error cause, but will also include the highest valid Short Message Reference (see section 2.3.2.1 below).

2.3.1 Requesting List Of Messages

The TE may request the MT to provide a list of SMS and CBS messages currently stored in the mobile termination. This is achieved by the LIST REQUEST command (section 2.4.1.1). The MT divides the messages stored into groups of 5 (called pages) and transfers the first 5 in a MESSAGE LIST response (section 2.4.2.1) containing message references allocated by the MT, plus the relevant header information described in GSM 03.40/04.11 and GSM 03.41/04.12.

If there are no messages stored in the MT, then the MESSAGE LIST response shall be empty.

The TE may then request further groups of up to 5 messages by repeating the LIST REQUEST command for pages 2,3, and so on. The MT will indicate that there are no more pages by responding with an empty MESSAGE LIST response.

2.3.2 Requesting Transfer Of Messages

The TE may request the transfer of one or more messages by means of the commands described below. The MT does not delete messages which have been transferred. Messages can only be deleted by the DELETE MESSAGE command (section 2.4.1.9).

2.3.2.1 Requesting Transfer Of A Specific Message

The TE may request the MT to transfer a specific message by sending the GET MESSAGE command (section 2.4.1.2), including the appropriate message reference. The MT will provide the full message including header in a MESSAGE response (section 2.4.2.2). If the message reference is unallocated, then the GET MESSAGE FAILURE response is returned with cause 'No such message' and the highest valid Message Reference (section 2.4.2.3).

2.3.2.2 Requesting Transfer Of All Messages

The TE may request the MT to transfer all messages by sending the GET FIRST MESSAGE command (section 2.4.1.3), followed by the appropriate number of GET NEXT MESSAGE commands (section 2.4.1.4).

The MT shall be able to transfer all messages one-by-one, starting with the 'first' and continuing with the 'next'. The precise ordering of the messages is left to the MT implementation.

If the MT exits from SMS/CBS mode for any reason, then this information need not be retained.

On receipt of the GET FIRST MESSAGE command, the MT shall set a pointer to the first message, and transfer this message using the MESSAGE response as described in section 2.3.2.1.

On receipt of the GET NEXT MESSAGE command, the MT shall move the pointer to the first available message after the last message transferred (using either GET FIRST MESSAGE, GET MESSAGE or GET NEXT MESSAGE), and transfer this message using the MESSAGE response as described in section 2.3.2.1.

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If the MT receives a GET NEXT MESSAGE command when all messages have been transferred to the TE, or there are no messages stored in the MT, then the GET MESSAGE FAILURE response shall be provided with the cause 'No such message' (see section 2.4.2.3).

If the TE receives an out of sequence message then it shall attempt to transfer the missing message using the GET MESSAGE command before continuing with GET NEXT MESSAGE. If this attempt fails with the cause 'no such message', it means that the message has been deleted, or it has been lost due to a failure at the MT.

The MT includes a LAST SHORT MESSAGE REFERENCE in the GET MESSAGE FAILURE response. This is so that the TE can detect whether or not the last short message was received in error.

If the MT receives a GET NEXT MESSAGE command prior to receiving a GET FIRST MESSAGE or GET MESSAGE command, then it shall continue as if the command had been GET FIRST MESSAGE (ie. provide the 'first' message and continue with the 'next' on receipt of the subsequent GET NEXT MESSAGE command).

2.3.3 Requesting Diversion Of Incoming Messages

The TE may request the MT to transfer SMS or CBS messages directly from the air interface to the DTE/DCE interface, by the following procedures. If messages are diverted then they are not stored in the MT. If messages are diverted and there is no communication path to the TE (eg because it has been disconnected), the diversion shall be cancelled.