ETSI TS 123 040 V17.2.0 (2022-05)

Digital cellular telecommunications system (Phase 2+) (GSM);
Universal Mobile Telecommunications System (UMTS);
LTE;
5G;
Technical realization of the Short Message Service (SMS)
(3GPP TS 23.040 version 17.2.0 Release 17)

Reference
RTS/TSGC-0123040vh20

Keywords
5G,GSM,LTE,UMTS

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Contents

Foreword

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Introduction

The Short Message Service (SMS) provides a means of sending messages of limited size to and from GSM/UMTS/EPS mobiles. The provision of SMS makes use of a Service Centre, which acts as a store and forward centre for short messages. Thus a GSM/UMTS/EPS PLMN needs to support the transfer of short messages between Service Centres and mobiles.

Mobile originated messages shall be transported from an MS to a Service Centre. These may be destined for other mobile users, or for subscribers on a fixed network. Mobile terminated messages shall be transported from a Service Centre to an MS. These may be input to the Service Centre by other mobile users (via a mobile originated short message) or by a variety of other sources, e.g. speech, telex, or facsimile.

1 Scope

The present document describes the Short Message Service (SMS) for GSM/UMTS/EPS/5GS networks. It defines:

- the services and service elements;
- the network architecture;
- the Service Centre functionality;
- the SMS Router functionality;
- the MSC functionality (with regard to the SMS);
- the SGSN functionality (with regard to the SMS);
- the MME functionality (with regard to the SMS);
- the SMSF functionality;
- the routing requirements;
- the protocols and protocol layering;

for the Mobile Originated and Mobile Terminated Short Message Service Teleservices, as specified in 3GPP TS 22.003 [2] and 3GPP TS 22.105 [32].

The use of radio resources for the transfer of short messages between the MS and the MSC or the SGSN or the MME is described in 3GPP TS 24.011 [13].

The present document also describes the Short Message Service (SMS) for EPS networks supported via "SMS in MME" (see 3GPP TS.23.272 [45], annex C).

The present document also describes the SGSN supporting Diameter based protocol for SMS between the SGSN and the central SMS functions (SMS-GMSC, SMS-IWMSC, SMS-Router) in annex J.

The present document also describes SMS for 5GS networks (see 3GPP TS 23.501 [51] and 3GPP TS 23.502 [52]).

The network aspects of Short Message Service provision are outside the scope of the present document (i.e. the provision of network connectivity between the PLMN subsystems). There is no technical restriction within the present document for the transfer of short messages between different PLMNs. Any such restriction is likely to be subject to commercial arrangements and PLMN operators must make their own provision for interworking or for preventing interworking with other PLMNs as they see fit.

The required and assumed network service offered to the higher layers is defined in the present document.

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, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] Void

[2] 3GPP TS 22.003: "Circuit Teleservices supported by a Public Land Mobile Network (PLMN)".

[3] 3GPP TS 22.004: "General on supplementary services".

[4] 3GPP TS 22.041: "Operator Determined Barring (ODB)".

[5] 3GPP TS 23.002: "Network architecture".

[6] 3GPP TS 23.008: "Organization of subscriber data".

[7] 3GPP TS 23.011: "Technical realization of supplementary services".

[8] 3GPP TS 23.015: "Technical realization of Operator Determined Barring (ODB)".

[9] 3GPP TS 23.038: "Alphabets and language-specific information".

[10] 3GPP TS 23.041: "Technical realization of Cell Broadcast Service (CBS)".

[11] Void

[12] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".

[13] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[14] 3GPP TS 27.005: "Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)".

[15] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[16] 3GPP TS 51.011 Release 4 (version 4.x.x): "Specification of the Subscriber Identity Module - Mobile Equipment (SIM- ME) interface".

[17] CCITT Recommendation E.164 (Blue Book): "The international public telecommunication numbering plan".

[18] CCITT Recommendation E.163 (Blue Book): "Numbering plan for the international telephone service".

[19] CCITT Recommendation Q.771: "Specifications of Signalling System No.7; Functional description of transaction capabilities".

[20] CCITT Recommendation T.100 (Blue Book): "International information exchange for interactive videotex".

[21] CCITT Recommendation T.101 (Blue Book): "International interworking for videotex services".

[22] CCITT Recommendation X.121 (Blue Book): "International numbering plan for public data networks".

[23] CCITT Recommendation X.400 (Blue Book): "Message handling services: Message handling system and service overview".

[24] ISO/IEC10646: "Universal Multiple-Octet Coded Character Set (USC); UCS2, 16 bit coding".

[25] 3GPP TS 22.022: "Personalisation of Mobile Equipment (ME); Mobile functionality specification".

[26] 3GPP TS 23.042: "Compression Algorithm for Text Messaging Services".

[27] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[28] 3GPP TS 31.115: "Secured packet structure for (U)SIM toolkit application".

[29] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[30] 3GPP TS 31.102: "Characteristics of the USIM application".

[31] 3GPP TS 31.101: "UICC – Terminal interface; Physical and logical characteristics".

[32] 3GPP TS 22.105: "Services and Service Capabilites".

[33] Infrared Data Association. Specifications for Ir Mobile Communications (IrMC). iMelody.

[34] IETF RFC 5322 (October 2008): "Internet Message Format".

[35] Void

[36] "vCard - The Electronic Business Card", version 2.1,The Internet Mail Consortium (IMC), September 18, 1996, URL:http://www.imc.org/pdi/vcard-21.doc".

[37] "vCalendar - the Electronic Calendaring and Scheduling Format", version 1.0, The Internet Mail Consortium (IMC), September 18, 1996, URL:http://www.imc.org/pdi/vcal-10.doc

[38] Scalable Polyphony MIDI Specification, MIDI Manufacturers Association (2002); http://www.midi.org

[39] Scalable Polyphony MIDI Device 5-to-24 Note Profile for 3GPP, MIDI Manufacturers Association (2002); http://www.midi.org

[40] The Complete MIDI 1.0 Detailed Specification, Incorporating all Recommended Practices, MIDI Manufacturers Association, Document version 96.1, 1996; http://www.midi.org

[41] 3GPP TS 23.097: Multiple Subscriber Profile (MSP) (Phase 2) - Stage 2

[42] 3GPP TS 23.204: "Support of SMS over generic 3GPP IP access; Stage 2".

[43] IETF RFC 3261 (June 2002): "SIP: Session Initiation Protocol".

[44] IETF RFC 3428 (December 2002): "Session Initiation Protocol (SIP) Extension for Instant Messaging".

[45] 3GPP TS 23.272: "Circuit Switched (CS) fallback in Evolved Packet System (EPS); Stage 2".

[46] 3GPP TS 29.272: "Evolved Packet System (EPS); Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol".

[47] 3GPP TS 29.118: "Mobility Management Entity (MME) – Visitor Location Register (VLR) SGs interface specification".

[48] 3GPP TS 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".

[49] Void.

[50] 3GPP TS 29.338: "Diameter based protocols to support of SMS capable MMEs".

[51] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[52] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[53] 3GPP TS 23.540: "5G System; Technical realization of Service Based Short Message Service; Stage 2".

2.1 Definitions and abbreviations

2.1.1 Definitions

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

NOTE 1: The term "mobile station" (MS) in the present document is synonymous with the term "user equipment" (UE) in UMTS terminology as defined in 3GPP TR 21.905 [29].

active MS: switched-on mobile station with a SIM/UICC see 3GPP TS 31.101 [31] module attached

alert-SC: service element provided by a GSM/UMTS PLMN to inform an SC which has previously initiated unsuccessful short message delivery attempt(s) to a specific MS, that the MS is now recognized by the PLMN to have recovered operation

status report: SC informing the originating MS of the outcome of a short message submitted to an SME

Gateway MSC For Short Message Service (SMS-GMSC): function of an MSC capable of receiving a short message from an SC, interrogating an HLR for routing information and SMS info, and delivering the short message to the VMSC or the SGSN of the recipient MS

Interworking MSC For Short Message Service (SMS-IWMSC): function of an MSC capable of receiving a short message from within the PLMN and submitting it to the recipient SC

IP-Short-Message-Gateway (IP-SM-GW): function responsible for protocol interworking between the IP-based UE and the SC

Loop Prevention (LP): information element that allows SMS applications to inhibit forwarding or automatic message generation that could cause infinite looping.

Messages-Waiting (MW): ervice element that makes a PLMN store information (Messages-Waiting-Indication), listing those SCs that have made unsuccessful short message delivery attempts to MSs in that PLMN

Messages-Waiting-Indication (MWI): data to be stored in the HLR and VLR with which an MS is associated, indicating that there is one or more messages waiting in a set of SCs to be delivered to the MS (due to unsuccessful delivery attempt(s))

Messages-Waiting-Data (MWD): part of the MWI to be stored in the HLR. MWD consists of an address list of the SCs which have messages waiting to be delivered to the MS

Mobile Management Entity (MME): exchange which performs packet switching functions for mobile stations located in a geographical area designated as the MME area.

Mobile-services Switching Centre (MSC): exchange which performs switching functions for mobile stations located in a geographical area designated as the MSC area

Mobile-Station-Memory-Capacity-Exceeded-Flag (MCEF): part of the MWI to be stored in the HLR

NOTE 2: MCEF is a Boolean parameter indicating if the address list of MWD contains one or more entries because an attempt to deliver a short message to an MS has failed with a cause of MS Memory Capacity Exceeded

Mobile-Station-Not-Reachable-Flag (MNRF): part of the MWI to be stored in the VLR, the MME, and the HLR. The MME supports all the requirements specified in the present document for the VLR with regard to the MNRF.

NOTE 3: MNRF is a Boolean parameter indicating if the address list of MWD contains one or more entries because an attempt to deliver a short message to an MS has failed with a cause of Absent Subscriber.

Mobile-station-Not-Reachable-for-GPRS (MNRG): part of the MWI to be stored in the SGSN and the HLR

NOTE 4: MNRG is a Boolean parameter indicating if the address list of MWD contains one or more entries because an attempt to deliver a short message to an MS has failed with a cause of Absent Subscriber.

Mobile-Station-Not-Reachable-via-the-MSC-Reason (MNRR-MSC): part of the MWI in the HLR which stores the reason for an MS being absent when an attempt to deliver a short message to an MS fails at the MSC with a cause of Absent Subscriber

Mobile-Station-Not-Reachable-via-the-SGSN-Reason (MNRR-SGSN): part of the MWI in the HLR which stores the reason for an MS being absent when an attempt to deliver a short message to an MS fails at the SGSN with a cause of Absent Subscriber

More-Messages-To-Send (MMS): information element offering an MS receiving a short message from an SC the information whether there are still more messages waiting to be sent from that SC to the MS

NOTE 5: The TP-MMS element (conveyed in the Transfer layer) is copied into the RP-MMS element (conveyed in the Relay layer). It is possible with Phase 2 and later versions of MAP (3GPP TS 29.002 [15]) for the RP-MMS element to keep a short message transaction open between the SMS-GMSC and the MS in the case where there are more-messages-to-send. Earlier versions of MAP support the transport of the TP-MMS element.

priority: service element enabling the SC or SME to request a short message delivery attempt to an MS irrespective of whether or not the MS has been identified as temporarily absent

protocol-identifier: information element by which the originator of a short message (either an SC or an MS) may refer to a higher layer protocol

receiving MS: the mobile station to which an MT short message is destined.

reply path procedure: mechanism which allows an SME to request that an SC should be permitted to handle a reply sent in response to a message previously sent from that SME to another SME

NOTE 6: This may happen even though the SC may be unknown to the SME which received the initial message.

report: response from either the network or the recipient upon a short message being sent from either an SC or an MS

NOTE 7: A report may be a delivery report, which confirms the delivery of the short message to the recipient, or it may be a failure report, which informs the originator that the short message was never delivered and the reason why.

When issued by the Service Centre, the delivery report confirms the reception of the Short Message by the SC, and not the delivery of the Short Message to the SME.

When issued by the Mobile Station, the delivery report confirms the reception of the Short Message by the Mobile Station, and not the delivery of the Short Message to the user.

replace short message type: range of values in the Protocol Identifier which allows an indication to be sent with a short message (MT or MO) that the short message is of a particular type allowing the receiving MS or the SC to replace an existing message of the same type held in the SC, the ME or on the SIM/UICC, provided it comes:

- in MT cases: from the same SC and originating address;
- in MO cases: from the same MS.

sending MS: the mobile station from which an MO short message is sourced.

Service Centre (SC): function responsible for the relaying and store-and-forwarding of a short message between an SME and an MS

NOTE 8: The SC is not a part of the GSM/UMTS PLMN, however MSC and SC may be integrated.

Serving GPRS Support Node (SGSN): exchange which performs packet switching functions for mobile stations located in a geographical area designated as the SGSN area

short message (SM): information that may be conveyed by means of the Short Message Service

NOTE 9: As described in the present document.

Short Message Entity (SME): entity which may send or receive Short Messages

NOTE 10: The SME may be located in a fixed network, an MS, or an SC.

SMS-STATUS-REPORT: short message transfer protocol data unit informing the receiving MS of the status of a mobile originated short message previously submitted by the MS, i.e. whether the SC was able to forward the message or not, or whether the message was stored in the SC for later delivery

SMS-COMMAND: short message transfer protocol data unit which enables an MS to invoke an operation at the SC

NOTE 11: An MS may then, for example, delete a short message, cancel a TP-Status-Report-Request, enquire about the status of a short message or request another function to be performed by the SC.