

ETSI TS 148 006 V13.0.0 (2016-01)



**Digital cellular telecommunications system (Phase 2+);
Signalling transport mechanism Specification
for the Base Station System -
Mobile Services Switching Centre (BSS - MSC) interface
(3GPP TS 48.006 version 13.0.0 Release 13)**



ReferenceRTS/TSGG-0248006vd00

Keywords

GSM

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	5
1 Scope	6
2 References	6
3 Definitions and abbreviations.....	9
3.1 Definitions	9
3.2 Abbreviations	9
4 Field of application.....	9
5 Functional content	9
6 Message transfer part (MTP) functions	10
6.1 General	10
6.2 Level 1.....	10
6.2.1 E1 link (ITU-T Recommendation Q.702).....	10
6.2.2 T1 link (ANSI Specification T1.111.2).....	11
6.3 Level 2.....	11
6.3.1 E1 link (ITU-T Recommendation Q.703).....	11
6.3.2 T1 link (ANSI Specification T1.111.3).....	12
6.4 Level 3.....	12
6.4.1 E1 link (ITU-T Recommendation Q.704).....	12
6.4.2 T1 link (ANSI Specification T1.111.4).....	16
6.5 Testing and Maintenance.....	19
6.5.1 E1 link (ITU-T Recommendation Q.707).....	19
6.5.2 T1 link (ANSI Specification T1.111.7).....	19
6a Message Transfer Part 3 (MTP3) – User Adaptation Layer (M3UA) functions.....	20
6a.1 Introduction	20
6a.2 Protocol Stack	20
6a.3 Data Link Layer	21
7 Interface functions.....	21
8 SCCP functions	21
8.1 Overview	21
8.2 Primitives	22
8.2.1 E1 link (ITU-T Recommendation Q.711).....	22
8.2.2 T1 link (ANSI Specification T1.112.1)	22
8.3 SCCP messages	23
8.3.1 E1 link (ITU-T Recommendation Q.712).....	23
8.3.2 T1 link (ANSI Specification T1.112.2)	24
8.4 SCCP formats and codes	25
8.4.1 E1 link (ITU-T Recommendation Q.713).....	25
8.4.2 T1 link (ANSI Specification T1.112.3)	26
8.5 SCCP procedures.....	26
8.5.1 E1 link (ITU-T Recommendation Q.714).....	26
8.5.2 T1 link (ANSI Specification T1.112.4)	28
9 Use of the SCCP.....	29
9.1 Connection establishment.....	29
9.1.1 Establishment procedure in case i)	31
9.1.2 Establishment procedure in case ii)	31
9.1.3 Establishment procedure in case iii)	31

9.1.4	Establishment procedure in case iv)	32
9.2	Connection release	32
9.3	Transfer of DTAP and BSSMAP data.....	32
9.3.1	Distribution function.....	32
9.3.1.1	ITU-T Recommendation	32
9.3.1.2	ANSI Specification	33
9.3.2	Transfer of DTAP messages	33
9.3.3	Transfer of BSSMAP messages.....	34
9.4	Connectionless services.....	34
9.4.1	Discrimination parameter (ITU-T Recommendation).....	34
9.4.2	Discrimination parameter (ANSI Specification).....	35
9.4.3	User Data Field Structure	35
10	Use of the SCCP for operations and maintenance.....	35
10.1	Connectionless service	36
10.2	Connection oriented services.....	36
10.3	BSS failure	36
Annex A (informative):	Change History	37
History		38

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/aad56965-88bb-48ca-9d1c-74093bceb2c9/etsi-ts-148-006-v13.0.0-2016-01>

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/48ca-9d1c-74093bceb2c9/etsi-ts-148-006-v13-0-2016-01>

1 Scope

The present document is split into four parts, clauses 4 to 6 dealing with the MTP, clause 6a dealing with M3UA/SCTP, clause 7 dealing with interface functions towards higher layers and clauses 8 to 10 dealing with the SCCP and its use.

The MTP provides a mechanism giving reliable transfer of signalling messages. Clauses 4 to 7 of the present document deal with the subset of the MTP that can be used between an BSS and an MSC, which is compatible with a full MTP.

The M3UA/SCTP provides a mechanism giving reliable transfer of signalling messages over an IP network.

The SCCP is used to provide a referencing mechanism to identify a particular transaction relating to for instance a particular call. Clauses 8 to 10 identify the SCCP subset that should be used between a BSS and an MSC. The SCCP can also be used to enhance the message routing for (for instance) operations and maintenance information.

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] | 3GPP TR 21.905: "Vocabulary for 3GPP Specifications". |
| [2] | Void. |
| [3] | Void. |
| [4] | Void. |
| [5] | Void. |
| [6] | Void. |
| [7] | Void. |
| [8] | Void. |
| [9] | Void. |
| [10] | Void. |
| [11] | Void. |
| [12] | Void. |
| [13] | Void. |
| [14] | Void. |
| [15] | Void. |
| [16] | Void. |
| [17] | Void. |
| [18] | Void. |

- [19] Void.
- [20] Void.
- [21] Void.
- [22] Void.
- [23] Void.
- [24] Void.
- [25] Void.
- [26] Void.
- [27] Void.
- [28] 3GPP TS 44.006: "Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".
- [29] Void.
- [30] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control Protocol".
- [31] Void.
- [32] Void.
- [33] Void.
- [34] Void.
- [35] Void.
- [36] Void.
- [37] Void.
- [38] Void.
- [39] Void.
- [40] Void.
- [41] Void.
- [42] Void.
- [43] Void.
- [44] Void.
- [45] Void.
- [46] 3GPP TS 48.008: "Mobile Switching Centre – Base Station System (MSC-BSS) interface; Layer 3 specification".
- [47] Void.
- [48] Void.
- [49] Void.
- [50] Void.
- [51] Void.
- [52] Void.

ITEH STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/aad56965-88bb-48ca-9d1c-74093bceb2c9/etsi-ts-148-006-v13.0.0-2016-01>

- [53] Void.
- [54] Void.
- [55] Void.
- [56] Void.
- [57] Void.
- [58] ITU-T Recommendation Q.702: "Signalling data link".
- [59] ITU-T Recommendation Q.703: "Signalling link".
- [60] ITU-T Recommendation Q.704: "Signalling network functions and messages".
- [61] ITU-T Recommendation Q.707: "Testing and maintenance".
- [62] ITU-T Recommendation Q.711: "Functional description of the signalling connection control part".
- [63] ITU-T Recommendation Q.712: "Definition and function of signalling connection control part messages".
- [64] ITU-T Recommendation Q.713: "Signalling connection control part formats and codes".
- [65] ITU-T Recommendation Q.714: "Signalling connection control part procedures".
- [66] 3GPP TS 23.003: "Numbering, addressing and identification".
- [67] ANSI T1.110-1999: "Signaling System No.7; General Information".
- [68] ANSI T1.111-2000: "Signalling System No. 7; Message Transfer Part".
- [69] ANSI T1.112-1996: "Signalling System No. 7; Signalling Connection Control Part Functional Description".
- [70] TIA/EIA/IS-104-A: "Personal Communications Service Descriptions for 1 800 MHz".
- [71] ITU-T Recommendation Q.701: "Functional description of the message transfer part (MTP) of Signalling System No. 7".
- [72] IETF RFC 2960(10/2000): "Stream Control Transmission Protocol".
- [73] IETF RFC 3332(09/2002): "Signalling System 7 (SS7) Message Transfer Part 3 (MTP3) – User Adaptation Layer (M3UA)".
- [74] IETF STD 51, RFC 1661(07/1994): "The Point-To-Point Protocol (PPP)".
- [75] IETF STD 51, RFC 1662(07/1994): "PPP in HDLC-like Framing".
- [76] IETF RFC 2507(02/1999): "IP header compression".
- [77] IETF RFC 1990(07/1994): "The PPP Multilink Protocol (MP)".
- [78] IETF RFC 2686(09/1999): "The Multi-Class Extension to Multi-Link PPP".
- [79] IETF RFC 2509(02/1999): "IP Header Compression over PPP".
- [80] IETF RFC 2474 (12/1998): "Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers".
- [81] RFC 3309: "SCTP Checksum Change".
- [82] IETF RFC 791 (09/1981): "Internet Protocol".
- [83] IETF RFC 2460: "Internet Protocol, Version 6 (Ipv6) Specification".
- [84] 3GPP TS 29.202: "SS7 Signalling Transport in Core Network; Stage 3"

3 Definitions and abbreviations

3.1 Definitions

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

E1: link employs 32 Pulse Code Modulation signals (timeslots) at 64 kbits/s. The 32 timeslots consist of 30 voice (or signalling) channels and 2 common signalling channels. The output bit rate is 2 048 Mbits/s.

T1: link employs 24 Pulse Code Modulation signals (timeslots) at 64 kbits/s. (T1 interface can alternatively use signalling at 56 kbits/s). The output bit rate is 1 544 Mbits/s. (A frame consists of 193 bits, (8 x 24) + 1, as one bit is used for synchronization. The frame repeats 8,000 times per second.).

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 apply.

4 Field of application

- a) The present document is applicable to the signalling between radio subsystems (BSS) and mobile switching centres (MSCs) in GSM PLMNs. It provides a minimum set of MTP, or in the case of IP-based signalling transport - M3UA and SCTP, requirements that may be implemented at a BSS or MSC, whilst maintaining compatibility with the implementation of a full specification of the MTP (M3UA/SCTP).
- b) For MTP signalling transport usage, the Technical Specification defines the interface at the 64 kbits/s boundary to the BSS or MSC and applies primarily for digital access arrangements, the use of analogue arrangements is an option for PLMN operator.

Also, the Technical Specification defines the interface at the 56 kbits/s boundary to the BSS or MSC for T1 links.
- c) The security of signalling links is a PLMN operator concern, however it is recommended that in the case where more than one multiplex system is required and security reasons dictate the use of a multiple link linkset, then each signalling link should be assigned in a different multiplex system. It is however noted that this is of little benefit if diversity of routing of the multiplexes is not used.
- d) Both associated and quasi-associated modes of signalling between the BSS and the MSC are allowed. In case of quasi-associated mode the STP functionality is provided outside the BSS. Future evolution or economic reasons applicable to the interface may however make the use of STP working at the BSS attractive, in which case some of the simplifications in this paper will not apply.
- e) A variety of information types may be supported by the signalling system, e.g. relating to circuit switched call control and packet communication. These are fully defined in the service series of Technical Specifications (the 3GPP TS 02.xx series and in [70] for PCS 1900).
- f) For E1 link usage, the ITU-T recommendations concerning the MTP shall be taken as being requirements unless covered by a statement in the present document.
- g) For T1 link usage, the ANSI recommendations concerning the MTP [68] shall be taken as being requirements unless covered by a statement in the present document.
- h) For IP-based signaling transport usage, 3GPP TS 29.202 [84] shall be taken as being requirements unless covered by a statement in the present document.

5 Functional content

The functional requirements are as follows:

- a) the network call control functions are as specified in 3GPP TS 48.008 and 3GPP TS 44.018;
- b) the minimum set of Message Transfer Part functions are specified in Blue Book ITU-T Recommendations Q.702, Q.703, Q.704 and Q.707, with the qualifications specified in the present document;

The functions are specified in ANSI T1.111 [68] for T1 links.

- c) the additional interface functions required for the proper operation of the layer 3 control functions in combination with the Message Transfer Part, or in the case of IP-based signalling transport - M3UA and SCTP, functions, are specified in clause 7 of the present document.
- d) the minimum set of Message Transfer Part 3 – User Adaptation (M3UA) functions are specified in 3GPP TS 29.202 [84].

6 Message transfer part (MTP) functions

6.1 General

For E1 links, the MTP functions as specified in ITU-T Recommendations Q.702, Q.703, Q.704 and Q.707 are applicable. For T1 links, the MTP functions as specified in ANSI specifications T1.110 clause 5, and T1.112 clause 5 are applicable. However, the following exceptions and modifications to those Recommendations may be applied for the MSC to BSS signalling, see clauses 6.2 to 6.4.

Some form of policing could be included at the MSC in order to ensure that no signalling messages received from the BSS can be routed further than the MSC if an administration requires. This is necessary to prevent fraudulent use of the signalling network for implementations of the GSM system. The manner in which this is achieved will be dependent on local agreements or regulations and system implementations.

Where load sharing is used, all messages to do with a given SCCP connection should be passed down a given link.

6.2 Level 1

6.2.1 E1 link (ITU-T Recommendation Q.702)

Q.702 figure 2

These figures should be treated as for information only. For the standard application of GSM, interface point C is appropriate.

Q.702 clause 4.4

The use of analogue circuits to support the signalling link is a national matter.

Q.702 clause 5

A signalling rate of 64 kbits/s is assumed. Lower rates (e.g. using analogue bearers) are a national concern.

Q.702 clause 6

Error characteristics and availability are a national concern. Care should be taken as excessive errors could lead to inefficient use of the signalling links.

Q.702 clause 8

The standard arrangement will be to derive the signalling link from a 2 048 kbits/s digital path.

Q.702 clause 9

Only digital signalling data links are relevant.