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Technical Report

Digital cellular telecommunications system (Phase 2+);
Support of Teletex in a GSM
Public Land Mobile Network (PLMN)
(GSM 03.44 version 7.0.0 Release 1998)

**GLOBAL SYSTEM FOR
MOBILE COMMUNICATIONS**

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Contents

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Foreword

This Technical Report (TR) has been produced by the Special Mobile Group (SMG).

The present document describes the Support of teletex in a digital cellular telecommunication system.

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

Version 7.x.y

where:

    7   indicates Release 1998 of GSM Phase 2+

    x   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

    y   the third digit is incremented when editorial only changes have been incorporated in the specification.

1   Scope

The present document describes the support of the teletex service by a GSM Public Land Mobile Network (PLMN).

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.

- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

[1]   CCITT F.200 series Recommendations, Fascicle II.5: "Telematic, data transmission and teleconference services-Operations and quality of service".

[2]   CCITT T.300 series Recommendations, Fascicle VII.5: "Terminal equipment and protocols for telematic services".

[3]   CCITT X.200 series Recommendations, Fascicle VIII.4 Data communication networks: services an facilities, interfaces".

[4]   CCITT X.300 series Recommendations, Fascicle VIII.6: "Data communication networks: interworking between networks, mobile data transmission systems,internetwork management".

[5]   CCITT X.400 series Recommendations, Fascicle VIII.7: "Data communication networks: message handling systems".

[6]   CCITT T.0 series Recommendations, Fascicle VII.3 Terminal equipment and protocols for telematic services (T.60,T.61,T.62)".

[7]   CCITT T.65 series Recommendations, Fascicle VII.5: "terminal equipment and telematic services (T.70)".

[8]   CCITT X.1 series Recommendations, Fascicle VIII.2: "Data communication networks: services and facilities, interfaces (X.21,X.31,X.32)".

[9]   CCITT X.40 series Recommendations, Fascicle VIII.3: "Data communication networks: transmission, singnalling and switching, network aspects, maintenance and administrative arrangements(X.52,X.71,X.75)".

[10]   CCITT V series Recommendations, Fascicle VIII.1: " Data communication over the telephone network (V.110)".

[11]   GSM 01.04: "Digital cellular telecommunication system (Phase 2+); Abbreviations and acronyms".

[12]   GSM 02.02: "Digital cellular telecommunications system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[13]   GSM 02.03: "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[14]   GSM 03.10: "Digital cellular telecommunication system (Phase 2+); GSM Public Land Mobile Network (PLMN) connection types".

[15]   GSM 03.70: "Digital cellular telecommunication system (Phase 2+); Routeing of calls to/from Public Data Networks (PDN)".

[16]   GSM 07.01: "Digital cellular telecommunications system (Phase 2+); General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[17]   GSM 07.03: "Digital cellular telecommunications system (Phase 2+); Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities".

[18]   GSM 09.01: "Digital cellular telecommunication system (Phase 2+); General network interworking scenarios".

[19]   GSM 09.04: "Digital cellular telecommunication system (Phase 2+); Interworking between the Public Land Mobile Network (PLMN) and the Circuit Switched Public Data Network (CSPDN)".

[20]   GSM 09.06: "Digital cellular telecommunications system (Phase 2+); Interworking between a Public Land Mobile Network (PLMN) and a Packet Switched Public Data Network/Integrated Services Digital Network (PSPDN/ISDN) for the support of packet switched data transmission services".

[21]   GSM 09.07: "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

2.1   Abbreviations

In addition to those below, definitions used in the present document are listed in GSM 01.04.

AU   Access Unit (CCITT X.31)
CF   Conversion Facility (for Ttx/Tx service interworking)
GMSC   Gateway MSC
HDLC   High Level Data Link Control
IWU   Interworking Unit (CCITT X.71/CCITT X.75)
LAPB   Link Access Procedure Balanced
PLP   Packet Layer Protocol
TDS   Teletex Document Store
TID   Terminal Identification (CCITT F.200)
Ttx   Teletex
Ttx-MS   Teletex Mobile Station (i.e. a MS with Ttx terminal connected)
Ttx-TE   Teletex Terminal Equipment
Tx   Telex
VCS   Virtual Circuit Service

3   Introduction

3.1   Teletex service definition

The teletex (Ttx) service is an international telematic service as defined in CCITT F.200-series of recommendations.

As an essential characteristic it provides a basic level of compatibility between all terminals participating in the service.

Normally the service shall operate on a fully automatic basis and be open continuously.

Teletex subscriber equipment shall be in accordance with the CCITT recommendations T.60, T.61, T.62, and T.70. Especially it shall

  a) have unique terminal identifications (TID);

  b) be able to send and/or receive documents without terminal operator intervention;

  c) have a certain set of indications to the terminal operator;

  d) in principle be able to accept calls continuously, if call numbers are published in the directories (In order to meet this requirement, it is allowed to use a document storage facility which can be network or customer premises based.);

  e) be able to prepare documents being forwarded to the telex service using appropriate conversion facilities within the network.

According to the CCITT T.70 (version 1988) the teletex service may be offered in the following types of networks:

  a) the Circuit Switched Public Data Network (CSPDN);

  b) the Packet Switched Public Data Network (PSPDN);

  c) the Public Switched Telephone Network (PSTN); and

  d) the Integrated Services Digital Network (ISDN).

The interworking between the different networks may be based on CCITT X.300-series of recommendations.

3.2 Context for the Support of Teletex in a GSM PLMN

Considering that

  a) international roaming of teletex subscribers must be supported;

  b) all CEPT countries have PSPDNs;

  c) PSPDNs providing an access unit AU (X.31 case A) support procedures according to CCITT X.32;

  d) each CEPT country will have an ISDN;

  e) ISDNs may provide the VCS;

  f) the teletex service supported by a GSM PLMN can participate in the internationally available teletex service, i.e. all teletex terminals, for which a call number is published in the service directory, can communicate with each other.

the following basic assumptions will apply:

  a) In principle no specific network interworking functions shall be necessary in a VPLMN for the support of teletex.

  b) No specific additional bearer service other than those defined in GSM 02.02 shall be needed in a VPLMN.

  c) Ttx specific IWFs, if any, must not have any impact on the MS of a roaming subscriber.

  d) Both PSTN and ISDN, if available, may be used as a transit network to the PSPDN.

  e) Presently no service interworking (especially for telex) directly from the GSM PLMN is provided. Conversion facilities within the fixed networks shall be used.

  NOTE: A mobile terminated call may be forwarded to a document storage facility called Teletex Document Store (TDS), if available, when the addressed Ttx-MS is temporarily unable to accept a call. The provision and the location of such a store is at the PLMN operator's discretion (e.g. within the PLMN or within a fixed network).
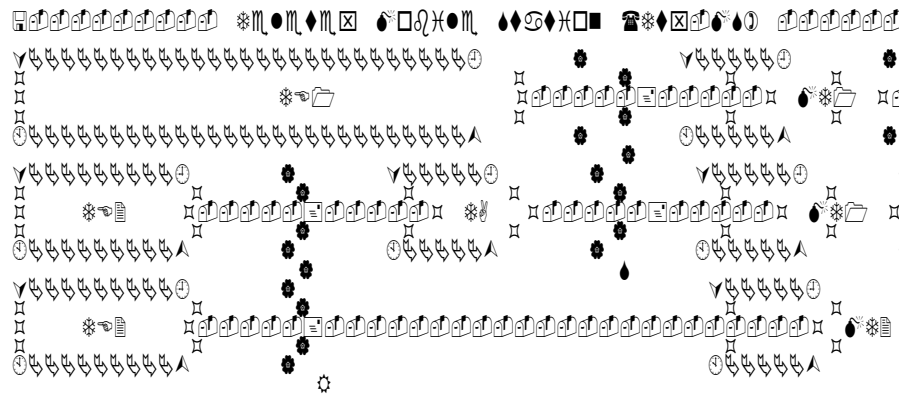
## 3.3	Reference Configuration of a Teletex Mobile Station

The reference configuration (figure 1/GSM 03.44) is equivalent to those configurations in GSM 07.03.

An explicit TA may be used between the R- and the S-interface reference point.

The configuration TE1-MT1 can only be supported by means of a specialized TAF including protocol conversion, if necessary, to guarantee the compatibility at the radio interface. For the time being this may be a national option.

Further configurations may be possible.

X.25

(X.21, X.21bis

V-series)

Figure 1/GSM 03.44: Reference Configuration of a Teletex Mobile Station

# 4	Interworking for Teletex Support

## 4.1	Global Network Configuration for Teletex

Presently teletex is offered in the CSPDN, the PSPDN, the PSTN, and in the very next future in the ISDN. Figure 2/GSM TS 03.44 shows the different networks to which a GSM PLMN may have to interwork, when supporting the communication between teletex terminals.
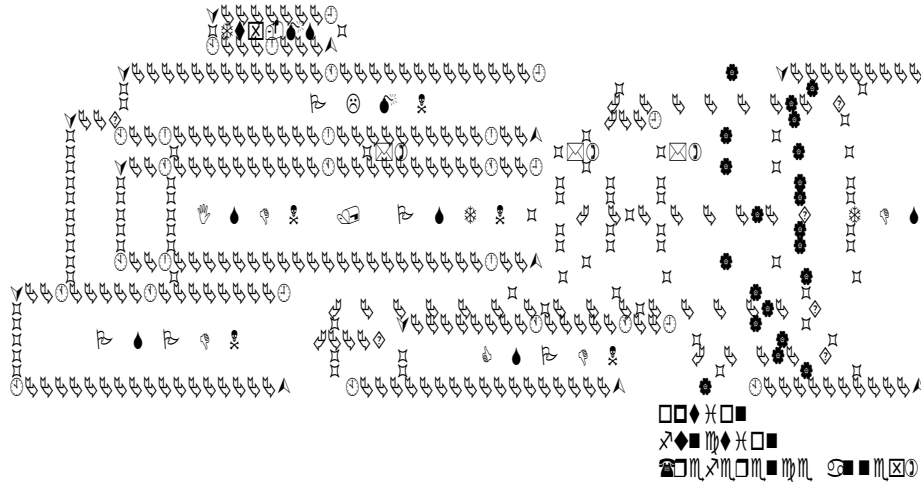
*)　　　　　This interworking requires a Ttx-specific IWF within the PLMN (see section 4.2)

**Figure 2/GSM 03.44: Global Network Configuration**

For service interworking with telex the national fixed network based Ttx/Tx conversion facility (CF) shall be used. For roaming subscribers this results in an international access. Whether the conversion facilities are prepared to receive such calls is not in the scope of the present document.

## 4.2　　　Network Interworking Scenarios

The following network interworking scenarios may be derived from the global network configuration. Some scenarios allow for different implementations of an IWF. For the interworking functions needed between the PLMN and the different networks refer to GSM TS 09.06 and 09.07. The choice of interworking scenario and the IWF is at the PLMN operator's discretion.

The PLMN and the particular PDN may be connected directly or via (a) transit network(s).
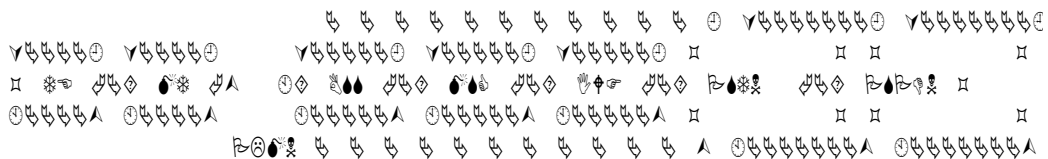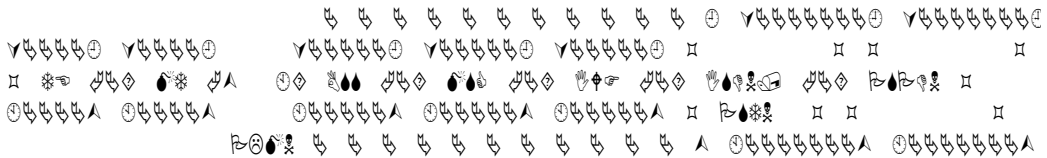
1) Direct interworking PLMN to PSPDN
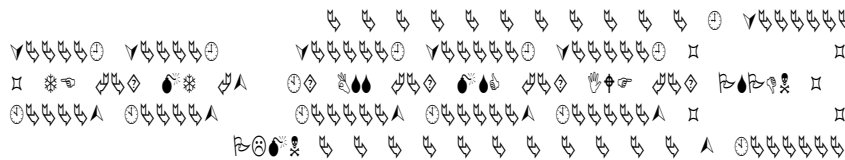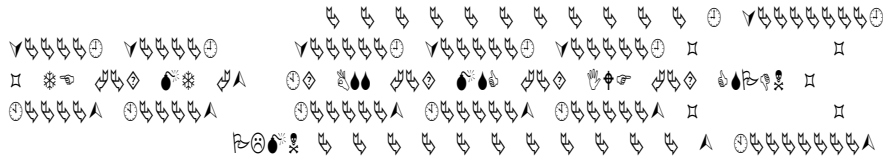

2) Interworking PLMN to PSPDN via ISDN
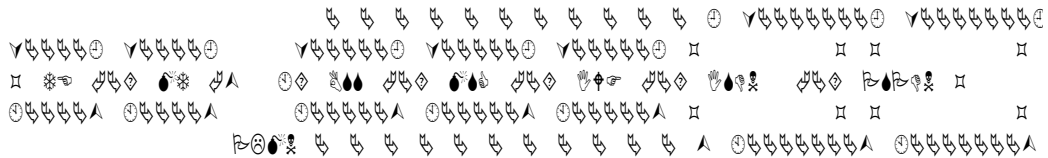
3) Interworking PLMN to PSPDN via PSTN

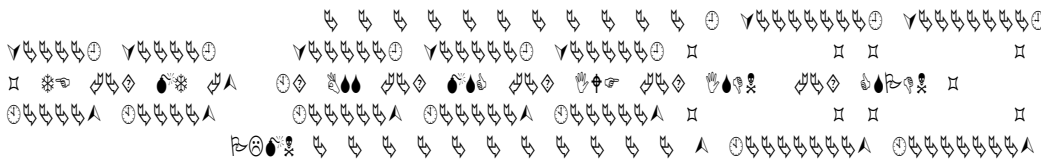4) Interworking PLMN to PSPDN via ISDN/PSTN

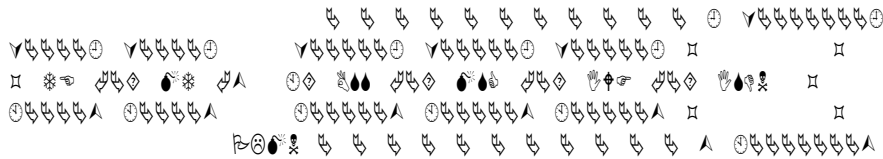5) Direct interworking PLMN to CSPDN with protocol conversion

NOTE:　This is a national option, because specific functionality in the IWF is needed .

6) Interworking PLMN to CSPDN via ISDN with protocol conversion

NOTE:　This is a national option, because specific functionality in the IWF is needed .

7) Direct interworking PLMN to ISDN with protocol conversion

NOTE:　Presently this interworking case applies only to the Ttx service within an ISDN using T.70-CSPDN protocols.

Figure 3/GSM 03.44: Network Interworking Scenarios

For the interworking PLMN to the different networks the following GSM specifications apply:

PLMN to CSPDN:　　　GSM 09.04

PLMN to PSPDN:　　　GSM 09.06

PLMN to PSTN/ISDN:　GSM 09.07

4.3　Mobile-to-mobile Communication

A communication from a mobile to another mobile is treated like a call from/to a fixed network subscriber, e.g. using the packet functions as per GSM 09.06.

4.4　Use of GSM Supplementary Services

For supplementary services refer to GSM 09.06 and GSM 09.04.In addition Call forwarding supplementary services may be used to forward a mobile terminated call to a TDS (refer annex).

4.5 High Layer Compatibility Information Element

Mobile subscribers using the teletex service may code the high layer compatibility information element as described below. Depending on the network implementation this indication may be used by the network for teletex specific requirements.

Depending on the signalling capabilities of the fixed network the high layer compatibility information element may not be included in the call setup message to the MS in case of a mobile terminated call. Therefore a Ttx-MS shall not reject an incoming call due to the absence of this element.

Table 1/GSM 03.44: High layer compatibility information element for teletex

High layer characteristics Identification	Teletex (basic teletex)
	Document application profile for formatted mixed mode [*]
	Document application profile for processable mode [*]

[*] for future use

Annex A (informative):
Teletex Document Store (TDS)

A.1 Introduction

A TDS is an optional functional unit, the provision of which is necessary, if the PLMN operator wishes that mobile terminated calls should not fail due to temporary absence of a Ttx-MS. A particular TDS can be in charge of one or more PLMNs. Each PLMN is the HPLMN of the Ttx-MSs, that TDS is acting for.

The provision and location of a TDS is at the PLMN operator's discretion (e.g. within the HPLMN or within a fixed network).

It is not intended to receive documents instead of the Ttx terminal in general, but only occasionally, if the MS does not accept a call. This may include e.g. temporary user initiated unconditional call forwarding.

Whether use of unconditional call forwarding is required in general, when the Ttx-MS is roaming in a another GSM PLMN, depends e.g. on the signalling capabilities of the concerned networks.

Some requirements can be identified from the user point of view either being a subscriber to a PLMN or to a fixed network.

These requirements are that a TDS must

  a) be able to receive and store documents for a Ttx terminal (subscriber) it is in charge for;

  b) act instead of the terminal as being the terminal itself (negotiation of options), especially there must not be any unacceptable impact on the remote fixed network based Ttx terminal which forces the user of that terminal to change his/her communication habits;

  c) to be responsible for the delivery of the documents to the terminal it is in charge for.

A minimum set of functions is necessary to fulfil the requirements. To perform those functions, however, a TDS can be e.g. a separate stand-alone system or part of a Message Handling System MHS (based on X.400- and/or T.300-series of CCITT recommendations).

Once a document has been received and is stored in the document store the way to access and/or retrieve the document is not in the scope of the present document. However, it should be noted that usually a Ttx terminal can only make use of the teletex protocols. During the process of receiving documents from another Ttx terminal located in a PLMN or in a fixed network the TDS has to behave like a Ttx terminal anyway (see also requirements above).

A.2 Minimum Set of Functions

The following function must be allocated to a TDS:

  - Ttx document reception;

  - Ttx document storage capability (document store);

  - either automatic forwarding Ttx documents to the Ttx-TE (subscriber) or document retrieval by the authorized Ttx-TE;

  - operation and maintenance facilities.

A.3   Receiving Teletex Documents into the Document Store

The Ttx document reception function of the TDS may be accessed e.g. using call forwarding facilities of the connected network. These facilities, if used, are activated by the network, whenever there is a match with the associated conditions, e.g. the addressed Ttx-TE in the PLMN does not answer the mobile terminated call. The address of the TDS must therefore be known to the network as forwarded-to address.

A.4   Getting Teletex Documents from the Document Store

The way of having access to the received documents and the detailed procedures are outside of the scope of the present document.

Annex B (informative):
Change Request History

Change history					
SMG No.	**TDoc. No.**	**CR. No.**	**Section affected**	**New version**	**Subject/Comments**
SMG#07				4.0.1	ETSI Publication
SMG#20				5.0.0	Release 1996 version
SMG#27				6.0.0	Release 1997 version
SMG#29				7.0.0	Release 1998 version

History

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