

Proposed

Annex B

Teletex Document Store

1. Introduction

A teletex document store (TDS) is an optional functional unit, the provision of which is necessary, if the PLMN operator wishes to guarantee a 24h-availability to receive documents. 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. user initiated incoming call barring.

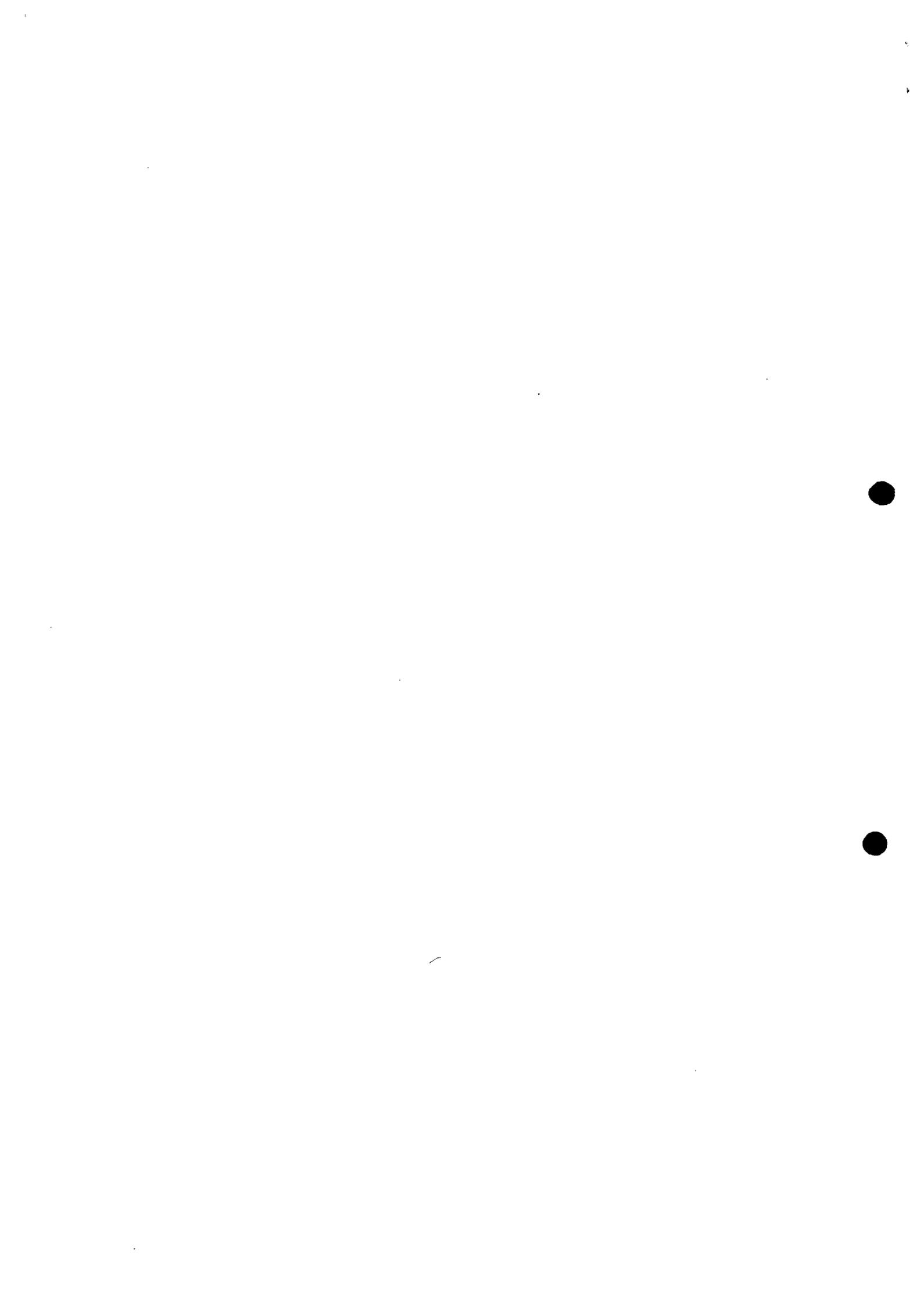
Whether use of unconditional call redirection is required in general, when the Ttx-MS is roaming in a another GSM PLMN, needs further study.

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 fulfill 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 this recommendation. 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).

2. Minimum Set of Functions

The following function must be allocated to a TDS:

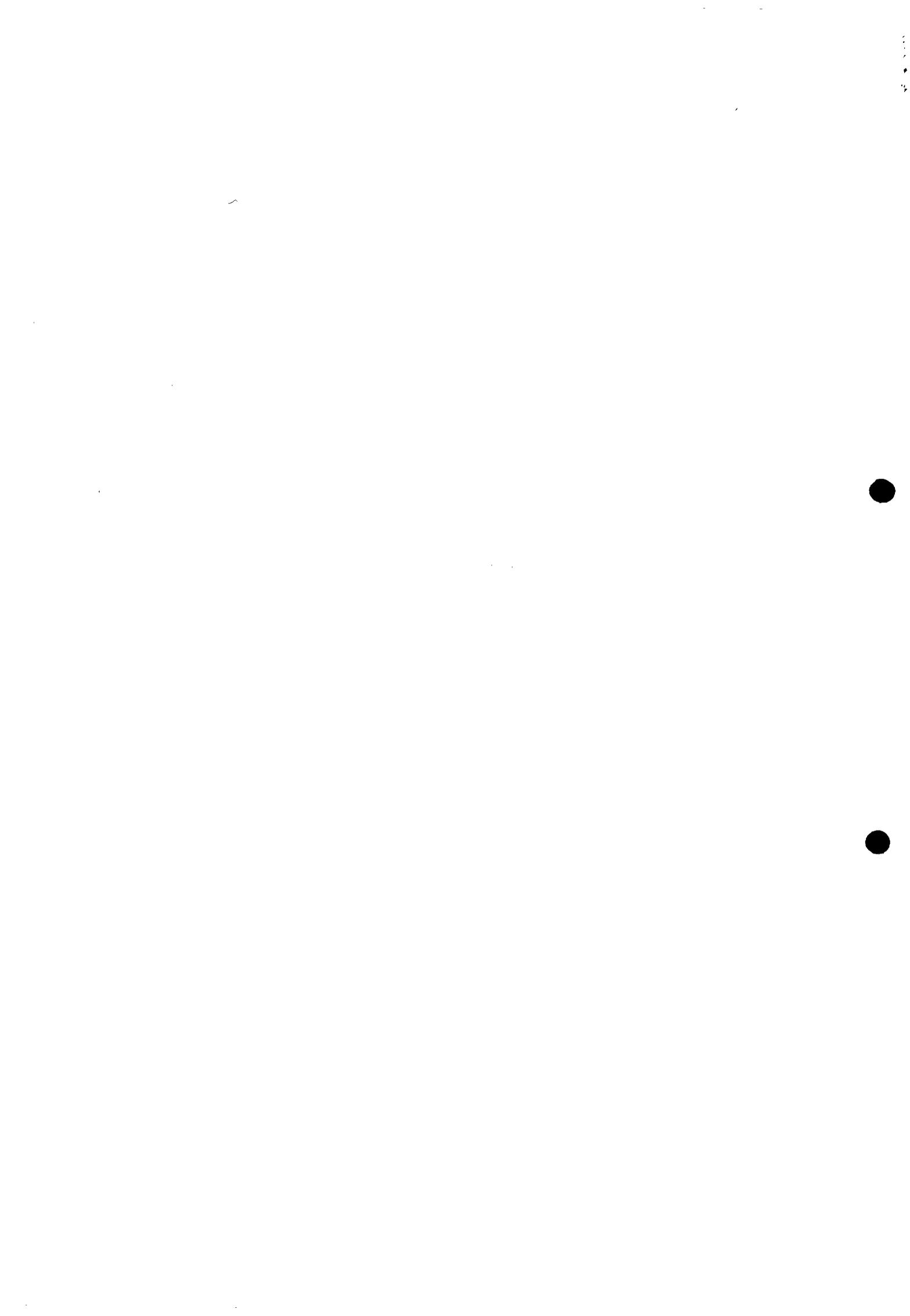
- Ttx document reception
- Ttx document storage capability (document store)
- either automatic forwarding Ttx documents to the Ttx-TE (subscriber) or document retrieval by the authorized Ttx-TE
- operation and maintenance facilities

3. Receiving Teletex Documents into the Document Store

The Ttx document reception function of the TDS may be accessed e.g. using call redirection facilities of the connected network. These facilities, if used, are activated by the network, whenever 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 redirection address.

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 this recommendation.



MSC	Mobile Service Switching Centre
MSRN	Mobile Station Roaming Number
MT	Mobile Termination
PDN	Public Data Network
PH	Packet Handler (CCITT X.31)
PLMN	Public Land Mobile Network
PLP	Packet Layer Protocol
PSPDN	Packet Switched Public Data Network
PSTN	Public Switched Telephone Network
RLP	Radio Link Protocol
RPOA	Recognized Private Operating Agency
TA	Terminal Adaptor
TAF	Terminal Adaptation Function
TDS	Teletex Document Store
TE	Terminal Equipment
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
VLR	Visitor Location Register
VPLMN	Visited PLMN

(to be amended according to further abbreviations in this recommendation)

3 Introduction

3.1 Teletex Service Definition

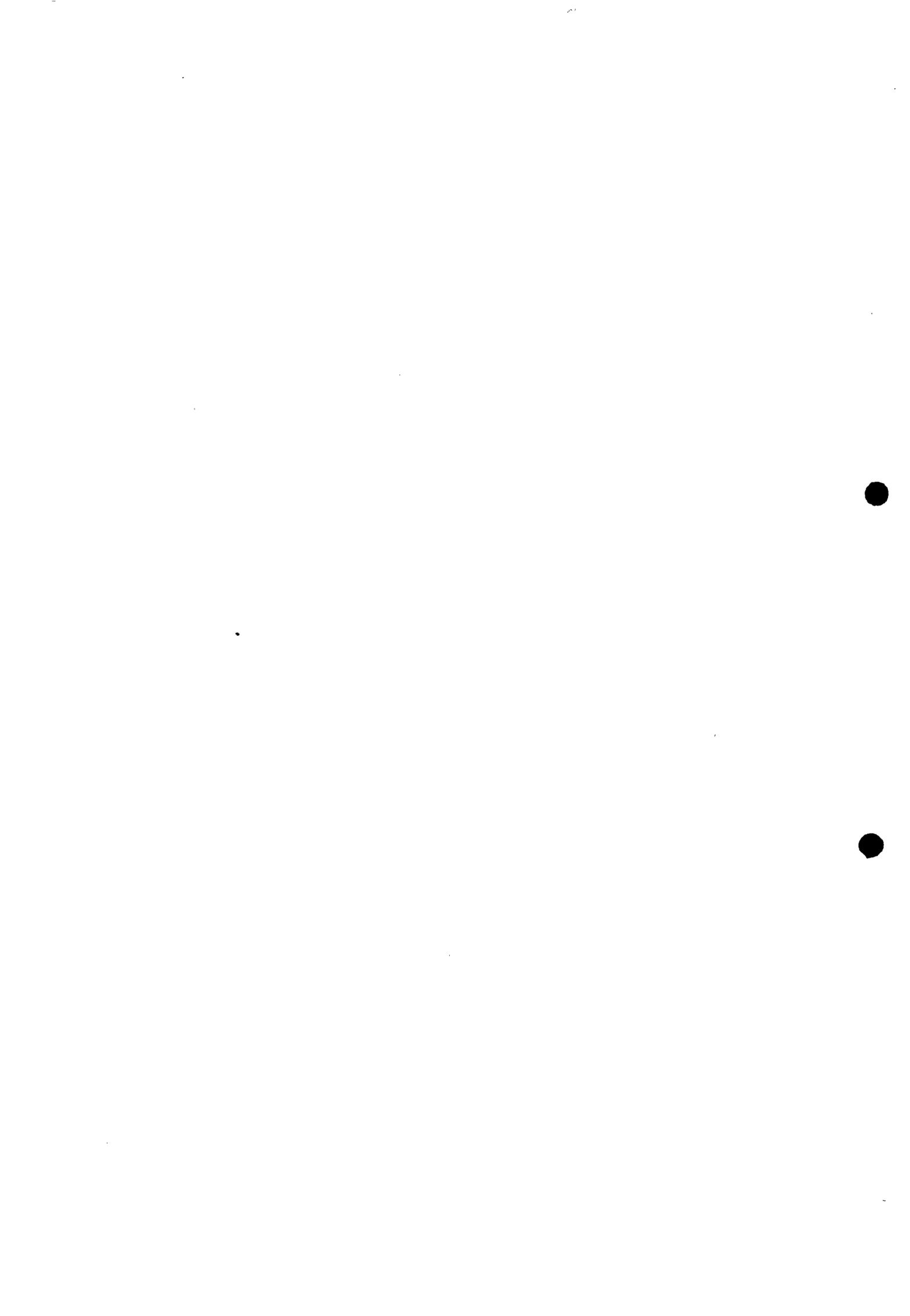
The teletex (Ttx) service is an international telematic service as defined in CCITT F.200-series of recommendations.

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.

Presently the teletex service is offered in three different types of networks (resulting in three different types of network access protocols - refer CCITT Rec. T.70):

- (a) the Circuit Switched Public Data Network (CSPDN),
- (b) the Packet Switched Public Data Network (PSPDN) and
- (c) the Public Switched Telephone Network (PSTN).

Connecting teletex terminals directly to an ISDN requires further study. Some interim solutions are available (refer CCITT Rec. T.90 / 1988).

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) the provision of the teletex service in a GSM PLMN is classed as 'A' category (GSM 02.03),
- (b) international roaming of teletex subscribers must be supported,
- (c) all CEPT countries have PSPDNs,
- (d) PSPDNs providing an access unit AU (X.31 case A) support procedures according to CCITT Rec. X.32,
- (e) each CEPT country will have an ISDN,
- (f) it should also be possible to interwork with teletex interim solutions in ISDNs,

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 redirected 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).

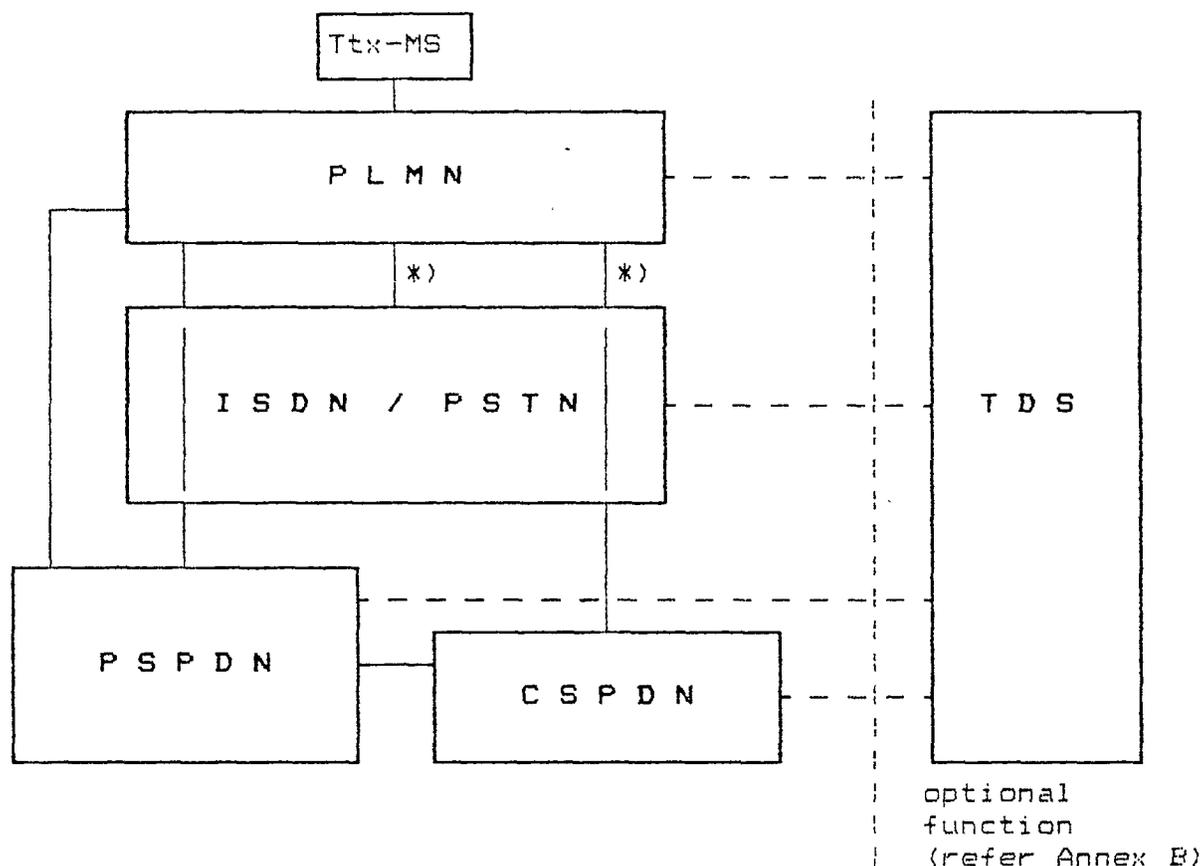
3.3 Reference Configuration of a Teletex Mobile Station

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 is for further study. Further configurations may be possible.





*) This interworking may require a Ttx-specific IWF within the PLMN (refer Annex A)

Figure 2 / GSM 03.44: Global Network Configuration

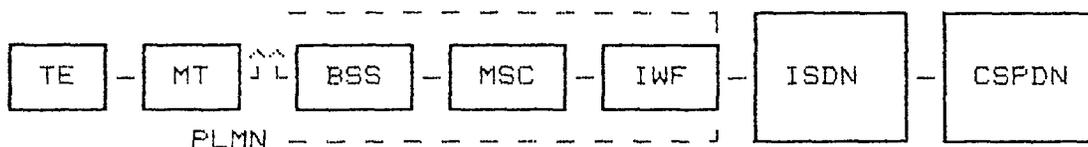
For service interworking with telex access to the national fixed network based Ttx/Tx conversion facility (CF) shall be used. For roaming subscribers this results in an international access. These scenarios need further study.

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. The interworking functions needed between the PLMN and the different networks are listed in section 5.3 / GSM 03.44 and annex A / GSM 03.44. The choice of interworking scenario and the IWF is at the PLMN operator's discretion.

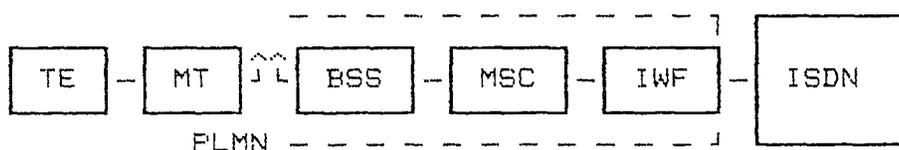


- (5) Interworking PLMN to CSPDN via ISDN with protocol conversion



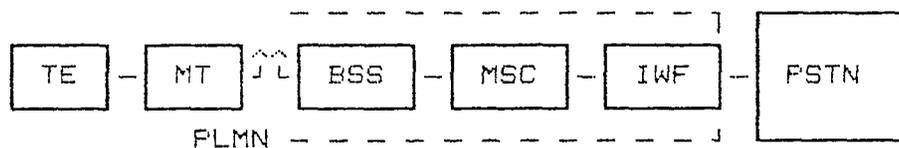
Note: This is a national option, because specific functionality in the IWF is needed (refer annex A).

- (6) Direct interworking PLMN to ISDN with protocol conversion



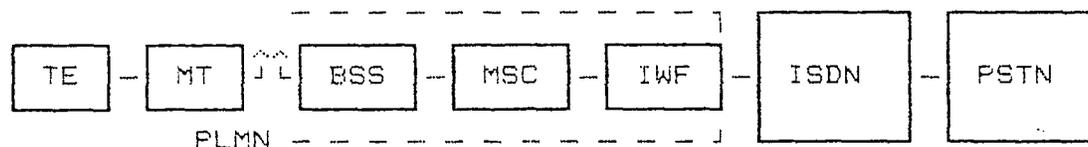
Note: Presently this interworking case applies only to the interim solution of Ttx service within an ISDN.

- (7) Interworking PLMN to PSTN with teletex terminals connected to the PSTN



Note: The applicability of this interworking scenario and its impact on the PLMN are for further study.

- (8) Interworking PLMN to PSTN via ISDN with teletex terminals connected to the PSTN



Note: The applicability of this interworking scenario and its impact on the PLMN are for further study.

Figure 3 / GSM 03.44 cont'd



4.5 Use of GSM Supplementary Services

Call forwarding supplementary services may be used to redirect a mobile terminated call to a TDS (refer annex B).

Use of other supplementary service, if applicable, is for further study.

5 Use of Bearer Services

5.1 Connection Types, Bearer Capabilities, Protocol Models

The relationship between the teleservice "teletex" and the connection elements needed within a GSM PLMN is stated in table 1 / GSM 03.44 (refer table "Relationship between Teleservices and GSM PLMN Connection Types" in GSM 03.10).

TELESERVICE IN GSM PLMN	ACCESS AT MOBILE STATION	RADIO INTERFACE CONNECTION ELEMENT	INTERMEDIATE RATE RA1 TO RA2 AT THE BSS- MSC-I/F	BSS-MSC CONNECTION ELEMENT
Teletex	Data packet duplex, synchronous access, 2.4 kbit/s	Cct mode, service data unit integrity, unrestricted, 3.6 kbit/s, HR or FR, transparent	8 kbit/s	Cct mode, service data unit integrity, 64 kb/s, unrestricted
		Cct mode, service data unit integrity, unrestricted, 6 kbit/s HR or 12 kbit/s FR, non-transparent	8 kbit/s HR, 16 kbit/s FR	

Table 1 / GSM 03.44: Relationship between Teleservices and GSM PLMN Connection Elements

If an ISDN only is used as transit network to an AU, then it should provide a "unrestricted digital" connection element.

If used in conjunction with a PSTN, the ISDN should provide a "3.1 kHz audio restricted" connection element.



The protocol models and rate adaptation schemes used to support teletex between MS and IWF are shown in the figure "Information Transfer Protocol Models for GSM PLMN Connections" of GSM 03.10. Protocol model 2 in this figure shows the use of transparent mode and protocol model 4 the use of non-transparent mode. ~~Use of non-transparent mode is necessary, when flag-stuffing is involved.~~

BEARER CAPABILITIES	VALUES	
Transfer Mode	circuit	packet
Information Transfer Capability	unrestricted digital information, 3.1 kHz Ex PLMN,	
Structure	service data unit integrity	
Duplex Mode	full duplex	
Signalling Access	X.32	X.25
Modem Type	V.22bis, V.32	
Access Structure	synchronous	
User Rate	2.4 kbit/s	
Intermediate Rate	4 kbit/s	
Rate Adaptation	X.30, [X.31 flag-stuffing], V.110	
Channel Requirements	half rate, full rate, dual / half rate preferred, dual / full rate preferred,	
Quality	transparent, non-transparent *)	
User Info L2 Protocol	X.25	

*) For Ttx support non-transparent is the preferred option.

Table 2 / GSM 03.44: Bearer Capabilities used for Ttx Support



Annex A

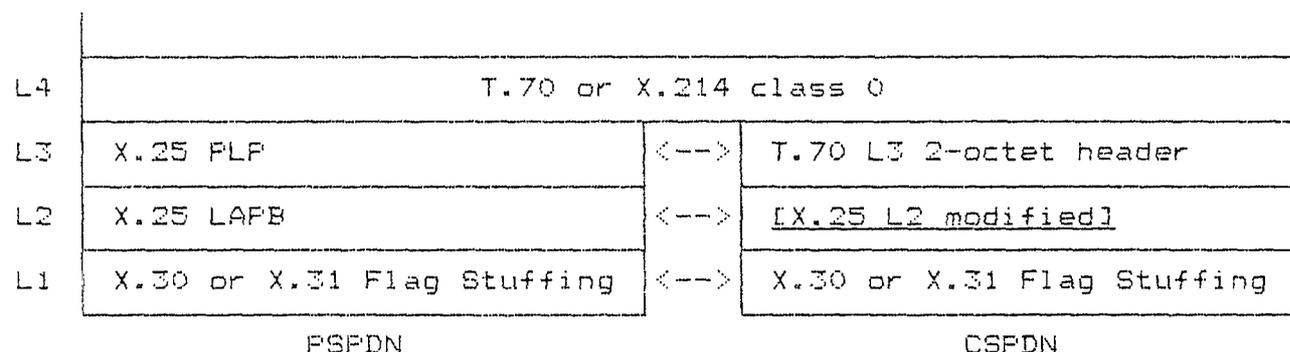
Teletex specific Interworking Functions

This annex deals with interworking functions with a Ttx-specific functionality.

Three different cases are illustrated:

- (a) interworking with a CSPDN via an ISDN to communicate with Ttx terminals through the CSPDN - especially when the Ttx service is offered in such a network in the given country (figure A.2 / GSM 03.44)
- (b) interworking with an ISDN to communicate with Ttx terminals directly connected to the ISDN - circuit switched interim solution (figure A.3 / GSM 03.44)
- (c) interworking with a PSTN or an ISDN/PSTN to communicate with Ttx terminals connected to the PSTN (figure A.4 / GSM 03.44).

Cases (a) and (b) need a special protocol conversion from PSPDN to CSPDN protocols (figure A.1 / GSM 03.44). Case (c) may need a LAPB termination in the IWF, for both Ttx terminals use the same layer 2 address, if the Ttx-TE connected to the MT does not support the symmetrical layer 2 addressing capability (refer ISO 7776).



protocol stacks and conversion for information transfer phase (data phase);

Figure A.1 / GSM 03.44: PSPDN-CSPDN protocol conversion

