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**Integrated Services Digital Network (ISDN);
Teletex end-to-end protocol over the ISDN**

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Terminal Equipment (TE) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS makes major reference to a number of CCITT Recommendations provided in the Normative references Clause (Clause 2), and can only be applied when considered together with elements of the CCITT Recommendations.

Annex A is normative and provides additional session layer requirements plus the necessary amendments needed to CCITT Recommendation T.62 [3]. Annex B is also normative and sets down test procedures for end-to-end protocols with reference to prETS 300 017 [8] together with CCITT Recommendation T.64 [7].

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1 Scope and field of application

This ETS refers to the low layer protocols to be used in the Integrated Services Digital Network (ISDN), as defined in CCITT Recommendation T.90 [1] together with ETS 300 080 [2].

This ETS specifies the end-to-end protocols to be used between two end systems as defined in CCITT Recommendation T.62 [3].

In addition, it defines the octet-string to be interchanged based on the coding scheme, as defined in CCITT Recommendation T.61 [4].

This ETS gives a general tool for a manufacturer-independent compatible text communication between end systems over the ISDN, based on the Telematic protocol stack.

2 Normative references

This ETS incorporates by dated or 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] CCITT Recommendation T.90 (1992): "Characteristics and protocols for terminals for telematics services in ISDN".
- [2] ETS 300 080 (1992): "Integrated Services Digital Network (ISDN); ISDN lower layer protocols for telematic terminals".
- [3] CCITT Recommendation T.62 (1988): "Control procedures for teletex and Group 4 facsimile services".
- [4] CCITT Recommendation T.61 (1988): "Character repertoire and coded character sets for the international teletex service".
- [5] CCITT Recommendation T.60 (1988): "Terminal equipment for use in the teletex service".
- [6] CCITT Recommendation T.62 bis (1988): "Control procedures for teletex and G 4 facsimile services based on Recommendations X.215 and X.225".
- [7] CCITT Recommendation T.64 (1988): "Conformance testing procedures for the teletex Recommendations".
- [8] Draft prETS 300 017: Terminal Equipment (TE); "Test procedures for Teletex".

3 Definitions and abbreviations

For the purpose of this ETS, the following definitions apply:

Teletex document: octet strings encoded according to the primary and supplementary sets of graphic character and the primary and supplementary sets of control functions as defined in CCITT Recommendation T.61 [4], §4.1 and §4.2, representing only characters out of the basic graphic character repertoire and the basic control function repertoire as defined in CCITT Recommendation T.61 [4], §3.2 and §3.3, and complying with the basic page formats as defined in CCITT Recommendation T.60 [5], §4.2.

The other terms and all abbreviations used throughout this ETS are as defined in the ETSs/CCITT Recommendations provided in Clause 2.

4 Protocol description

4.1 Network/Transport layer description

The implementation of the Network/Transport layers shall be fully in line with the provisions laid down and described in CCITT Recommendation T.90 [1] together with those in ETS 300 080 [2].

4.2 Session layer description

The implementation of the Session layer shall be fully in line with the provisions laid down and described in CCITT Recommendations T.62 [3] or T.62 bis [6] together with additional Session layer requirements (see Annex A).

4.3 Presentation layer description

The implementation of the Presentation layer shall be fully in line with the provisions laid down and described in CCITT Recommendation T.61 [4], §3.3, §4.1 and §4.2 and CCITT Recommendation T.60 [5], §4.2.

4.4 Application layer description

None.

5 Protocol conformance requirements

The protocol for the exchange of Teletex documents between two end systems is in conformity with the provisions laid down in Clause 5 if the protocols fulfil the following requirements:

- for Network/Transport conformance testing see ETS 300 080 [2];
- for Session conformance testing see CCITT Recommendation T.64 [7] and Annex B of this ETS;
- no tests are required for printing and displaying the received document.

Annex A (normative): Additional session layer requirements

A.1 Additional ETSI-specific requirements to CCITT Recommendation T.62

A.1.1 Paragraph 3.4.1.2a

If a normal document is transmitted from a Teletex terminal to the Teletex conversion facility this parameter shall be indicated.

A.1.2 Paragraph 3.4.4.3

All terminals shall examine the non-basic terminal capabilities indicated in CSS or RSSP and shall not rely on subsequent CDCL/RDCLP exchange to negotiate the use of any capabilities from table 3/CCITT Recommendation T.62 [3].

A.1.3 Paragraph 3.4.5.1

If CDCL also contained the indication of receiving capabilities of table 3/CCITT Recommendation T.62 [3] the receiving terminal shall indicate these in RDCLP as far as it supports these capabilities.

A.1.4 Paragraph 3.4.12

- sending terminals shall limit the content size of CDUI's to 5 000 octets or less;
- although CCITT Recommendation T.62 [3] requires for the possibilities to receive blocks of arbitrary size, the implementation receiving-buffers is allowed, if the following requirement is met: text blocks at least 10 000 octets in a single CDUI shall be accepted.

A.1.5 Paragraph 3.2.3.2

A negative response to Command Session Start with reason parameter 0000 0001 shall be mandatory if the receive storage capacity is below 2K octets.

A.1.6 Paragraph 3.2.10

It shall not be mandatory to respond to a request (via a "request session function" in RSSP or RSUI) for change of control. However, a calling terminal shall be able to allow the called equipment to send document(s) by giving change of control (CSCC). The choice of whether or not CSCC is sent shall be left to the operator.

A.1.7 Paragraph 3.3.1.1c

The CSCC command shall only be invoked outside document boundaries.

A.1.8 Paragraph 3.3.2.6

The timer value T shall be $T = 4 \text{ s} \pm 1 \text{ s}$.

A.1.9 Paragraph 3.3.2.7b

A window size of three shall be supported.

A.1.10 Paragraph 3.3.2.9

In general, the session protocol does allow the use of more than one session connection per transport connection. In order to avoid ambiguities in case of linking parts of a document which might be necessary, the calling terminal may only use this possibility if the unambiguity of the document linking information is guaranteed at both communication parties.

A.1.11 Paragraph 3.4.3

The sink shall not reject the reception of a document continuation because of the evaluation of document linking information.

The possibility to reject a CDC because of syntax errors is not touched upon by this rule.

A.1.12 Paragraph 3.4.3.2e

The third sentence shall read:

A terminal receiving a CDC that does not contain all of the terminal capabilities shall not reject the continuation of the document.

A.1.13 Paragraph 3.4.4.4

The CDCL command shall only be invoked outside document boundaries.

A.1.14 Paragraph 3.5.3

When a call has answered any checkpoint positively within a document it subsequently may not send a negative retrospective response (RDGR) to the commands CDS or CDC which initiated the start of this document.

A.1.15 Paragraph 4.1.3

During one transport connection a Teletex page may be repeated only once. All Teletex terminals need to be equipped with a control facility in order to avoid endless loops in case of page repetition or the transfer of the right to transmit. Such loops have to lead to a disconnection.

There is no obligation to implement a specific control mechanism.

A.1.16 Annex J, paragraph 2.1.1c

The timer value T shall be $T = 4 \text{ s} \pm 1 \text{ s}$.

Annex B (normative): Test procedures for end-to-end protocols

B.1 Introduction

This ETS contains and refers to test procedures to facilitate member bodies verification of the protocol conformance of Teletex systems in order to ensure the international compatibility of teletex. Furthermore, the specific ETSI Teletex protocol definitions are considered to harmonise the test procedures for those requirements.

This annex contains the ETSI agreed test cases which may be used by the member countries. It shall only be applicable when considered together with prETS 300 017 [8] and CCITT Recommendation T.64 [7]. The test definitions for the related CCITT Recommendations, which define Teletex, are not duplicated in this ETS.

The ETSI test procedures contained herein are based on requirements for Teletex systems in 2 main areas:

- a) conformance testing procedures for Teletex as defined in CCITT Recommendation T.64 [7];
- b) additional session layer requirements specified in Annex A of this ETS.

Therefore, the test procedures of this ETS cover all ETSI aspects of Teletex which have end-to-end significance.

These test procedures do not supersede the relevant CCITT Recommendation and this ETS which continue to be the definitive specifications for all aspects of the Teletex end-to-end protocol.

The test procedures of this ETS, together with the test procedures in CCITT, are intended to assist verification and cannot fully guarantee the compliance of Teletex systems to the relevant Recommendations and standards.

B.2 References

This ETS refers to CCITT Recommendation T.64 [7]. The whole of this CCITT Recommendation together with this ETS shall be applied for a comprehensive test of a Teletex end-to-end protocol.

B.3 Test limitations

The tests should establish to an acceptable degree of reliability that a Teletex system conforms to the relevant CCITT Recommendations and standards. It is not possible to test for complete conformance due to:

- a) the immense number of state event combinations and possible valid and invalid PDU types which would require an unacceptably large amount of computational resources time;
- b) the possibility that previous actions may affect the results of a particular test;
- c) "transient" states that, although defined in the CCITT Recommendations and standards, may not be externally accessible. Therefore, the relevant test cases defined in CCITT Recommendation T.64 [7] and denoted by "transient state" shall not be used.

B.4 Test numbering

The scheme adopted for the test case numbering, in general, follows the format used in CCITT Recommendation T.64 [7].

V W X Y n
test number
state from which the test is made
"G" calling, "D" called, "T" terminal related,
"M" mandatory, "C" conditional,
"E" ETSI agreed test.

A full description of the test numbering schemes, test types and actions may be found in CCITT Recommendation T.64 [7].

B.5 Tests for additional session layer requirements

(see Annex A of this ETS)
(see CCITT Recommendation T.62 [3])
(see CCITT Recommendation T.64 [7])

Table B.1

Test number	Description	See annex A
EMG 1	<p>Presence of the Service Interworking.</p> <p>Parameter within the normal document. SUT submits a control document followed by a normal document suitable for forwarding to Telex.</p> <p>Check:</p> <p>that the Service Interworking Parameter is present and is set to 1 within the normal document.</p>	A.1.1
EMG 2	<p>Usage of nbtc shown in CSS.</p> <p>SUT transmits a document using at least one nbtc from table 3/CCITT Recommendation T.62 [3].</p> <p>If the SUT is using CDCL the tester shall not repeat the already negotiated nbtc in CSS or RSSP.</p> <p>Check:</p> <p>that the SUT negotiated correctly with CSS/RSSP;</p> <p>that all supported nbtc parameters of table 3/CCITT Recommendation T.62 [3] appear at least in CSS.</p>	A.1.2
EMG 3	<p>Size of CDUI</p> <p>SUT transmits a page of more than 5 000 octets.</p> <p>Check:</p> <p>that the transmitted CDUIs contain not more than 5 000 octets.</p>	A.1.4

Table B.1: (continued)

Test number	Description	See annex A
ECG5	<p>Capability to handle change control functions.</p> <p>Test CG 2(A) in Annex D of CCITT Recommendation T.64 [7] shall be mandatory. Reason: the tested function is mandatory.</p>	A.1.6
EMD 1	<p>Presence of supported nbtc in RDCLP Tester set up a connection and transmits a CDCL containing all nbtc of table 3 of CCITT Recommendation T.62 [3].</p> <p>Check:</p> <p>that the SUT indicates all supported nbtc in RDCLP;</p> <p>that, at least in RSSP, indicated nbtc are present in RDCLP.</p>	A.1.3
EMD 2	<p>Receiving capability of CDUI with the maximum length.</p> <p>Tester establishes a connection and transmits a one page document containing one CDUI with 10 000 octets.</p> <p>Check:</p> <p>that the SUT accepts and receives the complete document.</p>	A.1.4
EMD 4	<p>Reason parameter in RSSN, PV set to h01.</p> <p>Load SUT memory such that less than 2 000 octets are free (if possible). Attempt to transmit a document to SUT.</p> <p>Check:</p> <p>that the SUT does not enter a session e.g. responds to CSS with a RSSN with reason "receiving capabilities unable to enter a session".</p>	A.1.5

Table B.1: (concluded)

<p>EMD 6</p>	<p>Linking of documents by CDC Tester starts a multipage document to SUT. Tester interrupts the document transmission after having acknowledgement of at least one page.</p> <p>Tester continues document transmission by using CDC with inopportune parameter values of:</p> <ul style="list-style-type: none"> - TID of the called terminal; - TID of the calling terminal; - additional session reference number; - document reference number; - checkpoint reference number. <p>Check:</p> <p>that the document(s) are accepted and presented correctly.</p>	<p>A.1.11</p>
<p>EMD 5</p>	<p>Missing terminal capabilities in a CDC command.</p> <p>Tester starts a multipage document to SUT. Tester interrupts the document transmission after having acknowledgement of at least one page.</p> <p>Tester continues document transmission by using CDC, containing not all of the necessary terminal capabilities for that document.</p> <p>Check:</p> <p>that the document(s) are accepted and presented correctly.</p>	<p>A.1.12</p>
<p>ECT 1</p>	<p>Disconnection due to endless loops.</p> <p>The terminal shall be protected against endless loops (e.g. timeout after 5 minutes, etc..). In practice compliance with this requirement will be stated by the manufacturer.</p>	<p>A.1.15</p>

Annex C (informative): Advisory notes and additional information

Paragraph 4.2.10/T.62

NOTE: The sum of the CRN and the corresponding Document Reference Number (DRN) shall not exceed 6 octets. In addition, it is recommended that the Checkpoint Reference Number (CRN) length in the RDPBP and RDEP shall be less than or equal to the corresponding CRN length in CDPB (or respectively CDE).

Paragraph 3.2.1.2/T.62

Advisory note:

3.2.1.2.d) Additional session reference number.

This number may be used to uniquely identify a document when operating serial sessions within the same minute in order that identical entries in the communication log may be avoided.

NOTE: Receiving terminals may not support ARS numbers.

Paragraph 3.2.8 and 3.2.9/T.62

The receipt of CSUI and RSUI with no information field should preferably not cause a procedural error.

Paragraph 3.4.11.2/T.62

Last sentence should read:

It does not indicate that the sender of RDRP will be able to perform automatic linking of the following parts of the interrupted document.

History

Document history	
February 1993	First Edition
January 1996	Converted into Adobe Acrobat Portable Document Format (PDF)