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Public Switched Telephone Network (PSTN); Category II specification for 1 200 bits per second duplex modems standardized for use on the PSTN

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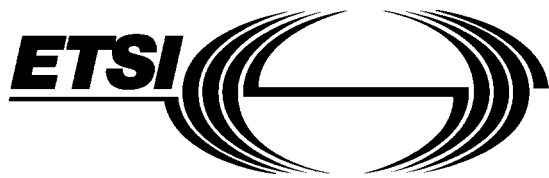
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ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

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

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Foreword

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

The objective of this specification, the application of which is entirely voluntary, is to provide the users with an added degree of assurance that modems in compliance with this specification can interwork with each other, under most network conditions.

This ETS contains the technical characteristics required for end-to-end interworking over the Public Switched Telephone Network (PSTN) for 1 200 bits per second duplex modems standardized for use over the PSTN.

These requirements are based on, and do not conflict with, CCITT Recommendation V.22 [1]. Additional requirements are included relating to end-to-end inter-operability over PSTN connections. Such requirements are in excess of the CCITT/ITU-T Recommendations.

Except where otherwise indicated, a modem which complies with CCITT Recommendation V.22 [1] should always meet the requirements of this ETS which relate to parameters specified in that CCITT Recommendation.

Clause 4 of this ETS references the requirements which are common to both Category I and Category II modems, which are contained in clause 4 of final draft prETS 300 114 [2]. The definition of Category I and Category II modems can be found in the foreword of final draft prETS 300 114 [2].

Clause 5 of this ETS contains Category II requirements specific to 1 200 bits per second duplex modems. In the case of certain functions common to a number of different types of modem (e.g. auto-answering sequence) reference is made to clause 5 of final draft prETS 300 114 [2] which contains the relevant requirements.

Transposition dates	
Date of adoption of this ETS:	26 April 1996
Date of latest announcement of this ETS (doa):	31 August 1996
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	29 February 1997
Date of withdrawal of any conflicting National Standard (dow):	29 February 1997

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1 Scope

This ETS contains the technical characteristics required for end-to-end interworking over the Public Switched Telephone Network (PSTN) of 1 200 bits per second (bit/s) duplex modems standardized for use over the in accordance with CCITT Recommendation V.22 [1].

NOTE: CCITT Recommendation V.22 [1] also describes a method of transmitting data at 600 bit/s. This ETS specifies the characteristics to be met by such modems and, if requested by the applicant, this feature can also be tested against the specifications.

The term "modem" in the context of this ETS includes all physical implementation practices for a voice band modem which is conductively connected to the PSTN.

This ETS specifies four modes of operation each with up to five modes of use (see subclause 5.2).

This ETS also contains descriptions of the tests to be performed in order to confirm compliance with the functional requirements contained herein. A general description of the test conditions and test requirements is given in annex A (normative).

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 V.22 (1984): "1 200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[2] Final draft prETS 300 114 (1996): "Public Switched Telephone Network (PSTN); Basic Category I and Category II specifications for modems standardized for use on the PSTN".

[3] ETS 300 001: "Attachments to the Public Switched Telephone Network (PSTN); General technical requirements for equipment connected to an analogue subscriber interface in the PSTN".

[4] CCITT Recommendation V.25 (1984): "Automatic answering equipment and/or parallel automatic calling equipment on the general switched telephone network including procedures for disabling of echo control devices for both manually and automatically established calls".

[5] CCITT Recommendation S.33 (1984): "Standardization of an international text for the measurement of the margin of start-stop machines using International Alphabet No 5".

[6] CCITT Recommendation V.52 (1984): "Characteristics of distortion and error-rate measuring apparatus for data transmission".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the definitions of final draft prETS 300 114 [2] apply, together with the following:

Modem Conformance Tester (MCT): Essentially a modem to the same recommendation as the modem under test, but the individual sub-systems within it are both accessible (e.g. provide test points and permit functions to be enabled or disabled when required) and externally controllable (e.g. permit sequences such as the start up procedure to be selectively repeated). The sub-systems within a conformance tester may be constructed as discrete items of equipment, so as to permit their assembly into varying configurations required to suit the tests (e.g. the asynchronous to synchronous converter may be simply applied to a synchronous CCITT Recommendation V.22 [1] conformance tester to achieve an asynchronous V.22 conformance tester).

As an interim measure, until the conformance tester is defined, its definition agreed to be appropriate by ETSI, and such a tester is available, a modem used for reference may be used in its place. In the case that the modem used for reference has not been shown to conform to the ETS in the relevant modes of operation/use, the testing authority ensures that the modem used for reference complies with the relevant ETS to the extent necessary for the performance of the test.

silence: Periods during the hand-shaking sequences where signals are not transmitted.

The period of silence is measured using the start and finish criteria defined below. The levels refer to signals which in the relevant frequency band have an in-band power level and are expressed with respect to the normal transmitted signal level of the modem under test recorded at the point of observation.

start of the period of silence: The instant at which the transmitted signal level drops below a level that is 6 dB below the normal transmit level.

end of period of silence: The instant the transmitted signal rises above a level that is 6 dB below the normal transmit level. During the period of silence at least one instant is observed where the signal level is at least 30 dB below the normal transmit level.

3.2 Abbreviations

For the purposes of this ETS, the abbreviations given in final draft prETS 300 114 [2] apply.

4 General requirements

4.1 References to other ETSs

The modem shall comply with final draft prETS 300 114 [2], clause 4.

> NOTE: Final draft prETS 300 114 [2] in turn refers to ETS 300 001 [3] for the majority, if not all, of its requirements.

4.2 Information to be provided by the applicant

4.2.1 Information required for testing purposes

The applicant shall declare for which of the modes of operation/use identified in this ETS, the modem is supposed to undergo tests.

Compliance shall be considered to have been accomplished by provision of the relevant information.

> NOTE: This could be accomplished by completion of forms such as those provided in annex C.

4.2.2 Instructions for use

Instructions for use shall be made available with the apparatus. The instructions for use shall include:

a) the apparatus or types of apparatus to which the instructions apply;

b) any information specifically indicated in this ETS for inclusion in the "Instructions for use";

and

c) any national restrictions on the use of the apparatus.

Any additional information that has been included shall be disregarded unless it is the subject of another ETS.

Compliance shall be checked by inspection.

5 Functional requirements specific to category II modems

5.1 General requirements

To comply with the requirements of this ETS, the modem shall provide:

- duplex mode of operation with continuous carrier, by means of the modulation scheme specified in CCITT Recommendation V.22 [1];

- channel separation by frequency division;

- means by which the channels may be selected either manually and/or automatically, where a modem is capable of transmitting in either of the two channels;

- provision of a guard tone of 1 800 Hz ± 20 Hz, which a modem is to transmit while transmitting in the high channel;

- signalling rates of 1 200 bit/s and, optionally, 600 bit/s;

- the interchange circuits (or equivalent) that are required to change state after an identifiable event or point in time, shall have changed state within a maximum of 3 seconds of that event, unless otherwise specified (see note 4).

NOTE 1: The general requirements described above are a subset of CCITT Recommendation V.22 [1]. In the requirements which follow, any deviations from the strict interpretation of the Recommendation have been identified.

NOTE 2: In the following, references are made to interchange circuits between the modem and the Data Terminal Equipment (DTE), as defined in CCITT Recommendation V.24. However, not all modems provide an interface with such interchange circuits. For these cases the references to CCITT Recommendation V.24 type interchange circuits indicate equivalent functionality of a DTE and a modem.

NOTE 3: To perform certain tests specified herein, it is desirable that it be possible to disable the transmit scrambler of the modem.

NOTE 4: This requirement is in addition to CCITT Recommendation V.22 [1].

5.2 Modes

It shall be possible to configure the modem to operate in at least one of the following modes of operation:

- 1 200 bit/s call mode;

- 1 200 bit/s answer mode;

and, optionally, in one or both of the following modes of operation:

- 600 bit/s call mode;

- 600 bit/s answer mode.

For each of the modes of operation at least one of the following modes of use shall be provided:

a) asynchronous with 8 bits per character;

b) asynchronous with 9 bits per character;

c) asynchronous with 10 bits per character;

d) asynchronous with 11 bits per character;

e) synchronous.

> NOTE: It is acceptable for the same mode of use to be provided for each of the modes of operation selected.

In the asynchronous (start-stop) modes of operation, the modem shall accept a data stream from the DTE at a nominal rate of 1 200 bits per second or, optionally, 600 bits per second. The asynchronous data to be transmitted shall, in accordance with subclause 5.9, be converted into a synchronous data stream suitable for transmission.

Demodulated data shall be decoded in accordance with subclause 5.5, then descrambled in accordance with subclause 5.10 and it shall then be passed for re-conversion into an asynchronous data stream in accordance with subclause 5.9.

In the synchronous mode of operation, the modem shall accept synchronous data from the DTE. The data shall then be scrambled in accordance with subclause 5.10 and passed to the modulator for encoding in accordance with subclause 5.5.

Demodulated data shall be decoded in accordance with subclause 5.5, then descrambled in accordance with subclause 5.10.

It shall be the applicant's responsibility to specify for which of these modes of operation/use the modem is supposed to undergo tests.

5.3 Line signals

5.3.1 Carrier frequencies

The carrier frequencies shall be 1 200 Hz ± 0,5 Hz for the low channel and 2 400 Hz ± 1 Hz for the high channel.

Compliance shall be checked by the method described in annex A, clause A.2.