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Attachments to the Public Switched Telephone Network (PSTN); Category II attachment requirements for 2400 bits per second duplex modems standardized for use on the PSTN (Candidate NET 23)

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Category II attachment requirements for 2400 bits per second
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**(The text of this ETS may be utilized, wholly or in part,
for the establishment of NET 23)**

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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). The text of this ETS may be utilized, wholly or in part, for the establishment of NET 23.

This ETS contains the technical requirements for approval to Category II of 2400 bits per second duplex modems standardized for use on the Public Switched Telephone Network (PSTN). Testing and approval to Category II is applicable only at the request of the applicant. These requirements are based upon, and do not conflict with, CCITT Recommendation V.22bis [7].

Additionally, requirements are included which relate to end-to-end inter-operability over PSTN connections. These requirements are in excess of the CCITT Recommendations. A modem which complies with CCITT Recommendation V.22bis [7] 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. This is stated in Clause 4 of ETS 300 114 [2].

Clause 5 of this ETS contains Category II requirements specific to 2400 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 ETS 300 114 [2] which contains the relevant requirements.

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1 Scope

This ETS specifies the technical characteristics to be met by modems seeking Category II approval for duplex operation over the PSTN at 2400 bits per second. The modulation scheme specified is that described in CCITT Recommendation V.22bis [7].

The term "modem" in the context of this ETS includes all physical implementation practices for voice band modems, which are galvanically connected to the PSTN.

This ETS specifies four modes of operation each with 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.

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] Draft prETS 300 001: "Attachments to the Public Switched Telephone Network (PSTN); General requirements for equipment connected to an analogue subscriber interface in the PSTN".
- [2] ETS 300 114: 1990: "Attachments to the Public Switched Telephone Network (PSTN); Basic attachment requirements for modems standardized for use on the PSTN."
- [3] CCITT Recommendation Q.144 (1984): "Specifications of Signalling System No 5: Line Signal Receiver".
- [4] 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".
- [5] CCITT Recommendation V.14 (1988): "Transmission of start-stop characters over synchronous bearer channels".
- [6] CCITT Recommendation V.22 (1984): "1200 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".
- [7] CCITT Recommendation V.22bis (1988): "2400 bits per second duplex modem using the frequency division technique standardized for use on the General Switched Telephone Network and on point-to-point 2-wire leased telephone-type circuits".
- [8] 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".
- [9] CCITT Recommendation V.42 (1988): "Error correcting procedures for DCEs using asynchronous-to-synchronous conversion".
- [10] CCITT Recommendation V.52 (1984): "Characteristics of distortion and error-rate measuring apparatus for data transmission".

[11] CCITT Recommendation V.54 (1984): "Loop Test devices for modems".

3 Definitions and abbreviations

3.1 Definitions

For the purpose of this ETS the definitions of ETS 300 114 [2] apply, together with the following.

Answer mode: when calls are established with automatic facilities, a standard answer mode shall be used by the modem at the answering station. This mode consists of conventional characteristics (e.g. use of high channel carrier frequency or particular scrambler generating polynomial) complementary to those used in the standard call mode by the modem at the calling station, in order to ensure proper connection and inter-working.

If calls are established on the Public Switched Telephone Network (PSTN) by operators, or for leased line operation, bilateral agreement on the use of call mode and answer mode shall be necessary.

Call mode: when calls are established with automatic facilities, a standard call mode shall be used by the modem at the calling station. This mode consists of conventional characteristics (e.g. use of low channel carrier frequency or particular scrambler generating polynomial) complementary to those used in the standard answer mode by the modem at the answering station, in order to ensure proper connection and inter-working.

If calls are established on the PSTN by operators, or for leased line operation, bilateral agreement on the use of call mode and answer mode shall be necessary.

Data Terminal Equipment (DTE): is used to define the origin and destination of signals present at the digital interface of a modem. This expression does not require that a "commercial data terminal" be present to receive or generate such signals; a tester or any other suitable device may monitor or generate such signals.

Initiation and Acknowledgement Signal (S1): comprises an unscrambled repetitive double dibit pattern of '00' and '11' at 1200 bit/s.

Modem: a functional unit that modulates and demodulates signals in order to enable digital data to be transmitted over analogue transmission facilities.

Modem Conformance Tester (MCT): this is 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 [6] conformance tester to achieve an asynchronous CCITT Recommendation V.22 [6] 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 absence of previous approval to Category II of the modem used for reference, in the relevant modes of use/operation, the testing authority shall ensure that the modem used for reference complies with the relevant ETS to the extent necessary for the performance of the test.

Modem used for reference: a modem used for some of the tests specified herein or in another modem specific ETS. A modem used for reference may, at the discretion of the applicant, be provided by the testing authority or by himself. It shall be designed:

- to meet the requirements of the same CCITT Recommendation(s) as the modem under test, to the extent necessary for performing the tests;

- to provide the functionalities for a modem used for reference that are specified in the relevant testing Clauses; and
- to provide an interface which is accessible and of a type suitable for use in the tests (e.g. CCITT Recommendation V.24).

Where the applicant has provided the modem used for reference and the test fails, the testing authority may not be in a position to determine the precise reason for failure.

Modes of operation: modes specified in this modem specific ETS, that have an influence upon line signals present at the PSTN interface.

Modes of use: modes specified in this modem specific ETS, that have an influence upon conditions present at a digital interface e.g. a "conventional" CCITT Recommendation V.24 interface or a PC bus interface in the case of an integral modem.

On-line state: the on-line state or condition is defined as an electrical condition into which, when connected to the network, a modem is placed such that it draws enough current to be capable of activating the exchange.

NOTE: Usually, a modem in on-line state is potentially capable of sending or receiving speech-band information to or from the network.

Silence: signals which in the relevant frequency band have an in-band power level which is at least 30 dB below the level of the transmitted signal at the point of measurement. This term is used to describe periods where signals are not transmitted during the hand-shaking sequences.

3.2 Abbreviations

AMM	Answer Mode Modem
CCITT	Comité Consultatif International Télégraphique et Téléphonique
Cct	Circuit
CEPT	Conférence Européenne des Administrations des Postes et des Télécommunications
CMM	Call Mode Modem
DCE	Data Circuit-Terminating Equipment
DTE	Data Terminal Equipment
ETS	European Telecommunication Standard
ETSI	European Telecommunications Standards Institute
MCT	Modem Conformance Tester
PSTN	Public Switched Telephone Network

4 General requirements

4.1 References to other ETSs

The modem shall comply with ETS 300 114 [2], Clause 4.

NOTE: ETS 300 114 [2] in turn refers to Draft prETS 300 001 [1] 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 which tests are relevant to the modes of operation/use identified in this ETS and are applicable to the equipment submitted for test.

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