INTERNATIONAL STANDARD

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Information technology — Telecommunications and information exchange between systems — Start-stop transmission signal quality at DTE/DCE interfaces

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Qualité des signaux de transmission arythmique aux interfaces ETTD/ETCD

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 7480 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

This second edition cancels and replaces the first edition (ISO 7480:1984), of which it constitutes a technical revision.

Annex A of this International Standard is for information only.

Introduction

The intent of this International Standard is to complement the electrical characteristics specified in CCITT V-series recommendations, and to provide a measurement for the transmission signal quality characteristics not covered in those documents.

The signal quality requirement that start-stop transmission equipment should meet is in part dependent on the application and in part dependent on the mechanism for timing derivation used by the equipment. For early start-stop transmission equipment, timing was derived or controlled from a mechanical source but nowadays an electronic source is commonplace.

An additional factor is that, whereas most start-stop transmission carries the timing information inherently within the signalling between the transmitting equipment and the receiving equipment, start-stop equipment may interface to a converter which encodes the information within a synchronous transmission system in which case, the required signal quality at the interface to the converter may need to be more tightly controlled.

To cover both types of equipment in both types of application, the signal quality specification in this International Standard is given separately for four performance categories, two of which (P1 and P2) are intended for DTEs using mechanical timing[1)] and two for DTEs using electronic timing. By having two mechanical categories, early start-stop transmission equipment with very limited signal quality capability is accommodated (Category P1). For the two electronic categories, the more stringent (Category II) is for equipment to be connected to synchronous DCEs operating in asynchronous mode in accordance with CCITT Recommendation V.14. For each of the four categories defined for the transmitting elements of DTEs (I, II, P1 and P2), four complementary categories are defined for the receiving elements of DTEs (A, B, PA, PB).

Notwithstanding the obvious pairings implied by the complementary categories, the intention is that any receiving equipment may operate with any transmitting equipment, the actual selection being dependent on such factors as channel characteristics and economic considerations of the data communication system. The importance of this International Standard is particularly evident when the transmitting and receiving equipments are furnished by different organizations as it provides a basis for agreement between the parties involved.

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1) It is intended to delete the mechanical categories at the next revision (see footnote 2 to table 1. At that time, consideration will be given to amending the electronic timing definition by replacing "a signal" in the first line by "an isochronous signal" and amending the other definitions accordingly.

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1 Scope

1.1 This International Standard specifies signal quality requirements for serial data transmission at the interface between start-stop transmission Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE). The interface referred to in this International Standard conforms to CCITT Recommendations V.24 (telephone networks) and X.24 (data networks) as specified in DCEs of the following CCITT Recommendations:

— V.21, V.22, V.22 bis, V.23, V.26 ter, V.32, V.32 bis, X.20, X.20 bis together with V.28 electrical characteristics;

— X.20 together with V.10 and/or V.11 electrical characteristics.

The signal quality requirement is limited to start-stop transmission at the interface with asynchronous DCEs, or with synchronous DCEs operating in asynchronous mode in accordance with CCITT Recommendations V.14 or V.42. Signal quality pertaining to DTEs working in a synchronous mode of operation is not part of this International Standard.

This International Standard is also applicable when the interface as specified in the above CCITT Recommendations is provided at the ISDN Reference point R as defined in CCITT Recommendation I.411 and as specified in CCITT Recommendations V.110, V.120 and X.30.

1.2 The signal quality characteristics apply regardless of whether or not multiplexing equipment is included. They do not apply where there is intermediate equipment and no signal regeneration is provided between interconnected sections.

1.3 This International Standard does not describe the signal quality of the DCE or the line associated with it. Neither does it describe any requirement for an acceptable bit error rate.

1.4 This International Standard does not specify the speed characteristics. The nominal value of the modulation rate and the character interval are application dependent.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

CCITT Recommendation I.411:1988, *ISDN user-network interfaces — Reference configurations.*

CCITT Recommendation V.10 (= X.26):1988. *Electrical characteristics for unbalanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications.*

CCITT Recommendation V.11 (= X.27):1988. *Electrical characteristics for balanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications.*

CCITT Recommendation V.14:1988, *Transmission of start-stop characters over synchronous bearer channels.*

CCITT Recommendation V.21:1988, *300 bits per second duplex modem standardized for use in the general switched telephone network.*

CCITT Recommendation V.22:1988, *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.*

CCITT Recommendation V.22 bis:1988, *2 400 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.*

CCITT Recommendation V.23:1988, *600/1 200 baud modem standardized for use in the general switched telephone network.*

CCITT Recommendation V.24:1988, *List of definitions for interchange circuits between data terminal equipment and data circuit-terminating equipment.*

CCITT Recommendation V.26 ter:1988, *2 400 bits per second duplex modem using the echo cancellation technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits.*

CCITT Recommendation V.28:1988, *Electrical characteristics for unbalanced double-current interchange circuits.*

CCITT Recommendation V.32:1988, *A family of 2-wire, duplex modems operating at data signalling rates of up to 9 600 bit/s for use on the general switched telephone network and on leased telephone-type circuits.*

CCITT Recommendation V.32 bis:1990, *A duplex modem operating at data signalling rates of up to 14 400 bit/s for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits.*

CCITT Recommendation V.42:1988, *Error-correcting procedures for DCEs using asynchronous-to-synchronous conversion.*

CCITT Recommendation V.110:1988, *Support of data terminal equipments (DTEs) with V-series type interfaces by an integrated services digital network (ISDN).*

CCITT Recommendation V.120:1988, *Support by an ISDN of data terminal equipment with V-series type interfaces with provision for statistical multiplexing.*

CCITT Recommendation X.20:1988, *Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for start-stop transmission services on public data networks.*

CCITT Recommendation X.20 bis:1988, *Use on public data networks of data terminal equipment (DTE) which is designed for interfacing to asynchronous duplex V-series modems.*

CCITT Recommendation X.24:1988, *List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) on public data networks.*

CCITT Recommendation X.30:1988, *Support of X.21, X.21 bis and X.20 bis based data terminal equipments (DTEs) by an integrated services digital network (ISDN).*