TECHNICAL REPORT – TYPE 2

ISO/IEC TR 24750

First edition
2007-07

Information technology – Assessment and mitigation of installed balanced cabling channels in order to support 10GBASE-T

PRICE CODE M

For price, see current catalogue

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INFORMATION TECHNOLOGY – ASSESSMENT AND MITIGATION OF INSTALLED BALANCED CABLING CHANNELS IN ORDER TO SUPPORT 10GBASE-T

FOREWORD

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2) 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.

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9) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

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The main task of IEC and ISO technical committees is to prepare International Standards. In exceptional circumstances, ISO/IEC JTC 1 or a subcommittee may propose the publication of a technical report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where, for any other reason, there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when the technical committee has collected data of a different kind from that which is normally published as an International Standard, for example ‘state of the art’.

Technical reports of types 1 and 2 are subject to review within three years of publication to decide whether they can be transformed into International Standards. Technical reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/IEC 24750, which is a technical report of type 2, was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This document is issued in the type 2 technical report series of publications (according to 16.2.2 of the Procedures for the technical work of ISO/IEC JTC 1 (5th edition, 2004)) as a prospective standard for provisional application in the field of balanced cabling channels, because there is an urgent requirement for guidance on how standards in this field should be used.

This document is not to be regarded as an International Standard. It is proposed for provisional application so that information and experience of its use in practice may be gathered. Comments on the content of this document should be sent to IEC Central Office.

A review of this type 2 technical report will be carried out not later than three years after its publication with the option of extension for a further three years, conversion into an International Standard or withdrawal.

ISO/IEC TR 24750 should be read in conjuction with IEEE802.3AN.

This Technical Report has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

INTRODUCTION

This Technical Report provides guidance whether an installed Class E channel will support 10GBASE-T. The Technical Report also provides mitigation procedures to improve the performance of Class E channels to the point where the application is supported. Class F according to ISO/IEC 11801:2002 will support 10GBASE-T without mitigation up to 100 m.

The support of 10GBASE-T includes additional parameters and an extended frequency range beyond Class E. Conformance of installed cabling beyond the original cabling specifications should be determined on a case-by-case basis, and is primarily needed due to new external noise requirements. Whether these requirements are met by a specific channel is influenced by the components and installation practices used. As 10GBASE-T uses frequencies above those specified for Class E of ISO/IEC 11801, input from supplier and installer may be helpful to evaluate the performance of installed Class E channels.

This Technical Report takes into account the design goals for 10GBASE-T equipment such as:

1) frequency signal range up to 500 MHz;
2) meet EMC limits specified for CISPR/FCC Class A;

NOTE While ISO/IEC 8802-3 (see bibliography) will specify an application to meet Class A on unshielded cabling, meeting Class B may require application specific equipment and/or cabling that exceeds the requirements of ISO/IEC 8802-3 and this TR respectively.

3) support a bit error rate of 10^{-12};
4) support operation over 4-connector, four-pair balanced cabling.

It is expected that 10GBASE-T will be supported by the following cabling channels specified in ISO/IEC 11801:2002.

- Class F channels will support 10GBASE-T to distances of at least 100 m.

- Class E channels using screened Category 6 components and assessed and mitigated according to the guidelines in this Technical Report will support 10GBASE-T to distances up to 100 m.

- Class E channels assessed and mitigated according to the guidelines in this Technical Report are expected to support 10GBASE-T to distances from 55 m to 100 m using unscreened Category 6 components.

In order to provide normative cabling specifications in explicit support of 10GBASE-T, work on an amendment to ISO/IEC 11801:2002 has been started. This amendment will provide new channel specifications that will include all characteristics needed to meet and/or exceed the 10GBASE-T requirements.

NOTE (Class E_A and Class F_A). Completion is expected in 2007.

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1 Scope

This Technical Report

- specifies the transmission performance for channels to support 10GBASE-T,
- specifies the methods to assess whether installed Class E and Class F channels meet 10GBASE-T requirements,
- provides mitigation techniques to improve the performance of an existing installation to meet the 10GBASE-T requirements.

NOTE 1 The channel transmission performance specified in this TR is derived from IEEE 802.3AN.

NOTE 2 IEEE 802.3AN specifies requirements beyond the frequency range specified for Class E of ISO/IEC 11801:2002 and additional parameters to those specified for Class E and Class F cabling in ISO/IEC 11801:2002.

NOTE 3 This Technical Report does not re-specify Class E and Class F cabling of ISO/IEC 11801:2002.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61935-1, *Testing of balanced communication cabling in accordance with ISO/IEC 11801 – Part 1: Installed cabling*[1]

ISO/IEC 11801:2002, *Information technology – Generic cabling systems*

IEEE802.3AN-2006, *IEEE Standard for information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications*

Amendment 1, *Physical Layer and Management Parameters for 10 Gb/s Operation, Type 10GBASE-T (IEEE802.3 10GBASE_Tan)*

NOTE 10GBASE-T refers to IEEE802.3AN, including its amendment.

[1] Third edition under consideration.