ISO/IEC TR 11801-9904

Edition 1.0 2017-05

TECHNICAL REPORT

Information technology – Generic cabling for customer premises – Part 9904: Assessment and mitigation of installed balanced cabling channels to support 2,5GBASE-T and 5GBASE-T

ISO/IEC TR 11801-9904:2017-05(en)

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 35.200

ISBN 978-2-8322-3914-8

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ISO/IEC TR 11801-9904, which is a Technical Report, has been prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

The list of all currently available parts of the ISO/IEC 11801 series, under the general title *Information technology – Generic cabling for customer premises*, can be found on the IEC web site.

ISO/IEC TR 11801-9904 should be read in conjunction with IEEE Std. 802.3bz.

This document 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 document provides guidance on whether installed Class D and Class E channels specified in ISO/IEC 11801:2002 will support 2,5GBASE-T and 5GBASE-T. This document also provides mitigation procedures to improve the performance of Class D and Class E channels to the point where these applications are supported. Higher classes according to ISO/IEC 11801:2002 will support 2,5GBASE-T and 5GBASE-T without mitigation up to 100 m.

The support of 2,5GBASE-T and 5GBASE-T includes additional parameters and an extended frequency range for Class D. 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 application requirements. Whether these requirements are met by a specific channel is influenced by the components and installation practices used. As 2,5GBASE-T and 5GBASE-T use frequencies above those specified for Class D of ISO/IEC 11801:2002 as well as exogenous noise parameters, input from supplier and installer might be helpful to evaluate the performance of installed Class D and Class E channels.

This document takes into account the design goals for 2,5GBASE-T and 5GBASE-T equipment such as frequency signal range up to 100 MHz for 2,5GBASE-T and up to 250 MHz for 5GBASE-T.

INFORMATION TECHNOLOGY – GENERIC CABLING FOR CUSTOMER PREMISES –

Part 9904: Assessment and mitigation of installed balanced cabling channels to support 2,5GBASE-T and 5GBASE-T

1 Scope

This part of ISO/IEC 11801

a) specifies the transmission performance for balanced cabling channels to support 2,5GBASE-T and 5GBASE-T,

b) specifies the methods to assess whether installed Class D and Class E channels meet 2,5GBASE-T and 5GBASE-T requirements,

c) provides mitigation techniques to improve the performance of an existing installation to meet the 2,5GBASE-T and 5GBASE-T requirements,

d) provides cabling recommendations for new installations.

NOTE 1 The channel transmission performance specified in this document is derived from IEEE Std 802.3bz:2016.

NOTE 2 IEEE Std 802.3bz:2016 specifies requirements beyond the frequency range specified for Class D of ISO/IEC 11801:2002 and additional parameters to those specified for Class D and Class E cabling in ISO/IEC 11801:2002.

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

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO/IEC 11801:2002, *Information technology – Generic cabling systems*
ISO/IEC 11801:2002/AMD1:2008

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 11801:2002 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
alien (exogenous) crosstalk
signal coupling from a disturbing pair of a channel to a disturbed pair of another channel

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.2]

3.1.2
alien (exogenous) far-end crosstalk loss
AFEXT
signal isolation between a disturbing pair of a channel and a disturbed pair of another channel, measured at the far-end

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.3]

3.1.3
alien (exogenous) near-end crosstalk loss
ANEXT
signal isolation between a disturbing pair of a channel and a disturbed pair of another channel, measured at the near-end

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.4]

3.1.4
attenuation to alien (exogenous) crosstalk ratio at the far-end
AACR-F
difference, in dB, between the alien far-end crosstalk loss from a disturbing pair of a channel and the insertion loss of a disturbed pair in another channel

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.7]

3.1.5
attenuation to alien (exogenous) crosstalk ratio at the near-end
AACR-N

difference, in dB, between the alien near-end crosstalk loss from a disturbing pair of a channel and the insertion loss of a disturbed pair in another channel

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.8]

3.1.6
attenuation to crosstalk ratio at the far-end
ACR-F
difference, in dB, between the far-end crosstalk loss from a disturbing pair of a channel and the insertion loss of a disturbed pair of the same channel

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.9]

3.1.7
attenuation to crosstalk ratio at the near-end
ACR-N
difference, in dB, between the near-end crosstalk loss from a disturbing pair of a channel and the insertion loss of a disturbed pair of the same channel

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.10]

3.1.8
equal level far-end crosstalk ratio
ELFEXT
difference, in dB, between the far-end crosstalk loss from a disturbing pair of a channel and the insertion loss of a disturbing pair of the same channel

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.35]

3.1.9
power sum alien (exogenous) far-end crosstalk loss
PSAFEXT
power sum of the signal isolation between multiple disturbing pairs of one or more channels and a disturbed pair of another channel, measured at the far-end

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.64]

3.1.10
power sum alien (exogenous) near-end crosstalk loss
PSANEXT
power sum of the signal isolation between multiple disturbing pairs of one or more channels and a disturbed pair of another channel, measured at the near-end

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.65]

3.1.11
power sum attenuation to alien (exogenous) crosstalk ratio at the far-end
PSAACR-F
difference, in dB, between the power sum alien far-end crosstalk loss from multiple disturbing pairs of one or more channels and the insertion loss of a disturbed pair in another channel

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.66]

3.1.12
power sum attenuation to alien (exogenous) crosstalk ratio at the near-end
PSAACR-N

difference, in dB, between the power sum alien near-end crosstalk loss from multiple disturbing pairs of one or more channels and the insertion loss of a disturbed pair in another channel

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.67]

3.1.13
power sum attenuation to crosstalk ratio at the far-end
PSACR-F
difference, in dB, between the power sum far-end crosstalk loss from multiple disturbing pairs of a channel and the insertion loss of a disturbed pair in the same channel

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.68]

3.1.14
power sum attenuation to crosstalk ratio at the near-end
PSACR-N
difference, in dB, between the power sum near-end crosstalk loss from multiple disturbing pairs of a channel and the insertion loss of a disturbed pair in the same channel

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.69]

3.1.15
power sum equal level far-end crosstalk ratio
PSELFEXT
power sum of all disturbing pairs of a channel, of the difference, in dB, between the far-end crosstalk loss and the insertion loss of each disturbing pair

[SOURCE: ISO/IEC 11801:2002/AMD1:2008, 3.1.70]

3.2 Abbreviations

For the purposes of this document, the abbreviations given in ISO/IEC 11801:2002 and the following apply.

AACR-F	attenuation to exogenous crosstalk ratio at the far-end
AACR-N	attenuation to exogenous crosstalk ratio at the near-end
ACR-F	attenuation to crosstalk ratio at the far-end
ACR-N	attenuation to crosstalk ratio at the near-end
AFEXT	exogenous far-end crosstalk loss
ALSNR	alien (exogenous) limited signal to noise ratio
ANEXT	exogenous near-end crosstalk loss
ELFEXT	equal level far-end crosstalk ratio
PBO	power back off
PSAACR-F	power sum attenuation to exogenous crosstalk ratio at the far-end
PSAACR-N	power sum attenuation to exogenous crosstalk ratio at the near-end
PSACR-F	power sum attenuation to crosstalk ratio at the far-end
PSACR-N	power sum attenuation to crosstalk ratio at the near-end
PSAFEXT	power sum exogenous far-end crosstalk loss
PSANEXT	power sum exogenous near-end crosstalk loss
PSD	power spectral density
PSELFEXT	power sum equal level far-end crosstalk ratio
WAP	wireless access point

4 Channel transmission performance

4.1 General

Clause 4 specifies the transmission performance of cabling channels

– ≤ 100 MHz to support 2,5GBASE-T,

– ≤ 250 MHz to support 5GBASE-T.

The channel performance described in 4.2 to 4.9 for frequencies up to 100 MHz and 250 MHz are for re-assessment of internal parameters (IL, RL, NEXT, PSNEXT, ACR-F, PSACR-F, Delay, Delay Skew) of Class D channels.

Class E channel internal parameters do not need any changes to support these two applications.

Additionally, the alien limited signal-to-noise ratio (ALSNR) criterion in 4.12 has to be met by both Class D and Class E channels.