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Interested committees:

Title: BS ISO/IEC 11801-1 Amendment 1 - Information technology - Generic cabling for customer premises

Part 1: General requirements

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- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
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Responsible Committee Secretary: **Ms Jaskirat Sahota (BSI)**Direct tel: **+ 44 20 8996 7356**E-mail: **jaskirat.sahota@bsigroup.com**

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



JTC1-SC25/2954/CD

COMMITTEE DRAFT (CD)

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SECRETARIAT:

Germany

SECRETARY:

Mr Marco Peter

OF INTEREST TO THE FOLLOWING COMMITTEES:

SC 46C, SC 48B

PROPOSED HORIZONTAL STANDARD:



Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☐ SAFETY

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Amendment 1 - Information technology - Generic cabling for customer premises - Part 1: General requirements

NOTE FROM TC/SC OFFICERS:

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Proposed draft Amendment 1 to ISO/IEC 11801-1:2017

FOREWORD

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Amendment 1 of International Standard ISO/IEC 11801-1 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This International Standard 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 amendment specifies single pair component Categories T1-A, T1-B, and T1-C, as well as cabling channels and link Classes T1-A, T1-B, and T1-C to support the delivery of single pair applications. Balanced single pair channels and links specified in this amendment are not a replacement for the generic 4-pair channels in ISO/IEC 11801-1. They are an additional media type intended for use in intelligent building and industrial automation devices (e.g in network sensors, actuators, and controllers). Because of the different types and locations of these devices, single pair cabling will have distinct structures and distribution architectures that are detailed in other parts of the ISO/IEC 11801 series.

Amendment 1 also provides modifications and corrections to ISO/IEC 11801-1:2017.

Proposed draft Amendment 1 to ISO/IEC 11801-1:2017

1 Scope

Replace existing bullet b) by the following:

b) channel transmission, environmental and SELV power delivery performance requirements;

2 Normative references

Insert normative references in alphabetical/numeric order:

IEC 61156-11, *Multicore and symmetrical pair/quad cables for digital communications – Part 11: Symmetrical single pair cables with transmission characteristics up to 600 MHz – Horizontal floor wiring – Sectional specification (in preparation)*

IEC 61156-12, *Multicore and symmetrical pair/quad cables for digital communications – Part 12: Symmetrical single pair cables with transmission characteristics up to 600 MHz – work area wiring – Sectional specification (in preparation)*

IEC 61156-13, *Multicore and symmetrical pair/quad cables for digital communications – Part 13: Symmetrical single pair cables with transmission characteristics up to 20 MHz – horizontal floor wiring – Sectional specification (in preparation)*

IEC 61156-14, *Multicore and symmetrical pair/quad cables for digital communications – Part 14: Symmetrical single pair cables with transmission characteristics up to 20 MHz – work area wiring – Sectional specification (in preparation)*

IEC 63171-1, *Connectors for electronic equipment – Part 1: Copper LC style connector for use with 1-pair balanced twisted pair cabling (in preparation)*

IEC 63171-6, *Connectors for electrical and electronic equipment – Part 6: Detail specification for 2-way and 4-way (data/power), shielded, free and fixed connectors for power and data transmission with frequencies up to 600 MHz (in preparation)*

3 Terms, definitions, abbreviations and symbols

3.1 Terms and definitions

3.2 Abbreviations

Insert, in the existing Table, the following new abbreviations in alphabetical sequence:

SELV safety extra low voltage

SP single-pair

SPE single-pair Ethernet

6 Channel performance requirements

Insert new subclause:

6.6 Single-pair cabling transmission performance

6.6.1 General

This document specifies the following Classes for single-pair balanced cabling:

- a) Class T1-A is specified up to 20 MHz,
- b) Class T1-B is specified up to 600 MHz,
- c) Class T1-C is specified up to 1 250 MHz.

Editor's Note: Class T1-C has some parameters starting at 0,1 MHz and others starting at 1 MHz. Recommend starting T1-C at 0,1 MHz for all parameters.

The insertion loss and other length related parameter performance of Class T1-A cabling is further subdivided into four sub-Classes, T1-A-100, T1-A-250, T1-A-400, and T1-A-1000. These sub-Classes have identical performance requirements for all other transmission parameters.

Editor's Note T1-B is backward compatible to T1-A up to 100 m.

A Class T1-A channel is specified so that it will provide the minimum transmission performance to support Class T1-A applications. Channels of a given Class will support all applications of a lower Class with the same length. Class T1-A is regarded as the lowest Class.

Annex E lists known single-pair balanced cabling applications by Class. The requirements in 6.6 are given by limits computed to one decimal place, using the equation for a defined frequency range. The limits for the propagation delay and delay skew are computed to three decimal places. The additional tables are for information only and have limits derived from the relevant equation at key frequencies. Many specifications in 6.6 have a plateau in the specified requirement. These plateaus do not accurately depict the system performance. They have been added for measurement purposes.

Editor's Note: Awaiting answer from IEC cable and measurement group on the treatment of values down to 0,1 MHz.

6.6.2 Component choice

The parameters specified in 6.6 apply to channels with screened or unscreened cable elements, with or without an overall screen, unless explicitly stated otherwise.

The nominal differential mode impedance of channels is 100 Ω . This is achieved by suitable design and appropriate choice of cabling components (irrespective of their nominal impedance).

6.6.3 Channel parameters

6.6.3.1 Return loss

The return loss requirements are applicable to all single pair cabling Classes.

The return loss (RL) of a single pair channel shall meet the requirements in Table 46.

The return loss requirements shall be met at both ends of the cabling. Return loss (RL) values at frequencies where the insertion loss (IL) is below 3,0 dB are for information only.

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Table 46 – Return loss for a single pair channel

Class	Frequency MHz	Minimum return loss dB
T1-A	$0,1 \leq f < 0,5$	$9 + 8(f)$
	$0,5 \leq f < 20$	13,0
T1-B	$0,1 \leq f < 1$	$9 + 10(f)$
	$1 \leq f < 10$	19,0
	$10 \leq f < 40$	$24 - 5 \lg(f)$
	$40 \leq f < 130$	16,0
	$130 \leq f < 400$	$37 - 10 \lg(f)$
	$400 \leq f < 600$	11,0
T1-C	$0,1 \leq f < 1$	$9 + 10(f)$
	$1 \leq f < 10$	19,0
	$10 \leq f < 40$	$24 - 5 \lg(f)$
	$40 \leq f < 130$	16,0
	$130 \leq f < 400$	$37 - 10 \lg(f)$
	$400 \leq f < 600$	11,0
	$600 \leq f < 1\,250$	$39 - 10 \lg(f)$

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Table 47 – Informative return loss values for a single pair channel at key frequencies

Minimum return loss dB			
Frequency MHz	Class		
	T1-A	T1-B	T1-C
0,1	9,8	10,0	10,0
1	13,0	19,0	19,0
20	13,0	17,5	17,5
100	–	16,0	16,0
250	–	13,0	13,0
500	–	11,0	11,0
600	–	11,0	11,0
1 000	–	–	9,0
1 250	–	–	8,0

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295 6.6.3.2 Insertion loss/attenuation

296 The insertion loss requirements are applicable to all single pair cabling Classes.

297 The insertion loss (IL) of a single pair channel shall meet the requirements in Table 48.

298

Table 48 – Insertion loss for a single pair channel

Class	Frequency MHz	Maximum insertion loss ^a dB
T1-A-1000	$0,1 \leq f < 20$	$10 \cdot \left(1,23 \cdot \sqrt{f} + 0,01 \cdot f + \frac{0,2}{\sqrt{f}} \right) + 10 \cdot 0,02 \cdot \sqrt{f}$
T1-A-400	$0,1 \leq f < 20$	$10 \cdot \left(1,23 \cdot \sqrt{f} + 0,01 \cdot f + \frac{0,2}{\sqrt{f}} \right) + 5 \cdot 0,02 \cdot \sqrt{f}$
T1-A-250	$0,1 \leq f < 20$	$2,55 \cdot \left(1,9108 \cdot \sqrt{f} + 0,0222 \cdot f + \frac{0,2}{\sqrt{f}} \right) + 4 \cdot 0,02 \cdot \sqrt{f}$
T1-A-100	$0,1 \leq f < 20$	$1,05 \cdot \left(1,9108 \cdot \sqrt{f} + 0,0222 \cdot f + \frac{0,2}{\sqrt{f}} \right) + 4 \cdot 0,02 \cdot \sqrt{f}$
T1-B	$0,1 \leq f < 600$	$1,05 \cdot \left(1,8 \sqrt{f} + 0,005 f + \frac{0,25}{\sqrt{f}} \right) + 4 \cdot 0,02 \sqrt{f}$
T1-C	$1 \leq f < 1\,250$	$1,05 \cdot \left(1,8 \sqrt{f} + 0,005 f + \frac{0,25}{\sqrt{f}} \right) + 4 \cdot 0,02 \sqrt{f}$
^a Insertion loss (IL) at frequencies that correspond to calculated values of less than 3,0 dB shall revert to a maximum requirement of 3,0 dB.		

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Table 49 – Informative insertion loss values for a single pair channel at key frequencies

Frequency MHz	Maximum insertion loss dB					
	Class					
	T1-A-1000	T1-A-400	T1-A-250	T1-A-100	T1-B	T1-C
0,1	10,3	10,3	3,2	3,0	3,0	–
1	14,6	14,5	5,2	3,0	3,0	3,0
20	58,3	57,9	23,4	9,8	9,0	9,0
100	–	–	–	–	20,3	20,3
250	–	–	–	–	32,5	32,5
500	–	–	–	–	46,7	46,7
600	–	–	–	–	51,4	51,4
1 000	–	–	–	–	–	67,6
1 250	–	–	–	–	–	76,2

6.6.3.3 Direct current (DC) loop resistance

The DC loop resistance requirements are applicable to all single pair cabling Classes.

The DC loop resistance of a single pair channel shall meet the requirements in Table 50.

Table 50 – Direct current (DC) loop resistance for a single pair channel at 20 °C

Class	Maximum DC loop resistance at 20 °C Ω
T1-A-1000 ^a	47,0
T1-A-400 ^b	60,0
T1-A-250 ^b	37,6
T1-A-100 ^b	15,3
T1-B ^c	17,4
T1-C ^c	17,4
^a The maximum DC loop resistance at 20 °C of the cable pair (excluding connections) within a channel shall be 0,046 Ω /m. This shall be achieved by an appropriate design. ^b The maximum DC loop resistance at 20 °C of the cable pair (excluding connections) within a channel shall be 0,149 Ω /m. This shall be achieved by an appropriate design. ^c The maximum DC loop resistance at 20 °C of the cable pair (excluding connections) within a channel shall be 0,17 Ω /m. This shall be achieved by an appropriate design.	

Editor's Note: T1-A-100 uses a larger diameter cable than T1-B and T1-C. Is this correct?

6.6.3.4 Direct current (DC) resistance unbalance

The DC resistance unbalance requirements are applicable to all single pair cabling Classes.

The DC resistance unbalance between the two conductors of a single pair channel shall not exceed 3 % or 100 m Ω , whichever is greater.

6.6.3.5 DC current carrying capacity

The minimum DC current carrying capacity requirements are applicable to all single pair cabling Classes.

Each conductor within a single channel shall have a minimum DC current carrying capacity under continuous operation of 2,0 A at 60 °C.

The DC current carrying capacity is not a guide for application support since other factors including the number of conductors and cables carrying remote powering current and their installation environment may place further restrictions on the current per conductor.

For information on DC current carrying capacity with respect to installation conditions and applications using remote power supplied over these Classes of single pair balanced cabling, see ISO/IEC TS 29125.

6.6.3.6 Dielectric withstand

The minimum dielectric withstand requirements are applicable to all single pair cabling Classes.

Dielectric withstand of single pair channels shall be a minimum of 1 000 V DC conductor-to-conductor and shall be a minimum of 1 000 V DC conductor-to-screen or conductor to earth, if a screen is not present, in accordance with IEC 61156-1 general specification. This requirement shall be met by design.

6.6.3.7 Propagation delay

The maximum propagation delay requirements are applicable to all single pair cabling Classes.

The propagation delay of a single pair channel shall meet the requirements in Table 51.

Table 51 – Propagation delay for a single pair channel

Class	Frequency MHz	Maximum propagation delay μs
T1-A	$0,1 \leq f < 20$	8,834
T1-B	$0,1 \leq f < 600$	$0,534 + 0,036/\sqrt{f} + 4 \times 0,0025$
T1-C	$1 \leq f < 1\,250$	$0,534 + 0,036/\sqrt{f} + 4 \times 0,0025$

Table 52 – Informative propagation delay values for a single pair channel at key frequencies

Maximum propagation delay μs			
Frequency MHz	Class		
	T1-A	T1-B	T1-C
0,1	8,834	0,658	–
1	8,834	0,580	0,580
20	8,834	0,552	0,552
100	–	0,548	0,548
250	–	0,546	0,546
500	–	0,546	0,546
600	–	0,545	0,545
1 000	–	–	0,545
1 250	–	–	0,545

6.6.3.8 Unbalance attenuation and coupling attenuation

6.6.3.8.1 General

Unbalance attenuation (*TCL* and *ELTCTL*) is specified for unscreened systems. Coupling attenuation is specified for screened systems.

6.6.3.8.2 Unbalance attenuation, near-end

The unbalance attenuation near-end is measured as transverse conversion loss (*TCL*).

Minimum *TCL* requirements are applicable to unscreened systems. The *TCL* of a single pair channel that is intended to be subjected to an environmental classification E_x shall meet the requirements in Table 53.

The *TCL* requirements shall be met at both ends of the cabling and shall be achieved by design and installation in accordance with manufacturer's instructions.