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INTERNATIONAL STANDARD

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



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

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INFORMATION TECHNOLOGY – GENERIC CABLING FOR CUSTOMER PREMISES –

Part 1: General requirements

FOREWORD

1) 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.

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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 first edition, together with ISO/IEC 11801-2, cancels and replaces ISO/IEC 11801:2002, Amendment 1:2008 and Amendment 2:2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) standard re-structured to contain those elements and requirements, that are common to generic cabling systems (in application fields such as offices and industrial premises), namely requirements for common elements of topology and transmission performance of channels, links and related components;

b) addition of balanced cabling channel and link Classes BCT-B, I and II;

c) addition of coaxial cabling channel and link Class BCT-C;

d) addition of balanced cabling component requirements for Category BCT-B, 8.1, and 8.2;

e) addition of coaxial cabling component requirements for Category BCT-C;

f) addition of cabled fibres of Category OS1a, and OM5;

g) removal of silica optical fibre cabling;

h) optical fibre cable OM1, OM2 and OS1 has been moved to an informative annex.

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

A list of all parts in the ISO/IEC 11801 series, published under the general title *Information technology – Generic cabling for customer premises*, can be found on the IEC website.

INTRODUCTION

This document contains general requirements in support of the other premises-specific referenced cabling design documents developed by ISO/IEC JTC 1/SC 25 including ISO/IEC 11801-2, ISO/IEC 11801-3, ISO/IEC 11801-4, ISO/IEC 11801-5, ISO/IEC 11801-6 and related Technical Reports (including the ISO/IEC TR 11801-99xx series, ISO/IEC TR 24704, ISO/IEC TR 24750 and ISO/IEC TR 29125).

This document specifies a multi-vendor cabling system which may be implemented with material from single or multiple sources, and is related to:

a) International Standards for cabling components developed by technical committees of the IEC, for example copper cables and connectors as well as optical fibre cables and connectors (see Clause 2 and bibliography);

b) standards for the testing of installed cabling (see Clause 2 and bibliography);

c) applications developed by technical committees of the IEC, by subcommittees of ISO/IEC JTC 1, by study groups of ITU-T, for example for LANs and ISDN, and by IEEE 802;

d) planning and installation guides and other standards which take into account the needs of specific applications for the configuration and the use of cabling systems on customer premises (e.g. ISO/IEC 14709 series, ISO/IEC 14763 series, ISO/IEC 30129, and ISO/IEC 18598).

Physical layer requirements for the applications listed in Annex E have been analysed to determine their compatibility with cabling classes specified in this document. These application requirements, together with statistics concerning premises-specific topologies and cabling models of the supported standards, have been used to develop the requirements for balanced, coaxial and optical fibre cabling.

As a result, generic cabling defined within this document:

1) specifies balanced cabling channel and link Classes A, B, C, D, E, E_A, F, F_A, I and II meeting both the requirements of standardized applications and to support the development and implementation of future applications;

2) specifies balanced cabling channel and link Class BCT-B to support the delivery of BCT applications;

3) specifies coaxial cabling channel and link Class BCT-C to support the delivery of BCT applications;

4) specifies optical fibre cabling meeting the requirements of standardized applications and exploiting component capabilities to ease the implementation of applications developed in the future;

5) invokes component requirements and specifies cabling implementations that ensure performance of links and of channels that meet or exceed the requirements for cabling classes.

Figure 1 shows the schematic and contextual relationships between the standards relating to information technology cabling produced by ISO/IEC JTC 1/SC 25, namely the ISO/IEC 11801 series of standards for generic cabling design, standards for the installation, operation and administration of generic cabling and for testing of installed generic cabling.

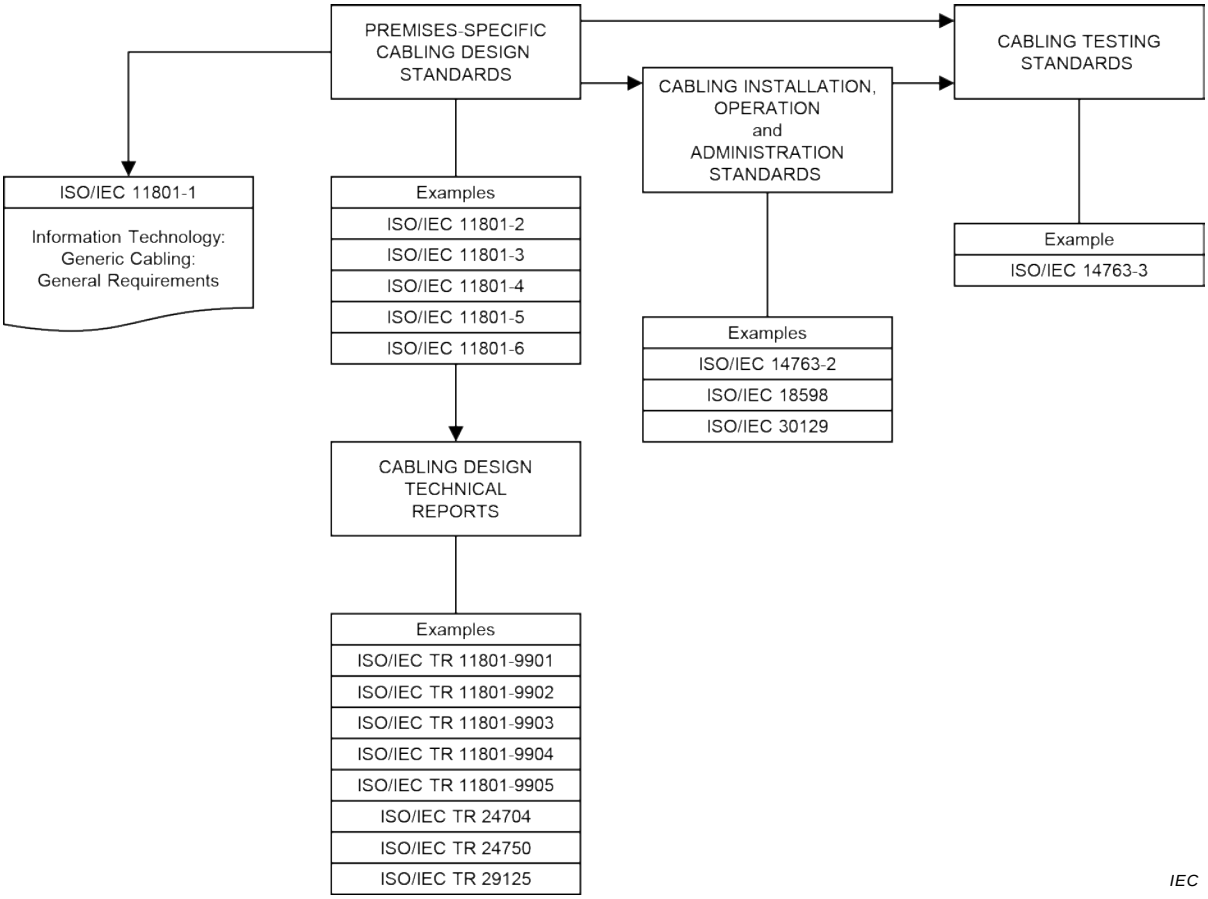


Figure 1 – Relationships between the generic cabling documents produced by ISO/IEC JTC 1/SC 25

This document refers to International Standards for components and test methods wherever appropriate International Standards are available.

INFORMATION TECHNOLOGY – GENERIC CABLING FOR CUSTOMER PREMISES –

Part 1: General requirements

1 Scope

This part of ISO/IEC 11801 specifies requirements that are common to the other parts of the ISO/IEC 11801 series. Cabling specified by this document supports a wide range of services including voice, data, and video that may also incorporate the supply of power.

This document specifies:

a) the fundamental structure and configuration of generic cabling requirements within the types of premises defined by the other parts of the ISO/IEC 11801 series,

b) channel transmission and environmental performance requirements,

c) link performance requirements,

d) backbone cabling reference implementations in support of the parts of the ISO/IEC 11801 series,

e) component performance requirements, referring to available International Standards for components and test methods where appropriate,

f) test procedures to verify conformance to the cabling transmission performance requirements of the ISO/IEC 11801 series.

NOTE This document does not contain specific conformance requirements. The cabling design documents supported by ISO/IEC 11801-1 incorporate the requirements of this document as part of their individual conformance requirements.

In addition, this document provides information regarding the applications supported by the cabling channels.

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.

IEC 60352-2, *Solderless connections – Part 2: Crimped connections – General requirements, test methods and practical guidance*

IEC 60352-3, *Solderless connections – Part 3: Solderless accessible insulation displacement connections – General requirements, test methods and practical guidance*

IEC 60352-4, *Solderless connections – Part 4: Solderless non-accessible insulation displacement connections – General requirements, test methods and practical guidance*

IEC 60352-5, *Solderless connections – Part 5: Press-in connections – General requirements, test methods and practical guidance*

IEC 60352-6, *Solderless connections – Part 6: Insulation piercing connections – General requirements, test methods and practical guidance*

IEC 60352-7, *Solderless connections – Part 7: Spring clamp connections – General requirements, test methods and practical guidance*

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IEC 60512-4-2, *Connectors for electronic equipment – Tests and measurements – Part 4-2: Voltage stress tests – Test 4b: Partial discharge*

IEC 60512-6-2, *Connectors for electronic equipment – Tests and measurements – Part 6-2: Dynamic stress tests – Test 6b: Bump*

IEC 60512-6-3, *Connectors for electronic equipment – Tests and measurements – Part 6-3: Dynamic stress tests – Test 6c: Shock*

IEC 60512-6-4, *Connectors for electronic equipment – Tests and measurements – Part 6-4: Dynamic stress tests – Test 6d: Vibration (sinusoidal)*

IEC 60512-11-4, *Connectors for electronic equipment – Tests and measurements – Part 11-4: Climatic tests – Test 11d: Rapid change of temperature*

IEC 60512-11-7, *Connectors for electronic equipment – Tests and measurements – Part 11-7: Climatic tests – Test 11g: Flowing mixed gas corrosion test*

IEC 60512-11-9, *Connectors for electronic equipment – Tests and measurements – Part 11-9: Climatic tests – Test 11i: Dry heat*

IEC 60512-11-10, *Connectors for electronic equipment – Tests and measurements – Part 11-10: Climatic tests – Test 11j: Cold*

IEC 60512-11-12, *Connectors for electronic equipment – Tests and measurements – Part 11-12: Climatic tests – Test 11m: Damp heat, cyclic*

IEC 60512-16-4, *Connectors for electronic equipment – Tests and measurements – Part 16-4: Mechanical tests on contacts and terminations – Test 16d: Tensile strength (crimped connections)*

IEC 60512-17-4, *Connectors for electronic equipment – Tests and measurements – Part 17-4: Cable clamping tests – Test 17d: Cable clamp resistance to cable torsion*

IEC 60512-19-3, *Electromechanical components for electronic equipment – Basic testing procedures and measuring methods – Part 19: Chemical resistance tests – Section 3: Test 19c – Fluid resistance*

IEC 60512-23-3, *Electromechanical components for electronic equipment – Basic testing procedures and measuring methods – Part 23-3: Test 23c: Shielding effectiveness of connectors and accessories*

IEC 60512-99-001, *Connectors for electronic equipment – Tests and measurements – Part 99-001: Test schedule for engaging and separating connectors under electrical load – Test 99a: Connectors used in twisted pair communication cabling with remote power*

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IEC 60603-7, *Connectors for electronic equipment – Part 7: Detail specification for 8-way, unshielded, free and fixed connectors*

IEC 60603-7-1, *Connectors for electronic equipment – Part 7-1: Detail specification for 8-way, shielded, free and fixed connectors*

IEC 60603-7-2, *Connectors for electronic equipment – Part 7-2: Detail specification for 8-way, unshielded, free and fixed connectors, for data transmissions with frequencies up to 100 MHz*

IEC 60603-7-3, *Connectors for electronic equipment – Part 7-3: Detail specification for 8-way, shielded, free and fixed connectors, for data transmission with frequencies up to 100 MHz*

IEC 60603-7-4, *Connectors for electronic equipment – Part 7-4: Detail specification for 8-way, unshielded, free and fixed connectors, for data transmissions with frequencies up to 250 MHz*

IEC 60603-7-5, *Connectors for electronic equipment – Part 7-5: Detail specification for 8-way, shielded, free and fixed connectors, for data transmissions with frequencies up to 250 MHz*

IEC 60603-7-7, *Connectors for electronic equipment – Part 7-7: Detail specification for 8-way, shielded, free and fixed connectors for data transmission with frequencies up to 600 MHz*

IEC 60603-7-41, *Connectors for electronic equipment – Part 7-41: Detail specification for 8-way, unshielded, free and fixed connectors, for data transmissions with frequencies up to 500 MHz*

IEC 60603-7-51, *Connectors for electronic equipment – Part 7-51: Detail specification for 8-way, shielded, free and fixed connectors, for data transmissions with frequencies up to 500 MHz*

IEC 60603-7-71, *Connectors for electronic equipment – Part 7-71: Detail specification for 8-way, shielded, free and fixed connectors, for data transmission with frequencies up to 1 000 MHz*

IEC 60603-7-81, *Connectors for electronic equipment – Part 7-81: Detail specification for 8-way, shielded, free and fixed connectors, for data transmissions with frequencies up to 2 000 MHz*

IEC 60603-7-82, *Connectors for electronic equipment – Part 7-82: Detail specification for 8-way, 12 contacts, shielded, free and fixed connectors, for data transmission with frequencies up to 2 000 MHz*

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IEC 60793-2-50, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres*

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IEC 60794-1-22, *Optical fibre cables – Part 1-22: Generic specification – Basic optical cable test procedures – Environmental test methods*

IEC 60794-2, *Optical fibre cables – Part 2: Indoor cables – Sectional specification*

IEC 60794-2-51, *Optical fibre cables – Part 2-51: Indoor cables – Detail specification for simplex and duplex cables for use in cords for controlled environment*

IEC 60794-3, *Optical fibre cables – Part 3: Outdoor cables – Sectional specification*

IEC 60794-5, *Optical fibre cables – Part 5: Sectional specification – Microduct cabling for installation by blowing*

IEC 60966-2-4, *Radio frequency and coaxial cable assemblies – Part 2-4: Detail specification for cable assemblies for radio and TV receivers – Frequency range 0 MHz to 3000 MHz, IEC 61169-2 connectors*

IEC 60966-2-5, *Radio frequency and coaxial cable assemblies – Part 2-5: Detail specification for cable assemblies for radio and TV receivers – Frequency range 0 MHz to 1000 MHz, IEC 61169-2 connectors*

IEC 60966-2-6, *Radio frequency and coaxial cable assemblies – Part 2-6: Detail specification for cable assemblies for radio and TV receivers – Frequency range 0 MHz to 3 000 MHz, IEC 61169-24 connectors*

IEC 61076-2-101, *Connectors for electronic equipment – Product requirements – Part 2-101: Circular connectors – Detail specification for M12 connectors with screw-locking*

IEC 61076-2-109, *Connectors for electronic equipment – Product requirements – Part 2-109: Circular connectors – Detail specification for connectors with M 12 × 1 screw-locking, for data transmission frequencies up to 500 MHz*

IEC 61076-3-104, *Connectors for electrical and electronic equipment – Product requirements – Part 3-104: Detail specification for 8-way, shielded free and fixed connectors for data transmissions with frequencies up to 2 000 MHz*

IEC 61076-3-106, *Connectors for electronic equipment – Product requirements – Part 3-106: Rectangular connectors – Detail specification for protective housings for use with 8-way shielded and unshielded connectors for industrial environments incorporating the IEC 60603-7 series interface*

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IEC 61156-1, *Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification*

IEC 61156-2, *Multicore and symmetrical pair/quad cables for digital communications – Part 2: Symmetrical pair/quad cables with transmission characteristics up to 100 MHz – Horizontal floor wiring – Sectional specification*

IEC 61156-3, *Multicore and symmetrical pair/quad cables for digital communications – Part 3: Work area cable – Sectional specification*

IEC 61156-4, *Multicore and symmetrical pair/quad cables for digital communications – Part 4: Riser cables – Sectional specification*

IEC 61156-5:2009, *Multicore and symmetrical pair/quad cables for digital communications – Part 5: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Horizontal floor wiring – Sectional specification*
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IEC 61156-5-1, *Multicore and symmetrical pair/quad cables for digital communications – Part 5-1: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Horizontal floor wiring – Blank detail specification*

IEC 61156-6, *Multicore and symmetrical pair/quad cables for digital communications – Part 6: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Work area wiring – Sectional specification*

IEC 61156-6-1, *Multicore and symmetrical pair/quad cables for digital communications – Part 6-1: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Work area wiring – Blank detail specification*

IEC 61156-7, *Multicore and symmetrical pair/quad cables for digital communications – Part 7: Symmetrical pair cables with transmission characteristics up to 1 200 MHz – Sectional specification for digital and analog communication cables*

IEC 61156-9:2016, *Multicore and symmetrical pair/quad cables for digital communications – Part 9: Cables for channels with transmission characteristics up to 2 GHz – Sectional specification*

IEC 61156-10, *Multicore and symmetrical pair/quad cables for digital communications – Part 10: Cables for cords with transmission characteristics up to 2 GHz – Sectional specification*

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IEC 61169-24, *Radio-frequency connectors – Part 24: Sectional specification – Radio frequency coaxial connectors with screw coupling, typically for use in 75 Ω cable networks (type F)*

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IEC 61300-2-5, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-5: Tests – Torsion*

IEC 61300-2-9, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-9: Tests – Shock*

IEC 61300-2-18, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-18: Tests – Dry heat – High temperature endurance*

IEC 61300-2-22, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-22: Tests – Change of temperature*

IEC 61300-2-34, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-34: Tests – Resistance to solvents and contaminating fluids of interconnecting components and closures*

IEC 61300-2-44, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-44: Tests – Flexing of the strain relief of fibre optic devices*

IEC 61300-2-46, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 2-46: Tests – Damp heat, cyclic*

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3 Terms, definitions, abbreviations and symbols

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
administration
methodology defining the documentation requirements of a cabling system and its containment, the labelling of functional elements and the process by which moves, additions and changes are recorded

3.1.2
alien crosstalk
signal coupling from a disturbing pair of a channel to a disturbed pair of another channel

Note 1 to entry: This also applies to the signal coupling from a disturbing pair within a link or component, used to create a channel, to a disturbed pair within a link or component, used to create another channel.

Note 2 to entry: This is also known as exogenous crosstalk.

3.1.3
alien far-end crosstalk loss
signal coupling between a disturbing pair of a channel and a disturbed pair of another channel, measured at the far-end

Note 1 to entry: This also applies to the measurement of the signal coupling between a disturbing pair within a link or component, used to create a channel, and a disturbed pair within a link or component, used to create another channel.

Note 2 to entry: This is also known as exogenous far-end crosstalk loss.

3.1.4
alien near-end crosstalk loss
signal coupling between a disturbing pair of a channel and a disturbed pair of another channel, measured at the near-end

Note 1 to entry: This also applies to the measurement of signal coupling between a disturbing pair within a link or component, used to create a channel, and a disturbed pair within a link or component, used to create another channel.

Note 2 to entry: This is also known as exogenous near-end crosstalk loss.

3.1.5
application
system, including its associated transmission and power feeding method, which is supported by telecommunications cabling

3.1.6
attenuation
decrease in magnitude of power of a signal in transmission between points

Note 1 to entry: Attenuation indicates the total losses on cable, expressed as the ratio of power output to power input.

3.1.7
attenuation to alien crosstalk ratio at the far-end
difference, in decibels, 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

Note 1 to entry: This also applies to the calculation using the alien far-end crosstalk loss from a disturbing pair within a link or component, used to create a channel, and the insertion loss of a disturbed pair within a link or component, used to create another channel.

Note 2 to entry: This is also known as attenuation to exogenous crosstalk ratio at the far-end.

3.1.8
attenuation to crosstalk ratio at the far-end
difference, in decibels, 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

Note 1 to entry: This also applies to the calculation using the far-end crosstalk loss from a disturbing pair within a link or component, used to create a channel, and the insertion loss of a disturbed pair within the link or component, of the same channel.

3.1.9
attenuation to crosstalk ratio at the near-end
difference, in decibels, 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

Note 1 to entry: This also applies to the calculation using the near-end crosstalk loss from a disturbing pair within a link or component, used to create a channel, and the insertion loss of a disturbed pair within the link or component, of the same channel.

3.1.10
average power sum alien near-end crosstalk loss
calculated average of the power sum alien near-end crosstalk loss of the pairs of a disturbed channel

Note 1 to entry: This also applies to the calculation using the pairs within a link used to create a channel.

Note 2 to entry: This is also known as average power sum exogenous near-end crosstalk loss.

3.1.11
average power sum attenuation to alien crosstalk ratio far-end
calculated average of the power sum attenuation to alien crosstalk ratio at the far-end of the pairs of a disturbed channel

Note 1 to entry: This also applies to the calculation using the pairs within a link used to create a channel.

Note 2 to entry: This is also known as average power sum attenuation to exogenous crosstalk ratio far-end.

3.1.12
balanced cable
cable consisting of one or more metallic symmetrical cable elements (twisted pairs or quads)

3.1.13
broadcast and communications technologies
group of applications including radio and TV

3.1.14
building backbone cable
fixed cable connecting distributors within the building backbone cabling subsystem

3.1.15
building distributor
distributor in which the building backbone cable(s) terminate(s) and at which connections to the campus backbone cable(s) may be made

3.1.16
building entrance facility
facility that provides all necessary mechanical and electrical services and which complies with all relevant regulations, for the entry of telecommunications cables into a building

3.1.17
cable
assembly of one or more cable units in an overall sheath

3.1.18
cable element
smallest construction unit in a cable

EXAMPLE Balanced pair, quad, single fibre, or coaxial pair.

3.1.19
cable sharing
using a single cable to support the simultaneous transmission of more than one application

3.1.20
cable unit
single assembly of one or more cable elements of the same type

Note 1 to entry: The cable unit may have a screen.

3.1.21
cabling
system of telecommunications cables, cords and connecting hardware that supports the connection of information technology equipment

3.1.22
cabling design document
relevant International Standard or Technical Report for cabling design developed by ISO/IEC JTC 1/SC 25

3.1.23
campus
premises containing one or more buildings

3.1.24
campus backbone cable
fixed cable connecting distributors within the campus backbone cabling subsystem

3.1.25
campus distributor
distributor from which the campus backbone cabling starts

3.1.26
channel
end-to-end transmission path connecting any two pieces of application-specific equipment

3.1.27
centralized optical fibre cabling
cabling technique that creates a combined backbone/horizontal channel from the equipment areas to the centralized cross-connect or interconnect by allowing the use of pull-through cables or splices

3.1.28
coaxial pair
uniform transmission line consisting of two cylindrical conductors with the same axis

[SOURCE: IEC 60050-704:1993, 704-02-05]

3.1.29
connecting hardware
device or combination of devices used to connect cables or cable elements

3.1.30
connection
mated device or combination of devices including terminations used to connect cables or cable elements to other cables, cable elements or application-specific equipment

3.1.31
connector
component normally attached to a cable or mounted on a piece of apparatus (excluding an adapter) for joining separable parts of a cabling system

3.1.32
connector sharing
using connecting hardware to support the simultaneous transmission of more than one application

3.1.33
consolidation point
connection point in the horizontal cabling subsystem between a floor distributor and a terminal equipment outlet

3.1.34
consolidation point cord
cabling between the consolidation point and the terminal equipment outlet(s)

3.1.35
consolidation point link
part of the permanent link between the floor distributor and the consolidation point, including the connecting hardware at each end

3.1.36
cord
cable, cable unit or cable element with a minimum of one termination

3.1.37
coupling attenuation
ratio, in decibels, of the differential power in the signal pairs to the power generated by the excited common mode currents

3.1.38
cross-connect
passive connection between cabling subsystems using a patch cord or jumper

3.1.39
cross-connection
connection by means of a cross-connect

3.1.40
data centre
structure, or group of structures, dedicated to the centralized accommodation, interconnection and operation of information technology and network telecommunications equipment providing data storage, processing and transport services, together with all the facilities and infrastructures for power distribution and environmental control, together with the necessary levels of resilience and security required to provide the desired service availability

Note 1 to entry: A structure can consist of multiple buildings and/or spaces with specific functions to support the primary function.

Note 2 to entry: The boundaries of the structure or space considered to be the data centre which includes the information and communication technology equipment and supporting environmental controls can be defined within a larger structure or building.

[SOURCE: ISO/IEC 30134-1:2016, 3.1.4]

3.1.41
distributor
functional element enabling the termination and connection of cabling subsystems to other cabling subsystems or transmission equipment

3.1.42
equipment cord
cord connecting one end of the cabling subsystem in a distributor to transmission equipment

3.1.43
equipment interface
point at which application-specific equipment can be connected to the generic cabling or network access cabling

3.1.44
external network interface
termination point providing demarcation of external telecommunications service provision

3.1.45
fixed connector
balanced cabling jack, coaxial adapter (integrated with or housing a coaxial free connector), or optical fibre adapter (integrated with or housing an optical fibre free connector)

3.1.46
free connector
balanced, coaxial, or optical fibre cabling plug

3.1.47
functional performance
level of transmission performance that is able to support the intended Class of applications

3.1.48
generic cabling
structured telecommunications cabling system, capable of supporting a wide range of standardized applications

3.1.49
hybrid cable
assembly of two or more cable units of different types in an overall sheath

3.1.50
information and communications technologies
group of applications using information and communications (telecommunications) technologies

3.1.51
information technologies
telecommunications
technology concerned with the transmission, emission and reception of signs, signals, writing, images and sounds by cable, radio, optical or other electromagnetic systems

3.1.52
insertion loss
loss incurred by inserting a device between a source and load of equal impedance

Note 1 to entry: The device itself may have a different impedance from the load and source impedance.

Note 2 to entry: The terms operational attenuation or operational insertion loss are sometimes associated with this definition.

3.1.53
insertion loss deviation
difference between the measured insertion loss of cascaded components and the insertion loss determined by the sum of the individual component insertion losses

3.1.54
interconnect
passive connection to a cabling subsystem not using a patch cord or jumper

3.1.55
interface
point at which connections are made to the generic cabling

3.1.56
jack
balanced cabling socket connector

3.1.57
jumper
cable, cable unit or cable element without connectors used for a cross-connection

3.1.58
keying
mechanical feature of a connector system, which guarantees polarization or prevents the connection to an incompatible socket or optical fibre adapter

3.1.59
link
transmission path between two cabling system interfaces, including the connections at each end

3.1.60
longitudinal conversion loss
logarithmic ratio, expressed in decibels, of the common mode injected signal at the near-end to the resultant differential signal at the near-end of a balanced pair

3.1.61
longitudinal conversion transfer loss
logarithmic ratio, expressed in decibels, of the common mode injected signal at the near-end to the resultant differential signal at the far-end of a balanced pair

3.1.62
multi-unit cable
balanced cable containing more than four pairs

3.1.63
network access cable
cable connecting an external network interface to a generic cabling distributor

3.1.64
operating temperature
stabilized temperature of the local environment, measured on the outside sheath of the cable, combining ambient temperature with any increase due to the application being supported

3.1.65
optical fibre cable
cable comprising one or more optical fibre cable elements

3.1.66
pair
two conductors of a balanced transmission line

EXAMPLE Twisted pair cable element or one side circuit in a quad cable element.

3.1.67
patch cord
cord used for a cross-connection

3.1.68
patch panel
panel at a distributor presenting the interface(s) of cabling subsystems to facilitate administrative moves and changes using patch cords or jumpers

Note 1 to entry: The panel also enables interfaces to be connected to transmission equipment using interconnect cords.

3.1.69
permanent link
transmission path between distributors or between distributor 1 and the terminal equipment outlet including the connections at both ends

Note 1 to entry: The permanent link does not include TE area cords, equipment cords, patch cords and jumpers, but includes the connection at each end. It can include an optional consolidation point.

3.1.70
power sum alien far-end crosstalk loss
power sum of the signal coupling between multiple disturbing pairs of one or more channels, links or components and a disturbed pair of another channel, link or component, measured at the far-end

Note 1 to entry: This is also known as power sum exogenous far-end crosstalk loss.

3.1.71
power sum alien near-end crosstalk loss
power sum of the signal coupling between multiple disturbing pairs of one or more channels, links or components and a disturbed pair of another channel, link or component, measured at the near-end

Note 1 to entry: This is also known as power sum exogenous near-end crosstalk loss.

3.1.72
power sum attenuation to alien crosstalk ratio at the far-end
difference, in decibels, between the power sum alien far-end crosstalk loss from multiple disturbing pairs of one or more channels, links or components and the insertion loss of a disturbed pair in another channel, link or component

Note 1 to entry: This is also known as power sum attenuation to exogenous crosstalk ratio at the far-end.

3.1.73
power sum attenuation to crosstalk ratio at the far-end
difference, in decibels, between the power sum far-end crosstalk loss from multiple disturbing pairs of a channel, link or component and the insertion loss of a disturbed pair in the same channel, link or component

3.1.74
power sum attenuation to crosstalk ratio at the near-end
difference, in decibels, between the power sum near-end crosstalk loss from multiple disturbing pairs of a channel, link or component and the insertion loss of a disturbed pair in the same channel, link or component

3.1.75
quad
cable element that comprises four insulated conductors twisted together

Note 1 to entry: Two diametrically facing conductors form a transmission pair also referred to as a side circuit.

3.1.76
requirement to be met by design
requirement which may be met by calculation and selection of appropriate materials and installation techniques, where either there is no test method specified that allows verification or there is no requirement for verification by testing

3.1.77
screened balanced cable
balanced cable with an overall screen and/or screens for the individual elements

3.1.78
side circuit
two diametrically facing conductors in a quad that form a pair

3.1.79
splice
joining of conductors or optical fibres, generally from separate sheaths

3.1.80
telecommunications outlet
terminal equipment outlet
fixed connecting device which provides an interface to the terminal equipment

Note 1 to entry: The term telecommunications outlet is used in some of the other parts of the ISO/IEC 11801 series, while the term terminal equipment outlet is used in this document.

3.1.81
terminal equipment
equipment at an outlet used to access information provided by transmission equipment

3.1.82
test interface
location where a connection between test equipment and the cabling to be tested occurs

3.1.83
tie cables
optional fixed cables connecting distributors of the same hierarchical level which are installed in addition to the basic hierarchical topology

3.1.84
transmission equipment
active equipment used to distribute information from distributors to other distributors and to outlets

3.1.85
transverse conversion loss
ratio between the common mode signal power and the injected differential mode signal power

3.1.86
twisted pair
cable element that consists of two insulated conductors twisted together in a determined fashion to form a balanced transmission line

3.1.87
unscreened balanced cable
balanced cable without any screens

3.2 Abbreviations

AACR-F	attenuation to alien crosstalk ratio at the far-end
AC	alternating current
ACR	attenuation to crosstalk ratio
ACR-F	attenuation to crosstalk ratio at the far-end
ACR-N	attenuation to crosstalk ratio at the near-end
AFEXT	alien far-end crosstalk (loss)
ANEXT	alien near-end crosstalk (loss)
APC	angled physical contact

ATM	asynchronous transfer mode
BCT	broadcast and communications technologies, sometimes referred to as HEM (home entertainment & multimedia)
BD	building distributor
BEF	building entrance facility
B-ISDN	broadband ISDN
BO	broadcast outlet
CATV	community antenna television
CD	campus distributor
CP	consolidation point
CSMA/CD	carrier sense multiple access with collision detection
DAB	digital audio broadcasting
DC	direct current
DCE	data circuit terminating equipment
DRL	distributed return loss
DTE	data terminal equipment
DVB	digital video broadcasting
DVB–C	digital video broadcasting – cable
DVB–S	digital video broadcasting – satellite
DVB–T	digital video broadcasting – terrestrial
EI	equipment interface
ELTCTL	equal level TCTL
EMC	electromagnetic compatibility
EO	equipment outlet
EQP	transmission equipment
FEXT	far-end crosstalk attenuation (loss)
ffs	for further study
FOIRL	fibre optic inter-repeater link
IC	integrated circuit
ICT	information and communications technology
IDC	insulation displacement connection
IEC	International Electrotechnical Commission
IL	insertion loss
ILD	insertion loss deviation
IPC	insulation piercing connection
ISDN	integrated services digital network
ISO	International Organization for Standardization
IT	information technology
JTC	joint technical committee
LAN	local area network
LCL	longitudinal to differential conversion loss
LCTL	longitudinal to differential conversion transfer loss
LDP	local distribution point

Min.	minimum
N/A	not applicable
NEXT	near-end crosstalk attenuation (loss)
OF	optical fibre
PC	physical contact
PL	permanent link
PMD	physical media dependent sublayer
PS AACR-F	power sum attenuation to alien crosstalk ratio at the far-end
PS AACR-F_{avg}	average power sum attenuation to alien crosstalk ratio at the far-end
PS ACR	power sum attenuation to crosstalk ratio
PS ACR-F	power sum attenuation to crosstalk ratio at the far-end
PS ACR-N	power sum attenuation to crosstalk ratio at the near-end
PS AFEXT	power sum alien far-end crosstalk (loss)
PS $AFEXT_{norm}$	normalized power sum alien far-end crosstalk (loss)
PS ANEXT	power sum alien near-end crosstalk (loss)
PS $ANEXT_{avg}$	average power sum alien near-end crosstalk (loss)
PS FEXT	power sum FEXT (loss)
PS NEXT	power sum NEXT (loss)
PVC	polyvinyl chloride
RL	return loss
SC	subscriber connector (optical fibre connector)
SCP	service concentration point
SO	service outlet
TCL	transverse conversion loss
TCTL	transverse conversion transfer loss
TE	terminal equipment
TI	test interface
TO	telecommunications outlet
TP-PMD	twisted pair physical medium dependent
TV	television

NOTE The abbreviation “lg” in the formulas signifies “$\log_{10}$”.

3.3 Symbols

3.3.1 Variables

A	coefficient of transmission matrix
B	length of backbone cable or coefficient of transmission matrix
C	length of the CP cable, designation for connector, or coefficient of transmission matrix
C	connection
D	coefficient of transmission matrix
F	combined length of patch cords/jumpers, equipment and work area cords
H	maximum length of the fixed horizontal cable
K	coefficient of cable attenuation increase
L	length of cable

l	number of the disturbing channel
N	number of disturbing channels
X	ratio of work area cable attenuation to fixed horizontal cable attenuation
Y	ratio of the CP cable attenuation to the fixed horizontal cable attenuation
Z	complex impedance
NVP	velocity relative to speed of light ($NVP = v/c$)
c	speed of light in vacuum
e	base of natural logarithm
f	frequency
i	current number of disturbing pair
j	imaginary operator
k	current number of disturbed pair
lg	log10
n	total number of pairs ($i \leq k \leq n$)
t	time
v	speed of propagation

3.3.2 Indices

C2	index to denominate a characteristic, measured from the connector at the floor distributor (second connector)
CH	index to denote the channel
CP	index to denote the consolidation point
PL	index to denominate a permanent link characteristic
TO	index to denominate a characteristic, measured from the TO
avg	index to denominate average of the associated parameter across all of the pairs in the same channel or link
cable	index to denominate a cable characteristic
channel	index to denominate a channel characteristic
connector	index to denominate a connector characteristic
cord cable	index to indicate a characteristic of the cable used for cords
in	index to indicate an input condition
local	index to denominate a locally measured characteristic
norm	index to denominate scaling of the associated parameter
remote	index to denominate a characteristic measured at a distance
term	index to indicate a terminating condition

4 Conformance

This document does not contain specific cabling installation conformance requirements. The cabling design documents supported by this document incorporate the requirements of this document as part of their individual conformance requirements.

Annex A contains requirements and recommendations for testing of channels, and links in order to determine their conformance to the transmission performance requirements of the relevant cabling design documents.