IEC 62783-2

Edition 1.0 2019-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Twinax cables for digital communications –
Part 2: Family specification – Cable for Ethernet-over-twinax physical interfaces

Câbles twinax pour transmissions numériques –
Partie 2: Spécification de famille – Câble pour interfaces physiques Ethernet sur twinax

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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TWINAX CABLES FOR DIGITAL COMMUNICATIONS –

Part 2: Family specification – Cable for Ethernet-over-twinax physical interfaces

FOREWORD

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International Standard IEC 62783-2 has been prepared by subcommittee 46C: Wires and symmetric cables, of IEC technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
46C/1103/FDIS	46C/1108/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

This International Standard is to be used in conjunction with the first edition of IEC 62783-1:—[1].

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

[1] Under preparation. Stage at the time of publication: IEC FDIS 62783-1:2018.

INTRODUCTION

This International Standard is a family specification. It constitutes Part 2 of the IEC 62783 series, which covers specific characteristics of twinax cables.

This document describes cables that are in compliance with the generic twinax cable requirements given in IEC 62783-1.

The family of twinax cables covered in this document are specifically intended for interconnection of Ethernet links over twinax cables, which are implemented using twinax link segments in accordance with IEEE Std 802.3™ Ethernet physical interfaces, for example, 10GBASE-CX4.

TWINAX CABLES FOR DIGITAL COMMUNICATIONS –

Part 2: Family specification – Cable for Ethernet-over-twinax physical interfaces

1 Scope

This part of IEC 62783 covers indoor cables and specifies the definitions and requirements of twin-axial cables used in digital communication systems.

This document, which is a family specification, gives additional requirements for twinax cables for use in IEEE Std 802.3 Ethernet physical interfaces.

This document gives requirements and transmission characteristics for single twinax elements as well as for multiple twinax elements within the same sheath, i.e. "twinax cable".

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 TR 61156-1-2[2]:2009, *Multicore and symmetrical pair/quad cables for digital communications – Part 1-2: Electrical transmission characteristics and test methods of symmetrical pair/quad cables*
IEC TR 61156-1-2:2009/AMD1:2014

IEC 62783-1:—[3], *Twinax cables for digital communications – Part 1: Generic specification*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62783-1 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

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2 A consolidated version of this publication exists, comprising IEC TR 61156-1-2:2009 and IEC TR 61156-1-2:2009/AMD 1:2014.

3 Under preparation. Stage at the time of publication: IEC FDIS 62783-1:2018.

4 Requirements for cables construction

4.1 General remarks

These twinax cables' characteristic impedance is 100 Ω. These twinax cable configurations range from 2 to 20 twinax elements, depending on the specific Ethernet implementation. Conductor size may range from 0,2 mm to 0,6 mm (32 AWG to 22 AWG).

4.2 Cable construction

4.2.1 General

The cable element and the cable shall be constructed accordingly to conform to IEC 62783-1 and to this document.

4.2.2 Conductor

The conductor shall conform to IEC 62783-1 and to the detail specifications.

4.2.3 Insulation

The insulation shall conform to IEC 62783-1 and to the detail specifications.

4.2.4 Colour code

The colour code shall conform to the detail specifications.

4.2.5 Drain wire

The drain wire shall conform to IEC 62783-1 and to the detail specifications.

4.2.6 Screening of cable assembly element

The cable element screen shall conform to IEC 62783-1 and to the detail specifications.

4.2.7 Cable make-up

The twinax cable consisting of 2 to 20 twinax elements as per Table 1, shall conform to IEC 62783-1 and to the detail specifications.

Table 1 – Supported IEEE 802.3 Ethernet-over-twinax implementations, configurations

Application	IEEE 802.3:2015 (reference)	Nominal frequency	Number of lanes	Long reach m	Short reach m
1000BASE-CX	Clause 39	625 MHz	2	10	5
10GBASE-CX4	Clause 54	1,562 5 GHz	8	7	3
100GBASE-CR10	Clause 85	5,156 25 GHz	20	3	1
40GBASE-CR4	Clause 85	5,156 25 GHz	8	3	1
100GBASE-CR4	Clause 92	12,890 6 GHz	8	3	1
25GBASE-CR	[a]	12,890 6 GHz	2	3	1

[a] Clause 110 to be published in IEEE 802.3:2018.

4.2.8 Screening of the cable core

The cable core screening shall conform to IEC 62783-1 and to the detail specifications.

4.2.9 Sheath

The finished cable sheath shall conform to IEC 62783-1 and to the detail specifications.

4.2.10 Colour of sheath

The colour of the finished cable sheath may be specified in the detail specifications.

4.2.11 Identification

4.2.11.1 Cable marking

The cable shall be marked as specified in the detail specifications.

4.2.11.2 Labelling

The cable shall be labelled as specified in the detail specifications.

4.2.12 Finished cable

Finished cable shall be packaged as specified in the detail specifications.

5 Requirements and test methods

5.1 General remarks

Unless otherwise specified, all tests and measurements shall conform to IEC 62783-1 and to the detail specifications.

These transmission requirements given in Table 2 are based on IEEE 802.3 Ethernet-over-twinax link segment requirements, which are given for information.

Table 2 – Supported IEEE 802.3 Ethernet-over-twinax implementations, transmission requirements

Application	IEEE 802.3:2015	Nominal frequency	Frequency range	IL max. (at nominal frequency)	RL min. (at nominal frequency)	ACR-F max. (at nominal frequency)
1000BASE-CX	Clause 39	625 MHz	10 MHz to 1 GHz	8,8 dB	See detail specifications	See detail specifications
10GBASE-CX4	Clause 54	1,562 5 GHz	100 MHz to 2 GHz	16,0 dB	12 dB	See detail specifications
100GBASE-CR10,	Clause 85	5,156 25 GHz	50 MHz to 10 GHz	17,04 dB	6,66 dB	See detail specifications
40GBASE-CR4	Clause 85	5,156 25 GHz	50 MHz to 10 GHz	17,04 dB	6,66 dB	See detail specifications
100GBASE-CR4	Clause 92	12,890 6 GHz	50 MHz to 19 GHz	22,48 dB	6 dB	See detail specifications
25GBASE-CR	[a]	12,890 6 GHz	50 MHz to 19 GHz	22,48 dB	6 dB	See detail specifications

[a] Clause 110 to be published in IEEE 802.3:2018.

NOTE Near-end crosstalk (NEXT) is not specified for this application.

5.2 Electrical tests

5.2.1 Conductor resistance

The conductor resistance shall conform to IEC 62783-1 and to the detail specifications.

5.2.2 Resistance unbalance

The resistance unbalance shall conform to IEC 62783-1 and to the detail specifications.

5.2.3 Dielectric strength

Dielectric strength shall conform to IEC 62783-1 and to the detail specifications.

5.2.4 Insulation resistance

Insulation resistance shall conform to IEC 62783-1 and to the detail specifications.

5.2.5 Mutual capacitance

Mutual capacitance shall conform to IEC 62783-1 and to the detail specifications.

5.2.6 Surface transfer impedance

Surface transfer impedance of the screen shall conform to IEC 62783-1 and to the detail specifications.

5.3 Transmission requirements and tests

5.3.1 General

Transmission requirements shall conform to IEC 62783-1 and to the detail specifications, over the frequency range specified in the detail specifications.

Transmission requirements' conformance is determined in accordance with IEC 62783-1 using test procedures according to IEC TR 61156-1-2:2009/AMD1:2014.

5.3.2 Characteristic impedance

The nominal characteristic impedance, 100 Ω, shall conform to IEC 62783-1 and to the detail specifications.

5.3.3 Return loss

The return loss shall conform to IEC 62783-1 and to the detail specifications.

5.3.4 Attenuation

The attenuation shall conform to IEC 62783-1 and to the detail specifications.

5.3.5 Propagation delay, inter-element delay skew, and intra-element delay skew

Propagation delay, inter-element delay skew, and intra-element delay skew shall conform to IEC 62783-1 and to the detail specifications.

5.3.6 Near-end crosstalk (NEXT)

The near-end crosstalk (NEXT) loss shall conform to IEC 62783-1 and to the detail specifications.