

INTERNATIONAL STANDARD

ISO/ IEC/IEEE 8802-3

Third edition
2021-02

AMENDMENT
2022-07

Telecommunications and exchange between information technology systems — Requirements for local and metropolitan area networks —

Part 3: Standard for Ethernet

AMENDMENT 10: Maintenance #14: Isolation

*Télécommunications et échange entre systèmes informatiques —
Exigences pour les réseaux locaux et métropolitains —*

Partie 3: Norme pour Ethernet

AMENDEMENT 10: Maintenance n° 14 : Isolation



Reference number
ISO/IEC/IEEE 8802-3:2021/Amd.10:2022(E)

© IEEE 2021



COPYRIGHT PROTECTED DOCUMENT

© IEEE 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from IEEE at the address below.

Institute of Electrical and Electronics Engineers, Inc
3 Park Avenue, New York
NY 10016-5997, USA

Email: stds.ipr@ieee.org
Website: www.ieee.org

Published in Switzerland

Foreword

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO/IEC documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. The IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While the IEEE administers the process and establishes rules to promote fairness in the consensus development process, the IEEE does not independently evaluate, test, or verify the accuracy of any of the information contained in its standards.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see <https://patents.iec.ch>).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

ISO/IEC/IEEE 8802-3:2021/Amd 10 was prepared by the LAN/MAN of the IEEE Computer Society (as IEEE 802.3cr™-2021) and drafted in accordance with its editorial rules. It was adopted, under the “fast-track procedure” defined in the Partner Standards Development Organization cooperation agreement between ISO and IEEE, by Joint Technical Committee ISO/IEC JTC 1, *Information technology, Subcommittee SC 6, Telecommunications and information exchange between systems*.

A list of all parts in the ISO/IEC/IEEE 8802 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

IEEE Std 802.3cr™-2021

(Amendment to IEEE Std 802.3™-2018
as amended by IEEE Std 802.3cb™-2018,
IEEE Std 802.3bt™-2018,
IEEE Std 802.3cd™-2018,
IEEE Std 802.3cn™-2019,
IEEE Std 802.3cg™-2019,
IEEE Std 802.3cq™-2020,
IEEE Std 802.3cm™-2020,
IEEE Std 802.3ch™-2020,
and IEEE Std 802.3ca™-2020)

IEEE Standard for Ethernet

Amendment 10: Maintenance #14: Isolation

Developed by the

LAN/MAN Standards Committee
of the
IEEE Computer Society

Approved 9 February 2021

IEEE SA Standards Board

Abstract: This amendment to IEEE Std 802.3-2018 replaces references to the IEC 60950 series of standards with appropriate references to the IEC 62368 series and makes appropriate changes to the standard corresponding to the new references.

Keywords: Ethernet, IEC 60950, IEC 62368, IEEE 802.3™, IEEE 802.3cr™, isolation, safety

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

Copyright © 2021 by The Institute of Electrical and Electronics Engineers, Inc.
All rights reserved. Published 24 February 2021. Printed in the United States of America.

IEEE and 802 are registered trademarks in the U.S. Patent & Trademark Office, owned by The Institute of Electrical and Electronics Engineers, Incorporated.

PDF: ISBN 978-1-5044-7381-1 STD24601
Print: ISBN 978-1-5044-7382-8 STDPD24601

IEEE prohibits discrimination, harassment and bullying.

For more information, visit <http://www.ieee.org/web/aboutus/whatis/policies/p9-26.html>.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

Important Notices and Disclaimers Concerning IEEE Standards Documents

IEEE Standards documents are made available for use subject to important notices and legal disclaimers. These notices and disclaimers, or a reference to this page (<https://standards.ieee.org/ipr/disclaimers.html>), appear in all standards and may be found under the heading “Important Notices and Disclaimers Concerning IEEE Standards Documents.”

Notice and Disclaimer of Liability Concerning the Use of IEEE Standards Documents

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE SA) Standards Board. IEEE develops its standards through an accredited consensus development process, which brings together volunteers representing varied viewpoints and interests to achieve the final product. IEEE Standards are documents developed by volunteers with scientific, academic, and industry-based expertise in technical working groups. Volunteers are not necessarily members of IEEE or IEEE SA, and participate without compensation from IEEE. While IEEE administers the process and establishes rules to promote fairness in the consensus development process, IEEE does not independently evaluate, test, or verify the accuracy of any of the information or the soundness of any judgments contained in its standards.

IEEE makes no warranties or representations concerning its standards, and expressly disclaims all warranties, express or implied, concerning this standard, including but not limited to the warranties of merchantability, fitness for a particular purpose and non-infringement. In addition, IEEE does not warrant or represent that the use of the material contained in its standards is free from patent infringement. IEEE Standards documents are supplied “AS IS” and “WITH ALL FAULTS.”

Use of an IEEE standard is wholly voluntary. The existence of an IEEE Standard does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the IEEE standard. Furthermore, the viewpoint expressed at the time a standard is approved and issued is subject to change brought about through developments in the state of the art and comments received from users of the standard.

In publishing and making its standards available, IEEE is not suggesting or rendering professional or other services for, or on behalf of, any person or entity, nor is IEEE undertaking to perform any duty owed by any other person or entity to another. Any person utilizing any IEEE Standards document, should rely upon his or her own independent judgment in the exercise of reasonable care in any given circumstances or, as appropriate, seek the advice of a competent professional in determining the appropriateness of a given IEEE standard.

IN NO EVENT SHALL IEEE BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO: THE NEED TO PROCURE SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE PUBLICATION, USE OF, OR RELIANCE UPON ANY STANDARD, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE AND REGARDLESS OF WHETHER SUCH DAMAGE WAS FORESEEABLE.

Translations

The IEEE consensus development process involves the review of documents in English only. In the event that an IEEE standard is translated, only the English version published by IEEE is the approved IEEE standard.

Official statements

A statement, written or oral, that is not processed in accordance with the IEEE SA Standards Board Operations Manual shall not be considered or inferred to be the official position of IEEE or any of its committees and shall not be considered to be, nor be relied upon as, a formal position of IEEE. At lectures, symposia, seminars, or educational courses, an individual presenting information on IEEE standards shall make it clear that the presenter's views should be considered the personal views of that individual rather than the formal position of IEEE, IEEE SA, the Standards Committee, or the Working Group.

Comments on standards

Comments for revision of IEEE Standards documents are welcome from any interested party, regardless of membership affiliation with IEEE or IEEE SA. However, **IEEE does not provide interpretations, consulting information, or advice pertaining to IEEE Standards documents.**

Suggestions for changes in documents should be in the form of a proposed change of text, together with appropriate supporting comments. Since IEEE standards represent a consensus of concerned interests, it is important that any responses to comments and questions also receive the concurrence of a balance of interests. For this reason, IEEE and the members of its Societies and Standards Coordinating Committees are not able to provide an instant response to comments, or questions except in those cases where the matter has previously been addressed. For the same reason, IEEE does not respond to interpretation requests. Any person who would like to participate in evaluating comments or in revisions to an IEEE standard is welcome to join the relevant IEEE working group. You can indicate interest in a working group using the Interests tab in the Manage Profile & Interests area of the [IEEE SA myProject system](#). An IEEE Account is needed to access the application.

Comments on standards should be submitted using the [Contact Us](#) form.

Laws and regulations

Users of IEEE Standards documents should consult all applicable laws and regulations. Compliance with the provisions of any IEEE Standards document does not constitute compliance to any applicable regulatory requirements. Implementers of the standard are responsible for observing or referring to the applicable regulatory requirements. IEEE does not, by the publication of its standards, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Data privacy

Users of IEEE Standards documents should evaluate the standards for considerations of data privacy and data ownership in the context of assessing and using the standards in compliance with applicable laws and regulations.

Copyrights

IEEE draft and approved standards are copyrighted by IEEE under US and international copyright laws. They are made available by IEEE and are adopted for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of engineering practices and methods. By making these documents available for use and adoption by public authorities and private users, IEEE does not waive any rights in copyright to the documents.

Photocopies

Subject to payment of the appropriate licensing fees, IEEE will grant users a limited, non-exclusive license to photocopy portions of any individual standard for company or organizational internal use or individual, non-commercial use only. To arrange for payment of licensing fees, please contact Copyright Clearance Center, Customer Service, 222 Rosewood Drive, Danvers, MA 01923 USA; +1 978 750 8400; <https://www.copyright.com/>. Permission to photocopy portions of any individual standard for educational classroom use can also be obtained through the Copyright Clearance Center.

Updating of IEEE Standards documents

Users of IEEE Standards documents should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of amendments, corrigenda, or errata. An official IEEE document at any point in time consists of the current edition of the document together with any amendments, corrigenda, or errata then in effect.

Every IEEE standard is subjected to review at least every 10 years. When a document is more than 10 years old and has not undergone a revision process, it is reasonable to conclude that its contents, although still of some value, do not wholly reflect the present state of the art. Users are cautioned to check to determine that they have the latest edition of any IEEE standard.

In order to determine whether a given document is the current edition and whether it has been amended through the issuance of amendments, corrigenda, or errata, visit [IEEE Xplore](#) or [contact IEEE](#). For more information about the IEEE SA or IEEE's standards development process, visit the IEEE SA Website.

Errata

Errata, if any, for all IEEE standards can be accessed on the [IEEE SA Website](#). Search for standard number and year of approval to access the web page of the published standard. Errata links are located under the Additional Resources Details section. Errata are also available in [IEEE Xplore](#). Users are encouraged to periodically check for errata.

Patents

IEEE Standards are developed in compliance with the [IEEE SA Patent Policy](#).

Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken by the IEEE with respect to the existence or validity of any patent rights in connection therewith. If a patent holder or patent applicant has filed a statement of assurance via an Accepted Letter of Assurance, then the statement is listed on the IEEE SA Website at <https://standards.ieee.org/about/sasb/patcom/patents.html>. Letters of Assurance may indicate whether the Submitter is willing or unwilling to grant licenses under patent rights without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination to applicants desiring to obtain such licenses.

Essential Patent Claims may exist for which a Letter of Assurance has not been received. The IEEE is not responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of Patents Claims, or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. Further information may be obtained from the IEEE Standards Association.

IMPORTANT NOTICE

IEEE Standards do not guarantee or ensure safety, security, health, or environmental protection, or ensure against interference with or from other devices or networks. IEEE Standards development activities consider research and information presented to the standards development group in developing any safety recommendations. Other information about safety practices, changes in technology or technology implementation, or impact by peripheral systems also may be pertinent to safety considerations during implementation of the standard. Implementers and users of IEEE Standards documents are responsible for determining and complying with all appropriate safety, security, environmental, health, and interference protection practices and all applicable laws and regulations.

Participants

The following individuals were officers and members of the IEEE 802.3 Working Group at the beginning of the IEEE P802.3cr Working Group ballot:

David J. Law, IEEE 802.3 Working Group Chair
Adam Healey, IEEE 802.3 Working Group Vice-Chair
Jon Lewis, IEEE 802.3 Working Group Secretary
Steven B. Carlson, IEEE 802.3 Working Group Executive Secretary
Valerie Maguire, IEEE 802.3 Working Group Treasurer

Jon Lewis, IEEE P802.3cr Maintenance #14: Isolation Task Force Chair and Editor

David Abramson	Marek Hajduczenia	Mick McCarthy
Pete Anslow	Howard Heck	Brett McClellan
Michikazu Aono	Brian Holden	Larry McMillan
Nobuyasu Araki	Bernd Horrmeyer	Richard Mellitz
Tim Baggett	Yasuhiro Hyakutake	Shimon Muller
Thananya Baldwin	Jonathan Ingham	James Nadolny
Steven Baumgartner	Kazuhiko Ishibe	Edward Nakamoto
Denis Beaudoin	Hideki Isono	Paul Neveux
Gitesh Bhagwat	Tom Issenhuith	Gary Nicholl
Rich Boyer	Hiroaki Ito	Shawn Nicholl
David Brandt	Kenneth Jackson	Kevin Noll
Ralf-Peter Braun	Andrew Jimenez	Mark Nowell
Theodore Brillhart	John Johnson	David Ofelt
Paul Brooks	Chad Jones	Ryo Okabe
Matthew Brown	Peter Jones	Tom Palkert
Jairo Bustos Heredia	Lokesh Kabra	Carlos Pardo
Adrian Butter	Haysam Kadry	Earl Parsons
Clark Carty	Manabu Kagami	Gerald Pepper
David Chalupsky	Upen Kareti	David Piehler
Jacky Chang	Athanasios Kasapi	Fabio Pittala
Xin Chang	Yong Kim	Christopher Pohl
Chan Chen	Mark Kimber	William Powell
Golam Choudhury	Michael Klempa	Rick Rabinovich
Keng Hua Chuang	Curtis Knittle	Parthasarathy Raju
John D'Ambrosia	Elizabeth Kochuparambil	Adee Ran
Piers Dawe	Sam Kocsis	Alon Regev
Fred Dawson	Wojciech Koczwara	Duane Remein
Gerrit den Besten	Paul Kolesar	Victor Renteria
Claudio DeSanti	Taiji Kondo	Thomas Rettig
Curtis Donahue	Daniel Koppermueller	Hamid Salehi
Liang Du	Glen Kramer	Sam Sambasivan
Kathryn Dube	Taketo Kumada	Edward Sayre
Frank Effenberger	Hans Lackner	Matthew Schmitt
David Estes	Frank Lambrecht	Hossein Sedarat
John Ewen	Mark Laubach	Masood Shariff
Vincent Ferretti	Greg Le Cheminant	Masato Shiino
Brian Franchuk	Jon Lewis	Ramin Shirani
Matthias Fritsche	Mike-Peng Li	Kapil Shrikhande
Takashi Fukuoka	Alex Lin	Jeff Slavick
Ali Ghiasi	Hai-Feng Liu	Scott Sommers
Joel Goergen	William Lo	Edward Sprague
Steven Gorshe	Kent Lusted	Peter Stassar
Hideki Goto	Jeffery Maki	Heath Stewart
Steffen Graber	David Malicoat	Junqing Sun
Olaf Grau	Eric Maniloff	Steve Swanson
Robert Grow	Flavio Marques	Tomoo Takahara
Martin Gubow	Arthur Marris	Satoshi Takahashi
Mark Gustlin	Takeo Masuda	Tadashi Takahashi

Kazuya Takayama	Ed Ulrichs	Peter Wu
Michael Takefman	Alexander Umnov	Dayin Xu
Masaru Terada	Edward Walter	Yu Xu
Geoffrey Thompson	Roy Wang	Lennart Yseboodt
Piroot Tooyserkani	Xuehuan Wang	Conrad Zerna
Nathan Tracy	Dong Wei	Xingxin Zhang
David Tremblay	Matthias Wendt	Chunhui Zhu
Stephen Trowbridge	Natalie Wienckowski	Yan Zhuang
Mike Tu	Dance Wu	Martin Zielinski
		George Zimmerman

The following members of the individual balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

Robert Aiello	Peter Jones	R. K. Rannow
Thomas Alexander	Lokesh Kabra	Robert Robinson
Rich Boyer	Piotr Karocki	Toshiaki Sakai
Ralf-Peter Braun	Stuart Kerry	Frank Schewe
Theodore Brillhart	Yong Kim	Heath Stewart
Jairo Bustos Heredia	Taiji Kondo	Mitsutoshi Sugawara
William Byrd	Mark Laubach	Geoffrey Thompson
Steven B. Carlson	David J. Law	Michael Thompson
Juan Carreon	Hyeong Ho Lee	David Tremblay
Clark Carty	Jon Lewis	Mark-Rene Uchida
Pin Chang	Michael Lynch	George Vlantis
Chan Chen	Valerie Maguire	Lisa Ward
Avraham Freedman	Jeffery Maki	Keith Waters
Matthias Fritsche	Michael Maytum	James Weaver
Robert Grow	Brett McClellan	Karl Weber
Stephen Haddock	Jonathon Melendon	Matthias Wendt
Marek Hajduczenia	Richard Mellitz	Natalie Wienckowski
Adam Healey	Tremont Miao	Scott Willy
Marco Hernandez	Nick S.A. Nikjoo	Chun Yu Charles Wong
David Hess	Paul Nikolich	Peter Wu
Werner Hoelzl	Satoshi Obara	James Young
Gergely Huszak	Bansi Patel	Yu Yuan
Yasuhiro Hyakutake	Adee Ran	Oren Yuen
		George Zimmerman

When the IEEE SA Standards Board approved this standard on 9 February 2021, it had the following membership:

Gary Hoffman, Chair
Vacant Position, Vice Chair
John D. Kulick, Past Chair
Konstantinos Karachalios, Secretary

Edward A. Addy	Daozhuang Lin	Dorothy Stanley
Doug Edwards	Kevin Lu	Mehmet Ulema
Ramy Ahmed Fathy	Daleep C. Mohla	Lei Wang
J. Travis Griffith	Chenhui Niu	F. Keith Waters
Joseph L. Koepfinger*	Damir Novosel	Karl Weber
Thomas Koshy	Annette Reilly	Sha Wei
David J. Law	Jon Walter Rosdahl	Howard Wolfman
Howard Li		Daidi Zhong

*Member Emeritus

Introduction

This introduction is not part of IEEE Std 802.3cr-2021, IEEE Standard for Ethernet. Amendment 10: Maintenance #14: Isolation.

IEEE Std 802.3™ was first published in 1985. Since the initial publication, many projects have added functionality or provided maintenance updates to the specifications and text included in the standard. Each IEEE 802.3 project/amendment is identified with a suffix (e.g., IEEE Std 802.3ba™-2010).

The half duplex Media Access Control (MAC) protocol specified in IEEE Std 802.3-1985 is Carrier Sense Multiple Access with Collision Detection (CSMA/CD). This MAC protocol was key to the experimental Ethernet developed at Xerox Palo Alto Research Center, which had a 2.94 Mb/s data rate. Ethernet at 10 Mb/s was jointly released as a public specification by Digital Equipment Corporation (DEC), Intel and Xerox in 1980. Ethernet at 10 Mb/s was approved as an IEEE standard by the IEEE Standards Board in 1983 and subsequently published in 1985 as IEEE Std 802.3-1985. Since 1985, new media options, new speeds of operation, and new capabilities have been added to IEEE Std 802.3. A full duplex MAC protocol was added in 1997.

Some of the major additions to IEEE Std 802.3 are identified in the marketplace with their project number. This is most common for projects adding higher speeds of operation or new protocols. For example, IEEE Std 802.3u™ added 100 Mb/s operation (also called Fast Ethernet), IEEE Std 802.3z added 1000 Mb/s operation (also called Gigabit Ethernet), IEEE Std 802.3ae added 10 Gb/s operation (also called 10 Gigabit Ethernet), IEEE Std 802.3ah™ specified access network Ethernet (also called Ethernet in the First Mile) and IEEE Std 802.3ba added 40 Gb/s operation (also called 40 Gigabit Ethernet) and 100 Gb/s operation (also called 100 Gigabit Ethernet). These major additions are all now included in and are superseded by IEEE Std 802.3-2018 and are not maintained as separate documents.

At the date of IEEE Std 802.3cr-2021 publication, IEEE Std 802.3 was composed of the following documents:

IEEE Std 802.3-2018

Section One—Includes Clause 1 through Clause 20 and Annex A through Annex H and Annex 4A. Section One includes the specifications for 10 Mb/s operation and the MAC, frame formats and service interfaces used for all speeds of operation.

Section Two—Includes Clause 21 through Clause 33 and Annex 22A through Annex 33E. Section Two includes management attributes for multiple protocols and speed of operation as well as specifications for providing power over twisted pair cabling for multiple operational speeds. It also includes general information on 100 Mb/s operation as well as most of the 100 Mb/s Physical Layer specifications.

Section Three—Includes Clause 34 through Clause 43 and Annex 36A through Annex 43C. Section Three includes general information on 1000 Mb/s operation as well as most of the 1000 Mb/s Physical Layer specifications.

Section Four—Includes Clause 44 through Clause 55 and Annex 44A through Annex 55B. Section Four includes general information on 10 Gb/s operation as well as most of the 10 Gb/s Physical Layer specifications.

Section Five—Includes Clause 56 through Clause 77 and Annex 57A through Annex 76A. Clause 56 through Clause 67 and Clause 75 through Clause 77, as well as associated annexes, specify subscriber access and other Physical Layers and sublayers for operation from 512 kb/s to 10 Gb/s, and defines

services and protocol elements that enable the exchange of IEEE Std 802.3 format frames between stations in a subscriber access network. Clause 68 specifies a 10 Gb/s Physical Layer specification. Clause 69 through Clause 74 and associated annexes specify Ethernet operation over electrical backplanes at speeds of 1000 Mb/s and 10 Gb/s.

Section Six—Includes Clause 78 through Clause 95 and Annex 83A through Annex 93C. Clause 78 specifies Energy-Efficient Ethernet. Clause 79 specifies IEEE 802.3 Organizationally Specific Link Layer Discovery Protocol (LLDP) type, length, and value (TLV) information elements. Clause 80 through Clause 95 and associated annexes include general information on 40 Gb/s and 100 Gb/s operation as well the 40 Gb/s and 100 Gb/s Physical Layer specifications. Clause 90 specifies Ethernet support for time synchronization protocols.

Section Seven—Includes Clause 96 through Clause 115 and Annex 97A through Annex 115A. Clause 96 through Clause 98, Clause 104, and associated annexes, specify Physical Layers and optional features for 100 Mb/s and 1000 Mb/s operation over a single twisted pair. Clause 100 through Clause 103, as well as associated annexes, specify Physical Layers for the operation of the EPON protocol over coaxial distribution networks. Clause 105 through Clause 114 and associated annexes include general information on 25 Gb/s operation as well as 25 Gb/s Physical Layer specifications. Clause 99 specifies a MAC merge sublayer for the interspersing of express traffic. Clause 115 and its associated annex specify a Physical Layer for 1000 Mb/s operation over plastic optical fiber.

Section Eight—Includes Clause 116 through Clause 126 and Annex 119A through Annex 120E. Clause 116 through Clause 124 and associated annexes include general information on 200 Gb/s and 400 Gb/s operation as well the 200 Gb/s and 400 Gb/s Physical Layer specifications. Clause 125 and Clause 126 include general information on 2.5 Gb/s and 5 Gb/s operation as well as 2.5 Gb/s and 5 Gb/s Physical Layer specifications.

IEEE Std 802.3cb™-2018

Amendment 1—This amendment includes changes to IEEE Std 802.3-2018 and its amendments, and adds Clause 127 through Clause 130, Annex 127A, Annex 128A, Annex 128B, and Annex 130A. This amendment adds new Physical Layers for operation at 2.5 Gb/s and 5 Gb/s over electrical backplanes.

IEEE Std 802.3bt™-2018

Amendment 2—This amendment includes changes to IEEE Std 802.3-2018 and adds Clause 145, Annex 145A, Annex 145B, and Annex 145C. This amendment adds power delivery using all four pairs in the structured wiring plant, resulting in greater power being available to end devices. This amendment also allows for lower standby power consumption in end devices and adds a mechanism to better manage the available power budget.

IEEE Std 802.3cd™-2018

Amendment 3—This amendment includes changes to IEEE Std 802.3-2018 and adds Clause 131 through Clause 140 and Annex 135A through Annex 136D. This amendment adds MAC parameters, Physical Layers, and management parameters for the transfer of IEEE 802.3 format frames at 50 Gb/s, 100 Gb/s, and 200 Gb/s.

IEEE Std 802.3cn™-2019

Amendment 4—This amendment includes changes to IEEE Std 802.3-2018 and adds 50 Gb/s, 200 Gb/s, and 400 Gb/s Physical Layer specifications and management parameters for operation over single-mode fiber with reaches of at least 40 km.

IEEE Std 802.3cg™-2019

Amendment 5—This amendment includes changes to IEEE Std 802.3-2018 and its amendments and adds Clause 146 through Clause 148 and Annex 146A and Annex 146B. This amendment adds 10 Mb/s Physical Layer specifications and management parameters for operation on a single balanced pair of conductors.

IEEE Std 802.3cq™-2020

Amendment 6—This amendment includes editorial and technical corrections, refinements, and clarifications to Clause 33 and related portions of the standard.

IEEE Std 802.3cm™-2020

Amendment 7—This amendment includes changes to IEEE Std 802.3-2018 and adds Clause 150. This amendment adds Physical Layer (PHY) specifications and management parameters for 400 Gb/s operation on four pairs (400GBASE-SR4.2) and eight pairs (400GBASE-SR8) of multimode fiber, over reaches of at least 100 m.

IEEE Std 802.3ch™-2020

Amendment 8—This amendment includes changes to IEEE Std 802.3-2018 and adds Clause 149, Annex 149A, Annex 149B, and Annex 149C. This amendment adds physical layer specifications and management parameters for operation at 2.5 Gb/s, 5 Gb/s, and 10 Gb/s over a single balanced pair of conductors.

IEEE Std 802.3ca™-2020

Amendment 9—This amendment to IEEE Std 802.3-2018 extends the operation of Ethernet passive optical networks (EPONs) to multiple channels of 25 Gb/s providing both symmetric and asymmetric operation for the following data rates (downstream/upstream): 25/10 Gb/s, 25/25 Gb/s, 50/10 Gb/s, 50/25 Gb/s, and 50/50 Gb/s. This amendment specifies the 25 Gb/s EPON Multi-Channel Reconciliation Sublayer (MCRS), Nx25G-EPON Physical Coding Sublayers (PCSs), Physical Media Attachment (PMA) sublayers, and Physical Medium Dependent (PMD) sublayers that support both symmetric and asymmetric data rates while maintaining backward compatibility with already deployed 10 Gb/s EPON equipment. The EPON operation is defined for distances of at least 20 km, and for a split ratio of at least 1:32.

IEEE Std 802.3cr™-2021

Amendment 10—This amendment includes changes to IEEE Std 802.3-2018 and adds Annex J. This amendment replaces references to the IEC 60950 series of standards (including IEC 60950-1 “Information technology equipment—Safety—Part 1: General requirements”) with appropriate references to the IEC 62368 “Audio/video, information and communication technology equipment” series and makes appropriate changes to the standard corresponding to the new references.

Two companion documents exist, IEEE Std 802.3.1 and IEEE Std 802.3.2. IEEE Std 802.3.1 describes Ethernet management information base (MIB) modules for use with the Simple Network Management Protocol (SNMP). IEEE Std 802.3.2 describes YANG data models for Ethernet. IEEE Std 802.3.1 and IEEE Std 802.3.2 are updated to add management capability for enhancements to IEEE Std 802.3 after approval of those enhancements.

IEEE Std 802.3 will continue to evolve. New Ethernet capabilities are anticipated to be added within the next few years as amendments to this standard.

Contents

1. Introduction.....	23
1.3 Normative references	23
8. Medium Attachment Unit and baseband medium specifications, type 10BASE5	24
8.3 MAU—medium electrical characteristics	24
8.3.2 MAU electrical characteristics.....	24
8.3.2.1 Electrical isolation	24
8.7 Environmental specifications.....	24
8.7.1 General safety requirements	24
8.8 Protocol implementation conformance statement (PICS) proforma for Clause 8, Medium Attachment Unit and baseband medium specifications, type 10BASE5	25
8.8.6 PICS proforma tables for MAU	25
8.8.6.8 MAU electrical characteristics.....	25
8.8.6.11 Safety requirements	26
9. Repeater unit for 10 Mb/s baseband networks.....	27
9.9 Medium attachment unit and baseband medium specification for a vendor-independent FOIRL	27
9.9.3 FOMAU electrical characteristics	27
9.9.3.1 Electrical isolation	27
10. Medium attachment unit and baseband medium specifications, type 10BASE2	28
10.8 Environmental specifications.....	28
10.8.3 Regulatory requirements.....	28
12. Physical signaling, medium attachment, and baseband medium specifications, type 1BASE5.....	29
12.10 Safety	29
12.10.1 Isolation	29
14. Twisted-pair medium attachment unit (MAU) and baseband medium, type 10BASE-T including type 10BASE-Te.....	30
14.3 MAU electrical specifications	30
14.3.1 MAU-to-MDI interface characteristics.....	30
14.3.1.1 Isolation requirements <u>Electrical isolation</u>	30
14.7 Environmental specifications.....	30
14.7.1 General safety	30
14.10 Protocol implementation conformance statement (PICS) proforma for Clause 14, Twisted-pair medium attachment unit (MAU) and baseband medium, type 10BASE-T and type 10BASE-Te.....	30
14.10.4 PICS proforma for 10BASE-T	30
14.10.4.5 PICS proforma tables for MAU	30
14.10.4.5.11 Isolation requirements <u>Electrical isolation</u>	30
14.10.4.5.15 Safety requirements	31

15. Fiber optic medium and common elements of medium attachment units and star, type 10BASE-F	32
15.3 Characteristics of the fiber optic medium	32
15.3.4 Electrical isolation	32
15.8 Protocol implementation conformance statement (PICS) proforma for Clause 15, Fiber optic medium and common elements of medium attachment units and star, type 10BASE-F	33
15.8.6 PICS Proforma for the fiber optic medium	33
15.8.6.4 Electrical isolation requirements	33
23. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 100BASE-T4	34
23.5 PMA electrical specifications	34
23.5.1 PMA-to-MDI interface characteristics	34
23.5.1.1 Isolation requirement	34
23.9 Environmental specifications	34
23.9.1 General safety	34
25. Physical Medium Dependent (PMD) sublayer and baseband medium, type 100BASE-TX	35
25.4 Specific requirements and exceptions	35
25.4.6 Replacement of 8.4.1, "UTP isolation requirements"	35
25.6 Protocol implementation conformance statement (PICS) proforma for Clause 25, Physical Medium Dependent (PMD) sublayer and baseband medium, type 100BASE-TX	36
25.6.4 PICS proforma tables for the Physical Medium Dependent (PMD) sublayer and baseband medium, type 100BASE-TX	36
25.6.4.2 PMD compliance	36
27. Repeater for 100 Mb/s baseband networks	37
27.5 Environmental specifications	37
27.5.1 General safety	37
32. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 100BASE-T2	38
32.6 PMA electrical specifications	38
32.6.1 PMA-to-MDI interface characteristics	38
32.6.1.1 Isolation requirement	38
32.10 Environmental specifications	38
32.10.1 General safety	38
33. Power over Ethernet over 2 Pairs	39
33.4 Additional electrical specifications	39
33.4.1 <u>Electrical isolation</u>	39
33.7 Environmental	39
33.7.1 General safety	39
33.8 Protocol implementation conformance statement (PICS) proforma for Clause 33, Power over Ethernet over 2 Pairs	40
33.8.3 PICS proforma tables for Power over Ethernet over 2 Pairs	40
33.8.3.4 Electrical specifications applicable to the PSE and PD	40

33.8.3.9	Environmental specifications applicable to PSEs and PDs	40
33.8.3.10	Environmental specifications applicable to the PSE	41
38.	Physical Medium Dependent (PMD) sublayer and baseband medium, type 1000BASE-LX (long wavelength laser) and 1000BASE-SX (short wavelength laser)	42
38.7	Environmental specifications	42
38.7.1	General safety	42
38.12	Protocol implementation conformance statement (PICS) proforma for Clause 38, Physical Medium Dependent (PMD) sublayer and baseband medium, type 1000BASE-LX (Long Wavelength Laser) and 1000BASE-SX (Short Wavelength Laser)	43
38.12.4	PICS proforma tables for Physical Medium Dependent (PMD) sublayer and baseband medium, type 1000BASE-LX (Long Wavelength Laser) and 1000BASE-SX (Short Wavelength Laser)	43
38.12.4.5	Optical measurement requirements	43
40.	Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 1000BASE-T	44
40.6	PMA electrical specifications	44
40.6.1	PMA-to-MDI interface tests	44
40.6.1.1	Isolation requirement <u>Electrical isolation</u>	44
40.9	Environmental specifications	44
40.9.1	General safety	44
40.12	Protocol implementation conformance statement (PICS) proforma for Clause 40—Physical coding sublayer (PCS), physical medium attachment (PMA) sublayer and baseband medium, type 1000BASE-T	45
40.12.7	PMA Electrical Specifications	45
40.12.10	General safety and environmental requirements	46
41.	Repeater for 1000 Mb/s baseband networks	47
41.4	Environmental specifications	47
41.4.1	General safety	47
52.	Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-S (short wavelength serial), 10GBASE-L (long wavelength serial), and 10GBASE-E (extra long wavelength serial)	48
52.10	Environmental specifications	48
52.10.1	General safety	48
52.15	Protocol implementation conformance statement (PICS) proforma for Clause 52, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-S (short wavelength serial), 10GBASE-L (long wavelength serial), and 10GBASE-E (extra long wavelength serial)	49
52.15.3	PICS proforma tables for Physical Medium Dependent (PMD) sublayer and baseband medium, types 10GBASE-R and 10GBASE-W	49
52.15.3.11	Environmental specifications	49
53.	Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-LX4	50
53.10	Environmental specifications	50
53.10.1	General safety	50

53.15	Protocol implementation conformance statement (PICS) proforma for Clause 53, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-LX4	51
53.15.4	PICS proforma tables for 10GBASE-LX4 and baseband medium.....	51
53.15.4.5	Optical measurement requirements	51
55.	Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 10GBASE-T.....	52
55.5	PMA electrical specifications	52
55.5.1	Isolation requirement Electrical isolation.....	52
55.9	Environmental specifications.....	52
55.9.1	General safety	52
55.12	Protocol implementation conformance statement (PICS) proforma for Clause 55—Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 10GBASE-T.....	53
55.12.6	PMA electrical specifications	53
55.12.9	General safety and environmental requirements	53
58.	Physical Medium Dependent (PMD) sublayer and medium, type 100BASE-LX10 (Long Wavelength) and 100BASE-BX10 (Bi-Directional Long Wavelength)	54
58.8	Environmental, safety, and labeling	54
58.8.1	General safety	54
58.10	Protocol implementation conformance statement (PICS) proforma for Clause 58, Physical Medium Dependent (PMD) sublayer and medium, type 100BASE-LX10 (Long Wavelength) and 100BASE-BX10 (Bi-Directional Long Wavelength)	55
58.10.3	PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 100BASE-LX10 and 100BASE-BX10.....	55
58.10.3.6	Environmental specifications.....	55
59.	Physical Medium Dependent (PMD) sublayer and medium, type 1000BASE-LX10 (Long Wavelength) and 1000BASE-BX10 (Bi-Directional Long Wavelength)	56
59.8	Environmental, safety, and labeling specifications	56
59.8.1	General safety.....	56
59.10	Protocol implementation conformance statement (PICS) proforma for Clause 59, Physical Medium Dependent (PMD) sublayer and medium, type 1000BASE-LX10 (Long Wavelength) and 1000BASE-BX10 (Bi-Directional Long Wavelength)	57
59.10.3	Major capabilities/options.....	57
59.10.3.6	Environmental, safety, and labeling specifications	57
60.	Physical Medium Dependent (PMD) sublayer and medium, type 1000BASE-PX (long wavelength passive optical networks)	58
60.10	Environmental, safety, and labeling	58
60.10.1	General safety	58
60.12	Protocol implementation conformance statement (PICS) proforma for Clause 60, Physical Medium Dependent (PMD) sublayer and medium, type 1000BASE-PX (long wavelength passive optical networks).....	59
60.12.4	PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 1000BASE-PX (long wavelength passive optical networks).....	59
60.12.4.12	Environmental specifications.....	59
70.	Physical Medium Dependent sublayer and baseband medium, type 1000BASE-KX	60

70.9	Environmental specifications.....	60
70.9.1	General safety	60
70.10	Protocol implementation conformance statement (PICS) proforma for Clause 70, Physical Medium Dependent (PMD) sublayer and baseband medium, type 1000BASE-KX.....	61
70.10.4	PICS proforma tables for Clause 70, Physical Medium Dependent (PMD) sublayer and baseband medium, type 1000BASE-KX	61
70.10.4.5	Environmental and safety specifications	61
71.	Physical Medium Dependent sublayer and baseband medium, type 10GBASE-KX4.....	62
71.9	Environmental specifications.....	62
71.9.1	General safety	62
71.10	Protocol implementation conformance statement (PICS) proforma for Clause 71, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-KX4.....	63
71.10.4	PICS proforma tables for Clause 71, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-KX4.....	63
71.10.4.6	Environmental and safety specifications	63
72.	Physical Medium Dependent sublayer and baseband medium, type 10GBASE-KR.....	64
72.9	Environmental specifications.....	64
72.9.1	General safety	64
72.10	Protocol implementation conformance statement (PICS) proforma for Clause 72, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-KR	65
72.10.4	PICS proforma tables for Clause 72, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-KR.....	65
72.10.4.7	Environmental specifications.....	65
75.	Physical Medium Dependent (PMD) sublayer and medium for passive optical networks, type 10GBASE-PR and 10/1GBASE-PRX.....	66
75.8	Environmental, safety, and labeling	66
75.8.1	General safety	66
75.10	Protocol implementation conformance statement (PICS) proforma for Clause 75, Physical Medium Dependent (PMD) sublayer and medium for passive optical networks, type 10GBASE-PR and 10/1GBASE-PRX.....	67
75.10.4	PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium for passive optical networks, type 10GBASE-PR and 10/1GBASE-PRX.....	67
75.10.4.19	Environmental specifications.....	67
84.	Physical Medium Dependent sublayer and baseband medium, type 40GBASE-KR4.....	68
84.10	Environmental specifications.....	68
84.10.1	General safety	68
84.11	Protocol implementation conformance statement (PICS) proforma for Clause 84, Physical Medium Dependent sublayer and baseband medium, type 40GBASE-KR4	69
84.11.4	PICS proforma tables for Clause 84, Physical Medium Dependent (PMD) sublayer and baseband medium, type 40GBASE-KR4.....	69
84.11.4.5	Environmental specifications.....	69
86.	Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-SR4 and 100GBASE-SR10	70
86.9	Safety, installation, environment, and labeling.....	70

86.9.1	General safety	70
86.11	Protocol implementation conformance statement (PICS) proforma for Clause 86, Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-SR4 and 100GBASE-SR10	71
86.11.4	PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, types 40GBASE-SR4 and 100GBASE-SR10	71
86.11.4.5	Environmental and safety specifications	71
87.	Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-LR4 and 40GBASE-ER4	72
87.9	Safety, installation, environment, and labeling	72
87.9.1	General safety	72
87.13	Protocol implementation conformance statement (PICS) proforma for Clause 87, Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-LR4 and 40GBASE-ER4	73
87.13.4	PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-LR4 and 40GBASE-ER4	73
87.13.4.6	Environmental specifications	73
88.	Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-LR4 and 100GBASE-ER4	74
88.9	Safety, installation, environment, and labeling	74
88.9.1	General safety	74
88.12	Protocol implementation conformance statement (PICS) proforma for Clause 88, Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-LR4 and 100GBASE-ER4	75
88.12.4	PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, types 100GBASE-LR4 and 100GBASE-ER4	75
88.12.4.6	Environmental specifications	75
89.	Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-FR	76
89.8	Safety, installation, environment, and labeling	76
89.8.1	General safety	76
89.11	Protocol implementation conformance statement (PICS) proforma for Clause 89, Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-FR	77
89.11.4	PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-FR	77
89.11.4.5	Environmental specifications	77
93.	Physical Medium Dependent (PMD) sublayer and baseband medium, type 100GBASE-KR4	78
93.10	Environmental specifications	78
93.10.1	General safety	78
93.11	Protocol implementation conformance statement (PICS) proforma for Clause 93, Physical Medium Dependent (PMD) sublayer and baseband medium, type 100GBASE-KR4	79
93.11.4	PICS proforma tables for Physical Medium Dependent (PMD) sublayer and baseband medium, type 100GBASE-KR4	79
93.11.4.5	Environmental specifications	79
94.	Physical Medium Attachment (PMA) sublayer, Physical Medium Dependent (PMD) sublayer, and baseband medium, type 100GBASE-KP4	80

94.5	Environmental specifications.....	80
94.5.1	General safety	80
94.6	Protocol implementation conformance statement (PICS) proforma for Clause 94, Physical Medium Attachment (PMA) sublayer, Physical Medium Dependent (PMD) sublayer, and baseband medium, type 100GBASE-KP4	81
94.6.4	PICS proforma tables for Physical Medium Attachment (PMA) sublayer, Physical Medium Dependent (PMD) sublayer, and baseband medium, type 100GBASE-KP4	81
94.6.4.6	Environment specifications.....	81
95.	Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-SR4	82
95.9	Safety, installation, environment, and labeling.....	82
95.9.1	General safety	82
95.12	Protocol implementation conformance statement (PICS) proforma for Clause 95, Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-SR4.....	83
95.12.4	PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-SR4	83
95.12.4.5	Environmental specifications.....	83
96.	Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 100BASE-T1	84
96.9	Environmental specifications.....	84
96.9.1	General safety	84
96.11	Protocol implementation conformance statement (PICS) proforma for Clause 96, Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 100BASE-T1	85
96.11.4	PICS proforma tables for Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 100BASE-T1	85
96.11.4.9	Environmental specifications.....	85
97.	Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, type 1000BASE-T1	86
97.9	Environmental specifications.....	86
97.9.1	General safety	86
97.11	Protocol implementation conformance statement (PICS) proforma for Clause 97, Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, type 1000BASE-T1	87
97.11.13	Environmental specifications.....	87
100.	Physical Medium Dependent (PMD) sublayer, and medium for coaxial distribution networks, type 10GPASS-XR	88
100.5	Environmental, safety, and labeling	88
100.5.1	General safety	88
100.7	Protocol implementation conformance statement (PICS) proforma for Clause 100, Physical Medium Dependent (PMD) sublayer and medium for coaxial cable distribution networks, type 10GPASS-XR	89
100.7.3	PICS proforma tables for Physical Medium Dependent (PMD) sublayer for coax cable distribution networks, type 10GPASS-XR.....	89
100.7.3.3	Environmental specifications.....	89
104.	Power over Data Lines (PoDL) of Single-Pair Ethernet.....	90

104.8 Environmental.....	90
104.8.1 General safety	90
104.9 Protocol implementation conformance statement (PICS) proforma for Clause 104, Power over Data Lines (PoDL) of Single-Pair Ethernet.....	91
104.9.4 PICS proforma tables for Clause 104, Power over Data Lines (PoDL) of Single-Pair Ethernet.....	91
104.9.4.8 Environmental.....	91
112. Physical Medium Dependent (PMD) sublayer and medium, type 25GBASE-SR	92
112.8 Safety, installation, environment, and labeling.....	92
112.8.1 General safety	92
112.11 Protocol implementation conformance statement (PICS) proforma for Clause 112, Physical Medium Dependent (PMD) sublayer and medium, type 25GBASE-SR	93
112.11.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 25GBASE-SR	93
112.11.4.5 Environmental specifications.....	93
113. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, types 25GBASE-T and 40GBASE-T	94
113.5 PMA electrical specifications	94
113.5.1 Isolation requirement Electrical isolation.....	94
113.9 Environmental specifications.....	94
113.9.1 General safety	94
113.12 Protocol implementation conformance statement (PICS) proforma for Clause 113, Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, types 25GBASE-T and 40GBASE-T	95
113.12.6 PMA Electrical Specifications.....	95
113.12.10 General safety and environmental requirements	95
122. Physical Medium Dependent (PMD) sublayer and medium, type 200GBASE-FR4, 200GBASE-LR4, 200GBASE-ER4, 400GBASE-FR8, 400GBASE-LR8, and 400GBASE-ER8.....	96
122.9 Safety, installation, environment, and labeling.....	96
122.9.1 General safety	96
122.12 Protocol implementation conformance statement (PICS) proforma for Clause 122, Physical Medium Dependent (PMD) sublayer and medium, type 200GBASE-FR4, 200GBASE-LR4, 200GBASE-ER4, 400GBASE-FR8, 400GBASE-LR8, and 400GBASE-ER8.....	97
122.12.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 200GBASE-FR4, 200GBASE-LR4, 200GBASE-ER4, 400GBASE-FR8, 400GBASE-LR8, and 400GBASE-ER8.....	97
122.12.4.8 Environmental specifications.....	97
126. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, types 2.5GBASE-T and 5GBASE-T	98
126.5 PMA electrical specifications	98
126.5.1 Isolation requirement Electrical isolation.....	98
126.9 Environmental specifications.....	98
126.9.1 General safety	98
126.12 Protocol implementation conformance statement (PICS) proforma for Clause 126—Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, types 2.5GBASE-T and 5GBASE-T	99

126.12.5 PMA Electrical Specifications	99
126.12.9 General safety and environmental requirements	99
128. Physical Medium Dependent sublayer and baseband medium, type 2.5GBASE-KX.....	100
128.9 Environmental specifications.....	100
128.9.1 General safety	100
128.10 Protocol implementation conformance statement (PICS) proforma for Clause 128, Physical Medium Dependent sublayer and baseband medium, type 2.5GBASE-KX	101
128.10.4 PICS proforma tables for Clause 128, Physical Medium Dependent (PMD) sublayer and baseband medium, type 2.5GBASE-KX.....	101
128.10.4.5 Environmental and safety specifications	101
130. Physical Medium Dependent sublayer and baseband medium, type 5GBASE-KR.....	102
130.9 Environmental specifications.....	102
130.9.1 General safety	102
130.10 Protocol implementation conformance statement (PICS) proforma for Clause 130, Physical Medium Dependent (PMD) sublayer and baseband medium, type 5GBASE-KR	103
130.10.4 PICS proforma tables for Clause 130, Physical Medium Dependent (PMD) sublayer and baseband medium, type 5GBASE-KR.....	103
130.10.4.6 Environmental specifications.....	103
138. Physical Medium Dependent (PMD) sublayer and medium, type 50GBASE-SR, 100GBASE-SR2, 200GBASE-SR4, 400GBASE-SR8	104
138.9 Safety, installation, environment, and labeling.....	104
138.9.1 General safety	104
138.11 Protocol implementation conformance statement (PICS) proforma for Clause 138, Physical Medium Dependent (PMD) sublayer and medium, type 50GBASE-SR, 100GBASE-SR2, 200GBASE-SR4, 400GBASE-SR8.....	105
138.11.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 50GBASE-SR, 100GBASE-SR2, 200GBASE-SR4, 400GBASE-SR8 ..	105
138.11.4.5 Environmental specifications.....	105
139. Physical Medium Dependent (PMD) sublayer and medium, type 50GBASE-FR, 50GBASE-LR, and 50GBASE-ER	106
139.8 Safety, installation, environment, and labeling.....	106
139.8.1 General safety	106
139.11 Protocol implementation conformance statement (PICS) proforma for Clause 139, Physical Medium Dependent (PMD) sublayer and medium, type 50GBASE-FR, 50GBASE-LR, and 50GBASE-ER	107
139.11.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 50GBASE-FR, 50GBASE-LR, and 50GBASE-ER	107
139.11.4.6 Environmental specifications.....	107
140. Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-DR	108
140.8 Safety, installation, environment, and labeling.....	108
140.8.1 General safety	108
140.11 Protocol implementation conformance statement (PICS) proforma for Clause 140, Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-DR	109

140.11.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-DR	109
140.11.4.5 Environmental specifications.....	109
141. Physical Medium Dependent (PMD) sublayer and medium for Nx25G-EPON passive optical networks.....	110
141.8 Environmental, safety, and labeling	110
141.8.1 General safety	110
141.10 Protocol implementation conformance statement (PICS) proforma for Clause 141, Physical Medium Dependent (PMD) sublayer and medium for Nx25G-EPON passive optical networks.....	111
141.10.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium for passive optical networks, type 25/10GBASE-PQ, 25GBASE-PQ, 50/10GBASE-PQ, 50/25GBASE-PQ, and 50GBASE-PQ.....	111
141.10.4.44 Environmental specifications.....	111
145. Power over Ethernet.....	112
145.4 Additional electrical specifications.....	112
145.4.1 <u>Electrical</u> isolation	112
145.6 Environmental.....	113
145.6.1 General safety	113
145.7 Protocol implementation conformance statement (PICS) proforma for Clause 145, Power over Ethernet.....	114
145.7.3 PICS proforma tables for Power over Ethernet	114
145.7.3.3 Electrical specifications applicable to the PSE and PD.....	114
145.7.3.7 Environmental specifications applicable to PSEs and PDs	114
145.7.3.8 Environmental specifications applicable to the PSE	114
146. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 10BASE-T1L	115
146.9 Environmental specifications.....	115
146.9.1 General safety.....	115
146.11 Protocol implementation conformance statement (PICS) proforma for Clause 146, Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 10BASE-T1L	116
146.11.4 PICS proforma tables for Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 10BASE-T1L.....	116
146.11.4.6 Environmental specifications.....	116
147. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 10BASE-T1S	117
147.10 Environmental specifications.....	117
147.10.1 General safety	117
150. Physical Medium Dependent (PMD) sublayer and medium, type 400GBASE-SR4.2	118
150.9 Safety, installation, environment, and labeling.....	118
150.9.1 General safety	118
150.11 Protocol implementation conformance statement (PICS) proforma for Clause 150, Physical Medium Dependent (PMD) sublayer and medium, type 400GBASE-SR4.2.....	119

150.11.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-SR4.2	119
150.11.4.5 Environmental specifications.....	119
Annex J (normative) Electrical isolation and general safety	120
J.1 Electrical isolation.....	120
J.2 General safety	120
J.3 Protocol implementation conformance statement (PICS) proforma for Annex J, Electrical isolation and general safety.....	121
J.3.1 Introduction.....	121
J.3.2 Identification.....	121
J.3.2.1 Implementation identification.....	121
J.3.2.2 Protocol summary	121
J.3.3 Major capabilities/options.....	122
J.3.4 PICS proforma tables for electrical isolation and general safety.....	122
J.3.4.1 Electrical isolation	122
J.3.4.2 General safety	122
Annex 83A (normative) 40 Gb/s Attachment Unit Interface (XLAUI) and 100 Gb/s ten-lane Attachment Unit Interface (CAUI-10).....	123
83A.6 Environmental specifications.....	123
83A.6.1 General safety	123
83A.7 Protocol implementation conformance statement (PICS) proforma for Annex 83A, 40 Gb/s Attachment Unit Interface (XLAUI) and 100 Gb/s ten-lane Attachment Unit Interface (CAUI-10).....	124
83A.7.7 Environmental specifications.....	124
Annex 83B (normative) Chip-to-module 40 Gb/s Attachment Unit Interface (XLAUI) and 100 Gb/s ten-lane Attachment Unit Interface (CAUI-10).....	125
83B.3 Environmental specifications.....	125
83B.3.1 General safety	125
83B.4 Protocol implementation conformance statement (PICS) proforma for Annex 83B, Chip-to-module 40 Gb/s Attachment Unit Interface (XLAUI) and 100 Gb/s ten-lane Attachment Unit Interface (CAUI-10).....	126
83B.4.6 Environmental specifications.....	126
Annex 86A (normative) Parallel Physical Interface (nPPI) for 40GBASE-SR4 and 40GBASE-LR4 (XLPPI) and 100GBASE-SR10 (CPPI)	127
86A.7 Safety, installation, environment, and labeling.....	127
86A.7.1 General safety	127
86A.8 Protocol implementation conformance statement (PICS) proforma for Annex 86A, Parallel Physical Interface (nPPI) for 40GBASE-SR4 and 40GBASE-LR4 (XLPPI) and 100GBASE-SR10 (CPPI)	128
86A.8.4 PICS proforma tables for Parallel Physical Interface (nPPI) for 40GBASE-SR4 and 40GBASE-LR4 (XLPPI) and 100GBASE-SR10 (CPPI).....	128
86A.8.4.4 Environmental and safety specifications	128

IEEE Standard for Ethernet

Amendment 10: Maintenance #14: Isolation

(This amendment is based on IEEE Std 802.3™-2018 as amended by IEEE Std 802.3cb™-2018, IEEE Std 802.3bt™-2018, IEEE Std 802.3cd™-2018, IEEE Std 802.3cn™-2019, IEEE Std 802.3cg™-2019, IEEE Std 802.3cq™-2020, IEEE Std 802.3cm™-2020, IEEE Std 802.3ch™-2020, and IEEE Std 802.3ca™-2020.)

NOTE—The editing instructions contained in this amendment define how to merge the material contained therein into the existing base standard and its amendments to form the comprehensive standard.

The editing instructions are shown in ***bold italic***. Four editing instructions are used: change, delete, insert, and replace. ***Change*** is used to make corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed by using ~~striketrough~~ (to remove old material) and underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Deletions and insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. ***Replace*** is used to make changes in figures or equations by removing the existing figure or equation and replacing it with a new one. Editing instructions, change markings, and this NOTE will not be carried over into future editions because the changes will be incorporated into the base standard.

Cross references that refer to clauses, tables, equations, or figures not covered by this amendment are highlighted in green.¹

¹ Notes in text, tables, and figures are given for information only and do not contain requirements needed to implement the standard.

1. Introduction

1.3 Normative references

Change the reference for IEC 62368-1 (as inserted by IEEE Std 802.3cg-2019) as follows:

IEC 62368-1:2018⁴, Audio/video, information and communication technology equipment—Part 1: Safety requirements.²

Insert the following new reference in alphanumeric order:

ITU-T Recommendation K.44, 2019—Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents—Basic Recommendation.³

²IEC publications are available from the International Electrotechnical Commission (<https://www.iec.ch/>) and the American National Standards Institute (<https://www.ansi.org>).

³ITU-T publications are available from the International Telecommunications Union (<https://www.itu.int/>).

8. Medium Attachment Unit and baseband medium specifications, type 10BASE5

8.3 MAU—medium electrical characteristics

8.3.2 MAU electrical characteristics

8.3.2.1 Electrical isolation

Change 8.3.2.1 as follows:

The MAU provides isolation between the AUI cable and the coaxial trunk cable. This isolation shall meet the isolation requirements as specified in J.1.

~~The MAU must provide isolation between the AUI cable and the coaxial trunk cable. This isolation shall withstand at least one of the following electrical strength tests:~~

- a) ~~1500 V-rms at 50 Hz to 60 Hz for 60 s, applied as specified in 5.3.2 of IEC 60950: 1991.~~
- b) ~~2250 Vdc for 60 s, applied as specified in 5.3.2 of IEC 60950: 1991.~~
- e) ~~A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses shall be 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time of half value), as defined in IEC 60060.~~

~~There shall be no isolation breakdown, as defined in 5.3.2 of IEC 60950: 1991, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 Vdc. In addition, the isolation impedance between the DTE and the coaxial cable shield shall be less than 15 Ω between 3 MHz and 30 MHz.~~

CAUTION

The current electrical isolation requirement is a change that was incorporated into IEEE Std 802.3-1996. Older editions of IEEE Std 802.3 had a significantly lower isolation requirement.

8.7 Environmental specifications

8.7.1 General safety requirements

Change 8.7.1 as follows:

~~All stations~~All Physical Layer MDIs meeting this standard shall conform to ~~IEC 60950: 1991~~the general safety requirements as specified in J.2.

8.8 Protocol implementation conformance statement (PICS) proforma for Clause 8, Medium Attachment Unit and baseband medium specifications, type 10BASE5⁴**8.8.6 PICS proforma tables for MAU****8.8.6.8 MAU electrical characteristics***Change the table in 8.8.6.8 as follows:*

Item	Parameter	Reference	Status	Support	Value/Comment
1	Isolation impedance between MDI and AUI cable (each conductor, including shields)	8.3.2.1	M	Yes [] No []	$\geq 250 \text{ k}\Omega$ at 60 Hz, $< 15 \text{ }\Omega$ for 3 MHz to 30 MHz Conforms to J.1
2	Breakdown voltage	8.3.2.1	M	Yes [] No []	$\geq 1.5 \text{ kV ac, rms}$
3 2	Current drawn from AUI sources	8.3.2.2	M	Yes [] No []	$\leq 0.5 \text{ A}$
4 3	Operation over VP voltage range	8.3.2.2	M	Yes [] No []	11.28–15.75 V, any permissible AUI cable
5 4	Low VP circuit behavior	8.3.2.2	M	Yes [] No []	No disruption of media
6 5	MAU current labeling	8.3.2.2	M	Yes [] No []	Current consumption shall be labeled externally
7 6	Reliability	8.3.2.3	M	Yes [] No []	MTBF ≥ 1 million hours of continuous operation

⁴Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

8.8.6.11 Safety requirements*Change the row for item 2 in the table in 8.8.6.11 as follows (unchanged rows not shown):*

Item	Parameter	Reference	Status	Support	Value/Comment
...					
2	General safety	8.7.1	M	Yes [] No []	Conforms to IEC 60950: 1994 <u>Conforms to J.2</u>
...					

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

9. Repeater unit for 10 Mb/s baseband networks

9.9 Medium attachment unit and baseband medium specification for a vendor-independent FOIRL

9.9.3 FOMAU electrical characteristics

9.9.3.1 Electrical isolation

Insert a new note at the beginning of 9.9.3.1 as follows:

NOTE—Since February 2021, electrical isolation requirements are in J.1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

10. Medium attachment unit and baseband medium specifications, type 10BASE2

10.8 Environmental specifications

10.8.3 Regulatory requirements

Change 10.8.3 as follows:

NOTE—Since September 2011, maintenance changes are no longer being considered for this clause. Since February 2021, electrical isolation requirements are in J.1.

The MAU and medium should consider IEC 60950 in addition to local and national regulations. See IEC 60950 and MIL-C-17F-1983 [B51].

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

12. Physical signaling, medium attachment, and baseband medium specifications, type 1BASE5

12.10 Safety

12.10.1 Isolation

Insert a new note at the beginning of 12.10.1 as follows:

NOTE—Since September 2003, maintenance changes are no longer being considered for this clause. Since February 2021, electrical isolation requirements are in J.1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

14. Twisted-pair medium attachment unit (MAU) and baseband medium, type 10BASE-T including type 10BASE-Te

14.3 MAU electrical specifications

14.3.1 MAU-to-MDI interface characteristics

Change the title and text of 14.3.1.1 (as modified by IEEE Std 802.3bt-2018) as follows:

~~14.3.1.1 Isolation requirement~~ Electrical isolation

A MAU with a MDI that is a PI (see 33.1.3) shall meet the isolation requirements defined in 33.4.1 or 145.4.1.

A MAU with a MDI that is not a PI shall provide isolation between the DTE Physical Layer circuits including frame ground and all MDI leads including those not used by 10BASE-T.

This electrical isolation shall meet the isolation requirements as specified in J.1, ~~withstand at least one of the following electrical strength tests:~~

- a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001.
- b) 2250 V de for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001.
- e) A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses shall be 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time of half value), as defined in IEC 60950-1:2001 Annex N.

~~There shall be no insulation breakdown, as defined in subclause 5.2.2 of IEC 60950-1:2001, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 V de.~~

14.7 Environmental specifications

14.7.1 General safety

Change 14.7.1 as follows:

An MAU meeting this standard shall conform to the general safety requirements as specified in J.2. ~~All equipment meeting this standard shall conform to IEC 60950-1.~~

14.10 Protocol implementation conformance statement (PICS) proforma for Clause 14, Twisted-pair medium attachment unit (MAU) and baseband medium, type 10BASE-T and type 10BASE-Te⁵

14.10.4 PICS proforma for 10BASE-T

14.10.4.5 PICS proforma tables for MAU

Change the title of 14.10.4.5.11 as follows:

~~14.10.4.5.11 Isolation requirements~~ Electrical isolation

⁵Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

Change the table in 14.10.4.5.11 as follows:

	Parameter	Subclause	Req	Imp	Value/Comment
IR1 IR1a	Isolation, MDI leads to DTE Physical Layer circuits Electrical isolation	14.3.1.1	C		Any one of three tests listed in 14.3.1.1 Function provided by MAUs that do not encompass the PI of a PD within their MDI. Conforms to J.1
IR1b	Isolation, MDI leads to all external conductors	14.3.1.1	E		Any of the three tests listed in 14.3.1.1 Function provided by MAUs that encompass the PI of a PD within their MDI.
IR2	Resistance after breakdown test	14.3.1.1	M		$\geq 2 \text{ M}\Omega$ at 500 Vdc

14.10.4.5.15 Safety requirements

Change item SR3 in the table in 14.10.4.5.15 as follows (unchanged rows not shown):

	Parameter	Subclause	Req	Imp	Value/Comment
...					
SR3	General safety	14.7.1	M		Conforms to IEC 60950:1994 Conforms to J.2
...					

15. Fiber optic medium and common elements of medium attachment units and star, type 10BASE-F

15.3 Characteristics of the fiber optic medium

15.3.4 Electrical isolation

Change 15.3.4 as follows:

Electrical isolation shall be provided between MDIs attached to the fiber optic cable. There shall be no conducting path between the optical medium connector plug and any conducting element within the fiber optic cable. This isolation shall meet the isolation requirements as specified in J.1. ~~withstand at least one of the following electrical strength tests:~~

- a) ~~1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in 5.3.2 of IEC 60950:1991.~~
- b) ~~2250 Vdc for 60 s, applied as specified in 5.3.2 of IEC 60950:1991.~~
- e) ~~A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses shall be 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time of half value) as defined in IEC 60060.~~

~~There shall be no isolation breakdown, as defined in 5.3.2 of IEC 60950:1991, during the test. The resistance after the test shall be at least 2 M Ω measured at 500 Vdc.~~

15.8 Protocol implementation conformance statement (PICS) proforma for Clause 15, Fiber optic medium and common elements of medium attachment units and star, type 10BASE-F⁶**15.8.6 PICS Proforma for the fiber optic medium****15.8.6.4 Electrical isolation requirements***Change the table in 15.8.6.4 as follows:*

Item	Feature	Subclause	Value/Comment	Status	Support
IR1	Electrical isolation, optical connector plug to any electrically conducting element in cable	15.3.4	Any one of three tests listed in 15.3.4 <u>Conforms to J.1</u>	M	Yes [<input type="checkbox"/>]
IR2	Resistance after breakdown test	15.3.4	> 2 MΩ measured at 500 Vdc	M	Yes [<input type="checkbox"/>]

⁶Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

23. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 100BASE-T4

23.5 PMA electrical specifications

23.5.1 PMA-to-MDI interface characteristics

23.5.1.1 Isolation requirement

Insert a new note at the beginning of 23.5.1.1 as follows:

NOTE—Since September 2003, maintenance changes are no longer being considered for this clause. Since February 2021, electrical isolation requirements are in J.1.

23.9 Environmental specifications

23.9.1 General safety

Change 23.9.1 as follows:

NOTE—Since September 2003, maintenance changes are no longer being considered for this clause. Since February 2021, safety information is in J.2.

All equipment meeting this standard shall conform to IEC 60950: 1991.

25. Physical Medium Dependent (PMD) sublayer and baseband medium, type 100BASE-TX

25.4 Specific requirements and exceptions

25.4.6 Replacement of 8.4.1, “UTP isolation requirements”

Change 25.4.6 (as modified by IEEE Std 802.3bt-2018) as follows:

A PMD with a MDI that is a PI (see 33.1.3 and 145.1.3) shall meet the isolation requirements defined in 33.4.1 and 145.4.1.

A PMD with a MDI that is not a PI shall provide isolation between frame ground and all MDI leads including those not used by the 100BASE-TX PMD.

This electrical isolation shall meet the isolation requirements as specified in J.1. ~~withstand at least one of the following electrical strength tests.~~

- a) ~~1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001.~~
- b) ~~2250 V de for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001.~~
- e) ~~A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses shall be 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time of half value), as defined in IEC 60950-1:2001 Annex N.~~

~~There shall be no insulation breakdown, as defined in subclause 5.2.2 of IEC 60950-1:2001, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 V de.~~

NOTE—In the case of a PMD with a MDI that is not a PI, these requirements are equivalent to those found in TP-PMD.

25.6 Protocol implementation conformance statement (PICS) proforma for Clause 25, Physical Medium Dependent (PMD) sublayer and baseband medium, type 100BASE-TX⁷**25.6.4 PICS proforma tables for the Physical Medium Dependent (PMD) sublayer and baseband medium, type 100BASE-TX****25.6.4.2 PMD compliance***Change item PD7 in the table in 25.6.4.2 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Status	Support	Value/Comment
...					
PD7	Isolation requirements	25.4.6	M		<u>Conforms to J.1</u>

⁷Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

27. Repeater for 100 Mb/s baseband networks

27.5 Environmental specifications

27.5.1 General safety

Insert a new note at the beginning of 27.5.1 as follows:

NOTE—Since September 2011, maintenance changes are no longer being considered for this clause. Since February 2021, safety information is in J.2.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

32. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 100BASE-T2

32.6 PMA electrical specifications

32.6.1 PMA-to-MDI interface characteristics

32.6.1.1 Isolation requirement

Insert a new note at the beginning of 32.6.1.1 as follows:

NOTE—Since September 2003, maintenance changes are no longer being considered for this clause. Since February 2021, electrical isolation requirements are in J.1.

32.10 Environmental specifications

32.10.1 General safety

Change 32.10.1 as follows:

NOTE—Since September 2003, maintenance changes are no longer being considered for this clause. Since February 2021, safety information is in J.2.

All equipment meeting this standard shall conform to IEC 60950.

33. Power over Ethernet over 2 Pairs

33.4 Additional electrical specifications

Change the title and text of 33.4.1 as follows:

33.4.1 Electrical isolation

PDs and PSEs shall provide isolation between all accessible external conductors, including frame ground (if any), and all MDI leads including those not used by the PD or PSE. Any equipment that can be connected to a PSE or PD through a non-MDI connector that is not isolated from the MDI leads needs to provide isolation between all accessible external conductors, including frame ground (if any), and the non-MDI connector. ~~Accessible external conductors are specified in subclause 6.2.1 b) of IEC 60950-1:2001.~~

This electrical isolation shall meet the isolation requirements as specified in J.1 with electrical strength test c) details being replaced by: “An impulse test consisting of a 1500 V, 10/700 μ s waveform, applied 10 times, with a 60 s interval between pulses. The shape of the impulses is 10/700 (10 μ s virtual front time, 700 μ s virtual time to half value), as defined in ITU-T Recommendation K.44.”~~withstand at least one of the following electrical strength tests:~~

- a) ~~1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001.~~
- b) ~~2250 V de for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001.~~
- e) An impulse test consisting of a 1500 V, 10/700 μ s waveform, applied 10 times, with a 60 s interval between pulses. The shape of the impulses shall be 10/700 μ s (10 μ s virtual front time, 700 μ s virtual time to half value), as defined in IEC 60950-1:2001 Annex N.

~~There shall be no insulation breakdown, as defined in subclause 5.2.2 of IEC 60950-1:2001, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 V de.~~

Conductive link segments that have differing isolation and grounding requirements shall have those requirements provided by the port-to-port isolation of network interface devices (NID).

33.7 Environmental

33.7.1 General safety

Change 33.7.1 as follows:

All equipment subject to this clause shall conform to ~~IEC 60950-1~~ the general safety requirements as specified in J.2. In particular, the PSE shall be classified as a Limited Power Source in accordance with IEC 60950-1 Annex Q of IEC 62368-1:2018, as applicable.

Equipment shall comply with all applicable local and national codes related to safety.

33.8 Protocol implementation conformance statement (PICS) proforma for Clause 33, Power over Ethernet over 2 Pairs⁸**33.8.3 PICS proforma tables for Power over Ethernet over 2 Pairs****33.8.3.4 Electrical specifications applicable to the PSE and PD**

Change the rows for items EL1 through EL5 in the table in 33.8.3.4 (as modified by IEEE Std 802.3bt-2018) as follows (unchanged rows not shown) and renumber existing items EL6 and above accordingly:

Item	Feature	Subclause	Value/Comment	Status	Support
EL1	Conductor isolation	33.4.1	Provided between accessible external conductors including frame ground and all MDI leads Conforms to J.1 with electrical strength test c) details as specified in 33.4.1	M	Yes []
EL2	Strength tests for electrical isolation	33.4.1	Withstand at least one of the electrical strength tests specified in 33.4.1	M	Yes []
EL3	Insulation breakdown	33.4.1	No breakdown of insulation during electrical isolation tests	M	Yes []
EL4	Isolation resistance	33.4.1	At least 2 MΩ, measured at 500 Vdc after electrical isolation tests	M	Yes []
EL5 EL2	Isolation and grounding requirements	33.4.1	Conductive link segments that have different requirements have those requirements provided by the port-to-port isolation of the NID	M	Yes []
...					

33.8.3.9 Environmental specifications applicable to PSEs and PDs

Change the rows for items ES1 and ES2 in the table in 33.8.3.9 as follows (unchanged rows not shown):

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	Safety	33.7.1	Conforms to J.2 IEC 60950-1:2001	M	Yes []
ES2	PSE classified as a limited power source	33.7.1	In accordance with IEC 60950-1:2001 Annex Q of IEC 62368-1:2018, as applicable	M	Yes []
...					

⁸Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

33.8.3.10 Environmental specifications applicable to the PSE*Change the table in 33.8.3.10 as follows:*

Item	Feature	Subclause	Value/Comment	Status	Support
PSEES1	Safety	33.7.1	Limited Power Source in accordance with IEC 60950-1:2001 <u>Annex Q of IEC 62368-1:2018, as applicable</u>	M	Yes []

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

38. Physical Medium Dependent (PMD) sublayer and baseband medium, type 1000BASE-LX (long wavelength laser) and 1000BASE-SX (short wavelength laser)

38.7 Environmental specifications

38.7.1 General safety

Change 38.7.1 as follows:

All equipment ~~meeting this standard~~ subject to this clause shall conform to the general safety requirements as specified in J.2.1EC-60950:1991.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

38.12 Protocol implementation conformance statement (PICS) proforma for Clause 38, Physical Medium Dependent (PMD) sublayer and baseband medium, type 1000BASE-LX (Long Wavelength Laser) and 1000BASE-SX (Short Wavelength Laser)⁹**38.12.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and baseband medium, type 1000BASE-LX (Long Wavelength Laser) and 1000BASE-SX (Short Wavelength Laser)****38.12.4.5 Optical measurement requirements***Change the row for item OR30 in the table in 38.12.4.5 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
...					
OR30	Compliance with IEC 60950-1991 General safety	38.7.1	<u>Conforms to J.2</u>	M	Yes []
...					

⁹Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

40. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 1000BASE-T**40.6 PMA electrical specifications****40.6.1 PMA-to-MDI interface tests**

Change the title and text of 40.6.1.1 (as modified by IEEE Std 802.3bt-2018) as follows:

40.6.1.1 ~~Isolation requirement~~ Electrical isolation

A PHY with a MDI that is a PI (see 33.1.3) shall meet the isolation requirements defined in 33.4.1 or 145.4.1.

A PHY with a MDI that is not a PI shall provide electrical isolation between the port device circuits, including frame ground (if any) and all MDI leads. This electrical isolation shall meet the isolation requirements as specified in J.1. ~~withstand at least one of the following electrical strength tests:~~

- a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001.
- b) 2250 V dc for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001.
- e) A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses shall be 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time of half value), as defined in IEC 60950-1:2001 Annex N.

~~There shall be no insulation breakdown, as defined in subclause 5.2.2 of IEC 60950-1:2001, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 V dc.~~

40.9 Environmental specifications**40.9.1 General safety**

Change 40.9.1 as follows:

All equipment meeting this standard shall conform to the general safety requirements as specified in J.2. ~~IEC 60950:1991.~~

**40.12 Protocol implementation conformance statement (PICS) proforma for
Clause 40—Physical coding sublayer (PCS), physical medium attachment (PMA)
sublayer and baseband medium, type 1000BASE-T¹⁰****40.12.7 PMA Electrical Specifications**

Change the rows for items PME1 through PME5 in the table in 40.12.7 as follows (unchanged rows not shown) and renumber existing items PME6 and above accordingly:

Item	Feature	Subclause	Status	Support	Value/Comment
PME1	The PHY shall provide electrical isolation between <u>Electrical isolation</u>	40.6.1.1	!PD:M	Yes [] N/A []	The port device circuits including frame ground, and all MDI leads. <u>Conforms to J:1.</u>
PME2	The PHY shall provide electrical isolation between	40.6.1.1	PD:M	Yes [] N/A []	All external conductors, including frame ground, and all MDI leads.
PME3	PHY provided electrical isolation shall withstand at least one of three electrical strength tests	40.6.1.1	M	Yes []	a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001. b) 2250 V dc for 60 s, applied as specified in subclause 5.2.2 of IEC 60950-1:2001. c) A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses shall be 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time or half value), as defined in IEC IEC 60950-1:2001 Annex N.
PME4	There shall be no insulation breakdown as defined in Section 5.3.2 of IEC 60950, during the test.	40.6.1.1	M	Yes []	
PME5	The resistance after the test shall be at least	40.6.1.1	M	Yes []	$\geq 2 \text{ M}\Omega$, measured at 500 Vdc.
...					

¹⁰Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

40.12.10 General safety and environmental requirements

Change the row for item ENV1 in the table in 40.12.10 as follows (unchanged rows not shown):

Item	Feature	Subclause	Status	Support	Value/Comment
ENV1	Conformance to safety specifications	40.9.1	M	Yes []	IEC 60950. <u>Conforms to J.2.</u>
...					

41. Repeater for 1000 Mb/s baseband networks

41.4 Environmental specifications

41.4.1 General safety

Change 41.4.1 as follows:

NOTE—Since September 2011, maintenance changes are no longer being considered for this clause. Since February 2021, safety information is in J.2.

All equipment meeting this standard shall conform to IEC 60950: 1991.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

52. Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-S (short wavelength serial), 10GBASE-L (long wavelength serial), and 10GBASE-E (extra long wavelength serial)

52.10 Environmental specifications

52.10.1 General safety

Change 52.10.1 as follows:

All equipment meeting this standard shall conform to the general safety requirements as specified in J.2.1.

52.15 Protocol implementation conformance statement (PICS) proforma for Clause 52, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-S (short wavelength serial), 10GBASE-L (long wavelength serial), and 10GBASE-E (extra long wavelength serial)¹¹**52.15.3 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and baseband medium, types 10GBASE-R and 10GBASE-W****52.15.3.11 Environmental specifications***Change the row for item ES1 in the table in 52.15.3.11 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	52.10.1	Conforms to IEC 60950-1 Conforms to J.2	M	Yes []
...					

¹¹Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

53. Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-LX4

53.10 Environmental specifications

53.10.1 General safety

Change 53.10.1 as follows:

All equipment meeting this standard shall conform to the general safety requirements as specified in J.2.1EC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

53.15 Protocol implementation conformance statement (PICS) proforma for Clause 53, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-LX4¹²**53.15.4 PICS proforma tables for 10GBASE-LX4 and baseband medium****53.15.4.5 Optical measurement requirements***Change the row for item OM43 in the table in 53.15.4.5 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
...					
OM43	General safety	53.10.1	Conform to IEC 60950-1 <u>Conforms to J.2</u>	M	Yes []
...					

¹²Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

55. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 10GBASE-T**55.5 PMA electrical specifications**

Change the title and text of 55.5.1 (as modified by IEEE Std 802.3bt-2018) as follows:

55.5.1 ~~Isolation requirement~~ Electrical isolation

~~A PHY with a MDI that is a PI (see 33.1.3) shall meet the isolation requirements defined in 33.4.1 or 145.4.1.~~

A PHY with a MDI that is not a PI shall provide electrical isolation between the port device circuits, including frame ground (if any) and all MDI leads. This electrical isolation shall meet the isolation requirements as specified in J.1, ~~withstand at least one of the following electrical strength tests:~~

- ~~a) 1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in Section 5.2.2 of IEC 60950-1:2001.~~
- ~~b) 2250 V de for 60 s, applied as specified in Section 5.2.2 of IEC 60950-1:2001.~~
- ~~c) A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses is 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time or half value), as defined in Annex N of IEC 60950-1:2001.~~

~~There shall be no insulation breakdown, as defined in Section 5.2.2 of IEC 60950-1:2001, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 V de.~~

55.9 Environmental specifications**55.9.1 General safety**

Change 55.9.1 as follows:

All equipment meeting this standard shall conform to the general safety requirements as specified in J.2. ~~IEC 60950-1.~~

**55.12 Protocol implementation conformance statement (PICS) proforma for
Clause 55—Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA)
sublayer and baseband medium, type 10GBASE-T¹³****55.12.6 PMA electrical specifications**

Change the rows for items PME1 and PME2 in the table in 55.12.6 as follows (unchanged rows not shown) and renumber existing items PME3 and above accordingly:

Item	Feature	Subclause	Status	Support	Value/Comment
PME1	Electrical isolation	55.5.1	M	Yes []	One of three electrical strength tests listed in 55.5.1 Conforms to J.1
PME2	Insulation breakdown after test	55.5.1	M	Yes []	>2 MΩ, measured at 500 V de
...					

55.12.9 General safety and environmental requirements

Change the row for item ENV1 in the table in 55.12.9 as follows (unchanged rows not shown):

Item	Feature	Subclause	Status	Support	Value/Comment
ENV1	Conformance to safety specifications	55.9.1	M	Yes []	IEC 60950-1 Conforms to J.2
...					

¹³Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so it can be used for its intended purpose and may further publish the completed PICS.

58. Physical Medium Dependent (PMD) sublayer and medium, type 100BASE-LX10 (Long Wavelength) and 100BASE-BX10 (Bi-Directional Long Wavelength)

58.8 Environmental, safety, and labeling

58.8.1 General safety

Change 58.8.1 as follows:

All equipment meeting this standard shall conform to the general safety requirements as specified in J.2.1.

58.10 Protocol implementation conformance statement (PICS) proforma for Clause 58, Physical Medium Dependent (PMD) sublayer and medium, type 100BASE-LX10 (Long Wavelength) and 100BASE-BX10 (Bi-Directional Long Wavelength)¹⁴**58.10.3 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 100BASE-LX10 and 100BASE-BX10****58.10.3.6 Environmental specifications***Change the row for item ES1 in the table in 58.10.3.6 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	58.8.1	Conforms to IEC 60950-1 Conforms to J.2	M	Yes []
...					

¹⁴Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

59. Physical Medium Dependent (PMD) sublayer and medium, type 1000BASE-LX10 (Long Wavelength) and 1000BASE-BX10 (Bi-Directional Long Wavelength)

59.8 Environmental, safety, and labeling specifications

59.8.1 General safety

Change 59.8.1 as follows:

All equipment meeting this standard shall conform to the general safety requirements as specified in J.2.1. ~~IEC 60950-1.~~

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

59.10 Protocol implementation conformance statement (PICS) proforma for Clause 59, Physical Medium Dependent (PMD) sublayer and medium, type 1000BASE-LX10 (Long Wavelength) and 1000BASE-BX10 (Bi-Directional Long Wavelength)¹⁵**59.10.3 Major capabilities/options****59.10.3.6 Environmental, safety, and labeling specifications**

Change the row for item ES1 in the table in 59.10.3.6 as follows (unchanged rows not shown):

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	59.8.1	Conforms to IEC 60950-1. Conforms to J.2.	M	Yes []
...					

¹⁵Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

60. Physical Medium Dependent (PMD) sublayer and medium, type 1000BASE-PX (long wavelength passive optical networks)

60.10 Environmental, safety, and labeling

60.10.1 General safety

Change 60.10.1 as follows:

All equipment meeting this standard shall conform to the general safety requirements as specified in J.2.1. ~~IEC 60950-1.~~

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

60.12 Protocol implementation conformance statement (PICS) proforma for Clause 60, Physical Medium Dependent (PMD) sublayer and medium, type 1000BASE-PX (long wavelength passive optical networks)¹⁶**60.12.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 1000BASE-PX (long wavelength passive optical networks)****60.12.4.12 Environmental specifications***Change the row for item ES1 in the table in 60.12.4.12 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	60.10.1	Conforms to IEC 60950-1 <u>Conforms to J.2</u>	M	Yes []
...					

¹⁶Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

70. Physical Medium Dependent sublayer and baseband medium, type 1000BASE-KX

70.9 Environmental specifications

70.9.1 General safety

Change 70.9.1 as follows:

All equipment that meets the requirements of this standard shall conform to the applicable requirements of Annex J, sections (including isolation requirements) of IEC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

70.10 Protocol implementation conformance statement (PICS) proforma for Clause 70, Physical Medium Dependent (PMD) sublayer and baseband medium, type 1000BASE-KX¹⁷**70.10.4 PICS proforma tables for Clause 70, Physical Medium Dependent (PMD) sublayer and baseband medium, type 1000BASE-KX****70.10.4.5 Environmental and safety specifications***Change the row for item ES1 in the table in 70.10.4.5 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	70.9.1	Conforms to IEC 60950-1 Conforms to the applicable requirements of Annex J	M	Yes []
...					

¹⁷Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

71. Physical Medium Dependent sublayer and baseband medium, type 10GBASE-KX4

71.9 Environmental specifications

71.9.1 General safety

Change 71.9.1 as follows:

All equipment that meets the requirements of this standard shall conform to the applicable requirements of Annex J sections (including isolation requirements) of IEC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

71.10 Protocol implementation conformance statement (PICS) proforma for Clause 71, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-KX4¹⁸**71.10.4 PICS proforma tables for Clause 71, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-KX4****71.10.4.6 Environmental and safety specifications**

Change the row for item ES1 in the table in 71.10.4.6 as follows (unchanged rows not shown):

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	71.9.1	Conforms to IEC 60950-1 Conforms to applicable requirements of Annex J	M	Yes []
...					

¹⁸Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

72. Physical Medium Dependent sublayer and baseband medium, type 10GBASE-KR

72.9 Environmental specifications

72.9.1 General safety

Change 72.9.1 as follows:

All equipment that meets the requirements of this standard shall conform to the applicable requirements of Annex J sections (including isolation requirements) of IEC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

72.10 Protocol implementation conformance statement (PICS) proforma for Clause 72, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-KR¹⁹**72.10.4 PICS proforma tables for Clause 72, Physical Medium Dependent (PMD) sublayer and baseband medium, type 10GBASE-KR****72.10.4.7 Environmental specifications***Change the row for item ES1 in the table in 72.10.4.7 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	72.9.1	Complies with applicable section of IEC 60950-1 <u>Conforms to applicable requirements of Annex J</u>	M	Yes []
...					

¹⁹Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

75. Physical Medium Dependent (PMD) sublayer and medium for passive optical networks, type 10GBASE-PR and 10/1GBASE-PRX

75.8 Environmental, safety, and labeling

75.8.1 General safety

Change 75.8.1 as follows:

All equipment subject to this clause shall conform to the general safety requirements as specified in J.2.1EC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

75.10 Protocol implementation conformance statement (PICS) proforma for Clause 75, Physical Medium Dependent (PMD) sublayer and medium for passive optical networks, type 10GBASE-PR and 10/1GBASE-PRX²⁰**75.10.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium for passive optical networks, type 10GBASE-PR and 10/1GBASE-PRX****75.10.4.19 Environmental specifications***Change the row for item ES1 in the table in 75.10.4.19 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	75.8.1	Conforms to IEC 60950-1 <u>Conforms to J.2</u>	M	Yes []
...					

²⁰Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

84. Physical Medium Dependent sublayer and baseband medium, type 40GBASE-KR4

84.10 Environmental specifications

84.10.1 General safety

Change 84.10.1 as follows:

All equipment subject to this clause shall conform to the applicable requirements of Annex J, sections
~~(including isolation requirements) of IEC 60950-1.~~

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

84.11 Protocol implementation conformance statement (PICS) proforma for Clause 84, Physical Medium Dependent sublayer and baseband medium, type 40GBASE-KR4²¹**84.11.4 PICS proforma tables for Clause 84, Physical Medium Dependent (PMD) sublayer and baseband medium, type 40GBASE-KR4****84.11.4.5 Environmental specifications***Change the row for item ES1 in the table in 84.11.4.5 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	84.10.1	Complies with applicable section of IEC 60950-1 Conforms to applicable requirements of Annex J	M	Yes []
...					

²¹Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

86. Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-SR4 and 100GBASE-SR10

86.9 Safety, installation, environment, and labeling

86.9.1 General safety

Change 86.9.1 as follows:

All equipment subject to this clause shall conform to the general safety requirements as specified in J.2.1EC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

86.11 Protocol implementation conformance statement (PICS) proforma for Clause 86, Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-SR4 and 100GBASE-SR10²²**86.11.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, types 40GBASE-SR4 and 100GBASE-SR10****86.11.4.5 Environmental and safety specifications***Change the row for item SES1 in the table in 86.11.4.5 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
SES1	General safety	86.9.1	Conforms to IEC 60950-1 <u>Conforms to J.2</u>	M	Yes []
...					

²²Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

87. Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-LR4 and 40GBASE-ER4

87.9 Safety, installation, environment, and labeling

87.9.1 General safety

Change 87.9.1 as follows:

All equipment subject to this clause shall conform to the general safety requirements as specified in J.2.1.1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

87.13 Protocol implementation conformance statement (PICS) proforma for Clause 87, Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-LR4 and 40GBASE-ER4²³**87.13.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-LR4 and 40GBASE-ER4****87.13.4.6 Environmental specifications***Change the row for item XLES1 in the table in 87.13.4.6 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
XLES1	General safety	87.9.1	Conforms to IEC 60950-1 <u>Conforms to J.2</u>	M	Yes []
...					

²³Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

88. Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-LR4 and 100GBASE-ER4

88.9 Safety, installation, environment, and labeling

88.9.1 General safety

Change 88.9.1 as follows:

All equipment subject to this clause shall conform to the general safety requirements as specified in J.2.1EC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

88.12 Protocol implementation conformance statement (PICS) proforma for Clause 88, Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-LR4 and 100GBASE-ER4²⁴**88.12.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, types 100GBASE-LR4 and 100GBASE-ER4****88.12.4.6 Environmental specifications***Change the row for item CES1 in the table in 88.12.4.6 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
CES1	General safety	88.9.1	Conforms to IEC 60950-1 <u>Conforms to J.2</u>	M	Yes []
...					

²⁴Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

89. Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-FR

89.8 Safety, installation, environment, and labeling

89.8.1 General safety

Change 89.8.1 as follows:

All equipment subject to this clause shall conform to the general safety requirements as specified in J.2.1EC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

89.11 Protocol implementation conformance statement (PICS) proforma for Clause 89, Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-FR²⁵**89.11.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 40GBASE-FR****89.11.4.5 Environmental specifications***Change the row for item XLES1 in the table in 89.11.4.5 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
XLES1	General safety	89.8.1	Conforms to IEC 60950-1 <u>Conforms to J.2</u>	M	Yes []
...					

²⁵Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

93. Physical Medium Dependent (PMD) sublayer and baseband medium, type 100GBASE-KR4

93.10 Environmental specifications

93.10.1 General safety

Change 93.10.1 as follows:

All equipment subject to this clause shall conform to the applicable requirements of Annex J, sections
~~(including isolation requirements) of IEC 60950-1.~~

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

93.11 Protocol implementation conformance statement (PICS) proforma for Clause 93, Physical Medium Dependent (PMD) sublayer and baseband medium, type 100GBASE-KR4²⁶**93.11.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and baseband medium, type 100GBASE-KR4****93.11.4.5 Environmental specifications***Change the row for item ES1 in the table in 93.11.4.5 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	93.10.1	Conform to applicable sections of IEC 60950-1 <u>Conforms to applicable requirements of Annex J</u>	M	Yes []
...					

²⁶Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

94. Physical Medium Attachment (PMA) sublayer, Physical Medium Dependent (PMD) sublayer, and baseband medium, type 100GBASE-KP4

94.5 Environmental specifications

94.5.1 General safety

Change 94.5.1 as follows:

All equipment subject to this clause shall conform to the applicable requirements of Annex J, sections
~~(including isolation requirements) of IEC 60950-1.~~

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

94.6 Protocol implementation conformance statement (PICS) proforma for Clause 94, Physical Medium Attachment (PMA) sublayer, Physical Medium Dependent (PMD) sublayer, and baseband medium, type 100GBASE-KP4²⁷**94.6.4 PICS proforma tables for Physical Medium Attachment (PMA) sublayer, Physical Medium Dependent (PMD) sublayer, and baseband medium, type 100GBASE-KP4****94.6.4.6 Environment specifications***Change the row for item ES1 in the table in 94.6.4.6 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	94.5.1	Complies with application section of IEC 60950-1 <u>Conforms to applicable requirements of Annex J</u>	M	Yes []
...					

²⁷Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

95. Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-SR4

95.9 Safety, installation, environment, and labeling

95.9.1 General safety

Change 95.9.1 as follows:

All equipment subject to this clause shall conform to the general safety requirements as specified in J.2.1EC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

95.12 Protocol implementation conformance statement (PICS) proforma for Clause 95, Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-SR4²⁸**95.12.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 100GBASE-SR4****95.12.4.5 Environmental specifications***Change the row for item CES1 in the table in 95.12.4.5 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
CES1	General safety	95.9.1	Conforms to IEC 60950-1 <u>Conforms to J.2</u>	M	Yes []
...					

²⁸Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

96. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 100BASE-T1

96.9 Environmental specifications

96.9.1 General safety

Change 96.9.1 as follows:

All equipment subject to this clause is expected to conform to all applicable local, state, national and application-specific standards.

~~All equipment subject to this clause shall conform to IEC 60950-1 (for IT and motor vehicle applications) and to ISO 26262 (for motor vehicle applications only, if required by the given application). All equipment subject to this clause may be additionally required to conform to any applicable local, state, or national standards or as agreed to between the customer and supplier.~~

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

96.11 Protocol implementation conformance statement (PICS) proforma for Clause 96, Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 100BASE-T1²⁹

96.11.4 PICS proforma tables for Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 100BASE-T1

96.11.4.9 Environmental specifications

Delete the rows for items ES1 and ES2 in the table in 96.11.4.9 and renumber the remaining items accordingly.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

²⁹Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

97. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, type 1000BASE-T1

97.9 Environmental specifications

97.9.1 General safety

Change 97.9.1 as follows:

All equipment subject to this clause is expected to conform to all applicable local, state, national and application-specific standards.

~~All equipment subject to this clause shall conform to IEC 60950-1 (for IT and motor vehicle applications) and to ISO 26262 (for motor vehicle applications only, if required by the given application). All equipment subject to this clause may be additionally required to conform to any applicable local, state, or national standards or as agreed to between the customer and supplier.~~

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

**97.11 Protocol implementation conformance statement (PICS) proforma for
Clause 97, Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA)
sublayer, and baseband medium, type 1000BASE-T1³⁰**

97.11.13 Environmental specifications

Delete the rows for items ES1 and ES2 in the table in 97.11.13 and renumber the remaining items accordingly.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

³⁰Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

100. Physical Medium Dependent (PMD) sublayer, and medium for coaxial distribution networks, type 10GPASS-XR

100.5 Environmental, safety, and labeling

100.5.1 General safety

Change 100.5.1 as follows:

All equipment subject to this clause shall conform to the general safety requirements as specified in J.2.1EC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

100.7 Protocol implementation conformance statement (PICS) proforma for Clause 100, Physical Medium Dependent (PMD) sublayer and medium for coaxial cable distribution networks, type 10GPASS-XR³¹**100.7.3 PICS proforma tables for Physical Medium Dependent (PMD) sublayer for coax cable distribution networks, type 10GPASS-XR****100.7.3.3 Environmental specifications***Change the row for item ES1 in the table in 100.7.3.3 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	100.5.1	Conforms to IEC 60950-1 Conforms to J.2	M	Yes []
...					

³¹Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

104. Power over Data Lines (PoDL) of Single-Pair Ethernet

104.8 Environmental

104.8.1 General safety

Change the first paragraph of 104.8.1 as follows:

All equipment subject to this clause shall conform to ~~J.2 IEC 60950-1~~ Annex Q of IEC 62368-1:2018. In particular, the PSE shall be classified as a Limited Power Source in accordance with ~~Annex Q of IEC 62368-1:2018~~ Annex Q of IEC 62368-1:2018. For automotive applications, systems described in this clause may be subject to additional requirements; refer to ISO 26262.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

104.9 Protocol implementation conformance statement (PICS) proforma for Clause 104, Power over Data Lines (PoDL) of Single-Pair Ethernet**104.9.4 PICS proforma tables for Clause 104, Power over Data Lines (PoDL) of Single-Pair Ethernet****104.9.4.8 Environmental**

Change the rows for items ENV1 and ENV2 in the table in 104.9.4.8 as follows (unchanged rows not shown):

Item	Feature	Subclause	Value/Comment	Status	Support
ENV1	General safety for PoDL equipment	104.8.1	To conform to IEC 60950-1	M	Yes []
ENV2	General safety for PoDL PSEs	104.8.1	To be classified as a Limited Power Source in accordance with IEC 60950-1 Annex Q of IEC 62368-1:2018	M	Yes []
...					

112. Physical Medium Dependent (PMD) sublayer and medium, type 25GBASE-SR

112.8 Safety, installation, environment, and labeling

112.8.1 General safety

Change 112.8.1 as follows:

All equipment subject to this clause shall conform to the general safety requirements as specified in J.2.1.1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd.10:2022

112.11 Protocol implementation conformance statement (PICS) proforma for Clause 112, Physical Medium Dependent (PMD) sublayer and medium, type 25GBASE-SR³²**112.11.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 25GBASE-SR****112.11.4.5 Environmental specifications***Change the row for item CES1 in the table in 112.11.4.5 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
CES1	General safety	112.8.1	Conforms to IEC 60950-1 <u>Conforms to J.2</u>	M	Yes []
...					

³²Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

113. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, types 25GBASE-T and 40GBASE-T

113.5 PMA electrical specifications

Change the title and text of 113.5.1 as follows:

113.5.1 ~~Isolation requirement~~ Electrical isolation

The PHY shall provide electrical isolation between the port device circuits, including frame ground (if any) and all MDI leads. This electrical isolation shall meet the isolation requirements as specified in J.1. ~~withstand at least one of the following electrical strength tests:~~

- a) ~~1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in 5.2.2 of IEC 60950-1:2001.~~
- b) ~~2250 V de for 60 s, applied as specified in 5.2.2 of IEC 60950-1:2001.~~
- e) ~~A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses is 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time or half value), as defined in Annex N of IEC 60950-1:2001.~~

~~There shall be no insulation breakdown, as defined in 5.2.2 of IEC 60950-1:2001, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 V de.~~

113.9 Environmental specifications

113.9.1 General safety

Change 113.9.1 as follows:

All equipment meeting this standard shall conform to the general safety requirements as specified in J.2. ~~IEC 60950-1.~~

113.12 Protocol implementation conformance statement (PICS) proforma for Clause 113, Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, types 25GBASE-T and 40GBASE-T³³**113.12.6 PMA Electrical Specifications**

Change the rows for items PME1 and PME2 in the table in 113.12.6 as follows (unchanged rows not shown):

Item	Feature	Subclause	Status	Support	Value/Comment
PME1	Electrical isolation	113.5.1	M	Yes []	One of three electrical strength tests listed in 113.5.1 <u>Conforms to J.1</u>
PME2	Insulation breakdown after test	113.5.1	M	Yes []	>2 MΩ, measured at 500 V de <u>Conforms to J.1</u>
...					

113.12.10 General safety and environmental requirements

Change the row for item ENV1 in the table in 113.12.10 as follows (unchanged rows not shown):

Item	Feature	Subclause	Status	Support	Value/Comment
ENV1	Conformance to safety specifications	113.9.1	M	Yes []	IEC 60950-1 <u>Conforms to J.2</u>
...					

³³Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so it can be used for its intended purpose and may further publish the completed PICS.

122. Physical Medium Dependent (PMD) sublayer and medium, type 200GBASE-FR4, 200GBASE-LR4, 200GBASE-ER4, 400GBASE-FR8, 400GBASE-LR8, and 400GBASE-ER8

122.9 Safety, installation, environment, and labeling

122.9.1 General safety

Change 122.9.1 as follows:

All equipment subject to this clause shall conform to J.21 ~~IEC 60950-1~~.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

122.12 Protocol implementation conformance statement (PICS) proforma for Clause 122, Physical Medium Dependent (PMD) sublayer and medium, type 200GBASE-FR4, 200GBASE-LR4, 200GBASE-ER4, 400GBASE-FR8, 400GBASE-LR8, and 400GBASE-ER8³⁴**122.12.4 PICS proforma tables for Physical Medium Dependent (PMD) sublayer and medium, type 200GBASE-FR4, 200GBASE-LR4, 200GBASE-ER4, 400GBASE-FR8, 400GBASE-LR8, and 400GBASE-ER8****122.12.4.8 Environmental specifications***Change the row for item ES1 in the table in 122.12.4.8 as follows (unchanged rows not shown):*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	122.9.1	Conforms to IEEE 60950-1 <u>IEC 60950-1</u>	M	Yes []
...					

³⁴Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

126. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, types 2.5GBASE-T and 5GBASE-T**126.5 PMA electrical specifications**

Change the title and text of 126.5.1 (as modified by IEEE Std 802.3bt-2018) as follows:

126.5.1 ~~Isolation requirement~~ Electrical isolation

A PHY with a MDI that is a PI (see 33.1.3) shall meet the isolation requirements defined in 33.4.1 or 145.4.1.

A PHY with a MDI that is not a PI shall provide electrical isolation between the port device circuits, including frame ground (if any) and all MDI leads. This electrical isolation shall meet the isolation requirements as specified in J.1, ~~withstand at least one of the following electrical strength tests:~~

- a) ~~1500 V rms at 50 Hz to 60 Hz for 60 s, applied as specified in Section 5.2.2 of IEC 60950-1:2001.~~
- b) ~~2250 V de for 60 s, applied as specified in Section 5.2.2 of IEC 60950-1:2001.~~
- e) ~~A sequence of ten 2400 V impulses of alternating polarity, applied at intervals of not less than 1 s. The shape of the impulses is 1.2/50 μ s (1.2 μ s virtual front time, 50 μ s virtual time or half value), as defined in Annex N of IEC 60950-1:2001.~~

~~There shall be no insulation breakdown, as defined in Section 5.2.2 of IEC 60950-1:2001, during the test. The resistance after the test shall be at least 2 M Ω , measured at 500 V de.~~

126.9 Environmental specifications**126.9.1 General safety**

Change 126.9.1 as follows:

All equipment meeting this standard shall conform to the general safety requirements as specified in J.2. ~~IEC 60950-1.~~

126.12 Protocol implementation conformance statement (PICS) proforma for Clause 126—Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, types 2.5GBASE-T and 5GBASE-T³⁵**126.12.5 PMA Electrical Specifications**

Change the rows for items PME1 and PME2 in the table in 126.12.5 as follows (unchanged rows not shown):

Item	Feature	Subclause	Status	Support	Value/Comment
PME1	Electrical isolation	126.5.1	M	Yes []	One of three electrical strength tests listed in 126.5.1 <u>Conforms to J.1</u>
PME2	Insulation breakdown after test	126.5.1	M	Yes []	>2 MΩ, measured at 500 V dc <u>Conforms to J.1</u>
...					

126.12.9 General safety and environmental requirements

Change the row for item ENV1 in the table in 126.12.9 as follows:

Item	Feature	Subclause	Status	Support	Value/Comment
ENV1	Conformance to safety specifications	126.9.1	M	Yes []	IEC 60950-1 <u>Conforms to J.2</u>
...					

³⁵Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so it can be used for its intended purpose and may further publish the completed PICS.

Clause 128 was added by IEEE Std 802.3cb-2018

128. Physical Medium Dependent sublayer and baseband medium, type 2.5GBASE-KX

128.9 Environmental specifications

128.9.1 General safety

Change 128.9.1 as follows:

All equipment that meets the requirements of this standard shall conform to the general safety requirements in J.2 applicable sections (including isolation requirements) of IEC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

128.10 Protocol implementation conformance statement (PICS) proforma for Clause 128, Physical Medium Dependent sublayer and baseband medium, type 2.5GBASE-KX³⁶**128.10.4 PICS proforma tables for Clause 128, Physical Medium Dependent (PMD) sublayer and baseband medium, type 2.5GBASE-KX.****128.10.4.5 Environmental and safety specifications***Change the table in 128.10.4.5 as follows:*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	128.9.1	Conforms to IEC 60950-1	M	Yes []
ES2	Electromagnetic compatibility	128.9.4	Comply with applicable local and national codes	M	Yes []

³⁶Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.

Clause 130 was added by IEEE Std 802.3cb-2018

130. Physical Medium Dependent sublayer and baseband medium, type 5GBASE-KR

130.9 Environmental specifications

130.9.1 General safety

Change 130.9.1 as follows:

All equipment that meets the requirements of this standard shall conform to the applicable requirements of Annex J sections (including isolation requirements) of IEC 60950-1.

IECNORM.COM : Click to view the full PDF of ISO/IEC/IEEE 8802-3:2021/Amd 10:2022

130.10 Protocol implementation conformance statement (PICS) proforma for Clause 130, Physical Medium Dependent (PMD) sublayer and baseband medium, type 5GBASE-KR³⁷**130.10.4 PICS proforma tables for Clause 130, Physical Medium Dependent (PMD) sublayer and baseband medium, type 5GBASE-KR****130.10.4.6 Environmental specifications***Change the table in 130.10.4.6 as follows:*

Item	Feature	Subclause	Value/Comment	Status	Support
ES1	General safety	130.9.1	Complies with applicable section of IEC 60950-1 requirements of Annex J	M	Yes []
ES2	Electromagnetic interference	130.9.4	Complies with applicable local and national codes	M	Yes []

³⁷Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this subclause so that it can be used for its intended purpose and may further publish the completed PICS.