Review of IEC 60825-x References in 802.3

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Introduction

During the Maintenance meeting 26 May 2011 in Incline Village, NV the forthcoming P802.3bh revision project was discussed.

One element of this revision is to review the normative references included in IEEE Std 802.3 and update them as necessary.

This contribution reviews the references to:

IEC 60825-1 Safety of laser products—Part 1: Equipment classification and requirements

IEC 60925-2 Safety of laser products—Part 2: Safety of optical fibre communication systems (OFCS)

in IEEE Std 802.3-2008 and its approved amendments and makes recommendations regarding their updates.

It is intended that comments corresponding to each of the recommended changes will be made during the revision project ballot.

References

The current references in 802.3 are:

IEC 60825-1:2001, Edition 1.2, Consolidated Edition; Safety of Laser Products—Part 1: Equipment classification, requirements and user's guide.

IEC 60825-2:1993, Safety of laser products—Part 2: Safety of optical fibre communication systems.

IEC 60825-1 and IEC 60825-2 are referenced in a number of places in 802.3

9.9.7.1.2 Optical source safety

The recommendations of IEC 60825: 1993, if applicable, shall be adhered to in determining the optical source safety and user warning requirements.

38.7.2 Laser safety

1000BASE-X optical transceivers shall be Class 1 laser certified under any condition of operation. This includes single fault conditions whether coupled into a fiber or out of an open bore. Transceivers shall be certified to be in conformance with IEC 60825-1.

Conformance to additional laser safety standards may be required for operation within specific geographic regions.

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38.12.4.5 Optical measurement requirements *(continued)*

Item	Feature	Subclause	Value/Comment	Status	Support
OR31	Laser safety compliance	38.7.2	Class 1	M	Yes [ ]
OR32	Laser safety compliance test conditions	38.7.2	IEC 60825-1	M	Yes [ ]

References in Clauses 52 and 53

IEC 60825-1 and IEC 60825-2 references in 802.3 *continued*:

52.10.2 Laser safety

10GBASE-R and 10GBASE-W optical transceivers shall conform to Class 1 laser requirements as defined in the IEC 60825-1:2001, under any condition of operation. This includes single fault conditions whether coupled into a fiber or out of an open bore.

Conformance to additional laser safety standards may be required for operation within specific geographic regions.

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52.15.3.11 Environmental specifications

Item	Feature	Subclause	Value/Comment	Status	Support
ES2	Laser safety —IEC Class 1	52.10.2	Conform to Class 1 laser requirements defined in the IEC 60825-1	M	Yes [ ]

53.10.2 Laser safety

The 10GBASE-LX4 optical transceivers shall be Class 1 laser certified under any condition of operation in conformance to the IEC 60825-1, which has been updated by Amendment 2 (2001-01). This includes single fault conditions whether coupled into a fiber or out of an open bore.

Conformance to additional laser safety standards may be required for operation within specific geographic regions.

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References in Clauses 58, 59, 60 and 68

IEC 60825-1 and IEC 60825-2 references in 802.3 *continued*:

58.8.2 Laser safety

100BASE-LX10 and 100BASE-BX10 optical transceivers shall conform to Class 1 laser requirements as defined in IEC 60825-1, under any condition of operation. This includes single fault conditions whether coupled into a fiber or out of an open bore. Conformance to additional laser safety standards may be required for operation within specific geographical regions.

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58.10.3.6 Environmental specifications

Item	Feature	Subclause	Value/Comment	Status	Support
ES2	Laser safety —IEC Class 1	58.8.2	Conform to Class 1 laser requirements defined in IEC 60825-1	M	Yes [ ]

59.8.2 Laser safety

This follows the text in 58.8.2 but for 1000BASE-BX10 and 1000BASE-LX10 optical transceivers

59.10.3.6 Environmental specifications

This follows the text in 58.10.3.6

60.8.2 Laser safety

This follows the text in 58.8.2 but for 1000BASE-PX10 and 1000BASE-PX20 optical transceivers

60.10.4.8 Environmental specifications

This follows the text in 58.10.3.6

68.10.3.5 Safety, installation, environment, and labeling

This follows the text in 58.10.3.6

References in Clauses 75 and 86

IEC 60825-1 and IEC 60825-2 references in 802.3 *continued*:

75.8.2 Laser safety

10GBASE–PR and 10/1GBASE–PRX optical transceivers shall conform to Class 1 laser requirements as defined in IEC 60825–1 and IEC 60825–2, under any condition of operation. This includes single fault conditions whether coupled into a fiber or out of an open bore.

Conformance to additional laser safety standards may be required for operation within specific geographic regions.

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75.10.4.15 Environmental specifications

Item	Feature	Subclause	Value/Comment	Status	Support
ES2	Laser safety —IEC Class 1	75.8.1	Conform to Class 1 laser requirements defined in IEC 60825-1 and IEC 60825-2	M	Yes [ ]

86.9.2 Laser safety

40GBASE–SR4 and 100GBASE–SR10 optical transceivers shall conform to Class 1M laser requirements as defined in IEC 60825–1 and IEC 60825–2, under any condition of operation. This includes single fault conditions whether coupled into a fiber or out of an open bore.

Conformance to additional laser safety standards may be required for operation within specific geographic regions.

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86.11.4.5 Environmental and safety specifications

Item	Feature	Subclause	Value/Comment	Status	Support
SES2	Laser safety	86.9.2	Conforms to Class 1M laser requirements defined in IEC 60825-1 and IEC 60825-2	M	Yes [ ]

References in Clauses 87, 88 and 89

IEC 60825-1 and IEC 60825-2 references in 802.3 *continued*:

87.9.2 Laser safety

40GBASE–LR4 optical transceivers shall conform to Class 1 laser requirements as defined in IEC 60825–1 and IEC 60825–2, under any condition of operation. This includes single fault conditions whether coupled into a fiber or out of an open bore.

Conformance to additional laser safety standards may be required for operation within specific geographic regions.

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87.12.4.5 Environmental specifications

Item	Feature	Subclause	Value/Comment	Status	Support
XLES2	Laser safety —IEC Class 1	87.9.2	Conforms to Class 1 laser requirements defined in IEC 60825-1 and IEC 60825-2	M	Yes [ ]

88.9.2 Laser safety

This follows the text in 87.9.2 but for 100GBASE–LR4 and 100GBASE–ER4 optical transceivers

88.12.4.6 Environmental specifications

This follows the text in 87.12.4.5

89.8.2 Laser safety

This follows the text in 87.9.2 but for 40GBASE–FR optical transceivers

89.11.4.5 Environmental specifications

This follows the text in 87.12.4.5

Revisions of IEC 60825-1 and IEC 60825-2

There have been two corrigenda and a revision of IEC 60825-1 since 2001:

Corrigendum 1 2002
Edition 2.0 2007
Corrigendum 1 2008 (Edition 2.1)
Interpretation sheet 1 2009
Interpretation sheet 2 2011

There have been three amendments and two revisions of IEC 60825-2 since 1993:

Amendment 1 1997
Edition 2.0 2000
Edition 3.0 2004
Amendment 1 2006 (Edition 3.1)
Interpretation sheet 1 2007
Amendment 2 2010 (Edition 3.2)

It seems hard to justify referencing these outdated versions of the documents defining laser safety since there has been so much change in them since then.

Comment #58 against 2008 revision D 2.0

Comment #58 against version D 2.0 of the 2008 Revision project of 802.3 proposed to remove the dates from the references to IEC 60825-1 and IEC 60825-2. The Response was:

> REJECT.
>
> It appears that there is a interpretation under development for IEC 60825-2 – Interpretation sheet for Publication IEC 60825-2 (Third edition - 2005 and its amendment 1 - 2006) - Safety of laser products - Part 2: Safety of optical fibre communication systems (OFCS)
>
> http://www.iec.ch/cgi-bin/procgi.pl/www/iecwww.p?wwwlang=&wwwprog=doc-det.p&progdb=db1&wcom=76&wclass=&wdoc=376&wsup=]
>
> Since there appears to work ongoing on this area we will keep the referbces as they are and request the IEEE P802.3ba Task Force to consider updates to these references when they do their optical work.

The IEEE Std 802.3ba-2010 amendment did not change the dates of the references to IEC 60825-1 and IEC 60825-2.

Status of IEC 60825-1 and IEC 60825-2

IEC 60825-1 and IEC 60825-2 are the internationally recognised base documents that country specific requirements documents are derived from. For example EN 60825-1 and EN 60825-1 are European requirements documents which follow the IEC versions and BS EN 60825-1 and BS EN 60825-2 are the UK national requirements documents.

Consequently, it is appropriate to refer to the latest versions of IEC 60825-1 and IEC 60825-2 rather than specific versions which rapidly become superseded.

IEC 60825-1 *Safety of laser products—Part 1: Equipment classification and requirements* provides the underlying requirements for the safety of all laser products. The requirements are formulae based and have to be interpreted to yield values for optical fibre based systems.

IEC 60825-2 *Safety of laser products—Part 2: Safety of optical fibre communication systems (OFCS)* sets out the requirements specifically for optical fibre communications systems and includes tables of values for commonly used wavelengths, fibre types etc.

It is therefore again proposed to make the references to IEC 60825-1 and IEC 60825-2 in 802.3 undated.

Specific proposals as to how to do this are given on the following slide.

Proposals

Change the references in subclause 1.3 to:

IEC 60825-1, Safety of laser products—Part 1: Equipment classification and requirements

IEC 60925-2, Safety of laser products—Part 2: Safety of optical fibre communication systems (OFCS)

Also, make the changes shown below:

9.9.7.1.2 Optical source safety

The recommendations of IEC 60825-1~~: 1993~~ and IEC 60825-2, if applicable, shall be adhered to in determining the optical source safety and user warning requirements.

52.10.2 Laser safety

10GBASE-R and 10GBASE-W optical transceivers shall conform to Class 1 laser requirements as defined in ~~the~~ IEC 60825-1~~:2001~~, under any condition of operation. This includes single fault conditions whether coupled into a fiber or out of an open bore.

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52.15.3.11 Environmental specifications

Item	Feature	Subclause	Value/Comment	Status	Support
ES2	Laser safety —IEC Class 1	52.10.2	Conform to Class 1 laser requirements defined in ~~the~~ IEC 60825-1	M	Yes [ ]

53.10.2 Laser safety

The 10GBASE-LX4 optical transceivers shall be Class 1 laser certified under any condition of operation in conformance to ~~the~~ IEC 60825-1~~, which has been updated by Amendment 2 (2001-01)~~. This includes single fault conditions whether coupled into a fiber or out of an open bore.

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Thanks!