Cl **86** *SC* **86.7.5.4** *P* **291** *L* **36** # 20276

Kolesar, Paul CommScope

Comment Type **TR** *Comment Status* **R**

The TDP test fails to assess the true chromatic dispersion impairment of the 40G/100GBASE-SR4/10 PMDs. Instead it places a surrogate filter into the test fixture receiver that is set to insert a reduction in channel bandwidth based on assumptions about the optical spectral behavior of the transmitter that are not true. Specifically, the filter-based methodology wrongly assumes the spectrum is constant as a function of time and the spectral shape is smooth and continuous. In fact the spectrum of multi-transverse mode lasers is strongly affected by modulation, typically changing in wavelength throughout a bit period, and their spectrum consists of a few discrete wavelengths with irregular adjacent amplitudes. These features affect the actual dispersion and cannot be accurately represented by a static filter. The problems associated with a filter-based approach are avoided when testing TDP of singlemode PMDs because an actual singlemode test fiber is used in the fixture that inserts the worst-case dispersion of the maximum length channel. This approach captures the effects of modulation and the wavelength variation called "chirp" of SM lasers, providing a much more accurate assessment of the transmitter performance and transmitter/fiber interaction. The availability of multimode fibers with bandwidths exceeding 10,000 MHz*km now permits the benefits of using a test fiber instead of a filter to be applied to the TDP test for multimode PMDs. In addition to greater accuracy, this approach adds the dimension of dispersion, presently frozen at a single value, to the compliance space. This added dimension enables maximal trade-off of jitter, distortion and dispersion which can positively impact production yield. More details are provided in kolesar_01_0509.pdf.

SuggestedRemedy

See complete proposal in kolesar_02_0509.pdf. Synopsis: a) insert into the TDP test bench a 50 µm fiber with modal bandwidth >= 10,000 MHz*km of a length chosen to apply the worst-case chromatic dispersion; b) adjust the receiver filter to remove the component associated with the present static surrogate for dispersion.

Response *Response Status* **U**

REJECT.

The sub task force voted on whether to implement the changes in kolesar_02_0509.pdf

Yes 12
No 5

Another comment points out that the surrogate filter causes problems and can be dispensed with anyway.
The proposed technique is interesting at a university level but unfamiliar, unproven and prone to unstable results with VCSELs.

This PMD is supposed to be cost-effective for the objective distance, where chromatic dispersion is not dominant. A new and unfamiliar test element would add cost and be misleading because the chromatic dispersion effects vary over time. It would be far too expensive and time-consuming to do this measurement with a useful level of confidence. Therefore any yield benefit would not flow to cost as hoped.

Cl **86** *SC* **86.7.5.4** *P* **291** *L* **45** # 20277

Kolesar, Paul CommScope

Comment Type **TR** *Comment Status* **R**

The use of a fiber-based channel in the TDP test fixture proposed in another comment permits the fixture to easily adapt to screen transmitters with performance that supports distances exceeding the minimum requirements of clause 86. Such transmitters address the need for a cost-effective solution for channels exceeding 100 m (see kolesar_01_0908). The adjustment to the TDP test fixture should be described within the standard to ensure interoperability, for example in an informative annex. See kolesar_01_0509.pdf for supporting information and details.

SuggestedRemedy

Create informative annex 86A entitled "Transmitter and dispersion penalty (TDP) test for extended-reach capability". If the TDP test fixture adjustment to clause 86.7.5.4 proposed in another comment is accepted, the proposed content for the annex is found in kolesar_03_0509.pdf. If the TDP test fixture adjustment is not accepted, the proposed content for the annex is found in kolesar_04_0509.pdf.

Response *Response Status* **U**

REJECT. [Editor's note: the supporting material that was to be in kolesar_01_0509 is now in kolesar_05_0509]

A straw poll of the sub-task force was taken.
Do you support the creation of an informative annex similar to that proposed in kolesar_04_0509.pdf?

Yes 10
No 9
Abstain 7

Based on this result, the a vote of the sub-task force was taken on the following Response:
ACCEPT IN PRINCIPLE
Create an informative annex similar to that proposed in kolesar_04_0509.pdf with editorial license

Yes 12
No 12
Abstain 6

Cl **01** *SC* **1.4** *P* **23** *L* **46** # 20541

Booth, Brad AMCC

Comment Type **TR** *Comment Status* **R**

L stands for long wavelength.

SuggestedRemedy

Change to read:
40GBASE-LR4: IEEE 802.3 Physical Layer specification for 40 Gb/s using 40GBASE-R encoding over four WDM lanes on single-mode fiber using long wavelengths.

100GBASE-LR4: IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over four WDM lanes on single-mode fiber using long wavelengths.

Response *Response Status* **U**

REJECT.
Since the 100GBASE-LR4 and 100GBASE-ER4 PMDs use identical wavelengths, they cannot be distinguished by means of a letter indicating wavelength.
In the 40GBASE and 100GBASE nomenclature the L does not stand for long wavelength, it stands for long reach.
This nomenclature was adopted by the task force in May 2008 (See slide 8 of Ganga_02_0508 and Motion #2 in May 2008 minutes).

Cl **01** *SC* **1.4** *P* **23** *L* **49** # 20542

Booth, Brad AMCC

Comment Type **TR** *Comment Status* **R**

S stands for short wavelength.

SuggestedRemedy

Change to read:
40GBASE-SR4: IEEE 802.3 Physical Layer specification for 40 Gb/s using 40GBASE-R encoding over four lanes of multimode fiber using short wavelengths.

100GBASE-SR10: IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over ten lanes of multimode fiber using short wavelengths.

Response *Response Status* **U**

REJECT.
In the 40GBASE and 100GBASE nomenclature the S does not stand for short wavelength, it stands for short reach.
This nomenclature was adopted by the task force in May 2008 (See slide 8 of Ganga_02_0508 and Motion #2 in May 2008 minutes).

Cl **01** *SC* **1.4** *P* **24** *L* **10** # 20545

Booth, Brad AMCC

Comment Type **TR** *Comment Status* **R**

E stands for extra long wavelength.

SuggestedRemedy

Change to read:
IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over four WDM lanes on single-mode fiber using extra long wavelengths.

Response *Response Status* **U**

REJECT.
Since the 100GBASE-LR4 and 100GBASE-ER4 PMDs use identical wavelengths, they cannot be distinguished by means of a letter indicating wavelength.
In the 40GBASE and 100GBASE nomenclature the E does not stand for extra long wavelength, it stands for extended reach.
This nomenclature was adopted by the task force in May 2008 (See slide 8 of Ganga_02_0508 and Motion #2 in May 2008 minutes).

Cl **30** *SC* **30.5.1.1.2** *P* **30** *L* **9** # 20549

Booth, Brad AMCC

Comment Type **TR** *Comment Status* **R**

L refers to long wavelength.

SuggestedRemedy

Change:
with long reach
To read:
using long wavelength
For 40GBASE-LR4 and 100GBASE-LR4.

Response *Response Status* **U**

REJECT.

See #541

Cl **30** *SC* **30.5.1.1.2** *P* **30** *L* **18** # 20550

Booth, Brad AMCC

Comment Type **TR** *Comment Status* **R**

E is for extra long wavelength.

SuggestedRemedy

Change "with extended reach" to "extra long wavelength" for 100GBASE-ER4.

Response *Response Status* **U**

REJECT.

See #545

Cl **69** *SC* **69.1.3** *P* **94** *L* **14** # 20560

Booth, Brad AMCC

Comment Type **TR** *Comment Status* **A**

Figure 69-1 shows the 40G PCS as 40GBASE-R PCS. This is an incorrect reference that doesn't follow with the PCS descriptions for the other PHYs. An 8B/10B PCS is used for 1000BASE-KX, and it is also used for 10GBASE-KX4 even though they are different.

SuggestedRemedy

Change 40GBASE-R PCS to be 64B/66B PCS.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.
The 8B/10B encoding used in 1000BASE-KX is not the same as that used in 10GBASE-KX4 so the current diagram is misleading.

In Figure 69-1 change
"8B/10B PCS" in the 1000BASE-KX stack to "1000BASE-X PCS"
"8B/10B PCS" in the 10GBASE-KX4 stack to "10GBASE-X PCS"
"64B/66B PCS" in the 10GBASE-KR stack to "10GBASE-R PCS"

Cl **80** *SC* **80.1.3** *P* **126** *L* **17** # 20575

Booth, Brad AMCC

Comment Type **ER** *Comment Status* **R**

In Figure 80-1, the PCS are described as a 40GBASE-R PCS and a 100GBASE-R PCS. This does not follow the convention previously established.

SuggestedRemedy

Change 40GBASE-R PCS and 10GBASE-R PCS to be 64B/66B PCS.

Response *Response Status* **U**

REJECT.

See response to comment #577

Cl **00** *SC* **0** *P* **126** *L* **18** # 20577

Booth, Brad AMCC

Comment Type **TR** *Comment Status* **R**

In the architectural figures for 802.3ba, there is a reference in the stack to 40GBASE-R PCS and 100GBASE-R PCS. This is incorrectly described relative to the description in Clause 82 which defines it as a 64B/66B PCS. Being verify specific is not required. For example, the 802.3 specification references 8B/10B PCS, 64B/66B PCS or just PCS in many instances through the standard. Calling out the specific port type is note required.

SuggestedRemedy

Change all diagrams to show 40GBASE-PCS and 100GBASE-R PCS as 64B/66B PCS.

Response *Response Status* **U**

REJECT.

There is a single lane 64B/66B PCS for 10GBASE-R. Hence to differentiate that the 40G and 100G R PCS is not the same as a 10G R PCS this specific reference was added. Also, the 40GBASE-R PCS is different from the 100GBASE-R PCS in terms of the number of lanes etc.

Cl **00** *SC* **0** *P* **1** *L* **1** # 21255

Booth, Brad AMCC

Comment Type **TR** *Comment Status* **A**

IEEE P802.3ba has selected nomenclature that conflicts with previous uses of the same nomenclature letter. There has been an effort in the past decade to establish a consistent use of letters for port type nomenclature. Unfortunately, this was not noticed until the task force was in working group ballot.

IEEE P802.3ba should strive to keep its nomenclature consistent with IEEE Std. 802.3-2008. Maintaining a consistency will easily permit additional PMD types to be added to the 40GbE and 100GbE family.

See booth_01_0709.pdf for more information on nomenclature.

SuggestedRemedy

In all uses of SR, change from short reach to be short wavelength.

In all uses of LR, change from long reach to be long wavelength.

In all uses of ER, change ER to be HR, and change from extended reach to be high-power long wavelength.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.
There was no agreement to change the nomenclature (see straw poll below)
Replace the two paragraphs starting "The letter C in the port type ..." in 80.1.4 with a description including a table similar to Table 52-1 and including reach.

The nomenclature was adopted by the Task Force in May 2008 (see motion #2). The adopted nomenclature was presented to the WG by the TF Chair during Jul'08 opening plenary.

The nomenclature was discussed in the task force which also included 802.3 WG members. The requirement for 802.3ba was to distinguish reach for different PMDs, and previous distinctions based on wavelength was not considered sufficient. Hence the current nomenclature was adopted. The nomenclature is also documented clearly in Clause 80.

The task force did discuss the consistency issue; during the discussions it was pointed out that the base document already uses same letter(s) to identify different characteristics. (e.g., B, L, S). Also in the base document numeric suffix identifies either number of lanes/wavelengths or distance. After considerable discussion there was consensus in the Task Force to adopt S, L and E to represent reach.

Also see comment #97.

Straw Poll: The Task force was asked to indicate a preference between the options:

Leave the nomenclature unchanged
change the nomenclature to one of 100GBASE-LRE4, 100GBASE-LR4E, 100GBASE-LR4-E

All in the room
Unchanged - 25
Change - 25

802.3 voters
Unchanged - 26
Change - 26

Cl **00** *SC* **0** *P* *L* # 21352

Grow, Robert Intel

Comment Type **ER** *Comment Status* **A**

We have a general problem with numbering. Not all projects are following the same convention, for example, P802.3av is inserting clauses and instructing renumbering, but this project attempts to follow the Style Guide (laudable but difficult for us). As is shown by this draft, the Style Manual convention doesn't support adding a new subclause when it is the first at that level (add 45.2.1.4.1a before 45.2.1.4.1), and it doesn't support alphabetic subclause ordering when doing this more than once (something we frequently do. For example in Clause 45, a second amendment would typically place a new bit definition for example as 45.2.1.4.1b before 45.2.1.4.1a which is before 45.2.1.4.1, but place a new register definition 45.2.1.12b after 45.2.1.12a.

SuggestedRemedy

Work with WG Chair to better coordinate projects and use consistent style for indicating changes. Though it can get painful (and was why I build a spreadsheet for clause 45 to manage amendments), I think we need to not follow the Style Guide for subclause insertions (which is add letters without renumbering) but rather insert and renumber, but I'll leave that decision to the WG Chair and if he chooses to the WGAC.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

Editorial license to find numbering that does not conflict with the finalized 802.3av amendment.

Cl **86A** *SC* **86A.4.2** *P* **430** *L* **14** # 22096

Ghiasi, Ali Broadcom

Comment Type **TR** *Comment Status* **R**

With current set of specifications the SerDes transmitter may have very large amount of de-emphasis 3-5 dB resulting in signifincat distortion at TP1a and also see comment 216/218 on D2.1

SuggestedRemedy

The options here are either limit max DDJ to about 0.125 or max 3 dB de-emphasis, see ghiasi_03_0909

Response *Response Status* **U**

REJECT.
see also response to comment 131

Cl **88** *SC* **88.8.5.3** *P* **356** *L* **12** # 22127

Ghiasi, Ali Broadcom

Comment Type **TR** *Comment Status* **A**

The CRU BW for the TDP measurement is defiend to be 10 MHz also see comment 224 and 225 D2.1 can limit the receiver to analog type instead of more efficent lower power digital implementation. The clock and power supply noise do not scale with higher baudrate so there is very little benifit of higher CRU BW. The CRU increased BW has very little benifit on the VCO noise. The 10 MHz burden will remin even in the case of future generations where ASIC/SerDes operate at 25 G!

SuggestedRemedy

Propose to consider CRU BW 7 MHz instead of current 10 MHz. Higher CRU BW has very little benifit on the VCO noise and power supply nosie but significant penalty on the receiver, see ghiasi_02_0909

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

In Table 88-13 correct the formula:
change "2 x 10^5/ f" to "5 x 10^5/ f"

The Task Force voted on whether to:
A - Leave the CRU corner frequency at 10 MHz and correct the formula in Table 88-13
B - Change the CRU corner frequency to 7 MHz in a consistent manner in clause 88

A 9
B 1

Cl **86A** *SC* **86A.4.1** *P* **428** *L* **27** # 22131

Ghiasi, Ali Broadcom

Comment Type **TR** *Comment Status* **R**

With current set of specifications the SerDes transmitter may have very large amount of de-emphasis 3-5 dB resulting in signifincat distortion at TP1a and also see comment 216/218 on D2.1

SuggestedRemedy

The options here are either limit max DDJ to about 0.125 UI or max 3 dB de-emphasis, see ghiasi_03_0909

Response *Response Status* **U**

REJECT.
J2 spec constrains DDJ and eye mask constrains excessive emphasis.
Although ghiasi_03_0909 shows an example module/host combination with a near failing Tx eye mask at TP2, there is insufficient information to determine the corrective action required in the spec to avoid a potential eye-mask issue. Further work is invited.