Cl **1** *SC* **1** *P* **1** *L* **1** # r02-1

Rannow, R K — Self Employed

Comment Type **G** *Comment Status* **X**

Still appears to be some confusing run-on sentences.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **1** *SC* **1.4.300** *P* **92** *L* **94** # r02-2

Nikolich, Paul — INDEPENDENT

Comment Type **GR** *Comment Status* **X**

Firstly, I disagree with the rejection of my earlier comments, as I believe the definition of "lane" should provide greater clarity, accuracy and precision.

Secondly, The term "lane" is used in the standard that is not consistent with the proposed definition. For example, later on in the definitions section the following definition is offered: 1.4.386 PCS lane (PCSL): In 40GBASE-R, 100GBASE-R, 200GBASE-R, and 400GBASE-R, the PCS distributes encoded data to multiple logical lanes, these logical lanes are called PCS lanes. One or more PCS lanes can be multiplexed and carried on a physical lane together at the PMA service interface. (See IEEE Std 802.3, Clause 83 and Clause 120.)

Note the use of the qualifiers "logical lane" and "physical lane". This implies there are at least two types of "lane", while the proposed definition appears to address "logical lane" and not "physical lane". At a minimum a definition for "physical lane" should be added to the standard.

SuggestedRemedy

1) Change the label on 1.4.300 to Logical Lane.
2) Add a definition for a Physical Lane.
3) Add illustrations to (1) and (2) above to improve the ability of a reader to correctly understand the definitions similar to what is used in 802.16-2017 definition of "protocol data unit" Figure 3-1

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.2.3** *P* **476** *L* **43** # r02-3

Brown, Matthew — MACOM

Comment Type **E** *Comment Status* **X**

In Table 93-6, there are are two numbers that wrap in the columns for the a4 maximum coefficient values for Test 1 and Test 4.

SuggestedRemedy

Fix the wrap using editorial magic.

Proposed Response *Response Status* **O**

Cl **120D** *SC* **120D.3.1** *P* **370** *L* **25** # r02-4

Rysin, Alexander — Mellanox Technologies

Comment Type **TR** *Comment Status* **X**

Requirements for Transmitter output residual ISI SNR_ISI (min) of 34.3 dB in 120D is too high - can barely measure the IC through the test fixture. The warning NOTE in 120D.3.1.7 shows the issue, but doesn't solve it. COM packages were shown to generate worse SNR_ISI. See presentation rysin_3cd_01_0318.pdf. 802.3bs D3.2 comment 43, 802.3bs D3.3 comment 31, 802.3cd D2.0 comment 140, 802.3cd D2.1 comment 49, 802.3cd D2.2 comment 22, 802.3cd D3.0 comment 48, 802.3cd D3.1 comments 23, 28.

SuggestedRemedy

Change the value for Transmitter Output residual ISI SNRISI (min) in Table 120D-1 to 30.5 dB

Proposed Response *Response Status* **O**

Cl **120E** *SC* **120E.4.2** *P* **401** *L* **29** # r02-5

Dawe, Piers J G — Mellanox Technologies

Comment Type **E** *Comment Status* **X**

to construct CDF

SuggestedRemedy

to construct the CDF
Or possibly: to construct a CDF
Compare item 4, and 83E.4.2 Eye width and eye height measurement method, item 3

Proposed Response *Response Status* **O**

Cl **120E** *SC* **120E.5.4.1** *P* **406** *L* **33** # r02-6

Dawe, Piers J G — Mellanox Technologies

Comment Type **E** *Comment Status* **X**

It would be good if the value/comment contents were more consistent representations of the limits.

SuggestedRemedy

If some items call out min or max or "less than" or similar, so should 17.5 mV, 32 mV, 12 dB, possibly 0.22 UI. This may apply to 120E.5.4.2, Module output, and eye heights in 83E.5.4 (where the limit for vertical eye closure is marked "(max)".

Proposed Response *Response Status* **O**

Cl **121** *SC* **121.8.5.4** *P* **136** *L* **20** # r02-7

Dawe, Piers J G — Mellanox Technologies

Comment Type **TR** *Comment Status* **X**

A much wider range of signals are allowed to be transmitted than are covered by SRS (required to be received).
At present it is allowed to make a transmitter with a noisy or distorted signal, use heavy emphasis to get it to pass the TDECQ test, yet a compliant receiver that passes SRS would not need to receive it. The range needs to be bounded on the left hand side of the maps in dawe_3cd_01a_0318 and dawe_032118_3cd_adhoc so that the receiver design can be bounded in terms of having to "invert" heavily over-emphasised signals, and the gap between possible signals and SRS closed or narrowed.
The remedy doen't directly outlaw over-emphasised signals, but gives them worse TDECQ scores.
D3.1 comment 35

SuggestedRemedy

This remedy lets the transmitter designer use reasonable amounts of emphasis, balancing his own transmitter bandwidth and the reference receiver front-end bandwidth.
After saying where the largest magnitude tap coefficient is, add "The tap coefficients are constrained so that the sum of the other four tap coefficients is less than zero."
Similarly in clauses 122, 124.

Proposed Response *Response Status* **O**

Cl **121** *SC* **121.8.5.3** *P* **136** *L* **14** # r02-8

Dawe, Piers J G — Mellanox Technologies

Comment Type **TR** *Comment Status* **X**

A much wider range of signals are allowed to be transmitted than are covered by SRS (required to be received).
At present it is allowed to make a transmitter with a noisy or distorted signal and use emphasis to get a "noise enhancement credit" to pass the TDECQ test, yet the eye closure is more than the TDECQ limit and a compliant receiver that passes SRS would not need to receive it. The range needs to be bounded on the top side of the maps in dawe_3cd_01a_0318 and dawe_032118_3cd_adhoc so that the receiver design can be bounded in terms of resolution and patterning, and the gap between possible signals and SRS closed or narrowed.
The first remedy has the disadvantage that errors in OMA measurement degrade its accuracy.
D3.1 comment 35

SuggestedRemedy

Either:
1. Limit TDECQ -10*log10(Ceq) to <=2.8 dB.
or:
2. Define TDECQrms = 10*log10(A_RMS/(s*3*Qt*R)) where A_RMS is the standard deviation of the measured signal after the 13.28125 GHz filter response (before the FFE), Qt and R are as already in Eq 121-12. s is the standard deviation of a fast clean signal with OMA=2 and without emphasis, observed through the filter response (0.6254 for 13.28125 GHz).
Limit 3 dB.
Either remedy to apply to all PMDs that use TDECQ in Section 8, although it would not matter much for 400GBASE-FR8 if the over-emphasis limit (see another comment) is in force.

Proposed Response *Response Status* **O**

Cl **121** *SC* **121.8.5.4** *P* **136** *L* **20** # r02-9

Dawe, Piers J G — Mellanox Technologies

Comment Type **TR** *Comment Status* **X**

The TDECQ method allows signals that are slower than 100GBASE-LR4, probably slower than the original T/2-spaced TDECQ allowed, and slower than the SRS test range: see right hand corner of the maps in dawe_032118_3cd_adhoc. If this hole is not plugged, there could be interoperability issues, and/or some product receivers with more tap strength than is needed to receive the range of reasonable signals, degrading their cost/power/performance trade-off.
This issue is less severe than the lack of a limit on the left hand side, but should be considered nevertheless.
These remedies don't by themselves outlaw slower signals, but give them worse TDECQ scores.
D3.1 comment 36.

SuggestedRemedy

Either:
1. Set a maximum cursor strength limit,1.59
or:
2. Set a maximum limit for 10*log10(Ceq), 2.2 dB
Similarly in clauses 122, 124, although because the signalling rate for 124 is higher, the limit there might be higher or absent.

Proposed Response *Response Status* **O**

Cl **121** *SC* **121.8.5.4** *P* **136** *L* **20** # r02-10

Dawe, Piers J G — Mellanox Technologies

Comment Type **TR** *Comment Status* **X**

dawe_3cd_01a_0318 showed that for the slowest, cleanest, most symmetrical allowed signal, putting the cursor at tap 3 has a negligible "benefit" vs. tap 2. This signal should probably not be allowed anyway (see another comment), and the reference receiver in TDECQ isn't meant to fully represent a real receiver. Rougher, noisier, faster, or less symmetric signals would see even less difference. Yet the option adds cost to real receivers (depending on implementation) and time to TDECQ measurements. In the last meeting, the effect of chromatic dispersion was mentioned. I have not yet found a chromatic dispersion effect that creates a slow leading edge, slower than trailing, for enough of the edges that it can be equalised. If it doesn't exist...
D3.1 comment 37

SuggestedRemedy

Change "Tap 1, tap 2, or tap 3, has the largest magnitude tap coefficient" to "Tap 1 or tap 2 has the largest magnitude tap coefficient".

Proposed Response *Response Status* **O**

Cl **116** *SC* **116** *P* **19** *L* **1** # r02-11

Dawe, Piers J G — Mellanox Technologies

Comment Type **TR** *Comment Status* **X**

802.3cd has made and may make changes to material similar to clauses 116 to 124 and their annexes that should be applied here too. In particular, the 1% TDECQ threshold adjust should be common to all SMF clauses that use TDECQ, or absent from all.

SuggestedRemedy

Apply the changes as appropriate.

Proposed Response *Response Status* **O**

Cl **121** *SC* **121.8.5.4** *P* **136** *L* **19** # r02-12

Dawe, Piers J G — Mellanox Technologies

Comment Type **TR** *Comment Status* **X**

Two apparent causes of inaccuracy in TDECQ:
1. Somewhat arbitrary, pattern-dependent measurement of OMA directly affects TDECQ;
2. The rule that the sum of the equalizer tap coefficients is equal to 1 seems to force the TDECQ algorithm to miss the optimum, at least sometimes. This appears to be not the same as the 1% threshold adjust issue.
D3.1 comment 35.

SuggestedRemedy

Issue 1 is cancelled out in (OMA-TDECQ) but not in OMA, so the issue is controlling the signal quality (as opposed to its useful amplitude). Use of TDECQrms as in another comment partially addresses this.

For issue 2: could delete "The sum of the equalizer tap coefficients is equal to 1." The reference receiver could be described as having an offset so that the average power is mapped to zero at the FFE input. Then the thresholds are simply -OMAouter/3, 0, OMAouter/3.

Proposed Response *Response Status* **O**