Cl **162** *SC* **162.9.3** *P* **140** *L* **8** # 62

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *c(n) max*

The maximum step size for c(1) is 0.05, while for all other coefficient it is 0.02.

Having a larger size for c(1) than for c(0) in the transmitter can create unexpected complexities to an optimization algorithm in the receiver (which has no way to tell if the sizes are equal or not). Training algorithms can be made simpler if the steps are nominally equal for all coefficients, so that decrements/increments in c(1) have the same effect on signal swing as other coefficients.

From the transmitter's point of view, there is little benefit, if at all, from having c(1) with a larger step size than all others.

Note that this commend is specific to the Tx electrical specifications. The COM search grid does not necessarily have to change (especially since c(1) is usually set to 0 in COM).

A presentation with further explanations is planned.

SuggestedRemedy

Change step size limits for c(1) to align with all other coefficients.

Add a recommendation that implementations should have the same nominal step size for all coefficients, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The commenter requested that this comment be considered for Clause 163 and Annex 120F, as well.

The relevant locations are 162.9.3, page 147, line 8, 163.9.1, page 176, line 6, and 120F.3.1, page 203, line 33.

Implement with editorial license.

Based on straw polls #1 and #2 do the following:

Change the TX tap maximum step size for TX characteristics to 0.025 for Clause 162, Clause 163, Annex 120F.

Add proposed recommendation with editorial license.

Straw poll #1
I support changing the maximum step size for all TX taps to 0.025 for Clause 162, Clause 163, and Annex 120F for transmitter characteristics (not COM).
A: Yes -- 22
B: No -- 11

Straw poll #2
I support adding the recommendation in the suggested remedy for comment #62.
Yes: 14
No: 13

Straw poll #3
I support closing comment #62 using the direction given by Straw Poll #1 and Straw Poll #2.
Yes: 18
No: 13

Cl **162** *SC* **162.9.3** *P* **140** *L* **10** # 63

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *c(n) max*

The maximum step size of 2% for a PAM4 equalizer creates a significant increase in complexity for a DAC-based transmitter implementation, compared to the step size required in the 802.3cd specs.

A PAM4 DAC with the 2.5% specification in 802.3cd is required to be able of outputting 6/0.025=240 possible values, while with a 2% step size it is requires 6/0.02=300 possible values. This means an additional bit should be used in the logic implementing the FFE and DAC control, and the analog circuits should enable more combinations.

The estimated cost in power consumption of the FFE+DAC logic and analog circuits from this small change in resolution, with a non-naive design, is about 0.3-0.4 pJ/bit. This additional power is going to be consumed regardless of the channel in question.

As presented in ran_3ck_adhoc_01_021920, COM sensitivity analysis shows the benefit from this finer resolution is negligible. It is expected that real life performance will also have little dependence on the step size. Therefore, requiring a smaller maximum step than 2/5% will just waste power.

SuggestedRemedy

Change the (max.) values for c(-3), c(-2), c(-1), and c(0) to 0.025.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #62.

Cl **162** *SC* **162.11.7** *P* **158** *L* **26** # 66

Mellitz, Richard Samtec

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

Tr should be scaled from 50G BaseKR because other timing parameter were scaled.

SuggestedRemedy

Replace TBD for Tr with 6.01e-3 ns

Response *Response Status* **C**

REJECT.

Note that comment #157 for 120F suggested a value of 6.5 ps for C2C. That comment was rejected due to lack of consensus after a series of straw polls.

There is no consensus to implement the suggested remedy.

Cl **162** *SC* **162.9.3** *P* **147** *L* **9** # 74

Healey, Adam Broadcom Inc.

Comment Type **T** *Comment Status* **A**

The maximum step size for the transmitter equalizer coefficients is unnecessarily small.

SuggestedRemedy

Increase the maximum step size to 0.025 for all coefficients.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #62.

Cl **162** *SC* **162.11.7** *P* **159** *L* **21** # 75

Healey, Adam Broadcom Inc.

Comment Type **T** *Comment Status* **R**

The transmitter equalizer coefficient ranges are unneccesarily broad. This leads to wasted search time and the possibility that an exepected channel will meet the COM requirements.

SuggestedRemedy

Reduce the coefficient ranges to the minimum required to support reasonable channels submitted for Task Force consideration. Make similar changes to Table 163-10.

Response *Response Status* **C**

REJECT.

The suggested remedy does not propose specific changes to the draft.

Cl **163** *SC* **163.9.1** *P* **176** *L* **8** # 76

Healey, Adam Broadcom Inc.

Comment Type **T** *Comment Status* **A**

The maximum step size for c(1) (0.05) does not agree with the same value specifed in Table 162-8 (0.02) for n00GBASE-CRn. There is no reason that they should be different.

SuggestedRemedy

Align the coefficient step size requirements between Tables 162-8, 163-5, and 120F-1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #62.

Cl **162** *SC* **162.9.4** *P* **152** *L* **16** # 130

Ghiasi, Ali Ghiasi Quantum/Inphi

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

ERL is TBD

SuggestedRemedy

RLCD=30-30*f/25.78 dB, from 10 MHz to 12.89 GHz
RLCD=15 dB 12.89 to 53 GHz
See ghiasi_3ck_03_0320

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: the comment refers to ERL, but actually addresses differential-to-common-mode return loss]

The task force reviewed slides 3 and 6 of
http://www.ieee802.org/3/ck/public/20_03/ghiasi_3ck_03_0320.pdf

Per straw poll #4 there is no consensus to implement the suggested remedy.

Straw poll #4.
I support closing comment #130 using the suggested remedy, but with fmax = 50 GHz.
Yes: 10
No: 27

Cl **163** *SC* **163.10** *P* **181** *L* **29** # 155

Li, Mike Intel

Comment Type **TR** *Comment Status* **R** *transition time*

Tr TBD

SuggestedRemedy

Change it to Tr =6.5 ps, which is consistent with CEI-112G-PAM4-LR

Response *Response Status* **C**

REJECT.

See response to comment #67

Cl **162** *SC* **162.11.7** *P* **160** *L* **6** # 10014

Mellitz, Richard Samtec

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

[Comment resubmitted from Draft 1.0. Subcl. 162.11.7 - Pg 152 - ln 33]

To move forwards a value for SNR_Tx needs to be chosen

SuggestedRemedy

Replace TBD with 32 dB as in slide 8 of mellitz_3ck_03_1119, slide 9 of lim_3ck_01_1119 in Table 162-15.

Response *Response Status* **C**

REJECT.

The task force reviewed slide 8 of
http://www.ieee802.org/3/ck/public/19_11/mellitz_3ck_03a_1119.pdf
and slide 9 of
http://www.ieee802.org/3/ck/public/19_11/lim_3ck_01a_1119.pdf

Based on the results of strawpolls #5 and #6 there is no consensus to make a change.

Straw poll #5
I support closing comment #10014 and #64 using SNR_TX = 32 dB:
Yes: 18
No: 18

Straw poll #6
I support closing comment #10014 and #64 using SNR_TX = 32 dB and COM = 2.5 dB:
Yes: 6
No: 36