Cl **1** *SC* **1.3** *P* **31** *L* **9** # 232

Dawe, Piers Nvidia

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

In the standards world, there is no such thing as QSFP112, and no expectation that there will be a specification of that name. QSFP specifications are published by the SFF Committee (now part of SNIA), and are mostly independent of operating speed.

SuggestedRemedy

Delete "QSFP112", add the relevant SFF specifications: some of SFF-8661 SFF-8662 SFF-8672 SFF-8663 SFF-8683 SFF-8679 SFF-8636 REF-TA-1011 SFF-8665 (take advice from the SFF committee for which).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 1.3, list the following normative references:
DSFP MSA Dual small form factor pluggable module, Rev. 1.0 September 12, 2018
OSFP MSA Specification for OSFP octal small form factor pluggable module, Rev 3.0 March 14th, 2020
QSFP+ - Specification for QSFP+ 28 Gb/s 4X Pluggable Transceiver Solution SFF-8665, Rev 1.9, June 29, 2015
QSFP-DD800 MSA QSFP-DD Specification for 800G operation, Rev 1.0 March 6, 2020
SFP+ Specification for SFP+ Module and Cage, SFF-8432, Rev 5.2a November 30, 2018
SFP-DD MSA SFP-DD Hardware Specification for SFP double density 2X pluggable transceiver, Rev 3.0 April 10, 2019

Throughout the draft…
Replace "SFP112" with "SFP+"
Replace "SFP112-DD" with "SFP-DD"
Replace "QSFP112" with "QSFP+"
Replace "QSFP112-DD" with "QSFP-DD800"

Implement with editorial license.

Cl **93A** *SC* **93A.1.2.4** *P* **198** *L* **50** # 132

Hidaka, Yasuo Credo Semiconductor

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

Scattering parameter of the second transmission line segment S^(l2) is used in EQ 93A-16b without its definition by new COM parameters z_p2 and Z_c2.

SuggestedRemedy

Insert the following statement at the end of 93A.1.2.3,

For clauses that includes a second package transmission line segment by parameters z_p2 and Z_c2, the scattering parameters for the second package transmission line are defined by Equation (93A-12a), Equation (93A–13a) and Equation (93A–14a). The units of z_p2 are mm.

rho2 = (Z_c2 - 2*R_0) / (Z_c2 + 2*R_0) (93A-12a)

s^(l2)_11(f) = s^(l2)_22(f) = rho2*(1-exp(-gamma(f)*2*z_p2)) / (1 - rho2^2*exp(-gamma(f)*2*z_p2)) (93A-13a)

s^(l2)_21(f) = s^(l2)_12(f) = (1-rho2^2)*exp(-gamma(f)*z_p2) / (1 - rho2^2*exp(-gamma(f)*2*z_p2)) (93A-14a)

The second transmission line scattering parameter matrix is then denoted as S^(l2).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **120F** *SC* **120F.3.2.2** *P* **208** *L* **10** # 169

Ran, Adee Intel

Comment Type **T** *Comment Status* **A** *bucket6*

"The reference impedance for common-mode return loss measurements is 25 Ohm"

Is this statement helpful (or even correct) for D-C conversion? It does not appear in similar places in existing clauses. This clause does not discuss common-mode (to common-mode) return loss.

Practically, the conversion RL is obtained from single-ended s-parameter measurements with a reference of 50 Ohm.

SuggestedRemedy

Delete this sentence.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Delete the referenced sentence.

For both 163 and 120F, add text elsewhere similar to 162.11.1 to specify the reference impedance for differential-mode and common-mode.

Cl **120F** *SC* **120F.4.1** *P* **212** *L* **5** # 133

Hidaka, Yasuo Credo Semiconductor

Comment Type **TR** *Comment Status* **D**

As shown in sun_3ck_adhoc_01_030420, f_LF = f_b/40 is better than f_LF = f_b/80 for C2C.

SuggestedRemedy

Change f_LF from f_b/80 to f_b/40 in table 120F-6.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120F** *SC* **120F.4.1** *P* **212** *L* **18** # 187

Ghiasi, Ali Ghiasi Quantum/Inphi

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

Normalized DFE taps are larger than necessary

SuggestedRemedy

The largest DFE taps observed for C2C channels B1max=0.65 and B2-B6(max)=0.1. See ghiasi_3ck_01_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: change subclause from 120F.4.2.]

The following presentation was reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_01a_0720.pdf

Change bmax(1) to 0.65
Change bmax(2) to 0.15
Change bmax(3:6) to 0.1

Cl **120F** *SC* **120F.4.1** *P* **212** *L* **19** # 235

Dawe, Piers — Nvidia

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

It isn't reasonable to expect a real receiver to provide a DFE tap strength of -0.85. Therefore, the channel should not be specified as if the receiver can do that. Further, there is an advantage in knowing that the sign of a tap can't change. Just as for CR and KR, sensible limits can be chosen without burdening the channels. See comment against 162.11.7 and new Heck presentation for more explanation

SuggestedRemedy

Add minimum tap weight limits:
Tap 1: min +0.3
Tap 2: min +0.05
All other taps: min -0.04 (same as KR)
Update definition of COM in 93A.1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The commenter is referring to the following presentation:
http://ieee802.org/3/ck/public/adhoc/jun17_20/heck_3ck_adhoc_01_061720.pdf

Implement the following with editorial license:

Add minimum tap weight limits:
Tap 1: min +0.3
Tap 2: min +0.05
All other taps: min -0.04

Update definition of COM in 93A.1.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **37** # 195

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

Reference equalizer to measure nearend and farend need to be defined

SuggestedRemedy

Reference the 4T DFE, but with following exception for near end B1max=0.15 and B2-B4(max)=0.05, far end equalizer B1max=0.35, B2-B4(max)=0.1. see ghiasi_03ck_02_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: changed SC/page/line from 120F.4.2/211/48]

The following presentation was reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02_0720.pdf

For TP4a NE measurement, set b_max to {0.4,0.15,0.1,0.1}
For TP4a FE measurement, set b_max to {0.4,0.15,0.1,0.1}

Implement with editorial license.

Cl **120G** *SC* **120G.1** *P* **219** *L* **17** # 172

Ran, Adee — Intel

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

The figure shows a host insertion loss of up to 11.9 dB, but in 120G.3.4.1.1 (module stressed input procedure) one of the test cases has 18.2 dB insetion loss, which "represents 16 dB channel loss with an additional allowance for host transmitter package loss". The informative graph at 120G.4.1 also looks like 16 dB.

SuggestedRemedy

Likely, change the value in the figure to 16 dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

120G.3.4.1.1 (P232/L8) refers to the channel IL, which is from host transmitter to module receiver including the transmitter package, as opposed to the host IL.

In Figure 120G-2, the channel loss, which is a sum of the section losses, is 16 dB.

It would be helpful to show the aggregate loss in the figure.

In Figure 120G-2, designate the insertion loss from host component to module component as 16 dB.

Also, in 120G.4.1, add a cross reference back to Figure 120G-2.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **36** # 131

Hidaka, Yasuo — Credo Semiconductor

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

Table 120G-3 specifies far-end pre-cursor ISI ratio with a reference to 120E.3.2.1.2. Some description in 120E.3.2.1.2 is not relevant for 120G.

SuggestedRemedy

Add a sub clause describing far-end pre-cursor ISI ratio in 120G.3.2.1, similar to 120E.3.2.1.2 like the following:

Capture the PRBS13Q waveform corresponding to the far-end eye (see TBD) and calculate the linear fit pulse using the procedure defined in 162.9.3.1.1. Any setting of the reference receiver at TP4 far-end in Table 120G-9 for which the far-end eye width and height satisfy the limits in Table 120G–3, may be used.
The peak amplitude of the linear fit pulse is p_max. The pre-cursor ISI p_pre is the value of the linear fit pulse 1 UI prior to the time of the pulse peak. The pre-cursor ISI ratio is p_pre / p_max.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

To be consistent with the methodology in 120G.5.2 the setting criteria should be based on EH and VEC. 162.9.3.1.1 includes both capture and linear fit methods. Some clarification of the reference is necessary.

In 120G.3.2, add a subclause describing far-end pre-cursor ISI ratio as follows:
“Capture the PRBS13Q waveform corresponding to the far-end eye and calculate the linear fit pulse using the procedure defined in 162.9.3.1.1. Any valid setting of the reference receiver continuous-time filter (see 120G.5.2) for which the far-end eye height and vertical eye closure satisfy the limits in Table 120G–3 may be used.
The peak amplitude of the linear fit pulse is p_max. The pre-cursor ISI p_pre is the value of the linear fit pulse 1 UI prior to the time of the pulse peak. The pre-cursor ISI ratio is p_pre / p_max.”

Change the reference in Table 120G-3 to point to the new subclause.
Implement with editorial license.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **36** # 130

Hidaka, Yasuo — Credo Semiconductor

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

The near-end eye and far-end eye of module output characteristics (at TP4) are not well defined. Table 120G-3 refers to 120E.3.3.2.1 for far-end eye height, but 120E.3.3.2.1 is host stressed input test.

SuggestedRemedy

Add a sub clause describing near-end and far-end eys in 120G.3.2.1, similar to 120E.3.2.1.1 like the following:

The near-end eye is measured using the method in 120G.5.2.

For the far-end eye, the signal measured at TP4 is first convolved with a host channel (~9.6 dB loss at Nyquist) that represents the worst case channel loss with some reflection in the host trace. The host channel is the host receiver PCB signal path S^(HOSPR) defined in 162.11.7.1.1 with an exception to use z_p = 244.7 mm. The methods in 120G.5.2 and TBD are then used to measure eye height, eye width, vertical eye closure, and far-end pre-cursor ISI ratio.

Change the references in Table 120G-3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with the exception that C0 and C1 are not included in the host channel.

Implement with editorial license.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **44** # 238

Dawe, Piers — Nvidia

Comment Type **TR** *Comment Status* **A** *bucket6*

Unlike CR and KR, the host receiver can't choose what the module output should be like. The module output is supposed to be set to a compromise that's good enough for all hosts. But it may turn out that that's not feasible. Yet we want to avoid fussy tuning schemes that burden the simple module output and the management entity that may be controlling multiple modules.

SuggestedRemedy

First choice: continue with present plan.
Second choice: let the host receiver sort out its channel (if crosstalk or reflections are bad, use a better equalizer).
Third choice: host tells module to use one of just two sets of specs; for low loss host channels and for high loss host channels. Module must be capable of both. Host selects one, by a means we don't specify, based on knowledge of its own preference and channel loss. Eye parameters defined at TP4 and after loss 2 for the low loss setting, after loss 1 and loss 3 for the high loss setting. Generous overlap between the two loss ranges so the host can choose by very simple means. Consider reduced pk-pk V max for the low loss setting.
Don't try to micro-manage the module.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #175.

Cl **120G** *SC* **120G.3.3** *P* **227** *L* **3** # 215

Maki, Jeffery — Juniper Networks

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

There is no prescription for channel equalization. The standard needs to be as prescriptive for the host as for the module. Module implementers need to know what they can expect of the host as must as the host must know what it can expect of the module. Both are parties to adoption and adherence to the standard.

SuggestedRemedy

Add the following sentence after the first sentence of the subclause, "Channel equalization is provided by an adaptive equalizer in the host."

Response *Response Status* **C**

ACCEPT.

Cl **120G** *SC* **120G.3.3.2** *P* **227** *L* **37** # 212

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

The reference 4T equalizer will be calibrated with ideal HCB-MCB vs host channels with long barrel via, need to make sure the host is not over stressed given that host channel has more impairments.

SuggestedRemedy

ghiasi_02_0620 investigates use of C0/C1 as in the CR methodology as one option, this method may result variation in the measurement due to interference but perhaps a better method is to increase eta_0 from 4.1E-8 to account for the board impairments. Eta_0 at TP4 near end is increased by 5x to account short channel impairments and eta_0 at TP4 far end increased by 2x from 4.1E-8. The contribution show that increasing eta_0 is a viable option. The 3rd option is just keep eta_0 at 4.1 E-8 without C0/C1 but instead reduce VEC and increase VEO. 1st option - increase eta_0, 2nd option - tighten the limit on VEO/VEC with eta_0=4.1E-8, 3rd option - add C0/C1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

It appears that the comment is proposing modifications to the reference receiver used for measurement of the host stressed input (TP4a) eye opening parameters.

The following presentation was reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02_0720.pdf

Resolve using the same channel characteristics adopted in the response to comment #130.

Cl **120G** *SC* **120G.3.3.2** *P* **227** *L* **37** # 178

Ran, Adee Intel

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

With two available module settings, one for near-end and one for far-end, a host tested for host stressed input should be allowed to choose when module setting it prefers.

The test should be modified to let the host calibrate the stress either at the MCB output, or after a frequency-dependent attenuator as specified for module output far-end testing. meeting the required BER at one of the settings is sufficient.

SuggestedRemedy

Change 120G.3.3.2.1 text and Figure 120G–8 per the comment.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Comment #175 adopted a pair of TP4 TX settings to address low-loss and high-loss host channels. The setting is to be selected as appropriate by the host.

Implement the suggested remedy with editorial license.

Cl **120g** *SC* **120g.3.3.2** *P* **227** *L* **49** # 197

Ghiasi, Ali Ghiasi Quantum/Inphi

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

Far end VEC is not listed

SuggestedRemedy

Far end VEC=7.5 dB, see ghiasi_3ck_02_0620

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentations were reviewed by the task force.
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_01_0720.pdf

The value for TP4a FE VEC should match the value for TP4 FE VEC. The value for TP4 FE VEC as adopted by comment #177 is 7.5 dB.

Set that TP4a FE stressed eye VEC target value to 7.5 dB.

Implement with editorial license.

Cl **120G** *SC* **120G.3.3.2** *P* **227** *L* **49** # 115

Hidaka, Yasuo Credo Semiconductor

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

Far end eye height of host stressed input test is TBD.
See hidaka_3ck_01_0720, slide 7.

SuggestedRemedy

Change TBD to 24mV.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentations were reviewed by the task force.
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_01_0720.pdf

The value for TP4a FE EH should match the value for TP4 FE EH. The value for TP4 FE EH as adopted by comment #177 is 24 mV.

Set that TP4a FE EH target value to 24 mV.

Implement with editorial license.

Cl **120G** *SC* **120G.3.4.1** *P* **230** *L* **35** # 200

Ghiasi, Ali Ghiasi Quantum/Inphi

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

Module stress eye height is TBD

SuggestedRemedy

This should be the same as TP1a 15 mV

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: change SC/page/line from 120G.3.2/224/33.]

Implement the suggested remedy.

Cl **120G** *SC* **120G.3.4.1** *P* **230** *L* **38** # 114

Hidaka, Yasuo — Credo Semiconductor

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

Eye height of module stressed input test is TBD.
It should be 15mV for consistency with host output spec.

SuggestedRemedy

Change TBD mV to 15 mV.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to #200.

Cl **120G** *SC* **120G.4.2** *P* **236** *L* **15** # 243

Dawe, Piers — Nvidia

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

D1.1 comment 142: "Should account for scope noise as TDECQ does", "Allow RSSing out the scope noise (as done in TDECQ) if it's significant." It turns out that it is significant, but that the scopes can handle this; we should not second-guess them.

SuggestedRemedy

Change step g from:
Compute an eye diagram from yrx(k), including the effect of Gaussian noise with variance calculated in the previous step.
to:
Compute an eye diagram from yrx(k), including the effect of Gaussian noise with variance calculated in the previous step, but taking into account that some noise from to the measurement instrument's noise is already in y2(k).
(We could say yrx(k) instead of y2(k), the noise is the same)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement suggested remedy with editorial license.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **5** # 39

Brown, Matt — Huawei Technologies Canada

Comment Type **T** *Comment Status* **D**

The single-ended termination resistor value is not specified for the reference receiver.

SuggestedRemedy

In Table 120G-9, add parameter "Single-ended termination resistance", Rd, with value 50 Ω.

Proposed Response *Response Status* **Z**

PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **7** # 118

Hidaka, Yasuo — Credo Semiconductor

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

It is not good to restrict gDC range by gDC2.
My simulation showed that many cases had the best gDC at max (weakest) regardless of gDC2 value, and resulted out of the specified range in D1.2.
This is reasonable, because the best gDC2 may be low (strong) to cancel low-frequency loss due to skin effect, whereas the best gDC may be high (weak) to suppress enhancement of high-frequency noise.
Hence, we should not restrict gDC range by gDC2.

SuggestedRemedy

Make gDC range independent from gDC2.

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #117.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **7** # 117

Hidaka, Yasuo — Credo Semiconductor

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

This CTLE will have positive gain if gDC = -2dB.
To avoid positive gain, upper bound of gDC for TP1a should be limited up to -3dB.

SuggestedRemedy

Change upper bound of -2 of gDC for TP1a to -3.

Response *Response Status* **C**

REJECT.

There is no consensus to make changes to g_DC and g_DC2.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **10** # 225

Dudek, Mike — Marvell.

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

Some channels appear to want GDC2 of less than -2dB even though GdC is more than -8dB

SuggestedRemedy

Change the 8dB to 6dB for GDC2 less than -2dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change -8 dB to -6 dB for g_DC2 less than -2 dB.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **16** # 201

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

CTLE gain setting for TP4 nearend are TBD

SuggestedRemedy

see ghiasi_3ck_02_0620 where includes min g_DC and g_DC_HP, min g_DC=5 dB and min g_DC_HP=2 dB

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: change reference from 120G.3.4.1.1.]

The following presentations were reviewed by the task force:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02a_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_01d_0720.pdf

For TP4 near-end…
Set gdc2 range = -2 to 0.
Set gdc range = -5 to -2. Same range for all gdc2 settings.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **23** # 202

Ghiasi, Ali — Ghiasi Quantum/Inphi

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

CTLE gain setting for TP4 far end are TBD

SuggestedRemedy

see ghiasi_3ck_02_0620 where includes min g_DC and g_DC_HP, min g_DC=10 dB and min g_DC_HP=3 dB

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: change subclause from 120G.3.4.1.1.]

The following presentations were review by the task force:
http://www.ieee802.org/3/ck/public/20_07/ghiasi_3ck_02a_0720.pdf
http://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_01d_0720.pdf

For TP4 far-end…
Set gdc2 range = -3 to -1.
Set gdc range = -9 to -3. Same range for all gdc2 settings.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **41** # 241

Dawe, Piers Nvidia

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

A negative first DFE tap means the DFE is taking emphasis out of the signal. In C2M, this should never happen: remember this is a measurement of a signal not a channel, the idea is that a signal with only mild emphasis or shaping is transmitted, there is always some channel loss, and the receiver equalizes a low-pass-filtered signal. Real receivers don't have to cope with over-emphasised signals: in CR and KR they can ask the far transmitter to reduce its emphasis, in C2C the management entity does that on the receiver's behalf. In C2M, the receiver has to tolerate any compliant signal, so the equalizer limits in the eye measurement have to be set more carefully than in COM. The real receiver is not required to be constructed like the COM receiver, and low power receiver designs often can't remove emphasis (because they shouldn't need to).
The first DFE tap minimum and the CTLE gDC maximum must be chosen together to stop people setting up C2M outputs badly.
Further, there should be realistic tap minima for all the taps, as for C2C, KR and CR (see other comments).
See hidaka_3ck_adhoc_01_021920 slide 8 for example tap weights found. Remember that these weights aren't the only acceptable solutions: for example, b1 gDC and TxFIR setting can be traded.

SuggestedRemedy

Tap 1 min +0.1 (max is 0.4)
Tap 2 min -0.15 (max is 0.15)
Taps 3, 4 min -0.05 (max is 0.1)
Adjust names of limits and 93A.1 to support separate max and min limits (see other comments).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[Editor's note: changed SC from 120G.4.2.]

The referenced presentation is here:
http://www.ieee802.org/3/ck/public/adhoc/feb19_20/hidaka_3ck_adhoc_01_021920.pdf

Implement the suggested remedy for both TP1a and TP4 NE/FE.

Implement with editorial license.

Cl **120G** *SC* **120G.5.2** *P* **235** *L* **43** # 242

Dawe, Piers Nvidia

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

It may be that too few scopes can achieve this level of noise (which should warn us that it might be challenging for product receivers too!) As it may be undesirable to attempt to remove or deconvolve noise from a measurement, the solution is to increase the one-sided noise spectral density eta0. Then, this fixed noise makes signals from high loss hosts look relatively worse than from low loss hosts. To avoid that and include something for low-loss ripple effects (see Dudek presentations), we can use a second signal-strength-dependent noise to balance up the reported eye openings across a range of host losses

SuggestedRemedy

Increase eta0 to what is needed for practical measurements.
Use a second noise term proportional to the eye height (after equalization) i.e. K*sum(AVupp + AVmid + AVlow). Use its variance similarly to eta0's, as in steps f and g.

Response *Response Status* **C**

REJECT.

[Editor's note: change SC from 120G.4.2.]

Further details and analysis are required. There is no consensus to implement the proposed methodology at this time.

Cl **120G** *SC* **120G.5.2** *P* **236** *L* **20** # 246

Dawe, Piers — Nvidia

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

This criterion "The values of eye height, eye width, and vertical eye closure are the values obtained with the combination of gDC and gDC2 that produces the minimum value of vertical eye closure where eye height also meets the target value" would fail a signal that passes all 3 criteria on a different Rx setting but fails ESMW at the setting for best VEC. We learnt in previous C2M projects that best vertical and best horizontal opening weren't at the same setting.
Editorial: the idea is not to meet a target, it is to meet or exceed a limit.

SuggestedRemedy

Change to:
The values of eye height, eye width, and vertical eye closure are the values obtained with the combination of gDC and gDC2 that produces the minimum value of vertical eye closure where eye height and ESMW also comply with the limits in the appropriate table.
Editorial: ESMW isn't really a measurement, it's a mask. Maybe define ESW as the measurement?

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The commenter is requesting to changes to the criteria for finding the measured values of EH, EW, and VEC. First, that the criteria includes ESMW in addition to eye height. Second, that the clarify the intent of the criteria.

According to discussions related to the response to comment #231,
there is constroversy over whether the EW/ESMW parameters should be retained. EW or ESMW should not be added to the criteria at this time.

Resolve this comment using the response to comment #123.

Cl **120G** *SC* **120G.5.2** *P* **236** *L* **21** # 123

Hidaka, Yasuo — Credo Semiconductor

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

The condition "where eye height also meets the target value" seems not necessary and confusing. It is not clear what is "the target value".

SuggestedRemedy

Remove "where eye height also meets target value".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The intent of the reference phrase is to eliminate combinations of gDC and gDC2 where the EH height specification fails.

Change "where eye height also meets target value" to "where eye height also complies with the specification for eye height (min) as specified for the interface".

Cl **162** *SC* **162.9.3** *P* **148** *L* **30** # 139

Ran, Adee
Intel

Comment Type **T** *Comment Status* **A** *Tx electrical*

(cross-clause)
Common-mode to common-mode return loss specification is currently TBD.

The specification in all PMD clauses since 802.3bj is 2 dB flat between 0.2-19 GHz.

This specification has been taken from InfiniBand without further discussion in 802.3bj. It may be difficult to justify specific limits. However, it is reasonable from implementation point of view and there is no evidence that requires modifying it.

It is proposed to extend the frequency range proportionally with the increase in signaling rate, to 40 GHz. This should be done in a new subclause that other specifications can refer to. It should also provide some justification to the specification.

SuggestedRemedy

Add a new subclause 162.9.3.6 with content:

162.9.3.6 Common-mode to common-mode return loss
Common-mode signal can be generated in the channel by conversion of a differential signal. Any common-mode signal returned into the channel can be converted back to a differential signal and result in differential noise into the receiver. To limit this effect, a minimum common-mode to common-mode return loss is required.

The common-mode to common-mode return loss shall be greater than or equal to 2 dB at all frequencies between 0.2 GHz and 40 GHz.

Refer to the new subclause in the appropriate row of table 162-9. Set the value to 2 dB.

Refer to the new subclause in Table 163-5 with the same value, and change the row name from "Common-mode return loss (min.)" to "Common-mode to common-mode return loss (min.)".

Add a new row for "Common-mode to common-mode return loss (min.)" with same content in table 120F-1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl **162** *SC* **162.9.3.2** *P* **152** *L* **24** # 145

Ran, Adee
Intel

Comment Type **T** *Comment Status* **A** *Tx electrical*

Addressing TBD equation 162-5.

Recommendations of maximum host board IL at the Nyquist frequency would be valuable for board design. Minimum recommendations should also be given, to reduce ISI from reflections.

Unlike previous generations, the assumption in this project is that host board is built of ultra-low-loss material where the loss at a large part of the spectrum is close to the loss at Nyquist. The IL equation has relatively little additional value and will be harder to justify. Therefore we can remove this TBD equation.

Recommended loss should be given at 26.56 GHz, not 25.56 GHz.

Also, since the effect of the test fixture may vary between MDIs and form factors, it would be helpful to recommend the IL from TP0 to the MDI and from the MDI to TP5 in addition. These are given in Figure 162A–1 as 6.875 dB each; this should be considered a maximum value.

Note that host board design should also minimize reflections, which may require a different specification or recommendation, but that is not proposed at this point.

SuggestedRemedy

Change the text of 162.9.3.2 to the following two paragraph, removing the equation:

The recommended insertion loss at 26.56 GHz from TP0 to TP2 or from TP3 to TP5 (including the test fixture) is between 7.1 dB and 10.975 dB.

The recommended insertion loss at 26.56 GHz from TP0 to the MDI pads (not including the MDI receptacle and test fixture) is between 3 dB and 6.875 dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #40.

Cl **162** *SC* **162.11.7.1.1** *P* **161** *L* **51** # 219

Dudek, Mike — Marvell.

Comment Type **T** *Comment Status* **A** *bucket6*

S(HOSP) is not correct.

SuggestedRemedy

Change it to S(HOSPR)

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7.1.2** *P* **162** *L* **29** # 127

Hidaka, Yasuo — Credo Semiconductor

Comment Type **T** *Comment Status* **A** *bucket6*

S^(HOSPT) is defined as the host transmitter PCB signal path in clause 162.11.7.1.1. The aggressor transmitter PCB signal path should use a different symbol. Clause 136.11.7.1 defined the agressor transmitter PCB signal path as S^(HOTxSP).

SuggestedRemedy

Change "S^(HOSPT)" to "S^(HOTxSP)" in Equation (162-13) and on line 29 and line 44.

Response *Response Status* **C**

ACCEPT.

Cl **162** *SC* **162.11.7.1.2** *P* **163** *L* **3** # 128

Hidaka, Yasuo — Credo Semiconductor

Comment Type **T** *Comment Status* **A** *bucket6*

S^(HOSPT) is defined as the host transmitter PCB signal path in clause 162.11.7.1.1. The aggressor transmitter PCB signal path should use a different symbol. Clause 136.11.7.1 defined the agressor transmitter PCB signal path as S^(HOTxSP).

SuggestedRemedy

Change "S^(HOSPT)" to "S^(HOTxSP)" in Equation (162-14) in page 162 and on line 3 in page 163.

Response *Response Status* **C**

ACCEPT.

Cl **162B** *SC* **162B.1.3.1** *P* **250** *L* **24** # 83

Haser, Alex — Molex

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

Fill in TBD value for T_t (6.16ps)

SuggestedRemedy

See haser_3ck_adhoc_01b_061020

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

For T_t, replace TBD with 7.5 ps.

Cl **162B** *SC* **162B.1.3.2** *P* **250** *L* **45** # 86

Haser, Alex — Molex

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

Fill in TBD for RL limit

SuggestedRemedy

See haser_3ck_adhoc_01b_061020 & update Figure 162B-4

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

Differential Return Loss =
18-0.5*fGHz ; 0.01 GHz ≤ fGHz < 25 GHz
5.5 ; 25 GHz ≤ fGHz ≤ 50 GHz

Cl **162B** *SC* **162B.1.3.3** *P* **251** *L* **18** # 88

Haser, Alex
Molex

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

Fill in TBD for CMCIL limit

SuggestedRemedy

See haser_3ck_adhoc_01b_061020 & update Figure 162B-5

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

Set the common-mode conversion loss limits as follows:
30-(21/28)*fGHz ; 0.01 TBD GHz ≤ fGHz < 20 GHz
15 ; 20 GHz ≤ fGHz ≤ 50 GHz

Cl **162B** *SC* **162B.1.3.6** *P* **254** *L* **11** # 92

Haser, Alex
Molex

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

Fill in TBD for T_nt

SuggestedRemedy

Set T_nt to 6.16 ps (see haser_3ck_adhoc_01b_061020)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following presentation was reviewed at a previous ad hoc meeting:
http://www.ieee802.org/3/ck/public/adhoc/jun10_20/haser_3ck_adhoc_01c_062420.pdf

Adopt the following values:
Tnt= 7.5 ps
Tft= 7.5 ps
ICNFEXT = 4.2mV
ICNNEXT = 1.5 mV
ICNTotal = 4.4 mV