Meeting 5&6 Comment Discussion

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120G (C2M) Topics

Matt

TP4a precursor ISI ratio Comments 150, 96, 246

Cl 120G SC 120G.5.3 P 241 L 31 # 150

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type TR *Comment Status* D *precursor ISI ratio*

Pre-cursor ISI was added in 802.3bs when we did not have VEC, several people have questioned if pre-cursor ISI is need. No has shown why we need to keep pre-cursor ISI, just it might be usefull.

SuggestedRemedy

Given than no one has shown pre-cursor ISI needed then we should remove

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

[Editor's note: Addresses incomplete specification.]
Since no value has been proposed or even discussed, it seems that this parameter is of low importance.
With editorial license, remove pre-cursor ISI specifications.

Cl 120G SC 120G.3.2 P 229 L 26 # 96

Brown, Matt — Huawei

Comment Type T *Comment Status* D *precursor ISI ratio*

Module output far-end pre-cursor ISI ratio value is TBD. The related measurement methodology was rewritten in D1.3.

SuggestedRemedy

Replace TBD with an appropriate value.

Proposed Response *Response Status* W

PROPOSED REJECT.

[Editor's note: Addresses incomplete specification.]
The suggested remedy does not given an actionable proposal.
Resolve using the response to comment #246.

Cl 120G SC 120G.3.2 P 229 L 26 # 246

Dawe, Piers — Nvidia

Comment Type T *Comment Status* D *precursor ISI ratio*

We don't know what to do with far-end pre-cursor ISI ratio. It was copied in from a spec with a very different reference receiver. In this scenario, we don't know what it's for, what a limit should be, or why.
I believe that the ordinary EH, EW and VEC specs with this reference receiver will defend receivers from the same threats that far-end pre-cursor ISI ratio in 120E was intended to guard against, except possibly for some drivers with exemplary noise, jitter and distortion but not so well tuned which can be received anyway.

SuggestedRemedy

We could leave this TBD hanging around in case someone finds a use for it, or clean it up for now while no-one has. We can bring it back later if justified.

Proposed Response *Response Status* W

PROPOSED REJECT.

[Editor's note: Addresses incomplete specification.]
The suggested remedy does not given an actionable proposal.
For task force review.

Per comment #96, the value for precursor ISI is still TBD.
No value has been proposed.
Comments #150 and #246 propose to remove this parameter.
Proposed response to #150 is to remove this parameter. If so, #246 and #96 close using the response to #150.

Matt

TP4a precursor ISI ratio method Comments 258

Cl 120G *SC* 120G.5.3 *P* 241 *L* 34 # 258

Dawe, Piers Nvidia

Comment Type TR *Comment Status* D *precursor ISI ratio*

The valid setting would have to satisfy eye width / ESMW too.

SuggestedRemedy

Modify the definition of valid setting or delete the subclause.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

Comment #41 proposes to remove EW and ESMW.
Comment #150 is calling for removal of pre-cursor ISI specifications.
If either #41 or #150 are accepted then resolve this comment using the responses to #41 and #150.
Otherwise, implement the suggested remedy with editorial license.

Comment #41 may result in EW and ESMW being deleted.
Comment #150 may result in this parameter being deleted.
If either EW/ESMW or precursor ISI are deleted then REJECT and point to other comment.

Otherwise…
AIP Resolve using the SR.

120G.5.3 Pre-cursor ISI ratio measurement method

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.

Matt

TP4a precursor ISI ratio Comments 259

Cl 120G	*SC* 120G.5.3	*P* 241	*L* 37	# 259
Dawe, Piers		Nvidia		

Comment Type T *Comment Status* D *precursor ISI ratio*

The pulse peak is not at the same time as the DFE sampling phase ts determined in step d of 120G.5.2, but it's close. No need for both.

SuggestedRemedy

Change from pmax to the pulse at the DFE sampling phase ts, or delete the subclause.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

Comment #150 is calling for removal pre-cursor ISI specifications.

Comment #150 may result in this parameter being deleted.
If either precursor ISI is deleted then REJECT and point to #150.

Otherwise…
(the proposed response should have been REJECT as follows)
REJECT
The parameters as defined here is consistent with definitions elsewhere. It is better to be consistent with similar or same parameters. The proposed changed does not improve the quality or clarity of this draft.

120G.5.3 Pre-cursor ISI ratio measurement method

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}.

TP4a precursor ISI ratio Comments 259

Cl 120G	*SC* 120G.5.3	*P* 241	*L* 37	# 259

Dawe, Piers — Nvidia

Comment Type T *Comment Status* D *precursor ISI ratio*

The pulse peak is not at the same time as the DFE sampling phase ts determined in step d of 120G.5.2, but it's close. No need for both.

SuggestedRemedy

Change from pmax to the pulse at the DFE sampling phase ts, or delete the subclause.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

Comment #150 is calling for removal pre-cursor ISI specifications.

Comment #150 may result in this parameter being deleted.
If precursor ISI is deleted then REJECT and point to #150.
Otherwise…
(the proposed response should have been REJECT as follows)
REJECT
The parameters as defined here is consistent with definitions elsewhere. It is better to be consistent with similar or same parameters. The proposed changed does not improve the quality or clarity of this draft.

120G.5.3 Pre-cursor ISI ratio measurement method

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}.

Transition Time Comments 91, 97

Cl **120G** *SC* **120G.3.1** *P* **226** *L* **26** # **91**

Brown, Matt — Huawei

Comment Type **T** *Comment Status* **D** *transition time*

The host output minimum transition time value is TBD. Since the transition time is measured after considerable loss and parasitics between the host device and the measurement point it seems unecessary to specify this parameter.
Alternately, use the transition time used in the the various COM simulations (7.5 ps).

SuggestedRemedy

Delete the host output transition time.
Alternately replace TBD with 7.5 ps.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

[Editor's note: Addresses incomplete specification.]
Implement one of the options in the suggested remedy.
For task force discussion.

Cl **120G** *SC* **120G.3.2** *P* **229** *L* **32** # **97**

Brown, Matt — Huawei

Comment Type **T** *Comment Status* **D** *transition time*

The module output minimum transition time value is TBD. Since the transition time is measured after considerable loss and parasitics between the host device and the measurement point it seems unecessary to specify this parameter.
Alternately, use the transition time used in the the various COM simulations (7.5 ps).

SuggestedRemedy

Delete the host output transition time.
Alternately replace TBD with 7.5 ps.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

[Editor's note: Addresses incomplete specification.]
Implement one of the options proposed in the suggested remedy.
For task force review.

From COM V2.95 configuration file…
config_com_ieee8023_93a=3ck_d1p3_120g_C2M_tp1a_09_01_20

Operational		
VEC Pass threshold	9	db
EH_min	15	mV
ERL Pass threshold	7	dB
DER_0	0.00001	
T_r	0.0075	ns
FORCE_TR	1	logical
PMD_type	C2M	
BREAD_CRUMBS	1	logical
SAVE_CONFIG2MAT	1	logical

TP1 XTALK, Transition Time Comment 107

Cl **120G** *SC* **120G.3.4.1.1** *P* **236** *L* **15** # **107**

Brown, Matt — Huawei

Comment Type **T** *Comment Status* **D** *TP4a transition time*

For the module input stressed eye, the pattern generator transition time value is TBD as follows:
"The target pattern generator 20% to 80% transition time at the input to the test channel in the module stressed input test is TBD ps."

SuggestedRemedy

Replace TBD with 7.5 ps.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

[Editor's note: Addresses incomplete specification.]
The suggested value is consistent with the value used in the COM configuration file used for comparative COM simulations.
Implement the suggested remedy.
For task force review.

~~This XTALK in NEXT from module output.~~
~~Should use same value as specified for the module output.~~
~~See comment 97.~~

such that the output of the pattern generator approximates the output jitter profile given by maximum J_{RMS} and maximum J4u, and complies with the even-odd jitter specification in Table 120F–1. The target pattern generator 20% to 80% transition time at the input to the test channel in the module stressed input test is TBD ps. The effective return loss of the test system as measured at TP1 meets the specification given in Figure 120G.3.1.3.

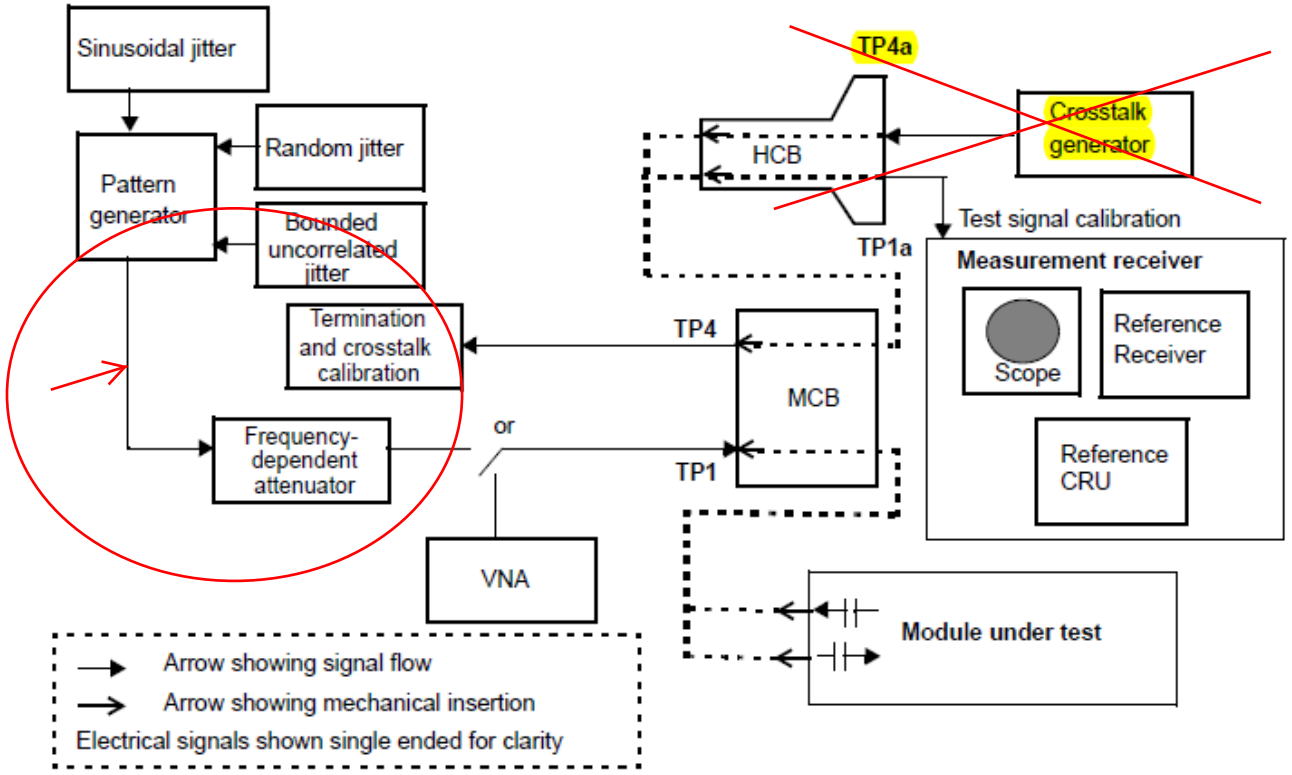

Figure 120G–9—Example module stressed input test

TP1a XTALK

Comment 92

Cl 120G *SC* 120G.3.1.6 *P* 228 *L* 24 # 92

Brown, Matt Huawei

Comment Type T *Comment Status* D *eye opening crosstalk*

The parameter values for the host output eye opening crosstalk source are TBD as follows: "The crosstalk generator is calibrated at TP4 (without the use of a reference receiver) with target differential peak-to-peak amplitude of TBD mV and slew time of TBD ps between –TBD V and +TBD V." Use the maximum peak to peak value from Table 120G-1, range of 20% to 80%, and minimum transition time from Table 120G-1 (value proposed in another comment).

SuggestedRemedy

Replace with the following:
The crosstalk generator is calibrated at TP4 (without the use of a reference receiver) with target differential peak-to-peak amplitude of 870 mV and slew time of 7.5 ps between –261 V and +261 V.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

[Editor's note: Addresses incomplete specification.]
Implement the suggested remedy.
For task force discussion.

Table 120G–1—Host output characteristics at TP1a

Differential peak-to-peak output voltage (max) Transmitter disabled Transmitter ~~enabled~~	120G.5.1	 35 ~~870~~	 mV

All counter-propagating signals are asynchronous to the co-propagating signals using the PRBS13Q (see 120.5.11.2.1) or PRBS31Q (see 120.5.11.2.2) pattern, or a valid 100GBASE-R, 200GBASE-R, or 400GBASE-R signal. For the case where PRBS13Q or PRBS31Q are used with a common clock, there is at least 31 UI delay between the patterns on one lane and any other lane, so that the symbols on each lane are not correlated. The crosstalk generator is calibrated at TP4 (without the use of a reference receiver) with target differential peak-to-peak amplitude of TBD mV and slew time of TBD ps between –TBD V and +TBD V.

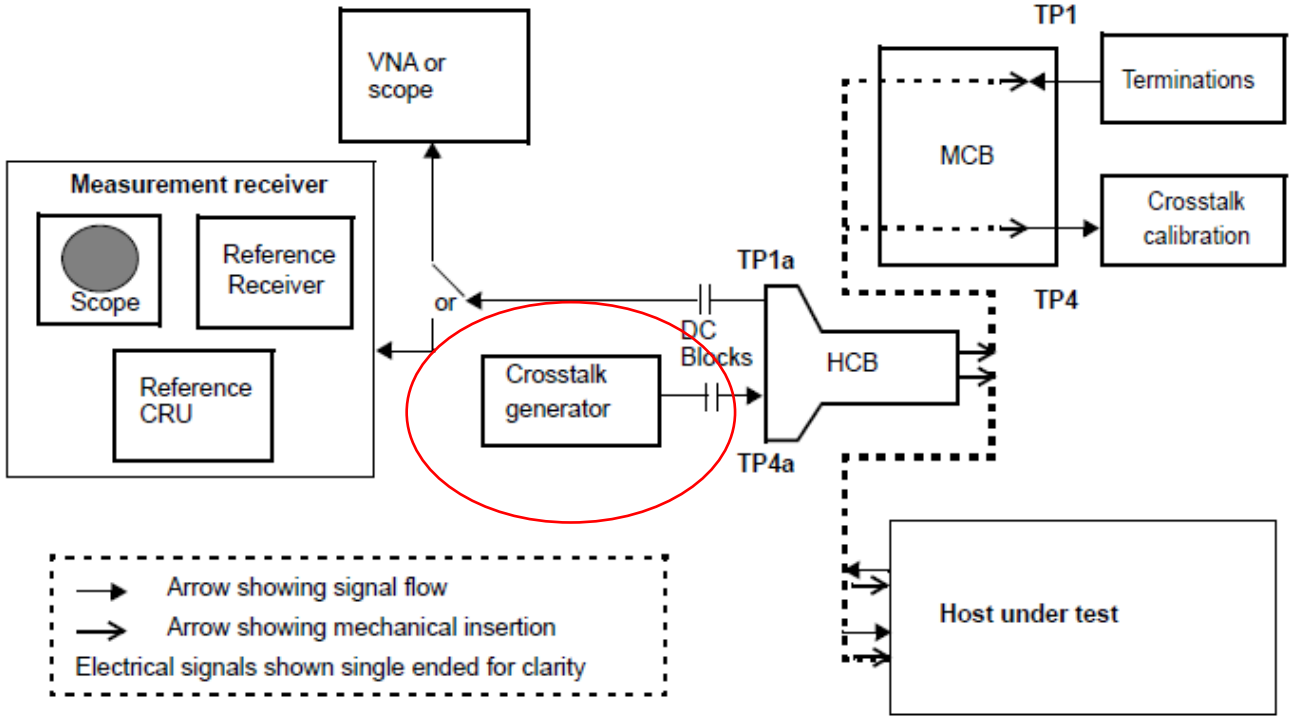

Figure 120G–6—Example host output test configuration

TP4 XTALK Comment 98

All counter-propagating signals are asynchronous to the co-propagating signals using the PRBS13Q (see 120.5.11.2.1) or PRBS31Q (120.5.11.2.2) pattern, or a valid 100GBASE-R, 200GBASE-R, or 400GBASE-R signal. For the case where PRBS13Q or PRBS31Q are used with a common clock, there is at least 31 UI delay between the patterns on one lane and any other lane, so that the symbols on each lane are not correlated. The crosstalk generator is calibrated at TP1a (without the use of a reference receiver) with target differential peak-to-peak amplitude of TBD mV and target transition time of TBD ps.

Cl **120G** *SC* **120G.3.2.2** *P* **230** *L* **14** # 98

Brown, Matt — Huawei

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

The parameter values for the module output eye opening crosstalk source are TBD as follows:
"The crosstalk generator is calibrated at TP1a (without the use of a reference receiver) with target differential peak-to-peak amplitude of TBD mV and target transition time of TBD ps."
Use the maximum peak to peak value and minimum transition time value (proposed in another comment) from Table 120G-1.

SuggestedRemedy

Replace with the following:
"The crosstalk generator is calibrated at TP1a (without the use of a reference receiver) with target differential peak-to-peak amplitude of 900 mV and target transition time of 7.5 ps."

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

[Editor's note: Addresses incomplete specification.]
Comment #91 proposes a maximum transition time of 7.5 ps.
Implement suggested remedy.
For task force discussion

Table 120G–1—Host output characteristics at TP1a

Differential peak-to-peak output voltage (max) Transmitter disabled Transmitter enabled	120G.5.1	 35 870	mV

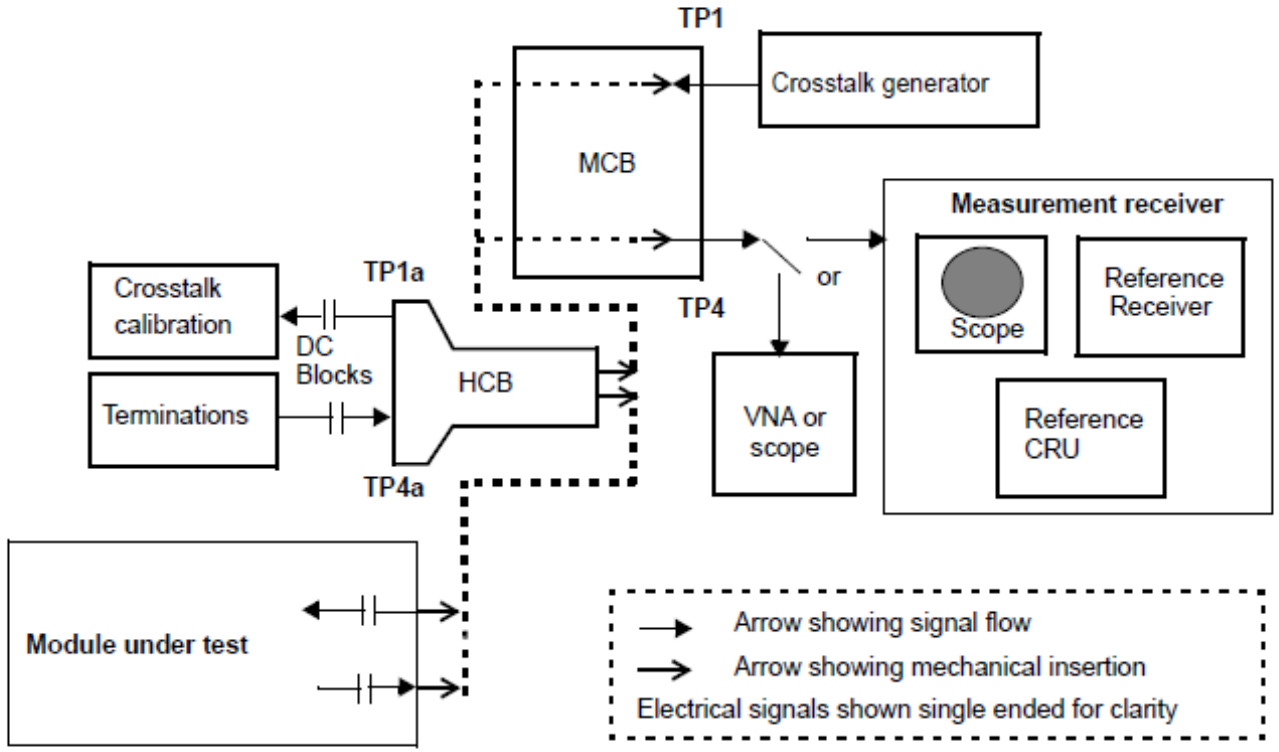

Figure 120G–7—Example module output test configuration

TP4a XTALK Comment 103

Cl **120G** *SC* **120G.3.3.2.1** *P* **233** *L* **32** # **103**

Brown, Matt — Huawei

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

For the host stressed input the crosstalk source transition parameters are TBD as follows: "The counter propagating crosstalk signals during calibration of the stressed signal are asynchronous with target amplitude of TBD mV peak-to-peak differential and 20% to 80% target transition time of TBD ps as measured at TP1a (without the use of a reference receiver)." Set amplitude to the host output maximum value and set the transition time to the host output minimum value.

SuggestedRemedy

Change the sentence to the following:
"The counter propagating crosstalk signals during calibration of the stressed signal are asynchronous with target amplitude of 870 mV peak-to-peak differential and 20% to 80% target transition time of 7.5 ps as measured at TP1a (without the use of a reference receiver)."

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

[Editor's note: Addresses incomplete specification.]
Implement the suggested remedy.
For task force discussion.

Table 120G–1—Host output characteristics at TP1a

Differential peak-to-peak output voltage (max) Transmitter disabled Transmitter enabled	120G.5.1	 35 870	 mV

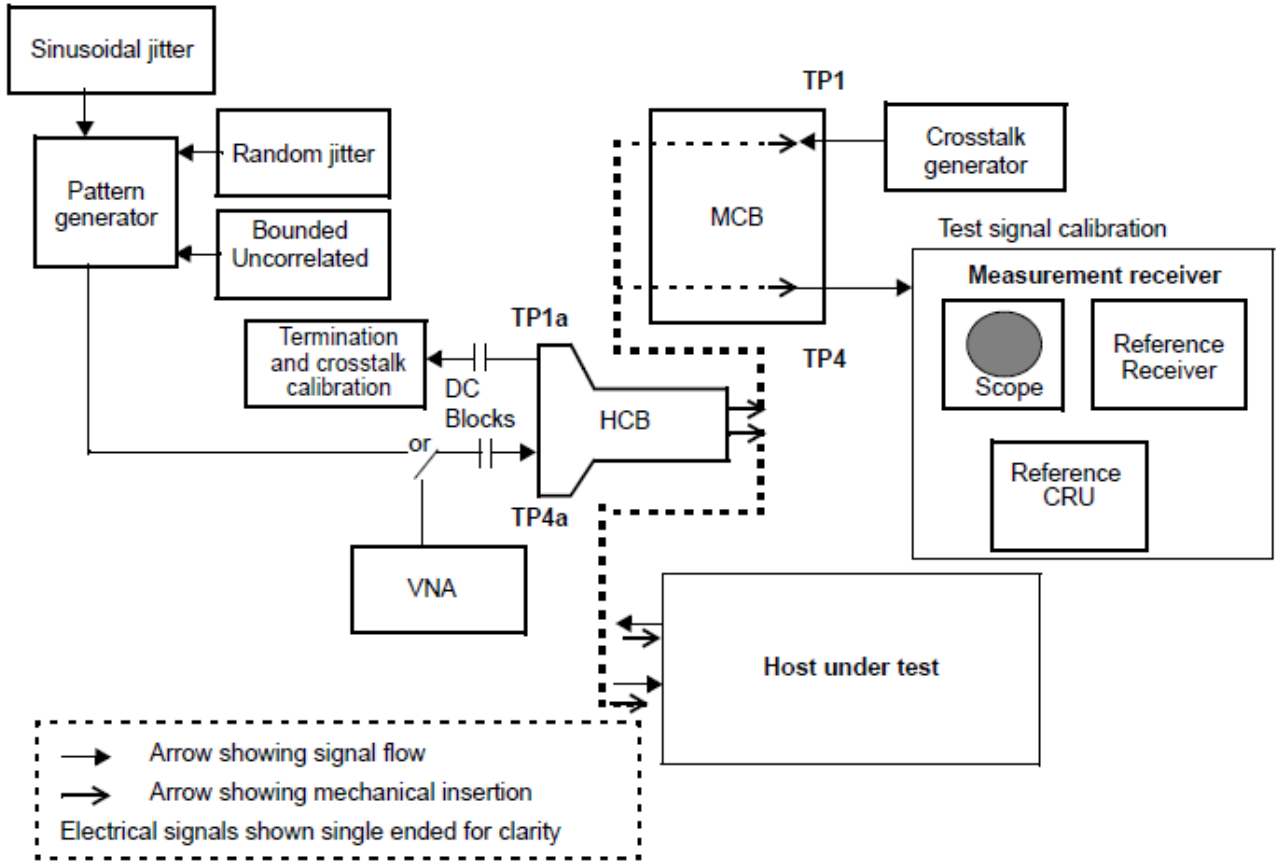

Figure 120G–8—Example host stressed input test

jitter are added such that the output of the pattern generator approximates the output jitter profile given by maximum J_{RMS} and maximum J4u, and complies with the even-odd jitter specification, in Table 120F–1.

The counter propagating crosstalk signals during calibration of the stressed signal are asynchronous with target amplitude of TBD mV peak-to-peak differential and 20% to 80% target transition time of TBD ps as measured at TP1a (without the use of a reference receiver). The crosstalk signal transition time is calibrated

TP1 XTALK Comment 108

Cl 120G *SC* 120G.3.4.1.1 *P* 236 *L* 47 # 108

Brown, Matt Huawei

Comment Type T *Comment Status* D *TP4a crosstalk*

The parameter values for the module input eye opening crosstalk source are TBD as follows:
"The counter propagating crosstalk signals during calibration of the stressed signal are asynchronous with target amplitude of TBD mV peak-to-peak differential and target slew time between –TBD mV and TBD mV of TBD ps as measured at TP4 (without the use of a reference equalizer)."
Use the maximum peak to peak value from Table 120G-3, range of 20% to 80%, and minimum transition time from Table 120G-3 (value proposed in another comment).

SuggestedRemedy

Replace with the following:
The crosstalk generator is calibrated at TP4 (without the use of a reference receiver) with target differential peak-to-peak amplitude of 900 mV and slew time of 7.5 ps between –270 V and +270 V.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

[Editor's note: Addresses incomplete specification.]
Implement the suggested remedy.
For task force discussion.

Table 120G–3—Module output characteristics (at TP4)

Parameter	Reference	Value	Units
Signaling rate per lane (range)	120G.3.1.1	53.125 ± 100 ppm	GBd
AC common-mode output voltage (max, RMS)	120G.5.1	17.5	mV
Differential peak-to-peak output voltage (max)	120G.5.1	900	mV

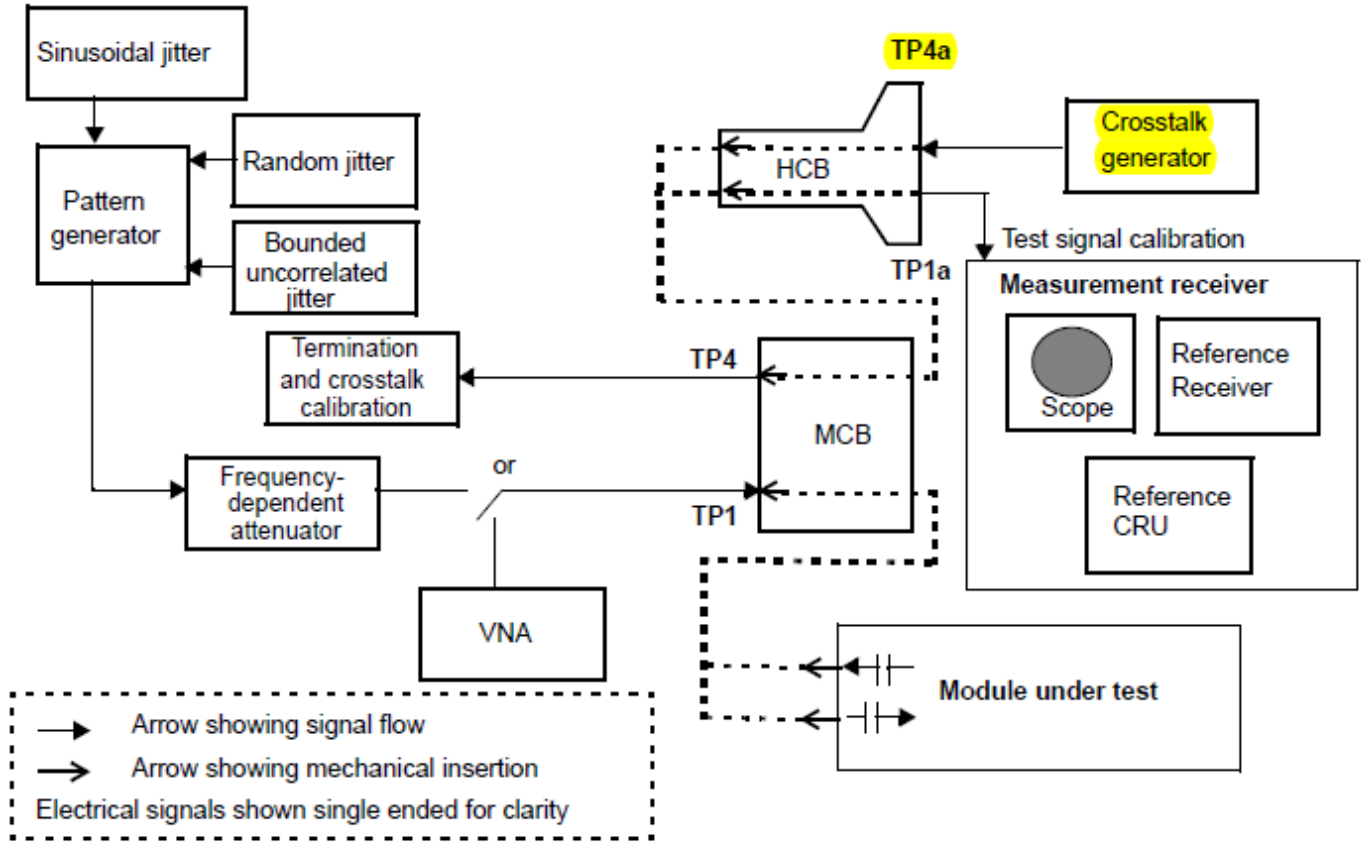

Figure 120G–9—Example module stressed input test

For the high loss case, pre-emphasis capability is likely to be required in the pattern generator to meet the TP1a eye height and vertical eye closure specifications.

The counter propagating crosstalk signals during calibration of the stressed signal are asynchronous with target amplitude of TBD mV peak-to-peak differential and target slew time between –TBD mV and TBD mV of TBD ps as measured at TP4 (without the use of a reference equalizer). The crosstalk signal transition time is calibrated with a PRBS13Q pattern (see 120.5.11.2.1). The pattern may be changed to a

TP4a/TP1 VEC Comments 191, 192

The comment points out that generation of the specified VEC for the stressed eye is not possible.

https://www.ieee802.org/3/ck/public/adhoc/sept23_20/louchet_3ck_adhoc_01a_092320.pdf

One solution proposed is to increase the specified value. However, this is effectively putting a heavier burden on the receiver.

The other proposed solution is to remove the SJ stress. However, the changes the receiver stress to all correlated ISI.

Neither solution seems to resolve the problem without overburdening or underburdening the receiver.

Cl **120G** *SC* **120G.3.3.2** *P* **232** *L* **23** # **191**

Calvin, John — Keysight Technologies

Comment Type **T** *Comment Status* **D** *TP1 VEC*

Based on Hadrien/Garg/Calvin presentation https://www.ieee802.org/3/ck/public/adhoc/sept23_20/louchet_3ck_adhoc_01a_092320.pdf it is illustrated that the Host stressed Far-end vertical eye closure of 7.5dB, cannot be realized with contemporary instrumentation. The current choice of MTF channel losses and sinusoidal impairments records a VEC on the order of 9.5dB.

SuggestedRemedy

Update the target Far-end vertical eye closure VEC in Table 120G-6 from 7.5dB to 9.5dB. Alternately asserting this 7.5dB VEC target without typical margining (SJ) impairments is allowable to reach a VEC of 7.5dB.

Proposed Response *Response Status* **W**

PROPOSED REJECT.

The suggested remedy proposes to address a limitation in the test equipment by increasing the specified value. This would result in tightening receiver specifications and loosening transmitter specifications. More justification for the proposes changes is required.
For task force discussion.

Cl **120G** *SC* **120G.3.4.1** *P* **235** *L* **40** # **192**

Calvin, John — Keysight Technologies

Comment Type **T** *Comment Status* **D** *TP4a VEC*

Based on Hadrien/Garg/Calvin presentation https://www.ieee802.org/3/ck/public/adhoc/sept23_20/louchet_3ck_adhoc_01a_092320.pdf it is illustrated that the Module stressed input test VEC (max) value of 9.5dB, cannot be realized with contemporary instrumentation. The current choice of MTF channel losses and sinusoidal impairments records a VEC on the order of 13dB.

SuggestedRemedy

Update the target VEC max in Table 120G-9 from 9.5dB to 13dB. Alternately asserting this 9.5dB target VEC should be attainable with either a lower loss C2M test channel, or without typical margining (SJ) impairments is allowable to reach a VEC of 9.5dB.

Proposed Response *Response Status* **W**

PROPOSED REJECT.

The relaxation of VEC specification will overly stress the receiver.
Reducing the amount of SJ is a possiblity but the signal may not have the appropriate characteristics.
For task force discussion.

EO Method Comment 206

Cl 120G SC 120G.5.2 P 241 L 10 # 206

Ran, Adee Intel

Comment Type T *Comment Status* D *EO method*

In item c the linear fit is performed "with parameter M the same as for step a)" - but in step a there is no mention of M.

If M corresponds to "a minimum of 3 samples per symbol" then this is too low for calculation of a linear fit and especially for obtaining t_s.

In the PMD clauses, for linear fit, M is required to be at least 32, and interpolation can be used. The third paragraph of 162.9.3.1.1 (which is referenced here) states this clearly, so no explicit statement is required.

SuggestedRemedy

Delete "with parameter M the same as for step a)".

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

Item a) previously referenced the capture method in 162.9.3.1.1 which specified M to be at least 32. This capture method was replaced with the in 120E.4.2, which specifies a minimum of 3 samples per symbol. The intent of keeping M the same in both the capture and the linear fit is to ensure a correspondence of the sample time derived from the linear fit.
Options to address this include:
1) Change the text in item a) to "The number of samples captured per symbol, M, is at least 3." or
2) In item c), delete "with parameter M the same as for step a)".
For task force discussion.

Perform the following step once:

a) Capture the PRBS13Q signal $y_1(k)$ with the effect of low-pass response equivalent to the specified receiver noise filter with associated parameter f_r in Table 120G–10 (instead of the test system response specified in 120G.3.1), and using a clock recovery unit with a corner frequency of 4 MHz and slope of 20 dB/decade. The capture includes a minimum of 3 samples per symbol, or equivalent. Collect sufficient samples equivalent to at least 1.2 million PAM4 symbols to allow for construction of a normalized cumulative distribution function (CDF) to a probability of 10^{-5} without extrapolation.

Perform the following five steps for each valid combination of g_{DC} and g_{DC2} as specified in Table 120G–10:

b) Compute the response $y_2(k)$ by applying the effect of the continuous time filter to $y_1(k)$ using the associated parameters in Table 120G–10.

c) Compute the linear fit pulse response $p_2(k)$ using the method defined in 162.9.3.1.1 with parameter M the same as for step a), D_p equal to 3, and N_p equal to 200.

The proposed options should be:
1) Change the text in item a) to "The number of samples captured per symbol, M, is at least 32." or
2) In item c), delete "with parameter M the same as for step a)".

The first one is suggested.

EO Method, TP1a reference receiver Comment 256

Cl **120G** *SC* **120G.5.2** *P* **240** *L* **10** # **256**

Dawe, Piers — Nvidia

Comment Type **T** *Comment Status* **D** *RR parameters*

By allowing stronger gDC with stronger gDC2, we can have up to 12 dB of peaking for gCD2 = -1 but up to 16 dB for gDC2 = -3 - yet we don't expect the maximum channel loss to vary like that.

SuggestedRemedy

I think we should be allowing stronger gDC with weaker gDC2, for TP1a and for TP4 far end.

Proposed Response *Response Status* **W**

PROPOSED REJECT.

The comment does not provide sufficient evidence to make the proposed changes not does the suggested remedy provide sufficient detail to to implement.
For task force discussion.

Table 120G–10—Eye opening reference receiver parameter values

Parameter	Symbol	Value	Units
Receiver 3 dB bandwidth	f_r	$0.75 \times f_b$	GHz
Continuous time filter, DC gain for TP1a Range for $g_{DC2} = 0$ Range for $-1 \le g_{DC2} < 0$ Range for $-2 \le g_{DC2} < -1$ Range for $-3 \le g_{DC2} < -2$ Step size	g_{DC}	 –2 to –9 –2 to –12 –4 to –12 –6 to –13 1.0	dB
Continuous time filter, DC gain 2 for TP1a Minimum value Maximum value Step size	g_{DC2}	 –3 0 0.5	dB

TP1, NE EH Comment 250

Cl 120G	*SC* 120G.3.3.2	*P* 232	*L* 17	# 250

Dawe, Piers — Nvidia

Comment Type TR *Comment Status* D *TP1 EH*

The module NE and FE minimum EH should not be the same (see another comment). If we stay with the 2-settings module specification, even if corrected with a 4-loss specification method, this should be reflected in this table, which should include near-end parameters anyway.

SuggestedRemedy

Add the rows for the near-end parameters.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

Add rows for NE EH, EW, and VEC to Table 120G-6 with values the same as for FE EH, EW, and VEC, respectively.
For task force discussion.

Table 120G–6—Host stressed input parameters

Parameter	Value
Far-end ESMW (eye symmetry mask width)	TBD UI
Far-end eye width	TBD UI
Applied peak-to-peak sinusoidal jitter	Table 120G–7
Far-end eye height	24 mV
Far-end vertical eye closure	7.5 dB

The stressed input is calibrated using either the near-end or the far-end method. The near-end and far-end eye height, eye width, and vertical eye closure are set to the target values in Table 120G–6 when measured according to the method in 120G.3.2.2.1. Meeting the BER requirements at only one of the methods is sufficient.

Revised response:
PROPOSED ACCEPT IN PRINCIPLE.
Some comments are proposing to remove EW as a parameter.
Add rows for NE EH, EW (if EW is not removed as a result of other comments), and VEC to Table 120G-6 with values the same as for FE EH, EW, and VEC, respectively.
For task force discussion.

TP4, EH
Comment 244

Cl **120G** *SC* **120G.3.2** *P* **229** *L* **19** # **244**

Dawe, Piers — Nvidia

Comment Type **TR** *Comment Status* **D** *TP4 NE EH*

For a reasonably clean module (or test equipment in a host stressed eye test), the driver swing has to be aggressively reduced to deliver only 24 mV. If the module is set to the "near" setting, and the host receiver isn't that near, the eye it is offered is smaller than 24 mV because of loss, and out of tune as well. 120E has 70 mV.

SuggestedRemedy

Change the NEEH from 24 mV to 50 mV.

Proposed Response *Response Status* **W**

PROPOSED REJECT.

The comment does not provide evidence that 24 mV is insufficient, it only points out that for loss greater than the HCB the host device might see something lower.
For task force discussion.

The currently specified value was a result of a great deal of offline consensus building and analysis.

See the following presentation:
https://www.ieee802.org/3/ck/public/20_07/ran_3ck_01b_0720.pdf
And related comment #xxx to the right.

Cl **120G** *SC* **120G.3.2** *P* **224** *L* **45** # **177**

Ran, Adee — Intel

From Draft 1.2 comments

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

Addressing Near-end eye height, differential (min) and Far-end eye height, differential (min) which are TBDs.

The host output is now specified in terms of VEC. There is no reason that the module output should not use this specification method.

The proposed limit values are based on host output specification, and are the same for near-end and for far-end, at this time. The limit values may be adjusted in future drafts. The module can use different settings to meet the near-end and far-end requirements.

SuggestedRemedy

Change the minimum NEEH and FEEH values in Table 120G–3 to 15 mV. Add rows for Near-end VEC and Far-end VEC, both with maximum value of 9 dB. Clarify that different module output settings may be used in the tests.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

For NE EH...
#177 proposes 15 mV
#135 proposes 50 mV
#191 proposes 40 mV

For FE EH...
#177 proposes 15 mV
#192 proposes 20 mV
#107 proposes 24 mV

For NE VEC...
#177 proposes 9 dB
#108 proposes 7.5 dB

For FE VEC...
#177 proposes 9 dB
#109 proposes 7 dB

The following presentations were reviewed:
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
http://www.ieee802.org/3/ck/public/20_07/ran_3ck_01b_0720.pdf

Straw polls #4 and #5, indicated strong support for adopting the values for far-end and near-end VEC and EH as proposed on slide 9 of ran_3ck_01b_0720.

The closed response to comment #175 adopted two equalization settings for module transmitter.

Set far-end VEC (max) to 7.5 dB
Set near-end VEC (max) to 7.5 dB
Set far-end EH (min) to 24 mV
Set near-end EH (min) to 24 mV

[Editor's note added after the comment was closed:
The URL for second listed presentation should be the following...
http://www.ieee802.org/3/ck/public/20_07/hidaka_3ck_01d_0720.pdf
]

TP4
Comments 144, 247, 252

Cl 120G SC 120G.3.2.1 P 229 L 48 # 144

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type TR *Comment Status* D *TP4 settings*

It is stated that module has two setting one settting for short and one setting for long, not clear what short and long are nor clear if the link must work between short and long!

SuggestedRemedy

Define short channel as following: Any host channel with loss up to 11 dB.
Define long channel as following: Any host channel with loss >11 dB.

Proposed Response *Response Status* W

PROPOSED REJECT.

This interface specification is written with the assumption that the maximum host insertion loss is around 11.9 dB. So providing a setting for going beyond 11 dB is not helpful.
The intent of having two settings, generically labelled short and long, is to provide appropriate amplitude and emphasis based on the host capabilities.
The setting is potentially chosen by a combination of the host device and the channel characteristics, and not solely based on the host channel insertion loss.
Near-end and far-end tests are specified for the module and it must meet both specifications with the appropriate setting of tx_eq_state, see 120G.3.3.2.1.
However, the setting of module tx_eq_state is not clearly specified for the host input specifications.
A proposal for how the module equalization is set for operation would be helpful.

Cl 120G SC 120G.3.2.1 P 229 L 46 # 247

Dawe, Piers — Nvidia

Comment Type TR *Comment Status* D *TP4 settings*

As already discussed, the 2-settings method with only two compliance losses doesn't work. If the module is set to the short setting, and the host receiver isn't that near, the eye it is offered is smaller than 24 mV because of loss, and out of tune as well. If the module is set to the long setting and the host isn't that long, the eye is also out of tune. There's no guarantee that either setting is usable.

SuggestedRemedy

We need four compliance losses forming two overlapping ranges, or go back to the one-setting method which is much preferable for avoiding complexity, firmware and interop issues.

Proposed Response *Response Status* W

PROPOSED REJECT.

The comment does not provide sufficient evidence that further changes are required.
The first option proposed in the suggested remedy is not sufficiently complete to implement.
The second option would result in moving further away from addressing the the concerns expressed in the comment.
For task force discussion.

Cl 120G SC 120G.3.3.2.1 P 233 L 43 # 252

Dawe, Piers — Nvidia

Comment Type T *Comment Status* D *TP4 settings*

"Meeting the BER requirements at only one of the methods is sufficient": not quite. The host needs to choose right as well.

SuggestedRemedy

If the 2-settings method is kept, say that meeting the BER requirements at the one of the two methods that the host selects is sufficient.

Proposed Response *Response Status* W

PROPOSED REJECT.

As written, if both far-end and near-end tests are performed and if either passes then the receiver passes. In reality, the tester would be aware of which mode to use to avoid an unecessary failed test.
See the response to comment #144.

TP4a
Comments 109, 254

Cl 120G SC 120G.3.4.1.1 P 237 L 14 # 109

Brown, Matt Huawei

Comment Type T *Comment Status* D *TP4a criteria*

For the module input stressed eye high-loss case the criteria to have CTLE setting greater than a certain value is not relevant because: (a) there are two gain parameters and (b) the reference receiver includes a DFE. Regardless, the minimum CTLE setting value is TBD.

SuggestedRemedy

Either:
(a) delete the following text:
"This CTLE setting has to be greater than or equal to TBD dB." on line 13, and
"except that the restriction that the CTLE setting has to be greater than or equal to TBD dB does not apply" on line 18
OR
(b) provide an alternate relevant criteria.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

[Editor's note: Addresses incomplete specification.]
Implement the suggested remedy.
For task force review.

Cl 120G SC 120G.3.4.1.1 P 237 L 14 # 254

Dawe, Piers Nvidia

Comment Type T *Comment Status* D *TP4a criteria*

"This CTLE setting has to be greater than or equal to TBD dB": with a compound CTLE, it's not as simple as that.
The limits should be close to that for TP4 FE in Table 120G-14, but might not be identical.

SuggestedRemedy

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

[Editor's note: Addresses incomplete specification.]
The suggested remedy does not provide an actionable remedy.
Resolve using the response to comment #109.

For the high-loss case, frequency-dependent attenuation is added such that the loss at 26.56 GHz from the output of the pattern generator to TP1a is 18.2 dB. The 18.2 dB loss represents 16 dB channel loss with an additional allowance for host transmitter package loss. Eye height and VEC are then measured at TP1a as described in 120G.5.2. Random jitter and the pattern generator output levels are adjusted (without exceeding the differential peak-to-peak input voltage tolerance specification as shown in Figure 120G–8) to result in the eye height for all three eyes and eye width for the smallest eye given in Figure 120G–9 using the reference receiver with the setting that maximizes the product of eye height and eye width. This CTLE setting has to be greater than or equal to TBD dB.

TP4a Comments 185

Cl 120G	*SC* 120G.6.3	*P* 243	*L* 29	# 185

Maki, Jeffery — Juniper Networks

Comment Type T *Comment Status* D *(bucket1)*

Major capability/option for the host is missing that is already listed for the module.

SuggestedRemedy

Add row to table with Item = ADE-H; Feature = Adaptive Equalization; Subclause = 120G.3.3; Value/Comment = See 120G.3.3; Status = M; Support = Yes [ ].

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

The capability is specified in 120G.3.3, but has not yet been listed in the PICS.
Implement suggested remedy with editorial license.

This comment was pulled from bucket #1.
The proposed response should be revised as follows:
AIP
The capability is specified in 120G.3.3, but has not yet been listed in the PICS.
Implement the suggested remedy with editorial license, except insert the new item ahead of RH1 in the table in 120G.6.4.3.

The module input adaptation criteria was part of D1.0.

120G.3.4 Module input characteristics

The module input shall meet the specifications given in Table 120G–8. Channel equalization is provided by an adaptive equalizer in the module.

120G.6.4.4 Module input

Item	Feature	Subclause	Value/Comment	Status	Support
RM1	Module input characteristics	120G.3.4	Table 120E–7	M	Yes [ ]

Similar text was added for the host input in a later draft. No related PICS item has been written yet.

120G.3.3 Host input characteristics

The host input shall meet the specifications given in Table 120G–5. Channel equalization is provided by an adaptive equalizer in the host.

No related PICS item has been written yet. The editorial team has deferred updating the PICS until the specifications are closer to completion as indicated in the editorial notes. However, there is no reason that we shouldn't given that the specification is already written.

Thanks