

IEEE P802.3ck D1.2 100/200/400 Gb/s Electrical Interfaces Task Force 3rd Task Force review comments

Cl 120F SC 120F.3.1 P 205 L 22 # 167

Ran, Adeel Intel

Comment Type T Comment Status A

Minimum and maximum tap value and step sizes refer to 136.9.3.1.4, but in this project we have different specifications in clause 162 (an additional tap, and uniform step size limits).

SuggestedRemedy

Change references for step sizes and ranges to 162.9.3.1.4 and 162.9.3.1.5 respectively.

Response Response Status C

ACCEPT.

Cl 120F SC 120F.3.1 P 205 L 23 # 183

Sun, Junqing Credo Semiconductor

Comment Type TR Comment Status A

TX FIR Range can be optimized for C2C applications

SuggestedRemedy

value at min. state for c(-3) (max.) = -0.05  
 value at max. state for c(-2) (min.) = 0.10  
 value at min. state for c(-1) (max.) = -0.28  
 value at min. state for c(1) (max.) = -0.1  
 see presentation sun\_3ck\_01\_0720

Response Response Status C

ACCEPT IN PRINCIPLE

Reviewed the following presentation:  
[http://www.ieee802.org/3/ck/public/20\\_07/sun\\_3ck\\_01\\_0720.pdf](http://www.ieee802.org/3/ck/public/20_07/sun_3ck_01_0720.pdf)

For the TX characteristics, implement the tap range and step size on slide 9 of the presentation except:  
 c(-1) min value is -0.30  
 c(0) min value is 0.55

Cl 120F SC 120F.3.1 P 205 L 23 # 11144

Dawe, Piers Mellanox

Comment Type TR Comment Status R

[Comment resubmitted from Draft 1.1. 120F.3.1, P203, L32]

The third precursor has only minor value for "28 dB" channels, so I don't expect it will be worthwhile for "20 dB" channels, yet it adds complexity to the silicon and the tuning. This is not KR or CR, it should be done with simpler silicon, like C2M.

SuggestedRemedy

Remove the third precursor.

Response Response Status C

REJECT

The comment does not provide sufficient evidence to support the change.

The following presentation shows an improvement due to c(-3) of 0.1 to 0.8 dB in COM for channels with COM near 3 dB.

[Http://www.ieee802.org/3/ck/public/adhoc/mar04\\_20/sun\\_3ck\\_adhoc\\_01\\_030420.pdf](http://www.ieee802.org/3/ck/public/adhoc/mar04_20/sun_3ck_adhoc_01_030420.pdf)

Removing the c(-3) would result in marginal channels failing.

Cl 120F SC 120F.4.1 P 211 L 25 # 184

Sun, Junqing Credo Semiconductor

Comment Type TR Comment Status A

TX FIR Range can be optimized for C2C applications

SuggestedRemedy

value at min. state for c(-3) (max.) = -0.04  
 value at max. state for c(-2) (min.) = 0.10  
 value at min. state for c(-1) (max.) = -0.28  
 value at min. state for c(0) (max.) = 0.6  
 value at min. state for c(1) (max.) = -0.1  
 see presentation sun\_3ck\_01\_0720

Response Response Status C

ACCEPT IN PRINCIPLE

Reviewed the following presentation:  
[http://www.ieee802.org/3/ck/public/20\\_07/sun\\_3ck\\_01\\_0720.pdf](http://www.ieee802.org/3/ck/public/20_07/sun_3ck_01_0720.pdf)

For the COM parameters, implement the tap range and step size on slide 9 of the presentation.

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CI 163 SC 163.9.1 P 177 L 26 # 33

Ben Artsi, Liav Marvell Technology  
 Comment Type T Comment Status A TP0v

TP0a has been shown to be extremely difficult to be used as a point to measure Specified Tx compliance parameters.

*SuggestedRemedy*

Measurement to be done at a newly defined TP0v which may vary according to implementation.  
 A presentation will be provided with details, parameters values and method.

Response Response Status C

ACCEPT IN PRINCIPLE

The following presentations were reviewed:

[http://www.ieee802.org/3/ck/public/20\\_07/benartsi\\_3ck\\_01\\_0720.pdf](http://www.ieee802.org/3/ck/public/20_07/benartsi_3ck_01_0720.pdf)  
[http://www.ieee802.org/3/ck/public/20\\_07/heck\\_3ck\\_01a\\_0720.pdf](http://www.ieee802.org/3/ck/public/20_07/heck_3ck_01a_0720.pdf)

Strawpoll #1.

I support use of the TP0v methodology as proposed in benartsi\_3ck\_01\_0720.

A: Yes  
 B: No  
 C: Need more information  
 Choose one.

A: 16 B: 1 C: 21

Implement using the contents of heck\_3ck\_01a\_0720 with editorial license, with the following exceptions:

- on slide 9, in value column change 0 to TBD (3 times)
- use different annex, e.g., 163A

CI 163 SC 163.9.1 P 178 L 5 # 222

Dudek, Mike Marvell.  
 Comment Type T Comment Status A TX FIR

It would be good to add the same recommendation for equal step sizes for backplane as has been added for copper cable.

*SuggestedRemedy*

Add the footnote "Implementations are recommended to use the same step size for all coefficients." to the transmitter output waveform

Response Response Status C

ACCEPT

CI 163 SC 163.9.2.3 P 181 L 53 # 156

Ran, Adeo Intel  
 Comment Type T Comment Status A RITT

The Rx test channel is calculated excluding the Rx device package model, and with a transition time filter with  $T_r = \text{TBD}$ . In 802.3cd this  $T_r$  was based on measurement at TP0, which may be after a package of a compliant device (this may be more representative than an instrument-grade transmitter).

The measured transition time at TP0 does not represent all the signal integrity effects of 100G packaged devices and test fixtures. Omitting a package model altogether and using only the transition time filter and ideal termination would not model internal reflections or reflection of signal returning from the test channel. This would lead to an optimistic COM result which may require addition of noise.

If the signal source does include a package or any other discontinuity then in practice there will be reflections and the signal will be worse than what COM (without package) predicts, resulting in overstressed test.

In the test method of annex 93C, this issue has been addressed by the statement "... the transmitter package model is included only if a compliant transmitter with a similar termination is used. If a transmitter with high quality termination is used... the termination is modeled as ideal and a Gaussian low pass filter is added". But later KR clauses (starting at 111) removed this condition and required using only a transition time filter, with value calculated from a measurement at TP0a. This may not be justifiable anymore with 100G devices.

If the signal source used in a test is a device which has known internal discontinuities modeled as s-parameters (e.g. from extraction, s-parameter measurement, or calculation from measured Tx output) then these s-parameters should be included in the calculated test channel.

*SuggestedRemedy*

Replace item d with the following:

d) In the calculation of COM (list item 7 in 93A.2), if the transmitter is a device with known s-parameters and transition time, these parameters should be used instead of the transmitter package model in 93A.1.2. If the transmitter is a packaged device with unknown parameters, then the package model in 93A.1.2 is used, with  $z_p$  of test 1 in Table 163-10 and  $T_r$  as specified in 163.10. If a calibrated instrument-grade transmitter is used, the transmitter termination is modeled as ideal and a Gaussian low pass filter is added as defined in 93A.2.

Similar changes may also be required for clause 162 and annex 120F, with possible modifications as necessary.

Response Response Status C

ACCEPT IN PRINCIPLE.

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Comment #38 discusses the same topic.

Change bullet d) to:

d) In the calculation of COM, if the transmitter is a device with known sparameters and transition time  $T_r$ , these parameters should be used instead of the transmitter package model in 93A.1.2. If a calibrated instrument-grade transmitter is used, The transmitter device package model  $S(tp)$  is omitted from Equation (93A-3) in the calculation of COM. The filtered voltage transfer function  $H(k)(f)$  calculated in Equation (93A-19) uses the filter  $H_t(f)$  defined by Equation (93A-46), where  $T_r$  is calculated as  $T_r = 1.09 \cdot T_{rm} - 4.32$  ps and  $T_{rm}$  is the measured 20% to 80% transition time of the signal at TP0a.  $T_{rm}$  is measured using the method in 120E.3.1.5.  $T_{rm}$  is measured with transmitter equalizer turned off. Apply the change to 120F.

Cl 163 SC 163.10 P 184 L 4 # 53

Mellitz, Richard

Samtec

Comment Type TR Comment Status A package parameter

Much work has been done on 100G package model. Parameters in table 163-10 were based on package transmission line losses different the specified in table 93A-3. The table 93A-3 values were suggested in benartsi\_3ck\_adhoc\_01\_121218 and benartsi\_3ck\_01\_0119.

*SuggestedRemedy*

Add line: The package transmission line,  $s^{(l)}(f)$ , uses table 93A-3 but replaces values for  $a_1$  and  $a_2$  with 0.0009909 and 0.0002772 respectively.

Response Response Status C

ACCEPT IN PRINCIPLE.

Implement suggested remedy with editorial license.

Cl 163 SC 163.10 P 184 L 14 # 206

Ghiasi, Ali

Ghiasi Quantum/Inphi

Comment Type TR Comment Status R COM parameter

COM receiver reference model does not excite common mode and model is fully symmetrical between P/N. Unless COM reference model has common mode excitation only differential aspect of the S4P exercised.

*SuggestedRemedy*

Non-idealities in COM can be introduced by following:

- Termination mismatch P/N 3%
  - Package P +/- 10%
  - Package N +/- 10%
- But the total RLM should still be 95%.

Response Response Status C

REJECT

COM mode impairment is indeed not fully considered in COM. However the suggested remedy does not provide clear information to implement.

There is no consensus to implement the suggested remedy at this time. More empirical evidence and consensus building is required.

Cl 163 SC 163.10 P 185 L 33 # 262

Dawe, Piers

Nvidia

Comment Type TR Comment Status R COM parameter

The analysis that led to the equalizer length choice needs to be revisited with the new COM.

*SuggestedRemedy*

If there is a significant improvement with the latest COM, remove positions 25-40 and define positions 13-24 as the tail, with 2 or 3 floating groups of 3 taps and an RSS limit.

Response Response Status C

REJECT

This comment does not provide sufficient evidence the suggested remedy will not disqualify channels the task force has agreed to pass.

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Cl 163 SC 163.10 P 185 L 34 # 263

Dawe, Piers

Nvidia

Comment Type TR Comment Status R COM parameter

The spec allows a channel to have its COM calculated with 9 taps in the range 13 to 24 clipped at +/-0.05 - which means that the channel's pulse response could be a little worse than +/-0.05 for these taps. That's a very bad channel! We don't need to provide all the receiver power and complexity to cope with it.

*SuggestedRemedy*

Use another DFE root-sum-of-squares limit for positions 13-24.

Response Response Status C

REJECT

The suggested remedy does not provide clear information to implement. Sufficient evidence has not been provided to justify the proposed change. More empirical evidence and consensus building is required.

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Cl 163 SC 163.10 P 185 L 36 # 264

Dawe, Piers

Nvidia

Comment Type TR Comment Status R COM parameter

As the effect of exceeding the DFE floating tap tail root-sum-of-squares limit increases parabolically as the channel exceeds the limit, the limit must be set a little lower than the worst channel we wish to allow to have an effect at the right point. OAch4 with COM 2.75 gave an unconstrained RSS\_tail of 0.022. Setting the limit 0.01 lower than that might affect its COM by 0.1 dB (vs. no limit) which seems like a gentle effect. However, it seems that the latest COM gives a more optimistic result anyway; this channel may not need the tail taps at all.

*SuggestedRemedy*

If there is no improvement with the latest COM, change the DFE floating tap tail root-sum-of-squares limit to 0.012.

If there is a small improvement with the latest COM, further reduce the limit accordingly.

If there is a significant improvement with the latest COM, remove taps 25-40 and apply a tail tap RSS limit to positions 13-24.

Response Response Status C

REJECT

The simulations to make the determinations in the suggested remedy are not available.

There is no consensus to implement the suggested remedy at this time. More empirical evidence and consensus building is required.