Cl **01** *SC* **1.4.50a** *P* **22** *L* **8** # 178

Booth, Brad — Dell

Comment Type **TR** *Comment Status* **R** *PHY types*

There is only one 100GBASE-P port type in the document; therefore, it can be covered by the 100GBASE-KP4 definition. There isn't a new sublayer (other than the PMD) so this really isn't needed.

SuggestedRemedy

Delete definition.

Response *Response Status* **U**

REJECT.

The definition of the 100GBASE-P port type was necessarily provided to describe a class of ports alternate to the 100GBASE-R port class in Clause 30 and Clause 80.

In addition, see comment #209.

Cl **78** *SC* **78.1.3.3.1** *P* **62** *L* **17** # 10

Bob Grow — RMG Consulting

Comment Type **ER** *Comment Status* **R** *warning*

Warning is inappropriate: From the IEEE Standards Style Manual, 17.4: ?Warnings call attention to the use of materials, processes, methods, procedures, or limits that have to be followed precisely to avoid injury or death.? I don?t think this even raises to the level of a Caution: ?Cautions call attention to methods and procedures that have to be followed to avoid damage to equipment.

SuggestedRemedy

Convert to a NOTE.

Response *Response Status* **U**

REJECT.

This warning necessarily follows the same format as 82.2.3.3. If it is unacceptable in this instance then it must be changed in both locations.

Cl **92** *SC* **92.11** *P* **191** *L* **51** # 237

Dawe, Piers — IPtronics

Comment Type **TR** *Comment Status* **R** *test fixture loss*

Are the 100GBASE-CR4 HCB, MCB PCB losses achievable in practice?

SuggestedRemedy

If not, make adjustments, keeping consistency with the OIF/InfiniBand EDR specifications.

Response *Response Status* **U**

REJECT.

Confidence expressed that current specifications can be met. Implementations to verify are pending.

Cl **92** *SC* **92.8.3.7.2** *P* **178** *L* **27** # 165

Moore, Charles — Avago Technologies

Comment Type **TR** *Comment Status* **R** *host tx jitter*

I have a several problems with the way jitter is specified, including:

1. The way TJ is defined is either unclear or it fails to use the definition of Jn given 92.8.3.7.4 and is likely to be too difficult to measure.
2. Measuring Q9 is overkill for a system which only needs a BER of about 1e-5.
3. Data dependent jitter is treated as being a form of deterministic jitter but actually behaves a lot like RJ.

SuggestedRemedy

A presentation will be made on this subject

Response *Response Status* **U**

REJECT.

There was no consensus to implement the proposal in moore_3bj_01_0513.

There is no formula for odd-even jitter and does not address 1E-12 operation without FEC for 100GBASE-KR4.

Cl **92** *SC* **92.8.3.7.2** *P* **178** *L* **27** # 231

Dawe, Piers IPtronics

Comment Type **TR** *Comment Status* **R** *host tx jitter*

TJ, DDJ and ERJ as used in this project are all proper nouns because they have definitions that are not the obvious meaning of the phrases: TJ is not all the jitter there is, DDJ is not all the data-dependent jitter, ERJ could contain any fraction that's random, EDJ is probably far from all the deterministic jitter. Other clauses may have used similar but uncapitalized terms without definition (making them common nouns, if technically unsatisfactory), or may have simply ignored the rules on proper nouns in Merriam-Webster. But we aren't required to repeat or correct those problems: this clause has definitions (good!) Jitter terminology can be confusing enough without erroneous typesetting - let's do it right to help our readers.

SuggestedRemedy

Use Total Jitter, Data Dependent Jitter, Effective Random Jitter (ERJ) and Effective Deterministic Jitter (EDJ) (all with capitals) as these are undeniably proper nouns.
Also, Even-odd Jitter can be treated as a proper noun because it has a definition, although its definition agrees with the meaning of the words.

Response *Response Status* **U**

REJECT.

The use of capital letters for the cited jitter terms are consistent with similar terms in 802.3-2012.

In addition, see response to capitalization Comment#135 against D1.0.

Cl **93** *SC* **93.8.1.4** *P* **222** *L* **47** # 240

Dawe, Piers IPtronics

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

The S-parameter specs go only as far as 19 GHz, implying that energy above 19 GHz is non-existent or harmless, yet time-domain signals are defined in a 33 GHz bandwidth, implying that energy between 19 GHz and 33 GHz could be present and important. These are not consistent. This issue applies more to KR4 than CR4, where one could always use thinner cables if too much high frequency energy were an issue.
As the S-parameter specs are frequency-aware limits, there is no particular reason to stop at 19 GHz. Do some instruments stop at 20 GHz?
For scopes: a 33 GHz bandwidth allows in frequencies and noise that a real receiver wouldn't, so it's not optimal. Worse, it probably costs more than a slower scope! Some slow scopes might degrade peak-to-peak and jitter measurements but the Bessel-Thomson response with its excellent phase response was chosen to avoid this while filtering irrelevant noise and so on.
This is a TR comment because it may take a while for people to assure themselves of the consequences of either a change or no change.

SuggestedRemedy

Change 19 GHz to 20 GHz for S-parameter ("loss") specs throughout (it may be fine to leave it at 19 for insertion loss fitting). Consider changing 33 GHz to 25 GHz for scope response, throughout except for transition time. For comparison, an optical signal would be measured in~19 GHz (3/4 of signalling rate).

Response *Response Status* **U**

REJECT.

The bandwidth of interest for the channel was deemed to be 75% of the signaling rate which in this case is approximately 19 GHz. The capability of an instrument to measure higher frequencies is not a justification to specify them.

Measurements made directly at the transmitter output (or at the output of a test fixture with controlled loss) do not include the high frequency attenuation introduced by the channel. A broader bandwidth, e.g. 125% of the signalling rate, is used for consistent and accurate measurement of transmitter parameters such as transition times and jitter. The benefit of reducing the bandwidth of the measurement for other parameters is unclear.

Cl **93** *SC* **93.9.1** *P* **231** *L* **48** # 58

Farhoodfar, Arash — Cortina-Systems

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

In table 93-9, "DER0" is specified at 10E-5. The actual value should be a funcion of DFE profile in COM. This can result in incorrect COM value as a function of the channel.

SuggestedRemedy

Make "DER0" a function of the DFE profile.
Remove "bmax" limitation from the table.

Response *Response Status* **U**

REJECT.

The method for the derivation of DER0 from the DFE profile is not defined.

The DER0 is tied to the minimum error ratio required for interference tolerance testing. The "DFE profile" of a given receiver under test may be unknown or not traceable to the COM model hence there may no common rigorous method to adjust the target error ratio to compensate.

A fixed DER0 is favored for a more rigid tie-in between channel requirements imposed by COM and receiver requirements imposed by interference tolerance.

Also note that bmax is set to 1 for 100GBASE-KR4 which is not an overly restrictive constraint.

Cl **93A** *SC* **93A.1** *P* **315** *L* **24** # 57

Farhoodfar, Arash — Cortina-Systems

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

Equation 93A-1 defines COM as 20log10(As/An) where "As" is the signal amplitude and "An" is the noise amplitude as defined in 93A.1.7. The "An" term includes ALL interference and noise terms including residual-ISI.
COM equalizer consists of a CTLE and a DFE. The COM timing recovery is a fixed zero-crossing timing recovery with no phase optimization capability. This is most often not complex enough an equalizer/timing-recovery and results in sub-optimal Equalization/Noise-Enhancement. The sub-optimality of COM is then scaled according "As/An" ratio resulting in a number that is grossly mis-leading.
For the KR4, misleading COM values are reported for longer/harder-to-equalize channels. It's particularly egregious to multiply ISI, since KP4 seems to be particularly hurt by lack of FFE.

SuggestedRemedy

Define COM as

The number of multiples of the baseline 'noise' (excluding ISI and xTalk) that you could add to the input of the receiver and still maintain BER < 1e-12

Response *Response Status* **U**

REJECT.

It should be noted that the "BER" is defined by the PMD that invokes the COM method, denoted as DER0, and is not necessarliy 1E-12.

COM is a measure of the relative eye opening (signal amplitude divided by noise amplitude) for a channel under test. It is not a measure of receiver margin.

Cl **94** *SC* **94.3.13.3** *P* **280** *L* **9** # 78

Ran, Adee Intel

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

If the channel is required to have COM of at least 3 dB, then a receiver which passes with any 3 dB COM channel, and any compliant transmitter (including worst case), should be compliant (with at least zero margin).

Requiring worse channel conditions (COM=1.5 dB, below the 3 dB requirement) over-stresses the receiver. This over-stress was not justified anywhere. Providing margin is the responsibility of each RX vendor; different vendors may aim to different margins, and may validate their margin in various ways. But the normative test should not require more than the worst case conditions; this "margin on the table" has a cost on each and every deployed system.

In addition, table 94-17 defines a "Max" value for COM which is equal to the "Min" value, implying zero tolerance. Calibrating this value of COM exactly is impossible in practice, so this test cannot be conducted as written (see also clause 1.2.6).

In addition, it is unclear whether the table defines a minimum stress required to make the test valid (as done in Annex 69A) or requires that a DUT must pass any test performed with these parameters (as often suggested).

The suggested remedy aims at making the test practical and following the spirit of Annex 69A, which defines minimum stress values.

SuggestedRemedy

1. Change the Max COM values in both tests to 3 dB (defining the minimum stress).
2. Remove the Min COM requirement.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

The 1.5 dB COM target ensures that the tested receiver works with any channel with 3 dB or better COM.

The specification has a 1.5 dB guardband relative to the channel target COM value. The channel COM target is currently 3 dB giving an interference tolerance target of 1.5 dB.

Leave the the 1.5 dB COM value in the Max column but remove the COM value from the Min column.

Cl **94** *SC* **94.3.13.3** *P* **280** *L* **9** # 166

Moore, Charles Avago Technologies

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

Receiver interference tolerance test for 100GBASE_KP4 could be "gamed" by using a channel with a large amount of ISI which can be equalized by the DUT but is not equalized by COM reference channel, so no added broadband noise is needed.
This would allow receivers with no actual margin for crosstalk to pass.

SuggestedRemedy

In Table 94-17 add a line "COM before adding effects of broadband noise minimum" and set values to 4dB. A value greater that the nominal 3dB for channel spec is recommended since test channel has no crosstalk.

Response *Response Status* **U**

REJECT.

Discussed by the committee.

It is not clear that the proposed solution prevents the cited problem.

Straw poll #1
Should we make the change in suggested remedy?
Yes: 5
No: 7

No consensus to make this change.

Cl **94** *SC* **94.4.1** *P* **286** *L* **49** # 59

Farhoodfar, Arash Cortina-Systems

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

In table 94-19, "DER0" is specified at 3x10E-4. The actual value should be a funcion of DFE profile in COM. This can result in incorrect COM valu as a function of the channel.

SuggestedRemedy

Make "DER0" a function of the DFE profile.
Remove "bmax" limitation from the table.

Response *Response Status* **U**

REJECT.

See the response to comment 58.

Also, comment 80 response sets the bmax value for the first DFE tap to 1.