Cl **93A** *SC* **93A.5.3** *P* **340** *L* **26** # r04-5

Healey, Adam — Broadcom Ltd.

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

It says that "n is an integer ranging from 1 to N" and "m is an integer ranging from 1 to M". Based on Equation (93A-63), this means the h(m=1)(n=1) corresponds to time T_fx+1/fb+1/(M*fb) which is more than 1 UI later than T_fx. It seems to me that this effectively extends the time gating to more than 1 UI later than T_fx which is not what is intended.

SuggestedRemedy

In 93A.5.3, change "... from 1 to N" to "... from 0 to N-1" (line 26) and change "... from 1 to M" to "... from 0 to M-1" (line 27 and line 38).

Response *Response Status* **C**

ACCEPT.

Cl **93A** *SC* **93A.5.5** *P* **340** *L* **53** # r04-4

Healey, Adam — Broadcom Ltd.

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

Since P^(-1)(DER0) is a number less than 1, ERL as defined here is a negative number. The limits applied in the various subclauses (e.g., 136.9.3.4, 137.9.2.1) assume it is a positive number (since it is a "loss").

SuggestedRemedy

Insert a negative sign before "20" so that the sentence becomes: "ERL is defined as -20 x log10 P^(-1)(DER0) where DER0 is the target detector error ratio."

Response *Response Status* **C**

ACCEPT.

Cl **116** *SC* **116.1.4** *P* **114** *L* **5** # r04-2

Nicholl, Gary — Cisco Systems, Inc.

Comment Type **E** *Comment Status* **A** *Clause 73*

Table 116-2a is missing a column for "Auto-Negotiation, Clause 73" which is mandatory for both 200GBASE-KR4 and 200GBASE-CR4. I view this as an editorial change and not a technical change as Clause 73 Auto-Negotiation is called out as required in the respective PMD clauses, i.e. Clause 137, Table 137-3 for 200GBASE-KR4 and Clause 136, Table 136-3 for 200GBASE-CR4.

SuggestedRemedy

Please add a column to Table 116-2a indicating that Clause 73 Auto-Negotiation is mandatory for both 200GBASE-KR4 and 200GBASE-CR4.

Response *Response Status* **C**

ACCEPT.

Cl **131** *SC* **131.1.4** *P* **122** *L* **1** # r04-3

Nicholl, Gary — Cisco Systems, Inc.

Comment Type **E** *Comment Status* **A** *Clause 73*

Table 131-2 is missing a column for "Auto-Negotiation, Clause 73" which is mandatory for both 50GBASE-KR and 50GBASE-CR. I view this as an editorial change and not a technical change as Clause 73 Auto-Negotiation is called out as required in the respective PMD clauses, i.e. Clause 137, Table 137-1 for 50GBASE-KR and Clause 136, Table 136-1 for 50GBASE-CR.

SuggestedRemedy

Please add a column to Table 131-2 indicating that Clause 73 Auto-Negotiation is mandatory for both 50GBASE-KR and 50GBASE-CR.

Response *Response Status* **C**

ACCEPT.

Cl **138** *SC* **138.7.1** *P* **270** *L* **16** # r04-10

Dawe, Piers J G — Mellanox Technologies

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

The optical power levels were consistent from D1.0 to D3.2 while TDECQ evolved. In D3.3, they went wrong.
Minimum OMA at max TDECQ was -1 dBm TBC in D1.0, -1 in D3.2, is now -1.4. In D1.0, OMA-TDECQ was -5 dBm TBC, and the unstressed sensitivity was -7 dBm. Now, OMA-TDECQ is -5.9 and the implied unstressed sensitivity is about -7.3, equivalent to 50GBASE-LR and 1.5 dB harder for the receiver than 50GBASE-FR. The definition of TDECQ has changed a few times, which I think explains why the budget has gone up from 6 dB TBC to 6.5 dB. It looks like OMA-TDECQ should have been increased to -5.5 when the apparent TDECQ was reduced following the introduction of adjustable decsision thresholds. king_3cd_01_0518 had proposed -5.7 dBm. See dawe_3cd_02_0718 or successor. D3.3 comment 25.

SuggestedRemedy

To restore the intent of D1.0, which was based on a TDECQ from about 0 to 4 dB, to go with the present TDECQ which goes from about 0.5 to 4.5 dB:
Increase OMA-TDECQ from -5.9 to -5.5 dBm. Increase SRS OMA from -3.4 back to -3 dBm (as in D1.0 and D3.2). Increase the other receiver sensitivity, equation 138-1, from max(-6.5, SECQ - 7.9) to max(-6.1, SECQ - 7.5). Tx min OMA from -4.5 in D3.3 to -4.1 (nearly the -4 from the baseline). Min average power at Tx from -6.5 in D3.3 to -6 (back to the baseline). Min average power at Rx from -8.4 in D3.3 to -7.9 (back to the baseline).

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **138** *SC* **138.7.1** *P* **270** *L* **22** # r04-12

Dawe, Piers J G — Mellanox Technologies

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

TDECQ limit of 4.5 dB (on top of the 4.8 dB PAM4 penalty), is extremely high. Technology that can do 100GBASE-SR4 (PAM2, almost the same signalling rate but no equalizer) should do better. king_3cd_02_0118 showed 1 to 2.5 dB with representative drive, and king_3cd_03_0518 shows better than 3.7 dB. chang_011018_3cd_01_adhoc-v2 showed 2.1 to 3.1 dB, the lower end with threshold adjust, although much of this was with PRBS15. king_3cd_02a_0718 slide 12 showed a multi-peaked distribution including some "failing" transmitters. dawe_3cd_01b_0518 slide 8 showed one at 4 dB and a few significantly better. The high limit in the draft requires a better equalizer (e.g. more precise tap and threshold settings) than needed for the SMF PMDs, and we need some more room in the budget for modal noise. D.30 comment 119, D3.1 comment 70, D3.2 comment 40, D3.3 comment 27.

SuggestedRemedy

Change max TDECQ and max TDECQ-10log10(Ceq) from 4.5 to 4.2 dB. Increase OMAouter-TDECQ in step.

Response *Response Status* **U**

REJECT.

This comment is similar to R03-27.

100GBASE-SR4 does not include receiver equalization, whereas the 100GBASE-SR2 does; therefore the penalty for each cannot be easily compared.

PAM4 transmitters for MMF with measured TDECQ values up to 5 dB have been shown in http://www.ieee802.org/3/cd/public/May18/king_3cd_03_0518.pdf, http://www.ieee802.org/3/cd/public/May18/dawe_3cd_01b_0518.pdf (slide 9), and in http://www.ieee802.org/3/cd/public/July18/king_3cd_02a_0718.pdf (slide 12) which supports the P802.3cd draft 3.4 TDECQ limit of 4.5 dB, taking account of product variability with larger sample sizes.

http://www.ieee802.org/3/cd/public/July18/king_3cd_02a_0718.pdf also shows receiver sensitivity vs estimated SECQ for values up to 4 dB with no indication of problems.

The current TDECQ limit was arrived at as a compromise between transmitter and receiver capabilities.

The URLs for the presentations cited by the commenter and not called out above are:
http://www.ieee802.org/3/cd/public/Jan18/king_3cd_02_0118.pdf
http://www.ieee802.org/3/cd/public/adhoc/archive/chang_011018_3cd_01_adhoc-v2.pdf
http://www.ieee802.org/3/cd/public/May18/dawe_3cd_01b_0518.pdf

Presentation <http://www.ieee802.org/3/cd/public/Sept18/dawe_3cd_01b_0918.pdf> was reviewed.

There was no support to make a change.

Cl **138** *SC* **138.7.2** *P* **271** *L* **17** # r04-11

Dawe, Piers J G — Mellanox Technologies

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

Even after the recent improvement to the transmitter spec, the penalty after equalization but before modal noise, at 4.5 dB on top of the 4.8 dB PAM4 penalty = 9.3 dB, is far higher than for any other optical Ethernet PMD type. Tiny amounts of modal noise will cause an additional penalty, magnified up by the "Pcross effect". There is only 0.1 dB in the budget for both mode partition noise and modal noise, which is about the same as in 100GBASE-SR4 (max TDEC 4.3 dB << 9.3). This is too small unless these noises are much smaller this time. The effect of modal noise and mode partition noise with a very high TDECQ transmitter (D.30 comment 119, D3.1 comment 70, D3.2 comment 40, D3.0 comment 116, D3.1 comment 71, D3.2 comment 46, D3.3 comment 26) is higher than with a more moderate penalty after equalization or without equalization as in 100GBASE-SR4. 100GBASE-SR4 takes this "Pcross" effect into account inside TDEC. Limiting TDECQ-10log10(Ceq) helps, but more improvement is needed.

SuggestedRemedy

Reduce max TDECQ and max TDECQ-10log10(Ceq) from 4.5 dB to 4.2 dB,
Increase TDECQ-OMAouter min from -5.9 to -5.6 dBm,
and increase the allocation for mode partition noise and modal noise in the budget from 0.1 dB to 0.4 dB; and/or
Adjust the definition of TDECQ for MMF to take these noises into account.
The SECQ in SRS should be the combination of Tx TDECQ and these other penalties (still 4.5, so no change), and the SRS OMA should be the lowest OMA that can be received, not below (receiver should not be tested outside its operating range): change SRS OMA from -3.4 to -3.3 (but see another comment pointing out that the power levels have slipped and should be corrected).
The budget table stays the same.

Response *Response Status* **U**

REJECT.

Presentation <http://www.ieee802.org/3/cd/public/Sept18/dawe_3cd_01b_0918.pdf> was reviewed.

Previous analysis has shown that the penalty for modal noise is significantly less than 0.1 dB for NRZ. Insufficient evidence has been provided to show that the penalty is large enough to warrant a change to the link budget.

See the following for previous analysis:
http://www.ieee802.org/3/aq/public/nov04/pepeljugoski_1_1104.pdf

There was no support to make a change.

Also, see response to r04-12.

Cl **138** *SC* **138.7.5.1** *P* **297** *L* **42** # r04-20

Calvin, John — Vital Technical Marketi

Comment Type **E** *Comment Status* **A** *Filter*

The bandwidth statement would benefit greatly with the addition of a clarification "tracking the fourth-order Bessel-Thomson response " -or- "tracking the filter response" text. The current text can be wrongly interpreted as supporting a range of bandwidth targets which was not the authors intent.

SuggestedRemedy

..fourth-order Bessel-Thomson filter with a bandwidth of approximately 13.28125 GHz tracking the filter response to at least 1.5 * 26.5625 GHz and at frequencies above 1.5 * 26.5625 GHz..

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment correctly points out that the measurement bandwidth definition can be improved.

Make the changes shown in <http://www.ieee802.org/3/cd/public/Sept18/king_3cd_01_0918.pdf>, slide 4 and onward, with editorial license.

See also comment r04-1, r04-19, and r04-21.

Cl **138** *SC* **138.8.5** *P* **273** *L* **50** # r04-1

Anslow, Peter — Ciena Corporation

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

Comment r03-9 against D3.3 made changes to the requirements on the frequency response of the equipment used for TDECQ, SECQ, and transition time measurements in Clauses 138, 139, and 140. Part of the resulting changes made to 138.8.7, 139.7.5.1, 139.7.7, and 140.7.7 was to delete the sentence: "Compensation may be made for any deviation from an ideal fourth-order Bessel-Thomson response."
However, this change seems to have been an unfortunate consequence of the editing, rather than a reflection of a deliberate decision to remove the ability to compensate for any deviation from an ideal fourth-order Bessel-Thomson response.
Also, as 138.8.5, 138.8.10, and 140.7.5 now include text that modifies the requirements for the equipment frequency response, the text allowing compensation to be made should be included here also.

SuggestedRemedy

Add the sentence:
"Compensation may be made for any deviation from an ideal fourth-order Bessel-Thomson response."
at the end of the third exception in 138.8.5
at the end of the second paragraph of 138.8.7
after the second sentence of the first exception in 138.8.10
at the end of the second paragraph of 139.7.5.1
at the end of the second paragraph of 139.7.7
at the end of the fourth exception in 140.7.5
at the end of the second paragraph of 140.7.7

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Make the changes shown in <http://www.ieee802.org/3/cd/public/Sept18/king_3cd_01_0918.pdf>, slide 4 and onward, with editorial license.

Cl **138** *SC* **138.8.5.1** *P* **274** *L* **2** # r04-14

Dawe, Piers J G — Mellanox Technologies

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

For some equalizer architectures, precursors are much more expensive than post-cursors (sun_3cd_042518_adhoc).
D3.1 comment 73, D3.2 comments 7, 8, 48, 53, D3.3 comment 32. A direct-mod transmitter is not naturally biased to postcursor, nor is the reference filter the transmitter is assessed with. The argument in the response to comment 32 was incorrect for MMF. We should not allow deliberately strange transmitted signals that cause an extra burden for low-power receivers.

SuggestedRemedy

Continue the improvement made in king_3cd_03_0118: change "Tap 1, tap 2, or tap 3, has" to "Tap 1 or tap 2 has".
There is a separate comment for SMF because the different TDECQ limit, dispersion and TDECQ test method there could lead to a different conclusion.

Response *Response Status* **U**

REJECT.

This comment is similar to several earlier comments including r03-32.

The final response to r03-32 was:

"REJECT.
Repeat of previous comments r02-48 and r02-53. During comment resolution on D3.2 a similar proposal was rejected for 50G PAM4 based PMDs.

The response to r02-48 is shown here for reference:
"REJECT
Allowing just one pre-cursor in the reference EQ means the transmitted signal, when propagated through a worst case channel, cannot have a significant amount of pre-cursor response at the receiver without suffering higher TDECQ penalty.

An electrical channel typically can guarantee that, however the chromatic and modal dispersion effects of the optical channel in combination with laser performance may require the extra tap. "

There was no related presentation for MMF PMDs, however there was a presentation on this topic for 50G SMF PMDs.
See: http://www.ieee802.org/3/cd/public/July18/sun_3cd_01b_0718.pdf

Based on straw poll #8 there is no consensus to make the proposed change.

For reference the result of straw poll #8 is provided here:

Straw Poll #8
For 50GBASE-SR, 100GBASE-SR2, and 200GBASE-SR4, I support constraining the largest magnitude tap coefficient to Tap 1 or tap 2.
Yes: 1
No: 16 "

Presentation <http://www.ieee802.org/3/cd/public/Sept18/dawe_3cd_01b_0918.pdf> was reviewed.

Straw Poll #3
For 50GBASE-SR, 100GBASE-SR2, and 200GBASE-SR4, I support constraining the largest magnitude tap coefficient to Tap 1 or tap 2.
Yes: 2, No: 15

There is no consensus to make the change.

Cl **138** *SC* **138.8.5.1** *P* **276** *L* **29** # r04-13

Dawe, Piers J G — Mellanox Technologies

Comment Type **TR** *Comment Status* **R** *MMF TX*

Make the MMF spec more consistent with the SMF specs so that a common equalizer IC can be used for both. While SMF TDECQ is measured for both extremes of channel, MMF TDECQ is measured for the slow channel only. That's OK, we can read across to the other case we don't measure, but recognise that a signal after a slow channel will look less emphasised than what the receiver has to tolerate. The reference equalizer's largest magnitude tap coefficient (0.8 for a fast channel) should be set consistently (as from the same transmitter) for the slow channel. dawe_3cd_01b_0518 proposed 0.87. The survey results for MMF (green points, slide 8, dawe_3cd_01b_0518) are all to the right of +0.5 dB (or tap strength about 1.1). So we could tighten up more than this proposal, but this is consistent with the SMF specs and still allows a strongly over-emphasised transmitter. See presentation.
D3.3 comment 31.

SuggestedRemedy

In "the largest magnitude tap coefficient, which is constrained to be at least 0.8", change 0.8 to 0.85. The SMF clauses can stay with 0.8.

Response *Response Status* **U**

REJECT.

VCSEL measurements to date have shown slightly higher TDECQ penalties than SMF transmitters due to low bandwidth, and the use of peaking can help to improve yield and reduce cost especially at process, temperature, and voltage corners.

Increasing the minimum coefficient of the largest magnitude tap will reduce the flexibility for the transmitter design.

Presentation <http://www.ieee802.org/3/cd/public/Sept18/dawe_3cd_01b_0918.pdf> was reviewed.

No support to make a change.

Cl **138** *SC* **138.8.7** *P* **274** *L* **33** # r04-15

Dawe, Piers J G — Mellanox Technologies

Comment Type **T** *Comment Status* **R** *Transition time*

This is the only MMF Tx measurement that requires this specific observation filter.
1. Transition time measurement should be a free by-product of a TDECQ measurement, as intended by D3.2 comment 54. It should also be a free by-product of a SECQ calibration measurement for SRS.
2. As this spec is there to protect the receiver, what matters is the signal after the slowest channel. This should be the same (34 ps) for SMF and MMF to allow common equalizer silicon. At the limit, the transition time is dominated by the signal not the observation bandwidth: switching between 13.28125 and 11.2 GHz is worth 2 in 34 ps.

SuggestedRemedy

Change "with a combined frequency response of a fourth-order Bessel-Thomson filter with a bandwidth of approximately 13.28125 GHz to at least 1.5 x 26.5625 GHz and at frequencies above 1.5 x 26.5625 GHz the response should not exceed -24 dB" to "with a combined frequency response as given for TDECQ in 138.8.5 for transmitters, or as given for SECQ in 138.8.10 for stressed receiver conformance test signal".
Either, let the receiver see the same slowest signal as for MMF:
In Table 138-8, Transmit characteristics, change 34 to 32.
or, if allowing slower received signals in MMF than SMF can be justified:
In 138.8.10 Stressed receiver sensitivity, change "the transition time is no greater than the value specified in Table 138-8" to "the transition time is no greater 36 ps" (this limit could be put in Table 138-9, Receive characteristics).

Response *Response Status* **C**

REJECT.

This comment does not apply to the substantive changes between IEEE P802.3cd D3.3 and D3.4, or the unsatisfied negative comments from the previous ballots. Hence it is not within the scope of the recirculation ballot (out of scope).

Presentation <http://www.ieee802.org/3/cd/public/Sept18/dawe_3cd_01b_0918.pdf> was reviewed.

Insufficient evidence has been provided to show there is a problem with the current draft.

SECQ and transmitter transition time measurements use the same 3 dB bandwidth definition.

Straw poll #1
I support the change in the suggested remedy.
Yes: 6, No: 11

There is no consensus to make the change.

Cl **138** *SC* **138.8.7** *P* **274** *L* **34** # r04-19

Calvin, John — Vital Technical Marketi

Comment Type **E** *Comment Status* **A** *Filter*

The bandwidth statement would benefit greatly with the addition of a clarification "tracking the fourth-order Bessel-Thomson response " -or- "tracking the filter response" text. The current text can be wrongly interpreted as supporting a range of bandwidth targets which was not the authors intent.

SuggestedRemedy

..fourth-order Bessel-Thomson filter with a bandwidth of approximately 13.28125 GHz tracking the filter response to at least 1.5 * 26.5625 GHz and at frequencies above 1.5 * 26.5625 GHz..

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment correctly points out that the measurement bandwidth definition can be improved.

Make the changes shown in <http://www.ieee802.org/3/cd/public/Sept18/king_3cd_01_0918.pdf>, slide 4 and onward, with editorial license.

See also comment r04-1, r04-20, and r04-21.

Cl **139** *SC* **139.7.5.4** *P* **299** *L* **5** # r04-16

Dawe, Piers J G — Mellanox Technologies

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

For some equalizer architectures, precursors are much more expensive than post-cursors (sun_3cd_042518_adhoc). Investigation of possible minimally compliant SMF signals and their associated TDECQ FFE settings indicates that 2 pre, 2 post (making the cursor the third tap) is never significantly better than 1 pre, 3 post (making it the second tap), for compliant signals (but not yet including chromatic dispersion). See dawe_3cd_01a_0318. The maximum chromatic dispersion is 3.2 ps/nm for 50GBASE-FR and 16 ps/nm for 50GBASE-LR. Compare 10GBASE-LR which is allowed 48 ps/nm. Scaling for signalling rate gives 7.2 ps/nm, twice as much as 50GBASE-FR. 10GBASE-LR doesn't have a receive equalizer and is not seen as dispersion-challenged. This indicates that it is likely that 50GBASE-FR doesn't need a second precursor, even with a direct mod transmitter. Improving the TDECQ search rules will avoid inefficiency both in product receiver design, testing and operation, and in TDECQ testing. D3.1 comment 76, D3.2 comment 53, D3.3 comment 37.

SuggestedRemedy

Continue the improvement made in king_3cd_03_0118, as done for 100GBASE-DR: change "Tap 1, tap 2, or tap 3, has the largest magnitude tap coefficient, which is constrained to be at least 0.8" to "For 50GBASE-FR, tap 1 or tap 2, has the largest magnitude tap coefficient, and for 50GBASE-LR, tap 1, tap 2, or tap 3, has the largest magnitude tap coefficient. This coefficient is constrained to be at least 0.8".
There is a separate comment for MMF because the different TDECQ limit, dispersion and TDECQ test method there could lead to a different conclusion.

Response *Response Status* **U**

REJECT.

This comment is similar to r03-47.

The final response to r03-47 is shown here for reference:

"REJECT.

This comment was received after the ballot closed. (late)

This is a similar comment to r02-53 for which the response is shown here for reference:

"REJECT:
Allowing just one pre-cursor in the reference EQ means the transmitted signal, when propagated through a worst case channel, cannot have a significant amount of pre-cursor response at the receiver without suffering higher TDECQ penalty.

An electrical channel typically can guarantee that, however the chromatic and modal dispersion effects of the optical channel in combination with laser performance may require the extra tap. No evidence has been provided to show otherwise."

The following presentation was reviewed and discussed.
Http://www.ieee802.org/3/cd/public/July18/sun_3cd_01b_0718.pdf

Based on straw polls 6 and 7 there is no consensus to make the proposed changes.
For reference the results to straw polls are shown here:
Straw Poll #6.
For 50GBASE-FR, I support constraining the largest magnitude tap coefficient to Tap 1 or tap 2.
Yes: 4
No: 19
Straw Poll #7
For 50GBASE-LR, I support constraining the largest magnitude tap coefficient to Tap 1 or tap 2.
Yes: 0
No: 19"

Presentation <http://www.ieee802.org/3/cd/public/Sept18/dawe_3cd_01b_0918.pdf> was reviewed.

There was no support to make the change.

Cl **139** *SC* **139.7.7** *P* **299** *L* **34** # r04-17

Dawe, Piers J G — Mellanox Technologies

Comment Type **T** *Comment Status* **R** *Transition time*

This is the only SMF Tx measurement that requires this specific observation filter without the test fiber.
1. The transmitter is responsible for dispersion effects and the "transmitter transition time" spec is there to protect the receiver (after dispersion).
2. For consistency and so that transition time is a free by-product of a TDECQ measurement as intended by D3.2 comment 54, we should measure transition time on the same pair of waveforms as for TDECQ.
Production testing can learn the correlation with / without dispersion and read across if they want to: the slowest signals that might fail this spec are less likely to be strongly affected by dispersion than fast signals, so that should work.

SuggestedRemedy

Change "The transmitter transition time of each lane" to "The transmitter transition time of each lane as observed in a TDECQ measurement (see 139.7.5)". In the second paragraph, delete "as measured through an optical..." Consider adding statements that for transmitter transition time measurement, the polarization rotator, optical splitter and variable reflector may be omitted, and averaging may be used.
Similarly in 140.7.7.

Response *Response Status* **C**

REJECT.

See the response to comment r04-15.

Straw poll #2:
I support the change in the suggested remedy.
Yes: 4, No: 13

[Editor's note added after comment resolution completed.
The response comment r04-15 is:
"REJECT.

This comment does not apply to the substantive changes between IEEE P802.3cd D3.3 and D3.4, or the unsatisfied negative comments from the previous ballots. Hence it is not within the scope of the recirculation ballot (out of scope).

Presentation <http://www.ieee802.org/3/cd/public/Sept18/dawe_3cd_01b_0918.pdf> was reviewed.

Insufficient evidence has been provided to show there is a problem with the current draft.

SECQ and transmitter transition time measurements use the same 3 dB bandwidth definition.

Straw poll #1
I support the change in the suggested remedy.
Yes: 6, No: 11

There is no consensus to make the change."
]

Cl **139** *SC* **139.7.7** *P* **299** *L* **41** # r04-21

Calvin, John — Vital Technical Marketi

Comment Type **E** *Comment Status* **A** *Filter*

The bandwidth statement would benefit greatly with the addition of a clarification "tracking the fourth-order Bessel-Thomson response " -or- "tracking the filter response" text. The current text can be wrongly interpreted as supporting a range of bandwidth targets which was not the authors intent.

SuggestedRemedy

..fourth-order Bessel-Thomson filter with a bandwidth of approximately 13.28125 GHz tracking the filter response to at least 1.5 * 26.5625 GHz and at frequencies above 1.5 * 26.5625 GHz..

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment correctly points out that the measurement bandwidth definition can be improved.

Make the changes shown in <http://www.ieee802.org/3/cd/public/Sept18/king_3cd_01_0918.pdf>, slide 4 and onward, with editorial license.

See also comment r04-1, r04-20, and r04-19.

Cl **140** *SC* **140.7.5** *P* **322** *L* **19** # r04-6

Propstra, Kees

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

The data suggests that you can achieve a TDECQ accuracy of 0.05 dB or better for a 53.125 GBaud PAM4 signal with a capture bandwidth of 36.5 GHz. Based on this and the suggestion to bring back the compensation I suggest the following text:

SuggestedRemedy

The combination of the O/E converter and the oscilloscope has a fourth-order Bessel-Thomson filter response with a bandwidth of approximately 26.5625 GHz to at least 0.68 * 53.125 GHz. Compensation may be made for any deviation from an ideal fourth-order Bessel-Thomson response.
Note:
This is applicable to all 100G per wavelength standards.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Reducing the range over which the filter is defined affects energy which can adversely affect the transition time and TDECQ measurements (see http://www.ieee802.org/3/cd/public/July18/king_3cd_01a_0718.pdf).

However, there is room for improvement in the filter definition.

Make the changes shown in <http://www.ieee802.org/3/cd/public/Sept18/king_3cd_01_0918.pdf>, slide 4 and onward, with editorial license.

Cl **140** *SC* **140.7.5.1** *P* **322** *L* **32** # r04-18

Palkert, Thomas

MACOM

Comment Type **GR** *Comment Status* **A** *Precursor*

Simulations show that 2 pre-cursor taps are required to equalize the DR input signal. This comment reverts the spec back to what it was in draft 3.2.

SuggestedRemedy

Change text from 'Tap 1 or tap 2 has the largest magnitude tap coefficient' to 'Tap 1, tap 2 or tap 3 has the largest magnitude tap coefficient'

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment does not apply to the substantive changes between IEEE P802.3cd D3.3 and D3.4, or the unsatisfied negative comments from the previous ballots. Hence it is not within the scope of the recirculation ballot (out of scope).

However, presentation <http://www.ieee802.org/3/cd/public/Sept18/palkert_3cd_01a_0918.pdf> was reviewed and there was consensus to make a change.

Straw poll #4: I support the change proposed in palkert_3cd_01a_0918.pdf slide 10.
Yes: 21, No: 8

Implement the change in palkert_3cd_01a_0918 slide 10 with editorial license.