

IEEE 802.3db D1.2 100G, 200G, 400G Short Reach Fiber Task Force 3rd Task Force review comments

CI 167 SC 167.7.1 P51 L15 # 1

Abbott, John Corning Incorporated

Comment Type TR Comment Status D

In Table 167-7 Transmit Characteristics the goal for the VR option is to be a low cost option for connections to the server. This was fully summarized in the original CFI for the project. In order to optimize VR for this new market opportunity using existing OM3 and OM4 fiber (optimized for performance at 850nm) we need to balance all options. It makes sense to broaden the wavelength range for VR from 842 to 865 (wider than SR) to make the VR transmitters as low cost as possible, but it is not at all clear that using transmitters at 940nm which need to match a lower fiber BW can match those at 850nm. This comment agrees with basic point of comment 70 of D1.1 that the VR wavelength range should be centered around 850nm (the design wavelength for the fiber).

SuggestedRemedy

Change 842 to 948 to 824 to 865 (2nm wider than SR on both sides)

Proposed Response Response Status W

Review the accompanying presentation, swanson_3db_01_090921.pdf.

PROPOSED REJECT.

The center wavelength (range) was discussed in the comment resolution against D1.1. The decision, after weighing the pros and cons, was to set the center wavelength range to 842 - 948 nm for VR.

CI 167 SC 167.7.1 P51 L16 # 2

Abbott, John Corning Incorporated

Comment Type T Comment Status D

Spectral Width of VR is specified as 0.65nm. If we are looking to make 940nm option as low cost as possible does it make sense to have a wider spectral width spec at 940nm? Or if we tighten the wavelength range back to 842-863nm can we make 850nm VCSELS easier to make with an even wider spectral width?

SuggestedRemedy

If line 15 is 842 to 948 increase spectral width at 948 to 0.70. If line 15 is 842 to 863, increase spectral width at 850nm to 0.70

Proposed Response Response Status W

PROPOSED REJECT.

Max RMS spectral width specification is a balance: (a) Relax value to maximize VCSEL yield, (b) Place more burden on the receiver with reduced channel bandwidth, and increased modal noise and MPN.

A maximum of 0.65 nm for RMS spectral width is a good balance.

CI 167 SC 167.7.2 P52 L40 # 3

Abbott, John Corning Incorporated

Comment Type TR Comment Status D

To achieve original VR objections for a low cost high data rate connection to the server, restore the receive wavelength range to 842-863; if increasing the range to make VR 850nm transceivers more robust and cost effective for short distance, increase this to 842-865nm. Choose the wavelength range for VR transmitter and receiver based on end user requirements in the data center.

SuggestedRemedy

Change 842 to 948 to 824 to 865 (2nm wider than SR transmitter on both sides) for VR and SR

Proposed Response Response Status W

PROPOSED REJECT.

The center wavelength (range) was discussed in the comment resolution against D1.1. The decision, weighing the pros and cons, was to set the center wavelength range to 842 - 948 nm for VR.

For SR, the center wavelength range is 844 - 863 nm.

CI 167 SC 167.7.3 P53 L14 # 4

Abbott, John Corning Incorporated

Comment Type TR Comment Status D

In Table 167-9 Illustrative Power Budget if the VR wavelength range is 842-948 the power budget should be executed at 842 and 948nm. The table uses 850nm (which makes sense) but do we need a presentation with power budget at 948nm? Do we need a separate 948nm column?

SuggestedRemedy

Suggested remedy is to leave table 167-9 as is and change table 167.7.1 (transmitter) to 842 to 863nm. 2nd option is to modify table 167-9 to include subcolumns under OM3 and OM4 for power budgets at 940 using IEC guidance EMBs and putting TBDs in the rest of the items

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Table 167-9 can be expanded for each wavelength band for VR.

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Cl 167 SC 167.8.5 P57 L40 # 5 [REDACTED]
 Abbott, John Corning Incorporated
 Comment Type T Comment Status D
 Table 167-12 the fiber emulation filter needs to model multiple kinds of pulses with the same 3dB BW, including pre-pulses, post-pulses, dual-Dirac-Delta pulses. The worst case is likely a small pre or post pulse which whose 3dB BW is X but whose 1.5dB BW extrapolated to 3dB is X/2.
 SuggestedRemedy
 Verify worst case assumption used in TDECQ and compare to fiber minEMBc 1.5dB BW, particularly for VR at 948.
 Proposed Response Response Status W
 PROPOSED ACCEPT IN PRINCIPLE.
 Discuss along with comments #38 and #54.

Cl 167 SC 167.7.1 P51 L45 # 6 [REDACTED]
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type TR Comment Status D
 Encircled flux Greater-less than and less than match symbols show up nu and Omega with Preview but its fine if viewed with Acrobat DC
 SuggestedRemedy
 This seem to be an issue with FM16 that require a different way to create PDF to avoid these issues
 Proposed Response Response Status W
 PROPOSED ACCEPT IN PRINCIPLE.

Cl 167 SC 167.7.1 P51 L27 # 7 [REDACTED]
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type TR Comment Status X
 During D1.1 recirculation we changed threshold adjust from +/-1% to +/- 2% with this change the TDECQ will improve somewhat
 SuggestedRemedy
 Suggest to make TDECQ for both SR/VR=4.1 dB
 See ghiasi_db_01_0921 for TDECQ measurements
 Proposed Response Response Status W
 Review accompanying presentation.

Cl 167 SC 167.7.2 P52 L51 # 8 [REDACTED]
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type TR Comment Status D
 Encircled flux Greater-less than and less than match symbols show up nu and Omega with Preview but its fine if viewed with Acrobat DC
 SuggestedRemedy
 This seem to be an issue with FM16 that require a different way to create PDF to avoid these issues
 Proposed Response Response Status W
 PROPOSED ACCEPT IN PRINCIPLE.

Cl 167 SC 167.7.1 P51 L44 # 9 [REDACTED]
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type TR Comment Status R
 At 50G some end users had to use APC cable plants due to reflections and in the 802.3db we have now added the option of APC connectors. If reflections are becoming an issue why are we promoting 12 dB glass-air termination!
 SuggestedRemedy
 Suggest adding 20 dB transmit reflectance to the table and suggest to change optical return loss tolerance to 15 dB
 Response Response Status C
 REJECT.
 (a) Installations with PC fiber termination may not meet the maximum 15 dB return loss.
 (b) Discussed after resolution of comment 72.
 Need to consider scenarios where PC MDIs, like with 100G-SR1, are used.

Cl 167 SC 167.7.1 P51 L44 # 10 [REDACTED]
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type TR Comment Status X
 Overshoot is TBD
 SuggestedRemedy
 Replace TBD overshoot with 20%
 See ghiasi_db_01_0921 for the overshoot measurements
 Proposed Response Response Status W
 Review accompanying presentation.

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Cl 167 SC 167.7.2 P52 L44 # 11
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type TR Comment Status R
 At 50G some end users had to use APC cable plants due to reflections and in the 802.3db we have now added the option of APC connectors. If reflections are becoming an issue why are we promoting 12 dB glass-air termination!
 SuggestedRemedy
 Suggest adding 20 dB receive reflectance to the table and suggest to change optical return loss tolerance to 15 dB
 Response Response Status C
 REJECT.
 (a) Installations with PC fiber termination may not meet the maximum 15 dB return loss.
 (b) Discuss after resolution of comment 72.
 Need to consider scenarios where PC MDIs, like with 100G-SR1, are used.

Cl 167 SC 167.7.2 P53 L7 # 12
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type TR Comment Status X
 During D1.1 recirculation we changed threshold adjust from +/-1% to +/- 2% with this change the TDECQ will improve somewhat and associated SECQ will be lower
 SuggestedRemedy
 Suggest to make SECQ for both SR/VR=4.1 dB
 See ghiasi_db_01_0921 for TDECQ measurements
 Proposed Response Response Status W
 Review accompanying presentation.

Cl 167 SC 167.7.1 P51 L37 # 13
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type TR Comment Status D
 Transmitter excursion need a reference
 SuggestedRemedy
 Please refernece 167.8.8
 Proposed Response Response Status W
 PROPOSED ACCEPT IN PRINCIPLE.

Cl 167 SC 167.8.5 P57 L33 # 14
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type TR Comment Status D
 To speed up TDECQ measurement and for better correlation with real DSP suggest to use MMSE optimization over full grid search
 SuggestedRemedy
 Use MMSE optimization to determine the TDECQ.
 Use of MMSE may slightly increase +0.1 dB the TDECQ, for exact amount see ghiasi_db_01_0921
 Proposed Response Response Status W
 Review accompanying presentation.

Cl Front m SC Front matter P17 L48 # 15
 Dawe, Piers Nvidia
 Comment Type E Comment Status D
 These examples, P802.3bj and IEEE P802.3bk, are history now.
 SuggestedRemedy
 Change to the list of post-802.3dc projects that overlap with this one, as best we know it, including cw and ck; this will help the reader.
 Proposed Response Response Status W
 PROPOSED ACCEPT.

Cl 167 SC 167.7.1 P51 L25 # 28
 Dawe, Piers Nvidia
 Comment Type T Comment Status A
 In general, merging cells with the same content improves readability. Here, the limits for VR and SR look the same but they aren't, because TDECQ means two different things.
 SuggestedRemedy
 Spell out the entries for VR and SR separately for this row and the next three.
 Response Response Status C
 ACCEPT IN PRINCIPLE.
 Make separate columns in Table 167-7 for the entries for VR and SR links according to the suggested remedy.

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Cl 167 SC 167.7.1 P51 L28 # 29
 Dawe, Piers Nvidia
 Comment Type T Comment Status A
 There are two competing definitions for OMA (min) in this table. We need to explain what the reader is supposed to do with them.
 SuggestedRemedy
 One way would be to use max(TECQ, TDECQ). This applies in the text and Figure 167-3 too.
 Response Response Status C
 ACCEPT IN PRINCIPLE.
 Implement with editorial license.
 Combine the two Outer OMA, each lane (min) to one:
 Outer OMA, each lane (min)
 for max(TECQ, TDECQ) <= 1.8 dB -2.6 dBm
 for 1.8 < max(TECQ, TDECQ) <= 4.4 dB -4.4 + max(TECQ, TDECQ)

Cl 167 SC 167.7.1 P51 L48 # 31
 Dawe, Piers Nvidia
 Comment Type T Comment Status D
 As the channel or signal is relatively slower than for any other optical PMDs so far, we should expect higher Ceq, contributing to TDECQ, but we should not expect higher K because we have 9 taps rather than 5, and 2% threshold adjust rather than 1%. We expect that "false negatives" won't be such an issue with 2% threshold adjust, and we can set the limits closer to what we really want, with less padding for measurement issues. We should re-optimize the spec considering these things, encouraging good equalisable signals both after and before the fibre. Overshoot/undershoot should be a useful additional protection eventually but it's still evolving, and the K limit can catch some bad transmitters that it misses - and K is a free by-product of TDECQ, K' is a free by-product of TECQ. The K limit is similar to VEC in C2M and EVM in coherent: a screen for signals that are bad after equalisation.
 SuggestedRemedy
 Insert rows for K'=TECQ-10.log10(Ceq') and K=TDECQ-10.log10(Ceq), limit 4 dB. For both VR and SR.
 Proposed Response Response Status W
 PROPOSED REJECT.
 Experimental evidence of links that fail due to high K/K' while passing all other Tx tests will be compelling for introducing the suggested new specifications.
 Continue discussion after resolution of comments related to eye threshold adjustment and TDECQ(max).

Cl 167 SC 167.7.2 P53 L16 # 34
 Dawe, Piers Nvidia
 Comment Type T Comment Status A
 "Only applies to 200GBASE-VR2, 400GBASE-VR4, 200GBASE-SR2 and 400GBASE-SR4": it's not "applies" that should be qualified by "only". Also, consider "alien crosstalk" in a multilane module operating as single-lane PMDs.
 Anyway, we have subclause 167.8.13 defining stressed receiver sensitivity, where the same point is made.
 SuggestedRemedy
 If making an editorial improvement, change to:
 Applies to 200GBASE-VR2, 400GBASE-VR4, 200GBASE-SR2 and 400GBASE-SR4 only. or much better and in preparation for 800GBASE-VR8 and 800GBASE-SR8,
 Not applicable to 100GBASE-VR1 and 100GBASE-SR1.
 Or, because the same module suffers the same crosstalk if used as 4 x 100GBASE-VR1 as when running as 1 x 400GBASE-VR4, remove the exception.
 Anyway, because this topic is addressed in 167.8.13 and we should not be defining things piecemeal by table footnotes - delete the note. See another comment against 167.8.13.
 Response Response Status C
 ACCEPT IN PRINCIPLE.
 Delete footnote e in Table 167-8.

Cl 167 SC 167.7.3 P54 L45 # 36
 Dawe, Piers Nvidia
 Comment Type E Comment Status A
 As far as I can see, Figure 167-5 presents the same information as figure 167-3 and 167-4, but does it better because the information is on a single graph so one can see the relation between transmit and receive OMAs.
 SuggestedRemedy
 Delete 167-3 and 167-4, move 167-5 to become 167-3 and refer to it instead of the existing 167-3 and 167-4.
 Response Response Status C
 ACCEPT IN PRINCIPLE.
 Keep Figure 167-5 and eliminate Figures 167-3 and 167-4. Update the references to the figures.
 Implement with editorial license.

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Cl 167 SC 167.8.1.1 P56 L28 # 37

Dawe, Piers Nvidia

Comment Type T Comment Status A

We specify that each lane has the min OMA and max TDECQ or better, and we specify SRS at min OMA and max TDECQ. The PCS distributes 10-bit symbols across the PAM4 lanes and MSB/LSB equally, so what matters is the aggregate of errors on all the lanes. Specifying this for the receiver, we will still exceed the spec in practice because of scatter on transmit parameters. Clauses 86 and 95 and the copper PMDs have this right.

SuggestedRemedy

Change from "Stressed receiver sensitivity is defined for each lane at the BER specified in 167.1.1." to "Stressed receiver sensitivity is defined for an interface at the BER specified in 167.1.1. The interface BER is the average of the BERs of the receive lanes when they are stressed."
After "operated as specified.", insert "To find the interface BER, the BERs of all the lanes when stressed are averaged."
In 167.8.13, delete "The BER is required to be met for each lane under test on its own."

Response Response Status C

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

The case of breakout was discussed. As an example, 400GBASE-SR4 is considered a single interface, and breakout is considered a separate application. Breakout is not defined in Clause 167.

Cl 167 SC 167.8.5 P57 L31 # 38

Dawe, Piers Nvidia

Comment Type T Comment Status A

151.8.5, TDECQ for 400GBASE-FR4 and 400GBASE-LR4-6, has this exception: The normalized noise power density spectrum, N(f) in Equation (121-9), is equivalent to white noise filtered by a fourth-order Bessel-Thomson response filter with a bandwidth of 25.5625 GHz.

SuggestedRemedy

I suppose this applies here, too.

Response Response Status C

ACCEPT IN PRINCIPLE.

Add two exceptions in 167.8.5:

1. The normalized noise power density spectrum, N(f) in Equation (121-9), is equivalent to white noise filtered by a fourth-order Bessel-Thomson response filter with a bandwidth of 26.5625 GHz.
2. If an equivalent-time sampling oscilloscope is used, the impact of the sampling process and the fiber emulation must also be compensated for, so that the correct magnitude of noise is present at the output of the equalizer.

Note that the 4th order BT filter bandwidth should be 26.5625 GHz, not 25.5625 GHz.

Cl 167 SC 167.8.13 P60 L12 # 41

Dawe, Piers Nvidia

Comment Type T Comment Status A

Looking ahead to 800GBASE-VR8 and 800GBASE-SR8, this might be better stated as an exception. Anyway, what if a multilane module is running as multiple 100GBASE-VR1? Formally, it's "alien crosstalk" but it's just the same.

SuggestedRemedy

Response Response Status C

ACCEPT IN PRINCIPLE.

In section 167.8.13, suggest using "For a receiver in a multilane device" in place of "For 200GBASE-VR2, 400GBASE-VR4, 200GBASE-SR2 and 400GBASE-SR4"

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Cl 78 SC 78.1.4 P25 L22 # 42

Dawe, Piers Nvidia

Comment Type E Comment Status D

Here, the order of 100GBASE-SRn PHY types is 4 2 10 1. In Table 80-1, it's 10 2 4 1. In Table 80-4, 10 4 and Table 80-5, 1 2. This seems inconsistent.

SuggestedRemedy

Consider what the order should be, bearing in mind that "100 m" doesn't mean exactly the same thing for the different PHYs, make changes to the order if appropriate.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.
Review these tables in light of latest 802.3dc draft and reorder as appropriate.

Cl 167 SC 167.8.5 P57 L20 # 43

Dawe, Piers Nvidia

Comment Type T Comment Status A

Problems with "The first filter represents the system receiver": there's no definition of "system receiver", we should not be implying that a product receiver has to be like the TDECQ reference receiver, and a filter is only a small part of a receiver.

SuggestedRemedy

Change to "The first filter represents a receiver front end frequency response", or similar.

Response Response Status C

ACCEPT IN PRINCIPLE.
Implement with editorial license.

A) Replace "system receiver" with "reference equalizer front end".

B) Switch the order of the filters in the description: First filter represents the fiber response, and the second filter represents the reference equalizer front end response.

Cl 167 SC 167.5.2 P47 L43 # 44

Bruckman, Leon Huawei

Comment Type E Comment Status D

It would be clearer to use "each signal stream" instead of "the signal stream". It will also make it consistent with the text in the following section. See also 802.3cu section 151.5.2

SuggestedRemedy

Replace: "The four optical power levels in the signal stream", with: "The four optical power levels in each signal stream"

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Cl 167 SC 167.5.7 P49 L9 # 45

Bruckman, Leon Huawei

Comment Type E Comment Status D

PMD_global_transmit_disable disables all lane's transmitters.

SuggestedRemedy

In bullet b) Replace: "turning off the optical transmitter in each lane.", with: "turning off the optical transmitter in all lanes."

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Cl 167 SC 167.7.1 P51 L35 # 49

Lingle, Robert OFS

Comment Type TR Comment Status D

The overshoot/undershoot parameter is currently TBD. Although, it is expected that guidance from measurements will be available later in 2021, we have guidance from 802.3cu that a value of 22% protects the receiver sufficiently from over-peaked signals.

SuggestedRemedy

Replace TBD for VRn and SRn PMD types with 22%. The purpose of the Overshoot/Undershoot spec is to protect the Rx from problematic signals from an overly pre-emphasized Tx. A very high value will penalize the Rx; a very low value will unnecessarily penalize the Tx. 802.3cu determined that 22% was a reasonable balance for SMF Tx. Data on VCSEL Tx later in 2021 may allow refinement, but 22% is a very reasonable value.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Discuss along with comment #10.

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Cl 167 SC 167.7.1 P51 L48 # 50

Lingle, Robert

OFS

Comment Type ER Comment Status D

An editor's note was added to TDECQ(max) value to indicate that some TF members preferred a slightly lower value, and to encourage further study on the next draft. Either a compelling reason to change TDECQ(max) from 4.4dB to another value within the cited range will be brought into CR on D1.2, resulting in a parameter value change, or it will not. In either case, this value can be adjusted during comment resolution as the draft progresses through WG ballot as well. There is no need to keep this editor's note in future drafts.

SuggestedRemedy

Remove this editor's note

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Address comment after discussion on TDECQ (max).

Cl 167 SC 167.8.5 P57 L32 # 51

Lingle, Robert

OFS

Comment Type ER Comment Status A

Editor's note states: "Noise handling in the fiber emulation and the fiber response is under further study." I hope that this topic can be addressed with both a comment & supporting contribution in this draft cycle. Otherwise, I think the Editor's Note has served its purpose and can be removed at this point. This topic can still be addressed in WG ballot cycle if further information becomes available.

SuggestedRemedy

Remove this editor's note

Response Response Status C

ACCEPT IN PRINCIPLE.

Implement the response in comment #38.

Remove the editors' note.

Cl 167 SC 167.8.5 P57 L33 # 52

Lingle, Robert

OFS

Comment Type ER Comment Status D

Editor's note states: "Use of minimum mean squared error optimization in place of optimization of TDECQ has been proposed." While this is an intriguing suggestion, I hope that this topic can be addressed with both a comment & supporting contribution in this draft cycle. Otherwise, I think the Editor's Note has served its purpose and can be removed at this point. This topic can still be addressed in WG ballot cycle if further information becomes available.

SuggestedRemedy

Remove this editor's note

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Address after discussion on comment #14.

Cl 167 SC 167.10.3.3 P65 L8 # 53

Lingle, Robert

OFS

Comment Type ER Comment Status A

Editor's note states: "a recommendation concerning distinguishing features to inform the user if the MDI is angled or not should be considered." This item should be resolved in this draft cycle or removed, as the answer should be clear by now. It is also not required for IEEE 802.3 to provide such guidance, which is more under the purview of cabling

SuggestedRemedy

Remove this editor's note

Response Response Status C

ACCEPT IN PRINCIPLE.

Add a sentence to 167.9.7 Like "It is recommended that each PHY with an angled fiber connector indicate that it uses an angled MDI."

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Cl 167 SC 167.8.5 P40 L13 # 54

Tang, Yi Cisco Systems, Inc.

Comment Type TR Comment Status A

"The TDECQ of each lane shall be within the limits given in Table 167-7 if measured using the methods specified in 121.8.5."
8023-2018 121.8.5 (Page 135, Equation 121-9): The value of Ceq (coefficient for the reference equalizer noise enhancement) can be calculated from N(f) and Heq(f) "Where N(f) is the normalized noise power density spectrum equivalent to white noise filtered by a fourth order Bessel-Thomson response filter with a bandwidth of 13.28125 GHz."
Issue: the noise enhancement relates to receiver noise, so its calculation shall be based on reference receiver bandwidth.

SuggestedRemedy

Add to the exception list:
"- The normalized noise power density spectrum, N(f) in Equation (121-9), is equivalent to white noise filtered by a fourth-order Bessel-Thomson response filter with a bandwidth of 25.5625 GHz." - same as 8023cu-2021

Response Response Status C

ACCEPT IN PRINCIPLE.

Implement the response in comment #38.

Cl 167 SC 167.7.1 P51 L31 # 66

Palkert, Tom Macom

Comment Type TR Comment Status D

Based on changes made to sampling window the TDECQ for VR can be improved

SuggestedRemedy

Change TDECQ for VR from 4.4 to 4.0 dB

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Combined discussion on this comment and comment #11.

Cl 167 SC 167.7.2 P52 L51 # 67

Palkert, Tom Macom

Comment Type TR Comment Status D

If TDECQ for VR is changed to 4.0. SECQ needs to match.

SuggestedRemedy

Change SECQ from 4.4 to 4.0

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Combined discussion on this comment and comment #12.

Cl 167 SC 167.7.1 P51 L15 # 68

Swanson, Steven Corning Incorporated

Comment Type TR Comment Status R

There has been no contributions that prove that the inclusion of 940nm VCSELs will increase market potential and leverage the high volume manufacturing infrastructure currently supplying 3D sensing applications. The VCSELs used for 3D sensing are not suitable for the IEEE 802.3db application and the added complexity of the receiver does not warrant the inclusion of another wavelength.

SuggestedRemedy

Change the center wavelength specification from 842-948 to 844-863.

Response Response Status C

REJECT.

Reviewed the accompanying presentation, swanson_3db_01_090921.pdf.

The center wavelength (range) was discussed in the comment resolution against D1.1. The decision, after weighing the pros and cons, was to set the center wavelength range to 842 - 948 nm for VR.

Based on a straw poll, decision is to leave the center wavelength range for VR links as 842 - 948 nm.

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Cl 167 SC 167.7.1 P51 L16 # 69

Swanson, Steven Corning Incorporated

Comment Type TR Comment Status R

In the transmitter specification, the only difference appears to be the spectral width of the source. This is offset by a more complex receiver.

In addition, in the CFI for this project, we identified two distinct market needs, one to support the shift from ToR to MoR/EoR architectures, requiring longer, low cost server-attachment links and another support 100G/optical lane to match to emerging 100G SerDes.

100GBASE-SR1, 200GBASE-SR2 and 400GBASE-SR4 variants seem to address the second requirement but it is not clear that the 100GBASE-VR1, 200GBASE-VR2 and 400GBASE-VR4 address the first.

Use cases included SFP112 connections to for next-generation servers, costs at 50% of DR and power consumption at 50% of DR.

I have seen no evidence that VR will support any of these use cases.

SuggestedRemedy

Consider eliminating the VR variants completely; the complexity of supporting two port types with little difference in the cost or power makes no sense. And the VR variant has no chance of competing for server-attachment links.

Response Response Status C

REJECT.

Reviewed the accompanying presentation, swanson_3db_01_090921.pdf.

The VR link (50m OM4 reach) was voted in motions #3 and #4 in Jan 2020.

It was also supported by an expert associated with an end user, shen_3db_01a_110520.pdf, during the discussion for the SR link (100m OM4 reach).

Cl 167 SC 167.7.2 P52 L40 # 70

Swanson, Steven Corning Incorporated

Comment Type TR Comment Status D

The requirement on the receiver to support a center wavelength range of 842-948 complicates the receiver design and adds cost. It will require an AR coating, and while some claim it will not add cost, it is not trivial.

SuggestedRemedy

Change the center wavelength specification from 842-948 to 844-863.

Proposed Response Response Status W

Review the accompanying presentation, swanson_3db_01_090921.pdf.

PROPOSED REJECT.

The center wavelength (range) was discussed in the comment resolution against D1.1. After weighing the pros and cons including the requirement of a wide band AR coating on the photodiode, the decision was to set the center wavelength range to 842 - 948 nm for VR.

Cl 167 SC 167.10.2.1 P63 L24 # 71

Swanson, Steven Corning Incorporated

Comment Type TR Comment Status D

In Table 167-15, the chromatic dispersion specifications are specified differently for OM3/OM4 and OM5. There is NO difference in the chromatic dispersion of these fibers. In fact the study that led to the specification of OM5 used OM3 and OM4 chromatic dispersion values to set the value for OM5.

A contribution has been submitted to correct this inconsistency in IEC and will be complete long before this standard is published.

SuggestedRemedy

For OM3 and OM4, eplace $1295 \leq \lambda \leq 1340$ with $1297 \leq \lambda \leq 1328$

Replace 0.105 for $1295 \leq \lambda \leq 1310$ and $0.000375 \hat{1} (1590 \hat{u} \lambda \text{ naught})$ for $1310 \leq \lambda \leq 1340$ with $\hat{u} 412/(840(1 \hat{u} (\lambda \text{ naught}/840)4))$

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

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CI 167 SC 167.10.3.3 P65 L4 # 72

Swanson, Steven Corning Incorporated

Comment Type TR Comment Status A

The suggestion to support two options, Option A for angled physical contact fiber interface and Option B for flat physical contact fiber interface for the MDI requirement for 200GBASE-VR2,400GBASE-VR4, 200GBASE-SR2 and 200GBASE-SR4 is a bad idea and will cause problems in the market.

SuggestedRemedy

Pick one, either angled or non-angled but not both.

Response Response Status C

ACCEPT IN PRINCIPLE.

Only include Option A (APC) in 167.10.3.3.

Remove all references to Option B, the idea of including two options for MDI, and Figure 167-11. Update the PICs and the rest of the document as needed.