

IEEE 802.3db D1.1 100G, 200G, 400G Short Reach Fiber Task Force 2nd Task Force review comments

CI 45 SC 45.2.1.6 P9 L 21 # 1

Dawe, Piers

Nvidia

Comment Type T Comment Status D General

For PMA/PMD type selection bits:

SuggestedRemedy

For PMA/PMD type selection:

Are 1 1 1 1 0 0 0 and 1 1 1 1 1 0 taken? By what? It would be neater if the P802.3db set were moved up or down 1 so each VRn and SRn pair differed by a single bit.

Please show the sub-rows before and after so we can see the context.

Please revise the rubric to mention 802.3cp, 802.3ct, P802.3cw and any others that use this register.

Preferably, please show all the changes that all active projects that are not already in the 802.3dc roll-up have made (802.3cp, 802.3ct, P802.3cw, any more). If all projects show each other's concurrent changes, any clashes will be more obvious.

In future, we may have 8-lane and maybe 16-lane variants of these PMD families. If this is expected, should we plan for a block of 8 or 10 PMDs, using the next (7th, bit 6) bit?

Proposed Response Response Status W

PROPOSED REJECT.

1 1 1 1 0 0 0 is 50GBASE-BR40-U from 802.3cp

1 1 1 1 1 1 0 is 400GBASE-SR4 in 802.3db

Moving the P802.3db set up by 1 (there is no room to go down by 1) would leave 1 1 1 1 0 0 1 unallocated and it may remain that way.

There is no significant advantage to having VRn and SRn pairs differ by 1 bit.

The sub-rows before and after the P802.3db set will be added in the next draft.

CI 167 SC 167.7.1 P39 L 15 # 2

Dawe, Piers

Nvidia

Comment Type T Comment Status D Center wavelength for VR

We should consider a wavelength range that allows the best laser bandwidth.

SuggestedRemedy

Consider a wider range of wavelengths for VR than the draft range for SR. This doesn't necessarily mean that the SRS signal need be slower, as laser speed and fibre bandwidth will net off.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

(a) Relaxing the wavelength range for VR is consistent with the goal of a low cost VR link relative to the SR link.

(b) In murty_3db_adhoc_01b_121720.pdf, the proposed range for VR is 842 - 868 nm, and for SR is 844 - 863 nm.

(c) Currently center wavelength is a TBD in D1.1 awaiting decision on inclusion of a 940 nm variant.

CI 167 SC 167.7.1 P39 L 33 # 3

Dawe, Piers

Nvidia

Comment Type T Comment Status D TDECQ other

As the channel is relatively slower than for any other optical PMDs so far, we should re-optimize the spec for this, encouraging good equalisable signals both after and before the fibre, not over-emphasised flaky ones. Overshoot/undershoot should be a useful 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: a screen for signals that are bad after equalisation.

SuggestedRemedy

Insert rows for K'=TECQ-10.log10(Ceq') and/or K=TDECQ-10.log10(Ceq), limit TBD between 3.4 and 4 dB. Consider if TDECQ max (and SECQ) should be increased (but see another comment recommending an improved reference equalizer).

Proposed Response Response Status W

PROPOSED REJECT.

This comment is similar to the comment #23 made against D1.0.

An example of a Tx waveform that passes Table 167-7 specifications but fails a link test because of K/K' would be useful in promoting a limit on T(D)ECQ - 10*log10(Ceq).

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CI 167 SC 167.8.5 P43 L19 # 4 [REDACTED]
 Dawe, Piers Nvidia
 Comment Type T Comment Status X TDECQ other
 The rules for threshold adjust should be improved because they make xECQ measurements inaccurate, because they rely on the OMAouter levels being found to an accuracy better than 1% of the OMA, and the measurement method we use for OMA isn't that good. Also we will need better xECQ technique if we move to MMSE optimization.
 SuggestedRemedy
 Proposal to follow.
 Proposed Response Response Status W
 Awaiting proposal.

CI 167 SC 167.8.5 P43 L40 # 5 [REDACTED]
 Dawe, Piers Nvidia
 Comment Type T Comment Status D Reference equalizer other
 Per D1.0 comment 30, "Add editors' note: The noise handling in the fiber emulation and the fiber response is under further study".
 SuggestedRemedy
 Does the draft need to say more about this?
 Proposed Response Response Status W
 PROPOSED REJECT.
 The editors' note was intended to draw attention to the change in the test procedure. It will be removed at or before D2.0 if no objections are raised.

CI 167 SC 167.8.5.1 P44 L1 # 6 [REDACTED]
 Dawe, Piers Nvidia
 Comment Type T Comment Status D Reference equalizer other
 As both the transmitter and the channel are slow as compared with SMF, we have a 9-tap FFE in the draft. But that isn't the best way to address a slow signal. Using this sub-optimum reference receiver forces us to choose high xECQ which burdens real receivers with very nasty signals that may be nasty for even a very smart receiver. A reference equalizer slightly more like the 120G C2M one (which is intended for even slower channels) would be better.
 Also, with 9 taps and 3 cursor positions, we have 3, 8-dimensional optimizations, which is time-consuming.
 SuggestedRemedy
 Change from FFE to CTLE, FFE, 1-tap DFE. Simple CTLE with single pole-zero pair as these channels are not as slow as 120G C2M. Remove unnecessary FFE taps that duplicate the CTLE function and/or if feasible, reduce the number of cursor positions.
 Proposed Response Response Status W
 PROPOSED REJECT.
 This represents a significant change from the current definition of the reference equalizer. A presentation supporting the suggested approach is requested.

CI 167 SC 167.8.5.1 P44 L4 # 7 [REDACTED]
 Dawe, Piers Nvidia
 Comment Type T Comment Status D Reference equalizer other
 We have 9 taps rather than the usual 5 because the channel is relatively slower than for other optical PMDs. So the last few taps should be correcting the tail of the response and should be quite small: actually much smaller than these proposed limits, but we can tighten them later as we learn more.
 SuggestedRemedy
 Impose limits on the absolute values of tap coefficients 7, 8 and 9: 0.4 0.3 0.2 for now. Also for the last taps for VR, depending how long that reference equalizer is.
 Proposed Response Response Status W
 PROPOSED ACCEPT IN PRINCIPLE.
 The suggested remedy will be implemented for the SR link.
 Tap Max absolute value
 7 0.4
 8 0.3
 9 0.2
 Similar limits will be considered after the reference equalizer length is defined for VR.

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Cl 167 SC 167.7.2 P40 L19 # 10
 Tang, Yi Cisco Systems, Inc.
 Comment Type TR Comment Status A Receiver sensitivity
 Raise minimum SECQ from 1.4dB to 1.8dB to allow additional margin for RX. Supporting presentation "tang_3db_adhoc_01a_062421.pdf" was reviewed by task force on 06/24.
 SuggestedRemedy
 All changes proposed are listed in the supporting presentation "tang_3db_adhoc_01a_062421.pdf".
 Page 40, 167.7.2 Table 167-8:
 Average receiver power, each lane (min): -6.4dBm
 Stressed receiver sensitivity (OMAouter), each lane (max): -2dBm
 Receiver sensitivity (OMAouter), each lane (max): max(-4.6, SECQ - 6.4) dBm.
 Remove Editors' note c
 Page 39, 167.7.1 Table 167-7:
 Average launch power, each lane (min): -4.6dBm
 Outer Optical Modulation Amplitude (OMAouter), each lane (min): -2.6dBm
 Remove Editors' note b
 Change note c to "Even if the TDECQ < 1.8dB"
 Page 45, 167.8.12, Equation 167-1:
 $RS = \text{Max}(-4.6, \text{SECQ}-6.4)$ (dBm)
 Change Figure 167-4 accordingly to match modified equation 167-1
 Response Response Status C
 ACCEPT IN PRINCIPLE.
 Implement suggested remedy with editorial license.

Cl 167 SC 167.7.1 P39 L28 # 11
 Tang, Yi Cisco Systems, Inc.
 Comment Type T Comment Status D TDECQ other
 Currently, the minimum launch power in OMA is constrained by TDECQ, but independent of TECQ. This allows for a transmitter with a TECQ of 4.4dB operating at -3dBm OMA while a transmitter with a TDECQ of 4.4dB can only operating at 0dBm and above. To address the spec gap, OMA-TECQ shall be specified as well as OMA-TDECQ.
 SuggestedRemedy
 "Launch power in OMAouter minus TDECQ (min)" shall be changed to
 "Launch power in OMAouter minus T(D)ECQ (min)"
 Proposed Response Response Status W
 Decision following accompanying presentation.

Cl 167 SC 167.7.1 P39 L15 # 13
 Lewis, David Lumentum
 Comment Type TR Comment Status D Center wavelength for VR
 The center wavelength (range) for -VRn should allow for nominal wavelengths between 850 nm and 940 nm with tolerance around those wavelengths. This will increase market potential and leverage the high volume manufacturing infrastructure currently supplying 3D sensing applications.
 SuggestedRemedy
 Change "TBD" to "844 to 948".
 Proposed Response Response Status W
 PROPOSED REJECT.
 Continue discussion on the accompanying presentation from David Lewis.
 This comment must be viewed in the broader context of what features are best to include in the VR link. Isolated changes impact choices for other parameters. Decision will be based on consensus.

Cl 167 SC 167.7.1 P39 L26 # 14
 Lewis, David Lumentum
 Comment Type T Comment Status D TDECQ for VR
 The transmitter characteristics for -VRn should match those for -SRn in order to support interoperability over -VR reaches.
 SuggestedRemedy
 Change OMAouter minus TDECQ (min), TDECQ (max), and TECQ (max) values from TBD to match the values in the corresponding -SRn column.
 Proposed Response Response Status W
 PROPOSED REJECT.
 This comment must be viewed in the broader context of what features are best to include in the VR link. Isolated changes impact choices for other parameters. Decision will be based on consensus.

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Cl 167 SC 167.7.2 P40 L10 # 15
 Lewis, David Lumentum
 Comment Type **TR** Comment Status **D** Center wavelength for VR
 The center wavelength (range) for -VRn should allow for nominal wavelengths between 850 nm and 940 nm with tolerance around those wavelengths. This will increase market potential by enabling receivers to work with different transmitters operating at different wavelengths.
 SuggestedRemedy
 Change "TBD" to "844 to 948".
 Proposed Response Response Status **W**
 PROPOSED REJECT.
 Continue discussion on the accompanying presentation from David Lewis.
 This comment must be viewed in the broader context of what features are best to include in the VR link. Isolated changes impact choices for other parameters. Decision will be based on consensus.

Cl 167 SC 167.7.2 P40 L26 # 16
 Lewis, David Lumentum
 Comment Type **T** Comment Status **D** TDECQ for VR
 The receiver characteristics for -VRn should match those for -SRn in order to support interoperability over -VR reaches.
 SuggestedRemedy
 Change SECQ value from TBD to match the value in the corresponding -SRn column.
 Proposed Response Response Status **W**
 PROPOSED REJECT.
 This comment must be viewed in the broader context of what features are best to include in the VR link. Isolated changes impact choices for other parameters. Decision will be based on consensus.

Cl 167 SC 167.7.3 P41 L16 # 17
 Lewis, David Lumentum
 Comment Type **T** Comment Status **D** Link budget
 Replace the TBDs for -VRn in Table 167-9 to include the same penalties as -SRn.
 SuggestedRemedy
 Change power budget (for max TDECQ) from TBD to 6.4 dB. Change allocation for penalties (for max TDECQ) from TBD to 4.6 dB. Change additional insertion loss allowed from TBD to 0.2 for OM3, and 0.1 for OM4 and OM5.
 Proposed Response Response Status **W**
 PROPOSED REJECT.
 The value for max TDECQ (and power budget) for VR links requires consensus.
 As suggested, the additional insertion loss for VR will be changed to 0.2 dB for OM3, and 0.1 dB for OM4 and OM5.

Cl 167 SC 167.1 P29 L45 # 35
 Nicholl, Gary Cisco
 Comment Type **TR** Comment Status **D** General
 Table 167-2. 3db precedes 3ck in the amendment order according to the project timeline as indicated in the 802.3-2018 editorial database. 3ck does not exist as far as 3db is concerned, and so AUI interfaces being defined by 3ck (i.e 100GAUI-1 C2C and 100GAUI-1 C2M) should not be referenced.
 SuggestedRemedy
 Delete rows for 120F and 120G from Table 167-1.
 Proposed Response Response Status **W**
 PROPOSED REJECT.
 These interfaces were added after a comment was received on Draft 0.1.

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Cl 167 SC 167.1 P30 L 20 # 36

Nicholl, Gary

Cisco

Comment Type TR Comment Status D General

Table 167-2. 3db precedes 3ck in the amendment order according to the project timeline as indicated in the 802.3-2018 editorial database . 3ck does not exist as far as 3db is concerned, and so AUI interfaces being defined by 3ck (i.e. 200GAUI-2 C2C, 200GAUI-2 C2M, 400GAUI-4 C2C and 400GAUI-4 C2M) should not be referenced.

SuggestedRemedy

Delete rows for 120F and 120G from Table 167-2.

Proposed Response Response Status W

PROPOSED REJECT.

These interfaces were added after a comment was received on Draft 0.1.

Cl 167 SC 167.7.1 P39 L 28 # 40

Nicholl, Gary

Cisco

Comment Type ER Comment Status D General

Change the way OMA (min) requirements are captured in the "transmit characteristic" table (Table 167-7, to be consistent with the change that was made by 802.3cu. For example see 802.3cu-2018 Table 151-7 and https://www.ieee802.org/3/cu/public/May20/nicholl_3cu_03_051920.pdf.

SuggestedRemedy

Make the following changes to Table 167-7:

- Change row "Outer Optical Modulation Amplitude (OMAAouter), each lane (min)" to be consistent with the format used in 802.3cu-2021 and https://www.ieee802.org/3/cu/public/May20/nicholl_3cu_03_051920.pdf.

- Delete the row "Launch power in OMAouter minus TDECQ (min)"

- Delete footnote c.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

This helps remove a footnote, but is otherwise a matter of style.

P802.3db D1.1 follows 50GBASE-SR (Clause 138), 100GBASE-DR (Clause 140), 400GBASE-SR4.2 (Clause 150) in using two lines:
 Outer optical modulation amplitude, each lane (min) -3.0
 Launch power in OMAouter minus TDECQ (min) -4.4
 (Example of 100GBASE-SR1)

802.3cu combines the two
 Outer optical modulation amplitude (OMAAouter), each lane (min)
 for TDECQ < 1.4 dB -0.2 dBm
 for 1.4 < TDECQ < 3.4 dB (-1.6 + TDECQ) dBm
 (Example of 400GBASE-FR4)

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Cl 167 SC 167.7.1 P39 L41 # 43
 Nicholl, Gary Cisco
 Comment Type TR Comment Status D General
 Should "Encircled Flux" be defined in sub-clause 167.8 ?
 SuggestedRemedy
 Add a definition and measurement method (which can be a reference) for "encircled flux" in sub-clause 167.8
 Proposed Response Response Status W
 PROPOSED ACCEPT IN PRINCIPLE.
 Footnote d in Table 167.7 refers to the IEC document for encircled flux measurement. A new section 167.8.12 can be created stating the same with editorial license. Note that this will change the subsection numbers of receiver sensitivity (167.8.12 -> 167.8.13), stressed receiver sensitivity (167.8.13 -> 167.8.14), and sinusoidal jitter for receiver conformance test (167.8.13.1 -> 167.8.14.1).

Cl 167 SC 167.7.1 P39 L48 # 44
 Nicholl, Gary Cisco
 Comment Type TR Comment Status D TDECQ other
 802.3cu added a Figure to illustrate "OMAouter each lane (max) and OMAouter each lane (min) versus TDECQ"
 SuggestedRemedy
 Add a figure (and associated text) following Table 167-7 to illustrate "OMAouter each lane (max) and OMAouter each lane (min) versus TDECQ" for the different PMDs. See 802.3cu-2021 Figure 151-3 as an example.
 Proposed Response Response Status W
 PROPOSED ACCEPT IN PRINCIPLE.
 Implement suggested remedy with editorial license.

Cl 167 SC 167.7.2 P40 L20 # 45
 Nicholl, Gary Cisco
 Comment Type TR Comment Status A Receiver sensitivity
 In 802.3cu we made "receiver sensitivity" normative and changed the way it is represented in the table (see 802.3cu-2021, Table 151-8 as an example).
 SuggestedRemedy
 Make the following changes to Table 167-8:
 - Change the row "Receiver sensitivity (OMAouter), each lane (max)" to use the same format adopted by 802.3cu-2021. See 802.3cu-2021, Table 151-8 as an example.
 - Delete footnote e
 Response Response Status C
 ACCEPT IN PRINCIPLE.
 (a) Implement suggested remedy with editorial license. In section 167.8.12, refer to the Table 167-8 for receiver sensitivity and remove the equation.
 (b) Footnote e ("Receiver sensitivity is informative ...") in Table 167-8 will be removed. Receiver sensitivity is made normative (see comments 48 and 56).

Cl 167 SC 167.7.2 P40 L38 # 46
 Nicholl, Gary Cisco
 Comment Type TR Comment Status A Receiver sensitivity
 802.3cu added a Figure to illustrate "Receiver sensitivity (OMAouter), each lane (max) versus TECQ" for the different PMDs. Note in defining receiver sensitivity 802.3cu switched to using TECQ rather than SECQ. I have submitted a separate comment against the 167.8.12 proposing to make the same change for 802.3db.
 SuggestedRemedy
 Add a figure (and associated text) following Table 167-8 to illustrate "Receiver sensitivity (OMAouter), each lane (max) versus TECQ" for the different PMDs. See 802.3cu-2021 Figure 151-4 as an example.
 Response Response Status C
 ACCEPT IN PRINCIPLE.
 Implement suggested remedy but leave TBDs where appropriate for VR with editorial license.

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CI 167 SC 167.7.3 P41 L27 # 47
 Nicholl, Gary Cisco
 Comment Type TR Comment Status A Receiver sensitivity
 802.3cu added several figures following the illustrative link budget table to illustrate the "Transmitter OMAouter each lane versus TDECQ and receiver sensitivity (OMAouter) each lane versus TECQ" for each PMD.
SuggestedRemedy
 Add figures (and associated text) following Table 167-9 to illustrate "Transmitter OMAouter each lane versus TDECQ and receiver sensitivity (OMAouter) each lane versus TECQ" for the different PMDs. See 802.3cu-2021 Figure 151-5 as an example.
Response Response Status C
 ACCEPT IN PRINCIPLE.
 Implement suggested remedy but leave TBDs where appropriate for VR with editorial license.

CI 167 SC 167.8.12 P45 L42 # 48
 Nicholl, Gary Cisco
 Comment Type TR Comment Status A Receiver sensitivity
 In 802.3cu we made "receiver sensitivity" a normative parameter and defined it based on TECQ rather than SECQ. We should make the same change 802.3db.
SuggestedRemedy
 Update section 167.8.12 to make "receiver sensitivity" a normative paramter and defined based on TECQ rather than SECQ. Propose using the text of 802.3cu-2021, sub-clause 151.8.12 as a template.
Response Response Status C
 ACCEPT IN PRINCIPLE.
 Comment 56 (Mike Dudek) also recommends making receiver sensitivity normative.
 Implement with editorial license.

CI 167 SC 167.7.2 P51 L33 # 56
 Dudek, Mike Marvell
 Comment Type TR Comment Status A Receiver sensitivity
 With equalizing receivers it is possible to pass stressed receiver sensitivity while not being able to pass sensitivity and such a receiver would not be inter-operable with some Tx's and channel combinations. For this reason 802.3cu made the sensitivity specification normative
SuggestedRemedy
 Delete footnote "e". Also on page 56 line 44 delete "is informative and" and delete "The normative requirement for receivers is stressed receiver sensitivity." line 1 page 57. on line 45 page 45 change "should" to "shall".
Response Response Status C
 ACCEPT IN PRINCIPLE.
 Comment 48 (Gary Nicholl) also recommends making receiver sensitivity normative.
 Implement suggested remedy with editorial license.

CI 167 SC 167.7.3 P52 L22 # 57
 Dudek, Mike Marvell
 Comment Type TR Comment Status D Link budget
 The minimum OMA given for VR in table 167-7 is -3dBm The OMA sensitivity for VR in table 167-8 is -5dBm Therefore the additional insertion loss allowed can be calculated. However providing additional insertion loss for VR may not be the best use of the optical budget.
SuggestedRemedy
 Either put 0.2dB for OM3 and 0.1dB for OM4 and OM5 for additional insertion loss allowed or put 0.1dB for OM3 and 0dB for OM4 and OM5 and make the minimum Tx specs 0.1dB lower for VR than for SR.
Proposed Response Response Status W
 PROPOSED ACCEPT IN PRINCIPLE.
 For VR, the additional insertion loss will be changed to
 0.2 dB for OM3, and
 0.1 dB for OM4 and OM5.

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CI 167 SC 167.8.6 P55 L33 # 60

Dudek, Mike

Marvell

Comment Type TR Comment Status D Reference equalizer other

Section 167.8.5.1 specifies the reference equalizer including which taps have the largest magnitude and what that value is. Rows 33 to 37 are contradicting that information. Also as the same receiver is used to receive the signal from both short fibers and long fibers there should not be a difference in the reference receiver for TECQ and TDECQ

SuggestedRemedy

Delete rows 33 to 37. If appropriate adjust the parameters in section 167.8.5.1

Proposed Response Response Status W

PROPOSED REJECT.

The constraints on the tap coefficients are written separately for TDECQ and TECQ to allow for different reference equalizer definitions for VR and SR. Once the reference equalizer and tests to ensure interoperability between SR and VR are defined, the text will be consolidated to the extent possible.

CI 167 SC 167.7.1 P39 L30 # 63

Palkert, Tom

Macom

Comment Type TR Comment Status D TDECQ for VR

Need value for TBD for TDECQ

SuggestedRemedy

Replace TBD for TDECQ with 3.4 dB

Proposed Response Response Status W

PROPOSED REJECT.

This comment must be viewed in the broader context of what features are best to include in the VR link. Isolated changes impact choices for other parameters. Decision will be based on consensus.

CI 167 SC 167.8.5.1 P43 L50 # 64

Palkert, Tom

Macom

Comment Type TR Comment Status D Reference equalizer for VR

Need value for Ref equalizer tap length TBD

SuggestedRemedy

Replace TBD with value of 9

Proposed Response Response Status W

PROPOSED REJECT.

This comment must be viewed in the broader context of what features are best to include in the VR link. Isolated changes impact choices for other parameters. Decision will be based on consensus.

CI 167 SC 167.8.5 P43 L29 # 65

Palkert, Tom

Macom

Comment Type TR Comment Status D Center wavelength for VR

Need value for the bandwidth of the 2nd filter for VR

SuggestedRemedy

Replace TBD with value of 22 GHz

Proposed Response Response Status W

PROPOSED REJECT.

The bandwidth of the 2nd filter for VR requires consensus on the center wavelength range.

CI 167 SC 167.7.1 P39 L26 # 66

Palkert, Tom

Macom

Comment Type TR Comment Status D Overshoot

Need value for TBD for VR Overshoot

SuggestedRemedy

Replace TBD with 12%

Proposed Response Response Status W

PROPOSED REJECT.

Proposed value should be validated. Currently, 802.3cu is the only standard where the overshoot/undershoot is a test parameter with a specified max value of 22% (of outer

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CI 167 SC 167.7.2 P40 L24 # 67
 Palkert, Tom Macom
 Comment Type **TR** Comment Status **D** TDECQ for VR
 Need value for TBD for SECQ for VR
 SuggestedRemedy
 Replace TBD with value of 3.4 dB
 Proposed Response Response Status **W**
 PROPOSED REJECT.
 This comment must be viewed in the broader context of what features are best to include in the VR link. Isolated changes impact choices for other parameters. Decision will be based on consensus.

CI 167 SC 167.7.2 P40 L40 # 70
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type **TR** Comment Status **D** Center wavelength for VR
 We have not seen compelling enough advantage with 940 nm VCSELs, not to mention these high speed VCSELs are very different designs than 940 nm VCSELs from 3D sensing, the 940 nm VCSELs require InGaAs detector and not backward compatible with 200GBASE-SR4.
 SuggestedRemedy
 Change TBD with center wavelength of 840-860 nm
 Proposed Response Response Status **W**
 PROPOSED REJECT.
 This comment must be viewed in the broader context of what features are best to include in the VR link. Isolated changes impact choices for other parameters. Decision will be based on consensus.

CI 167 SC 167.8.5.1 P43 L50 # 71
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type **ER** Comment Status **D** Reference equalizer for VR
 The debate between 5T vs 9T FFE need to consider VCSEL BW, improvement in packaging, compatability between VR and SR, and potentially lower cost and power
 SuggestedRemedy
 Given that VCSELs BW and packaging are improving and compatability between VR and SR transmitters are essential, a 5T FFE satisfies the above and longer term will have lower cost and power. Replace TBD tap with 5, Tap 1, tap 2, or tap 3, has the largest magnitude tap coefficient, which is constrained to be at least 0.8.
 Proposed Response Response Status **W**
 PROPOSED REJECT.
 This comment must be viewed in the broader context of what features are best to include in the VR link. Isolated changes impact choices for other parameters. Decision will be based on consensus.

CI 167 SC 167.8.5 P43 L21 # 72
 Ghiasi, Ali Ghiasi Quantum/Marvell
 Comment Type **TR** Comment Status **D** TDECQ other
 TDECQ procedure allow up to +/- 1% threshold adjustment given that VCSEL have larger waveform excursion where OMA (1/6, 1/2, 2/3) levels deviates from signal mean crossing this end up increasing TDECQ
 SuggestedRemedy
 Most CDR use statistical mean to set the slicer level and there is further adjustment capability as it has been suggested there is no issue to increase the TDECQ threshold adjustment from 1% to 2%
 Proposed Response Response Status **W**
 PROPOSED REJECT.
 This represents a change from the existing method for calculating TDECQ. Validation of the suggested remedy is requested.

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CI 167 SC 167.10.3.3 P52 L17 # 74

Ghiasi, Ali Ghiasi Quantum/Marvell

Comment Type TR Comment Status D MDI

Most customers have spoken in support of angled MPO connector due to performance issue which can be difficult to meet with PC MPO, introducing option B PC finish MPO MDI unlikely to have broad market potential and will fragment the market. There is also concern with plugging type A into Type B or vis versa.

SuggestedRemedy

Remove option B, but define the cable plant where both PC and APC are supported.

Proposed Response Response Status W

PROPOSED REJECT.
Option B was included in case non-angled connectors are needed by large enterprise end users in the future.