

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

CI 180 SC 180.9.9.1 P 488 L 35 # 25

Brown, Matthew

Qualcomm

Comment Type TR Comment Status R TFSEH (OI)

The optical receiver portion of the functional receiver is defined as complying with the characteristics in Table 180-8. In other words, it meets and may likely exceed these requirements. For instance, the receiver jitter tracking bandwidth may exceed the minimum implied by the the jitter tolerance mask for the receiver sensitivity test. The effects of excessive jitter at a transmitter might therefore not be evident in this functional test. This functional test would be an ideal means to catch the effects of low-frequency jitter which may cause significant correlation (clustering) of errors. The other transmitter tests would not catch this effect.

SuggestedRemedy

Define the optical receiver such that the jitter tracking bandwidth is constrained to be close to barely passing the jitter tolerance requirements. For instance, define the tracking bandwidth to be no higher than 4 MHz.

Response Response Status U

REJECT.

The TFT method indeed capture and offset the potential better performance of the FRx than the worst case receiver.

If an optical receiver has much better tolerance to jitter, during the SRS test (which includes a jitter stressed source) that optical receiver will show larger margin to the Rx Sens spec than another optical receiver with marginal jitter tolerance. Therefore, when adjusting VOA_level per TFT, the high jitter tolerance receiver will be adjusted to lower input OMA. The amount of extra attenuation of the high jitter tolerance optical receiver would be equivalent to their offset in Rx Sensitivity.

Additionally, such a requirement would require a validation process of the functional receiver and a way to implement the suggested remedy. However these changes can be very costly even not implementable.

Several participants acknowledged there may be an issue to be considered. However, there was no consensus in this regard nor on a potential remedy.

There is no consensus to make the proposed change.

CI 176C SC 176C.6.4.4 P 803 L 32 # 106

Ran, Adee

Cisco Systems, Inc.

Comment Type TR Comment Status A Error Ratio (CG)

For p=1, measurement of block error ratio for validation of the requirements for AUI-C2C (Table 176C-6, probability lower than Hmax for all values of k), even with corrected values of Hmax per another comment, would take more than 1e20 years (for k=16), which is not quite feasible.
For p>1 the required times are even longer.

This means the test cannot be declared to pass without some kind of extrapolation of the measurement.

Similar concerns exist for AUI-C2M (Table 176D-10), KR (Table 178-11) and CR (Table 179-13). Although for KR and CR the test times for p=1 may be feasible, p=2 would still require more than a year to verify.

A spreadsheet for the calculation will be contributed.

SuggestedRemedy

Add the following NOTE after Table 176C-6, based on 180.9.16:

NOTE: If the statistical projection is modeled accurately by a linear fit extrapolation, a means to provide statistical projection of the measured histograms (see 174A.9.3) in order to reduce test time follows. Extrapolate the measured histogram to Hm(i)(16) using a line determined by a linear fit of log10(Hm(i)(k)), for k = 1 to n, where n is the largest value of k for which all bins from 0 to k have a count greater than 2.

Add similar notes after Table 176D-10, Table 178-11, and Table 179-13.

Response Response Status U

ACCEPT IN PRINCIPLE.

Add the NOTE as in the response to comment I-266 after Table 178-11, and Table 179-13.

There was no consensus to add similar notes to Table 176C-6 and Table 176D-10.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.9.9.1 P 488 L 36 # 121

Huber, Thomas

Nokia

Comment Type ER Comment Status A TFSEH (OI)

Using "FRx" to mean "functional receiver" is very confusing, since FR is also used to indicate the 2 km CWDM PMD family, and "FRx" or "FRn" are commonly used to indicate a set of FR PHYs.

SuggestedRemedy

It appears that "FRx" is used only in the title of the clause and in the first and last sentences of the first paragraph. Delete "(FRx)" in the title and first sentence, and replace "FRx" with "functional receiver" in the last sentence.

Response Response Status U

ACCEPT IN PRINCIPLE.
Resolved using the response to comment #-43

Cl 181 SC 181.9.9 P 519 L 8 # 122

Huber, Thomas

Nokia

Comment Type ER Comment Status A TFSEH (OI)

Using "FRx" to mean "functional receiver" is very confusing, since FR is also used to indicate the 2 km CWDM PMD family, and "FRx" or "FRn" are commonly used to indicate a set of FR PHYs.

SuggestedRemedy

It appears that FRx is used only in this bullet point. Delete "(FRx)" in the first sentence and replace FRx in the last sentence with "functional receiver"

Response Response Status U

ACCEPT IN PRINCIPLE.
Resolved using the response to comment #-43

Cl 182 SC 182.9.9 P 551 L 32 # 123

Huber, Thomas

Nokia

Comment Type ER Comment Status A TFSEH (OI)

Using "FRx" to mean "functional receiver" is very confusing, since FR is also used to indicate the 2 km CWDM PMD family, and "FRx" or "FRn" are commonly used to indicate a set of FR PHYs.

SuggestedRemedy

It appears that FRx is used only in this bullet point. Delete "(FRx)" in the first sentence and replace FRx in the last sentence with "functional receiver"

Response Response Status U

ACCEPT IN PRINCIPLE.
Resolved using the response to comment #-43

Cl 183 SC 183.9.9 P 584 L 33 # 124

Huber, Thomas

Nokia

Comment Type ER Comment Status A TFSEH (OI)

Using "FRx" to mean "functional receiver" is very confusing, since FR is also used to indicate the 2 km CWDM PMD family, and "FRx" or "FRn" are commonly used to indicate a set of FR PHYs.

SuggestedRemedy

It appears that FRx is used only in this bullet point. Delete "(FRx)" in the first sentence and replace FRx in the last sentence with "functional receiver"

Response Response Status U

ACCEPT IN PRINCIPLE.
Resolved using the response to comment #-43

Cl 184 SC 184.4 P 599 L 5 # 125

Huber, Thomas

Nokia

Comment Type TR Comment Status A (B1) (L)

The text indicates that the alignment lock and deskew are the same as specified in 172.2.5.1, except that deskew is only required to a 2-symbol boundary. However, 172.2.5.1 specifies the state machine in figure 172-6 is required. That state machine counts FEC codeword errors and restarts lock if 3 consecutive uncorrected codewords are received. The LR1 inner FEC does not decode the FEC, so it doesn't need this state machine.

SuggestedRemedy

Change the sentence to read:
The alignment lock and deskew function shall be identical to the processes specified in 172.2.5.1 except that only a deskew to 20-bit (two RS-FEC symbols) boundaries across all PCS lanes is required, and the codeword monitor function in Figure 172-6 is not required.

Response Response Status U

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl **178B** SC **178B.5** P **868** L **8** # **132**

Huber, Thomas

Nokia

Comment Type **TR** Comment Status **R** Functions (CA)

Figure 178B-3 shows bidirectional communication between the RTS and ILT functions. This is presumably the result of the choice to use the ILT training frames to signal RTS information on 200G IMDD PHYs - but that choice doesn't make the RTS signaling part of the ILT function. There is no need for the RTS function to communicate to the ILT function.

SuggestedRemedy

Change the arrow between ILT and RTS to be one-way from ILT to RTS. Further detail will be provided in a presentation

Response Response Status **U**

REJECT.
Resolved using the response to comment I-140.

Cl **178B** SC **178B.5** P **869** L **14** # **133**

Huber, Thomas

Nokia

Comment Type **TR** Comment Status **R** Functions (CA)

Figure 178B-4 shows local_rts as a signal communicated from the RTS function to the ILT function and remote_rts as a signal communicated from the ILT function to the RTS function. Since local_rts cannot be true unless the ILT function is complete on every lane, the ILT function cannot possibly depend on local_rts. Remote_rts is unrelated to training the link, so it should not be coming through the ILT function, it should be a direct input to the RTS function. The confusion seems to be that the sa,e frame structure used for ILT is used to signal RTS for 200G IMDD AUIs/PMDs - but that doesn't make the RTS signaling part of the ILT function.

SuggestedRemedy

Revise figure 178B-4 to not show local_rts and remote_rts as signals between the two functions, but rather to show a 'training complete' signal from ILT to RTS. Further details will be provided in a presentation.

Response Response Status **U**

REJECT.
Resolved using the response to comment I-140.

Cl **178B** SC **178B.6** P **869** L **31** # **134**

Huber, Thomas

Nokia

Comment Type **TR** Comment Status **R** Functions (CA)

The operation of the RTS function should have no dependency on whether training is enabled (or even defined) for an ISL. Having such a dependency complicates extending APSU to PMDs that don't use ILT. The ISL needs to indicate to the RTS function that "training is complete" (whatever that means for the ISL in question).

SuggestedRemedy

Change "The operation of the RTS function is different based upon the state of mr_training_enable and whether the interface is implemented in a retimer (see 178B.9)." to "The operation of the RTS function is different based upon whether the interface is implemented in a retimer (see 178B.9)." Further details will be provided in a presentation.

Response Response Status **U**

REJECT.
Resolved using the response to comment I-140.

Cl **178B** SC **178B.6** P **869** L **46** # **135**

Huber, Thomas

Nokia

Comment Type **TR** Comment Status **R** Functions (CA)

RTS status signalling cannot be provided by the ILT function, since some PMDs don't have that function. RTS status is signaled by a PMD- or AUI-specific mechanism (which in some cases is the same training frame that ILT uses, but that does not make this signaling part of the ILT function).

SuggestedRemedy

Change "The state of the local_rts variable is provided to the peer interface via the ILT function (Figure 178B.4)." to "The state of the local_rts variable is provided to the peer interface via a PMD- or AUI-specific mechanism." Further details on the implications of this will be provided in a presentation.

Response Response Status **U**

REJECT.
Resolved using the response to comment I-140.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

CI 178B SC 178B.7 P 870 L 4 # 136

Huber, Thomas

Nokia

Comment Type TR Comment Status R Functions (CA)

RTS status signaling cannot be transferred by the ILT function, since some PMDs don't have that function. RTS status is signaled by a PMD- or AUI-specific mechanism (which in some cases is the same training frame that ILT uses, but that does not make this signaling part of the ILT function).

SuggestedRemedy

Change "The ILT function facilitates the establishment of communication between the peer interfaces of an ISL, including clock and data recovery and the transfer of the RTS status of the transmitter."
to
"The ILT function facilitates the establishment of communication between the peer interfaces of an ISL."
Further details on the implications of this will be provided in a presentation.

Response Response Status U

REJECT.
Resolved using the response to comment I-140.

CI 178B SC 178B P 870 L 9 # 137

Huber, Thomas

Nokia

Comment Type TR Comment Status R Functions (CA)

The ILT function shouldn't have a DATA or a LOCAL PATTERN mode. This function is providing training on all the lanes of the PMD/AUI, not RTS signaling.

SuggestedRemedy

Remove DATA and LOCAL PATTERN modes from 178B.7. Further details will be provided in a presentation.

Response Response Status U

REJECT.
Resolved using the response to comment I-140.

CI 178B SC 178B.7.3.3 P 873 L 8 # 138

Huber, Thomas

Nokia

Comment Type TR Comment Status R Training pattern (CA)

The "1:2" and "x3" functions in figure 178B-6 are not clear. There is some explanation in 178B.7.3.4, but if the reader doesn't know that, it's hard to understand the figure.

SuggestedRemedy

In fiure 178B-6, change "1:2" to "Distribution" and change "x3" to "PAM2 encoder". Add these sentences to the end of the first paragraph of 178B.7.3.3:
The distribution function performs a round-robin distribution of the test pattern to two streams, A and B, with the first bit going to stream A and the second bit going to stream B, etc. The PAM2 encoder encodes the input stream of bits as PAM2 symbols to be transmitted over the PMD (see 178B.7.3.4).

Response Response Status U

REJECT.

There is some agreement that the labelling in the figure as pointed out in this comment could be improved.

There is no consensus to adopt the changes as proposed in the suggested remedy.

CI 178B SC 178B.8 P 884 L 17 # 140

Huber, Thomas

Nokia

Comment Type TR Comment Status R state diagram (CA)

The state diagrams in figures 178B-9 and 178B-10 need to be refactored to separate states related to per-lane link training from states related to per-interface ready-to-send functions. This will simplify extension of APSU to PMD types other than 200G/lane IMDD.

SuggestedRemedy

A presentation with a complete proposal to revise the diagrams and supporting text (variable definitions, etc.) will be provided.

Response Response Status U

REJECT.

The following related contributions were reviewed by the CRG:
https://www.ieee802.org/3/dj/public/26_05/huber_3dj_01a_2605.pdf
https://www.ieee802.org/3/dj/public/26_05/osorio_3dj_01a_2605.pdf
https://www.ieee802.org/3/dj/public/26_05/mascitto_3dj_02b_2605.pdf
https://www.ieee802.org/3/dj/public/26_05/huber_3dj_02_2605.pdf

Further work to develop a complete proposal and related consensus is needed.

There is no consensus to make the proposed changes.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 181 SC 181.7.1 P 509 L 17 # 150

Ran, Adee Cisco Systems, Inc.

Comment Type TR Comment Status R OMAouter value (OI)

200G/L transmitter are found to be optimized with a lower extinction ratio; for this there is the need to raise power close to the maximum limits to meet minimum OMAouter specifications.

For manufacturing purposes it would be good to have some extra room to allow for maximum OMAouter specified.

While 1.6TBASE-DR8/DR8-2 specifies OMAouter (max) = 4.2dBm and Average power (max) = 4.0 dBm, this is not true for FR4/FR4-500 which are specified with a lower OMAouter (max) = 4.8 dBm then Average power (max) = 4.9 dBm.

Proposed to normalize the tuning range across PMDs and set maximum Outer optical modulation amplitude (OMAouter) = 5.1 dBm for both FR4-500 and FR4.

SuggestedRemedy

In Table 18105, change Outer optical modulation amplitude (OMAouter), each lane (max) from 4.8 to 5.1 dBm.

In Table 18306, for 800GBASE-FR4, change Outer optical modulation amplitude (OMAouter), each lane (max) from 4.8 to 5.1dBm.

Response Response Status U

REJECT.

Strawpoll O-1 (directional)

I support adopting the suggested remedy to comment I-150.

Yes: 4

No: 13

Based on the result of strawpoll O-1 there was no consensus to make a change.

There was interest expressed in this topic. Further contributions on this topic are encouraged.

Cl 179B SC 179B.4.19 P 909 L 18 # 169

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status R ILdd fit (E)

Channel ILD is covered by FOM_ILD and ERL. ILdd variations are common in these channels on good fixture channels. The ILdd here is overly restrictive.

SuggestedRemedy

Change line 18 to
ILdd(f) is the fitted insertion loss in dB at frequency f

Response Response Status U

REJECT.

The suggested remedy would result in relaxing the test fixture specifications. Comment I-13 refers to previous presentations and straw polls that indicate a desire to tighten the specifications instead.

There was no consensus to make the proposed change.

Cl 179 SC 179.9.4.6 P 429 L 42 # 181

Rysin, Alexander NVIDIA

Comment Type TR Comment Status R SNDR (E)

SNDR limits for most of the presets cannot be met even with a test equipment PPG with practical host channels. Data obtained with an instrument-grade pattern generator and practical channels representing the different host classes was presented in rysin_3dj_01a_2509.

SuggestedRemedy

Revise the SNDR limits based on data collected with practical channels.

Response Response Status U

REJECT.

The comment refers to the contribution
<https://www.ieee802.org/3/dj/public/25_09/rysin_3dj_01a_2509.pdf>, where SNDR measurements are on slides 5-8.

The presentation provided measured data for a specific implementation. It is unclear whether the measured devices (host boards and pattern generators) represent PMDs that could interoperate with minimum capability receivers, and whether the data indicates inability to meet the SNDR in all implementations.

The resolution of comment I-275 can improve the measured SNDR results.

The suggested remedy does not include sufficient detail to implement.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

CI 178B SC 178B.7.2 P 870 L 51 # 201

Mascitto, Marco

Infinera Canada Inc.,Nokia

Comment Type TR Comment Status R Functions (CA) (Bx)

The first sentence of this subclause appears to suggest that the per-lane ILT function generates local pattern data so that an adaptation process can take place when in LOCAL_PATTERN mode. We do not want imply or suggest this. The only mode where adaptation is taking place is in TRAINING mode.

SuggestedRemedy

Replace:

The per-lane ILT function is responsible for the locally generated data that is transmitted while not in DATA mode and for the adaptation processes of the received signal.

With:

The per-lane ILT function is responsible for the locally generated training frames that are transmitted while in TRAINING mode and for the adaptation processes of the received signal. It is also responsible for the locally generated pattern that is transmitted while in LOCAL_PATTERN mode.

Response Response Status U

REJECT.

The Per-lane ILT function is also responsible for squelching in the QUIET state (Figure 178B 10). The sentence as is covers this case also, while the proposed text will need more details.

The sentence does not suggest that local pattern mode should be used to for transmitter training.

There is no consensus to make the proposed changes.

CI 178B SC 178B.8.2.4 P 886 L 15 # 206

Mascitto, Marco

Infinera Canada Inc.,Nokia

Comment Type TR Comment Status R State diagrams (CA)

Figure 178B-9 should be optimized for the reason described in:

https://www.ieee802.org/3/dj/public/26_03/slavick_3dj_03_2603.pdf.

However, the revised state diagram shown on slide 3 can be further optimized by removing the CLOCK_MODE state, and revising the START state exit conditions as follows:

(!sl_ready + !mr_training_enable) *

uses_recovered_clock condition to the SWITCH_CLOCK state

(!sl_ready + !mr_training_enable) *

!uses_recovered_clock to the FOWARD_RTS state

SuggestedRemedy

Implement the optimizations described in this comment. For clarity, a presentation with a revised diagram will be provided.

Response Response Status U

REJECT.

The following contribution was reviewed by the CRG:

https://www.ieee802.org/3/dj/public/26_05/mascitto_3dj_01_2605.pdf

There is no consensus to make the proposed change.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.9.6.4 P 483 L 39 # 222

Maniloff, Eric Ciena Corporation

Comment Type TR Comment Status R TDECQ-Ceq (OI)

Ceq is currently referenced to the low frequency signal content after FFE normalization. It needs to be aligned with the same TDECQ reference of OMA_outer and take into account the DFE tap to be meaningful interpreted as a transmitter bandwidth limiting metric.

SuggestedRemedy

Appending to TDECQ definition in line 39 thru. 48, p483, the following new metric definitions $\delta\text{CEQ_DFE [dB]} = 10\log_{10}(\text{Ceq}) + ?10\log_{10}(\text{OMA?_outer})\hat{u}$
 $10\log_{10}(\text{?OMA?_TDECQ})$ represents the equalizable ISI penalty associated with the reference DFE receiver, which can be subtracted from TDECQ $\text{CEQ_FFE [dB]} = \text{CEQ_DFE} - 10*\log_{10}(1+b)$ where b is the normalized DFE coefficient defined in Table 180-16 represents the bandwidth limiting metric of the transmitter. Make similar changes in Clauses 181, 182, 183.

Response Response Status U

REJECT.

There is no consensus to make the proposed changes.

Cl 180 SC 180.7.1 P 468 L 35 # 223

Maniloff, Eric Ciena Corporation

Comment Type TR Comment Status R TDECQ-Ceq (OI)

Over peaking of transmitters is not effectively prevented. The overshoot limit is not effective as higher bandwidth transmitters could be over peaked and still meet an overshoot specification. Use of Ceq from the Reference Rx gives insight into whether the Tx is overpeaked. With the introduction of the DFE into the Reference Rx, the calculation of Ceq needs to be modified to account for the DFE tap.

SuggestedRemedy

Reintroduce Ceq into Table 180-7 with a Minimum value of 0dB. Similar changes should be made in clauses 181, 182, 183. Supporting contribution to be provided.

Response Response Status U

REJECT.

There is no consensus to make the proposed changes.

Cl 179B SC 179B.4.1 P 909 L 11 # 238

Heck, Howard TE Connectivity

Comment Type TR Comment Status R ILdd fit (E)

Prior contributions (e.g. https://iee802.org/3/dj/public/26_03/lusted_3dj_02a_2603.pdf) have proposed tightening the range of the min/max specs by using fitted insertion loss and accounting for differences between the fitted insertion loss of an actual test fixture and the reference insertion loss.

SuggestedRemedy

Change page 909, line 18 to
 ILdd(f) is the fitted insertion loss in dB at frequency f

Change page 907, line 32 to
 The effects of differences between the fitted insertion loss of an actual test fixture and the reference insertion loss are to be accounted for in the measurements.

A supporting presentation is planned.

Response Response Status U

REJECT.

The CRG reviewed the contribution
https://www.ieee802.org/3/dj/public/26_05/heck_3dj_01b_2605.pdf.
 There is no consensus to make a change to the draft.

The discussion following the presentation included the following:

- Concerns about tightening the insertion loss limits (measured or fitted).
- Support for the direction of de-embedding measured test fixture s-parameters and re-embedding S-parameters based on the reference loss curves.
- The presentation does not include S-parameters based on the reference loss curves, but there is a path to calculate these.
- Slides 7 and 8 of [heck_3dj_01b_2605](https://www.ieee802.org/3/dj/public/26_05/heck_3dj_01b_2605.pdf) include a possible change to the draft, but the CRG recommends more work on this area towards a complete proposal.

See also the response to comment I-169.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 179B SC 179B.3.1 P 907 L 34 # 240

Heck, Howard

TE Connectivity

Comment Type TR Comment Status R MDI connector (E)

There may be multiple configurations of MDI connectors (SMT right angle 1x1, Stacked SMT right angle 2x1, Cabled host, Vertical SMT, etc) which can introduce different high speed performance variabilities. It is requested that this clause reference a specific configuration to minimize variations between MCB suppliers.

SuggestedRemedy

Add text: A single port 1x1 SMT right angle MDI connector is normative for the MCB specifications. Other connector configurations are informative.

Response Response Status U

REJECT.

Per the style manual, "Interspersed normative and informative text is not allowed".

There was no consensus to make the proposed change.

Cl 176D SC 176D.6.4 P 820 L 36 # 242

Ghiasi, Ali

Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R C2M methodology (E)

Comments submitted against D2.x requested demonstration that using transmitter out test parameters with SNDR are sufficient for interoperability. These explicit jitter value either will are too strengthen or too relaxed from the point of what receiver cares!

SuggestedRemedy

The established method in CK VEO and VEC has direct correlation to what receiver can tolerate, the EECQ is another test developed in the OIF Linear and RTLr is a composite test that determines goodness/badness from the perspective of the receiver.

TF either need to demonstrate that the current jitter limits is sufficient for interoperability otherwise consider adding VEO/VEC or EECQ.

Other standards that typically follow IEEE in this case plan to continue with VEC/VEO and some major customers also not convinced what we have for C2M is sufficient and likely will create their own specifications

Response Response Status U

REJECT.

The comment does not indicate any problem with the existing specification. Rather, it requests a demonstration that it is "sufficient for interoperability". This is a call for action, and is not implementable in the draft.

The existing methodology has been in place since D1.1 (based on the response to comment #186 against D1.0). It is aligned with the KR/CR methodology due to the addition of ILT to C2M interfaces. The methods mentioned in the suggested remedy are specified for fixed-waveform signals and do not take into account the effect of variable transmitter equalization. Measurement data of the currently specified parameters with existing test equipment has been provided in several contributions. No such data for the suggested alternative methods has been contributed.

A methodology change will have a widespread impact on the draft, since input specifications (receiver tolerance tests) are aligned with the transmitter specified paramters for calculation of COM. It would risk the project schedule.

The suggested remedy does not provide sufficient detail for the CRG to understand the proposed changes and for the editors to implement.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.9.2 P 476 L 6 # 252

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R Reference CRU peaking (CG)

With TDECQ expected to capture jitter more accurately now that explicit jitter measurement are removed the CRU maximum peaking must be defined, also the slope should be -20 dB not 20 dB.

SuggestedRemedy

Original text: The clock recovery unit (CRU) has a corner frequency of 4 MHz and a slope of 20 dB/decade.

proposed text: The clock recovery unit (CRU) has a 3 dB corner frequency of 4 MHz and a slope of -20 dB/decade. The CRU maximum jitter transfer peak is =0.3 dB from 40 kHz to 20 MHz.

Response Response Status U

REJECT.
Resolved using the response to comment #-264.

Cl 181 SC 181.9.2 P 517 L 3 # 253

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R Reference CRU peaking (CG)

With TDECQ expected to capture jitter more accurately now that explicit jitter measurement are removed the CRU maximum peaking must be defined

SuggestedRemedy

Original text: The clock recovery unit (CRU) has a corner frequency of 4 MHz and a slope of 20 dB/decade.

proposed text: The clock recovery unit (CRU) has a 3 dB corner frequency of 4 MHz and a slope of -20 dB/decade. The CRU maximum jitter transfer peak is =0.3 dB from 40 kHz to 20 MHz.

Response Response Status U

REJECT.
Resolved using the response to comment #-264.

Cl 182 SC 182.9.2 P 548 L 18 # 254

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R Reference CRU peaking (CG)

With TDECQ expected to capture jitter more accurately now that explicit jitter measurement are removed the CRU maximum peaking must be defined

SuggestedRemedy

The CRU maximum jitter transfer peak is =0.3 dB from 42.7 kHz to 20 MHz.

Response Response Status U

REJECT.
Resolved using the response to comment #-264.

Cl 183 SC 183.9.2 P 581 L 38 # 256

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R Reference CRU peaking (CG)

With TDECQ expected to capture jitter more accurately now that explicit jitter measurement are removed the CRU maximum peaking must be defined

SuggestedRemedy

The CRU maximum jitter transfer peak is =0.3 dB from 42.7 kHz to 20 MHz.

Response Response Status U

REJECT.
Resolved using the response to comment #-264.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.9.6.1 P 477 L 44 # 258

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R TDECQ-jitter (OI)

802.3dj has spend last 1 year to best capture jitter in TDECQ and FRx, unless xAUI-n (C2M) interface operate with jitter tolerance condition in 176D.8.14 TDECQ measurement maybe be too optimistic see also unsatisfied comment 147 D2.2

SuggestedRemedy

Add sentence: For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M) interface (see Table 18001 through Table 18004), the clock source for the tes pattern is derived from the clock recovered from the xAUI-n input signal. The xAUI-n input signal is that described for the Jitter tolerance test in 176D.8.14. The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal. See ghiasi_3dj_02_2605

Response Response Status U

REJECT.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/26_05/ghiasi_3dj_02_2605.pdf

Based on straw poll TF-17 there is no consensus to adopt the proposed changes.

Straw poll TF-17 (directional)
 I support adoption of the proposed change (blue text) in the top paragraph on slide 9 of ghiasi_3dj_02_2605.
 Yes: 10
 No: 23

Cl 181 SC 181.9.6 P 517 L 53 # 259

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R TDECQ-Jitter (OI)

802.3dj has spend last 1 year to best capture jitter in TDECQ and FRx, unless xAUI-n (C2M) interface operate with jitter tolerance condition in 176D.8.14 TDECQ measurement maybe be too optimistic see also unsatisfied comments against D2.1 and D2.2

SuggestedRemedy

Add sentence: For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M) interface (see Table 18001 through Table 18004), the clock source for the tes pattern is derived from the clock recovered from the xAUI-n input signal. The xAUI-n input signal is that described for the Jitter tolerance test in 176D.8.14. The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal. See ghiasi_3dj_02_2605

Response Response Status U

REJECT.

Resolved using the response to comment I-258

Cl 182 SC 182.9.6 P 549 L 38 # 260

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R TDECQ-Jitter (OI)

802.3dj has spend last 1 year to best capture jitter in TDECQ and FRx, unless xAUI-n (C2M) interface operate with jitter tolerance condition in 176D.8.14 TDECQ measurement maybe be too optimistic see also unsatisfied comments against D2.1 and D2.2

SuggestedRemedy

Add sentence: For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M) interface (see Table 18001 through Table 18004), the clock source for the test pattern is derived from the clock recovered from the xAUI-n input signal. The xAUI-n input signal is that described for the Jitter tolerance test in 176D.8.14. The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal. See ghiasi_3dj_02_2605

Response Response Status U

REJECT.

Resolved using the response to comment I-258

Cl 183 SC 183.9.6 P 582 L 46 # 261

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R TDECQ-Jitter (OI)

802.3dj has spend last 1 year to best capture jitter in TDECQ and FRx, unless xAUI-n (C2M) interface operate with jitter tolerance condition in 176D.8.14 TDECQ measurement maybe be too optimistic see also unsatisfied comments against D2.1 and D2.2

SuggestedRemedy

Add sentence: For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M) interface (see Table 18001 through Table 18004), the clock source for the test pattern is derived from the clock recovered from the xAUI-n input signal. The xAUI-n input signal is that described for the Jitter tolerance test in 176D.8.14. The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal. See ghiasi_3dj_02_2605

Response Response Status U

REJECT.

Resolved using the response to comment I-258

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.9.9 P 487 L 40 # 262

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R TDECQ-Jitter (OI)

802.3dj has spend last 1 year to best capture jitter in TDECQ and FRx, unless xAUI-n (C2M) interface operate with jitter tolerance condition in 176D.8.14 TDECQ measurement maybe be too optimistic see also unsatisfied comments against D2.1 and D2.2

SuggestedRemedy

Add sentence: For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M) interface (see Table 18001 through Table 18004), the clock source for the tes pattern is derived from the clock recovered from the xAUI-n input signal. The xAUI-n input signal is that described for the Jitter tolerance test in 176D.8.14. The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal.
See ghiasi_3dj_02_2605

Response Response Status U

REJECT.
Resolved using the response to comment I-258.

Cl 179 SC 179.9.4.7 P 430 L 17 # 263

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R Reference CRU peaking (CG)

Defining just the corner frequency of CRU is not sufficient for accurate measurement

SuggestedRemedy

change to: (CRU) with a corner frequency of 4 MHz and a slope of 20 dB/decade with maximum CRU jitter transfer peak of =0.3 dB.

Response Response Status U

REJECT.
Resolved using the response to comment #-1264.

Cl 179 SC 179.9.4.2.1 P 425 L 33 # 264

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R Reference CRU peaking (CG)

Defining just the corner frequency of CRU is not sufficient for accurate measurement

SuggestedRemedy

change to: (CRU) with a corner frequency of 4 MHz and a slope of 20 dB/decade with maximum CRU jitter transfer peak of =0.3 dB.

Response Response Status U

REJECT.

The CRU description with the wording "a slope of 20dB/decade" matches several other clauses in the draft, as well as existing PMD clauses. The specifications in 802.3dj are consistent with these existing clauses and do not require deviation from established wording.

The term "jitter transfer peak" in the suggested remedy is not defined in 802.3dj, and "jitter transfer" is used only informatively in the base standard. Since the specifications (e.g. 179.9.4.2.1) refer to the CRU as a high-pass filter, the editors assume the intent is peaking in the observed jitter transfer function (though this term is not used in 802.3 at all).

The comment seems to address possible jitter amplification by the CRU. However, the specification of "slope of 20 dB/decade" implies a first-order filter, for which there is no peaking, as a model. The existing specification does not explicitly allow any jitter amplification. Implementations might deviate from this model, but no evidence has been provided for significant jitter amplification in CRUs of test equipment used for jitter measurements.

The suggested remedy would allow jitter amplification (0.3 dB) at some frequencies in test equipment, without justification. No data was provided suggesting that the suggested remedy would improve interoperability or change measurement results significantly.

There is no consensus to make the proposed changes.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 176D SC 176D.7.2 P 824 L 41 # 269

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R C2M reference channel (E)

COM reference model provided is module-chip and only used for interference tolerance, but current transmitter relies on jitter output which is incomplete not having a reference COM model

SuggestedRemedy

Create an ASIC-Module COM model and also a Module-ASIC COM model. If there is interest in TF, I can provide it COM models.

Response Response Status U

REJECT.
The COM reference model applies to both host-to-module and module-to-host channels. The direction may require different inputs to the analysis (s-parameter files, port order, and possibly 802.3 COM tool configuration sheets) but these are not part of the standard. The COM reference model is not used in jitter measurement.

The suggested remedy does not include sufficient detail to implement.

Cl 176D SC 176D.6.4 P 821 L 34 # 274

Calvin, John Keysight Technologies

Comment Type TR Comment Status R SNR_ISI (E)

SNRISI has a limit of 26dB. The pass/fail statistics gathered on early system/switch designs are having trouble passing this number. Particularly any host with a HH channel ranges from 24-25dB and fails current specifications.

SuggestedRemedy

A presentation will be offered to support this comment. Propose changing the 26dB target value for SNRISI to 24dB would offer margin on systems that are known to interoperate, but are failing this spec.

Response Response Status U

REJECT.
No related presentation was provided for review at the CRG meeting. The comment does not provide sufficient evidence to support the proposed changes.

Cl 176D SC 176D.6.5 P 822 L 23 # 277

Calvin, John Keysight Technologies

Comment Type TR Comment Status R C2M specs (E)

Vf minimum value of .389V still fails the majority of early designs.

SuggestedRemedy

The interop report out:
https://www.ieee802.org/3/dj/public/26_01/calvin_3dj_01a_2601.pdf Page 23 shows 9 out of 12 modules failing Vf. We either need to review the measurement methodology in Vf (which is not new) or consider further reduction of the Vf values to 350mV.

Response Response Status U

REJECT.
The v_f specification is an important component of the COM analysis that supports the loss budget of 32 dB for C2M applications. Reducing the minimum v_f would undermine this analysis and prevent interoperability with worst-case hosts. The information in the referenced presentation does not justify reducing the v_f limits. It shows that some of the tested modules met the requirements. Devices that failed the requirements might have not been configured correctly or might be non-compliant. [Editor's note: changed clause/subclause/page from 179D/179D.6.3/821 to 176D/176D.6.5/822]

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

CI 179 SC 179.9.4.7.2 P 431 L 38 # 305

Dudek, Michael

Marvell

Comment Type TR Comment Status R Jitter (E)

For calculating JH4u from Djdd and RJrms Q4 is used with a value of 3.891 approximating Q(Q4) of 5×10^{-5} (equation 179-13). However for the calculation of ADD and sigmaRj from JH4u and Jrms in the interference tolerance test in 179.9.5.3.3 Q4d is used with a value of 3.719. approximating $Q(Q4d) \cdot 1 \times 10^{-4}$. That means that Add is not equal to Djdd. and sigmaRj is not equal to RJRMS. This seems strange. (Note the same Q4d is also used in 178.9.3.4.2)

SuggestedRemedy

Reconcile this difference. Change "Q4" to "Q4d" with value 3.719 in 4 places in 179.9.4.7.2 and change the Q value to 1×10^{-4} .

Response Response Status U

REJECT.

Equations (179-17) and (179-18) are solutions of standard deviation from a measured quantile, and use Q4d.

The term Q4d is consistent with Q3d defined in 162.9.5.3.3, which was changed from Q3 by the resolution of comment #209 against 802.3ck D2.0 (see <www.ieee802.org/3/ck/comments/draft2p0/8023ck_D2p0_final_closedcomments.pdf#page=45> and related contributions <https://www.ieee802.org/3/ck/public/adhoc/apr14_21/hidaka_3ck_adhoc_01_041421.pdf> and <https://www.ieee802.org/3/ck/public/21_05/li_3ck_02c_0521.pdf>).

The calculation in Equation (179-13) uses Q4 to convert the parameters of the Dual Dirac model to the 5×10^{-5} quantile on each side, to calculate the "all but 1×10^{-4} " range. This is a different calculation and it can be tested to yield a sufficiently accurate result. Using Q4d would yield the 1×10^{-4} quantile, which would result in "all but 2×10^{-4} " range instead.

There was no consensus to make the suggested change.

CI 176D SC 176D.6.4 P 821 L 33 # 312

Dudek, Michael

Marvell

Comment Type TR Comment Status R SNDR (E)

The SNDR for the host output is measured with the worst case next aggressor after the major loss of the channel. (i.e. close to the end of the channel). It is unrealistic and unnecessary to meet the values at the CR test point

SuggestedRemedy

Change the requirement (just for the host output) from "Table 179-9" to 27.5dB. On line 17 Delete "The minimum SNDR requirements in Table 179-9 apply for both module output and host output."

Response Response Status U

REJECT.

The CRG discussion indicated concerns about the proposed change, and lack of data to support it.

There was no consensus to make a change.

CI 176D SC 176D.6.4 P 821 L 37 # 354

Ghiasi, Ali

Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R C2M methodology (E)

TP1a has no composite eye penalty

SuggestedRemedy

Add EECQ per definition in the OIF 112G-RTLr with max limit of 9 dB and following exceptions BT4 filter 60 GHz, reference equalizer per definition in table 176D-7

Response Response Status U

REJECT.

Resolved using the response to comment I-242.

CI 176D SC 176D.8.13.1 P 833 L 44 # 355

Ghiasi, Ali

Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status R C2M methodology (E)

Interference penalty has no composite measurable penalty and given COM may differ from actual stress generator may result in under/over stress test condition

SuggestedRemedy

Add EECQ per definition in the OIF 112G-RTLr with max limit of 9 dB and following exceptions BT4 filter 60 GHz, reference equalizer per definition in table 176D-7

Response Response Status U

REJECT.

Resolved using the response to comment I-242.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.9.1 P 475 L 34 # 388
 Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point
 Comment Type TR Comment Status R test pattern (OI)
 Table 180-14 says to use pattern 6 (SSPRQ) to measure TDECQ, but the text in Sec. 180.9.6.1, lines 36-37, says to use test pattern 3 or 5 (PRBS31Q or Scrambled idle).
 SuggestedRemedy
 Resolve inconsistency between text and Table 180-14.
 Response Response Status U
 REJECT.
 Resolved using the response to comment #-390.

Cl 180 SC 180.9.6.1 P 477 L 36 # 389
 Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point
 Comment Type TR Comment Status R test pattern (OI)
 Table 180-14 says to use pattern 6 (SSPRQ) to measure TDECQ, but the text in Sec. 180.9.6.1, pg. 477, lines 36-37, says to use test pattern 3 or 5 (PRBS31Q or Scrambled idle).
 SuggestedRemedy
 Resolve inconsistency between text and Table 180-14.
 Response Response Status U
 REJECT.
 Resolved using the response to comment #-390.

Cl 180 SC 180.9.6.1 P 477 L 46 # 390
 Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point
 Comment Type TR Comment Status R test pattern (OI)
 This says that the pattern of the xAUI-n input signal can be a valid xBASE-R signal (in addition to PRBS31Q and scrambled idle), but that contradicts lines 36-37 on the same page, and it contradicts Table 180-14 on pg 475 line 34.
 SuggestedRemedy
 Resolve inconsistencies on allowed input patterns and update affected text and Table.
 Response Response Status U
 REJECT.

The three different instances of test pattern references pointed out in the comment are meant for three different interfaces. They do not need to or should not be consistent or synchronized to avoid correlation between the different signal sources.

Consider a Tx lane under test in a PMD , this PMD could interface with xAUI-n C2M interfaces, this PMD also includes Tx aggressor lanes and Rx lanes both of which can bring crosstalk noise to the Tx lane under test.

--Line 36 and 37 of page 477 talks about the receive lanes, using test pattern 3 or 5. This addition of counter propagating aggressor lanes were first introduced into 802.3dj draft during D1.3 comment. These signals are to add crosstalk, they would benefit to be as close as to the real application. No need to use SSPRQ. <receiver may not be able to track SSPRQ, because the clock may not be able to lock to it, SSPRQ is intended for transmitter.
 >

--Line 45 and 46 talks about the xAUI-n interfaces that is attached to the PMD under test. The test pattern is used for the xAUI-n input signal, which can be PRBS31Q, scrambled idle or a valid xBASE-R signal.

--Table 180-14 specifies the test pattern for the TDECQ testing, which is meant for the Tx lane under test.

Allowing multiple choices of feasible test patterns provides flexibility of user and implementer.

The suggested remedy does not provide sufficient detail to implement.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.9.6.4 P 482 L 20 # 397

Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point

Comment Type TR Comment Status R TDECQ (OI)

The method of estimating SER using a CDF for y and a Gaussian approximation is unnecessarily complex and double or triple counts errors. It also excludes the Gaussian tail probabilities as described in swenson_3dj_01a_2603.pdf

SuggestedRemedy

Revise calculation of SER by using Q functions (tabulated integrals of the Gaussian distribution). A presentation will give details.

Response Response Status U

REJECT.

The comment indicated that he was unable to provide the presentation mentioned in the suggested remedy.

The suggested remedy does not provide sufficient detail to implement.

Cl 186 SC 186.4.3 P 686 L 1 # 408

Opsasnick, Eugene Broadcom Inc.

Comment Type TR Comment Status R state diagram (L) (B1)

State diagram Figure 186-20 is used for the RX alignment marker location field syncing. As stated in another comment, the statement to "start multiframe_counter" is missing. The state diagram also requires either 8 non-zero values or 5 zero values in a row to match in order to use the new value, but this should not be necessary since the AML value used is after FEC correction. This state diagram is actually two state diagrams that interact and the interaction is not very clear. This process could be simplified to use the aml_value as-is unless the expected RAML location it is part of an uncorrectable codeword. The state diagram can then be simplified and made easier to understand.

SuggestedRemedy

Simplify and make more clear the state diagram figure 186-20 for alignment marker location tracking. A consensus presentation with changes for this state daigram is planned.

Response Response Status U

REJECT.

The commenter indicated that a related consensus presentation will not be available for the CRG meeting.

The suggested remedy does not provide sufficient detail to implement.

Cl 180 SC 180.9.6.4 P 482 L 13 # 415

Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point

Comment Type TR Comment Status R TDECQ (OI)

The CDF(y) method of calculating SER assumes that the eye is open to begin with before noise is added. But with a TDECQ of 3.4 dB, there may be some points that cross the nearest threshold without added noise.

SuggestedRemedy

Since the transmitted symbol sequence is known and synchronized with the received waveform, the probability of symbol error can be computed for a particular y given x using a Q function, even when y is in the wrong decision region. Use this method to compute the SER. A presentation will be given with details.

Response Response Status U

REJECT.

The comment indicated that he was unable to provide the presentation mentioned in the suggested remedy.

The suggested remedy does not provide sufficient detail to implement.

Cl 180 SC 180.1 P 458 L 6 # 417

Dawe, Piers J G NVIDIA

Comment Type ER Comment Status R editorial (Bx) (OI)

Table 180-1 and 2, Physical Layer clauses associated with... are clones of each other. Each really has 3 columns. The status (optional, required or conditional) is the same in each. But the presentation obscures the very high level of commonality.

SuggestedRemedy

Present these as a single table with four columns: Clause number, 200GBASE-DR1 (with the abbreviated titles from Table 180-1), 400GBASE-DR2 (with the abbreviated titles from Table 180-2), Status. Combine footnotes c and e.

Response Response Status U

REJECT.

Combining the two tables together does not improve the clarity of the draft but rather results in a table that is more difficult to read since it would need to include a two PCS rows (one for each Ethernet rate), two xMII rows (one for each Ethernet rate), etc., where only one of those rows would be relevant to any one PHY type. An example with with two Ethernet rates can be found in Table 122-1 in the base standard.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.1 P 460 L 6 # 418

Dawe, Piers J G

NVIDIA

Comment Type ER Comment Status R editorial (Bx) (OI)

Table 180-3 and 4, Physical Layer clauses associated with... are not quite clones of each other. Each really has 3 columns. The status (optional, required or conditional) is the same in each. But the presentation obscures the very high level of commonality and makes it hard to spot the differences (PCS and PMA).

SuggestedRemedy

Present these as a single table with four columns: Clause number, 200GBASE-DR1 (with the abbreviated titles from Table 180-1), 400GBASE-DR2 (with the abbreviated titles from Table 180-2), Status. There will be one more row than in Table 180-3. Combine footnote d.

Response Response Status U

REJECT.

Resolved using the response to comment #-417.

Cl 180 SC 180.2 P 461 L 37 # 419

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R error ratio allocation (CG)

Based on the FLR specification and FEC CER of 174A.6 and the sentence at line 41, the sentence at line 37 is applicable to pluggable modules where the decisions are made in the module, errors can be counted at its PMA, and some error budget is reserved for the following AUIs in the receive path. But it is not correct for RTL, LPO, NPO and CPO where there is no C2M AUI.

SuggestedRemedy

Change the first sentence to:

With a compliant input signal, a PMD receiver is expected to meet the block error ratio (BLER) of 1.45×10^{-11} (see 174A.6), measured at the PMA adjacent to the PMD using the method described in 174A.9, with the appropriate BER_{added}. For a receiver in a module with an AUI C2M, BER_{added} is 6.4×10^{-5} . For a receiver where the PMA adjacent to the PMD is the final PMA in the receiver (e.g. in a host ASIC), BER_{added} is 3.2×10^{-5} . For a receiver where the PMA adjacent to the PMD is followed by an AUI C2C then the final PMA in the receiver, BER_{added} is 5×10^{-5} . Similarly in other optical clauses.

Response Response Status U

REJECT.

The comment points out that some implementations may not align with sublayer partitioning as specified by IEEE 802.3.

How such a device determines its compliance is left to the implementer.

Note the last paragraph of 180.2 describes the behavior the PHY is expected to meet for cases when the PMD can not be evaluated standalone. Also, 174A.9 explains how BER_{added} is determined and 174A.13 summarizes the allocation of error ratios to each physical interface.

There is no consensus to make the proposed changes.

Cl 180 SC 180.2 P 461 L 41 # 420

Dawe, Piers J G

NVIDIA

Comment Type ER Comment Status R editorial (Bx) (OI)

The paragraphs in this subclause are ordered top - bottom - middle.

SuggestedRemedy

Swap the second and third paragraphs so that the logic behind these requirements is more apparent. Several clauses.

Response Response Status U

REJECT.

There is not consensus to make the proposed changes.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 174A SC 174A.9 P 745 L 22 # 421

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R (Bx) (CG)

The FEC bin histogram, BER_added and masks methodology is very complicated. It needs more accessible explanation.

SuggestedRemedy

Add a more accessible explanation, with graphs and examples to illustrate what is going on. Show how the method can be simplified when assessing error rates around PMDs, where BER_added is relatively small.

Response Response Status U

REJECT.

The suggested remedy does not provide sufficient detail to implement.

Cl 175 SC 175.2.4.6.1 P 291 L 10 # 423

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R syntax (L)

802.3 is a specification, not an example, lecture or tutorial. It is definitive and should be written in proper formal English. am_x<119:0> is not an example; it is *the* name for this thing. Other sections use better language, for example "The variable tx_am_sf is set as follows".

SuggestedRemedy

Change:

Let am_x<119:0> be the alignment marker for PCS lane x, x=0 to 15, where bit 0 is the first bit transmitted.

am_x<119:0> is constructed as shown in Figure 175-3 using the values in Table 175-4 for each PCS lane number x.

to:

The alignment marker for PCS lane x is am_x<119:0>, where x=0 to 15 and bit 0 is the first bit transmitted. It is constructed as shown in Figure 175-3 using the values in Table 175-4 for each PCS lane number x.

Scrub the draft for similar misuse of "let".

Response Response Status U

REJECT.

The sentence is grammatically correct and is a well-structured definition commonly used in technical specifications to define a variable (am_x<119:0>), its context (PCS lane x), its range (x=0 to 15), and the interpretation of its bits ("bit 0 is the first bit transmitted"). This precise phrasing is used to ensure the transmitter and receiver agree on how the alignment marker is constructed and serialized.

The CRG reviewed the slide 29-33 of

https://www.ieee802.org/3/dj/public/26_05/opsasnick_3dj_01a_2605.pdf.

There are many examples of this language in the base standard, see slide 32 of opsasnick_3dj_01a_2605.pdf.

The is no consensus to make a change.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 178 SC 178.10.1 P 401 L 16 # 424

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R (Bx) ?

This table contains "C_d^(1)", "C_d^(2)" and so on. A superscript denotes either exponentiation or some sort of footnote or reference, yet the former would not be consistent with the units and the latter are missing. Computer programs don't have variable names containing superscript, and such names are difficult for humans too.

SuggestedRemedy

Change to C_d1, "C_d2" and so on. Similarly R_d and so on
Scrub the draft for unnecessary superscript notation, so that it does not appear outside 178A.1, Channel Operating Margin.

Response Response Status U

REJECT.

The format of the die capacitance symbol is consistent with the convention specified in 178A and used in 179, 176C, and 176D.
It is also consistent with similar symbols defined in Annex 93A.

There is no consensus to make the suggested changes.

[CC: 178, 179, 176C, 176D]

Cl 178 SC 178.10.1 P 403 L 25 # 425

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R Jitter (E)

This says "Random jitter, RMS", "sigma_RJ" yet it is clear by inspection that what is meant is Gaussian jitter, and the its cause (random, known cause, or unknown cause) is not the point. A new COM definition is our chance to follow OIF and break with this old name from 8B/10B times which in the age of scrambled coding is inaccurate and encourages sloppy thinking.

SuggestedRemedy

Change "Random jitter, RMS", "sigma_RJ" to "Gaussian jitter, RMS", "sigma_GJ" throughout. Add notes as necessary pointing out that similar quantities in older clauses (Annex 93A for example) use the old names.

Response Response Status U

REJECT.

Resolved using the response to comment I-426.

Cl 179 SC 179.9.4.7 P 448 L 8 # 426

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R Jitter (E)

This says "Random jitter, RMS", "sigma_RJ" yet it is clear by inspection that what is meant is Gaussian jitter, and the its cause (random, known cause, or unknown cause) is not the point. A new COM definition is our chance to follow OIF and break with this old name from 8B/10B times which in the age of scrambled coding is inaccurate and encourages sloppy thinking.

SuggestedRemedy

Change "Random jitter, RMS", "sigma_RJ" to "Gaussian jitter, RMS", "sigma_GJ" throughout. Add notes as necessary pointing out that similar quantities in older clauses (Annex 93A for example) use the old names.

Response Response Status U

REJECT.

The term "random jitter" and associated symbols has been used in several previous places in 802.3.
The suggested change is a matter of preference.

There was no consensus to make the suggested changes.

[Editor's note: changed Page/Line from 403/25 to 448/8]

[CC: 178, 179, 176C, 176D, 178A]

Cl 180 SC 180.3 P461 L49 # 429

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R service interface (CA)

"The service interface" language was imposed from the world of software onto 802.3 a very long time ago. For years, it was boilerplate that we did not need to take seriously. Now, with ILT, APSU, RTL, LPO, CPO, the distinction becomes interesting and we should get this right so as to prepare solid foundations for future projects.

As is abundantly clear from the base standard and the definitions 1.4.469, Physical Medium Attachment (PMA) sublayer, and 1.4.470 Physical Medium Dependent (PMD) sublayer, a PMA provides functions for transmission, reception, clock recovery and skew alignment while the PMD interfaces to the transmission medium concerned (coax, twinax, MMF, SMF). The PMD is untimed, it's a media convertor. In a traditional retimed optical module, there are formally, a PMA which provides CDR, pattern generation and maybe pattern checking, above a PMD that converts untimed electrical signals between the internal electrical format of the module or an IC within it, and the optical format - and vice versa. Even for a spec where there is a DFE in a reference receiver for a PMD, the spec has no concept of bits or errors at the DFE output; the digital, countable symbol stream is inside the PMA or at the interface above it, and the interface below the PMA (AUI) has an analog specification.

SuggestedRemedy

Here, change "The PMD translates the encoded data to and from signals suitable for the specified medium" to "The PMD translates the signals from and to the adjacent PMA to and from signals suitable for the specified medium".

Replace the next paragraph, which describes a digital interface, with a definition for an interface carrying signals (rather than bits or a symbol stream) on the datapath. The auxiliary primitives PMD:IS_SIGNAL.request and PMD:IS_SIGNAL.indication can remain "digital"; they aren't associated with timing-critical pattern generators and such.

Make appropriate changes to 178A (APSU). Items such as the retimer reference model in Figure 178B-13 will be formally in a PMA, always. This will allow a consistent definition framework for copper, IMDD and coherent optical PHYs.

Response Response Status U

REJECT.

As defined explicitly in the draft (see 180.3), the output of the PMD is the detected PAM4 symbols (i.e., after the DSP); the PMA or Inner FEC above processes those detected symbols. The draft does not explicitly define how the the PMD is implemented. Based on that definition, for a linear optical interface, the PMD would encompass the linear optical front end and associated electronics on the module, the electrical channel between the host device and the module, and the DSP on the host device.

The definition of PMA in 1.4.469 notes some functions are only for some PHY types: "(depending on the PHY) collision detection, clock recovery and skew alignment".

The comment is proposing to change this definition to a different reference point. As currently specified the interface between the PMD and sublayer above provides a clean and consistent interface. Changing the PMD interface as proposed would required the PMD service interface to be fully redefined as an analog interface.

Cl 180 SC 180.3 P462 L10 # 431

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status A service interface (Bx) (CG)

This says "provides the status from ISLs above the PMD". This is the only use of "ISL" in the clause, and there is no cross-reference. The thing above a PMD is always a PMA, so this unfamiliar term seems unnecessary. "the status" is too vague. Naming a status primitive as "request" is unnatural and confusing (although we have a reason to do it), so it should be explained more thoroughly.

SuggestedRemedy

Change "is used for the PMA above the PMD to indicate the validity of PMD:IS_UNITDATA_i.request".

Give a cross-reference.

Four clauses.

Response Response Status U

ACCEPT IN PRINCIPLE.

The text as written could be improved. Similar changes are warranted in 177.2 and 184.3. A similar sentence would be beneficial in the service interface definitions in clauses 178 and 179.

In 180.3, 181.3, 182.3, 183.3...

Change: "The SIGNAL_OK parameter of the PMD:IS_SIGNAL.request provides the status from ISLs above the PMD"

To: "The PMD receives signal status information from the client sublayer using the PMD:IS_SIGNAL.request primitive"

Make similar changes in 177.2 and 184.3 but with changing "PMD" to "FEC".

Add similar sentences in 178, 179.

In 177.2, replace the 5th paragraph (starting with "The Inner FEC receives signal status information") with following sentence:

"The Inner FEC sublayer receives signal status information from the client sublayer using the FEC:IS_SIGNAL.request primitive."

Add the same sentence as a new paragraph at the end of 184.3.

Implement with editorial license.

[Editor's note: CC: 178 through 183]

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.5.1 P 464 L 7 # 433

Dawe, Piers J G

NVIDIA

Comment Type **TR** Comment Status **R** signal_detect (Bx) (OI)

This shows the signal detect after the usual AND gate at the bottom of the diagram, but an unconnected SIGNAL_OK at the top of the diagram. But these are connected; the ILT/RTS functions will be asleep until signal detect reports that there is light coming in and it is worth waking up. A consideration of squelch shows that getting this right can be important.

SuggestedRemedy

Show signal detect as an input to "ILT/RTS functions"

Response Response Status **U**

REJECT.

802.3dj now uses a different mechanism local_rx_ready that defines the perceived quality of the signal from the perspective of ILT.

Signal detect as defined may or may not be helpful at the discretion of the implementor.

Cl 180 SC 180.5.4 P 465 L 29 # 436

Dawe, Piers J G

NVIDIA

Comment Type **TR** Comment Status **R** signal_detect (Bx) (OI)

In existing optical PMDs, the relation between signal detect function and SIGNAL_OK is simple. In this draft it is not stated in these sections where one would expect it. There should be some text explaining how the global and/or lane-by-lane signal detect function relates to SIGNAL_OK.

SuggestedRemedy

Add text explaining how the global and/or lane-by-lane signal detect function relates to SIGNAL_OK.

Response Response Status **U**

REJECT.

For PMDs that uses RTS and ILT function, SIGNAL_OK is dependent on the rts_status and not related to the signal detect functions. The local_rx_ready variable is used to define the perceived quality of the signal in ILT function.

Signal detect as defined may or may not be helpful at the discretion of the implementor.

Cl 180 SC 180.5.5 P 466 L 1 # 437

Dawe, Piers J G

NVIDIA

Comment Type **TR** Comment Status **R** signal_detect (OI)

This text, which has been modified from text for 1000BASE-LX and 1000BASE-SX, says: "Implementations need to provide adequate margin between the input optical power level at which the PMD_signal_detect_i variable is set to 1 and the inherent noise level of the PMD". This could be read as a pseudo-requirement that (for decreasing signal strength), the SD should trip before the signal is too noisy to use, or after - the direction of the margin is not indicated. Actually, too noisy to use is not the requirement. The inherent noise level of the PMD is not on the same scale as the input optical power level, and for SD based on average optical power, it is barely relevant.

The paragraph would be more use in a copper clause.

"need" should be avoided.

SuggestedRemedy

Say what we actually mean: NOTE--Implementors should ensure that the PMD_signal_detect_i variable is not incorrectly set to 1 by the action of the inherent noise level of the PMD, including the effects of crosstalk, power supply noise, etc.

Or better, delete the paragraph. It is only an attempt at guidance to designers, and confusing.

Six clauses.

Response Response Status **U**

REJECT.

Strawpoll O-2 (directional) Chicago rules

I support

1: Leave text as is

2: Change text per suggested remedy per I-437

3: Delete the paragraph

1: 6

2: 5

3: 7

Strawpoll O-3 (directional) Pick one

I support

1: Leave text as is

2: Change text per suggested remedy per I-437

3: Delete the paragraph

1: 10

2: 1

3: 5

No consensus to make a change.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.7.1 P 468 L 28 # 439

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TDECQ-limit (OI)

There is a strong relation between ECQ, and histogram spacing + width. Histogram spacing is very important to protect receivers from narrow eyes caused by transmitter jitter.

SuggestedRemedy

If the histogram spacing + width remains as is, increase the TDECQ and TECQ limits to 3.8 dB. The useful signal strength, OMA-TDECQ, is unchanged. Several clauses.

Response Response Status U

REJECT.

The comment proposes to increase the limit of TDECQ and TECQ. However, no data or simulation analysis has been provided indicating that 3.4dB is failing properly working transmitter.

Changing the TDECQ limit would require a corresponding change in the stressed receiver sensitivity limit.

Insufficient evidence was provided to justify to proposed changes.

There is no consensus to make the proposed changes.

Cl 180 SC 180.7.1 P 468 L 36 # 440

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TFSEH (OI)

The transmitter functional symbol error histogram method tests transmitter-receiver pairs, not just transmitters. Depending on the receiver used, a transmitter could be falsely failed or falsely passed. The FEC bin 8 criterion is not connected to the FLR objective of this project, nor to a target such as OIF's 1e-15 effective BER. Extrapolation from bin 8 to bins 14-16 which are the ones that matter, is lacking. Although the idea of counting errors can be useful for deploying links in volume where the implementation of transmitter and receiver (technology, supplier, revision) really are paired, 802.3 is an interoperability standard.

SuggestedRemedy

Remove this row from this table. Remove row from Table 180-14. Move 180.9.9 to an annex. Four clauses.

Response Response Status U

REJECT.

This comment is proposing to remove the "Transmitter functional symbol error histogram" parameter as a mandatory requirement for all PMDs defined in Clauses 180 through 183. Instead, make it informative specification.

A previous poll to determine support for removing this feature was taken by the CRG at the November 2025 Plenary meeting during Working Group ballot. The poll showed high support for retaining the TFSEH feature at the time.

See the response to comment I-138 in the following document:
https://www.ieee802.org/3/dj/comments/D2p2/8023dj_D2p2_comments_final_id.pdf

Based on straw poll TF-4, there is no consensus to make the proposed change.

Straw poll TF-3 (directional):

I support adopting the suggested remedy to comment I-440.

Y: 33

N: 16

Concern was expressed over the language and meaning of this straw poll so the poll was repeated with better clarifying language in TF-4.

Straw poll TF-4 (directional):

I support adopting the suggested remedy (as provided by commenter) to comment I-440.

Y: 20 (change to informative specification)

N: 41 (retain as mandatory specification)

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.7.1 P 468 L 36 # 441

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status A Overshoot (OI)

The transmitter overshoot and undershoot limit is far too high (D2.2 comments 223 and 252). A signal with overshoot like this has been badly set up. It is outside the range of signal shapes a receiver is expected to see, as well as wasting transmitter headroom and receiver ADC resolution.

SuggestedRemedy

For the current 1e-2 hit ratio, the limit should be reduced to from 22% to 13%, and transmitter power excursion should be reduced from 2.3 dBm to 1.8 dBm. See another comment for the hit ratio.

Response Response Status U

ACCEPT IN PRINCIPLE.

The resolution to comment I-248 changed the hit ratio for overshoot/undershoot measurement to 1E-4 and adopted a new value for overshoot/undershoot (max).

Further evidence and data is required to make a change to power excursion (max) value. There was no consensus to change either the measurement hit ratio or the value for power excursion (max).

Cl 180 SC 180.7.1 P 468 L 42 # 442

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R ER and MPI (OI)

The extinction ratio limit is there to protect the receiver from MPI. MPI can get worse at low extinction ratio, when it happens (rarely - fading) but for PAM4 this is a fairly weak function. On the other hand ECQ improves with low extinction ratio (linearity), differently for different technologies but it always happens (not fading). Also, RF power and supply voltage can be reduced at lower extinction ratio.

SuggestedRemedy

Reduce the extinction ratio limit from 3.5 dB to 3 dB.

The definition of TDECQ, which is already channel-dependent, can be modified to include MPI, similar to Eq. 95-3; if so, increase the TDECQ limit by 0.1 dB for the reference case in tables 180-9 and 180-12. The definition of TECQ and SECQ, where the optical channel is negligible, are not changed. The receiver sensitivity is lowered by 0.1 dB.

Or, TDECQ can remain without MPI: receiver sensitivity and stressed receiver sensitivity are lowered by 0.1 dB.

Apply this to all IMDD clauses. I can imagine that it would this would be particularly helpful for 800GBASE-LR4 where a low extinction ratio will enable a good chromatic dispersion penalty.

Response Response Status U

REJECT.

The comment proposes to reduce the limit of extinction ratio to 3dB. However, no data or simulation analysis has been provided indicating that 3.5dB can not be supported by current modulator technology, nor any data showing 3dB is sufficient for worst case of the link, particularly in high loss and penalty cases such as LR4. Therefore, the limit of ER should remain the same until further evidence be presented to the task force.

The power budget is built with dedicated penalty allocation for MPI and DGD for the past two PAM4 signaling rates. Changing to include penalty in TDECQ as the proposed remedy could cause unnecessary confusion to the industry.

TDECQ measurement setup (Figure 180-9) could not emulate the MPI effect, i.e. the channel that the optical signal passes follows the requirement specified in Table 180-15 with minimum insertion loss, and not necessarily the multiple reflection from the multiple connections or splices as in the case of real application.

Regarding the alternate approach, the current power budget and (receiver sensitivity-OMA_min) already takes into account of MPI penalty. $-0.1 - (-3.4) = 3.3\text{dB}$, which includes 3dB(max. IL) and 0.1dB MPI and 0.2dB DGD penalty.

There was interest expressed in this topic. Further contributions on this topic are encouraged.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.7.1 P 468 L 43 # 443

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R Transition time (OI)

The transmitter transition time limit was scaled from 100G where a retiming (pluggable) receiver with FFE-based or other linear equalization was considered. Today at 200G, receivers are DSP, with design learnings from copper where the signals are *much* slower. Generating high bandwidth signals is far from free, and with today's receivers that tolerate slow signals well, 8 ps max is not necessary.

SuggestedRemedy

Change 8 ps to 12 ps, or remove the item completely and rely on well-chosen ECQ, tap weight and overshoot limits to protect us from bad signals on the far right of the ECQ map.

Response Response Status U

REJECT.

Resolved using the response to comment #-319.

Cl 180 SC 180.7.1 P 468 L 47 # 445

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R RINxxOMA (Bx) (OI)

Transmitter noise is included in TDECQ and TECQ. We introduced a RIN limit too, -132 dB/Hz at 50G/lane, because we don't attempt to find the shape of the RIN spectrum, which determines how the RIN is amplified by the equalizer, so we just keep fairly small. At 100G/lane, the limit is -136 (more noise bandwidth). At 200G/lane, we reduced the limit by another 3 dB, keeping things in proportion. Then we added the DFE (in the reference receiver and in real DSP), so there is much less noise enhancement. TDECQ and TECQ pick up electrical noises such as from power supplies as well as true RIN - these are not at high enough frequencies to undergo noise enhancement.

SuggestedRemedy

Change the RIN limit to -137 dB/Hz. Four clauses.

Response Response Status U

REJECT.

Noise enhancement dependent on DSP implementation, it is not necessarily that DFE is implemented in a commercial DSP. Modern CW laser or EML could support -139dB/Hz which helps in providing clean transmitter signal. Data or evidence is needed to reduce the RIN limit.

There is no consensus to make the proposed change.

Cl 180 SC 180.7.2 P 470 L 7 # 446

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R ER and MPI (OI)

Tweaking the receiver sensitivities for MPI accounting (see another comment).

SuggestedRemedy

Change the receiver sensitivity from -3.4, -4.3 + TECQ to -3.5, -4.4 + TECQ. Change the stressed receiver sensitivity from -0.9 to -1. Similarly in other IMDD clauses.

Response Response Status U

REJECT.

Resolved using the response to comment I-442.

Cl 180 SC 180.7.2 P 470 L 9 # 447

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TDECQ-limit (OI)

Tweaking the stressed receiver sensitivity for a change to max TDECQ and TECQ (see another comment).

SuggestedRemedy

Change the stressed sensitivity from -0.9 to -0.5 and change SECQ from 3.4 to 3.8 dB. Similarly in other IMDD clauses.

Response Response Status U

REJECT.

Resolved using the response to comment #-439.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.7.3 P 471 L 7 # 448
 Dawe, Piers J G NVIDIA
 Comment Type **TR** Comment Status **R** Power budget (OI)
 Tweaking the budget for changes to max TDECQ and TECQ and MPI (see other comments).
SuggestedRemedy
 Change the power budget from 6.7 to 7.2 dB.
 Change the allocation for penalties from 3.7 to 4.2 dB
 In table footnotes b and c, change 0.1 dB to 0.2 dB.
 Similarly in other IMDD clauses.
 Response Response Status **U**
 REJECT.
 This comment is partially resolved with the response to comments I-439 and I-442.
 The comment does not provide sufficient evidence to support the proposed changes.
 There is no consensus to make the proposed changes.

Cl 180 SC 180.9.2 P 476 L 5 # 452
 Dawe, Piers J G NVIDIA
 Comment Type **TR** Comment Status **R** Reference Rx (OI)
 The choice of fourth-order Bessel-Thomson response is a historical accident. Fifth order rolls off a bit steeper at high frequencies, which is more realistic, and has no other significant difference. The better roll-off leads to better measurements. This is also true for measurements where reflections at an instrument's electrical connectors are a concern. This is our chance to make the change, as the industry transitions to a new speed and new test equipment.
SuggestedRemedy
 Change fourth-order to fifth-order throughout the draft.
 Response Response Status **U**
 REJECT.
 The BT filter response is used to bound the implementation of a reference receiver, which typically are implemented in test equipment. Fourth order BT response has been used in previous signaling rates, changing it to a fifth order BT response may require re-validation of existing implementations.
 No evidence has been provided in the comment showing that the current spec as is will cause false result of transmitter characteristic measurements.

Cl 180 SC 180.9.6.1 P 477 L 46 # 457
 Dawe, Piers J G NVIDIA
 Comment Type **TR** Comment Status **R** test pattern (Bx) (CO)
 SSPRQ contains a section for challenging CDRs. There is no point challenging the CRU in the scope; that only degrades the measurement. SSPRQ is not used for testing receivers. So it must be there to challenge the PMAs between the PCS and the Tx PMD. Yet this says "The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal" - which I believe is for practical considerations in ICs, some years ago.
SuggestedRemedy
 Change "The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal."
 to "The pattern of the xAUI-n input signal should be SSPRQ on the lane under test, and test patterns 3, 5 or 6 on the other lanes. However, test patterns 3, 5 or 6 may be used on the lane under test.
 Response Response Status **U**
 REJECT.
 The SSPRQ test pattern was adopted in IEEE 802.3bs specifically for testing of TDECQ (for optical transmitters) and SECQ (for optical receiver test calibration). See comment #50 here:
http://www.ieee802.org/3/bs/comments/P802d3bs_D1p3_comments_final_ID.pdf
 The high stress and low-frequency content was intended to challenge the "low-frequency" control loops that might be implemented within an optical transmitter. It was not intended for receiver testing. There is no assurance that AUI or PMD receiver will be able to effectively track SSPRQ without penalty compared to other test patterns. Note that the analyses referenced in comment #50 shows that the phase stress is considerably higher than for the patterns specified for RX testing.
 There is no consensus to make to proposed changes.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

CI 180 SC 180.9.6.3 P 479 L 36 # 465
 Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status R Reference equalizer (OI)
 A floating main tap is not attractive, whether in a reference equalizer (software) or a real product equalizer - it is more trouble than small floating taps well after the main tap.
 SuggestedRemedy
 Fix the main tap position e.g. at position 4, and add up to 3 more FFE taps as necessary to preserve the FFE's effectiveness. Remove the variable a in Figure 180-10.
 Response Response Status U
 REJECT.
 Based on straw poll TF-9 and TF-10 there is no consensus to make any of the changes proposed in the suggested remedy.
 Straw poll TF-9 (choose 1) and TF-10 (chicago) (directional)
 I support changing the FFE length and number of equalizer pre-cursor taps for the reference equalizer taps as follows:
 A: no change
 B: set number of pre-cursor taps to fixed number 3 and leave FFE length at 15
 C: set number of pre-cursor taps to fixed number 3 and change FFE length to 18
 TF-9 (choose 1) A: 39 B: 1 C: 6
 TF-10 (chicago) A: 39 B: 5 C: 16

CI 180 SC 180.9.6.3 P 479 L 37 # 466
 Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status R tap weight-main (OI)
 The main tap minimum 0.8 allows an excessively over-emphasised signal (this is not affected by the addition of the DFE). Relative to the signalling rate, 200G silicon is slower than 100G or 50G silicon and 200G receivers are designed to cope well with such signals. Designing them to cope with badly set-up signals as well would be wasteful. We allow somewhat less than 1 for tolerancing, but 20% off is too much. A properly revised overshoot spec can catch some of these signals, but we should write down what we mean here in any case.
 SuggestedRemedy
 Change 0.8 to 0.9.
 Response Response Status U
 REJECT.
 The limit was set based on data brought to the task force in slide 5 of https://www.ieee802.org/3/dj/public/25_09/rodes_3dj_01a_2509.pdf.
 The comment does not provide sufficient evidence that the proposed changes will improve interoperability.
 There is no consensus to make the proposed change.

CI 180 SC 180.9.6.3 P 479 L 37 # 467
 Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status R tap weight (OI)
 The tap weights were created by drawing limit lines that passed a population of transmitters, some time ago. The main tap maximum and the other FFE tap limits need review, taking the DFE into account and considering what is cost-effective for receivers. In particular, the we will see less of the characteristic alternating FFE tap weights because the DFE can do that job better, so taps 4+ should be tightened up.
 SuggestedRemedy
 Review the tap weight limits and make changes as appropriate.
 Response Response Status U
 REJECT.
 The suggested remedy does not provide sufficient detail to implement.

CI 180 SC 180.9.6.3 P 480 L 17 # 468
 Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status R tap weight-equation (OI)
 Causal vs. anticausal pulse shapes
 This pre-post equalizer coefficient difference limit $|w(1)/w(0) - b(1) - w(-1)/w(0)|$ seeks to keep the attack and decay of the signal pulse similar. Yet the evidence from https://iee802.org/3/dj/public/25_05/chayeb_3dj_01_2505.pdf#page=8 and 9, plotted in https://iee802.org/3/dk/public/2511/3dk_dawe_2511_1.pdf, shows that for a real receiver, the situation is very far from symmetrical; relatively fast attack (c(-1) close to zero) and slow decay (c(+1) strongly -ve) is tolerated well, but the opposite is not.
 SuggestedRemedy
 Remove the absolute bars | |
 Response Response Status U
 REJECT.
 If the absolute bars are removed then the associated limit likely needs to be adjusted. Further work to justify the change and the associated limit is required.
 There is no consensus to make the proposed change.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.9.6.3 P 480 L 22 # 469

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status A tap weight-DFE (OI)

The DFE tap limit seems too weak. Copper clauses use a limit of 0.85, but with a different definition.

SuggestedRemedy

Set the limit to at least 0.35 on the old scale, or the equivalent of 0.55 on the new scale or as defined in copper clauses and COM. This leaves another 0.3 for losses between TP2 and TP5.

Response Response Status U

ACCEPT IN PRINCIPLE.
Resolved using the response to comment #-1-221.

Cl 180 SC 180.9.6.4 P 481 L 27 # 472

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TDECQ-histogram (OI)

The apparent TDECQ or TECQ is a very strong function of histogram window spacing. Reducing the spacing does not make the signal any better, but it lowers our guard against signals with a jitter problem. This should be treated very carefully.

SuggestedRemedy

As in another comment, increase the headline TDECQ, TECQ limit from 3.4 to 3.8 dB. Reduce the histogram window spacing from 0.1 UI between centres to 0.09 UI (if sampling at 50 s/UI is feasible) or $3/32 = 0.09375$ UI (if sampling at 32/UI is preferred).

Response Response Status U

REJECT.

First, since there is another comment #-1-439 specifically on TDECQ limit, response to this comment would focus on the histogram window spacing. In theory, the two histogram window spacing can be arbitrary. Reducing the histogram spacing could reduce the reported TDECQ value. But the effect of changing the spacing by less than 0.01 UI is questionable. Note that, previous contribution https://www.ieee802.org/3/dj/public/25_11/rodes_3dj_01a_2511.pdf provides data of TDECQ comparing impact of histogram spacing and SER target. It showed for a transmitter of 2.5dB TDECQ, changing spacing from 0.1UI to 0.08UI would reduce TDECQ to 2.44dB. The result of using 0.09UI or 0.09375UI will be closer to 2.5dB, and the difference could be within measurement variation.

However, there is value in reconsidering the factors that could affect TDECQ value, such as histogram window spacing and SER target. Contributions are encouraged to support further consensus building on this topic.

Cl 180 SC 180.9.6.4 P 481 L 29 # 473

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TDECQ-histogram (OI)

The histogram window width should be chosen carefully. A wide width allows points in the windows to be collected more quickly, but the samples towards the time-centre of the eye are benign samples that just dilute the measurement, making it less discriminating. The evidence in rodes_3dj_01_2601.pdf slide 4 (which is for TDECQcer) shows that a narrower window improves repeatability. Common practice is to collect very close to 32, 64 or 128 samples/UI, for which 0.04 is not optimal.

SuggestedRemedy

Make the histogram window a little narrower according to what sampling ratio is appropriate: $1/32 = 0.03125$ UI for 32 s/UI or 0.02 UI for 50 s/UI.

Response Response Status U

REJECT.

There is some agreement that changes in the direction of the suggested remedy may be warranted. However, further analysis and a complete proposal are required.

There is no consensus to make the proposed change.

Cl 180 SC 180.9.6.4 P 483 L 23 # 476

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TDECQ (OI)

The appropriate probability for ECQ, for the right correlation, should be considered. It won't be the same as the target pre-FEC SER because of geometrical factors. The target pre-FEC SER should not be $4.56e-4$ anyway; we know that is not adequate for the FLR objective.

SuggestedRemedy

Choose a more appropriate probability. Adjust Qt consistent with this.

Response Response Status U

REJECT.

The suggested remedy does not provide sufficient detail to implement.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.9.6.4 P 483 L 27 # 477

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TDECQ (OI)

The threshold adjust range of 1% is far too restrictive and a cause of the disappointing scatter that we see in TDECQ measurements. IEEE Std 802.3db (100GBASE-SR1 family) adopted 2% and I have not heard any complaints. Real receivers are pretty tolerant of this.

SuggestedRemedy

Change +/-1% to +/-2.5%

Response Response Status U

REJECT.

The comment referenced to 802.3db as a supporting evidence. 802.3db defines vcsel-based transmitters for MMF optical links. Both the transmitter and the fiber link characteristic are different from that of 802.3dj, i.e., SMF optics. Evidence or data of transmitters suitable for SMF 200Gb/s signaling is needed to justify the proposed change.

Based on straw poll TF-18, there is no consensus to make the proposed change.

Straw poll TF-18.

For TDECQ calculation, I support changing the threshold adjust range to +/-2.5%.

Yes: 11

No: 19

Cl 180 SC 180.9.9 P 487 L 13 # 480

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TFSEH (OI)

This functional symbol error histogram method tests transmitter-receiver pairs. As the receiver is not calibrated, and subject to much more possible variation than a CRU/scope, it tests transmitter-receiver pairs, not transmitters.

SuggestedRemedy

Remove spec row from Table 180-7. Remove row from Table 180-14. Move 180.9.9 to an annex.
Four clauses.

Response Response Status U

REJECT.

Resolved using the response to comment #-1440.

Cl 180 SC 180.9.9 P 487 L 13 # 481

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TFSEH (OI)

A real compliant receiver will have better jitter tolerance and other properties than a spec-worst receiver, so "passing" transmitter-receiver pairs can contain unsatisfactory transmitters because of the lack of receiver calibration.

SuggestedRemedy

Calibrate the receiver or delete the subclause.

Response Response Status U

REJECT.

Resolved using the response to comment #-1-25.

Cl 180 SC 180.9.9 P 488 L 18 # 482

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TFSEH (OI)

A receiver is not required to meet 1.75e-12 in bin 8 under any circumstances. A receiver that exceeds this will make any transmitter-receiver pair "fail" this test.

SuggestedRemedy

Provide a thought-through mask or delete the subclause.

Response Response Status U

REJECT.

The suggested remedy does not provide sufficient detail on an alternate mask to implement.

There is no consensus to change the mask or delete the subclause.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.9.9 P 488 L 8 # 483

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TFSEH (OI)

If this mask were useful, there should be a figure showing it. But actually, any transmitter-receiver pair will have the least margin at bin 8 so none of the others matter.

SuggestedRemedy

If there will be a thought-through mask, illustrate it.

Response Response Status U

REJECT.

The commenter indicated that the intent of the suggested remedy was to add a figure illustrating the mask.

Based on straw poll O-4 there is no consensus to make the proposed change.

There is no consensus to make the proposed changes.

Straw poll O-4 (directional)

I support adding a figure illustrating the transmitter symbol error mask.

Y: 12

N: 22

Cl 180 SC 180.9.9 P 488 L 8 # 484

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TFSEH (OI)

A transmitter-receiver pair that is marginal to this mask (i.e. close to the limit at bin 8) would probably have a FLR in the 1e-20 to 1e-25 region, which is far removed from the project objective (FLR 6.2e-11 = effective BER 1e-13) or the OIF's target (effective BER 1e-15) or reasonable market expectations. The difference between bin 8 and bins 14-16 is very large. Just drawing a line sideways from bin 9 is not adequate.

SuggestedRemedy

Decide what the performance objective of this test should be. The obvious candidate is the OIF's target (effective BER 1e-15). Use FEC bin extrapolation as we do for receiver testing.

Or delete the subclause.

Response Response Status U

REJECT.

The suggested remedy does not provide sufficient detail to implement.

There is no consensus to make the proposed changes.

Cl 180 SC 180.9.9.1 P 489 L 16 # 485

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TFSEH (OI)

Estimating actual MPI and DGD penalty is impractical; we don't do it for TDECQ with much the same channel. MPI depends on transmitter and receiver as well as channel. But we expect that for a decent test channel in the lab, with good well-maintained connectors and typical not worst-case fibre, these will be very small.

SuggestedRemedy

Delete Test_fiber_MPI+DGD_penalty or delete the subclause.

Response Response Status U

REJECT.

There is no consensus to make the proposed change.

Cl 180 SC 180.9.9.1 P 488 L 40 # 486

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TFSEH (OI)

AGCs have levels but attenuators have attenuations

SuggestedRemedy

Change "VOA_level " to "OA" for optical attenuation

Response Response Status U

REJECT.

There is no consensus to make the proposed change.

Cl 180 SC 180.9.9.1 P 488 L 40 # 487

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R TFSEH (OI)

This is 802.3. We specify observable signals at compliance points. In the context of an optical spec, "DUT will be interpreted as device = optical module, while what is intended to be tested is the transmitter under test as it says on line 44, and what is actually tested is a transmitter-receiver pair.

SuggestedRemedy

Change "DUT" to "PUT", and when the receiver calibration is sorted out, change to "TUT".

Response Response Status U

REJECT.

There is no consensus to make the proposed change.

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial SA ballot comments

Cl 180 SC 180.9.10 P 489 L 42 # 489

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status A Overshoot (OI)

The overshoot probability criterion (hit ratio) in 140.7.7, 1e-2, is far too weak and lets a surprising number of UI exceed the limit (D2.2 comment 223). 167.8.8 for 100GBASE-SR1 says "Overshoot and undershoot are calculated relative to OMA_outer using the methods in 140.7.7 except that a hit ratio of 3×10^{-3} is used." This was what we could do at the time but it isn't really enough.

SuggestedRemedy

Use a hit ratio of 1e-4, here and in 180.9.11, transmitter power excursion.

Response Response Status U

ACCEPT IN PRINCIPLE.
Resolved using the response to comment #-441.

Cl 180 SC 180.9.15 P 491 L 3 # 493

Dawe, Piers J G

NVIDIA

Comment Type TR Comment Status R Rx sensitivity (OI)

Receiver sensitivity is a property of the lanes together ("interface BER" concept), not each lane separately. We ensure that each transmit lane is good enough, and each channel lane. We test a receiver by applying the same optical power on each lane, but the receiver can share its error allocation across its lanes how it chooses, just as it can allocate errors to LSB and MSB within a lane as it chooses. This is what happens naturally if the errors are checked at the PCS. 174A.9.5 says "If this test passes for each lane, then the PHY or xMII Extender will meet the expected codeword error ratio. If this test fails, then the performance may be further verified using the method in 174A.9.6 or 174A.9.7."

SuggestedRemedy

Delete "of each lane" here and in 180.9.16. In Table 180-8, the table entries are optical powers which are by lane, not error ratios which are not, so maybe "each lane" can stay there, although it is misleading.

Response Response Status U

REJECT.

CRG discussion on this comment highlighted some ambiguity regarding the definition of receiver sensitivity and the associated measurement method, specifically with respect to per-lane and all-lane measurements.

Further consensus building and contribution is encouraged to address this matter.

There was no consensus on adopting changes.