### IEEE P802.3cw D1.0 400 Gb/s over DWDM systems 1st Task Force review comments

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
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<th>Bruckman, Leon</th>
<th>Huawei</th>
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</thead>
<tbody>
<tr>
<td>155</td>
<td>155.1.2</td>
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<td>PROPOSED ACCEPT.</td>
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</tbody>
</table>

**Comment:** In following clauses the PCS and PMA are referred to as shaded, but in the figure they are not.

**Suggested Remedy:**

Add shade to the PCS and PMA blocks in Figure 155-1

**PROPOSED ACCEPT.**

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
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<tr>
<td>155</td>
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<td>PROPOSED ACCEPT.</td>
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</table>

**Comment:** 400GAUI-n is not mentioned in the figure.

**Suggested Remedy:**

Remove the 400GAUI-n definition from the Figure 155-1 text

**PROPOSED ACCEPT.**

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
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<td>155</td>
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<td>39</td>
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<td>PROPOSED ACCEPT.</td>
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</tbody>
</table>

**Comment:** The "mapper" is referred to in the previous sentence as the "GMP mapper". Call it the same in this sentence for consistency.

**Suggested Remedy:**

Replace: "The mapper values" with: "The GMP mapper values"

**PROPOSED ACCEPT.**
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Cl 155 SC 155.2.4.4.3 P40 L29 # 5
Bruckman, Leon Huawei
Comment Type E Comment Status D bucket
The "mapper" is referred to in the previous sentence as the "GMP mapper". Call it the same in this sentence for consistency.
SuggestedRemedy
Replace: "The mapper values" with: "The GMP mapper values"
Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 155 SC 155.2.4.4 P40 L40 # 6
Bruckman, Leon Huawei
Comment Type E Comment Status D bucket
The MFAS is a wrapping counter
SuggestedRemedy
Replace: "It counts from 0x00 to 0xFF" with "It is a wrapping counter from 00x00 to 0xFF"
Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 155 SC 155.2.4.4.5 P41 L5 # 7
Bruckman, Leon Huawei
Comment Type E Comment Status D bucket
Redundant text
SuggestedRemedy
Replace "The 3-bit LDI field is defined to indicate to the downstream 400GBASE-ZR PHY to indicate the quality" with "The 3-bit LDI field is defined to indicate to the downstream 400GBASE-ZR PHY the quality"
Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 155 SC 155.2.4.4.6 P41 L15 # 8
Bruckman, Leon Huawei
Comment Type T Comment Status A GMP description
Jcn bytes are used to recover the data blocks from the payload.
SuggestedRemedy
Replace " których are then used by the receive path GMP de-mapper to re-time the received 257B blocks to the same..." with "which are then used by the receive path GMP de-mapper to recover the 275B data blocks and re-time them to the same..."
Response Response Status C
ACCEPT IN PRINCIPLE.
Replace:
"...which are then used by the receive path GMP de-mapper to re-time the received 257B blocks to the same..."
with:
"...which are then used by the receive path GMP de-mapper to recover the 257B data blocks and re-time them to the same..."

Cl 155 SC 155.2.4.5 P41 L27 # 9
Bruckman, Leon Huawei
Comment Type E Comment Status D bucket
Unnecessary new line and missing chracter
SuggestedRemedy
Make "Each SC-FEC block has 119 x 10 280 / 5 244 664 bits." part of the previous paragraph (no new line) and replace: "119 x 10 280 / 5 244 664 bits" with: "119 x 10 280 / 5 bits = 244 664 bits"
Proposed Response Response Status W
PROPOSED ACCEPT.
IEEE P802.3cw D1.0 400 Gb/s over DWDM systems 1st Task Force review comments

Cl 155 SC 155.2.4.5 P41 L30 # 10
Bruckman, Leon Huawei
Comment Type E Comment Status D
Wrong plural
SuggestedRemedy
Replace "A 32-bit cyclic redundancy codes is calculated" with: "A 32-bit cyclic redundancy code is calculated"

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 155 SC 155.2.4.6 P42 L12 # 11
Bruckman, Leon Huawei
Comment Type E Comment Status D
Unnecessary word (IMHO)
SuggestedRemedy
Replace "requires an additional 34 bits of padding" with: "requires additional 34 bits of padding"

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 155 SC 155.2.4.8 P44 L8 # 12
Bruckman, Leon Huawei
Comment Type E Comment Status D
There seem to be a missing space after the dot
SuggestedRemedy
Add a space between the dot and the begin of the sentence "The operation."

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 155 SC 155.2.5.7.1 P48 L17 # 13
Bruckman, Leon Huawei
Comment Type T Comment Status D
The MFAS is a wrapping counter
SuggestedRemedy
Replace: "It counts from 0x00 to 0xFF" with: "It is a wrapping counter from 00x00 to 0xFF"

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 155 SC 155.2.5.7.2 P48 L41 # 14
Bruckman, Leon Huawei
Comment Type T Comment Status A
The sentence defining the RPF bit, although identical to the one in G.709.1, is a little bit confusing.
SuggestedRemedy
Replace: "The RPF bit indicates that a signal fail status was detected by the remote 400GBASE-ZR receive function in the upstream direction" with: "The RPF bit indicates, in the upstream direction, that a signal fail status was detected by the remote 400GBASE-ZR receive function"

Response Response Status C
ACCEPT IN PRINCIPLE.
Replace: "The RPF bit indicates that a signal fail status was detected by the remote 400GBASE-ZR receive function in the upstream direction..." with:

"The RPF bit indicates, in the upstream direction, that a signal fail status was detected by the remote 400GBASE-ZR receive function..."

Cl 155 SC 155.2.5.7.2 P48 L48 # 15
Bruckman, Leon Huawei
Comment Type E Comment Status D
Wrong tense
SuggestedRemedy
Replace "define in Clause 118" with "defined in Clause 118"

Proposed Response Response Status W
PROPOSED ACCEPT.
Cl 155 SC 155.2.5.8 P49 L1 # 16
Bruckman, Leon Huawei
Comment Type T Response Status C

SuggestedRemedy

Missing clause

There is no clause that describes the GMP de-mapper, something like: "The GMP de-mapper uses the JC bytes to recover the 257B data blocks and re-time them"

Response ACCEPT IN PRINCIPLE.

Add the following at 155.2.5.8:

"The GMP de-mapper decodes the JC bytes and interprets them according to ITU-T G.709 Annex D. The values from the JC bytes are used to recover the 257B data blocks and to re-time them. The CRC8 value in JC1-3 and the CRC4 value in JC4-6 protect against errors in the JC bytes."

Cl 155 SC 155.3.2 P50 L32 #17
Bruckman, Leon Huawei
Comment Type E Response Status W

SuggestedRemedy

Missing dot

Add dot after "400GBASE-ZR PCS"

Proposed Response PROPOSED ACCEPT.

Cl 155 SC 155.3.6 P59 L21 #19
Bruckman, Leon Huawei
Comment Type E Response Status W

SuggestedRemedy

Missing plural

Replace "into two stream" with: "into two streams"

Proposed Response PROPOSED ACCEPT.
IEEE P802.3cw D1.0 400 Gb/s over DWDM systems 1st Task Force review comments

Cl 155  SC 155.3.6  P59  L41  # 20
Bruckman, Leon  Huawei
Comment Type  T  Comment Status  D  cross reference
Not clear which clause is referred here
SuggestedRemedy
"according to Clause 155", but this is clause 155, so either replace with "according to this clause" or write the right clause.

Proposed Response  Response Status  W
PROPOSED ACCEPT IN PRINCIPLE.

Change:
"Implementations are required to have a frame loss ratio (see 1.4.275) of less than 1.7 \times 10^{-12} for 64-octet frames with minimum interpacket gap when processed according to Clause 155."
to:
"Implementations are required to have a frame loss ratio (see 1.4.275) of less than 1.7 \times 10^{-12} for 64-octet frames with minimum interpacket gap when additionally processed according to this clause."

Cl 156  SC 156.2  P65  L23  # 22
Bruckman, Leon  Huawei
Comment Type  T  Comment Status  D  cross reference
SIGNAL_DETECT is not based on light received, it is fixed to OK
SuggestedRemedy
Remove from the note the sentence: "It is possible for a poor quality link to provide sufficient light for a SIGNAL_DETECT = OK indication and still not meet the BER defined in 156.1.1."
Response  Response Status  C
REJECT.
This text exactly matches the corresponding text in 802.3ct 154.2 and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.

Cl 156  SC 156.10.2  P78  L44  # 23
Bruckman, Leon  Huawei
Comment Type  E  Comment Status  R  Verb fix
SuggestedRemedy
Replace: "that the manufacturer of a laser product provide information" with: "that the manufacturer of a laser product provides information"
Response  Response Status  C
REJECT.
The existing text is consistent with multiple enforce clauses.

Cl 156  SC 156.2  P65  L19  # 21
Bruckman, Leon  Huawei
Comment Type  T  Comment Status  A
According to clause 156.5.4 SIGNAL_DETECT is fixed to OK. This ahhl be reflected in the text here
SuggestedRemedy
Two options:
1 - Replace "The SIGNAL_DETECT parameter can take on one of two values: OK or FAIL," with "The SIGNAL_DETECT parameter value is fixed to OK."
   and remove the sentence: "When SIGNAL_DETECT = FAIL, the rx_symbol parameters are undefined."
2 - Just remove these two last sentences.
Response  Response Status  C
ACCEPT IN PRINCIPLE.

Change "The SIGNAL_DETECT parameter can take on one of two values: OK or FAIL."
When SIGNAL_DETECT = FAIL, the rx_symbol parameters are undefined." to
"The SIGNAL_DETECT parameter takes a fixed value of OK."
The definition of error-vector-magnitude (EVM) is currently in TBD status. EVM requires a definition as well as a specification limit. Small changes in EVM can be seen as large changes in OSNR (see http://grouper.ieee.org/groups/802/3/cn/public/adhoc/18_1025/anslow_3cn_01_181025.pdf).


Suggested Remedy
A method for computing EVM has been developed by Keysight Technologies and used in ITU and OIF standards. This is contained within a large Matlab script. The computation details need to be followed exactly to achieve consistent results. This script is available for use within the IEEE 802.3 standard. It is likely too large to be directly written into the standard document, so if used, guidance from the group is requested on the details for script management and inclusion within the 802.3cW clauses. A presentation on the Keysight EVM script is planned to support this comment

Response
REJECT.

Supporting test data to verify test methodology is not available.

The term 'DWDM system' is not present in the corresponding text for 100GBASE-ZR in 802.3ct, and should not be present here.

Suggested Remedy
Delete 'DWDM system', so the text reads 400GBASE-ZR PCS/400GBASE-ZR PMA over a PMD with reach up to at least 80 km as specified in Clause 156.

Proposed Response
PROPOSED ACCEPT.

Since the 400GBASE-ZR PMA is different, it is perhaps easiest to just add a sentence in front of the existing text.

Suggested Remedy
Change from: "The 200GBASE-R and 400GBASE-R PMAs are specified in Clause 120." to The 400GBASE-ZR PMA is specified in clause 155. The 200GBASE-R PMA and all other 400GBASE-R PMAs are specified in Clause 120.

Response
ACCEPT IN PRINCIPLE.

The 200GBASE-R PMA and all 400GBASE-R PMAs other than 400GBASE-ZR are specified in Clause 120. The 400GBASE-ZR PMA is specified in clause 155.
IEEE P802.3cw D1.0 400 Gb/s over DWDM systems 1st Task Force review comments

### Comment 28

**Comment Type:** E  
**Comment Status:** D  
**SC:** 155.1.1  
**P:** 33  
**L:** 20  
**Huber, Tom**  
**Nokia**

**Comment:** Missing a / between 54B and 66B

**Suggested Remedy:** Change 64B66B to 64B/66B

**PROPOSED ACCEPT.**

### Comment 29

**Comment Type:** T  
**Comment Status:** D  
**SC:** 155.1.4  
**P:** 35  
**L:** 2  
**Huber, Tom**  
**Nokia**

**Comment:** While it is true that the interface between PCS and PMA is ultimately related to two streams of 16QAM symbols, and that two polarizations are used, that seems too detailed and not really consistent with how the Tx path is subsequently described, where the PMA is what creates the 16QAM symbols.

**Suggested Remedy:** State the nominal rate at the PMA service interface as ~462 Gbit/s rather than as a symbol rate per polarization.

**PROPOSED ACCEPT IN PRINCIPLE.**

**Proposed Response**

Change from:

"The 400GBASE-ZR PCS has a nominal rate at the PMA service interface of 59.84375 x (28/29) Gsymbol/s on each of two polarizations."

To:

"The 400GBASE-ZR PCS has a nominal rate at the PMA service interface of 462.2414 Gb/s +/- 20 ppm."

### Comment 31

**Comment Type:** T  
**Comment Status:** D  
**SC:** 155.2.1  
**P:** 36  
**L:** 11  
**Huber, Tom**  
**Nokia**

**Comment:** The text here describes the Tx interface between the PCS and PMA as two streams of 4-bit symbols. Figure 155-2 and other text in 155.2.x describes it as 8 bitstreams, and 155.3 describes how the PMA creates the 16QAM symbols and distributes them to the two polarizations.

**Suggested Remedy:** It appears that the intent is that the interface between PCS and PMA in the Tx direction be described as 8 bitstreams, and the PMA is responsible for turning that into two streams of 16QAM symbols. Change "When communicating with the PMA in the transmit direction, the 400GBASE-ZR PCS provides two streams of 4-bit 16-state quadrature amplitude modulation (16QAM) symbols." to "When communicating with the PMA in the transmit direction, the 400GBASE-ZR PCS provides 8 digital lanes, which the PMA encodes into 2 streams of 16QAM symbols."

**Proposed Response**

Change from:

"When communicating with the PMA in the transmit direction, the 400GBASE-ZR PCS provides two streams of 4-bit 16-state quadrature amplitude modulation (16QAM) symbols."

To:

"When communicating with the PMA in the transmit direction, the 400GBASE-ZR PCS provides 8 digital lanes, which the PMA encodes into 2 streams of 16QAM symbols."
<table>
<thead>
<tr>
<th>Comment ID</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Comment Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>T</td>
<td>D</td>
<td>This sentence would fit better as part of the earlier paragraph about the transmit channel being in test-pattern mode. Suggested Remedy: Move the sentence to the end of the paragraph on line 29. Proposed Response</td>
</tr>
<tr>
<td>33</td>
<td>E</td>
<td>D</td>
<td>Missing a B in 64/66B. Suggested Remedy: Change to &quot;64B/66B&quot;. Proposed Response</td>
</tr>
<tr>
<td>34</td>
<td>T</td>
<td>D</td>
<td>The description of the frame is confusing. The text says the frame contains 10240 257B blocks, which are viewed as an array of 256 by 10280 bits, but the switch from blocks to bits is not clearly stated in the text (it is clear in the figure). Also, the overhead portion of the frame isn't organized into 257B blocks - it just occupies the space that 20 257B blocks would occupy. Suggested Remedy: Replace the second sentence of the first paragraph with these sentences: The frame is illustrated as a structure with 256 rows of 10 280 bits with a logical transmission order of left to right, top to bottom. This frame contains 5140 bits of overhead and 10220 257B blocks of payload. Proposed Response</td>
</tr>
<tr>
<td>35</td>
<td>T</td>
<td>D</td>
<td>Since the details of the overhead are in 155.2.4.4.3, it would be better to just reference that clause here. Suggested Remedy: Revise list item 3) to read as follows: &quot;The next 1280 bits carry OH bytes, as discussed in 155.2.4.4.3.&quot; Proposed Response</td>
</tr>
<tr>
<td>36</td>
<td>T</td>
<td>A</td>
<td>It would be more clear if the specific overhead functions that are supported are mentioned first, and then the note that other OH defined in G.709.1 is not used. Also the value to be filled in for the unused bits should be clearly specified (G.709.1 says unsourced overhead is set to zero, so that is suggested here as well), and the editor's note concerning interleaving needs to be addressed. The details of the JC OH being multiframeled are better handled in the later clause that is specific to that overhead. Suggested Remedy: Replace the text with the following: The overhead is organized into 4 sets of 320 bits that are interleaved in groups of 10 bits to form the 1280 bit field. The contents of each group of 320 bits is described in ITU-T G.709.1 clauses 8.1 and 9.2. For 400GBASE-ZR, only the first set of 320 bits is used, and within those bits, only the multi-frame alignment signal (MFAS) byte, status byte, and six justification control bytes JC1 to JC6 are used. Other overhead defined in G.709.1 is not used and is set to 0. Response</td>
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</tbody>
</table>

Huber, Tom
Nokia
IEEE P802.3cw D1.0 400 Gb/s over DWDM systems 1st Task Force review comments

Comment Type T  Comment Status D  Huber, Tom Nokia
There are only 4 320-bit instances in the overhead; the MFAS is only in the first one.

SuggestedRemedy
Change "The MFAS is in the first four 320-bit OH instances" to "The MFAS is in the first of the four 320-bit OH instances."

Proposed Response PROPOSED ACCEPT.

Comment Type T  Comment Status A  Huber, Tom Nokia
The generator polynomial is clearly not described in 3.2.9 of 802.3. It is unclear what reference is intended.

SuggestedRemedy
Provide the correct cross-reference. The generator polynomial is discussed in 9.2 of OIF 400ZR IA; is that the intended reference?

Response ACCEPT IN PRINCIPLE.

Comment Type T  Comment Status A  Huber, Tom Nokia
It would be helpful to introduce the multiframe aspect of this overhead here and also indicate that the details are in the OIF 400ZR IA.

SuggestedRemedy
Insert this text at the start of the clause: The justification control information is spread across the second, third, and fourth frames of a four-frame multiframe (based on the two lowest order bits of the MFAS) as described in OIF 400ZR IA.Cla use 8.9.

Response ACCEPT IN PRINCIPLE.

Comment Type T  Comment Status A  Huber, Tom Nokia
The text is difficult to parse.

SuggestedRemedy
Replace the first sentence with two sentences and modify the beginning of the (current) second sentence as shown: The Hamming SD-FEC decoder extracts 119 bits from an incoming 128-bit SD-FEC codeword. The incoming SD-FEC codeword is formed from a digitized representation of sixteen DP-16QAM symbols. The incoming symbols are digitized to an m-bit resolution by the PMA...

Response ACCEPT IN PRINCIPLE.

Comment Type T  Comment Status A  Huber, Tom Nokia
The justification control information is spread across the second, third, and fourth frames of a four-frame multiframe (based on the two lowest order bits of the MFAS) as described in OIF 400ZR IA. Clause 8.9.

Response ACCEPT IN PRINCIPLE.

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**Comment ID: 42**

Cl: 156  SC: 156.7.1  P: 72  L: 18  # 42

Zhang, Bo  Marvell / Inphi

**Comment Type:** TR

**Comment Status:** A

**Comment Text:**

Side-mode suppression ratio (SMSR) is not a relevant Tx spec for 400GBASE-ZR

**Suggested Remedy:**

Replace SMSR spec with out-of-band OSNR (min) so that it's aligned with OIF 400ZR and OpenROADM

**Response:**

ACCEPT IN PRINCIPLE.

Replace SMSR spec with out-of-band OSNR (min), as well as a definition of out-of-band OSNR. Values TBD.

---

**Comment ID: 43**

Cl: 156  SC: 156.7.1  P: 72  L: 28  # 43

Zhang, Bo  Marvell / Inphi

**Comment Type:** TR

**Comment Status:** A

**Comment Text:**

address TBD for I-Q offset (max)

**Suggested Remedy:**

Adopt DC I-Q offset of -26dB and instantaneous I-Q offset of -20dB from OIF 400ZR spec to ensure interoperability between 400ZR and 400GBASE-ZR

**Response:**

ACCEPT IN PRINCIPLE.

See response to comment 67.

---

**Comment ID: 44**

Cl: 156  SC: 156.7.1  P: 72  L: 20  # 44

Zhang, Bo  Marvell / Inphi

**Comment Type:** TR

**Comment Status:** A

**Comment Text:**

laser linewidth spec needs to be companioned with laser phase noise spec

**Suggested Remedy:**

Add laser phase noise spec from OIF published 400ZR IA - laser frequency noise mask (13.1.210)

**Response:**

ACCEPT IN PRINCIPLE.

See response to comment 65.

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**Comment ID: 45**

Cl: 156  SC: 156.7.1  P: 72  L: 26  # 45

Zhang, Bo  Marvell / Inphi

**Comment Type:** TR

**Comment Status:** R

**Comment Text:**

address TBD for EVM (max)

**Suggested Remedy:**

Replace TBD with 14.8% from way_3ct_01b_1119.pdf to stimulate some task force progress. Note that test methodology detailed in way_3ct_01b_1119.pdf might be different than that from pittala_3ct_01a_191205

**Response:**

REJECT.

See response to comment 24.

---

**Comment ID: 46**

Cl: 156  SC: 156.7.2  P: 73  L: 24  # 46

Zhang, Bo  Marvell / Inphi

**Comment Type:** TR

**Comment Status:** A

**Comment Text:**

Average receive power values called out in 'Receiver OSNR' are not aligned with the min Average receive power value in line 20

**Suggested Remedy:**

Replace -16dBm with -12dBm

**Response:**

ACCEPT IN PRINCIPLE.

See response to comment 68.

---

**Comment ID: 47**

Cl: 156  SC: 156.7.2  P: 73  L: 28  # 47

Zhang, Bo  Marvell / Inphi

**Comment Type:** TR

**Comment Status:** A

**Comment Text:**

Average receive power value called out in 'Receiver OSNR tolerance' is not aligned with the min Average receive power value in line 20

**Suggested Remedy:**

Replace -16dBm with -12dBm

**Response:**

ACCEPT IN PRINCIPLE.

See response to comment 69.

---
Cl 156 SC 156.7.2 P73 L33 # 48
Zhang, Bo Marvell / Inphi
Comment Type TR Comment Status A
footnote b says mandatory receiver OSNR tolerance spec is informative
SuggestedRemedy
Revise footnote b as 'b: Receiver sensitivity (max), for OSNR >=34dB (12.5GHz) is informative'
Response Response Status C
ACCEPT IN PRINCIPLE.
See response to comment 70.

Cl 156 SC 156.7.2 P73 L17 # 49
Zhang, Bo Marvell / Inphi
Comment Type TR Comment Status D
Value in damage threshold is empty
SuggestedRemedy
Either remove this damage threshold spec or add a TBD in the value cell
Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Add TBD as value

Cl 156 SC 156.8 P74 L33 # 50
Zhang, Bo Marvell / Inphi
Comment Type TR Comment Status A
OSNR at TP3 value is not aligned with Transmitter in-band OSNR value
SuggestedRemedy
Replace 35dB with 34dB
Response Response Status C
ACCEPT IN PRINCIPLE.
See response to comment 73.

Cl 156 SC 156.8 P74 L19 # 52
Zhang, Bo Marvell / Inphi
Comment Type TR Comment Status A
OSNR at TP3 value is not aligned with Transmitter in-band OSNR value
SuggestedRemedy
Replace 35dB with 34dB
Response Response Status C
ACCEPT IN PRINCIPLE.
See response to comment 73.

Cl 156 SC 156.8 P74 L9 # 53
Zhang, Bo Marvell / Inphi
Comment Type TR Comment Status A
Address TBD for Average output power at TP3
SuggestedRemedy
Replace TBD with 0dBm per Receiver spec
Response Response Status C
ACCEPT.
IEEE P802.3cw D1.0 400 Gb/s over DWDM systems 1st Task Force review comments

**Comment ID 54**

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

**Address TBD for OSNR at TP3 < 35dB**

**Suggested Remedy**: Replace TBD with -12dBm per Receiver spec

**Response**: ACCEPT.

---

**Comment ID 55**

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

**Address TBD for fiber chromatic dispersion slope**

**Suggested Remedy**: Replace TBD with 0.05ps/km/nm/nm per P802.3ct spec

**Response**: ACCEPT.

---

**Comment ID 56**

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

As the loss budget between TP2 to TP3 is less than 10dB, there is practically no usage for unamplified scenarios with Mux/dmux included

**Suggested Remedy**: Suggest remove this whole 156A.4 section

**Response**: REJECT.

The editor's note at the beginning annex 156A states "All values in this annex are placeholders from 802.3ct and are subject to change". Analysis defining which scenarios can be supported is necessary and is pending further development of the draft.

Contributions are welcome to address which scenarios can be supported.

---

**Comment ID 57**

**Comment Type**: E  **Comment Status**: D

**400GAUI-n does not appear in this figure**

**Suggested Remedy**: Remove 400GAUI-n from the acronym definitions list

**Proposed Response**: PROPOSED ACCEPT.

---

**Comment ID 58**

**Comment Type**: T  **Comment Status**: A

The statement that rate matching isn't required is correct, but not because of the GMP process. Rate matching is not needed because AM's are not inserted.

**Suggested Remedy**: Clarify sentence to indicate that rate-matching is not needed because AM's are not inserted on the transcoded blocks.

**Response**: ACCEPT IN PRINCIPLE.

**Change**: "Note that the rate matching described at 119.2.4.1 is not required for the 400GBASE-ZR PCS because the GMP mapping process takes care of any rate differences."

to:

"Note that the rate matching described at 119.2.4.1 is not required for the 400GBASE-ZR PCS because alignment markers are not inserted into the transcoded blocks."
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Comment 155: OH description

Comment Type: T  Comment Status: A  OH description

Need complete OH diagram to indicate LDI and RPF locations.

Suggested Remedy:
Add complete OH definitions/diagram including bit locations

Response: Response Status: C
ACCEPT IN PRINCIPLE.

See the response to comment #36. That response references the OH description in ITU-T G.709.1 clauses 8.1 and 9.2, which is a superset of the OH bytes used in this clause.

No changes to the text in question.

Comment 156: BER of 2.4E-4 is incorrect

Comment Type: T  Comment Status: A  BER of 2.4E-4 is incorrect

Suggested Remedy:
Replace 2.4E-4 with correct value of ~1.26e-2

Response: Response Status: C
ACCEPT IN PRINCIPLE.

Replace 2.4E-4 with correct value of 1.25e-2.

Comment 156: TP2 and TP3 need to be indexed to in figure 156-3 to define intra and inter-channel impacts of the black link

Comment Type: T  Comment Status: A  TP2 and TP3 need to be indexed to in figure 156-3 to define intra and inter-channel impacts of the black link

Suggested Remedy:
Replace TP2 with TP2_i and TP3 with TP3_i

Response: Response Status: C
ACCEPT IN PRINCIPLE.

Change to TP2_i and TP3_i as suggested. The use of the _i labels is required to define the Adjacent DWDM channel spectral attenuation as stated in maniloff_3cw_01a_210429.

Comment 156: ZR is incomplete name

Comment Type: E  Comment Status: D  ZR is incomplete name

Suggested Remedy:
Replace ZR with 400GBASE-ZR

Proposed Response: Response Status: W
PROPOSED ACCEPT.

For task force discussion.

The value in this draft is incorrectly based on the sum of the 400GBASE-R PCS or 400GX and the 400GBASE-R PMA.

A contribution with recommended maximum (bit time), maximum (pause_quanta), and maximum (us) for the 400GBASE-ZR PCS and PMA is needed.

We will need to add a new entry to Table 116-6 with the maximum values.

As the commenter points out, the CFEC delay is of the order of 4.5 us, or ~ 1.8 million bit times at 400 Gb/s. This would correspond to 3515.625 pause_quanta. The actual value (TBD) will require calculation of all other delays between the PCS service interface (400GMII) and the 400GBASE-ZR PDM service interface.
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Comment ID 64

Cl 156 SC 156.7.1 P72 L17 # 64
Maniloff, Eric Ciena

Comment Type T Comment Status A Interchannel cross talk

Spectral excursion defines a single point on the transmit spectrum. To properly account for both filtering and inter-channel crosstalk penalties the full spectral shape needs to be specified.

SuggestedRemedy

Replace Spectral Excursion with a Maximum and minimum spectral mask. A supporting presentation will be available to define this.

Response Response Status C ACCEPT IN PRINCIPLE.

The Optical Crosstalk Ad Hoc was formed to discuss the different impairments to address 75 GHz spacing at 400Gb compared to 100 GHz spacing at 100Gb. The Ad Hoc output was captured in maniloff_3cw_01a_210429 and presented on 4/29. During the meeting a strawpoll was taken which showed clear consensus on the approach documented in the presentation.

I would support adopting the optical crosstalk proposal defined in maniloff_3cw_01a_210429

• Yes – 28
• No – 2
• Abstain - 6

Implement the recommendations stated in maniloff_3cw_01a_210429 with editorial license.

Comment Status A Response Status C

Comment ID 65

Cl 156 SC 156.7.1 P72 L20 # 65
Maniloff, Eric Ciena

Comment Type T Comment Status A

A single value for the linewidth is insufficient for a coherent receiver.

SuggestedRemedy

Replace linewidth with a Laser Frequency Noise mask.

Response Response Status C

ACCEPT IN PRINCIPLE.

In Table 156-8 replace "Laser linewidth (max)" with "Laser Frequency Noise mask". Values TBD. Update parameter definitions 156.9 with editorial license.

Implement laser phase noise spec consistent with OIF published 400ZR IA - laser frequency noise mask (13.1.210) with editorial license.


Comment Status A Response Status O

Comment ID 66

Cl 156 SC 156.7.1 P72 L33 # 66
Maniloff, Eric Ciena

Comment Type T Comment Status A

Laser RIN is missing from table

SuggestedRemedy

Add an entry for RIN Average and an entry for RIN peak

Response Response Status C

ACCEPT IN PRINCIPLE.

In Table 156-6 add entries for "RIN Average" and "RIN peak". Use values consistent with the published OIF 400ZR IA "13.1.212". Update parameter definitions 156.9 with editorial license.


Comment Status A Response Status C

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Maniloff, Eric  Ciena

Comment Type  T  Comment Status  A
I-Q Offset should include both a max instantaneous and mean value

SuggestedRemedy
Split I/Q offset into maximum instantaneous and mean values

Response  Response Status  C
ACCEPT IN PRINCIPLE.

In Table 156-6 replace "I-Q offset (max)" with "I-Q (max instantaneous)" and "I-Q (mean)". Use values consistent with the published OIF 400ZR IA "13.1.270a and 13.1.270b". Update parameter definitions 156.9, with editorial license.


Maniloff, Eric  Ciena

Comment Type  T  Comment Status  A
Receiver OSNR specs should be defined relative to -12dBm

SuggestedRemedy
Replace -16dBm with -12dBm

Response  Response Status  C
ACCEPT.

Maniloff, Eric  Ciena

Comment Type  T  Comment Status  A
Receiver OSNR tolerance should be defined for Average Power (min)

SuggestedRemedy
Replace -16dBm with -12dBm

Response  Response Status  C
ACCEPT.

Maniloff, Eric  Ciena

Comment Type  T  Comment Status  A
Interchannel cross talk
The specification needs to include a more detailed DWDM channel passband definition.

SuggestedRemedy
Add a passband definition for the DWDM channel. A supporting contribution will be presented.

Response  Response Status  C
ACCEPT IN PRINCIPLE.

See response to comment 64.
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Comment ID 73
Maniloff, Eric Ciena

Comment Type T Comment Status A
References to 35 dB should all be to 34 dB, since this is the minimum Tx OSNR

SuggestedRemedy
Replace all references (lines 11, 12, 16, 19) to 35 dB (12.5GHz) with 34 dB (12.5GHz)

Response Response Status C
ACCEPT.

Comment ID 74
Maniloff, Eric Ciena

Comment Type T Comment Status A Interchannel cross talk
Inter-Channel Crosstalk is not a meaningful specification for a coherent receiver. The spectral distribution of the crosstalk needs to be defined.

SuggestedRemedy
Inter-Channel crosstalk should be replaced with a spectrally resolved attenuation definition between adjacent ports on the DWDM black link. A supporting contribution will be presented.

Response Response Status C
ACCEPT IN PRINCIPLE.

See response to comment 64.

Comment ID 75
Maniloff, Eric Ciena

Comment Type T Comment Status A Interchannel cross talk
Laser Linewidth defined as a single parameter is insufficient for a coherent receiver

SuggestedRemedy
A laser frequency noise mask should be included

Response Response Status C
ACCEPT IN PRINCIPLE.

See response to comment 65.
Comment Type T Comment Status R

Table 156-4, The channel number and corresponding optical frequency in Table 156-4 is reasonable for 75GHz grid, but not representing the channel center frequency for 100GHz grid.

SuggestedRemedy

Add new table summarizing the channel index number and center frequency for 100GHz grid including description in the text.

Alternatively, refer the table 154-6 in IEEE802.3ct for 100GHz grid or refer ITU-T G.697.1 with description of channel index assignment for two different cases, 100G- and 75GHz grid.

Response Response Status C

REJECT.

The decision to replace 100GHz spacing with 75GHz spacing for the 400Gb Ethernet 80km objective was made by the IEEE P802.3ct task force at the January 2020 interim meeting, see motion #3. Note, this decision was made while the 400Gb 80km objective was part of the IEEE P802.3ct project.

This decision was then reaffirmed by the IEEE P802.3cw task force on April 2nd interim teleconference meeting.

Comment Type T Comment Status R

In Table 156-7, nominal center frequency is referring Table 156-4, which indicating the center frequency of 75GHz grid spacing.

Center frequency for 100GHz grid is different from that of 75GHz grid.

Better to provide the channel index and corresponding optical frequency for 100GHz grid.

SuggestedRemedy

change context correspondingly

Response Response Status C

REJECT.

See response to comment 78.

Comment Type E Comment Status D

Missing tab in the format for some contents entries?

SuggestedRemedy

Fix or re-apply the template?

Proposed Response Proposed Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

There is no page 124 in the document so not clear on the specific issue raised. Some spacing and text wrap issues were noticed in the table contents and these will be resolved.
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**Comment**

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

Saying simply that 400GBASE-Z uses 400GBASE-R encoding is misleading the reader; this isn't just another BASE-R. A distinguishing feature is OTN-like GMP framing and clocking. Also, the next definition, for 400GBASE-ZR, says "using 400GBASE-Z encoding", phase and amplitude modulation and coherent detection, the same as this one. There has to be some difference between 400GBASE-R and 400GBASE-Z - and there is, the difference is GMP.

**Suggested Remedy**

Change "using 400GBASE-R encoding, a combination of phase and amplitude modulation..." to "using 400GBASE-R encoding, GMP retiming and framing, a combination of phase and amplitude modulation...".

**Response**

**Response Status**: C

ACCEPT IN PRINCIPLE.

Change "using 400GBASE-Z encoding" to "using 400GBASE-R encoding". No other changes to the text. This description aligns with the corresponding text in 802.3ct, which was the first project to define Ethernet operation over DWDM systems, and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.

**Comment**

**Comment Type**: T
**Comment Status**: A

This says that the SIGNAL_DETECT parameter can take on one of two values: OK or FAIL, while 156.5.4 says that SIGNAL_DETECT is fixed to OK.

**Suggested Remedy**

As this PMD can be used with non-amplified channels, it would be useful to change 156.5.4 to allow a conventional signal detect function with two values when used with non-amplified channels.

**Response**

**Response Status**: C

ACCEPT IN PRINCIPLE.

See response to comment 21. No change to 156.5.4.
Comment Type: TR

Clause 156 is for 400GBASE-ZR which isn’t a 400GBASE-R PMD, it’s a 400GBASE-Z PMD.

Suggested Remedy

Add a row for the delay of the 400GBASE-Z PMA

Response: Response Status: C

REJECT.

Comment Status: R

Response Status: C

There is no 400GBASE-Z PMA.

Comment Type: T

As this table contains entries for both 400GBASE-R and 400GBASE-Z

Suggested Remedy

For footnotes a and b, change 400GBASE-R to 400GBASE

Response: Response Status: C

REJECT.

Comment Status: R

Response Status: C

There is no 400GBASE.

See response to comment 88.
As we all know and Figure 156-2 shows, TP2 is not the MDI. Line 51 says see 156.5.1 which reminds us that "The optical transmit signal is defined at the output end of a single-mode fiber patch cord (TP2), between 2 m and 5 m in length". An equivalent sentence to this one in 156.11 has been deleted from 154.11.

**Suggested Remedy**
Delete the sentence "At the transmitter output the MDI coincides with TP2 and at the receiver input with TP3, as shown in Figure 156–2."

**Response**
**Response Status** C
**ACCEPT.**

This is so complicated and relies so heavily on references to a non-802.3 document that this definition by directive and reference risks ambiguity.

**Suggested Remedy**
Add an annex with suitable examples (see Annex 119A for the idea). Large examples should be made available separately on the web.

**Response**
**Response Status** C
**REJECT.**

This text exactly matches the corresponding text in 802.3ct 156A.4, which was the first project to define Etherent operation over DWDM systems, and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.

**Suggested Remedy**
Complete the definition

**Response**
**Response Status** C
**REJECT.**

This text exactly matches the corresponding text in 802.3ct 154.9.12, which was the first project to define Etherent operation over DWDM systems, and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.

**Suggested Remedy**
This text exactly matches the corresponding text in 802.3ct 154.9.12, which was the first project to define Etherent operation over DWDM systems, and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.

**Response**
**Response Status** C
**REJECT.**

This text exactly matches the corresponding text in 802.3ct 154.9.12, which was the first project to define Etherent operation over DWDM systems, and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.

**Suggested Remedy**
This text exactly matches the corresponding text in 802.3ct 154.9.12, which was the first project to define Etherent operation over DWDM systems, and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.

**Response**
**Response Status** C
**PROPOSED ACCEPT.**
This isn't your grandfather's PMA. Frame alignment word (FAW), training sequence (TS), reserved symbols and pilot sequences (PS) are more like PCS functions, and complicated enough that definition by directive risks ambiguity.

SuggestedRemedy
As for a PCS: add an annex with suitable examples (see Annex 119A for the idea). Large examples should can be made available separately on the web.

REJECT.
The suggested remedy does not provide any specific changes to the draft. Task force contributions are requested.

---

Channels aren't transported, they are transmission paths. Signals may be transported or transmitted over or on channels

SuggestedRemedy
Change "enable the transport of multiple DWDM channels over a single fiber" to "enable multiple DWDM channels over a single fiber" or "enable the transport of multiple DWDM signals over a single fiber".

REJECT.
This text exactly matches the corresponding text in 802.3ct 154.6, which was the first project to define Etherent operation over DWDM systems, and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.

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This text exactly matches the corresponding text in 802.3ct 154.9.15 and 154.9.16, which was the first project to define Etherent operation over DWDM systems, and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.
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Cl 156 SC 156.5.1 P67 L7 # 103
Dawe, Piers Nvidia

Comment Type TR Comment Status R

TP2 and TP3 are test points for the PMD. The way this clause uses TP2 as a specification point for the DWDM black link is causing problems, because the PMD and TP2 are separated by a patch cord between 2 m and 5 m in length (see 156.5.1). There is no need to the test point for the transmitter and the input to the "DWDM black link" to be at the same point. The input to the "Fiber optic cabling (channel)" (see Figure 38-7, Figure 151-7 or many others) is the MDI. There are plenty of names for the output of the PMD (such as "MDI", "PMD" or "transmitter"), or a new one could be invented.

SuggestedRemedy
Define the "DWDM channel" as from MDI to MDI, same as "Fiber optic cabling (channel)" in so many clauses, and or "link segment" (see 1.4.309). Use a figure like Figure 151-7 if appropriate. TP2 can be shown within the "DWDM channel", or the transmitter can be connected to TP2 for testing and to the "DWDM channel" for use, which is more realistic.

Response Response Status C
REJECT.

The use of TP2 and TP3 in clause 156 is the same as 802.3ct clause 154, which was the first project to define Ethernet operation over DWDM systems, and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.

Cl 156 SC 156.10.2 P78 L38 # 101
Dawe, Piers Nvidia

Comment Type TR Comment Status R

As the sentence above says, laser safety should apply at the Tx MDI also. As we know, TP2 is not at the MDI.

SuggestedRemedy
Change "to the single channel points at TP2 and TP3, as shown in Figure 156-3," to "where the signals are in separate fibers, such as TP2 and TP3 in Figure 156-3".

Response Response Status C
REJECT.

This text exactly matches the corresponding text in 802.3ct 154.10.2, which was the first project to define Ethernet operation over DWDM systems, and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.

Cl 156A SC 156A.4 P88 L54 # 102
Dawe, Piers Nvidia

Comment Type TR Comment Status R

This says "the PMDs at TP2 and TP3" yet we know that the PMD and TP2 are separated by a patch cord between 2 m and 5 m in length (see 156.5.1).

SuggestedRemedy
Delete "at TP2 and TP3".

Response Response Status C
REJECT.

The use of TP2 and TP3 in annex 156A is the same as 802.3ct annex 154A, which was the first project to define Ethernet operation over DWDM systems, and the stated intention is to ensure that 802.3cw is aligned with 802.3ct.