Cl **155** *SC* **155.1.2** *P* **34** *L* **3** # 1

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

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

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.2** *P* **34** *L* **19** # 2

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

400GAUI-n is not mentioned in the figure

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.4** *P* **35** *L* **1** # 3

Bruckman, Leon Huawei

Comment Type **T** *Comment Status* **X**

Better indicate the rate with its tolerance and use Gbd (instead of Gsymbol/s), also add the approximate nominal rate (as done in other clauses of this document). Refer for example to 802.3ct clause 153.3.2.2.2

SuggestedRemedy

Replace: "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" with "The 400GBASE-ZR PCS has a rate at the PMA service interface of (28/29) x 59.84375 GBd ±20 ppm (~57.7802 GBd) on each of two polarizations"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4.3** *P* **39** *L* **4** # 4

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

The "mapper" is referrred 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* **O**

Cl **155** *SC* **155.2.4.4.3** *P* **40** *L* **29** # 5

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

The "mapper" is referrred 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* **O**

Cl **155** *SC* **155.2.4.4.4** *P* **40** *L* **40** # 6

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

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* **O**

Cl **155** *SC* **155.2.4.4.5** *P* **41** *L* **5** # 7

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

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* **O**

Cl **155** *SC* **155.2.4.4.6** *P* **41** *L* **15** # 8

Bruckman, Leon Huawei

Comment Type **T** *Comment Status* **X**

JCn bytes are used to recover the data blocks from the payload.

SuggestedRemedy

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 275B data blocks and re-time them to the same..."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4.5** *P* **41** *L* **27** # 9

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

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" wih : "119 x 10 280 / 5 bits = 244 664 bits"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4.5** *P* **41** *L* **30** # 10

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

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* **O**

Cl **155** *SC* **155.2.4.6** *P* **42** *L* **12** # 11

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

Unnecesary word (IMHO)

SuggestedRemedy

Replace "requires an additional 34 bits of padding" with :"requires additional 34 bits of padding"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4.8** *P* **44** *L* **8** # 12

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

There seem to be a missing space after the dot

SuggestedRemedy

Add a space between the dot and the beging of the sentence "The operation…"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.7.1** *P* **48** *L* **17** # 13

Bruckman, Leon Huawei

Comment Type **T** *Comment Status* **X**

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* **O**

Cl **155** *SC* **155.2.5.7.2** *P* **48** *L* **41** # 14

Bruckman, Leon Huawei

Comment Type **T** *Comment Status* **X**

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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.7.2** *P* **48** *L* **48** # 15

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

Wrong tense

SuggestedRemedy

Replace "define in Clause 118" with "defined in Clause 118"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.8** *P* **49** *L* **1** # 16

Bruckman, Leon Huawei

Comment Type **T** *Comment Status* **X**

Missing clause

SuggestedRemedy

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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.2** *P* **50** *L* **32** # 17

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

Missing dot

SuggestedRemedy

Add dot after "400GBASE-ZR PCS"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.2** *P* **51** *L* **49** # 18

Bruckman, Leon Huawei

Comment Type **T** *Comment Status* **X**

Sentence is not clear, and also the "SIL" acronym shall be called out here.

SuggestedRemedy

Replace "The PMA:IS_SIGNAL.indication primitive is generated through a set of signal indication logic that reports", with "The PMA:IS_SIGNAL.indication primitive is generated through a signal indication logic (SIL) that reports"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.6** *P* **59** *L* **21** # 19

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

Missing plural

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.6** *P* **59** *L* **41** # 20

Bruckman, Leon Huawei

Comment Type **T** *Comment Status* **X**

Not clear which clause is referred here

SuggestedRemedy

"according to Clause 155", but this is clause 155, so either repalce with "according to this clause" or write the right clause.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.2** *P* **65** *L* **19** # 21

Bruckman, Leon Huawei

Comment Type **T** *Comment Status* **X**

According to clause 156.5.4 SIGNAL_DETECT is fixed to OK. This ahhl be reflected in thetext here

SuggestedRemedy

Tow 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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.2** *P* **65** *L* **23** # 22

Bruckman, Leon Huawei

Comment Type **T** *Comment Status* **X**

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."

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.10.2** *P* **78** *L* **44** # 23

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

Verb fix

SuggestedRemedy

Replace: "that the manufacturer of a laser product provide information" with: "that the manufacturer of a laser product provides information"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.9** *P* **76** *L* **31** # 24

Le Cheminant, Greg — Keysight Technologies

Comment Type **T** *Comment Status* **X**

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). A specification limit requires a known method of measurement. The complexity of the EVM measurement requires a specific analysis process to achieve consistent results. This process should be explcitly defined. See https://grouper.ieee.org/groups/802/3/cn/public/adhoc/19_0207/lecheminant_3cn_01_190207.pdf and https://grouper.ieee.org/groups/802/3/cn/public/adhoc/19_0509/lecheminant_3ct_01_190509.pdf

SuggestedRemedy

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 inclusiion within the 802.3cw clauses. A presentation on the Keysight EVM script is planned to support this comment

Proposed Response *Response Status* **O**

Cl **30** *SC* **30.5.1.1.2** *P* **20** *L* **17** # 25

Huber, Tom — Nokia

Comment Type **E** *Comment Status* **X**

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

SuggestedRemedy

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 *Response Status* **O**

Cl **116** *SC* **116.2.3** *P* **29** *L* **47** # 26

Huber, Tom — Nokia

Comment Type **T** *Comment Status* **X**

Probably best to split out 200G and 400G here, so that the 400G part can refer to both 119/120 and 155.

SuggestedRemedy

Revise the text to read as follows:
The term 200GBASE-R refers to a specific family of Physical Layer implementations based upon the 64B/66B coding method specified in clause 119 and the PMA specifications defined in clause 120. The term 400GBASE-R refers to a specific family of Physical Layer implementations based upon the 64B/66B coding method specified in clause 119 or 155 and the PMA specifications defined in Clause 120 or 155. 200GBASE-R and 400GBASE-R PCSs perform encoding (decoding) of data from (to) the 200GMII or 400GMII to 256B/257B code blocks, apply FEC, distribute the data to multiple lanes, and transfer the encoded data to
the PMA.

The 200GBASE-R PCS has almost the same functionality as the 200GXS, and therefore may be configured as a 200GXS in order to implement part of the optional 200GMII Extender (see Clause 118). The 400GBASE-R PCS has almost the same functionality as the 400GXS, and therefore may be configured as a 400GXS in order to implement part of the optional 400GMII Extender (see Clause 118).

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.2.4** *P* **30** *L* **17** # 27

Huber, Tom — Nokia

Comment Type **T** *Comment Status* **X**

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

SuggestedRemedy

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.1** *P* **33** *L* **20** # 28

Huber, Tom Nokia

Comment Type **E** *Comment Status* **X**

Missing a / between 54B and 66B

SuggestedRemedy

Change 64B66B to 64B/66B

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.4** *P* **35** *L* **2** # 29

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

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.

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.4.1** *P* **35** *L* **11** # 30

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

While clause 117 may specify both 200GMII and 400GMII the PCS service interface for 400GBASE-ZR is only the 400GMII.

SuggestedRemedy

Delete 200GMII from the parenthetical "(200GMII/400GMII)"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.1** *P* **36** *L* **11** # 31

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

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.

SuggestedRemedy

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 *Response Status* **O**

Cl **155** *SC* **155.2.1** *P* **37** *L* **47** # 32

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

This sentence would fit better as part of the earlier paragraph about the transmit channel being in test-pattern mode.

SuggestedRemedy

Move the sentence to the end of the paragraph on line 29.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **37** *L* **51** # 33

Huber, Tom Nokia

Comment Type **E** *Comment Status* **X**

Missing a B in 64/66B

SuggestedRemedy

Change to "64B/66B".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4.3** *P* **38** *L* **28** # 34

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

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.

SuggestedRemedy

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 *Response Status* **O**

Cl **155** *SC* **155.2.4.3** *P* **39** *L* **5** # 35

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

Since the details of the overhead are in 155.2.4.4.3, it would be better to just reference that clause here.

SuggestedRemedy

Revise list item 3) to read as follows: "The next 1280 bits carry OH bytes, as discussed in 155.2.4.4.3."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4.4.3** *P* **40** *L* **26** # 36

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

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 bytes 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 multiframed are better handled in the later clause that is specific to that overhead.

SuggestedRemedy

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4.4.4** *P* **40** *L* **39** # 37

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

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 *Response Status* **O**

Cl **155** *SC* **155.2.4.4.5** *P* **40** *L* **44** # 38

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

LF is a reasonable replacement signal to insert (this is what ITU and OIF both specify)

SuggestedRemedy

Replace the first sentence of the clause and the editor's note with the following: In the case of a DSP framing or 400GBASE-ZR frame or multi-frame loss, the PCS receive path inserts a stream of 257B blocks carrying LF ordered sets.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4.4.6** *P* **41** *L* **14** # 39

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

It would be helpful to introduce the multiframed 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.Clause 8.9.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4.5** *P* **41** *L* **31** # 40

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

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?

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.1** *P* **47** *L* **5** # 41

Huber, Tom Nokia

Comment Type **T** *Comment Status* **X**

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 DP-16QAM symbols are digitized to an m-bit resolution by the PMA...

Proposed Response *Response Status* **O**

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

Zhang, Bo Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

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

SuggestedRemedy

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

Proposed Response *Response Status* **O**

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

Zhang, Bo Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

address TBD for I-Q offset (max)

SuggestedRemedy

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

Proposed Response *Response Status* **O**

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

Zhang, Bo Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

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

SuggestedRemedy

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

Proposed Response *Response Status* **O**

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

Zhang, Bo Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

address TBD for EVM (max)

SuggestedRemedy

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

Proposed Response *Response Status* **O**

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

Zhang, Bo Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

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

SuggestedRemedy

Replace -16dBm with -12dBm

Proposed Response *Response Status* **O**

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

Zhang, Bo Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

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

SuggestedRemedy

Replace -16dBm with -12dBm

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.2** *P* **73** *L* **33** # 48

Zhang, Bo Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

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'

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.2** *P* **73** *L* **17** # 49

Zhang, Bo Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

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* **O**

Cl **156** *SC* **156.8** *P* **74** *L* **12** # 50

Zhang, Bo Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

OSNR at TP3 value is not aligned with Transmitter in-band OSNR value

SuggestedRemedy

Replace 35dB with 34dB

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.8** *P* **74** *L* **17** # 51

Zhang, Bo Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

OSNR at TP3 value is not aligned with Transmitter in-band OSNR value

SuggestedRemedy

Replace 35dB with 34dB

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.8** *P* **74** *L* **19** # 52

Zhang, Bo — Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

OSNR at TP3 value is not aligned with Transmitter in-band OSNR value

SuggestedRemedy

Replace 35dB with 34dB

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.8** *P* **74** *L* **9** # 53

Zhang, Bo — Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

Address TBD for Average output power at TP3

SuggestedRemedy

Replace TBD with 0dBm per Receiver spec

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.8** *P* **74** *L* **12** # 54

Zhang, Bo — Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

Address TBD for OSNR at TP3<35dB

SuggestedRemedy

Replace TBD with -12dBm per Receiver spec

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.8** *P* **74** *L* **25** # 55

Zhang, Bo — Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

Address TBD for fiber chromatic dispersion slope

SuggestedRemedy

Replace TBD with 0.05ps/km/nm/nm per P802.3ct spec

Proposed Response *Response Status* **O**

Cl **156A** *SC* **156A.4** *P* **88** *L* **34** # 56

Zhang, Bo — Marvell / Inphi

Comment Type **TR** *Comment Status* **X**

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

SuggestedRemedy

Suggest remove this whole 156A.4 section

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.2** *P* **34** *L* **19** # 57

Maniloff, Eric — Ciena

Comment Type **E** *Comment Status* **X**

400GAUI-n does not appear in this figure

SuggestedRemedy

Remove 400GAUI-n from the acronym definitions list

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4.1** *P* **38** *L* **12** # 58

Maniloff, Eric — Ciena

Comment Type **T** *Comment Status* **X**

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.

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4.4.5** *P* **41** *L* **5** # 59

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

Need complete OH diagram to indicate LDI and RPF locations.

SuggestedRemedy

Add complete OH definitions/diagram including bit locations

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.7** *P* **60** *L* **31** # 60

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

Delay listed as 892.16 ns is incorrect, actual delay is ~4.5 us.

SuggestedRemedy

Update delay with actual value.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.1** *P* **64** *L* **25** # 61

Maniloff, Eric Ciena

Comment Type **E** *Comment Status* **X**

ZR is incomplete name

SuggestedRemedy

Replace ZR with 400GBASE-ZR

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.1.1** *P* **64** *L* **37** # 62

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

BER of 2.4E-4 is incorrect

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.6** *P* **69** *L* **32** # 63

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

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

SuggestedRemedy

Replace TP2 with TP2_i and TP3 with TP3_i

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.1** *P* **72** *L* **17** # 64

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.1** *P* **72** *L* **20** # 65

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

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

SuggestedRemedy

Replace linewidth with a Laser Frequency Noise mask.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.1** *P* **72** *L* **33** # 66

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

Laser RIN is missing from table

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.1** *P* **72** *L* **28** # 67

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

I-Q Offset should include both a max instantaneous and mean value

SuggestedRemedy

Split I/Q offset into maximum instantaneous and mean values

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.2** *P* **73** *L* **24** # 68

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

Receiver OSNR specs should be defined relative to -12dBm

SuggestedRemedy

Replace -16dBm with -12dBm

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.2** *P* **73** *L* **27** # 69

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

Receiver OSNR tolerance should be defined for Average Power (min)

SuggestedRemedy

Replace -16dBm with -12dBm

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.2** *P* **73** *L* **33** # 70

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

Tx OSNR min is 34dB, this should be used in note b

SuggestedRemedy

Replace 35 dB with 34 dB

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.8** *P* **74** *L* **7** # 71

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

Ripple is used in ITU-T G698.2 to define both the allowable loss/gain variations within the passband and the passband. Ripple as used here should be used only to define the loss/gain variations within the passband.

SuggestedRemedy

Add a footnote to clarify that ripple is only defining the loss/gain variations withing th DWDM channel passband.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.8** *P* **74** *L* **7** # 72

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.8** *P* **74** *L* **11** # 73

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

References to 35 dB should all be to 34dB, since this is the minimum Tx OSNR

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.8** *P* **74** *L* **34** # 74

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.5** *P* **76** *L* **13** # 75

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

Laser Linewidth defined as a single parameter is insufficient for a coherent receiver

SuggestedRemedy

A laser frequency noise mask should be included

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.22** *P* **78** *L* **17** # 76

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **X**

Inter-Channel Crosstalk is not a meaningful specification for a coherent receiver. The spectral distribution of the crosstalk needs to be defined.

SuggestedRemedy

156.9.22 should be modified to include an adjacent channel spectral attenuation for the DWDM black link, and describe how this is used along with Tx spectrum to calculate the worst-case inter-channel crosstalk.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.5.1** *P* **67** *L* **16** # 77

Park, Charles Juniper Networks

Comment Type **E** *Comment Status* **X**

Figure 156-2,
PMD service interfaces in Fig. 156-2 need to be corrected.

SuggestedRemedy

"PMD:IS_UNITDATA_0.request to PMD:IS_UNITDATA_3.request"

"PMD:IS_UNITDATA_0.indication to PMD:IS_UNITDATA_3.indication"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.6** *P* **69** *L* **47** # 78

Park, Charles Juniper Networks

Comment Type **T** *Comment Status* **X**

Table 156-4,
The channel number and corresponding optical frequency in Table 156-4 is reasonbale 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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.1** *P* **72** *L* **12** # 79

Park, Charles — Juniper Networks

Comment Type **T** *Comment Status* **X**

In Table 156-6, 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

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.2** *P* **73** *L* **14** # 80

Park, Charles — Juniper Networks

Comment Type **T** *Comment Status* **X**

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

Proposed Response *Response Status* **O**

Cl **FM** *SC* **FM** *P* **124** *L* **20** # 81

Dawe, Piers — Nvidia

Comment Type **E** *Comment Status* **X**

Missing tab in the format for some contents entries?

SuggestedRemedy

Fix or re-apply the template?

Proposed Response *Response Status* **O**

Cl **1** *SC* **1.4.110c** *P* **19** *L* **9** # 82

Dawe, Piers — Nvidia

Comment Type **TR** *Comment Status* **X**

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.

SuggestedRemedy

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...".

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.2** *P* **65** *L* **19** # 83

Dawe, Piers — Nvidia

Comment Type **T** *Comment Status* **X**

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.

SuggestedRemedy

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.

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.1.3** *P* **28** *L* **13** # 84

Dawe, Piers — Nvidia

Comment Type **TR** *Comment Status* **X**

As 1.4.110c says that 400GBASE-Z is an "IEEE 802.3 family of Physical Layer devices", it's not 400GBASE-R and needs introduction here.

SuggestedRemedy

Add a sentence introducing the 400GBASE-Z family.

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.1.3** *P* **28** *L* **23** # 85

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

This says that 400GBASE-ZR uses 400GBASE-R encoding, while 1.4.110d says it uses using 400GBASE-Z encoding. As the encoding is not regular 400GBASE-R encoding but GMP retimed and framed, 400GBASE-Z encoding is right and 400GBASE-R encoding is wrong (seriously incomplete).

SuggestedRemedy

Change "400GBASE-R encoding" to "400GBASE-Z encoding".

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.2.5** *P* **30** *L* **21** # 86

Dawe, Piers Nvidia

Comment Type **E** *Comment Status* **X**

P802.3ck is changing this subclause and comes before this project in the list of amendments.

SuggestedRemedy

Update the draft to include P802.3ck's changes as necessary

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.2.5** *P* **30** *L* **25** # 87

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

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

SuggestedRemedy

Change "400GBASE-R" to "400GBASE" in this sentence.

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.4** *P* **30** *L* **38** # 88

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **X**

Need an entry for the delay of the 400GBASE-Z PMA

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.4** *P* **30** *L* **38** # 89

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **X**

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

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.5** *P* **31** *L* **9** # 90

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **X**

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

SuggestedRemedy

Change "400GBASE-R" to "400GBASE"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155** *P* **33** *L* **2** # 91

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

type what?
This PHY called "400GBASE-ZR" in this draft is similar in intent to 10GBASE-LW: the output from a BASE-R PCS is transmitted in telecoms style framing. While Z in the first position as an alternative to S, L or E, is familiar from unofficial specs as meaning 80 km or similar.

SuggestedRemedy

Complete the title: 400GBASE-ZW. Change 400GBASE-ZR to 400GBASE-ZW throughout, change 400GBASE-Z to 400GBASE-W throughout.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.11** *P* **79** *L* **41** # 92

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

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.

SuggestedRemedy

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.".

Proposed Response *Response Status* **O**

Cl **156A** *SC* **156A.3** *P* **87** *L* **47** # 93

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

It is not clear what if anything "application" means here. Sometimes it's the wrong word technically: see 1.4.309 link segment.

SuggestedRemedy

1. Here, change "Examples of DWDM black link applications with OSNR..." to "DWDM black link example with OSNR..." (there is only one example here);
2. Change "For any application over any DWDM black link distance and any number of channels" to "For a particular DWDM black link distance and number of channels";
3. Change "Specifically in an example application of 40 channels" to "Specifically in an example with";
In 156A.4:
4. In 156A.4, change "Example of DWDM black link applications with OSNR" to "DWDM black link examples with OSNR" (there are four examples here);
5. Change "four examples of DWDM black link applications" to "four examples";
6. Change "conventional point-to-point Ethernet application where the PMDs" to "conventional point-to-point Ethernet link segment where the PMDs";
7. Change Table 156A-2--40 channel example DWDM black link application with ...
to: Table 156A-2--40-channel example with ...
and similarly for the next three tables.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.3** *P* **34** *L* **38** # 94

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

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.

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.12** *P* **77** *L* **3** # 95

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

This subclause is supposed to define transmitter in-band OSNR. It says "OSNR is defined in 156.9.11." but does not say what "transmitter in-band" means.

SuggestedRemedy

Complete the definition

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.5** *P* **58** *L* **48** # 96

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **X**

PMA:IS_UNITDATA_0.indication to PMA:IS_UNITDATA_3.indication

SuggestedRemedy

PMD:IS_UNITDATA_0.indication to PMD:IS_UNITDATA_3.indication

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.1.3** *P* **49** *L* **44** # 97

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.6** *P* **68** *L* **37** # 98

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **X**

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".

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.15** *P* **77** *L* **28** # 99

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

Need to say whether transmitter impairments are included or not

SuggestedRemedy

Following 154.9.15 (P802.3ct), change "includes effects from impairments inside the DWDM black link." to "includes effects associated with impairments of the transmitter and inside the DWDM black link." Further, as the receiver should tolerate any compliant transmitter, not just its own transmitter, this would be better "includes effects associated with impairments of a transmitter and inside a DWDM black link.".

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.15** *P* **77** *L* **25** # 100

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **X**

This subclause "Receiver OSNR" says "The Receiver shall be able to tolerate an OSNR", which sounds like OSNR tolerance. Yet the next subclause is called "Receiver OSNR tolerance". The names are too similar.

SuggestedRemedy

Make changes to make it clear to the reader why there are two things and what the difference is. If possible, rename one of them. A reference to 156A.2 might help.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.10.2** *P* **78** *L* **38** # 101

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

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".

Proposed Response *Response Status* **O**

Cl **156A** *SC* **156A.4** *P* **88** *L* **54** # 102

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

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".

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.5.1** *P* **67** *L* **7** # 103

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**