

**Cl 00 SC 0 P1 L 2 # 428**  
 Ganga, Ilango Intel  
**Comment Type E Comment Status D**  
 Page1, Line 2, 30: Typo, change "Amendement" to "Amendment"  
 Page3, Line 8: Typo, change "consciously" to "consciously"  
 page 3, line 10: typo, change consecutively to consecutively  
 page 3, line 37, typo, change to "superseded"  
 page 3, line 52, two periods, remove one period at end of sentence  
**SuggestedRemedy**  
 As per comment  
**Proposed Response Response Status W**  
 PROPOSED ACCEPT.

**Cl 00 SC 0 P4 L 29 # 417**  
 Ganga, Ilango Intel  
**Comment Type ER Comment Status D**  
 IEEE 802.3az: Replace Clause xx with appropriate clause/annex number used by IEEE.  
**SuggestedRemedy**  
 Replace with "This amendment includes changes to IEEE Std 802.3-2008 and adds Clause 78."  
**Proposed Response Response Status W**  
 PROPOSED ACCEPT.

**Cl 01 SC 1.1.3.2 P22 L 22 # 429**  
 Ganga, Ilango Intel  
**Comment Type E Comment Status D**  
 "CGMII is is": delete one "is"  
**SuggestedRemedy**  
 As per comment  
**Proposed Response Response Status W**  
 PROPOSED ACCEPT.

**Cl 01 SC 1.1.3.2 P22 L 30 # 147**  
 D'Ambrosia, John Force10 Networks  
**Comment Type T Comment Status A**  
 add "PPI" as a compatibility interface  
**SuggestedRemedy**  
 add the following  
 Parallel Physical Interface (PPI). The PPI is provided as a physical instantiation of the PMD service interface for 40GBASE-SR4 and 100GBASE-SR10 PHYs. While conformance with implementation of this interface is not strictly necessary to ensure communication, it is recommended, since it allows maximum flexibility in intermixing PHYs and DTEs. The PPI is optional  
**Response Response Status C**  
 ACCEPT IN PRINCIPLE.

add the following:

Parallel Physical Interface (PPI). The PPI is provided as a physical instantiation of the PMD service interface for 40GBASE-SR4 and 100GBASE-SR10 PHYs. While conformance with implementation of this interface is not strictly necessary to ensure communication, it allows maximum flexibility in intermixing PHYs and DTEs. The PPI is intended for use as a chip-to-module interface. No mechanical connector is specified for use with the PPI. The PPI is optional.

**Cl 01 SC 1.3 P22 L 41 # 248**  
 Trowbridge, Stephen Alcatel-Lucent  
**Comment Type TR Comment Status A**  
 Add reference to ITU-T Recommendation G.694.2 (CWDM grid) as this is now necessary for the 40GBASE-LR4 interface  
**SuggestedRemedy**  
 Add:  
 ITU-T Recommendation G.694.2, 2003, Spectral grids for WDM applications: CWDM wavelength grid  
 after reference to G.694.1  
**Response Response Status C**  
 ACCEPT IN PRINCIPLE.  
 and delete subclause 87.14 where it is currently specified.

**Cl 01**      **SC 1.3**                      **P 22**              **L 45**              # **352**  
Dawe, Piers                      Avago Technologies

**Comment Type**    **T**              **Comment Status**    **A**  
Another reference for the list (not sure if it's a normative or informative reference)

**SuggestedRemedy**  
Add G.709

**Response**                      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

G.709 is the standard for OTN  
Add the following reference to Annex A (informative references):  
  
ITU-T G.709 Interfaces for the optical transport network (OTN)

**Cl 01**      **SC 1.3**                      **P 22**              **L 52**              # **351**  
Dawe, Piers                      Avago Technologies

**Comment Type**    **T**              **Comment Status**    **A**  
As we are not doing the maintenance work to remove all references to ANSI/EIA/TIA-455-127-1991, we can't do this by a 'change'

**SuggestedRemedy**  
In the draft replace  
'Change the following reference... Laser Diodes.'  
with another entry for the 'insert' list,  
TIA-455-127-A-2006, FOTP-127-A-Basic Spectral Characterization of Laser Diodes.

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

See also comment # 354

**Cl 01**      **SC 1.4**                      **P 23**              **L 1**              # **11**  
Anslow, Peter                      Nortel Networks

**Comment Type**    **T**              **Comment Status**    **A**  
The definition of 40GBASE-LR4 is missing

**SuggestedRemedy**  
Add the definition as:  
"40GBASE-LR4: IEEE 802.3 Physical Layer specification for 40 Gb/s using 40GBASE-R encoding over four WDM lanes on single mode fiber with long reach. (See IEEE 802.3, Clause 87.)"

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

also see comment 607

CI 01	SC 1.4	P 23	L 20	# 9
Anslow, Peter		Nortel Networks		
Comment Type	T	Comment Status	A	
The definition of 40GBASE-SR4 is "IEEE 802.3 Physical Layer specification for 40 Gb/s using 40GBASE-R encoding over four lanes of, short reach, multi mode fiber." This implies that the fibre alone determines the reach.				
SuggestedRemedy				
Re-word as: "40GBASE-SR4: IEEE 802.3 Physical Layer specification for 40 Gb/s using 40GBASE-R encoding over four lanes of multi mode fiber with short reach. (See IEEE 802.3, Clause 86.)"				
Similarly re-word 100GBASE-SR10 definition to:				
"100GBASE-SR10: IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over ten lanes of multi mode fiber with short reach. (See IEEE 802.3, Clause 86.)"				
Response		Response Status	C	
ACCEPT IN PRINCIPLE.				
change:				
"IEEE 802.3 Physical Layer specification for 40 Gb/s using 40GBASE-R encoding over four lanes of, short reach, multi mode fiber."				
to:				
"40GBASE-SR4: IEEE 802.3 Physical Layer specification for 40 Gb/s using 40GBASE-R encoding over four lanes of multimode fiber, with short reach. (See IEEE 802.3, Clause 86.)"				
Similarly re-word 100GBASE-SR10 definition to:				
"100GBASE-SR10: IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over ten lanes of multimode fiber, with short reach. (See IEEE 802.3, Clause 86.)"				

CI 01	SC 1.4	P 23	L 22	# 607
Ganga, Ilango		Intel		
Comment Type	T	Comment Status	A	
Add 40GBASE-LR4 to the definitions list in 1.4				
SuggestedRemedy				
Insert the following text at line 22:				
1.4.x 40GBASE-LR4: IEEE 802.3 Physical Layer specification for 40 Gb/s using 40GBASE-R encoding over four WDM lanes, long reach, single mode fiber. (See IEEE 802.3, Clause 87.)				
Response		Response Status	C	
ACCEPT IN PRINCIPLE.				
See comment #11 for remedy				

CI 01 SC 1.4 P23 L35 # 10  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

The definition of 100GBASE-ER4 "IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over four WDM lanes, extended long reach, single mode fiber." This implies that the fibre alone determines the reach.

*SuggestedRemedy*

Re-word as: "100GBASE-ER4: IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over four WDM lanes on single mode fiber with extended reach. (See IEEE 802.3, Clause 88.)"

Similarly re-word 100GBASE-LR4 definition to:

"100GBASE-LR4: IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over four WDM lanes on single mode fiber with long reach. (See IEEE 802.3, Clause 88.)"

Response Response Status C

ACCEPT IN PRINCIPLE.

add comma after fiber in suggested remedy:

Re-word as: "100GBASE-ER4: IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over four WDM lanes on single mode fiber, with extended reach. (See IEEE 802.3, Clause 88.)"

Similarly re-word 100GBASE-LR4 definition to:

"100GBASE-LR4: IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over four WDM lanes on single mode fiber, with long reach. (See IEEE 802.3, Clause 88.)"

CI 01 SC 1.4 P23 L44 # 148  
D'Ambrosia, John Force10 Networks

Comment Type T Comment Status A

Parallel Physical Interface (PPI) is not defined.

*SuggestedRemedy*

Add

Parallel Physical Interface (PPI) - The interface between the Physical Medium Attachment (PMA) sublayer and the Physical Medium Dependent (PMD) sublayer. (See IEEE 802.3, Clause 86)

Response Response Status C

ACCEPT IN PRINCIPLE.

Parallel Physical Interface (PPI) - The interface between the Physical Medium Attachment (PMA) sublayer and the Physical Medium Dependent (PMD) sublayer for 40GBASE-SR4 and 100GBASE-SR10 PHYs. (See IEEE 802.3, Clause 86)

CI 01 SC 1.4 P23 L44 # 12  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

The definition of virtual lanes is awkwardly worded:

"Virtual Lane: In 40GBASE-R and 100GBASE-R, the PCS distributes encoded data to multiple logical lanes, these logical lanes are called virtual lanes. They are called virtual lanes since one or more of PCS lanes can be multiplexed and carried on a physical lane together at the PMA interface."

*SuggestedRemedy*

Re-word as:

"Virtual Lane: In 40GBASE-R and 100GBASE-R, the PCS distributes encoded data to multiple logical lanes, these logical lanes are called virtual lanes since one or more of the PCS lanes can be multiplexed and carried on a physical lane together at the PMA interface."

Proposed Response Response Status W

PROPOSED ACCEPT.

**CI 01**      **SC 1.4**      **P 23**      **L 50**      # **13**  
 Anslow, Peter      Nortel Networks

**Comment Type**    **E**      **Comment Status**    **D**  
 The modified definition for "1.4.311 RMS spectral width" is shown in italic font. The font should match the base document

**SuggestedRemedy**  
 Change the font of the modified definition for RMS spectral width to match the base document

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT.

Change font style to normal from italic

**CI 01**      **SC 1.5**      **P 24**      **L 11**      # **15**  
 Anslow, Peter      Nortel Networks

**Comment Type**    **T**      **Comment Status**    **A**  
 The abbreviation OPU3 is expanded as "Optical Payload Unit 3" but OPU is defined in ITU-T G.709 as "Optical channel Payload Unit"

**SuggestedRemedy**  
 Change to "Optical channel Payload Unit 3"

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

**CI 01**      **SC 1.5**      **P 24**      **L 5**      # **14**  
 Anslow, Peter      Nortel Networks

**Comment Type**    **E**      **Comment Status**    **D**  
 The abbreviation for CAUI is expanded as "100Gb/s Attachment Unit Interface" but the other abbreviations use "Gigabit" rather than "Gb/s"

**SuggestedRemedy**  
 Change to "100 Gigabit Attachment Unit Interface"

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT.

**CI 04**      **SC 4.4.2**      **P 25**      **L 17**      # **246**  
 Trowbridge, Stephen      Alcatel-Lucent

**Comment Type**    **T**      **Comment Status**    **A**  
 Should "96 bits" entry for 40 Gb/s and 100 Gb/s include reference to "NOTE 7" below the table? Note 7 explains that this could be as little as 8 bits in the Rx direction

**SuggestedRemedy**  
 Include reference to Note 7 in this table cell

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

change Note 7 to foot note b against 96 bits in last column.

**CI 04**      **SC 4.4.2**      **P 25**      **L 46**      # **16**  
 Anslow, Peter      Nortel Networks

**Comment Type**    **T**      **Comment Status**    **A**  
 Underneath the new note 7 there is a box containing "WARNING Any deviation from the above specified values may affect proper operation of the network."  
 This warning box is already present in the base standard beneath the notes to Table 4-2. Is this warning to be added again part way through the notes? If so, this has the effect of effectively removing the warning from all of the notes except new note 7 and the last note.

**SuggestedRemedy**  
 Remove the warning box from below the new note 7

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

**CI 30**      **SC 30.3.2.1.2**      **P 27**      **L 11**      # **151**  
 D'Ambrosia, John      Force10 Networks

**Comment Type**    **T**      **Comment Status**    **A**  
 30.3.2.1.2 aPhyType needs updated

**SuggestedRemedy**  
 add  
 40GBASE-R Clause 82 40 Gb/s 64B/66B  
 100GBASE-R Clause 82 100 Gb/s 64B/66B

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

See comment #150

CI 30 SC 30.3.2.1.2 P27 L15 # 612  
Ganga, Ilango Intel

Comment Type TR Comment Status A

Add appropriate attribute for 40GBASE-R and 100GBASE-R

*SuggestedRemedy*

Insert the following attributes to the end of the list APPROPRIATE SYNTAX:

40GBASE-R Clause 82 40 Gb/s multilane 64B/66B  
100GBASE-R Clause 82 100 Gb/s multilane 64B/66B

Response Response Status C

ACCEPT.

See comment #150

CI 30 SC 30.3.2.1.3 P27 L21 # 613  
Ganga, Ilango Intel

Comment Type TR Comment Status A

Add appropriate attribute for 40GBASE-R and 100GBASE-R to aPHYTypeList

*SuggestedRemedy*

Insert the following attributes to the end of the list APPROPRIATE SYNTAX:

40GBASE-R Clause 82 40 Gb/s multilane 64B/66B  
100GBASE-R Clause 82 100 Gb/s multilane 64B/66B

Also change the Note at the end of 30.3.2.1.3 (IEEE Std 802.3-2008) as follows:

NOTE-At 10 Gb/s, 40 Gb/s or 100 Gb/s the ability of the PMD must be taken into account when reporting the possible types that the PHY could be.;

Response Response Status C

ACCEPT.

See comment #150

CI 30 SC 30.5.1.1.14 P27 L # 608  
Ganga, Ilango Intel

Comment Type T Comment Status A

update the text in 30.5.1.1.44 (802.3-2008) for 40 Gb/s and 100 Gb/s:

*SuggestedRemedy*

Change following text in 30.5.1.1.44 aFECmode after BEHAVIOUR DEFINED AS:

or FEC enable bit in 10/40/100GBASE-R FEC control register (see 45.2.1.85).;

Response Response Status C

ACCEPT.

See comment #150

CI 30 SC 30.5.1.1.15 P27 L # 609  
Ganga, Ilango Intel

Comment Type T Comment Status A

update text in 30.5.1.1.15 aFECCorrectedBlocks for 40 Gb/s and 100 Gb/s

*SuggestedRemedy*

change text after BEHAVIOUR DEFINED AS as follows:

For 1000BASE-PX or 10GBASE-R or 40GBASE-R or 100GBASE-R PHYs, a count of corrected FEC blocks. This counter will not increment for other PHY types.

Response Response Status C

ACCEPT.

See comment #150

CI 30 SC 30.5.1.1.16 P27 L # 610  
Ganga, Ilango Intel

Comment Type T Comment Status A

update text in 30.5.1.1.16 aFECUnCorrectableBlocks for 40 Gb/s and 100 Gb/s

*SuggestedRemedy*

change text after BEHAVIOUR DEFINED AS as follows:

For 1000BASE-PX or 10GBASE-R or 40GBASE-R or 100GBASE-R PHYs, a count of corrected FEC blocks. This counter will not increment for other PHY types.

Response Response Status C

ACCEPT.

See comment #150

CI 30 SC 30.5.1.1.2 P27 L 22 # 614  
Ganga, Ilango Intel

Comment Type TR Comment Status A

Insert the following subclause 30.5.1.1.2 aMAUType and add 40G and 100G list

*SuggestedRemedy*

Insert the following to the aMAUType attribute list after 10GBASE-T.

40GBASE-R Multilane R PCS/PMA as specified in Clause 82 over undefined PMD  
40GBASE-KR4 40GBASE-R PCS/PMA over an electrical backplane PMD as specified in Clause 84  
40GBASE-CR4 40GBASE-R PCS/PMA over 4 lane shielded copper balanced cable PMD as specified in Clause 85  
40GBASE-SR4 40GBASE-R PCS/PMA over 4 lane OM3 multimode fiber PMD as specified in Clause 86  
40GBASE-LR4 40GBASE-R PCS/PMA over 4 WDM lane long reach single mode fiber PMD as specified in Clause 87

100GBASE-R Multilane R PCS/PMA as specified in Clause 82 over undefined PMD  
100GBASE-CR10 100GBASE-R PCS/PMA over 10 lane shielded copper balanced cable PMD as specified in Clause 85  
100GBASE-SR10 100GBASE-R PCS/PMA over 10 lane OM3 multimode fiber PMD as specified in Clause 86  
100GBASE-LR4 100GBASE-R PCS/PMA over 4 WDM lane long reach single mode fiber PMD as specified in Clause 88  
100GBASE-ER4 100GBASE-R PCS/PMA over 4 WDM lane extended long reach single mode fiber PMD as specified in Clause 88

Update the Register names in first paragraph after BEHAVIOUR DEFINED AS

PMA/PMD control 2 register  
PCS control 2 register

Change the last paragraph after BEHAVIOUR DEFINED AS as follows:

The enumerations 1000BASE-X, 1000BASE-XHD, 1000BASE-XFD, 10GBASE-X, 10GBASE-R, 10GBASE-W, 40GBASE-R and 100GBASE-R shall only be returned if the underlying PMD type is unknown.;

Response Response Status C

ACCEPT.

See comment #150

CI 30 SC 30.5.1.1.2 P27 L 22 # 149  
D'Ambrosia, John Force10 Networks

Comment Type T Comment Status A

30.5.1.1.2 needs to be updated.

*SuggestedRemedy*

Add

30.5.1.1.2 aMAUType  
40GBASE-KR4 - R PCS/PMA over an electrical backplane PMD as specified in Clause 84  
40GBASE-CR4 - R copper over 8 pair 100-Ohm balanced cable as specified in Clause 85  
40GBASE-SR4 - R fiber over 8 OM3 multi-mode fibers as specified in Clause 86  
40GBASE-LR4 - R fiber over 4 wavelengths on single mode fiber as specified in Clause 87  
100GBASE-CR4 - R copper over 20 pair 100-Ohm balanced cable as specified in Clause 85  
100GBASE-SR10 - R fiber over 20 OM3 multi-mode fibers as specified in Clause 86  
100GBASE-LR4 - R fiber over 4 wavelengths on 10km single mode fiber as specified in Clause 88  
100GBASE-ER4 - R fiber over 4 wavelengths on 40km single mode fiber as specified in Clause 88

Response Response Status C

ACCEPT.

See comment #150

Cl 30 SC 30.5.1.1.4 P27 L # 615  
Ganga, Ilango Intel

Comment Type TR Comment Status A

Update the text in 30.5.1.1.4 (802.3-2008) for 40 Gb/s and 100 Gb/s:

Change following text in 30.5.1.1.4 aMediaAvailable after BEHAVIOUR DEFINED AS:

#### SuggestedRemedy

Change following text in 30.5.1.1.4 aMediaAvailable after BEHAVIOUR DEFINED AS:

Any MAU that implements management of Clause 28 or Clause 73 Auto-Negotiation will map remote fault indication to MediaAvailable "remote fault."

Change following text in 30.5.1.1.4 aMediaAvailable after BEHAVIOUR DEFINED AS in last paragraph:

10/40/100GBASE-R PCS Latched high BER status bit (45.2.3.12.2)

Response Response Status C

ACCEPT.

See comment #150

Cl 30 SC 30.6.1.1.5 P27 L # 616  
Ganga, Ilango Intel

Comment Type TR Comment Status A

Update attribute 30.6.1.1.5 aAutoNegLocalTechnologyAbility for 40G and 100G PHY types

#### SuggestedRemedy

Insert the following to the list after 10GBASE-KRFD:

40GBASE-KR4FD Full duplex 40GBASE-KR4 as specified in Clause 84  
40GBASE-CR4FD Full duplex 40GBASE-CR4 as specified in Clause 85  
100GBASE-CR10FD Full duplex 100GBASE-CR10 as specified in Clause 85

Change the text after BEHAVIOUR DEFINED AS as follows:

This indicates the technology ability of the local device, as defined in Clause 28, Clause 37 and Clause 73.

Response Response Status C

ACCEPT.

See comment #150

Cl 30 SC 30.6.1.1.5 P27 L 22 # 150  
D'Ambrosia, John Force10 Networks

Comment Type T Comment Status A

need to update 30.6.1.1.5 aAutoNegLocalTechnologyAbility

#### SuggestedRemedy

Add

30.6.1.1.5 aAutoNegLocalTechnologyAbility  
40GBASE-KR4FD - Full duplex 40GBASE-KR4 as specified in Clause 84  
40GBASE-CR4FD - Full duplex 40GBASE-CR4 as specified in Clause 85  
100GBASE-CR10FD - Full duplex 100GBASE-CR10 as specified in Clause 85

Response Response Status C

ACCEPT.

[Editor's note: corrected subclause number]

The editor will implement this and many other additions to Clause 30 in the next draft.

Cl 30B SC 30B.2 P270 L 17 # 619  
Ganga, Ilango Intel

Comment Type TR Comment Status R

Update 30B.2 ASN.1 module for CSMA/CD managed objects to add 40G and 100G PHY types

#### SuggestedRemedy

Insert following lines to the list PhyTypeValue::= ENUMERATED:  
Insert to the end of the list after 2BASE-TL

40GBASE-R (82) --Clause 82 40 Gb/s multilane 64B/66B  
100GBASE-R (821) --Clause 82 100 Gb/s multilane 64B/66B

Response Response Status C

REJECT.

Given that project 802.3.1 will be taking responsibility for MIB updates based on the contents of Clause 30. Further changes to annexes 30A & 30B are no longer necessary.



CI **30B** SC **30B.2 ASN.1** P **270** L **15** # **617**  
Ganga, Ilango Intel

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

Update 30B.2 ASN.1 module for CSMA/CD managed objects to add 40G and 100G PHY types

*SuggestedRemedy*

Insert following 3 lines to the list "AutoNegTechnology::= ENUMERATED" as follows:

Insert after 100GBASE-TFD:

40GBASE-KR4 (822), --40GBASE-KR4 PHY as defined in Clause 84

40GBASE-CR4 (823), --40GBASE-CR4 PHY as defined in Clause 85

100GBASE-CR4 (8211), --100GBASE-CR10 PHY as defined in Clause 85

Response Response Status **C**

REJECT.

See comment #619

CI **30B** SC **30B.2 ASN.1** P **270** L **16** # **618**  
Ganga, Ilango Intel

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

Update 30B.2 ASN.1 module for CSMA/CD managed objects to add 40G and 100G PHY types

*SuggestedRemedy*

Insert following lines to the list after "TypeValue::= ENUMERATED" as follows:

Insert after 10GBASE-T:

40GBASE-R (821) Multilane R PCS/PMA as specified in Clause 82 over undefined PMD  
40GBASE-KR4 (822) 40GBASE-R PCS/PMA over an electrical backplane PMD as specified in Clause 84

40GBASE-CR4 (823) 40GBASE-R PCS/PMA over 4 lane shielded copper balanced cable PMD as specified in Clause 85

40GBASE-SR4 (824) 40GBASE-R PCS/PMA over 4 lane OM3 multimode fiber PMD as specified in Clause 86

40GBASE-LR4 (825) 40GBASE-R PCS/PMA over 4 WDM lane long reach single mode fiber PMD as specified in Clause 87

100GBASE-R (8210) Multilane R PCS/PMA as specified in Clause 82 over undefined PMD  
100GBASE-CR10 (8211) 100GBASE-R PCS/PMA over 10 lane shielded copper balanced cable PMD as specified in Clause 85

100GBASE-SR10 (8212) 100GBASE-R PCS/PMA over 10 lane OM3 multimode fiber PMD as specified in Clause 86

100GBASE-LR4 (8213) 100GBASE-R PCS/PMA over 4 WDM lane long reach single mode fiber PMD as specified in Clause 88

100GBASE-ER4 (8214) 100GBASE-R PCS/PMA over 4 WDM lane extended long reach single mode fiber PMD as specified in Clause 88

Response Response Status **C**

REJECT.

See comment #619

CI 45 SC P29 L2 # 551  
 Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

MDIO base on 1.5 V HSTL logic in CL 45 is outdated and often require extra power source.

*SuggestedRemedy*

Suggest to use JESD8-14A-01 duplicate table 45-65 MDIO electrical interface characteristics for 40/100 GbE

Vdd - Supply Voltage 0.9 to 1.1 V

Vih - Input high voltage  $0.65 \times V_{dd}$  to  $V_{dd} + 0.2$

VIL - Input low voltage -0.2 to  $0.35 \times V_{dd}$

Voh - Output high voltage at  $I_{oh} = -2$  mA,  $0.75 \times V_{dd}$  (min)

Vol - Output low voltage at  $I_{ol} = 2$  mA,  $0.25 \times V_{dd}$  (max)

CI - Input capacitance - 10 pF

CL - Bus loading - 470 pF

Response Response Status C

REJECT.

[Editor's note: Removed text "all" from subclause field]

There is no demonstrated demand to make such a substantial change. If the TF decides that it wishes to expand its scope to include such a change then text will be developed to define the new signaling in a manner that includes backward compatibility.

CI 45 SC P58 L # 533  
 Vijayaraghavan, Divya Altera Corp.

Comment Type E Comment Status D

Page: 58, 63

- Table 45

-97a: register value should be 3.51 not 3.50

- Table 45

-99a: register value should be 3.53 not 3.50

*SuggestedRemedy*

Always compare to 2 or 4, but not both.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

The editor does not understand the proposed remedy.

Change Table 45-97a, register number from 3.50 to 3.51

Change Table 45-99a, register number from 3.50 to 3.53

CI 45 SC 45.2.1 P29 L15 # 439  
Barrass, Hugh Cisco

Comment Type T Comment Status A

The use of "Backplane/Copper/TBD" is particularly ugly. The TF needs to settle on a vergage and stick to it. It doesn't need to be perfect - exceptions and usage changes can always be noted where required.

All of the usage in 802.3ba is BASE-R copper so that usage seems to be the most obvious. There may be some small exceptions for non BASE-R backplane (I haven't checked all the details) but these can be covered with specific notes. Future BASE-R copper may not use the same registers, but that bridge can be crossed when (if) we reach it.

*SuggestedRemedy*

Change "Backplane/Copper/TBD" to "BASE-R copper"

Table 45-3 and all related 45.2.1 register definitions.

The footnote below Table 45-3 can be retained (with the name change). The verbage at the beginning of each register definition should mimic the footnote.

Remove the editor's note.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "Backplane/Copper/TBD" to "BASE-R"

Table 45-3 and all related 45.2.1 register definitions.

The footnote below Table 45-3 can be retained (with the name change). The verbage at the beginning of each register definition should mimic the footnote.

Remove the editor's note.

CI 45 SC 45.2.1 P29 L6 # 368  
Dawe, Piers Avago Technologies

Comment Type TR Comment Status A

The device address structure of Clause 45 dates from XENPAK days. As the PMD and PMA may now be separate, they cannot always be managed as a single MMD unless a proxy is used. Even then, one loses the ability to control each one independent of the other with the present allocation of MMDs to registers. Also, there can be multiple separate PMAs for any port, with multiple possible loopback positions for example.

*SuggestedRemedy*

Continue to manage the PMD with device address 1, but allocate a device address number (the next available is 8) to PMA. Use a register within address 8 as an addressing scheme to distinguish between multiple PMDs of the same port. Copy the old stuff relevant to 40G/100G PMAs from 1 to 8, put the new stuff in 8. I believe a nAUI interface can count as a n:n PMA, but there could be two sorts like the 'PHY XS and DTE XS' in 10G.

Response Response Status C

ACCEPT IN PRINCIPLE.

Current device address 1 is defined for PMA/PMD and it is appropriate to leave it as such. There must always be a PMA sublayer bound to the PMD and this device address should refer to those two sublayers.

A new and separate device address can be used to address higher PMA sublayers. It may be advantageous to use a different sublayer name to apply to these higher level PMA layers. Each separate PMA that is distinct from the PMA/PMD should be allocated a device address.

Therefore device address 8 will be PMAx-1 the lowest PMAx layer; device address 9 will be PMAx-2 the next lowest PMAx layer and device address 10 will be PMAx-3 the next PMAx layer. The editor believes that 4 total PMA layers will be sufficient.

The PMAx layers will share the same register addresses and definitions as each other. Only functions that are required to be separate from the PMA/PMD will be defined in the PMAx layers (e.g. loopback). Clearly there will be need for careful review of the register set that is included for PMAx layers.

On a practical note - it can be expected that silicon manufacturers will offer select pins or other means to allow system developers to use silicon devices to perform PMAx functions in a flexible manner.

Align with Clause 83 per comment responses (#157 etc).

dawe\_04\_1108 addresses this comment.

**Cl 45**      **SC 45.2.1**      **P33**      **L 13**      # **17**  
 Anslow, Peter      Nortel Networks

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

Table 45-3 Note a says "The name "Backplane/Copper/TBD" is used to denote PHYs that use the PMD described in Clause 72, including PHYS designated as BASE-KR and BASE-CR" but Clause 72 only covers 10GBASE-KR

**SuggestedRemedy**  
 change "The name "Backplane/Copper/TBD" is used to denote PHYs that use the PMDs described in Clause 72, 84 or 85, including PHYs designated as BASE-KR and BASE-CR"

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

**Cl 45**      **SC 45.2.1.1.3**      **P34**      **L 25**      # **128**  
 D'Ambrosia, John      Force10 Networks

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

note states "Change Table 45-7 for 40Gb/s and 100 Gb/s PMA /PMD type selection," and then 45.2.1.6.1 is also noted to be changed for 40 Gb/s and 100 Gb/s PMA/PMD type selections. However, 45.2.1.1.3 states "When bits 5 through 2 are set to 0000 the use of a 10G PMA/PMD is selected. More specific selection is performed using the PMA/PMD control 2 register (Register 1.7)"

**SuggestedRemedy**  
 modify 45.2.1.1.3 to state

"When bits 5 through 2 are set to 0000 the use of a >=10G PMA/PMD is selected. More specific selection is performed using the PMA/PMD control 2 register (Register 1.7)"

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT.

**Cl 45**      **SC 45.2.1.4**      **P33**      **L 47**      # **18**  
 Anslow, Peter      Nortel Networks

**Comment Type**    **E**      **Comment Status**    **A**

The editing instruction says "Insert 45.2.1.4.7 and 45.2.1.4.8 as follows:" but the inserted clauses are 45.2.1.4.8 and 45.2.1.4.9 (leaving room for 802.3av to insert 45.2.1.4.7)

**SuggestedRemedy**  
 change editing instruction to "Insert 45.2.1.4.8 and 45.2.1.4.9 as follows:"

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

**Cl 45**      **SC 45.2.1.4.8**      **P33**      **L 49**      # **152**  
 D'Ambrosia, John      Force10 Networks

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

Note reads to "Insert 45.2.1.4.7 and 45.2.1.4.8 as follows" but the sections are entered in as 45.2.1.4.8 and 45.2.1.4.9

**SuggestedRemedy**  
 The section #'s are correct per Table 45-6, but the note is incorrect. Ignore note.

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

See comment #18

**Cl 45**      **SC 45.2.1.6.1**      **P34**      **L 29**      # **19**  
 Anslow, Peter      Nortel Networks

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

The first sentence is modified to be "The PMA/PMD type of the PMA/PMD shall be selected using bits 4 through 0." However Table 45-7 uses bits 5 through 0

**SuggestedRemedy**  
 Change "using bits 4 through 0." to "using bits 5 through 0."

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

**Cl 45**      **SC 45.2.1.6.1**      **P34**      **L 32**      # **20**  
 Anslow, Peter      Nortel Networks

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

The text "and the 40G/100G PMA/PMD extended ability register 2" has been added, but the register is now called just "40G/100G PMA/PMD extended ability register" in Table 45-12a

**SuggestedRemedy**  
 change added text from "and the 40G/100G PMA/PMD extended ability register 2" to "and the 40G/100G PMA/PMD extended ability register"

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

Also change register number 1.12 to 1.13 in 45.2.1.12a

**Cl 45**      **SC 45.2.1.6.1**      **P34**      **L 33**      # **21**  
 Anslow, Peter      Nortel Networks

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

This states "A PMA/PMD shall ignore writes to the PMA/PMD type selection bits that select PMA/PMD types it has not advertised in the PMA/PMD status 2 register." However the PMA/PMD type is now advertised in three registers as per the preceeding text.

**SuggestedRemedy**  
 change "it has not advertised in the PMA/PMD status 2 register" to "it has not advertised"

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

**Cl 45**      **SC 45.2.1.76**      **P39**      **L 33**      # **464**  
 Dudek, Mike      JDSU

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

Clause 72 is not being changed in this draft (including no change in title). It doesn't make sense to be changing this subclause if Clause 72 PMD's are the only ones being used and clause 72 is the single PMD 10GBASE-KR (ie Clause 72 is not being changed to include reference to other PMD's than 10GBASE-KR). Otherwise the ISO reference models in the other clauses should indicate 10GBASE-KR as the PMD layer.

**SuggestedRemedy**  
 reference other clauses besides clause 72 on line 36 or change clause 72 to include other items besides 10GBASE-KR (and change it's title). Also do the equivalent for Clause 45.2.1.77 to 45.2.1.87

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

See comment #17 - 2 locations.

**Cl 45**      **SC 45.2.1.8**      **P35**      **L 9**      # **430**  
 Ganga, Ilango      Intel

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

Fix typo "usee" to "use"

**SuggestedRemedy**  
 Per comment

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT.

**Cl 45**      **SC 45.2.1.81a**      **P43**      **L 5**      # **283**  
 Anslow, Peter      Nortel Networks

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

Several very minor editorial issues in clause 45 collected in to one comment.

**SuggestedRemedy**  
 Remove underline from Table 45-58a page 43 line 5  
 Remove underline from Table 45-58b page 44 line 21  
 Space missing in "status register3" page 61 line 8  
 Space missing in "Table45-133" page 65 line 13

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT.

**Cl 45**      **SC 45.2.1.84**      **P45**      **L 15**      # **376**  
 Dawe, Piers      Avago Technologies

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

Need a shorter name than 'Backplane/Copper/TBD FEC'. Something neutral as to application, which may evolve over the months and years.

**SuggestedRemedy**  
 K-FEC ?

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

See comment #439

Cl 45 SC 45.2.1.84 P45 L 28 # 375  
Dawe, Piers Avago Technologies

Comment Type TR Comment Status R FEC

The moderate power taken by FEC is spent four ways: encoding (basically a CRC generation), error detection (CRC checking), error correction, and re-coding as non-FEC 64B/66B and error marking. A significant fraction of the power and complexity goes in error correction; all the rest is straightforward. Most of the latency is taken by error correction and optional PCS error marking. In some scenarios e.g. a copper cable approaching 10 m, we need FEC for its excellent error detection capability. In other scenarios e.g. 40GBASE-KR4, 100GBASE-ER4, we do (or should) allow FEC for its error detection as well.

But when a particular link is up and running, a receiver that is happy with its received BER can switch the correction off, with no need for handshaking with the transmitter. This still gives excellent error detection, and remains compatible with PCS error indication. In principle this could be done lane by lane but the remedy below treats all the lanes as a group. There is another comment for Clause 74, and a short presentation.

#### SuggestedRemedy

Add another register bit in Table 45-61,  
1.170.2  
xxx FEC error correction disable ability  
A read of 1 in this bit indicates that the xxx FEC sublayer is able to operate while detecting but not correcting received errors.  
RO  
Insert new 45.2.1.84.1 xxx FEC error correction disable ability (1.170.2)  
When read as a one, bit 1.170.2 indicates that the xxx FEC decoder is able to operate while detecting but not correcting received errors (see 74.7.4.5). When read as a zero, the xxx FEC decoder is not able to operate while detecting but not correcting received errors.  
Add another register bit in Table 45-62,  
1.171.2  
FEC error correction disable  
A write of 1 to this bit configures the xxx FEC decoder to operate while detecting but not correcting received errors.  
R/W  
Insert new 45.2.1.85.1 10 Gb/s FEC error correction disable (1.171.2)  
This bit instructs the xxx FEC decoder to operate while detecting but not correcting received errors (see 74.7.4.5)  
When bit 1.171.2 written as a one, if 1.171.1 is one, the xxx FEC decoder shall operate while detecting but not correcting received errors (see 74.7.4.5). When bit 1.171.2 is written as a zero, the xxx FEC decoder shall either correct as well as detect received errors according to 74.7.4.5, or neither detect nor correct, as determined by bits 1.170.0 and 1.171.0.  
The default value of bit 1.171.2 is zero.

Response Response Status C  
REJECT.

In the event that the TF decides to change the definition in Clause 74 to allow "partial FEC"

then ability and control bits will be added to Clause 45.

See comment #322 which was rejected.

Cl 45 SC 45.2.1.86 P47 L 2 # 431  
Ganga, Ilango Intel

Comment Type E Comment Status D

Double period (..), delete a period

#### SuggestedRemedy

As per comment

Proposed Response Response Status W

PROPOSED ACCEPT.

Cl 45 SC 45.2.1.87b P48 L 12 # 411  
Ganga, Ilango Intel

Comment Type E Comment Status D

repetition of lanes lanes, delete "lanes"

#### SuggestedRemedy

per comment

Proposed Response Response Status W

PROPOSED ACCEPT.

Cl 45 SC 45.2.3 P48 L 10 # 432  
Barrass, Hugh Cisco

Comment Type E Comment Status D

Table 45-82 is incomplete - there are more elements in the base document that are not shown here.

#### SuggestedRemedy

Show table elements from the base document or ellipses where blocks are omitted.

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 45 SC 45.2.3.11 P52 L 24 # 86  
Szczepanek, Andre Texas Instruments

Comment Type ER Comment Status R

Bit 3.23.3 advertises the ability to test a PRBS9 pattern.  
However there is no corresponding "PRBS9 receive test-pattern enable" in Table 45-94.

*SuggestedRemedy*

I dont think there was any intention to add PRBS9 pattern verification.  
There is no mention of it in the PMA clause iether.  
Remove Bit 3.23.3

Response Response Status C

REJECT.

[Editor's note: corrected subclause number field from 45-90 to 45.2.3.11]

The ability and control for PRBS9 was defined in 802.3aq and cannot be deleted.

CI 45 SC 45.2.3.11 P52 L 9 # 229  
Gustlin, Mark Cisco

Comment Type TR Comment Status A

The description implies that the PCS can support a PRBS31 or PRBS9 test pattern, but for 100/40GBASE-R these are now part of the PMA functions, not the PCS (and there can be multiple locations of the test patterns).

*SuggestedRemedy*

Clarify the text that for 100/40GBASE-R PRBS patterns are in the PMA, and add the appropriate PMA registers for this functionality.

This also has to be corrected in table 45-94.

Response Response Status C

ACCEPT IN PRINCIPLE.

Add register bits in MMD 1 (PMA/PMD) for ability and enable to match the test patterns defined in 83.6.7.

Update PMA register block with the following:

1.x.15 PRBS31 pattern testing ability  
1.x.11:0 PRBS31 error count

1.y.15 PRBS31 transmit test pattern enable  
1.y.14 PRBS31 receive test pattern enable

The wording of 45.2.3.11 is correct as it covers 10G, 40G and 100G.

CI 45 SC 45.2.3.12.3 P54 L 23 # 645  
Nicholl, Gary Cisco

Comment Type TR Comment Status A

In keeping with nicholl\_02\_0508 and the follow-up discussion at the Munich meeting I would like to request that the size of the BER be increased from 6 bits to at least 24 bits.

*SuggestedRemedy*

I will be providing a contribution in Dallas with a suggested remedy

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected subclause number]

See also comment #646

Notwithstanding that the TF will review presentation and in the absence of an alternative at this time, the editor suggests:

Add 2 registers - 3.44, 3.45  
3.44 BER high order  
3.45 Errored blocks high order

Each register is defined in tandem with the existing 8 bit counters. The high order counter contains bits 23:8 and the value latches on read of the lower 8 bits (status register 2). The counter also resets on read of status register 2. These bits shall be held at all ones in the case of overflow.

Also change the last sentence of 45.2.3.12.3 & 45.2.3.12.4 to "If the [corresponding high order register] is not implemented then these bits shall be held at all ones in the case of overflow."

Also look at text for multi-word registers in the beginning of Clause 45 to make the best editorial solution. Make sure that the new function is for 40/100 only. Consider ability indication.

**CI 45**      **SC 45.2.3.12.4**      **P54**      **L 30**      # **646**  
 Nicholl, Gary      Cisco

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

In keeping with nicholl\_02\_0508 and the follow-up discussion at the Munich meeting I would like to request that the size of the Errored Block counter be increased from 8 bits to at least 24 bits.

**SuggestedRemedy**

I will be providing a contribution in Dallas with a suggested remedy.

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

[Editor's note: corrected subclause number]

See comment #645

**CI 45**      **SC 45.2.3.13**      **P54**      **L 37**      # **230**  
 Gustlin, Mark      Cisco

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

In 100/40GBASE-R the pseudo random test pattern is just sending idles scrambled, so there are no seed patterns needed.

**SuggestedRemedy**

Remove the additions of 100/40GBSE-R to this register.

**Response**      **Response Status**    **C**

ACCEPT.

No change to this register - remove it from the draft.

**CI 45**      **SC 45.2.3.15**      **P55**      **L 18**      # **220**  
 Gustlin, Mark      Cisco

**Comment Type**    **ER**      **Comment Status**    **D**

Currently it says:

"The test-pattern methodology is described in 49.2.8"

But this should also refer to clause 82 for 40/100G.

**SuggestedRemedy**

Change to:

"The test-pattern methodology is described in 49.2.8 for 10 Gb/s and in 82.2.10 for 40/100GBASE-r"

**Proposed Response**      **Response Status**    **W**

PROPOSED ACCEPT IN PRINCIPLE.

Change to

The test-pattern methodology is described in 49.2.8 and 82.2.10

**CI 45**      **SC 45.2.3.16**      **P56**      **L 1**      # **221**  
 Gustlin, Mark      Cisco

**Comment Type**    **ER**      **Comment Status**    **D**

Table name is incorrect, should include 40/100.

Is:

Table 45-95-10GBASE-R PCS test-pattern error counter register bit definitions

**SuggestedRemedy**

Change to:

Table 45-95-10/40/100GBASE-R PCS test-pattern error counter register bit definitions

**Proposed Response**      **Response Status**    **W**

PROPOSED ACCEPT.

**CI 45**      **SC 45.2.3.17a**      **P56**      **L 19**      # **23**  
 Anslow, Peter      Nortel Networks

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

This refers to Table 45-96 but the new table is 45-96a

**SuggestedRemedy**

Change reference to Table 45-96a

**Response**      **Response Status**    **C**

ACCEPT.



**Cl 45** **SC 45.2.3.17a** **P57** **L1** # **219**  
 Gustlin, Mark Cisco

**Comment Type ER** **Comment Status D**

Table title should include "register 1" since there are register 2,3 etc...

Table 45-96a-Multi-lane BASE-R PCS alignment status register bit definitions

**SuggestedRemedy**

Change it to:

"Table 45-96a-Multi-lane BASE-R PCS alignment status register 1 bit definitions"

**Proposed Response** **Response Status W**

PROPOSED ACCEPT.

[Editor's note: Corrected subclause field from Table 45-96a to 45.2.3.17a]

**Cl 45** **SC 45.2.3.18a** **P58** **L15** # **24**  
 Anslow, Peter Nortel Networks

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

This refers to Table 45-97 but the new table is 45-97a

**SuggestedRemedy**

Change reference to Table 45-97a

**Response** **Response Status C**

ACCEPT.

**Cl 45** **SC 45.2.3.18a** **P59** **L** # **235**  
 Gustlin, Mark Cisco

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

In table 45-97a, the bits are numbered incorrectly, they should all be 3.51.x vs. 3.50 since the previous register used 3.50.x already.

**SuggestedRemedy**

Change to 3.51.x in this table.

**Response** **Response Status C**

ACCEPT.

**Cl 45** **SC 45.2.3.18a.4** **P60** **L1** # **25**  
 Anslow, Peter Nortel Networks

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

Titles of 45.2.3.18a.4 through 45.2.3.18a.8 refer to the wrong bits and in 45.2.3.18a.4 "bit 3.51.9" should be "bit 3.51.8"

**SuggestedRemedy**

change titles of 45.2.3.18a.4 through 45.2.3.18a.8:  
 from "Lane 16 lock (3.51.9)" to "Lane 16 lock (3.51.8)"  
 from "Lane 15 lock (3.51.3)" to "Lane 15 lock (3.51.7)"  
 from "Lane 14 lock (3.51.2)" to "Lane 14 lock (3.51.6)"  
 from "Lane 13 lock (3.51.1)" to "Lane 13 lock (3.51.5)"  
 from "Lane 12 lock (3.51.0)" to "Lane 12 lock (3.51.4)"  
 and in 45.2.3.18a.4 change "bit 3.51.9" to "bit 3.51.8"

**Response** **Response Status C**

ACCEPT.

**Cl 45** **SC 45.2.3.19a** **P61** **L3** # **26**  
 Anslow, Peter Nortel Networks

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

This refers to Table 45-98 but the new table is 45-98a

**SuggestedRemedy**

Change reference to Table 45-98a

**Response** **Response Status C**

ACCEPT.

**Cl 45** **SC 45.2.3.19a.1** **P61** **L45** # **27**  
 Anslow, Peter Nortel Networks

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

In 45.2.3.19a.1 through 45.2.3.19a.8 the text refers to "bit 3.50.x" which should be "bit 3.52.x"

**SuggestedRemedy**

Change "bit 3.50." to ""bit 3.52." in 16 places

**Response** **Response Status C**

ACCEPT.

CI 45 SC 45.2.3.20a P62 L37 # 522  
Ofelt, David Juniper Networks

Comment Type E Comment Status D

There are some cut-paste errors.  
In 20a - there are references to "register 2" that should be "register 4"  
In 20a.1 - There are references to bit "3.51" that should be "3.53"  
In table 45-99a - The bit numbers references in the table are listed as "3.50", they should be "3.53".  
All the other sections in 20a.3 reference "3.51" and instead of "3.53"

SuggestedRemedy

Change the references to "register 2" to "register 4"  
Change the references to "3.51" to "3.53"

Proposed Response Response Status W

PROPOSED ACCEPT.

[Editor's note: corrected subclause number]

CI 45 SC 45.2.3.20a P62 L39 # 28  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

This refers to Table 45-98 but the new table is 45-99a  
also text contains "Multi-lane BASE-R PCS alignment status register 2" which should be "Multi-lane BASE-R PCS alignment status register 4" in 4 places

SuggestedRemedy

Change reference to Table 45-99a  
Change "Multi-lane BASE-R PCS alignment status register 2" to "Multi-lane BASE-R PCS alignment status register 4" in 4 places

Response Response Status C

ACCEPT.

CI 45 SC 45.2.3.20a P63 L5 # 30  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

In Table 45-99a in the first column 3.50.x should be 3.53.x

SuggestedRemedy

Change "3.50." to "3.53." in 13 places

Response Response Status C

ACCEPT.

CI 45 SC 45.2.3.20a P63 L5 # 236  
Gustlin, Mark Cisco

Comment Type TR Comment Status A

In table 45-99a, the bits are numbered incorrectly, they should all be 3.53.x vs. 3.50 since a previous register used 3.50.x already.

SuggestedRemedy

Change the numbering to 3.53.x

Response Response Status C

ACCEPT.

CI 45 SC 45.2.3.20a.1 P62 L50 # 29  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

In 45.2.3.20a.1 through 45.2.3.20a.12 the text refers to "bit 3.51.x" which should be "bit 3.53.x"

In 45.2.3.20a.4 "bit 3.51.9" should be "bit 3.53.8"

SuggestedRemedy

Change "bit 3.51." to ""bit 3.53." in 23 places and in 45.2.3.20a.4 change "bit 3.51.9" to "bit 3.53.8"

Response Response Status C

ACCEPT.

CI 45 SC 45.2.3.20a.4 P64 L1 # 31  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

Titles of 45.2.3.20a.4 through 45.2.3.20a.8 refer to the wrong bits

SuggestedRemedy

change titles of 45.2.3.20a.4 through 45.2.3.20a.8:  
from "Lane 16 aligned (3.53.9)" to "Lane 16 aligned (3.53.8)"  
from "Lane 15 aligned (3.53.3)" to "Lane 15 aligned (3.53.7)"  
from "Lane 14 aligned (3.53.2)" to "Lane 14 aligned (3.53.6)"  
from "Lane 13 aligned (3.53.1)" to "Lane 13 aligned (3.53.5)"  
from "Lane 12 aligned (3.53.0)" to "Lane 12 aligned (3.53.4)"

Response Response Status C

ACCEPT.

Cl 45 SC 45.2.3.6.1 P50 L 54 # 234  
Gustlin, Mark Cisco

Comment Type TR Comment Status A

In clause 45, subclause 45.2.3.2.2, PCS receive link status(3.1.2), the supporting paragraph talks about 10GBASE-R using this bit as a latching low version of bit 3.32.12. This should be the same for 40/100GBASE-R.

*SuggestedRemedy*

Add in appropriate text for 40/100GBASE-R.

Response Response Status C

ACCEPT IN PRINCIPLE.

In 45.2.3.2.2 change:

"10GBASE-R, 10GBASE-W, or 10GBASE-T"

to

"10/40/100GBASE-R, 10GBASE-W, or 10GBASE-T"

Cl 45 SC 45.2.3.7 P51 L 33 # 22  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

In Table 45-87 new rows are added for bits 3.8.4 and 3.8.4 but the text is not in underline font

*SuggestedRemedy*

Change text of added rows to underline font

Response Response Status C

ACCEPT.

Cl 45 SC 45.2.7 P65 L 46 # 440  
Barrass, Hugh Cisco

Comment Type T Comment Status A

"Backplane/Copper/TBD" is ugly. This needs to be replaced with "BASE-R copper" for 802.3ba, but also needs "Backplane" for the other backplane functions.

*SuggestedRemedy*

Change "Backplane/Copper/TBD" to "Backplane, BASE-R Copper" in Table 45-133 and in 45.2.7.12.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "Backplane/Copper/TBD" to "Backplane, BASE-R copper" in Table 45-133 and in 45.2.7.12.

Cl 45 SC 45.2.7.12 P66 L 17 # 32  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

In Table 45-142 bit 7.48.7 has been Reserved. However the whole row should be shown in underline font as it is new.

*SuggestedRemedy*

Show whole row for bit 7.48.7 in underline font

Proposed Response Response Status W

PROPOSED ACCEPT.

Cl 4A SC 4A.4.2 P267 L 21 # 70  
Chung, Hwan Seok ETRI

Comment Type T Comment Status A

Rephrase sentence for consistency. Change "For 40 and 100 Gb/s operation, " to " For 40 Gb/s and 100 Gb/s operation,"

*SuggestedRemedy*

Response Response Status C

ACCEPT IN PRINCIPLE.

Apply the same change to Note 7 in 4.4.2 in page 25

**Cl 4A**    **SC 4A.4.2**    **P 267**    **L 28**    # 294  
 Anslow, Peter    Nortel Networks

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

Under the new note 4 there is a warning box containing "WARNING Any deviation from the above specified values may affect proper operation of the network." This implies that this warning note must be included again.

**SuggestedRemedy**  
 Delete the warning box and change the editing instructions to say that the new note 4 is inserted before the warning box.

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

See also comment #16

**Cl 69**    **SC 69.1.1**    **P 69**    **L 11**    # 378  
 Dawe, Piers    Avago Technologies

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

Don't say 'family of xxx Physical Layer signaling systems is extended' The reader is not required to know or care which Physical Layer signaling systems were standardised before which.

**SuggestedRemedy**  
 Change 'is extended to include' to 'includes', three times.

**Proposed Response**    **Response Status W**  
 PROPOSED REJECT.

This is existing text from the base standard and does not need to be changed for 802.3ba.

Also the suggested remedy does not improve the readability of the text.

**Cl 69**    **SC 69.1.3**    **P 70**    **L 20**    # 523  
 Ofelt, David    Juniper Networks

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

The "I" in the "MDI" label is the wrong font size :).

**SuggestedRemedy**  
 Make it bigger...

**Proposed Response**    **Response Status W**  
 PROPOSED ACCEPT.

[added 69 to subclause number in comment]

**Cl 69**    **SC 69.1.3**    **P 70**    **L 34**    # 153  
 D'Ambrosia, John    Force10 Networks

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

Implementors may not specify a different data width for 40GBASE-KR4.

**SuggestedRemedy**  
 Add the following-  
 Modify bullet f as follows:

The MDI as specified in Clause 70 for 1000BASE-KX, Clause 71 for 10GBASE-KX4, Clause 72 for 10GBASE-KR, or Clause 84 for 40GBASE-KR4.

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

**Cl 69A**    **SC 69A.3**    **P 271**    **L 21**    # 427  
 Ganga, Ilango    Intel

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

typo, change to "tolerance"

**SuggestedRemedy**  
 per comment

**Proposed Response**    **Response Status W**  
 PROPOSED ACCEPT.

This is fixing a typo in the base standard so needs to be done as a change.

**Cl 73**    **SC 73**    **P 73**    **L 5**    # 33  
 Anslow, Peter    Nortel Networks

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

Format of Note does not conform to style guide

**SuggestedRemedy**  
 Either change "Note that" to "NOTE-" to make the note informative or change the font of the note to "Text" (10 point) for normative text.

**Response**    **Response Status C**  
 ACCEPT IN PRINCIPLE.

Change to informative text and also change the editing instruction appropriately.

CI 73 SC 73.10.1 P75 L 22 # 34  
 Anslow, Peter Nortel Networks

Comment Type T Comment Status A

The PD definition has changed from "represents all of the following that are present: 1000BASE-KX PMA, 10GBASE-KX4 PMA, and 10GBASE-KR PMA." to "represents all of the following that are present: 1000BASE-KX PMA, 10GBASE-CX4, 10GBASE-KX4 PMA, 10GBASE-KR PMA, 40GBASE-KR4, 40GBASE-CR4, 100GBASE-CR10." where some have PMA afterwards and some don't

SuggestedRemedy

Change to "represents all of the following that are present: 1000BASE-KX PMA, 10GBASE-CX4 PMA, 10GBASE-KX4 PMA, 10GBASE-KR PMA, 40GBASE-KR4 PMA, 40GBASE-CR4 PMA, 100GBASE-CR10 PMA."

Response Response Status C  
 ACCEPT.

CI 73 SC 73.10.1 P76 L 40 # 521  
 Valliappan, Magesh Broadcom

Comment Type TR Comment Status A AN

For KR4/CR4/CR10 implementations where PMD&AN are in one device and the PCS&MAC are in a different device separated by an XLAUI interface, there isn't a well defined way for autoneg to access link status from the PCS.

SuggestedRemedy

The best remedy is an in-band indication of link status through the XLAUI interface, but I don't know how this can be done.

Will submit a presentation if suitable solution is available.

Response Response Status C  
 ACCEPT IN PRINCIPLE.

The commenter makes a valid point but the task force will need to agree a solution.

This problem really concerns CAUI/XLAUI rather than Clause 73.

Add editor's note "A mechanism has yet to be specified for indicating link status from a PCS connected to a KR4/CR4/CR10 PMD through a CAUI/XLAUI interface".

[added 73 to subclause number in comment]

CI 73 SC 73.10.2 P77 L 1 # 241  
 Meyer, Jeffrey Centellax

Comment Type E Comment Status D FEC

This is merely a grammar comment for the sentence "Timer for the amount of time to wait...". The sentence should begin with an article like "The timer for the amount of time to wait...". This also appears on line 9.

SuggestedRemedy

Begin the sentence with an article like "The".

Proposed Response Response Status W  
 PROPOSED REJECT.

This is text from the base standard. Making a change like this is unnecessary and would require changing the definition of all ten timers in Clause 73.

CI 73 SC 73.2 P73 L 7 # 154  
 D'Ambrosia, John Force10 Networks

Comment Type T Comment Status A AN

Figure 73-1 only reflects 1 Gb/s and 10 Gb/s, and does not reflect 40 Gb/s for 40GBASE-KR4 and 40GBASE-CR4 or 100 Gb/s for 100GBASE-CR10.

SuggestedRemedy

Add Fig 73-1 with the following modification : show location of auto-negotiation sublayer for 40 Gb/s and 100 Gb/s.

Response Response Status C  
 ACCEPT.

CI 73 SC 73.3 P73 L 19 # 155  
D'Ambrosia, John Force10 Networks

Comment Type T Comment Status A AN

lane for auto-negotiation for 40GBASE-KR4, CR4, and CR10 is not indicated.

*SuggestedRemedy*

Add last paragraph of 73.3, as modified, per below:

When the MDI supports multiple lanes, then lane 0 of the MDI shall be used for Auto-Negotiation and for connection of any single-lane PHYs (e.g., 100BASE-KX or 10GBASE-KR).

Response Response Status C

ACCEPT IN PRINCIPLE.

[corrected subclause number in comment]

implement suggested remedy and correct typo change '100BASE-KX' to '1000BASE-KX'

CI 73 SC 73.5.1 P73 L 1 # 270  
Healey, Adam LSI Corporation

Comment Type T Comment Status A AN

Subclause 73.5.1.1 needs to be amended for 40GBASE-KR4, 40GBASE-CR4, and 100GBASE-CR10 to ensure the PHYs exchange DME pages on a common lane.

*SuggestedRemedy*

Amend last sentence of 73.5.1.1 to read: "When the PHY has 10GBASE-KX4, 40GBASE-KR4, 40GBASE-CR4, or 100GBASE-CR10 capability, DME pages shall be transmitted only on lane 0. The transmitters for unused lanes should be disabled as specified in 71.6.7, <insert appropriate cross-references>."

Response Response Status C

ACCEPT IN PRINCIPLE.

[corrected subclause number in comment]

See remedy in comment # 441

CI 73 SC 73.5.1 P73 L 27 # 441  
Barrass, Hugh Cisco

Comment Type T Comment Status A AN

The editor's note notwithstanding, the paragraph needs rewording (because it's ugly!) and more importantly, the following paragraph regarding operation over multilane media must be changed.

*SuggestedRemedy*

Delete the editor's note and the paragraph in the existing draft. Replace with:

Change text as follows (underlines & strikeouts will need to be added by the editor):

DME pages can be transmitted by local devices capable of operating in 1 Gb/s, 10Gb/s, 40Gb/s and 100Gb/s; using 1, 4 or 10 lanes.

73.5.1.1 DME electrical specifications

Change text as follows:

Transmitter characteristics shall meet the specifications in Table 73-1 at TP1 while transmitting DME pages. Receiver characteristics shall meet the specifications in Table 73-1 at TP4 while receiving DME pages.

For any multi-lane PHY, DME pages shall be transmitted only on lane 0. The transmitters on other lanes should be disabled as specified in 71.6.7.

Response Response Status C

ACCEPT IN PRINCIPLE.

Delete the editor's note and the following paragraph as this text is redundant.

Renumber 73.5.1.1 to 73.5.1 and use the title "DME electrical specifications"

Implement the commenter's suggested remedy for 73.5.1.1 using appropriate underlines & strikeouts

CI 73 SC 73.6.4 P73 L 49 # 462  
Chalupsky, David Intel Corp.

Comment Type T Comment Status A AN

There is unnecessary distinction between CR4 and KR4 in autonegotiation. In Table 45-3 (PMA/PMD registers) we have already set the precedent that backplane and copper registers should be kept common as much as feasible. We should continue this practice. Propose combining KR4 and CR4 Technology Ability fields, priority resolution, and state variables as indicated in Remedy. Beyond simplicity there is a problem with advertising CR4 & KR4 in separate bits and allowing them both to be set. In this case the underlying PHY cannot distinguish if the media is backplane or copper. The Priority Resolution Table says to pick CR4, but the media may actually be a backplane, so the result would be to indicate a CR4 resolution when it is actually KR4... and it doesn't matter. Combine the bits.

#### SuggestedRemedy

Table 73-1: Rename bit A3 "40GBASE-KR4/CR4" Reclaim the remaining bits by naming A4 as CR10 & returning A5 to reserved.

Table 73-2: Combine CR4 and KR4 into the same resolution priority level.

subclause 73.10.1: 40GKR4 and 40GCR4 into the same variable. Either pick one of the two existing variable names, or make a combined name like "40GCKR4". Change the description to "represents that the 40GBASE-KR4 or 40GBASE-CR4 PMA is the signal source"

subclause 73.10.1: definition of single\_link\_ready: combine CR4 & KR4 (5 & 6) into one line: "5) link\_status\_[40GCKR4] = OK" as appropriate for the variable name used above.

Table 45-142 (and subclause 45.2.7.12.2): combine autoneg resolution for CR4 and KR4 into the same bit, since autoneg cannot distinguish. Suggest using bit 5. Change the bit 5 description to read "...is negotiated to perform 40GBASE-KR4 or 40GBASE-CR4" (The name for this bit can be resolved in the future to be consistent with the "Backplane/Copper/TBD" names that need to be resolved elsewhere in the draft.)

Response Response Status C

ACCEPT IN PRINCIPLE.

The CR4 and KR4 PMDs have different electrical specifications so the distinction is necessary.

Therefore reject suggested remedy to make these equivalent.

The commenter makes a valid point that a system should never advertise capability for both CR4 and KR4 simultaneously.

Add a note to say that CR4 and KR4 should not be advertised simultaneously.

CI 73 SC 73.7.4.1 P75 L 17 # 463  
Chalupsky, David Intel Corp.

Comment Type T Comment Status A AN

Unnecessary distinction between CX4 and KX4 in autonegotiation variables. Subclause 74.7.4.1 line 17-18 already indicate that CX4 may be parallel detected, and that it is up to the system implementer to distinguish KX4 from CX4 as the PHY cannot. To be consistent with that we should remove CX4 state variables from autoneg, because the PHY cannot distinguish parallel detected KX4 from CX4.

#### SuggestedRemedy

73.7.4.1, line 17. After sentence "Additionally, parallel detection may be used for 10GBASE-CX4" insert "Parallel detection of 10GBASE-CX4 should be indicated by setting the Negotiated Port Type to 10GBASE-KX4 in the management register 7.48.2."

subclause 73.10.1, page 76 line 8: delete the variable definition 10GCX4.  
Page 76, line 37: delete line with "link\_status\_[10GCX4]=OK"

Response Response Status C

ACCEPT IN PRINCIPLE.

Modify 7.48.2 bit definition of 10GBASE-KX4 negotiated port-type to include CX4 in Clause 45.

1 = PMA/PMD is negotiated to perform 10GBASE-KX4 or 10GBASE-CX4  
0 = PMA/PMD is not negotiated to perform 10GBASE-KX4 or 10GBASE-CX4

Add paragraph at end of '45.2.7.12.2 Negotiated Port Type'

System developers need to distinguish between parallel detection of 10GBASE-KX4 and 10GBASE-CX4 based on the MDI and media type present.

73.7.4.1, line 17. After sentence "Additionally, parallel detection may be used for 10GBASE-CX4" insert "Parallel detection of 10GBASE-CX4 will be indicated by the setting of the Negotiated Port Type to '10GBASE-KX4 or 10GBASE-CX4' in the management register bit 7.48.2."

subclause 73.10.1, page 76 line 8: delete the variable definition 10GCX4.

change:  
10GKX4; represents that the 10GBASE-KX4 PMA is the signal source.  
to:  
10GKX4; represents that the 10GBASE-KX4 or 10GBASE-CX4 PMA is the signal source.

Page 76, line 37: delete line with "link\_status\_[10GCX4]=OK"

CI 74 SC 74.3 P79 L 21 # 156  
D'Ambrosia, John Force10 Networks

Comment Type T Comment Status A

Fig 74-1 only shows FEC for 10GBASE-R. The clause is being modified elsewhere to separate between serial and multi-lane PHY. It should be done in this figure as well.

*SuggestedRemedy*

Add Fig 74-1 with modification to show 40GBASE-R and 100GBASE-R layers as well.

Response Response Status C

ACCEPT.

CI 74 SC 74.4.2 P79 L 34 # 442  
Barrass, Hugh Cisco

Comment Type T Comment Status A

As the editor's note suggests - a diagram is needed.

*SuggestedRemedy*

Delete the editor's note after doing what it says.

Response Response Status C

ACCEPT IN PRINCIPLE. New Figure for 40GBASE-R and 100GBASE-R like Figure 74-2, but should show less detail about what is in PCS, and focus on multi-lane FEC. Editorial license to create the figure.

CI 74 SC 74.4.2 P79 L 41 # 239  
Gustlin, Mark Cisco

Comment Type TR Comment Status A

Today in clause 74, subclause 74.5.3 it describes the primitive FEC\_SIGNAL\_indication. This states if the FEC receive is in lock or not. This is fine for the legacy 16 bit parallel interface, but for 40/100GbE the FEC block could be across a XLAUI or CAUI interface from the PCS. It would be better if we defined the behavior for loss of FEC lock also for the case where we just have the XLAUI or CAUI i/f between the PCS and FEC block.

*SuggestedRemedy*

Define the FEC loss of lock behavior as sending the raw unsynchronized bit stream to the PCS. Without FEC lock, and without the FEC block lock restoring the 66b blocks, the receive PCS will be down and out of lock which is what we want in this situation.

Response Response Status C

ACCEPT IN PRINCIPLE.

Define the FEC loss of lock behavior as sending the raw unsynchronized bit stream to the PCS. Editorial license to match primitive naming. This only affects 40GBASE-R and 100GBASE-R FEC, not 10GBASE-R.

CI 74 SC 74.4.2 P79 L 41 # 222  
Gustlin, Mark Cisco

Comment Type TR Comment Status A

Subclause 74.5 (which is not part of our D1.0) needs to be changed to enable it to hook up to our PCS and PMA sublayers.

Here are the current primitives for the FEC clause (based on the 16 bit wide parallel bus):

FEC (clause 74) primitives:

- a) FEC\_UNITDATA.request(tx\_data-group<15:0>)
- b) FEC\_UNITDATA.indication(rx\_data-group<15:0>)
- c) FEC\_SIGNAL.indication(SIGNAL\_OK)

Right now this clause won't hook up to the PCS or PMA clause. Right now for the 40/100G PCS:

PMA\_UNITDATA.requestx (x = 0-3 for 40GBASE-R) PMA\_UNITDATA.indicatex (x = 0-3 for 40GBASE-R) PMA\_SIGNAL.indication

We need to add the correct primitives to the FEC clause so it hooks up to the 40/100G PCS/PMA.

*SuggestedRemedy*

This could just be:

40GBASE-R and 100GBASE-R run one instance of the FEC sublayer on each PCS lane.

To hook up to the PCS or PMA sublayers, the following primitives are used.

For 40GBASE-R the primitives are:

PMA\_UNITDATA.requestx (x = 0-3)  
PMA\_UNITDATA.indicatex (x = 0-3)  
PMA\_SIGNAL.indication

For 100GBASE-R the primitives are:

PMA\_UNITDATA.requestx (x = 0-19)  
PMA\_UNITDATA.indicatex (x = 0-19)  
PMA\_SIGNAL.indication

Response Response Status C

ACCEPT IN PRINCIPLE.

Add subclause 74.5 with indicated service interface definition for 40GBASE-R and 100GBASE-R. Should be consistent with primitive naming comment 620. Editorial license. Description is for a single bit-wide PCS lane (not 16-bit as in current clause 74) FEC block instantiated 4 or 20 times.



**Cl 74**      **SC 74.7.4.5**      **P79**      **L 39**      # **433**  
 Barrass, Hugh      Cisco

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

The editor's note is no longer required.

**SuggestedRemedy**  
 Delete the editor's note

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT.

**Cl 74**      **SC 74.7.4.5**      **P79**      **L 46**      # **322**  
 Dawe, Piers      Avago Technologies

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

The moderate power taken by FEC is spent four ways: encoding (basically a CRC generation), error detection (CRC checking), error correction, and re-coding as non-FEC 64B/66B and error marking. A significant fraction of the power and complexity goes in error correction; all the rest is straightforward. Most of the latency is taken by error correction and optional PCS error marking. In some scenarios e.g. a copper cable approaching 10 m, we need FEC for its error detection. In other scenarios e.g. 40GBASE-KR4, 100GBASE-ER4, we do (or should) allow FEC for its error detection as well. But when a particular link is up and running, a receiver that is happy with its received BER can switch the correction off, with no need for handshaking with the transmitter. This still gives excellent error detection, and remains compatible with PCS error indication. In principle this could be done lane by lane but the remedy below treats all the lanes as a group. There is another comment for Clause 74.

**SuggestedRemedy**  
 Add sentence 'For reduced power, latency and complexity, in some circumstances the FEC decoder detects errors but does not attempt to correct them. These circumstances are explained in the relevant PMD clauses e.g. Clause 84 to Clause 88.'  
 I intend to provide a short presentation showing the difference between error detection and error correction.

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

This needs approval by the task force.

Also the proposed remedy is not complete. MTTFPA, power, latency need to be analyzed before a change can be proposed.

Cannot use as background error monitor alone without adding latency because giving up sync header redundancy without being able to mark blocks bad due to FEC code will significantly increase MTTFPA.

Could affect PCS high BER and lock state machines if a single error multiplies to mark the entire block bad.

**Cl 74**    **SC 74.7.4.5**    **P79**    **L 49**    # **524**  
Ofelt, David    Juniper Networks

**Comment Type**    **E**    **Comment Status**    **D**  
Punctuation missing for "In case of successful decoding the decoder..."

**SuggestedRemedy**

Change to

"In case of successful decoding, the decoder..."

or possibly

"In the case of successful decoding, the decoder..."

**Proposed Response**    **Response Status**    **W**

PROPOSED REJECT.

[corrected subclause number in comment]

This is text from the base standard so should not be modified unless there is a serious problem with it.

**Cl 74**    **SC 74.7.4.5**    **P80**    **L 2**    # **87**  
Szczepanek, Andre    Texas Instruments

**Comment Type**    **ER**    **Comment Status**    **D**  
"The single lane PHY marks every 8th 64B/66B block"  
is not strictly true. It also always marks the last block in a frame (+7!)  
This is repeated on line 31 on the same page

**SuggestedRemedy**

Change to

"The single lane PHY marks every 8th and the last 64B/66B word in an FEC block"  
or similar. The four lane wording may need the same change.

**Proposed Response**    **Response Status**    **W**

PROPOSED ACCEPT IN PRINCIPLE.

[corrected subclause number in comment]

See remedy to comment # 227

**Cl 74**    **SC 74.7.4.5**    **P80**    **L 2**    # **227**  
Gustlin, Mark    Cisco

**Comment Type**    **TR**    **Comment Status**    **A**  
So that 40G and 100G will have similar behavior when it comes to the PCS SM interactions with uncorrectable FEC blocks, change 40G marking behavior to be consistent with 100G (mark all blocks bad).

**SuggestedRemedy**

Change: The single lane PHY marks every 8th 64B/66B block, the four PCS-lane PHY marks every second 64B/66B block and the twenty PCS-lane PHY marks every 64B/66B block.

To: The single lane PHY marks every 8th 64B/66B block, the four and twenty PCS-lane PHYs marks every 64B/66B block.

Make the same change on line 31 of the same page also.

**Response**    **Response Status**    **C**

ACCEPT IN PRINCIPLE.

See comment 87, it is not strictly true to say the single lane PHY marks every 8th block.

Change text from:

When the decoder is configured to indicate decoding error, the decoder indicates error to the PCS by means of setting both sync bits to the value 11 in the 1st, 9th, 17th, 25th, and 32nd of the 32 decoded 64B/66B blocks from the corresponding errored FEC block, thus forcing the PCS sublayer to consider this block as invalid for a single lane PHY. Multi-PCS-lane PHYs require errors to be marked in more of the 64B/66B blocks to ensure that detected errors are signaled to the MAC for every frame containing an error. The single lane PHY marks every 8th 64B/66B block, the four PCS-lane PHY marks every second 64B/66B block and the twenty PCS-lane PHY marks every 64B/66B block.

Change to:

When the decoder for 10GBASE-R is configured to indicate decoding error, the decoder indicates error to the PCS by means of setting both sync bits to the value 11 in the 1st, 9th, 17th, 25th, and 32nd of the 32 decoded 64B/66B blocks from the corresponding errored FEC block, thus forcing the PCS sublayer to consider this block as invalid.

When the decoder for 40GBASE-R or 100GBASE-R is configured to indicate decoding error, the decoder needs to mark errors in more of the 64B/66B blocks to ensure that detected errors are signaled to the MAC for every frame containing an error. The FEC sublayers for 40GBASE-R and 100GBASE-R mark all thirty-two 64B/66B blocks to indicate error to the PCS.

Editorial license to make equivalent correction to line 31 page 80.

**Cl 74**      **SC 74.8**      **P81**      **L 11**      # **461**  
Chalupsky, David      Intel Corp.

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

Table 74-1 register names are "Backplane" but they are named "Backplane/Copper/TBD" in Clause 45. This is just a reminder that resolving the naming issue in Cl45 also applies to Table 74-1.

**SuggestedRemedy**

Apply resolution of Table 45-3 "Backplane/Copper/TBD" naming issue to Table 74-1.

**Proposed Response**      **Response Status**    **W**

PROPOSED ACCEPT.

Comments # 377, 443, 461 all raise this issue

**Cl 74**      **SC 74.8**      **P81**      **L 11**      # **443**  
Barrass, Hugh      Cisco

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

All of the register names need to change to match Clause 45.

**SuggestedRemedy**

Change the register names for all the registers in Table 74-1 to match Clause 45 (may be changed by another comment).

**Response**      **Response Status**    **C**

ACCEPT.

comments # 377, 443, and 461 all raise this issue. See comment 439 for register naming changes to clause 45.

**Cl 74**      **SC 74.8**      **P81**      **L 25**      # **377**  
Dawe, Piers      Avago Technologies

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

PMA/PMD register names ('Backplane FEC') do not match Clause 45 ('Backplane/Copper/TBD FEC') in this draft. The former is too specific, the latter is too long. Need a shorter name: something neutral as to application, which may evolve over the months and years.

**SuggestedRemedy**

K-FEC ?

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

Comments # 377, 443, 461 all raise this issue. See comment 439 for register naming changes to clause 45.

**Cl 80**      **SC 1.4**      **P87**      **L 21**      # **85**  
Szczepanek, Andre      Texas Instruments

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

"at least 100m"

**SuggestedRemedy**

"at least 100m"

**Proposed Response**      **Response Status**    **W**

PROPOSED ACCEPT.

CI 80 SC 80.1.1 P85 L 12 # 311  
Dawe, Piers Avago Technologies

Comment Type TR Comment Status A

The paragraph quoted has several problems and seems to have no purpose beyond advertisement. Any reader of a document like this will be above such material.  
'The 40 and 100 Gigabit Ethernet extends the IEEE 802.3 protocol to operating speeds of 40 Gb/s and 100 Gb/s. The bit rate is faster and the bit times are shorter-both in proportion to the change in bandwidth while maintaining maximum compatibility with the installed based of IEEE 802.3 interfaces. The minimum packet transmission time has been reduced by a factor of four for 40 Gb/s and ten for 100 Gb/s.'  
Extends? will be wrong when .3ba is rolled into the base standard. 'bandwidth' is wrong term. 'while maintaining maximum compatibility with the installed based of IEEE 802.3 interfaces' There is very little compatibility with the installed based of IEEE 802.3 interfaces intended (and none spelled out in the objectives). 'packet transmission time' means? For links up to 10 and 40 km, transmission time is substantially determined by the speed of light, not the MAC rate. 'factor of four' as compared with what?

SuggestedRemedy

Delete the paragraph. Anyone who thinks it leaves a void can bring in something better next time.

Response Response Status C  
ACCEPT.

CI 80 SC 80.1.1 P85 L 15 # 465  
Dudek, Mike JDSU

Comment Type E Comment Status D  
typo

SuggestedRemedy

Change "based" to "base"

Proposed Response Response Status W  
PROPOSED ACCEPT.

CI 80 SC 80.1.2 P85 L 3138 # 71  
Chung, Hwan Seok ETRI

Comment Type T Comment Status A

There are two types of description for MMF in D1.0 such as "multi mode fiber" and "multimode fiber". Across the entire document, "multimode fiber" was mostly used. So, to maintain consistency, it will be better to change "multi mode fiber" to "multimode fiber." The change should be done in following lines.

Clause 1, page 23, line 21: multi mode fiber->multimode fiber  
Clause 1, page 23, line 42: multi mode fiber->multimode fiber  
Clause 80, page 85, line 31: multi mode fiber->multimode fiber  
Clause 80, page 85, line 38: multi mode fiber->multimode fiber

SuggestedRemedy

Response Response Status C  
ACCEPT.

CI 80 SC 80.1.3 P85 L 45 # 118  
Marris, Arthur Cadence

Comment Type E Comment Status D  
Style:  
The word "respectively" is redundant.

SuggestedRemedy

Delete "respectively"

Proposed Response Response Status W  
PROPOSED ACCEPT.

CI 80 SC 80.1.3 P86 L 1 # 116  
Marris, Arthur Cadence

Comment Type E Comment Status D  
Punctuation  
delete comma before and

SuggestedRemedy

Change  
"MAC, and"  
to  
"MAC and"

Proposed Response Response Status W  
PROPOSED ACCEPT.

CI 80 SC 80.1.3 P 86 L 36 # 380  
Dawe, Piers Avago Technologies

Comment Type E Comment Status D

'It is important to note that': is just padding. If it didn't matter, we wouldn't say it.

*SuggestedRemedy*

Delete

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 80 SC 80.1.3 P 86 L 5 # 379  
Dawe, Piers Avago Technologies

Comment Type T Comment Status R

New figures in new clauses should do things properly.

*SuggestedRemedy*

Use upper and lower case as normal, e.g. change 'LAN CSMA/CD LAYERS' to 'LAN CSMA/CD layers'. Also in following clauses.

Response Response Status C

REJECT.

This issue was also discussed during 802.3 maintenance. All the layer diagrams in 802.3ba have been updated for consistency with the base spec.

CI 80 SC 80.1.3 P 86 L 53 # 35  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

item e) currently reads "The PMD Service Interface, which, when physically implemented at an observable interconnection port, uses a 4 or 10 lane data path as specified in Clause 86."

To match the other items the name PPI should be included.

*SuggestedRemedy*

change "when physically implemented at an observable interconnection port" to "when physically implemented as PPI (Parallel Physical Interface) at an observable interconnection port"

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 80 SC 80.1.4 P 87 L 18 # 466  
Dudek, Mike JDSU

Comment Type T Comment Status A

The wording in this paragraph implies that shorter cables are not compliant.

*SuggestedRemedy*

Change "represents a physical medium of ....." to "represents the ability to operate over a physical medium of ....." 5 places.

Response Response Status C

ACCEPT IN PRINCIPLE.

Accept suggested remedy and also:

add 'up to'

and change "teast" to "least" on line 21.

For example change:

The letter C in the port type (e.g. 40GBASE-CR4 or 100GBASE-CR10) represents a physical medium of shielded balanced copper cabling assembly of at least 10 m in length

to:

The letter C in the port type (e.g. 40GBASE-CR4 or 100GBASE-CR10) represents the ability to operate over a physical medium of shielded balanced copper cabling assembly of up to at least 10 m in length.

Make similar change for the other port types.

also update the example in 1.2.3 in the base spec

See response to comments # 36 and # 112

CI 80 SC 80.1.4 P87 L 18 # 36  
Anslow, Peter Nortel Networks

Comment Type E Comment Status A

This says "The letter C in the port type (e.g. 40GBASE-CR4 or 100GBASE-CR10) represents a physical medium of shielded balanced copper cabling assembly of at least 10 m in length.". But the physical medium is up to 10 m in length. It is the PMD that is capable of at least 10 m.

SuggestedRemedy

Either change "at least" to "up to" in 5 places in this paragraph,  
or  
change "represents a physical" to "represents a port capable of operation over a physical"  
in 5 places

Response Response Status C

ACCEPT IN PRINCIPLE.

see response to comment 466

CI 80 SC 80.1.4 P87 L 18 # 284  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

Several very minor editorial issues in clause 80 collected in to one comment.

SuggestedRemedy

Change "for e.g." to "e.g." in page 87 lines 18 and 21  
Change "concepts of MII:" to "concepts of the MII:" page 94 line 15  
Change "implemented DIC" to "implemented the DIC" page 104 line 3  
Change "a RXC" to "an RXC" page 106 line 38  
Page 111 line 12 external reference to clause 21 should be blue

Proposed Response Response Status W

PROPOSED ACCEPT.

This comment also affects Clause 81

CI 80 SC 80.1.4 P87 L 18 # 112  
Marris, Arthur Cadence

Comment Type T Comment Status A

The PHYs need to be able to drive at least these distances while the media can be up to these distances.

SuggestedRemedy

Consider changing  
"of at least"  
to  
"of up to at least"  
in three places

Also change "teast" to "least" on line 21.

Response Response Status C

ACCEPT IN PRINCIPLE.

see response to comment 466

CI 80 SC 80.1.4 P87 L 21 # 412  
Ganga, Ilango Intel

Comment Type E Comment Status D

Typo: change to "at least"

SuggestedRemedy

per comment

Proposed Response Response Status W

PROPOSED ACCEPT.

Also see comment #85

CI 80 SC 80.11 P91 L 1 # 130  
D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D

subclauses not numbered properly - 80.11 should be 80.6

SuggestedRemedy

renumber 80.11 to 80.6

Proposed Response Response Status W

PROPOSED ACCEPT.

Same as comment #121

**Cl 80**      **SC 80.11**      **P91**      **L 1**      # **121**  
D'Ambrosia, John      Force10 Networks

**Comment Type**    **E**      **Comment Status**    **D**  
Clause 80.11 needs to be renumbered.

**SuggestedRemedy**  
80.11 should be 80.6

**Proposed Response**      **Response Status**    **W**  
PROPOSED ACCEPT.

**Cl 80**      **SC 80.2.3**      **P88**      **L 10**      # **145**  
D'Ambrosia, John      Force10 Networks

**Comment Type**    **T**      **Comment Status**    **A**  
Optional XLAUI / CAUI not shown in Table 80-1.

**SuggestedRemedy**  
show columns for 83A and XLAUI / CAUI. All 40GBASE-R PMDs should be optional for XLAUI and NA CAUI. All 100GBASE-R PMDs should be optional for CAUI and NA for XLAUI.

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

**Cl 80**      **SC 80.2.3**      **P88**      **L 23**      # **312**  
Dawe, Piers      Avago Technologies

**Comment Type**    **T**      **Comment Status**    **R**      **FEC**  
Clause 74 FEC is applicable to all these port types. Whether we like it or not, it can be applied. At least as far as error detection, it should be mandatory for 40GBASE-CR4 and 100GBASE-CR10. I expect it will turn out to be a practical necessity for 100GBASE-ER4.

**SuggestedRemedy**  
Make Clause 74 FEC mandatory for 40GBASE-CR4 and 100GBASE-CR10, optional for all other port types in this table. The distinction between mandatory FEC detection and mandatory FEC correction can be explained elsewhere.

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

FEC is specified as optional in Clauses 84 and 85. This table captures this correlation.

Any change to FEC requirement for respective PMDs need to be discussed in the task force.

Related to comments #322, and #370

**Cl 80**      **SC 80.2.3**      **P88**      **L 23**      # **313**  
Dawe, Piers      Avago Technologies

**Comment Type**    **TR**      **Comment Status**    **R**      **AN**  
Auto-negotiation is an unnecessary burden on front-side ports. See another comment.

**SuggestedRemedy**  
Provide two columns under '73', Auto-negotiation M for 40GBASE-KR4 only (blank for all others), Link Negotiation (if we keep that name) O or M as decided for 40GBASE-CR4 and 100GBASE-CR10. Revise 82.2.20.

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

AN requirement for CR PMDs is specified in Clause 85. This table captures this correlation.

See comment # 341 which was rejected by the copper sub task force.

**Cl 80**      **SC 80.2.3**      **P88**      **L 37**      # **38**  
Anslow, Peter      Nortel Networks

**Comment Type**    **E**      **Comment Status**    **D**  
This paragraph mentions all of the PHY types except 40GBASE-LR4. Also, the english could be improved.

**SuggestedRemedy**  
Add 40GBASE-LR4 to the list of 40G PHY types, change "The terms 40GBASE-R and 100GBASE-R refers" to "The terms 40GBASE-R and 100GBASE-R refer" and change "based upon 64B/66B data coding method" to "based upon the 64B/66B data coding method"

**Proposed Response**      **Response Status**    **W**  
PROPOSED ACCEPT IN PRINCIPLE.

See response to comment #113

---

*Cl* **80**      *SC* **80.2.3**      *P* **88**      *L* **38**      # **113**  
Marris, Arthur      Cadence

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

This text is redundant as it repeats what is described in 80.1.4 Nomenclature. Also it does not mention 40GBASE-LR4 and 'terms' should be 'term'.

*SuggestedRemedy*

Delete

The term 40GBASE-R refers to a specific family of Physical Layer implementations for 40 Gb/s such as 40GBASE-KR4, 40GBASE-CR4 and 40GBASE-SR4. The term 100GBASE-R refers to a specific family of Physical Layer implementations for 100 Gb/s such as 100GBASE-CR10, 100GBASE-SR10, 100GBASE-LR4 and 100GBASE-ER4. All 40GBASE-R and 100GBASE-R PHY devices share a common PCS specification defined in Clause 82,

So that the text reads:

The term '40GBASE-R and 100GBASE-R' refers to a specific family of Physical Layer implementations based upon 64B/66B data coding method specified in Clause 82 and the PMA specification defined in Clause 83.

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

---

*Cl* **80**      *SC* **80.2.3**      *P* **88**      *L* **45**      # **323**  
Dawe, Piers      Avago Technologies

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

Good introductory material overlooked in 82.1.3.

*SuggestedRemedy*

Either add sentence here 'The functions of the PCS, FEC, PMA, PMD and AN sublayers are summarized in 82.1.3.' or move 82.1.3. into 80.2.

*Response*      *Response Status*    **C**  
ACCEPT IN PRINCIPLE.

Move appropriate definitions from 82.1.3 to Clause 80. Grant editorial license to this in the best way.

---

*Cl* **80**      *SC* **80.2.3**      *P* **88**      *L* **5**      # **37**  
Anslow, Peter      Nortel Networks

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

This contains "implementations and the Table 80-1 specifies" which reads awkwardly.

*SuggestedRemedy*

"implementations and the Table 80-1 specifies" to "implementations. Table 80-1 specifies"

*Proposed Response*      *Response Status*    **W**  
PROPOSED ACCEPT.

[corrected page number from 87 to 88]



Cl 80 SC 80.2.6 P89 L 11 # 620  
Ganga, Ilango Intel

Comment Type TR Comment Status A

Service interface specification method and notation:

For all the service interfaces used in 802.3ba follow the definition used in 1.2.2 and be consistent with service interfaces used in the base specification (IEEE 802.3-2008)

This comment applies to Clause 82 to Clause 88

In the base specification the only the parameters used in the primitive is a vector, none of the primitives are vectors. Whereas in 802.3ba the primitive is defined as a vector with just a single parameter. This is inconsistent with the base standard (IEEE Std 802.3-2008)

Change the service interface definition in 802.3ba to be consistent with the base standard

For example the PMD service interface in Clause 86 is defined as follows:

PMD\_UNITDATA.request<n:0>(tx\_biti), i=0..n  
or in otherwords  
PMD\_UNITDATA.request0(tx\_bit0)  
PMD\_UNITDATA.request1(tx\_bit1)  
...  
PMD\_UNITDATA.requestn(tx\_bitn)

Instead define the primitives with parameter as vectors as in 802.3-2008

PMD\_UNITDATA.request(tx\_bit<n:0>)  
or in otherwords  
PMD\_UNITDATA.request(tx\_bitn, .. tx\_bit2, tx\_bit1, tx\_bit0)

*SuggestedRemedy*

Change service interface definition in 802.3ba to be consistent with the base specification (IEEE Std 802.3-2008). Make this change globally to Clauses 80 through 88 and remove the editorial notes.

For example the PMD\_UNITDATA.request primitive in PMD service interface will be redefined as follows:

PMD\_UNITDATA.request(tx\_bit<n:0>)  
or in otherwords  
PMD\_UNITDATA.request(tx\_bit<n>, .. tx\_bit2, tx\_bit1, tx\_bit0)

Response Response Status C

ACCEPT IN PRINCIPLE.

This comment affects Clauses 80 through 88

For example change to:

PMD\_UNITDATA.request0(tx\_bit)

PMD\_UNITDATA.request1(tx\_bit)

...

PMD\_UNITDATA.requestn(tx\_bit)

and equivalent change to the receive side

except for the service interface between the RS and PCS which remains how it is currently defined.

Grant editorial license to make the necessary changes to accommodate this update.

Cl 80 SC 80.2.6 P89 L 14 # 314  
Dawe, Piers Avago Technologies

Comment Type E Comment Status D Review

'Editor's note... The service interface notation used in 802.3ba PMD PMA clauses have some differences from the notations used for 10GbE sublayer interfaces. The differences need to be explained in the introductory Clause 80

The definitions and notation for service interfaces in 802.3ba PMD/PMA will be reconciled, during TF review, as per the service interface definitions specified in 1.2.2 .'  
What is the difference/issue?

*SuggestedRemedy*

If found to be OK, delete this and similar notes.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

See response to comment #620.

Delete Editor's note as appropriate

CI 80 SC 80.3 P89 L 23 # 315  
Dawe, Piers Avago Technologies

Comment Type T Comment Status R Delay

MAC Control PAUSE can't be used with long links because the round trip latency becomes too much to cope with. At each higher MAC rate, this is ever more true. If the entity above the MAC wants to know the round trip latency, it should use Ping or similar method to find it out for a particular link. Even with this table, for many port types there is no guarantee that the nominal maximum latency is not exceeded because 'A PMD which exceeds the operational range requirement while meeting all other optical specifications is considered compliant'.

#### SuggestedRemedy

Remove the table rows for 40GBASE-LR4 PMD, 100GBASE-LR4 PMD and 100GBASE-ER4 PMD. Delete 87.2.1 and 88.2.1, change '87.2 Delay and skew' to '87.2 Skew', similarly 88.2.

Response Response Status C

REJECT.

The Pause requirement and text is consistent with 802.3-2008 base standard for different Physical layers.

CI 80 SC 80.3 P89 L 25 # 418  
Ganga, Ilango Intel

Comment Type ER Comment Status D  
Change "PHY implementors" to "PHY implementations"

SuggestedRemedy  
per comment

Proposed Response Response Status W  
PROPOSED REJECT.

This text is consistent with rest of the sentence.

CI 80 SC 80.3 P89 L 32 # 316  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A Delay

With multi-lane sublayers, these time units are confusing. 'bit time' was always confusing to PMD and PMA engineers.

#### SuggestedRemedy

Add a column in ns. Consider deleting one of the two 'Maximum' columns in D3.0. If we keep a column in bit times, change 'bit time' to 'MAC bit time'.

Response Response Status C

ACCEPT IN PRINCIPLE.

Add footnote to table explaining what the bit-times represent in nanoseconds for each speed.

CI 80 SC 80.3 P89 L 34 # 300  
Shafai, Farhad Sarance Technologies

Comment Type TR Comment Status A Delay

Based on implementations in FPGAs, I have measured the delay through the MAC, RS and MAC Control layers and would like to suggest the values for this delay that is currently in table 150-1 to be changed as per this comment.

#### SuggestedRemedy

In table 150-1, row 1, change 8129 to 17920.  
In table 150-1, row 1, change 16 to 35.  
Supplemental material is provided in support of this remedy.

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: Commenter has used old clause numbers. Changed Clause number from 150 to 80]

In table 80-1  
add row for 40G MAC, RS and MAC control delays  
maximum bit time 4800

change 100G delays  
add row for 100G MAC, RS and MAC control delays  
maximum bit time 17920

editorial license to calculate the matching pause quanta

Also see comment #301

CI 80 SC 80.3 P89 L35 # 301  
Shafai, Farhad Sarance Technologies

Comment Type TR Comment Status A Delay

Based on implementations in FPGAs, I have measured the delay through the PCS and would like to suggest the TBD values for the PCS round trip delays to be changed as described here. These delays are specified in table 150-1.

#### SuggestedRemedy

Change the TBD fields for 40GBASE-R PCS round trip delay to: 11264 bit time in column 2, and 22 pause quanta in column 3.  
Change the TBD fields for 100GBASE-R PCS round trip delay to: 35328 bit time in column 2, and 69 pause quanta in column 3.  
Supplemental material is provided in support of this remedy.

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: Commenter has used old clause numbers. Changed Clause number from 150 to 80]

In table 80-1 on page 89  
Correct table number to 80-2

add row for 40G PCS delays  
maximum bit time 11264

change 100G PCS delays  
maximum bit time 35328

editorial license to calculate the matching pause quanta

Also see comment #300

CI 80 SC 80.3 P89 L44 # 317  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A Delay

TBDs

#### SuggestedRemedy

Accept the proposed Round-trip delay limit for 40GBASE-SR4 and 100GBASE-SR10.

Response Response Status C

ACCEPT.

update SR4 to 1024 bit times  
SR10 to 2048 bit times

CI 80 SC 80.3 P89 L46 # 39  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D Delay

In Table 80-1 the reference for 40GBASE-LR4 is only to clause 87 rather than 87.2.1

#### SuggestedRemedy

Change "See 87." to "See 87.2.1."

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

The reference is to the "Delay" subclauses that specify the delay numbers in the respective clauses.

Change references in table to point to relevant subclauses that specify delays

CI 80 SC 80.3 P89 L54 # 240  
Gustlin, Mark Cisco

Comment Type TR Comment Status A Skew

Currently clause 80 does not have the allowed skew constraints. It seems to me that it would be good to add in a table and some background on the skew constraints in this clause as well as putting the applicable skew constraints in each appropriate clause (PCS, PMA, PMD etc).

#### SuggestedRemedy

Add in a section based on the attached presentation into clause 80 and other appropriate clauses.

Response Response Status C

ACCEPT IN PRINCIPLE.

From giannakopoulos\_01\_1108.pdf

Add diagrams from slides 5 and 6 to define the skew measurement points.

Copy data from tables on slide 15 for max skew and 18 for dynamic skew values.

Grant editorial license to make appropriate changes and organize the data based on this material.

Define skew in nanoseconds with explanation of UI to ns conversion.

Also add skew numbers and appropriate text to relevant Clauses (PMA and all the PMDs, that is 83 - 88)

**Cl 80**      **SC 80.3**      **P90**      **L 5**      # 119

Marris, Arthur      Cadence

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

spelling of meter. Should this be 'metre'?

**SuggestedRemedy**

Consider changing to 'metre'.

**Proposed Response**      **Response Status W**

PROPOSED REJECT.

Meter is the correct spelling

**Cl 81**      **SC 81.1**      **P93**      **L 46**      # 131

D'Ambrosia, John      Force10 Networks

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

choice of wording

**SuggestedRemedy**

reword

The purpose of the MII is to provide a simple and easy-to-implement logical interconnection between the Media Access Control (MAC) sublayer and the Physical Layer (PHY). The MII is not intended to be electrically instantiated, rather it can logically connect layers within a device.

The MII is an optional logical interface between the Media Access Control (MAC) sublayer and the Physical Layer (PHY).

**Proposed Response**      **Response Status W**

PROPOSED ACCEPT.

**Cl 81**      **SC 81.1**      **P93**      **L 5**      # 133

D'Ambrosia, John      Force10 Networks

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

Use of "MII" is ambiguous.

**SuggestedRemedy**

Suggest XLGMII and CGMII be used when referring to speed appropriate MII.

**Proposed Response**      **Response Status W**

PROPOSED ACCEPT IN PRINCIPLE.

Will change the references that are speed specific to XLGMII and CGMII. For example subclause 81.1.3 would change from:

"The MII has been specified to suport 40 Gb/s and 100 Gb/s"

to:

"The XLGMII has been specified to suport 40 Gb/s and the CGMII has been specified to support 100 Gb/s"

**Cl 81**      **SC 81.1.5**      **P95**      **L 17**      # 114

Marris, Arthur      Cadence

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

OSI not ISO

**SuggestedRemedy**

Change

"ISO (IEEE)"

to

"OSI"

**Response**      **Response Status C**

ACCEPT.

Change

"This MII (like the original MII, GMII and XGMII) maximizes media independence by cleanly separating the Data Link and Physical Layers of the ISO (IEEE) seven-layer reference model"

To:

This MII (like the original MII, GMII and XGMII) maximizes media independence by cleanly separating the Data Link and Physical Layers of the OSI seven-layer reference model"

CI 81 SC 81.3.1.1 P100 L 53 # 104  
Ebbers, Jonathan IBM

Comment Type T Comment Status R

For 100G, are we really going to run with TX\_CLK and RX\_CLK at 1.56GHz? This seems like quite a frequency jump; I'm surprised no consideration was given to expanding the bus width from 4 bytes to 8 or 16. We typically time the cores with 200 ps of margin, but 1.56G only gives us a 640ps cycle time. I think even at 45nm this would be very tight to time.

SuggestedRemedy

Clarify the frequency requirements or allow for a wider MII bus definition.

Response Response Status C

REJECT.

[changed subclause number from 3.1.1 to 81.3.1.1]

This is a logical interface. Implementation left up to the user.

CI 81 SC 81.3.1.3 P102 L 7 # 318  
Dawe, Piers Avago Technologies

Comment Type T Comment Status R

Some of the lines shown are impossible with the hex values given.

SuggestedRemedy

Remove the lines below '0xFF' and above '0x00'. Also Fig. 81-6, 81-7.

Response Response Status C

REJECT.

Although the comment makes some sense, the way that the data bus is shown is consistent with typical conventions on how a data bus is shown in a timing diagram, and is consistent with clause 46.

CI 81 SC 81.3.4 P108 L 17 # 115  
Marris, Arthur Cadence

Comment Type T Comment Status A clause49

Most of the text and the state diagram in 81.3.4 has been copied verbatim from Clause 46.

SuggestedRemedy

Consider referencing sub clause 46.3.4 for link fault signalling rather than having a direct copy. Something along the lines of:

"Link fault signalling shall be implemented as described in 46.3.4. The four octet sequence ordered set shall start in lane 0 with the octets in lanes 4, 5, 6 and 7 set to 0x00."

Response Response Status C

ACCEPT IN PRINCIPLE.

Add a sentence to clause 81.3.4 describing the difference from 46.3.4, and remove duplication of state machine Figure 81-9.

CI 81 SC 81.3.4 P108 L 22 # 319  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Decide once and for all whether to allow 'unidirectional' operation at 40 and 100G. Per conversation at last meeting, it seems it's possibly helpful for an unprotected link, probably harmful for a protected link. Will there be unprotected managed 40G or 100G Ethernet links?

SuggestedRemedy

Decide and write it down. If we do allow unidirectional, the bad Hamming distance of the Sequence ordered\_sets might be worth changing.

Response Response Status C

ACCEPT IN PRINCIPLE.

There has been no mention in the baseline or any objectives of supporting operation in unidirectional mode. We should state that this clause only supports bi-directional operation. Hamming distance between sequence ordered sets is not important as they are sent multiple times.

Cl 81 SC 81.3.4 P108 L 22 # 237  
Gustlin, Mark Cisco

Comment Type TR Comment Status A

Remove  
"[Editor's note (to be removed prior to publication) - The behavior described below does not allow unidirectional operation]"

The behavior does not allow unidirectional operation which is what is intended.

SuggestedRemedy

As above.

Response Response Status C

ACCEPT.

Remove the editors note.

Cl 81 SC 81.3.4.3 P109 L 51 # 275  
Healey, Adam LSI Corporation

Comment Type T Comment Status A

"...with each pair of fault sequences separated by less than 128 columns and no intervening fault\_sequences of a different fault value."

...seems to be inconsistent with the Link Fault Signaling state diagram (Figure 81-9).  
Ordered sets do not need to arrive in pairs.

SuggestedRemedy

Change to read "...with each fault sequence separated by less than 128 columns and no intervening fault\_sequences of a different fault value."

Response Response Status C

ACCEPT.

Change

"...with each pair of fault sequences separated by less than 128 columns and no intervening fault\_sequences of a different fault value."  
to:

"...with each fault sequence separated by less than 128 columns and no intervening fault\_sequences of a different fault value."

Cl 81 SC 81.3.5 P110 L 51 # 223  
Gustlin, Mark Cisco

Comment Type TR Comment Status A

Remove the following:

"81.3.5 PCS MDIO function mapping

[Editor's note (to be removed prior to publication) - Insert MDIO/MII variable mapping"

Clause 81 has no function mapping.

SuggestedRemedy

As above

Response Response Status C

ACCEPT.

Remove:

"81.3.5 PCS MDIO function mapping

[Editor's note (to be removed prior to publication) - Insert MDIO/MII variable mapping"

Cl 82 SC 2.8 P125 L 49 # 250  
Estes, Dave UNH - IOL

Comment Type E Comment Status D

Typo, "or" instead of "of"

SuggestedRemedy

Change "and has lots or transitions" to "and has lots of transitions"

Proposed Response Response Status W

PROPOSED ACCEPT.

[Changed subclause number 2.8 to 82.2.8]

Duplicate of #178, which was accepted.

CI 82 SC 82 P112 L1 # 444  
Barrass, Hugh Cisco

Comment Type T Comment Status A clause49

This clause reproduces most of Clause 49 without any reference to that clause. There are a number of reasons why this is a bad idea.

Firstly, it allows the definition of the 64B/66B PCS to diverge more than necessary for the development of 40 & 100G. This may cause problems, especially with developers who are planning to reuse parts of their 10GBASE-R designs for 40G or 100G. Subtle differences between the clauses will not easily be noticed. This may be particularly difficult for developers of multi-rate implementations (e.g. 4 x 10G that also supports 40G - or other combination silicon development).

It also wastes time reviewing and commenting on pages of specification that are already in the standard. Not to mention that LOAs may have to be resubmitted for IP that is already in Clause 49.

*SuggestedRemedy*

Rewrite the clause so that copied text is referenced and only the changes and additions are included in this clause.

The commenter will supply complete text if required (based on the existing Clauses 49 and 82).

Response Response Status C

ACCEPT IN PRINCIPLE.

Some subclauses that are unchanged are:  
82.2.6, 82.2.14, figure 82-16 (PCS tx SM).  
I propose that clause 82 just refer back to 49 for these.

All other subclauses that I saw have some differences. Figure 82-17 has just one minor difference for the entry requirements for RX\_INIT, not sure how I would best address cases like this?

Changing many of the subclauses to refer back to clause 49 and then adding a number of changes seems to me that it will reduce the readability.

CI 82 SC 82.1.1 P113 L12 # 120  
Marris, Arthur Cadence

Comment Type E Comment Status D

Punctuation, delete comma before and.

*SuggestedRemedy*

Change  
' , and'  
to  
'and'

on lines 12 and 13

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 82 SC 82.1.1 P113 L23 # 321  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

'medium be compliant at the PMA level.' The medium is not at the PMA level, and not connected directly to the PMA. Also, there could be FEC between PMA and PCS.

*SuggestedRemedy*

Does this work: 'The 40GBASE-R and 100GBASE-R PCSs can operate with any full duplex medium requiring only that the sublayers below the PCS provide a compliant service interface to the PCS.'

Response Response Status C

ACCEPT IN PRINCIPLE.

Delete the sentence:

"40GBASE-R and 100GBASE-R can be extended to support any full duplex medium requiring only that the medium be compliant at the PMA level." The sentence does not provide any value

**Cl 82**      **SC 82.1.1**      **P146**      **L1**      # **320**  
Dawe, Piers      Avago Technologies

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

Draft says 'The terms 40GBASE-R and 100GBASE-R are used when referring generally to Physical Layers using the PCS defined here.' There should be nothing rate-specific in the PCS clause; these are generically useful PCSs that could be re-used at faster VL rates in future. The PCSs could be thought of as 'R4' and 'R20'.

**SuggestedRemedy**  
No urgent need to rename them, but it's worth adding a sentence to say that one uses 4 PCS lanes and the other uses 20 PCS lanes, here in the Scope.

**Proposed Response**      **Response Status W**  
PROPOSED REJECT.

Right now this PCS is rate specific for 40 and 100G

**Cl 82**      **SC 82.1.3.1**      **P115**      **L1**      # **129**  
D'Ambrosia, John      Force10 Networks

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

Bullet C is confusing in relation to what the actual functions in the PCS are, as the Tx PCS and Rx PCS seem to both be capable of adding / deleting idles.

**SuggestedRemedy**  
Replace bullet c with the following text -

Compensation through insertion or deletion of idles for any rate difference caused by the insertion or deletion of alignment markers due to any rate difference between the MII and PMA

**Proposed Response**      **Response Status W**  
PROPOSED ACCEPT IN PRINCIPLE.

Change:  
"Deleting (inserting) idles to compensate for the rate difference between the MAC and PMD due to the insertion (deletion) of alignment markers and due to any rate difference between the MII and PMA."

to:  
"Compensation for any rate differences caused by the insertion or deletion of alignment markers or due to any rate difference between the MII and PMA through the insertion or deletion of idles."

**Cl 82**      **SC 82.1.3.2**      **P115**      **L6**      # **324**  
Dawe, Piers      Avago Technologies

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

Missing sublayers

**SuggestedRemedy**  
Add new subclauses summarizing the FEC and AN sublayers.

**Response**      **Response Status C**  
ACCEPT IN PRINCIPLE.

Subclauses 82.1.3.x will be removed from clause 82 since they are redundant with what is already in clause 80.

82.1.3.1 Physical Coding Sublayer (PCS)  
82.1.3.2 Physical Medium Attachment (PMA) sublayer  
82.1.3.3 Physical Medium Attachment (PMD) sublayer  
Overtaken by events - see comment 323

**Cl 82**      **SC 82.1.3.3**      **P115**      **L21**      # **195**  
Baldwin, Thananya      Ixia

**Comment Type ER**      **Comment Status D**

Title is incorrect:  
82.1.3.3 Physical Medium Attachment (PMD) sublayer

**SuggestedRemedy**  
Title should read:  
82.1.3.3 Physical Medium Dependent (PMD) sublayer

**Proposed Response**      **Response Status W**  
PROPOSED REJECT.

Subclause 82.1.3.3 is going to be deleted.

**Cl 82**      **SC 82.1.3.3**      **P115**      **L22**      # **107**  
Marris, Arthur      Cadence

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

The title of this subclause is wrong. Also there is no need to mention the PMD and MDI here. All in all this is just adding confusion.

**SuggestedRemedy**  
Delete subclause 82.1.3.3.

**Response**      **Response Status C**  
ACCEPT. Overtaken by events, see comment 323



CI 82 SC 82.1.3.3 P115 L22 # 40  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

The title of 82.1.3.3 is "Physical Medium Attachment (PMD) sublayer". This should be "Physical Medium Dependent (PMD) sublayer"

SuggestedRemedy

Change "Physical Medium Attachment (PMD) sublayer" to "Physical Medium Dependent (PMD) sublayer"

Proposed Response Response Status W

PROPOSED REJECT.

Subclause 82.1.3.3 is to be deleted.

CI 82 SC 82.1.4 P115 L30 # 132  
D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D

wording is confusing, as it implies that the two pcs's use two interfaces.

SuggestedRemedy

Reword  
There are two interfaces employed by the 40GBASE-R and 100GBASE-R PCSs.

to

There is one distinct interface employed for each rate of PCS.

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 82 SC 82.1.4 P115 L34 # 108  
Marris, Arthur Cadence

Comment Type T Comment Status A

The sentence "The Reconciliation sublayer provides the same service interface to the PCS." does not make sense.

SuggestedRemedy

Delete this sentence.

Response Response Status C

ACCEPT.

CI 82 SC 82.1.4 P115 L37 # 100  
Ebbers, Jonathan IBM

Comment Type E Comment Status D

The 40GBASE-R PCS has a nominal rate at the PMA service interface of 10.3125 Mtransfers/s, which provides capacity for the MAC data rate of 40 Gb/s.  
The 100GBASE-R PCS has a nominal rate at the PMA service interface of 5.15625 Mtransfers/s, which provides capacity for the MAC data rate of 100 Gb/s.

I think Mtransfers/s should be Gtransfers/s.

SuggestedRemedy

Change "The 40GBASE-R PCS has a nominal rate at the PMA service interface of 10.3125 Mtransfers/s, which provides capacity for the MAC data rate of 40 Gb/s. The 100GBASE-R PCS has a nominal rate at the PMA service interface of 5.15625 Mtransfers/s, which provides capacity for the MAC data rate of 100 Gb/s."

to

"The 40GBASE-R PCS has a nominal rate at the PMA service interface of 10.3125 Gtransfers/s, which provides capacity for the MAC data rate of 40 Gb/s. The 100GBASE-R PCS has a nominal rate at the PMA service interface of 5.15625 Gtransfers/s, which provides capacity for the MAC data rate of 100 Gb/s."

Proposed Response Response Status W

PROPOSED ACCEPT.

[Changed subclause number 1.4 to 82.1.4]

Will correct this.

CI 82 SC 82.1.4 P115 L39 # 187  
Baldwin, Thananya Ixia

Comment Type TR Comment Status A

Incorrect units (Mtransfers/s) in the following sentences.  
"The 40GBASE-R PCS has a nominal rate at the PMA service interface of 10.3125 Mtransfers/s, which provides capacity for the MAC data rate of 40 Gb/s. The 100GBASE-R PCS has a nominal rate at the PMA service interface of 5.15625 Mtransfers/s, which provides capacity for the MAC data rate of 100 Gb/s."

SuggestedRemedy

The units should be Btransfers or Gtransfers to convey billion transfers per second.

Response Response Status C

ACCEPT.

Already covered by comment #100, will be changing this.

CI 82 SC 82.1.5 P115 L47 # 285  
 Anslow, Peter Nortel Networks

Comment Type E Comment Status D

Several very minor editorial issues in clause 82 collected in to one comment.

*SuggestedRemedy*

Change "PMA service interfaces" to "PMA service interface" page 115 line 47  
 Change "wide, data" to "wide data" page 117 line 9  
 Change "to 64B/66B block" to "to 64B/66B blocks" page 117 line 10  
 Change "markers are shown" to "markers is shown" page 126 line 20  
 Change "for 40GBASE-R PCS:" to "for the 40GBASE-R PCS:" page 126 line 47  
 External links "21.5" and "14.2.3.2" should be blue page 130 lines 1 and 2  
 All blue text in 82.2.18.1 are register numbers which should not be blue  
 Blue text in 82.2.18.4 is a register number which should not be blue

Proposed Response Response Status W  
 PROPOSED ACCEPT.

CI 82 SC 82.1.6 P116 L18 # 190  
 Baldwin, Thananya Ixia

Comment Type TR Comment Status A

Figure 82-2-Functional block diagram  
 is missing the lane re-ordering function in the rx path.

*SuggestedRemedy*

Insert a block called "Lane Reorder" after "Alignment Lock Lane Deskew" block.  
 The new block must be before the PCS Receive block

Response Response Status C  
 ACCEPT.

Insert block in the figure and make appropriate changes to the sub-clause, with editorial  
 license.

CI 82 SC 82.1.6 P116 L20 # 639  
 Ganga, Ilango Intel

Comment Type E Comment Status D

typo in the block diagram, change "AIIGNMENT" to "ALIGNMENT"

*SuggestedRemedy*

per comment

Proposed Response Response Status W  
 PROPOSED ACCEPT.

Already covered by #103.

CI 82 SC 82.1.6 P116 L29 # 336  
 Dawe, Piers Avago Technologies

Comment Type E Comment Status D

PMA\_UNITDATA.indicate

*SuggestedRemedy*

PMA\_UNITDATA.indication  
 Search and replace, 10 instances

Proposed Response Response Status W  
 PROPOSED ACCEPT.

CI 82 SC 82.1.6 P116 L44 # 225  
 Gustlin, Mark Cisco

Comment Type TR Comment Status A

Remove:

"[Editor's note (to be removed prior to publication) - The primitive descriptions below need  
 to be reconciled  
 with the FEC primitives.]"

Another comment has been added to clause 74 to make the changes so it can connect to  
 clause 82.

*SuggestedRemedy*

As above

Response Response Status C  
 ACCEPT. See comment 222, clause 74 for the alignment of the FEC clause

CI 82 SC 82.1.6 P116 L52 # 103  
 Ebbers, Jonathan IBM

Comment Type E Comment Status D

Figure 2

"ALIGNMENT LOCK LANE DESKEW" should be "ALIGNMENT LOCK LANE DESKEW".

*SuggestedRemedy*

Change "ALIGNMENT LOCK LANE DESKEW" to "ALIGNMENT LOCK LANE DESKEW".

Proposed Response Response Status W  
 PROPOSED ACCEPT.

[Changed subclause number 1.6 to 82.1.6]

**Cl 82**      **SC 82.1.6**      **P116**      **L 6**      # **224**  
 Gustlin, Mark      Cisco

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

In figure 82-2 there is a box around the encode and scramble blocks that is labeled PCS transmit. Enlarge this box to incorporate the block distribution and alignment insertion also. Also enlarge the box labeled PCS receive to include the BER monitor, alignment lock and lane block lock blocks.

Historically these boxes tried to include what was part of what state machine in clause 49, but it was not clear and confuses the issue.

**SuggestedRemedy**  
 As above

**Response**      **Response Status**    **C**  
 ACCEPT. Remove boxes around Tx and Rx, leaving only functional blocks

**Cl 82**      **SC 82.2**      **P116**      **L 48**      # **325**  
 Dawe, Piers      Avago Technologies

**Comment Type**    **T**      **Comment Status**    **A**      *clause49*

This PCS is extremely like the Clause 49 PCS. It costs a lot of unnecessary time going through it with a fine toothcomb to find where there are differences and where there are not.

**SuggestedRemedy**  
 Please add a subclause listing the similarities and differences. You might want to cover yourself by making it informative.

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

This is similar to comment #444. For that comment I will delete subclauses that are unchanged from 49 and refer to clause 49.

I also think it might be appropriate to add the following to subclause 82.1.2 which defines the relationship between this clause and others:

"This clause borrows heavily from Clause 49. 64B/66B encoding is re-used with appropriate changes made to support 8 byte alignment vs. the 4 byte alignment in Clause 49. On top of 64B/66B encoding is a methodology to add alignment markers and distribute data to multiple lanes in order to support PMDs with multiple lanes."

**Cl 82**      **SC 82.2.10**      **P128**      **L**      # **438**  
 Barrass, Hugh      Cisco

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

"sends 4 bits at a time" implies that the bits are sent as a vector.

**SuggestedRemedy**  
 Change:

it sends 4 bits (for 40GBASE-R) or 20 bits (for 100GBASE-R) of test pattern at a time to

it sends the test pattern in 4 separate data streams (for 40GBASE-R) or 20 separate data streams (for 100GBASE-R)

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT.

**Cl 82**      **SC 82.2.10**      **P128**      **L 1**      # **446**  
 Barrass, Hugh      Cisco

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

The Test-pattern generators description is incomplete - when compared to the source in Clause 49.

It does not describe how the seed is placed in the scrambler, inverted etc.

**SuggestedRemedy**  
 The full text of 49.2.8 needs to be copied in, then the references to the square wave and PRBS sequences removed.

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

Most of 49.2.8 is not applicable. Comment #90 adds in more detail about the pattern (idle control). There are no plans to have invert patterns etc. Here is one clarification that might help people understand the differences between clause 49 and this clause:

From:  
 When pseudo-random pattern is selected, the test pattern is generated by the scrambler using a random seed loaded through the MDIO registers.

To:  
 "When pseudo-random pattern is selected, the test pattern is generated by the scrambler. No seeding of the scrambler is required during test pattern operation."

CI 82 SC 82.2.10 P128 L1 # 90  
Szczepanek, Andre Texas Instruments

Comment Type TR Comment Status A

The test-pattern generator and checker sub-clauses require definition of the test pattern.

*SuggestedRemedy*

Use the 10GBASE-R pseudo-random pattern ?

Response Response Status C

ACCEPT IN PRINCIPLE.

[Changed subclause number 2.10 to 82.2.10]

Line 11 in subclause 82.2.10 does define it, but to make it clearer I propose:

Change:

"The input to the scrambler is the control block type with all idles."

to:

"The input to the scrambler is a control block (block type=0x1e) with all idles as defined in figure 82-5."

CI 82 SC 82.2.10 P128 L10 # 102  
Ebberts, Jonathan IBM

Comment Type E Comment Status D testing

82.2.10 says that the scrambler starts off with a seed loaded from the MDIO registers.

This seems to contradict 82.2.6 which says that there is no initial value for the scrambler.

We suspect that there is no initial value for regular operation and a defined seed for test operation. Should the specification be more specific on this point?

*SuggestedRemedy*

Clarify the sentence in 82.2.6, "There is no requirement on the initial value for the scrambler." to "There is no requirement on the initial value for the scrambler for regular operation; test-patterns shall load an initial value from the MDIO registers."

Proposed Response Response Status W

PROPOSED ACCEPT.

[Changed subclause number 2.10 to 82.2.10]

CI 82 SC 82.2.12 P128 L30 # 204  
Marris, Arthur Cadence

Comment Type T Comment Status A

Inappropriate use of the word "must".

*SuggestedRemedy*

Change "must reorder" to "reorders".

Also similar problem on line 34 but in this case consider using shall.

Response Response Status C

ACCEPT.

From:

"The PCS must reorder lanes if they are received out of order"

To:

"The PCS reorders lanes if they are received out of order"

And

From:

"The skew budget that the PCS receiver must support is shown in Table 82-4"

To:

"The skew budget that the PCS receiver shall support is shown in Table 82-4"

CI 82 SC 82.2.12 P128 L 34 # 274  
Healey, Adam LSI Corporation

Comment Type T Comment Status R skew

This subclause states that "the skew budget that the PCS receiver must support is shown in Table 82-4." The skew budget in Table 82-4 presumes a concatenation of optional interfaces and a generous allocation for media skew that may not be present in every compliant implementation. Consider, for example, that a 40GBASE-KR4 PHY has a need for considerably less skew tolerance. By mandating a fixed tolerance, needless latency is introduced for this PHY type. One can expect a demand for low latency interfaces in the marketplace.

Also note that the receiver skew tolerance requirements are not defined in Clause 48 which defines similar deskew functionality.

SuggestedRemedy

It is sufficient to define the maximum skew contributions for each component of a 40 Gb/s and 100 Gb/s link leading up to the input of the PCS receiver. These contributions may be summarized in a table (such as Clause 48, Table 48-5) so that the implementer may easily calculate the skew tolerance required for the targeted application. Remove the normative requirement for PCS skew tolerance (including Table 82-4).

Response Response Status C

REJECT.

Overtaken by events. The skew will be specified in clause 80 and removed from clause 82 (see comment 240). The maximum skew to be tolerated does not equate to latency.

CI 82 SC 82.2.12 P128 L 38 # 526  
Ofelt, David Juniper Networks

Comment Type E Comment Status D skew

People sometimes assume that designing in a large skew buffer will add latency. It would be good to add some clarifying text.

SuggestedRemedy

Add something like:

A design that allows for a large amount of skew tolerance does not add any additional latency. Latency due to skew only occurs due to the differential delay between all paths between the source and destination. The path with the largest latency will end up with the smallest skew buffer.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

[Changed subclause number 2.12 to 82.2.12]

I agree that something like this should be added somewhere in the document. At this point it is not clear where it belongs though. Once we determine where the bulk of the skew information is presented we should add this note there. I personally would like to see most of the skew information to move to clause 80.

CI **82** SC **82.2.13** P **129** L **4** # **88**  
Szczepanek, Andre Texas Instruments

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

There is confusion on this page as to where compensation for alignment marker removal is located.

\* 82.2.13 says it is an RS sublayer function

\* 82.2.15 says it is a Receive Process function

So which is it

SuggestedRemedy

compensation for marker insertion is a PCS transmit function So to be symmetrical compensation for removal should be in the receive process

Response Response Status **C**

ACCEPT.

[Changed subclause number 2.13 to 82.2.13]

Change:

"The difference in rate from the deleted alignment markers is compensated for by inserting idles by a function in the RS sublayer."

To:

"The difference in rate from the deleted alignment markers is compensated for by inserting idles by a function in the Receive process."

CI **82** SC **82.2.15** P **129** L **27** # **266**  
Healey, Adam LSI Corporation

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

Receive process must also insert idles to compensate for removal of alignment markers.

Also suggest using similar language as 48.4.2.3 for the concept of clock rate compensation.

SuggestedRemedy

Suggest:

"The receive process must insert idles to compensate for the removal of alignment markers. If the PCS receive process spans multiple clock domains, it may also perform clock rate compensation via the deletion of idles or sequence ordered sets or the insertion of idles."

Proposed Response Response Status **W**

PROPOSED ACCEPT IN PRINCIPLE.

Change:

"Where the MII and PMA sublayer data rates are not synchronized to a 32:33 ratio, the receive process will insert idles, delete idles, or delete sequence ordered sets to adapt between rates."

"The receive process must insert idles to compensate for the removal of alignment markers. If the PCS receive process spans multiple clock domains, it may also perform clock rate compensation via the deletion of idles or sequence ordered sets or the insertion of idles."

CI **82** SC **82.2.17.2.2** P **130** L **19** # **189**  
Baldwin, Thananya Ixia

Comment Type **TR** Comment Status **A** amsm

Incorrect interval in the following definition. Should be 16384.

"am\_valid

Boolean indication that is set true if received block rx\_coded is a valid alignment marker. A valid alignment marker will match one of the encodings in Table 82-2 and it will be repeated every 16385 blocks. Note that we do not know which marker to expect on which lane."

SuggestedRemedy

Replace 16385 with 16384.

"am\_valid

Boolean indication that is set true if received block rx\_coded is a valid alignment marker. A valid alignment marker will match one of the encodings in Table 82-2 and it will be repeated every 16384 blocks. Note that we do not know which marker to expect on which lane."

Response Response Status **C**

ACCEPT.

Already covered by comment #251, will be corrected.

CI 82 SC 82.2.17.2.2 P130 L43 # 251  
Estes, Dave UNH - IOL

Comment Type T Comment Status A

The spacing of alignment markers is incorrectly stated as 16385 instead of 16384.

*SuggestedRemedy*

Change 16385 to 16384

Response Response Status C

ACCEPT.

[Changed subclause number 2.17.2.2 to 82.2.17.2.2]

CI 82 SC 82.2.17.2.2 P130 L51 # 268  
Healey, Adam LSI Corporation

Comment Type T Comment Status A

What is the difference between deskew\_error and !alignment\_valid?

*SuggestedRemedy*

Clarify the difference. If there is no difference, delete deskew\_error and substitute !alignment\_valid in PCS deskew state diagram (Figure 82-14).

Response Response Status C

ACCEPT.

Makes sense, will change 82-14 appropriately and delete deskew\_error

CI 82 SC 82.2.17.2.2 P131 L18 # 527  
Ofelt, David Juniper Networks

Comment Type E Comment Status D

bit number is wrong- rx\_raw is 72 bits wide, but the description does not number the bits properly.

*SuggestedRemedy*

OLD:

Vector containing one MII transfers. RXC<0> through RXC<7> are from rx\_raw<0> through rx\_raw<7>, respectively. RXD<0> through RXD<63> are from rx\_raw<8> through rx\_raw<63>, respectively.

NEW:

Vector containing one MII transfers. RXC<0> through RXC<7> are from rx\_raw<0> through rx\_raw<7>, respectively. RXD<0> through RXD<63> are from rx\_raw<8> through rx\_raw<71>, respectively.

Proposed Response Response Status W

PROPOSED ACCEPT.

[Changed subclause number 2.17.2.2 to 82.2.17.2.2]

CI 82 SC 82.2.17.2.2 P131 L18 # 3  
Seung-Hwan, Kim ETRI

Comment Type T Comment Status A

Should be change 'rx\_raw<63>' to 'rx\_raw<71>'.

*SuggestedRemedy*

Response Response Status C

ACCEPT.

change 'rx\_raw<63>' to 'rx\_raw<71>'.  
Dupe of #527

CI 82 SC 82.2.17.2.2 P131 L 29 # 252  
Estes, Dave UNH - IOL

Comment Type T Comment Status A amsm  
test\_am is currently defined similarly to test\_sh which will cause the PCS alignment marker lock state diagram to run on every received 66-bit block, instead of only running the state diagram on candidates for valid alignment markers.

SuggestedRemedy  
State that test\_am is set to true when the Lane deskew process has accumulated enough bits (16384\*66) from the PMA to evaluate the next alignment marker.

Response Response Status C  
ACCEPT.

[Changed subclause number 2.17.2.2 to 82.2.17.2.2]

Add this to the definition. Dup of 106

CI 82 SC 82.2.17.2.4 P133 L 3 # 253  
Estes, Dave UNH - IOL

Comment Type T Comment Status A amsm  
am\_cnt is currently written to use the last 4 block received.

SuggestedRemedy  
Change the definition to use a "4\*16384 block window"

Response Response Status C  
ACCEPT.

[Changed subclause number 2.17.2.4 to 82.2.17.2.4]

I will re-define it and make it clear that the window refers to alignment marker windows which are 16384\*66 bits (not block windows). Dup of 252, 106

CI 82 SC 82.2.17.2.4 P133 L 5 # 254  
Estes, Dave UNH - IOL

Comment Type T Comment Status A amsm  
am\_invalid\_cnt is currently written to use a 4 block window.

SuggestedRemedy  
Change the definition to use a "4\*16384 block window"

Response Response Status C  
ACCEPT. Dup of 252, 106

CI 82 SC 82.2.17.2.5 P133 L 19 # 255  
Estes, Dave UNH - IOL

Comment Type T Comment Status A  
31.25us\_timer and 12.5us\_timer are not referenced by the BER monitor state diagram.

SuggestedRemedy  
Remove 31.25us\_timer and 12.5us\_time and define xus\_timer as "Timer that is triggered every 31.25 us +1%, -25% (for 40GBASE-R) or 12.5 us +1%, -25% (for 100GBASE-R)"

Response Response Status C  
ACCEPT.

[Changed subclause number 2.17.2.5 to 82.2.17.2.5]

CI 82 SC 82.2.17.3 P133 L 26 # 41  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A  
In clause 81.3.4.3 there is a simple description of the Link Fault State Diagram. This says "The variable link\_fault is set to indicate the value of a received Sequence ordered\_set when four fault\_sequences containing the same fault value have been received with each pair of fault sequences separated by less than 128 columns and no intervening fault\_sequences of a different fault value."  
Simple descriptions for Figure 82-12-PCS lane lock state diagram, Figure 82-13-PCS alignment marker lock state diagram and Figure 82-15-BER monitor state diagram along the lines of that above would be very helpful.

SuggestedRemedy  
Add simple descriptions of the state diagrams for Figures 82-12, 82-13 and 82-15

Response Response Status C  
ACCEPT.

Add simple text descriptions of the PCS state diagrams.



Cl 82 SC 82.2.17.3 P134 L1 # 226  
Gustlin, Mark Cisco

Comment Type TR Comment Status A

The PCS lane lock and high ber SMs won't work properly with the FEC block due to how the FEC block marks errors.

*SuggestedRemedy*

Make the changes to the state machine to implement what is in gustlin\_03\_1108. This will be presented at the meeting.

And Remove:

"[Editor's note (to be removed prior to publication) - FEC errored block marking will likely change some of the state machines since the FEC sublayer will need to mark many blocks bad to ensure that all 64B packets are dropped.]"

Response Response Status C

ACCEPT.

Make the changes as stated in slides 13 and 15 of gustlin\_03\_1108.

Cl 82 SC 82.2.17.3 P136 L # 192  
Baldwin, Thananya Ixia

Comment Type T Comment Status R

"UCT" appears in Figure 82-12-PCS lane lock state diagram but not defined in the document.

*SuggestedRemedy*

Define UCT and list it in the Abbreviations section.

Response Response Status C

REJECT.

[Added missing subclause number 82.2.17.3 to subclause field]

UCT is defined in subclause 1.2.1 and is in subclause 1.5 Abbreviations.

Also looking at many other clauses, I do not see UCT defined within other clauses. So to remain consistent it will not be defined in clause 82.

Cl 82 SC 82.2.17.3 P137 L # 258  
Estes, Dave UNH - IOL

Comment Type TR Comment Status R

Figure 82-13 - PCS alignment marker lock state diagram.

There is no valid exit from state INVALID\_AM if am\_lock<x> = false and am\_invalid\_count < 4.

*SuggestedRemedy*

Remove am\_lock<x> from the exit condition to transition from state INVALID\_AM to TEST\_AM, making the exit condition "test\_am \* am\_cnt < 4 \* am\_invalid\_cnt < 4".

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

[Changed subclause number 2.17.3 to 82.2.17.3]

Looking at the SM, if you are in INVALID\_AM, and you do not have am\_lock, then you go to AM\_SLIP. That is because when you are looking for am\_lock you need to see two non errored ones in a row to declare lock. If you are not in lock, and you see an error, then you drop out, the invalid count at that point does not matter.

Talked to Dave by email:

I see what I did wrong, I misread the transition from INVALID\_AM to AM\_SLIP, I read it as "am\_invalid\_cnt=4 \* !am\_lock<x>" when it is really "am\_invalid\_cnt=4 + !am\_lock<x>".

This way makes more sense!

He agrees to reject the comment.

**Cl 82**      **SC 82.2.17.3**      **P 137**      **L**      # **106**  
Ebbbers, Jonathan      IBM

**Comment Type**    **T**      **Comment Status**    **A**      *amsm*

The definition of test\_am appears to be inadequate. As defined, test\_am will be true once for every 66-bit block and TEST\_AM will be entered very frequently, causing !am\_valid to be the exit path from TEST\_AM almost every time, causing the FSM to never reach the 2\_GOOD state.

**SuggestedRemedy**

Refine test\_am's definition to be less like that of test\_sh. After the first detection of a valid AM, test\_am should be tied to a timer that counts down from 16383 before asserting the next test\_am.

**Response**      **Response Status**    **C**

ACCEPT.

[Changed subclause number from Figure 13 to 82.2.17.3]

Agree, several other comments have also pointed this out. It will be fixed. Editorial license for how to fix state machine. Dup of 106

**Cl 82**      **SC 82.2.17.3**      **P 137**      **L 21**      # **191**  
Baldwin, Thananya      Ixia

**Comment Type**    **TR**      **Comment Status**    **A**      *amsm*

In Figure 82-13-PCS alignment marker lock state diagram, it appears the loop to fall out of lock will take either 4 or 7

**SuggestedRemedy**

We will submit a new diagram to Mark G

**Response**      **Response Status**    **C**

ACCEPT.

[Changed subclause number from Figure 82-13 to 82.2.17.3]

This is also addressed by comment #8. It will be fixed. Use sliding window rather than fixed window to look for alignment markers. Duplicate of comment 8. Editorial license to change the state machine appropriately

**Cl 82**      **SC 82.2.17.3**      **P 137**      **L 21**      # **188**  
Baldwin, Thananya      Ixia

**Comment Type**    **TR**      **Comment Status**    **A**      *amsm*

In Figure 82-13-PCS alignment marker lock state diagram, the Test\_AM loop is not skipping 16383 blocks before checking for the next valid AM.

**SuggestedRemedy**

Insert a state and associated "16383 block" counter in the path between VALID\_AM and TEST\_AM to skip 16383 blocks before checking for the next valid AM.

**Response**      **Response Status**    **C**

ACCEPT.

[Changed subclause number from Figure 82-13 to 82.2.17.3]

Agreed, Several other comments have pointed this out. It will be fixed. Duplicate of 106.

**Cl 82**      **SC 82.2.17.3**      **P 137**      **L 23**      # **8**  
Shafai, Farhad      Sarance Technologies

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

The state diagram in figure 152-12 shows that after am\_lock is achieved, if there are 4 !am\_valid conditions in a fixed window of 4 alignment marker periods, then am\_lock is set to false. Because the window is fixed in time, it is possible that up to 6 !am\_valid conditions may occur and the state machine will remain in lock (i.e. 3 !am\_valid conditions in one window followed immediately by 3 more !am\_valid conditions in the next window).

**SuggestedRemedy**

Suggested remedy is to make the window "sliding". That is, if there are four consecutive !am\_valid conditions over any four align maker periods, then the am\_lock is set to false.

**Response**      **Response Status**    **C**

ACCEPT.

Make the appropriate changes to the state machine to have a sliding window.

Apparantly the commenter has commented using Draft 0.9 with old clause numbers. The clause number and subclause fields have been corrected to 82 to import into the comment database. Same remedy as 191

CI 82 SC 82.2.17.3 P137 L27 # 534  
Vijayaraghavan, Divya Altera Corp.

Comment Type T Comment Status R amsm

Inconsistency in am\_cnt in alignment marker state machine

*SuggestedRemedy*

Always compare to 2 or 4, but not both.

Response Response Status C

REJECT.

[Changed subclause number from Figure 82-13 to 82.2.17.3]

It compares to 2 for going in lock, 4 for out of lock, this is the baseline.

CI 82 SC 82.2.17.3 P137 L27 # 99  
Ebbbers, Jonathan IBM

Comment Type TR Comment Status A amsm

It may require as many as 100,000 test\_am instances before the AM Lock FSM will reach 2\_GOOD (assuming that the location of the Alignment Marker is in the last of the 16384 possible locations checked by the PCS AM Lock State Machine). Is this a reasonable worst-case start-up delay?

*SuggestedRemedy*

Even though the AM\_SLIP function is listed as implementation specific, indicate to the reader that the delay caused by the PCS AM Lock State Machine may take up to 100,000 blocks before reaching am\_lock.

Response Response Status C

ACCEPT IN PRINCIPLE.

[Changed subclause number from Figure 13 to 82.2.17.3]

Add a statement about the typical time required to lock.

CI 82 SC 82.2.17.3 P137 L30 # 5  
Seung-Hwan, Kim ETRI

Comment Type T Comment Status R amsm

Should be change 'am\_cnt = 2 \*' to 'am\_cnt = 4 \*'.

*SuggestedRemedy*

Response Response Status C

REJECT.

If I understand the comment correctly, the am\_cnt = 2 \* is from the VALID\_AM to 2\_GOOD state transition. This should be 2, only two good markers in a row gets in you lock.

CI 82 SC 82.2.17.3 P137 L33 # 6  
Seung-Hwan, Kim ETRI

Comment Type T Comment Status R amsm

Should be change '2\_GOOD' to '4\_GOOD'.

*SuggestedRemedy*

Response Response Status C

REJECT.

This should remain 2\_GOOD. The baseline has two good markers to get in lock.

CI 82 SC 82.2.17.3 P138 L # 256  
Estes, Dave UNH - IOL

Comment Type T Comment Status A

Figure 82-14 - PCS deskew state diagram

Using "am\_status" as an exit condition from state LOSS\_OF\_ALIGNMENT is redundant. It is redundant because !am\_status is a global transition to the same state.

*SuggestedRemedy*

Change the exit condition from LOSS\_OF\_ALIGNMENT to ALIGN\_ACQUIRED to "alignment\_valid"

Response Response Status C

ACCEPT.

[Changed subclause number 2.17.3 to 82.2.17.3]

CI 82 SC 82.2.17.3 P138 L10 # 267  
Healey, Adam LSI Corporation

Comment Type T Comment Status A

Per the PCS deskew state diagram (Figure 82-14), the definition of deskew\_error in 82.2.17.2 (page 130, line 51), and the use of align\_status in the Receive state diagram (Figure 82-17, page 141, line 2), a spurious bit error that occurs during an alignment marker will suppress the receipt of all packets until the next next group of alignment markers arrives, which could be a significant number of packets. Hysteresis should be added to Figure 82-14 to avoid this hair-trigger behavior.

*SuggestedRemedy*

Modify state diagram such that four consecutive deskew\_error indications are required to set align\_status = FALSE. Due to the hysteresis in PCS alignment marker lock state diagram (Figure 82-13), it seems acceptable to set align\_status = TRUE based on the single alignment\_valid indication.

Response Response Status C

ACCEPT IN PRINCIPLE.

Had a long email conversation with Adam on this. The problem is with the following statement:

"alignment\_valid

Boolean indication that is set true if all lanes are aligned. In order to be valid, each lane must be in am\_lock, with each alignment marker matching a marker from Table 82-2. In addition each lane must have a unique marker value and the lanes must be deskewed so that each marker from all lanes are aligned. It is false otherwise."

This can mean that a single bit error that cause the alignment marker to not match would cause the SW to go out of alignment. This is bad, so here is the change:

Chang it to:

"alignment\_valid

Boolean indication that is set true if all lanes are aligned. It is valid when each lane is in am\_lock, with each lane locked to a unique alignment marker from Table 82-2. All lanes are deskewed, aligning all alignment markers. alignment\_valid is false otherwise."

Comment #268 where it is proposed that the variable deskew\_error is to be deleted is also related to this.

CI 82 SC 82.2.17.3 P139 L35 # 257  
Estes, Dave UNH - IOL

Comment Type T Comment Status A

Figure 82-15 - BER monitor state diagram

The sentence "xus\_timer = 31.25 usec for 40GBASE-R or 12.5 usec for 100GBASE-R" is not necessary if xus\_timer is defined in subclause 82.2.17.2.5. This sentence does not fully define the timer because it does not include the +1%/-25% tolerance.

*SuggestedRemedy*

Remove this sentence.

Response Response Status C

ACCEPT.

[Changed subclause number 2.17.3 to 82.2.17.3]

CI 82 SC 82.2.18 P134 L8 # 233  
Gustlin, Mark Cisco

Comment Type TR Comment Status A

Change the format of the PCS management clause with one consistent with the latest table based format.

*SuggestedRemedy*

Replace subclause 82.2.18 with the attached document (gustlin\_04\_1108.pdf).

Response Response Status C

ACCEPT.

CI 82 SC 82.2.18.2 P134 L41 # 4  
Seung-Hwan, Kim ETRI

Comment Type T Comment Status A

Should be change 'per 31.25' to 'per 31.25 us'.

*SuggestedRemedy*

Response Response Status C

ACCEPT.

**Cl 82**      **SC 82.2.18.4**      **P135**      **L14**      # **269**  
Healey, Adam      LSI Corporation

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

The data pattern that the PCS transmits to the PMA during loopback is not defined (TBD).

**SuggestedRemedy**  
Recommend a continuous stream of of 0x00FF data words per Clause 49.

**Response**      **Response Status C**  
ACCEPT IN PRINCIPLE.

0x00ff is not good since it would be mangled through the PMA gearbox and may result in insufficient clock content on individual lanes, confusing SERDES, etc.

Following the PMA loopback methodology, the PCS should send onward the signal it is looping back.

**Cl 82**      **SC 82.2.2**      **P117**      **L10**      # **117**  
Marris, Arthur      Cadence

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

grammar, independent needs to be an adverb.

**SuggestedRemedy**  
change to 'independently'.

**Proposed Response**      **Response Status W**  
PROPOSED ACCEPT.

**Cl 82**      **SC 82.2.2**      **P117**      **L3**      # **141**  
D'Ambrosia, John      Force10 Networks

**Comment Type ER**      **Comment Status D**

Wording of statement: "The PCS comprises the PCS Transmit and PCS Receive processes for 40GBASE-R and 100GBASE-R." implies that a single PCS is defined for both 40G and 100G rates.

**SuggestedRemedy**  
change sentence to:

The 40GBASE-R and 100GBASE-R PCS's comprise the PCS Transmit and PCS Receive processes for each rate of operation.

**Proposed Response**      **Response Status W**  
PROPOSED ACCEPT.

Change:  
"The PCS comprises the PCS Transmit and PCS Receive processes for 40GBASE-R and 100GBASE-R"  
To:  
"The 40GBASE-R and 100GBASE-R PCS's comprise the PCS Transmit and PCS Receive processes for each rate of operation"

**Cl 82**      **SC 82.2.21**      **P135**      **L35**      # **228**  
Gustlin, Mark      Cisco

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

Remove this subclause. And remove the editors note saying to add it in, and remove this section since this is being put in section 82.2.18.

**SuggestedRemedy**  
Remove section 82.2.21.

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

CI 82 SC 82.2.21 P136 L 27 # 242  
Meyer, Jeffrey Centellax

Comment Type E Comment Status D

What does the "\*\*\*" in the conditional statements mean? I suspect that this is a boolean AND? However most people use a & or && from what i have seen. You might explain your conventions for the state diagrams. I did see where the ++ operator was explained earlier in the document. Maybe "\*\*\*" was explained and I missed it.

SuggestedRemedy

Add a footnote for the conventions or explain the "\*\*\*" and "+" where the "++" operator was explained. It is confusing with a multiply and add.

Proposed Response Response Status W

PROPOSED REJECT.

This seems to be standard IEEE SM notation. See Clause 1, Figure 1-2 where this is defined.

CI 82 SC 82.2.21 P137 L 30 # 530  
Ofelt, David Juniper Networks

Comment Type T Comment Status A amsm

Figure 82-13 - The state diagram is confusing (at least to me) about whether it is intending to declare alignment lock after 2 or 4 alignment blocks. The state diagram has a back arc from VALID\_AM to TEST\_AM if am\_cnt < 4, but if am\_cnt is two, then it exits to the 2\_GOOD state and we declare that we have alignment lock for that lane.

There does not seem to be any text description of the process, so I can't double-check the intent that way.

SuggestedRemedy

If the state diagram is in error (should be am\_cnt==4 to get lock), then fix it. Otherwise, add some descriptive text to 82.2.12 to describe the general algorithm. Actually, adding descriptive text in either case would be good.

Response Response Status C

ACCEPT.

Comment #41 also addressed part of this. The intent is to create lock after two markers. Descriptive text will be added.

CI 82 SC 82.2.21 P139 L 35 # 413  
Ganga, Ilango Intel

Comment Type E Comment Status D

instead of usec, use the "micro" symbol for microsecond. See page 10 for symbols used in document.

SuggestedRemedy

Per comment

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 82 SC 82.2.4 P122 L 12 # 247  
Trowbridge, Stephen Alcatel-Lucent

Comment Type TR Comment Status A

Align control block type 4b with other 66B codes. The mapping of 40GbE into ODU3 will use a transcoding algorithm that is used for other purposes (e.g., mapping of FC1200 into ODU2e) and there is improved reuse if codes are aligned. This would also leave the door open to future use of the Ethernet PCS format, for example if FC in the future were to do a 40G or 100G spec. Since the sequence ordered set only has two values (LF and RF), three bytes are plenty- we don't need 7 bytes.

SuggestedRemedy

Block type 4b should explicitly include the "O" code as in Figure 49-7 (rather than assuming a sequence ordered set) and four control characters (always idles in this case) in the latter half of the 66B block. An alternate solution would be to have 802.3ba use control code 0x55 rather than 0x4b and simply send the ordered set which appears once on the MII twice on the PCS.

Response Response Status C

ACCEPT IN PRINCIPLE.

Here are some proposed changes:

Change figure 82-5, keep block type 0x4b and remove block type 0x55. Re-define block type 0x4b to exactly what it was in clause 49 with the O type field to differentiate between sequence and signal ordered sets. Make appropriate changes to the text also. Note that the MII stays the same, but the upper bytes are dropped.

CI 82 SC 82.2.4.10 P123 L37 # 262  
Healey, Adam LSI Corporation

Comment Type E Comment Status D

It is not necessary to have two sub-clauses addressing ordered sets at the same level in the clause heirarchy.

*SuggestedRemedy*

Merge information in 82.2.4.10 and 82.2.4.5.

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 82 SC 82.2.4.10 P123 L41 # 525  
Ofelt, David Juniper Networks

Comment Type E Comment Status D

Sentence unclear...

"When it is necessary to designate the control character for the sequence ordered\_set specifically, /Q/ will be used."

*SuggestedRemedy*

Clarify what is meant by needing to specify the control character.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

[Changed subclause number 2.4.10 to 82.2.4.10]

There have been several comments on the ordered set description. This will be clarified by combining the text from 82.2.4.5 and 82.2.4.10.

CI 82 SC 82.2.4.11 P L # 101  
Ebbers, Jonathan IBM

Comment Type E Comment Status D

"sent" and "received" are pretty ambiguous terms, especially since this is meant to apply to both the encoder (egress path) and decoder (ingress path). "received" is an especially poor choice of word given that it applies also to the Tx path.

*SuggestedRemedy*

Change

"The /E/ is sent whenever an /E/ is received. It is also sent when invalid blocks are received. The /E/ allows the PCS to propagate received errors."

to

"For both the encoder and decoder, the /E/ is generated whenever an /E/ is detected. The /E/ is also generated when invalid blocks are detected. The /E/ allows the PCS to propagate detected errors."

Proposed Response Response Status W

PROPOSED ACCEPT.

[Changed subclause number 2.4.11 to 82.2.4.11]

CI 82 SC 82.2.4.2 P119 L22 # 110  
Marris, Arthur Cadence

Comment Type T Comment Status A

There is no mention of alignment marker insertion in Figure 82-3

*SuggestedRemedy*

Change "Block Distribution" to "Block Distribution and Alignment Marker Insertion"

Response Response Status C

ACCEPT IN PRINCIPLE.

Also in Figure 82-4 indicate "Lane Block Sync, Deskew and Alignment Marker Removal".

CI 82 SC 82.2.4.3 P119 L34 # 193  
Baldwin, Thananya Ixia

Comment Type E Comment Status D

Figure 82-3-PCS Transmit bit ordering has "0 0 0" between the columns. Should be "..."

*SuggestedRemedy*

Replace "0 0 0" with "..."

Proposed Response Response Status W

PROPOSED ACCEPT.

**CI 82**      **SC 82.2.4.3**      **P120**      **L 34**      # 194  
 Baldwin, Thananya      Ixia

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

Figure 82-4-PCS Receive bit ordering has "0 0 0" between the columns. Should be "..."

**SuggestedRemedy**  
 Replace "0 0 0" with "..."

**Proposed Response**      **Response Status W**  
 PROPOSED ACCEPT.

**CI 82**      **SC 82.2.4.3**      **P121**      **L 14**      # 111  
 Marris, Arthur      Cadence

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

Redundant text. Isn't this paragraph just repeating what has already been said in 82.2.4.1, page 118 line 32?

**SuggestedRemedy**  
 Consider deleting the redundant text from either 82.2.4.1 or 82.2.4.3.

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

delete the redundant text from 82.2.4.3

**CI 82**      **SC 82.2.4.3**      **P122**      **L**      # 259  
 Estes, Dave      UNH - IOL

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

Figure 82-5 - 64B/66B block formats

The Block Payload descriptions for block types 0xb4, 0xcc, 0xd2, and 0xe1 are incorrect. They do not include enough single bit fields. 0xb4 should have 4 but only 3 are displayed, 0xcc should have 3 but only 2 are displayed, 0xd2 should have 2 but only 1 is displayed, 0xe1 should have 1 but none are displayed.

**SuggestedRemedy**  
 Add one single bit field to the Block Payload descriptions for block types 0xb4, 0xcc, 0xd2, and 0xe1.

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

[Changed subclause number 2.4.3 to 82.2.4.3]

Already covered by comment #7 and proposed accepted.

**CI 82**      **SC 82.2.4.3**      **P122**      **L 12**      # 264  
 Healey, Adam      LSI Corporation

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

In Figure 82-5, it could be made more clear which control block format corresponds to a sequence ordered set and which corresponds to a signal ordered set without requiring the reader to cross-reference to Table 82-1.

**SuggestedRemedy**  
 Add a footnote to the table distinguishing the two ordered set block formats.

**Proposed Response**      **Response Status W**  
 PROPOSED ACCEPT.

A footnote will be added, though the format might change since there is another comment out about how ordered sets are handled (#247)

**CI 82**      **SC 82.2.4.4**      **P121**      **L 35**      # 164  
 D'Ambrosia, John      Force10 Networks

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

The TF is waiting to hear back for confirmation from the ITU-T SG15 regarding the following statement -

The mapping of 40GBASE-R PCS into OPU3 specified in ITU-T Recommendation G.709 depends on the set of control block types shown in Figure 82-5. Any change to the coding specified in Figure 82-5 must be coordinated with ITU-T Study Group 15.

**SuggestedRemedy**  
 Add Editor's note stating that awaiting confirmation from ITU-T SG15 of the statement above from Liaison sent from July 08 Plenary meeting.

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

Editor's note not needed because liaison letter received from ITU-T SG15 with confirmation [http://www.ieee802.org/3/minutes/nov08/1108\\_ITU\\_SG15\\_to\\_802\\_3\\_LS02.pdf](http://www.ieee802.org/3/minutes/nov08/1108_ITU_SG15_to_802_3_LS02.pdf)



CI 82 SC 82.2.4.4 P122 L # 7  
Wong, Don Cisco Systems

Comment Type ER Comment Status D

Figure 82-5

For BlockTypeField 0xb4, 0xcc, 0xd2 & 0xe1, missing one more "single bit" field (marked by thin rectangle).

*SuggestedRemedy*

Add "thin rectangle" for BlockTypeField 0xb4, 0xcc, 0xd2 & 0xe1.

Proposed Response Response Status W

PROPOSED ACCEPT.

[Added missing subclause number 82.2.4.4 to subclause field]

Will add the appropriate rectangles.

CI 82 SC 82.2.4.4 P122 L7 # 202  
Marris, Arthur Cadence

Comment Type T Comment Status A

Figure 82-5 improvements

*SuggestedRemedy*

Remove the slash (/) in the middle of the block format description. For example change D3/D4 to D3 D4.

Delete redundant row with block type field 0x4b

Width of C5, C6 and C7 is wrong for block type fields 0xcc 0xd2 0xe1

Response Response Status C

ACCEPT IN PRINCIPLE.

Yes on: Remove the slash (/) in the middle of the block format description. For example change D3/D4 to D3 D4.

Width of C5, C6 and C7 is wrong for block type fields 0xcc 0xd2 0xe1

Delete row for 0x55 per comment 247.

CI 82 SC 82.2.4.4 P122 L725 # 2  
Seung-Hwan, Kim ETRI

Comment Type T Comment Status A

At Data Block Formats and Control Block Formats :

The slash('/') is used to separate and represent two 4 bytes transfer in 10GBase-R, but in 40G/100GBase-R there is no need slash('/') between 8 bytes.

*SuggestedRemedy*

Response Response Status C

ACCEPT.

Also covered by #202

CI 82 SC 82.2.4.5 P122 L12 # 532  
Vijayaraghavan, Divya Altera Corp.

Comment Type T Comment Status A

Block Types 4b and 55 have the same format in the 64b/66b table (figure 82-5). Typo in block type 55.

*SuggestedRemedy*

Remove block type 55. Does not apply to 8 byte alignment.

Response Response Status C

ACCEPT. See comment 247.

CI 82 SC 82.2.4.5 P123 L37 # 263  
Healey, Adam LSI Corporation

Comment Type E Comment Status D

It may be useful to point out that sequence and signal ordered set encoding differs from the encoding defined in Clause 49.

*SuggestedRemedy*

Add a note to highlight this difference.

Proposed Response Response Status W

PROPOSED REJECT.

This to me seems like a slippery slope, since many things in clause 82 differ from clause 49, do I put a note everywhere where this is a difference?

CI 82 SC 82.2.5 P124 L9 # 265  
Healey, Adam LSI Corporation

Comment Type E Comment Status D

Text seems essentially correct but could be compacted and clarified, using similar language to 48.4.2.3. A lot of words are used to describe the concept of traversing clock domains, which really shouldn't be necessary for a user of the standard.

*SuggestedRemedy*

Suggest:

"The transmit process must delete idles or sequence ordered sets to accomodate the transmission of alignment markers. If the PCS transmit process spans multiple clock domains, it may also perform clock rate compensation via the deletion of idles or sequence ordered sets or the insertion of idles."

Proposed Response Response Status W

PROPOSED ACCEPT.

Change:

"Therefore, if the PCS is connected to an MII and PMA sublayer where the ratio of their transfer rates is exactly 32:33, then the transmit process only needs to perform rate adaptation to make room for the alignment markers. This will consist of deleting idles or deleting sequence ordered sets. Where the MII and PMA sublayer data rates are not synchronized to that ratio, the transmit process will need to insert idles, delete idles, or delete sequence ordered sets to adapt between the rates in addition for making room for alignment markers."

To:

"The transmit process must delete idles or sequence ordered sets to accomodate the transmission of alignment markers. If the PCS transmit process spans multiple clock domains, it may also perform clock rate compensation via the deletion of idles or sequence ordered sets or the insertion of idles."

CI 82 SC 82.2.8 P125 L23 # 249  
Estes, Dave UNH - IOL

Comment Type E Comment Status D

It is unclear how the Alignment markers are inserted without changing the PMA clock rate.

*SuggestedRemedy*

Insert a note indicating that columns of Idle will need to be deleted prior to the scrambler. The number of columns to delete will be an average of 1 column of Idle for every 16384 MII columns, however this is just an average since the alignment markers will be inserted on all lanes at the same time.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

[Changed subclause number 2.8 to 82.2.8]

Change:

"They interrupt any transfer that is already occurring so that the alignment markers can be inserted into all lanes at the same time."

to:

"They interrupt any transfer that is already occurring so that the alignment markers can be inserted into all lanes at the same time. Room for the alignment markers is created by periodically deleting IPG from the MII data stream"

CI 82 SC 82.2.8 P125 L 23 # 105  
Ebberts, Jonathan IBM

Comment Type T Comment Status A markers

82.2.8 states that the alignment markers are inserted after 16383 66-bit blocks are transmitted. We assume this includes interrupting a data packet and not waiting until an IPG. Since we cannot possibly write over data, is this process handled at the same time and in the same way as clock compensation (idle/OSet insert/delete) in the async crossing? How can we be sure that the MII data presented to the PCS Transmitter will have enough excess bandwidth to allow for AM insertion and clock compensation?

#### SuggestedRemedy

Provide a more explicit description of the relationship between alignment marker insertion and idle insertion/deletion. Provide a specific minimum inter-frame size for transmitted MII data (from the MAC or RS) to allow for proper AM insertion and +/- 100 PPM clock frequency compensation.

Response Response Status C

ACCEPT IN PRINCIPLE.

[Changed subclause number 2.8 to 82.2.8]

The numbering in figure 82.8 shows that the markers interrupt the regular data. See folkens\_01\_0508 for calculations of sufficient space even with jumbo frames.

Add to the 1st paragraph of 82.2.5 a sentence indicating that there is more than sufficient IPG+ordered sets to delete to make room for alignment markers in addition to clock compensation and a sentence that the algorithm for IPG deletion is implementation dependent.

CI 82 SC 82.2.8 P125 L 24 # 186  
Baldwin, Thananya Ixia

Comment Type ER Comment Status D

Another function of the alignment marker (lane re-order) is missing in the following sentence...

"In order to support alignment and de-skew of individual lanes at the receive PCS, alignment markers are added periodically to each lane."

Also, the words "alignment" and "de-skew" are redundant.

#### SuggestedRemedy

Add "lane reordering" and delete "alignment" in the sentence :

"In order to support de-skew and lane reordering of individual lanes at the receive PCS, alignment markers are added periodically to each lane."

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 82 SC 82.2.8 P125 L 25 # 1  
Seung-Hwan, Kim ETRI

Comment Type E Comment Status D

Spelling: Should be change 'de-skew' to 'deskew' for consistency.

#### SuggestedRemedy

Proposed Response Response Status W

PROPOSED REJECT.

CI 82 SC 82.2.8 P125 L 26 # 434  
Barrass, Hugh Cisco

Comment Type E Comment Status D

It's not really a "regular 66-bit block" since it doesn't use a defined 64B/64B code.

#### SuggestedRemedy

Change "regular 66-bit block" "specially defined 66-bit block"

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 82 SC 82.2.8 P125 L 49 # 178  
Alping, Arne Ericsson AB

Comment Type ER Comment Status D

...has lots or transitions... (spelling error)

#### SuggestedRemedy

Change to: ...has lots of transitions...

Proposed Response Response Status W

PROPOSED ACCEPT.

[Changed subclause number 2.8 to 82.2.8]

CI 82 SC 82.2.8 P125 L 49 # 435  
Barrass, Hugh Cisco

Comment Type E Comment Status D

"that looks random and has lots or transitions"

Apart from the obvious typo, this phrase does not seem right - what does it mean to "look random?"

#### SuggestedRemedy

Change "that looks random and has lots or transitions" to "that is defined to be balanced and irregular with many transitions"

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Change "that looks random and has lots or transitions" to  
"that is defined to be balanced and with many transitions"

CI 82 SC 82.2.8 P125 L 49 # 200  
Marris, Arthur Cadence

Comment Type E Comment Status D

change "lots or" to "many"

#### SuggestedRemedy

as above

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 82 SC 82.2.8 P126 L 32 # 203  
Marris, Arthur Cadence

Comment Type T Comment Status A

Use of boolean NOT operator. Is the use of the boolean operator ! appropriate for bit vector negation?

#### SuggestedRemedy

Consider changing M0 = !M4 to M4 is the inverse of M0 etc.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "Note that M0 = !M4, M1 = !M5, M2 = !M6, and M3 = !M7" to

"Note that M4 through M7 are the bit-wise inversion of M0 through M3, respectively"

CI 82 SC 82.2.8 P126 L 33 # 299  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A markers

During the review of Draft 0.9 Piers Dawe proposed that different lane markers should be used for 40GBASE-R and 100GBASE-R. If this is agreed, suitable lane markers have been generated and evaluated in the accompanying presentation.

#### SuggestedRemedy

If different lane markers are agreed for 40GBASE-R from 100GBASE-R then use the values in anslow\_06\_1108.pdf as the lane markers for 40GBASE-R

Response Response Status C

ACCEPT.

CI 82 SC 82.2.8 P127 L 6 # 326  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A markers

The two PCSs are distinguished by width not lane rate. In future we will consider using one or both at faster lane rates, and quite likely consider 20 x 10G for 200G. The lane markers for a 4-wide PCS should be distinct from a 20-wide PCS.

#### SuggestedRemedy

Add four new lane markers for the 4-wide 40GBASE-R PCS. Pete Anslow has the markers and a presentation.

Response Response Status C

ACCEPT.

See comment 299 for specific values

CI 82 SC 82.2.9 P126 L 42 # 445  
Barrass, Hugh Cisco

Comment Type T Comment Status A

The phrase "sends four bits of transmit data at a time" implies that the PCS is sending a 4 bit vector. This is not the case, it is sending 4 data streams.

Also, is there a reason why "four" is spelt out and "20" is not?

#### SuggestedRemedy

Change "sends four bits of transmit data at a time" to "sends four data streams"

Also change "sends 20 bits of transmit data at a time" to "sends twenty data streams"

Response Response Status C

ACCEPT.

**Cl 82**      **SC 82.2.9**      **P 126**      **L 46**      # **436**  
 Barrass, Hugh      Cisco

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

"parallel" is not a good word - especially when it is followed by "serial"

**SuggestedRemedy**  
 Replace "parallel" with "separate"

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT.

**Cl 82**      **SC 82.2.9**      **P 126**      **L 47**      # **437**  
 Barrass, Hugh      Cisco

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

"on lane 0 bits 0 to 65 are sent"

This paragraph written by Yoda was...

Change to a more traditional word order

**SuggestedRemedy**  
 Change

"on lane 0 bits 0 to 65 are sent, on lane 1 bits 66 to 131 are sent; on lane 2 bits 132 to 197 are sent, on lane 3 bits 198 to 263 are sent, then on lane 0 bits 264 to 329 are sent etc."

to

"bits 0 to 65 are sent on lane 0, bits 66 to 131 are sent on lane 1; bits 132 to 197 are sent on lane 2, bits 198 to 263 are sent on lane 3, then bits 264 to 329 are sent on lane 0 etc."

With similar changes to the following paragraph for 100G.

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT.

Nice Star Wars reference, I agree it make sense to change the order.

**Cl 82**      **SC 82.2.9**      **P 127**      **L 44**      # **327**  
 Dawe, Piers      Avago Technologies

**Comment Type**    **TR**      **Comment Status**    **R**      *skew*

Tracking the last little bit of skew costs power in high speed analog circuitry. The PCS is implemented as a silicon chip in a package on a PCB. It has no need to generate anything remotely like 2 bits of Dynamic Skew (if 'bits' means UI). There could be several x 10 ps gate delay, most of which is correlated lane to lane (giving maybe 5 ps Dynamic Skew) plus perhaps 2" or 400 ps mismatched lane lengths on the PCBs, which might change by 5% over temperature and humidity: that's 20 ps. Total 25 ps (0.25 UI at 10G, 1 MAC BT for 40G, 2.5 MAC BT for 100G).

**SuggestedRemedy**  
 Change PCs dynamic skew output limit to 25 ps.

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

Overtaken by events. Skew will be covered in clause 80 and not in the PCS clause. See comment #240. Commenter can resubmit against clause 80 if solution from giannakopoulos\_01\_1108 is not acceptable.

**Cl 82**      **SC 82.2.9**      **P 127**      **L 5**      # **535**  
 Vijayaraghavan, Divya      Altera Corp.

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

Lane 10: 2d and de are not inversions of each other. Which is right and which needs correction?

**SuggestedRemedy**  
 Fix incorrect value

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

In Lane 10, change 0x2d to 0x21

CI 83 SC 0 P L # 95  
Jongyoon, Shin ETRI

Comment Type E Comment Status D

Change all "sub-layer"  
to  
"sublayer" in clause 83 to keep consistency with other clauses.

SuggestedRemedy

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 83 SC 83 P 143 L 1 # 331  
Dawe, Piers Avago Technologies

Comment Type E Comment Status D

sub-layer

SuggestedRemedy

To match base document, sublayer. Search and replace, 18 instances.

Proposed Response Response Status W

PROPOSED ACCEPT.

Also see comment #95

CI 83 SC 83 P 146 L 10 # 332  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Text says 'the supportable PMA stages' but table is not complete. For example, Tx 2:1 is missing. If you add all the missing possibilities the table might get rather long, although the rows could be shallower. I don't think we should talk about 'initial version of the standard': 802.3 is very old, and we have not yet made any promises that there will be a version which will use more of this table.

SuggestedRemedy

Suggest you list only the 'prime factors'. For 40G, that's 4:2, 2:1, 1:2, 2:4., 1:1, 2:2, 4:4. Say in main text, not just a table note, that PMAs such as 4:1 and 1:4 may be made without going through the intermediate (in this case 2-wide) stage (and if such is true, they could map the lanes a bit differently to how a tree of atomic PMAs would).

Response Response Status C

ACCEPT IN PRINCIPLE.

Delete table 83-1. Replace with text to indicate that for 40GBASE-R, the number of input and output lanes are divisors of 4 and for 100GBASE-R, the number of input and output lanes are divisors of 20.

CI 83 SC 83 P 146 L 6 # 333  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Are these \_logical\_ lanes or just lanes?

SuggestedRemedy

?

Response Response Status C

ACCEPT IN PRINCIPLE.

Overtaken by events. Table 83-1 removed, and replacement text does not use the word "logical".

CI 83 SC 83.1.1 P143 L21 # 158  
D'Ambrosia, John Force10 Networks

Comment Type T Comment Status A

Per the baseline proposal, trowbridge\_01\_0708, PMA interfaces are abstract, logical, or physical.

*SuggestedRemedy*

Change wording

Electrical and timing specifications for the XLAUI and CAUI interfaces based on 10Gb/s per lane signaling are covered in Annex 83A. The PMD service interfaces for 40GBASE-SR and 100GBASE-SR PMD are covered in 86.1.1. Other PMA interfaces are specified as logical interfaces, and may not be realized physically.

to

The interfaces for the inputs of the 40GBASE-R and 100GBASE-R PCS's are defined in an abstract manner and do not imply any particular implementation. The PMD service interfaces for 40GBASE-SR and 100GBASE-SR PMDs are defined in 86.1.1. Other PMD service interfaces are defined abstractly. For 40GBASE-R PMA's, an interface, known as XLAUI, connecting PMA stages is defined in Annex 83A. For 100GBASE-R PMA's, an interface, known as CAUI, connecting PMA stages has been defined in Annex 83A.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change wording

Electrical and timing specifications for the XLAUI and CAUI interfaces based on 10Gb/s per lane signaling are covered in Annex 83A. The PMD service interfaces for 40GBASE-SR and 100GBASE-SR PMD are covered in 86.1.1. Other PMA interfaces are specified as logical interfaces, and may not be realized physically.

to

The interfaces for the inputs of the 40GBASE-R and 100GBASE-R PCS's are defined in an abstract manner and do not imply any particular implementation. The PMD service interfaces for 40GBASE-SR and 100GBASE-SR PMDs are defined in 86.1.1. Other PMD service interfaces are defined abstractly. For 40GBASE-R PMA's, an interface, known as XLAUI, connecting PMA stages is defined in Annex 83A. For 100GBASE-R PMA's, an interface, known as CAUI, connecting PMAs is defined in Annex 83A.

CI 83 SC 83.1.1 P143 L22 # 286  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

Two very minor editorial issues in clause 83 collected in to one comment.

*SuggestedRemedy*

Change "for 40GBASE-SR and 100GBASE-SR PMD" to "for the 40GBASE-SR and 100GBASE-SR PMDs" page 143 line 22  
Space missing in "isin" page 148 line 44

Proposed Response Response Status W

PROPOSED ACCEPT.

Also see reponse to comment #158

CI 83 SC 83.1.1 P143 L22 # 134  
D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D

Wording - A PMA connects to other sublayers.

*SuggestedRemedy*

change

The 40GBASE-R PMA can connect directly to one of the following Physical Layers: 40GBASESR4, 40GBASE-LR4, 40GBASE-CR4, or 40GBASE-KR4. The 100GBASE-R PMA can connect directly to one of the following Physical Layers: 100GBASE-SR10, 100GBASE-LR4, 100GBASE-ER4, or 100GBASE-CR10.

to

The purpose of the 40GBASE-R PMA is to attach the 40GBASE-R PMD of choice to the 40GBASE-R PCS. The purpose of the 100GBASE-R PMA is to attach the 100GBASE-R PMD of choice to the 100GBASE-R PCS.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Care needs to be taken that only the lowest PMA layer in the stack can connect directly to the indicated physical layers

CI 83 SC 83.1.1 P143 L 23 # 330  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Draft says 'Other PMA interfaces are specified as logical interfaces, and may not be realized physically.' This looks like a prohibition.

*SuggestedRemedy*

Suggest 'Other PMA interfaces are specified as logical interfaces, without electrical or timing specifications.' ?

Response Response Status C

ACCEPT IN PRINCIPLE.

Replace:

Other PMA interfaces are specified as logical interfaces, and may not be realized physically.

with:

Other PMA interfaces are specified as abstract interfaces.

Also see response to comment #158

CI 83 SC 83.1.2 P143 L 30 # 334  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

PCS lanes are not always virtual.

*SuggestedRemedy*

I think we should rename 'virtual lane' to 'PCS lane' throughout.

Response Response Status C

ACCEPT IN PRINCIPLE.

Need an acronym: suggest PCSL. In figure 83-4 and elsewhere, use z as lane count instead of v, and add to legend that z=4 for 40GBASE-R and z=20 for 100GBASE-R (consistent with p149 lines 32-40).

Also affects Clause 82. Remove Virtual Lane comments from clause 82.

CI 83 SC 83.1.3 P144 L 36 # 643  
Nicholl, Gary Cisco

Comment Type T Comment Status A

I would like to see a PMA line loopback (by which I mean data loopback from/to the PMD service interface) as a mandatory requirement. This is something that was not included in the original 802.3ae spec (10GE), but is widely implemented and used by the industry (primarily for PMD compliance testing).

*SuggestedRemedy*

I will be making a contribution in Dallas to propose a remedy.

Response Response Status C

ACCEPT IN PRINCIPLE.

[Changed subclause from 1.3 to 83.1.3]

An optional PMA line loopback at the lowermost PMA level (nearest the PMD). The loopback would use the received clock for the transmit side and loop back the data on a per PMA lane basis. Also add in appropriate MDIO register to control the loopback if it is implemented. Change the name of the current PMA loopback to "system PMA loopback" in order to differentiate it from the line loopback. Editorial license to fit it into the text in the appropriate place. Add a similar figure to 83-5 but in the opposite direction to explain line loopback operation. Line loopback and system loopback should each have two MDIO bits: one to indicate whether line/system loopback is supported and the other to enable.

CI 83 SC 83.1.3 P144 L 46 # 96  
Jongyoon, Shin ETRI

Comment Type E Comment Status D

Change "optionally provides data loopback" to "optionally provide data loopback".

*SuggestedRemedy*

Proposed Response Response Status W

PROPOSED ACCEPT.



**CI 83**      **SC 83.1.3**      **P144**      **L 47**      # **626**  
 CHANG, Frank      Vitesse

**Comment Type**    **T**      **Comment Status**    **R**

Feel "provide test generation and detection" not sufficient.

**SuggestedRemedy**  
 Change to "provide build-in-self-test (BIST) function with test pattern generator and checker"

**Response**      **Response Status**    **C**

REJECT.

[Changed subclause from 1.3 to 83.1.3]

BIST would be a new function that requires a presentation to justify adding the feature and to specify its operation. It depends on implementation architecture and is not normally considered in the scope of 802.3 standardization.

**CI 83**      **SC 83.1.4**      **P145**      **L 6**      # **157**  
 D'Ambrosia, John      Force10 Networks

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

Aspects of the PMA layering are incorrect.

**SuggestedRemedy**  
 XLAUI / CAUI should be marked as optional.  
 PMA (4:4) and PMA (10:10) with optional notes are actually conditional based on implementation of optional interface.

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

Stack in figure 83-2 should be replaced. Suggestion is to include most expanded case of multiple PMAs as an example, using "Example" in the title to clarify that this is not the only layering. Editorial license granted to construct an appropriate figure consistent with other changes to clause 83. An informative Annex should be prepared to illustrate a variety of other example configurations.

**CI 83**      **SC 83.1.4**      **P146**      **L 1**      # **467**  
 Dudek, Mike      JDSU

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

The statement on line 1 implies that only the items in table 83-1 are supportable. However the table is titled "example PMA variants". A 2 lane solution I believe is supportable at 100G and might be used in the future.

**SuggestedRemedy**  
 Either include all the supportable PMA stages in table 83-1 or change the sentence on line 1 to "Table 83-1 summarizes some examples of the supportable PMA stages for each interface rate however it is not exhaustive"

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

Overtaken by events. Table will be removed. See comment 332.

**CI 83**      **SC 83.1.4**      **P146**      **L 4**      # **624**  
 CHANG, Frank      Vitesse

**Comment Type**    **ER**      **Comment Status**    **D**

In table 83-1, some PMA stage examples become irrelevant such as 4 inputs to 1 outputs to cover 40g serial in 40GBASE-R transmit (& Receive), or 4(5) inputs to 1 outputs to cover 100g serial in 100GBASE-R transmit (& Receive).

**SuggestedRemedy**  
 Suggest take them out from the table.

**Proposed Response**      **Response Status**    **W**

PROPOSED ACCEPT IN PRINCIPLE.

Need to reconcile with multiple comments on this table: comments #467, #624, #42, #43 plus a related comment #625.

CI 83 SC 83.1.4 P146 L41 # 42  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

In Table 83-1 the 100GBASE-R receive list is almost the Tx list in reverse and swapped over, but not quite. Swapping 5:10 and 4:10 over would fix this

SuggestedRemedy

Swap the 5:10 and 4:10 rows in the table

Proposed Response Response Status W

PROPOSED ACCEPT.

Need to reconcile with multiple comments on this table: comments #467, #624, #42, #43 plus a related comment #625.

CI 83 SC 83.1.4 P146 L48 # 43  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

In Table 83-1 Note 1 says "Not used in initial version of the standard" this would be better as "Not used in this version of the standard"

SuggestedRemedy

change "Not used in initial version of the standard" to "Not used in this version of the standard"

Proposed Response Response Status W

PROPOSED ACCEPT.

Need to reconcile with multiple comments on this table: comments #467, #624, #42, #43 plus a related comment #625.

CI 83 SC 83.1.4 P146 L6 # 97  
Jongyoon, Shin ETRI

Comment Type E Comment Status D

In Table 83-1 change "Logical output Lanes" to "Logical output lanes".

SuggestedRemedy

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 83 SC 83.2 P147 L4 # 642  
Ganga, Ilango Intel

Comment Type TR Comment Status R

A PMA is always bidirectional and contains both Transmit and Receive functions. So calling this as a separate RX PMA and a TX PMA is confusing and this is not consistent through out the clause. In some references in this clause the PMA implies both for e.g 20:10 PMA which includes both TX PMA and RX PMA.

So instead of referring this as RX and TX PMA, simply define the PMA as a single block which includes both Transmit and Receive functions. This methodology is consistent with the definitions of PCS/PMA/PMD which are all bidirectional with TX and RX functions.

SuggestedRemedy

Define the PMA as a single block which includes both Transmit and Receive functions, illustrated in Fig 83-3 as single PMA block with TX and RX blocks inside the PMA. The TX function in the PMA connects to p input lanes and q output lanes. The RX function in the PMA connects to q input lanes and p output lanes. In this case the link status is associated with the RX function.

Also Change Fig 83-4 to illustrate both TX and RX functions

Also for primitives, the TX function can use PMA\_UNIDATA.request and the RX function use PMA\_UNIDATA.indication in the following manner

Transmit direction for data flowing from MAC to MDI

PMA\_UNIDATA.request\_in  
PMA\_UNIDATA.request\_out

Receive direction

PMA\_UNIDATA.indication\_in  
PMA\_UNIDATA.indication\_out

Signal indication

PMA\_SIGNAL.indication\_in  
PMA\_SIGNAL.indication\_out

So this can be consistently mapped to the request and indication of PMD primitives or FEC primitives

Accordingly, update the text description and primitive definitions in 83.3

Response Response Status C

REJECT.

We discussed this in trowbridge\_01\_0708. There is a great deal of text that gets replicated if the general operation of m input lanes to n output lanes needs to be described twice because it occurs in Tx and Rx directions. The primitive naming all changes also if this proposal is accepted.

CI 83 SC 83.2 P148 L4 # 528  
 Ofelt, David Juniper Networks

Comment Type E Comment Status D  
 Figure 83-4

Every variable in the figure is defined except for "v".

SuggestedRemedy  
 Add a label to define "v" to the figure.

Proposed Response Response Status W  
 PROPOSED ACCEPT.

[Changed subclause 2 to 83.2]

CI 83 SC 83.2 P148 L44 # 201  
 Marris, Arthur Cadence

Comment Type E Comment Status D  
 change isin to "is in".

SuggestedRemedy  
 As above

Proposed Response Response Status W  
 PROPOSED ACCEPT.

Multiple comments # 135, 414, 201, and 550

CI 83 SC 83.2 P148 L44 # 627  
 CHANG, Frank Vitesse

Comment Type T Comment Status A  
 Dono't feel "Where the PMA isin the TX or RX direction" is enough to cover loopback function.

SuggestedRemedy  
 Suggest such change sth like "Whether the PMA is unidirectiona in the TX or RX direction, or bidirectional (for the sake o loopback)".

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Overtaken by events - loopback and other aspects will be described differently than in the previous draft. Where a similar concept is described, it should be clarified that the top of the stack is the PMA closest to the PCS while the bottom of the stack is the PMA closest to the PMD.

CI 83 SC 83.2 P148 L44 # 414  
 Ganga, Ilango Intel

Comment Type E Comment Status D  
 typo change to "PMA is in"

SuggestedRemedy  
 per comment

Proposed Response Response Status W  
 PROPOSED ACCEPT.

Multiple comments # 135, 414, 201, and 550

CI 83 SC 83.2 P148 L44 # 550  
 Ghiasi, Ali Broadcom

Comment Type E Comment Status D  
 No space between is and in

SuggestedRemedy  
 Add space

Proposed Response Response Status W  
 PROPOSED ACCEPT.

[Changed subclause 2 to 83.2]

Also see comments #135, #414, and #201

CI 83 SC 83.2 P148 L44 # 135  
 D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D  
 Need a space between "isin"

SuggestedRemedy  
 change  
 Whether the PMA isin the Tx or Rx direction.

to

Whether the PMA is in the Tx or Rx direction.

Proposed Response Response Status W  
 PROPOSED ACCEPT.

Multiple comments # 135, 414, 201, and 550

CI 83 SC 83.3 P149 L10 # 529  
Ofelt, David Juniper Networks

Comment Type E Comment Status D

I find the usage of m, n, p, q, and x, y to be inconsistent throughout the text.

p and q seem to always be the the number of links on the RS/FEC facing and PMD sides of a given PMA.

x and y are introduced here "A Tx PMA with x input lanes and y output lanes is paired with an Rx PMA with y input lanes and x output lanes" but then in 83.3.1 and 83.3.2, x is always used as the input lane count and y as the output lane count - this is direction independent.

Then in figure 83-4 and in the text that deals with bits assigned to virtual lanes (e.g. 83.6.2), m and n are used for the input and output lane count and "x" is used for the offset of the current bit.

*SuggestedRemedy*

Make the variable usage more consistent. One way would be to have the generic input and output lane counts be "m" and "n" and the direction-specific counts as "p" and "q". x and y can then be reserved for talking about bit positions or any other need for a generic variable.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

[Changed subclause 2 to 83.2]

We tried to do this, but with a slightly different usage. m and n were always direction specific (m is input and n is output). p and q were used with a pair of PMAs in opposite directions, and x and y were used in more generic contexts. Good to know specific cases where this seems not to be applied

CI 83 SC 83.3 P149 L12 # 142  
D'Ambrosia, John Force10 Networks

Comment Type ER Comment Status D

The reference to the PMA or PMA stages is inconsistent and can cause confusion.

*SuggestedRemedy*

Reword -

Several PMA stages may be required to adapt between the number of VLs emerging from the PCS to the number of lanes required by a particular PMD. For example, a 4-lane interface for 100GBASE-R may involve a 20:10 PMA from the PCS, two 10:10 PMAs on either side of a CAUI for an extender, and a 10:4 PMA which finally interfaces with the PMD.

to

Several PMA stages may be required to adapt between the number of VLs emerging from the PCS to the number of lanes required by a particular PMD. For example, a 4-lane interface for 100GBASE-R may involve a 20:10 PMA stage from the PCS, two 10:10 PMA stages on both sides of a CAUI for an extender, and a 10:4 PMA stage which finally interfaces with the PMD.

An example drawing would be useful.

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 83 SC 83.3.1.1 P150 L6 # 335  
Dawe, Piers Avago Technologies

Comment Type E Comment Status D

PMA\_UNITDATA.inputx (input\_bit\_lane\_x)

*SuggestedRemedy*

PMA\_UNITDATA.inputx(input\_bit\_lane\_x)

i.e. without the space. Same in following subclauses.

Proposed Response Response Status W

PROPOSED ACCEPT.

**CI 83**      **SC 83.4**      **P151**      **L 44**      # **606**  
D'Ambrosia, John      Force10 Networks

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

The first sentence of this clause is

The PMA Service Interface exists between the PMA client (the PCS or FEC sub-layer) and the uppermost PMA in a set of one or more stacked PMAs (possibly including an extender sub-layer).

An extender sub-layer was not been defined by the baseline, though the XLAUI / CAUI can be perceived in this fashion.

**SuggestedRemedy**  
Suggested rewording -

The PMA Service Interface exists between the PMA client (the PCS or FEC sub-layer) and the uppermost PMA in a set of one or more stacked PMAs, as well as between stages in a stacked PMA.

Presentation to be provided

**Response**      **Response Status C**  
ACCEPT IN PRINCIPLE.

Overtaken by events. PMA service interface will be more clearly defined in new formulation. Editorial license to change the PMA description per discussion and trowbridge\_02\_1108

**CI 83**      **SC 83.5**      **P152**      **L 12**      # **98**  
Jongyoon, Shin      ETRI

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

Need to clarify "40GBASE-SR4 and 100GBASE-SR10 interfaces" in the following text.

"Note that electrical and timing specifications of the PMD service interface are defined only for 40GBASE-SR4 and 100GBASE-SR10 interfaces."

**SuggestedRemedy**  
Change "Note that electrical and timing specifications of the PMD service interface are defined only for 40GBASE-SR4 and 100GBASE-SR10 interfaces."  
to  
"Note that electrical and timing specifications of the PMD service interface are defined only for 40GBASE-SR4 and 100GBASE-SR10 PMDs."

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

**CI 83**      **SC 83.5**      **P152**      **L 14**      # **44**  
Anslow, Peter      Nortel Networks

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

This says "For other PMDs, the PMA service interface is specified only logically." This should be "PMD service interface"

**SuggestedRemedy**  
change "the PMA service interface is specified only logically." to "the PMD service interface is specified only logically."

**Response**      **Response Status C**  
ACCEPT IN PRINCIPLE.  
Change "the PMA service interface is specified only logically." to "the PMA service interface is specified only abstractly."

**CI 83**      **SC 83.5**      **P152**      **L 14**      # **415**  
Ganga, Ilango      Intel

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

typo, change to "specified"

line 23, typo change to "adjascent"

**SuggestedRemedy**  
per comment

**Proposed Response**      **Response Status W**  
PROPOSED ACCEPT.

**CI 83**      **SC 83.6**      **P152**      **L 3435**      # **625**  
CHANG, Frank      Vitesse

**Comment Type ER**      **Comment Status D**

Since the TF decide not to define optical modules with 2x20g or 40g, so feel it is not appropriate to define the possible numbers of input of 2, 1 for 40GBASE-R. Same for 100GBASE-R with 2,1.

**SuggestedRemedy**  
Suggest to take it out.

**Proposed Response**      **Response Status W**  
PROPOSED ACCEPT IN PRINCIPLE.

Needs to be reconciled with what we decide to do with Table 83-1. Note that the text indicates that the number of POSSIBLE input or output lanes is among the listed values, which is accurate, but we need to have an agreement on the best way to describe the difference between what is supported by the architecture and what is specified in the initial version of the standard.

CI **83** SC **83.6** P**156** L**3** # **469**  
 Dudek, Mike JDSU

Comment Type **T** Comment Status **A**  
 I agree that 8ones followed by 8 zeros is a good choice

SuggestedRemedy  
 Implement the 8one 8 zero and remove the TBD's

Response Response Status **C**  
 ACCEPT.

CI **83** SC **83.6.2** P**153** L**28** # **337**  
 Dawe, Piers Avago Technologies

Comment Type **T** Comment Status **R**  
 What does 'Tx PMA implemented synchronously with PCS' mean? For PMA implemented together with PCS, or integrated with PCS, surely the spec is 'Not applicable'?

SuggestedRemedy  
 For a Tx PMA receiving from the PCS, I believe 25 ps (which is 0.25 UI at 10 GBd) is adequate: see another comment for explanation.

Response Response Status **C**  
 REJECT.

Overtaken by events. The new skew budgets are expressed per exposed skew points and moved to clause 80. If the commenter is not satisfied, another comment can be submitted against clause 80. See comment 240.

CI **83** SC **83.6.2** P**153** L**3** # **416**  
 Ganga, Ilango Intel

Comment Type **E** Comment Status **D**  
 to be consistent change to R x (v/m)

also on line 8, change to R x (v/n)

SuggestedRemedy  
 per comment

Proposed Response Response Status **W**  
 PROPOSED REJECT.

R x (v/m)=(R x v)/m, so no help is needed to evaluate correctly

CI **83** SC **83.6.2** P**153** L**31** # **338**  
 Dawe, Piers Avago Technologies

Comment Type **T** Comment Status **R**  
 Other Tx PMA Dynamic Skew tolerance should not have unnecessary padding, as compensating the last couple of UI with analog circuitry costs power. I believe CEI have a 1.5 UI limit for 'Relative Wander' (their term for Dynamic Skew). 'bits/VL' would need explaining.

SuggestedRemedy  
 Make this 150 ps (which is 1.5 UI at 10 GBd). Don't quote bits/VL.

Response Response Status **C**  
 REJECT.

Overtaken by events. The new skew budgets are expressed per exposed skew points and moved to clause 80. If the commenter is not satisfied, another comment can be submitted against clause 80. See comment 240.

CI **83** SC **83.6.6** P**154** L**34** # **628**  
 CHANG, Frank Vitesse

Comment Type **TR** Comment Status **A**  
 In 83.6.6, PMA loopback mode should support lineside loopback and diagnostic loopback functions.

SuggestedRemedy  
 Suggest to define two kinds of loopback. in addition to lineside loopback illustrated in Fig 83-5, add the host-side loopback as 2nd option.

Response Response Status **C**  
 ACCEPT IN PRINCIPLE.

Overtaken by events. See 643.

CI 83 SC 83.6.6 P154 L 39 # 640  
Ganga, Ilango Intel

Comment Type T Comment Status A

As per the 83.6.6 the "uppermost" PMA in the stack provides loopback function. It is ambiguous which one is the "uppermost", on the linkside or the host side?

Also in a stacked PMA where the PMA's are separated, loop back is desirable in both places in the stack. E.g MAC/PCS/PMA implemented in a separate chip and PMA/PMD or PMA/FEC/PMA/PMD in a separate chip.

#### SuggestedRemedy

Clarify the term "uppermost" PMA in 83.6.6.

Response Response Status C

ACCEPT IN PRINCIPLE.

See comment #143 which contains a suggested remedy.

CI 83 SC 83.6.6 P154 L 39 # 143  
D'Ambrosia, John Force10 Networks

Comment Type ER Comment Status D Review

Description of the multi-stage PMA concept is confusing

#### SuggestedRemedy

At the PMA service interface, the uppermost PMA in a set of one or more stacked PMAs may provide a loopback function. The function involves looping back each input lane of the uppermost Tx PMA to an output lane of the uppermost Rx PMA.

to

The uppermost PMA stage in a set of one or more s PMA stages may provide a loopback function. The function involves looping back each input lane of the uppermost Tx PMA stage to an output lane of the uppermost Rx PMA stage.

Presentation to be provided.

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 83 SC 83.6.6 P154 L 43 # 339  
Dawe, Piers Avago Technologies

Comment Type T Comment Status R

Lane mapping in loopback: as fibre-optic PMDs can't do loopback, one wants the PMA loopback to occur near the bottom of any tree of PMAs (e.g. this from 48.3.3 'NOTE-The signal path that is exercised in the Loopback mode is implementation specific, but it is recommended that this signal path encompass as much of the circuitry as is practical.' A  $2^n-1$  PRBS spread across 4 lanes is four  $2^{n-1}$  PRBSs, so I think we can still validate working silicon if the lanes get mixed up. Although if the silicon is faulty, it may be harder to know which lane is at fault.

#### SuggestedRemedy

Expect and allow the lanes to be repositioned in loopback.

Response Response Status C

REJECT.

Note that this applies to the proposed line side loopback rather than the existing host side loopback. As the comment observes, if you mix up the lanes, you can't tell which lane is at fault as the fault may be at the Tx or Rx. Other comments propose separate error counters per lane. This capability seems most useful if you do not mix up the lanes. If this refers to line side loopback, it has been overtaken by events. See comment 643. Not entirely sure if commenter was referring to system or line side loopback, but in either case, you shouldn't mix up the lanes as it reduces diagnostic ability. You can't gearbox a PRBS if this is what was intended.

CI 83 SC 83.6.7 P155 L 25 # 231  
Gustlin, Mark Cisco

Comment Type TR Comment Status A

Officially adopt the test pattern strategy that is described here. Delete the editor's note.

#### SuggestedRemedy

Remove:

"[Editor's Note (to be removed prior to publication): There is no adopted baseline for test patterns - the following is a placeholder based on gustlin\_03\_0708.pdf]"

Response Response Status C

ACCEPT.

**CI 83**      **SC 83.6.7**      **P155**      **L 38**      # **243**  
Meyer, Jeffrey      Centellax

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

Why is PRBS9 used for the short pattern? There are many more test equipment vendors and FPGA vendor cores for the ITU-T V.29 PRBS7 with  $1+x^6+x^7$  polynomial. It is shorter and quicker to see ISI evolving on a sampling scope.

**SuggestedRemedy**  
Use the ITU-T V.29 PRBS polynomial

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

See comment #232 for the editor's note to be added.

**CI 83**      **SC 83.6.7**      **P155**      **L 38**      # **232**  
Gustlin, Mark      Cisco

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

Add in support for a PRBS9 pattern.

**SuggestedRemedy**  
Change: "When transmit PRBS31 test pattern (see 49.2.8) is enabled (TBD - should a shorter pattern, e.g., PRBS9 (see 68.6.1) be included also?), the PMA generates a PRBS31 pattern on each of its output lanes."

To: "When transmit PRBS31 test pattern (see 49.2.8) is enabled, the PMA generates a PRBS31 pattern on each of its output lanes. When transmit PRBS9 test pattern is enabled, the PMA generates a PRBS31 pattern on each of its output lanes."

Also add in anywhere else in the clause where it is appropriate the support for the PRBS9.

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

Add an editor's note indicating that there is agreement to add support for a short test pattern, and it is TBD whether that pattern is PRBS7, PRBS9, or a manufactured pattern. Operation of the short test pattern can be specified while the pattern itself is TBD. Editorial license.

**CI 83**      **SC 83.6.7**      **P155**      **L 39**      # **629**  
CHANG, Frank      Vitesse

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

Agree with Editor comment on PRBS31 pattern is too long.

**SuggestedRemedy**  
Suggest to add short patterns like PRBS7, PRBS9 or even CJPAC etc in the text. (PRBS9 is well established in LRM.)

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

See comment #232 for the editor's note to be added

**CI 83**      **SC 83.6.7**      **P155**      **L 39**      # **468**  
Dudek, Mike      JDSU

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

It would be highly desirable to include the prbs9 function as suggested in the TBD note

**SuggestedRemedy**  
Add the PRBS9 test pattern.

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.  
See comment #232 for the editor's note to be added.

**CI 83**      **SC 83.6.7**      **P155**      **L 47**      # **531**  
Ofelt, David      Juniper Networks

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

Response to the Editor's question about should the BIST logic report errors per lane...

**SuggestedRemedy**  
I think that we either need to provide a error counter per lane or there needs to be registers that capture the lane number of the first lane to see errors and then the error count for that lane.

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

[Changed subclause 6.7 to 83.6.7]

Provide pattern error counters per lane. Assuming BIST refers to a self-test other than the pattern interface tests, this is out of scope and should be rejected..



CI 83 SC 83.6.7 P155 L 67 # 89  
 Szczepanek, Andre Texas Instruments

Comment Type T Comment Status R

Whilst defining the operation of the PRBS error counter for the PMA, the deficiencies of the current 10GBASE-R function should be considered.

The self-synchronous descrambling of the PRBS31 sequence shown in Figure 49-11 is both inaccurate and costly to implement.

1) The error count is 3x the number of received error bits only if errored bits do not appear 3 or 28 bits apart (the PRBS tap separation). So in bursty environments the count will not be 3x the number of errors.

2) Compliance with the Figure 49-11 requires the ability to increment a counter at 10Ghz. Any practical implementation will have to be implemented in parallel and increment a counter at a lower rate (create a backlog of increments and do them whilst no errors are received).

Absolute compliance to Figure 49-11 at high bits rates is not practical.

Aggregation of these counters to 40/100G will only compound these issues

SuggestedRemedy

Set an accuracy limit for the error counter

eg indicate that the counter need only be bit accurate at error rates above say 1e-4, and for burst lengths of say less than 32bits

Response Response Status C

REJECT.

[Changed subclause 6.7 to 83.6.7]

Presentations made so far were entirely reuse of PRBS31 from 10GBASE-R. Need a presentation to justify why this cannot be reused and why the proposed alternative approach would be more feasible and would provide equivalent verification of the lanes.

CI 83 SC 83.7 P156 L 8 # 136  
 D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D  
 registers provide information., not "may provide"

SuggestedRemedy

change

The optional MDIO capability described in Clause 45 describes several variables that may provide control and status information for and about the PMA. Mapping of MDIO control variables to PMA control variables is shown in Table 83-3.

to

The optional MDIO capability described in Clause 45 describes several variables that provide control and status information for and about the PMA. Mapping of MDIO control variables to PMA control variables is shown in Table 83-3.

Proposed Response Response Status W  
 PROPOSED ACCEPT.

CI 83A SC 3.4 P286 L 33 # 602  
 Ghiasi, Ali Broadcom

Comment Type ER Comment Status D  
 please replace +- with symbol

SuggestedRemedy

Replace with the frame symbol

Proposed Response Response Status W  
 PROPOSED ACCEPT.

CI 83A SC 3.4 P286 L 41 # 598  
 Ghiasi, Ali Broadcom

Comment Type TR Comment Status R  
 With faster process 24 ps is becoming limits the desing options

SuggestedRemedy

Change 24 ps Rise/Fall time to 20 ps

Response Response Status C  
 REJECT.

Technical justification needs to be provided to support comment. Concern that faster rise impact SI were voiced.

CI **83A** SC **3.4** P **286** L **46** # **597**  
 Ghiasi, Ali Broadcom  
 Comment Type **TR** Comment Status **A**  
 Error rate for the Total jitter not defined  
 SuggestedRemedy  
 Add note TJ defined at BER 1E-15 with value of 0.64 UI  
 Response Response Status **C**  
 ACCEPT IN PRINCIPLE.  
 Remedy provided in comment#596

CI **83A** SC **831.3.3** P **283** L **11** # **651**  
 Li, Mike Altera  
 Comment Type **TR** Comment Status **A**  
 Transmitter equalization is not defined. As such channel jitter will be specified with the assumption that ISI is not compensated. This will eat the DJ margin of Tx and Rx while most of them today have the equalization capabilities.  
 Not defining equalization will result in expensive nXAUI specification, with ready silicon equalization unused.  
 SuggestedRemedy  
 Technical proposal is needed and approved to determine what type of equalization is best suitable for nXAUI channel (Tx, Rx, Tx+Rx) in terms of cost and performance.  
 Response Response Status **C**  
 ACCEPT IN PRINCIPLE.  
 Add Editors note: [83A.3.3- transmitter eyemask as defined in figure 83A-5 is not considered a sufficient description to guarantee performance; additional test methods are required]

CI **83A** SC **83A** P **279** L **1** # **278**  
 Anslow, Peter Nortel Networks  
 Comment Type **E** Comment Status **D**  
 This Note says "NOTE-This annex is numbered in correspondence to its associated clause; i.e., Annex 83A corresponds to Clause 83." However, the only Annex with a note of this kind is the first one, Annex 4A  
 SuggestedRemedy  
 Remove the note  
 Proposed Response Response Status **W**  
 PROPOSED ACCEPT IN PRINCIPLE.

CI **83A** SC **83A** P **280** L **1** # **649**  
 Li, Mike Altera  
 Comment Type **TR** Comment Status **A**  
 BER for the nXAUI link needs to be defined  
 SuggestedRemedy  
 A proposal on the BER for nXAUI is needed and approved.  
 Response Response Status **C**  
 ACCEPT IN PRINCIPLE.  
 Remedy provided in #596.

CI **83A** SC **83A.1** P **280** L **31** # **170**  
 D'Ambrosia, John Force10 Networks  
 Comment Type **TR** Comment Status **A**  
 There is an issue with Fig 83A-1. The PMA blocks above and below the XLAUI / CAUI are labeled "PMA." While some may think this is just a naming nomenclature, it does have the potential to cause confusion, as there are very different functions inherent in these PMA blocks.  
 SuggestedRemedy  
 Replace Fig 83A-1 with Fig 83-2, except only shadowed areas are the two AUIs.  
 Response Response Status **C**  
 ACCEPT.  
 Replace Fig 83A-1 with Fig 83-2, except only shadowed areas are the two AUIs.

CI **83A** SC **83A.1** P **281** L # **196**  
Mezer, Amir Intel

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

The XLAUI/CAUI specification is such that:

- The transmit test point is defined right at the transmitter output.
- The channel is normative
- The receiver test point is defined right at the receiver input.

The question is:

Whose responsibility is it to ensure that the receiver input meets the specification defined in 83A.3.4.2 "Input signal definition"?

There may be a situation where each of the components meets the spec. requirements but the system does not work, i.e.

- The transmitter meets the spec. requirements at its input.
- The channel meets its specifications.
- The receiver operates flawlessly with the input signal as defined in 83A.3.4.2.

But, since the resultant receiver input Of transmitter+channel is not a requirement, the actual input signal will be different and the system will not work.

#### SuggestedRemedy

Leave the normative channel requirements.

Change the transmit test point so that it is tested at the receiver input.

If the transmitter meets the requirements, this will ensure a minimal input signal for the receiver.

In addition, define the transmitter spec. requirements at that point so that they match 83A.3.4.2 "Input signal definition".

Response Response Status **C**

ACCEPT IN PRINCIPLE.

See comment #651.

CI **83A** SC **83A.1** P **281** L **16** # **360**  
Dawe, Piers Avago Technologies

Comment Type **T** Comment Status **R**

Isn't it quite feasible to interoperate between a nAUI lane and an XFI spec part? Even to comply to both at once?

#### SuggestedRemedy

Unless this is not so, say that this spec is similar to XFI (part of XFP), add reference for XFP document.

Response Response Status **C**

REJECT.

Although this is feasible, there may be risks in explicitly stating it is interoperable with XFI. XFI loss budget including connector at 5.5GHz is 6dB. nAUI is looking at a 10dB budget.

CI **83A** SC **83A.1** P **281** L **3** # **638**  
CHANG, Frank Vitesse

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

I donot agree XLAUI or CAUI is just for chip-to-chip interconnect, this is only true for nx10g MMF module with non-retimed interface. For optical 4x25g SMF or 4x10g X40 modules, CAUI or XLAUI could be interface connecting optical modules to host oard.

#### SuggestedRemedy

Suggest the change as:

The purpose of the XLAUI or CAUI is to provide a flexible chip-to-chip internection as well as the connection between optical module and host ASIC board.....

Response Response Status **C**

ACCEPT IN PRINCIPLE.

change to:

The purpose of the XLAUI or CAUI is to provide a flexible chip-to-chip internection as well as the connection between optical module and the host .....

CI **83A** SC **83A.1** P **281** L **6** # **291**  
Anslow, Peter Nortel Networks

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

Several very minor editorial issues in clause 83A collected in to one comment.

#### SuggestedRemedy

Change "example application of XLAUI includes providing lane" to "example application of XLAUI is to provide lane" page 281 line 6

Remove spurious empty paragraph from page 282 line 39

Use the +- symbol (Ctrl-q 1) page 283 line 14 and page 286 line 32

Use Greater than or equal to sign (Ctrl-q 3) and Less than or equal to sign (Ctrl-q #) page

284 line 38, page 285 line 2 and page 288 line 5

Space missing in "10MHz" page 284 line 48

Proposed Response Response Status **W**

PROPOSED ACCEPT.

**CI 83A**    **SC 83A.1.1**    **P 281**    **L 23**    # 512

Dudek, Mike    JDSU

**Comment Type**    **T**    **Comment Status**    **R**

I think that XLAUI and CAUI can only be used between PMA's not between other layers in the model

**SuggestedRemedy**

Delete bullet a)

**Response**    **Response Status**    **C**

REJECT.

Electrical interface can be used in other areas

**CI 83A**    **SC 83A.2**    **P 282**    **L 19**    # 328

Dawe, Piers    Avago Technologies

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

The primary purpose of the nAUI spec is the same as the XFI spec at 10G: to provide a standardised and interoperable spec for plugging retimed transceiver modules into line cards or similar. Like XFI (part of XFP), it needs to take a connector into account (does not need to define the connector mechanicals) and define the compliance points with reference to the connector.

**SuggestedRemedy**

Use the six TP compliance points defined in 86.7.1, relegate the points in Fig 83A-2 to informative reference points like A and D in SFP+.

**Response**    **Response Status**    **C**

REJECT.

Additional compliance points may be required in nAUI, but they may not be the same six TP defined in 86.7.1.

Additional presentation material required.

**CI 83A**    **SC 83A.2.2**    **P 282**    **L 11**    # 218

Mellitz, Richard    Intel Corporation

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

Its not clear how to perform Tx and Rx compliance testing without details of context.

**SuggestedRemedy**

Define test fixtures and coordinate test point through out document.

**Response**    **Response Status**    **C**

ACCEPT IN PRINCIPLE.

Remedy provided in comment#556.

**CI 83A**    **SC 83A.2.2**    **P 282**    **L 20**    # 555

Ghiasi, Ali    Broadcom

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

Transmitt and Receive function are missing from Fig 83A

**SuggestedRemedy**

Please add transmitt and receive function to Fig 83A

**Response**    **Response Status**    **C**

ACCEPT IN PRINCIPLE.

Please add transmitt and receive function to Fig 83A (see figure 85.2)

Cl **83A** SC **83A.3.2** P **282** L **53** # **556**  
 Ghiasi, Ali Broadcom

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

Missing definition of loss between transmitt and receive complinace points, add definition for transmitt and receive compliance points

*SuggestedRemedy*

Transmitt Compliance Point - Any interconnect may be used between the XLAUI/CAUI transmitt functon and Transmitt Compliance Point as long as transmitter parameters of Table 83A-1 are met.

Receive Compliance Point - The interconnect from the Receive Compliance Point to the XLAUI/CAUI receive function including AC coupling SDD21 response shall be  $SDD21(dB) \geq (-0.007 - 0.1684 * \sqrt{f} - 0.0617 * f)$   
 f is given in GHz.  
 SDD21 loss a Nyquist is 0.7 dB and 0.2 larger than SFP+ loss.

Response Response Status **C**

ACCEPT IN PRINCIPLE.

Add 83A.2.1-Transmitters Compliance Points for the transmitter - Any interconnect which has a loss less than (SDD21(dB) (TBD) )  
 f is given in GHz) between the XLAUI/CAUI transmit pin and Transmit Compliance Point may be used as long as transmitter parameters of Table 83A-1 are met.

Add 83A.2.2- Receivers Compliance Points for the receivers - Any interconnect which has a loss less than (SDD21(dB) (TBD) )  
 f is given in GHz) between the XLAUI/CAUI receive pin and Receive Compliance Point may be used as long as receiver parameters of Table 83A-2 are met.

Cl **83A** SC **83A.3.2** P **283** L **37** # **562**  
 Ghiasi, Ali Broadcom

Comment Type **TR** Comment Status **A** Jitter

PWS (Pulse Width Shrinkage) a critical parameter on transmitter high frequency performance is missing from lis tof parameters in table 83A-1.

*SuggestedRemedy*

Puurpose to add PWS (Pulse Width Shrinkage) with 0.12 UI value.  
 PWS is measured per FC-PI-4 Annex A.1.3.2 using PRBS9 pattern

Response Response Status **C**

ACCEPT IN PRINCIPLE.

[Editor's note: proposals for jitter methodology to be submitted against D1.1 for completion of TBDs]

Cl **83A** SC **83A.3.3** P **282** L **27** # **567**  
 Ghiasi, Ali Broadcom

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

With faster processes 24 ps transition time starting to be an issue

*SuggestedRemedy*

Suggest to change 24 ps to 20 ps

Response Response Status **C**

REJECT.

Presentation material was requested to support comment. SI concrns were raised regarding faster rise time.

**Cl 83A**    **SC 83A.3.3**    **P 283**    **L 11**    # **215**  
Mellitz, Richard    Intel Corporation

**Comment Type**    **T**    **Comment Status**    **A**  
Jitter not consistent with electrical characteristics of 10GBASE-KR/ 40GBASE-KR

**SuggestedRemedy**  
Add:  
  
Max output jitter (peak-to-peak)  
Random jitter  
Deterministic jitter  
Duty Cycle Distortion

**Response**    **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

Remedy provided in #562.

**Cl 83A**    **SC 83A.3.3**    **P 283**    **L 11**    # **652**  
Li, Mike    Altera

**Comment Type**    **TR**    **Comment Status**    **A**  
Jitter transfer function (JTF) is not defined for Tx jitter definition/testing. This will grossly oversetimate the jitter, leaving the jitter margin created by clock and data recovery (CDR) unused, resulting in expensive nXAUI specification.

**SuggestedRemedy**  
Technical proposal for JTF associated with CDR is needed and approved.

**Response**    **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

Add to 83A.4.3.1 - The clock recovery unit (CRU) used in the transmit jitter measurement has a corner frequency of less than or equal to 4 MHz and a slope of -20 dB/decade (need figure consistent with text). When using a CRU as a clock for jitter measurements.

**Cl 83A**    **SC 83A.3.3**    **P 283**    **L 12**    # **599**  
Ghiasi, Ali    Broadcom

**Comment Type**    **TR**    **Comment Status**    **A**  
Transmitt compliance not yet defined

**SuggestedRemedy**  
Purpose to use ghiasi\_01\_0708 min and max loss channel for transmitter compliance subset of s4p file can be included in the draft for either soft testing or building actual boards

**Response**    **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

Remedy provided in comment#651.

**Cl 83A**    **SC 83A.3.3**    **P 283**    **L 14**    # **601**  
Ghiasi, Ali    Broadcom

**Comment Type**    **ER**    **Comment Status**    **D**  
please replace +- with symbol

**SuggestedRemedy**  
Replace with the frame symbol

**Proposed Response**    **Response Status**    **W**  
PROPOSED ACCEPT.

**Cl 83A**    **SC 83A.3.3**    **P 283**    **L 14**    # **74**  
Chung, Hwan Seok    ETRI

**Comment Type**    **T**    **Comment Status**    **A**  
Across the entire document D1.0, the usual description of signaling speed per lane (range) in table is 10.3125 +- 100 ppm. So, to maintain consistency, the signaling speed per lane in Table 83A-1 should be "10.3125 +- 100 ppm" not "10.3125 GBd +- 100 ppm". In addition, the +- sign should be changed to mathematical symbolic font style.

**SuggestedRemedy**

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

So, to maintain consistency, the signaling speed per lane in Table 83A-1 should be "10.3125 +- 100 ppm" not "10.3125 GBd +- 100 ppm". In addition, the +- sign should be changed to mathematical symbolic font style.

**Cl 83A**    **SC 83A.3.3**    **P 283**    **L 16**    # 181  
 Alping, Arne    Ericsson AB

**Comment Type**    **ER**    **Comment Status**    **D**  
 96.96969697 (too many significant numbers)

**SuggestedRemedy**  
 Change to: 96.9697 ps

(compare to, e.g, Table 85-4 on page 181)

**Proposed Response**    **Response Status**    **W**  
 PROPOSED REJECT.

[Editor's note: Corrected / replaced table number in subclause field with 83A.3.3]

See comment # 362

**Cl 83A**    **SC 83A.3.3**    **P 283**    **L 21**    # 361  
 Dawe, Piers    Avago Technologies

**Comment Type**    **E**    **Comment Status**    **D**  
 Table too narrow

**SuggestedRemedy**  
 Resize LH column to contents

**Proposed Response**    **Response Status**    **W**  
 PROPOSED ACCEPT.

**Cl 83A**    **SC 83A.3.3**    **P 283**    **L 28**    # 514  
 Dudek, Mike    JDSU

**Comment Type**    **T**    **Comment Status**    **A**  
 In table 83A-1 it would be good to reference the rise/fall test methodology as with a Tx with pre-emphasis the value depends greatly on the exact methodology.

**SuggestedRemedy**  
 Add footnote d to the Rise/fall time row. Footnote d to say "Rise and Fall times are defined in 83A.4.4

**Response**    **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

Add foot note which says "Rise/Fall time measurement methodology defined in 83A.4.4

**Cl 83A**    **SC 83A.3.3**    **P 283**    **L 29**    # 279  
 Anslow, Peter    Nortel Networks

**Comment Type**    **E**    **Comment Status**    **D**  
 In table 83A-1 the specification for the Differential Output S-parameters is "(see "Equation 83A-1")". This should refer to the clause defining the requirement not just the equation. This also applies to the next row in this table and also two places in Table 83A-2

**SuggestedRemedy**  
 Change "(see "Equation 83A-1")" to "see 83A.3.3.3" in the next row change "(see "Equation 83A-2")" to "see 83A.3.3.4" in Table 83A-2 change "(see "Equation 83A-3")" to "see 83A.3.4.4" in Table 83A-2 change "(see "Equation 83A-4")" to "see 83A.3.4.5"

**Proposed Response**    **Response Status**    **W**  
 PROPOSED ACCEPT.

**Cl 83A**    **SC 83A.3.3**    **P 283**    **L 32**    # 295  
 Anslow, Peter    Nortel Networks

**Comment Type**    **T**    **Comment Status**    **R**  
 In Table 86-6 There are two jitter parameters "Maximum Total Jitter" and "Maximum Deterministic Jitter" where it is not clear if this is UI peak to peak or not. Also applies to:  
 Table 83A-2 "Maximum Total Jitter"  
 Table 83A-2 "Maximum non-EQ Jitter (TJ - ISI)"

**SuggestedRemedy**  
 Either change the parameter names to include "(pk-pk)" or change the units to be UIptp

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

The definitions are inappropriate for pk-pk.

**Cl 83A**    **SC 83A.3.3**    **P 283**    **L 33**    # 596  
 Ghiasi, Ali    Broadcom

**Comment Type**    **TR**    **Comment Status**    **A**  
 Error rate for the Total jitter not defined

**SuggestedRemedy**  
 Add note TJ defined at BER 1E-15

**Response**    **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

[Editors note state condition for total jitter error rate at 1E-15 is proposed]  
 Place note 83A.1.1

**Cl 83A** **SC 83A.3.3** **P 283** **L 35** # **566**  
 Ghiasi, Ali Broadcom  
**Comment Type** **TR** **Comment Status** **A**  
 The classical DJ and RJ measured jitter are jitter PDF dependent and not valid for jitter distribution which are not dual-dirac.  
**SuggestedRemedy**  
 To limit the uncorrelated jitter add UJ of 0.025 UI (RMS) per IEEE CL 68.6.8 method  
 Replace DJ with DDJ of 0.17 UI per method of FC-PI4 A.1.3.1 with PSBS 9 pattern  
**Response** **Response Status** **C**  
 ACCEPT IN PRINCIPLE.

Remedy provided in #562.

**Cl 83A** **SC 83A.3.3** **P 283** **L 7** # **513**  
 Dudek, Mike JDSU  
**Comment Type** **T** **Comment Status** **A**  
 Spurious precision in the Baud period. The tolerance of the signaling rate is +/-100ppm and is only listed to 6 significant digits  
**SuggestedRemedy**  
 Round the Baud period to 6 significant figures here and in tables 83A-1 and 83A-2  
**Response** **Response Status** **C**  
 ACCEPT IN PRINCIPLE.  
 See remedy in 362.

**Cl 83A** **SC 83A.3.3** **P 283** **L 7** # **362**  
 Dawe, Piers Avago Technologies  
**Comment Type** **T** **Comment Status** **A**  
 If you have stated the signalling rate there is no need to give the unit interval, and 'Baud period' is slang.  
**SuggestedRemedy**  
 Delete 'The corresponding Baud period is nominally 96.96969697 ps.' and the similar row in Table 83A-1.  
**Response** **Response Status** **C**  
 ACCEPT.  
 Delete 'The corresponding Baud period is nominally 96.96969697 ps.' and the similar row in Table 83A-1 and the similar row in Table 83A-2.

**Cl 83A** **SC 83A.3.3** **P 283** **L 8** # **180**  
 Alping, Arne Ericsson AB  
**Comment Type** **ER** **Comment Status** **D**  
 ...is nominally 96.96969697 ps... (to many significant numbers)  
**SuggestedRemedy**  
 Change to: ...is nominally 96.9697 ps...  
 (compare to, e.g. Table 85-4 on page 181)  
**Proposed Response** **Response Status** **W**  
 PROPOSED REJECT.  
 See comment # 362

**Cl 83A** **SC 83A.3.3.1** **P 284** **L 19** # **280**  
 Anslow, Peter Nortel Networks  
**Comment Type** **E** **Comment Status** **D**  
 The title of Figure 83A-3 is "Figure 83A-3-Driver output voltage limits and definitions [SLi<P> and SLi<N> are the positive and negative sides of the differential signal pair for lane i (i = 0, 1, 2, 3 for XLAUI. For CAUI i = 0:9)]". The text within the square brackets should not be part of the figure title.  
**SuggestedRemedy**  
 Move this text to be a note under the figure as is done for Figure 85-2 and 85-9  
**Proposed Response** **Response Status** **W**  
 PROPOSED ACCEPT.

**Cl 83A** **SC 83A.3.3.2** **P 284** **L 22** # **492**  
 Dudek, Mike JDSU  
**Comment Type** **T** **Comment Status** **A**  
 Transition time appears to be the same as rise/fall time. If they are the same they should be called the same thing here and in table 83A-1, and 83A.4.4  
**SuggestedRemedy**  
 Change "Transition time" to "Rise/fall time" in the title of this subclause and in the first sentence.  
**Response** **Response Status** **C**  
 ACCEPT.  
 Change "Transition time" to "Rise/fall time" in the title of this subclause and in the first sentence.



CI **83A** SC **83A.3.3.3** P**284** L**37** # **211**  
 Mellitz, Richard Intel Corporation

Comment Type **ER** Comment Status **D**

Avoid s-parameter designations and keep loss definition consistent in document.

SuggestedRemedy

Make loss positive dB

Proposed Response Response Status **W**

PROPOSED ACCEPT IN PRINCIPLE.

Changes also required in PPI. Require suggestion to avoid s-parameter designations.

CI **83A** SC **83A.3.3.3** P**284** L**41** # **611**  
 Ganga, Ilango Intel

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

Update the the Return loss definition and plots to be consistent with the definition and plots in the base standard (IEEE Std 802.3-2008, Annex 69B)

The Return Loss limits in Figure 83A-4 and Figure 83A-7 to be plotted in log linear scale with loss being positive (See 69B.4.5)

SuggestedRemedy

Response Response Status **C**

ACCEPT.

Require values for return loss definition and plots which are consistent with Annex 69B.

See remedy 139.

CI **83A** SC **83A.3.3.3** P**284** L**42** # **363**  
 Dawe, Piers Avago Technologies

Comment Type **ER** Comment Status **D**

Editor's note says 'The Return Loss limits in Figure 83A-4 and Figure 83A-7 may have to be plotted in log linear scale with loss being positive. The definition or formatting to be reconciled similar to the definition or plots in base spec 802.3-2008 Annex 69B'. Just because another clause did or didn't use a log frequency scale does not tie our hands. Just because another clause didn't use S-parameters doesn't preclude us from using S-parameters.

SuggestedRemedy

Do the right thing for our circumstances. S-parameters are good. Vertical grid lines would be welcome.

Proposed Response Response Status **W**

PROPOSED REJECT.

Although I am always up for doing the right thing, I think the group is leaning towards reusing Annex 69B

CI **83A** SC **83A.3.3.3** P**285** L**1** # **212**  
 Mellitz, Richard Intel Corporation

Comment Type **ER** Comment Status **D**

Avoid s-parameter designations and keep loss definition consistent in document.

SuggestedRemedy

Make loss positive dB in Figure 83a-4

Proposed Response Response Status **W**

PROPOSED ACCEPT IN PRINCIPLE.

Input required on how to avoid s-parameter designations.

SDD21 for PPI also in (-)

See Figure 86-4

CI **83A** SC **83A.3.3.4** P **284** L **50** # **603**  
 Ghiasi, Ali Broadcom

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

The reference impedance for differential return loss measurement is 100 ohms in the common mode section

*SuggestedRemedy*

please change to "The reference impedance for common mode s-parameters measurement is 25 ohms.

Response Response Status **C**

ACCEPT.

CI **83A** SC **83A.3.3.4** P **285** L **9** # **139**  
 D'Ambrosia, John Force10 Networks

Comment Type **E** Comment Status **A**

Fig 83A-4 is inconsistent with similar diagrams in 802.3

*SuggestedRemedy*

correct figure. Updated figure to be provided.

Response Response Status **C**

ACCEPT.

Correct figure. Updated figure in D'Ambrosia\_03\_11\_08.pdf and changes listed below.

Change high confidence region to pass region.

Delete SDD22 and SCC22. Add differential to return loss and common mode return loss.

0 db at the top for loss based impairments.

CI **83A** SC **83A.3.3.5** P **286** L **18** # **493**  
 Dudek, Mike JDSU

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

misalignment of label

*SuggestedRemedy*

Move the labels X2 and 1-X2 to line up with the dotted lines.

Proposed Response Response Status **W**

PROPOSED ACCEPT.

CI **83A** SC **83A.3.4** P **286** L **1225** # **600**  
 Ghiasi, Ali Broadcom

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

Inteference tolerance test not yet defined

*SuggestedRemedy*

Puopose to use ghiasi\_01\_0708 min and max loss channelas the frequency dependent attenuator in 69A.2 test setup followed by a limiting Amplifier prior to inteference injection. TP1 must have maximum jitter as defiend in table 83A-1. Pre-emphasais can be adjusted to reach the TP4 J2=0.42 UI, Inteference generator then adsjuted to increase the total jitter to value listed in table 83A-2

Response Response Status **C**

ACCEPT IN PRINCIPLE.

Add Editors note 83A.4.3.2 :[ An interference tolerance test is required]

CI **83A** SC **83A.3.4** P **286** L **25** # **216**  
 Mellitz, Richard Intel Corporation

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

Receiver compliance not consistent with electrical characteristics of 10GBASE-KR/40GBASE-KR

*SuggestedRemedy*

Use section 69A (Interference tolerance testing)

Response Response Status **C**

ACCEPT IN PRINCIPLE.

Response provided in comment#600.

CI **83A** SC **83A.3.4** P **286** L **34** # **182**  
 Alping, Arne Ericsson AB

Comment Type **ER** Comment Status **D**  
 96.96969697 (too many significant numbers)

SuggestedRemedy  
 Change to: 96.9697 ps

(compare to, e.g, Table 85-4 on page 181)

Proposed Response Response Status **W**  
 PROPOSED REJECT.

[Editor's note: Corrected / replaced table number in subclause field with 83A.3.4]

See comment # 362

CI **83A** SC **83A.3.4** P **286** L **41** # **494**  
 Dudek, Mike JDSU

Comment Type **T** Comment Status **A**  
 In table 83A-2 it would be good to reference the rise/fall test methodology

SuggestedRemedy  
 Add footnote d to the Rise/fall time row. Footnote d to say "Rise and Fall times are defined in 83A.4.4

Response Response Status **C**  
 ACCEPT.

Add footnote d to the Rise/fall time row. Footnote d to say "Rise and Fall times are defined in 83A.4.4

CI **83A** SC **83A.3.4** P **286** L **4647** # **648**  
 Li, Mike Altera

Comment Type **TR** Comment Status **A**  
 The frequency spectrum content needs to be specified. Otherwise one may use a easy spectrum jitter input (e.g., low frequency dominated) to pass the receiver tolerance test, while such a receiver will fail in the presence of worst case jitter input spectrum (e.g., high-frequency DCD, ISI, Xtalk, or RJ) in real-world.

SuggestedRemedy  
 A technical proposal is needed and approved to address this important aspect for Rx.

Response Response Status **C**  
 ACCEPT IN PRINCIPLE.

Add editors note: in jitter test methodology need a proposal to use a reference clock recovery unit.

CI **83A** SC **83A.3.4** P **286** L **48** # **650**  
 Li, Mike Altera

Comment Type **TR** Comment Status **A**  
 Non-Eq jitter is NOT (TJ-ISI) and needs to be well-defined, and (TJ-ISI) needs to be removed.

SuggestedRemedy  
 remove TJ-ISI for non-EQ jitter and spell-out and exactly what is No-EQ jitter e.g., DCD, PJ, BUJ, RJ).

Response Response Status **C**  
 ACCEPT IN PRINCIPLE.

Remedy provided in #562.

**Cl 83A**    **SC 83A.3.4.1**    **P 287**    **L 8**    # **238**  
 Gustlin, Mark    Cisco

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

Currently the BER target is TBD. Change this to a BER of 10-15. The PMD BER target is 10-12, but if you have two CAUI/XLAUI interfaces in series with a PMD interface, all with a BER of 10-12, you won't meet the overall goal of 10-12. In addition this is a chip to chip interface which typically requires a higher BER target. 10-15 seems to be a reasonable and achievable target.

**SuggestedRemedy**  
 Change: "The receiver shall operate with a BER of better than TBD in the presence of a reference input signal as defined in 83A.3.4.2"

To:  
 "The receiver shall operate with a BER of better than 10<sup>-15</sup> in the presence of a reference input signal as defined in 83A.3.4.2"

**Response**    **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

[Editor's note: corrected Clause number from 83 to Annex 83A as this comment refers to Annex 83A]

**Cl 83A**    **SC 83A.3.4.4**    **P 287**    **L 52**    # **495**  
 Dudek, Mike    JDSU

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

There is still a lot of energy at frequencies below 50MHz. Having an unconstrained return loss at one end of the trace and only 12dB return loss at the other end can lead to large signal distortion.

**SuggestedRemedy**  
 Change 50MHz to 10 MHz here and in equation 83A-3 (page 288 line 4)

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

Change 50 MHz to 10 MHz here and in equation 83A-3 (page 288 line 4)

**Cl 83A**    **SC 83A.3.4.5**    **P**    **L**    # **140**  
 D'Ambrosia, John    Force10 Networks

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

Fig 83A-7 is inconsistent with similar diagrams in 802.3

**SuggestedRemedy**  
 correct figure. Updated figure to be provided.

**Proposed Response**    **Response Status**    **W**  
 PROPOSED ACCEPT.

**Cl 83A**    **SC 83A.3.4.5**    **P 286**    **L 48**    # **365**  
 Dawe, Piers    Avago Technologies

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

'non-EQ Jitter (TJ - ISI)' There's no definition of what 'non-EQ Jitter' means in this document, nor this usage of 'ISI'. I suspect if I saw one I would not agree with it ;-)

**SuggestedRemedy**  
 Find a better metric, or explain these terms.

**Response**    **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

Remedy provided in comment#562.

**Cl 83A**    **SC 83A.3.4.5**    **P 288**    **L 16**    # **213**  
 Mellitz, Richard    Intel Corporation

**Comment Type**    **ER**    **Comment Status**    **D**

Avoid s-parameter designations and keep loss definition consistent in document.

**SuggestedRemedy**  
 Make loss positive dB in Figure 83a-7

**Proposed Response**    **Response Status**    **W**  
 PROPOSED ACCEPT IN PRINCIPLE.

Input required on how to avoid s-parameter designations.

SDD21 for PPI also in (-)

See Figure 86-4

Cl **83A** SC **83A.3.4.5** P **288** L **23** # **364**  
 Dawe, Piers Avago Technologies

Comment Type **T** Comment Status **R**

As one of these lines is the same as a line in Fig 83A-4

*SuggestedRemedy*

Remove this figure and put the four limits (three traces) on Fig 83A-4 (extending the vertical scale to -16).

Response Response Status **C**

REJECT.

Consensus to keep independent limits lines to distinguish individual parameters are favoured.

Cl **83A** SC **83A.3.4.5** P **288** L **8** # **496**  
 Dudek, Mike JDSU

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

This section is descriptint SCD11 which is not common mode input return loss

*SuggestedRemedy*

Change the title of the section to "Reflected differential to common mode conversion.

Response Response Status **C**

ACCEPT IN PRINCIPLE.

Change the title of the section to " differential to common mode conversion"

Cl **83A** SC **83A.3.4.8** P **289** L **14** # **329**  
 Dawe, Piers Avago Technologies

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

It's not clear that these jitter specs allow the two concatenated CDRs and an optical link, XFP style, that will be wanted when connecting e.g. a 40GBASE-LR4 module.

*SuggestedRemedy*

Modify the jitter specifications to be sure they do. This may mean that the specs on the transmit side and receive side differ. See presentation.

Response Response Status **C**

REJECT.

It is not necessary for XAU1 / CAUI specifications to spell this out. nAU1 needs to ensure the nAU1 link works properly. TP2/3 needs to make sure the optical link works properly

Cl **83A** SC **83A.3.5** P **289** L **40** # **498**  
 Dudek, Mike JDSU

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

The Interconnect characteristics deserve their own section, not a subsection of the receiver (and partly in measurement methods) and are missing return loss

*SuggestedRemedy*

Make 83A.3.5 into 83A.4 (and relabel 83A.4)

Move present section 83A.4.1 and Figure 83A-9 into this new section.

Rename present 83A.4.1 to "Interconnect Loss"

Add to the Characteristic Impedance editors note (page 289 line 49) "and return loss specifications"

Response Response Status **C**

ACCEPT IN PRINCIPLE.

Editors note:[add 83A.4-resolve channel requirements i.e., normative or informative]

Make 83A.3.5 into 83A.4 (and relabel 83A.4)

Move present section 83A.4.1 and Figure 83A-9 into this new section.

Rename present 83A.4.1 to "Interconnect Loss"

Add to the Characteristic Impedance editors note (page 289 line 49) "and return loss specifications"

Cl **83A** SC **83A.4** P **290** L **7** # **217**  
 Mellitz, Richard Intel Corporation

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

Interconnect definition not consistent with electrical characteristics of 10GBASE-KR/40GBASE-KR Annex 69b.

*SuggestedRemedy*

Utilize style of IL, A, ILD, RL, and ICR in Annex 69b if parameters are applicable.

Response Response Status **C**

ACCEPT IN PRINCIPLE.

Editors note 83A.4 :[XLAUI / CAUI channel will consider using parameters 69B when appropriate.]

**Cl 83A**    **SC 83A.4.1**    **P 290**    **L 11**    # **214**  
 Mellitz, Richard    Intel Corporation

**Comment Type**    **ER**    **Comment Status**    **D**

Avoid s-parameter designations and keep loss definition consistent in document.

**SuggestedRemedy**  
 Make similar to Annex 69b

**Proposed Response**    **Response Status**    **W**  
 PROPOSED ACCEPT IN PRINCIPLE.

Additional material required on actual values

**Cl 83A**    **SC 83A.4.2**    **P 290**    **L 43**    # **497**  
 Dudek, Mike    JDSU

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

An eye mask that does not state at what probability it is to be met has led to confusion in the past.

**SuggestedRemedy**  
 Add to the editors note here "This section should include at what probability the eye mask has to be met"

or state the probabilities in Sections 83A.4.2 and 83A.3.3.5

**Response**    **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

Add to the editors note here ["This section should include at what BER the eye mask has to be met"]

**Cl 83A**    **SC 83A.4.3**    **P 291**    **L 28**    # **199**  
 SUZUKI, TOSHIHIRO    ANRITSU

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

For XLAUI/CAUI should be tested under the worst condition.  
 So jitter tolerance test should be executed with MLD pattern not PRBS.

**SuggestedRemedy**  
 So jitter tolerance test should be executed with MLD pattern not PRBS.

**Response**    **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

PRBS31 is defined as a PMA test pattern in 83.6.7

Editors note:83A.4.3- In addition to PRBS31, consider including appropriate patterns when performing jitter measurements e.g., MLD and other representative patterns.

**Cl 83A**    **SC 83A.5**    **P 291**    **L 36**    # **366**  
 Dawe, Piers    Avago Technologies

**Comment Type**    **T**    **Comment Status**    **R**

Like a PMA or PCS clause, nAUI is completely on a single line card or similar, so the draft doesn't need environmental specifications for it.

**SuggestedRemedy**  
 Delete the subclause

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

83A.5. Environmental specifications need to be addressed.

**Cl 83A**    **SC 83A3.3.3**    **P 283**    **L 11**    # **647**  
 Li, Mike    Altera

**Comment Type**    **TR**    **Comment Status**    **A**    **Jitter**

Pulse width jitter (PWJ) is needed at about 8Gbps or above to avoid jitter amplification (JA) due to the lossy channel. If PWJ is not defined and bounded, nXAUI link will break in the presence of large PWJ.

**SuggestedRemedy**  
 PWJ needs to be defined and specified. I suggest that 802.3ba adopt the definition and value similar to those of Fibre Channel 8X and PCIe Gen 3.

**Response**    **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.  
 Remedy provided in #562.

**Cl 84**      **SC 84.1**      **P159**      **L12**      # **62**  
 Sun Hyok, Chang      Electronics and Teleco

**Comment Type**    **T**      **Comment Status**    **A**  
 '40GBASE-KR' is wrong in the title of Table 84-1.

**SuggestedRemedy**  
 '40GBASE-KR' has to be replaced by '40GBASE-KR4'

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

[added 84 to subclause number in comment]

**Cl 84**      **SC 84.1**      **P159**      **L14**      # **63**  
 Sun Hyok, Chang      Electronics and Teleco

**Comment Type**    **T**      **Comment Status**    **A**  
 It is wrong that '10GBASE-KR' is written at line 14 of Table 84-1.

**SuggestedRemedy**  
 '10GBASE-KR' has to be replaced by '40GBASE-KR4'

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

[added 84 to subclause number in comment]

Also see comment # 197

**Cl 84**      **SC 84.1**      **P159**      **L14**      # **197**  
 Gu, Yuan      ZTE Corporation

**Comment Type**    **E**      **Comment Status**    **D**  
 In table 84-1,  
 Change the 2nd column sub-title "10GBASE-KR" to "40GBASE-KR4"

**SuggestedRemedy**

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT.

Also see comment # 63

**Cl 84**      **SC 84.2**      **P160**      **L51**      # **45**  
 Anslow, Peter      Nortel Networks

**Comment Type**    **T**      **Comment Status**    **A**  
 The service primitives in clause 84 are not in the same format (e.g. PMD\_UNITDATA.request<0:3>) as for clauses 85 through 88

**SuggestedRemedy**  
 Change the format of the service primitives in clause 84 to be in the same format (e.g. PMD\_UNITDATA.request<0:3>) as for clauses 85 through 88

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

The service interface definition will be reconciled to what will be adopted for the other clauses.

**Cl 84**      **SC 84.7.4**      **P164**      **L49**      # **46**  
 Anslow, Peter      Nortel Networks

**Comment Type**    **T**      **Comment Status**    **A**  
 This says "Upon completion of training, SIGNAL\_DETECT shall be set to OK" but it is not clear that training must be completed on all lanes.  
 The same issue for clause 85.7.4

**SuggestedRemedy**  
 Change "Upon completion of training, SIGNAL\_DETECT shall be set to OK" to "Upon completion of training on all lanes, SIGNAL\_DETECT shall be set to OK"

Do the same in clause 85.7.4

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

**Cl 84**      **SC 84.7.4**      **P165**      **L2**      # **205**  
 Marris, Arthur      Cadence

**Comment Type**    **T**      **Comment Status**    **A**  
 Change "1 or 0" to "one or zero" to match nomenclature in 45.2.1.9.5

**SuggestedRemedy**  
 as above

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

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**Cl 84**      **SC 84.7.6**                      **P 165**      **L 24**                      # **47**  
Anslow, Peter                      Nortel Networks

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

When in loopback mode this says "When loopback mode is selected, transmission requests passed to the transmitter are shunted directly to the receiver, overriding any signal detected by the receiver on its attached link. Note, this bit does not affect the state of the transmitter." This text is not entirely clear whether the transmitter continues to send data?.

This also applies to 85.7.8

*SuggestedRemedy*

Change "are shunted directly" to "are sent directly"

Change "Note, this bit does not affect the state of the transmitter." to "Note that this bit does not affect the state of the transmitter which continues to send data (unless disabled)."

Also make these changes in 85.7.8

*Response*                      *Response Status*      **C**

ACCEPT.

---

**Cl 84**      **SC 84.7.6**                      **P 165**      **L 33**                      # **287**  
Anslow, Peter                      Nortel Networks

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

Two very minor editorial issues in clause 84 collected in to one comment.

*SuggestedRemedy*

Note 2 is in 10 point font rather than the usual 9 point page 165 line 33  
External references to clause 21 should be blue page 168 lines 15 and 48

*Proposed Response*                      *Response Status*      **W**

PROPOSED ACCEPT.

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**Cl 84**      **SC 84.8**                      **P**                      **L 166**                      # **470**  
Dudek, Mike                      JDSU

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

There is likely to be more crosstalk in a KR4 system than in a KR system.

*SuggestedRemedy*

Evaluate the effects of additional crosstalk and include them in changed specs. In the meantime add an editors note saying "Editors note to be removed prior to publication. The effect of additional crosstalk in the KR4 system is under investigation.

*Response*                      *Response Status*      **C**

ACCEPT IN PRINCIPLE.

See response to comment # 167

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**Cl 84**      **SC 84.8**                      **P 166**      **L 12**                      # **64**  
Sun Hyok, Chang                      Electronics and Teleco

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

'40GBASE-KR' is wrong in the title of Subclause 84.8.

*SuggestedRemedy*

'40GBASE-KR' has to be replaced by '40GBASE-KR4'

*Response*                      *Response Status*      **C**

ACCEPT.

[added 84 to subclause number in comment]



CI 84 SC 84.8 P166 L16 # 374  
Dawe, Piers Avago Technologies

Comment Type TR Comment Status R

84.8 refers to 72.7, which says '...the PMD sublayer is standardized at test points TP1 and TP4 as shown in Figure 72-1. The electrical path from the transmitter block to TP1, and from TP4 to the receiver block, will affect link performance and the measured values of electrical parameters used to verify conformance to this standard. Therefore, it is recommended that this path be carefully designed.' In other words, there is no expectation that a board from vendor A, a backplane from B and another board from C can be expected to interoperate reliably, because each of them can spend as much of the shared channel budget as he pleases. This is not an interoperability spec, it's just an advertisement for some ICs. Is this what we want?

#### SuggestedRemedy

Discuss. Options are: make it into a proper interoperability spec with test points related to the connectors (Clause 86 will have to do much of that work anyway), delete the clause, move it to an annex, or accept that it's not a proper spec.

Response Response Status C

REJECT.

The 802.3ap project specified the backplane interconnect characteristics to be informative, with a normative description of receiver testing, which ensures interoperability.

The baseline proposal voted in by the task force for 40GBASE-KR4 adopted the 802.3ap informative channel. Making the channel normative as the commenter seems to request would be big change.

CI 84 SC 84.8.2.1 P167 L1 # 271  
Healey, Adam LSI Corporation

Comment Type T Comment Status A

Receiver interference tolerance requirement is unclear. Annex 69A defines a test for a 10GBASE-KR receiver in isolation.

Does this requirement imply that a single 40GBASE-KR4 lane is tested in isolation? If so, should the unused lanes be terminated by the reference impedance, and what is their operational state (active or quiescent)?

If all lanes are to be tested in parallel, are parallel instances of the Annex 69A set-up required, or does a new multi-lane test apparatus need to be defined?

#### SuggestedRemedy

A supporting presentation will be provided to compare several approaches to this problem and suggest a direction.

Response Response Status C

ACCEPT IN PRINCIPLE.

Follow proposal in summary slide of healey\_01\_1108.pdf and test in isolation with other lanes transmitters active.

add paragraph at end of 84.8.2.1 so 84.8.2.1 reads as follows:

The receiver interference tolerance tests are the same as those described for 10GBASE-KR in 72.7.2.1 and Annex 69A.

For 40GBASE-KR4 each lane shall be tested individually using the methodology defined in Annex 69A with the transmitters of the unused lanes active and terminated by the reference impedance.

See also comment # 166

CI 84 SC 84.8.2.1 P167 L1 # 166  
D'Ambrosia, John Force10 Networks

Comment Type TR Comment Status A

This section needs clarification, as it is ambiguous as to whether a single isolated lane is being tested or are all channels as an aggregate being tested.

#### SuggestedRemedy

test on a single lane basis, (joint) presentation to be provided

Response Response Status C

ACCEPT IN PRINCIPLE.

see response to comment # 271

CI **84** SC **84.8.2.1** P**167** L**3** # **552**  
Ghiasi, Ali Broadcom

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

Learning KR specifications weakness the current interference tolerance test is not comprehensive since there is no group delay or phase info in the channel

*SuggestedRemedy*

For 40GBase-KR4 replace magnitude response of Fig 69B.2 with pulse response of the channel

Response Response Status **C**

REJECT.

group delay info is not necessary for short channels one meter in length

also see comment 553

[added 84 to subclause number in comment]

CI **84** SC **84.9** P**167** L**7** # **553**  
Ghiasi, Ali Broadcom

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

Informative channel in 69B has no phase or group delay, this is major weakness when KR specifications are proposed to be used for CR4 and CR10

*SuggestedRemedy*

Please fix the problem as KR is not the gold standard, either provide group delay info for Fig 69B.2 or better provide pulse response for the channel

Response Response Status **C**

REJECT.

see responses to comment 552 and 571

[added 84 to subclause number in comment]

CI **84** SC **84.9** P**167** L**8** # **167**  
D'Ambrosia, John Force10 Networks

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

Informative interconnect characteristics are specified, "Crosstalk requirements Informative interconnect characteristics for 40GBASE-KR4 are provided in Annex 69B." However, the crosstalk requirements for 10GBASE-KR were specified under the assumption that all crosstalk was uncorrelated. For a multilane approach crosstalk will come from correlated and uncorrelated sources.

*SuggestedRemedy*

provide a multi-lane xtalk specification that takes into account correlated & uncorrelated crosstalk sources. Presentation to be provided.

Response Response Status **C**

ACCEPT IN PRINCIPLE.

Add editors note at end of 84.9

"Editors note to be removed prior to publication. Requirements for multi-lane crosstalk for 40GBASE-KR4 are being considered. See healey\_01\_1108.pdf page 21."

Also please provide more detailed remedy in follow up comment against 69B.

Also see comment # 470

<b>Cl 85</b>	<b>SC 85.1</b>	<b>P171</b>	<b>L 10</b>	# <b>288</b>
Anslow, Peter		Nortel Networks		
<b>Comment Type</b>	<b>E</b>	<b>Comment Status</b>	<b>D</b>	
Several very minor editorial issues in clause 85 collected in to one comment.				
<b>SuggestedRemedy</b>				
Reference to Clause 45 should be cross-reference page 171 line 10				
The dash between 81 and RS should be an em-dash page 171 line 18				
The dash between 73 and Auto-Negotiation should be an em-dash page 171 line 30				
Change "interface for these" to "interfaces for these" page 172 line 45				
Reference to Clause 45 should be cross-reference page 174 line 49				
Space missing in "disable 9to" page 175 line 17				
The word "Global_" is in 10 point font right side of page 175 line 33				
Force the second "PMD" to next line on left side of page 175 line 35				
Change ".." to "." page 177 line 10				
Remove space between "PMD_SIGNAL.indication" and "(SIGNAL_DETECT)" in two places page 178 lines 38 and 39				
Change "When a Global_PMD_..." to "When Global_PMD_..." page 179 line 24				
Change "NOTES				
1" to "NOTE1" page 179 line 51				
Change "2" to "NOTE2" page 180 line 3				
It would be useful to colour external equation references blue (see comment on front matter) page 181 lines 28, 29, 30, 31 also page 183 lines 18 an 19				
Set pagination to "Anywhere" to remove blank half page for heading 85.9.1 page 185 line 1				
Do Special, Equations, Equations, "shrink wrap" on equation 85-6 to fix cropping page 187 line 26				
External reference to clause 21 should be blue page 197 line 11				
<b>Proposed Response</b>		<b>Response Status</b>	<b>W</b>	
PROPOSED ACCEPT.				

<b>Cl 85</b>	<b>SC 85.1</b>	<b>P171</b>	<b>L 22</b>	# <b>471</b>
Dudek, Mike		JDSU		
<b>Comment Type</b>	<b>T</b>	<b>Comment Status</b>	<b>A</b>	
There is a problem in Table 85-1. XLAUI isn't applicable to 100GBASE-CR, but CAUI is optional				
<b>SuggestedRemedy</b>				
Either label the 83A row as XLAUI/CAUI or insert an additional row for CAUI and make the appropriate changes.				
<b>Response</b>		<b>Response Status</b>	<b>C</b>	
ACCEPT IN PRINCIPLE.				
Suggested remedy comment #159				

<b>Cl 85</b>	<b>SC 85.1</b>	<b>P171</b>	<b>L 23</b>	# <b>159</b>
D'Ambrosia, John		Force10 Networks		
<b>Comment Type</b>	<b>T</b>	<b>Comment Status</b>	<b>A</b>	
Reference only to XLAUI is made, and then 40G and 100G PMDs list XLAUI as optional.				
<b>SuggestedRemedy</b>				
Add another row for 83A CAUI				
for row 83A XLAUI, mark 100GBASE-CR10 not applicable				
for row 83A CAUI, mark 40GBASE-CR4 not applicable				
<b>Response</b>		<b>Response Status</b>	<b>C</b>	
ACCEPT.				
Add another row for 83A CAUI				
for row 83A XLAUI, mark 100GBASE-CR10 not applicable				
for row 83A CAUI, mark 40GBASE-CR4 not applicable				
<b>Cl 85</b>	<b>SC 85.1</b>	<b>P171</b>	<b>L 30</b>	# <b>341</b>
Dawe, Piers		Avago Technologies		
<b>Comment Type</b>	<b>TR</b>	<b>Comment Status</b>	<b>R</b>	<b>AN</b>
Auto-negotiation is an unnecessary burden on the host. It is not necessary for these copper links, and should not appear on front-panel ports.				
<b>SuggestedRemedy</b>				
Delete Auto-negotiation from Clause 85. Remove the Note at Clause 73, but provide a table showing which port types could use Auto-negotiation proper, which could use Parallel Detection (see below), and which could use Training.				
Formalize and extend 'Parallel Detection' (73.7.4.1 Parallel Detection function) as a properly specified Link Negotiation based on the principles of Fibre Channel's Link Speed Negotiation.				
See presentation.				
<b>Response</b>		<b>Response Status</b>	<b>C</b>	
REJECT.				
Draft 1 reflects consensus for AN usage for negotiating FEC capability (commonality with KR/KR4) and parallel detection function to detect legacy 10GBASE-CX4.				
The sub-task force reviewed and discussed dawe_01_11_08.pdf				

CI 85 SC 85.1 P171 L32 # 370  
Dawe, Piers Avago Technologies

Comment Type TR Comment Status R FEC

The copper-cable receivers are expected to rely even more on long DFE than Backplane Ethernet, and so when errors happen, moderately long error bursts are very probable. This overwhelms the CRC's error-detecting guarantee. These port types do not go into closed systems as Backplane Ethernet ports do, so the standard has to take responsibility for avoiding false packet acceptance rather than the system implementer.

#### SuggestedRemedy

FEC encoding and error detection must be mandatory, to provide adequate error detection. This is significantly less onerous than requiring mandatory full FEC error correction (correcting errors is a step beyond detecting them) which can remain optional.

Response Response Status C

REJECT.

refer to response to comment 322 against Clause 74

More work is needed to determine whether MTFPA is a real issue with DFE. This work is going to be done in the logic track.

CI 85 SC 85.1 P171 L35 # 48  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

Table 85-1 Note b contains two instances of "XLGMII" which should be "CGMII"

#### SuggestedRemedy

Change "XLGMII" to "CGMII" in two places

Response Response Status C

ACCEPT.

Change "XLGMII" to "CGMII" in two places

CI 85 SC 85.1 P171 L35 # 198  
Gu, Yuan ZTE Corporation

Comment Type E Comment Status D

Change "XLGMII" to "CGMII"

also in line 36  
the same change

#### SuggestedRemedy

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 85 SC 85.1 P171 L7 # 168  
D'Ambrosia, John Force10 Networks

Comment Type TR Comment Status A

A normative statement for the combination of sublayers is needed.

In order to form a complete PHY (Physical Layer device), a PMD is combined with the appropriate sublayers (see Table 85-1) and with the management functions, which are optionally accessible through the management interface defined in Clause 45, or equivalent.

#### SuggestedRemedy

change noted sentence to

In order to form a complete PHY, the desired PMD shall be combined with the appropriate sublayers (see Table 85-1) and with the management functions that are optionally accessible through the management interface defined in Clause 45, or equivalent.

Response Response Status C

ACCEPT.

**Cl 85**      **SC 85.10**      **P191**      **L**      # **547**  
 Fogg, Michael      Tyco Electronics

**Comment Type T**      **Comment Status A**  
 Replace Trace Loss (TBD from Nicholl\_01\_0708.pdf) with specific values

**SuggestedRemedy**  
 Provide values to discuss with Diminico Subgroup

**Response**      **Response Status C**  
 ACCEPT IN PRINCIPLE.

[Editor's note: Corrected missing subclause number 85.10 to subclause field]

Remedy provided in comment #448

**Cl 85**      **SC 85.10**      **P191**      **L 16**      # **460**  
 Chalupsky, David      Intel Corp.

**Comment Type E**      **Comment Status D**  
 typo: "differential" is misspelled as "diferential" in 85.10 section heading.

**SuggestedRemedy**  
 Change "diferential" to "differential"

**Proposed Response**      **Response Status W**  
 PROPOSED ACCEPT.

**Cl 85**      **SC 85.10**      **P191**      **L 16**      # **448**  
 DiMinico, Christopher      MC Communications

**Comment Type TR**      **Comment Status A**  
 Provide TBD values for 85.10 Transmitter and receiver differential printed circuit board trace loss equation (85-10). Add TBD to equation as contributions from IL and power sum crosstalk to ICR under consideration.

**SuggestedRemedy**  
 The maximum insertion loss (in dB with f in MHz) for the transmitter and receiver differential controlled impedance printed circuit boards for each differential lane shall be:  
 $\text{Insertion Loss}(f) \leq (0.2032) * [20 * \log(e) * (2.00E-05 * \sqrt{f * 10^6}) + 1.1E-10 * (f * 10^6) + 3.2E-20 * ((f * 10^6)^2 + -1.2E-30 * (f * 10^6)^3)]$  TBD dB

for all frequencies from 100 MHz to 6000 MHz.

Insertion Loss(f) represents 8 inches (0.2032 m) of the maximum fitted attenuation (Amax) due to trace skin effect and dielectric properties as defined in Annex 69B.4.2.

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

[Editor's note: Added missing Clause and subclause numbers (85.10) to clause/subclause number fields]

The maximum insertion loss (in dB with f in MHz) for the transmitter and receiver differential controlled impedance printed circuit boards for each differential lane shall be:  
 $\text{Insertion Loss}(f) \leq (0.2032) * [20 * \log(e) * (2.00E-05 * \sqrt{f * 10^6}) + 1.1E-10 * (f * 10^6) + 3.2E-20 * ((f * 10^6)^2 + -1.2E-30 * (f * 10^6)^3)]$  TBD dB

for all frequencies from 100 MHz to 6000 MHz.

Insertion Loss(f) represents 8 inches (0.2032 m) of the maximum fitted attenuation (Amax) due to trace skin effect and dielectric properties as defined in Annex 69B.4.2.

**Cl 85**      **SC 85.10**      **P191**      **L 17**      # **420**  
 Ganga, Ilango      Intel

**Comment Type E**      **Comment Status D**  
 line 17: typo, change to "differential"  
 line 24: typo, change to "transmitter"

**SuggestedRemedy**

**Proposed Response**      **Response Status W**  
 PROPOSED ACCEPT.

Cl 85 SC 85.11 P192 L # 536  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status A

Figures 85-10 and 85-11  
Add Figure

*SuggestedRemedy*

Figures to be provided on supporting documents

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.11 to subclause field]

Supporting documentation to be reviewed by sub-task force.

Figure 85-10 and 85-11 shall be Style-1 40GBASE-CR4 MDI connectors  
plug and receptacle referenced in  
small form factor pluggable (QSFP), SFF-8436.

Cl 85 SC 85.11 P196 L # 549  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status R

Add lane to MDI connector pin mapping

*SuggestedRemedy*

Table to be provided in supporting documentation

Response Response Status C

REJECT.

[Editor's note: corrected missing subclause number 85.11 to subclause field]

More details on comment and suggested remedy required.  
Supporting documentation to be reviewed by sub-task force.

Cl 85 SC 85.11.1 P191 L 42 # 473  
Dudek, Mike JDSU

Comment Type T Comment Status A

Connectors can't meet the requirements of both style 1 and style 2.

*SuggestedRemedy*

Change "(Style 1) and 85.11.1.2 (Style 2)" to "(Style 1) or 85.11.1.2 (Style 2)"

Response Response Status C

ACCEPT.

Change "(Style 1) and 85.11.1.2 (Style 2)" to "(Style 1) or 85.11.1.2 (Style 2)"

Cl 85 SC 85.11.1 P191 L 43 # 53  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

This says "between the PMD of 85.7.1 and" but 85.7.1 is the link block diagram

*SuggestedRemedy*

change "between the PMD of 85.7.1 and" to "between the PMD of 85.8 and"

Response Response Status C

ACCEPT IN PRINCIPLE.

Change: "between the PMD of 85.7.1 and"  
To: "between the PMD of 85.7 and"

Cl 85 SC 85.11.2 P195 L # 548  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status R

Add Figures 85-14 and 85-15

*SuggestedRemedy*

Add mating face views from the SFF-8632 (referenced by 8092)  
Figure 6.2 (Plug) and 6.3 (Receptacle)

Response Response Status C

REJECT.

[Editor's note: Added missing Clause number and subclause numbers to clause/subclause  
number fields]

IBTA has selected the CXP connector (SFF-8642) . Per (diminico\_02\_0708.pdf) the intent  
is to reference IBTA selected connector.

CI 85 SC 85.11.2 P195 L 6 # 447  
DiMinico, Christopher MC Communications

Comment Type T Comment Status A  
IBTA has selected the CXP connector currently specified as Version 0.3 - Oct. 2, 2008 "120 Gb/s 12x Small Form-factor Pluggable (CXP) Interface Specification for Cables, Active Cables, & Transceivers". Replace SFF-8092 with the IBTA selected connector SFF-8642 which has been the stated intent (diminico\_02\_0708.pdf).

*SuggestedRemedy*

Page 195 line 6 replace SFF-8092 with SFF-8642.

Response Response Status C  
ACCEPT.

CI 85 SC 85.11.2 P195 L 6 # 421  
Ganga, Ilango Intel

Comment Type E Comment Status D  
typo, change to "considered"

*SuggestedRemedy*

Proposed Response Response Status W  
PROPOSED ACCEPT.

CI 85 SC 85.7 P177 L # 538  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status A  
Figure 85-2  
Location of TP-1 and TP-4

*SuggestedRemedy*

Recommend either placing two new test points TP-0 and TP-5 located 4" from connector (per nicholl\_01\_0708.pdf) or to move TP-1 and TP-4 a specified amount of loss (possibly 2dB @ 5.1625GHz)

Response Response Status C  
ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.7 to subclause field]

SuggestedRemedy in comment#451

CI 85 SC 85.7 P189 L # 546  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status A  
Remove MDELFEXT - Use ICR specification  
Remove Figure 85-7  
Remove Figure 85-8

*SuggestedRemedy*

Response Response Status C  
ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.7 to subclause field]

Suggested Remedy in comment#454

CI 85 SC 85.7 P193 L # 537  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status A  
Table 85-7  
Add values

*SuggestedRemedy*

Add values from QSFP Specification, to be provided in supporting documentation

Response Response Status C  
ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.11 to subclause field]

Supporting documentation to be reviewed by sub-task force.  
Table 85-7-Style-1 40GBASE-CR4 lane to MDI connector pin mapping shall be plug and receptacle referenced in small form factor pluggable (QSFP), SFF-8436.

Cl 85 SC 85.7.1 P177 L 10 # 419  
Ganga, Ilango Intel

Comment Type E Comment Status D

double period (.). delete a period

Line 14, typo: change to "transmitter"

SuggestedRemedy

Proposed Response Response Status W

PROPOSED ACCEPT.

Cl 85 SC 85.7.1 P177 L 15 # 273  
Healey, Adam LSI Corporation

Comment Type T Comment Status A

Clause 85 references Clause 72 in multiple places, yet uses a definition of TP1 and TP4 that is inconsistent with definition in Clause 72. This will inevitably lead to confusion.

SuggestedRemedy

Define TP1 and TP4 in a manner consistent with their use in Clause 72, or add a note explaining the mapping.

Response Response Status C

ACCEPT IN PRINCIPLE.

Sugessted remedy comment #450

Cl 85 SC 85.7.1 P177 L 20 # 574  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status A

802.3ap backplanes support KX, KX4 and KR. CR4/CR10 are based on the 802.3ap and has the full provision to support another IEEE803.3ak (CX4)

SuggestedRemedy

Add badrate of 3.125 GBd to line 22. Duplicate Transition time line for CX4 with min value of 20 ps and max value of 130 ps .

Add differential output voltage p-p 800 mV to 1200 mV for CX4

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.7.1 to subclause field]

The provisions to support IEEE803.3ak (CX4) are embodied in compatability at the MDI and auto-negotiation.

Editors note: Support of compatability with IEEE803.3ak (CX4) is at the the MDI.

Cl 85 SC 85.7.1 P177 L 22 # 450  
DiMinico, Christopher MC Communications

Comment Type TR Comment Status A channel

Add channel test/reference points TP0 and TP5 to

Figure 85-2 to provide channel definition demarcation points for tests and/or references.

SuggestedRemedy

Add channel test/reference points TP0 and TP5 to

Figure 85-2.

Response Response Status C

ACCEPT.

[Editor's note: Corrected/replaced figure number in subclause field to 85.7.1]

Add channel test/reference points TP0 and TP5 to

Figure 85-2.



CI 85 SC 85.7.1 P177 L 30 # 586  
 Ghiasi, Ali Broadcom

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

Max and min loss between PMA IC and TP1a and TP4a are not defined, the link will not work if there is 10 dB loss on the PCB

**SuggestedRemedy**

Loss from PMA function to TP1a and loss from TP4a to PMA function is  $SDD21 \leq (-0.0788 - 0.6169 \cdot \sqrt{f}) - 0.5855 \cdot f$   
 Min loss  
 $SDD \geq (2/6 - 2 \cdot f/6)$   
 Where f is in GHz  
 The maximum SDD21 assumes the HCB PCB loss at Nyquist is  $\leq 1.0$  dB

**Response** **Response Status** C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.7.1 to subclause field]

[Editors note: transmitter testing from TP2 needs to be addressed]

CI 85 SC 85.7.1 P177 L 33 # 581  
 Ghiasi, Ali Broadcom

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

AC coupling in CR4/CR10 are between TP4 and Chip which comes from legacy KR, specially with SR4/S10 defining the AC coupling in the module.

**SuggestedRemedy**

AC coupling need to be between TP3 and MDI

**Response** **Response Status** C

ACCEPT.

[Editor's note: corrected missing subclause number 85.7.1 to subclause field]

Editors note:[the location of the AC coupling needs to be defined]

CI 85 SC 85.7.1 P177 L 33 # 554  
 Ghiasi, Ali Broadcom

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

There is no definition of TP1 or TP4, Please provide definition for TP1 and TP4

**SuggestedRemedy**

TP1 definition - Any interconnect may be used between the SR4 or SR10 transmit function and TP1 as long as transmitter parameters of Table 85-4 are met.

TP4 definition - The interconnect from TP4 to SR4 or SR10 receive function shall be  $SDD21(dB) \geq (-0.007 - 0.1684 \cdot \sqrt{f}) - 0.0617 \cdot f$   
 f is given in GHz.  
 SDD21 loss a Nyquist is 0.7 dB and 0.2 larger than SFP+ loss.

**Response** **Response Status** C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.7.1 to subclause field]

[Editors note: transmitter and receiver testing and definitions]

CI 85 SC 85.7.1 P177 L5 # 451  
DiMinico, Christopher MC Communications

Comment Type TR Comment Status A channel

Add text for inclusion of TP0 and TP5 in subclause 85.7.1.

SuggestedRemedy

Delete text: The 40GBASE-CR4 and 100GBASE-CR10 channel is defined between the transmitter and receiver blocks to include the transmitter and receiver differential controlled impedance printed circuit board insertion loss and the cable assembly insertion loss as illustrated in Figure 85-2.

Add text:The 40GBASE-CR4 and 100GBASE-CR10 channel is defined between the transmitter (TP0) and receiver blocks (TP5) to include the transmitter and receiver differential controlled impedance printed circuit board insertion loss and the cable assembly insertion loss as illustrated in Figure 85-2. TP0 and TP5 are reference points that may not be testable in an implemented system.

Response Response Status C

ACCEPT.  
Delete text: The 40GBASE-CR4 and 100GBASE-CR10 channel is defined between the transmitter and receiver blocks to include the transmitter and receiver differential controlled impedance printed circuit board insertion loss and the cable assembly insertion loss as illustrated in Figure 85-2.

Add text:The 40GBASE-CR4 and 100GBASE-CR10 channel is defined between the transmitter (TP0) and receiver blocks (TP5) to include the transmitter and receiver differential controlled impedance printed circuit board insertion loss and the cable assembly insertion loss as illustrated in Figure 85-2. TP0 and TP5 are reference points that may not be testable in an implemented system.

CI 85 SC 85.7.2 P178 L4 # 49  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

The format of the messages PMD\_UNITDATA.request and PMD\_UNITDATA.indication in clauses 85.7.2 and 85.7.3 do not match the definitions in 85.2

SuggestedRemedy

change "message PMD\_UNITDATA.request (tx\_bit<0:3>)" to "messages PMD\_UNITDATA.request<0:3>" in two places.  
change "message PMD\_UNITDATA.request(tx\_bit<0:9>)" to "messages PMD\_UNITDATA.request<0:9>" in two places (Note, the first one has 0:3 where it should be 0:9).  
change "message PMD\_UNITDATA.indication (rx\_bit<0:3>)" to "messages PMD\_UNITDATA.indication<0:3>" in two places (clause 85.7.3)  
change "message PMD\_UNITDATA.indication (rx\_bit<0:9>)" to "messages PMD\_UNITDATA.indication<0:9>" in two places (clause 85.7.3)

Response Response Status C

ACCEPT IN PRINCIPLE.

See response to clause 80 comment#620

CI 85 SC 85.7.4 P178 L37 # 109  
Marris, Arthur Cadence

Comment Type T Comment Status A

Reword first two paragraphs to be similar to subclause 84.7.4 for clarity.

*SuggestedRemedy*

Change:

"The Global PMD signal detect function shall report to the PMD service interface, using the message PMD\_SIGNAL.indication (SIGNAL\_DETECT) for 40GBASE-CR4 and PMD\_SIGNAL.indication (SIGNAL\_DETECT) for 100GBASE-CR10, which is signaled continuously. SIGNAL\_DETECT in 40GBASE-CR4 and 100GBASE-CR10 indicates the successful completion of the start-up protocol on all four or ten lanes.

SIGNAL\_DETECT, while normally intended to be an indicator of signal presence, is used by 40GBASECR4 and 100GBASE-CR10 to indicate the successful completion of the start-up protocol on each lane."

to

"The Global PMD signal detect function shall continuously report the message PMD\_SIGNAL.indication (SIGNAL\_DETECT) to the PMD service interface. SIGNAL\_DETECT, while normally intended to be an indicator of signal presence, is used by 40GBASE-CR4 and 100GBASE-CR10 to indicate the successful completion of the start-up protocol on all lanes."

Response Response Status C  
ACCEPT.

CI 85 SC 85.7.4 P178 L44 # 472  
Dudek, Mike JDSU

Comment Type T Comment Status R

Cables are removable (not like backplanes). What will cause Signal Detect to become Fail if the link is broken.

*SuggestedRemedy*

If a broken link will create system reset then an informative note to that effect would be good. If it won't then change the function to include a signal present detection in addition to successful completion of start up protocol.

Response Response Status C  
REJECT.

Signal detect is implemented in 85.7.4; if the link is broken auto-negotiation restarts and training.

CI 85 SC 85.7.4 P178 L54 # 206  
Marris, Arthur Cadence

Comment Type T Comment Status A

Change "1 or 0" to "one or zero" to match nomenclature in 45.2.1.9.5

*SuggestedRemedy*  
as above

Response Response Status C  
ACCEPT.

CI 85 SC 85.7.7 P179 L30 # 50  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

Clause 85.7.7 is about lane-by-lane transmit disable function, but the text discusses "Global\_PMD\_transmit\_disable function". This needs to be changed along the lines of clause 86.4.8

*SuggestedRemedy*

Change the first two sentences from "The Global\_PMD\_transmit\_disable function is optional. It allows the electrical transmitters in each lane to be selectively disabled." to "The PMD\_transmit\_disable\_i function (where i represents the lane number in the range 0:3 or 0:9) is optional and allows the optical transmitter in each lane to be selectively disabled."

in item a) change "the Global\_PMD\_transmit\_disable variable" to "a PMD\_transmit\_disable\_i variable" and change "the transmitter such that" to "the transmitter associated with that variable such that"

in item b) change "may turn off the electrical transmitter." to "may set each PMD\_transmit\_disable\_i to ONE, turning off the electrical transmitter in each lane."

in item c) change "Global\_PMD\_transmit\_disable" to "PMD\_transmit\_disable\_i"

Response Response Status C  
ACCEPT.

CI **85** SC **85.8.2** P**18** L**3** # **342**  
Dawe, Piers Avago Technologies

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

I understand that 10 m is extremely challenging. A link like this if it fails will create error bursts not just single errors, endangering mean time to false packet acceptance.

*SuggestedRemedy*

Do investigations to quantify the level of difficulty. First, can a reasonable 10 m cable with reasonable lengths of PCB traces give a channel within the high confidence region as defined for 10GBASE-KR in 802.3ap Annex 69B? Second, is that an adequate or complete condition for as low-BER link?

Define a length and cable electrical spec above which FEC is mandatory, and/or reduce the distance objective for Clause 85.

Response Response Status **C**

REJECT.

Many of the steps in the suggested remedy have been performed. Yes, a reasonable 10 m cable with reasonable lengths of PCB traces gives a channel within the high confidence region as defined for 10GBASE-KR in 802.3ap Annex 69B; please see diminico\_02\_0708.pdf "802.3ba copper cable assembly baseline proposal".

What's reasonable in PCB trace length is subjective; the baseline includes guidance to use nicholl\_01\_0708.pdf.

A length and electrical specification is embodied in draft 1 for review and comment.

CI **85** SC **85.8.3** P**181** L**14** # **51**  
Anslow, Peter Nortel Networks

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

This says "with the exception of the transmitter specified in 85.8.3.3." but 85.8.3.3 is the "Signaling speed range" and does not specify a transmitter.

*SuggestedRemedy*

Change this cross-reference to the intended subclause

Response Response Status **C**

ACCEPT IN PRINCIPLE.

Suggested remedy

Change: "with the exception of the transmitter specified in 85.8.3.3."

To:" with the exception of the transmitter characteristics specified in 85.8.3.3."

Also see comment #144

CI **85** SC **85.8.3** P**181** L**15** # **144**  
D'Ambrosia, John Force10 Networks

Comment Type **ER** Comment Status **D**

Reference in following sentence is unclear.

The specifications are summarized in Table 85-4 and detailed in 72.7.1.1 through 72.7.1.11 with the exception of the transmitter specified in 85.8.3.3.

85.8.3.3 is for signaling speed range, and is same for -KR.

*SuggestedRemedy*

Corrrect reference from 85.8.3.3 to correct reference.

Proposed Response Response Status **W**

PROPOSED ACCEPT IN PRINCIPLE.

Refer response to comment # 51

CI 85 SC 85.8.3 P181 L 22 # 52  
 Anslow, Peter Nortel Networks

Comment Type T Comment Status A

The nominal unit interval is given in Table 85-4 as "96.9697" but in clause 83A it is given as "96.96969697". Since the UI is the same for these two clauses, the number of significant figures quoted should be the same. Considering the 100 ppm tolerance, somewhere between these two seems appropriate.

*SuggestedRemedy*

Change all occurrences of "96.9697" and "96.96969697" to "96.969697" (four places in clause 85 and three places in clause 83A)

Response Response Status C

ACCEPT IN PRINCIPLE.

Change all occurrences of "96.9697" and "96.96969697" to "96.969697"

Note: if applicable three places in clause 83A

CI 85 SC 85.8.3 P181 L 25 # 564  
 Ghiasi, Ali Broadcom

Comment Type TR Comment Status R testing

To guarantee interoperability a transmitter compliance test method is required.

*SuggestedRemedy*

Purpose to use software method of IEEE 802.3 CL 68 TWDP which uses cable impulse response.

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: corrected missing subclause number 85.8.3 to subclause field]

Transmitter characteristics are tested at TP2. Subclause 85.8.3.1 specifies test fixtures, or functional equivalence, to measure the transmitter specifications described in 85.8.3. Contributions to improve 85.8.3.1 welcome.

CI 85 SC 85.8.3 P181 L 25 # 568  
 Ghiasi, Ali Broadcom

Comment Type TR Comment Status A

Currently table 85-4 only has transmitter off level which is 30 mV and you wouldn't go that far with it!

*SuggestedRemedy*

Please add VMA per definition of IEEE CL 68.6.2 with min value of 360 mV

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.8.3 to subclause field]

Add editors note as before to consider with transmitter compliance testing.

CI 85 SC 85.8.3 P181 L 28 # 569  
 Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

Differential Output return loss is TBD

*SuggestedRemedy*

Purpose to use SDD11 per equation 83A-1

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: Added missing subclause number 85.7.1 to subclause field]

The draft reflects the consensus to utilize 10GBASE-KR (Clause 72) for 4x and 10x KR transmit and receive functions.

The TBD is applied to either utilize the Differential output return loss (min.) in 72.7.1.5 [See Equation (72-4) and Equation (72-5)] (TBD) or if deemed insufficient create new requirement in 85.9.x

*Cl* **85**      *SC* **85.8.3**      *P* **181**      *L* **31**      # **572**  
 Ghiasi, Ali      Broadcom

*Comment Type*    **TR**      *Comment Status*    **R**  
 Differential input return loss is TBD

*SuggestedRemedy*  
 Purpose to use SDD22 per equation 83A-1

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

This comment was WITHDRAWN by the commenter.

[Editor's note: corrected missing subclause number 85.8.3 to subclause field]

The draft reflects the consensus to utilize 10GBASE-KR (Clause 72) for 4x and 10x KR transmit and receive functions.

The TBD is applied to either utilize the Differential input return loss (minimum) 72.7.2.5 [See Equation (72-4) and Equation (72-5) or if deemed insufficient create new requirement.

*Cl* **85**      *SC* **85.8.3**      *P* **181**      *L* **31**      # **570**  
 Ghiasi, Ali      Broadcom

*Comment Type*    **TR**      *Comment Status*    **R**  
 Common mode Output return loss is TBD

*SuggestedRemedy*  
 Purpose to use SCC11 per equation 83A-2

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

This comment was WITHDRAWN by the commenter.

[Editor's note: corrected missing subclause number 85.8.3 to subclause field]

The draft reflects the consensus to utilize 10GBASE-KR (Clause 72) for 4x and 10x KR transmit and receive functions.

The TBD is applied to either utilize the Common-mode voltage limits 72.7.1.4 or if deemed insufficient create new requirement in 85.9.x.

*Cl* **85**      *SC* **85.8.3**      *P* **181**      *L* **33**      # **563**  
 Ghiasi, Ali      Broadcom

*Comment Type*    **TR**      *Comment Status*    **R**  
 With faster processes 24 ps transition time starting to be an issue

*SuggestedRemedy*  
 Suggest to change 24 ps to 20 ps

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

This comment was WITHDRAWN by the commenter.

[Editor's note: corrected missing subclause number 85.8.3 to subclause field]

Recommend submitting supporting presentation for sub-task force review..

*Cl* **85**      *SC* **85.8.3**      *P* **181**      *L* **36**      # **558**  
 Ghiasi, Ali      Broadcom

*Comment Type*    **TR**      *Comment Status*    **A**      *jitter*  
 The classical DJ and RJ measured jitter are jitter PDF dependent and not valid for jitter distribution which are not dual-dirac.

*SuggestedRemedy*  
 Repalce RJ with UJ of 0.025 UI (RMS) per IEEE CL 68.6.8 method  
 Replace DJ with DDJ per method of FC-PI4 A.1.3.1 with PSBS 9 pattern

*Response*      *Response Status*    **C**  
 ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.8.3 to subclause field]

Add editors note per 83A regarding jitter.

**Cl 85**      **SC 85.8.3**      **P181**      **L 38**      # 559  
 Ghiasi, Ali      Broadcom

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

Duty Cycle distortion is classified to be 0.035 UI and is part of deterministic jitter, except the current definition of DCD does not capture pattern dependent component of DCD.

**SuggestedRemedy**

Puopose to repalace DCD with PWS (Pulse Width Shrinkage) with 0.1 UI value.  
 PWS is measured per FC-PI-4 Annex A.1.3.2 using PRBS9 pattern

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.8.3 to subclause field]

editors note: data dependent pulse width shrinkage needs to be addressed; not currently included in the DCD.

**Cl 85**      **SC 85.8.4**      **P182**      **L 50**      # 604  
 Ghiasi, Ali      Broadcom

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

KR can not operate over 10 m of 24 AWG cable which is the largest pratical size with max host PCB loss. KR standard was developed 3 years ago and with improved process and technology we should not limit the application to shorter than 10m or have unreasonable PCB trace loss.

**SuggestedRemedy**

Assuming PMA IC loss to TP1a and TP4a to PMA IC loss are Nyquist is 4.5 dB then based on diminico results the KR refrence channel loss at Nyquist need to be increasaed to 27 dB. This will allow 4" of FR4-6 on each end or about 6" of improved FR4.

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.8.4 to subclause field]

See suggested remedy in comment#456.

**Cl 85**      **SC 85.8.4**      **P182**      **L 50**      # 590  
 Ghiasi, Ali      Broadcom

**Comment Type**    **TR**      **Comment Status**    **R**      *testing*

There is no definition how to test the receiver for compliance

**SuggestedRemedy**

Puopose to use the pulse response from the 10 m cable assembly as the frequency dependent attenuator in the Fig 69A-1. In Fig 69A-1 TP1 must have maximum jitter as defined by table 85-4.

**Response**      **Response Status**    **C**

REJECT.

[Editor's note: corrected missing subclause number 85.8.3 to subclause field]

85.8.4.1 Bit error ratio  
 The receiver shall operate with a BER 10-12 or better when receiving a compliant transmit signal, as defined in 85.8.3, through a compliant cable assembly as defined in 85.9 exhibiting the maximum insertion loss of 85.9.2. The cable assembly is normative. This approach is consistent with CX4.

In addition, Receiver characteristics are summarized in Table 85-5 and as detailed in 72.7.1.1 through 72.7.2.5 with the exception of the receiver characteristics specified in 85.8.4.1, 85.8.4.2, and 85.8.4.3.

**Cl 85**      **SC 85.8.4**      **P183**      **L 1**      # 169  
 D'Ambrosia, John      Force10 Networks

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

This clause points to receiver characteristics detailed in 72.7.1.1 through 72.7.2.5, which includes Rx interference tolerance testing specified in 72.7.2.1. This is ambiguous, as it does not indicate whether a single isolated lane is being tested or are all channels as an aggregate being tested.

**SuggestedRemedy**

test on a single lane basis, (joint) presentation to be provided

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

Remedy per comment#272

CI 85 SC 85.8.4 P183 L1 # 272  
Healey, Adam LSI Corporation

Comment Type T Comment Status A

"Receiver characteristics are summarized in Table 85-5 and as detailed in 72.7.1.1 through 72.7.2.5 with the exception of the receiver characteristics specified in 85.8.4.1, 85.8.4.2, and 85.8.4.3."

Subclause 71.7.2.1, Receiver interference tolerance, which references Annex 69A, defines a test for a 10GBASE-KR receiver in isolation.

At the same time, subclause 85.8.4.1 states that "the receiver shall operate with a BER  $10^{-12}$  or better when receiving a compliant transmit signal, as defined in 85.8.3, through a compliant cable assembly as defined in 85.9 exhibiting the maximum insertion loss of 85.9.2."

This implies that all lanes as tested as an aggregate using a cable assembly model spanning TP2 to TP3.

Which requirement applies?

SuggestedRemedy

A supporting presentation will be provided to compare several approaches to this problem and suggest a direction.

Response Response Status C

ACCEPT IN PRINCIPLE.

Editors note added to be added add end of 85.8.4.1: to clarify ambiguity recognized by commentor.

CI 85 SC 85.8.4 P183 L1 # 165  
D'Ambrosia, John Force10 Networks

Comment Type TR Comment Status A

This clause points to receiver characteristics detailed in 72.7.1.1 through 72.7.2.5, which includes Rx interference tolerance testing specified in 72.7.2.1. There are potential differences in rx interference tolerance testing between backplane and cabling testing.

SuggestedRemedy

Create an annex 85A, which details tests for -c4 testing. Presentation to be provided.

Response Response Status C

ACCEPT IN PRINCIPLE.

Add editors note per Adam Healey comment#272

CI 85 SC 85.8.4 P183 L16 # 591  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

There is no requirement on the min receive signal

SuggestedRemedy

Purpose to use min receive VMA of 180 mV diff p-p per definition of IEEE CL68.6.2.

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: corrected missing subclause number 85.8.3 to subclause field]

CI 85 SC 85.8.4 P183 L17 # 573  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

Max input differential p-p level of of 1200 mV is not compatible with the SR4 and SR10, where both SRxx and CRxx serve the front panel market and some time on the same port!

SuggestedRemedy

Reduce max input level to 850 mV

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: corrected missing subclause number 85.8.4 to subclause field]

Proposal inconsistent with Differential peak-to-peak output voltage (max.) 72.7.1.4 1200 mV.

Receiver specifications are summarized in Table 85-4 and detailed in 72.7.1.1 through 72.7.1.11 with the exception of the transmitter specified in 85.8.3.3



Cl 85 SC 85.8.4 P183 L 21 # 575  
 Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

Since CR4/CR10 does not interface with KX there is not no reason to have 1600 mV damage threshold

SuggestedRemedy

Remove 1600 mV damage threshold

Response Response Status C

REJECT.

[Editor's note: corrected missing subclause number 85.8.4 to subclause field]

Not sure why this isn't usefull guidance.

For sub-task force discussion.

Cl 85 SC 85.8.4 P183 L 9 # 576  
 Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

Support for CX4 is missing from the table. 802.3ap already has support for KX4 operation which is simialr to CX4.

SuggestedRemedy

Add Signaling rate of 3.125 GBd to table 85-5.

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: corrected missing subclause number 85.8.3 to subclause field]

Not necessary in specifying the 40GBASE-CR4 and 100GBASE-CR10 PMD.

Cl 85 SC 85.9 P183 L 49 # 452  
 DiMinico, Christopher MC Communications

Comment Type TR Comment Status A Channel

Add channel subclause before cable assembly subclause and move 85.10 (Tx\_pcb and Rx\_pcb IL) under channel subclause to provide hierichical structure to specification consistent with channel/link topology.

SuggestedRemedy

(1)Add channel subclause before cable assembly subclause- Page 183, Line 49;  
 >>85.x Channel

The 40GBASE-CR4 and 100GBASE-CR10 channel is defined between the transmitter and receiver blocks to include the transmitter and receiver differential controlled impedance printed circuit board insertion loss and the cable assembly insertion loss as illustrated in Figure 85-2.

(2)Delete page 191, line 16-34 and move deleted text as new subclause under new channel subclause 85.x

Response Response Status C

ACCEPT.

[Editor's note: added missing subclause number 85.9 to subclause field]

(1)Add channel subclause before cable assembly subclause- Page 183, Line 49;  
 >>85.x Channel

The 40GBASE-CR4 and 100GBASE-CR10 channel is defined between the transmitter and receiver blocks to include the transmitter and receiver differential controlled impedance printed circuit board insertion loss and the cable assembly insertion loss as illustrated in Figure 85-2.

(2)Delete page 191, line 16-34 and move deleted text as new subclause under new channel subclause 85.x

Cl 85 SC 85.9 P184 L # 539  
 Fogg, Michael Tyco Electronics

Comment Type T Comment Status A

Figure 85-6  
 Replace TBD values with actual limit numbers, and remove ELFEXT and MDLFEXT as they are redundant

SuggestedRemedy

Values to be supplied with supporting documents

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.9 to subclause field]

Suggested remedy comment #453 and comment #454

CI 85 SC 85.9 P184 L2 # 343  
Dawe, Piers Avago Technologies

Comment Type TR Comment Status R

It is very good that TP1, TP2 TP3 TP4 are positioned in relation to the connector, but not clear enough where they are exactly with respect to the connector. While for some measurements like S-parameter measurements on a passive cable, de-embedding can be used to infer the performance right next to the connector, For measurements of nonlinear active elements like transmitters and receivers, in general this cannot be done.

#### SuggestedRemedy

Use the same defined reference losses between each TP and the connector as in Clause 86: this includes specifying the loss between PMD and TP2 in 85.8.3.1 Fig 85-3. For the S-parameter specs, where de-embedding is viable, give the equivalent de-embedded specs also so that the cables can be assessed using either approach.

Response Response Status C

REJECT.

Consistent with CX4, all cable assembly measurements are to be made between TP1 and TP4 as illustrated in Figure 85-2. Two mated connector pairs have been included in the cable assembly specifications defined in 85.9.

TP1 and TP4 are not test points for the measurements of nonlinear active elements like transmitters and receivers.

PCB trace loss at TP0 defined (Tx\_pcb) and at TP5 (Rx\_pcb.).

We intend to close on the test point measurements regarding de-embedding utilizing editors note.

CI 85 SC 85.9 P184 L6 # 449  
DiMinico, Christopher MC Communications

Comment Type T Comment Status A

Update Table 85-6-Cable assembly differential characteristics based on accepted cable assembly TBD values and additions/deletions of cable assembly parameters.

#### SuggestedRemedy

Editor to update Table 85-6-Cable assembly differential characteristics' summary with accepted cable assembly TBD values and additions/deletions of cable assembly parameters.

Response Response Status C

ACCEPT.

[Editor's note: added missing subclause number 85.9 to subclause field]

Editor to update Table 85-6-Cable assembly differential characteristics' summary with accepted cable assembly TBD values and additions/deletions of cable assembly parameters.

CI 85 SC 85.9 P185 L # 540  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status A

Figure 85-4 - Provide specific values for cable assembly (TP-1 to TP-4), and for cable assembly including fixturing (TP-0 to TP-5?)

#### SuggestedRemedy

Add values from supporting document

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.9 to subclause field]

All cable assembly measurements are to be made between TP1 and TP4 as illustrated in Figure 85-2. Two mated connector pairs have been included in the cable assembly specifications defined in 85.9.

We intend to close on the test point measurements regarding de-embedding utilizing editors note.

CI 85 SC 85.9 P185 L 50 # 457  
DiMinico, Christopher MC Communications

Comment Type TR Comment Status A

Add cable assembly ILD specifications to limit cable assembly ILD. Add TBD to equation as contributions from IL and power sum crosstalk to ICR under consideration.

#### SuggestedRemedy

Add subclause page 185 line 50 85.9.x Cable assembly insertion loss deviation  
Insert text under subclause

The cable assembly insertion loss deviation is the difference between the cable insertion loss and the fitted insertion loss determined using Equation (85-x).

$$ILD(f) = IL(f) - IL_{fitted}(f) \text{ (85-x)}$$

The fitted insertion loss is determined using Equations (85.xx)-(85.xx); use 69B-1 to 69B-5 for (85.xx)-(85.xx) replacing A(f) with  $IL_{fitted}(f)$ . Add TBDs beside equations to indicate that an alternate to the least mean square line fit to the cable assembly IL is under consideration.

The ILD shall be within the region bounded by the following equations:

$$ILD_{max} = 0.7(TBD) + 0.2(TBD) \cdot 10^{-9} \cdot (f \cdot 10^6) \text{ TBD dB}$$

$$ILD_{min} = -0.7(TBD) + 0.2(TBD) \cdot 10^{-9} \cdot (f \cdot 10^6) \text{ TBD dB}$$

$$1000 \text{ MHz} \leq f \leq 6000 \text{ MHz}$$

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: added missing subclause number 85.9 to subclause field]

Fixed typo in equation:

$$\text{From: } ILD_{min} = -0.7(TBD) + 0.2(TBD) \cdot 10^{-9} \cdot (f \cdot 10^6) \text{ TBD dB}$$

$$\text{To: } ILD_{min} = -0.7(TBD) - 0.2(TBD) \cdot 10^{-9} \cdot (f \cdot 10^6) \text{ TBD dB}$$

CI 85 SC 85.9 P186 L # 541  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status A

Add specific values for cable assembly and cable assembly with fixturing for return loss

#### SuggestedRemedy

Values to be provided in supporting document

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.9 to subclause field]

Suggested remedy comment #459

CI 85 SC 85.9 P187 L # 543  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status A

Replace TBD values on MDNEXT with specific values

#### SuggestedRemedy

Values to be provided from supporting documents

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.9 to subclause field]

Suggested remedy comment #453.

CI 85 SC 85.9 P187 L # 542  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status A

Replace TBD values for NEXT with specific values

#### SuggestedRemedy

Values to be provided from supporting documents

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.9 to subclause field]

Suggested remedy comment #453.

Cl 85 SC 85.9 P188 L # 544  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status A

Figure 85-6  
Remove or add specific values

*SuggestedRemedy*

Add values from supporting documents

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.9 to subclause field]

Suggested remedy comment #453.

Cl 85 SC 85.9 P188 L # 545  
Fogg, Michael Tyco Electronics

Comment Type T Comment Status A

Remove ELFEXT values (Use ICR)

*SuggestedRemedy*

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.9 to subclause field]

Suggested remedy comment #454.

Cl 85 SC 85.9 P190 L 45 # 455  
DiMinico, Christopher MC Communications

Comment Type TR Comment Status A

Define total power sum crosstalk to be used in the ICR calculation.

*SuggestedRemedy*

Add subclause line 45 page 190 85.9.x Cable assembly power sum differential crosstalk

Add text below new subclause: The combined multi-disturber FEXT and multi-disturber NEXT, specified as the power sum of MDFEXT and MDNEXT, is determined using Equation (85-XX).

Add power sum equation (85-XX) for total power sum crosstalk calculated from MDFEXT and MDNEXT.

Response Response Status C

ACCEPT.

[Editor's note: Added missing Clause and subclause numbers (85.9) to clause/subclause number fields]

Add subclause line 45 page 190 85.9.x Cable assembly power sum differential crosstalk

Add text below new subclause: The combined multi-disturber FEXT and multi-disturber NEXT, specified as the power sum of MDFEXT and MDNEXT, is determined using Equation (85-XX).

Add power sum equation (85-XX) for total power sum crosstalk calculated from MDFEXT and MDNEXT.

CI 85 SC 85.9.1 P185 L 16 # 577  
 Ghiasi, Ali Broadcom  
 Comment Type TR Comment Status R  
 3.125 GBd operation insertion loss missing  
 SuggestedRemedy  
 Add insertion loss limit from from 54-3.  
 Response Response Status C  
 REJECT.  
 This comment was WITHDRAWN by the commenter.  
 [Editor's note: corrected missing subclause number 85.9.1 to subclause field]  
 Not necessary in specifying the  
 40GBASE-CR4 and 100GBASE-CR10  
 PMD.

CI 85 SC 85.9.2 P185 L 10 # 588  
 Ghiasi, Ali Broadcom  
 Comment Type TR Comment Status A  
 Cable assembly is missing common mode return loss parameter.  
 SuggestedRemedy  
 Propose the following SCC22/SCC11 mask  
 SCC22<= (-12 + 2.8\*f) from 0.01 to 2.5 GHz and (-5.2+0.08\*f) from 2.5 to 11.1 GHz.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 [Editor's note: corrected missing subclause number 85.9.2 to subclause field]  
 Editors note:[Include cable assembly common mode return loss.]

CI 85 SC 85.9.2 P185 L 14 # 458  
 DiMinico, Christopher MC Communications  
 Comment Type TR Comment Status A  
 Provide values for TBDs in cable assembly insertion loss (85-1) for sqrt(f) and f. Remove 1/sqrt(f) term. Add TBD cable assembly insertion loss equation as contributions from IL and power sum crosstalk to ICR are still under consideration.  
 SuggestedRemedy  
 Replace TBDs with values in (85-1) Add TBD to equation as contributions from IL and power sum crosstalk to ICR under consideration.  
 Insertion Loss (f) = 0.192749\*sqrt(f)+0.001494\*f TBD dB  
 Remove 1/sqrt(f) term. Given the CR4 and CR10 bandwidth compared to CX4 the 1/sqrt(f) loss function term is not necessary as a regression term.  
 Response Response Status C  
 ACCEPT.  
 Replace TBDs with values in (85-1) Add TBD to equation as contributions from IL and power sum crosstalk to ICR under consideration.  
 Insertion Loss (f) = 0.192749\*sqrt(f)+0.001494\*f TBD dB  
 Remove 1/sqrt(f) term. Given the CR4 and CR10 bandwidth compared to CX4 the 1/sqrt(f) loss function term is not necessary as a regression term.

CI 85 SC 85.9.2 P185 L 15 # 244  
 Meyer, Jeffrey Centellax  
 Comment Type T Comment Status A  
 Why is there a term for 1/sqrt(f) in the insertion loss formula. The coefficient will most likely be 0.000 because it blows up at low frequencies. Read and microwave transmission line book and you see that the loss approaches a constant at low frequencies. Instead you need a constant term for the DC loss.  
 SuggestedRemedy  
 Insertion loss (d) <= TBD + TBD \* sqrt(f) + TBD \* f  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Suggested remedy comment #458

**Cl 85**      **SC 85.9.2**      **P185**      **L 15**      # 571  
Ghiasi, Ali      Broadcom

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

Group delay information are necessary to gurantee cable interoperability

**SuggestedRemedy**

Either add cable group delay or the cable pulse response

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.9 to subclause field]

Add editor's note in 85.9.x : [Editor's note (to be removed prior to publication) - subclause to specify group delay or other means to characterize post cursor response (TBD)]

**Cl 85**      **SC 85.9.2**      **P185**      **L 17**      # 340  
Dawe, Piers      Avago Technologies

**Comment Type**    **T**      **Comment Status**    **R**

Specification range for cable insertion loss is not adequate at either end. SFP+ Annex E cable S-parameter specs go from 10 MHz to 11.1 GHz.

**SuggestedRemedy**

Extend the range of Cable assembly insertion loss, Cable assembly return loss, Near-End Crosstalk, MDNEXT, FEXT and MDELNEXT to at least 10 MHz to 10 GHz.

**Response**      **Response Status**    **C**

REJECT.

SFP+ "SFF-8431 Specifications for Enhanced 8.5 and 10 Gigabit Small Form Factor Pluggable Module" defines the electrical interface specifications for 8.5 and 10 Gigabit/s Small Form Factor Pluggable (SFP+) modules and hosts and optionally support lower signaling rates as well.

Per baseline agreement channel parameters to be consistent with 10GBASE-KR in 802.3ap Annex 69B.

**Cl 85**      **SC 85.9.3**      **P186**      **L 10**      # 589  
Ghiasi, Ali      Broadcom

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

Cable assembly return loss does not specify if it is SCC or SDD but I am assuming it is Differential return loss.

**SuggestedRemedy**

Propose to use SDD22/SDD11 per equation 83A-1

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.9.3 to subclause field]

Suggested remedy comment#459

CI 85 SC 85.9.3 P186 L6 # 459  
DiMinico, Christopher MC Communications

Comment Type TR Comment Status A

Provide TBD values for 85.9.3 Cable assembly return loss.

*SuggestedRemedy*

85.9.3 Cable assembly return loss  
The return loss (in dB with f in MHz) of each pair of the 40GBASE-CR4 and 100GBASE-CR10 cable assembly shall be:

Return\_loss(f)= 10 dB

for 100 MHz  $\leq f < 4000$  MHz

Return\_loss(f)= $10-10\log(f/4000)$

for 4000 MHz  $\leq f \leq 10000$  MHz

Figure 85-5-Minimum cable assembly return loss (informative) to be provided in attachment.

Response Response Status C

ACCEPT IN PRINCIPLE.

85.9.3 Cable assembly return loss  
The return loss (in dB with f in MHz) of each pair of the 40GBASE-CR4 and 100GBASE-CR10 cable assembly shall be:

Return\_loss(f)  $\geq 10$  dB

for 100 MHz  $\leq f < (TBD) < (TBD)4000$  MHz

Return\_loss(f)= $10-10\log(f/(TBD)4000)$

for (TBD)4000 MHz  $\leq f \leq 10000$  MHz

CI 85 SC 85.9.3 P186 L9 # 557  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status A

Cable return loss is missing, please add cable return loss

*SuggestedRemedy*

Purpose to use SDD22 as defined by EQ 83A-1  
and SCC22 as defined by EQ 83A-2

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: corrected missing subclause number 85.9 to subclause field]

Suggested remedy comment #459

See editors note for SCC22.

CI 85 SC 85.9.4 P186 L46 # 453  
DiMinico, Christopher MC Communications

Comment Type TR Comment Status A

Define NEXT and MDNEXT to be used in the ICR calculation and remove individual limit specifications The use of independent limit lines for each disturber is unnecessary as the individual impairments are not uniquely distinguished i.e., they are combined on a power sum basis to limit crosstalk in relation to insertion loss.

*SuggestedRemedy*

(1)Delete lines 48-54 page 186. (2)Delete equation (85-4) page 187. delete lines 4-5 page 187. (3) Add text under 85.9.4.1 Differential Near-End Crosstalk: Since four or ten transmit and four or ten receive lanes are used to transfer data between PMDs, the NEXT that is coupled into a receive lane will be from the four or ten transmit lanes. (4) Delete lines 8-9 page 187  
Since four or ten transmit and four or ten receive lanes are used to transfer data between PMDs, the NEXT that is coupled into a receive lane will be from the four or ten transmit lanes.(5)Delete lines 13-20 page 187.(6) Delete lines 1-28 page 188.

Response Response Status C

ACCEPT.

CI 85 SC 85.9.4.2 P187 L 26 # 245  
Meyer, Jeffrey Centellax

Comment Type T Comment Status A

In equation ( 85-6) the power of the NEXT loss is denoted NL(f). This is poor notation. Subscripts should not appear after function arguments.

SuggestedRemedy

More appropriate notation would be NLi(f).

Response Response Status C

ACCEPT.

CI 85 SC 85.9.4.2 P187 L 5 # 561  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

NEXT has large high frequency component but the NEXT frequency is limited 6 GHz.

SuggestedRemedy

Increase NEXT frequency range to 11 GHz or show there is no impact limiting NEXT to 6 GHz.

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: corrected missing subclause number 85.9.4.2 to subclause field]

Recommend supporting presentation that shows impact requiring increase of NEXT frequency range to 11 GHz.

CI 85 SC 85.9.5 P188 L 30 # 454  
DiMinico, Christopher MC Communications

Comment Type TR Comment Status A

Define FEXT and MDFEXT to be used in the ICR calculation and remove individual limit specifications. The use of independent limit lines for each disturber is unnecessary as the individual impairments are not uniquely distinguished i.e., they are combined on a power sum basis to limit crosstalk in relation to insertion loss. In addition, ELFEXT is unnecessary as ICR enables crosstalk to insertion loss tradeoff.

SuggestedRemedy

(1)Delete lines 30-54 page 188. (2)Delete lines 1-5 page 189.

(3)Add text line 31 page 188>> Since four lanes or ten lanes are used to transfer data between PMDs, the FEXT that is coupled into a data carrying lane will be from the three other lanes or nine other lanes in the same direction.

(4)Remove equal level line 6 page 189 in subclause title.

(5)Replace ELFEXT with FEXT 85.9.5.2 Multiple Disturber Far-End Crosstalk (MDFEXT) loss and globally.

(6)Delete lines 8-9 page 189. (7)Delete lines 13-54 page 189.(7)Delete lines 15-43 page 190.

Response Response Status C

ACCEPT IN PRINCIPLE.

(1)Delete lines 30-54 page 188. (2)Delete lines 1-5 page 189.

(3)Add text line 31 page 188>> Since four lanes or ten lanes are used to transfer data between PMDs, the FEXT that is coupled into a data carrying lane will be from the three other lanes or nine other lanes in the same direction.

(4)Remove equal level line 6 page 189 in subclause title.

(5)Replace ELFEXT with FEXT 85.9.5.2 Multiple Disturber Far-End Crosstalk (MDFEXT) loss and globally.

(6)Delete lines 8-9 page 189. (7)Delete lines 13-54 page 189.(7)Delete lines 15-43 page 190.

Editor note: include near power sum equation - need to consider need for voltage sum.



CI 85 SC 85.9.x P190 L 45 # 456  
DiMinico, Christopher MC Communications

Comment Type TR Comment Status A

Add cable assembly ICR specification to limit the total multi-disturber cable assembly crosstalk noise. Add TBD to equation as contributions from IL and power sum crosstalk to ICR under consideration.

#### Suggested Remedy

Add new subclause below 85.9.x Cable assembly power sum differential crosstalk  
>>85.9.x Cable assembly insertion loss to crosstalk ratio (ICR)

The cable assembly insertion loss to crosstalk ratio (ICR) is the ratio of the cable assembly insertion loss to the total cable assembly crosstalk loss determined using Equation (89.xx).

$ICR(f) = -IL(f) + PSXT(f)$  (TBD) dB

100MHz<=f<=5156.25 MHz

Add text: Assuming ICR is computed at N uniformly-spaced frequencies  $f_n$  spanning the frequency range 100 MHz to 5156.25 MHz, ICRfit may be computed using Equations (85-x) through (85-x); utilize Equations (69B-19) through (69B-23).

Add text: ICRfit shall be greater than or equal to ICRmin as defined by the following equation: Add TBD to equation as contributions from IL and power sum crosstalk to ICR under consideration.

Add equation:  $ICRfit(f) \geq ICRmin(f) = 23.3 - 18.7 \cdot \log((f \cdot 10^6)/(5 \cdot 10^9)) - 2.5$  (TBD) dB

Add Figure to illustrate insertion loss to crosstalk ratio limit.

Note: 2.5 dB of the 3 dB signal-to-noise ratio penalty related to insertion loss deviation embodied in 802.3ap ICRmin is applied as 2.5 dB ICRmin margin to account for reduction in ILD penalty for CR4 and CR10

Response Response Status C

ACCEPT IN PRINCIPLE.

Suggested remedy applies to channel ICR.

Add new subclause below 85.9.x for channel insertion loss to crosstalk ratio (ICR)  
>>85.9.x Channel insertion loss to crosstalk ratio (ICR)

The channel insertion loss to crosstalk ratio (ICR) is the ratio of the channel insertion loss to the total channel crosstalk loss determined using Equation (89.xx).

$ICR(f) = -IL(f) + PSXT(f)$  (TBD) dB

100MHz<=f<=5156.25 MHz

Add text: Assuming ICR is computed at N uniformly-spaced frequencies  $f_n$  spanning the frequency range 100 MHz to 5156.25 MHz, ICRfit may be computed using Equations (85-x) through (85-x); utilize Equations (69B-19) through (69B-23).

Add text: ICRfit shall be greater than or equal to ICRmin as defined by the following equation: Add TBD to equation as contributions from IL and power sum crosstalk to ICR under consideration.

Add equation:  $ICRfit(f) \geq ICRmin(f) = 23.3 - 18.7 \cdot \log((f \cdot 10^6)/(5 \cdot 10^9))$  (TBD) dB

Add Figure to illustrate insertion loss to crosstalk ratio limit.

Note: 2.5 dB of the 3 dB signal-to-noise ratio penalty related to insertion loss deviation embodied in 802.3ap ICRmin is applied as 2.5 dB ICRmin margin to account for reduction in ILD penalty for CR4 and CR10

Add new subclause below 85.9.x Cable assembly power sum differential crosstalk

>>85.9.x Cable assembly insertion loss to crosstalk ratio (ICR)

The cable assembly insertion loss to crosstalk ratio (ICR) is the ratio of the cable assembly insertion loss to the total cable assembly crosstalk loss determined using Equation (89.xx).

$ICR(f) = -IL(f) + PSXT(f)$  (TBD) dB

100MHz<=f<=5156.25 MHz

Add text: Assuming ICR is computed at N uniformly-spaced frequencies  $f_n$  spanning the frequency range 100 MHz to 5156.25 MHz, ICRfit may be computed using Equations (85-x) through (85-x); utilize Equations (69B-19) through (69B-23).

Add text: ICRfit shall be greater than or equal to ICRmin as defined by the following equation: Add TBD to equation as contributions from IL and power sum crosstalk to ICR under consideration.

Add equation:  $ICRfit(f) \geq ICRmin(f) = 23.3 - 18.7 \cdot \log((f \cdot 10^6)/(5 \cdot 10^9))$  (TBD) dB

Add Figure to illustrate insertion loss to crosstalk ratio limit.

CI 85 SC 9.3 P186 L3 # 580  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

It is not clear how the HOST NEXT is accounted for in current draft and there is nothing that prevents the host having excessive NEXT. If the amount of NEXT and FEXT for the host is equal to the test board the cable are tested with then the current methodology hold. I can see case there will be double counting of NEXT and FEXT in the case of a low noise host but in the cases of noisy noisy host NEXT and FEXT can be under-estimated under estimated.

#### SuggestedRemedy

To eliminated the case of noisy host, the host NEXT and FEXT must also meet 85-4, 85-5, and 85-6 equations.

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: corrected missing subclause number 85.9.3 to subclause field]

Add editor's note in 85.9.x channel ICR: [Editor's note (to be removed prior to publication) - (TBD) considerations for crosstalk contributions from Tx\_pcb and Rx\_pcb need to be considered in the channel ICR]

CI 86 SC 86.1 P199 L16 # 630  
CHANG, Frank Vitesse

Comment Type TR Comment Status A

To make Fiber type OM3 clear.

#### SuggestedRemedy

Suggest to be consistent with Clause 52.5 10GBASE-S definition, indicating 2000MHz.km Minimum modal BW @850nm.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change footnote "a" from "Specified in IEC 60793-2-10" to "Specified in IEC 60793-2-10. See 86.10.2.1"

CI 86 SC 86.1 P199 L16 # 260  
Vanderlaan, Paul Nexans

Comment Type E Comment Status D

Change from:

Table 86-1

Type A1a.2a (50/125 im multimode) "OM3"

#### SuggestedRemedy

Change to:

Table 86-1

Type A1a.2a (50/125 im multimode) "OM3 or better"

Indicates higher performing fibers will be suitable

Proposed Response Response Status W

PROPOSED REJECT.

[Editor's note: corrected subclause number to 86.1 in subclause number field]

One is always allowed to use better; no need to say it.

CI 86 SC 86.1 P199 L21 # 583  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

In some applications products will be developed dual purpose, 40GbE or 4 10GbE per CL 52. These products will be able to operate longer and on legacy OM1 and PM2 fibres. A note should be added to the reach with Ref to CL 52

#### SuggestedRemedy

Note. If the transmitter and receiver are compliant to IEEE 10GBASE-S CL 52.5 the reach on OM3 fibre would be 300 m.

Response Response Status C

REJECT.

[Editor's note: subclause number changed from 1 to 86.1]

Duplicates comment 582.

Cl 86 SC 86.1 P199 L 21 # 582  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

In some applications products will be developed dual purpose, 40GbE or 4 10GbE per CL 52. These products will be able to operate longer and on leacy OM1 and PM2 fibres. A note should be added to the reach with Ref to CL 52

*SuggestedRemedy*

Note. If the transmitter and receiver are compliant to IEEE 10GBase-S CL 52.5 the reach on OM3 fibre would be 300 m.

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: subclause changed from 1 to 86.1]

4 or 10 x 10GBASE-S is not the same PMD as 40GBASE-SR4 or 100GBASE-SR10 and this clause would not apply in that scenario.

Cl 86 SC 86.1 P199 L 22 # 54  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

In Table 86-1 the abbreviation "Gbd" should be "GBd"

*SuggestedRemedy*

change "Gbd" to "GBd"

Proposed Response Response Status W

PROPOSED ACCEPT.

Cl 86 SC 86.1 P199 L 22 # 73  
Chung, Hwan Seok ETRI

Comment Type T Comment Status A

At Table 86-1, the unit for signaling rate should be 'GBd', not 'Gbd'.

*SuggestedRemedy*

Response Response Status C

ACCEPT.

Cl 86 SC 86.1 P199 L 23 # 302  
Oulundsen III, George OFS

Comment Type E Comment Status D

Footnote to Table 86-1: Should we add reference to the TIA-492AAAC-A standard. The IEC standard is currently referenced.

*SuggestedRemedy*

Proposed Response Response Status W

PROPOSED REJECT.

See response to comment #305.

Cl 86 SC 86.1 P199 L 32 # 55  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

This says "The purpose of each PHY sublayer is summarized in 82.1.4. 40 Gb/s and 100 Gb/s Ethernet is introduced in Clause 80." which would be better re-arranged

*SuggestedRemedy*

Change to "40 Gb/s and 100 Gb/s Ethernet is introduced in Clause 80 and the purpose of each PHY sublayer is summarized in 82.1.4."

Proposed Response Response Status W

PROPOSED ACCEPT.

Cl 86 SC 86.1 P199 L 34 # 289  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

Several very minor editorial issues in clause 86 collected in to one comment.

*SuggestedRemedy*

Clause 1 should be an internal cross-reference page 199 line 34  
Annex A should be an internal cross-reference page 199 line 35  
Clause 45 should be an internal cross-reference page 199 line 40  
Clause 45 should be an internal cross-reference page 203 line 21  
"." missing at the end of the sentence page 209 line 54  
Separator too thick below "Nominal core diameter" page 219 line 22

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 86 SC 86.1 P199 L 8 # 137  
D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D Review

Overview is done in a manner that is inconsistent with other PMD clauses in 802.3ba

#### SuggestedRemedy

Put text below and Table 86-2 in front of current "Overview" intro text.  
This clause specifies the 40GBASE-SR4 PMD and 100GBASE-SR10. In order to form a complete PHY, the desired PMD shall be connected to the appropriate sublayers (see Table 86-1) and with the management functions that are optionally accessible through the management interface defined in Clause 45, or equivalent.

Renumber current Table 86-1 to 86-2.

Label new Table 86-1 as  
Table 86-1-PHY (Physical Layer) clauses associated with the 40GBASE-SR4 and 100GBASE-SR10 PMDs

add row in new table 86-1 for Annex 83A-XLAUI - mark optional under 40G and "na" under 100G  
add row in new table 86-1 for Annex 83A-CAUI - mark optional under 100G and "na" under 40G

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

It is consistent (can see that by reading lines 31-40 first) although it looks like clauses 58, 59, and it provides an overview to help first-time readers. Add nAUI to table but explain that it's not applicable next to the PMD.

As to 'In order to form a complete PHY, the desired PMD shall be connected to the appropriate sublayers (see Table 86-1)...', see line 37. The preferred first words are now 'When forming a complete PHY' (e.g. Clause 72; acknowledging that a PMD can still be compliant even if not connected). Strictly, the PMD is connected to only three things; PMA, management, and medium through MDI. It cannot be asked about higher sublayers - if that is desired it should be done in Clause 80. As to 'management functions that are optionally accessible through the management interface defined in Clause 45, or equivalent.', 86, 87 and 88 have has 'management functions that may be accessible through the management interface defined in Clause 45.' In general management is optional as well as the form of its interface (for some clauses in e.g. BP Ethernet this is not the case). Change all three or none.

As to table 'PHY (Physical Layer) clauses associated with the 40GBASE-SR4 and 100GBASE-SR10 PMDs', this table exists in 86, 87 and 88 as 'PMD type and associated clauses'. The RS is not part of the PHY although it is part of the Physical Layer. Change all three table titles to 'Physical Layer clauses associated with the xxx PMD(s)', or change none. Try to adjust pagination so this table does not float two pages down the document.

CI 86 SC 86.1 P201 L 22 # 75  
Sun Hyok, Chang Electronics and Teleco

Comment Type T Comment Status A

'XLMII' is written at line 22 below Table 86-2.

#### SuggestedRemedy

'XLMII' has to be replaced by 'XLGMII'

Response Response Status C

ACCEPT.

CI 86 SC 86.1 P201 L 23 # 76  
Sun Hyok, Chang Electronics and Teleco

Comment Type T Comment Status A

'XLMII' is written at line 23 below Table 86-2.

#### SuggestedRemedy

'XLMII' has to be replaced by 'XLGMII'

Response Response Status C

ACCEPT.

[Editor's note: subclause changed from 1 to 86.1]

CI 86 SC 86.1 P208 L 12 # 560  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status A

PWS (Pulse Width Shrinkage) a critical parameter is missing from table 86-6 list of parameters.

#### SuggestedRemedy

Purpose to add PWS (Pulse Width Shrinkage) with 0.1 UI value.  
PWS is measured per FC-PI-4 Annex A.1.3.2 using PRBS9 pattern

Response Response Status C

ACCEPT IN PRINCIPLE.

See response in comment 476

**CI 86**      **SC 86.1**      **P 217**      **L 44**      # **146**  
D'Ambrosia, John      Force10 Networks

**Comment Type**    **T**      **Comment Status**    **A**      **Review**

organization of 86.10 is not done in a manner consistent with 87.12 and 88.13 (which is consistent with 52.14).

**SuggestedRemedy**

organize and name in manner consistent with 87.12 and 88.13.  
Change title of 86.10 to "Characteristics of the fiber optic cabling (channel)"  
Change title of 86.10.1 to "Optical Fiber Cable"  
change 86.10.2 to 86.11  
Add 86.10.2 Optical fiber connection - An optical fiber connection, as shown in Figure 86-5 consists of a mated pair of optical connectors for the appropriate number of fibers for the PMD type.  
change 86.10.2.2 to 86.10.2.1 - Connection insertion loss  
change 86.10.2.2.1 to 86.10.2.2 - Maximum discrete reflectance  
change 86.10.2.3 to 86.10.3

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

The organisation is consistent with other clauses. The subclauses have been grouped together under 86.10 Optical channel to distinguish them from the electrical channel.

Add a Maximum discrete reflectance subclause containing a specification of -20 dB

**CI 86**      **SC 86.1**      **P 219**      **L 3**      # **357**  
Dawe, Piers      Avago Technologies

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

A question and two editor's notes on this page

**SuggestedRemedy**

Consult the experts and clear up.

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

Change "simplex[?]" to "unidirectional"

**CI 86**      **SC 86.10.1**      **P 218**      **L 1**      # **210**  
Mellitz, Richard      Intel Corporation

**Comment Type**    **ER**      **Comment Status**    **R**      **Review**

Avoid s-parameter designations and keep loss definition consistent in document. Figure 86-5

**SuggestedRemedy**

Make loss positive dB  
Channel loss is IL not SDD21

**Response**      **Response Status**    **C**

REJECT.

[Editor's note: corrected subclause number to 86.10.1 in subclause number field]

S-parameters are very well established and are a good way of presenting the information; see e.g. diminico\_02\_0708.pdf slide 22.

**CI 86**      **SC 86.10.1**      **P 218**      **L 45**      # **355**  
Dawe, Piers      Avago Technologies

**Comment Type**    **T**      **Comment Status**    **A**      **Skew**

Skew of medium per Gustlin is 45 UI (4.5 ns).

**SuggestedRemedy**

If this seems high, revisit the stress assumptions in the skew model.

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

See resolution of comment # 308

See also comments 517.

CI 86 SC 86.10.1 P218 L 45 # 308  
Oulundsen III, George OFS

Comment Type T Comment Status A Skew

Table 86-17: Currently, there are a lot of TBDs regarding skew constraints. The 802.3ba Task Force adopted "kolesar\_02\_0508.xls" as the MMF cable skew spreadsheet model. At that time we understood that the values could change, but the concept of the model spreadsheet was adopted. Should we use the values proposed in "kolesar\_02\_0508.xls" as a starting point and replace the TBD with the model values where we can? Better values can be entered when discovered.

#### SuggestedRemedy

Replace the TBD for "Cabling Skew Max" value with the value of 45.4 ps/m or 4.54 ns for 100-m of MMF cable given in "kolesar\_02\_0508.xls". See the presentation "kolesar\_01\_0508.pdf" for reference.

Response Response Status C

ACCEPT IN PRINCIPLE.

Since the resolution of comment 240 has set the maximum skew at SP3 to 44 ns and the maximum skew at SP4 to 144 ns, change the Cabling skew value from "TBD" to "100 ns"

See comments # 355, 517.

CI 86 SC 86.10.1 P218 L 46 # 517  
Kolesar, Paul CommScope

Comment Type T Comment Status A Skew

Cabling skew value is presently TBD and needs to be defined.

#### SuggestedRemedy

Replace TBD with 4.5. This value is consistent with the worst-case value for a 100 m link as determined using the MM skew model kolesar\_02\_0508.xls.

Response Response Status C

ACCEPT IN PRINCIPLE.

See resolution of comment # 308

See comments # 355.

CI 86 SC 86.10.2 P219 L 2 # 518  
Kolesar, Paul CommScope

Comment Type T Comment Status A

The insertion loss measurement referenced in under revision and has passed CVD ballot and is entering FDIS stage. The methods have been renamed. Method 2 is becoming the method of Annex A.

#### SuggestedRemedy

Replace "Method 2" with "Annex A".

Response Response Status C

ACCEPT IN PRINCIPLE.

Add this information as an editor's note and adopt it when the new IEC 61280-4-1 is published.

CI 86 SC 86.10.2.1 P219 L 10 # 519  
Kolesar, Paul CommScope

Comment Type TR Comment Status A Fibre specs

The present specification references a fiber specification as if it were a cabling specification. This can be remedied by referencing the cabling specifications for ribbon and multifiber cable forms, and also stating that the fiber contained within these cable shall meet the OM3 fiber performance code. The presently referenced cable specs are inappropriate, as the first is for simplex and duplex indoor cable, and the second for premises outdoor cable.

#### SuggestedRemedy

Replace:  
The 40GBASE-SR4 and 100GBASE-SR10 fiber optic cabling shall meet the requirements of IEC 60793-2-10 and the requirements given in Table 86-18, where they differ. Multimode cables chosen from [Editor's note (to be removed prior to publication) - Insert additional reference for multiway cable if appropriate], IEC 60794-2-11 or IEC 60794-3-12 may be suitable.

With:  
The 40GBASE-SR4 and 100GBASE-SR10 fiber optic cabling shall meet the requirements of IEC 60794-2-21 or IEC 60794-2-31. The fiber contained within these cables shall meet the requirements of IEC 60793-2-10 type A1a.2.

Response Response Status C

ACCEPT IN PRINCIPLE.

40GBASE-SR4 and 100GBASE-SR10 can operate over duplex cables (using several pairs); special ribbon cable is not required.

Change first two sentences of 86.10.2.1 to:  
The fiber contained within the 40GBASE-SR4 and 100GBASE-SR10 fiber optic cabling shall meet the requirements of IEC 60793-2-10 type A1a.2 and the requirements given in Table 86-18, where they differ. A variety of multimode cable types may fulfil these requirements, provided the resulting channel also meets the cabling skew requirement in Table 86-17.

CI 86 SC 86.10.2.1 P219 L 12 # 68  
Chung, Hwan Seok ETRI

Comment Type T Comment Status A Fibre specs

As editor recommended, it will be better to insert additional reference for multimode fiber. So, change from "Multimode cables chosen from IEC 60792-2-11 or IEC 60794-3-12 may be suitable," to "Multimode cables chosen from TIA/EIA-492AAAC,ISO/IEC-11801,IEC 60792-2-11 or IEC 60794-3-12 may be suitable."

#### SuggestedRemedy

Response Response Status C

ACCEPT IN PRINCIPLE.

See response to comment # 519

CI 86 SC 86.10.2.1 P219 L 27 # 356  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A Fibre specs

3.5 dB/km for fibre cable loss seems pretty gross, much higher than the uncabled fibre loss. Is it still that bad?

#### SuggestedRemedy

?

Response Response Status C

ACCEPT IN PRINCIPLE.

The value of 3.5 dB is still current in ISO/IEC 11801 Ed 2.0

Replace "3.5 TBD" with "3.5" in Table 86-18

CI 86 SC 86.10.2.1 P219 L 29 # 520  
Kolesar, Paul CommScope

Comment Type TR Comment Status A

The dispersion characteristics quoted have been superseded. The third edition of IEC 60793-2-10 published in 2006 adjusted the characteristics to more closely reflect that actual dispersion characteristics of 50um fibers. Requiring the fiber to meet IEC 60793-2-10 makes repeating the dispersion characteristic in table 86-18 redundant. But if these specs must be repeated, then they should be in harmony with the IEC spec.

#### SuggestedRemedy

Replace the zero dispersion wavelength value with:  
1295 < lambda0 < 1340

Replace the dispersion slope value with:  
< 0.105 for 1295 nm < lambda0 < 1310  
< 0.000375(1590 - lambda0) for 1310 nm < lambda0 < 1340 nm

Note: All the above < symbols should be "less than or equal to" symbols.

Response Response Status C

ACCEPT IN PRINCIPLE.  
[Page changed from 210 to 219]

See response to comment # 486

CI 86 SC 86.10.2.1 P219 L 29 # 486  
Dudek, Mike JDSU

Comment Type TR Comment Status A Fibre specs

I understand that the chromatic specifications for OM3 fiber are now tighter than listed here.

#### SuggestedRemedy

Change the max value of the zero dispersion wavelength from 1320nm to 1316nm.  
Change the Chromatic dispersion slope max line to 0.1028 for 1300<=lambda<= 1316 and  
.....

Response Response Status C

ACCEPT IN PRINCIPLE.

Replace the zero dispersion wavelength value with:  
1295 <= lambda0 <= 1340

Replace the dispersion slope value with:  
<= 0.105 for 1295 nm <= lambda0 <= 1310  
<= 0.000375(1590 - lambda0) for 1310 nm <= lambda0 <= 1340 nm

See also comment # 520

CI 86 SC 86.10.2.1 P219 L 34 # 306  
Oulundsen III, George OFS

Comment Type E Comment Status A Fibre specs

Footnote to Table 86-18: Reference is made to TIA-492AAAC-2002 and the question is asked if there is an IEC equivalent. The answer is yes. The IEC equivalent is IEC 60793-1-49:2006.

#### SuggestedRemedy

Response Response Status C

ACCEPT IN PRINCIPLE.

In Table 86-18 change "Effective modal bandwidth" to "Effective modal bandwidth (min)"

Change  
"Effective modal bandwidth for fiber meeting TIA/EIA-492AAAC-2002 [Editor's note (to be removed prior to publication) - Is there an IEC equivalent now?] when used with sources meeting the wavelength and encircled flux specifications of Table 52-7."  
to  
"When measured with the launch conditions specified in Table 86-8"

See comment #520.



CI 86 SC 86.10.2.2.1 P219 L43 # 382  
King, Jonathan Finisar

Comment Type TR Comment Status A

The TBDs in 86.10.2.2.1 are inconsistent with the standard cabling model shown in Fig 86-5

*SuggestedRemedy*

Make text consistent with other SR applications. Paragraph should become:  
The maximum link distances for multimode fiber are calculated based on an allocation of 1.5 dB total connection and splice loss. For example, this allocation supports 2 connections with an average insertion loss per connection of 0.75 dB. Connections with different loss characteristics may be used provided the requirements of Table 86-17 and Table 86-18 are met.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change paragraph to:  
The maximum link distances for multimode fiber are calculated based on an allocation of 1.5 dB total connection and splice loss. For example, this allocation supports 2 connections, each with an insertion loss of 0.75 dB. Connections with different loss characteristics may be used provided the requirements of Table 86-17 and Table 86-18 are met.

See also comment # 348.

CI 86 SC 86.10.2.3 P220 L4 # 163  
D'Ambrosia, John Force10 Networks

Comment Type T Comment Status R

no connectors were proposed in baseline for BASE-SR PMDs.

*SuggestedRemedy*

Replace references to IEC 61753-1-1 and IEC 61753-022-2 with TBD.

Response Response Status C

REJECT.

Specifications are for performance and do not apply to specific connector types

CI 86 SC 86.10.2.3 P220 L6 # 515  
Kolesar, Paul CommScope

Comment Type TR Comment Status A

The MPO connector is the form of choice on cabling infrastructure supporting array connectivity. It is also the connector selected in MSAs like the QSFP and SNAP12. Unlike past standardization periods where two-fiber connector forms were hotly debated, the MPO is virtually uncontested in the array connectivity space. This permits straight forward specification of the MPO to terminate the cabling at the MDI. Note that the proposed interface type 7-4 permits from 2 to 24 fibers. It is expected that this may be further defined to be fiber-count specific. This specificity is already possible in the cans of 40GBASE-SR4 as the 12 fiber type. It may be either 12 or 24 fibers as the MSA for 100GBASE-SR10 is defined.

*SuggestedRemedy*

Add the following:

The connector type terminating the cabling at the MDI shall meet the specifications of IEC 61754-7 interface 7-4 (MPO female plug connector with flat interface).

Response Response Status C

ACCEPT IN PRINCIPLE.

Add an editor's note to say that the MPO connector is an example of a suitable connector for the MDI

**CI 86**      **SC 86.2.1**      **P 202**      **L 44**      # **344**  
Dawe, Piers      Avago Technologies

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

Accepting the proposed delay limits.

**SuggestedRemedy**  
Accept the proposed delay limits. If we continue to specify delay in BT, change 'bit-times' to 'MAC bit-times' twice. Now that reviewers have had a chance to read the editor's note, delete it.

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

Change first two sentences of clause 86.2.1 to:  
"A 40GBASE-SR4 PMD shall incur a round-trip delay (transmit and receive) of not more than 1024 bit-times, or 2 pause\_quanta, including 2 m of fiber. A 100GBASE-SR10 PMD shall incur a roundtrip delay (transmit and receive) of not more than 2048 bit-times, or 4 pause\_quanta, including 2 m of fiber."

Also delete editor's note.

The commenter is invited to submit a comment regarding changing 'bit-times' to 'MAC bit-times' against the whole draft rather than one PMD type.

See also comment #317

**CI 86**      **SC 86.2.2**      **P 203**      **L 10**      # **345**  
Dawe, Piers      Avago Technologies

**Comment Type**    **T**      **Comment Status**    **A**      **Skew**

Proposing skew limits

**SuggestedRemedy**  
For overall skew, see Gustlin presentation. For dynamic skew: 200 ps from PMA, 100 ps PMD Tx add, 700 ps medium add, 200 ps PMD Rx add, giving 1200 ps returned to PMA. Remove editor's note.

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.  
Insert editors note at the end of clause 86.2.2 to say:  
"The dynamic skew limit at SP2 may be too high, further information is invited"

Commenter is invited to review the implementation of the resolution of comment #240 in draft 1.1 and comment against that if it is not acceptable

**CI 86**      **SC 86.2.2**      **P 203**      **L 10**      # **393**  
Petrilla, John      Avago Technologies

**Comment Type**    **T**      **Comment Status**    **A**      **Skew**

The attribute skew is not defined nor does there appear a defined measurement. While this may not be essential in the logical domain, where dynamic skew is being considered and the signals are electrical or optical it appears important to define skew such that jitter is not included.

**SuggestedRemedy**  
Add a skew measurement sub-clause to clause 86.7 such that jitter is not captured in the skew measurement.

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

Insert a new subclause to define the measurement of skew and dynamic skew on multimode fibers containing an editor's note as a placeholder including the principle that the dynamic skew does not double count jitter and that the definition of skew in clause 82.2.9 may need to be modified.

Also add a new subclause to clause 87 to define the measurement of skew and dynamic skew for a WDM based PMD containing an editor's note as a placeholder.

Also add a new subclause to clause 88 referring to the measurement definition in clause 87.

**CI 86**      **SC 86.2.2**      **P 203**      **L 13**      # **516**  
Kolesar, Paul      CommScope

**Comment Type**    **T**      **Comment Status**    **A**      **Skew**

The maximum skew and dynamic skew for the multimode fiber medium are TBDs that require values. The values suggested are calculated using the skew model adopted by the TF in May 2008 found in kolesar\_02\_0508.xls with the default worst-case parameters at a link length of 300 m to allow for the possibility of extended reach technologies. Engineering the de-skew circuits to handle this amount of skew will permit support for possible future enhancements. Note that the skew value suggested here three times larger than that suggested in another comment submitted against line 46 of page 218 (table 86-17) wherein the channel distance is explicitly defined as a 100 m maximum.

**SuggestedRemedy**  
Replace the existing sentence with:  
The delays through the medium shall match to within 13.6 ns and do not change by more than 20.3 ns including the effects of varying launch conditions and operating wavelength.

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

Same resolution as comment # 345

CI 86 SC 86.2.2 P203 L 817 # 307  
Oulundsen III, George OFS

Comment Type T Comment Status A Skew

Currently, there are a lot of TBDs regarding skew constraints. The 802.3ba Task Force adopted kolesar\_02\_0508.xls as the MMF cable skew spreadsheet model. At that time we understood that the values could change, but the concept of the model spreadsheet was adopted. Should we use the values proposed in kolesar\_02\_0508.xls as a starting point and replace the TBD with the model values where we can? Better values can be entered when discovered.

SuggestedRemedy

Response Response Status C

ACCEPT IN PRINCIPLE.

Same resolution as comment # 345

CI 86 SC 86.4.1 P204 L 30 # 346  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Editor's note

SuggestedRemedy

See Anslow presentation and comment, remove editor's note

Response Response Status C

ACCEPT.

Replace Figure 86-2 with the version shown in anslow\_05\_1108.pdf  
Also remove editor's note.  
See also comment # 298.

CI 86 SC 86.4.2 P204 L 47 # 392  
Petrilla, John Avago Technologies

Comment Type E Comment Status D

The phrase, the four or ten, is introduced and used in several places. Previously, page 199, line 30, the term, n + 1, is used and is more succinct.

SuggestedRemedy

Except for page 199, replace all instances of the phrase, the four or ten, with n + 1.

Proposed Response Response Status W

PROPOSED REJECT.

It's not much more succinct.

CI 86 SC 86.4.2 P204 L 51 # 578  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status A

Transmit function is missing AC coupling

SuggestedRemedy

Transmit function include AC coupling.

Response Response Status C

ACCEPT IN PRINCIPLE.

Give editor licence to modify the draft to include AC coupling in the PMD transmit side and receive side.

CI 86 SC 86.4.2 P205 L 1 # 298  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

During the review of version 0.9 of the draft, some issues were raised concerning the block diagrams in clauses 86, 87 and 88. These diagrams should be clear and also consistent with each other and with Figure 86-3 for the symbols used for optical and electrical connectors

SuggestedRemedy

Replace Figures 86-1, 87-1 and 88-1 with those shown in anslow\_05\_1108.pdf

Response Response Status C

ACCEPT IN PRINCIPLE.

Replace Figures 86-2, 87-2 and 88-2 with those shown in anslow\_05\_1108.pdf

For Fig 86-2, this is same as comment # 346.

CI 86 SC 86.4.3 P205 L 29 # 579  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status A

AC coupling are missing from receive function

SuggestedRemedy

Receive function include AC coupling.

Response Response Status C

ACCEPT IN PRINCIPLE.

See resolution of comment 578

CI 86 SC 86.5 P 207 L 18 # 347  
Dawe, Piers Avago Technologies

Comment Type T Comment Status R

Note to clause editor: check that 'There are no lane assignments' is compatible with e.g. lane by lane signal detect function.

SuggestedRemedy

Per comment

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

Also see comment # 474.

CI 86 SC 86.5 P 207 L 21 # 474  
Dudek, Mike JDSU

Comment Type TR Comment Status A

Although there are no requirements on the physical location of the various lanes within the group of lanes there is a requirement for knowing which fibers in the MTP are used for Tx, which are used for Rx and which are not used.

SuggestedRemedy

insert the word "electrical" so that the sentence becomes ".... where the electrical lanes are physically....."

insert two subsections.

"86.5.1 Optical lane assignments for 40GBASE-SR4

Although the location of lanes within the group of Tx lanes is not required, it is necessary to define the positions of the Tx lanes and Rx lanes within the ribbon fiber connector. Figure xxx shows the location.

86.5.2 Optical lane assignments for 100GBASE-SR10

Although the location of lanes within the group of Tx lanes is not required, it is necessary to define the positions of the Tx lanes and Rx lanes within the ribbon fiber connector. Figure yyy shows the location."

Figure xxx to be as in INF-8438i figure 20 with the following changes. Title becomes 40GBASE-SR MDI optical receptacle and channel orientations. Replace the row saying Fiber number with "Fiber positions xxxxxxxxxxxx (12 x's). Replace the numbers in the Transmit and receive Channel rows with xxxx. Add an additional row with "Unused positions" and place XXXX in the middle 4 positions.

Figure yyy to say "TBD. Editors note to be removed prior to publication The figure will show the fibers at the edge of a 12 fiber ribbon as unused positions (ie fiber numbers 1 and 12 are unused.)"

Response Response Status C

ACCEPT IN PRINCIPLE.

In clause 86.5 Change "define where the lanes are physically" to "define where the electrical lanes are physically"

insert two subsections.

"86.5.1 Optical lane assignments for 40GBASE-SR4"

"86.5.2 Optical lane assignments for 100GBASE-SR10"

Add editor's note to each subclause to say presentations to define the contents of this subclause are invited.

**Cl 86**      **SC 86.5**      **P 207**      **L 21**      # **303**  
 Oulundsen III, George      OFS

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

Remove the word "with". This appears to be a typographical error.

*SuggestedRemedy*

**Proposed Response**      **Response Status**    **W**

PROPOSED ACCEPT.

It wasn't, but the sentence works without it.

**Cl 86**      **SC 86.6**      **P 207**      **L**      # **138**  
 D'Ambrosia, John      Force10 Networks

**Comment Type**    **E**      **Comment Status**    **D**      *Review*

Recommend creating Annex 86A and moving PPI electrical specifications, as the PPI might eventually be used with PMDs.

*SuggestedRemedy*

Move all PPI electrical specifications into Annex 86A.

**Proposed Response**      **Response Status**    **W**

PROPOSED REJECT.

At present, only n0GBASE-SRn uses PPI although we hope to achieve some level of compatibility with Clause 83A and Clause 85, and we are more likely to do a good job of making PPI consistent with the rest of Clause 86 where it is. Best to develop it in place and then revisit this question when we go to WG ballot.

**Cl 86**      **SC 86.6.1**      **P 208**      **L 1**      # **475**  
 Dudek, Mike      JDSU

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

It would be good to label Table 86-6 with "at TP1a" at the end of the title.

*SuggestedRemedy*

**Proposed Response**      **Response Status**    **W**

PROPOSED ACCEPT.

[Editor's note: Added missing Clause, subclause (86.6.1), page and line numbers to appropriate fields]

**Cl 86**      **SC 86.6.1**      **P 208**      **L 10**      # **293**  
 Anslow, Peter      Nortel Networks

**Comment Type**    **T**      **Comment Status**    **A**      *DJ*

In Table 86-6 There are two jitter parameters "TP1a Total Jitter output" and "TP1a Deterministic Jitter output" where it is not clear if this is UI peak to peak or not.

Also applies to:

Table 86-7 "Total Jitter tolerance at TP1a"

Table 86-11 "Total Jitter output at TP4"

Table 86-12 "Total Jitter tolerance"

*SuggestedRemedy*

Either change the parameter names to include "(pk-pk)" or change the units to be UIptp

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

See response to 402

**Cl 86**      **SC 86.6.1**      **P 208**      **L 11**      # **476**  
 Dudek, Mike      JDSU

**Comment Type**    **TR**      **Comment Status**    **A**      *DJ*

Dj in the Tx has been shown by the SFF8431 committee to be a poorer predictor of link performance than DDPWS and DDJ

*SuggestedRemedy*

Replace the Deterministic Jitter Output rows in Table 86-6 and Table 86-7 with two rows.

"TP1a Data Dependent Jitter Output    Max TBD

"TP1a Data Dependent Pulse Width Shrinkage Output Max TBD

Add "editors note to be removed prior to publication. Max values of DDJ and DDPWS are TBD, however for comparison SFF8431 has DDJ max 0.1UI and DDPWS max 0.05UI."

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

In Table 86-6 and 86-7, add a row "Data Dependent Pulse Width Shrinkage (DDPWS)" with unit "UI" and with "TBD" in the Max column for table 86.6 and the Min column for table 86-7.

Add an editor's note below table 86-6 to say that proposals have been made to replace Deterministic Jitter with Data Dependent Jitter or 99% Jitter. A value of 0.15 UI has been proposed for Dual Dirac Deterministic Jitter.

CI 86 SC 86.6.1 P208 L11 # 477  
Dudek, Mike JDSU

Comment Type TR Comment Status A S-par

In order to ensure that reflections don't overall degrade performance, the differential return loss of the host needs to be specified. To control EMI the common mode return loss of the host also needs to be specified.

#### SuggestedRemedy

Add rows to Table 86-6 after AC common mode.

"Differential output reflection coefficient, SDD22 Max see 86.6.1.1  
Differential Output common mode reflection coefficient, SCC22 Max -6dB 10MHz to 2.5GHz, -3dB 2.5GHz to 11.1GHz"

Change title and text of 86.6.1.1 to say "SDD11 at TP1 and SDD22 at TP1a" (ie 2 places)

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: subclause changed from 86.6 to 86.6.1 ]

Add rows to Table 86-6 after AC common mode:  
"Differential output reflection coefficient, SDD22"  
Max value: "see 86.6.1.1"

"Common mode output reflection coefficient, SCC22"  
Max value: "see [new subclause created by comment 587]"

Change title and text of 86.6.1.1 to say "SDD11 at TP1 and SDD22 at TP1a" (ie 2 places)

CI 86 SC 86.6.1 P208 L11 # 349  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A DJ

Deterministic Jitter spec or 99% jitter spec? Also at PPI receive side.

#### SuggestedRemedy

?

Response Response Status C

ACCEPT IN PRINCIPLE.

See response to comment 476

CI 86 SC 86.6.1 P208 L11 # 290  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

In Table 86-6 The "TP1a Deterministic Jitter output" min and max values are blank  
Same issue for Table 86-7 "AC common mode input voltage tolerance" max

#### SuggestedRemedy

Make the "TP1a Deterministic Jitter output" min "-" and the Max "TBD" if no values are available

Make the "AC common mode input voltage tolerance" max "-"

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 86 SC 86.6.1 P208 L11 # 402  
Petrilla, John Avago Technologies

Comment Type TR Comment Status A DJ

Table 86-6, has blank entries for TP1a Deterministic Jitter output and units of UI. There are several other instances of units for TJ and DJ shown as UI

#### SuggestedRemedy

For Table 86-6, TP1a Deterministic Jitter output, enter 0.15 in the Max column and change the Units column entry to UI pk-pk. Check other TJ and DJ entries in Tables 86-6, 7, 11 & 12 and, where appropriate, change UI to UI pk-pk.

Response Response Status C

ACCEPT IN PRINCIPLE.

Create a subclause within clause 86.7.3 to define jitter measurements.  
Add an editor's note to this subclause to say that when the jitter parameters and their measurement methods have been defined the units of the jitter parameters in the tables of clause 86 will be reviewed.

See also response to comment 476

CI 86 SC 86.6.1 P208 L12 # 565  
 Ghiasi, Ali Broadcom

Comment Type TR Comment Status A DJ

The classical DJ and RJ measured jitter are jitter PDF dependent and not valid for jitter distribution which are not dual-dirac.

#### SuggestedRemedy

Repalce RJ with UJ of 0.025 UI (RMS) per IEEE CL 68.6.8 method

Replace DJ with DDJ of 0.15 UI per method of FC-PI4 A.1.3.1 with PSBS 9 pattern

Response Response Status C

ACCEPT IN PRINCIPLE.

See response in comment 476

CI 86 SC 86.6.1 P208 L14 # 403  
 Petrilla, John Avago Technologies

Comment Type TR Comment Status A Elec Mask

In Table 86-6, there's a TBD for eye mask coordinate X2 and another in the Conditions column.

#### SuggestedRemedy

In Table 86-6, replace the TBD for eye mask coordinate X2 with 0.25 and delete the TBD in the Conditions column or replace it with a reference to subclause 86.7.4.7.

Response Response Status C

ACCEPT IN PRINCIPLE.

See resolution to comment #389

See also comments # 389, 390, 404.

CI 86 SC 86.6.1 P208 L14 # 389  
 King, Jonathan Finisar

Comment Type TR Comment Status A Elec Mask

Table 86-6

Eye mask coordinates: X1,X2,Y1,Y2 and conditions contain TBDs.

Use SFP+MSA mask and coordinates for TP1

#### SuggestedRemedy

Use SFP+MSA mask and coordinates for TP1

Eye mask coordinates: X1,X2,Y1,Y2 become 0.12, 0.33, 95, 350

Condition becomes <5e-5 hit rate.

Response Response Status C

ACCEPT IN PRINCIPLE.

A show of hands was taken as to whether to accept this proposal:

Yes 10

No 2

Eye mask coordinates: X1,X2,Y1,Y2 become 0.12, 0.33, 95, 350

Condition becomes <5e-5 hit ratio.

See also comments 403, 390, 404.

CI 86 SC 86.6.1 P208 L36 # 56  
 Anslow, Peter Nortel Networks

Comment Type T Comment Status A

In table 86-7 the parameter "Total Jitter tolerance at TP1a" is at TP1a wheras the table title says "at TP1"

#### SuggestedRemedy

change table title from "PPI electrical transmit signal input specifications at TP1" to "PPI electrical transmit signal input specifications at TP1 and TP1a"

Response Response Status C

ACCEPT IN PRINCIPLE.

change table title from "PPI electrical transmit signal input specifications at TP1" to "PPI electrical transmit signal input specifications at TP1a"

**CI 86**      **SC 86.6.1**      **P 208**      **L 37**      # **394**  
Petrilla, John      Avago Technologies

**Comment Type**    **T**      **Comment Status**    **R**

In Table 86-7 the min entry for Total Jitter tolerance at TP1a has a value of 0.3. This has insufficient precision for jitter since it permits a range of 0.25 to 0.349. All jitter entries should have, at least, two significant digits.

**SuggestedRemedy**  
In Table 86-7, change the min entry for Total Jitter tolerance at TP1a from 0.3 to 0.30.

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

The task force believes a standard doesn't use the significant digits convention; it takes things at face value.  
This issue affects the whole 802.3 standard and should be submitted to the maintenance task force

Do you agree with this response?  
Yes 13  
No 3

**CI 86**      **SC 86.6.1**      **P 208**      **L 38**      # **584**  
Ghiasi, Ali      Broadcom

**Comment Type**    **TR**      **Comment Status**    **A**      **DJ**

The classical DJ and RJ measured jitter are jitter PDF dependent and not valid for jitter distribution which are not dual-dirac.

**SuggestedRemedy**  
Repalce RJ with UJ of 0.025 UI (RMS) per IEEE CL 68.6.8 method  
Replace DJ with DDJ of 0.15 UI per method of FC-PI4 A.1.3.1 with PSBS 9 pattern

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

See response in comment 476

**CI 86**      **SC 86.6.1**      **P 208**      **L 42**      # **404**  
Petrilla, John      Avago Technologies

**Comment Type**    **TR**      **Comment Status**    **A**      **Elec Mask**

In Table 86-7 there's a TBD for Eye mask coordinate X2 and another in the Conditions column.

**SuggestedRemedy**  
In Table 86-7, replace the TBD for eye mask coordinate X2 with 0.25 and delete the TBD in the Conditions column or replace it with a reference to subclause 86.7.4.7.

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

See resolution of comment #390

See also comment # 389, 390, 403.

**CI 86**      **SC 86.6.1**      **P 208**      **L 42**      # **390**  
King, Jonathan      Finisar

**Comment Type**    **TR**      **Comment Status**    **A**      **Elec Mask**

Table 86-7  
Eye mask coordinates: X1,X2,Y1,Y2 and conditions contain TBDs.

Use SFP+MSA mask and coordinates for TP1

**SuggestedRemedy**  
Use SFP+MSA mask and coordinates for TP1

Eye mask coordinates: X1,X2,Y1,Y2 become 0.12, 0.33, 95, 350  
Condition becomes <5e-5 hit rate.

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

Eye mask coordinates: X1,X2,Y1,Y2 become 0.12, 0.33, 95, 350  
Condition becomes <5e-5 hit ratio.

See also comments # 403, 389, 404.



CI 86 SC 86.6.2 P209 L # 309  
Dallesasse, John Emcore Corporation

Comment Type TR Comment Status R

Given the target distance of 100 meters, we need to evaluate the possibility of eliminating the encircled flux specification. This will likely be a challenging specification to meet over temperature (or even at a single temperature on all lanes) for a parallel optical module. General discussions on the expected impairment in modal bandwidth for an overfilled as opposed to restricted launch into OM3 fiber suggest that eliminating encircled flux may be possible, but further analysis of this question by an ad-hoc group may be necessary.

#### SuggestedRemedy

Eliminate the encircled flux specification from Table 86-8 and any other places referenced in these clauses.

Response Response Status C

REJECT.

[Editor's note: subclause changed from "Table 86-8" to "86.6.2"]

Removing the encircled flux specification would lead to an unknown fiber modal bandwidth which could be less than that for overfilled launch and unknown connector loss (which could be more than that for overfilled launch).

CI 86 SC 86.6.2 P209 L 15 # 631  
CHANG, Frank Vitesse

Comment Type TR Comment Status A

Table 86-8 need more rows, lack parameters.

#### SuggestedRemedy

- Suggest to edit the following
- Extra row for signaling speed as 4/10 x 10.3125GBd +/-100ppm.
- Add Average launch power, each lane MIN specs as TBD
- ORL tolerance should be MAX, not min, specs.
- RIN12OMA should set to -128dB/HZ (-132dB/Hz would affect cost/yield)
- Add TDP specs as TBD.

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: subclause changed from 86.82 to 86.6.2]

In Table 86-8  
Add row for "Average launch power, each lane" with a Min value of "TBD"  
Change the "Optical return loss tolerance" to be a Max value  
Change the value of "RIN12OMA" to be "-128 dB/Hz"

CI 86 SC 86.6.2 P209 L 23 # 478  
Dudek, Mike JDSU

Comment Type T Comment Status A Optical Power

Optical receivers are in general limited by the peak power of the input signal (Average power is less important). As the spec stands the receiver has to cope with the maximum input average power at infinite extinction ratio with the allowed eye mask overshoot. This is much more than is likely to happen in practice. We should limit the peak power explicitly.

#### SuggestedRemedy

Add extra rows to Tables 86-8, 86-9, 86-10.

Peak Power Max 3dBm. (no min)

To this row in table 86-8 add a footnote. Peak Power is the maximum value of the power as measured on the eye diagram see 86.7.4.7

Response Response Status C

ACCEPT IN PRINCIPLE.

Insert an editor's note that a possible peak power specification or a maximum OMA limit is under consideration for 40/100GBASE-SR

See also comment # 406.

CI 86 SC 86.6.2 P209 L 23 # 395  
Petrilla, John Avago Technologies

Comment Type T Comment Status R

In Table 86-8, values for entries Average launch power, Optical Modulation Amplitude (OMA) and Extinction ratio show only one significant digit. These have insufficient precision and should have two significant digits.

#### SuggestedRemedy

In Table 86-8, change the entries for Average launch power, Optical Modulation Amplitude (OMA) and Extinction ratio to show two significant digits.

Response Response Status C

REJECT.

See response to comment # 394.

CI 86 SC 86.6.2 P209 L 24 # 405  
Petrilla, John Avago Technologies

Comment Type TR Comment Status A Aggregate

In Table 86-8, the characteristics, Optical Modulation Amplitude (OMA), Optical Modulation Amplitude(OMA), Aggregate signal parameter, and RIN12OMA can be replaced by using the Transmitter eye mask as the aggregate signal parameter.

#### SuggestedRemedy

In Table 86-8, delete or label as informative the characteristics, Optical Modulation Amplitude (OMA), Aggregate signal parameter, and RIN12OMA and use the Transmitter eye mask as the aggregate signal parameter.

Response Response Status C

ACCEPT IN PRINCIPLE.

This comment would need to be re-submitted if an aggregate signal parameter is accepted in to the draft.

CI 86 SC 86.6.2 P209 L 36 # 406  
Petrilla, John Avago Technologies

Comment Type TR Comment Status A

In Table 86-8, the entry for Transmitter eye mask definition calls for X3, Y2 and Y3 coordinates which are not required, does not label the coordinates as Specification values and has TBD as entries in the Type and Value columns and no entry in the Unit column.

#### SuggestedRemedy

In Table 86-8, add a header row to label the Transmitter eye mask coordinates as Specification values (See Tables 86-6 & 7 as examples.), delete X3, Y2 and Y3 coordinates, split the remaining coordinates into two rows, one for X1 & X2 and the other for Y1 (againing using Tables 86-6 & 7 as examples), replace the TBD and enter 0.225 as the value for X1, 0.355 as the value for X2 and 176 as the value for Y1, enter UI as units for X1 & X2 and uW as units for Y1 and add a reference to subclause 86.7.4.7. Since there is no applicable figure in subclauses 86.6.2 or 86.7.4.7 (nor 83A.3.3.5) for Tx eye masks where Y1 is an absolute value, create a new figure and insert in subclause 86.6.2, 86.7.4.7 or where otherwise appropriate.

Response Response Status C

ACCEPT IN PRINCIPLE.

More evaluation of this proposal is required before it could be incorporated in to the draft. See resolution of comment #385

CI 86 SC 86.6.3 P209 L 52 # 396  
Petrilla, John Avago Technologies

Comment Type T Comment Status A Aggregate

Including the phrase, "power in OMA" in the sentence, "A signal with power in OMA and average power not within the ranges given cannot be compliant." is not applicable if OMA is deleted from Table 86-8 or is changed to informative.

#### SuggestedRemedy

Change the sentence, A signal with power in OMA and average power not within the ranges given cannot be compliant, to, A signal with average power not within the ranges given cannot be compliant.

Response Response Status C

ACCEPT IN PRINCIPLE.

This comment would need to be re-submitted if an aggregate signal parameter is accepted in to the draft.

CI 86 SC 86.6.3 P209 L 53 # 57  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A

This says "A signal with power in OMA and average power not within the ranges given cannot be compliant.". However either condition makes the signal non-compliant so it should be "or" not "and"

#### SuggestedRemedy

change "in OMA and average" to "in OMA or average"

Response Response Status C

ACCEPT.

CI 86 SC 86.6.3 P210 L 11 # 397  
Petrilla, John Avago Technologies

Comment Type T Comment Status A Aggregate

In Table 86-9, the characteristic, "Optical Modulation Amplitude (OMA), each lane", is not applicable if OMA is deleted from Table 86-8 or is changed to informative.

#### SuggestedRemedy

In Table 86-9, delete the characteristic, "Optical Modulation Amplitude (OMA), each lane", if OMA is deleted from Table 86-8 or is changed to informative.

Response Response Status C

ACCEPT IN PRINCIPLE.

This comment would need to be re-submitted if an aggregate signal parameter is accepted in to the draft.

**Cl 86**      **SC 86.6.3**      **P210**      **L 6**      # **348**  
Dawe, Piers      Avago Technologies

**Comment Type**    **T**      **Comment Status**    **R**  
Have we allowed enough for connector loss?

**SuggestedRemedy**  
Check that we have allowed enough for 100 m of fibre and a reasonable number of connectors, remembering that with a restricted launch, the actual connector loss is less than the measured connector loss. Reduce the numbers in the minimum column by 0.1 dB if appropriate, and adjust Table 86-13, fill in TBDs in 86.10.2.2.1. Remove the footnote here.

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

This comment was WITHDRAWN by the commenter.

See also comment # 382.

**Cl 86**      **SC 86.6.4**      **P210**      **L**      # **398**  
Petrilla, John      Avago Technologies

**Comment Type**    **T**      **Comment Status**    **R**  
In Table 86-10 Value entries for "Damage threshold" and "Average power at receiver input" show only a single significant digit and lack sufficient precision.

**SuggestedRemedy**  
In Table 86-10 change Values entries for "Damage threshold" and "Average power at receiver input" to show at least two significant digits as needed for the desired precision.

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

The number of significant digits does not indicate the precision of a limit in this standard. The limits are taken to be exact. For the damage threshold limit of +2 dBm, a value of 2.000001 would be compliant and a value of 1.9999999 would not.

See also comment # 394.

**Cl 86**      **SC 86.6.4**      **P210**      **L 35**      # **407**  
Petrilla, John      Avago Technologies

**Comment Type**    **TR**      **Comment Status**    **A**      **Optical Power**  
In Table 86-10, Value column entries are TBD for attributes, Stressed receiver sensitivity in OMA, Vertical eye closure penalty, and Stressed eye jitter J.

**SuggestedRemedy**  
In Table 86-10, change Value column TBD for Stressed receiver sensitivity in OMA to -5.4, Vertical eye closure penalty to 1.67, and Stressed eye jitter J to 0.37.

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

Insert editor's note under the Table 86.10 to say:  
"Values of -5.4 dBm for Stressed receiver sensitivity in OMA, 1.67 dB for Vertical eye closure penalty and 0.37 UI Stressed eye jitter J have been proposed. Further information is invited"

**Cl 86**      **SC 86.6.5**      **P211**      **L 19**      # **587**  
Ghiasi, Ali      Broadcom

**Comment Type**    **TR**      **Comment Status**    **A**      **S-par**  
With stacked connector -6 dB SCC can not be met which could eliminated SR10

**SuggestedRemedy**  
Propose the following SCC2 mask  
 $SCC22 \leq (-12 + 2.8*f)$  from 0.01 to 2.5 GHz and  $(-5.2+0.08*f)$  from 2.5 to 11.1 GHz.

**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

Add a new subclause titled "Common mode output reflection coefficient SCC22 at TP4 and TP1a" to define the following SCC22 mask  
 $SCC22 \leq (-12 + 2.8*f)$  from 0.01 to 2.5 GHz and  $(-5.2+0.08*f)$  from 2.5 to 11.1 GHz.

Change the values of "Common mode output reflection coefficient, SCC22" in Table 86-11 to refer to new subclause.

CI 86 SC 86.6.5 P211 L 24 # 605  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status A DJ

Total jitter at TP4 is 0.7 UI which is the same as SFP+ single channel. The SR4/SR10 optics are more relax than SR optics but the SerDes tolerance is the same.

#### SuggestedRemedy

The Total Jitter at TP4 for SR4 and SR10 should be 0.65 UI. Since CR4/CR10 TJ are 0.28 UI if the optical link does not close then TJ in table 86-6 and 86-7 are suggested to be reduced to 0.28 UI

Response Response Status C

ACCEPT IN PRINCIPLE.

Add an editors note under table 86-11 to say that a proposal has been made to reduce the "Total Jitter output at TP4" in Table 86-11 to 0.65 UI. supporting evidence for this would be required

CI 86 SC 86.6.5 P211 L 27 # 592  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status A DJ

MJSQ method of DJ and RJ breakdown is only valid for dual-Dirac jitter pdf, the DJ reported can even be 0 for cases the actual high freq jitter is very large.

#### SuggestedRemedy

Replace DJ with 99% probability jitter with symbol J2

Response Response Status C

ACCEPT IN PRINCIPLE.

See response to comment 476

CI 86 SC 86.6.5 P211 L 29 # 408  
Petrilla, John Avago Technologies

Comment Type TR Comment Status A Elec Mask

In Table 86-11, there's a TBD for Eye mask coordinate X2 and another in the Conditions column.

#### SuggestedRemedy

In Table 86-11, change the TBD for Eye mask coordinate X2 from TBD to 0.50 and either delete the TBD in the Conditions column or change to reference subclause 86.7.4.7.

Response Response Status C

ACCEPT IN PRINCIPLE.

In Table 86-11, change the TBD for Eye mask coordinate X2 from TBD to 0.50  
Also change the TBD in the Conditions column to reference subclause 86.7.4.7.

TYPE: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general  
COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn  
SORT ORDER: Clause, Subclause, page, line

CI 86 SC 86.6.5 P211 L 41 # 479  
Dudek, Mike JDSU

Comment Type T Comment Status A

It is good to be explicit at what test point the specifications apply

#### SuggestedRemedy

Add at TP4a to the title of Table 86-12

Response Response Status C

ACCEPT.

CI 86 SC 86.6.5 P211 L 49 # 593  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status A DJ

MJSQ method of DJ and RJ breakdown is only valid for dual-Dirac jitter pdf, the DJ reported can even be 0 for cases the actual high freq jitter is very large.

#### SuggestedRemedy

Replace DJ with 99% probability jitter with symbol J2

Response Response Status C

ACCEPT IN PRINCIPLE.

Add an editor's note below table 86-12 to say that proposals have been made to replace Deterministic Jitter with 99% Jitter.

CI 86 SC 86.6.5 P211 L 49 # 304  
Oulundsen III, George OFS

Comment Type E Comment Status D

Table 86-12: I believe that the footnote superscript "a" should be added to the "Deterministic Jitter tolerance (pk-pk)" value of 0.40 in the "Min" column of the table. I believe that this is a typographical error.

#### SuggestedRemedy

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 86 SC 86.6.5 P211 L 50 # 480  
 Dudek, Mike JDSU

Comment Type TR Comment Status A

In order to ensure that reflections don't overall degrade performance, the differential return loss of the host needs to be specified. To control EMI the differential to common mode reflection coefficient of the host also needs to be specified.

#### SuggestedRemedy

Add rows to Table 86-12 after Deterministic jitter tolerane

"Differential input reflection coefficient, SDD11 Max see 86.6.5.1  
 Reflected Differential to common mode conversion, SCD11 Max -10dB 10MHz - 11.1GHz

Change title and text of 86.6.5.1 to say "SDD22 at TP4 and SDD11 at TP4a" (ie 2 places)

Response Response Status C  
 ACCEPT.

CI 86 SC 86.6.5 P211 L 52 # 409  
 Petrilla, John Avago Technologies

Comment Type TR Comment Status A Elec Mask

In Table 86-12, there's a TBD for Eye mask coordinate X2 and another in the Conditions column.

#### SuggestedRemedy

In Table 86-12, change the TBD for Eye mask coordinate X2 from TBD to 0.50 and either delete the TBD in the Conditions column or change to reference subclause 86.7.4.7.

Response Response Status C  
 ACCEPT IN PRINCIPLE.

In Table 86-12, change the TBD for Eye mask coordinate X2 from TBD to 0.50  
 Also reference subclause 86.7.4.7 in the conditions

See also comment # 408.

CI 86 SC 86.6.5.1 P212 L 37 # 305  
 Oulundsen III, George OFS

Comment Type E Comment Status D

Footnote to Table 86-13: Should we add the TIA-492AAAC-A standard to footnote a. The IEC standard is already referenced.

#### SuggestedRemedy

Proposed Response Response Status W  
 PROPOSED REJECT.

No; if international standards are available, we should use them. Now if TIA documents were free and IEC ones paid for, there would be an incentive.

CI 86 SC 86.6.6 P212 L 26 # 261  
 Vanderlaan, Paul Nexans

Comment Type E Comment Status D

Change From  
 "Effective modal bandwidth at 850 nm"

#### SuggestedRemedy

Change to:  
 "Minimum Effective modal bandwidth at 850 nm"

Indicates higher performing fibers will be suitable

Proposed Response Response Status W  
 PROPOSED ACCEPT IN PRINCIPLE.

[Editor's note: corrected subclause number to 86.6.6 in subclause number field]

This is an example, with 'worst allowed' fibre. See 86.10 for the actual specs. In Table 86-18, make Effective modal bandwidth a minimum.

CI 86 SC 86.6.6 P212 L 34 # 410  
Petrilla, John Avago Technologies

Comment Type TR Comment Status A Optical Power

In Table 86-13 there's a TBD for Allocation for penalties.

*SuggestedRemedy*

In Table 86-13 change the TBD for Allocation for penalties to 6.8.

Response Response Status C

ACCEPT IN PRINCIPLE.

change the TBD for Allocation for penalties to 6.4

And see comment # 632.

CI 86 SC 86.6.6 P212 L 34 # 632  
CHANG, Frank Vitesse

Comment Type TR Comment Status A Optical Power

Allocation for penalty state TBD, which should be 8.3-1.9=6.4dB, the difference as compared with 10GABSE-SR should come related to the contribution from channel-to-channel xtalk.

*SuggestedRemedy*

Pls clarify.

Response Response Status C

ACCEPT IN PRINCIPLE.

See remedy of comment # 410.

CI 86 SC 86.7.2 P214 L 34 # 481  
Dudek, Mike JDSU

Comment Type T Comment Status A

For consistency and to ensure reproducible measurements the square test pattern with a fixed number of ones and zeros should be used for the measurements of OMA, and RIN.

The budgeting for the link assumes that the difference between the OMA for the Tx and the OMA for the Rx is the optical loss (average power). If the prbs9 is used to measure OMA for the Tx while square wave is used for the Rx this may no longer be true as the prbs9 pattern and square wave pattern will not always give the same answer. (If a vendor wishes to use prbs9 for production test the vendor should guard band his measurements for the differences the guard band being based on his own product characteristics.)

*SuggestedRemedy*

Make the measurements of OMA and RIN patterns Square eight ones and eight zeros for all three rows in standard font. Remove the editor preference note. Change the footnote to say "The items in italics" instead of "The second column"

Response Response Status C

ACCEPT.

CI 86 SC 86.7.3 P215 L 1 # 350  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

For AC common mode voltage, Termination mismatch and Transition time, copy text from SFF-8431 D3.1 with appropriate modifications (this is not issued at time of writing but will be issued before the P802.3ba co-located interim)

*SuggestedRemedy*

Use text from SFF-8431 D3.1 with appropriate modifications (this is not issued at time of writing but will be issued before the P802.3ba co-located interim)

Response Response Status C

ACCEPT.

And see comments # 482, 483.

**Cl 86**      **SC 86.7.3.1**      **P215**      **L3**      # **482**  
Dudek, Mike      JDSU  
**Comment Type**    **T**      **Comment Status**    **A**  
Missing definition of AC common mode voltage  
**SuggestedRemedy**  
Copy the section from SFF8431 D.15 with editorial changes to remove SFP+ references.  
**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.  
See resolution of comment 350

**Cl 86**      **SC 86.7.3.2**      **P215**      **L8**      # **483**  
Dudek, Mike      JDSU  
**Comment Type**    **TR**      **Comment Status**    **A**  
Missing Test procedure for Termination mismatch.  
**SuggestedRemedy**  
Copy the section from SFF8431 D.16  
**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.  
See resolution of comment 350

**Cl 86**      **SC 86.7.4.1**      **P215**      **L20**      # **484**  
Dudek, Mike      JDSU  
**Comment Type**    **T**      **Comment Status**    **A**  
It is bad practice to specify things in two places.  
**SuggestedRemedy**  
Delete the test pattern description "appropriate portion.....to end of sentence" and replace with "pattern defined in Table 86-15."  
Do the equivalent at line 39.  
**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.

Change "modulated using the appropriate portion of a valid 40GBASE-R4 or 100GBASE-R10 signal, or with a valid 10GBASE-R signal." to "modulated using the test pattern defined in Table 86-15."

Also on line 39 change "using TBD test pattern or a valid 40GBASE-R4 or 100GBASE-R10 signal." to "using the test pattern defined in Table 86-15."

**Cl 86**      **SC 86.7.4.3**      **P215**      **L28**      # **399**  
Petrilla, John      Avago Technologies  
**Comment Type**    **T**      **Comment Status**    **A**      **Aggregate**  
There is a proposal for Table 86-8 to replace OMA with an aggregate test. If accepted subclause 86.7.4.3 can be deleted or labeled as informative.  
**SuggestedRemedy**  
If the proposal for Table 86-8 to replace OMA with an aggregate test is accepted, deleted or labeled subclause 86.7.4.3 as informative.  
**Response**      **Response Status**    **C**  
ACCEPT IN PRINCIPLE.  
This comment would need to be re-submitted if an aggregate signal parameter is accepted in to the draft.

**CI 86**      **SC 86.7.4.6**      **P215**      **L 43**      # 391  
Petrilla, John      Avago Technologies

**Comment Type**    **T**      **Comment Status**    **A**      **Aggregate**

There is a proposal for Table 86-8 to use the Tx eye mask as the aggregate test. If accepted subclause 86.7.4.6 can be deleted.

**SuggestedRemedy**

If proposal for Table 86-8 to use the Tx eye mask as the aggregate test is accepted, delete subclause 86.7.4.6.

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

This comment would need to be re-submitted if an aggregate signal parameter is accepted in to the draft.

**CI 86**      **SC 86.7.4.6**      **P215**      **L 45**      # 485  
Dudek, Mike      JDSU

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

We need to say what test pattern is on the channels not under test

**SuggestedRemedy**

Add the sentence. "The pattern on the lanes not under test should be prbs31 or valid 40GBASE-R encoded data.

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

Add the sentence: "The signal on the lanes not under test should be Pattern 3 (PRBS31) or a valid 40GBASE-R or 100GBASE-R signal."

**CI 86**      **SC 86.7.4.7**      **P215**      **L 50**      # 385  
King, Jonathan      Finisar

**Comment Type**    **T**      **Comment Status**    **A**      **Optical Mask**

Generic eye mask measurement details missing.

**SuggestedRemedy**

Use text from 802.3aq (Clause 68.6.5) describing fionite hit rate eye mask measurements.

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

Apply the changes in anslow\_07\_1108.pdf except for:  
"In Table 86-8 set {X1, X2, X3, Y1, Y2, Y3} to {0.25, 0.40, 0.45, 0.25, 0.28, 0.40} with editor's note that the numbers are provisional." which leaves the eye mask in Table 86-8 "TBD"

Also add a second editor's note under the existing note in 86.7.4.7 to say "an absolute eye mask is being considered as the aggregate signal parameter for 40GBASE-SR4 and 100GBASE-SR10 replacing the relative mask defined in clause 86.7.4.7"

**CI 86**      **SC 86.7.4.7.1**      **P216**      **L 1**      # 292  
Anslow, Peter      Nortel Networks

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

Clause 86.7.4.7.1 "Eye mask for TP1a and TP4" should be a subclause of 86.7.3 "Electrical parameters" and not 86.7.4 "Optical parameter definitions"

**SuggestedRemedy**

Move the "Eye mask for TP1a and TP4" clause to 86.7.3

**Proposed Response**      **Response Status**    **W**

PROPOSED ACCEPT IN PRINCIPLE.

Also move 86.7.4.7 Eye diagrams to after of 86.7.2 and before 86.7.3, or delete it.



CI 86 SC 86.7.4.7.1 P216 L3 # 401  
Petrilla, John Avago Technologies

Comment Type T Comment Status A Aggregate

There is a proposal for Table 86-8 to use the Tx eye mask as the aggregate test. Since this mask has an absolute values for the vertical coordinate, the sentence "Unlike the optical eye mask, the vertical dimensions are fixed rather than scaled to the signal." is no longer applicable

*SuggestedRemedy*

If proposal for Table 86-8 to use the Tx eye mask as the aggregate test is accepted, delete the sentence "Unlike the optical eye mask, the vertical dimensions are fixed rather than scaled to the signal."

Response Response Status C

ACCEPT IN PRINCIPLE.

This comment would need to be re-submitted if an aggregate signal parameter is accepted in to the draft.

CI 86 SC 86.7.7.4 P215 L32 # 400  
Petrilla, John Avago Technologies

Comment Type T Comment Status A Aggregate

There is a proposal for Table 86-8 to use the Tx eye mask as the aggregate test. If accepted subclause 86.7.4.4 can be deleted.

*SuggestedRemedy*

If proposal for Table 86-8 to use the Tx eye mask as the aggregate test is accepted, delete subclause 86.7.4.4.

Response Response Status C

ACCEPT IN PRINCIPLE.

This comment would need to be re-submitted if an aggregate signal parameter is accepted in to the draft.

CI 86 SC 86.9 P217 L28 # 353  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A S-par

Need a channel S-parameter equation

*SuggestedRemedy*

One way to develop one would be to scale the SFP+ channel by the ratio of recommended trace lengths, but the SFP+ equations don't have  $f^3$  terms.

Response Response Status C

ACCEPT IN PRINCIPLE.

See resolution of comment # 585.

CI 86 SC 86.9 P217 L28 # 209  
Mellitz, Richard Intel Corporation

Comment Type ER Comment Status R Review

Avoid s-parameter designations and keep loss definition consistent in document. Figure 86-5

*SuggestedRemedy*

Use A for attenuation.

Response Response Status C

REJECT.

[Editor's note: corrected subclause number to 86.9 in subclause number field]

S-parameters are very well established and are a good way of presenting the information; see e.g. diminico\_02\_0708.pdf slide 22.

**CI 86**      **SC 86.9**      **P217**      **L 30**      # **585**  
 Ghiasi, Ali      Broadcom

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

Max and min loss between PMA IC and TP1a and TP4a are listed as TBD

**SuggestedRemedy**  
 $SDD21 \leq (-0.0788 - 0.6169 \cdot \text{SQRT}(f) - 0.5855 \cdot f)$   
 Min loss  
 $SDD \geq (2/6 - 2 \cdot f/6)$   
 Where  $f$  is in GHz  
 The maximum SDD21 assumes the HCB PCB loss at Nyquist is  $\leq 1.0$  dB

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

Add editor's note in clause 86.9 to say  
 The maximum loss at the Nyquist frequency for the host PCB trace under consideration is from 2.75 to 3.5 dB. The SDD21 equation includes the loss of the connector and the host compliance board.  
 an equation has been proposed as below:  
 $SDD21 \leq (-0.0788 - 0.6169 \cdot \text{SQRT}(f) - 0.5855 \cdot f)$   
 Min loss  
 $SDD \geq (2/6 - 2 \cdot f/6)$   
 Where  $f$  is in GHz  
 The maximum SDD21 assumes the HCB PCB loss at Nyquist is  $\leq 1.0$  dB

See also comment # 353.

**CI 86**      **SC 86.9**      **P218**      **L**      # **162**  
 D'Ambrosia, John      Force10 Networks

**Comment Type**    **T**      **Comment Status**    **A**      **S-par**

the equations driving Figure 86-4 use variables that are TBD, therefore the figure should be blank.

furthermore, Note Figure 86-4 is inconsistent with similar figures in 802.3. Loss is a positive number.

**SuggestedRemedy**  
 remove curves in Figure 86-4

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

Page 218. The frequency breaks are in the equations. Will turn the y axis 0 -2 etc to TBD until the equations have parameters, then will redraw the figure.

Add "SDD21 limits are TBD see equation 86-3 and 86-4" to the figure

**CI 87**      **SC 87.1**      **P223**      **L 12**      # **160**  
 D'Ambrosia, John      Force10 Networks

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

Table 87-1 does not include reference to Annex 83A, XLAUI.

**SuggestedRemedy**  
 add row for Annex 83A, XLAUI and mark optional.

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

**CI 87**      **SC 87.1.1.2.3**      **P225**      **L 23**      # **276**  
 Anslow, Peter      Nortel Networks

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

It would be helpful to indicate where in clause 83 the effect of receipt is defined.  
 Also applies to 88.1.1.2.3

**SuggestedRemedy**  
 Change "in Clause 83" to "in 83.3.1.3"  
 Also make this change in 88.1.1.2.3

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT.

CI 87 SC 87.1.1.3.3 P 225 L 47 # 277  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

It would be helpful to indicate where in clause 83 the effect of receipt is defined.  
Also applies to 88.1.1.3.3

*SuggestedRemedy*

Change "in Clause 83" to "in 83.3.3.3"  
Also make this change in 88.1.1.3.3

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 87 SC 87.11 P 239 L 14 # 91  
Sun Hyok, Chang Electronics and Teleco

Comment Type T Comment Status R Optical

In Table 87-13, 'DGD\_max' is represented to describe the PMD (polarization mode dispersion) specification. But 'DGD\_max' is not sufficient to give the PMD specification of the fiber link. Parameter of P(DGD\_tot > DGD\_max) is needed.(from the Method 2 of IEC 61282-3). P(DGD\_tot > DGD\_max) is the probability that a system DGD value, DGD\_tot, exceeds DGD\_max.

*SuggestedRemedy*

Parameter of P(DGD\_tot > DGD\_max) per each lane is needed in Table 87-13.

Response Response Status C

REJECT.  
[Subclause changed from 11 to 87.11]

See response to comment 94

802.3 specifies only the DGD\_max that the system must tolerate for BER within specified limits . See clause 52.13. This is consistent with ITU specifications for optical systems (eg G.691, G.959.1). Different users are able to tolerate different probabilities of the actual DGD exceeding DGD\_max, so it inappropriate to specify this value.

See also comments #92 and #93

CI 87 SC 87.11 P 239 L 15 # 296  
Anslow, Peter Nortel Networks

Comment Type T Comment Status A Optical

In Table 87-13 the value of DGD\_max is "TBD". The DGD\_max value for 10GBASE\_LR in Table 52-24 is 10 ps. This equates to a link PMD coefficient of 0.8 ps/sqrt(km) (assuming S = 3.75) and is expected to give only a small penalty at 10.3125 Gb/s.

*SuggestedRemedy*

In Table 87-13 set the value of DGD\_max to 10 ps  
See anslow\_04\_1108.pdf for more detail.

Response Response Status C

ACCEPT.  
See also comment 207

CI 87 SC 87.11 P 239 L 16 # 381  
King, Jonathan Finisar

Comment Type TR Comment Status A Optical Reflections

In Table 87-13, Optical return loss is TBD dB  
Limiting factor here is round trip reflections leading to coherent interference at the receiver. Optical return loss 26dB or greater is consistent with Clause 52 10GBASE-ER Fibre optic cabling channel characteristics; with a transmitter reflectance of -12dB max, this would keep penalties due to round trip coherent interference down to approx 0.25dB

.....  
also applies to Table 88-176

*SuggestedRemedy*

Last row of Table 87-13 becomes

Optical return loss (min) 26 dB  
.....

Last row of Table 87-13 becomes

Optical return loss (min) 26 26 26 dB

Response Response Status C

ACCEPT IN PRINCIPLE.

Set values to 21 dB as per comment 487 and consistent with Clause 52.7.1

CI 87 SC 87.11 P 239 L 21 # 92  
Sun Hyok, Chang Electronics and Teleco

Comment Type T Comment Status R Optical

In line 21, it is written that 'DGD\_max is the maximum differential group delay that the system must tolerate'. It is wrong. 'DGD\_max' is defined in the Method 2 of IEC 61282-3. 'DGD\_max' is defined with  $P(DGD_{tot} > DGD_{max})$ , which is the probability that a system DGD value,  $DGD_{tot}$ , exceeds  $DGD_{max}$ . 'DGD\_max' and ' $P(DGD_{tot} > DGD_{max})$ ' give the DGD specification of the fiber link.

#### SuggestedRemedy

The sentence 'DGD\_max is the maximum differential group delay that the system must tolerate' is needed to be replaced by "DGD\_max is defined in the Method 2 of IEC 61282-3"

Response Response Status C

REJECT.  
[Subclause changed from 11 to 87.11]  
See response to comment 94

802.3 specifies only the  $DGD_{max}$  that the system must tolerate for BER within specified limits. See clause 52.13. This is consistent with ITU specifications for optical systems (eg G.691, G.959.1). Different users are able to tolerate different probabilities of the actual DGD exceeding  $DGD_{max}$ , so it inappropriate to specify this value.

See also comments #91 and #93

CI 87 SC 87.12 P 239 L 18 # 500  
Dudek, Mike JDSU

Comment Type T Comment Status A Channel

The channel characteristics for max channel insertion loss, and Positive and negative dispersion are a function of wavelength it would be good to note the wavelength range for which the values in table 87-13 apply.

#### SuggestedRemedy

Add a footnote to Channel insertion loss (max), Positive dispersion (max), and negative dispersion (min). The footnote to say. Over the wavelength range 1264.5nm to 1337.5nm.

Response Response Status C

ACCEPT IN PRINCIPLE.

Add the footnote as per the suggested remedy and remove editor's note below table 87-13

CI 87 SC 87.13 P 239 L 15 # 207  
Chung, Hwan Seok ETRI

Comment Type T Comment Status A Optical

In Table 87-13, we propose  $DGD_{max}$  characteristics as "10 ps"

#### SuggestedRemedy

The details of  $DGD_{max}$  for 40GBASE-LR4 will be presented in November plenary.

Response Response Status C

ACCEPT.

See also comment 296

CI 87 SC 87.4.4 P 228 L 27 # 594  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

PMD loopback function is missing

#### SuggestedRemedy

Please add PMD loopback function

Response Response Status C

REJECT.

For same reasons given in response to comment 595

Cl 87 SC 87.5 P L # 310  
 Dallesasse, John Emcore Corporation

Comment Type TR Comment Status R Optical

The lane wavelengths used for the 40GBASE-LR4 PMD should be the same as the wavelengths used for the Clause 53 10GBASE-LX4 PMD. This will allow maximum re-utilization of laser and optical demultiplexer technologies developed for 10GBASE-LX4. Reducing development costs have a direct impact on the economic feasibility of this project. It would be a mistake to walk away from a technology investment that has been paid for and proven over years of manufacturing. Additionally, the proposed reduction of the channel bandwidth from 13.4 nm (10GBASE-LX4) to 13 nm (40GBASE-LR4) would have some impact on laser yields and consequently cost. In order to allow a 0-70 C module operating range, the lasers need to be in spec from -5 to +85C. Assuming 0.1 nm/C, 9 nm of the band is taken by temperature. Approximately 1.5 nm is allocated for guard bands. Consequently, the window that is being targeted for laser operation at a given temperature is 2.5 nm for the proposed 40GBASE-LR4 versus 2.9 nm for 10GBASE-LX4.

#### SuggestedRemedy

Change all references for L0, L1, L2, and L3 to match the wavelength specifications in Clause 53 (10GBASE-LX4).

Response Response Status C

REJECT.

[Editor's note: added missing subclause number 87.5 to subclause field]

Baseline proposal wavelengths were selected to minimize worst case dispersion penalty and loss.

Cl 87 SC 87.5 P 230 L 11 # 69  
 Chung, Hwan Seok ETRI

Comment Type T Comment Status A Edit

correct typo and insert space between 20 and nm. Change from "20nm" to "20 nm"

#### SuggestedRemedy

Response Response Status C

ACCEPT.

Cl 87 SC 87.6 P 230 L 34 # 80  
 Sun Hyok, Chang Electronics and Teleco

Comment Type T Comment Status A Optical

In line 34, 'operational range' is written. The term 'operating range' is used in line 32 and in the title of Table 87-6. So, 'operational range' needs to be changed to 'operating range'.

#### SuggestedRemedy

'operational range' has to be replaced by 'operating range'.

Response Response Status C

ACCEPT.

[Editor's note: added missing subclause number 87.6 to subclause field]

Cl 87 SC 87.6 P 230 L 41 # 77  
 Sun Hyok, Chang Electronics and Teleco

Comment Type T Comment Status A Optical

In Table 87-6, I think 'Minimum range' is confusing expression. Because '2m to 10 km' is not 'minimum'.

#### SuggestedRemedy

'Operating range' is easier to be understood. 'Minimum range' has to be replaced by 'Operating range'.

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: added missing subclause number 87.6 to subclause field]

Change "Minimum range" to "Required operating range" in Table 87-6. Also change "operating at 12.5 km meets the minimum range requirement of 2 m to 10 km" to "operating at 12.5 km meets the operating range requirement of 2 m to 10 km" on page 230 line 43.

<b>Cl 87</b>	<b>SC 87.6.1</b>	<b>P 231</b>	<b>L 13</b>	<b># 488</b>
Dudek, Mike		JDSU		
<b>Comment Type</b>	<b>TR</b>	<b>Comment Status</b>	<b>A</b>	<b>Optical Power</b>
Optical receivers are in general limited by the peak power of the input signal (Average power is less important). As the spec stands the receiver has to cope with the maximum input average power at infinite extinction ratio with the allowed eye mask overshoot. This is much more than is likely to happen in practice. We should limit the peak power explicitly. (The suggested value equates to the Maximum average power at 9dB ER without overshoot).				
<i>SuggestedRemedy</i>				
Add extra rows to Tables 87-7, and 87-8,				
Peak Power Max 4.5dBm. (no min)				
To this row in table 87-7 add a footnote. Peak Power is the maximum value of the power as measured on the eye diagram see 86.7.4.7				
<b>Response</b>		<b>Response Status</b>	<b>C</b>	
ACCEPT IN PRINCIPLE.				
Insert an editor's note that a possible peak power specification or a maximum OMA limit is under consideration for 40GBASE-LR4				

<b>Cl 87</b>	<b>SC 87.6.1</b>	<b>P 231</b>	<b>L 30</b>	<b># 487</b>
Dudek, Mike		JDSU		
<b>Comment Type</b>	<b>T</b>	<b>Comment Status</b>	<b>A</b>	<b>Optical Reflections</b>
With a specification for the receiver reflection of -26dB there is no need to require the Transmitter to tolerate a 12dB reflection. The cable is limited to 26dB return loss at any discrete reflection. A tolerance to 20dB reflection would appear adequate.				
<i>SuggestedRemedy</i>				
Change optical return loss tolerance from 12dB to 20dB on line 30. Change RIN12 to RIN20 on line 28. Change RIN12 to RIN20 in 87.7.7 page 236 line 20 and insert "that the reflection is 20dB and" between "exception" and "that" on page 236 line 21, change 12db to 20dB for optical return loss in table 87-11 on page 235 line 17, and change from TBD to 21 for the optical return loss in table 87-13 page 239 line 17.				
<b>Response</b>		<b>Response Status</b>	<b>C</b>	
ACCEPT IN PRINCIPLE.				
In addition to the changes proposed in this comment, in Table 87-13 change "Optical return loss" to "Optical return loss (min)"				

<b>Cl 87</b>	<b>SC 87.6.1</b>	<b>P 231</b>	<b>L 33</b>	<b># 185</b>
Cole, Chris		Finisar		
<b>Comment Type</b>	<b>T</b>	<b>Comment Status</b>	<b>A</b>	<b>Optical Mask</b>
Table 87-7-40GBASE-LR4 transmit characteristics Transmit eye mask definition {X1, X2, X3, Y1, Y2, Y3} TBD The adopted 40GBASE-LR4 baseline (cole_01_0908) also had a footnote which stated "Tx eye mask spec to be specified as per eye mask methodology discussions." This specifically referred to using the results of the Statistical Eye discussions, which have now been formalized in the Statistical Eye Ad Hoc. Since there is no final consensus recommendation from the Statistical Eye Ad Hoc, the specification TBD can not be completed.				
<i>SuggestedRemedy</i>				
Replace TBD in Table 87-7 with eye mask coordinates as in Clause 52, Table 52.12. Add Transmitter Optical Waveform measurement procedure as in Clause 52 Section 52.9.7. Remove references to 10GBASE-L and 10GBASE-W, from second and third sentence, respectively.				
<b>Response</b>		<b>Response Status</b>	<b>C</b>	
ACCEPT IN PRINCIPLE.				
See resolution of comment #385				

<b>Cl 87</b>	<b>SC 87.6.3</b>	<b>P 232</b>	<b>L 17</b>	<b># 633</b>
CHANG, Frank		Vitesse		
<b>Comment Type</b>	<b>TR</b>	<b>Comment Status</b>	<b>A</b>	<b>Optical</b>
edits in table 87-8,				
<i>SuggestedRemedy</i>				
Suggest the change: - Feel Rx reflectance should be MAX, not min specs. - Add Stress eye jitter specs as conition for SRS.				
<b>Response</b>		<b>Response Status</b>	<b>C</b>	
ACCEPT IN PRINCIPLE.				
[Editor's note: Note Page number and line corrected to point to Table 87-8]				
Change to 'Receiver reflectance (max)' In table 87-8 add row for stressed eye jitter and format this together with the vertical eye closure in a similar way to table 86-11				

CI 87 SC 87.6.3 P 233 L 2 # 634  
CHANG, Frank Vitesse

Comment Type TR Comment Status R Optical

In Table 87.9, Allocation for penalties sound too optimistic. 10GBase-L allocate 3.2dB while LR4 is only 2.3dB with xtlk.

#### SuggestedRemedy

Suggest to consider 4-4.2dB, and change RX parameters in Table 87-8 accordingly.

Response Response Status C

REJECT.

The allocation for penalties was part of baseline proposal adopted by the task force. The commenter is invited to present evidence to the task force to support a change in values.

CI 87 SC 87.7.1 P 233 L 31 # 384  
King, Jonathan Finisar

Comment Type T Comment Status A Test Patterns

No Table of Test Patterns

.....

also applies to Clause 88

#### SuggestedRemedy

Insert table similar to Table52-21-Test patterns in clause 52

into section 87.7.1 and 88.8.1

with:

Pattern 1 TBD

Pattern 2 TBD

Pattern 3 PRBS31b PRBS31c

and notes under table as:

aThis pattern is defined in TBD.

bThis is the test-pattern checker defined in 49.2.12.

cThis is the test-pattern checker defined in 50.3.8.2.

Response Response Status C

ACCEPT IN PRINCIPLE.

Insert tables in clauses 87.7.1 and 88.8.1 with contents consistent with resolutions of other comments on test patterns and with licence to the editors on the format.

CI 87 SC 87.7.1 P 233 L 36 # 422  
Ganga, Ilango Intel

Comment Type E Comment Status D

double period (..), Delete one period at the end of the Note.

#### SuggestedRemedy

per comment

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 87 SC 87.7.1 P 233 L 36 # 387  
King, Jonathan Finisar

Comment Type T Comment Status R Test Patterns

NOTE has unnecessary TBD, this is a general statement about test patterns used for testing optical parameters

also applies to 88.8.2

#### SuggestedRemedy

New text for Note

NOTE- Although test patterns are designed to emulate system operation, they do not form valid 40GBASE-R signals.

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

CI 87 SC 87.7.2 P 233 L 42 # 490  
Dudek, Mike JDSU

Comment Type T Comment Status A Testing

It is bad practice to specify things in two places.

#### SuggestedRemedy

Change "using a valid 40GBASE-R signal" with "using the test pattern defined in table 87-10."

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolution as comment 383  
See also comments 499, 507, 510

Cl 87	SC 87.7.2	P233	L42	# 383
King, Jonathan				
Finisar				
Comment Type	T	Comment Status	A	Test Patterns
paragraph requires a valid 40GBASE-R signal; should also allow an appropriate test pattern to be used. (the note in 87.7.1 says test patterns are not valid 40GBASE-R signals)				
also applies to 88.8.2				
SuggestedRemedy				
add text to end of paragraph:				
'... valid 40GBASE-R signal, or test pattern referenced in Table 87-10.'				
similar remedy for 88.8.2				
Response	Response Status C			
ACCEPT IN PRINCIPLE.				
See also comment 490, 499				
Change "modulated using a valid 40GBASE-R signal." to "modulated using the test pattern defined in Table 87-10."				
Change the relevant TBD in Table 87-10 to "TBD or valid 40GBASE-R signal"				
For resolution of text in clause 88.8.2 see comment 507				
See also comments 484, 490, 499 and 510				

Cl 87	SC 87.7.2	P 233	L 42	# 388
King, Jonathan		Finisar		
Comment Type	TR	Comment Status	A	Testing
OSA resolution is TBD				
Suggest use 0.1nm				
This value is small enough to allow accurate wavelength measurement, and is readily achievable with currently available OSAs				
.....				
Also applies to 88.8.2				
SuggestedRemedy				
replace TBD with 0.1nm				
Response	Response Status C			
ACCEPT IN PRINCIPLE.				
Change "An optical spectrum analyzer (OSA) or equivalent instrument is used, with the resolution bandwidth of TBD, and the lane under test is modulated using a valid 40GBASE-R signal."				
to				
"An optical spectrum analyzer (OSA) or equivalent instrument is used and the lane under test is modulated using a valid 40GBASE-R signal."				
Make the same change in 88.8.2				



CI 87 SC 87.7.5 P234 L37 # 386  
King, Jonathan Finisar

Comment Type T Comment Status A Testing

The optical filter is undefined

also applies to 88.8.5

#### SuggestedRemedy

Add wording extracted from Editors note (p234 line 42ff), and reference to G959.1 :

The optical filter passband ripple shall be limited to 0.5 dB and the isolation is chosen such that the ratio of the power in the lane being measured to the sum of the powers of all of the other lanes is greater than 20 dB (See G959.1 Annex B).

and remove Editors note

Response Response Status C

ACCEPT IN PRINCIPLE.

Add the text "The optical filter passband ripple shall be limited to 0.5 dB and the isolation is chosen such that the ratio of the power in the lane being measured to the sum of the powers of all of the other lanes is greater than 20 dB (See ITU-T G.959.1 Annex B)."

CI 87 SC 87.7.5.1 P235 L4 # 491  
Dudek, Mike JDSU

Comment Type T Comment Status A Testing

There are multiple different jitter measurements.

#### SuggestedRemedy

Change "Jitter less than 0.2UI" to "Total Jitter less than 0.2UI".

Response Response Status C

ACCEPT.

CI 87 SC 87.7.5.4 P236 L7 # 489  
Dudek, Mike JDSU

Comment Type E Comment Status D

wrong spelling

#### SuggestedRemedy

change sererate to separate.

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 87 SC 87.7.5.4 P236 L7 # 423  
Ganga, Ilango Intel

Comment Type E Comment Status D

typo, change to "seperate"

#### SuggestedRemedy

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Change to 'separate', see 489

CI 87 SC 87.7.6 P236 L14 # 499  
Dudek, Mike JDSU

Comment Type T Comment Status A Test Patterns

It is bad practice to specify things in two places.

#### SuggestedRemedy

Change "using TBD test pattern or a valid 40GBASE-R signal" with "using the test pattern defined in table 87-10."

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "measured using TBD test pattern or a valid 40GBASE-R signal" to "measured using the test pattern defined in Table 87-10"

Change the relevant TBD in Table 87-10 to "TBD or valid 40GBASE-R signal"

See also comments 383, 484, 490, 507 and 510

CI 88 SC 88.1 P243 L12 # 161  
D'Ambrosia, John Force10 Networks

Comment Type T Comment Status A

Table 88-1 does not include reference to Annex 83A, CAUI.

#### SuggestedRemedy

add row for Annex 83A, CAUI and mark optional.

Response Response Status C

ACCEPT.

**CI 88**      **SC 88.1**      **P 243**      **L 21**      # **367**  
Dawe, Piers      Avago Technologies

**Comment Type**    **T**      **Comment Status**    **R**      **FEC**

Won't 100GBASE-ER4 suffer from SOA noise and will benefit from FEC to achieve a suitably low BER reliably?

**SuggestedRemedy**

Add FEC to Table 88-1, at least as an option, and I suspect mandatory for 100GBASE-ER4. Do more investigation to find out if it needs be mandatory: maybe only for the longest links.

**Response**      **Response Status**    **C**

REJECT.

The optical power budgets in the adopted baseline were chosen to enable a BER of  $10^{-12}$  without the use of FEC. See for instance slide 17 of cole\_02\_0508.pdf

**CI 88**      **SC 88.12**      **P 262**      **L 14**      # **93**  
Sun Hyok, Chang      Electronics and Teleco

**Comment Type**    **T**      **Comment Status**    **R**

In Table 88-17, 'DGD\_max' is represented to describe the PMD (polarization mode dispersion) specification. But 'DGD\_max' is not sufficient to give the PMD specification of the fiber link. Parameter of  $P(DGD_{tot} > DGD_{max})$  is needed.(from the Method 2 of IEC 61282-3).  $P(DGD_{tot} > DGD_{max})$  is the probability that a system DGD value,  $DGD_{tot}$ , exceeds  $DGD_{max}$ .

**SuggestedRemedy**

Parameter of  $P(DGD_{tot} > DGD_{max})$  per each lane is needed in Table 88-17.

**Response**      **Response Status**    **C**

REJECT.

[Subclause changed from 12 to 88.12]

See comment #94 for justification  
See also comments #91 and #92

**CI 88**      **SC 88.12**      **P 262**      **L 15**      # **208**  
Chung, Hwan Seok      ETRI

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

In Table 87-17, we propose DGD\_max characteristics for 100GBASE-LR4 and 100GBASE-ER4 as "10 ps" and "7.6 ps", respectively.

**SuggestedRemedy**

The details of DGD\_max for 100GBASE-LR4 and 100GBASE-ER4 will be presented in November plenary.

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

[This comment taken to refer to Table 88-17]  
[Subclause changed from 88-17 to 88.12]

Resolution for 100GBASE-LR4 is 10 ps as proposed by both comments.

Resolution for 100GBASE-ER4 is 10.3 ps

See also comment #297

**CI 88**      **SC 88.12**      **P 262**      **L 15**      # **297**  
Anslow, Peter      Nortel Networks

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

In Table 88-17 the values of DGD\_max for 100GBASE-LR4 and 100GBASE-ER4 are "TBD".

**SuggestedRemedy**

Set DGD\_max for 100GBASE-LR4 to 10 ps  
Set DGD\_max for 100GBASE-ER4 30 km to 10.3 ps  
Set DGD\_max for 100GBASE-ER4 40 km to 10.3 ps  
See anslow\_04\_1108.pdf for detailed justification.

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

Resolution for 100GBASE-LR4 is 10 ps as proposed by both comments.

Resolution for 100GBASE-ER4 as comment #208

CI 88 SC 88.12 P 262 L 20 # 94  
Sun Hyok, Chang Electronics and Teleco

Comment Type T Comment Status R

In line 20, it is written that 'DGD\_max is the maximum differential group delay that the system must tolerate'. It is wrong. 'DGD\_max' is defined in the Method 2 of IEC 61282-3. 'DGD\_max' is defined with  $P(DGD\_tot > DGD\_max)$ , which is the probability that a system DGD value, DGD\_tot, exceeds DGD\_max. 'DGD\_max' and ' $P(DGD\_tot > DGD\_max)$ ' give the DGD specification of the fiber link.

SuggestedRemedy

The sentence 'DGD\_max is the maximum differential group delay that the system must tolerate' is needed to be replaced by 'DGD\_max is defined in the Method 2 of IEC 61282-3'

Response Response Status C

REJECT.

[subclause changed from 12 to 88.12]

IEEE 802.3 has chosen to specify only the DGD\_max that the system has to tolerate with the BER remaining within the specified limit. See 802.3 clause 52.13. This is also in line with ITU-T specifications for optical systems (e.g. G.691, G.959.1). Different users are able to tolerate a range of probabilities of the actual DGD exceeding the DGD\_max value. (see anslow\_01\_0308.pdf slides 8 and 9). For a user to determine what average DGD his link should have the DGD\_max value should be divided by the value of "S" corresponding to the probability acceptable to that user. Because of the wide range of probabilities that are acceptable for different Ethernet applications it is inappropriate to specify this value.

See also comments #91, #92 and #93

CI 88 SC 88.12 P 262 L 21 # 511  
Dudek, Mike JDSU

Comment Type T Comment Status A

The channel characteristics for max channel insertion loss, and Positive and negative dispersion are a function of wavelength it would be good to note the wavelength range for which the values in table 87-13 apply.

SuggestedRemedy

Add a footnote to Channel insertion loss (max), Positive dispersion (max), and negative dispersion (min). The footnote to say. "Over the wavelength range 1294.53nm to 1310.19nm."

Remove the editors note.

Response Response Status C

ACCEPT.

CI 88 SC 88.3 P 246 L 17 # 595  
Ghiasi, Ali Broadcom

Comment Type TR Comment Status R

PMD loopback function is missing

SuggestedRemedy

Please add PMD loopback function

Response Response Status C

REJECT.

[Subclause changed from 3 to 88.3]

Providing an optical loopback is not really practical. Providing an electrical loopback function will constrain the implementation options for the PMD circuitry as it requires a 100 Gbit/s path from the Tx side to the Rx side. This was not a function included in 10GBASE-R PMDs

See also comment #594

CI 88 SC 88.4 P 246 L 44 # 174  
Alping, Arne Ericsson AB

Comment Type E Comment Status D

...and Receive functions which convey... (comma is missing)

SuggestedRemedy

Change to: ...and Receive functions, which convey...

Proposed Response Response Status W

PROPOSED ACCEPT.

[Subclause changed from 4 to 88.4]

Comma should also be added to 87.4

CI 88 SC 88.4.1 P247 L 26 # 501  
Dudek, Mike JDSU

Comment Type T Comment Status A

It would be helpful to the reader to explicitly point out that there are no electrical specs for the 25G PMD service interface in this document. (See also Anslow\_05\_1108.pdf)

*SuggestedRemedy*

Change the first part of the note on figure 88-2 to "Specification of the retimer function and the electrical implementation of the PMD service interface is beyond the scope of this standard".

Response Response Status C

ACCEPT.

This is done in the proposed diagram on slide 5 of anslow\_05\_1108.pdf

CI 88 SC 88.4.4 P248 L 45 # 502  
Dudek, Mike JDSU

Comment Type T Comment Status R

The Signal Detect does not need to be guaranteed to be OK when the input signal is less than a valid link will supply. This level is the stressed sensitivity not the sensitivity.

*SuggestedRemedy*

Insert the word "stressed" in front of receiver on line 44 in table 88-4.

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

CI 88 SC 88.4.5 P249 L 11 # 175  
Alping, Arne Ericsson AB

Comment Type E Comment Status D

...of the Signal Detect function... (upper case letter for Signal Detect)

*SuggestedRemedy*

Change to: ...of the SIGNAL\_DETECT function...

Proposed Response Response Status W

PROPOSED REJECT.

[Subclause changed from 4.5 to 88.4.5]

The parameter is "SIGNAL\_DETECT" but the function that generates it is "Signal Detect"

CI 88 SC 88.6 P250 L 34 # 81  
Sun Hyok, Chang Electronics and Teleco

Comment Type T Comment Status A

In line 34, 'operational range' is written. The term 'operating range' is used in line 32 and in the title of Table 88-6. So, 'operational range' in line 34 needs to be changed to 'operating range'.

*SuggestedRemedy*

'operational range' has to be replaced by 'operating range'.

Response Response Status C

ACCEPT.

[Subclause changed from 6 to 88.6]  
See also comments #80 and #82

CI 88 SC 88.6 P250 L 41 # 78  
Sun Hyok, Chang Electronics and Teleco

Comment Type T Comment Status A

In Table 88-6, I think 'Minimum range' is confusing expression. Because '2m to 10 km' is not 'minimum'.

*SuggestedRemedy*

'Operating range' is easier to be understood. 'Minimum range' has to be replaced by 'Operating range'.

Response Response Status C

ACCEPT IN PRINCIPLE.

[Subclause changed from 6 to 88.6]

Change "Minimum range" to "Required operating range" in Table 88-6.  
Also change "operating at 12.5 km meets the minimum range requirement of 2 m to 10 km" to "operating at 12.5 km meets the operating range requirement of 2 m to 10 km" on page 250 line 35.

See also comments #77 and #79

Cl 88	SC 88.6.1	P 251	L 13	# 84
Hiroataka , Oomori		Sumitomo Electric		
Comment Type	T	Comment Status	A	Optical Power
The range between Max and Min transmitter launch OMA seems to be too narrow to have good yield.				
The root cause is located at the low launch OMA max and the low receive OMA sensitivity.				
Several numbers in Table.88-7 and 88-8 need to be modified.				
A full justification is given in the attached file Oomori_01_1108.pdf				
SuggestedRemedy				
1) Change Transmitter launch OMA max from 4.0dBm to 4.5dBm				
2) Change Transmitter average launch power (max) from 4.0dBm to 4.5dBm				
3) Change Reciever OMA sensitivity from -8.1dBm to -8.6dBm				
Other parameters are required to change as a consequence of this. For a full list see slide 13 of attached file Oomori_01_1108.pdf				
Response	Response Status C			
ACCEPT.				
[Page changed from 250 to 251]				

Cl 88	SC 88.6.1	P 251	L 19	# 505
Dudek, Mike		JDSU		
Comment Type	T	Comment Status	A	Optical Power
Optical receivers are in general limited by the peak power of the input signal (Average power or OMA is less important). As the spec stands the receiver has to cope with the maximum input average power with the maximum OMA and the allowed eye mask overshoot. This is much more than is likely to happen in practice and is also restricting the maximum OMA at lower average powers. We should limit the peak power explicitly, and relax the maximum OMA value. (The suggested value equates to a maximum OMA of 4.5dBm with a maximum Average power of 4.5dBm, or an ER of 4.7 at 4.5dBm average power).				
SuggestedRemedy				
Add an additional row in tables 88-7,88-8, with				
Peak Power Max 6.3dBm. (no min)				
Increase the Maximum OMA to 5.5dBm.				
To the peak power row in table 87-7 add a footnote. Peak Power is the maximum value of the power as measured on the eye diagram see 88.8.8				
Response	Response Status C			
ACCEPT IN PRINCIPLE.				
Insert an editor's note that a possible peak power specification is under consideration for 100GBASE-LR4 and ER4				

<i>Cl</i> <b>88</b>	<i>SC</i> <b>88.6.1</b>	<i>P</i> <b>251</b>	<i>L</i> <b>24</b>	# <b>176</b>
Alping, Arne		Ericsson AB		
<i>Comment Type</i>	<b>E</b>	<i>Comment Status</i>	<b>D</b>	
Transmitter and dispersion penalty, each lane (max) (acronyme is missing)				
<i>SuggestedRemedy</i>				
Cgange to: Transmitter and Dispersion Penalty (TDP), each lane (max)				
<i>Proposed Response</i>	<i>Response Status</i> <b>W</b>			
PROPOSED REJECT.				
[Subclause changed from "Table 88-7" to 88.6.1]				
The current version is consistent with Table 87-7 and Table 52-12 of the base standard.				

CI 88 SC 88.6.1 P251 L3 # 621  
CHANG, Frank Vitesse

Comment Type T Comment Status R

What is the inherent reason to use ER of 4dB, which seems obviously odd?

**SuggestedRemedy**

suggest to change ER as 3.5dB or 6dB which look more realistic. (need to re-calculate the launch power numbers accordingly).

Also RIN to be -132dB/Hz is tough, suggest -128dB/Hz.

Response Response Status C

REJECT.

The ER of 4 dB was in the adopted baseline proposal. The suggested remedy has values that are both higher and lower than the current value suggesting that there is no good technical justification for the change.

The RIN value of -132 dB/Hz comes from the 128 dB/Hz requirement for 10GBASE-LR scaled by the relative receiver bandwidths. Using a value of 128 dB/Hz would significantly increase the penalty due to this effect.

The commenter is invited to bring technical justification for these proposals.

CI 88 SC 88.6.1 P251 L32 # 503  
Dudek, Mike JDSU

Comment Type T Comment Status A

With a specification for the receiver reflection of -26dB there is no need to require the Transmitter to tolerate a 12dB reflection. The cable is limited to 26dB return loss at any discrete reflection. A tolerance to 20dB reflection would appear adequate.

**SuggestedRemedy**

Change optical return loss tolerance from 12dB to 20dB on line 32 table 88-7. Change RIN12 to RIN20 on line 30. Change RIN12 to RIN20 in 87.8.7 page 259 line 16 and insert "that the reflection is 20dB and" between "exception" and "that" on page 259 line 18, Also change the Optical return loss (min) for LR4 in Table 88-15 to 20dB.

Response Response Status C

ACCEPT IN PRINCIPLE.

In addition to the changes proposed in this comment, in Table 88-17 change "Optical return loss" to "Optical return loss (min)" and set the value for 100GBASE-LR4 to 21 dB.

See also comment #381

CI 88 SC 88.6.1 P251 L35 # 183  
Cole, Chris Finisar

Comment Type T Comment Status A Optical Mask

Table 88-7-100GBASE-LR4 transmit characteristics

Transmit eye mask definition {X1, X2, X3, Y1, Y2, Y3} TBD

The adopted 100GBASE-LR4 baseline (cole\_01\_0708) also had a footnote which stated "Tx eye mask spec to be specified as per eye mask methodology discussions." This specifically referred to using the results of the Statistical Eye discussions, which have now been formalized in the Statistical Eye Ad Hoc.

Since there is no final consensus recommendation from the Statistical Eye Ad Hoc, the specification TBD can not be completed.

**SuggestedRemedy**

Replace TBD in Table 88-7 with eye mask coordinates as in Clause 52, Table 52.12. Add Transmitter Optical Waveform measurement procedure as in Clause 52 Section 52.9.7. Remove references to 10GBASE-L and 10GBASE-W, from second and third sentence, respectively.

Response Response Status C

ACCEPT IN PRINCIPLE.

See resolution of comment #385

See also comments #184, #185, #385

CI 88 SC 88.6.1 P251 L48 # 281  
Anslow, Peter Nortel Networks

Comment Type E Comment Status A

The second Editors Note underneath Table 88-7 beginning "The adopted baseline for 100GBASE-LR4 in anslow\_01\_0708.pdf had a value of 3.2 dBm" was only relevant before the draft was accepted by the Task Force and should now be deleted.

**SuggestedRemedy**

Delete this Editors Note

Response Response Status C

ACCEPT.

**CI 88**      **SC 88.6.2**      **P 252**      **L 24**      # 635  
 CHANG, Frank      Vitesse

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

In Table 88-8, RX reflectance should not be MIN specs. Also need Stress eye jitter specs as condition for SRS test.

**SuggestedRemedy**

- Change RX reflectance as MAX specs.
- Also Stress eye jitter specs as condition for SRS test.

**Response**      **Response Status**    **C**

ACCEPT IN PRINCIPLE.

Change to 'Receiver reflectance (max)'  
 In table 88-8 add row for stressed eye jitter and format this together with the vertical eye closure in a similar way to table 86-11

**CI 88**      **SC 88.6.2**      **P 252**      **L 26**      # 644  
 Nicholl, Gary      Cisco

**Comment Type**    **T**      **Comment Status**    **R**

Do we need to specify what BER the Receiver sensitivity (OMA) paramter is specified for ? I am assuming that it is BER=10-12 (same as stressed receiver sensitivity) ?

We also need to clarify is this is the raw BER on the line or whether it is the effective BER after the error multiplication of the scrambler is taken into consideration (in which case the BER on the line is a factor of 3 less than specified). If it is indeed the former then we need to specify a way that it can be tested as this was an issue that came up in 10GE testing.

**SuggestedRemedy**

One possible solution would be to define an unframed PRBS test mode with no 64/66B encoding or scrambling enabled, to be used for testing all of the PMD optical parameters. However I am not sure how this would work for a MLD based interface (which needs the 64/66B encoding and MLD lane markers to operate) ?

**Response**      **Response Status**    **C**

REJECT.

[Subclause changed from 6.2 to 88.6.2]

Clause 88.8.10 starts "Receiver sensitivity, which is defined for an ideal input signal, is informative and testing is not required."

**CI 88**      **SC 88.6.3**      **P 253**      **L 13**      # 622  
 CHANG, Frank      Vitesse

**Comment Type**    **T**      **Comment Status**    **R**

In Table 88-9, Allocation for penalties is too optimistic, which is not comparable to even 10Gbase-LR signal channel specs.

**SuggestedRemedy**

Suggest to consider adding the extra xtalk spenalty, which should let the total penalties to fall within 3.5 to 4dB.

**Response**      **Response Status**    **C**

REJECT.

The penalty due to crosstalk in the receiver is the responsibility of the receiver. It is not necessary (or desirable) to specify this crosstalk penalty. This penalty is taken in to account when a realistic value is set for the required sensitivity. Crosstalk in the transmitter is part of the penalty, but is assumed to be small. This is assumed to be an EA modulated laser with lower penalties than direct mod laser assumed in 10G-BASE-LR. The 26 dB return loss of the reciever will make the reflection penalty less than that for 10G\_BASE-LR

**CI 88**      **SC 88.7**      **P 253**      **L 26**      # 82  
 Sun Hyok, Chang      Electronics and Teleco

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

In line 26, 'operational range' is written. The term 'operating range' is used in line 23 and in the title of Table 88-10. So, 'operational range' in line 26 needs to be changed to 'operating range'.

**SuggestedRemedy**

'operational range' has to be replaced by 'operating range'.

**Response**      **Response Status**    **C**

ACCEPT.

[Subclause changed from 7 to 88.7]

See also comments #80 and #81

**Cl 88**      **SC 88.7**      **P 253**      **L 33**      # **79**  
 Sun Hyok, Chang      Electronics and Teleco

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

In Table 88-10, I think 'Minimum range' is confusing expression. Because '2m to 30 km' or '2m to 40 km' is not 'minimum'.

**SuggestedRemedy**  
 'Operating range' is easier to be understood. 'Minimum range' has to be replaced by 'Operating range'.

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

[Subclause changed from 7 to 88.7]

Change "Minimum range" to "Required operating range" in Table 88-10.  
 Also change "operating at 42.5 km meets the minimum range requirement of 2 m to 30 km" to "operating at 42.5 km meets the operating range requirement of 2 m to 30 km" on page 253 line 26.  
 See also comments #77 and #78

**Cl 88**      **SC 88.7.1**      **P 254**      **L 19**      # **506**  
 Dudek, Mike      JDSU

**Comment Type**    **TR**      **Comment Status**    **A**      **Optical Power**

Optical receivers are in general limited by the peak power of the input signal (Average power or OMA is less important). As the spec stands the receiver has to cope with the maximum input average power with the maximum OMA and the allowed eye mask overshoot. This is much more than is likely to happen in practice and is also restricting the maximum OMA at lower average powers. We should limit the peak power explicitly, and relax the maximum OMA value. (The suggested value equates to a maximum OMA of 4.0dBm with a maximum average power of 2.4dBm without overshoot,

**SuggestedRemedy**  
 Add an additional row in tables 88-11 and 88-12 with

Peak Power Max 4.8dBm. (no min)  
 Increase the Maximum OMA to 5.0dBm.

To the peak power row in table 87-11 add a footnote. Peak Power is the maximum value of the power as measured on the eye diagram see 88.8.8

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

See response to comment #505

**Cl 88**      **SC 88.7.1**      **P 254**      **L 25**      # **623**  
 CHANG, Frank      Vitesse

**Comment Type**    **T**      **Comment Status**    **R**

ER=8dB sound odd as compare with prevailing TX specs.

**SuggestedRemedy**  
 As EML at 1310nm is assumed, suggest ER=8.2d or 6dB, which is more popular in ITU or IEEE specs. Also change RIN <-132dB/Hz to -128dB/Hz for std specs.

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

See response to comment #621

The ER of 8 dB was in the adopted baseline proposal. The suggested remedy has values that are both higher and lower than the current value suggesting that there is no good technical justification for the change.  
 The RIN value of -132 dB/Hz comes from the 128 dB/Hz requirement for 10GBASE-LR scaled by the relative receiver bandwidths. Using a value of 128 dB/Hz would significantly increase the penalty due to this effect.  
 The commenter is invited to bring technical justification for these proposals.

**Cl 88**      **SC 88.7.1**      **P 254**      **L 33**      # **184**  
 Cole, Chris      Finisar

**Comment Type**    **T**      **Comment Status**    **A**      **Optical Mask**

Table 88-11-100GBASE-ER4 transmit characteristics  
 Transmit eye mask definition {X1, X2, X3, Y1, Y2, Y3} TBD  
 The adopted 100GBASE-ER4 baseline (cole\_02\_0708) also had a footnote which stated "Tx eye mask spec to be specified as per eye mask methodology discussions." This specifically referred to using the results of the Statistical Eye discussions, which have now been formalized in the Statistical Eye Ad Hoc.  
 Since there is no final consensus recommendation from the Statistical Eye Ad Hoc, the specification TBD can not be completed.

**SuggestedRemedy**  
 Replace TBD in Table 88-11 with eye mask coordinates as in Clause 52, Table 52.12. Add Transmitter Optical Waveform measurement procedure as in Clause 52 Section 52.9.7. Remove references to 10GBASE-L and 10GBASE-W, from second and third sentence, respectively.

**Response**      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.

See resolution of comment #385

See also comments #183, #185, #385



CI 88 SC 88.7.2 P 254 L 30 # 504  
Dudek, Mike JDSU

Comment Type TR Comment Status A

With a specification for the receiver reflection of -26dB there is no need to require the Transmitter to tolerate a 12dB reflection. The cable is limited to 26dB return loss at any discrete reflection. A tolerance to 20dB reflection would appear adequate.

*SuggestedRemedy*

Change optical return loss tolerance from 12dB to 20dB on line 30 Table 88-11. Change RIN12 to RIN20 on line 28. And if my comment 35 is not accepted Change RIN12 to RINx in 87.8.7 page 259 line 16 and insert "that the reflection is xdB and" between "exception" and "that" on page 259 line 18. Also add a sentence at the end of this sentence. The value of x is given in the relevant table. Also change the optical return loss (min) for ER4 to 20dB in Table 88-15

Response Response Status C

ACCEPT IN PRINCIPLE.

In addition to the changes proposed in this comment, in Table 88-17 change "Optical return loss" to "Optical return loss (min)" and set the value for 100GBASE-ER4 to 21 dB for both the 30km and 40km operating distances.

See also comment #381

CI 88 SC 88.7.2 P 255 L 1 # 83  
Cole, Chris Finisar

Comment Type T Comment Status A Optical Power

Table 88-12

A comment has been submitted for Table 88-7 and 88-8 (10GBASE-LR4 transmit characteristics) to increase the max optical power by 0.5dB. The purpose of this comment for Table 88-12 is to align the 10GBASE-ER spec (40km) with the changes proposed to the 10GBASE-LR (10km) spec. This will make the 40km spec consistent with the intent of 802.3ba when it adopted it as baseline, specifically that it have interoperable overload characteristics with the 10km spec.

*SuggestedRemedy*

The following three changes are proposed for table 88-12-100GBASE-ER4 receive characteristics:

Receive power, per lane OMA (max): 4.0dBm => 4.5dBm

Average receive power, per lane (max): 4dBm => 4.5dB

Damage threshold: 5.0dBm -> 5.5dBm

The SOA overload data presented in 802.3ba during this year fully supports increasing overload by 0.5dB.

Response Response Status C

ACCEPT.

CI 88 SC 88.7.2 P 255 L 21 # 636  
CHANG, Frank Vitesse

Comment Type TR Comment Status A

In Table 88-12, RX reflectance should not be MIN specs.

*SuggestedRemedy*

Change RX reflectance as MAX specs. Add Stress eye jitter as condition to SRS test.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change to 'Receiver reflectance (max)'

In table 88-12 add row for stressed eye jitter and format this together with the vertical eye closure in a similar way to table 86-11

CI 88 SC 88.7.3 P 256 L 12 # 637  
CHANG, Frank Vitesse

Comment Type TR Comment Status R

In Table 88-13, the penalties for 40km sound too optimistic, which should show larger penalty than 30km.

#### SuggestedRemedy

The penalties for 40km should be 0.5dB higher than 30km, also suggest to change 40km IL as 16dB, as the IL is too pessimistic, keeping in mind ER4 has very tight link budget.

Response Response Status C

REJECT.

The allocation for penalties for the 40 km case has been supported by various contributions to the Task Force. Reducing the penalties for the 30 km case achieves little as it simply increases the additional insertion loss allowed.

If we assume 1.5 dB for connector loss, then the 18 dB insertion loss gives 16.5 dB for the loss of the fibre and splices. From the data used to produce slide 10 of anslow\_01\_0307.pdf referred to 1295 nm this covers about 70% of installed 40 km links. If we reduce the insertion loss from 18 dB to 16 dB, then we only get 14.5 dB for the loss of the fibre and splices. From the same data set as above, this only covers 6% of real installed links. Even reducing the connector loss to 1 dB results in a coverage of only 16% of links.

CI 88 SC 88.8.1 P 256 L 34 # 424  
Ganga, Ilango Intel

Comment Type E Comment Status D  
double period (..). Delete a period at end of note.

#### SuggestedRemedy

Proposed Response Response Status W  
PROPOSED ACCEPT.

CI 88 SC 88.8.10 P 259 L 43 # 177  
Alping, Arne Ericsson AB

Comment Type E Comment Status D

...jitter and RIN... (missing comma)

#### SuggestedRemedy

Change to: ...jitter, and RIN...

Proposed Response Response Status W

PROPOSED REJECT.

[Subclause changed from 8.10 to 88.8.10]

[Page change from 250 to 259]

In a list, for example "Monday, Tuesday, Wednesday and Thursday" it is not usual to put a comma before the "and".

CI 88 SC 88.8.2 P 256 L 40 # 507  
Dudek, Mike JDSU

Comment Type T Comment Status A

It is bad practice to specify things in two places.

#### SuggestedRemedy

Change "using a valid 40GBASE-R signal" with "using the test pattern defined in table 88-14."

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "modulated using a valid 100GBASE-R signal." to "modulated using the test pattern defined in Table 88-14"

Change the relevant TBD in Table 88-14 to "TBD or valid 100GBASE-R signal"

See also comments #383, #484, #490, #499 and #510

CI 88 SC 88.8.5.1 P257 L51 # 508  
Dudek, Mike JDSU

Comment Type T Comment Status A  
There are multiple different jitter measurements.

*SuggestedRemedy*

Change "Jitter less than 0.2UI" to "Total Jitter less than 0.2UI".

Response Response Status C  
ACCEPT IN PRINCIPLE.

Change from "Jitter less than 0.20 UI peak-peak" to "Total jitter less than 0.20 UI peak-peak"

See also comment #491

CI 88 SC 88.8.5.4 P259 L4 # 509  
Dudek, Mike JDSU

Comment Type E Comment Status D  
spelling error

*SuggestedRemedy*

Change sereate to separate.

Proposed Response Response Status W  
PROPOSED ACCEPT.

[Clause number changed from 87 to 88]

CI 88 SC 88.8.5.4 P259 L4 # 179  
Alping, Arne Ericsson AB

Comment Type ER Comment Status D  
...filter to sererate the lane... (spelling error)

*SuggestedRemedy*

Change to: ...filter to separate the lane...

Proposed Response Response Status W  
PROPOSED ACCEPT.

[Subclause changed from 8.5.4 to 88.8.5.4]

See also comment #425

CI 88 SC 88.8.5.4 P259 L6 # 425  
Ganga, Ilango Intel

Comment Type E Comment Status D  
typo, change to "seperate"

*SuggestedRemedy*

per comment

Proposed Response Response Status W  
PROPOSED REJECT.

Changed to "separate" as per comment #179

\*\*\*\*\*added after proposals uploaded\*\*\*\*\*

PROPOSED ACCEPT IN PRINCIPLE.  
Changed to "separate"  
See also comment #179

CI 88 SC 88.8.6 P259 L11 # 510  
Dudek, Mike JDSU

Comment Type T Comment Status A  
It is bad practice to specify things in two places.

*SuggestedRemedy*

Change "using aTBD test pattern or a valid 40GBASE-R signal" with "using the test pattern defined in table 88-14."

Response Response Status C  
ACCEPT IN PRINCIPLE.

Change "measured using TBD test pattern or a valid 100GBASE-R signal." to "measured using the test pattern defined in Table 88-14."  
Change the relevant TBD in Table 88-14 to "TBD or valid 100GBASE-R signal"  
See also comments #383, #484, #490, #499 and #507

CI 99 SC P L # 641  
Ganga, Ilango Intel

Comment Type T Comment Status A

Add Protocol implementation conformance statement (PICS) proforma to the end of the Clauses 82 to 88 and annex 83A.

SuggestedRemedy

Response Response Status C

ACCEPT.

Affects clauses 81 through 88 and annex 83A

CI 99 SC P11 L # 125  
D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D

Global - multiple instances where there are wrap-around issues with ToC. also multiple instances where there is no space between the clause # and the title of the clause or sub-clause.

SuggestedRemedy

Fix wraparound issues and add a space between the Clause # and title text.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Fix formatting where possible, some of this is tool issue in generating ToC.

CI 99 SC P16 L22 # 127  
D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D

Clause 86.8.2 - Laser Safety does not show up in ToC. Not sure if this is related to the fact that in the bookmarks that 86.8.2 shows up as a subclause under 86.8.1.

SuggestedRemedy

Correct ToC to show 86.8.2  
correct bookmark in pdf file

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Check and fix any paragraph heading formatting issue in 86.8.2

CI 99 SC P18 L52 # 126  
D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D

The annex and the title of the annex are listed as separate entries in the ToC. Annex 30A - GDMO Specification for IEEE 802.3 Managed Object Classes  
Annex 30B - GDMO and ASN.1 definitions for Management  
Annex 69A - Interference Tolerance Testing  
Annex 69B - Interconnect Characteristics  
Annex 83A - 40 Gb/s Attachment Unit Interface (XLAUI) and 100 Gb/s Attachment Unit Interface (CAUI)

SuggestedRemedy

in ToC list Annex # and title on same line

Proposed Response Response Status W

PROPOSED ACCEPT.

Check and update formatting of Annex title or ToC as appropriate

CI 99 SC P2 L8 # 122  
D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D

PPI is not listed as a keyword.

SuggestedRemedy

Add PPI to Keywords.

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 99 SC P21 L43 # 282  
Anslow, Peter Nortel Networks

Comment Type E Comment Status D

It would be useful to add external equations to the list of references marked in dark blue

SuggestedRemedy

Change "NOTE- Cross references that refer to clauses, tables, or figures not covered by this amendment are highlighted in dark blue." to "NOTE- Cross references that refer to clauses, tables, figures or equations not covered by this amendment are highlighted in dark blue."

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 99 SC P6 L16 # 123  
D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D  
Listing of Editorial Team and Officers is incomplete.

SuggestedRemedy  
Complete list provided below.

John D'Ambrosia  
Task Force Chair

Ilango Ganga  
Task Force Editor-in-Chief,  
Editor, Clauses 1, 4, 80, Annexes A, 4A

Mark Gustlin  
"Logic" Sub-task Force Chair  
Editor, Clauses 81& 82

Chris DiMinico  
"Cu" Sub-task Force Chair  
Editor, Clause 85

Pete Anslow  
"Optical" Sub-task Force Chair  
Editor, Clause 88

Hugh Barrass  
Editor, Clauses 30, 45, Annexes 30A, 30B

Piers Dawe  
Editor, Clause 86

Jonathan King  
Editor, Clause 87

Ryan Latchman  
Editor, Annex 83A

Arthur Marris  
Editor, Clauses 69, 73, 74, 84, Annexes 69A, 69B

Steve Trowbridge  
Editor, Clause 83

George Oulundsen  
Task Force Secretary

Frank Chang  
Task Force Web Master

Proposed Response Response Status W  
PROPOSED ACCEPT.

CI 99 SC P9 L17 # 124  
D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D  
Approval of standards is listed as 15 September 200x. Schedule for standard approval at June standards board meeting.

SuggestedRemedy  
Change "15 September 200x" to "xx June 2010"

Proposed Response Response Status W  
PROPOSED ACCEPT.

CI 99 SC 99 P10 L49 # 373  
Dawe, Piers Avago Technologies

Comment Type E Comment Status D  
There is a newer version of this page

SuggestedRemedy  
Ask P802.3av for it

Proposed Response Response Status W  
PROPOSED ACCEPT IN PRINCIPLE.

Check and update if appropriate

CI 99 SC 99 P14 L30 # 72  
Chung, Hwan Seok ETRI

Comment Type T Comment Status A  
In page 14, line 30, the title 40GBASE-KR should be changed to 40GBASE-KR4.

SuggestedRemedy

Response Response Status C  
ACCEPT IN PRINCIPLE.

Fix the paragraph heading in 84.8. (ToC will get updated)

CI 99 SC 99 P3 L8 # 371  
 Dawe, Piers Avago Technologies  
 Comment Type E Comment Status D  
 consciously  
 SuggestedRemedy  
 consciously  
 Proposed Response Response Status W  
 PROPOSED ACCEPT.

CI 99 SC 99 P4 L49 # 369  
 Dawe, Piers Avago Technologies  
 Comment Type E Comment Status D  
 I doubt that errata for all the world's standards are available at this URL.  
 SuggestedRemedy  
 Change 'all other standards' to 'all other IEEE standards'  
 Proposed Response Response Status W  
 PROPOSED ACCEPT.

CI 99 SC 99 P4 L5 # 372  
 Dawe, Piers Avago Technologies  
 Comment Type E Comment Status D  
 .Section  
 SuggestedRemedy  
 Section  
 Line 12, 10 split from Gb/s over a line break. Use non-breaking space and if necessary, the  
 Frame option to stop s being split from Gb/.  
 Line 18, change 'of the IEEE Std 802.3 standard with' to 'of IEEE Std 802.3 with'  
 Line 23, use new .3av clause numbers (75 to 77, 75A, 75B, 75C, 76A)  
 Line 24, change 'operation point-to-multipoint' to 'operation on point-to-multipoint'  
 Proposed Response Response Status W  
 PROPOSED ACCEPT IN PRINCIPLE.  
 Fix typos as suggested  
 Update clause numbers for .3av as suggested  
 Check and update formatting as appropriate

CI A SC P265 L12 # 426  
 Ganga, Ilango Intel  
 Comment Type E Comment Status D  
 Line 12, typo change to "Alphabetical"  
 Line 19, extra space, change to "2008."  
 SuggestedRemedy  
 per comment  
 Proposed Response Response Status W  
 PROPOSED ACCEPT.

CI A SC A P265 L14 # 354  
 Dawe, Piers Avago Technologies  
 Comment Type T Comment Status A  
 As we are not doing the maintenance work to remove all references to ANSI/EIA/TIA-455-  
 127-1991, we can't do this by a 'change'. But we should add the new TIA-455-127-A to the  
 normative references, so no point adding it here also. Nothing to do.  
 SuggestedRemedy  
 Delete 'Change B8 as follows... Lasers Diodes.'  
 Response Response Status C  
 ACCEPT.  
 remove change to B8  
 See response to comment # 351

CI A SC A P265 L21 # 358  
 Dawe, Piers Avago Technologies  
 Comment Type E Comment Status D Review  
 SFP+ D3.1 should be available  
 SuggestedRemedy  
 Update reference Bx2  
 Proposed Response Response Status W  
 PROPOSED REJECT.  
 Provide reference to latest specification when available.

<i>Cl</i> <b>A</b>	<i>SC</i> <b>A</b>	<i>P</i> <b>266</b>	<i>L</i> <b>1</b>	# <b>359</b>
Dawe, Piers				
Avago Technologies				
<i>Comment Type</i>	<b>E</b>	<i>Comment Status</i>	<b>D</b>	
Blank page				
<i>SuggestedRemedy</i>				
Continue learning how to stop Frame from doing this!				
<i>Proposed Response</i>		<i>Response Status</i>	<b>W</b>	
PROPOSED ACCEPT IN PRINCIPLE.				
Check and update frame options in Annex A				