Cl **151**   *SC* **151.8.5.2**   *P* **66**   *L* **37**   # 1

Kimber, Mark   Semtech

Comment Type **TR**   *Comment Status* **A**   *FR4 dispersion*

Due to S0 changing in Table 151-14 from 0.093 to 0.092, the dispersion values for FR4 in Table 151-12 need to be updated accordingly.

SuggestedRemedy

In the FR4 dispersion equation change 0.0465 to 0.046 for both minimum and maximum dispersion.

Response   *Response Status* **C**

ACCEPT.

Cl **151**   *SC* **151.10**   *P* **73**   *L* **34**   # 2

Kimber, Mark   Semtech

Comment Type **TR**   *Comment Status* **A**   *FR4 dispersion*

Due to S0 changing in Table 151-14 from 0.093 to 0.092, the dispersion values for FR4 in Table 151-13 need to be updated accordingly.

SuggestedRemedy

Change FR4 negative (min) dispersion to -11.7 from -11.9. Change FR4 positive (max) dispersion to 6.6 from 6.7.

Response   *Response Status* **C**

ACCEPT.

Cl **151**   *SC* **151.1**   *P* **53**   *L* **52**   # 3

Stassar, Peter   Huawei

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

The last paragraph on page 53 seems redundant. It seems to be reused from Clause 122, where there are both 4 lane and 8 lane PMDs. In other PMD clauses where WDM is used for 4 lane PMDs, 87 and 88, an equivalent paragraph has not been inserted.

SuggestedRemedy

Remove the last paragraph on page 53 in clause 151.1

Response   *Response Status* **C**

ACCEPT.

Cl **151**   *SC* **151.6**   *P*   *L*   # 4

Stassar, Peter   Huawei

Comment Type **ER**   *Comment Status* **A**   *bucket*

In the text of clause 151.6 no reference is included to the lane assignments of 400GBASE-LR4.

SuggestedRemedy

Modify the first paragraph of 140.6 to:
The wavelength range for each lane of the 400GBASE-FR4 and 400GBASE-LR4 PMDs is defined in Table 151-5. The 400GBASE-FR4 and 400GBASE-LR4 center wavelengths are members of the CWDM wavelength grid defined in ITU-T G.694.2 and are spaced at 20 nm.

Response   *Response Status* **C**

ACCEPT.

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COMMENT STATUS: D/dispatched A/accepted R/rejected   RESPONSE STATUS: O/open W/written C/closed Z/withdrawn
SORT ORDER: Comment ID

Comment ID **4**   Page 1 of 6
11/12/2019 4:52:55 PM

Cl **140**	*SC* **140.6.2**	*P*	*L*	# 5			

Stassar, Peter   Huawei

Comment Type **TR**   *Comment Status* **A**   LR1 FR1 interop

As clarified in
http://www.ieee802.org/3/cu/public/cu_adhoc/cu_archive/stassar_3cu_adhoc_102319.pdf
the maximum average power into the 100GBASE-FR1 receiver is actually 0.5 dB too high
for the 100GBASE-FR1 application. For interworking with a 100GBASE-LR1 transmitter the
minimum loss in the link needs to be 0.3 dB. In order to meet an engineering desire to have
a minimum loss of 0 dB in case of interworking this maximum power, also called overload,
should be raised another 0.3 dB which may be technically challenging and impacting cost.
Unless it wil be demonstrated that raising the overload by 0.3 dB will not impact cost, it is
proposed to reduced the overload by 0.5 dB, as well as the damage threshold and increase
the minimum loss for interworking between an LR1 transmitter and an FR1 receiver to 0.8
dB.

SuggestedRemedy

In Table 140-7:
Lower the 100GBASE-FR1 Receiver Average receive power (max) by 0.5dB to 4 dBm.
Lower the 100GBASE-FR1 damage threshold by 0.5 dB to 5dBm.
In Table 140-16:
Increase the 100GBASE-LR1 transmitter to 100GBASE-FR1 receiver minimum loss from
0.3 dB to 0.8 dB.

Response   *Response Status* **C**

ACCEPT IN PRINCIPLE.

A straw poll was taken and the consensus was to accept the proposed remedy.

In Table 140-7 for 100GBASE-FR1:
Change the Damage threshold value from 5.5 dBm to 5 dBm.
Change Average receive power (max) from 4.5dBm to 4 dBm.
Change Receive power (OMAouter) (max) from 4.7dBm to 4.2 dBm.

In Table 140-16 increase the 100GBASE-LR1 transmitter to 100GBASE-FR1 receiver
minimum loss from 0.3 dB to 0.8 dB.

Cl **140**	*SC* **140.10b**	*P*	*L*	# 6			

Stassar, Peter   Huawei

Comment Type **TR**   *Comment Status* **A**   LR1 FR1 interop

When connecting 100GBASE-LR1 optics on one side of the link to 100GBASE-FR1 optics
on the other side of the link, the link loss can be larger than the maximum of 4 dB for
100GBASE-FR1, without increasing the maximum distance of 2 km. In the link from an LR1
Tx to an FR1 Rx the transmitter power is 1.2 dB higher, allowing 5.2 dB loss in the link
instead of 4 dB.
In the other direction from an FR1 Tx to an LR1 Rs the receiver is 1.6 dB more sensitive.
Therefore the link can tolerate a maximum loss of 5.6 dB instead of 4 dB.

SuggestedRemedy

In Table 140-16:
For the "100GBASE-LR1 transmitter to 100GBASE-FR1 receiver" direction increase the
maximum loss from 4 to 5.2 dB.
For the "100GBASE-FR1 transmitter to 100GBASE-LR1 receiver" direction increase the
maximum loss from 4 to 5.6 dB.

Response   *Response Status* **C**

ACCEPT IN PRINCIPLE.

Values change due to accepted response to comment #5 and #9.

In Table 140-16:
Change the maximum loss values to 4.9 dB in the LR1 to FR1 direction, and to 5.1 dB in
the FR1 to LR1 direction.

Additionally, in Table 140-15:
Change the maximum loss values to 3.9 dB in the LR1 to DR direction and to 4.5 dB in the
DR to LR1 direction.

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 Z/withdrawn
SORT ORDER: Comment ID

Comment ID **6**

Page 2 of 6
11/12/2019 4:52:55 PM

Cl **151**   *SC* **151.7.1**   *P*   *L*   # 7

Stassar, Peter   Huawei

Comment Type   **TR**   *Comment Status* **A**   *TDECQ-SECQ*

In Table 151-7 the value for "TDECQ - SECQ" is currently still labelled as TBD, which was agreed at the Indianapolis meeting in September 2019.
In line with the considerations in http://www.ieee802.org/3/cu/public/Sept19/stassar_3cu_01_0919.pdf it is proposed to replace "TBD" by "2.5".
An upper limit of 2.5 dB for TDECQ - SECQ should not be an overly conservative limit.
An associated presentation will be submitted to the November 2019 cu TF meeting.

SuggestedRemedy

In Table 151-7, for "TDECQ - SECQ", replace TBD by 2.5.

Response   *Response Status* **C**

ACCEPT IN PRINCIPLE.

A straw poll was taken and there was consensus to make the change.

Straw poll:

For 400GBASE-LR4-6, I would prefer to:

A) Remove the TDECQ - SECQ parameter
B) Replace the TBD with 2.5dB as the value for TDECQ-SECQ

A: 9   B: 16

Change parameter name of "TDECQ - SECQ" to "TDECQ - TECQ" in Table 151-7, and replace TBD by 2.5.

Introduce definition of TECQ with editorial license as below:

Title: Transmitter eye closure for PAM4 (TECQ):
The TECQ of each lane shall be measured using the methods specified for TDECQ in 121.8.5, except that the test fiber is not used.

Cl **140**   *SC* **Table 140-6, 140-7, 140**   *P* **41**   *L*   # 8

Mazzini, Marco   Cisco

Comment Type   **TR**   *Comment Status* **R**   *DGD penalty*

Relax 100GBASE-LR1 transmitter characteristics by 0.1dB

SuggestedRemedy

Into mmazzini_3cu_adhoc_101519, a change of 0.1dB of 100GBASE-LR1 transmitter characteristics has been proposed, a reduction of 0.1dB of DGD penalty (from 0.3dB to 0.2dB) seems acceptable, given that two different and independent contributions are proposing 0.25dB and 0.2dB penalty.

Response   *Response Status* **C**

REJECT.

A straw poll was taken.

There was no concensus to make the proposed change.

Cl **140**   *SC* **Table 140-6, 140-7**   *P* **41**   *L*   # 9

Mazzini, Marco   Cisco

Comment Type   **TR**   *Comment Status* **A**   *Tx average min*

Relax 100GBASE-LR1 transmitter Average launch power (min)

SuggestedRemedy

Into mmazzini_3cu_adhoc_101519, change 100GBASE-LR1 transmitter Average Launch power (min), has been proposed, to allow infinite transmitter's extinction ratio.

Response   *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 140-6:
Change Average launch power (min) for 100GBASE-LR1 from -1.1 dBm to -2 dBm.
Change Average launch power (min) for 100GBASE-FR1 from -2.4dBm to -2.9 dBm.

In Table 140-7:
Change Average receive power (min) for 100GBASE-FR1 from -6.4dBm to -6.9 dBm
Change Average receive power (min) for 100GBASE-LR1 from -7.4dBm to -8.3 dBm.

TYPE: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general   Comment ID **9**   Page 3 of 6
COMMENT STATUS: D/dispatched A/accepted R/rejected   RESPONSE STATUS: O/open W/written C/closed Z/withdrawn   11/12/2019 4:52:55 PM
SORT ORDER: Comment ID

Cl **140**   *SC* **140.6**   *P* **41**   *L*   # 10

Mazzini, Marco   Cisco

Comment Type   **TR**   *Comment Status* **A**   *Tx avg min*

Relax 100GBASE-FR1 transmitter Average launch power (min)

SuggestedRemedy

Into mmazzini_3cu_adhoc_101519, a change 100GBASE-LR1 transmitter Average Launch power (min) has been proposed, to allow higher transmitter's extinction ratio and align with 100GBASE-DR minimum power requirement.

Response   *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #9.

Cl **151**   *SC* **Table 151-7**   *P* **61**   *L*   # 11

Mazzini, Marco   Cisco

Comment Type   **TR**   *Comment Status* **A**   *Tx off power*

Relax Average launch power of OFF transmitter from -20 to -15dBm

SuggestedRemedy

As proposed into mmazzini_3cu_adhoc_101519, the average power of OFF transmitter can be implemented by laser shout down or by a SiP switch for this technology.
As already specified for 100GBASE PMDs, it would be good to relax this value to -15dBm too in consistency with 802.3bs and 802.3cd.

Response   *Response Status* **C**

ACCEPT IN PRINCIPLE.

Discussion in the TF was that a value of -16dBm for Tx OFF was acceptable for 400GBASE-FR4 and 400GBASE-LR4-6.

Change "Average launch power of OFF transmitter, each lane (max)" in Table 151-7 from -20dBm to -16dBm for both 400GBASE-FR4 and 400GBASE-LR4-6.

Cl **151**   *SC* **Table 151-7, 151-8, 151**   *P* **61**   *L*   # 12

Mazzini, Marco   Cisco

Comment Type   **TR**   *Comment Status* **R**   *DGD penalty*

Relax 400GBASE-LR4 transmitter characteristics by 0.1dB

SuggestedRemedy

Into mmazzini_3cu_adhoc_101519, a change of 0.1dB of 100GBASE-LR4 transmitter characteristics has been proposed, a reduction of 0.1dB of DGD penalty (from 0.3dB to 0.2dB) seems acceptable, given that two different and independent contributions are forecasting 0.2dB and 0.1dB penalty for a link of 6kms with 4ps DGD.

Response   *Response Status* **C**

REJECT.

See response to comment #8.

Cl **140**   *SC* **Table 140-7, Table 140-**   *P* **41**   *L*   # 13

Mazzini, Marco   Cisco

Comment Type   **TR**   *Comment Status* **R**   *LR1 FR1 interop*

Align some 100GBASE-FR1 and LR1 receiver characteristics so to allow compatibility between 100GBASE-FR1 and 100GBASE-LR1.

SuggestedRemedy

Into mmazzini_3cu_adhoc_101519, a change into Table 140-7 was proposed, to align 100GBASE-FR1 to 100GBASE-LR1 and avoid the usage of an external attenuator of 0.3dB value.

Response   *Response Status* **C**

REJECT.

See resolution to comment #5

Cl **140**   *SC* **140.10b**   *P* **49**   *L* **21**   # 14

Mazzini, Marco   Cisco

Comment Type   **TR**   *Comment Status* **R**   *LR1 FR1 interop*

Remove 'Attenuators may be used to achieve the required losses'.

SuggestedRemedy

Into mmazzini_3cu_adhoc_101519, a change into Table 140-7 was proposed, to align 100GBASE-FR1 to 100GBASE-LR1 and avoid the usage of an external attenuator of 0.3dB value.

Response   *Response Status* **C**

REJECT.

See reponse to comment #5.

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 Z/withdrawn
SORT ORDER: Comment ID

Comment ID **14**

Page 4 of 6
11/12/2019 4:52:56 PM

Cl **151** *SC* **Table 151-7** *P* **61** *L* # 15

Mazzini, Marco   Cisco

Comment Type **TR** *Comment Status* **R**   *TDECQ-SECQ*

Remove TDECQ-SECQ parameter from Table 151-7

SuggestedRemedy

Into mmazzini_3cu_adhoc_102319, the TDECQ-SECQ removal from Table 151-7 was proposed. This new parameter does not give any significant benefit to discriminate bad from good transmitters and add unwanted time and costs. To contraint distortion a reduction of TDECQ-10Log(Ceq) from 3.4dB to 3.3dB for 400GBASE-LR4 is also proposed.

Response   *Response Status* **C**

REJECT.

A straw poll was taken and there was no consensus to make the change.

Straw poll:

For 400GBASE-LR4-6, I would prefer to:

a) Remove the TDECQ - SECQ parameter
b) Replace the TBD with 2.5dB as the value for TDECQ-SECQ

A: 9 B: 16

Cl **116** *SC* **116.1.4** *P* **33** *L* **3** # 16

Nicholl, Gary   Cisco

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

Need to fill in TBD

SuggestedRemedy

Replace TBD with "IEEE Std 802.3cm-20xx"

Response   *Response Status* **C**

ACCEPT.

Cl **o** *SC* **0** *P* **0** *L* **0** # 17

Nicholl, Gary   Cisco

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

Several people have submitted minor editorial comments outside of the official comment review process.

SuggestedRemedy

Allow the editorial team to address the received editorial comments with editorial licence.

Response   *Response Status* **C**

ACCEPT.

Cl **151** *SC* **151.8.5.2** *P* **66** *L* **37** # 18

Nicholl, Gary   Cisco

Comment Type **T** *Comment Status* **A**   *FR4 dispersion*

FR4 dispersion in Table 151-12 is based on slope of 0.093 whereas the LR4 value is based on 0.092. Need to align on 0.092.

SuggestedRemedy

Update FR4 dispersion values in Table 151-12 to be based on a slope of 0.092. Also update positive and negative dispersion values in Table 151-13 for 400GBASE-FR4 to be consistent with a dispersion slope of 0.092.

Response   *Response Status* **C**

ACCEPT IN PRINCIPLE.

See responses to comments #1 and #2.

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 Z/withdrawn
SORT ORDER: Comment ID

Comment ID **18** Page 5 of 6
11/12/2019 4:52:56 PM

Cl **151**   *SC* **151.7.1**   *P* **61**   *L* **20**   # **19**

Okabe, Ryo   Fujitsu Optical Components, Ltd.

Comment Type **T**   *Comment Status* **R**   *withdrawn*

This comment is related to Tx OMA and Rx sensitivity. Tx OMA and Rx sensitivity are depicted in the lower figure, simultaneously. Blue and green line show current 6-km spec in IEEE802.3cu and alternative plan for 10-km spec, respectively. Both specs should be discussed and aligned each other.
 Though 2.0-dB headroom for Tx max is kept with 6-km spec, on the other hand 10-km spec has only 1.7-dB headroom which is not sufficient for the manufacturing margin and yeild. Headroom for 2.0 dB is nessesary at least.

SuggestedRemedy

To keep more than 2.0 dB margin for Tx spec, there would be possible solutions as below;
1) decrese Tx OMA(min) from +0.2 to -0.1 dB
2) increase Tx OMA(max) from 4.4 to 4.7 dB
Rx sensitivity should be changed for corrsponding the above change.

From a view point of power consumption, option-1) would have benefit of 0.2W/4-lane power saving according to our estimation.
Option-2) might lead over load issue for the Rx sensitivity.

In conclusion, FOC would like to propose spec refinement for Tx OMA and Rx sensitivity to decrease by 0.3 dB in order to keep 2.0 dB headroom for Tx OMA spec.

Response   *Response Status* **C**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **1**   *SC* **1.4**   *P* **17**   *L* **26**   # **20**

Cole, Chris   II-VI

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

LR in 400GBASE-LR4 has been associated with 10km reach at recent rates

SuggestedRemedy

Replace every instance of 400GBASE-LR4 throughout the document with 400GBASE-LR4-6

Response   *Response Status* **C**

ACCEPT IN PRINCIPLE.

Adopt 400GBASE-LR4-6 per cole_3cu_01a_1119.

Motion #3 was made and passed (Y/N/A: 33/0/2)

Cl **30**   *SC* **30.5.1.1.2**   *P* **19**   *L* **44**   # **21**

Trowbridge, Steve   Nokia

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

The normal order seems to be increasing MAC rate, then increasing reach for PHYs of the same MAC rate, then decreasing lane count for PHYs with the same reach

SuggestedRemedy

As the reach of 400GBASE-LR4 is 6km, it should go before rather than after 400GBASE-LR8 which has 10km reach

Response   *Response Status* **C**

ACCEPT IN PRINCIPLE.

Two comments were received on this topic (#21 and #22).

During the 802.3cu TF meeting in Hawaii, Nov 2019 it was agreed to change the name of 400GBASE-LR4 to 400GBASE-LR4-6 (Motion #3).

Change the order of 400GBASE-LR4-6 in the various lists and tables throughout the draft with editorial license (e.g. Clause 30, 78 and 116), to reflect the reduction in reach from 10km to 6km, i.e. after the 2km PMDs and before the 10km PMDs.

Cl **116**   *SC* **116.1.4**   *P* **33**   *L* **12**   # **22**

Trowbridge, Steve   Nokia

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

The normal order seems to be increasing MAC rate, then increasing reach for PHYs of the same MAC rate, then decreasing lane count for PHYs with the same reach

SuggestedRemedy

As the reach of 400GBASE-LR4 is 6km, it should go before rather than after the 400GBASE-LR8 column which has 10km reach

Response   *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #21.

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 Z/withdrawn
SORT ORDER: Comment ID

Comment ID **22**

Page 6 of 6
11/12/2019 4:52:56 PM