Cl **00**　　　*SC* **1.4.4**　　　　　*P* **229**　　　*L* **18**　　　　　# **1**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**T**　　　*Comment Status*　**A**
　Need to mention 68.

Suggested Remedy
　Change 'Clause 52' to 'Clause 52 or Clause 68'.

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

Cl **00**　　　*SC* **2.8**　　　　　*P* **239**　　　*L* **50**　　　　　# **2**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**T**　　　*Comment Status*　**A**
　Need to mention 68. Editorial: shouldn't have 'Clause' here.

Suggested Remedy
　Change 'Clause 52.9' to '52.9 and 68.6'.

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

Cl **00**　　　*SC* **49.1.2**　　　　　*P* **227**　　　*L* **35**　　　　　# **3**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**E**　　　*Comment Status*　**A**
　Need to mention 68.

Suggested Remedy
　Change 'Clause 52' to 'Clause 52 and Clause 68'.

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

Cl **00**　　　*SC* **49.1.4.4**　　　　　*P* **229**　　　*L* **18**　　　　　# **4**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**T**　　　*Comment Status*　**A**
　Need to mention 68.

Suggested Remedy
　Change 'Clause 52' to 'Clause 52 or Clause 68'.

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

Cl **00**　　　*SC* **49.2.8**　　　　　*P* **239**　　　*L* **50**　　　　　# **5**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**T**　　　*Comment Status*　**A**
　Need to mention 68. Editorial: shouldn't have 'Clause' here.

Suggested Remedy
　Change 'Clause 52.9' to '52.9 and 68.6'.

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

Cl **30**　　　*SC* **5.1.1.2**　　　　　*P* **19**　　　*L* **3**　　　　　# **6**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**E**　　　*Comment Status*　**A**
　Please put the material in the usual clause order (so at the moment clause 30 would appear first). Each clause gets a new page and some boilerplate editing instructions.

Suggested Remedy
　Per comment.

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

Cl **30B**　　　*SC* **2**　　　　　*P* **19**　　　*L* **13**　　　　　# **7**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**E**　　　*Comment Status*　**A**
　re editor's note - value required. I suppose the obvious choice is 494. Then, the LRM entry would follow SR, not precede it. Then, the entries in the other list (30.5.1.1.2?) should be in the same order (makes it easier to read and maintain).

Suggested Remedy
　Ask David Law if the above is true!

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

Cl **30B**　　　*SC* **2**　　　　　*P* **19**　　　*L* **13**　　　　　# **8**
Dawe, Piers　　　　　　　　　　　Agilent

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

Suggested Remedy
　LRM

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

TYPE: TR/technical required T/technical E/editorial　COMMENT STATUS: D/dispatched A/accepted R/rejected　SORT ORDER: Clause, Page, Line, Subclause　　Page 1 of 29
RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn
Cl **30B**　　　*SC* **2**

Cl **44**   *SC* **1.1**   *P* **1**   *L* **31**   # 9
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
   Add '10GBASE-LRM' to the list of Physical Layer entities. (page/line number from
   802.3am/D2.0, as for most of my comments against 44-49)

Suggested Remedy
   Change 'CX4, and in Clause 52 for' to 'CX4, Clause 68 for 10GBASE-LRM, and in Clause
   52 for'.

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

Cl **44**   *SC* **1.3**   *P* **2**   *L* **46**   # 10
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
   List in d) needs extending. (page/line number from 802.3am/D2.0)

Suggested Remedy
   Change 'CX4, and in Clause 52 for' to 'CX4, Clause 68 for 10GBASE-LRM, and in Clause
   52 for'.

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

Cl **44**   *SC* **1.4**   *P* **4**   *L* **14**   # 11
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
   Need to refer to clause 68. Editorial: EACH device isn't in a range of clauses.

Suggested Remedy
   Change 'Specifications of each physical layer device are contained in Clause 52 through
   Clause 54 inclusive.' to 'Specifications of these physical layer devices are contained in
   Clause 52 through Clause 54 and Clause 68.'

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

Cl **44**   *SC* **1.4**   *P* **4**   *L* **3**   # 12
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
   family needs extending.

Suggested Remedy
   Add 10GBASE-LRM to list of 10GBASE-R family of physical layer implementations.

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

Cl **44**   *SC* **1.4.4**   *P* **19**   *L* **17**   # 13
Dawe, Piers   Agilent

Comment Type   **T**   *Comment Status* **A**
   You need to add a little more to table 44-1.

Suggested Remedy
   Show the whole table in the draft, with underscores and strikeouts (if any). Add row and
   column as proposed. Add 'M's in new row, columns 49, 51 and 68.

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

Cl **44**   *SC* **3**   *P* **5**   *L* **20**   # 14
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
   Need to refer to clause 68.

Suggested Remedy
   In table 44-2, change 'See 52.2.' to 'See 52.2 and 68.2.'

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

Cl **44**   *SC* **4**   *P* **6**   *L* **32**   # 15
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
   Need to refer to clause 68.

Suggested Remedy
   Change 'Clause 45 through Clause 54' to 'Clause 45 through Clause 54 and Clause 68'.

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

Cl **44**　　*SC* **5**　　　　　　*P* **7**　　*L* **21**　　　# **16**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**E**　　*Comment Status*　**A**
　Need another row for Table G5 of ISO/IEC 11801: 1995, Annex G.

Suggested Remedy
　In table 44-4, add a row for 8802-3: 10GBASE-LRM. Take advice on the Is and Ns needed.

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

Cl **44**　　*SC* **5**　　　　　　*P* **7**　　*L* **21**　　　# **17**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**E**　　*Comment Status*　**A**
　When referring to ISO/IEC 11801: 1995 or 2002?

Suggested Remedy
　Check with the 802.3am project.

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

Cl **44**　　*SC* **5**　　　　　　*P* **7**　　*L* **5**　　　# **18**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**E**　　*Comment Status*　**A**
　Need another entry for Table G1 of ISO/IEC 11801: 1995, Annex G. It looks like a standard format. I don't know if the order matters - the new entry might go better at c) to match table G5.

Suggested Remedy
　Add entry for 10GBASE-LRM:　h) Within the section Optical Link:　　CSMA/CD 10GBASE-LRM ISO/IEC 8802-3/PDAM 26

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

Cl **45**　　*SC* **2.1.7.4**　　　　*P* **23**　　*L* **26**　　　# **19**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**T**　　*Comment Status*　**A**
　Need to mention 68.

Suggested Remedy
　Change 'in 52.4.8' to 'in 52.4.8 or 68.4.8 as appropriate'.

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

Cl **45**　　*SC* **2.1.7.5**　　　　*P* **23**　　*L* **39**　　　# **20**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**T**　　*Comment Status*　**A**
　Need to mention 68.

Suggested Remedy
　Change 'Clause 52' to 'Clause 52 or Clause 68'.

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

Cl **45**　　*SC* **2.1.8**　　　　*P* **25**　　*L* **4**　　　# **21**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**T**　　*Comment Status*　**A**
　Need to mention 68.

Suggested Remedy
　Change 'in 52.4.7' to 'in 52.4.7 or 68.4.7 as appropriate'.

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

Cl **68**　　*SC* **1**　　　　　　*P* **2**　　*L* **7**　　　# **22**
Dawe, Piers　　　　　　　　　　　Agilent

Comment Type　**T**　　*Comment Status*　**X**
　Problem with first sentence: another clause says it specifies multimode optical fiber for certain 10GBASE serial PHYs. Here we don't change that: we specify for 10GBASE-LRM only.

Suggested Remedy
　Change

　'This clause specifies the 10GBASE-LRM PMD and multimode fiber media for the 10GBASE serial LAN PHY.'

　to

　'This clause specifies the PMD and multimode fiber media for the 10GBASE-LRM serial LAN PHY.'

Response　　　　　　*Response Status*　**Z**
　WITHDRAWN.

TYPE: TR/technical required T/technical E/editorial   COMMENT STATUS: D/dispatched A/accepted R/rejected   SORT ORDER: Clause, Page, Line, Subclause   Page 3 of 29
RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn

Cl **68**　　　*SC* **1**

Cl **68**   *SC* **1.4**   *P* **3**   *L* **36**   # **23**

Dawe, Piers   Agilent

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

Italics in figure 68-2 not needed. It looks like this formatting is left over from figure 38-1 where the letters were arranged vertically - I don't think the italics have a well-understood meaning.

Suggested Remedy

Change 'PMA' into non-italic text (twice).

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **1.4**   *P* **3**   *L* **36**   # **24**

Dawe, Piers   Agilent

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

It would be a service to the reader if the 'PMD service interface' mentioned in 68.4.2 were illustrated in fig. 68-2.

Suggested Remedy

If desired, mark the two PMD service interfaces (by adding dotted lines between PMA and PMD on each side, and labelling them)

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **10**   *P* **17**   *L* **53**   # **25**

Dawe, Piers   Agilent

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

In the footnote 1, 'annex' should be 'subclause' per maintenance request 1112.

Suggested Remedy

In the footnote 1, change 'annex' to 'subclause'

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **10.2.1**   *P* **17**   *L* **18**   # **26**

Dawe, Piers   Agilent

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

The material in 68.10.2.1 (52.15.2.1) is a form to be filled in, not just stuff to be read, so it should be copied in here not just referred to. I think this is a general issue and means that our plan to do part of the PICS by reference won't work.

Suggested Remedy

Replace '52.15.2.1 shall be used.' with the contents of 52.15.2.1.

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **10.2.1**   *P* **17**   *L* **2**   # **27**

Dawe, Piers   Agilent

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

Title of PICS doesn't follow title of clause. Same problem in 68.10.1 and title of 68.10.3.

Suggested Remedy

Change title of PICS to:
'Protocol Implementation Conformance Statement (PICS) proforma for Clause 68, physical medium dependent (PMD) sublayer type 10GBASE-LRM (long wavelength, 64B/66B coding, multimode fiber)'.
Change 'IEEE Std 802.3aq-200x, physical medium dependent (PMD) sublayer and baseband medium, type 10GBASE-LRM' to 'IEEE Std 802.3aq-200x, physical medium dependent (PMD) sublayer type 10GBASE-LRM (long wavelength, 64B/66B coding, multimode fiber)'.
Change title of 68.10.3 to 'PICS proforma tables for physical medium dependent (PMD) sublayer type 10GBASE-LRM (long wavelength, 64B/66B coding, multimode fiber)'.
I would be happy if the section in brackets were left out in any or all of these three cases - but I don't know if it would be correct to do so.

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **10.2.2**   *P* **17**   *L* **22**   # **28**
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
    The material in 68.10.2.2 (52.15.2.2) is a form to be filled in, not just stuff to be read, so it
    should be copied in here not just referred to. Note that I'm referring to 802.3am/D2.0,
    which is the latest version of clause 52 available.

Suggested Remedy
    Replace '52.15.2.2 shall be used.' with the contents of 52.15.2.2, and then change 'IEEE
    Std 802.3-200X, Clause 52, Physical Medium Dependent (PMD) sublayer and baseband
    medium, type 10GBASE-R and 10GBASE-W' to 'IEEE Std 802.3aq-200X, physical medium
    dependent (PMD) sublayer type 10GBASE-LRM (long wavelength, 64B/66B coding,
    multimode fiber)', and change 'does not conform to IEEE Std 802.3-200X' to 'does not
    conform to IEEE Std 802.3aq-200X'.

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

Cl **68**   *SC* **10.2.3**   *P* **17**   *L* **31**   # **29**
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
    Tables should be in 9 point

Suggested Remedy
    Reapply default format in PICS tables.

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

Cl **68**   *SC* **10.3.1**   *P* **17**   *L* **51**   # **30**
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
    The material in 68.10.3.1 and 68.10.3.2 (52.15.3.2 and 52.15.3.1) is forms to be filled in,
    not just stuff to be read, so it should be copied in here not just referred to.

Suggested Remedy
    Replace '52.15.3.1 shall be used.' with the contents of 52.15.3.1. Replace '52.15.3.2 shall
    be used.' with the contents of 52.15.3.2.

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

Cl **68**   *SC* **10.3.4**   *P* **18**   *L* **17**   # **31**
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
    Per another comment - title of 68.6 may evolve

Suggested Remedy
    Keep this title in step.

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

Cl **68**   *SC* **10.3.4**   *P* **18**   *L* **19**   # **32**
Dawe, Piers   Agilent

Comment Type   **T**   *Comment Status* **A**
    As the editor's note says, this subclause needs completing.

Suggested Remedy
    Complete it! by reference to the normative requirements of 68.6.

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

Cl **68**   *SC* **10.3.4**   *P* **18**   *L* **21**   # **33**
Dawe, Piers   Agilent

Comment Type   **T**   *Comment Status* **A**
    Duplicate title, no content.

Suggested Remedy
    Change title to 'Characteristics of the fiber optic cabling and MDI'. Complete the
    subclause (table) by reference to the normative requirements of 68.8, 68.9, and (I think)
    table 68-2.

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

Cl **68**   *SC* **2.1.10**   *P* **27**   *L* **50**   # **34**
Dawe, Piers   Agilent

Comment Type   **T**   *Comment Status* **A**
    Need to add a register bit for 10GBASE-LRM PMA/PMD type to table 45-12 (bits 1.11.x)

Suggested Remedy
    As agreed with 802.3an and 802.3ap

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

TYPE: TR/technical required T/technical E/editorial   COMMENT STATUS: D/dispatched A/accepted R/rejected   SORT ORDER: Clause, Page, Line, Subclause   Page 5 of 29
RESPONSE STATUS: O/open   W/written   C/closed   U/unsatisfied Z/withdrawn

Cl **68**   *SC* **2.1.10**

Cl **68**　　*SC* **2.1.6**　　　　　*P* **20**　　*L* **47**　　　# **35**

Dawe, Piers　　　　　　　　　　　Agilent

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

Need to add a register bit pattern for 10GBASE-LRM PMA/PMD type to table 45-8 (bits 1.7.x).

Suggested Remedy

As agreed with 802.3an and 802.3ap

Response　　　　　　*Response Status*　**C**

ACCEPT.

Cl **68**　　*SC* **4.1**　　　　　*P* **3**　　*L* **36**　　　# **36**

Dawe, Piers　　　　　　　　　　　Agilent

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

Gratuitous capitals in figure 68-2

Suggested Remedy

Change 'Fiber Optic Cabling (Channel)' to 'Fiber optic cabling (channel);　Change 'Bulkheads' to 'bulkheads';　　Change 'Patch Cord' to 'Patch cord'

Response　　　　　　*Response Status*　**C**

ACCEPT. PROPOSED ACCEPT

Cl **68**　　*SC* **4.4**　　　　　*P* **4**　　*L* **40**　　　# **37**

Dawe, Piers　　　　　　　　　　　Agilent

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

typo

Suggested Remedy

Change 'implementation' to 'implementations'.

Response　　　　　　*Response Status*　**C**

ACCEPT. PROPOSED ACCEPT

Cl **68**　　*SC* **4.9**　　　　　*P* **5**　　*L* **31**　　　# **38**

Dawe, Piers　　　　　　　　　　　Agilent

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

Grammar

Suggested Remedy

Insert a 'the' to give '... contribute to the PMA/PMD receive fault bit ...'

Response　　　　　　*Response Status*　**C**

ACCEPT. PROPOSED ACCEPT

Cl **68**　　*SC* **5**　　　　　*P* **5**　　*L* **47**　　　# **39**

Dawe, Piers　　　　　　　　　　　Agilent

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

There's a special multiplication dot for use in places like 'MHz.km'. See Table 59-16 for an example.

Suggested Remedy

Change the ordinary stop in 'MHz.km' to the multiplication dot. Add the multiplication dot to the 'List of special symbols' table. Include the whole 'List of special symbols' section (modified from 802.3am) in its proper place in the draft (currently intended to be at the end). While you are there: add the multiplication cross to the table too. Thanks!

Response　　　　　　*Response Status*　**C**

ACCEPT.

Cl **68**　　*SC* **5**　　　　　*P* **5**　　*L* **50**　　　# **40**

Dawe, Piers　　　　　　　　　　　Agilent

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

One or both of the 50 um fiber types, when combined with indifferent connector tolerances, are turning out to be more challenging than expected. For OM3, it's not certain that we need the whole 300 m, as another PMD is rated for 300 m on OM3. We should not delay the project and delay the use of LRM on OM1, for OM3. Note that link performance is degraded by connector offsets through the three mechanisms of impaired bandwidth, optical loss and modal noise - these appear to be correlated.

Suggested Remedy

For each 50 um fiber type, consider 300 m but with reduced connector loss, and/or current (1.5 dB) connector loss but with reduced reach.

Response　　　　　　*Response Status*　**Z**

WITHDRAWN.

TYPE: TR/technical required T/technical E/editorial　COMMENT STATUS: D/dispatched A/accepted R/rejected　SORT ORDER: Clause, Page, Line, Subclause　　Page 6 of 29
RESPONSE STATUS: O/open   W/written   C/closed   U/unsatisfied   Z/withdrawn

Cl **68**　　*SC* **5**

Cl **68**   *SC* **5**   *P* **5**   *L* **50**   # **41**

Jaeger, John   Big Bear Networks

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

the 50um 400/400 & 500/500 row should be split into two rows - one for 500/500 and one for 400/400

Suggested Remedy

change the middle 50um row to two rows as indicated below:

50um   500/500   0.5 to 300   2
50um   400/400   TBD   2

Response   *Response Status* **C**

ACCEPT.

change the middle 50um row to two rows as indicated below:

50um   500/500   0.5 to 300   2
50um   400/400   0.5 to 240   2

Cl **68**   *SC* **5**   *P* **5**   *L* **54**   # **42**

Dawe, Piers   Agilent

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

Readability

Suggested Remedy

Insert an 'an' giving '... and an allocation ...'.

Response   *Response Status* **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **5.1**   *P* **6**   *L* **13**   # **43**

Lindsay, Tom   ClariPhy Communicati

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

Table 68-3: In 802.3ae, the extinction ratio for LR was increased from the 3 dB value used in SR due to concerns about inteferometric noise with DFB lasers and single mode fibers. LRM, as SR, will be using MM fibers (and further, possibly MM lasers), where interferometric noise should not be a concern.   Also, LRM may benefit from eye shapes including overshoot and other characteristics that might be better enabled by a lower extinction ratio.

Suggested Remedy

1. Set the minimum extinction ratio in the table to 3 dB, as in SR.   2. This would also affect Figure 68-3 on page 7, as it would further open the allowable design space along the upper left slope. It would increase that portion by ~0.6 dB.

Response   *Response Status* **Z**

WITHDRAWN.

In favor of 3dB ER: 9
In favor of 3.5dB ER: 18

Cl **68**   *SC* **5.1**   *P* **6**   *L* **17**   # **44**

Dawe, Piers   Agilent

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

Looking again at chromatic dispersion: a 4 nm RMS spectral width would produce dispersion effects (perhaps both deterministic and mode partition noise) that we don't want to budget for. The problem would arise with an extreme wavelength and a maximum spectral width; implementers can easily avoid this combination at no significant cost.

Suggested Remedy

Impose a spec in the form of a spectral width vs wavelength trade-off in the style of the two left columns of table 59-4 and the solid-line limit in figure 59-3. I'll try to bring some calculations and proposed limits to the meeting.

Response   *Response Status* **C**

ACCEPT.

Include spec the on spectral width vs wavelength trade-off in the style of the two left columns of table 59-4 and a figure in the style of the solid-line limit in figure 59-3.

Wavelenth sprectral width
1260   2.4
1300   4
1355   4

For: 23
Against: 1
Abstain: 3

Cl **68**   *SC* **5.1**   *P* **6**   *L* **23**   # **45**
Dawe, Piers   Agilent

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

The tentative extinction ratio limit has been in place for at least a whole ballot cycle without attracting comment. Let us just confirm it.

Suggested Remedy

Change 'TBD [Editor's note: 3.5 suggested]' to '3.5'.

Response   *Response Status*   **C**

ACCEPT.

Cl **68**   *SC* **5.1**   *P* **6**   *L* **3**   # **46**
Dawe, Piers   Agilent

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

Tightening the text.

Suggested Remedy

Change 'per measurement techniques defined in 68.6.' to 'per definitions in 68.6.' Similarly for 68.5.2.

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **5.1**   *P* **6**   *L* **31**   # **47**
Weiner, Nick   Phyworks

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

Transmitter noise spec and OMA:noise ratio for the comprehensive stressed receiver tests:

The latter is intended to mimic, in part, transmitter RIN present in a real channel. They are presently specified using different units. This is rather confusing.

Suggested Remedy

Represent i) Transmitter noise in Table 68-3 and ii) OMA:noise ratio for the comprehensive stressed receiver tests in Table 68-4, using the same units.

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT IN PRINCIPLE

Style eg for Tx RIN (use correct names and value)
Tx SNR   29
equiv RINxOMA   -128   dB/Hz

Style eg for TP3 noise (use correct names and value)
SNR   11.5

Also, include equations to convert

Cl **68**   *SC* **5.1**   *P* **6**   *L* **31**   # **48**
Weiner, Nick   Phyworks

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

1) Consistency within document may be improved by representing i) transmitter noise and ii) OMA:noise ratio for the comprehensive stressed receiver tests using the same units.

2) The divide by 2 within in ""OMA/(2 x rms noise)"" is for consistency with the RINxOMA definition.

Suggested Remedy

1) Change Table 68-2, RINxOMA entry to

Description: OMA:rms noise ratio
Value: 50 (value correct?)
Unitless.

2) Change Table 68-3 OMA:(2 x rms noise) ratio entry to:

Description: OMA:rms noise ratio
Value: 23

Response   *Response Status*   **Z**

WITHDRAWN. PROPOSED ACCEPT IN PRINCIPLE   Add the alternative metrics in brackets (29 in table 68-3, -120 dB/Hz in table 68-4). Following common practice, keep with dB/Hz as primary units for RIN and linear units for noise calibration.

Cl **68**   *SC* **5.1**   *P* **6**   *L* **33**   # **49**
Aronson, Lew   Finisar

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

Table 68-3:   The present eye mask has positive and negative overshoot limits of 40%. This limit is arbitrary and may in fact preclude useful waveforms.   The overshoot limits should be removed, unless evidence is provided of potential problems with unlimited overshoot, in which cas a larger value, perhaps 100% should be used.

Suggested Remedy

Eliminate the Y3 parameter from Table 68-3 and modify the diagram in Figure 68-4 to remove the Y3 and negative Y3 labels and lines and the shaded regions at the top and bottom diagram.   In the event that an argument is made that there should be some limits, I would support any value higher than 75%

Response   *Response Status*   **C**

ACCEPT. Propose accept in principle. Set Y3 = 0.8.

Cl **68**   *SC* **5.1**   *P* **6**   *L* **34**   **#** **50**
Dawe, Piers   Agilent

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

Experimental work indicates that with EDC, overshoot is not something to be specified against as in a traditional link. We can relax the mask outer limits; this will assist cost effectiveness.

Suggested Remedy

Change the Y3 limit from 0.4 to 0.75. Investigate to see if it can be further relaxed.

Response   *Response Status* **C**

ACCEPT. Propose accept in principle. Set Y3 = 0.8.

Cl **68**   *SC* **5.1**   *P* **6**   *L* **37**   **#** **51**
Dawe, Piers   Agilent

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

Coverage of a greater proportion of fibers can be obtained by a ""two launch"" strategy, so if best coverage at 300 m is our objective, this is what we should do. The costs can be kept to a minimum if the cheaper launch is allowed where appropriate. Note that we believe that separate 'off-center' launch specifications for 50 um and 62 um will give better coverage than a compromise off-center launch (by whatever name or technology). Also that a center launch through single mode fiber will give better coverage than simply into multimode fiber. In the suggested remedy, '220 m' may be tweaked as more information becomes available.

Suggested Remedy

Require the module to emit in the center of the fiber, with a relaxed tolerance.
Require the module to meet the transmit power window after a regular MMF patchcord, and after a regular SMF patchcord.
Define one or two mode conditioning patchcord (MPCP) with more relaxed tolerances than the ones in clauses 38 and 59. (One if a common specification will work well enough for 62 and 50 um fiber, two if not). Allow clause 38/59 MPCPs to be used in this application.
Allow regular MMF patchcords to be used:
For OM1 up to 220 m,
For OM2,
For OM3.
Require MPCPs to be used in the first instance for OM1, 220 to 300 m. Allow the user to substitute a regular MMF patchcord (at the transmit end) for the links which are not satisfactory with the MCPC.
Allow MPCP to be used for OM2.
Allow MPCP to be used for OM3 up to 220m.

Response   *Response Status* **C**

ACCEPT.

Add footnote to Table 68-3 indicating the preference between launches.

Add foornote to tx power in OMA spec in Table 68-3:

Required the transmit power window at TP2 after a regular MMF patchcord, and after a regular MCP.

Cl **68**   *SC* **5.1**   *P* **6**   *L* **37**   **#** **52**

Cunningham, David   Agilent

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

Table 68-3:

Transmitted optical launch specification for 62.5 um fiber
Need to agree specification.

For 300 m links with typical connectors theory and experiment have shown that no single launch can reduce all PIE_D values below 6 dBo. Theory has indicated that the occurrence of PIE_D greater than about 5.5 dB0 should be less than 1%. However, experiments with the TIA 1996 Round Robin cables indicate that for any one launch PIE_D greater than 5.5 dBo is common (3 or 4 out of 9 cables). The same is true for links with two connectors, each having 7 um lateral offset, at the tranmit end of the link. Also, for links with two 7 um connectors, at the transmit end of the link, no launch has any particular benefit compared to another launch. However, the probability of having two 7 um connectors at the transmit end of a link is very low - this does not seem to be a reasonable worst case for 10GBASE-LRM.

Typical 300 m, in service links, would not have two 7um connectors at the transmit end. Typical 300 m links with high PIE_D for offset launch (SM offset or Vortex) can be converted to links with low PIE_D if a center launch is used. Conversely, typical 300 m links with high PIE_D for center launch can be converted to links with low PIE_D if an offset launch (SM offset or Vortex) is used. The PIE_D values of all the TIA 1996 round robin fibres can be converted to PIE_D value less than 5.5 dB if a two-launch strategy is used. Also, it must be recognised that customers of 10GBASE-LRM are likely to do initial tests with these cables and with good connectors. The only way to ensure near 100% success rate is with two launches: a centre and an offset type launch.

Experiments have also shown that for OM1 cable an offset launch (SM or Vortex) is much more stable than a centre launch.

Suggested Remedy

Split row in two to allow for a default launch and an alternate launch.
Remove text in current Description cell of table. Complete the two new rows as follows:

Description: Encircled flux for default launch
Type: max & min
Values: < 30% in 5um radius & > 86 in 23 um radius
Unit: %

Description: Encircled flux for alternate launch
Type: max & min
Values: > 35 % in 5um radius & > 80 % in 10 um radius
Unit: %

Response   *Response Status* **C**

ACCEPT.

For: 31

Agaist 0
Abstain 6

Split row in two to allow for a default launch and an alternate launch.
Remove text in current Description cell of table. Complete the two new rows as follows:

Description: Default

Use MCP as used in Clause 38

Description: Encircled flux for alternate launch
Type: max & min
Values: > 30 % in 5um radius & > 86 % in 11 um radius
Unit: %

Cl **68**   *SC* **5.1**   *P* **6**   *L* **3844**   **#** **53**

King, Jonathan   Big Bear Networks

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

Table 68-3 Transmit charateristics

Table 68-3 contains TBDs on the launch conditions for OM1 , OM2, OM3
The launch study group (task 2 and 4) will have preliminary launch recommendations for each of these fibres (note these may be revised following launch study group progress - a summary update will be provided at the Jan meeting)

Suggested Remedy

Insert into Launch section of Table 68-3-10GBASE-LRM transmit characteristics
----
   Link type   TP2 Encircled flux test criteria
1 Launch for OM1   < 30 % in 4.5 µm radius
                         > 86 % in 24 µm radius
                         note 1
2 Launch for OM2   < 30 % in 6 µm radius
                         > 86 % in 18 µm radius
                         note 2
3 Launch for OM3   > 30 % in 5 µm radius
                         > 86 % in 11 µm radius
                         note 3
4 'Universal launch'   TBD
    for OM1, OM2, OM3

Footnote 1: For example 20+/-3 micron offset single-mode launch
Footnote 2: For example 13+/-3 micron offset single-mode launch
Footnote 3: For example single-mode centre launch

Response   *Response Status* **Z**

WITHDRAWN.

Cl **68** *SC* **5.1** *P* **6** *L* **4** **#** **54**

Dawe, Piers Agilent

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

The second sentence is in 9 point font.

Suggested Remedy

Restore the paragraph to the usual format.

Response *Response Status* **C**

ACCEPT. PROPOSED ACCEPT

Cl **68** *SC* **5.1** *P* **6** *L* **40** **#** **55**

Aronson, Lew Finisar

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

Table 68-3: The current table has two rows refering to launch specifications for 50 um fiber. These do not distinguish which subset of 50 um fiber they apply to.

Suggested Remedy

The description of the two rows should refer to OM2 and OM3 as follows:

ROW 15: Transmitted optical launch specification for 50 um fiber with OFL of 400/400 or 500/500.

ROW 16: Transmitted optical launch specification for 50 um fiber with OFL of 1500/500

Response *Response Status* **Z**

WITHDRAWN.

Cl **68** *SC* **5.1** *P* **6** *L* **40** **#** **56**

Cunningham, David Agilent

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

Table 68-3
Transmitted optical launch specification for 50 um OM2 fiber
Need to agree specification.

Experimentally, using the TIA 1996 round robin cables, for reasonable offset type launches (SM or Vortex), typical 300 links have PIE_D less than 6 dBo. However, the maximum radius of the light propagating in the fiber must be small enough to control loss and modal noise.   For links with two 7 um connectors, at the transmit end of the link, PIE_D is always less than 6 dBo independent of the launch type.

Suggested Remedy

Remove text in current Description cell of table.

Complete the row as follows:

Description: Encircled flux
Type: max & min
Values: < 30% in 6 um radius & > 86 in 18 um radius
Unit: %

Response *Response Status* **C**

ACCEPT.

For 30
Against 0
Abstain 10

Split row in two to allow for a default launch and an alternate launch.
Remove text in current Description cell of table. Complete the two new rows as follows:

Description: Default

Use MCP as used in Clause 38

Description: Encircled flux for alternate launch
Type: max & min
Values: > 30 % in 5um radius & > 86 % in 11 um radius
Unit: %

Cl **68**　　　*SC* **5.1**　　　　　　*P* **6**　　　*L* **40**　　　# **57**

Aronson, Lew　　　　　　　　　　Finisar

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

Table 68-3:

We should settle on a final minimum extinction ratio of 3.5 dB. The present low value is useful as it allows a relatively wide setup range and allow the broadest use of laser quality. It also allows waveforms with positive and negative overshoot which may be beneficial.

There is less argument against lower values except that at some point having a very large DC content in the receive signal imposes a significant design constraint on the receiver TIA design.

3.5 dB remains a good compromise.

Suggested Remedy

Remove editors note from current value and use 3.5 dB for minimum extinciton ratio

Response　　　　　　*Response Status*　**Z**

WITHDRAWN.

Cl **68**　　　*SC* **5.1**　　　　　　*P* **6**　　　*L* **43**　　　# **58**

Cunningham, David　　　　　　　Agilent

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

Table 68-3
Transmitted optical launch specification for 50 um OM3 fiber
Need to agree specification.

For typical 300 m links with good connectors, OM3 cable will generally have high PIE_D's for launches that put most of the light near 11 to 15 um radii. PIE_D generally decreases if the light is launched at radii greater than about 15 um. However, loss especially with connectors increases quickly if the light is launched at radii greater than 18 um. Modal noise is an issue if the light is launched at radii greater than about 18 um. Also, for offset type launches OM3 cable will typically produce impulse responses with a lot of precursor ISI. It is advantageous to equalizer implementation to avoid the combination of high PIE_D and high precursor ISI. For typical 300 m links with good connectors centre launch typically produces low PIE_D and post cursor ISI a combination that is advantageous to equalization.

Suggested Remedy

Split the row in two to allow for a default launch and an alternate launch.
Remove text in current Description cell of table.

Complete the two new rows as follows:

Description: Encircled flux for default launch
Type: max & min
Values: > 30 % in 5 um radius & > 80% in 10 um radius
Unit: %

Description: Encircled flux for alternate launch
Type: max & min
Values: < 30% in 6 um radius & > 86 in 18 um radius
Unit: %

Response　　　　　　*Response Status*　**C**

ACCEPT.

For 20
Against 0
Abstain 19

Split row in two to allow for a default launch and an alternate launch.
Remove text in current Description cell of table. Complete the two new rows as follows:

Description: Encircled flux for default launch
Type: max & min
Values: > 30 % in 5um radius & > 86 % in 11 um radius
Unit: %

Description: Alternative

Use MCP as used in Clause 38

Cl **68**   *SC* **5.1**   *P* **6**   *L* **45**   **#** 59

Aronson, Lew   Finisar

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

Optical return loss tolerance is listed as a max value. In fact 12 dB is the min value of return loss the part should tolerate.

Suggested Remedy

Change type column in return loss row to MIN.

Response   *Response Status*   **C**

ACCEPT.

Cl **68**   *SC* **5.1**   *P* **6**   *L* **51**   **#** 60

Dawe, Piers   Agilent

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

We can be 'more normative' and I think, more proper, in note c.

Suggested Remedy

Change 'Transmitter waveform and dispersion penalty measurement is described in 68.6.5.2' to 'Transmitter waveform and dispersion penalty is defined in 68.6.5.2'

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **5.1**   *P* **6**   *L* **51**   **#** 61

Dawe, Piers   Agilent

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

Notes b and c are sentences which should end with .

Suggested Remedy

Add . to each.

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **5.2**   *P*   *L*   **#** 62

Lindsay, Tom   ClariPhy Communicati

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

Table 68-4: The TP3 group has agreed to remove sine jitter from the stress test, as other stresses already adequately represent TP2 jitter, and we are planning a separate sine jitter tolerance test.

Suggested Remedy

2 rows regarding sine jitter in Table 68-4 should have already been moved per the previous comment.

Remove the frequency synthesizer from Figure 68-8.

Remove item a) from line 36 on page 13.

Response   *Response Status*   **C**

ACCEPT. Propose accept

Cl **68**   *SC* **5.2**   *P* **8**   *L* **23**   **#** 63

Weiner, Nick   Phyworks

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

At November meeting we selected ratio of 11.5 for OMA: (2 x rms noise) for comprehensive stressed tests. This was intended to corresponding to 0.9dB total penalty.

My own analysis (as presented during conf. call before November meeting) indicates that ratio should actually be 12 and that the 11.5 corresponds to a penalty of 1dB.

Suggested Remedy

Change OMA: (2 x rms noise) value to 12. Or OMA: rms noise value to 24.

Response   *Response Status*   **Z**

WITHDRAWN.

TYPE: TR/technical required T/technical E/editorial   COMMENT STATUS: D/dispatched A/accepted R/rejected   SORT ORDER: Clause, Page, Line, Subclause   Page 13 of 29

RESPONSE STATUS: O/open   W/written C/closed   U/unsatisfied Z/withdrawn   *Cl* **68**   *SC* **5.2**

Cl **68**   *SC* **5.2**   *P* **8**   *L* **23**   # **64**

Aronson, Lew   Finisar

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

Table 68-4:The line which describes the required noise level for the comprehensive stressed sensitivity test should have a footnote which explains that this is the required noise level without the ISI impairment.

Suggested Remedy

Add a footonote to line 23 which reads:

The OMA/(2x rms noise) ratio is measured with no ISI impairment on the test signal.

Response   *Response Status* **C**

ACCEPT. Propose accept

Add foornote:

The OMA/(2x rms noise) ratio is defined without ISI introduced by the ISI generator.

Cl **68**   *SC* **5.2**   *P* **8**   *L* **25**   # **65**

Aronson, Lew   Finisar

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

Table 68-4:   The use of any Bessel Thompson filter in the comprehensive stressed sensitivie test is optional and in any case the bandiwdth of the filter will be dependent on other implementation characteristics. This will be described in the test description later in the clause.   Therefore, this line should be eliminated from the table.

Suggested Remedy

Eliminate the Row of Table 68-4 presently labeled Bandwidth of Bessel-Thomson Filter (line 25)

Response   *Response Status* **C**

ACCEPT. Propose accept

Cl **68**   *SC* **5.2**   *P* **8**   *L* **26**   # **66**

Aronson, Lew   Finisar

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

Table 68-4:   Anticipating that the model for describing the ISI impairments of the stressed sensitivity test will use a fixed time spacing between peaks common to each impairment, there should be a single row specifying this value. Present value is still TBD

Suggested Remedy

Add a row to Table 68-4 immediately before the current three ISI parameters as follows: ISI peak spacing   -   TBD   ps

Response   *Response Status* **C**

ACCEPT. Propose accept in principle:
Add a row to Table 68- 4 immediately before the current three ISI parameters as follows:
ISI peak spacing : 0.75 UI

Cl **68**   *SC* **5.2**   *P* **8**   *L* **27**   # **67**

Aronson, Lew   Finisar

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

Table 68-4:

Anticipating a 4 peak definition of the ISI parameters, and in line with another comment defining the test signal and calibration, modify the wording of the ISI parameter rows to refer to 4 values, A1 - A4

Suggested Remedy

Modify the descriptions of the 3 row to Table 68-4 defining the ISI parameters as follows:

Description   Value
Pre-cursor ISI peak heights {A1,A2,A3,A4}   {TBD,TBD,TBD,TBD}
Symmetrical ISI peak heights {A1,A2,A3,A4}   {TBD,TBD,TBD,TBD}
post-cursor ISI peak heights {A1,A2,A3,A4}   {TBD,TBD,TBD,TBD}~~

Response   *Response Status* **C**

ACCEPT. For: 29
Against:2
Abstain:14

Propose Accept in principle:
Modify the descriptions of the 3 rows to Table 68- 4 defining the ISI parameters as follows:
Description   Value
Pre-cursor ISI peak heights {A1, A2, A3,A4} {0.65 0.5 .91 .26}
Symmetrical ISI peak heights {A1, A2, A3,A4} {.88 .58. 89 .1}
Post-cursor ISI peak heights {A1, A2,A3,A4} {.51 .89 .29 .81}

Table 68-3, Line 35: Remove editor's note for value. Enter value of 5.

Adjust text on comprehensive receiver test accordingly.

Cl **68**   *SC* **5.2**   *P* **8**   *L* **33**   # **68**

Lindsay, Tom   ClariPhy Communicati

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

Table 68-4: Receiver test conditions should not be toleranced.

Suggested Remedy

Remove max from line 33. We don't want a user to think he can require compliance at -10 dBm, for example!

Response   *Response Status* **Z**

WITHDRAWN.

Cl **68**   *SC* **5.2**   *P* **8**   *L* **37**   **#** **69**

Bhoja, Sudeep   Big Bear Networks

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

Table 68-4 Currently there is a TBD in the Simple stressed receiver test section for the Bandwidth of Bessel-Thomson filter. Per the November & December TP3 conference call discussions on this item, propose that we insert the agreed 2GHz value based on the PIE-D statistics from the adopted fiber model.

Suggested Remedy

Change the TBD for the value of the bandwidth of the Bessell Thompson-filter in Table 68-4 to ""2.0""

Response   *Response Status*   **Z**

WITHDRAWN.

Cl **68**   *SC* **5.2**   *P* **8**   *L* **38**   **#** **70**

Lindsay, Tom   ClariPhy Communicati

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

Table 68-4: We should specify the signal characteristics, not the implementation.

Suggested Remedy

Per the previous comment, change this line to
Rise and fall times, 20-80%   129 psec

Note, per the previous comment, the test description gets specific about the filter response type (Bessel-Thomson) and the background for the value.

Response   *Response Status*   **C**

ACCEPT.

Proposed accept in principle

Use text (only) from Tom70Jan05

Also in Figure 68-9: Change "Bessel-Thomson filter" to Filter as required"

Cl **68**   *SC* **5.2**   *P* **8**   *L* **46**   **#** **71**

Dawe, Piers   Agilent

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

We can be 'more normative' and I think, more proper, in notes b and e.

Suggested Remedy

Change 'Comprehensive stressed receiver test is described in 68.6.6.1' to 'Comprehensive stressed receiver sensitivity is defined in 68.6.6.1'
Change 'Simple stressed receiver test is described in 68.6.6.2' to 'Simple stressed receiver sensitivity is defined in 68.6.6.2'

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **5.2**   *P* **8**   *L* **46**   **#** **72**

Dawe, Piers   Agilent

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

Notes b and e are sentences which should end with .

Suggested Remedy

Add . to each.

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **5.2**   *P* **8**   *L* **47**   **#** **73**

Dawe, Piers   Agilent

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

Unwanted . after 'Bessel-Thomson filter' (twice in table 68-4).

Suggested Remedy

Remove them.

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **5.2**   *P* **8**   *L* **47**   **#** **74**

Lindsay, Tom   ClariPhy Communicati

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

Table 68-4: In application, the spectrum will not be flat, but quite varied. So let's not worry about creating too artificial of a requirement.

Suggested Remedy

Remove the note.

Response   *Response Status*   **Z**

WITHDRAWN. Propose reject

Cl **68**   *SC* **5.2**   *P* **8**   *L* **47**   # **75**

Aronson, Lew   Finisar

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

Table 68-4, editor's note in comment c.   In the spirit of not assigning tolerances to specification parameters, we should eliminate the editor's note in this comment. I would further suggest that we should make the 10 GHz point the 3 dB point which is a cleared definition and almost certainly still larger enough

Suggested Remedy

Change footnote c to read: Bandwidth refers to the -3 dB point of the noise spectrum, which is otherwise flat with frequency.

Response   *Response Status* **C**

ACCEPT. Propose Accept in principle:
Change footnote c to read:
Bandwidth refers to the -3 dB (electrical) point of the noise spectrum.

Cl **68**   *SC* **5.2**   *P* **8**   *L* **47**   # **76**

Dawe, Piers   Agilent

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

re 'Noise spectrum to be flat up to this frequency [Editor's note: Definition of flat?]' The noise loading is meant to be a secondary effect (secondary to the receiver's own sensitivity) and the noise flatness would be a tertiary effect. Yes it matters, but we can leave it to the implementer to choose whether to aim for really flat or use wider tolerances.

Suggested Remedy

Delete the Editor's note.

Response   *Response Status* **Z**

WITHDRAWN. Propose reject

Cl **68**   *SC* **5.2**   *P* **8**   *L* **48**   # **77**

Dawe, Piers   Agilent

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

I'm sure other comments will flesh out the stress testing. This comment is to remind us to remove this note as we progress.

Suggested Remedy

Remove note d.

Response   *Response Status* **C**

ACCEPT. Propose accept

Cl **68**   *SC* **6**   *P* **9**   *L* **1**   # **78**

Dawe, Piers   Agilent

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

In this section we are really defining exactly what we mean by each optical parameter, to give meaning and precision to the spec limits given previously. We often do this by explaining how to measure each parameter, but we aren't writing formal measurement procedures as TIA or IEC might. I suggest we change the title to make this clearer.

Suggested Remedy

Change the title from 'Optical measurement methods' to 'Definitions of optical parameters and measurement methods'.

Response   *Response Status* **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **6**   *P* **9**   *L* **1**   # **79**

Dawe, Piers   Agilent

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

We may have a problem of document structure here. For some optical parameters, we have nothing new to say, so we don't have a subclause defining them. We refer to other clauses but from table 68-5 which is in a subclause 68.6.1 headed 'Test patterns'.

Suggested Remedy

Option 1: Modify 68.6.1 to be something like 'Test patterns and related subclauses for optical parameters' and alter the text to something like 'Test patterns are as in Table 68–5 unless specified otherwise. This table also refers to the related subclauses where the parameter definitions are to be found.'   Option 2: Introduce new subclauses 'Definition of average optical power' and 'Definition of wavelength and spectral width' with contents 'See 52.9.3' and 'RMS spectral width is defined as the standard deviation of the spectrum. See 52.9.2.' Modify table 68-5 to point to these new subclauses instead of the ones in 52.

Response   *Response Status* **Z**

WITHDRAWN. See comment 87

Cl **68**   *SC* **6.1**   *P* **9**   *L* **19**   # **80**

Dawe, Piers   Agilent

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

Table 68-5 is hard to use as we haven't mentioned patterns 1, 2 or 3.

Suggested Remedy

Change 'and other (52.9.1.1)' to 'and other patterns 1, 2 and 3 (52.9.1.1)', then insert these sentences copied from 52.9.1.1: 'Patterns 1, 2, and 3 are defined in Table 52–21. Pattern 3 is optional.' Or, the two extra sentences could be a footnote to table 68-5.

Response   *Response Status* **Z**

WITHDRAWN. See comment 87

Cl **68**   *SC* **6.1**   *P* **9**   *L* **24**   # **81**

Dawe, Piers   Agilent

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

I'm afraid we may have to define exactly what we mean by '2^7-1 PRBS', although I don't think it matters. 48.2.4.2 mentions a PRBS based on one of the 7th order polynomials listed in Figure 48–5, which are X^7 + X^3 + 1 or X^7 + X^6 + 1. The latter is the polynomial in a SONET/SDH scrambler (e.g. as in G.707).   I believe most or all test equipment produce !(X^7 + X^6 + 1) (i.e. containing a run of 7 zeroes, which is O.150 style), by default - and most or all can invert the pattern on request.   Further, I think it would be OK to add an extra bit to balance the pattern up and make it 128 bits long. But not sure if people want to do this.

Suggested Remedy

Add footnote to table 68-5 '2^7-1 PRBS': 'A suitable pattern may be generated by the polynomial X^7 + X^6 + 1. In its commonly used form, the pattern is inverted such that there is a run of seven zeroes in its length of 127 bits.' If thought fit, add another sentence 'A balanced pattern with one additional bit is also acceptable.'

Response   *Response Status* **C**

ACCEPT.

For 23
Against: 0
Abstain: 16

Propose accept in principle. In table 68-5
Change 2^7-1 PRBS to 2^9-1 PRBS.
Add footnote to table 68-5 '2^9-1 PRBS': 'A suitable pattern may be generated by the polynomial x^9+x^5+1 as specified in ITU-T V.52. The binary (0,1) data sequence d(n) is given by d(n)=d(n-9)+d(n-5), modulo 2. The pattern has a run of nine ones in its length of 511 bits.'
Add another sentence 'A balanced pattern with one additional bit is also acceptable.'

Add V.52 to referernce list

Cl **68**   *SC* **6.1**   *P* **9**   *L* **24**   # **82**

Dawe, Piers   Agilent

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

Font size of '1 or 2^7-1 PRBS'

Suggested Remedy

Restore to default (9 point)

Response   *Response Status* **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **6.1**   *P* **9**   *L* **24**   # **83**

Aronson, Lew   Finisar

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

Table 68-5: Present transmitter waveform dispersion penalty test requires at least a PRBS9 test pattern. Furthermore, it is my understanding that it may be necessary to specify a specific PRBS9 to go with the MATLAB code provided for the penaty calculation. If so, I suggest below the x^9+x^5 + 1 function which is also specified by ITU-T V.52

Suggested Remedy

Table 68-5 line 24: Pattern column

1 or 2^9 - 1 PRBS with generating function x^9+x^5 + 1

would also except:

1 or 2^9 - 1 PRBS as defined in ITU-T V.52

Response   *Response Status* **Z**

WITHDRAWN. Propose accept in principle. In table 68-5
Change 2^7-1 PRBS to 2^9-1 PRBS.
Add footnote to table 68-5 '2^9-1 PRBS': 'A suitable pattern may be generated by the polynomial x^9+x^5+1 as specified in ITU-T V.52. The data sequence d(n) is given by d(n)=d(n-9)+d(n-5), modulo 2. The pattern is not inverted such that there is a run of nine ones in its length of 511 bits.'
Add another sentence 'A balanced pattern with one additional bit is also acceptable.'

Cl **68**   *SC* **6.1**   *P* **9**   *L* **32**   # **84**

Aronson, Lew   Finisar

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

Table 68-5: The suggested subclause reference is perfectly adequate. Suggest we remove editor's note

Suggested Remedy

Table 68-5 line 32: Replace TBD and editor's note in related subclause column with 52.9.2

Response   *Response Status* **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **6.1**   *P* **9**   *L* **32**   # 85
Dawe, Piers   Agilent

Comment Type   **T**   *Comment Status* **A**
   As we don't have anything special to say about wavelength and spectral width, referring to
   52.9.2 as the editor suggests should be OK.

Suggested Remedy
   Change 'TBD [Editor's note: 52.9.2?]' to '52.9.2'.

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

Cl **68**   *SC* **6.1**   *P* **9**   *L* **6**   # 86
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
   Having added 'as', it makes sense to remove the brackets round '52.9.1.2'.

Suggested Remedy
   Remove them. Insert a comma after 52.9.1.2

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

Cl **68**   *SC* **6.1**   *P* **9**   *L* **6**   # 87
Aronson, Lew   Finisar

Comment Type   **E**   *Comment Status* **A**
   The present first paragraph of 68.6.1, while taken directly from Clause 52 is poorly worded.

Suggested Remedy
   Replace first paragraph of 68.6.1 with: Compliance is to be achieved in normal
   operation. Five test patterns are used: A square wave and patterns 1,2 and 3 defined in
   52.9.1.1 and 52.9.1.2, and the PRBS9 pattern. Table 68-5 defines the test patterns to be
   used in each measurement unless otherwise specified.

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

   Also:

   Table 68-5, line 24: Change 2^7 to 2^9

   Modify title of 68.6.1 to be 'Test patterns and related subclauses for optical parameters'

   Alter text of 68.6.1 to the meaning of:

   Compliance is to be achieved in normal operation. Five test patterns may be used: A
   square wave and patterns 1,2 and 3 defined in 52.9.1.1 and 52.9.1.2, and the PRBS9
   pattern. Table 68-5 defines the test patterns to be used in each measurement unless
   otherwise specified.

   Definitions of params are defined in subclauses given in Table 68-5

   This table also refers to the related subclauses where the parameter definitions are to be
   found.'

Cl **68**   *SC* **6.2**   *P* **9**   *L* **43**   # 88
Dawe, Piers   Agilent

Comment Type   **T**   *Comment Status* **A**
   This title could be more accurate, as the text is firstly a definition. Also, we should spell out
   the abbreviation.

Suggested Remedy
   Change 'OMA measurement' to 'Optical modulation amplitude (OMA)'

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

Cl **68**   *SC* **6.2**   *P* **9**   *L* **45**   # **89**
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status* **A**
   Grammar: too many 'for's.

Suggested Remedy
   Change the second one to 'of'.

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

Cl **68**   *SC* **6.2**   *P* **9**   *L* **48**   # **90**
Dawe, Piers   Agilent

Comment Type   **T**   *Comment Status* **A**
   re editor's note: there isn't much to note here apart from the right pattern. I don't think we can give a ruling on histogram dimensions, as the right choice may depend on the waveform being measured.

Suggested Remedy
   Replace note with these sentences modified from 52.9.9.2: 'OMA can be approximated with patterns 1, 2 or 3 using histograms as suggested in Figure 52–11. However, the normative definition for OMA is as given in 52.9.5.'

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

Cl **68**   *SC* **6.3**   *P* **9**   *L* **54**   # **91**
Dawe, Piers   Agilent

Comment Type   **T**   *Comment Status* **A**
   It's worth pointing out (again) here that extinction ratio is defined with a different pattern to OMA.

Suggested Remedy
   Add sentence: 'Note that extinction ratio is defined with a different pattern to OMA (see Table 68-5).'

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

Cl **68**   *SC* **6.4**   *P* **10**   *L* **1**   # **92**
Aronson, Lew   Finisar

Comment Type   **T**   *Comment Status* **A**
   There are several problems with this subclause.

   1) It is probably unnecessarily confusing to lump in the noise calibration of the comprehensive stressed test signal with the RINOMA of the transmitter. The stressed test calibration is better defined in the description of that test (and is included in the proposed new wording for that section I provide in another comment). Further comments below assume we have done this separation

   2) For the alternative test description, still need to reference the diagram (or provide a new diagram) showing the implementation of the back reflection condition.

   3) Description b) needs more description of the fact that you are measuring this on a scope with reference receiver.

   4) Given that the spec we are measuring to is defined in dB/Hz in Table 68-3, we need to have an equation relating the ratio of the rms noise measured and the OMA to the Table 68-3 specification (-128 dB/Hz)

Suggested Remedy
   New Subclause wording (with elimination of current editor's notes):

   68.6.4 Relative intensity noise optical modulation amplitude (RINxOMA) measurement.

   Table 68-3 specifies the transmitter's RINxOMA. Conformance shall be determined according to the procedure defined in 58.7.7, or alternately according to the following procedure.

   a) Use a test setup as in Figure 58-4 substituting a reference receiver with 7.5 GHz Bessel-Thomson filter and oscilloscope for the optical to electrical converter and other elements which follow.

   b) Use a square wave to measure OMA, according to the method of 52.9.5.

   c) Using the same square wave, measure the rms noise with a 1 UI wide histogram with at least 1000 points in the center region of the logic ONE portion of the square wave. The measurement should be compensated noise in the measurement system.

   d) The required ratio of OMA to rms noise measured is given by:

   $$OMA/(2*rms\ noise) = 1/SQRT(10^{\wedge}((RIN+10*LOG(NBW))/10))$$

   where RIN is the specification in Table 68-3 and NBW is 7.5 GHz

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

   PROPOSED ACCEPT IN PRINCIPLE   Don't say 'Conformance shall be determined'. The

---

conformance is what is required, not the determination of it.

68.6.4 Relative intensity noise optical modulation amplitude (RINxOMA) measurement.

A) Use a test setup as in Figure 58-4 substituting a reference receiver with 7.5 GHz Bessel-Thomson filter and oscilloscope for the optical to electrical converter and other elements which follow.

B) Use a square wave to measure OMA, according to the method of 52.9.5.

c) Using the same square wave, measure the rms noise with a 1 UI wide histogram with at least 1000 points in the center region of the logic ONE portion of the square wave. The measurement should be compensated noise in the measurement system.

D) The required ratio of OMA to rms noise measured is given by:

OMA/(2*rms noise) = 1/SQRT(10^((RIN+10*LOG(NBW))/10)) to OMA/(2*rms noise) = SQRT((10^(-RIN/10))/BW) . Use BW not NBW following precedent in other clauses.

Cl **68**	*SC* **6.4**	*P* **10**	*L* **1**	**#** **93**

Lindsay, Tom   ClariPhy Communicati

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

Per the Editor's notes, this clause needs some work...

Suggested Remedy

1. Eliminate the first note. I don't think we should use clause 58's method for calibration of the TP3 tester (Lew has procedure in his TP3 clause/comment for doing this), and I am aware of another comment Lew is preparing to provide more guidance on the method given here for RIN_OMA.

2. Given TP2 waveform options being considered, I am concerned that the method given by 58.7.7 will introduce a lot of variability into the result of RIN_OMA. Therefore, in the first paragraph, eliminate the 2nd sentence, and -preferably- reword the rest to ""… shall be determing according to the following procedure.""

As a less preferred option, add ""… or alternatively, to the procedure defined in clause 58.7.7.""

3. IF we must retain a link to 58.7.7, then replace the 2nd editor's note with ""The method given by clause 58.7.7 may produce different results for RIN_OMA then the method given here. This is because the method of clause 58.7.7 does not measure OMA by the definitions of this standard, which requires a low frequency square wave pattern. If a square wave pattern is used, the the methods of clause 58.7.7 should provide correct results"".

4. I have a test setup figure that may help. See ""Tom Lindsay Figure 2.doc"".

5. After all this, move this test into the Transmitter measurements section, clause 68.6.5, probably as 68.6.5.3.

Response   *Response Status* **C**

ACCEPT. PROPOSED ACCEPT IN PRINCIPLE
    1.   Eliminate the first note.
    2.   Change wording of 'Conformance shall be determined': the conformance is what is required, not the determination of it.
    3.   Remove the editor's note around line 20.
    4.   Use the example screen shot from the submitted figure, modified to show a histogram on 0 too. Show an optoelectronic scope in place of several boxes. Show the back reflection as in figure 58-4. Use 'System under test' in place of 'Device under test'.

Cl **68**   *SC* **6.4**   *P* **10**   *L* **11**   # **94**
Dawe, Piers   Agilent

Comment Type   **T**   *Comment Status*   **A**
re 'Measure the rms noise using a 1 UI wide histogram [Editor's note: need more detail?], with at least 1000 points, on the logic ONE level.'   We need to include the use of the back reflection. On the other hand, the stricture for at least 1000 points is too much detail. We could point out that the user needs enough points (hits?) to achieve the accuracy he needs - but that's so obvious we don't need to say it, and we don't yet know what accuracy is required.

Suggested Remedy
Delete '[Editor's note: need more detail?], with at least 1000 points, '. Add 'If appropriate, repeat with different settings of the polarization rotator until an upper limit of rms noise is found.'

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

Cl **68**   *SC* **6.4**   *P* **10**   *L* **11**   # **95**
Lindsay, Tom   ClariPhy Communicati

Comment Type   **T**   *Comment Status*   **A**
To address the Editor's note...

Suggested Remedy
I think the only detail that may be missing is: ""The measurement histogram should be applied over as wide of a region as possible where the deterministic waveform has negligible slope or other vertical variations relative to the noise being measured.""

This can also replace/eliminate the requirement of the 1 UI histogram.

Fix the grammar in line 13. Replace ""to"" with ""should be"".

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

""The measurement histogram should be applied over a flat region of the waveform.""

See response to comment 96.

Cl **68**   *SC* **6.4**   *P* **10**   *L* **13**   # **96**
Dawe, Piers   Agilent

Comment Type   **E**   *Comment Status*   **A**
Change 'and to compensated for' to ...

Suggested Remedy
and to be compensated for

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

Cl **68**   *SC* **6.4**   *P* **10**   *L* **15**   # **97**
Dawe, Piers   Agilent

Comment Type   **T**   *Comment Status*   **A**
We can add an equation to round off the procedure. Are my factors of 20, 2, 10 correct?

Suggested Remedy
Add the following (using the proper x-like multiply sign instead of *):
c) Calculate RINxOMA by use of the equation:
RINxOMA = 20*log10(2 * rms noise / OMA) - 10*log10(BW) [dB/Hz] (68-n)
Where:
RINxOMA = Relative Intensity Noise referred to optical modulation amplitude measured with x dB reflection,
OMA and rms noise are measured in the same linear optical units e.g. mW, and
BW = Noise bandwidth of the measuring system (Hz), i.e. low pass bandwidth of oscilloscope - high pass bandwidth due to DC blocking capacitor if any. In this case, 7.5 x10^9 Hz

Response   *Response Status*   **C**
ACCEPT. PROPOSED ACCEPT IN PRINCIPLE   Accept comment but change last sentence to 'In this case, BW is close to 7.5 x10^9 Hz.' Make clear that rms noise is mean of noise in 1s and noise in 0s.

Cl **68**   *SC* **6.4**   *P* **10**   *L* **20**   # **98**
Dawe, Piers   Agilent

Comment Type   **T**   *Comment Status*   **A**
Editor's note '58.7.7 uses (random) data, or PRBS, vs. square pattern for alternative test.]' is not correct. 58.7.7.3 says '... using the pattern specified for the PMD type (e.g. in 58.7.1 and 59.9.1)', and we have already told our readers which pattern to use in table 68-5. (Actually, it would be better to use a PRBS, but then it wouldn't be RINxOMA the way we are defining OMA, it would be just SNRx.)

Suggested Remedy
Delete the note.

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

Cl **68**　　*SC* **6.4**　　　　　　*P* **10**　　*L* **4**　　　　# **99**

Weiner, Nick　　　　　　　　　　Phyworks

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

1) Draft 1.0 gives two signal to noise measurement methods. These can not both define the measured parameter.

2) Situation made un-necessarily complicated by defining different signal to noise ratio parameters for transmitter and receiver test condition.

Suggested Remedy

1) Change title to ""OMA:rms noise ratio measurement""

2) Select simple definition - e.g. Ratio of difference between (mean 1 and 0 levels) and (mean of the two standard deviations);

3) Describe one normative test procedure.

4) Include informative reference to other method.

See file: "weiner 68.6.4 proposals Jan 05.pdf" for two examples.

Response　　　　　　　*Response Status*　**C**

ACCEPT. PROPOSED ACCEPT IN PRINCIPLE
　　Instead of Ratio of difference between (mean 1 and 0 levels) and (mean of the two standard deviations), use Ratio of difference between (mean 1 and 0 levels) and (SUM of the two standard deviations). This is more like the definition of Q used in ITU-T and the Ethernet link model. Include equations to translate each way between the two units, per other comments.

Cl **68**　　*SC* **6.4**　　　　　　*P* **10**　　*L* **4**　　　　# **100**

Dawe, Piers　　　　　　　　　　Agilent

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

The links 'Table 68–3' and 'Table 68–4' didn't work for me.

Suggested Remedy

Check, fix if broken.

Response　　　　　　　*Response Status*　**C**

ACCEPT. PROPOSED ACCEPT

Cl **68**　　*SC* **6.4**　　　　　　*P* **10**　　*L* **5**　　　　# **101**

Dawe, Piers　　　　　　　　　　Agilent

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

Bad phrase 'Conformance shall be determined', too similar to 'shall be tested'.

Suggested Remedy

After 'the transmitter's RINxOMA.' insert 'RINxOMA is defined by Equation 58-9.'.   Change 'Conformance shall be determined, in each case, according to the procedure defined in 58.7.7, or alternatively according to the following procedure:' to 'In each case, the parameters may be measured according to 58.7.7, or alternatively according to the following procedure.'

Response　　　　　　　*Response Status*　**C**

ACCEPT. PROPOSED ACCEPT

Cl **68**　　*SC* **6.4**　　　　　　*P* **10**　　*L* **6**　　　　# **102**

Dawe, Piers　　　　　　　　　　Agilent

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

Need to explain when back reflection is or isn't used, when we refer to the existing RINxOMA procedure. We may also like to add a figure like 58-4 but showing an oscilloscope in place of the O/E converter and everything to its right.

Suggested Remedy

After 'according to the following procedure.', add 'For measurement of RINxOMA, a back reflection is used (see Figure 58-4). For calibration of the signal in the comprehensive stressed receiver test, a back reflection is not used.'   Delete the editor's note 'Would be helpful to include notes'.   Add new figure per comment.

Response　　　　　　　*Response Status*　**C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **6.5**   *P* **12**   *L* **41**   # **103**

Lindsay, Tom   ClariPhy Communicati

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

The TP2 study team has developed a TP2 jitter spec.

Suggested Remedy

1. Specification (for Table 68-3)
Uncorrelated jitter (rms)   max   0.033   UI

2. Method (insert after subclause 68.6.5.3, RIN_OMA)
Title: 68.6.5.4.   Uncorrelated jitter test

The optical jitter measurement is intended to control uncorrelated noise and jitter.

The DUT shall repetitively transmit the pattern as required by clause 68.6.5.2, Transmitter waveform and dispersion penalty test. The signal shall be acquired by a signal analyzer with the frequency response of a 7.5 GHz Bessel Thomson filter as per clause 68.6.5.1, Transmitter optical waveform, and with trigger timing based on clock recovery, again as per clause 68.6.5.1. The signal analyzer shall provide a means of stably triggering on a single bit in the repetitive pattern. The measurement is performed on the center bit of the first displayed occurrence of a rising edge.

The DUT must be fully operational in both transmit and receive directions during this test. A horizontal histogram with height of ~0.01 OMA on the rising edge is used to measure jitter. It should be placed approximately at the average amplitude value of the square wave. At least 1000 hits are required in the histogram. Compensation for measurement equipment noise and jitter is recommended as long as the measurement equipment doesn't contribute more than 30% of the specification limit.

Refer to Figure ZZ (new, per the previous comment) in clause 68.6.5.3.

Response   *Response Status* **C**

ACCEPT. Agreed as in document Tom103Jan05

Cl **68**   *SC* **6.5.2**   *P* **11**   *L* **43**   # **104**

Dawe, Piers   Agilent

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

re 'The transmitter waveform and dispersion penalty is intended to control deterministic dispersion.' The penalty can't control, although the spec limit is intended to. Also it would be better to say something like this right at the beginning of the paragraph, to introduce the concept. And a 'master shall' will save us work when writing out the PICS.

Suggested Remedy

Insert new first sentences 'Transmitter waveform and dispersion penalty is a measure of the deterministic dispersion penalty due to a particular transmitter with standard emulated multimode fibers and receiver. It shall be defined by a waveform analysis method as follows.' Delete the sentence mentioned in the comment.

Response   *Response Status* **C**

ACCEPT. Propose accept

Cl **68**   *SC* **6.5.2**   *P* **11**   *L* **47**   # **105**

Aronson, Lew   Finisar

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

To the extent that the following points are not addressed in an expected complete new description of this section, there are several point in the current wording which should be addressed.

1) a 2^9 test pattern as described in the comment for Table 68-5 should be used rather than 2^7

2) Allow 7 samples per UI. Appears to work and allows a PRBS9 to be captured in a single frame on a common scope (Agilent 86100A/B)

Suggested Remedy

In present text:

Change 2^7 - 1 PRBS to 2^9-1 PRBS

Change ""...at least 8 samples per unit interval.."" to ""...at least 7 samples per unit interval..""

Response   *Response Status* **C**

ACCEPT. Propose accept regarding sample count.
Propose accept in principle regarding pattern. Change 2^7-1 PRBS to 2^9-1 PRBS, as defined in Table 68-5, …

Cl **68**   *SC* **6.5.2**   *P* **11**   *L* **48**   # **106**

Dawe, Piers   Agilent

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

This language is too implementation specific, and specifies a roll-your-own oscilloscope when most users would prefer to buy a ready-made one.

Suggested Remedy

Change 'O/E converter and through a 4th-order, 7.5 GHz Bessel-Thomson filter. The filtered output is connected to an oscilloscope and also to a trigger recovery circuit. The trigger recovery circuit must recover a suitable pattern and/or clock trigger for the oscilloscope so that the waveform can be captured and stored.' to 'oscilloscope with a 4th-order, 7.5 GHz Bessel-Thomson response and a suitable trigger function so that the waveform can be captured and stored.' Change figure 68-5 to match.

Response   *Response Status*   **C**

ACCEPT. Propose accept and also change Figure 68-5 as per Tom document Tom106Jan05

Cl **68**   *SC* **6.5.2**   *P* **11**   *L* **51**   # **107**

Dawe, Piers   Agilent

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

Specifying 16 averages is too implementation specific. I assume we are using averaging to reduce the measurement noise in the captured waveform, but we don't know how much measurement noise we are trying to reduce. Do we know how noise affects the calculated penalty? If so we could give a target SNR for guidance.

Suggested Remedy

Change 'Averaging of at least 16 waveforms, or equivalent, is required.' to 'Averaging should be used to obtain a suitably low noise measurement.' Remove 'At least 16 averages,' from figure 68-5.

Response   *Response Status*   **C**

ACCEPT. For: 23
Against: 2
Abstain: 18

Propose accept in principle. Agreed text is "Averaging should be used to avoid a pessimistic estimate of TWDP."

Cl **68**   *SC* **6.5.2**   *P* **11**   *L* **54**   # **108**

Dawe, Piers   Agilent

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

re 'The DUT must be fully operational in both transmit and receive directions during this test.' I'm not sure there's any point saying this. Do we really expect the transmitter to be perturbed by the receiver? Although the opposite is so likely that we do make a point of imposing the condition. We are using averaging here so if the receiver made the transmitter noisier, we would not see it anyway.

Suggested Remedy

Delete the sentence.

Response   *Response Status*   **C**

ACCEPT. Propose accept.

Cl **68**   *SC* **6.5.2**   *P* **12**   *L* **33**   # **109**

Lindsay, Tom   ClariPhy Communicati

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

Representation of algorithm is missing from the TWDP test.   Per the previous comment, MATLAB code will be used to describe the algorithm.

Suggested Remedy

After completion of review and consensus by the TP2 study team, insert the MATLAB code after the informative material provided by the previous comment.

Response   *Response Status*   **C**

ACCEPT. For: 26
Against:1
Abstain: 16

Propose accept. Code to be exactly as distributed by Norm Swenson for review for two recent TP2 calls. Insert at Figure 68-6.
Removing copyright marking

Cl **68**　　　*SC* **6.5.2**　　　　　*P* **12**　　　*L* **33**　　　　# **110**

Lindsay, Tom　　　　　　　　ClariPhy Communicati

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

Representation of algorithm is missing from the TWDP test.　　The TP2 study team has agreed that the details required for signal processing for the TWDP test will be described with MATLAB code. But, in addition, the team has reviewed an informative description that would greatly add understanding by a casual read.

Suggested Remedy

Does it make more sense to create an Annex for this? I have modified Norm Swenson's work with an annex in mind.　　Wherever is best, insert the informative description attached to these comments. The document name sent with my comments is ""Informative description of TWDP algorithm.doc"".

Response　　　　　　*Response Status*　**C**

ACCEPT.

Propose accept in principle.
Change "Laser response" in Figure 1 of document to "TP2 transmitter response".

Cl **68**　　　*SC* **6.5.2**　　　　　*P* **12**　　　*L* **8**　　　　# **111**

Aronson, Lew　　　　　　　　Finisar

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

Several minor changes are needed in Figure 68-5　　1) Change PRBS7 to PRBS9　　2) TP2 label should point to end of patchcord rather than beginning　　3) Box currently labeled E/O converter should be O/E converter

Suggested Remedy

Change Figure 68-5 according to comment.

Response　　　　　　*Response Status*　**Z**

WITHDRAWN. Propose accept.

Cl **68**　　　*SC* **6.5.3**　　　　　*P* **12**　　　*L* **45**　　　　# **112**

King, Jonathan　　　　　　　　Big Bear Networks

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

Description of transmitter optical launch measurement should include a reference to an encircled flux measurement method, and fibre specific launches for OM1, OM2, and OM3 - following recommendations from the launch study group (tasks 2 and 4)

Suggested Remedy

For example (specific wording may change following progress in the launch study group), amend paragraph to:

The optical launch measurement method is described in [Editor's note: references required]. Figure 68-7 illustrates the measurement method. For a port with a single mode launch, use of 50 μm offset launch patch cord is recommended into OM2 fiber, use of a 62.5 μm offset launch patch cord is recommended into OM1 fiber, and a standard 50um patch cord is recommended into OM3 fiber. For a port with a universal launch, standard 50 μm and 62.5 μm patch cords are recommended

Response　　　　　　*Response Status*　**Z**

WITHDRAWN.

Cl **68**　　　*SC* **6.5.3**　　　　　*P* **12**　　　*L* **47**　　　　# **113**

Aronson, Lew　　　　　　　　Finisar

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

While major work remains to be done on this section, one minor point in the current wording should be changed:　　Currently it is stated that: ""For a port with a multimode-compliant offset launch, standard 50 um and 62.5 um patchcords are specified""　　This should not not be limited to only offset launches

Suggested Remedy

remove the word offset from this line.

Response　　　　　　*Response Status*　**Z**

WITHDRAWN.

Cl **68**　　　*SC* **6.5.3**　　　　　*P* **13**　　　*L* **1**　　　　# **114**

King, Jonathan　　　　　　　　Big Bear Networks

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

Figure 68-7

Figure 68.7 contains illustrations of two 50/125 fibres, presumably one of them should be 62.5/125

Suggested Remedy

change label on one of the fibre reel pictures to say 62.5/125

Response　　　　　　*Response Status*　**C**

ACCEPT.

TYPE: TR/technical required T/technical E/editorial　　COMMENT STATUS: D/dispatched A/accepted R/rejected　　SORT ORDER: Clause, Page, Line, Subclause　　　Page 25 of 29

RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn　　　　　　　　　　　　　　　　　　*Cl* **68**　　　*SC* **6.5.3**

Cl **68**   *SC* **6.6**   *P* **12**   *L*   # **115**

Lindsay, Tom   ClariPhy Communicati

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

TP3 has agreed to a low frequency jitter test, but details have not been supplied.   The concept and values were agreed during a TP3 con-call.

Suggested Remedy

1. Move 2 rows involving jitter out from the comprehensive test in Table 68-4 to another section named ""Low frequency jitter tolerance test:""
Set the value of frequency to 40 kHz, and set the value of jitter to 5 UI pk-pk.

2. Add clause 68.6.6.3. ""Low frequency jitter tolerance test""
Add text ""The low frequency jitter tolerance test is to ensure clock recovery in the receiver can track low frequency jitter without producing errors.

The receiver under test shall satisfy the low frequency jitter tolerance test specifications in Table 68-4.

[Insert ""Tom Lindsay D1.0 Figure 1.doc""]
Figure 68-? Gives the block diagram for the low frequency jitter tolerance test. As shown in the figure, an electrical signal is created using a pattern generator impaired by frequency modulation of the generating clock. The resulting electrical signal is filtered and converted to an optical signal using a linear electrical/optical converter. The optical waveform is connected to an optical attenuator, and to the receiver under test via a mode conditioning patch cord. [Editor's note: Further note on the MCP to go in here]

The signal impairments are specified in Table 68-4 as the conditions of the low frequency jitter tolerance test. The OMA for this test should be set to Received power in OMA as specified in Table 68-4. A BER of better than 10-12 shall be achieved.

Although described in this document as frequency modulation, an actual test system may use phase or frequency modulation for inducing sinusoidal jitter. The modulation may occur on the clock source that generates the data, or on the data stream itself. It is up to the implementer to assure the correct values are achieved at the output of the tester.

Response   *Response Status* **C**

ACCEPT. Propose to accept in principle,

Remedy as given, with following change:

Remove BT filter block from figure

Cl **68**   *SC* **6.6**   *P* **12**   *L* **50**   # **116**

Aronson, Lew   Finisar

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

As part of a proposed new section for the compreshensive stressed receiver test, propose also eliminating the single paragraph clause 68.6.6 which refers to both the comprehensive and simple receiver tests, and include the relevant wording in each sections respectively.   This allows us to reduce the number of subclauses one level which helps clarity

Suggested Remedy

Eliminate subclause 68.6.6 and paragraph of text. Change present subclause 68.6.6.1 number to 68.6.6 and present 68.6.6.2 to 68.6.7.

Response   *Response Status* **C**

ACCEPT. Editor will resolve

Cl **68**   *SC* **6.6**   *P* **12**   *L* **54**   # **117**

Dawe, Piers   Agilent

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

68.6.6.1 and 68.6.6.2 define as well as describe (and there's a typo in this sentence).

Suggested Remedy

Change '68.6.6.1 and 68.6.6.2 describe the test corresponding tests.' to '68.6.6.1 and 68.6.6.2 define the relevant parameters and describe the corresponding tests.'

Response   *Response Status* **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **6.6.1**   *P* **13**   *L* **26**   # **118**
Aronson, Lew   Finisar

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

The present clause 68.6.6.1 describing the comprehensive stressed sensitivity test is missing a great deal of required material describing the signal charateristics, calibration method and test method. Additionally, there are a number of mistakes and omissions in the present Figure 68-8.

The referenced document in the remedy replaced this entire clause.

Note that the document presumes, as is the current state of consensus, that there is no sinusoidal jitter impairment. It also presumes a 4 peak fixed dT representation (but not normative implementation) of the ISI impairment.

Suggested Remedy

Replace present subclause 68.6.6.1 with the text provided in seperate document:

ReceiverSensitivityClauses-SuggestedChangetoD1.0_1-07-05.pdf

submitted to the -LRM reflector on 1/7/05.

Response   *Response Status* **C**

ACCEPT. For 32
Against 0
Abstain: 9

Propose accept

Cl **68**   *SC* **6.6.1**   *P* **13**   *L* **27**   # **119**
Dawe, Piers   Agilent

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

We need to state how to verify low frequency jitter tolerance. In the proposal below I have truncated the applied jitter at 1.5 UI which I think is a step point for an SDH/SONET jitter tolerance mask. I may have too much jitter in the 4-10 MHz range - if so, the amount of jitter could be halved and 133 kHz changed to 67 kHz.

Suggested Remedy

I believe the easiest way would be to use the clock jitter method in figure 68-8. Add a table like 52-19 but simpler (.LE. means the less than or equals sign, x means multiplication sign):

Table 68-n - Sinusoidal jitter
Frequency Range   Sinusoidal Jitter (UI pk to pk)
f < 133 kHz   NA
133 kHz < f .LE. 10 MHz   2 x 10^5/f
f > 10 MHz   0

Response   *Response Status* **Z**

WITHDRAWN.

Cl **68**   *SC* **6.6.2**   *P* **14**   *L* **24**   # **120**
Dawe, Piers   Agilent

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

This subclause defines parameters as well as describing a test

Suggested Remedy

Delete the word 'test' in the title, giving 'Simple stressed receiver sensitivity and overload (informative)'

Response   *Response Status* **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **6.6.2**   *P* **14**   *L* **33**   # **121**
Dawe, Piers   Agilent

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

rise/fall time is not intended to be negligible!

Suggested Remedy

Delete 'rise/fall times, '. Insert comma after 'RIN'.

Response   *Response Status* **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **6.6.2**   *P* **14**   *L* **33**   # **122**
Lindsay, Tom   ClariPhy Communicati

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

The informative sensitivity test requires specification of the filter and the final test condition.

Per the next comment, I decided to focus on the signal characteristics, not the implementation.

Suggested Remedy

1. Remove ""rise/fall times,"" from line 33.

2. Replace the first sentence of the last paragraph of this subclause with its own paragraphs: ""The rise and fall times of the test signal shall meet the requirements given in Table 68-4 and have the approximate time-properties of a 4th Bessel-Thomson filter. The value for the rise and fall times is based on a simplified channel model having a 2 GHz Bessel-Thomson filter and driven by a simplified source model having a Gaussian impulse response with a step response of 47.1 psec, 20-80%, rise and fall times.

The rise and fall time values are to be measured and calibrated with a 7.5 GHz Bessel-Thomson filter and with the 10 bit pattern used for OMA calibration for the comprehensive stress test.

Other implementations may be used provided that the resulting signal in the optical domain meets the requirements at TP3.

Response   *Response Status*   **C**

REJECT. For: 12
Against: 11

Proposed response:

1. Remove ""rise/fall times,"" from line 33.

2. Replace the first sentence of the last paragraph of this subclause with its own paragraphs:

The rise and fall times of the test signal should meet the requirements given in Table 68-4, and the test signal should have the approximate time-properties of a 4th-order Bessel-Thomson filter. The value for the rise and fall times is based on a simplified channel model having a 4th-order, 2 GHz 3 dB bandwidth Bessel-Thomson filter driven by an ideal NRZ transmitter followed by a Gaussian filter with a 47.1 ps 20-80% rise/fall time step response

The rise and fall times of the test signal are to be measured and calibrated with a 7.5 GHz Bessel-Thomson filter and with the 10 bit pattern used for OMA calibration for the comprehensive stress test.

Other implementations may be used provided that the resulting signal in the optical domain meets the requirements at TP3.

Cl **68**   *SC* **7.1**   *P* **14**   *L* **47**   # **123**
Dawe, Piers   Agilent

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

unwanted comma

Suggested Remedy

Remove the comma after 'specifications'.

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **7.3**   *P* **15**   *L* **22**   # **124**
Dawe, Piers   Agilent

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

typo

Suggested Remedy

change 'specification' to 'specifications'.

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT

Cl **68**   *SC* **8**   *P* **15**   *L* **35**   # **125**
Dawe, Piers   Agilent

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

Completing the sentence at the editor's note: 52, 58 and 59 have very similar wording, which we can re-use.

Suggested Remedy

Delete the note and complete the sentence: '... optical elements as long as the optical characteristics of the channel, such as attenuation, dispersion, reflections and modal bandwidth, meet the specifications.'

Response   *Response Status*   **C**

ACCEPT. PROPOSED ACCEPT in principle

Delete the note and complete the sentence: '… optical elements as long as the optical characteristics of the channel, such as attenuation, dispersion, reflections and modal bandwidth and total connector loss meet the specifications.'

Cl **68** *SC* **8** *P* **15** *L* **36** # `126`
Dawe, Piers Agilent

Comment Type **T** *Comment Status* **A**
I believe that ANSI/TIA/EIA-526-14A method A-1 applies to single-mode fibre.

Suggested Remedy
Delete ', and ANSI/TIA/EIA-526-14A/method A-1'.

Response *Response Status* **C**
ACCEPT. Editor to confirm that only MMF reference remains.

Cl **68** *SC* **9.1** *P* **16** *L* **3** # `127`
Dawe, Piers Agilent

Comment Type **E** *Comment Status* **A**
Table could take less space.

Suggested Remedy
Make it full width using 'shrink to fit'.

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

Cl **68** *SC* **9.2** *P* **16** *L* **9** # `128`
Dawe, Piers Agilent

Comment Type **T** *Comment Status* **A**
Table 68-6 needs entries for zero dispersion wavelength (with footnote).

Suggested Remedy
Copy from table 59-16 (table 52-25 has the same limits for zero dispersion wavelength).

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

Cl **99** *SC* *P* **2** *L* **1** # `129`
Dawe, Piers Agilent

Comment Type **E** *Comment Status* **A**
Now we have material for more than one clause, we need a contents list

Suggested Remedy
Add the table of contents.

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

TYPE: TR/technical required T/technical E/editorial   COMMENT STATUS: D/dispatched A/accepted R/rejected   SORT ORDER: Clause, Page, Line, Subclause
RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn

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Cl **99** *SC*