

Cl 00 SC 45 P L # 305  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

No registers? No management? You have to choose between Clause 22 or 45 for the registers; I would guess 45.

SuggestedRemedy

Create placeholder clauses 45 and 30.

Response Response Status C

ACCEPT IN PRINCIPLE.  
Placeholder for clause 45 and 30 will be created.

Cl 00 SC 56.1.2 P2 L35 # 299  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

As one would reasonably think of 10GEPON as Ethernet for subscriber access networks, like GEPON, some minor additions to Clause 56, Introduction to Ethernet for subscriber access networks, are needed.

SuggestedRemedy

Change to:

For P2MP optical fiber topologies, EFM supports a nominal bit rates of 1000 Mb/s and 10 Gb/s, shared amongst the population of Optical Network Units (ONUs) attached to the P2MP topology. The 1000 Mb/s P2MP PHYs use the 1000BASE-X Physical Coding Sublayer (PCS), the Physical Medium Attachment (PMA) sublayer defined in Clause 65, and an optional FEC function defined in Clause 65. The 1 Gb/s P2MP PHYs use the 10GBASE-R PCS and Physical Medium Attachment (PMA) sublayers and FEC function defined in Clause 92.

In 56.1.3, after 'as defined in Clause 60.', add 'Physical Layer signaling systems at 10 Gb/s and 1/10 Gb/s are defined in Clause 91 and Clause 92.'

Add rows to table 56-1 and 56-2 to refer to other tables for 10GEPON and 1/10GEPON (which may already exist in Clause 91). Update 56.1.5 to cover the new OLT and ONU types.

Response Response Status C

ACCEPT IN PRINCIPLE.

In 56.1.2 Change

From:

"For P2MP optical fiber topologies, EFM supports a nominal bit rate of 1000 Mb/s, shared amongst the population of Optical Network Units (ONUs) attached to the P2MP topology. The P2MP PHYs use the 1000BASE-X Physical Coding Sublayer (PCS), the Physical Medium Attachment (PMA) sublayer defined in Clause 65, and an optional FEC function defined in Clause 65."

To:

"For P2MP optical fiber topologies, EFM supports a nominal bit rates of 1000 Mb/s and 10 Gb/s, shared amongst the population of Optical Network Units (ONUs) attached to the P2MP topology. The 1000 Mb/s P2MP PHYs use the 1000BASE-X Physical Coding Sublayer (PCS), the Physical Medium Attachment (PMA) sublayer defined in Clause 65, and an optional FEC function defined in Clause 65. The 10 Gb/s P2MP PHYs use the 10GBASE-R PCS and Physical Medium Attachment (PMA) sublayers and FEC function defined in Clause 92."

In 56.1.2.2 Change

From:

"The Clause 22 RS and MII, and Clause 35 RS and GMII, are both employed for the same purpose in EFM, that being the interconnection between the MAC sublayer and the PHY sublayers. Extensions to the Clause 35 RS for P2MP topologies are described in Clause 65. The combination of MPCP and the extension of the Reconciliation Sublayer (RS) for P2P Emulation allows an underlying P2MP network to appear as a collection of point-to-point links to the higher protocol layers (at and above the MAC Client). It achieves this by prepending a Logical Link Identification (LLID) to the beginning of each data frame, replacing two octets of the preamble. This is described in Clause 65. EFM Copper links use

the MII of Clause 22 operating at 100 Mb/s. This is described in 61.1.4.1.2."

To:

The Clause 22 RS and MII, Clause 35 RS and GMII, and Clause 46 RS and XGMII are all employed for the same purpose in EFM, that being the interconnection between the MAC sublayer and the PHY sublayers. Extensions to the Clause 35 RS for P2MP topologies are described in Clause 65. Extensions to the Clause 46 RS for P2MP topologies are described in Clause 92. The combination of MPCP and the extension of the Reconciliation Sublayer (RS) for P2P Emulation allows an underlying P2MP network to appear as a collection of point-to-point links to the higher protocol layers (at and above the MAC Client). It achieves this by prepending a Logical Link Identification (LLID) to the beginning of each data frame, replacing two octets of the preamble. This is described in Clause 65. EFM Copper links use the MII of Clause 22 operating at 100 Mb/s. This is described in 61.1.4.1.2.

In 56.1.3 Change

From:

"For P2MP topologies, EFM introduces a family of Physical Layer signaling systems which are derived from 1000BASE-X, but which include extensions to the RS, PCS and PMA, along with an optional forward error correction (FEC) capability, as defined in Clause 65. The family of P2MP Physical Layer signaling systems includes the combination of 1000BASE-PX10-D (Passive Optical Network Downstream 10 km), plus 1000BASE-PX10-U (PON Upstream 10 km), and the combination of 1000BASE-PX20-D (PON Downstream 20 km) plus 1000BASE-PX20-U (PON Upstream 20 km), as defined in Clause 60."

To:

"For P2MP topologies, EFM introduces a family of Physical Layer signaling systems which are derived from 1000BASE-X and 10GBASE-R, but which include extensions to the RS, PCS and PMA. An optional forward error correction (FEC) capability is defined in Clause 65 for the 1000BASE-X derivatives while a mandatory FEC is defined in Clause 92 for 10GBASE-R derivatives. The family of P2MP Physical Layer signaling systems addressing 1000BASE-X derivatives are defined in Clause 60. The family of P2MP Physical Layer signaling systems addressing 10GBASE-R derivatives are defined in Clause 91. For asymmetric derivatives see Clause TBD."

Editors Note: this may be C91 or to be defined Annex.

Add rows to table 56-1 and 56-2 to refer to other tables for 10GEAPON and 1/10GEAPON (which may already exist in Clause 91).

In 56.1.5 Change

From:

"In contrast to previous editions of IEEE Std 802.3, in certain circumstances a DTE is allowed to transmit frames while not receiving a satisfactory signal. It is necessary for an EPON OLT to do this to bring a PON into operation (although it is highly inadvisable for an EPON ONU to transmit without receiving). Clause 66 describes optional modifications to the 100BASE-X PHY, 1000BASE-X PHY and 10GBASE RS so that a DTE may signal remote fault using OAMPDUs. When unidirectional operation is not enabled, the sublayers in Clause 66 are precisely the same as their equivalents in Clause 24, Clause 36, and Clause 46."

<i>Cl</i> 64	SC	P	L	# 403
Mandin, Jeff		PMC Sierra		

<i>Comment Type</i>	TR	<i>Comment Status</i> A	<i>Deferred</i>
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The state diagrams in clause 64 become very complex when GEAPON, 10GEAPON, and coexistence cases are considered.

In addition to the examples discussed previously, the control multiplexers in figures 64-12 and 64-13 need to operate using different logic for 1G and 10G. In 1G the FEC\_Overhead function is invoked to provide interframe delay, whereas in 10G the Carrier Sense signal is used.

Moreover, technical difficulties result from maintaining a unified OLT definition: The multipoint MAC control entity in figure 64-3 will not allow simultaneous transmissions on the 10G and 1G downstreams.

*Suggested Remedy*

- Create a new clause (based on current clause 64) to describe 10GEAPON MAC Control.
  - 10GEAPON MAC control is a revision of Clause 64 which enables coexistence on the same PON with an OLT an ONUs that comply with the 1G definition.
  - The 10G OLT and 1G OLT communicate at the level of the DBA and might happen to be implemented in the same physical device.
  - Initially, the new clause should point back at clause 64 except for the sections that have already been modified. Next, the Registration and control multiplexer state diagrams would be updated for 10G.
- Create an informational annex to describe coexistence of 1G and 10G on the same PON.

<i>Response</i>	<i>Response Status</i> W
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ACCEPT IN PRINCIPLE.

The proposed scope of changes is as follows:

- fall back with clause 64 to the version from IEEE 802.3-2005.
- create a new clause (tentative number 93) based on the existing document 3av\_c64\_1\_0.pdf
- create an ad hoc chartered with the creation of a prototype of solution #2 as presented in 3av\_0801\_kramer\_5.pdf, slide 3. Ad hoc participants: Marek, Jeff, Glen, Eric.

Cl 64 SC 64.1.2 P244 L49 # 344  
Lynskey, Eric Teknovus

Comment Type E Comment Status A

Changes have been made to Clause 64 which are not reflected by change bars in the document that was reviewed. One example can be found in the last paragraph on page 244. References to the 10G broadcast MAC have been added but no change bars appear to let the reviewer know that this is new text. Another example is 64.3.2.3 on page 263. I have not done a thorough search of the Clause to see if this occurs in additional places. Draft 0.91 does show the change bars here, so something was lost in the conversion from 0.91 to 1.0.

*SuggestedRemedy*

When D1.1 is created, do a diff between D1.1 and the latest version of Clause 64.

Response Response Status C

ACCEPT IN PRINCIPLE.

In D1.1, a new Clause 93 will be created containing MPCP for 10G EPON. Since it is a new clause, it will not be marked up with any change bars. In future releases of Clause 93, mark up bars will be used.

Changes to be introduced in Clause 93.

Cl 64 SC 64.1.2 P244 L51 # 345  
Lynskey, Eric Teknovus

Comment Type E Comment Status A

Method used to describe speed is inconsistent between clauses.

Clause 64 - 1 Gbit/s, 10 Gbit/s  
Clause 91 and 92 - 1000 Mb/s, 10 Gb/s

*SuggestedRemedy*

In Clause 64, replace all occurrences of 1 Gbit/s with 1000 Mb/s. Replace all occurrences of 10 Gbit/s with 10 Gb/s.

Response Response Status C

ACCEPT.

See comment #77.

Changes to be introduced in Clause 93.

Cl 64 SC 64.1.2 P244 L51 # 354  
Lynskey, Eric Teknovus

Comment Type T Comment Status A

The text seems to say that all 1Gb/s and 10Gb/s ONUs can be communicated to at once. It is not clear that one of these additional MACs is only for 1Gb/s ONUs and the other is only for 10Gb/s ONUs.

*SuggestedRemedy*

Reword sentence as follows, "One additional MAC is instantiated to communicate to all 1Gb/s ONUs and one additional MAC is instantiated to communicate to all 10Gb/s ONUs."

Response Response Status C

ACCEPT IN PRINCIPLE.

Proposed to reword to "Two additional MACs are instantiated: one MAC instance to communicate to all 1 Gb/s downstream ONUs and another MAC instance to communicate to 10 Gb/s downstream ONUs."

Cl 64 SC 64.1.2 P244 L51 # 77  
Marek, Hajduczenia Nokia Siemens Networ

Comment Type ER Comment Status A

This clause uses the term "Gbit/s" which is discouraged by the IEEE guidelines.

*SuggestedRemedy*

Replace all the terms "Gbit/s" with the "Gb/s" as appropriate for the IEEE 802.3 standard prepared for balloting.

Response Response Status C

ACCEPT.

Cl 64 SC 64.1.2 P244 L51 # 394  
Mandin, Jeff PMC Sierra

Comment Type E Comment Status A

802.3 convention is to use 'Gb/s' rather than 'Gbit/s'

*SuggestedRemedy*

Change every instance of 'Gbit/s' to 'Gb/s'

Response Response Status C

ACCEPT.

See comment #77.

Changes to be introduced in Clause 93.

**Cl 64**    **SC 64.1.2**                      **P245**        **L2**                      # 346  
Lynskey, Eric                                      Teknovus

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

We should not be adding new text to Clause 64 unless it is necessary.

*SuggestedRemedy*

Remove the word "compliant" from the sentence.

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

ACCEPT.

Remove the word "compliant" from the sentence.  
Changes to be introduced in Clause 93.

**Cl 64**    **SC 64.1.2**                      **P245**        **L2**                      # 78  
Marek, Hajduczenia                                      Nokia Siemens Networ

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

Terms "Single Copy Broadcast" and "Single-Copy Broadcast" are used interchangeably in the Clause. The term is defined more than once in the text.

*SuggestedRemedy*

Adop only one spelling of the full acronym - suggested to accept "Single Copy Broadcast (SBC). Remove multiple definitions in the text of Clause 64. Add definition of the term SCB to Clause 1.5.

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

ACCEPT.

The term "Single Copy Broadcast" will be used along with the respective acronym "SCB".  
The SCB should be introduced to Clause 1.5.

**Cl 64**    **SC 64.2.2.1**                      **P252**        **L30**                      # 388  
Kuroda, Yasuyuki                                      O F Networks Co., Ltd.

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

In 1Gb/s, "16 bit times" is 16ns that is equal to 1 time\_quantum. On the other hand, "16 bit times" in 10Gb/s is 1.6ns that is different from 1 time\_quantum. It includes discrepancy. While a time\_quantum for 10Gb/s signal should be defined, we propose that it is the same as the one for 1Gb/s.  
Since 1Gb/s signal co-exists with 10Gb/s signal in upstream, a common Timestamp for both 1Gb/s and 10Gb/s is required in order to avoid collision with each signal.

*SuggestedRemedy*

Delete "bit times".

The same correction should be done in the texts of guardThresholdONU (Cl. 64.2.2.1 Page:252 line:35)

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

ACCEPT IN PRINCIPLE.

Remove the reference to 16 bit times altogether i. e. (16 bit times).

The modified sentences will read as follows: "This constant holds the maximal amount of drift allowed for a timestamp received at the OLT. This value is measured in units of time\_quantum." and "This constant holds the maximal amount of drift allowed for a timestamp received at the ONU. This value is measured in units of time\_quantum."

**Cl 64**    **SC 64.2.2.1**                      **P252**        **L50**                      # 387  
Kuroda, Yasuyuki                                      O F Networks Co., Ltd.

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

Since the EPD is a byte in 64B/66B coding, the size of "tailGuard" is 27 bytes.

*SuggestedRemedy*

"VLAUE" should be 27.

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

ACCEPT.

Accept to be included in Clause 93, see comment #403.

Cl 64 SC 64.2.2.4 P255 L3 # 397  
Mandin, Jeff PMC Sierra

Comment Type T Comment Status A

ONU discovery logic requires that there be a 10G equivalent to the 1G FEC\_Overhead() function.

Burst init overhead (ie. leading IDLEs) should be included, and the value should be rounded up to the size of a full FEC block.

*SuggestedRemedy*

Insert Function definition:

10G\_PCS\_Overhead(length)

This function calculates the size of additional overhead to be added by the PCS and FEC encoders while transmitting a frame of size length. Parameter length represents the size of an entire frame including preamble, SFD, DA, SA Length/Type, and FCS. If the frame does not occupy an entire FEC block, the function result rounds up to the size of a complete FEC block. As well, the burst preamble is included in the overhead.

As specified in 49.2.4, the 66bit encoder adds 2 control bits for every 8 octets of data. As specified in 92.2.3.2, the FEC encoder adds 264 bits of parity and related control for every 216 data octets. The function returns the value of FEC overhead in units of time quanta.

The following formula is used to calculate the overhead:

$PCS\_Overhead = \text{Ceiling} [ [ [ [ \text{Ceiling}(\text{length}/216) ] * 318 ] + \text{preambleBits} ] / \text{BitTimesPerTQ} ] ]$

where PreambleBits == 66 and BitTimesPerTQ == 165

Response Response Status C

ACCEPT.

Cl 64 SC 64.3.2.3 P262 L19 # 15  
Ossman, Valentin PMC-Sierra

Comment Type T Comment Status A

There are mixed speed ONUs, for example 10Gbit/s downstream and 1Gbit/s upstream. The turrent text only refers in general to 10 or 1 Gbit/s ONUs while the distinction should be made on downstream speed only.

*SuggestedRemedy*

Add "downstream" twice in the sentence on line 19 of clause 64.3.2.3 to read like this:

"The SCB MAC instance associated with the LLID 7F-FF shall provide broadcast services for 1 Gbit/s downstream compliant ONUs, while SCB MAC instance associated with the LLID 7F-FE - for 10 Gbit/s downstream compliant ONUs."

Response Response Status C

ACCEPT IN PRINCIPLE.  
See comment #79.

Cl 64 SC 64.3.2.3 P262 L19 # 79  
Marek, Hajduczenia Nokia Siemens Networ

Comment Type TR Comment Status A

"The SCB MAC instance associated with the LLID 7F-FF shall provide broadcast services for 1 Gbit/s compliant ONUs," ... what does it mean that the ONU is 1 Gb/s compliant? It is too generic in the case of asymmetric data rate ONUs. The same comment goes to the sentence "SCB MAC instance associated with the LLID 7F-FE - for 10 Gbit/s compliant ONUs."

*SuggestedRemedy*

Suggestion to change the first sentence to "The SCB MAC instance associated with the LLID 7F-FF shall provide broadcast services for 1 Gbit/s DS capable ONUs," and the second one to "SCB MAC instance associated with the LLID 7F-FE - for 10 Gbit/s DS capable ONUs."

Response Response Status C

ACCEPT IN PRINCIPLE.  
Reword the sentence to "The SCB MAC instance associated with the LLID 7F-FF shall provide broadcast services for ONUs operating at 1 Gb/s in the downstream direction" and "SCB MAC instance associated with the LLID 7F-FE - for ONUs operating at 10 Gb/s in the downstream direction"

Cl 64 SC 64.3.2.4 P262 L38 # 389  
Kuroda, Yasuyuki O F Networks Co., Ltd.

Comment Type T Comment Status A

In 1Gb/s, "16 bit times" is 16ns that is equal to 1 time\_quantum.  
On the other hand, "16 bit times" in 10Gb/s is 1.6ns that is different from 1 time\_quantum.  
It includes discrepancy.  
While a time\_quantum for 10Gb/s signal should be defined,  
we propose that it is the same as the one for 1Gb/s.  
Since 1Gb/s signal co-exists with 10Gb/s signal in upstream,  
a common Timestamp for both 1Gb/s and 10Gb/s is required in order to  
avoid collision with each signal.

*SuggestedRemedy*

Replace "16 bit times" to "one time\_quantum".  
The same correction should be done in the following.  
- Grant #n Length (Cl. 64.3.6.1 Page:288 line:12)  
- Sync Time (Cl. 64.3.6.1 Page:288 line:26)  
- Sync Time (Cl. 64.3.6.4 Page:294 line:12)

Response Response Status C  
ACCEPT.

Cl 64 SC 64.3.3 P264 L1 # 111  
Remein, Duane Alcatel-Lucent

Comment Type ER Comment Status A

Figure 64-15 is marked as being changes but there is no obvious change.  
Figure 64-32 and surrounding text (Pg 287 & 288) appears to have changed substantially  
but is not marked as changed.  
Numerous other changes appear to be improperly marked.

*SuggestedRemedy*

Issue Draft 1.1 with all changes marked as compared to c64 from 2005 version of the  
standard.

Response Response Status W  
ACCEPT IN PRINCIPLE.  
See comment # 344.

Cl 64 SC 64.3.3.6 P272 L45 # 87  
Marek, Hajduczenia Nokia Siemens Networ

Comment Type TR Comment Status A

Error in the state machine for the Discovery Processing OLT Register State Diagram:  
"data\_tx[88:96] < pending\_grants" - it would suggest that pending\_grants is 9 bits wide (88,  
89, ... 96). It is defined as 8 bits wide.

*SuggestedRemedy*

Change to "data\_tx[88:95] < pending\_grants".

Response Response Status C  
ACCEPT.

Cl 64 SC 64.3.6.1 P288 L19 # 402  
Mandin, Jeff PMC Sierra

Comment Type T Comment Status A

Labels in "Discovery Information Field" could be more informative

*SuggestedRemedy*

In bullet e) [line 19] and in Table 64-1

\* Change each instance of "OLT is 10G/1G capable" to "OLT supports both 10G and 1G  
upstreams"

\* Change each instance of "OLT is opening 1G discovery window" to "OLT can receive at 1  
Gb/s in this window".

\* Change each instance of "OLT is opening 10G discovery window" to "OLT can receive at  
10 Gb/s in this window"

Response Response Status C

ACCEPT IN PRINCIPLE.  
Change "OLT is 10G/1G capable" to "OLT supports both 10 Gb/s and 1Gb/s in the upstream  
direction".  
Change "OLT is not 10G/1G capable" to "OLT does not support both 10 Gb/s and 1Gb/s in  
the upstream direction".  
Change "OLT is opening 1G discovery window" to "OLT can receive 1 Gb/s data in this  
window."  
Change "OLT is opening 10G discovery window" to "OLT can receive 10 Gb/s data in this  
window."  
Change "OLT is not opening 1G discovery window" to "OLT cannot receive 1 Gb/s data in  
this window."  
Change "OLT is not opening 10G discovery window" to "OLT cannot receive 10 Gb/s data in  
this window."

Cl 64 SC 64.3.6.1 P288 L31 # 116  
 Remein, Duane Alcatel-Lucent

Comment Type TR Comment Status A

The word "optional" appears to be struck from the sentence "The size of this field depends on the used Grant #n Length/Start Time entry-pairs as well as the presence of the optional Discovery Information field."

The presents of the Discovery Information field is indeed optional as existing PMDs will not have this field explicitly defined (true default values align with proper definition of the field but that's just good engineering).

SuggestedRemedy

Include the word "optional" in the referenced sentence.

Response Response Status C

This comment was WITHDRAWN by the commenter.

Cl 64 SC 64.3.6.1 P288 L7 # 347  
 Lynskey, Eric Teknovus

Comment Type T Comment Status A Deferred

Figure 64-33 should be changed so that only a single frame is shown with all fields. Similar to the Sync Time field, the Discovery Information field is only transmitted in Discovery GATE messages. There is no need to show a separate figure for this. Now, what may be of value is showing a complete 1 Gb/s GATE and a separate but complete 10 Gb/s GATE message.

SuggestedRemedy

Option 1: Remove Figure 64-33(b) and add Discovery Information to (a).  
 Option 2: Update Figure 64-33(b) so that it shows a generic Discovery GATE. This can be done by fixing the Grant Start time (4), Grant length (2), and Sync Time(2) to the correct values and by showing that the Discovery Information (0/1) field may or may not be present.  
 Option 3: Show complete and separate 1 Gb/s and 10 Gb/s GATE frames.

Response Response Status W

ACCEPT IN PRINCIPLE.  
 Clause 93 will include a 10 Gb/s GATE MPCPDU only (with Discovery Information field) -  
 Option 1. Figure 64-32 is probably referred to - see 3av\_c64\_d1\_0\_markup.pdf.

Cl 64 SC 64.3.6.1 P289 L # 348  
 Lynskey, Eric Teknovus

Comment Type E Comment Status A

There is a duplication of text between the description and Table 64-2.

SuggestedRemedy

Replace bullet "e" with the following, "Discovery Information. This is an 8 bit flag register present in 10 Gb/s capable devices. Table 64-2 presents the internal structure of the Discovery Information flag field."

Response Response Status C

ACCEPT IN PRINCIPLE.  
 Changes to be introduced in Clause 93.  
 Change the text to "Discovery Information. This is an 16 bit flag register (see comment #91). Table 93-2 presents the internal structure of the Discovery Information flag field."

Cl 64 SC 64.3.6.1 P289 L23 # 355  
 Lynskey, Eric Teknovus

Comment Type T Comment Status A

Like the Sync Time field, the Discovery Information field is only present when the gate is a discovery gate.

SuggestedRemedy

Copy the last sentence of bullet "f" to the end of bullet "e". "This field is present only when the gate is a discovery gate, as signaled by the Discovery flag and is not present otherwise."

Response Response Status C

ACCEPT IN PRINCIPLE.  
 Changes to be included in Clause 93.  
 Strike out the text "while it is not present in 1G Discovery GATE MPCPDU" from bullet e).  
 See comment #403.

Cl 64 SC 64.3.6.1 P289 L30 # 349  
Lynskey, Eric Teknovus

Comment Type T Comment Status A

The changes to bullet item "g" are not necessary and make the text more confusing. Stating the minimum and maximum values of Pad/Reserved for all possible types of GATE frames is sufficient. As written, this text is also inconsistent with Figure 64-33(b), which shows fields with variable lengths.

*SuggestedRemedy*

Remove changes to bullet "g".

Response Response Status C

ACCEPT IN PRINCIPLE.

Changes to be included in Clause 93.

See comment #403.

Replace the contents of bullet g) with "Pad/Reserved. This is an empty field that is transmitted as zeros, and ignored on reception when constructing a complying MPCP protocol implementation. The size of this field depends on the used Grant #n Length/Start Time entry-pairs as well as the presence of the Sync Time and Discovery Information fields, and varies in length from 13 – 39 accordingly."

Cl 64 SC 64.3.6.1 P290 L10 # 356  
Lynskey, Eric Teknovus

Comment Type T Comment Status A

It is not clear what bit 0 is used for in Table 64-2. A 10G OLT can be capable of 1G upstream, 10G upstream, or both 1G and 10G upstream. These three modes of operation need two bits to be fully described.

*SuggestedRemedy*

Rename bit 0 to "OLT receiver is capable of 1Gb/s".

Insert new bit 1 to be "OLT receiver is capable of 10Gb/s".

Shift existing bits 1 and 2 to 2 and 3.

Response Response Status C

ACCEPT IN PRINCIPLE.

Commenter refers to Table 64-1.

Changes to be included in Clause 93.

See comment #403.

Use the solution presented in #91 - the Discovery Information field in GATE MPCP DU will be identical to the one proposed in #91.

Cl 64 SC 64.3.6.3 P292 L # 86  
Marek, Hajduczenia Nokia Siemens Network

Comment Type TR Comment Status A

This particular Clause as well as Clause 64.3.6.4 need to be updated to reflect baseline proposal 30 as defined at <http://www.ieee802.org/3/av/public/baseline.html>. Currently Clause 64 does not include the adjustable Laser on/off times.

*SuggestedRemedy*

Add 2 new points in Clause 64.3.6.3 before the existing point e) (tentative names e-1, e-2) with the following text: "Laser On Time. This field is 1 byte long and carries the Laser On Time characteristic for the given ONU transmitter. The value is expressed in the units of TQ." and "Laser Off Time. This field is 1 byte long and carries the Laser Off Time characteristic for the given ONU transmitter. The value is expressed in the units of TQ."

Add 2 new points in Clause 64.3.6.4 before the existing point g) (tentative names g-1, g-2) with the following text: "Echoed Laser On Time. This field is 1 byte long and carries the Laser On Time characteristic for the given ONU transmitter. The value is expressed in the units of TQ. The value is delivered to the ONU for confirmation purposes only and its utilization is not prescribed in this specification." and "Echoed Laser Off Time. This field is 1 byte long and carries the Laser Off Time characteristic for the given ONU transmitter. The value is expressed in the units of TQ. The value is delivered to the ONU for confirmation purposes only and its utilization is not prescribed in this specification."

Update Figure 64-34 and Figure 64-35 to include information on the Laser On Time / Laser Off Time and Echoed Laser On Time / Echoed Laser Off Time fields, respectively (each 1 byte long). Update the size of the Pad fields for both Figure 64-34 and Figure 64-35 to 36 / 35 and 32 respectively.

Update the Pad field description in Clause 64.3.6.3 to "Pad/Reserved. This is an empty field that is transmitted as zeros, and ignored on reception when constructing a complying MPCP protocol implementation. The size of the Pad/Reserved field depends on the presence of the Discovery Information flag field - it is equal to 36 when the said field is absent and 35 when present."

Update the state machines for Discovery Processing in the ONU on:

Figure 64-23:

```
Box: REGISTER_REQUEST:
data_tx[0:15] < REGISTER_REQ
data_tx[48:55] < status
data_tx[56:63] < pendingGrants
data_tx[64:71] < laserOnTime
data_tx[72:79] < laserOffTime
```

Figure 64-20

```
Box SIGNAL
flags < data_rx[48:55]
pending_grants < data_rx[56:63]
laserOnTime < data_tx[64:71]
laserOffTime < data_tx[72:79]
```



status < incoming

Figure 64-21  
 Box REGISTER  
 data\_tx[48:63] < LLID  
 data\_tx[64:71] < status  
 data\_tx[72:87] < syncTime  
 data\_tx[88:95] < pending\_grants (corrected version is already included, see my common number 15)  
 data\_tx[96:103] < laserOnTime  
 data\_tx[104:111] < laserOffTime

Add definitions of the variables in the Clause 64.3.3.2:

laserOnTime, type 32 bit unsigned, This variable holds the time required to turn on the ONU PMD. It counts in time\_quanta units the time period required for turning on the PMD, as specified in 60.7.13.1. VALUE: 00-00-00-20 (512 ns) - default

laserOffTime, type 32 bit unsigned, This variable holds the time required to turn off the ONU PMD. It counts in time\_quanta units the time period required for turning on the PMD, as specified in 60.7.13.1. VALUE: 00-00-00-20 (512 ns) - default

remove entries for the constants laserOnTime and laserOffTime in Clause 64.3.5.1.

*Response* *Response Status* **C**  
 ACCEPT IN PRINCIPLE.  
 Changes applicable to Clause 93.  
 See comment #403.

**Cl 64** **SC 64.3.6.3** **P292** **L32** # 100  
 Remein, Duane Alcatel-Lucent

*Comment Type* **T** *Comment Status* **R**  
 Discovery Information is optional (marked deleted) in sentence "The size of the Pad/Reserved field depends on the presence of the optional Discovery Information flag field - it is equal to 38 when the said field is absent and 37 when present."

*SuggestedRemedy*  
 Include the word "optional" in the referenced sentence.

*Response* *Response Status* **C**  
 This comment was WITHDRAWN by the commenter.

**Cl 64** **SC 64.3.6.3** **P292** **L37** # 91  
 Ryan, Hirth Teknovus

*Comment Type* **T** *Comment Status* **A**  
 MH: Table 64-5 is affected  
 An ONU may be 10G only upstream capable, 1G only upstream capable, or 10G or 1G upstream capable. The Flag Field should include 2 bits to describe the upstream capability: One for 10G upstream capable, and one for 1G upstream capable.

*SuggestedRemedy*  
 add bit "ONU is 10G upstream capable" and "ONU is 1G upstream capable". remove "ONU is 10G/1G upstream capable"

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

Change the size of the Discovery Information field to 16 bits (2 bytes).

Change the Discovery Information field as presented below:

- bit 0: ONU is 1G upstream capable
- bit 1: ONU is 10G upstream capable
- bit 2: reserved
- bit 3: reserved
- bit 4: 1G registration attempt
- bit 5: 10G registration attempt
- bit 6: reserved
- bit 7: reserved
- ...
- bit 15: reserved

**Cl 64** **SC 64.3.6.3** **P293** **L41** # 357  
 Lynskey, Eric Teknovus

*Comment Type* **T** *Comment Status* **A** *Deferred*  
 It is not clear what bit 0 is used for in Table 64-6. A 10G ONU can be capable of 1G upstream, 10G upstream, or both 1G and 10G upstream. These three modes of operation need two bits to be fully described.

*SuggestedRemedy*  
 Rename bit 0 to "ONU transmitter is capable of 1Gb/s".  
 Insert new bit 1 to be "ONU transmitter is capable of 10Gb/s".  
 Shift existing bits 1 and 2 to 2 and 3.

*Response* *Response Status* **W**  
 ACCEPT IN PRINCIPLE.  
 Commenter refers to Table 64-5.  
 For resolution, see comment #91.

**Cl 64**    **SC 64.3.6.3**                      **P294**        **L5**                      # 337  
Lynskey, Eric                                      Teknovus

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

Spilt Figure 64-35 into a 1 Gb/s REGISTER\_REQ and a 10 Gb/s REGISTER\_REQ instead of a general one and one with Discovery Information field. This will also make things easier if other changes are needed.

**SuggestedRemedy**

Have separate 1Gb/s and 10 Gb/s figures.

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

ACCEPT IN PRINCIPLE.

Figure 64-34 is meant (see 3av\_c64\_d1\_0.pdf).

There will be only one figure as presented in Figure 64-34(b).

Changes applicable to Clause 93.

**Cl 91**        **SC 91**                                      **P121**        **L11**                      # 270  
Dawe, Piers                                      Avago Technologies

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

Draft says 'All insertions to the original text of the clause are marked with change bars and presented in underlined blue colour.'

**SuggestedRemedy**

Insertions/deletions to previous draft of the clause should be presented in underlined blue or cross-through red. Insertions/deletions to base document, if not new for this draft, should be underlined or cross-through black.

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

ACCEPT IN PRINCIPLE.

Since this is a new clause, only insertions / deletions to previous draft of the clause should be presented in underlined blue or cross-through red.

**Cl 91**        **SC 91**                                      **P121**        **L2**                      # 267  
Dawe, Piers                                      Avago Technologies

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

802.3 uses b/s not bps

**SuggestedRemedy**

Global search for bps and replace with b/s

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

ACCEPT.

See comment #77.

**Cl 91**        **SC 91**                                      **P121**        **L6**                      # 268  
Dawe, Piers                                      Avago Technologies

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

amendment/corrigendum

**SuggestedRemedy**

amendment

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

ACCEPT.

See comment #121.

**Cl 91**        **SC 91**                                      **P121**        **L7**                      # 269  
Dawe, Piers                                      Avago Technologies

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

802.3-2005

**SuggestedRemedy**

802.3-200x (should become 2008 later). If 802.3av has changed Clause 64, keep in step.

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

ACCEPT IN PRINCIPLE.

Based on comment #403, Clause 64 will not be modified in 802.3av. Once 802.3av is approved, 802.3av will use the latest available Clause 64.

**Cl 91**        **SC 91.1**                                      **P121**        **L34**                      # 117  
Kramer, Glen                                      Teknovus, Inc.

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

Do not use gratuitous acronyms

**SuggestedRemedy**

Throughout the clause relpace

PBC = power budget class

DS = downstream

US = upstream

Remove editorial note #1

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

ACCEPT.

**Cl 91**    **SC 91.1**                      **P121**        **L34**                      # 121  
Kramer, Glen                                      Teknovus, Inc.

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

Introduction text introduces many concepts out of order, e.g., Asymmetric and symmetric PMD definitions are given after they are used. Repeated definitions for U- and D- suffix. Introductions of power budgets and PMDs are all mixed together.

**SuggestedRemedy**

Replace text in sections 91.1 and 91.3 with sections 91.1 and 91.2 in the attached document 3av\_0801\_kramer\_1.pdf.

Relocate sections 91.1.4 and 91.1.5 in C91 D1.0 under the section 91.3 PMD Functional Specifications (see outline shown in 3av\_0801\_kramer\_1.pdf).

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

ACCEPT IN PRINCIPLE.  
Replace 'Gbps' with 'Gb/s'.  
Line rates should be expressed in GBd not in Gbps.  
Remove '(Option Layout 1)'.

**Cl 91**    **SC 91.1**                      **P121**        **L35**                      # 266  
Dawe, Piers                                      Avago Technologies

**Comment Type**    **E**                                      **Comment Status**    **R**

PBC names PR10, PR20 and PR30 / PRX10, PRX20 and PRX30 could be shorter. The power budget class can be the same whatever the signaling rate. See other comments.

**SuggestedRemedy**

P1, P2 and P3 ?

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

REJECT.  
See motion #5 from the November 2007 meeting.

**Cl 91**    **SC 91.1**                      **P121**        **L38**                      # 73  
Marek, Hajduczenia                                      Nokia Siemens Networ

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

Based on the stipulations of the IEEE 206.1-2004 maintained by SCC14, 10 Gbps should not be used in the IEEE standards ready for the sponsoer ballot stage. 10 Gb/s should be used instead

**SuggestedRemedy**

Replace all "10 Gbps" with "10 Gbit/s" in clauses 64, 91 and 92.

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

ACCEPT.  
See comment #77.

**Cl 91**    **SC 91.1**                      **P121**        **L42**                      # 271  
Dawe, Piers                                      Avago Technologies

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

New abbreviations (actually, DS has been used occasionally already)

**SuggestedRemedy**

Don't put them here, put them in your Clause 1 draft (there'll be more). Explain that US and DS mean directions of transmission, not positions. Do you want to add PBC?

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

ACCEPT IN PRINCIPLE.  
See comment #117.

**Cl 91**    **SC 91.1**                      **P121**        **L44**                      # 273  
Dawe, Piers                                      Avago Technologies

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

Trying to introduce confusing terminology

**SuggestedRemedy**

In an Ethernet PON, a single downstream (D) or 'OLT' PMD broadcasts in the downstream direction (DS) to multiple upstream (U) or 'ONU' PMDs and, in the upstream direction (US), receives bursts from each 'U' PMD over a single branched topology, single-mode fiber network.

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

ACCEPT IN PRINCIPLE.  
See comment # 121.

**Cl 91**    **SC 91.1**                      **P121**        **L46**                      # 272  
Dawe, Piers                                      Avago Technologies

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

New train of thought

**SuggestedRemedy**

Start a new paragraph with 'This clause specifies'

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

ACCEPT IN PRINCIPLE.  
See comment # 121.

**Cl 91**    **SC 91.1**                      **P121**    **L48**                      # 300  
Dawe, Piers                                      Avago Technologies

**Comment Type T**                      **Comment Status D**                      **Deferred**

Using / in a name is probably a bad idea, unless you really do mean dual mode like 10/100 Ethernet for twisted pair - and this draft doesn't.

**SuggestedRemedy**

Could use underscore instead. (Could we be more creative to make the names shorter e.g. 11GBASE....?)

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

PROPOSED REJECT.  
Underscore can be discussed by the TF. We have motions #5 and #6 approved by the TF - see the document at [http://www.ieee802.org/3/av/public/2007\\_11/3av\\_0711\\_minutes\\_unapproved.pdf](http://www.ieee802.org/3/av/public/2007_11/3av_0711_minutes_unapproved.pdf) for details. The idea of 11GBASE was discussed and rejected since the resulting link operates at 10G DS and 1G US and not 11G in the same direction(s), what would be suggested by the name. 10/1GBASE was found to be more informative.

**Cl 91**    **SC 91.1**                      **P121**    **L48**                      # 274  
Dawe, Piers                                      Avago Technologies

**Comment Type E**                      **Comment Status R**

If these names are too long, the 'BASE' is not accurate anyway. It doesn't mean baseband (for an optical link), but does signify Ethernet.

**SuggestedRemedy**

Could replace 'BASE' by 'E'. E.g. 10GE-PR-U1

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

REJECT.  
See comment #300.

**Cl 91**    **SC 91.1**                      **P122**    **L1**                      # 301  
Dawe, Piers                                      Avago Technologies

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

PBCs are not just mappings, they define the optical distribution network in three grades

**SuggestedRemedy**

This clause specifies the following PMDs:

...  
(including MDI), and three PBCs of the single-mode fiber medium.

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

ACCEPT IN PRINCIPLE.  
See comment #121.

**Cl 91**    **SC 91.1**                      **P122**    **L1**                      # 164  
Lin, Rujian                                      Shanghai Luster Terab

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

A 10GBASE-PR-UxDx PMD, 10GBASE-PR-DxUx PMD.

**SuggestedRemedy**

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

ACCEPT IN PRINCIPLE.  
See comment #304.

**Cl 91**    **SC 91.1**                      **P122**    **L1**                      # 304  
Dawe, Piers                                      Avago Technologies

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

10GBASE-PR-Ux: I think this is the only paragraph where this syntax is used. As we use X for something else, 10GBASE-PR-U would be better, more like what has been done in previous clauses.

**SuggestedRemedy**

Or can '10GBASE-PR-Ux PMD, 10GBASE-PR-Dx PMD, 10/1GBASE-PRX-Dx PMD or 10/1GBASE-PRX-Ux PMD' be condensed to '10GBASE-PR or 10/1GBASE-PRX PMD'?

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

ACCEPT IN PRINCIPLE.  
See comment #121.

**Cl 91**    **SC 91.1**                      **P122**    **L18**                      # 165  
Lin, Rujian                                      Shanghai Luster Terab

**Comment Type E**                      **Comment Status R**

as a PMD transmitting and receiving at the same data rate

**SuggestedRemedy**

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

REJECT.  
Unclear comment and lack of suggested remedy.

**Cl 91**    **SC 91.1**                      **P122**    **L19**                      # 303  
 Dawe, Piers                              Avago Technologies

**Comment Type**    **T**                      **Comment Status**    **A**  
 Not data rate

**SuggestedRemedy**  
 signalling (preferred) or signaling rate (twice in this sentence). 'data streams' can become 'bit streams'.

**Response**                              **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.  
 See comment #121.

**Cl 91**    **SC 91.1**                      **P122**    **L20**                      # 166  
 Lin, Rujian                              Shanghai Luster Terab

**Comment Type**    **E**                      **Comment Status**    **R**  
 as a PMD transmitting and receiving at different data rates

**SuggestedRemedy**

**Response**                              **Response Status**    **C**  
 REJECT.  
 Unclear comment and lack of suggested remedy.

**Cl 91**    **SC 91.1**                      **P122**    **L23**                      # 276  
 Dawe, Piers                              Avago Technologies

**Comment Type**    **E**                      **Comment Status**    **A**  
 This could be made easier to read, from:  
 Typically, in DS, 10GBASE-PR-D3 and 10/1GBASE-PRX-D3 PMDs use the 1574 - 1580 nm band, while 10GBASE-PR-D1, 10GBASE-PR-D2, 10/1GBASE-PRX-D1 and 10/1GBASE-PRX-D2 PMDs use the 1580 - 1600 nm band to transmit data. In US, 10GBASE-PR-U1 and 10GBASE-PR-U3 PMDs use the 1260 - 1280 nm band, while 10/1GBASE-PRX-U1, 10/1GBASE-PRX-U2 and 10/1GBASE-PRX-U3 PMDs use the 1260 - 1360 nm band to transmit data.  
 to:

**SuggestedRemedy**  
 Typically, in DS, 10GBASE-PR-D3 and 10/1GBASE-PRX-D3 PMDs (D3 PMDs) use the 1574 - 1580 nm band, while D1 and D2 PMDs use the 1580 - 1600 nm band to transmit data. In US, 10GBASE-PR PMDs use the 1260 - 1280 nm band, while 10/1GBASE-PRX PMDs use the 1260 - 1360 nm band to transmit data.

**Response**                              **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.  
 See comment #121.

**Cl 91**    **SC 91.1**                      **P122**    **L23**                      # 101  
 Remein, Duane                              Alcatel-Lucent

**Comment Type**    **E**                      **Comment Status**    **A**  
 Use of the abbreviation "DS" degrades readability in the phrase Typically, in DS, 10GBASE-PR-D3 and 10/1GBASE-PRX-D3 PMDs use

**SuggestedRemedy**  
 Replace DS with the words "down stream" and add the word "direction" so the phrase becomes "Typically, in the down stream direction, 10GBASE-PR-D3 and 10/1GBASE-PRX-D3 PMDs use ..."

Globally apply to document

**Response**                              **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.  
 "Downstream" is defined in Clause 1.4 and not "Down stream". See comment #117.

**Cl 91**    **SC 91.1**                      **P122**    **L3**                      # 275  
 Dawe, Piers                              Avago Technologies

**Comment Type**    **E**                      **Comment Status**    **A**  
 10/1GBASE-PR PMA

**SuggestedRemedy**  
 10GBASE-PR or 10/1GBASE-PRX PMA ?

**Response**                              **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.  
 Change the text "10GBASE-PR-Ux PMD, 10GBASE-PR-Dx PMD, 10/1GBASE-PRX-Dx PMD or 10/1GBASE-PRX-Ux PMD is connected to the appropriate 10/1GBASE-PR PMA of Clause 92, and to the medium through the MDI." to "10GBASE-PR-D, 10GBASE-PR-U and 10/1GBASE-PRX-D PMDs are connected to the appropriate Clause 92 PMA while 10/1GBASE-PR-U PMD is connected to appropriate Clause 65 PMA, and to the medium through the MDI."

Cl 91 SC 91.1 P122 L33 # 167  
Lin, Rujian Shanghai Luster Terab

Comment Type E Comment Status A  
which transmit in these directions and receive in the opposite directions.

SuggestedRemedy

Response Response Status C

ACCEPT IN PRINCIPLE.  
Line 53 is probably referenced .  
Suggest to change "The suffixes D and U indicate the PMDs at each end of a link which transmit in these directions and receive in the opposite directions." to "The suffixes D and U indicate the PMDs at each end of a link and the direction to which they transmit i.e. a D PMD transmits towards the ONUs and the U PMD transmits towards the OLT."  
See comment #121.

Cl 91 SC 91.1 P122 L34 # 306  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A  
Draft says: 'The splitting ratio or reach length is increased in symmetric 10 Gbps / asymmetric 10 / 1 Gbps capable PONs thanks to application of FEC enabled link.' Unless FEC is optional, or absent in e.g. PBC PR10 or PRX10, increased as compared with what? What is the status of FEC on the 1G side?

SuggestedRemedy

You might want to add an FEC row to tables 91-1 and 91-2. Rewrite this sentence: here's just a suggestion 'Forward error correction (FEC) is used in the situations specified in Table ... to obtain a low error rate at the PHY service interface in spite of a high splitting ratio or reach. FEC for 10GBASE-PR and 10/1GBASE-PRX is defined in 92.2 and 65.2. FEC is used in 10GBASE-PR-2 and 10GBASE-PR-3 links and is optional for 10GBASE-PR-1 links. ... FEC is optional for the 1 Gb/s side (or whatever is decided)

Response Response Status C

ACCEPT IN PRINCIPLE.  
Add footnotes to "Bit error ratio (max)" parameter in Table 91-10, 91-17 the following text "The BER of  $10^{-12}$  is achieved by the utilization of FEC as described in Clause 92.2."

Cl 91 SC 91.1 P122 L35 # 168  
Lin, Rujian Shanghai Luster Terab

Comment Type E Comment Status R  
10/1 Gbps capable PONs

SuggestedRemedy

Response Response Status C

REJECT.  
Unclear comment and lack of suggested remedy.

Cl 91 SC 91.1 P122 L38 # 182  
Lin, Rujian Shanghai Luster Terab

Comment Type T Comment Status D Deferred  
Two optional temperature ranges are defined, see 91.8.4 for further details. Implementations may be declared as compliant over one or both complete ranges.

SuggestedRemedy  
Add temperature statement.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.  
Adopt the text in the editorial note. Replace reference to 91.8.4 with reference to 60.8.4.  
Accept the proposed response  
Yes: \_14\_  
No: \_6\_  
Abstain: \_10\_  
Motion fails

Straw poll:  
\_16\_ 1) I prefer to keep reference to 60.8.4  
\_11\_ 2) I prefer to remove mention of the temperature ranges from Clause 91  
\_0\_ 3) I prefer to define new temperature ranges (different than 60.8.4)

Cl 91 SC 91.1 P122 L48 # 307  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Note 6 says: Verify what is meant by the 'Maximum channel insertion loss' row in the Table 91-1 - only ChIL with no penalties, ChIL with penalties or total power budget. This is confusing in IEEE 802.3ah.'

I'm not confused about this. See '1.4.95 channel insertion loss: As used in IEEE 802.3 Clause 38 for fiber optic links, the static loss of a link between a transmitter and receiver. It includes the loss of the fiber, connectors, and splices.'

Insertion loss of the Fiber optic cabling (Channel) is the ratio of the light that would come out of the ODN including patchcords at one MDI to the light injected at another MDI, using normal loss test set methods at the usual measurement wavelengths (1310 or 1550 nm). As Clause 60 says, 'the channel insertion loss includes the loss for connectors, splices and other passive components such as splitters'. Penalties such as transmitter penalty or dispersion penalties, are not loss, although they are part of the 'budget' the 802.3 way.

*SuggestedRemedy*

Remove the note. Create a new 91.8 'Definitions of optical parameters and measurement methods', and a sub-subclause 'Insertion loss', contents 'Insertion loss for SMF Fiber optic cabling (Channel) is defined at 1310 or 1550 nm. A suitable test method is described in ... [provide ITU-T or IEC reference].'

Start a 1.4.n section of the draft. Modify 1.4.95 channel insertion loss: As used in IEEE 802.3 Clause 38, Clause 52, Clause 53, Clause 58, Clause 59, Clause 60, Clause 68 and Clause 91 for fiber optic links, the loss of light through a link between a transmitter and receiver. It includes the loss of the fiber, connectors, and splices. (See IEEE Std 802.3, Clause 91.8.n.)

Other clauses from 9 onwards use the term; do they mean the same?

Response Response Status C

ACCEPT.

Cl 91 SC 91.1 P122 L7 # 302  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Draft says: NOTE-PMDs defined in this Clause support the coexistence with Clause 60 PMDs as described in detail in informative Annex A1. I'm surprised that there isn't a coexistence objective. I think that clearly and normatively defining what coexistence is supported/unadvisable/beyond the scope... between GEAPON and 10GEAPON is a required piece of 802.3av. If you want to make further material about coexistence with ITU PON or video overlay, informative, that's more justifiable.

*SuggestedRemedy*

Create a coexistence table. Later as the Clause 30 management attributes and clause 45 registers are worked out, the draft will have to be much more clear about static and dynamic dual-speed capabilities.

Response Response Status C

ACCEPT IN PRINCIPLE.

Create Annex 91A containing the description of the coexistence related issues.

TYPE: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general

COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn

SORT ORDER: Clause, Subclause, page, line

Cl 91 SC 91.1 P122 L7 # 277  
Dawe, Piers Avago Technologies

Comment Type E Comment Status A

It might be Clause 91, but not 'this Clause'

*SuggestedRemedy*

this clause. Global search and replace.

Response Response Status C

ACCEPT.

Cl 91 SC 91.1 P123 L10 # 280  
Dawe, Piers Avago Technologies

Comment Type E Comment Status R

'Number of fibers' doesn't seem right for a PON: there isn't just one fibre

*SuggestedRemedy*

Number of fibers at a MDI?

Response Response Status C

REJECT.

Between the OLT Tx and ONU Rx there is always only one fibre path, even though physically the PON plant features a splitter which can fan out 2+ fibres from a single trunk fibre. From the point of view of the ONU/OLT transceivers, there is always only one fibre, unlike in P2PE where the same wavelengths are used to Rx and Tx thus requiring two separate fibers.

Cl 91 SC 91.1 P123 L14 # 65  
Marek, Hajduczenia Nokia Siemens Networ

Comment Type T Comment Status A

10GBASE-PR-U3/D3 is stated as working with the minimum range of 0.5 m to at least 20 km. This was not voted on - the U3/D3 PMDs should operate with the 29 dB ChIL, whereas the nominal reach for this power class is not defined. The same comment applies to line 37 on the same page.

*SuggestedRemedy*

Remove the reference to the minimum range for the PR30 PBC and state only the minimum range of 0.5 m. The same remedy is suggested for line 37.

Response Response Status C

ACCEPT IN PRINCIPLE.

See comment #66 and #121.

**Cl 91**    **SC 91.1**                      **P123**            **L14**            # 66  
Marek, Hajduczenia                      Nokia Siemens Networ

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

What does the "minimum range" mean? There is no clear definition of this term?

**SuggestedRemedy**

Define the term "minimum range" below Table 91-1 and Table 91-2.

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

ACCEPT IN PRINCIPLE.

See document 3av\_0801\_kramer\_3.pdf for the new format of Table 91-1.

**Cl 91**    **SC 91.1**                      **P123**            **L16**            # 330  
Dawe, Piers                                      Avago Technologies

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

If all the channel insertion loss will be splitting loss, the losses at 1270 and 1590/1577 nm will be much the same as each other (does connector loss depend on wavelength?). But if a significant part of the insertion loss will be distance-based fibre attenuation, the loss at 1590/1577 nm will be less than at 1270 nm. GEAPON has a 0.5 dB difference.

**SuggestedRemedy**

Is the same appropriate here?

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

REJECT.

The calculated difference between the 1270 nm and 1590/1577 nm window loss is around 0.3 dB for 20 km link. The values included in the Tables 91-1 and 91-2 are consistent with the maximum channel insertion loss for either DS or US, whichever is greater (typically, the 1270 nm is greater and limits the system reach). In such a case, the DS will be overprovisioned by the said 0.3 dB.

**Cl 91**    **SC 91.1**                      **P123**            **L16**            # 309  
Dawe, Piers                                      Avago Technologies

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

A link consisting of 10GBASE-PR-U1 and 10GBASE-PR-D2 would be PR20, max/min loss 24/10 dB, not 5/20 as shown? I think insertion loss classes map 1:1 to the PBCs but not to the PMDs.

**SuggestedRemedy**

Remove the range and loss rows from table 91-1 and 91-2 and move them to 91-4 and 91-5. You might then want to present 91.3 before these tables. Add rows for these tables for which PBCs these PMDs can be used with: more than one option sometimes depending on PMD at the other end.

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

ACCEPT IN PRINCIPLE.

See comment #121 and #66.

**Cl 91**    **SC 91.1**                      **P123**            **L18**            # 410  
Chang, Frank                                      Vitesse

**Comment Type TR**            **Comment Status D**                      *Deferred*

The temperature ranges should be pointed out in the Overview, which is critical in making sure the task force is defining the worst-case specs with the consideration of specific environment conditions.

**SuggestedRemedy**

Add what is similar to 60.1, referring to 60.8.4 for further details. The Task force take action to define the case temperature classes similar to Table 60-13.

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

PROPOSED ACCEPT IN PRINCIPLE.

See comment #182.

**Cl 91**    **SC 91.1**                      **P123**            **L20**            # 113  
Remein, Duane                                      Alcatel-Lucent

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

Table 91-1 note b is incorrect. If FEC is already accounted for then minimum range will not be increased by "extended" FEC.

Same comment on table 91-2.

**SuggestedRemedy**

Remove phrase "The upper bound on minimum range may be increased by application on extended FEC." from note b.

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

ACCEPT IN PRINCIPLE.

See comment #66.

**Cl 91**    **SC 91.1**                      **P123**            **L21**            # 4  
Lynskey, Eric                                      Teknovus

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

In Table 91-1 and Table 91-2 footnote B, it mentions that two types of FEC are supported. The Task Force has not made this decision, and as of now, only a single FEC, RS(255, 223), has been voted on.

**SuggestedRemedy**

Remove the second sentence of footnote B for both tables.

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

ACCEPT IN PRINCIPLE.

See comment #66.

(Resolved at November 2007 TF meeting)



**Cl 91**    **SC 91.1**                      **P123**        **L21**                      # 308  
Dawe, Piers                                      Avago Technologies

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

'The upper bound on minimum range may be increased by application on extended FEC.:  
What 'extended FEC.'

**SuggestedRemedy**

Unless a stronger FEC variant appears in the draft, delete the sentence.

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

ACCEPT.  
See comment #66.

**Cl 91**    **SC 91.1**                      **P123**        **L22**                      # 76  
Marek, Hajduczenia                                      Nokia Siemens Networ

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

"The quoted minimum range values already account for FEC gain. The upper bound on minimum range may be increased by application on extended FEC." - extended FEC is already used in the form of the RS(255,233,8). The statement is inconsistent with the baseline nr. 29 on <http://www.ieee802.org/3/av/public/baseline.html>.

**SuggestedRemedy**

Remove sentence number 2 i.e. "The upper bound on minimum range may be increased by application on extended FEC" leaving the whole block in the following form "The quoted minimum range values already account for FEC gain."

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

ACCEPT IN PRINCIPLE.  
See comment #66.

**Cl 91**    **SC 91.1**                      **P123**        **L39**                      # 183  
Lin, Rujian    Shanghai Luster Terab

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

MH: Table 91-2 is affected  
TBD 29  
TBD 15

**SuggestedRemedy**

Define the Maximum channel insertion loss and Minimum channel insertion loss.

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

ACCEPT.  
See comment #66.

**Cl 91**    **SC 91.1**                      **P123**        **L5**                      # 84  
Marek, Hajduczenia                                      Nokia Siemens Networ

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

Table 91-1 includes 10GBASE-PR-U1 with the ChIL min = 5 and ChIL max = 20 while it is supposed to work with PR10 and PR20 budgets with ChIL min 5 and 10 and ChIL max 20 and 24 respectively. That is not currently reflected in the Table 91-1.

**SuggestedRemedy**

Copy the 10GBASE-PR-U1 column to the right of the 10GBASE-PR-D1 column and use the appropriate min and max ChIL values i.e. 24 and 10 dB.

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

ACCEPT IN PRINCIPLE.  
See comment #66.

**Cl 91**    **SC 91.1**                      **P123**        **L5**                      # 118  
Kramer, Glen    Teknovus, Inc.

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

Tables 91-1 and 91-2 are confusing. It does not make sense to talk about distance or channel insertion loss for a single PMD. These tables should describe power budget classes, not PMDs.

**SuggestedRemedy**

Modify the tables as shown in the attached document 3av\_0801\_kramer\_1.pdf.

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

ACCEPT IN PRINCIPLE.  
See comment #66.

**Cl 91**    **SC 91.1**                      **P123**        **L6**                      # 278  
Dawe, Piers    Avago Technologies

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

Cramped table

**SuggestedRemedy**

Select table, size column widths to contents, with maximum (432?). Also Tables 91-3, 91-12.

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

ACCEPT.

Cl 91 SC 91.1 P123 L6 # 359  
 Suzuki, Ken-Ichi NTT  
 Comment Type T Comment Status A  
 10GBASE-PR-U1 can be also used for PR20.  
 SuggestedRemedy  
 Add the description of "10GBASE-PR-U1" to the left of "10GBASE-PR-D2" on Table 91-1.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 See comment #66.

Cl 91 SC 91.1 P124 L # 407  
 Chang, Frank Vitesse  
 Comment Type TR Comment Status R  
 In Table 91-2, 91-4 for co-existence cases with 1G PX10, PX20, the losses are indicated as the same for different wavelengths, this is different from what is already specified by 802.3ah.  
 SuggestedRemedy  
 Suggest to follow 802.3ah definition (where the loss for 1590nm or 1577nm should be even slightly smaller than 1490nm).  
 Response Response Status C  
 REJECT.  
 See comment #330.

Cl 91 SC 91.1.1 P123 L50 # 279  
 Dawe, Piers Avago Technologies  
 Comment Type E Comment Status A  
 The following are the objectives of PR10, PR20, PR30, PRX10, PRX20 and PRX30:  
 SuggestedRemedy  
 The following are the objectives of this clause: ?  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 See comment #121.

Cl 91 SC 91.1.2 P124 L18 # 281  
 Dawe, Piers Avago Technologies  
 Comment Type E Comment Status A  
 hashed  
 SuggestedRemedy  
 hashed  
 Response Response Status C  
 ACCEPT.

Cl 91 SC 91.1.2 P124 L19 # 174  
 Lin, Rujian Shanghai Luster Terab  
 Comment Type ER Comment Status R  
 Figure 91-1 depicts the relationships of the PMD (shown hashed) with other sublayers and the ISO/IEC Open System Interconnection (OSI) reference model. The OLT has two interfaces between the sublayers of RS and PCS-XGMII and GMII along with the respective stacks and indication of appropriate clauses where the given entities are defined. Two types of ONU are depicted i.e. symmetric 10/10G ONU and asymmetric 10/1G ONU. Optional sublayers of the stack required to assure coexistence with Clause 60 PMDs are presented in the figure in an informative way, refer to Annex A1 for detailed description of the coexistence options.  
 SuggestedRemedy  
 Insert a description on Figure 91-1.  
 Response Response Status W  
 REJECT.  
 Unclear Suggested Remedy.

Cl 91 SC 91.1.2 P125 L # 72  
Marek, Hajduczenia Nokia Siemens Network

Comment Type TR Comment Status A

Figure 91-1 does not represent correctly the relationship of the Clause 91 PMD to the OSI reference model. In the case of symmetric data rate PMDs, there is only XGMII interface between the RS and the PMD, in the case of the asymmetric data rate PMDs, the clause 91 PMD is connected to Clause 92 RS via XGMII and GMII in the appropriate directions i.e. in the OLT, the Tx direction is serviced by the XGMII, the Rx direction is serviced by the GMII.

*SuggestedRemedy*

Suggest to redesign Figure 91-1 to represent the symmetric 10 Gbps EPONs, with the XGMII interface only between the clause 92 RS and the PMD. Suggest to copy Figure 91-1 creating Figure 91-2 and represent the asymmetric data rate EPON, where the OLT has the RS connected to the PMD via XGMII in the TX and GMII in the Rx direction, while in the ONU - the RS will be connected to the PMD via XGMII in the Rx direction and via GMII in the Tx direction. The coexisting situation will not be covered in the Clause 91.

Response Response Status C

ACCEPT.  
See 3av\_0801\_hajduczenia\_3.pdf (Figure 91-1) and 3av\_0801\_hajduczenia\_4.pdf (Figure 91-2).

Cl 91 SC 91.1.2 P125 L12 # 287  
Dawe, Piers Avago Technologies

Comment Type E Comment Status A

Shading doesn't work well after pdf and printer translation

*SuggestedRemedy*

Can you hatch in the other direction?

Response Response Status C

ACCEPT.

Cl 91 SC 91.1.2 P125 L19 # 310  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Fibre does not go past the MDI: this isn't classic Ethernet on coax. Compare Fig 60-1.

*SuggestedRemedy*

Make the fibres go to the two MDIs not past them

Response Response Status C

ACCEPT.

Cl 91 SC 91.1.2 P125 L2 # 285  
Dawe, Piers Avago Technologies

Comment Type E Comment Status A

Shouldn't write WORDS in CAPITALS: only abbreviations and such

*SuggestedRemedy*

Change the words to lower case, with leading capital where needed

Response Response Status C

ACCEPT IN PRINCIPLE.  
Which captions are referred to ?

Cl 91 SC 91.1.2 P125 L2 # 286  
Dawe, Piers Avago Technologies

Comment Type E Comment Status A

Font too small: 7 point

*SuggestedRemedy*

Change to 8 point. There'll be room when it isn't all in capitals.

Response Response Status C

ACCEPT IN PRINCIPLE.  
Examine new Figure 91-1 and 91-2. Which caption is meant?

Cl 91 SC 91.1.2 P125 L31 # 288  
Dawe, Piers Avago Technologies

Comment Type E Comment Status A

'PON Medium': not a non-ordinary-English term

*SuggestedRemedy*

PON medium

Response Response Status C

ACCEPT.

Cl 91 SC 91.1.2 P125 L31 # 311  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

'PON Medium' appears to include the ONU

*SuggestedRemedy*

Shorten the bracket to span the Optical distributor combiner(s)

Response Response Status C

ACCEPT IN PRINCIPLE.  
Use an arrow to indicate the PON medium.

Cl 91 SC 91.1.4 P124 L42 # 169  
Lin, Rujian Shanghai Luster Terab

Comment Type E Comment Status R

The following specifies the services provided by the all the PMDs defined in this Clause.

*SuggestedRemedy*

Response Response Status C

REJECT.  
Unclear comment and lack of suggested remedy.

Cl 91 SC 91.1.4 P124 L42 # 282  
Dawe, Piers Avago Technologies

Comment Type E Comment Status A

by the all the PMDs

*SuggestedRemedy*

by the PMDs

Response Response Status C

ACCEPT.

Cl 91 SC 91.1.4 P124 L45 # 283  
Dawe, Piers Avago Technologies

Comment Type E Comment Status A

This can be simplified (as can 91.1.5.n):  
The PMD Service Interface supports the exchange of a continuous stream of bits, representing either 64B/66B (the transmit and receive paths in the 10GBASE-PR-D and 10GBASE-PR-U type PMDs, receive path in 10/1GBASE-PRX-D type PMDs) or 8B/10B (transmit path in 10/1GBASE-PRX-U type PMDs) code-groups encoded, scrambled and serialized in Clause 92 PMA, between the Clause 92 PMA and PMD entities.

*SuggestedRemedy*

The PMD Service Interface supports the exchange of a continuous stream of bits, representing either 64B/66B blocks (the transmit and receive paths in 10GBASE-PR PMDs, transmit path in 10/1GBASE-PRX-D PMDs) or 8B/10B (transmit path in 10/1GBASE-PRX-U PMDs, receive path in 10/1GBASE-PRX-D PMDs) code-groups encoded, scrambled and serialized in a?the? Clause 92 PMA, between the PMA and PMD entities.

Response Response Status C

ACCEPT IN PRINCIPLE.  
Proposal to reword to "The PMD Service Interface supports the exchange of a continuous stream of bits, representing either 64B/66B blocks (the transmit and receive paths in 10GBASE-PR PMDs, transmit path in 10/1GBASE-PRX-D PMDs) or 8B/10B blocks (transmit path in 10/1GBASE-PRX-U PMDs, receive path in 10/1GBASE-PRX-D PMDs) encoded, scrambled and serialized in the Clause 92 PMA, between the PMA and PMD entities."

Cl 91 SC 91.1.4 P124 L45 # 102  
Remein, Duane Alcatel-Lucent

Comment Type T Comment Status A

The sentence "The PMD Service Interface supports the exchange of a continuous stream of bits, representing either 64B/66B (...) or 8B/10B (...) code-groups encoded, scrambled and serialized in Clause 92 PMA, between the Clause 92 PMA and PMD entities." makes it sound like C92 deals with either 64B/66B or 8B/10B when in fact it only deals with 64B/66B.

*SuggestedRemedy*

Change to read: "The PMD Service Interface supports the exchange of a continuous stream of bits, representing either 64B/66B encoding (...) as described in Clause 92 PMA entities or 8B/10B encoding(...) as described in Clause 65 PMA entities."

Response Response Status C

ACCEPT IN PRINCIPLE.  
Reword to "The PMD Service Interface supports the exchange of a continuous stream of bits, representing either 64B/66B blocks (the transmit and receive paths in 10GBASE-PR PMDs, transmit path in 10/1GBASE-PRX-D PMDs) or 8B/10B blocks (transmit path in 10/1GBASE-PRX-U PMDs, receive path in 10/1GBASE-PRX-D PMDs), between the PMA and PMD entities."

Cl 91 SC 91.1.4 P124 L45 # 175  
Lin, Rujian Shanghai Luster Terab

Comment Type ER Comment Status A

*SuggestedRemedy*

Agree on the insertion from Line 45 to Line 49 on Page 124 in Draft 1.0

Response Response Status W

ACCEPT IN PRINCIPLE.  
See comment #102.

Cl 91 SC 91.1.4 P124 L49 # 284  
Dawe, Piers Avago Technologies

Comment Type E Comment Status A

a compatible PMA - spelling. Match or change 'The' PMD at the beginning of the sentence?

*SuggestedRemedy*

the PMA? the specified PMA?

Response Response Status C

ACCEPT IN PRINCIPLE.  
Proposed "received from the compatible PMA".

**Cl 91**    **SC 91.1.4**                      **P124**                      **L49**                      # **12**

Jiang, Jessica                                      Salira

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

Typo error: "compatibile" should be "compatible"

**SuggestedRemedy**

"compatibile" should be "compatible"

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

ACCEPT.

**Cl 91**    **SC 91.1.4**                      **P125**                      **L1**                      # **119**

Kramer, Glen                                      Teknovus, Inc.

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

Figure 91-1 is unclear as to whether PRX type PMDs use only GMII or GMII and XGMII together.

**SuggestedRemedy**

Replicate figure 91-1 for PR and PRX types separately. Show XGMII and GMII for PRX and only XGMII for PR. Call the shaded box "PMD, PRX type (Clause 91)" in one figure and "PMD, PR type (Clause 91)" in another figure.

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

ACCEPT IN PRINCIPLE.

Accept Figure 91-1 as presented in 3av\_0801\_hajduczenia\_3.pdf. Change the identification of the PMD in the stack from "PMD (Clause 91)" to "PR-type PMD (Clause 91)".

Accept Figure 91-2 as presented in 3av\_0801\_hajduczenia\_4.pdf. Change the identification of the PMD in the stack from "PMD (Clause 91)" to "PRX-type PMD (Clause 91)". Represent the XGMII and GMII interfaces as presented in Figure 91-1. Indicate the data transmission direction with an arrow.

**Cl 91**    **SC 91.1.5**                      **P126**                      **L9**                      # **289**

Dawe, Piers                                      Avago Technologies

**Comment Type**    **E**                      **Comment Status**    **R**

Are delay constraints and the primitives are not related, so should they be grouped together? Clause 52 and 60 are different

**SuggestedRemedy**

?

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

REJECT.

Reason to reject: no proposed remedy

**Cl 91**    **SC 91.1.5**                      **P126**                      **L9**                      # **312**

Dawe, Piers                                      Avago Technologies

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

It doesn't belong here, but remember FEC delay (see e.g. 74.6). If delay is done by reference to 36.5, I wouldn't call a PON 'half duplex or 'full duplex' so some clarification would be needed.

**SuggestedRemedy**

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

ACCEPT IN PRINCIPLE.

"An upper bound to the delay through the PMD is required for predictable operation of the MAC Control MPCP operation. The PMD shall incur a round-trip delay (transmit and receive) of not more than ?TBD? time-quanta. A description of overall system delay constraints can be found in 64.3.2.4, and the definition for the time\_quantum can be found in 64.2.2.1."

**Cl 91**    **SC 91.1.5.1**                      **P126**                      **L21**                      # **176**

Lin, Rujian                                      Shanghai Luster Terab

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

**SuggestedRemedy**

Agree on the insertion from Line 21 to Line 25 on page 126 in Draft 1.0.

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

ACCEPT IN PRINCIPLE.

**Cl 91**    **SC 91.1.5.2**                      **P126**                      **L36**                      # **177**

Lin, Rujian                                      Shanghai Luster Terab

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

**SuggestedRemedy**

Agree on the insertion from Line 36 to Line 40 on page 126 in Draft 1.0

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

ACCEPT.

Cl 91 SC 91.2.1 P127 L24 # 178  
 Lin, Rujian Shanghai Luster Terab

Comment Type ER Comment Status A

The PMD block diagram is absent.

*SuggestedRemedy*

Add Figure 91-2 PMD block diagram.

Response Response Status W

ACCEPT IN PRINCIPLE.  
 See comment #313.

Cl 91 SC 91.2.1 P127 L25 # 313  
 Dawe, Piers Avago Technologies

Comment Type T Comment Status A

re which figure, 52-2 or 60-2. What do you mean, 'and meeting the ITU-T specifications.'?

*SuggestedRemedy*

Figure 60-2 looks suitable. Can you show the extent of the ODN on it, or on the equivalent of Figure 60-10, Fiber optic cable model?

Response Response Status C

ACCEPT IN PRINCIPLE.  
 Remove the Editor's note #13. Adopt Figure 60-2 as the base for a figure in subclause 91.2.1, representing the PMD block diagram.

Cl 91 SC 91.2.1 P130 L1 # 411  
 Chang, Frank Vitesse

Comment Type TR Comment Status A

Editor notes #16 indicate two options for PMD block diagrams.

*SuggestedRemedy*

Suggest to follow Clause 60 particularly for P2MP case, where Figure 91-3 (which is crossed out) must be modified.

Response Response Status W

ACCEPT IN PRINCIPLE.  
 See comment #313.  
 Author referes to 3av\_c91\_1\_0\_markup.pdf.

Cl 91 SC 91.2.4.1 P127 L45 # 314  
 Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Can we make this less confusing: 'ONU PMD signal detect (downstream)'?

*SuggestedRemedy*

U (ONU) PMD signal detect of DS signal? Similarly for 91.2.4.2.

Response Response Status C

ACCEPT IN PRINCIPLE.  
 Strike out "(downstream)" in the title of subclause 91.2.4.1.  
 Strike out "(upstream)" in the title of subclause 91.2.4.2.

Cl 91 SC 91.2.4.1 P127 L52 # 315  
 Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Simplify: no receiver is required to verify whether a compliant 10GBASE-R signal is being received.

*SuggestedRemedy*

Change 'The 10GBASE-PR-U1, 10GBASE-PR-U3, 10/1GBASE-PRX-U1, 10/1GBASE-PRX-U2 and 10/1GBASE-PRX-U3 PMD receiver is not required to verify whether a compliant 10GBASE-R signal is being received.' to 'The PMD receiver is not required to verify whether a compliant 10GBASE-R signal is being received.'

Response Response Status C

ACCEPT IN PRINCIPLE.  
 Suggested text "The ONU PMD receiver is not required to verify whether a compliant 10GBASE-R signal is being received."

Cl 91 SC 91.2.4.2 P128 L9 # 316  
 Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Simplifying

*SuggestedRemedy*

Change 'The 10GBASE-PR-D1, 10GBASE-PR-D2, 10GBASE-PR-D3 PMD receiver is not required to verify whether a compliant 10GBASE-R signal is being received. Similarly, the 10/1GBASE-PRX-D1, 10/1GBASE-PRX-D2 and 10/1GBASE-PRX-D3 PMD receiver is not required to verify whether a compliant 1000BASE-X signal is being received.'

to  
 'The 10GBASE-PR-D PMD receiver is not required to verify whether a compliant 10GBASE-R signal is being received. Similarly, the 10/1GBASE-PRX-D PMD receiver is not required to verify whether a compliant 1000BASE-X signal is being received.'

Response Response Status C

ACCEPT.

**Cl 91**    **SC 91.2.4.3**    **P128**    **L20**    # 290  
Dawe, Piers    Avago Technologies

**Comment Type E**    **Comment Status A**  
'Receive conditions for PR and PRX PMD types'

**SuggestedRemedy**

Just 'Receive conditions' will do: PR and PRX PMD types are all that there could be in this clause.

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

**Cl 91**    **SC 91.2.5**    **P128**    **L41**    # 291  
Dawe, Piers    Avago Technologies

**Comment Type E**    **Comment Status A**  
the three ONU PMDs

**SuggestedRemedy**

the five ONU PMDs? the five -U (ONU) PMD types?

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

Change "PMD\_SIGNAL.request(tx\_enable) is defined for the three ONU PMDs." to "PMD\_SIGNAL.request(tx\_enable) is defined for all ONU PMDs specified in Clause 91."

**Cl 91**    **SC 91.3**    **P128**    **L44**    # 120  
Kramer, Glen    Teknovus, Inc.

**Comment Type TR**    **Comment Status A**  
Section 91.3 is out of place. It should be part of Introduction, not be stack between two sections describing PMD specification.

Section 91.3 explains how we combine PMDs to satisfy our objectives of having 3 power budget classes. This section should follow immediately after the Goals and Objectives section.

**SuggestedRemedy**

Use the following outline for the clause 91:

- 91.1 Overview
  - 91.1.1. Terminology and conventions
  - 91.1.2. Goals and objectives
  - 91.1.3. Power Budget Classes
  - 91.1.4. Positioning of PMD sublayer within the IEEE 802.3 architecture
- 91.2 PMD Types
  - 91.2.1. Mapping of PMDs to Power Budgets
- 91.3 PMD functional specifications
- 91.4 PMD to MDI Optical Specifications ... (OLT PMDs)
- 91.5 PMD to MDI Optical Specifications ... (ONU PMDs)
- ....

Move section 91.1.4 Physical Medium Dependent (PMD) sublayer service interface to be the first subsection under PMD functional specifications. Refer to attached file 3av\_0801\_kramer\_1.pdf for proposed section introduction corresponding to the above outline.

**Response**    **Response Status C**  
ACCEPT IN PRINCIPLE.  
Align with comment #121.

**Cl 91**    **SC 91.3**                      **P129**    **L1**                      # 317  
Dawe, Piers                                      Avago Technologies

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

In my mind, there are three loss classes (not 6) - for the ODN: and PMDs which may be used on them according to these tables. The loss classes are the same for 1/10G as for 10G (and compatible(?), and very nearly the same, for Clause 60 GEAPON).

*SuggestedRemedy*

Change '91.3.1 Symmetric, 10 Gbps PBCs (PR type)  
The symmetric data rate PBCs comprise two symmetric data rate PMDs, i.e. 10GBASE-PR-D1, 10GBASE-PR-D2 or 10GBASE-PR-D3 on the OLT side and 10GBASE-PR-U1 or 10GBASE-PR-U3 on the ONU side. There is a strict mapping between the said PMDs and the individual PBCs, as presented in Table 91-4.'  
to  
'91.3.1 Power budget classes for symmetric and asymmetric PMDs  
There are three PBCs. The PMDs to be used with each PBC are shown in Table 91-4 and Table 91-5.' Note that there is no 10GBASE-PR-U2 PMD type.'  
Delete the title and text of 91.3.2.  
And see other comments.

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

ACCEPT IN PRINCIPLE.  
See comment #121.

**Cl 91**    **SC 91.3**                      **P129**    **L16**                      # 326  
Dawe, Piers                                      Avago Technologies

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

One of the nice innovations in Clause 68 is 68.5.2 Characteristics of signal within, and at the receiving end of, a compliant 10GBASE-LRM channel. 10GEAPON will need such a table; network maintenance will require it.

*SuggestedRemedy*

Add extra rows to Tables 91-4 and 91-5, Highest power in OMA max, Lowest power in OMA min, Highest average power max, Lowest average power. For each, there are two numbers: the highest/lowest anywhere in the link, and the highest/lowest at the receiving MDI. Populate table from numbers in the other tables. This may be something a determined reader could puzzle out for himself, but with so many variants, it will be worthwhile to tabulate it!

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

REJECT.

**Cl 91**    **SC 91.4**                      **P129**    **L39**                      # 179  
Lin, Rujian                                      Shanghai Luster Terab

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

*SuggestedRemedy*

Agree on the insertion from Line 39 to Line 42 on Page 129 in Draft 1.0.

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

ACCEPT.

**Cl 91**    **SC 91.4**                      **P129**    **L45**                      # 292  
Dawe, Piers                                      Avago Technologies

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

Editors Note 15

*SuggestedRemedy*

The blue text makes sense to me.

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

ACCEPT.  
See comment #179 and #121.

**Cl 91**    **SC 91.4**                      **P129**    **L49**                      # 293  
Dawe, Piers                                      Avago Technologies

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

Transceivers don't support media. It's the other way round; media are at the bottom of the layer stack. And there are only two types shown for any PMD (B1.1 and B1.3 SMF)

*SuggestedRemedy*

Change 'transceiver supports all media types' to 'transceiver operates over the media types'. Same in 91.5.

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

ACCEPT.  
See comment #121.



Cl 91 SC 91.4 P130 L26 # 194  
 Effenberger, Frank Huawei Technologies,

Comment Type T Comment Status A

RMS spectral width does not make much sense for single moded lasers. I appreciate that we will keep it for the 1G upstream link, but for 10G it makes no sense. Found on p130, line 26 and on p134, line 14. (Tables 91-6 through 91-9; 91-12; 91-14 and 91-15)

**SuggestedRemedy**

Propose that RMS spectral width is removed from tables 91-6 and 91-12. Delete tables 91-7,8,9,14,15. Add the following items to tables 91-6 and 91-12:

Side Mode Suppression Ratio (min) [Note] 30 dB (for all cases)

Add Note: Transmitter is a single longitudinal mode device. Chirp is allowed such that the total optical path penalty does not exceed that found in table 91-18.

Response Response Status C

ACCEPT.

Cl 91 SC 91.4 P130 L42 # 391  
 Hiroshi, Hamano Fujitsu Labs. Ltd.

Comment Type T Comment Status A

In Table 91-6, Transmitter and dispersion penalty (TDP) values still remain TBD.

**SuggestedRemedy**

I propose 1.5dB as baseline TDP values for the PR and PRX type OLT PMD transmit classes, following the presentation 3av\_0711\_hamano\_1.pdf.

Response Response Status C

ACCEPT.

Cl 91 SC 91.4 P134 L19 # 413  
 Chang, Frank Vitesse

Comment Type TR Comment Status A

Donot think RMS spectral width (max) is a good parameter.

**SuggestedRemedy**

Suggest to change to SMSR (min) = 30dB as EML is assumed.

Response Response Status C

ACCEPT.

See comment #194

Cl 91 SC 91.4 P135 L # 415  
 Chang, Frank Vitesse

Comment Type TR Comment Status A

Table 91-10, -11, -12, not needed for DFB type lasers.

**SuggestedRemedy**

Take out Table 91-10, -11, -12.

Response Response Status C

ACCEPT IN PRINCIPLE.

See comment #194.

Commenter was referring to 3av\_c91\_1\_0\_markup.pdf.

Cl 91 SC 91.4 P137 L17 # 417  
 Chang, Frank Vitesse

Comment Type TR Comment Status A

Do we want to specify RX sens (max) as -27.6dBm OMA for B++ 29dB??

**SuggestedRemedy**

Change.

Response Response Status C

ACCEPT IN PRINCIPLE.

For PRX30 ONU PMD adopt the applicable parameters presented in 3av\_0801\_suzuki\_1.pdf, slide number 4.

TDP parameter to be equal to 1.4 dB.

Accepted with no objections from the TF.

Cl 91 SC 91.4.1 P130 L12 # 170  
 Lin, Rujian Shanghai Luster Terab

Comment Type E Comment Status A

fanally 10GBASE-PR-D3 and 10/1GBASE-PRX-D43 share the same transmit parameters.

**SuggestedRemedy**

Response Response Status C

ACCEPT IN PRINCIPLE.

Replace "fanally 10GBASE-PR-D3 and 10/1GBASE-PRX-D43 share the same transmit parameters." to "finally, 10GBASE-PR-D3 and 10/1GBASE-PRX-D3 share the same transmit parameters.".

See comment #121.

Cl 91 SC 91.4.1 P130 L20 # 318  
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

I don't like the 'Nominal transmitter type' table entry. It's not required so why is it here?

*SuggestedRemedy*

Delete this row and its note from each table. Earlier in the clause, add a sentence such as 'While it is not required, it is expected that PMD transmitters of this clause will use lasers, and amongst them, 10G transmitters and transmitters in the 1574-1600 nm range will use single longitudinal mode lasers.'

Response Response Status C

ACCEPT IN PRINCIPLE.

The suggested text to be placed in 91.4.1.

Cl 91 SC 91.4.1 P130 L23 # 9  
Jiang, Jessica Salira

Comment Type T Comment Status R

In table 91-6, the unit for signaling speed (range) use "GBd" instead of "Gb/s" or "Gbps". Typically, baud rate is for parallel data which consists more than one value, for serial data, suggest to use bit rate "b/s" or "bps".

There are more than one place use "GBd". The change should be applied to all.

*SuggestedRemedy*

Change "GBd" to "Gbps" or "Gb/s"

Response Response Status C

REJECT.

The definition and use of baud and bit per second is specified in IEEE Std 260.1-2004 'IEEE Standard Letter Symbols for Units of Measurement (SI Units, Customary Inch-Pound Units, and Certain Other Units)'. This is maintained by Standards Coordinating Committee on Quantities, Units, and Letter Symbols (SCC14). The use of this is enforced by having SCC14 as a mandatory coordination at the sponsor ballot stage.

(Resolved at November 2007 TF meeting)

Cl 91 SC 91.4.1 P130 L31 # 334  
Dawe, Piers Avago Technologies

Comment Type TR Comment Status A

An extinction ratio spec of 9 dB minimum seems unnecessary and constraining to innovation. I thought the 9 dB was only a number to be used in calculation. I've made this comment a TR because it may take more than one ballot cycle to get to a complete set of spec numbers for these tables.

*SuggestedRemedy*

Unless there is a demonstrated reason for such a high extinction ratio, change the limit to something more moderate, e.g. 6 dB if there is no hope of using direct modulation (lower if there is). Remember, you don't have to have the OMA spec and the average power spec intercept at the extinction ratio spec.

Response Response Status C

ACCEPT.

Additionally include figure as presented in 3av\_0801\_effenbergger\_5.pdf, slide 2.

While keeping the minimum OMA and minimum average power unchanged, I prefer the minimum downstream ER to be:

- 1) 9 dB \_12\_
- 2) 6 dB \_24\_

I accept the proposed response:

- 1) Yes: \_21\_
- 2) No: \_2\_
- 3) Abstain: \_4\_

Cl 91 SC 91.4.1 P130 L33 # 85  
Marek, Hajduczenia Nokia Siemens Networ

Comment Type TR Comment Status A

The OMA mW values are not calculated correctly e.g. is: 2.91 dBm = 1.54 mW. Applicable to all OMA mW values in: Table 91-6, Table 91-12 i.e. Launch OMA (min), Table 91-10, Table 91-17i.e. Stressed receive sensitivity OMA (max)

*SuggestedRemedy*

Convert the OMA dBm values into OMA mW values using the formula:  $10^{(dBm/10)}$ . Multiply by 1000 if to be expressed in uW.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change the applicable formulas in the channel link model. Change the Launch OMA (min) [mW] in Table 91-6, Table 91-12 and Stressed receive sensitivity OMA (max) [mW] in Table 91-10, Table 91-17 to correct values.

**Cl 91**    **SC 91.4.1**                      **P130**    **L33**                      # 362

Suzuki, Ken-Ichi                                      NTT

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

Values of Launch OMA (min) (dBm) are not coincident with those of Launch OMA (min) (mW)

**SuggestedRemedy**

Check and correct the equation on the spread sheet.

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

ACCEPT.  
See comment #95.

**Cl 91**    **SC 91.4.1**                      **P130**    **L33**                      # 323

Dawe, Piers    Avago Technologies

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

Specs to 1/100 dBm; that's 0.23%. Not a realistic accuracy

**SuggestedRemedy**

Round them off to 1/10 dB. Round the mW to similar precision. All tables.

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

REJECT.

**Cl 91**    **SC 91.4.1**                      **P130**    **L37**                      # 319

Dawe, Piers    Avago Technologies

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

Ton, Toff not of interest for OLT transmitters

**SuggestedRemedy**

Delete the rows, here and in Table 91-12 and Table 91-13.

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

ACCEPT.

**Cl 91**    **SC 91.4.1**                      **P130**    **L39**                      # 322

Dawe, Piers    Avago Technologies

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

Optical return loss tolerance should be the same as the subscript in RINxOMA

**SuggestedRemedy**

e.g. if you mean 15, enter 15 three times. If not decided, change RIN15OMA to RINxOMA.

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

ACCEPT IN PRINCIPLE.  
Change RIN15OMA to RINxOMA.

**Cl 91**    **SC 91.4.1**                      **P130**    **L40**                      # 320

Dawe, Piers    Avago Technologies

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

Optical return loss of ODN: ODN is not part of the transmitter. (I wonder how it got there in Clause 60.)

**SuggestedRemedy**

Delete this row, here and in Table 91-12 and Table 91-13. There's another table for the ODN.

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

ACCEPT.  
The parameter is included in Table 91-18 and 91-19.

**Cl 91**    **SC 91.4.1**                      **P130**    **L42**                      # 188

Lin, Rujian    Shanghai Luster Terab

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

MH: Table 91-6 is affected  
Set Transmitter and dispersion penalty(max) to be 1.5dB

**SuggestedRemedy**

In measurement on TDP, it is important, but difficult to define an ideal transmitter which in theoretic concept is a transmitter with perfect driving waveform, perfect laser response, no optical delay, minimum line-width, no chirp and minimum relative intensity noise, because TDP = Receiver sensitivity in the case of test Tx with the worst fiber link  $\epsilon_{\alpha}$  Receiver sensitivity in the case of ideal Tx with pure attenuation (without fiber chromatic dispersion, PMD and optical reflection)  
So I think that in the Draft we need to set up a definition on ideal Tx for TDP test.  
For the TDP values I think that the data proposed by Dr. Hiroshi Hamano- 1.5dB for 1574-1580nm downstream and 3.0dB for 1260-1360nm upstream- is reasonable and a good start point for further investigation.

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

ACCEPT IN PRINCIPLE.  
See comment #391.

**Cl 91**    **SC 91.4.1**                      **P130**        **L44**                      # 321  
Dawe, Piers                                      Avago Technologies

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

Decision timing offset for transmitter and dispersion penalty (min): as these are the continuous-mode transmitters, can use the value in 52.9.10.4. Also, it shouldn't be a minimum; it's what the test equipment is set AT, not below or above.

**SuggestedRemedy**

+/-0.05 UI. Delete '(min)'. In Table 91-12 it should be a little higher. In Table 91-13 it might be same as 1000BASE-PX10-U (+/-0.125 UI if that does not cost too much performance).

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

ACCEPT IN PRINCIPLE.

Table 91-6, parameter "Decision timing offset for transmitter and dispersion penalty (min)" will be renamed to "Decision timing offset for transmitter and dispersion penalty" (Tables affected: 91-6, 91-12, 91-13).

Values of the "Decision timing offset for transmitter and dispersion penalty" parameter for Table 91-6 equal to +/-0.05 UI.

Values of the "Decision timing offset for transmitter and dispersion penalty" parameter for Table 91-13 equal to +/-0.125 UI, for PRX-U3 PMD.

Values of the "Decision timing offset for transmitter and dispersion penalty" parameter for Table 91-12 equal to +/-0.0625 UI.

**Cl 91**    **SC 91.4.1**                      **P130**        **L47**                      # 110  
Remein, Duane                                      Alcatel-Lucent

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

Note b of table 91-6 "centre" should be "center".  
In general spelling follows american standard.

**SuggestedRemedy**

Change to "center"  
Change spell check dictionary to American English

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

ACCEPT.

**Cl 91**    **SC 91.4.1**                      **P130**        **L49**                      # 294  
Dawe, Piers                                      Avago Technologies

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

10GBASE-PR-D1 / 10/1GBASE-PRX-D1

**SuggestedRemedy**

This is another reason not to use / in these type names.

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

ACCEPT IN PRINCIPLE.

Such combinations can be replaced i.e. "10GBASE-PR-D1 / 10/1GBASE-PRX-D1" can become "10GBASE-PR-D1 and 10/1GBASE-PRX-D1".

**Cl 91**    **SC 91.4.1**                      **P130**        **L9**                      # 331  
Dawe, Piers                                      Avago Technologies

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

Reference to section that's gone AWOL.

**SuggestedRemedy**

Create a new 91.8 'Definitions of optical parameters and measurement methods' (much better title and concept that 'Optical measurement requirements' because optical measurement is not required, although performance is). Contents can mainly refer to 58.7.n and occasionally to 68.6 or 52.9.n.

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

ACCEPT IN PRINCIPLE.

Create a placeholder for a new Subclause 91.8. Text TBD pending presentation from Vijay during the meeting in March 2008.

**Cl 91**    **SC 91.4.1**                      **P131**        **L13**                      # 184  
Lin, Rujian                                      Shanghai Luster Terab

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

MH: Table 91-7, 91-8, 91-9 are affected  
This limits for the 10GBASE-PR10-U-D transmitter are illustrated in Figure 91-3.

**SuggestedRemedy**

Add Figure 91-3 10GBASE-PR-D transmitter spectral limits on page 131 in Draft 1.0.

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

ACCEPT IN PRINCIPLE.

Tables removed. See comment #194.

**Cl 91**    **SC 91.4.1**                      **P131**        **L4**                      # 295  
Dawe, Piers                                      Avago Technologies

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

Because all these wavelengths are 274 to 300 nm from the furthest zero dispersion wavelength (i.e. see similar chromatic dispersion) , there is little point in having the spectral width depend on wavelength.

**SuggestedRemedy**

Get rid of the three tables and most of the text. Add two rows to Table 91-6. 'The equation used to calculate these values is detailed in 91.8.2.' can become a footnote. Provide a 91.8.2 or refer to 60.7.2 or equation (60-3).

This remedy does NOT necessarily apply to the U transmitters.

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

ACCEPT IN PRINCIPLE.

See comment #194.

CI 91 SC 91.4.1 P131 L4 # 103  
 Remein, Duane Alcatel-Lucent  
 Comment Type E Comment Status A  
 Combine Tables 91-7, 91-8 and 91-9 (increased readability)  
 SuggestedRemedy  
 Combine Tables 91-7, 91-8 and 91-9  
 Response Response Status C  
 ACCEPT.  
 See comment #194.

CI 91 SC 91.4.1 P132 L22 # 363  
 Suzuki, Ken-Ichi NTT  
 Comment Type TR Comment Status A  
 Values of Stressed receive sensitivity OMA (max) (dBm) are not coincident with those of  
 Stressed receive sensitivity OMA (max) (uW)  
 SuggestedRemedy  
 Check and correct the equation on the spread sheet.  
 Response Response Status C  
 ACCEPT.  
 See comment #85.

CI 91 SC 91.4.1 P134 L3 # 382  
 Toshiaki, Mukojima Oki Electric Industry C  
 Comment Type E Comment Status A  
 Change spelling of "10G/1GBASE-PRX-D4" to "10G/1GBASE-PRX-D3"  
 SuggestedRemedy  
 Response Response Status C  
 ACCEPT.

CI 91 SC 91.4.2 P131 L47 # 324  
 Dawe, Piers Avago Technologies  
 Comment Type T Comment Status A  
 As 10GEPON is going further and faster than GEAPON, dispersion penalty is a serious  
 issue. Stressed receive performance should not be optional here. But in return, to keep the  
 burden of testing and reporting down, unstressed sensitivity can become optional.  
 SuggestedRemedy  
 Change 'overload, sensitivity, reflectivity' to 'overload, stressed sensitivity, reflectivity.'  
 Change 'Its stressed receive characteristics should' to 'Its (unstressed) sensitivity should'.  
 Same for 91.5.2 type PR.

Response Response Status C  
 ACCEPT.

CI 91 SC 91.4.2 P131 L48 # 171  
 Lin, Rujian Shanghai Luster Terab  
 Comment Type E Comment Status R  
 per measurement techniques described in 91.8.11. Either  
 SuggestedRemedy

Response Response Status C  
 REJECT.  
 Lack of clear comment and suggested remedy.

CI 91 SC 91.4.2 P132 L10 # 390  
 Tsuji, Shinji Sumitomo Electric  
 Comment Type T Comment Status A  
 Table 91-10.  
 Receiver sensitivity is defined at the BER of  $10^{-3}$  in the baseline reference presentation.  
 SuggestedRemedy  
 Please modify  $10^{-12}$  to  $10^{-3}$ .  
 The same modification should be done at Table 91-17 page 136 line 48.  
 Response Response Status C  
 ACCEPT.

Cl 91 SC 91.4.2 P132 L10 # 104  
 Remein, Duane Alcatel-Lucent

Comment Type E Comment Status A

It seems odd the 10-12 BER spec is entered once for each column whereas other common specifications are discretely spelled out. Recommend consistency by entering 10-12 for each column.

Also applies to Table 91-17 c91 subc91.5.1 pg 136 line 37.

SuggestedRemedy

enter 10-12 in separate cell for each column

Response Response Status C

ACCEPT IN PRINCIPLE.  
 See comment #390.

Cl 91 SC 91.4.2 P132 L13 # 325  
 Dawe, Piers Avago Technologies

Comment Type T Comment Status R

Damage threshold for 10GBASE-PR-D3 should be Tx max for 10GBASE-PR-U3 + 1. For the others, it could be the same, or Tx max for 10GBASE-PR-U1 + 1 (i.e. +5 dBm).

SuggestedRemedy

That's +10 dBm for 10GBASE-PR-D3.

Response Response Status C

REJECT.  
 TF considers the parameter value to require further study.

Cl 91 SC 91.4.2 P132 L23 # 327  
 Dawe, Piers Avago Technologies

Comment Type T Comment Status A

VECP and stressed eye jitter are set points that the stressed receiver conformance test should be set AT, not above or below

SuggestedRemedy

Delete '(min)' for these two, all receiver tables.

Response Response Status C

ACCEPT.

Cl 91 SC 91.4.2 P132 L28 # 329  
 Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Jitter corner frequency

SuggestedRemedy

Probably 4 MHz for 10GBASE-PR-U (continuous mode: same as Clause 52), in the range 4-8 MHz TBD for 10GBASE-PR-U, 637 kHz for 10/1GBASE-PRX-D3 (like Clause 60 - maybe could be increased a little).

Response Response Status C

ACCEPT IN PRINCIPLE.

Change parameter name from "Jitter corner frequency" to "Jitter corner frequency for a sinusoidal jitter".

10GBASE-PR-D will use "Jitter corner frequency for a sinusoidal jitter" of 4 MHz (as in Clause 52, Figure 52-4).

10/1GBASE-PRX-U3 will use "Jitter corner frequency for a sinusoidal jitter" of 637 kHz (as in Clause 60).

10GBASE-PR-U will use "Jitter corner frequency for a sinusoidal jitter" of TBD.

Cl 91 SC 91.4.2 P132 L34 # 328  
 Dawe, Piers Avago Technologies

Comment Type T Comment Status A

Consistency with current Clause 60. See [http://ieee802.org/3/maint/requests/maint\\_1171.pdf](http://ieee802.org/3/maint/requests/maint_1171.pdf)

SuggestedRemedy

Note that following a maintenance request, note c has disappeared from Tables 60-5 and 60-8.

Response Response Status C

ACCEPT IN PRINCIPLE.

Footnote "c" will read "Transceiver\_settling is informative".

Cl 91 SC 91.4.2 P136 L21 # 416  
 Chang, Frank Vitesse

Comment Type TR Comment Status R

I donot think Stressed Rx Sens (AOP or OMA) is properly used in the table.

SuggestedRemedy

1) Suggest to put Stressed Rx sens in AOP and OMA into TBD, while move the corrected numbers to the rows for receiver sens.

2) In footnote, change stress receiver sens as optional or to be defined later once the stress test method is defined.

Response Response Status C

REJECT.

Cl 91 SC 91.5 P132 L41 # 180  
Lin, Rujian Shanghai Luster Terab

Comment Type ER Comment Status A

*SuggestedRemedy*

Agree on the insertion from Line 41 to Line 44 on Page 132 in Draft 1.0

Response Response Status W

ACCEPT.

Cl 91 SC 91.5 P134 L21 # 361  
Suzuki, Ken-Ichi NTT

Comment Type E Comment Status A

"Unit" of "Launch OMA (min)", dBm(wW), must be a typo.

*SuggestedRemedy*

Replace "dBm(wW)" by "dBm(mW)".

Response Response Status C

ACCEPT.

Cl 91 SC 91.5 P134 L3 # 360  
Suzuki, Ken-Ichi NTT

Comment Type E Comment Status A

"Uescription" must be a typographical error.

*SuggestedRemedy*

Replace "Uescription" by "Description".

Response Response Status C

ACCEPT.

Cl 91 SC 91.5 P134 L30 # 392  
Hiroshi, Hamano Fujitsu Labs. Ltd.

Comment Type T Comment Status A

In Table 91-12, Transmitter and dispersion penalty (TDP) values still remain TBD.

*SuggestedRemedy*

I propose 3.0dB as baseline TDP values for the PR type ONU PMD transmit classes, following the presentation 3av\_0711\_hamano\_1.pdf.

Response Response Status C

ACCEPT.

Cl 91 SC 91.5.1 P133 L42 # 74  
Marek, Hajduczenia Nokia Siemens Networ

Comment Type ER Comment Status A

Reference to the non-existing PMD i.e. 10GBASE-PR-U2 is made - see  
<http://www.ieee802.org/3/av/public/baseline.html> and  
[http://www.ieee802.org/3/av/public/2007\\_11/3av\\_0711\\_effenberger\\_1.pdf](http://www.ieee802.org/3/av/public/2007_11/3av_0711_effenberger_1.pdf).

*SuggestedRemedy*

Remove all the references to the 10GBASE-PR-U2 from the text.

Response Response Status C

ACCEPT.  
See comment #121.

Cl 91 SC 91.5.1 P133 L44 # 296  
Dawe, Piers Avago Technologies

Comment Type E Comment Status A

Table 91-12 for PR type OLT PMDs

*SuggestedRemedy*

Table 91-12 for PR type ONU PMDs? And p134 line 1.

Response Response Status C

ACCEPT.

CI 91 SC 91.5.1 P134 L19 # 335  
Dawe, Piers Avago Technologies

Comment Type TR Comment Status D Deferred

An extinction ratio spec of 6 dB minimum seems too constraining for 10G, 1310 nm band. I thought the 6 dB was only a number to be used in calculation. I've made this comment a TR because it may take more than one ballot cycle to get to a complete set of spec numbers for these tables.

#### SuggestedRemedy

Unless there is a demonstrated reason for such a high extinction ratio, change the limit to something more moderate, e.g. 3.5 or 4 dB. Remember, you don't have to have the OMA spec and the average power spec intercept at the extinction ratio spec.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

While keeping the minimum OMA and minimum average power unchanged, I prefer the minimum upstream ER to be:

- 1) 6 dB \_20\_
- 2) 4 dB \_10\_

I prefer to:

- 1) relax upstream Tx specification by relaxing minimum ER \_11\_
- 2) relax upstream Tx specification by relaxing minimum average power \_19\_
- 3) not relax upstream Tx specification \_8\_

I prefer to relax upstream Tx specification by relaxing both the minimum ER and minimum average power:

- 1) Yes: \_10\_
- 2) No: \_11\_

Resolve comment #335 by relaxing the minimum average power:

- 1) Yes: \_11\_
  - 2) No: \_5\_
  - 3) Abstain: \_8\_
- (technical >=75%) Fails

CI 91 SC 91.5.1 P134 L21 # 364  
Suzuki, Ken-Ichi NTT

Comment Type TR Comment Status A

Values of Launch OMA (min) (dBm) are not coincident with those of Launch OMA (min) (mW)

#### SuggestedRemedy

Check and correct the equation on the spread sheet.

Response Response Status C

ACCEPT.  
See comment #85.

CI 91 SC 91.5.1 P134 L24 # 114  
Remein, Duane Alcatel-Lucent

Comment Type TR Comment Status A

My understanding is that MAC timing requirements were to remain unchanged. Given that Toff (max) is an integral part of MAC timing this parameter should be 512 ns (same as c60 upstream PMDs).

#### SuggestedRemedy

Set Toff in Table 91-12 to 512 (ns) for both 10GBASE-PR-U1 and 10GBASE-PR-U3.

Response Response Status C

ACCEPT.

CI 91 SC 91.5.1 P134 L30 # 189  
Lin, Rujian Shanghai Luster Terab

Comment Type T Comment Status A

MH: Table 91-12 is affected  
Set Transmitter and dispersion penalty(max) to be 3.0dB

#### SuggestedRemedy

In measurement on TDP, it is important, but difficult to define an ideal transmitter which in theoretic concept is a transmitter with perfect driving waveform, perfect laser response, no optical delay, minimum line-width, no chirp and minimum relative intensity noise, because TDP = Receiver sensitivity in the case of test Tx with the worst fiber link  $\epsilon_{\alpha}$  Receiver sensitivity in the case of ideal Tx with pure attenuation (without fiber chromatic dispersion, PMD and optical reflection)  
So I think that in the Draft we need to set up a definition on ideal Tx for TDP test.  
For the TDP values I think that the data proposed by Dr. Hiroshi Hamano- 1.5dB for 1574-1580nm downstream and 3.0dB for 1260-1360nm upstream- is reasonable and a good start point for further investigation.

Response Response Status C

ACCEPT.  
See comment #392.

CI 91 SC 91.5.1 P135 L22 # 115  
Remein, Duane Alcatel-Lucent

Comment Type TR Comment Status A

My understanding is that MAC timing requirements were to remain unchanged. Given that Toff (max) is an integral part of MAC timing this parameter should be 512 ns (same as c60 upstream PMDs).

#### SuggestedRemedy

Set Toff in Table 91-13 to 512 (ns) for both 10/1GBASE-PRX-U3.

Response Response Status C

ACCEPT.  
See comment #114.



**Cl 91**    **SC 91.5.1**                      **P135**        **L27**                      # 190  
Lin, Rujian                                      Shanghai Luster Terab

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

MH: Table 91-13 is affected  
Set Transmitter and dispersion penalty(max) to be 3.0dB

*SuggestedRemedy*

In measurement on TDP, it is important, but difficult to define an ideal transmitter which in theoretic concept is a transmitter with perfect driving waveform, perfect laser response, no optical delay, minimum line-width, no chirp and minimum relative intensity noise, because TDP = Receiver sensitivity in the case of test Tx with the worst fiber link £<sup>2</sup>  
Receiver sensitivity in the case of ideal Tx with pure attenuation (without fiber chromatic dispersion, PMD and optical reflection)  
So I think that in the Draft we need to set up a definition on ideal Tx for TDP test.  
For the TDP values I think that the data proposed by Dr. Hiroshi Hamano- 1.5dB for 1574-1580nm downstream and 3.0dB for 1260-1360nm upstream- is reasonable and a good start point for further investigation.

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

ACCEPT IN PRINCIPLE.  
See comment #417.

**Cl 91**    **SC 91.5.1**                      **P135**        **L34**                      # 297  
Dawe, Piers                                      Avago Technologies

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

for 10GBASE-PR-U1, 10GBASE-PR-U3, 10/1GBASE-PRX-U1 and 10/1GBASE-PRX-U3 PMDs are shown, respectively, in Table 91-14, Table 91-15, Table 91-16, Table 91-18 and Table 91-19.

*SuggestedRemedy*

for 10GBASE-PR-U1, 10GBASE-PR-U3, 10/1GBASE-PRX-U1, 10/1GBASE-PRX-U2 and 10/1GBASE-PRX-U3 PMDs are shown, respectively, in Table 91-14, Table 91-15, Table 60-4, Table 60-7 and Table 91-16.

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

ACCEPT IN PRINCIPLE.  
RMS for 10/1GBASE-PRX-U1, 10/1GBASE-PRX-U2 and 10/1GBASE-PRX-U3 PMDs needs to reference respectively tables Table 60-4, Table 60-7 and Table 91-16. 10GBASE-PR-U1, 10GBASE-PR-U3 PMDs will not use the RMS at all - see comment #194.

**Cl 91**    **SC 91.5.1**                      **P135**        **L39**                      # 105  
Remein, Duane                                      Alcatel-Lucent

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

Recommend combining Tables 91-14, 91-15 and 91-16 (readability).

*SuggestedRemedy*

Combine Tables 91-14, 91-15 and 91-16.

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

ACCEPT IN PRINCIPLE.  
See comment #194.

**Cl 91**    **SC 91.5.1**                      **P135**        **L48**                      # 172  
Lin, Rujian                                      Shanghai Luster Terab

**Comment Type**    **E**                      **Comment Status**    **R**

MH: Table 91-14 is affected  
These limits for 10GBASE-PR10-U transmitter are illustrated in Figure 91-34.

*SuggestedRemedy*

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

REJECT.  
Lack of suggested remedy.  
See comment #194.

**Cl 91**    **SC 91.5.1**                      **P136**        **L10**                      # 181  
Lin, Rujian                                      Shanghai Luster Terab

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

MH: Table 91-15, 91-16 are affected  
These limits for 10GBASE-PR10-U transmitter are illustrated in Figure 91-34.

*SuggestedRemedy*

Add Figure 91-4 10GBASE-PR-U transmitter spectral limits on Page 136.

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

ACCEPT IN PRINCIPLE.  
See comment #194.

Cl 91 SC 91.5.1 P137 L13 # 365  
 Suzuki, Ken-Ichi NTT  
 Comment Type TR Comment Status A  
 Values of Stressed receive sensitivity OMA (max) (dBm) are not coincident with those of Stressed receive sensitivity OMA (max) (uW)  
 SuggestedRemedy  
 Check and correct the equation on the spread sheet.  
 Response Response Status C  
 ACCEPT.  
 See comment #85.

Cl 91 SC 91.5.1 P137 L47 # 383  
 Toshiaki, Mukojima Oki Electric Industry C  
 Comment Type E Comment Status A  
 Delete unmapped PR PMD class name "10GBASE-PR-U2"  
 SuggestedRemedy  
 Response Response Status C  
 ACCEPT.  
 See comment #74.

Cl 91 SC 91.5.1 P138 L47 # 405  
 Chang, Frank Vitesse  
 Comment Type TR Comment Status R  
 Same as comment #5.  
 SuggestedRemedy  
 Response Response Status C  
 REJECT.  
 Unable to track comment ID number.

Cl 91 SC 91.5.1 P139 L # 418  
 Chang, Frank Vitesse  
 Comment Type TR Comment Status A Deferred  
 B++ 29dB??  
 SuggestedRemedy  
 Suggest add ER=6dB and calculate launching power accordingly.  
 Response Response Status W  
 ACCEPT.  
 See comment #417.  
 Commenter refers to 3av\_c91\_1\_0\_markup.pdf, Table 91-17.  
 The launch power will be calculated using the approved version of the channel link model (v2.1).

Cl 91 SC 91.5.1 P140 L # 412  
 Chang, Frank Vitesse  
 Comment Type TR Comment Status R  
 same as comment #7.  
 SuggestedRemedy  
 Response Response Status C  
 REJECT.  
 Unable to track comment ID number.

Cl 91 SC 91.5.2 P136 L34 # 173  
 Lin, Rujian Shanghai Luster Terab  
 Comment Type E Comment Status A  
 91.8.11. Either  
 SuggestedRemedy  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 I assume that the line "91.8.11 Either the damage threshold" is to be changed to "91.8.11. Either the damage threshold".

**Cl 91**    **SC 91.5.2**                      **P136**        **L36**                      # 75  
Marek, Hajduczenia                      Nokia Siemens Networ

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

Table 91-17 contains reference to the 10GBASE-PR-U2 PMD, which does not exist since the PR10 and PR20 ONU PMDs are to identical.

**SuggestedRemedy**

Table 91-17 needs to be separated into the symmetric PMD and asymmetric PMD definitions i.e. Table 91-17 would contain the specifications for the 10GBASE-PR-U1 and 10GBASE-PR-U3, while the new Table 91-18 would contain the specifications for the 10/1GBASE-PRX-U1, 10/1GBASE-PRX-U2 and 10/1GBASE-PRX-U3. If in the course of the further development, 10/1GBASE-PRX-U1 and 10/1GBASE-PRX-U2 is found to share the same parameters, the Table 91-17 and Table 91-18 could be marked again.

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

ACCEPT.  
Remove the reference to the 10GBASE-PR-U2 only.

**Cl 91**    **SC 91.5.2**                      **P137**        **L1**                      # 298  
Dawe, Piers                                      Avago Technologies

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

Run-on part of table split over a page break should be titled Table n-n ... (continued)

**SuggestedRemedy**

Assuming the editor used the current template - get the template keeper to fix it.

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

ACCEPT.

**Cl 91**    **SC 91.5.2**                      **P140**        **L47**                      # 381  
Toshiaki, Mukojima                      Oki Electric Industry C

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

Delete unmapped PR PMD class name "10GBASE-PR-U2"

**SuggestedRemedy**

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

ACCEPT.

**Cl 91**    **SC 91.5.2**                      **P141**        **L**                      # 408  
Chang, Frank                                      Vitesse

**Comment Type ER**        **Comment Status R**

same as comment #8

**SuggestedRemedy**

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

REJECT.  
Unable to track comment ID number.

**Cl 91**    **SC 91.6**                                      **P138**        **L21**                      # 336  
Dawe, Piers                                      Avago Technologies

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

The allocations for penalties are too small. Remember, in 802.3 it's all penalties including those in the transmitter - not just path penalty/dispersion penalty. I've made this comment a TR because it may take more than one ballot cycle to get to a complete set of spec numbers for these tables.

**SuggestedRemedy**

Assuming channel insertion loss (max) is as intended, increase the allocations for penalties and increase the available power budget in step. Here and DS allocations in Table 19.

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

REJECT.  
Lack of precise values for the increase in the allocation for penalties and the available power budget.

**Cl 91**    **SC 91.6**                                      **P138**        **L36**                      # 67  
Marek, Hajduczenia                      Nokia Siemens Networ

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

Table 91-19 indicates significant differences for Channel insertion loss (min) and Allocation for penalties for the DS and US channels. The 1 Gbps specs should be aligned with the new power budget specifications to remain comparable with the 10 Gbps channel specs.

**SuggestedRemedy**

Align the channel link model for 1 Gbps and 10 Gbps links by e.g. recalculating the 1 Gbps channel models in the new link model spreadsheet. Then use the penalty and channel insertion values which are required to make the system work.

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

This comment was WITHDRAWN by the commenter.

Cl 91 SC 91.6 P138 L5 # 106  
 Remein, Duane Alcatel-Lucent

Comment Type T Comment Status A

Table 91-18; Nominal distance is a misleading term to the casual user.

This comment also applies to Table 91-19

*SuggestedRemedy*

Add a note the "Nominal distance refers to the expected maximum distance a PMD will be capable of achieving in a typical ODN, numerous ODN implementation practices may result in longer or shorter distances being actually achievable in a users' network."

Response Response Status C

ACCEPT.

Cl 91 SC 91.6 P141 L # 419  
 Chang, Frank Vitesse

Comment Type TR Comment Status R

Nowhere indicate assumptions on optical loss and attn. calculated in spreadsheet.

*SuggestedRemedy*

Suggest to add optical loss and attn. table with assumptions of the number of connectors.

Response Response Status C

REJECT.

The 1G EPON standard does not define the number of fibre connectors to be used in the PON plant. It is inappropriate to define such a parameter in 10G EPON specs. We have the ChIL which includes all the loss for the passive PON plant and it is up to the system implementer to chose how to use the allocated dBs.

Cl 91 SC 91.6 P142 L # 409  
 Chang, Frank Vitesse

Comment Type ER Comment Status R

Same as comment #2.

*SuggestedRemedy*

Response Response Status W

REJECT.

Unable to track comment ID number.

Cl 91 SC 91.6 P142 L # 406  
 Chang, Frank Vitesse

Comment Type TR Comment Status D Deferred

Is the link closed with allocation for penalties?

*SuggestedRemedy*

Add DS/US jitter budget table and revisit the allocation for penalties.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

At the moment, the link is closed with allocation for penalties. The feedback from the jitter ad-hoc is expected at the March meeting, when the appropriate allocation for jitter can be added.

Cl 91 SC 91.8 P139 L22 # 332  
 Dawe, Piers Avago Technologies

Comment Type T Comment Status A

For this 'Environmental, safety, and labeling' section you might start by copying 68.7 (except the NOTE) - it's short and simple.

*SuggestedRemedy*

For this section you might start by copying 68.7 (except the NOTE) - it's short and simple. Then you can choose to say 'as defined in 52.10.1' or 'as defined in 60.8.1' and so on - the differences are not great.

Response Response Status C

ACCEPT IN PRINCIPLE.

Copy the contents of 68.7 with appropriate changes to subclause 91.8.

Cl 91 SC 91.9 P134 L # 414  
 Chang, Frank Vitesse

Comment Type TR Comment Status R

Table 91-9, 9-13 Wavelength (range) not appropriate.  
 MH: Page 135 is also affected

*SuggestedRemedy*

Change Wavelength (range) to Center wavelength (range), typically for DFB type lasers.

Response Response Status C

REJECT.

See the accepted baseline proposals which included the wavelength ranges.

**Cl 91**    **SC 91.9**                      **P139**    **L26**                      # 333  
Dawe, Piers                              Avago Technologies

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

For this 'Characteristics of the fiber optic cabling' section

**SuggestedRemedy**

Copy or reference 60.9 or its sections?

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

ACCEPT IN PRINCIPLE.

Replace the text "1:16" in Figure 60-10 and in the note with text "1:16 or 1:32".

**Cl 92**    **SC 92**                              **P299**    **L1**                              # 338  
Lynskey, Eric                              Teknovus

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

The headings on even and odd pages are not consistent. On all odd pages, the header uses "EEE" instead of IEEE. On all even pages, the header uses Draft 0.91 instead of 1.0.

**SuggestedRemedy**

Replace "EEE" with "IEEE". Modify headings so that both even and odd pages use the same header information and are updated appropriately for the next draft number.

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

ACCEPT.

**Cl 92**    **SC 92.1**                              **P299**    **L1**                              # 1  
Lynskey, Eric                              Teknovus

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

Every line of text does not have a line number. In addition, each page has two lines marked as line number 24.

**SuggestedRemedy**

Fix line numbering to match that of Clause 64 and 91.

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

ACCEPT.

(Resolved at November 2007 TF meeting)

**Cl 92**    **SC 92.1.1**                              **P299**    **L12**                              # 68  
Marek, Hajduczenia                              Nokia Siemens Networ

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

The initial description of the system should be more specific i.e. "This subclause extends Clause 46 to enable multiple data link layers to interface with a single physical layer. This subclause also extends Clause 65 to enable asymmetrical data links which transmit at one rate and receive at a different rate." needs changes

**SuggestedRemedy**

Change to "This subclause extends Clause 46 to enable multiple data link layers to interface with a single physical layer and Clause 65 to enable asymmetrical data links, transmitting at one data rate (e.g. 10 Gb/s) and receive in another data rate (e.g. 1 Gb/s)."

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

ACCEPT.

**Cl 92**    **SC 92.1.1**                              **P300**    **L1**                              # 80  
Marek, Hajduczenia                              Nokia Siemens Networ

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

Figure 92-1 is not correct - in the case of symmetric data rate PMD, only XGMII will be available, in the case of asymmetric data rate PMD, the XGMII and GMII will be used in only one transmission direction e.g. GMII for Tx and XGMII for Rx or vice versa.

**SuggestedRemedy**

Correct the figure to reflect the connection between the PMD and the RS. It is suggested to split the figure into 2 and depict the symmetric and asymmetric data rate PMD connection separately.

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

ACCEPT IN PRINCIPLE.

Duplicate figure 91-1 with necessary modifications to show 10G symmetric and asymmetric cases.

**Cl 92**      **SC 92.1.1.1**                      **P300**                      **L18**                      # 400  
Mandin, Jeff                                      PMC Sierra

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

Description of transmit direction behaviour of an asymmetric RS is unclear.

**SuggestedRemedy**

Modify as lines 18-?? as follows:

As described in 64.1.2, multiple MACs within an OLT are bound to a single GMII, while at the ONU a single MAC is bound to the GMII. The multipoint control protocol (MPCP) ensures that only one MAC is transmitting at any one time. Correspondingly, only one PLS\_DATA.request primitive is active at any time.

For 10G links, the mechanism is extended to allow the MAC to be bound to a single XGMII, or to a GMII transmit path and an XGMII receive path (in the case of an asymmetric ONU), or to an XGMII transmit path and a GMII receive path (in the case of an asymmetric OLT).

In the transmit direction, the RS maps the active PLS\_DATA.request to either the GMII signals (TXD<7:0>, TX\_EN, TX\_ER, and GTX\_CLK) or the XGMII signals (TXD<31:0>, TXC<3:0>, and TX\_CLK) according to the MAC instance generating the request. The RS replaces octets of preamble with the values of the transmitting MAC's MODE and LLID variables.

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

ACCEPT IN PRINCIPLE.

Change

From:

"As described in 64.1.2, multiple MACs within an OLT are bound to a single GMII, while at the ONU a single MAC is bound to the GMII. The multipoint control protocol (MPCP) ensures that only one MAC is transmitting at any one time. This is extended to allow the MAC to be bound to a single XGMII, or to a GMII transmit path and an XGMII receive path (in the case of an asymmetric ONU), or to an XGMII transmit path and a GMII receive path (in the case of an asymmetric OLT). Only one PLS\_DATA.request primitive is active at any time. The active PLS\_DATA.request is mapped to either the GMII signals (TXD<7:0>, TX\_EN, TX\_ER, and GTX\_CLK) or the XGMII signals (TXD<31:0>, TXC<3:0>, and TX\_CLK). The RS replaces octets of preamble with the values of the transmitting MAC's MODE and LLID variables."

To:

"As described in 64.1.2, multiple MACs within an OLT are bound to a single GMII, while at the ONU a single MAC is bound to the GMII. The multipoint control protocol (MPCP) ensures that only one MAC is transmitting at any one time. Correspondingly, only one PLS\_DATA.request primitive is active at any time.

For 10G links, the mechanism is extended to allow the MAC to be bound to a single XGMII, or to a GMII transmit path and an XGMII receive path (in the case of an asymmetric ONU), or to an XGMII transmit path and a GMII receive path (in the case of an asymmetric OLT).

In the transmit direction, the RS maps the active PLS\_DATA.request to either the GMII signals (TXD<7:0>, TX\_EN, TX\_ER, and GTX\_CLK) or the XGMII signals (TXD<31:0>,"

TXC<3:0>, and TX\_CLK) according to the MAC instance generating the request. The RS replaces octets of preamble with the values of the transmitting MAC's MODE and LLID variables."

**Cl 92**      **SC 92.1.1.3**                      **P301**                      **L1**                      # 396  
Mandin, Jeff                                      PMC Sierra

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

The "Rate of operation" subclause does not belong here.

The parallel subclause of clause 46 pertains to the rate of the XGMII and is still applicable to 10GEPON.

**SuggestedRemedy**

1. Delete 92.1.1.3 (line rates are specified in the appropriate PMD clauses)

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

ACCEPT.

**Cl 92**      **SC 92.1.2.2**                      **P301**                      **L11**                      # 398  
Mandin, Jeff                                      PMC Sierra

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

Carrier Sense backoff is used in both directions not just downstream

**SuggestedRemedy**

Delete "in the downstream direction" so that the text reads:

For 10 GEPON the CRS signal is used to defer the MAC to allow the PCS to insert FEC parity bytes.

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

ACCEPT.

**Cl 92**      **SC 92.1.2.2**                      **P301**                      **L8**                      # 368  
Suzuki, Ken-Ichi                                      NTT

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

"Mapping of" of Sub-clause title "Mapping of PLS\_CARRIER.indication in XGMII Structure" may be written in a different font.

**SuggestedRemedy**

Check the font style. If so, rewrite "UnprotectedBlockCount -= 28" in the same font.

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

ACCEPT.

Change

From: Times New Roman

To: Arial

CI 92 SC 92.1.2.2 P301 L9 # 369  
 Suzuki, Ken-Ichi NTT  
 Comment Type E Comment Status A  
 "The XGMII Structure" may be a typo.  
 SuggestedRemedy  
 Recommend you replace "Structure" by "structure".  
 Response Response Status C  
 ACCEPT.

CI 92 SC 92.1.2.2 P304 L2 # 370  
 Suzuki, Ken-Ichi NTT  
 Comment Type E Comment Status A  
 "0x7FFE or 0xFFE a" may be a type.  
 SuggestedRemedy  
 Replace ""0x7FFE or 0xFFE a" by ""0x7FFF or 0xFFE"  
 Response Response Status C  
 ACCEPT.  
 See comment 81

CI 92 SC 92.1.2.2.5 P302 L8 # 339  
 Lynskey, Eric Teknovus  
 Comment Type E Comment Status A  
 In Figure 92-2, the acronym UTC is incorrect, and should be replaced with UCT.  
 SuggestedRemedy  
 Replace UTC with UCT on lines 8 (leaving INIT state), and twice on line 22 (leaving Clear CRS state and Set CRS state).  
 Response Response Status C  
 ACCEPT.

CI 92 SC 92.1.2.3.2 P303 L2 # 399  
 Mandin, Jeff PMC Sierra  
 Comment Type T Comment Status A  
 No need to discuss 66b code position in 10G RS transmit text.  
 Just point back to the EPON text.  
 In 1G this discussion was needed because 8b/10b code caused variable preamble length.  
 SuggestedRemedy  
 1. Delete "except as noted below" from 92.1.2.3.2  
 2. Delete 92.1.2.3.2.1, 92.1.2.3.2.2, 92.1.2.3.2.3  
 Response Response Status C  
 ACCEPT.  
 Also see Comment 2 and 350.

CI 92 SC 92.1.2.3.2.1 P303 L6 # 340  
 Lynskey, Eric Teknovus  
 Comment Type E Comment Status A  
 SGMII is not a valid interface.  
 SuggestedRemedy  
 Replace SGMII with XGMII.  
 Response Response Status C  
 ACCEPT.

**Cl 92**      **SC 92.1.2.3.2.1**      **P303**      **L6**      # 350  
Lynskey, Eric      Teknovus

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

A compliant 10G reconciliation sublayer will always align the Start control character to lane 0. This does not depend on whether or not deficit idle count is supported. Also, the third byte of preamble will be in lane 2 and not lane 3.

The extra text in this subclause seems overly confusing and is not necessary. The first sentence of the subclause is all that is needed, and this is already captured in Clause 65. Like we are doing with some of the other fields, we should just reference Clause 65 here.

**SuggestedRemedy**

Option 1: Remove all text from this subclause and insert the following sentence, "The SLD field is as described in 65.1.3.2.1".

Option 2: Replace third paragraph in this subclause with the following: "When using the XGMII, the Start control character replaces the first preamble octet and is always aligned to lane 0. Therefore, the SLD will appear in lane 2 of the same column containing the Start control character."

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

ACCEPT IN PRINCIPLE.  
See comment # 399

**Cl 92**      **SC 92.1.2.3.2.1**      **P303**      **L6**      # 2  
Lynskey, Eric      Teknovus

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

The /S/ code-group may only be transmitted in lane 0.

**SuggestedRemedy**

Replace paragraph with the following. "When using the XGMII, the Start control character will be transmitted in lane 0, and thus the SLD will appear in lane 3 in the same column that contains the start control character."

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

ACCEPT IN PRINCIPLE.  
Also see Comment 399

(Resolved at November 2007 TF meeting)

**Cl 92**      **SC 92.1.2.3.3.1**      **P303**      **L14**      # 401  
Mandin, Jeff      PMC Sierra

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

No need to discuss 66b code position in 10G RS receive text.

In 1G this discussion was needed because the amount of preamble received actually varies when the 8b/10b code is employed.

LLID text is needed however as it is different from GEPON.

**SuggestedRemedy**

Delete 92.1.2.3.3.1 ("SLD" subclause)

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

ACCEPT.  
See Comment 3.

**Cl 92**      **SC 92.1.2.3.3.1**      **P303**      **L16**      # 3  
Lynskey, Eric      Teknovus

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

The SLD should only be received in lane 3 of the same column that contains the start control character.

**SuggestedRemedy**

Replace paragraph with, "When using the XGMII, the start control character will be received in lane 0, and the SLD will be received in lane 3 of the same column that contains the start control character."

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

ACCEPT IN PRINCIPLE.  
See comment 401

(Resolved at November 2007 TF meeting)



Cl 92 SC 92.1.2.3.3.2 P303 L22 # 81  
Marek, Hajduczenia Nokia Siemens Network

Comment Type T Comment Status R

"If the received logical\_link\_id value matches 0x7FFF or 0x7FFE and an enabled MAC exists with a logical\_link\_id variable with the same value then the comparison is considered a match to that MAC." - hexadecimal numbers are represented in the xx-xx-...-xx format.

*SuggestedRemedy*

replace all 0x7FFF with 07-FF and 0x7FFE with 7F-FE.

Response Response Status C

REJECT.

This comment was WITHDRAWN by the commenter.

Cl 92 SC 92.1.2.3.3.2 P304 L1 # 393  
Mandin, Jeff PMC Sierra

Comment Type T Comment Status A

Duplicate text

*SuggestedRemedy*

Modify text:

b) If the received mode bit is 1 and the received logical\_link\_id value does not match the logical\_link\_id variable, or the received logical\_link\_id matches 0x7FFE or 0x7FFE a, then the comparison is considered a match.

Response Response Status C

ACCEPT.

Change to:

"If the received mode bit is 1 and the received logical\_link\_id value does not match the logical\_link\_id variable, or the received logical\_link\_id matches 0x7FFE, then the comparison is considered a match."

Cl 92 SC 92.2.1 P304 L10 # 395  
Mandin, Jeff PMC Sierra

Comment Type E Comment Status A

Incorrect clause reference

*SuggestedRemedy*

Change text to say: "This subclause extends the physical coding sublayer described in Clause 49"

Response Response Status C

ACCEPT.

Cl 92 SC 92.2.1 P304 L12 # 351  
Lynskey, Eric Teknovus

Comment Type T Comment Status A

Auto-Negotiation, as defined in Clause 37, is only applicable for devices with a Clause 36 PCS. There is currently no Auto-Negotiation defined for 10 Gb/s devices using a fiber network. Since this subclause is dealing with extensions of the Clause 49 PCS, there is no need to mention Auto-Negotiation.

*SuggestedRemedy*

Remove the two sentences referring to Auto-Negotiation.

Response Response Status C

ACCEPT.

Cl 92 SC 92.2.1 P304 L13 # 358  
Lynskey, Eric Teknovus

Comment Type TR Comment Status A

The sentence prohibiting the use of a XAUI interface within the ONU seems overly forceful and inappropriate. The combination of XGXS and XAUI layers are meant to be transparent to the rest of the stack. It is not a good idea to specifically prohibit this optional, and highly used, interface.

The original motion for this came about because there was some concern that errors occurring on the XAUI interface could mistakenly cause the ONU laser to turn on out of its slot. In practical implementations, this will not be an issue.

*SuggestedRemedy*

Remove this sentence.

Response Response Status C

ACCEPT.

In favor as proposed: 10  
Opposed: 0  
Abstain: 13

**Cl 92**    **SC 92.2.1**                      **P304**        **L24**        # 371  
Suzuki, Ken-Ichi                              NTT

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

"GMII/XGMII" is not coincident with the abbreviation for "GIGABIT MEDIA INDEPENDENT INTEFASES" and I do not think Figure 92.3 needs the description of GMII.

**SuggestedRemedy**  
Replace "GMII/XGMII == GIGABIT MEDIA INDEPENDENT INTEFASES" by "XGMII = GIGABIT MEDIA INDEPENDENT INTEFASES"

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

ACCEPT IN PRINCIPLE.  
Figure will be replaced with one similar to Figure 91-1.

**Cl 92**    **SC 92.2.1**                      **P305**        **L8**        # 341  
Lynskey, Eric                                      Teknovus

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

Typo.

**SuggestedRemedy**  
Replace "ts-raw" with "tx\_raw".

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

ACCEPT.

**Cl 92**    **SC 92.2.2**                      **P305**        **L5**        # 352  
Lynskey, Eric                                      Teknovus

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

The start of frame is always aligned to Lane 0 of the XGMII interface. There are two possible locations for a start of frame when talking about the 64-bit blocks used in Clause 49. The proposal is to align to the first of these locations.

**SuggestedRemedy**  
Replace first sentence of this paragraph with, "Two consecutive XGMII transfers provide eight characters that are encoded into one 66-bit transmission block. To increase burst efficiency the start of a burst is aligned to the first of these two transfers."

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

ACCEPT IN PRINCIPLE.  
(Also see 3av\_0801\_remain\_2.pdf)  
Change  
From:  
"To increase burst efficiency it is desirable to align the start of a burst to Lane 0 of the XGMII interface. If this is not done ..."

To:  
"Two consecutive XGMII transfers provide eight characters that are encoded into one 66-bit transmission block. To increase burst efficiency the start of a burst is aligned to the first of these two transfers. If this is not done ..."

Add reference to state machine (Figure 92-8).

**Cl 92**    **SC 92.2.2.1**                      **P306**        **L14**        # 69  
Marek, Hajduczenia                              Nokia Siemens Networ

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

In the Figure 92-4, there is a spelling mistake in one of the blocks i.e. "SYNCRONIZER". The same holds true for Figure 92-5.

**SuggestedRemedy**  
Replace with the "SYNCHRONIZER"

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

ACCEPT.

Cl 92 SC 92.2.2.1 P307 L22 # 353  
Lynskey, Eric Teknovus

Comment Type T Comment Status D

There is no such thing as an // ordered\_set in the Clause 49 PCS. Another thing to think about is whether we need to have idle here or if other control codes, such as sequence ordered sets, can also be used.

*SuggestedRemedy*

Replace // ordered\_sets with "idle control characters".

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

(Also see 3av\_0801\_remein\_2.pdf)

Change

From:

"Upon initialization, the FIFO buffer is filled with // ordered\_sets and the laser is turned off. When the first code-group that is not // arrives at the buffer, the Data Detector sets the PMD\_SIGNAL.request(tx\_enable) primitive to the value ON, instructing the PMD sublayer to start the process of turning the laser on (see Figure 92-5).

When the buffer empties of data (i.e., contains only // ordered\_sets), the Data Detector sets the PMD\_SIGNAL.request(tx\_enable) primitive to the value OFF, instructing the PMD sublayer to start the process of turning the laser off. Between packets, // or /R/ ordered\_sets will arrive at the buffer. If the number of these // or /R/ ordered\_sets is insufficient to fill the buffer then the laser is not turned off."

To:

"Upon initialization, the FIFO buffer is filled with idle control characters and the laser is turned off. When the first code-group that is not idle arrives at the buffer, the Data Detector sets the PMD\_SIGNAL.request(tx\_enable) primitive to the value ON, instructing the PMD sublayer to start the process of turning the laser on (see Figure 92-5).

When the buffer empties of data (i.e., contains only idle control characters), the Data Detector sets the PMD\_SIGNAL.request(tx\_enable) primitive to the value OFF, instructing the PMD sublayer to start the process of turning the laser off. Between packets, idle control characters will arrive at the buffer. If the number of these idle control characters is insufficient to fill the buffer then the laser is not turned off."

Cl 92 SC 92.2.2.1 P307 L24 # 112  
Remein, Duane Alcatel-Lucent

Comment Type ER Comment Status A

Figure references appear to be out of sequence (1 off) example: "... to start the process of turning the laser on (see Figure 92-5)". should be Figure 92-6.

*SuggestedRemedy*

Correct references.

Response Response Status C

ACCEPT.

Cl 92 SC 92.2.2.1 P308 L3 # 8  
Effenberger, Frank Huawei Technologies,

Comment Type TR Comment Status A

The paragraph mentions the synchronization pattern as "1010..." and the SOD as a "Barker link sequence." The former is inaccurate in comparison with the baseline (which used 0101...), and the later is non-specific, since we definitely need to specify the SOD.

*SuggestedRemedy*

We recommend changing the synchronization pattern to "0101...".

Also, we recommend specifying the SOD to be the pattern "0x 1 16A2 DC69 F0CD EE40" This pattern, which is different from the example given in the baseline, has a hamming distance of 32 from all shifts of itself and the synchronization pattern 0101..., which seems to be the best possible distance for a 66 bit pattern. It has a max run length of 6, and is has a balance of 32/34 bits of 1/0.

Response Response Status C

ACCEPT IN PRINCIPLE.

(Also see 3av\_0801\_remein\_2.pdf)

Change

From:

"The ONU burst transmission begins with a synchronization patter (binary 1010...) which facilitates receiver clock recovery and gain control at the OLT. To facilitate byte level synchronization the ONU transmits a 66 bit Start of Data (SOD) delimiter composed of a Barker link sequence (see Figure 92-7). When received at the OLT the delimiter allows byte alignment of the incoming data stream, even in the presence of bit errors. The SOD is followed by @tbd (two)@ IDLE blocks which are used to synchronize the SCRAMBLER at the OLT.

To:

"The ONU burst transmission begins with a synchronization pattern 0x55.. (binary 0101...) which facilitates receiver clock recovery and gain control at the OLT. To facilitate FEC codeword synchronization the ONU transmits a 66-bit BURST\_DELIMITER (see Figure 92-7). When received at the OLT the delimiter allows FEC codeword alignment of the incoming data stream, even in the presence of bit errors. The BURST\_DELIMITER is followed by one IDLE block which is used to synchronize the descrambler and one IDLE block to provide IPG at the OLT. These two IDLE blocks are part of the FEC codeword."

Ensure SOD definition is included in proper format.

Cl 92 SC 92.2.2.1 P308 L3 # 372  
 Suzuki, Ken-Ichi NTT  
 Comment Type E Comment Status A  
 "patter" must be a typo.  
 SuggestedRemedy  
 Replace "patter" by "pattern".  
 Response Response Status C  
 ACCEPT.

Cl 92 SC 92.2.2.1 P308 L5 # 70  
 Marek, Hajduczenia Nokia Siemens Networ  
 Comment Type T Comment Status A  
 "The SOD is followed by @tbd (two)@ IDLE blocks which are used to synchronize the SCRAMBLER at the OLT."  
 SuggestedRemedy  
 Replace with "The SOD is followed by two IDLE blocks which are used to synchronize the SCRAMBLER at the OLT."  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change to "two" pending any additional motions resulting from 3av\_0801\_effenberger\_2.pdf

Cl 92 SC 92.2.2.1 P308 L7 # 343  
 Lynskey, Eric Teknovus  
 Comment Type E Comment Status A  
 Figure 92-6 has been copied from Clause 65 but is not correct for 10G FEC operation.  
 SuggestedRemedy  
 Replace figure.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 New figure to be presented (3av\_0801\_remain\_1.pdf) during Task Force meeting in Portland.

Cl 92 SC 92.2.2.1 P309 L15 # 82  
 Marek, Hajduczenia Nokia Siemens Networ  
 Comment Type T Comment Status A  
 "Required number of sync blocks per burst. The value of this constant is derived from Sync-Time parameter passed from the OLT to ONUs.64.3.3.2" - incomplete. Additionally, 64.3.3.2 defines syncTime and not Sync-Time variable.

SuggestedRemedy  
 Change to something like this "Required number of sync blocks per burst. The value of this constant is derived from syncTime parameter passed from the OLT to ONUs. See 64.3.3.2 for details."

Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 (Also see 3av\_0801\_remain\_2.pdf)  
 Change  
 From:  
 "Required number of sync blocks per burst. The value of this constant is derived from SyncTime parameter passed from the OLT to ONUs.64.3.3.2"  
 To:  
 "Required number of sync blocks per burst. The value of this constant is derived from syncTime parameter passed from the OLT to ONUs. See 64.3.3.2 for details."

Cl 92 SC 92.2.2.2.1 P305 L8 # 107  
 Remein, Duane Alcatel-Lucent  
 Comment Type E Comment Status A  
 Typo "ts-raw,71:0>"  
 SuggestedRemedy  
 Replace with "ts-raw<71:0>"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Replace with ts\_raw<71:0>  
 see comment 341

Cl 92 SC 92.2.2.2.1 P309 L13 # 7  
 Effenberger, Frank Huawei Technologies,

Comment Type TR Comment Status A

The constant "BURST\_DELIMITER" is defined, but this is substantially the same as the "Start of Data" concept. Also, the definition is incomplete.

*SuggestedRemedy*

We should change all occurrences of "BURST\_DELIMITER" to "SOD", or alternatively we change "SOD" to "BURST\_DELIMITER". One way or the other, I don't care.

Change definition to read:

BURST\_DELIMITER

TYPE: 66 bit unsigned

A 66-bit value used to find the beginning of the first FEC codeword in the upstream burst

Default: 0x 1 16A2 DC69 F0CD EE40

Response Response Status C

ACCEPT.

Resolved at November 2007 TF meeting

Will Globaly replace "SOD" with "BURST\_DELIMITER"

Change definition to read:

BURST\_DELIMITER

TYPE: 66 bit unsigned

A 66-bit value used to find the beginning of the first FEC codeword in the upstream burst

Default: 0x 1 16A2 DC69 F0CD EE40

Cl 92 SC 92.2.2.2.1 P309 L6 # 64  
 Marek, Hajduczenia Nokia Siemens Networ

Comment Type E Comment Status R

The Constants and Variables are typically started with lower case ...

*SuggestedRemedy*

Align with the capitalization in Caluse 65, 64 and others.

Response Response Status C

REJECT.

Clause 65 uses All CAPS, Capatilized and lower-case variaables. Examples:

65.2.2.2.1 Variables

BEGIN

DelayBound

dtx\_code-group

Cl 92 SC 92.2.2.2.3 P310 L24 # 83  
 Marek, Hajduczenia Nokia Siemens Networ

Comment Type T Comment Status A

"IsIdle(tx\_code-group) This function is used to determine whether tx\_code-group is a code-group in //, the IDLE ordered\_set, or /C/, the Configuration ordered\_set. This function returns true if tx\_code-group is /K28.5/ or any code-group that follows a /K28.5/ or any two consecutive /D/ code-groups that follow /K28.5/D21.5/ or /K28.5/D2.2/. Otherwise, the IsIdle function returns false." - this definition needs to be different for 64B/66B code since the IDLE code group is encoded in a different way.

*SuggestedRemedy*

Aling with the 64B/66B code words definition for IDLE character, as defined in Table 49-1- Control codes. Observe that this function will work on the 64B/66B code words in the case of 10G transmsion and 8B/10B code words in the case of 1G transmission. This needs to be reflected properly in the function definition.

Response Response Status C

ACCEPT IN PRINCIPLE.

This function definition is a carry over from c65 and is not used in c92. The definition will be removed.

Also true for; FIFO.RemoveHead, FIFO.Append, PUDR and IdleLength. These will be removed also.

Cl 92 SC 92.2.2.2.3 P311 L6 # 71  
 Marek, Hajduczenia Nokia Siemens Networ

Comment Type E Comment Status R

Pseudo-code placement is not typical in the standard. What is the purpose of this code in this location?

*SuggestedRemedy*

Either keep it and format it accordingly, and refer to it in the text or replace with the text description. A flow chart could also be used to express the same processing step.

Response Response Status C

REJECT.

The pseudo code refered to is taken directly from the variable definition in

0703\_kramer\_1.pdf. See motion 7 from Geneva 2007 meeting:

"To accept as a baseline for FEC framing the presentations 0701\_effenberger\_1.pdf,

0703\_kramer\_1.pdf and 0705\_lynskey\_1.pdf."

passed

17 for

4 against

1st Frank Effenberger

2nd Erik Lynskey

Cl 92 SC 92.2.2.2.6 P312 L16 # 94  
 Daido, Fumio Sumitomo Electric Indu

Comment Type T Comment Status A

The mathematical formula in the Delete IDLE state is wrong.

*SuggestedRemedy*

Please change "VectorCount = FecRatio" to "VectorCount = VectorCount - FecRatio" or "VectorCount -= FecRatio".

Response Response Status C

ACCEPT IN PRINCIPLE.

Change

From:

"VectorCount = FecRatio"

To:

"VectorCount -= FecRatio"

Note: c92 State Diagrams need though review.

Cl 92 SC 92.2.2.3 P315 L17 # 193  
 Effenberger, Frank Huawei Technologies,

Comment Type T Comment Status A

A description of the "Synchronizer function" is needed.

*SuggestedRemedy*

I offer the following text as a building block, however, I leave it to the editors to determine how to splice this into the chapter, because the current outline structure is completely baffling to me. I suggest that it needs a thorough re-structure, maybe on the next go around, once we have all the parts.

The general approach taken here is to reuse the material from clause 49.2.9 and 49.2.13 as much as possible, with the minimum of additions. I have left the original section numbering intact, so the reader can see its source.

Subject to task-force motions, I assume that we are using RS(255,223) code, and so we are synchronizing to codewords that are 31 blocks long, and contain 4 blocks of parity. Also, we are using a parity block sync header pattern of 00, 11, 11, 00. This provides maximum Hamming distance, which is important for making this framing scheme provide lower false locking probability.

Add the following text where appropriate:

49.2.9 Codeword Synchronization

When the receive channel is operating in normal mode, the codeword synchronization function receives data via 16-bit PMA\_UNITDATA.request primitive. It shall form a bit stream from the primitives by concatenating requests with the bits of each primitive in order from rx\_data-group<0> to rx\_data-group<15> (see Figure 49-6). It obtains lock to the 31\*66-bit blocks in the bit stream using the sync headers and outputs 66-bit blocks, with the codeword structure being indicated by a locally generated sync header pattern. Lock is obtained as specified in the codeword lock state machine shown in Figure 92-X.

The incoming sync header pattern is 27 conventional (clause 49) sync headers (01 or 10), and then 00, 11, 11, and 00. The state machine performs a search for this pattern, and when it finds a perfect match of two full codewords (62 blocks), it then asserts codeword lock.

When codeword lock is true, the decoder guarantees that the sync header of the last block in the codeword will be "11", and that no other sync header will have this pattern, even in the face of errors. This is achieved by forcing the first 27 sync headers to be conventional headers, and forcing the last four headers to be 00, 00, 00, and 11. This locally forced pattern then allows the subsequent FEC decoder logic to find the last block in the codeword with a trivial match of the sync header to 11.

When in codeword lock, the state machine continues to check for sync header validity. If 16 or more sync headers in a codeword pair (62 blocks) are invalid, then the state machine deasserts codeword lock.

Add the following text where appropriate:

## 49.2.13 Detailed functions and state diagrams

## 49.2.13.1 State diagram conventions

The body of this subclause is comprised of state diagrams, including the associated definitions of variables, constants, and functions. Should there be a discrepancy between a state diagram and descriptive text, the state diagram prevails.

The notation used in the state diagrams follows the conventions of 21.5. State diagram timers follow the conventions of 14.2.3.2. The notation ++ after a counter or integer variable indicates that its value is to be incremented.

## 49.2.13.2 State variables

## 49.2.13.2.1 Constants

All the relevant constants defined in 49.2.13.2.1 are inherited. In addition, the following items are defined.

SH\_CW\_PATTERN[0..30]

31 element array of codeword sync header bit counts, where each element is set to the value 1 except for:

SH\_CW\_PATTERN[27]=0

SH\_CW\_PATTERN[28]=2

SH\_CW\_PATTERN[29]=2

SH\_CW\_PATTERN[30]=0

## 49.2.13.2.2 Variables

All the relevant variables defined in 49.2.13.2.2 are inherited. In addition, the following items are defined.

sh\_valid[i]

Boolean indication that is set true if received block rx\_coded has valid sync header bits for the supposed current position in the FEC codeword. That is, sh\_valid[i] is asserted if (rx\_coded<0> + rx\_coded<1>) == SH\_CW\_PATTERN[i mod 31] and de-asserted otherwise.

cword\_lock

Boolean variable that is set true when receiver acquires codeword delineation.

## 49.2.13.2.3 Functions

All the relevant functions defined in 49.2.13.2.3 are inherited. In addition, the following items are defined.

Force(i)

Forces the sync header to the state that preserves FEC frame lock. Note that for parity blocks, the pattern is known a priori. For payload blocks, the first bit is forced to be the complement of the second bit. While this may duplicate a bit error, it will not propagate, as the FEC decoder discards the first bit before decoding.

Force(i)

```
{
  If ( cword_lock == true )
  If ( i>26 )
    If ( i==30 )
      rx_coded<0>=1
      rx_coded<1>=1
    else
      rx_coded<0>=0
      rx_coded<1>=0
    else
      rx_coded<0>=!rx_coded<1>
}
```

## 49.2.13.2.4 Counters

All the relevant counters defined in 49.2.13.2.4 are inherited.

## 49.2.13.2.5 Timers

No timers are needed.

## 49.2.13.3 State diagrams

The Lock state machine shown in Figure 92-X determines when the PCS has obtained lock to the received data stream. The BER is determined by the FEC decoder function, and so a separate state machine is not required.

Add the figure, as provided in attachment...

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

ACCEPT IN PRINCIPLE.

Subclause 92.2 to be reorganized per the outline below. Text similar to that in the suggested Remedy to be included in next draft. Details to be provided in a presentation 3av\_0801\_remain\_2.pdf at the TF at Portland.

See comment #193 and #404.

See comment #404 for the proposed outline.

Defer resolution of comment #193 until next comment resolution cycle:

1) Yes: \_8\_

2) No: \_8\_

3) Abstain: \_Count not taken\_

(Procedural, >= 50%)

Moved: Jeff Mandin

Second: Valentin Ossman

It is a tie, Chair votes to not to defer the resolution of comment #193 until the next comment resolution cycle.

Accept proposed response to comment #193

Passed with no objections from the floor.

Cl	SC	P	L	#
92	92.2.3	313	7	11
Jiang, Jessica		Salira		
<i>Comment Type</i>	<b>E</b>	<i>Comment Status</i>	<b>A</b>	
	In Edit comments,	10GBASE-RR should be	10GBASE-PR	
<i>Suggested Remedy</i>		"10GBASE-RR" should be	"10GBASE-PR"	
<i>Response</i>		<i>Response Status</i>	<b>C</b>	
		ACCEPT.		

**Cl 92**      **SC 92.2.3.1**                      **P313**      **L10**                      # 98  
FENG, Dongning                                      Huawei Technologies

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

Since RS(255,223) is selected as a baseline proposal, a more detail description should be defined.

**SuggestedRemedy**

The FEC code used is a linear cyclic block code - the Reed-Solomon code (255, 223, 16) over the Galois Field of GF(28) - a non-binary code operating on 8-bit symbols. The code encodes 223 information symbols and adds 32 parity symbols. The code is systematic-meaning that the information symbols are not disturbed in any way in the encoder and the parity symbols are added separately to each block.

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

ACCEPT IN PRINCIPLE.  
See Comment 95

**Cl 92**      **SC 92.2.3.1**                      **P313**      **L9**                      # 95  
Daido, Fumio    Sumitomo Electric Indu

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

I would like to provide general description of RS(255,223).

**SuggestedRemedy**

The following paragraph is a general description of RS(255,223). Please replace 92.2.3.1 with this. But it is difficult to describe the mathematical expression in plain text, so I will attach the PDF format file which includes this description.

-----  
**92.2.3.1 FEC code**

The FEC code used is a linear cyclic block code - the Reed-Solomon code (255, 223) over the Galois Field of GF(28) - a non-binary code operating on 8-bit symbols. The code encodes 223 information symbols and adds 32 parity symbols. The code is systematic-meaning that the information symbols are not disturbed in any way in the encoder and the parity symbols are added separately to each block.

The code is the systematic form of the RS code based on the generating polynomial  $G(x)=P(x-\alpha^i)$  ( $i=0,1,2,\dots,30, 31$ )

where alpha is equal to 0x02 and is a root of the binary primitive polynomial  $x^8+x^4+x^3+x^2+1$ . A codeword of the systematic code is presented by  $D(x) + P(x) = G(x) * L(x)$  where: D(x) is the data vector -  $D(x)=D_{222}X^{254} + \dots + D_0X^32$ . D222 is the first data octet and D0 is the last.

P(x) is the parity vector -  $P(x)=P_{31}X^{31} + \dots + P_0$ . P31 is the first parity octet and P0 is the last.

A data octet (d7, d6, ..., d1, d0) is identified with the element:  $d7^* + d6^* + \dots + d1^* + d0$  in GF(28), the finite field with 28 elements. The code has a correction capability of up to sixteen symbols.

For the (255,223) Reed-Solomon code, the symbol size equals one octet. d0 is identified as the LSB and d7 is identified as the MSB bit in accordance with the conventions of 3.1.1.

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

ACCEPT.

See 3av\_0801\_diado\_1.pdf



Cl 92 SC 92.2.3.2.1 P313 L13 # 99  
 FENG, Dongning Huawei Technologies

Comment Type T Comment Status A

Since RS(255,223) is selected as a baseline proposal, a more detail description under this section should be defined.

*SuggestedRemedy*

Padding of FEC codewords and appending of FEC parity bytes is illustrated in Figure 92-10. Ethernet packets are received from the PCS scrambler in blocks of 66 bits. The data is partitioned into 27 blocks. Each partition of 27 blocks is then encoded using the RS(255,223) FEC encoder, which results in an additional 4 parity symbols for each block. The block, minus any padding, plus the associated 4 parity symbols form the @tbd@ byte FEC codeword. The additional 4 parity blocks, which are generated from this encoding process for each block, are gathered and added at the end of FEC code word to be transmitted. Note that parity is not calculated over the first bit of each 66 bit from the scramble as this bit is redundant. However this first bit is always transmitted over the link.

Response Response Status C

ACCEPT IN PRINCIPLE.  
 See comment #95

Cl 92 SC 92.2.3.2.1 P313 L14 # 404  
 Mandin, Jeff PMC Sierra

Comment Type TR Comment Status A

Descriptive text related to figure 92-10 is somewhat unclear and lacks some details.

To describe the FEC frame, you really have to describe transmitter behaviour. And if you describe the FEC transmitter then the FEC receiver should be described also.

*SuggestedRemedy*

1. Delete the current 92.2.3.2.2

2. Modify text to read as follows:

92.2.3.2.1 Calculation of Parity Octets by Transmitter

Padding of FEC codewords and appending of FEC parity bytes is illustrated in Figure 92-10. Ethernet packets are received from the PCS scrambler in blocks of 66 bits. The FEC encoder accumulates 27 66b blocks and removes the first bit of each block (ie. the redundant sync bit). The FEC encoder then prepends 29 '0' bits (called PAD) to the 27 65 bit blocks form the data portion of a FEC codeword. The data is FEC-encoded, which results in an additional 4 parity symbols for each block - completing the 255-byte Reed-Solomon codeword.

92.2.3.2.2 FEC Frame for Transmission

As shown in figure 92-10, after the Reed-Solomon codeword has been computed, the FEC encoder constructs the transmittable FEC frame with the original sequence of 27 66bit blocks (including the redundant sync bit and not including the pad bits). The FEC encoder then prepends a 2bit sync header (described below) to each of the parity octets, and then finally places the four 66bit parity blocks following the 27 66bit data blocks.

The total length of the FEC Frame is thus 2046 bits. The FEC encoder only transmits full 2046-bit frames to the gearbox.

92.2.3.2.3 Parity Block Sync Header

Format of sync header of parity blocks is TBD.

92.2.3.2.3 Processing of the FEC Frame upon Reception

The FEC decoder employs the RS(255,223) algorithm to correct or confirm correctness of the 27 66b blocks contained in the frame. The decoder then forwards the 66bit data blocks to the descrambler and discards the parity blocks

If the FEC decoder determines that the frame is not correctable (due to an excess of symbols containing errors), the data blocks are nevertheless passed to the descrambler to maintain descrambling synchronization. The data blocks of the frame must then be replaced

by /E/ blocks before being passed to the PCS.

Response Response Status **C**

ACCEPT IN PRINCIPLE.

Subclause 92.2 to be reorganized per the outline below. Text similar to that in the Suggested Remedy to be included in next draft. Details to be provided in a presentation 3av\_0801\_remein\_2.pdf at the TF at Portland. See comment 193 and 404.

92.2 Extensions of the physical coding sublayer for data detection & forward error correction..

92.2.1 Overview

92.2.2 10GBASE-PR Transmitters

92.2.2.1 Alignment and Idle Deletion

92.2.2.2 64B/66B Encode

92.2.2.3 Scrambler

92.2.2.4 FEC Encoding

92.2.2.4.1 FEC Algorithm (RS((255, 223))

92.2.2.4.2 Parity Calculation

92.2.2.4.3 FEC Transmission Block Formatting

92.2.2.5 Data Detector and Burst Mode Considerations (ONU only)

92.2.2.6 Gearbox

92.2.2.7 Detailed functions and state diagrams

92.2.2.7.1 Constants

92.2.2.7.2 Variables

92.2.2.7.3 Functions

92.2.2.7.4 Messages

92.2.2.7.5 Counters

92.2.2.7.6 State Diagrams

92.2.3 10GBASE-PR Receivers

92.2.3.1 Synchronizer

92.2.3.2 FEC Decoder

92.2.3.3 Descrambler

92.2.3.4 66B/64B Decode

92.2.3.5 Idle Insertion

92.2.3.6 Detailed functions and state diagrams

92.2.3.6.1 Constants

92.2.3.6.2 Variables

92.2.3.6.3 Functions

92.2.3.6.4 Messages

92.2.3.6.5 Counters

92.2.3.6.6 State Diagrams

Insert the text "If the FEC decoder determines that the frame is not correctable (due to an excess of symbols containing errors), the data blocks are nevertheless passed to the descrambler to maintain descrambling synchronization. The data blocks of the frame must then be replaced by /E/ blocks before being passed to the 64B/66B decoder." as editorial comment.

Cl **92** SC **92.2.3.2.1** P**313** L**17** # **373**

Suzuki, Ken-Ichi

NTT

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

At the beginning of a sentence, "note" should be replaced by "Note".

SuggestedRemedy

Replace "note" by "Note".

Response Response Status **C**

ACCEPT.

Cl **92** SC **92.2.3.2.1** P**315** L L # **10**

Jiang, Jessica

Salira

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

Figure 92-10 is not the same as baseline file -- 3av\_0705\_effenberger\_4.pdf. It is missing two bits between the last blocks and FEC parity.

SuggestedRemedy

Make the correction based on baseline file

Response Response Status **C**

ACCEPT.

Add header to parity.

(Resolved at November 2007 TF meeting)

Cl **92** SC **92.2.3.2.1** P**315** L**11** # **342**

Lynskey, Eric

Teknovus

Comment Type **T** Comment Status **D**

Now that we have agreed on the FEC code, we can replace N and M with appropriate constants.

SuggestedRemedy

Replace N with 27 and replace M with 4.

Proposed Response Response Status **W**

PROPOSED ACCEPT.

Also see Figure 92-10.

Cl 92 SC 92.2.3.2.2 P315 L15 # 379  
 Suzuki, Ken-Ichi NTT  
 Comment Type E Comment Status A  
 "font" of " to the font of the payload" must be a typo.  
 SuggestedRemedy  
 Replace "font" by "front".  
 Response Response Status C  
 ACCEPT.

Cl 92 SC Figure 92-1 P300 L12 # 367  
 Suzuki, Ken-Ichi NTT  
 Comment Type E Comment Status A  
 In Figure 92-1, "GMIII" must be a typo.  
 SuggestedRemedy  
 Replace "GMIII" by "GMII".  
 Response Response Status C  
 ACCEPT.

Cl 92 SC Figure 92-9 P314 L10 # 374  
 Suzuki, Ken-Ichi NTT  
 Comment Type E Comment Status A  
 In Figure 92-9, "UnprotectedBlockCount -= 28" inside the block of "Laser\_Is\_Off" may be written in a different font.  
 SuggestedRemedy  
 Check the font style. If so, rewrite "UnprotectedBlockCount -= 28" in the same font.  
 Response Response Status C  
 ACCEPT.  
 Font is Times New Roman  
 Change to Arial

Cl 92 SC Figure 92-9 P314 L114 # 376  
 Suzuki, Ken-Ichi NTT  
 Comment Type E Comment Status A  
 In Figure 92-9, "ProtectedBlockCount -= 0" inside the right block of "Transmit\_Burst\_Preamble" may be written in a different font.  
 SuggestedRemedy  
 Check the font style. If so, rewrite "ProtectedBlockCount -= 28" in the same font.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 See comment 375  
 In left block titled "Transmit\_Burst\_Preamble" the term "UnprotectedBlockCount -= 28" was in Times New Roman and will be changed to Arial.  
 In right block titled "Transmit\_Burst\_Preamble" the term "ProtectedBlockCount = 0" was in Times New Roman and will be changed to Arial.

Cl 92 SC Figure 92-9 P314 L14 # 377  
 Suzuki, Ken-Ichi NTT  
 Comment Type E Comment Status A  
 In Figure 92-9, "PMD\_SIGNAL.Request" is different from the definition of Sub-clause 92.2.2.2.4.  
 SuggestedRemedy  
 Replace "PMD\_SIGNAL.Request" by ""PMD\_SIGNAL.request" defined on the line 13 of page 311.  
 Response Response Status C  
 ACCEPT.

Cl 92 SC Figure 92-9 P314 L21 # 378  
 Suzuki, Ken-Ichi NTT  
 Comment Type E Comment Status A  
 In Figure 92-9, "PMD\_SIGNAL.Request" is different from the definition of Sub-clause 92.2.2.2.4.  
 SuggestedRemedy  
 Replace "PMD\_SIGNAL.Request" by ""PMD\_SIGNAL.request" defined on the line 13 of page 311.  
 Response Response Status C  
 ACCEPT.

Cl 92 SC Figure 92-9 P314 L21 # 375  
 Suzuki, Ken-Ichi NTT

Comment Type E Comment Status A

In Figure 92-9, "UnprotectedBlockCount -= 28" inside the left side block of "Transmit\_Burst\_Preamble" may be written in a different font.

**SuggestedRemedy**

Check the font style. If so, rewrite "UnprotectedBlockCount -= 28" in the same font.

Response Response Status C

ACCEPT IN PRINCIPLE.  
 See Comment 376

Cl 92 SC general P L # 109  
 Remein, Duane Alcatel-Lucent

Comment Type E Comment Status A

No explanation of use of "??" symbols as in pg 309 line 11 "TYPE: ??"

**SuggestedRemedy**

add editors note at the front of the document "Editors Note: double question marks is used to denote missing content (as in "TYPE: ??", the final text will be updated in a later edition."

add similare note for other instances of "??"

Response Response Status C

ACCEPT.

Cl 92 SC general P308 L # 108  
 Remein, Duane Alcatel-Lucent

Comment Type E Comment Status A

No explanation of use of "@" symbols as in pg line 5 "@tbd (two)@"

**SuggestedRemedy**

add editors note "Editors Note: the text "@tbd (two)@" is temporary, the final text will be updated in a later edition."

add similare note for other instances of "@ text @"

Response Response Status C

ACCEPT.

Cl 92 SC Header Peven L # 366  
 Suzuki, Ken-Ichi NTT

Comment Type E Comment Status A

In header of even pages, The header caption still show the old draft version.

**SuggestedRemedy**

Correct the draft version.

Response Response Status C

ACCEPT.

Cl 92 SC Header Podd L # 380  
 Suzuki, Ken-Ichi NTT

Comment Type E Comment Status A

In header of odd pages, "I" is missing on the header caption.

**SuggestedRemedy**

Add "I" ahead of the header caption "EEE Draft P802.3avTM/D1.0"

Response Response Status C

ACCEPT.