

CI 00 SC 0 P110 L6 # 1552  
 Lynskey, Eric Teknovus

Comment Type E Comment Status D mailto

Mailto links still present for some cross references.

1 page 10 line 17  
 1.4.95 page 12 line 28  
 30 page 13 line 18  
 45 page 16 line 19  
 56 page 27 line 18  
 66 page 37 line 18  
 66.4.2.1 page 38 line 41  
 66.4.2.2 page 39 line 3  
 66.4.2.3 page 29 line 13  
 66.5.4.5 page 40 9 locations  
 67 page 41 line 6  
 91 page 42 line 9  
 92 page 85 line 25  
 92.1.1 page 86 line 46 two locations  
 92.1.3 page 91 line 5  
 92.1.3 page 91 line 11  
 92.1.5 page 91 line 47  
 92.1.6 page 91 line 53  
 92.1.6 page 92 line 1  
 92.1.6.1.4 page 93 line 10  
 92.1.6.2.1 page 95 line 5  
 92.1.6.2.2 page 95 line 16  
 92.1.6.2.3 page 95 line 38  
 92.1.6.2.3.3 page 96 line 43  
 92.2.2.1.2 page 100 line 37  
 92.2.2.1.3 page 101 line 18  
 92.2.2.2 page 103 line 51  
 92.2.2.3 page 104 line 3  
 92.2.2.4.1 page 103 line 35  
 92.2.2.5.2 page 110 line 6  
 92.2.2.6 page 111 line 47  
 92.2.3.2.1 page 117 line 12  
 92.2.3.3.3 page 121 line 41  
 92.2.3.3.4 page 122 line 24  
 92.2.3.3.4 page 122 line 25  
 92.2.3.4 page 123 line 6  
 92.2.3.4 page 123 line 7  
 92.2.3.4.2 page 123 line 39  
 92.2.3.5 page 124 line 44  
 92.2.3.6 page 124 line 49  
 92.2.3.7 page 125 line 13  
 92.2.3.7 page 125 line 14  
 92.2.3.7.3 page 126 line 40  
 92.3 page 127 Table 92-5 five locations

92.3.1.2 page 129 line 6  
 92.4.4.9 page 134 line 27  
 92A page 135 line 19  
 93 page 142 line 6  
 93.3.2.3 page 165 line 27  
 93.3.3.2 page 170 line 51

*SuggestedRemedy*

Remove all mailto links from the document. Make all cross references to other subclauses within the draft functional.

*Proposed Response* Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Global replace all instances of:

"Clause @@" with "@@Clause "

and

"Subclause @@" with "@@Subclause"

This will resolve the mailto issue.

The editors will activate any new or modified cross references that directly link within the draft book.

Editors may defer activating all non-modified links to a later release depending on time available for creating next draft.

CI 45 SC 45.2.1.88.2 P23 L27 # 1560  
 Lynskey, Eric Teknovus

Comment Type T Comment Status D

Missing reference to FEC decoder subclause.

*SuggestedRemedy*

Replace with 92.2.3.3.

*Proposed Response* Response Status W

PROPOSED ACCEPT.

Replace with active link.

CI 45 SC 45.2.1.89.2 P24 L1 # 1561  
 Lynskey, Eric Teknovus

Comment Type T Comment Status D

The two references in this subclause need to be updated.

*SuggestedRemedy*

Replace 45.3.2.84.2 with 45.2.1.88.2.

Replace 74.8.3 with 92.2.3.3.

*Proposed Response* Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Replace 45.2.1.84.2 with active link to 45.2.1.88.2

Replace 74.8.3 with active link to 92.2.3.3

**Cl 45**    **SC 45.2.1.90**                      **P24**                      **L13**                      # **1562**  
 Lynskey, Eric                                      Teknovus

**Comment Type**    **T**                      **Comment Status**    **D**  
 Reference to Clause 74.

**SuggestedRemedy**  
 Remove the sentence.

**Proposed Response**                      **Response Status**    **W**  
 PROPOSED ACCEPT IN PRINCIPLE.  
 Change reference to 92.2.3.3.2

Add to 92.2.3.3.2  
 FEC\_corrected\_blocks\_counter  
 TYPE: 32 bit non Roll-over counter  
 A corrected block is an FEC block that has invalid parity, and has been corrected by the FEC decoder. FEC\_corrected\_blocks\_counter counts once for each corrected FEC blocks processed when decode\_done and decode\_success are True. This counter is provided by a management interface that may be mapped to the 45.2.1.90 register (1.178, 1.179).

**Cl 45**    **SC 45.2.1.91**                      **P24**                      **L35**                      # **1563**  
 Lynskey, Eric                                      Teknovus

**Comment Type**    **T**                      **Comment Status**    **D**  
 Reference to Clause 74.

**SuggestedRemedy**  
 Remove the sentence.

**Proposed Response**                      **Response Status**    **W**  
 PROPOSED ACCEPT IN PRINCIPLE.  
 Change reference to 92.2.3.3.2

Add to 92.2.3.3.2  
 FEC\_uncorrected\_blocks\_counter  
 TYPE: 32 bit non Roll-over counter  
 An uncorrected block is an FEC block that has invalid parity, and has not been corrected by the FEC decoder.  
 FEC\_uncorrected\_blocks\_counter counts once for each uncorrected FEC blocks processed when decode\_done is True and decode\_success is False. This is a 32-bit counter. This variable is provided by a management interface that may be mapped to the 45.2.1.91 register (1.174, 1.175).

**Cl 45**    **SC 45.2.3.29**                      **P25**                      **L27**                      # **1564**  
 Lynskey, Eric                                      Teknovus

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

There is some missing description of the BER monitor behavior. Back in 3av\_0801\_mandin\_2.pdf, the idea was to set the hi\_ber flag in the 10GBASE-R and 10GBASE-T status register. If we still want to do that, then we need to add and show the modified register definition. The other option would be to create a new register only for PR and PRX. Since we've added register 3.74, it may make sense to put this functionality here and update the Clause 92 text as appropriate. Also, 10GBASE-R and 10GBASE-T have another register that represents a latched version of the high BER flag. We need to decide if we want this functionality, too.

**SuggestedRemedy**

Create new 10GBASE-PR and 10/1GBASE-PRX BER Monitor Status register modeled after 10GBASE-R status and 10GBASE-R status 2 registers.

**Proposed Response**                      **Response Status**    **W**  
 PROPOSED ACCEPT IN PRINCIPLE.  
 Author needs to provide additional detail.

**Cl 45**    **SC 45.2.3.29**                      **P25**                      **L32**                      # **1553**  
 Lynskey, Eric                                      Teknovus

**Comment Type**    **E**                      **Comment Status**    **D**  
 Cross reference refers to subclause that doesn't exist.

**SuggestedRemedy**  
 Replace with 92.2.3.4 and provide linked cross reference so it will update and be correct if subclause numbering changes.

**Proposed Response**                      **Response Status**    **W**  
 PROPOSED ACCEPT.  
 Replace with active link.

**Cl 91**      **SC 91.4.1**                      **P54**              **L15**              # 1524  
Hamano, Hiroshi                      Fujitsu Labs.

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

In Figure 91-5, the hatching pattern is not always well printed, depending on the printer. Figure 91-6 (P 59, L 9), and Figure 91-8 (P 64, L 7, L19) have the same problem.

**SuggestedRemedy**

Try some other hatching patterns.

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

PROPOSED ACCEPT IN PRINCIPLE.

Several patterns were tested without success until now. The currently used hatching pattern is the least dense pattern available.

**Cl 91**      **SC 91.5**                      **P57**              **L14**              # 1536  
Hajduczenia, Marek                      Nokia Siemens Networ

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

The note says "The specifications for OMA have been derived from extinction ratio of 9 dB and average launch power", while ER for ONUs is set at 6 dB. This way the note is not correct. Correct the contents of the note as proposed.

**SuggestedRemedy**

Change "of 9 dB" to "of 6 dB"

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

PROPOSED ACCEPT.  
(was "E" changed to "T")

**Cl 91**      **SC 91.5**                      **P57**              **L14**              # 1528  
Hamano, Hiroshi                      Fujitsu Labs.

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

In the NOTE, the expression "extinction ratio of 9dB" still remains for ONU PMDs. But the ONU extinction ratio is not always 9dB, actually 6dB for ONU transmitter.

**SuggestedRemedy**

Delete "of 9dB" from the text.

This becomes identical to the NOTE for OLT in SC 91.4 (P 53, L 13).

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

PROPOSED ACCEPT IN PRINCIPLE.

See also comment #1536.

Text ""The specifications for OMA have been derived from extinction ratio of 9 dB and average launch power" to be changed "The specifications for OMA have been derived from extinction ratio of 6 dB and average launch power" in SC 91.5, line 14. Respective text in SC 91.4, line 13, page 53 is not affected i.e. OAM and AVP is calculated for ER = 9 dB, though lower ER is allowed (6 dB).

**Cl 91**      **SC 91.5.1**                      **P57**              **L53**              # 1523  
Hamano, Hiroshi                      Fujitsu Labs.

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

In Footnote C, word preciseness should be cared.

Not only "laser source", but the total "transmitter" affects TDP value.

Power can be relaxed not by "the same amount" as the TDP, but "the same decrement" as the TDP.

What should be indicated here is "the more tightened TDP, the more relaxed power."

**SuggestedRemedy**

Change "laser source" to "transmitter".

Change "the same amount" to "the same decrement".

And Footnote C will be as follows;

If a transmitter has a lower TDP, the minimum transmitter launch OMA (OMAMin) and average minimum launch power (AVPmin) may be relaxed by the same decrement as the TDP.

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

PROPOSED ACCEPT IN PRINCIPLE.

(was "E" changed to "T")

Change "laser source" to "transmitter".

Change "the same amount" to "the same decrement".

New text of footnote c) will read as follows: "If a transmitter has a lower TDP, the minimum transmitter launch OMA (OMAMin) and average minimum launch power (AVPmin) may be relaxed, decrementing them by the same value as TDP."

@@"min" in AVPmin and OMAMin must be subscripted@@

**Cl 91**      **SC 91.5.1**                      **P59**              **L14**              # 1526  
Hamano, Hiroshi                      Fujitsu Labs.

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

In Figure 91-6, relaxed power level indication suffix seems incorrect in "Apostrophe" placement.

**SuggestedRemedy**

Change "AVP 'min" to "AVP' min".

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

PROPOSED ACCEPT.

**CI 91**    **SC 91.6**    **P63**    **L1**    # 1539  
 Hajduczenia, Marek    Nokia Siemens Networ

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

Table 91-13 contains 3 errors which need to be fixed before moving forward:

1. Allocation for penalties for PRX20 US is incorrect. It is 3, it should be 2 (26 - 24 = 2 dB)
2. Minimum CHIL for PRX10 US is incorrect. It is 8 dB and should be 5 dB (see Table 60-9)
2. Minimum CHIL for PRX20 US is incorrect. It is 8 dB and should be 10 dB (see Table 60-9)

**SuggestedRemedy**

Introduce the following changes into Table 91-13

1. Allocation for penalties for PRX20 US is incorrect. It is 3, it should be 2 (26 - 24 = 2 dB)
2. Minimum CHIL for PRX10 US is incorrect. It is 8 dB and should be 5 dB (see Table 60-9)
2. Minimum CHIL for PRX20 US is incorrect. It is 8 dB and should be 10 dB (see Table 60-9)

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

PROPOSED ACCEPT.  
 (was "E" changed to "T")

**CI 91**    **SC 91.6**    **P63**    **L16**    # 1529  
 Hamano, Hiroshi    Fujitsu Labs.

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

In Table 91-13, following values are incorrect for 1G upstream.

"Channel insertion loss (min)" for PRX10 and PRX20 should be consistent with those in Table 91-1 (P 44, L 28) and also in Table 60-9 (802.3ah PX10 and PX20).

"Allocation for penalties" for PRX20 should be the same as that in Table 60-9 (802.3ah PX20), and equal to "Available power budget" minus "Channel insertion loss (max)".

**SuggestedRemedy**

- Change "Channel insertion loss (min)" for PRX10 US, from 8 dB to 5 dB.
- Change "Channel insertion loss (min)" for PRX20 US, from 8 dB to 10 dB.
- Change "Allocation for penalties" for PRX20 US, from 3 dB to 2 dB.

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

PROPOSED ACCEPT.  
 See also comment #1539

**CI 91**    **SC 91.6.1**    **P63**    **L40**    # 1525  
 Hamano, Hiroshi    Fujitsu Labs.

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

Figure number reference is incorrect.  
 That in Line 47 is also the same.

**SuggestedRemedy**

Change "Figure 91-7" to "Figure 91-8".

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

PROPOSED ACCEPT.

**CI 91**    **SC 91.6.1**    **P63**    **L40**    # 1538  
 Hajduczenia, Marek    Nokia Siemens Networ

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

Incorrect Figure reference in "Figure 91-7 depicts the wavelength allocation plan for EPON and 10G-EPON systems, as discussed below.". Figure 91-7 is referenced while Figure 91-8 should be referenced

**SuggestedRemedy**

Change "Figure 91-7 depicts" to "Figure 91-8 depicts". Make sure hyperlink is fixed.

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

PROPOSED ACCEPT.  
 See also comment #1525.

**CI 91**    **SC 91.6.1**    **P64**    **L19**    # 1530  
 Hamano, Hiroshi    Fujitsu Labs.

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

In Figure 91-8, PRX10, PRX20, PRX30 upstream wavelength band illustration for 10G-EPON is missing.

**SuggestedRemedy**

See Supplement 3av\_0807\_hamano\_1.pdf.

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

PROPOSED ACCEPT IN PRINCIPLE.  
 Editors suggest to further separate PR and PRX type PMD wavelength allocation plan for complete clarity. Otherwise, bands will overlap in the US channel.



CI 92 SC 2.2.5.1 P109 L37 # 1540  
 Effenberger, Frank Huawei Technologies,

Comment Type T Comment Status D Sync Pattern

There was a call for a sync pattern that is more "data like", and that has controlled runs of 0's and 1's. This has certain benefits for certain Rx topologies. This comment suggests a new value for the SP that:

1. Has DC balance
2. Has a 50% transition density
3. Has equal run lengths of 1's and 0's up to 6 bits in length.
4. Has the flatest spectrum possible
5. Has a 66 bit length

When we change the SP, we must also change the BD. So far, the best BD found has a Hamming distance of 30 bits.

#### SuggestedRemedy

Modify the mentioned constants in the section to read:

SP

TYPE: 66-bit unsigned

A 66-bit value used to for the burst mode synchronization pattern.

Value: 0x 4 BF 40 18 E5 C5 49 BB 59 (transmission bit sequence: 10 1111 1101 0000 0010 0001 1000 1010 0111 1010 0011 1001 0010 1101 1101 1001 1010)

BURST\_DELIMITER

TYPE: 66-bit unsigned

A 66-bit value used to find the beginning of the first FEC codeword in the upstream burst.

Value: 0x 8 6B F8 D8 12 D8 58 E4 AB (transmission bit sequence: 01 1101 0110 0001 1111 0001 1011 0100 1000 0001 1011 0001 1010 0010 0111 1101 0101)

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 92 SC 92.1.2.3 P90 L32 # 1546  
 Lynskey, Eric Teknovus

Comment Type E Comment Status D

Figure 92-4 has corrupted speed labels for MACs.

#### SuggestedRemedy

Replace speeds with the following (left to right):

1G-1G, 1G-1G, 10G-1G, 10G-1G, 10G-10G, 10G-10G

OR

1 Gb/s, 1 Gb/s, 10/1 Gb/s, 10/1 Gb/s, 10 Gb/s, 10 Gb/s

Proposed Response Response Status W

PROPOSED ACCEPT.

(was against c92)

CI 92 SC 92.1.6 P56 L # 131458  
 Khermosh, Lior PMC-SIERRA

Comment Type T Comment Status D carrier sense

currently as the draft is defined there is a potential condition that even though we do a compensation of the delay there can be the case that the PCS will not be ready for the next packet. This case happens when exactly the packet should be transmitted and the PCS transmits parity bytes of IPGs (this can happen if there is gaps between the packets which is above the minimal IPG). This will add a 2TQs jitter in the timestamp. The timestamp is added to the packet but the MAC will not start transmitting due to the feedback from the PCS (using PLS\_CARRIER.indication(CARRIER\_STATUS)) which delays the MAC. This feedback should be removed and the PCS should hold an elastic jitter FIFO to compensate with a maximal delay width and make it a fixed delay. Please note that both FEC\_overhead\_tx and FEC\_pverhead\_delay will compensate for that and should be accurate.

#### SuggestedRemedy

Remove the carrier sense feedback from the PCS. Work in open loop. The MPCP has a prediction of the overhead added to the packet and should delay the MAC accordingly. The PCS should have an elastic FIFO to make the delay in the PCS fixed. Add a text to describe the FIFO and the work.

Basically the FIFO read pointer is set to a fixed threshold of the maximal delay and the FIFO is filled in the MAC rate. When there is a gap the depth of the FIFO changes and filled afterwards. As the read threshold remains the same and read in the PCS output rate, it keeps the data going out in constant gaps, hence keeping the delay fixed. The FIFO should be described in the regular format of state machines in the spec.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

@@Deferred to July, 2008, see motion #4@@

Cl 92 SC 92.1.6.1 P91 L1 # 1532  
Mandin, Jeff PMC Sierra

Comment Type TR Comment Status D carrier sense

MPCP in clause 93 transmits frames to using MAC:MA\_DATA.request().  
MAC:MA\_DATA.request() transfers supplied data to the MAC sublayer for further processing and completes immediately (see 4.3.2.1 in 802.3as-2006 or 802.3ay/D2.2).

Since the RS CARRIER\_STATUS indication has \_no\_ effect on MPCP, the logic for generating it doesn't accomplish anything and should be removed.

Note that this issue is distinct from the considerations previously mentioned in comment 1458

*SuggestedRemedy*

1. Delete subclause 92.1.6.1
2. On page 91, line 1: Delete the paragraph:

"As discussed in Subclause @@46.1.7.3@@, the PLS\_CARRIER.indication primitive is not used for 10 Gb/s operation. However, 10G-EPON operation extends the 10 Gb/s RS by using the PLS\_CARRIER.indication primitive to defer the MAC between frames in order to allow the PCS to insert FEC parity octets"

Proposed Response Response Status W

PROPOSED REJECT.

Based on:

- 1) At this point, less change is preferred,
- 2) No discussion on this topic on reflector

The comment author is strongly encouraged to discuss this on the reflector prior to the July meeting, so as to demonstrate support within the Task Force.

Cl 92 SC 92.1.6.1.5 P94 L27 # 1557  
Lynskey, Eric Teknovus

Comment Type T Comment Status D

The exit condition from UPDATE that returns to UPDATE seems to have been partially lost and pushed off the end of the page. There is nothing shown after the not equal to sign.

*SuggestedRemedy*

Add "(C))" to the end of the condition.

Proposed Response Response Status W

PROPOSED ACCEPT.

Cl 92 SC 92.1.6.1.6 P94 L1 # 1565  
Lynskey, Eric Teknovus

Comment Type TR Comment Status D carrier sense

This comment applies to Figure 92-5. As written, the Carrier Status state diagram has a flaw when short frames are being transmitted. A 64-byte frame will end up causing CRS to be set for 54 columns when it may not need to be set at all during the frame. This will cause additional IPG to be sent for frames that have a length less than 54 columns. Additional information can be found in 3av\_0807\_lynkey\_2.pdf. The FrameMaker source file can be provided if necessary.

*SuggestedRemedy*

Replace Figure 92-5 with the diagram found on slide 5 of 3av\_0807\_lynkey\_2.pdf.

Proposed Response Response Status W

PROPOSED ACCEPT.

**CI 92**      **SC 92.1.6.2.3.2**      **P96**      **L7**      # 1543  
 Remein, Duane      Alcatel-Lucent

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

Add support for ONU Control Channel  
 Modify OLT and ONU comparison statements.  
 Table 92-4 Reserved LLID Values.  
 Reserve one LLID for ONU control channel path. This will enable other standards groups to define a common ONU control channel promoting a single standard for 10Gb/s PONs. (see related comments against Subclause 93.3.2.3 pg 165 ln 41)

**SuggestedRemedy**

Change text starting at line 7 from:  
 "b) 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.  
 c) If the received logical\_link\_id has a value other than 0x7FFF or 0x7FFE and an enabled MAC exists with a mode variable with a value of 0 and a logical\_link\_id variable matching the received logical\_link\_id value, then the comparison is considered a match to that MAC."  
 To:  
 b) If the received logical\_link\_id value matches 0x7FFF, 0x7FFE or 0x7FFD 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.  
 c) If the received logical\_link\_id has a value other than 0x7FFF, 0x7FFE or 0x7FFD and an enabled MAC exists with a mode variable with a value of 0 and a logical\_link\_id variable matching the received logical\_link\_id value, then the comparison is considered a match to that MAC.

Change text starting at line 17 from:  
 "b) If the received mode bit is equal to 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."  
 To:

"b) If the received mode bit is equal to 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 0x7FFD, then the comparison is considered a match."

"Add line in Table 92-4  
 "0x7FFD ONU Control Channel"  
 with reference to note b and c  
 Change last line to read  
 "0x7FFC-0x7F00 reserve for future use"  
 with reference to note b and c

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

**CI 92**      **SC 92.2.2.1.4**      **P101**      **L24**      # 1547  
 Lynskey, Eric      Teknovus

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

Typo in definition for DelCount.

**SuggestedRemedy**

Replace "than" with "that".

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

**CI 92**      **SC 92.2.2.1.5**      **P102**      **L16**      # 1551  
 Lynskey, Eric      Teknovus

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

Some state diagrams throughout the draft use "else" as an exit condition and some use "ELSE". We should be consistent. Clause 93 uses "else", so perhaps that is the way to go. If we choose "else", figures affected would be 92-19, 92-26, 92-27. If we choose "ELSE", figures affected would be 92-10, 92-11, and 92-18.

**SuggestedRemedy**

Select one method and be consistent throughout clause.

**Proposed Response**      **Response Status**    **W**  
 PROPOSED ACCEPT IN PRINCIPLE.  
 Replace "ELSE" with "else" in all figures.



CI 92 SC 92.2.2.5 P109 L1 # 1535  
Ben-Amram, Haim PMC-Sierra

Comment Type TR Comment Status D end of burst

To support end-of-burst delimiter, change would be needed to AGC settling. This is detailed in 3av\_0807\_benamram\_1.pdf

*Suggested Remedy*

Revise end-of-burst delimiter as in 3av\_0807\_benamram\_2.pdf.

*Proposed Response* Response Status W

PROPOSED REJECT.

The concept of an end-of-burst delimiter was already discussed by the Task Force and rejected. However it is reasonable to revisit the subject and reconfirm the position of the Task Force

Vote:

Adopt end-of-burst as proposed in 3av\_0807\_benamram\_2.pdf

For:

Against:

Abstain:

CI 92 SC 92.2.2.5.5 P110 L48 # 1558  
Lynskey, Eric Teknovus

Comment Type T Comment Status D

TBD for SyncBlockCount type. It should have the same type as SYNC\_LENGTH.

*Suggested Remedy*

Replace TBD with 16-bit unsigned.

*Proposed Response* Response Status W

PROPOSED ACCEPT.

CI 92 SC 92.2.2.5.6 P111 L12 # 1545  
Kramer, Glen Teknovus, Inc.

Comment Type TR Comment Status D

Refer to Figures 92-17 and 92-18:

During state machine modeling, several problems got uncovered.

#1) ReceiveNextBlock() function is said to be a blocking function, but 66-bit blocks arrive not periodically, but with big gaps. During such gaps, the Data Detector will not output any data to the GearBox.

#2) In state TRANSMIT\_BURST\_PREAMBLE, the number of transmitted blocks may exceed SyncBlockCount, since additional blocks are inserted, but are not accounted for. Longer burst preamble leads to potential burst collisions and may overflow the FIFO\_DD queue.

#3) Idles are not being counted in states Transmit\_Burst\_Delimiter and Transmit\_Burst\_Terminator

See detailed explanation in 3av\_0807\_kramer\_1.pdf

*Suggested Remedy*

Use the modified state diagrams and associated constants, variables, counters, and functions as presented on pages 103-107 in the 3av\_0807\_kramer\_1.pdf.

*Proposed Response* Response Status W

PROPOSED ACCEPT.

The editor wishes to express his gratitude for the supplied frame files.

CI 92 SC 92.2.2.5.6 P112 L4 # 1548  
Lynskey, Eric Teknovus

Comment Type E Comment Status D

The INIT state Figure 92-18 has idleBlockCount, but it should be IdleBlockCount.

*Suggested Remedy*

Capitalize variable.

*Proposed Response* Response Status W

PROPOSED ACCEPT.

Note if comment 1545 is accepted as is this change will not be required.

CI 92 SC 92.2.3.1.3 P114 L25 # 1533  
Mandin, Jeff PMC Sierra

Comment Type TR Comment Status D

Text refers to gearbox in the receive path, but there is no such animal.

*Suggested Remedy*

1. Remove the function BlockFromGearbox() from 92.2.3.1.3
2. Change AppendInbuffer in 92.2.3.1.3 as follows so that it operates on a single new bit rather than a 66b block.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.  
Comment is incomplete.

Replace the function BlockFromGearbox() with BitFromPMA() in the following locations:

Pg. 114 Ln 30  
Pg. 114 Ln 40 (replace function)  
Pg. 116 Ln 16 (Figure 92-19)  
Pg. 121 Ln 43

Replace AppendInbuffer with the following:

```
Append_inbuffer()
{
  NewBit = BitFromPMA()
  if (newBlockExpected)
  {
    newBlock <= 0
    if (input_buffer_location > 1784)
      ParityHeaderExpected <= 1
  }
  else if (ParityHeaderExpected)
  {
    parityHeaderExpected <= 0
  }
  else
  {
    inbuffer[input_buffer_location] <= NewBit
    input_buffer_location++
    if ( (input_buffer_location - 29) % 65) = 0
      newBlockExpected <= 1
  }
}
```

Add variables:  
newBlockExpected

TYPE: boolean  
Next bit to arrive is bit 0 of a 66 bit block.  
Initialized to 0.

parityHeaderExpected  
TYPE: boolean  
Next bit to arrive is bit 1 of a 66bit block carrying parity.  
Initialized to 0.

Replace DecodeWhenReady() on page 113 line 1 with the following:

```
DecodeWhenReady()
{
  if (input_buffer_location == 2039)
  {
    if (cword_lock)
    {
      Decode();
    }
    Flush_inbuffer();
  }
}
```

CI 92 SC 92.2.3.1.3 P114 L31 # 1549  
Lynskey, Eric Teknovus

Comment Type E Comment Status D

Confusing notation here. We should use the special symbols and operators found on page 10.

*Suggested Remedy*

Replace "<>" with "not equal to" symbol.

Proposed Response Response Status W

PROPOSED ACCEPT.  
Ctrl-q 9 Symbol

CI 92 SC 92.2.3.3.3 P122 L9 # 1550  
Lynskey, Eric Teknovus

Comment Type E Comment Status D

Pseudo-code could be made easier to read.

*Suggested Remedy*

Start "else" branch on new line.

Proposed Response Response Status W

PROPOSED ACCEPT.

Cl 92 SC 92.2.3.7 P124 L51 # 1531  
Mandin, Jeff PMC Sierra

Comment Type TR Comment Status D Variable PCS Delay

The RX PCS idle insertion scheme introduces a large amount of delay variation:

- \* In the case where a 64byte frame terminates in the last octet of a FEC codeword, the frame will be delayed one parity region (ie. 264 PMA bit times).
- \* Whereas a 1522 byte frame which terminates in the first octet of a FEC codeword will be delayed 8 full codewords (ie. 16320 PMA bit times).
- \* This delay variation is much greater than the 1TQ that is permitted.
- \* The delay variation derives from the fact that the idle insertion scheme passes the frame up as soon as it is fully received - in effect giving reduced latency to short frames.

\* Specifically, if we look at lines 17-18 of current figure 92-27, we see that the amount of time that a frame is retained in the II\_Fifo depends on when FrameReadyCount is bumped, for which we look to current figure 92-26 to see that it depends directly on the length of the frame.

SuggestedRemedy

Correct the Rx PCS delay variation by using a jitter buffer as indicated in 3av\_0806\_mandin\_1.pdf.

In keeping w/ the requests of the chair, the text modifications are kept "conservative" to include only the changes relevant to technical completeness of the draft.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.  
See resolution to comment 1566.

Cl 92 SC 92.2.3.7.5 P127 L5 # 1566  
Lynskey, Eric Teknovus

Comment Type TR Comment Status D Variable PCS Delay

This comment applies to Figure 92-26 and Figure 92-27. These diagrams introduce an unacceptable amount of delay variation. This delay variation will impact the MPCP timestamp and will cause many problems throughout the PON. A new state diagram has been modeled and developed that provides a fixed delay of 40 vectors (16 TQ). Additional information can be found in 3av\_0807\_lynskey\_2.pdf. The FrameMaker source file can be provided if necessary.

SuggestedRemedy

Replace Figure 92-26 and 92-27 with the diagram found on slide 6 of 3av\_0807\_lynskey\_1.pdf.

Proposed Response Response Status W

PROPOSED ACCEPT.

Cl 93 SC P L # 1541  
Remein, Duane Alcatel-Lucent

Comment Type E Comment Status D

Invalid reference @@92.1.2.3.3.2@@

SuggestedRemedy

Change to:  
@@92.1.6.2.3.2@@

Proposed Response Response Status W

PROPOSED ACCEPT.

*Cl* **93**      *SC* **93.1.1**                      *P***143**      *L***41**                      # **1542**  
 Remein, Duane                                      Alcatel-Lucent

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

Objective c) "Support a single LLID per ONU" is incorrect as an ONT must support more than one LLID (ex. 0x7FFF or 0x7FFE must be supported AND at least on LLID after registration and possibly one SCB LLID).

*SuggestedRemedy*

Change objective c) to:  
 "Support at least one unregistered ONU LLID and at least one other LLID per ONU"

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

PROPOSED REJECT.

I do not believe SCB and 0x7FFF/0x7FFE LLDs are instantiated in the ONU but rather exist in the filtering rules as defined in clause 92. Observe that ONU has only one MAC and one associated LLID as per standard behaviour. Check also what is included in 92.1.6.2.3.2 LLID:

if ([mode = 1 (single copy broadcast or multicast LLID)] or [mode = 0 (unicast LLID) and LLID = 0x7FFE]) a match is announced and the frame is passed to the MAC.

if (mode = 0 and LLID = ONU\_LLID) a match is announced and the frame is passed to the MAC.

From this point now on, only ONU\_LLID exists, which is consistent with the objective.

In the OLT, You have LLIDs associated with SCB MAC (0x7FFF and 0x7FFE in our case).

*Cl* **93**      *SC* **93.2.2.1**                      *P***154**      *L* **1**                      # **1534**  
 Mandin, Jeff                                      PMC Sierra

*Comment Type*    **TR**                      *Comment Status*    **D**                      *FEC\_Overhead*

MPCP in clause 93 transmits frames to using MAC:MA\_DATA.request().  
 MAC:MA\_DATA.request() transfers supplied data to the MAC sublayer for further processing and completes immediately (see 4.3.2.1 in 802.3as-2006 or 802.3ay/D2.2).

Consequently:

a) the post-frame-transmission backoff timers in the OLT and ONU Control Multiplexer state diagrams are incorrect. They must be changed to account for the length of the frames+IPG themselves (and not just the FEC overhead)

b) The function for computing the delay to compensate for FEC overhead must result that is the same as (or perhaps higher than) the actual required delay. ie. The fec\_overhead\_min() function is incorrect and must be replaced.

Note that this is in addition to the considerations mentioned in comment ??

*SuggestedRemedy*

Modify state diagrams and overhead functions as indicated in 3av\_0806\_mandin\_2.pdf

The essential concept is that the PCS can keep track of when parity insertion is occurring and perform the precisely correct backoff. The DIC algorithm is performed by the RS, but since DIC only moves the next data position forward or backward within a column, there is never a case where DIC impacts FEC overhead.

In keeping w/ the requests of the chair, the text modifications are kept "conservative" so as to include only the changes relevant to "technical completeness" of the draft.

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

PROPOSED ACCEPT IN PRINCIPLE.

Aling with comment #131459.

Cl 93 SC 93.2.2.4 P124 L119 # 131459  
 Khernosh, Lior PMC-SIERRA

Comment Type T Comment Status D FEC\_Overhead

As I have promised in the IEEE meeting, I have put in another look at the FEC\_overhead function to try to suggest a coherent behavior. These are my conclusions. Appreciate comments.

A bit of a history.

The FEC\_overhead function is a legacy heritage from 802.3ah clause 64. The function appears in 3 places with 2 use cases.

Basically the function calculates the additional overhead that should be added to a packet due to the FEC. In the 802.3ah frame based FEC, this is a value per packet which depends only on the packet length.

1) OLT transmit state machine:

The overhead is used to add a delay after the packet, to stall the MPCP layer (which also inserts timestamp) to match the MAC transmission.

2) ONU transmit state machine.

The overhead appears in 2 places:

A) The overhead is used to check if the packet fits inside the remaining time for grant transmission.

B) The overhead is used to add a delay after the packet, to stall the MPCP layer (which also inserts timestamp) to match the MAC transmission.

3) Gate processing ONU activation state diagram

The overhead is used to reduce the window for the random delay.

Use in 802.3av

Currently the function was exported to the 802.3av, as is, in all state machines, just the formula was changed a bit.

However when checking, it seems that a different adaptation is needed due to the fact that the FEC is now stream based and not packet based.

Looks like it would be more convenient to divide the overhead into 2 functions for each use case in the state diagrams.

One function (FEC\_Overhead\_tx) to check if the packet fits the grant and the other (FEC\_Overhead\_delay) calculating the delay for the MAC.

(Basically the discovery calculation should use the first function however we can simply put in there a fixed value of single CW, as all values there are fixed and known (frame size is 64bytes) and have the random in CW granularity).

The FEC\_Overhead\_tx takes all worse case rounding scenarios. It includes rounding up of the current packet size into the nearest FEC codeword. (This what would happen if it is the last frame in the grant)

The FEC\_Overhead\_delay reflects the estimated delay required after a packet due to insertion of FEC overhead. So the average value for IPG (ie. 12) is used, and the packet size (plus the "balance" remaining from the previous packet) should be rounded down to

the nearest FEC block. If the FEC block is not full then there is no delay added.

The FEC overhead is a function of packet length, IPG and (localTime-beginTime). (localTime-beginTime) defines the position of the packet in the FEC codeword's chain.

At the OLT - beginTime is the OLT init time.

At the ONU - beginTime is the start of the Fec codewords in the grant (start\_time+laser\_on+syn\_time)

Inaccuracies:

There is an inherent inaccuracy in both functions since the MPCP layer works in TQs and not bytes.

Another inaccuracy is involving the IPG which should be added in the overhead. IPG changes in 10G between 9-15bytes due to the DIC functionality.

The state machines of the MPCP coordinates between the MAC and MAC control which are not aware of the DIC so we could have fixed IPG to 12bytes. However the function really should be aware of the line transmission so DIC should be accounted.

FEC\_Overhead\_tx can must ensure that the packet can be transmitted. So it either takes worse case for the IPG (15 bytes) or holds a DIC function like the RS and monitor the real IPG.

FEC\_Overhead\_delay can use the average of 12 bytes and MAC would be aligned. The data on the line will jitter in 3bytes (added to the RTT jitter).

*Suggested Remedy*

FEC\_Overhead\_tx(length)

This function calculates the size of additional overhead, to be added by the FEC encoder, while encoding a frame of size length, using worst-case assumptions about FEC parity requirements for the frame. The function is used to check if the packet fits the grant.

This function is calculated at the beginning of the packet.

Parameter length represents the size of an entire frame including preamble, SFD, DA, SA, Length/Type, and FCS.

As described in Clause @92.2.3@, FEC encoder adds 32 parity octets for each block of 216 data or control octets.

The following formula is used to calculate the overhead:

Parameters:

IPG [bytes] - IPG =15

payloadBalance [bytes]

FEC\_Overhead\_tx [TQs]

length [bytes] - the length of a packet, not including IPG

beginTime [TQs]

localTime [TQs]

Initial conditions

OLT:

beginTime = start\_of\_time

payloadBalance =0

For the ONU the initial conditions are set at beginning of a grant:  
 beginTime = start\_of\_grant\_time + laser\_on + sync\_time  
 payloadBalance = 0

The value for each packet:  
 payloadBalance = ((localTime - beginTime)\*20)%248 + length + IPG  
 FEC\_overhead\_tx = round\_up(((32+ 216) \*round\_up( payloadBalance / 216) -  
 payloadBalance)/20)

FEC\_Overhead\_delay(length)  
 This function calculates the size of additional overhead to be added by the FEC encoder while encoding a frame of size length as the last frame in the grant. The function provides the additional delay before the next packet to fit to the gap the FEC encoder needs for the parity bytes  
 This function is calculated at the beginning of the packet.  
 Parameter length represents the size of an entire frame including preamble, SFD, DA, SA, Length/Type, and FCS.  
 As described in Clause @@92.2.3@@, FEC encoder adds 32 parity octets for each block of 216 data or control octets.  
 The following formula is used to calculate the overhead:

Parameters:  
 IPG [bytes] - IPG =12  
 payloadBalance [bytes]  
 FEC\_Overhead\_tx [TQs]  
 length [bytes] - the length of a packet, not including IPG  
 beginTime [TQs]  
 localTime [TQs]

Initial conditions  
 OLT:  
 beginTime = start\_of\_time  
 payloadBalance = 0

For the ONU the initial conditions are set at beginning of a grant:  
 beginTime = start\_of\_grant\_time + laser\_on + sync\_time  
 payloadBalance = 0

The value for each packet:  
 payloadBalance = ((localTime - beginTime)\*20)%248 + length + IPG  
 FEC\_overhead\_delay = round\_up(32/20\*round\_down(payloadBalance / 216 ))

NOTE-The notation round\_up(x) represents a ceiling function, which returns the value of its argument x rounded up to the nearest integer. The notation round\_down(x) represents a flooring function, which returns the value of its argument x rounded down to the nearest

integer. The notation a%b represents a modulo division of two numbers a and b.

Also change in Figure 93-12 on page 118 at the "start packet initiate timer" state on line 42 the FEC\_overhead to FEC\_overhead\_delay

Also change in Figure 93-13 on page 119 at the "check Size" state on line 31 the FEC\_overhead to FEC\_overhead\_tx

Also change in Figure 93-13 on page 119 at the "start packet initiate timer" state on line 43 the FEC\_overhead to FEC\_overhead\_delay

Also in Figure 93-13:

\* Add the following text at the beginning of the "Transmit Frame" State on line 36 (ie. before the invocation of "TransmitFrame"):

"packet\_initiate\_delay = FEC\_Overhead\_Delay(length+tailGuard)"

\* delete the first four lines from the "start packet initiate timer" state on line 43 (so that the only text remaining is "[start packet\_initiate\_timer, packet\_initiate\_delay]"

Proposed Response Response Status **W**  
 PROPOSED ACCEPT IN PRINCIPLE.  
 @@Deferred to July 2008 for consideration, see motion #4@@

Cl 93	SC 93.2.2.7	P162	L42	# 1559
Lynskey, Eric		Teknovus		

Comment Type **T** Comment Status **D**  
 In Figure 93-12, there is a slight error in the value to be loaded into the packet\_initiate\_timer. If FEC were not enabled, this timer would be seeded with a value of 12 bytes to enforce a minimum IPG between two frames. Since FEC is enabled, this timer should be seeded with the minimum IPG plus the overhead required for FEC. Note that the FEC\_Overhead function already takes this IPG into account when calculating the overhead, so no change is necessary to this function. We may want to create a constant called minIpgBytes instead of using a value of 12 in the state diagram, but the end result would be the same.

Suggested Remedy  
 In both Figure 93-12 and 93-13, modify to read:  
 packet\_initiate\_delay = FEC\_Overhead\_Min(sizeof(data\_tx) + tailGuard) + 12

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

*Cl* **93**      *SC* **93.3.2.3**                      *P***165**      *L***41**                      # **1544**  
Remein, Duane                      Alcatel-Lucent

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

Add support for ONU Control Channel LLID.  
(see related comment against Subclause 92.1.6.2.3.2 pg 96 ln 7)

*SuggestedRemedy*

Add below 93.3.2.3 Multicast and single copy broadcast support

"93.3.2.4 ONU Control Channel support

In addition to the unicast MAC and the SCB MAC the OLT and ONU shall support a single ONU Control Channel(OCC). The associated MAC is reserved for optional higher layers for control of the ONU functions not specified in this standard. The Configuration of SCB channels as well as filtering and marking of frames for support of SCB is defined in Clause @@92.1.6.2.3.2@@ for 10G-EPON compliant Reconciliation Sublayers."

Renumber remaining subclauses and update PICS.

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

PROPOSED REJECT.

It is not clear what this "Control Channel LLID" is and what it is for. There is no need to instantiate another MAC in the ONU and bind it with a new LLID.