IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Response

#3349
Cl 101 SC 101.4.2.9 P 174 L 35 # 3349
Richard, Prodan
Broadcom

Comment Type TR
Comment Status A
Rev
Correcting some equation/notation errors, adding text and a generator polynomial as needed for clarification of operation. Page 179, Line 4, Figure 101-24 has an error as the left-most XOR has no output.

SuggestedRemedy
Update subclause 101.4.2.9 as per attached prodan_3bn_10_0514.pdf (and fm). CMP files are also provided to indicate the changes.

Response Response Status C
ACCEPT IN PRINCIPLE.
Per suggestion with the following modifications:
Pg 175 ln 20 should ref 101.4.2.9.5 not 45.2.1.108 as in prodan_3bn_10_0514.
Pg 175 ln 38 should ref Equation (101-10) not 101-6 as in prodan_3bn_10_0514.
Pg 178 ln 27 change style to numbered eq.
Pg 179 ln 4 the illustration of the CRC S/R will be changed by the removal the the up arrow entering XOR by Gm=1 and addition of a left arrow on the same signal line entering box cm-1.

#3350
Cl 45 SC 45.2 P 29 L 33 # 3350
Remain, Duane
Huawei

Comment Type E
Comment Status A
Rev
Change per remain_3bn_13_0515.pdf
(on behalf of P Anslow, see anslow_3bn_01_0515.pdf)

SuggestedRemedy
per comment
Response Response Status C
ACCEPT.

#3351
Cl 101 SC 101.2.4.3 P 123 L 39 # 3351
Remain, Duane
Huawei

Comment Type E
Comment Status A
Change per remain_3bn_14_0515.pdf
(on behalf of P Anslow, see anslow_3bn_01_0515.pdf)

SuggestedRemedy
per comment
Response Response Status C
ACCEPT.

#3352
Cl 102 SC 102.2.3.1.4 P 235 L 23 # 3352
Remain, Duane
Huawei

Comment Type E
Comment Status A
Change per remain_3bn_15_0515.pdf
(on behalf of P Anslow, see anslow_3bn_01_0515.pdf)

SuggestedRemedy
per comment
Response Response Status C
ACCEPT.

#3353
Cl 103 SC 103.1 P 271 L 5 # 3353
Remain, Duane
Huawei

Comment Type E
Comment Status A
Change Protocol to protocol (2x) and Coax to coax in this para.

SuggestedRemedy
Per comment
Response Response Status C
ACCEPT.

#3354
Cl 101 SC 101.3.2.1.2 P 126 L 44 # 3354
Remain, Duane
Huawei

Comment Type E
Comment Status A
Ed/TBD
Remove the following Editors Notes:
Pg Ln
126 44
126 51
129 41
208 18

SuggestedRemedy
Per comment
Response Response Status C
ACCEPT.

Comment ID 3354 Page 1 of 62
TYPE: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general
COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed Z/withdrawn
SORT ORDER: Comment ID
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Cl 102 SC 102.1.3 P 220 L 43 # 3355
Remain, Duane Huawei

Comment Type: E  Comment Status: A

Response

Accept.

Cl 103 SC 103.2.2.1 P 282 L 48 # 3358
Remain, Duane Huawei

Comment Type: T  Comment Status: A

Response

Accept.

Cl 103 SC 103.2.2.4 P 285 L 36 # 3356
Remain, Duane Huawei

Comment Type: T  Comment Status: A

Response

Accept.

Cl 102 SC 102.4.4.1 P 266 L 25 # 3357
Remain, Duane Huawei

Comment Type: T  Comment Status: A

Response

Accept.

Cl 103 SC 103.1.2 P 274 L 1 # 3360
Remain, Duane Huawei

Comment Type: E  Comment Status: A

Response

Accept.

Comment ID: 3360
Page 2 of 62
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Draft 1.4

Comment ID 3361

Cl 103 SC 103.2.2.1 P 282 L 35 # 3361
Remein, Duane Huawei

Comment Type E Comment Status A

MAC_Control_type is defined in Cl 32 not 64.

Suggested Remedy

Change ref from 64.2.2.1 to 31.4.1.3

Response Status C

ACCEPT.

Comment ID 3362

Cl 103 SC 103.2 P 276 L 40 # 3362
Remein, Duane Huawei

Comment Type T Comment Status A

There are no substantive differences between Cl 103.2/103.2.1/103.2.1.1/103.2.2 and the corresponding subclauses of Cl 77. We should avoid duplication between these clauses where possible.

Suggested Remedy

Replace the text of 103.2 with the following:
"As depicted in Figure 103-3, the Multipoint MAC Control functional block contains functions very similar to those found in Clause 77. In EPoC the CLT replaces the OLT and the CNU replaces the ONU. Significant differences are noted in the following sections."

Replace the text of 103.2.1 with the following:
"The principle of Multipoint MAC Control is the same as those described in 77.2.1 for EPON."

Replace the text of 103.2.1.1 with the following:
"The ranging and timing processes for EPoC are the same as those described in 77.2.1.1 for EPON."

Replace the text of 103.2.2 with the following:
"The purpose and high level functionality of multipoint transmission control is similar to those described in 77.2.2 for EPON. Detailed differences are noted in the definitions below and in Figure 103-9 through Figure 103-14.

Remove Figure 103-4 "Round trip time calculation".
RETAIN Figure 103-5 "Multipoint Transmission Control service interfaces" through . Figure 103-14 "CNU Control Multiplexer state diagram".
RETAIN sections 103.2.2.1 "Constants" through 103.2.2.7 "State diagrams".

Response Status C

ACCEPT.

See Related Cmt# 3429, 3363, & 3421

Comment ID 3364

Cl 101 SC 101.4.2.8.3 P 172 L 9 # 3364
Remein, Duane Huawei

Comment Type E Comment Status A

EDITORS NOTE (to be removed prior to publication): a state diagram is needed for this subclause.

It is my opinion that the bit loading function is described in sufficient detail that a state diagram is not needed.

Suggested Remedy

Remove the Ed Note

Response Status C

ACCEPT.

Final Responses

Comment ID 3363

Cl 103 SC 103.2.2.3 P 283 L 27 # 3363
Remein, Duane Huawei

Comment Type T Comment Status A

There are several defined items in Cl 103.2.2.x that are different between EPoC and EPON such as fecOffset. It would be a good idea to give these unique names.

This is true for:
Pg Ln Variable,
283 25 fecOffset,
284 10 OctetsRemaining,
284 36 ResetBound,
285 36 CheckGrantSize(length),
287 16 packet_initiate_timer,
314 31 effectiveLength,
316 17 rndDlyTmr,

Suggested Remedy

Globally change:
fecOffset -> fecOffsetC (15 instances)
OctetsRemaining -> OctetsRemainingC (3 instances)
ResetBound -> ResetBoundC (4 instances)
CheckGrantSize -> CheckGrantSizeC (3 instances)
packet_initiate_timer -> packet_initiate_timerC (6 instances)
effectiveLength -> effectiveLengthC (5 instances)
rndDlyTmr -> rndDlyTmrC (3 instances)

Response Status C

ACCEPT.

See Related Cmt# 3429, 3363, & 3421
**Comment ID** 3365  
**Page 201 line 8:** EDITORS NOTE (to be removed prior to publication): the above definition are essentially copies from Cl 45.2.1.112. Recommend keeping this and referencing this from Cl 45.

**Suggested Remedy**

Change subclauses 45.2.1.136.2 and 45.2.1.136.4 from:

45.2.1.136.2 Type 2 Start (1.1909.11:8)
Register bits 1.1909.11 through 1.1909.8 indicate the number, as an integer between 0 and 15, of the first subcarrier designated as a Type 2 Pilot. These register bits are a reflection of the variable Type2_Start defined in 101.4.3.7.1.

45.2.1.136.4 Type 1 Start (1.1909.3:0)
Register bits 1.1909.3 through 1.1909.0 indicate the number, as an integer between 0 and 15, of the first subcarrier designated as a Type 1 Pilot. These register bits are a reflection of the variable Type1_Start defined in 101.4.3.7.1.

To:

Type 2 Start (1.1909.11:8)
Bits 1.1909.11:8 indicate the number of the first subcarrier designated as a Type 2 Pilot. These bits are a reflection of the variable Type2_Start defined in 101.4.3.7.1.

Type 1 Start (1.1909.3:0)
Bits 1.1909.3:0 indicate the number of the first subcarrier designated as a Type 1 Pilot. These bits are a reflection of the variable Type1_Start defined in 101.4.3.7.1.

Remove the Ed Note pg 201 ln 8

Pg 201 ln5: Typo - in line 5 "Type 1Start" sqb "Type2Start"

**Response**

ACCEPT IN PRINCIPLE.
Remove Ed Note pg 201 ln 8

---

**Comment ID** 3366  
**Page 208 line 13:** EDITORS NOTE (to be removed prior to publication): the above definition are essentially copies from Cl 45.2.7a.3. Recommend keeping this and referencing this from Cl 45.

**Suggested Remedy**

Change 45.2.7a.4.1 and 45.2.7a.4.2 from:

45.2.7a.4.1 Real pre-equalizer coefficient SC(0) (12.2048.15:0)
Register bits 12.2048.15 through 12.2048.0 specify the real part of the pre-equalizer coefficient for subcarrier 0 for the US OFDMA channel. The number is a Q2.14 format signed fractional number. This register is a reflection of the variable EQ_CoefR(0) defined in 101.4.3.11.2.

45.2.7a.4.2 Imaginary pre-equalizer coefficient SC(0) (12.2049.15:0)
Register bits 12.2049.15 through 12.2049.0 specify the imaginary part of the pre-equalizer coefficient for subcarrier 0 for the US OFDMA channel. The number is a Q2.14 format signed fractional number. This register is a reflection of the variable EQ_CoefI(0) defined in 101.4.3.11.2.

To:

45.2.7a.4.1 Real pre-equalizer coefficient SC(0) (12.2048.15:0)
Register bits 12.2048.15 through 12.2048.0 specify the real part of the pre-equalizer coefficient for subcarrier 0 for the US OFDMA channel. This register is a reflection of the variable EQ_CoefR(0) defined in 101.4.3.11.2.

45.2.7a.4.2 Imaginary pre-equalizer coefficient SC(0) (12.2049.15:0)
Register bits 12.2049.15 through 12.2049.0 specify the imaginary part of the pre-equalizer coefficient for subcarrier 0 for the US OFDMA channel. This register is a reflection of the variable EQ_CoefI(0) defined in 101.4.3.11.2.

Remove Ed Note pg 208 ln 13

**Response**

ACCEPT.

---

**Comment ID** 3367  
**Page 201 line 2:** EDITORS NOTE (to be removed prior to publication): This subclause is reserved for the summary of the power-saving capabilities for this PMD type. This material would be all new in the amendment added by IEEE P802.3bn EPoC Task Force.

**Suggested Remedy**

Strike the section. Power-saving capabilities are documented in Cl 100.

**Response**

ACCEPT.
<table>
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<tr>
<th>Comment ID</th>
<th>Comment Type</th>
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<td>3369</td>
<td>E</td>
<td>A</td>
<td>Ed/TBD</td>
<td>Replace with the following note:</td>
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<td></td>
<td>NOTE: Most of the variables transferred via the PHY Link are reflected in Clause 45. The EPoC Index and bits are determined from Clause 45 register designations using the following rules:</td>
</tr>
</tbody>
</table>

```plaintext
If 1.1900 <= RegAdd <= 1.1999 Then Index = (RegAdd - 1.1900) * 1000 (i.e., 0-99)
46 indexes in this range were in use as of Draft 1.4.
If 12.0000 <= RegAdd Then Index = (RegAdd - 12.0000) * 1000 + 1000 (i.e., 1000+)
12287 indexes in this range are in use as of Draft 1.4.
If variable is not in CI 45 use indexes 500-999.
```

**Response**

ACCEPT IN PRINCIPLE.

Change to

NOTE: Most of the variables transferred via the PHY Link are reflected in Clause 45. The EPoC Index and bits are determined from Clause 45 register designations using the following rules:

```plaintext
If 1.1900 <= RegAdd <= 1.1999 Then Index = (RegAdd - 1.1900) * 1000 (i.e., 0-99)
If 12.0000 <= RegAdd Then Index = (RegAdd - 12.0000) * 1000 + 1000 (i.e., 1000+)
If variable is not in CI 45 use indexes 500-999.
```

**Use Style NOTE**
Draft 1.4 IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Final Responses

At 138 line 37 replace the Ed. Note with the following:
"The CNU may indicate it is capable of a shorter response time to a downstream EPoC Message Block by setting the PhyLinkRspTm to a value of less than 61440 (4.8 ms).

Response  Response Status  C

Cl 102  SC 102.2.3.2  P 263  L 53  # 3371
Remein, Duane Huawei

Comment Type  T  Comment Status  A  PICS Ed/TBD
EDITORS NOTE (to be removed prior to publication): we need to define a minimum time of 2.5 ms between the EPCH message and the beginning of the Probe Period.

SuggestedRemedy
Remove the Ed Note
At pg 263 ln 52 add
"The CNU shall decode and be capable of acting on EPoC Probe Control Header instructions included in a downstream PHY Link frame within 2.5 ms."

Response  Response Status  C

Cl 103  SC 103.3.2.4  P 295  L 42  # 3372
Remein, Duane Huawei

Comment Type  T  Comment Status  A

Given that this only applies to MAC Control and that time in PHY is seen as distance there is no reason these TBDs cannot be the same as in EPON.
In cl 77 these two TBD's are both 1024 (i.e., 16.384 us).

SuggestedRemedy
Change both TBDs to 1024 (i.e., 16.384 us).

Response  Response Status  C

At pg line 35 change:
"The CNU shall decode and be capable of acting on instructions included in a downstream PHY Link frame within 4.8 ms."
To:
The CNU shall decode and be capable of acting on EPoC Message Block instructions included in a downstream PHY Link frame within 4.8 ms."

Jan 20, 2015

Comment ID 3372
Page 6 of 62
5/20/2015 10:29:23 AM

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched A/accepted R/rejected  RESPONSE STATUS: O/open W/written C/closed Z/withdrawn
SORT ORDER: Comment ID
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

### Comment 3373

**Comment ID:** #3373  
**Page:** 318  
**Line:** 51  
**Type:** E  
**Status:** A  

**Comment:**
*EDITORS NOTE (to be removed prior to publication): the figure above "Gate Processing CNU Programming state diagram" will require modification if sub-clause 10x.4 "Discovery Process in dual-rate systems" is removed."

However some ONUs are single rate (10G) and this SD seems to work fine for them. Therefore I must conclude that it works fine even with the removal of 10x.4 Discovery Process in dual-rate systems.

**Suggested Remedy:**
Remove the Ed Note.

**Response Status:** C

**Response:**
ACCEPT.

---

### Comment 3374

**Comment ID:** #3374  
**Page:** 147  
**Line:** 31  
**Type:** T  
**Status:** A  

**Comment:**
*EDITORS NOTE (to be removed prior to publication): A figure and reference to same is needed showing FEC decoding process in CLT receiver.

However there is no reason that Figure 101-12 cannot cover both CNU and CLT receive paths.

**Suggested Remedy:**
Change title of Figure 101-12 to "PCS receive path processing"

Add text to the end of the 1st para in 101.3.3.1.2 as follows:

"Note that burstStart and burstEnd indications are passed via the PMA_UNITDATA.indication and are used by the LDPC Decoder in the CLT to determine FEC codeword sizes in any given burst."

**Response Status:** C

**Response:**
ACCEPT.

---

### Comment 3375

**Comment ID:** #3375  
**Page:** 124  
**Line:** 2  
**Type:** E  
**Status:** A  

**Comment:**
*EDITORS NOTE (to be removed prior to publication): this figure will need to be updated if burst marker structure is changed.

**Suggested Remedy:**
Replace figure with that in remein_3bn_17_0515.pdf

**Response Status:** C

**Response:**
ACCEPT IN PRINCIPLE.

Per comment but change "Burst Marker" lable on 3rd idle 64B/66B block at beginning of burst to "Burst Time Header"

---

### Comment 3376

**Comment ID:** #3376  
**Page:** 136  
**Line:** 26  
**Type:** E  
**Status:** A  

**Comment:**
*EDITORS NOTE (to be removed prior to publication): the TF need to do a thorough review of Idle control character deletion process as it is currently written to be applicable to both US & DS and these processes will be very different in EPoC where US/DS rates are different and US has multiple FEC's.

**Suggested Remedy:**
remove Ed Note

**Response Status:** C

**Response:**
ACCEPT.
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Draft 1.4

Response #3377

Cl 101 SC 101.3.2.1.3 P 126 L 11 # 3377
Remain, Duane Huawei

Comment Type E Comment Status A Ed/TBD
Ed Note has served it's purpose.
"EDITORS NOTE (to be remove prior to publication): Note that the list of variables will be updated per technical decision #45 (http://www.ieee802.org/3/bn/public/decisions/decisions.html) once EPoC-specific FEC and PMD overhead details are settled."

Suggested Remedy
Remove Ed Note.

Response Response Status C
ACCEPT.

Response #3378

Cl 101 SC 101.3.2.1.5 P 127 L 5 # 3378
Remain, Duane Huawei

Comment Type T Comment Status A
Figure 101-4 does not imply an "order shown" as specified in the following statement:
"The CLT PCS shall perform the Idle deletion process as shown in Figure 101-2. The CNU PCS shall perform the Idle deletion process as shown in Figure 101-3 (data rate adaptation sub-process) Figure 101-3 and in (FEC overhead compensation sub-process), in the order shown in Figure 101-4."

Suggested Remedy
Change to read: The CNU PCS shall perform the Idle deletion process as shown in Figure 101-3 (data rate adaptation sub-process) and in Figure 101-4 (FEC overhead compensation sub-process).

Response Response Status C
ACCEPT.

Response #3379

Cl 101 SC 101.3.3.1.8 P 153 L 41 # 3379
Remain, Duane Huawei

Comment Type T Comment Status A
Replace "decodeFailure ++" with "FecCodeWordFail ++" in DECODE_FAIL state

Suggested Remedy
Per comment.

Response Response Status C
ACCEPT.

Response #3380

Cl 100 SC 100.2.9.7 P 105 L 30 # 3380
Remain, Duane Huawei

Comment Type E Comment Status A
Change title of Table 100-11 from "CNU transmitter output signal characteristics" to "CNU RF output requirements" (to match the complementary CLT RF output requirements table 100-3)

Suggested Remedy
per comment

Response Response Status C
ACCEPT.

Response #3381

Cl 100 SC 100.2.6.1 P 87 L 37 # 3381
Remain, Duane Huawei

Comment Type T Comment Status A
DS_DataRate & DS_DataRate have no defined data type (although they are well defined).

Suggested Remedy
Add new section 100.2.6.3 Variables
DS_DataRate TYPE: UQ34.3 format
This variable indicates the downstream data rate in units of bps and is calculated as shown in Equation 100-1.

US_DataRate TYPE: UQ34.3 format
This variable indicates the upstream data rate in units of bps and is calculated as shown in Equation 100-2.

Update reference in Cl 45.2.1.147 & 45.2.1.148 pg 50 ln 7 & 37

This comment should be changed to clause 00 after a proposed response is made.

Response Response Status C
ACCEPT.

Comment ID 3381 Page 8 of 62 5/20/2015 10:29:23 AM

TYPE: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general
COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed Z/withdrawn
SORT ORDER: Comment ID
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<td>DS_OFDM_ID formally defined in Cl 102.4.1.7.2 pg 255 In 10 and should be used here where we discuss SC configuration.</td>
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<td>Move definition of DS_OFDM_ID from 102.4.1.7.2 to 101.4.2.3.5</td>
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<td>&quot;... using the DS_ModTypeSC(n) variables (where 0 &lt;LTE&gt; n &lt;LTE&gt; 4095). These variables allow the PHY to configure ... &quot;</td>
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<td>&quot;... using the DS_ModTypeSC(n) variables (where 0 &lt;LTE&gt; n &lt;LTE&gt; 4095) in conjunction with DS_OFDM_ID. The OFDM channel being configured is determined by DS_OFDM_ID. The DS_ModTypeSC(n) variables configure ... &quot;</td>
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<td>{&lt;LTE&gt; above is the symbol &quot;less than or equal to&quot;}</td>
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<td>This statement made sense when the bit definition was in Reg 12.1.3:0 but now that the enumeration is in Cl 101 it doesn't.</td>
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<td>&quot;See registers 12.1.3 through 12.1.0 for interpretation of individual bits.&quot;</td>
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<td>Strike the statement in 4 places in 45.2.7a.2.x</td>
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<td>1) include text about AssgndCNU_ID (in same index as AllwdCNU_ID) here in the discussion of CNU_ID allocation message and explain how AssgndCNU_ID and AllwdCNU_ID are used at CNU.</td>
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IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

**Comment**

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

This statement describes the output of the encoder not the input.

"The EPoC 64B/66B encoder does not include a scrambler function as described in 49.2.6 and the input is a 65B block with a single synch header bit."

**Suggested Remedy**

Change "input" to "output"

**Response**

Response Status: C

ACCEPT.

---

**Comment**

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

Now that we know positively what "any additional FEC-related overhead" is we can be more precise in this statement:

**Suggested Remedy**

Change:

"insertion of the FEC parity data as well as any additional FEC-related overhead" to:

"insertion of the FEC parity data and CRC40"

**Response**

Response Status: C

ACCEPT.

---

**Comment**

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

"FEC encode" should be "FEC Encoder" in 4 places:

Pg line
134 3
134 31
144 37
145 46

"data detector" should be "Data Detector" in 3 places

125 20
144 37
146 46

**Suggested Remedy**

Per comment

**Response**

Response Status: C

ACCEPT.

Also see Cmt# 3441 regarding FEC Encoder

---

**Comment**

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

Redraw figures 101-3 & 101-4 so symbols display correctly.

**Suggested Remedy**

Replace with native FrameMaker figures as illustrated in remein_3bn_19_0515.pdf

**Response**

Response Status: C

ACCEPT.
**Response #3390**

Comment Type: **E**

**Comment Status: A**

**Wording:**

"The CLT 10GPASS-XR PCS operating on CCDN shall encode the transmitted data using one of the LDPC (16200, 14400) code per Table 101-2."

**Suggested Remedy**

"The CLT 10GPASS-XR PCS operating on CCDN shall encode the transmitted data using the LDPC (16200, 14400) code per Table 101-2."

**Response**: Accept.

---

**Response #3391**

Comment Type: **T**

**Comment Status: A**

**Incorrect Fig Ref:**

"The CLT shall implement the Data Detector output process as depicted in Figure 101-8."

**Suggested Remedy**

"The CLT shall implement the Data Detector output process as depicted in Figure 101-9."

**Response**: Accept.

---

**Response #3392**

Comment Type: **T**

**Comment Status: A**

**The Equation following this statement needs an Eq Number so it can be referenced by PICS**

"The "MUST" on line 21 seems to be D3.1 carry-over and the sentence is poorly worded."

**Suggested Remedy**

Change para style to numbered equation.

"The number of cycles of each subcarrier generated by the CLT during one period of the subcarrier clock (for each OFDM symbol) MUST be an integer number."

"The number of OFDM clock cycles of each subcarrier generated by the CLT during one period of the subcarrier clock is an integer number."

**Response**: Accept.

See Cmt# 3566
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Final Responses

Comment ID 3393

Response

Cl 101 SC 101.4.3.11.1 P 207 L 30 # 3393
Remein, Duane Huawei

Comment Type T Comment Status A PreEq PICS Rev

This set of 3 requirements can be simplified, steps 2 & 3 have nothing to do with normalization:

"The CNU normalizes the new calculated coefficients as follows:
1) Upon applying any updates, the CNU shall normalize the new calculated coefficients as follows: mean (abs (Ck)^2 ) = 1 (summation is over all k subcarriers, which are active subcarriers).
2) The CNU shall apply the newly calculated coefficients for transmitting within 10 ms after receiving an update via a PHY Link message.
3) The newly calculated coefficients for transmitting shall take affect at the beginning of a transmission."

SuggestedRemedy

Change to read:
"The CNU shall normalize the new calculated coefficients by adjusting the mean of (abs (Ck)^2 ) to be 1. The summation is over all k subcarriers, which are active subcarriers.
The CNU shall apply the newly calculated coefficients for transmitting at the beginning of a transmission within 10 ms after receiving an update via a PHY Link message."

Response

Response Status C

ACCEPT IN PRINCIPLE. 
*** See Topic PreEq ***
This is included in remein_3BN_04_0515.pdf

change

"The CNU shall apply the newly calculated coefficients for transmitting at the beginning of a transmission within 10 ms after receiving an update via a PHY Link message."

Response

Response Status C

ACCEPT.

Note p172 l24

Comment ID 3394

Response

Cl 101 SC 101.4.2.6.4 P 168 L 31 # 3395
Remein, Duane Huawei

Comment Type T Comment Status A

This requirement is a duplicate of that at line 12.
"The CLT shall follow Step 1 through Step 8 as specified below for defining the frequencies for the location of these continuous pilots."

SuggestedRemedy

Strike the sentence.

Response

Response Status C

ACCEPT.

Comment ID 3396

Response

Cl 101 SC 101.4.2.6.4 P 169 L 41 # 3396
Remein, Duane Huawei

Comment Type T Comment Status A

This Step is already required per statement pg 168 ln 12:
"The CLT shall transmit this continuous pilot pattern to the CNUs in the system and communicate the placement using the PHY Link."

SuggestedRemedy

Change to read:
"The CLT transmits this continuous pilot pattern to the CNUs in the system and communicate the placement using the PHY Link."

Response

Response Status C

ACCEPT.

Comment ID 3397

Response

Cl 101 SC 101.4.4.5 P 213 L 31 # 3394
Remein, Duane Huawei

Comment Type T Comment Status A

A note seems to be a inappropriate place for a requirement:
"Note that downstream RF spectrum availability as well as device implementation will determine OFDM channel presence and actual subcarrier use. The symbol mapping function therefore shall process all active subcarriers per symbol across all OFDM channels."

SuggestedRemedy

Strike "Note that" and change para style so the statement reads:
"Downstream RF spectrum availability as well as device implementation will determine OFDM channel presence and actual subcarrier use. The symbol mapping function therefore shall process all active subcarriers per symbol across all OFDM channels."

Response

Response Status C

ACCEPT.

Comment ID 3397 Page 12 of 62

Type: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general
Comment Status: D/dispatched A/accepted R/rejected Response Status: O/open W/written C/closed Z/withdrawn
 sort order: Comment ID

5/20/2015 10:29:23 AM
This requirement is inappropriate here. The PCS has no control over the minimum gap time between bursts which is control by the MPCP layer.

**Suggested Remedy**

Change wording to:

The CLT grant generator ensures a minimum gap time between bursts from any CNU equal to the transmission time of one (1) resource block expressed in units of time quantum (see 77.2.2.2).

In 103.3.2.4 add the following requirement:

"The CLT shall ensure that a minimum gap time between bursts from any two CNUs equal to the transmission time of one (1) resource block expressed in units of time_quantum."

Add PICS statement to cover new requirement.

**Response**

ACCEPT IN PRINCIPLE.

Per suggestion but

"The CLT ensures a minimum gap time between bursts from any CNU equal to the transmission time of one resource block expressed in units of time_quantum."

and in Eq 101-26 put right of equality in ceiling function

---

Remnants of two symbol sizes and no mention of windowing:

"The downstream PHY Link shall use the same OFDM Symbol size and cyclic prefix duration as the downstream MAC data channel."

**Suggested Remedy**

Globally replace LocalTS_ctr with LocalTS

**Response**

ACCEPT.

---

PhyLnkRspTm is not reflected in CL 45 registers. However PhyLnkRspTm is defined as 16 bits in Cl 102 pg 241 ln 11 which equates to 300+ us. Whereas on pg 238 ln 35 the is a max response time of 4.8 ms.

**Suggested Remedy**

Add new register

45.2.1.aaa PHY Link Response Time register (Register 1.19xx)

The assignment of bits in the PHY Link Response Time register is shown in Table 45-xxx.

Add new table for Registers 1.19xx & 1.19xy

Add variable and CI 45 cross reference to Table 102-3

Change definition of PhyLnkRspTm from:

"in OFDM clocks' to

"in units of 78.125 ns (12 x 1/204.8)"

**Response**

ACCEPT IN PRINCIPLE.

As proposed but units to be:

"in units of 78.125 ns (16 x 1/204.8)"

---

Several instance of LocalTS_ctr should be LocalTS

**Suggested Remedy**

Globally replace LocalTS_ctr with LocalTS

**Response**

ACCEPT.
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Response #3402

Cl 102 SC 102.2.3.3 P 237 L 24 # 3402
Remen, Duane Huawei

Comment Type T Comment Status A
DS requirement is duplicate pg 234 in 39 & 237 in 24
"The CLT shall only transmit the valid values of the PHY DA and OPCODE fields as given in Table 102-8, and Table 102-10 respectively."

Suggested Remedy
Change to:
"The CLT shall only transmit the valid OPCODE field values as given in Table 102-10."

Response Response Status C
ACCEPT.

Response #3403

Cl 102 SC 102.3.1.2 P 244 L 14 # 3403
Remen, Duane Huawei

Comment Type TR Comment Status A
Nowhere do we specify where the US PHY Link modulation is set, only that it is limited to those type listed in Table 100-2.
"The upstream PHY Link shall use any of the modulation formats listed under PHY Link CNU Tx/CLT Rx in Table 100-2."

Suggested Remedy
Change to read:
"The upstream PHY Link shall use any of the modulation formats listed under PHY Link CNU Tx/CLT Rx in Table 100-2 and is set using the US_PhyLnkMod variable."

In 102.3.5.3 add:
US_PhyLnkMod
TYPE: 4 bit integer
This variable sets the type of modulation used for the upstream PHY Link. The assignment of bits to each modulation type is shown below.
bit 3 2 1 0
1 x x x = reserved
0 1 1 1 = 128-QAM
0 1 1 0 = 64-QAM
0 1 0 1 = 32-QAM
0 1 0 0 = 16-QAM
0 0 1 1 = 8-QAM
0 0 1 0 = reserved
0 0 0 1 = BPSK
0 0 0 0 = reserved

In Table 102-3 add:
US PHY Link Modulation | US PHY Link control | 1.1912.15:12 | US_PhyLnkMod | 12 | 15:12

In Cl 45.2.1.139 US PHY Link control register (Register 1.1912) In table 45-98i change:
1.1912.15:12 | Reserved | Ignore on read | RO
to:
1.1912.15:12 | US PHY Link Modulation | US PHY Link modulation type | R/W
Add:
45.2.1.138.1 US PHY Link Modulation (1.1912.15:12)
Bits 1.1912.15:12 are used to set the modulation type of the US PHY Link. These bits are a reflection of the US_PhyLnkMod variable defined in 102.3.5.3.

Response Response Status C
ACCEPT IN PRINCIPLE.
Use US_PhyLinkMod instead of US_PhyLnkMod
Comment ID 3404

Comment Type E  Comment Status A
Incomplete ref: described in 102.1.4.2.1.
SuggestedRemedy
Change to: 102.1.4.1.1 and 102.1.4.2.1

Response  Response Status C
ACCEPT.

Comment ID 3405

Comment Type E  Comment Status A
Improper Figure Ref. "illustrated in 102-22."
SuggestedRemedy
Change to: "illustrated in Figure 102-22."

Response  Response Status C
ACCEPT.

Comment ID 3406

Comment Type TR  Comment Status A
Undefined variable RangingOffset.
"When the CNU receives the PhyTimingOffset variable it shall add the new value of PhyTimingOffset to the RangingOffset."
SuggestedRemedy
Change to read: "When the CNU receives the PhyTimingOffset variable it shall add the new value of PhyTimingOffset to the LocalTS."

Response  Response Status C
ACCEPT.
Comment ID 3409

Cl 103 SC 103.2.2 P 281 L 2 # 3409
Remen, Duane Huawei

Comment Type T Comment Status A

Figure 103-7 still has a carry-over from TDD - "transmitAllowed(n)"

SuggestedRemedy

Remove from:

Figure 103-7
Figure 103-13

Pg 285 In 12 change

“This variable is used to control PDU transmission at the CNU and at the CLT and is defined in 64.2.2.3.”

to

“This variable is used to control PDU transmission at the CNU and is defined in 64.2.2.3.”

Response Response Status C

ACCEPT.

Comment ID 3410

Cl 102 SC 102.3.1.1 P 244 L 7 # 3410
Remen, Duane Huawei

Comment Type E Comment Status A

Clause 45 ref.

“... per the US_PHYLinkStrt variable (see US PHY Link Start, 45.2.1.139) ...”

SuggestedRemedy

change to:

“... per the US_PHYLinkStart variable (see 102.3.5.3) ...”

Add to 102.3.5.3

US_PHYLinkStart

TYPE: 12-bit unsigned integer

This variable indicates the starting subcarrier of the upstream 10GPASS-XR PHY Link. It specifies the lowest frequency subcarrier of the upstream PHY Link used to carry PHY Link information bits.

In 45.2.1.139.1 change [ref] to 102.3.5.3.

Response Response Status C

ACCEPT IN PRINCIPLE.

Per comment

Globally replace US_PHYLinkStart with US_PhylLinkStart

Comment ID 3411

Cl 100 SC 100.2.8.4 P 92 L 40 # 3411
Remen, Duane Huawei

Comment Type T Comment Status A

Eq 100-6 (N*) needs to be formatted with two conditions: something like

If Neqport = 1 then

N* = (factor1)

If Neqport > 1 then

N* = (factor2)

As it is now it is not clear exactly how N* is calculated.

SuggestedRemedy

Per comment

Response Response Status C

ACCEPT IN PRINCIPLE.

Editor will consider best approach.

Comment ID 3412

Cl 101 SC 101.3.2.1.2 P 125 L 9 # 3412
Remen, Duane Huawei

Comment Type T Comment Status A

Need to rationalize the three 16-bit unsigned integer countVector’s

Pg 125 In 9

countVectorT - Counts ... as part of data rate adaptation and FEC overhead compensation. (used in Figure 101-2)

Pg 126 In 36

countVectorF - Counts ... as part of the FEC overhead compensation sub-process. (used in Figure 101-4)

countVectorP - Counts ... as part of the data rate adaptation sub-process. (used in Figure 101-3)

SuggestedRemedy

At a minimum move countVectorT definition to 101.3.2.1.3 Counters instead of 101.3.2.1.2 Variables

Response Response Status C

ACCEPT.
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Final Responses

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Remein, Duane Huawei

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

**Comment:** CLT_TxMute (as in Cl 45 & 100.3.4) or just TxMute?

**Suggested Remedy:**
- Change Entry in Table 100-1 to CLT_TxMute.

**Response**

**Response Status:** C

**ACCEPT.**

---

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Remein, Duane Huawei

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

The definition of variable DS_ChCnt can be better placed.

**Suggested Remedy:**
- Move the definition to new section 100.2.6.3 Variables
- Remove section 100.2.8.7
- In 100.2.6.1 pg 87 line 22 change "The downstream Frame Data Load (bits) is a summation over all active channels, over 128 symbols, ..." to "The downstream Frame Data Load (bits) is a summation over all active channels, as defined by DS_ChCnt, over 128 symbols, ..."
- In equation on pg 87 line 26 change "5" above 1st summation symbol to "DS_ChCnt"
- Add DS_ChCnt to Table 100-1 after DSNr
- Add DS OFDM channels | DS OFDM control | 1.1901.14:12 | DS_ChCnt | 1 | 14:12
- In Cl 101.4.2.1 pg 160 line 40 change "Optional OFDM channels 2, 3, 4, and 5 are enabled when configured for operation." to "Optional OFDM channels 2, 3, 4, and 5 are enabled when configured for operation via the DS_ChCnt variable."
- Add to Table 101-1 after DS_TmIntrlv
- DS OFDM channels | DS OFDM control | 1.1901.14:12 | DS_ChCnt | 1 | 14:12
- In Cl 45.2.1.132.2 pg 39 line 52 change "TBD_Var_name" to "DS_ChCnt" and "[ref]" to "100.2.6.3"
- Note this comment is written against Cl 100 but should be changed to Cl 00 after a proposed response has been made.

**Response**

**Response Status:** C

**ACCEPT.**
US_FreqCh1 is not formally defined. This seems to be a logical place.

Suggested Remedy

In 100.2.7.3 Variables Add
US_FreqCh1
TYPE: 16-bit unsigned integer
This variable specifies the center frequency, in steps of 50 kHz, of subcarrier 0 for the upstream OFDM channel. Subcarriers are numbered from 0 to 4095 with subcarrier 0 at the lowest frequency. This definition equates to a subcarrier 0 center frequency of from 5 MHz to 3.27675 GHz. The minimum value for this register is 100. See Table 100-11 for additional details.

Note currently there is no table for CNU RF output requirements but Table 100-11 seems to be similar

Update ref in 45.2.1.135.1 pg 43 ln 27 to 100.2.7.3

Note this comment is written against Cl 100 but should be changed to Cl 00 after a proposed response has been made.

Response
ACCEPT.

Response Status C

Cl 100 SC 100.2.7.3 P 89 L 10 # 3415
Remein, Duane Huawei

Note currently there is no table for CNU RF output requirements but Table 100-11 seems to be similar

Update ref in 45.2.1.135.1 pg 43 ln 27 to 100.2.7.3

Note this comment is written against Cl 100 but should be changed to Cl 00 after a proposed response has been made.

Response
ACCEPT.

Response Status C

Cl 102 SC 102.2.1.1 P 228 L 43 # 3416
Remein, Duane Huawei

DS_PhyLinkStrt not formally defined and should remove ref to Cl 45 here "(see DS PHY Link Start parameter, 45.2.1.138)"

Suggested Remedy

Change
"(see DS PHY Link Start parameter, 45.2.1.138)"
to
"(see 102.2.6.3)"

Add to 102.2.6.3 Variables
DS_PhyLinkStrt
TYPE: 12-bit integer
This variable sets the starting subcarrier in OFDM Channel 1 of the downstream PHY Link. It specifies the lowest frequency subcarrier of the downstream PHY Link used to carry PHY Link information bits.

In Cl 45.2.1.138.1 pg 46 in 6 update reference to 102.2.6.3

Note that Cl 45.2.1.138.1 should be combined with 45.2.1.138 per IEEE Style guide (no single subclauses). Likewise 45.2.1.139 and 45.2.1.139.1 should be combined.

Response
ACCEPT.

Chaged pg to 228 fm 229
| Comment ID | Comment Type | Comment Status | Page | L | P | CI | SC | Comment | Type | Comment Status | Page | L | P | CI | SC | Comment | Type | Comment Status | Page | L | P |
|------------|--------------|----------------|------|---|---|----|----|---------|-------|----------------|------|---|---|----|----|---------|-------|----------------|------|---|---|----|----|---------|-------|----------------|------|---|---|----|----|---------|
| 3417       | T            | F              | 12   |   | 264| 102.4.3 | 102 | AssgnCNU_ID not formally defined, remove Cl 45 ref *(see 45.2.1.141)* | SuggestedRemedy | Change *(see 45.2.1.141)* to *(see 102.4.3.3)*. New definition included in remain_3bn_10_0515.pdf: AssgnCNU_ID TYPE: boolean The value of this variable is used to indicate if the associated CNU_ID value has been assigned to a CNU by the PHY. When the flag is set to one the associated CNU_ID has been assigned to a new CNU whereas when the flag is set to zero the associated CNU_ID has not been assigned. Update reference in 45.2.1.141.1 pg 47 ln 25 to 102.4.3.3. See related comment on SCI 102.4.1.6 pg 254 ln 16 suggested topic CNU_ID_Alloc. | Response | ACCEPT. See Cmt # 3384 |   |   | | | | | | |
| 3418       | T            | F              | 12   |   | 226| 102.1.8 | 102 | NewCNU_Rng not formally defined or used. | SuggestedRemedy | Add to 102.4.1.7.2 Variables NewCNU_Rng TYPE: 16-bit integer This variable indicates the range of the CNU corresponding to Allowed CNU_ID in units of OFDM clock (1/204.8 MHz). Add to the end of 102.4.1.4: "The CLT calculates the range of the CNU based on the PHY Link Response and uses this to report the NewCNU_Rng when declaring the CNU link-up (see 102.4.3)." | Response | ACCEPT. |   |   | | | | | | | |
| 3420       | T            | F              | 12   |   | 255| 102.4.1.7.2 | 102 | PhyTimingOffset, and PhyPowerOffset not formally defined. | SuggestedRemedy | Add to 102.4.1.7.2 Variables PhyTimingOffset TYPE: signed 8-bit integer This variable is used to set the CNU upstream transmitter power by specifying the relative change, in units of 1/4 dB, the CNU is to make in order that transmissions arrive at the CLT at the desired power level. Changing the value of this variable while running using Management is highly undesirable and is unspecified. PhyPowerOffset TYPE: signed 32-bit integer This variable is used to align the CNU to the upstream OFDM timing. PhyTimingOffset is in units of 1/204.8 MHz and a negative value causes the timing of the CNU transmissions to be delayed. Changing the value of this variable while running using Management is highly undesirable and is unspecified. | Response | ACCEPT. |   |   | | | | | | | |
There are several defined item in Cl 103.2.2.x that are identical to items defined elsewhere for EPON. For example IdleGapCount definition is identical to that in Cl 77.2.2.3. This is true for:

- Pg 283 Line 37 IdleGapCount (Cl 77.2.2.3),
- Pg 284 Line 41 RTT (cl 64.2.2.3),
- Pg 285 Lines 33 Opcode-specific function(opcode) (Cl 64.3.5.5),
- Pg 286 Lines 43 select() (Cl 64.2.2.4),
- Pg 286 Lines 48 SelectFrame() (Cl 64.2.2.4),
- Pg 287 Line 1 sizeof(sdu) (Cl 64.2.2.4),
- Pg 288 Line 3 pendingGrants (64.3.3.2),
- Pg 289 Lines 33 mpcp_timeout (64.3.4.2),
- Pg 289 Lines 43 select() (64.3.4.2),
- Pg 290 Lines 14 report_timeout (64.3.4.2),
- Pg 291 Lines 33 Opcode-specific function(opcode) (64.3.5.1),
- Pg 292 Line 12 currentGrant (64.3.5.2),
- Pg 293 Lines 36 gate_timeout (64.3.5.2),
- Pg 294 Line 41 grantList (64.3.5.2),
- Pg 294 Lines 53 maxDelay (64.3.5.2),
- Pg 295 Line 8 nextGrant (64.3.5.2),
- Pg 295 Lines 14 nextStopTime (64.3.5.2),
- Pg 296 Line 33 empty(list) (64.3.5.3),
- Pg 297 Line 36 InsertInOrder(sorted_list, inserted_element) (64.3.5.3),
- Pg 297 Lines 42 hsbroadcast(grant) (64.3.5.3),
- Pg 297 Lines 47 PeekHead(sorted_list) (64.3.5.3),
- Pg 298 Line 51 Random(r) (64.3.5.3),
- Pg 299 Line 1 RemoveHead(sorted_list) (64.3.5.3),
- Pg 299 Line 7 gntStTmr (64.3.5.4),
- Pg 299 Line 11 gate_periodic_timer (64.3.5.4)

Suggested Remedy
Add to the descriptions: “as described in xxx” replacing xxx with the appropriate ref.

Response
See Related Cmt# 3429, 3363, & 3421

There are no substantive differences between Cl 103.3/103.3.1/103.3.2/103.3.2.x/103.3.3/103.3.4 and the corresponding subclauses of Cl 77, with some exceptions. We should avoid duplication between these clauses where possible.

Suggested Remedy
See remein_3bn_17_0515.pdf pg 3-5

Response
ACCEPT IN PRINCIPLE.

In numerous figures "RFOnTime" should be "rfOnTime"

Suggested Remedy
Replace 19 instance of "RFOnTime" with "rfOnTime"

Response
ACCEPT.
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Draft 1.4

Final Responses

Comment # 3425

Remein, Duane
Huawei

Comment Type E
Comment Status A

The definition of pendingGrants is identical to that in 64.3.3.2.

Suggested Remedy
Append to the description "and is defined in 64.3.3.2."

Response ACCEPT.

Comment # 3426

Remein, Duane
Huawei

Comment Type T
Comment Status A

There are no substantive differences between Cl 103.3/103.3.1/103.3.2/103.3.2.x/103.3.3/103.3.4/103.3.5/103.3.6 and the corresponding subclauses of Cl 77, with some exceptions. We should avoid duplication between these clauses where possible.

Suggested Remedy
Replace the text of 103.3 with the following:
"As depicted in Figure 103-3, the Multipoint MAC Control functional block comprises nearly the same functions and layering system as that described in 77.3. In EPoC the CLT replaces the OLT and the CNU replaces the ONU. Significant differences are noted in the following sections.

103.3.1 Principles of Multipoint Control Protocol
The principles of the Multipoint Control Protocol are the same as those found in 77.3.1 except the EPoC system uses an Orthogonal Frequency Division Multiple Access (OFDMA) method in the upstream direction. In EPON the Multipoint Control Protocol allows one and only one MAC is allowed to transmit at any given time. In EPoC the Multipoint Control Protocol allows multiple MACs to transmit in any given time but coincident transmitters are separated in frequency.

103.3.2 Compatibility considerations
103.3.2.1 PAUSE operation
See 77.3.2.1
103.3.2.2 Optional Shared LAN emulation
Optional Shared LAN emulation for EPoC is the same as described in 77.3.2.2 except the specific behavior of the filtering layer at the RS is specified in 101.2.4.3.
103.3.2.3 Multicast and single copy broadcast support
Multicast and single copy broadcast support in EPoC is the same as described in 77.3.2.3 except the configuration of SCB channels as well as filtering and marking of frames for support of SCB is defined in 101.2.4.3."

RETAIN the text of 103.3.2.4 Delay requirements as is.

Replace the text of 103.3.3 with the following:
"Discovery processing in the EPoC system is largely the same as in the EPON system with the following exceptions. In the EPoC system CNUs that have not completed PHY Discovery process (see 102.4.1) will not respond to Discovery GATE MPCPDUs. In the EPoC coax cable distribution network only one upstream data rate is allowed for a given configuration. The laserOnTime and laserOffTime parameters of EPON are replaced in EPoC with rfOnTime and rfOffTime, respectively."

Remove Figure 103-15

Replace the text in 103.3.4 with the following:
"Report processing in EPoC is as described in 77.3.4."
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Replace the text in 103.3.4 with the following:
"Gate processing in EPoC is as described in 77.3.4 with the exception being that EPoC used an RF transmitter rather than a laser."

Replace the text of 103.3.6 with the following:
"MPCPDU structure and encoding in EPoC is as described in 77.3.4 with the exceptions noted below."

Replace the text of 103.3.6.1 with the following:
"The GATE used in EPoC is the same as used for EPON with the following exceptions. In EPoC rfOnTime and rfOffTime replace laserOnTime and laserOffTime, respectively. The 16-bit Discovery Information register described in 77.3.6.1 is not used in EPoC; all bits in this register are reserved and ignored on reception."

Replace the text of 103.3.6.1 with the following:
"The REPORT description for EPoC is identical to that of EPON."

Replace the text of 103.3.6.2 with the following:

Response

Response Status C

ACCEPT IN PRINCIPLE.

See response to Cmt# 3423

Comment Status A

Response Status C

Remein, Duane

Huawei

Response

Comment Type E

Comment Status A

Rev

There are inconsistencies in how we are cross referencing variable in Cl 103 when the variable is previously defined in EPON. For example data_rx is defined 4 times in the draft. Here the full definition is repeated and a cross reference provided to 64.2.2.3

Pg 299 In 46 is simply cross referenced to 64.2.2.3

Pg 309 In 49 is cross referenced to 103.2.2.3 as is the def on pg 314 In 25.

SuggestedRemedy

For each variable that is identical to one defined in Cl 64 or 77:
For the 1st instance of the definition repeat the def and provide a cross reference to the earliest definition.
For all subsequent definitions internally cross reference to the first definition in Cl 103.

Response

Response Status C

ACCEPT.

Response

Comment Type T

Comment Status A

In definition of macDelay REGISTER_REQ is incorrect in the following sentence: This delay is calculated such that the CNU would have sufficient time to transmit the REGISTER_REQ message and its associated overhead (FEC parity data, end-of-frame sequence, etc.) and terminate the RF before the end of the discovery grant.

SuggestedRemedy

Change REGISTER_REQ to REGISTER (as in 64.3.5.2 & 77.3.5.2)

Response

Response Status C

ACCEPT IN PRINCIPLE.

Cl 64 uses REGISTER while Cl 77 uses REGISTER_REQ. Leave wording as is. Ensure any crossreference is tagged to Cl 77.3.5.2.

Comment Status A

Response Status C

Remein, Duane

Huawei

Response

Comment Type E

Comment Status A

Rev

Include a statement regarding similarities between Cl 77 & 64 with Cl 103 and a table that summarizes the major differences between Cl 103 defined items (variables, counters, functions etc.) and those of Cl 77.

SuggestedRemedy

At the end of Cl 103.1 add the following:
"The EPoC Multipoint MAC Control shares much in common with prior versions of this protocol defined in Clause 64 and Clause 77. There are a number of variables, constants and functions that are complementary to those defined for EPON Multipoint MAC Control but that are unique to EPoC. These are listed in Table 103.1."

Add Table 103-1 as shown in remein_3bn_17_0515.pdf pg 1

(see related comments on fecOffset pg 283 In 27 and IdleGapCount pg 283 In 37)

Response

Response Status C

ACCEPT.

See Related Cmt# 3429, 3363, & 3421

Comment Status A
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| Apparently "every 8th block" in the following confuses some folks: If CRC40ErrCtrl is TRUE and the calculated value of CRC40 does not match the value of CRC40 retrieved from the received FEC codeword, the FEC decoder replaces bit <0> and <1> in the sync headers in first 64B/66B block and every 8th 64B/66B block, e.g. 1st, 9th, 17th, 25th, etc. as well as the last 64B/66B block from the errored FEC codeword with the binary value of "11".

SuggestedRemedy
Change 45.2.1.131.2 to read:
"Bit 1.1900.2 is used to control marking of frames with CRC40 errors to higher layers as described in 101.3.1.1.4."

Remove the Editors note
In Cl 101, SCI 101.3.3.1.4, pg 149, In 28 change sentence to read:
"If CRC40ErrCtrl is TRUE and the calculated value of CRC40 does not match the value of CRC40 retrieved from the received FEC codeword, the FEC decoder replaces bit <0> and <1> in the sync headers in first 64B/66B block and every 8th 64B/66B block, (i.e., if Mod(N/8) = 1 where Mod return the remainder and N is the block number) as well as the last 64B/66B block from the errored FEC codeword with the binary value of "11"."

Response | Response Status | C
| ACCEPT IN PRINCIPLE. |

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| Editors NOTE (to be removed prior to publication): Transmit Enable and it’s reflected variable TxEnable, need to be rationalized against tx_enable (also referred to as Tx_Enable and TX_ENABLE) used in EPON clauses. Note that EPOC clauses use TxEnable exclusively except in CI 100 which has 3 instances of tx_enable.

See related comment on TxEnable SCI 102.4.3 Pg 264 Ln 12

SuggestedRemedy
Remove Editors Note.
Change 17 instances of TxEnable to PD_Enable.

At Pg 38 ln 45, Pg 38 ln 9, Change 2 instances of
"Transmit enable"
To
"PHY Discovery enable"

SCI 102.2.6.3 Pg 241 ln 30: change the definition of PD_Enable from:
"This variable enables the device to transmit onto the media when TRUE. It is set to FALSE following initialization and every reset."

To:
"This variable enables the device to respond to a PHY Discovery window and transmit onto the media when TRUE. It is set to FALSE following initialization and every reset. It is set to TRUE after all elements required for PHY Discovery listed in Table 102-13 have been written by the CLT."

SCI 102.1.8 Pg 225 Ln 29: change row in Table 102-3 from:
"Transmit enable 10GPASS-XR control 1.1900.0 TxEnable 0 0"
To:
"PHY Discovery enable 10GPASS-XR control 1.1900.0 PD_Enable 0 0"

Response | Response Status | C |
| ACCEPT. |
Assuming we change TxEnable to PD_Enable the new variable does not fully describe the state of link-up ready. Create a new variable for this:

SuggestedRemedy

Create new variable LinkUpRdy.
Change at Pg 264 ln 11
"Once the CLT has verified the CNU is in the link-up status by reading the TxEnable variable as TRUE it may set ."
To:
"Once the CLT has verified the CNU is in the link-up status by reading the Variable listed in the Link-Up column of Table 102-3 it shall set the LinUpRdy variable to TRUE and it may set ."

Pg 266 In 17 change:
"to be link-down and sets LinkUpRdy, PhyDiscComplete and PD_Enable to FALSE"
To:
"to be link-down and set both PhyDiscComplete and TxEnable to FALSE"

at Pg 267 in 4 and pg 267 in 9 change:
"It may further force the CNU to reassess its’ readiness for participation on the network by setting TxEnable to FALSE."
To:
"It may further force the CNU to reassess its’ readiness for participation on the network by setting PD_Enable and LinkUpRdy to FALSE.

Add Row to Table 102-3:
LinkUpRdy | 10GPASS-XR control | 1.1900:10 | LinkUpRdy | 0 | 10

TYPE: real number

EDITORS NOTE (to be removed prior to publication): we should specify a minimum precision for this number.

Use Ux.3 for consistency with UD/DS Rate.

Same comment against Pg 125 ln 45 (PHY_OSizeFrac TYPE).

SuggestedRemedy

Pg 124 ln 54 Change:
"TYPE: real number"
"TYPE: U1.3 format"

Pg 125 ln 45 Change:
"TYPE: real number"
"TYPE: U0.3 format"

ACCEPT.

Editors Note to be removed prior to publication: we should specify a minimum precision for this number. Use U5 for consistency with UD/DS Rate. Same comment against Pg 125 ln 45 (PHY_OSizeFrac TYPE).

SuggestedRemedy

Pg 124 in 54 Change:
"TYPE: real number"
"TYPE: U1.3 format"

Pg 125 in 45 Change:
"TYPE: real number"
"TYPE: U0.3 format"

Remove Ed Note pg 126 ln 1

ACCEPT.
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<td>zero bit-loading EDITORS NOTE (to be removed prior to publication): May need to adjust &quot;zero-bit-loaded&quot; via more socialization on its use. Pg 171 ln 25, 171-27, &amp; 172-16</td>
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<td>Change 45.2.1.137.1 US copy in process (1.1910.3) from: When read as a one bit 1.1910.3 indicates that a copy of the currently active upstream profile to the inactive profile is in process. Note that while this variable has a value of one writes to all upstream profile variables shall be ignored and switching between profiles is prohibited. This register bit is a reflection of the variable US_CpyInP defined in 101.4.1.1.1. To: When read as a one, bit 1.1910.11 indicates that a copy of the currently active upstream profile to the inactive profile is in process, writes to all upstream profile variables are ignored, and switching between profiles is prohibited. This bit is a reflection of the variable US_CpyInP defined in 101.4.1.1.1.</td>
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"When bit 1.1910.2 is set to one, a copy of the currently active downstream profile to the inactive profile is initiated and will continue to completion. This bit is a reflection of the variable UDS_PrflCpy defined in 101.4.1.1.1."

Remove the Ed Note pg 158 In 48
Response

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Remein, Duane
Huawei

Comment Type: E, Comment Status: A
This statement is peppered throughout the clause 5x and only needs to be stated once: "In case of any discrepancy between state diagrams and the descriptive text, the state diagrams prevail."

Suggested Remedy
Move the statement to the end of SCI 101.1.1
Remove other instances.

Response

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Remein, Duane
Huawei

Comment Type: E, Comment Status: A
If we are consistently using FEC Encoder we should probably also use FEC Decoder universally.
Likewise for 64B/66B encode(r) and 64B/66B decode(r)

Suggested Remedy
Globally replace
"FEC decode" (3x) and "FEC decoder" (18x) with
"FEC Decoder"

"64B/66B encode" (1x) and 64B/66B encoder (2x) with
"64B/66B Encoder"

"64B/66B decode" (1x) and 64B/66B decoder (11x) with
"64B/66B Decoder"

Response

The wording of these para’s are overly complex and, in some cases incorrect:

"The CLT downstream OFDM symbol and subcarrier frequency and timing relationship is defined in 101.4.2.3. Tolerances for the downstream subcarrier clock frequency are given in this subclause Table 100-3). Functional requirements involving the downstream subcarrier clock frequency and downstream signal generation are contained in 101.4.2.3, which couple the subcarrier clock frequency tolerance performance to the phase noise requirements of Table 100-3 and the downstream OFDM symbol clock requirements of this subclause. Each cycle of the downstream subcarrier clock is 4096 cycles (50 kHz subcarrier spacing) of the downstream OFDM symbol clock (which is nominally 204.8 MHz), since the subcarrier clock period is defined as the FFT duration for each OFDM symbol. Functional requirements on locking the downstream waveform to the 10.24 MHz Master Clock are then equivalently functional requirements locking the downstream subcarrier clock to the Master Clock. Downstream OFDM symbol clock jitter requirements (which are in the time domain) of Table 101-8 are equivalent to requirements on the downstream subcarrier clock (and its harmonics). The requirements on the OFDM symbol clock are measured using observable parameters in the downstream waveform, which include the downstream subcarrier clock frequency (manifested in the subcarrier spacing) and the downstream subcarrier frequencies."

Can we just say that if you pass the phase noise it can be assumed that the clock jitter requirements are met? Can we make Table 101-9 informative (since otherwise we need to identify a place where it is to be measured).

1) Table 100-3 does not directly mention subcarrier clock or it’s tolerances.
2) the “functional requirements” in 101.4.2.3 are not normative (no “shall”s); further CI 101.4.2.3 refers back to 101.4.2.2 creating a circular ref. Compounding the problem CI 101.4.2.3 does not mention phase noise or Table 100-3 so it is difficult to see how it couples “the subcarrier clock frequency tolerance performance to the phase noise requirements of Table 100-3”
3) the 50 kHz subcarrier clock period is not observable at the MDI as it is obscured by the CP time.
4) the 10.24 MHz Master Clock is not defined in the draft.

See remein_3bn_20_0515.pdf and remein_3bn_21_0515.pdf for more information on this issue

Suggested Remedy
Reword 101.4.2.2 and 101.4.2.3 so they are correct and easily understood.

Proposed Response
REJECT.

This comment was WITHDRAWN by the commenter.
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 draft 1.4 ieee 802.3bn epon protocol over coax (epoC) tf 4th task force review comments final responses

Reimein, Duane Huawei

Comment ID 3445 Page 28 of 62 5/20/2015 10:29:23 AM

TYPE: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed Z/withdrawn SORT ORDER: Comment ID
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Draft 1.4

Cl 99 SC n/a P 2 L 1 # 3450
Remeín, Duane Huawei

Comment Type ER Comment Status A
Update abstract text & keywords list and update project description on pg 4 line 49.

SuggestedRemedy
Replace [abstract text] with:
"defines physical layer specifications and management parameters for the operation of
Ethernet Passive Optical Networks (EPON) Protocol over coaxial media.

Replace [keywords list] with:
"Ethernet Passive Optical Networks (EPON), EPON Protocol over Coax (EPoC), Multi-
Point MAC Control (MPMC), orthogonal frequency division multiplexing (OFDM), Physical
Coding Sublayer (PCS), Physical Media Attachment (PMA), Physical Medium Dependent
(PMD), PON, Point to Multipoint (P2MP), Reconciliation Sublayer (RS)"

Replace:
"This amendment adds the physical layer specifications and management parameters for
the operation of EPON Protocol over coaxial media. [complete]"

with
"This amendment adds physical layer specifications and management parameters for
symmetric and/or asymmetric operation of up to 10 Gb/s on point-to-multipoint Radio
Frequency (RF) distribution plants comprising either amplified or passive coaxial media. It
also extends the operation of Ethernet Passive Optical Networks (EPON) protocols, such
as Multipoint Control Protocol (MPCP) and Operation Administration and Management
(OAM)."

(copy from PAR)

Response Response Status C
ACCEPT.

Cl 45 SC 45.2 P 27 L 5 # 3452
Remeín, Duane Huawei

Comment Type E Comment Status A
Ed/TBD

Remove Ed Note and Table 45-0

SuggestedRemedy
per comment

Response Response Status C
ACCEPT.

Cl 45 SC 45.2.1.131 P 37 L 50 # 3453
Remeín, Duane Huawei

Comment Type T Comment Status A
Rev

The description of CRC40 Errors in Table 45-98a does not match the behavior described in
the accompanying text.

1 = CRC40 Errored frames are passed to the MAC layer without error indication
0 = CRC40 Errored frames are passed to the MAC layer using an error indication

SuggestedRemedy
Change to:
1 = CRC40 Errored frames are passed with all sync headers set to <1,1>
0 = CRC40 Errored frames are passed with some sync headers set to <1,1>

Response Response Status C
ACCEPT IN PRINCIPLE.
Change to:
1 = CRC40 Errored frames are passed with some sync headers set to <1,1>
0 = CRC40 Errored frames are passed as received

Pg 38 ln 30 add "and as describee in 101.3.3.1.4" to end of para in section 45.2.1.131.2
CRC40 Errors (1:1900.2)

Response Response Status C
ACCEPT.

Cl 01 SC n/a P 23 L 3 # 3451
Remeín, Duane Huawei

Comment Type E Comment Status A
Ed/TBD

Change per remeín_3bn_12_0515.pdf
(on behalf of P Anslow, see anslow_3bn_01_0515.pdf)

SuggestedRemedy
per comment

Response Response Status C
ACCEPT.
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Laubach, Mark  
Broadcom

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

Line 23: fix "two rows above" as there is only one row above  
Line 36: add apostrophe to "channels": From Peter: is this intended to be possessive? if so it should be channels'

Line 42: From Peter: "These footnotes don't seem applicable to this table which is about power levels and not noise and spurious requirements."

Line 46: "all channel with 999", wording is broken

**Suggested Remedy**  
As per comment for lines 23 and 46.

Line 42: add draft text to explain what relaxations are and how to apply to this table.

Line 46: Change footnote to "Add 5 dB relaxation to the values specified above for noise and spurious emissions requirements in all channels with 999 MHz < center frequency of the noise measurement ≤ 1215 MHz. For example -73 dBc becomes -68 dBc."

For Table Footnotes a, b, and c, add the following to the end of each footnote: "Also see 100.2.8.5."

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

Laubach, Mark  
Broadcom

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

To prevent cross-refs splitting across lines: Format, Document, Text Options, delete the middle dash of three, Apply

**Suggested Remedy**  
As per comment.

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

Laubach, Mark  
Broadcom

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

"wedged" is not a technical term. Replace word with "positioned"

**Suggested Remedy**  
As per comment.

**Response**  C  **Response Status**  ACCEPT.
Cl 100 SC 100.2.9.5.1 P 99 L 18 # 3464
Laubach, Mark Broadcom
Comment Type ER Comment Status A
Line 18, 29, 30, and 45: dash to Ctrl-q Shift-p
Line 22: Esc n s
Line 53: change "." to "."
SuggestedRemedy
As per comment.
Response Response Status C
ACCEPT.

Cl 100 SC 100.2.9.5.3 P 102 L 17 # 3467
Laubach, Mark Broadcom
Comment Type ER Comment Status A
Line 3, 37: asterisk to fm multiply
Line 46: insert nonbreaking space in "400 kHz" to avoid line separation.
SuggestedRemedy
As per comment.
Response Response Status C
ACCEPT.

Cl 100 SC 100.2.9.5.1 P 100 L 45 # 3465
Laubach, Mark Broadcom
Comment Type ER Comment Status A
Line 45: "2.0" to "2"
Line 54: lower case "Specification" and "Interval"
SuggestedRemedy
As per comment.
Response Response Status C
ACCEPT IN PRINCIPLE.
"lower case"

Cl 100 SC 100.2.9.3 P 101 L 5 # 3466
Laubach, Mark Broadcom
Comment Type ER Comment Status A
Line 5 and in Table 100-8: all short dashes to Ctrl-q Shift-p
SuggestedRemedy
As per comment.
Response Response Status C
ACCEPT.

Cl 100 SC 100.2.9.7 P 106 L 8 # 3469
Laubach, Mark Broadcom
Comment Type ER Comment Status A
Line 8 to 12: lower case all but first Parameter word in first column.
Line 10: ohms to ohm symbol.
Line 24: add ctrl space to "6.4 MHz"
Lines 39 to 46: in second column all dashes to Ctrl-q Shift-p
SuggestedRemedy
As per comment.
Response Response Status C
ACCEPT.
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Final Responses

Comment ID 3470

Laubach, Mark
Broadcom

Comment Type ER

Comment Status A

Line 30: ",," to ",
Lines 45-53: remove trailing ",.0" form numbers in second column,

Suggested Remedy
As per comment.

Response Status C

ACCEPT.

Comment ID 3471

Laubach, Mark
Broadcom

Comment Type ER

Comment Status A

Table 100-14:
Set the Orphan Rows for this table to a more reasonable value (3
Page 109:
Lines 12 and 13 Lower case of second, and second and third parameter words
Line 12 "ohms" to omega symbol
Lines 15 and 17, ":" to ":to"

Suggested Remedy
As per comment.

Response Status C

ACCEPT.

Comment ID 3472

Laubach, Mark
Broadcom

Comment Type T

Comment Status A

Table 100-11 title should match CLT transmitter table header text.
Change "CNU transmitter output signal characteristics" to "CNU RF output requirements"

Suggested Remedy
As per comment.

Response Status C

ACCEPT.

Comment ID 3473

Laubach, Mark
Broadcom

Comment Type T

Comment Status A

Figure 101-8, change title of "ADD_BLOCK_BLOCK_TO_FIFO" to 
"ADD_65BIT_BLOCK_TO_FIFO" to convey that the one SH bit is being stripped as part of 
the tx_coded<65:1> copy to the FIFO. Also fixes the "BLOCK_BLOCK" title word 
duplication.

Suggested Remedy
As per comment.

Response Status C

ACCEPT.

Comment ID 3474

Laubach, Mark
Broadcom

Comment Type E

Fix variable name so that it doesn't hyphenate.

Suggested Remedy
As per comment.

Response Status C

ACCEPT.

Comment ID 3475

Laubach, Mark
Broadcom

Comment Type T

Comment Status A

Fig 101-7

Figure 101-7, update top of figure for burst marker updates. This has likely be done in 
another comment.

Line 37: designate/illustrate a Bq 65 bit block and label as "Burst time header" with an 
arow pointing to that block. This block is after the two "Idles" blocks and before the first 
"MAC Data" block.

Suggested Remedy
As per comment.

Response Status C

ACCEPT IN PRINCIPLE.

See Cmt# 3375 for update to Figure 101-7.
### IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

**Draft 1.4**

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**Comment: TR**

Laubach, Mark

**Response Status:** C

**SuggestedRemedy:**

Replace table 100-7 as per laubach_3bn_10_0515.pdf. This removes the TBD. Editors Note on Line 33 no longer needed, delete.

**SuggestedRemedy:**

As per comment.

**Response:**

ACCEPT IN PRINCIPLE.

Replace CM with CNU

---

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**Comment: T**

Laubach, Mark

**Response Status:** C

**SuggestedRemedy:**

Some DOCSIS or other jargon remains in the table notes.

Question on NOTE 6: assuming CM is cable modem, and needs to change to CNU, what does the "97% criteria" specifically refer to in this statement?

**SuggestedRemedy:**

Line 18/19: NOTE 2, change "MSO" to "cable operator"

Line 23/24: NOTE 5, change "U/S" to "US"

Line 24/25: NOTE 6, change "Upstream CM" to "upstream CNU".

**Response:**

ACCEPT IN PRINCIPLE.

Still need clarification on "97% criteria".

---

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**Comment: TR**

Laubach, Mark

**Response Status:** C

**SuggestedRemedy:**

For creating Draft 1.4, a comparison was done between Table 100A-2 and the channel model spreadsheet in baseline_channel_model_3bn_01_0413.xlsx, worksheet "US Baseline". The value of "54" was incorrect as noticed in D1.3 and changed to "-50" to match the spreadsheet value. An editors note was added to make sure this technical value change is approved by TF in this comment resolution.

If the TF approves this comment, remove as "-50" and leave the editors note. If the TF wants the old value of "54" returned, then change the table cell text back to "54" and remove the editors note.

**SuggestedRemedy:**

As per comment.

**Response:**

ACCEPT.

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**Comment: TR**

Laubach, Mark

**Response Status:** C

**SuggestedRemedy:**

Figure 101-7, the top part is incorrect. The Type 2's RBs should be removed as the first and last RBs of a burst. First and last are the first and last RBs of the respective marker. Also, the burst markers use all the RB's in the marker and no "holes" are left for data. Belief is that this is already corrected in another comment, this one is here "just in case".

**SuggestedRemedy:**

As per comment.

**Response:**

ACCEPT IN PRINCIPLE.

See Cmt# 3375

---

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

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

**SORT ORDER:** Comment ID

---

**Comment ID:** 3480  Page 34 of 62

5/20/2015 10:29:24 AM
The changed position of the PMD\textunderscore SIGNAL\_request() to be just before the IDFT does not give sufficient lead time for conventional RF power amplifier turn on times. Need to accommodate up to 100 us of turn on time. Moving signal generation back to the data detector satisfies this lead in timing.

1) Update Figure 100-3 to move PMD\_SIGNAL\_request() back up to be an output of the Data Detector.
2) Page 85, Line 33, change "PMA" to "PCS data detector".
3) CL 101.4.3.8.2, Page 201, Line 46 to 54, remove text and remove editor\textquotesingle s note.
4) CL 101.3.3.5.7, Page 142, Line 19. Insert this paragraph at the end of the transferToPMA description, as part of the description: "CNU only operation: upon initialization of the CNU, the PMD\_SIGNAL\_request(tx\_enable) primitive is set to the value OFF. When burstStart is TRUE, the CNU sets the PMD\_SIGNAL\_request(tx\_enable) primitive to the value ON, instructing the PMD sublayer to start the process of turning the RF power amplifier ON (see Figure 100-3 and 100.2.9.7). When burstEnd is TRUE, the CNU sets the PMD\_SIGNAL\_request(tx\_enable) primitive to the value OFF, instructing the PMD sublayer to start the process of turning the RF power amplifier off."
5) Clause 100, 100.2.9, Page 106, Line 16, Add new subclause "100.2.9.8 CNU RF power amplifier time reporting requirements" as per laubach\_3bn\_02\_0515.pdf and process the other editing directives.
6) Clause 103, 103.3.2.4, Page 295 Line 42. Replace "The CLT shall not grant less than TBD time\_quanta into the future, in order to allow the CNU processing time when it receives a gate message. The CNU shall process all messages in less than this period. The CLT shall not issue more than one message every TBD time\_quanta to a single CNU. with "The CLT shall not issue more than one message every 1024 time\_quanta to a single CNU. The CNU shall process all messages in less than this period. The CLT shall not issue a gate message that is exactly 1024 time\_quanta into the future. The unit of time\_quanta is defined in 77.2.2.1."

SuggestedRemedy

As per comment.

Accept in principle.

For min\_processing\_time Pg 313 ln 35 change "TBD" to 1024
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Draft 1.4

Final Responses

Laubach, Mark
Broadcom

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| SuggestedRemedy | |
| Response | Accept. |

Laubach, Mark
Broadcom

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Laubach, Mark
Broadcom

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Laubach, Mark
Broadcom

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Laubach, Mark
Broadcom

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Laubach, Mark
Broadcom

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Laubach, Mark
Broadcom

Comment ID: 3489
Page 36 of 62
5/20/2015 10:29:24 AM

TYPE: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general
COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed Z/withdrawn
SORT ORDER: Comment ID

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**Laubach, Mark**

**Response**

**Laubach, Mark**

**Response**

**Laubach, Mark**

**Response**

**Laubach, Mark**

**Response**
### IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

#### Draft 1.4

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**Comment ID** 3500

**Page 38 of 62**

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**T/technical**  
**E/editorial**  
**G/general**

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**A/accepted**  
**R/rejected**  
**RESPONSE STATUS:** O/open  
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**Z/withdrawn**

**SORT ORDER:** Comment ID

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- **SC:** SC 102.4.4.1
- **Page:** P 266
- **Line:** L 27
- **Response ID:** #3507

**Response:**
- **Response Status:** C

**Suggested Remedy:**
- As per comment.
- **ACCEPT.**

**Response:**
- **Response Status:** C

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**Comment ID:** 3507
**Page:** 39 of 62

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

**Comment Status:** D/dispatched  A/accepted  R/rejected  **RESPONSE STATUS:** O/open  W/written  C/closed  Z/withdrawn

**SORT ORDER:** Comment ID

**Comment ID:** 3507

5/20/2015 10:29:24 AM
Comment ID 3508

Response

Laubach, Mark
Broadcom

Comment Type T
Comment Status A

Change the description of the syncTime variable to: "This variable holds the time required to stabilize an EPON receiver at the OLT (see 76.3.2.5.3 and 77.3.3). The EPoC CLT OFDMA receiver is synchronized and stabilized during PHY Discovery and does not use a synchronization preamble as part of the upstream burst (see 101.3.2.5.3). This variable is present to maintain compatibility with the EPON MPCP.

VALUE: 0

Line 44: delete Editors note.

Suggested Remedy

As per comment.

Response Status C

ACCEPT IN PRINCIPLE.

Per comment but last sentence to read:
"This variable is present to maintain compatibility with the EPON MPCP and always has a value of zero in EPoC PHYs."

Laubach, Mark

Comment ID 3509

Response

Laubach, Mark

Comment Type T
Comment Status A

Remove TBD from "nominal conditions" column.

Suggested Remedy

As per comment.

Response Status C

ACCEPT IN PRINCIPLE.

Pending discussion with TF.

Laubach, Mark

Comment ID 3510

Response

Laubach, Mark

Comment Type T
Comment Status A

Line 9: add cross reference to "Clause 100"

Line 44: question from Peter shouldn't it be "NS" for "not supported"? Mark note: there is no "NA" in Clause 1 abbreviations, first use in section 1 is for "numerical aperture" in D.4.1.1. Section 2: Table 29-2 uses "NA" without any definition. Same in Section 3, Table 42-2. Same in Section 4, Table 52-19 and 53-11. Same in Section 5, Table 59-3. No use in Section 6

Line 58: insert comma before "respectively"

Suggested Remedy

For line 44: discuss with TF on changing NA to NS everywhere or changing "supported" to something else or simply removing ", NA = not supported" for other items, as per comment.

Response Status C

ACCEPT IN PRINCIPLE.

Pending discussion with TF.

Laubach, Mark

Comment ID 3511

Response

Laubach, Mark

Comment Type T
Comment Status A

Page 87:

Line 1: change "Date" to "Data" in title
Line 3: change "at MAC/PLS" to "at the MAC/PLS", drop "/PLS" form second use.
Line 4: change first "in" to "for"
Line 12: change variable text in FM to not hyphenate.
All clauses, editors to verify/change:
Line 15: remove "size (usec)" from end of sentence, "size" is already in sentence and usec is already in equation.
Line 16: change all "<mu>-sec" to "<mu>s" in this clause as per style guide.
Line 37: change all "bits/sec" to "b/s" in this clause.
Line 43, change all "bps" to "b/s" in this clause.
Line 43: Remove trailing ".0" from "10.0" as from Peter: 1.2.6 says: "trailing zeros having no significance" so don't show them.

Suggested Remedy

As per comment.

Response Status C

ACCEPT.

Change fm Cl 00 SCI 0 to Cl 100 SCI 100.2.6
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

**Draft 1.4**

**Final Responses**

**Comment**

**3512**

**Cl 100 SC 100.2.7.1**

Laubach, Mark

**Comment Type** ER

**Comment Status** A

**SuggestedRemedy**

Line 41 and 48: change first "is" to "are"

**Response**

Response Status C

ACCEPT.

**Comment**

**3513**

**Cl 100 SC 100.2.7.3**

Laubach, Mark

**Comment Type** ER

**Comment Status** A

**SuggestedRemedy**

Line 7: Change "54.0" to "54 MHz"

Line 8: Remove comma, change to "3276.76 MHz"

Line 26 and 52: Use the multiply symbol Ctrl-q 0

Line 52: "9.40" to "9.4" "190.00" to "190", "180.60" to "180.6"

**Response**

Response Status C

ACCEPT.

**Comment**

**3514**

**Cl 100 SC 100.2.8.2**

Laubach, Mark

**Comment Type** ER

**Comment Status** A

**SuggestedRemedy**

Table 100-3:

All rows: lower case all but first word in Parameter

Line 40: use omega symbol rather than "ohms"

**Response**

Response Status C

ACCEPT.

**Comment**

**3515**

**Cl 100 SC 100.2.8.2**

Laubach, Mark

**Comment Type** T

**Comment Status** A

**SuggestedRemedy**

Line 5: Question on meaning for: "up to <+-> of the subcarrier". Replace "up to +- of the subcarrier" with "up to <+-> 50 kHz of the subcarriers' center frequencies"

Line 18: change "be meet" to "meet"

Line 21: lower case all but first word in table title

**Response**

Response Status C

ACCEPT.

**Comment**

**3516**

**Cl 100 SC 100.2.12.2.1**

Laubach, Mark

**Comment Type** ER

**SuggestedRemedy**

Table 100-15

Remove trailing ".0" in all numbers.

**Response**

Response Status C

ACCEPT.

**Comment**

**3517**

**Cl 00 SC 0**

**Comment Type** ER

**From Peter:** The 802.3 web page has: Since Boolean is named after George Boole the capitalization Boolean should always be used (and not boolean) with the exception of the MIB clauses and annexes described below.

**SuggestedRemedy**

Search and replace throughout the draft

**Response**

Response Status C

ACCEPT.
Comment Type: ER, Comment Status: A

From Peter:

1) this heading should be at the top of a new page as per the 802.3 template.
2) provide the rest of the PICS.

Suggested Remedy

As per comment.

Response

Response Status: C

ACCEPT.

Comment Type: ER, Comment Status: A

From Peter:

"meters is a lower case m and there should be a space between a number
and its unit."
Change "50M" to "50 m" and "2M" to "2 m"

Suggested Remedy

As per comment.

Response

Response Status: C

ACCEPT.

Comment Type: ER, Comment Status: A

From Peter:

Table 100A-1:
Line 5: "1.0" to "1", add non breaking space also.
Line 9: dash to space Ctrl-q Shift-p
Line 22: 54 to 1000 (Style manual)
Line 26 and elsewhere in able: dashes to Ctrl-q Shift-p
Lines 37 through 42: all "nsec" to "ns"
In table, fix dashes and uses as per remedies in other
Page 346:
Lines 12 and 17: dash to Ctrl-q Shift-p
Line 26: font issue with "Echo mask..."
Line 27c: "-" to " to "

Suggested Remedy

As per comment.

Response

Response Status: C

ACCEPT.

Comment Type: ER, Comment Status: A

Table 100A-2
Line 52: "-" to " to "
Page 347:
Fix dashes, usec, and nsec. Same as in previous comment for Table 100A-1.
Page 348:
Line 14: Nominal Conditions value is blank (empty) for 5 usec. Remove this row in the

Suggested Remedy

As per comment.

Response

Response Status: C

ACCEPT.

Comment Type: ER, Comment Status: A

Table 100A-14 as per laubach_3bn_12_0515.pdf (and fm)

Suggested Remedy

As per comment.

Response

Response Status: C

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<td>Add new informative text to the end of this subclause: <em>As FEC codewords may straddle downstream frame boundaries, the CNU may optionally process the FCP value encoded in the received PHY Link messages in the current downstream frame. The FCP value indicates the starting bit position of the next codeword in the next downstream frame.</em></td>
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<td>PMD_SIGNAL.request() generation is being moved back to the Clause 101 PCS if approved by the TF. See related comment #</td>
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<td>Lines 33 and 34:</td>
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<td>Change: &quot;In the upstream direction, this primitive is generated by the Clause 101 PMA to turn on and off the transmitter according to the presence of non-null data presented to the IDFT.” to: &quot;In the upstream direction, this primitive is generated by the Clause 101 PCS to turn on and off the RF power amplifier in the Clause 100 PMD (see 100.2.9.x).&quot;</td>
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<td>A transcription error was made in the N* equation. In side the minimum function, change ceiling(Neqport/4) to ceiling(Neqport/4) (i.e., drop the apostrophe).</td>
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<td>How is &quot;j&quot; used in the equation?</td>
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<td>Line 35, add a comma at end after &quot;1&quot;</td>
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<td>Suggested Remedy</td>
<td>Add a sentence to the &quot;where:&quot; list for eq 100-19: &quot;j is the jth subcarrier in the burst.&quot; italicize each &quot;j&quot;.</td>
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<td>Line 35: add the comma at the end.</td>
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<tr>
<td>Comment</td>
<td>Make sure the use of RBsize and definitions are all TRUE and FALSE and not &quot;1&quot; and &quot;0&quot; respectively throughout the draft. As per 101.4.3.3.5 (page 188), TRUE is for 16 symbols, and FALSE is for 8 symbols.</td>
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<td>Suggested Remedy</td>
<td>Editors: make it so.</td>
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</table>
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Comment: Cross reference to Clause 45 should be removed/changed.

Response: As per comment.

Comment Status: A
Response Status: C

Comment: In Table 100-3, insert a new row before the first non-header row before "Frequency band". New parameter text "Downstream master frequency clock", value "10.24", and units "MHz".

Response: As per comment.

Comment Status: A
Response Status: C

Comment: Table 100-1 does not support modulation type (bit loading) profiles for 5 DS channels

Response: Add entries for modulation types for all channels or a channel indicator

Comment Status: A
Response Status: C

Comment: 8192-QAM and 16384-QAM are not applicable for the upstream

Response: Correct table 100-2 accordingly

Comment Status: A
Response Status: C
Comment Type: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched  A/accepted  R/rejected  RESPONSE STATUS: O/open  W/written  C/closed  Z/withdrawn
SORT ORDER: Comment ID

Comment #3540

**Comment Type:** TR  **Comment Status:** A  **Rev:**
Table 100-2 includes Optional modulation formats. Are these optional at the transmitter, receiver or both? Is there a corresponding capability register?

**SuggestedRemedy:**
Specify if optional. If optional in the transmitter a capability register is required.

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

ACCEPT IN PRINCIPLE.
Add "The CNU reports supported optional modulations to the CLT via <capability register name> see 102.x.x.x." or similar, if one exists.

Comment #3541

**Comment Type:** TR  **Comment Status:** A  **Rev:**
"data rate of at least 1.6 Gb/s". This is different than the data rate required in section 56 (1.8 Gbps)

**SuggestedRemedy:**
Align the two specs.

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

ACCEPT IN PRINCIPLE.
Use same TF resolution as for comment #3562

Comment #3542

**Comment Type:** TR  **Comment Status:** R  **Rev:**
Equation 100-1 doesn't take the FEC overhead into account.

**SuggestedRemedy:**
Multiply by the max DS FEC Rate

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

REJECT.
PSC overheads are not included in this calculation. This is the PMA raw data rate, see laubach_3bn_15_0194.xls

Comment #3543

**Comment Type:** TR  **Comment Status:** R  **Rev:**
Equation 100-2 doesn't take the FEC overhead into account.

**SuggestedRemedy:**
Multiply by the max US FEC Rate

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

REJECT.
PSC overheads are not included in this calculation. This is the PMA raw data rate, see laubach_3bn_15_0194.xls

Comment #3544

**Comment Type:** TR  **Comment Status:** A  **Rev:**
54 MHz is in the upstream frequency range

**SuggestedRemedy:**
change 54 MHz to 258 MHz

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

ACCEPT IN PRINCIPLE.
The integer range of this variable is larger than the DS requirements of 258 to 1218 MHz on both the low side and the high side. Does the TF wish to narrow the range of this variable or leave as is?

Comment #3545

**Comment Type:** TR  **Comment Status:** R  **Rev:**
Figure 101-7 is not updated

**SuggestedRemedy:**
Correct the burst structure in the figure accordingly.

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

ACCEPT IN PRINCIPLE.
See Cmt# 3375
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<td>The text in this section should be replaced in accordance with the recent ECR submitted to DOCSIS3.1.</td>
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<td>Suggested Remedy: Modify the text accordingly. Proposed text is provided in a separate document.</td>
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<td>101.4.2.4.3</td>
<td>163</td>
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<td>TR</td>
<td>A</td>
<td>May the 22 MHz contiguous band include nulls?</td>
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<td>Suggested Remedy: Clarify the specifications accordingly. A null subcarrier is not &quot;excluded&quot;.</td>
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<tr>
<td>101</td>
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<td>161</td>
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<td>T</td>
<td>A</td>
<td>Jitter requirements in Table 101-8 for frequencies above 1 KHz are excessively loose for OFDM at 200 MHz, and practical transmitters must have orders of magnitude better jitter performance. Phase noise is defined for the frequencies above 1 KHz and is much tighter (100-4).</td>
</tr>
<tr>
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<td>Suggested Remedy: Propose to delete specifications above 1 KHz in Table 101-8.</td>
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Response: Kliger, Avi Broadcom

Type: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
Comment Status: D/dispatched A/accepted R/rejected  RESPONSE STATUS: O/open W/written C/closed Z/withdrawn
Sort Order: Comment ID

5/20/2015 10:29:24 AM
### IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

#### Final Responses

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<td>&quot;there may be up to 14 exclusion bands internal to a single 192 MHz OFDM channel&quot; - Limiting number of exclusion bands to 14 is not needed.</td>
<td>Remove limitation or increase it to 64</td>
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<td>8192-QAM and 16384-QAM are not supported by upstream.</td>
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<td>3552</td>
<td>E</td>
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<td>C</td>
<td>Some entries have range of values and corresponding bit mapping, some do not</td>
<td>Add values and bit mapping to RB size and Rnd</td>
</tr>
</tbody>
</table>

*Please note that the comments and suggested remedies are part of the draft document and not the final document.*

---

**Comment ID 3554**

- **Comment Type**: ER
- **Comment Status**: A

- **Response**: REJECT.
- **Response Status**: C

Some entries have range of values and corresponding bit mapping, some do not.

Suggested Remedy

Add values and bit mapping to RB size and Rnd.
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<td>&quot;symbol&quot; is used in various places to describe a resource element, and is also used in conjunction with OFDM symbol. In other places modulation symbol or I/Q value pair are used.</td>
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<tr>
<td>Suggested Remedy</td>
<td>Replace symbol with modulated symbol or I/Q value pair where applicable</td>
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<td>ACCEPT IN PRINCIPLE. Note: Subclause 100.2.1.1 is on Delay constrains and is not the target of this comment. Line 8: replace &quot;symbol&quot; with &quot;modulated symbol&quot;</td>
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<td>&quot;The PMA supports five 190 MHz wide OFDM channels; each containing 3800 subcarriers each&quot; - 3800 is the number of active subcarriers</td>
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<td>all channels must use the same CP size</td>
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<td>&quot;Acquisition Time for the CNU&quot; - state specifically that this is the downstream channel (or PLC) acquisition time, that is including PLC proper decoding, being able to receive the downstream PLC and to transmit PHY Discovery responses</td>
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<td>should state: &quot;Downstream channel Acquisition Time for the CNU .. &quot;</td>
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<tr>
<td>Fig 101-7</td>
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<td>REJECT. See Cmt# 3375 (topic Fig 101-7) The symbol mapper has no way to predict when the end of burst will come so it can backtrack and place a Type 2 pilot before the end marker.</td>
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<th>#</th>
<th>Cliger, Avi</th>
<th>Broadcom</th>
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<td>Fig 101-7</td>
<td>Type 2 RB precedes the stop burst marker</td>
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<td>Response Status</td>
<td>C</td>
<td></td>
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</tr>
<tr>
<td>REJECT. See Cmt# 3375 (topic Fig 101-7) The symbol mapper has no way to predict when the end of burst will come so it can backtrack and place a Type 2 pilot before the end marker.</td>
<td></td>
<td></td>
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<td></td>
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</table>
Comment Type: T  Comment Status: A
Rev
for the upstream n<=12
SuggestedRemedy:
correct text
Response  Response Status: C
ACCEPT.

Comment Type: TR  Comment Status: A
Rev
There is no support for upto 10 Gbps in the upstream in these specifications. 1.8 Gbps can be supported as indicated in section 56 and 1.6 Gb/s somewhere else
SuggestedRemedy:
Change text accordingly
Response  Response Status: C
ACCEPT IN PRINCIPLE.
For upstream laubach_3bn_15_0914.xlsx predicts 1.7 Gb/s in upstream with 4.4% pilot overhead. Suggest making it "up to 1.6 Gb/s" for upstream consistent in all places.

Comment Type: TR  Comment Status: A
PreEq Rev
section 101.4.3.11.1 specifies that all transmissions other than probes and PHY Discovery must use probes but it doesn't specify when the CNU must reset its pre-equalizer coefficients
SuggestedRemedy:
Add the following text below line 43:
The CNU shall reset all its pre-equalizer coefficients to the default value of 1+j0 in the following cases: before its first transmission after a change in at least one of the following parameters: upstream channel frequency (the frequency of subcarrier with index zero), subcarrier spacing, Cyclic Prefix size, Rolloff Period duration.
Response  Response Status: C
ACCEPT IN PRINCIPLE.
*** See Topic PreEq ***
See response to Cmt# 3580

Comment Type: TR  Comment Status: A
PreEq Rev
CLT pre-equalization operation is verified subject to specified conditions using the described method
SuggestedRemedy:
Add the following text to the section 101.4.3.11.1:
*The CMTS MUST be able to calculate and distribute initial pre-equalizer coefficients to reduce the channel amplitude variation, by 0.8 dB or more corresponding to a 3 dB increase in MER from 16 dB to 19 dB, under the following conditions:
*As measured by a spectrum analyzer or equivalent, on upstream probes.
*The probe signal power into CMTS burst receiver is +5.4 dBmV ±1 dB (approximately 0 dBmV per 6.4 MHz).
*An OFDMA channel with 22 MHz encompassed spectrum, where all subcarriers within the encompassed spectrum are active subcarriers, is measured.

Pre-equalization operation subject to these conditions is verified using the following method:
The test modulator generates the first transmission using a compliant probe:
*This transmission is input into the spectrum analyzer, with an initial "flat" test channel, achieving 0.3 dB p-p amplitude variation or less after calibration of the spectrum analyzer (corresponding to a residual MER of 35 dB).
*Add a micro-reflection into the test channel with an amplitude of -16 dB ±0.5 dB and a delay of 0.3125 microseconds ±0.5 nanoseconds compared to main path.
*Verify the channel (except for the echo) changes by no more than 0.3 dB p-p, in addition to the 2.78 dB p-p signal amplitude variation induced by the micro-reflection (the 0.3 dB tolerance allows the maximum amplitude variation to increase to 3.08 dB p-p corresponding to total MER of 15.3 dB or a residual MER of 35 dB).

The test modulator generates the second transmission using a compliant probe sent to both the spectrum analyzer and the CMTS burst receiver (unit under test) with a CNR > 35 dB:
*The spectrum analyzer measures and records the amplitude variation over the spectrum of subcarriers (this is the "reference amplitude variation measurement" of the test).
*The CLT OFDMA receiver develops pre-equalizer coefficients.
*The CLT formats and transmits compliant commands for the pre-equalizer coefficients.
*The downstream test receiver validates reception of pre-equalization coefficients.

Pre-equalization coefficients are implemented by the test modulator prior to the third transmission:
*The spectrum analyzer measures and records the amplitude variation over the spectrum of subcarriers for this third transmission from the test modulator, which has been pre-equalized.
*The reduction in this third amplitude variation measurement at the spectrum analyzer compared to the initial amplitude variation measurement of the second transmission is measured.
*The required minimum reduction in amplitude variation or better is observed.
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Final Responses

Response

ACCEPT IN PRINCIPLE.

*** See Topic PreEq ***

This is included in remein_3BN_04_0515.pdf

Per rem but:

In remein_3BN_04_0515.pdf strike "(approximately 0 dBmV per 6.4 MHz)" in
remein_3BN_04_0515.pdf 101.4.3.11.2 Step 2 abbreviate ns & us, use 312.5 ns

Ed Note: the above tests only the CLT, shouldn’t there be an equivalent test for the CNU?

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
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<tbody>
<tr>
<td>101</td>
<td>101.4.3.12.1</td>
<td>208</td>
<td>54</td>
<td>3565</td>
</tr>
</tbody>
</table>

Kliger, Avi
Broadcom

Comment Type TR
Comment Status A

Suggested Remedy

The CP size must be greater than the windowing size except for PHY discovery.

The CP size (USNcp) shall always be greater than the window size (USNrp)

Response

ACCEPT IN PRINCIPLE.

As in 101.4.2.12 to end of para at pg 208 in 23 add:

"CP and Window sizes shall be selected such that the USNrp value is less than the USNcp value.*"

Pg 183 In 3 change:

"CP and Window sizes shall be selected such that the DSNrp value is less than the CP value"

to:

"CP and Window sizes shall be selected such that the DSNrp value is less than the DSNcp value

Several corrections and clarifications are required for this text:

to this text are needed:

1. The relation of K to the subcarrier frequency and relation of L to the cyclic prefix are not explicitly defined. Clarify that the center frequency is a K is an integer related to the subcarrier index and frequency upconversion of the OFDM channel, and L is an integer related to the cyclic prefix.*

2. Add clarification that the carrier frequency (center frequency of the Nth subcarrier must be an integer multiple of the subcarrier spacing)

3. Make the equation for the subcarrier clock frequency more intuitive; 20*Masterclock is the OFDM sampling frequency (204.8 MHz) divided by the number of subcarriers : 4096

The carrier frequency (i.e. the center frequency of the N-th subcarrier) MUST be an integer multiple of the sub-carrier spacing (1)"

and add the following as the footnote (1)

"The number of cycles of each subcarrier generated by the CLT during the OFDM symbol duration (of each symbol) shall be K + K * L / 128, where K is an integer equal to the nominal RF frequency of the subcarrier (Hz) divided by the nominal subcarrier span (Hz), and L is an integer related to the cyclic prefix wherein L=128*(nominal cyclic prefix duration, seconds)*(nominal subcarrier spacing, Hz)

4. Replace the last bullet, which starts with "The phase of each subcarrier within one OFDM is the same, ...", with

"The symbol clock and carrier frequency clock will both be derived from the 10.24 MHz Master Clock reference frequency, since Section 101.4.2.3 requires locking of the RF carrier to the Master Clock and and locking the Downstream OFDM Clock (204.8 MHz) to the Master Clock.*"

Response

ACCEPT IN PRINCIPLE.

Make the following corrections in section 101.4.2.3

1. 2nd bullet:

"change the equation to:

subcarrier clock frequency = (20 / 4096) * Master Clock frequency"

2. 4th bullet:

"Each OFDM symbol has a cyclic prefix which is an integer multiple of 1 / 128th, of the subcarrier clock period"

3. 6th bullet:

"The carrier frequency (i.e. the center frequency of the N-th subcarrier) MUST be an integer multiple of the sub-carrier spacing (1)"

and add the following as the footnote (1)

"The number of cycles of each subcarrier generated by the CLT during the OFDM symbol duration (of each symbol) shall be K + K * L / 128, where K is an integer equal to the nominal RF frequency of the subcarrier (Hz) divided by the nominal subcarrier span (Hz), and L is an integer related to the cyclic prefix wherein L=128*(nominal cyclic prefix duration, seconds)*(nominal subcarrier spacing, Hz)

4. Replace the last bullet, which starts with "The phase of each subcarrier within one OFDM is the same, ...", with

"The symbol clock and carrier frequency clock will both be derived from the 10.24 MHz Master Clock reference frequency, since Section 101.4.2.3 requires locking of the RF carrier to the Master Clock and and locking the Downstream OFDM Clock (204.8 MHz) to the Master Clock.*"
2. 4th bullet: Per comment - change "1/64th" to: "1/128th

3. 6th bullet: change text to the following (also see Cmt# 3392):
   "The carrier frequency (i.e. the center frequency of the N-th subcarrier) is an integer multiple of the sub-carrier spacing. The number of cycles for each subcarrier generated by the CLT during an OFDM symbol duration shall be as given in Eq 101-xxx
   \[ K + \frac{K \cdot L}{128} \]  Eq (101-xxx)
   Where:
   K is an integer equal to the nominal RF frequency of the subcarrier (Hz) divided by the nominal subcarrier spacing (Hz), and
   L is an integer related to the cyclic prefix as shown in Eq 100-yyy
   \[ L = 128 \times (DSNcp*10^{-6}) \times 50000 \]  Eq (101-yyy)

4. Strike last bullet, which starts with "The phase of each subcarrier within one OFDM is the same, ...", as the suggested remedy was to essentially state "the OFDM sym clock is derived from the 10.24 MHz Master Clock since this section requires that the subcarrier clock is locked to the 10.24 MHz Master Clock ".
   ED Note: the terms "carrier frequency clock" and "RF carrier" do not appear in the draft hence they were removed from the above statement.

At pg 162 line 16 change:
   The "locking" of subcarrier "clock and carrier" are defined and characterized by the following rules
   To
   The synchronization of then subcarrier clock and subcarrier frequency are defined and characterized by the following rules

   **CI/SC** 101.4.3.2  P 186  L 24  # 3567
   Kliger, Avi  Broadcom

   **Comment Type** T  **Comment Status** A  **PreEq Rev**
   Text for this sub-section is missing

   **SuggestedRemedy**
   Add text as proposed in the presentation

   **Response**  **Response Status** C
   ACCEPT IN PRINCIPLE.
   See kilger_3bn_01d_0515.pdf
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<td>100</td>
<td>100.2.8.2</td>
<td>90</td>
<td>17</td>
<td>3570</td>
<td>Create a variable per downstream channel for OFDM channel power. Editor can pick the variable name. Type: unsigned integer. Description: &quot;Downstream OFDM channel power expressed in increments of 0.2 dB. The value is set according to the requirements in Table 100-7.&quot;. Editors to add to appropriate clause tables and clause 45 as needed.</td>
</tr>
<tr>
<td>Cl</td>
<td>100.3</td>
<td>78</td>
<td>14</td>
<td>3571</td>
<td>Remove &quot;Data Detector&quot; from FEC Encoder box in Figure 100-2. Page 79, Line 13: Add &quot;Data Detector&quot; to box FEC Encode in Figure 100-3.</td>
</tr>
<tr>
<td>Cl</td>
<td>100.2.10.1</td>
<td>106</td>
<td>27</td>
<td>3572</td>
<td>Disregard earlier comment to only remove the Editor's note without creating a variable. Delete editors note. Create variable name: &quot;Target Receive Power&quot;, type signed integer &quot;This is the configured target receive power for the CLT upstream receiver, represented in 0.1 dB steps. See Table 100-12.&quot; Value: 0 (default). Editors to add to appropriate clause tables and clause 45 as needed.</td>
</tr>
</tbody>
</table>

**Response**

**Response Status** C

**SuggestedRemedy**

As per comment.

**Comment ID** 3571

**Page** 53 of 62

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

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

**SORT ORDER:** Comment ID

**5/20/2015  10:29:24 AM**
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<th>Comment Status</th>
<th>Page/Line References</th>
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<th>Response Status</th>
<th>Rev</th>
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<tbody>
<tr>
<td>3575</td>
<td>T</td>
<td>A</td>
<td>Pg 43 In 25 change:</td>
<td>&quot;This definition equates to a center frequency from 5 MHz to 3.27675 GHz in 50 kHz steps. The minimum value for this register is 100.&quot; to: &quot;This definition equates to a center frequency from 0 MHz to 3.27675 GHz in 50 kHz steps.&quot;</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
</tr>
<tr>
<td>3576</td>
<td>T</td>
<td>A</td>
<td>After line 16 add:</td>
<td>&quot;The CLT and CNU shall ensure that the encompassed spectrum of a 192 MHz downstream OFDM channel or the upstream OFDMA channel, respectively does not exceed 190 MHz (3800 subcarriers, see Table 100-3 and Table 100-11). These 3800 maximum active subcarriers shall occupy the range 148 &lt;= k &lt;= 3947, where k is the spectral index of the subcarrier.&quot;</td>
<td>As per comment.</td>
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<tr>
<td>3577</td>
<td>T</td>
<td>A</td>
<td>After line 16 add:</td>
<td>&quot;The CLT ensures that the encompassed spectrum of a 192 MHz OFDM channel, respectively does not exceed 190 MHz (3800 subcarriers, see Table 100-3 and Table 100-11). These 3800 maximum active subcarriers shall occupy the range 148 &lt;= k &lt;= 3947, where k is the spectral index of the subcarrier in EQ 101-18.&quot;</td>
<td>As per comment.</td>
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Comment Type  T  Comment Status  A  CL30

Page/line references to P802.3bx Section 2, Clause 30, Draft 3.0.

Page 388, Line 14:
Create editors directive to update aPhyType. Place the following line in alphanumeric order after "10/1GBASE-PRX", underlined:

"10GPASS-XR<tab>Clause 100 and 101 up to 10 Gb/s 64B/66B OFDM downstream and up to 1.7 Gb/s 64B/66B OFDMA upstream"

Clause 30.3.2.1.3, Page 388, Line 48.

Repeat the above instructions to add a new line to aPhyTypeList after "10/1GBASE-PRX".

SuggestedRemedy

As per comment.

Response  Response Status  C

ACCEPT IN PRINCIPLE.
Add CI 30
Create editors directive to update aPhyType. Place the following line in alphanumeric order after "10/1GBASE-PRX", underlined:

"10GPASS-XR<tab>Clause 100, Clause 101, and Clause 102 up to 10 Gb/s 64B/66B OFDM downstream and up to 1.6 Gb/s 64B/66B OFDMA upstream"

Clause 30.3.2.1.3, Page 388, Line 48.

Repeat the above instructions to add a new line to aPhyTypeList after "10/1GBASE-PRX".

Comment Type  T  Comment Status  A

Item 1) in editors note is resolved as the protocol permits updating only those subcarriers that are needed. However, ranges are not supported, individual subcarriers are specified.
For 2) add directly after line 43, a new paragraph/sentence with "When switching from current upstream profile to the next profile where there is a change between excluded and active subcarrier use, the CNU upstream PHY shall be reset, see xxx.xx". Editor to add cross reference to appropriate subclause.

Remove the editor's note at lines 44-49.

SuggestedRemedy

As per comment.

Response  Response Status  C

ACCEPT IN PRINCIPLE.
*** See Topic PreEq ***
This is included in remin_3BN_04_0515.pdf
Omit the note the end of the first para and from Table 102-13:
"Note that setting a significant number of subcarriers from excluded to active may cause interference to existing services on the coax cable distribution network and it is therefore recommended that the CLT reset the EPoC network prior to making such changes."

Remove the editor's note at lines 44-49.

Comment Type  T  Comment Status  A

Insert new subclause on Channel Band Plan as contained in laubach_3bn_14.0515.pdf (and docx). Note that this addition includes adding a normative reference Clause 1.3.

SuggestedRemedy

As per comment.

Response  Response Status  C

ACCEPT IN PRINCIPLE.
Remove two "shall"s in ref to Eq 101-18.

Comment ID 3581  Page 55 of 62  5/20/2015  10:29:24 AM
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Laubach, Mark

Comment Type T  Comment Status A  Rev

Add PICS subclauses to 100.7 as per laubach_3bn_15_0515.pdf (and fm).

Suggested Remedy
As per comment.

Response  Response Status C
ACCEPT IN PRINCIPLE.
Adjust Clause title in first row of table.

Laubach, Mark

Comment Type ER  Comment Status A
Change cross reference from Table-11 to Table-12

Suggested Remedy
As per comment.

Response  Response Status C
ACCEPT.

Laubach, Mark

Comment Type ER  Comment Status A
1) Change "Upstream" to "upstream"
2) Line 32, Cross reference should be to Table 100-12. Update it.

Suggested Remedy
As per comment.

Response  Response Status C
ACCEPT.

Laubach, Mark

Comment Type ER  Comment Status A
Move this text to the end of 100.3.1, remove 100.3.4 subclause header. There is a subclause for this material already. Update PICS.

Suggested Remedy
As per comment.

Response  Response Status C
ACCEPT.
# IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

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<tr>
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<th>Type</th>
<th>Comment Status</th>
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<th>Suggested Remedy</th>
<th>Response</th>
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<td>3588</td>
<td>85</td>
<td>T</td>
<td>A</td>
<td>C</td>
<td>T</td>
<td>A</td>
<td>Line 44: Change &quot;shall convey&quot; to &quot;conveys&quot; \nPage 86, Line 3: same change. \nMakes the CI 100 PICS a little easier.</td>
<td>As per comment.</td>
<td>ACCEPT.</td>
<td></td>
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<td>3589</td>
<td>102</td>
<td>T</td>
<td>A</td>
<td>C</td>
<td>T</td>
<td>A</td>
<td>This paragraph is a duplicate shall for the paragraph on in CL 100.2.9.5.2 Page 101, Line 50 with the exception of the parenthetical phrase. This will confuse the PICS with duplicate shalls.</td>
<td>Remove the paragraph on page 102 at line 41.</td>
<td>ACCEPT.</td>
<td></td>
<td></td>
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<tr>
<td>3590</td>
<td>103</td>
<td>T</td>
<td>A</td>
<td>C</td>
<td>T</td>
<td>A</td>
<td>1) Change &quot;ramp-up&quot; to &quot;RF power amplifier turn on&quot; and &quot;ramp-down&quot; to &quot;turn off&quot;. \n2) Add a &quot;see 100.x.x.x&quot; cross reference at end of the sentence pointing to the subclause \nIFF the power amplifier turn on and turn off time text proposal gets accepted. \n3) Line 39, add missing period at end of sentence.</td>
<td>As per comment.</td>
<td>ACCEPT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3591</td>
<td>114</td>
<td>T</td>
<td>A</td>
<td>C</td>
<td>T</td>
<td>A</td>
<td>The sentence &quot;When operating in one-CW-per-channel test mode the CLT shall be capable of generating the CW tone over the full range of Center Frequency in Table 100-16.&quot; essentially duplicates the &quot;shall&quot; on Line 1. Suggest deleting this second sentence from Line 25 to end of paragraph. Having these two similar &quot;shall&quot;s confused the PICS. \nAlso on line 2, change &quot;the CW&quot; to &quot;a CW&quot; or &quot;any CW&quot;.</td>
<td>As per comment and TF selection.</td>
<td>ACCEPT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3592</td>
<td>162</td>
<td>E</td>
<td>A</td>
<td>C</td>
<td>E</td>
<td>A</td>
<td>This is the first of two instances where active subcarrier is defined (active subcarrier used 37x). \n&quot;Subcarriers that are not configured as excluded are active subcarriers.&quot;</td>
<td>Change the following locations to include the definition: \nCI 100 pg 87 In 23 so the line reads: \n&quot;summation of bit per subcarrier for all active subcarriers (subcarriers that are not configured as excluded are active subcarriers):&quot; \nCI 101 pg 160 In 49 so the line reads: \n&quot;that are configured to carry data (subcarriers that are not configured as excluded are active subcarriers).&quot; \nSee 101.4.2.8. \nRemove all other instances of the phrase.</td>
<td>ACCEPT.</td>
<td></td>
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</table>
## 45.2.1.160 PHY Delay registers (1.1948 through 1.1949)

The assignment of bits in the PHY Delay registers is shown in Table 45-98ad.

### Table 45-98ad PHY Delay registers bit definitions

<table>
<thead>
<tr>
<th>Bit(s)</th>
<th>Name</th>
<th>Description</th>
<th>R/Wa</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1948.15:0</td>
<td>PHY differential delaylower</td>
<td>Difference in delay between XGMII to MDI path and MDI to XGMII path, low order</td>
<td>RO</td>
</tr>
<tr>
<td>1.1949.3:0</td>
<td>PHY differential delay upper</td>
<td>Difference in delay between XGMII to MDI path and MDI to XGMII path, high order</td>
<td>RO</td>
</tr>
<tr>
<td>1.1949.15:4</td>
<td>PHY differential delay precision</td>
<td>Precision of PHY differential delay</td>
<td>RO</td>
</tr>
</tbody>
</table>

Bits 1.1948.15:0 and 1.1949.3:0 form a 20-bit signed integer that the PHY manufacturer uses to declare the difference in delay between the XGMII interface to the MDI interface path and the MDI interface to the XGMII interface path in units of 1/204.8 MHz. These bits are a reflection of the DiffDelay variable.

### 45.2.1.160.2 XGMII to MDI delay tolerance (1.1949.15:4)

Bits 1.1949.15:4 form a 12-bit integer that the PHY manufacturer uses to declare the tolerance of the PHY differential delay parameter in units of 1/204.8 MHz. These bits are a reflection of the DiffDelayTol variable.

### Page 115 Line 26 Change

"100.6 Timesync capability"

To

"100.6 Time of day synchronization capability
See 101.6 for PHY requirements pertaining to time of day synchronization."

### Page 214 Line 17 Change

"101.6 Timesync capability"

To

"101.6 Time of day synchronization capability
EPoC PHYs may support time of day synchronization using the IEEE 1588 protocol. EPoC PHYs that are intended to support IEEE 1588 shall support the variables in 101.6.1."

Add two items to PICS based on the above option and conditional requirement.

**Add:**
- 101.6.1 Variables
- DiffDelay

**TYPE:** 20-bit signed integer
This variable declares the difference in delay between the XGMII interface to the MDI interface path and the MDI interface to the XGMII interface path in units of 1/204.8 MHz. The variable may be updated by the PHY when any of the parameters listed in Table 102-13 are changed.

DiffDelayTol
TYPE: 12-bit integer
This variable declares the tolerance of the DiffDelay variable in units of 1/204.8 MHz. The variable may be updated by the PHY when any of the parameters listed in Table 102-13 are changed.*

Proposed Response  Response Status  Z
REJECT.
This comment was WITHDRAWN by the commenter.
CNUs whose CNU_ID matches the value of PhyDiffTS_CNU. This variable exists only in the CLT.

PhyLnkDiffTS_Valid
TYPE: Boolean
In the CLT the value of PhyLnkDiffTS is only valid when this variable is TRUE. The PhyLnkDiffTS_Valid variable is set to FALSE by any write to PhyLnkDiffTS_CNU.

Response
Response Status C
ACCEPT IN PRINCIPLE.
For CNU to Capture feature only.

CI 100 SC 100.2.8.5 P 94 L 17 # 3596
Remein, Duane Huawei
Comment Type T Comment Status A
The following statement is the only instance of the term inactive subcarrier.
"The CLT modulator shall satisfy the out-of-band spurious emissions requirements of Table 100-6 in gap spectrum between OFDM channels of at least 6 MHz and within exclusion bands within OFDM channels of at least 8 MHz, except for the 1 MHz of inactive subcarriers on each edge of any exclusion band, with relaxations as described in the following paragraphs when applicable."

As such is may be confusing.

SuggestedRemedy
Replace "inactive" with "excluded"

Response
Response Status C
ACCEPT.

Cl 101 SC 100.2.5 P 160 L 47 # 3597
Remein, Duane Huawei
Comment Type T Comment Status A Rev
Ability registers missing:
Optional DS Modulation Types
Optional US Modulation Types
Number of Supported DF OFDM Channels
consider changing the "O" in Table 100-2 for 8-QAM PHY Link CNU Tx/CLT Rx to either M or NA

SuggestedRemedy
See remein_3bn_03_0515.pdf

Response
Response Status C
ACCEPT IN PRINCIPLE.
Per comment and Change from CI 100.2.5 to 101.4.2.3 pg 160 in 47
Remove 8K & 16K from US_ModAbility

CI 102 SC 102.3.2.2 P 245 L 13 # 3598
Remein, Duane Huawei
Comment Type T Comment Status A
OPCODE Write ACK & Write/Verify ACK. Some registers may include read only bits. Failure to write a Read Only bit should not be considered an unsuccessfully "received and executed write Instruction"

SuggestedRemedy
Add footnote to Write ACK & Write/Verify ACK: a write or write verify PHY Instruction to an index that contains read only bits is considered successful when all read/write bits in the index are written.

Response
Response Status C
ACCEPT.

Cl 00 SC 0 P 214 L 24 # 3599
Remein, Duane Huawei
Comment Type T Comment Status A Rev
Add PICS for Clause 101, 102 & update PICS in 103

SuggestedRemedy
See remein_3bn_02_0515.pdf

Response
Response Status C
ACCEPT IN PRINCIPLE.
Change title to 101.7.4.2 to Transmissions
FDM channel 1 -> OFDM channel 1
Change Yes/NS for Mandatory to Yes/No
In CL 103 remove all Ed Notes from PICS

CI 102 SC 102.4 P 249 L 9 # 3600
Kiiger, Avi Broadcom
Comment Type T Comment Status A Rev
Probes are used for periodic verification of the CNU's timing as well transmission power and pre-equalizer coefficients

SuggestedRemedy
Modify the sentence as follows: "While an EPoC network is in operation, periodic verification of the CNU's OFDMA timing, transmission power and pre-equalizer coefficients is needed to ensure orthogonality and proper reception. This is accomplished using Wideband Probing. Wideband Probing may also be used during the PHY Discovery process to fine tune the timing of CNUs joining the network"

Response
Response Status C
ACCEPT.
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Draft 1.4

Final Responses

Comment ID 3601

Kliger, Avi

Broadcom

Comment Type T

Comment Status A

Rev

On figure 102-19 "AmpOffset" is used but the text uses PowerOffset. Probing is also used for pre-equalization settings.

Suggested Remedy

Change AmpOffset to PowerOffset in Figure 102-19.

Add update pre-equalizer setting in line 23.

ACL: 3601

Response

Response Status C

ACCEPT.

Comment ID 3602

Kliger, Avi

Broadcom

Comment Type T

Comment Status A

Rev

first and last subcarriers of the PLC should be of type-2 RBs.

Suggested Remedy

Correct figure 102-17 accordingly.

ACL: 3602

Response

Response Status C

ACCEPT IN PRINCIPLE.

As per comment plus to para

"The upstream PHY Link utilizes a pilot pattern to assist the CLT receiver in capturing the bursting PHY Link transmissions. The PHY Link pilot pattern is illustrated in Figure 102–17. PHY Link pilots are BPSK encoded."

Add

"The two edge subcarriers of the upstream PHY Link are Type 2 pilots whereas the 6 internally subcarriers are Type 1 Pilots."

Comment ID 3603

Kliger, Avi

Broadcom

Comment Type TR

Comment Status A

Rev

Since RB types are required in order to send data in the upstream direction, their corresponding entry in the Link-up column should be Y.

Suggested Remedy

Correct table 102-13 accordingly.

ACL: 3603

Response

Response Status C

ACCEPT.

Comment ID 3604

Kliger, Avi

Broadcom

Comment Type TR

Comment Status A

Rev

The transmit power of the unaligned CNU must be controlled by the CLT with a value that is provided in the downstream PLC and is common to all initial PD responses from new CNUs. If the CNU does not receive a corresponding CNU_ID instruction from the CLT it shall retry with an increased transmission power by a step that is also provided by the CLT. This is required to prevent interference to other CNUs and to expedite the acquisition time.

Suggested Remedy

Add this description below line 28 and update table 102-13 accordingly (enter a corresponding new field for the initial PD transmission power) with Y under PHY Discovery column. Add initial PD transmission power and initial PD TX power step to teh PLC parameters. Add increasing PD transmission power function in TRANSMIT BDISC block in figure 102-24.

ACL: 3604

Response

Response Status C

ACCEPT IN PRINCIPLE.

Editor D to create variables & gen text.

Editor M to modify Fig 102-24.

Comment ID 3605

Kliger, Avi

Broadcom

Comment Type TR

Comment Status A

Rev

"Multiple valid PHY Discovery Responses that overlap in time may be received by the CLT during a single PHY Discovery window depending on the modulated spectrum of OFDM channel 0."

This sentence is not clear in how that PD overlaped in time may be received depends on the modulat3ed spectrum of channel 0. During a probe period there could multiple PD windows open on different subcarriers. The CKT may receive them simulataneously.

Suggested Remedy

Modify the sentence accordingly.

ACL: 3605

Response

Response Status C

ACCEPT IN PRINCIPLE.

Change:

"Multiple valid PHY Discovery Responses that overlap in time may be received by the CLT during a single PHY Discovery window depending on the modulated spectrum of the upstream OFDM channel."

to

"Multiple valid PHY Discovery Responses that overlap in time, but not frequency, may be received by the CLT during a single PHY Discovery window depending on the modulated spectrum of the upstream OFDM channel."

Other Comments

5/20/2015 10:29:24 AM

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

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

SORT ORDER: Comment ID
IEEE 802.3bn EPON Protocol over Coax (EPoC) TF 4th Task Force review comments

Comment Type: T  Comment Status: A  Rev

Text must specify how the CNU shall handle the power offset value received from the CLT

Suggested Remedy:
Add the following text in line 43:
"When the CNU receives the PhyPowerOffset variable it shall increase its transmission power by the PhyPowerOffset value if the PhyPowerOffset is negative and reduced its transmission power by the PhyPowerOffset value if PhyPowerOffset is positive"

Response  Response Status: C
ACCEPT IN PRINCIPLE.
See cmt 3384 included in remein_3bn_10b_0515.

Comment Type: E  Comment Status: A  Rev

Subclause has no text

Suggested Remedy:
Remove subclause

Response  Response Status: C
ACCEPT.
Remove 102.3.1.3 US PHY Link Subcarrier Block Interleaving

Comment Type: T  Comment Status: A

Null subcarriers in the downstream need to be modulated by prbs:
Change:
"Nulled subcarriers are not modulated except when being used as a scattered pilot in the downstream direction (see 101.4.2.6.1)"
To:
"Nulled subcarriers are BPSK modulated using the pseudo-random sequence generated by the 13-bit linear feedback shift register, illustrated in Figure 101-25 except when being used as a scattered pilot in the downstream direction (see 101.4.2.6.1)"

Suggested Remedy:
As per comment.

Response  Response Status: C
ACCEPT.