

**(Approved 22 Jan 2014)**  
**IEEE P802.3bn EPoC PHY Task Force**  
**November 12-14, 2013**  
**Dallas, Texas, United States**  
**Chair: Mark Laubach**  
**Recording Secretary: Duane Remein**

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## Summary:

The P802.3bn EPoC PHY Task Force met for two and one half days in Dallas, Texas. A total of 23 presentations were reviewed and 14 technical motions were passed, including 5 baseline proposals. A summary of decisions can be viewed at [decisions](#) and [baseline proposals](#). Additionally, a comment resolution session was held for Task Force Draft D0.2.

## Tuesday, 12 November 2013

8:01AM the Chair called the meeting to order. Introductions were made and each participant declared their employer and affiliation.

### Motion# 1

Motion to approve minutes from 2-4 September 2013, York, England meeting:

unconfirmed\_minutes\_3bn\_01\_0913.pdf

Moved: Marek Hajduczenia

Second: Victor Hou

Procedural (>50%)

Passed by Voice without opposition

The Chair covered the [Meeting Agenda](#) and inquired if anyone would be publicly reporting on this meeting; there was no response. There was a request to record the meeting; there were numerous objections and the request was disallowed. The Chair reviewed the IEEE Patent Policy and related slides.

8:15AM The Chair made a call for patents; there was no response.

The Chair reviewed the [work items](#) developed in York and the Task Force timeline. The Task Force has received permission from CableLabs to allow copying of text from the DOCSIS 3.1 specification.

### Motion# 2

Motion to approve the amended Agenda for this meeting.

Moved: Duane Remein

Second: Tim Brophy

Procedural (>50%)

Passed by Voice without opposition

**Mark Laubach**

**[Opening report: Combined PHY](#)**

**Broadcom**

Summary of PHY ad hoc committee activities

9:05AM Steve Shellhammer assumed the Chair while Mark presented.

**Mark Laubach,** [PHY High Level Block Diagrams and](#) **Broadcom**  
**Avi Kliger** [First pass look at PHY Delays](#)

Proposed a DS block diagram and starting point for an US block diagram (also see [kliger 3bn 01 1113.vsd](#)). Touched on delay and latency and clearly indicated that more study is required to fully understand PHY delay.

9:42AM Mark Laubach resumed the Chair.

**Duane Remein** [EPoC PHY Block Diagrams](#) **Huawei**

Discussion about combined US/DS Block diagram for EPoC.

10:25AM Steve Shellhammer assumed the Chair while Mark presented.

**Mark Laubach,** [Example of Multiple OFDM Downstream](#) **Broadcom**  
**Avi Kliger** [Channels and Examining Backwards](#)  
[Compatibility](#)

Discussion of example method for doing supporting multiple OFDM channels, an example approach for supporting different CNU channel capabilities, and an example of an approach to support deployment of mixed generations of CNU to illustrate complexity for further discussion.

11:17AM Mark Laubach resumed the Chair.

**Marek Hajduczenia** [MPCP for EPoC](#) **BrightHouse Networks**

Proposal to require CNUs to be fully compatible with CI 77 MPCP and allow more extensive changes to CI 102 MPCP for EPoC.

11:50AM recessed for lunch; reconvened at 1:32pm.

**Richard Prodan** [Upstream Codeword Filling](#) **Broadcom**

Proposed a PHY method to accommodate multiple FEC Codewords with decisions based on fixed size thresholds.

**Duane Remein,** [CI 102 Issues and Proposed Solutions](#) **Huawei**  
**Hesham ElBakoury**

Proposed a MPCP method to accommodate multiple FEC Codewords with decisions based on optimal CW size plus some fixes to existing CI 102.

2:30PM Steve Shellhammer assumed the Chair as Mark is a co-author on the following presentation.

**Bruce Currivan,** [PNM for EPoC](#) **Broadcom**  
**Richard Prodan (presenter),** **Intel**  
**Mark Laubach,** **Huawei**  
**Bernard Arambepola,** **CableLabs**  
**Hesham ElBakoury,**  
**Belal Hamzeh**

Proposal for using the EPoC PHY to test and diagnose Cable plant impairments.

3:05PM Mark Laubach resumed the Chair.

**Richard Prodan,**                    [Constellation mapping for EPoC LDPC coding](#)                    **Broadcom**  
**BZ Shen,**  
**Avi Kliger**  
Proposal for mapping data bits to constellation positions.

3:50PM Steve Shellhammer assumed the Chair as Mark is a co-author on the following presentation.

**Richard Prodan,**                    [Downstream Baseline Proposal](#)                    **Broadcom**  
**BZ Shen,**  
**Tom Kolze,**  
**Avi Kliger (presenter),**  
**Mark Laubach**  
Proposed baseline material on DS OFDM material. See also [laubach\\_3bn\\_04\\_1113.pdf](#).

4:30PM Mark Laubach resumed the Chair.

**Saif Rahman,**                    [EPoC PMD Electrical Input/Output -](#)                    **Comcast**  
**Joe Solomon,**                    [baseline proposal Part I / Part II](#)                    **Broadcom**  
**Tom Kolze**  
Proposed PMD baseline material. Also see [rahman\\_saif\\_3bn\\_02\\_1113.pdf](#).

**Jin Zhang**                            [EPoC Scrambler](#)                            **Marvell**  
Review of possible scrambler for EPoC PCS; looked at EPON scrambler and D3.1 scrambler.

**Jin Zhang**                            [EPoC DS Bit Loading Procedure](#)                    **Marvell**  
Procedure for setting downstream bit loading tables. Also see [zhang\\_3bn\\_02a\\_1113.pdf](#).

6:20PM recessed for the day.

### Wednesday, 13 November 2013

8:02AM the Chair called the meeting to order.

**Yuping Zhao**                    [Introduction of HINOC: a solution to the TDD mode](#)                    **Peking University**  
Overview and progress of HINOC 2.0. It was noted that the TDD sub-task force chair should follow up with the presenter on possible calls to gather additional input from the Chinese community.

**Eugene Dai**                            [Paradoxes in EPoC](#)                            **Cox**  
Proposed removing TDD

**Marek Hajduczenia**                    [DATA TRACES FOR P802.3BN](#)                    **Brighthouse Networks**  
Provided an overview of a data set of US packet statistics gathered from a PON primarily serving mobile backhaul.

**BZ Shen,**                            [FEC for upstream initial and fine ranging](#)                    **Broadcom**  
**Richard Prodan**  
**Avi Kliger**  
Proposed a FEC for initial ranging and for fine ranging. The proposal assumes these two functions are carried in the US PHY-Link.

**Syed Rahman**                      [Base line proposal for Burst Markers in EPoC](#)                      **Huawei**

Detailed baseline proposal on upstream and/or downstream burst markers. Also see [rahman\\_syed\\_3bn\\_01\\_1113.pdf](#).

**Syed Rahman**                      [Base line proposal for upstream wideband probing in EPoC](#)                      **Huawei**

Detailed baseline proposal on upstream probing. Also see [rahman\\_syed\\_3bn\\_02\\_1113.pdf](#).

**Steve Shellhammer**                      [TDD based on FDD Upstream](#)                      **Qualcomm**

Survey of remaining items to be completed for TDD.

**Duane Remein**                      [CL 10x.y PHY-Link Part I baseline](#)                      **Huawei**

Proposed baseline material for PHY-Link.

**Duane Remein**                      [CL 10x.y PHY-Link Part II baseline](#)                      **Huawei**

Proposed baseline material for PHY-Link, transmit & receive state diagrams.

**Mark Laubach,**                      [Downstream Baseline Proposal revision](#)                      **Broadcom**  
**Avi Kliger**

Proposed baseline material on DS OFDM material; also see [laubach\\_3bn\\_04\\_1113.pdf](#). Revision addressed new NCP approach as compared to baseline approach.

The Chair held an open discussion on upstream issues and miscellaneous OFDM/EPoC items.

12:30PM – recessed for lunch; 2:15PM – reconvened; Steve Shellhammer chaired while Mark presented.

**Mark Laubach,**                      [NCP Approach Comparison](#)                      **Broadcom**  
**Avi Kliger**

See also baseline proposal: [laubach\\_3bn\\_04a\\_1113.pdf](#)

3:00PM Mark Laubach resumed the Chair.

#### **Comment Resolution Session**

Duane Remein acting Chair for the comment resolution session.

The Task Force reviewed and resolved all ER, T and TR comments excepting comment #1185.

5:57PM recessed for the day.

### **Thursday, 14 November 2013**

8:04AM the Chair reconvened the meeting.

Concluded comment resolution resolving comment #1185.

**Motion# 3**

Move to: Accept in bulk the comment resolutions for all Editorial comments as recorded in [8023bn\\_draft0d2\\_proposed\\_responses.pdf](#).

Moved: Duane Remein

Second: Joe Solomon

For: 24 Against: 0 Abstain: 2

Technical ( $\geq 75\%$ )

Motion Passed

8:35AM Steve Shellhammer assumed the Chair while Mark participated in motions related to presentations he co-authored.

**Motion# 4**

Move to: Adopt the upstream codeword filling algorithm from [prodan\\_3bn\\_01\\_1113.pdf](#) pages 2, 3, 4 and 12 for EPoC.

Moved: Rich Prodan

Second: Duane Remein

For: 24 Against: 0 Abstain: 4

Technical ( $\geq 75\%$ )

Motion Passed

**Motion# 5**

Move to: Adopt the constellation mapping procedure in [prodan\\_3bn\\_02\\_1113.pdf](#) pages 2-4, 6-7 for EPoC.

Moved: BZ Shen

Second: Avi Kliger

For: 23 Against: 0 Abstain: 7

Technical ( $\geq 75\%$ )

Motion Passed

Mark Laubach resumed the Chair.

**Motion# 6**

Move to: Adopt [rahman\\_saif\\_3bn\\_02\\_1113.pdf](#) as baseline proposal for PMD Downstream Electrical Input/Output.

Moved: Saifur Rahman

Second: Joe Solomon

For: 25 Against: 0 Abstain: 1

Technical ( $\geq 75\%$ )

Motion Passed

**Motion# 7**

Move to: Adopt the LDPC FEC codes in [shen\\_3bn\\_01\\_1113.pdf](#):

The (128,80) punctured LDPC code with 24-bit CRC for initial ranging on BPSK pages 3 & 5.

The (362,272) shortened and punctured LDPC code for fine ranging on QPSK page 7.

Moved: BZ Shen

Second: Leo Montreuil

For: 28 Against: 0 Abstain: 1

Technical ( $\geq 75\%$ )

Motion Passed

**Motion# 8**

Move to: Adopt [zhang\\_3bn\\_02a\\_1113.pdf](#) pages 5 to 18 as a starting point towards baseline proposal for the procedure of updating the bit loading profiles for downstream, excluding block mode operation.

Moved: Jin Zhang

Second: Duane Remein

For: 16                      Against: 8              Abstain: 8

Technical ( $\geq 75\%$ )

Motion Failed

**Motion# 9**

Move to: Adopt [rahman\\_syed\\_3bn\\_02\\_1113.pdf](#) as a baseline proposal for the upstream wideband probing.

Moved: Syed Rahman

Second: Leo Montreuil

For: 30                      Against: 0              Abstain: 4

Technical ( $\geq 75\%$ )

Motion Passed

**Motion# 10**

Move to: Adopt [kliger\\_3bn\\_01a\\_1113.pdf](#) slide 5 as a baseline proposal for CNU upstream Tx.

Moved: Avi Kliger

Second: Marek Hajduczenia

For: 36                      Against: 0              Abstain: 0

Technical ( $\geq 75\%$ )

Motion Passed

**Straw Poll #1**

Should support for 2048 and 4096 QAM in the TDD upstream be mandatory?

Yes: 22

No: 0

Abstain: 12

**Motion# 11**

Support for 2048 and 4096 QAM in the TDD upstream shall be mandatory, using the same QAM constellation mapping as the FDD downstream.

Moved: Steve Shellhammer

Second: Saifur Rahman

For: 27                      Against: 0              Abstain: 8

Technical ( $\geq 75\%$ )

Motion Passed

## Straw Poll #2

Which of the following choices do you prefer?

1. Do not use start/stop markers
2. Use start marker at the beginning of the downstream time window and a stop marker at the end of the downstream time window
3. Allow start/stop marker at multiple points within the downstream time window

Choice 1: 3 votes

Choice 2: 7 votes

Choice 3: 6 votes

## Motion# 12

Move to: Adopt [rahman\\_syed\\_3bn\\_01\\_1113.pdf](#) as the baseline proposal for burst markers. "Power boosting for Burst Marker sequences" section is removed and T.B.D.

Moved: Syed Rahman

Second: Jin Zhang

For: 18                      Against: 0      Abstain: 12

Technical (>= 75%)

Motion Passed

Steve Shellhammer assumed the Chair while Mark participated in Motions related to presentations he co-authored.

## Motion# 13

Move to: Adopt "NCP in the Data Path" approach as described in [laubach\\_3bn\\_03c\\_1113.pdf](#) pages 5 to 8 as a replacement for "NCP in the PLC" approach.

Moved: Avi Kliger

Second: Rich Prodan

For: 14                      Against: 10      Abstain: 9

Technical (>= 75%)

Motion Failed

## Motion# 14

Move to: Adopt [laubach\\_3bn\\_04c\\_1113.pdf](#) as a baseline starting point for EPoC downstream.

Moved: Mark Laubach

Second: Saifur Rahman

For: 33                      Against: 0      Abstain: 0

Technical (>= 75%)

Motion Passed

Mark Laubach resumed the Chair.

## Motion# 15

Create a new clause to address PHY-Link and incorporate into the draft.

Moved: Duane Remein

Second: Marek Hajduczenia

For: 31                      Against: 0      Abstain: 0

Procedural (>50%)

Motion Passed

**Motion# 16**

Adopt changes proposed in [remein 3bn 06 1113.pdf](#) "CI-102 Issues and Solutions" slides 14-18 & 20-21 and incorporate into the draft.

Moved: Duane Remein

Second: Syed Rahman

For: 16                      Against: 3              Abstain: 13

Technical (>= 75%)

Motion Passed

**Motion# 17**

Accept [remein 3bn 07 1113.pdf](#) and [remein 3bn 08 1113.pdf](#) as PHY-Link baseline material and incorporate into the draft. Include PLC material extracted from [laubach 3bn 04c 1113.pdf](#). All material goes into the new PHY-Link Clause.

Moved: Duane Remein

Second: Saifur Rahman

For: 30                      Against: 0              Abstain: 0

Technical (>= 75%)

Motion Passed

**Motion# 18**

Authorize the Editors to create Draft 0.3 from Draft 0.2 by incorporating approved baseline and comment resolution material from the November 2013 meeting.

Moved: Duane Remein

Second: Marek Hajduczenia

For: 35                      Against: 0              Abstain: 0

Technical (>= 75%)

Motion Passed

*[Chair's Note: Sequence of Motions #19, #20, and Straw Poll #3: The Motion #19 question was presented, moved, and seconded. Our Task Force meeting agreement is that motion discussions are limited to 15 minutes and that the Task Force must approve additional increments of 15 minutes. (See [Meeting Agenda, Page 37.](#)) Due to substantial discussion, Motion #20 was to ask for continuation of the discussion on Motion #19. At the end of discussion, the Task Force conducted Straw Poll #3. The Task Force then proceeded with a roll call vote on Motion #19.]*

**Motion# 19**

Move to:

Separate P802.3bn work into two efforts:

1. EPoC FDD single channel (192MHz FFT) working under existing PAR, focused to meet market needs
2. Move the TDD work to second track to be developed under a new 802.3 project, including EPoC TDD Mode, Multi-channel for both modes, MMP, and other enhancements into second project.

Note: this would authorize P802.3bn Chair to work with the 802.3 Chair and WG with goal of seeking project documents approval by 802.3 WG at 2014 March closing plenary meeting.

Moved: Eugene Dai

Second: Edwin Mallette

Saif Rahman requested a Roll Call vote; the Chair granted the request.

For: 16                      Against: 13              Abstain: 6

Technical (>= 75%)

Motion Failed



Roll Call Voting Tabulation:

<u>Last Name</u>	<u>First Name</u>	<u>Employer</u>	<u>Yes</u>	<u>No</u>	<u>Abstain</u>
Allard	Michel	Cogeco Cable	Y		
Boyd	Ed	Xingtera		N	
Brophy	Tim	Cisco		N	
Brown	Alan	Aurora Networks			A
Dai	Eugene	Cox	Y		
Darling	Mike	Shaw Cable		N	
Dickinson	John	Bright House Networks	Y		
ElBakoury	Hesham	Huawei	Y		
Hajduczenia	Marek	Bright House Networks	Y		
Hirth	Ryan	Broadcom	Y		
Hou	Victor	Broadcom	Y		
Knittle	Curtis	CableLabs			A
Kolze	Tom	Broadcom	Y		
Kramer	Glen	Broadcom		N	
Lessard	Andre	Commscope			A
Lin	Rujian	Shanghai Luster Teraband Photonics	Y		
Malette	Edwin	Bright House Networks	Y		
Montreuil	Leo	Broadcom	Y		
Ng	Lup	Cortina Systems		N	
Noll	Kevin	Time Warner Cable	Y		
Peters	Michael	Sumitomo	Y		
Powell	Bill	Alcatel-Lucent			A
Prodan	Rich	Broadcom	Y		
Rahman	Saifur	Comcast		N	
Rahman	Syed	Huawei		N	
Remein	Duane	Huawei		N	
Schmitt	Matt	CableLabs		N	
Shellhammer	Steve	Qualcomm		N	
Shen	BZ	Broadcom	Y		
Solomon	Joe	Comcast		N	
Sun	Yanbin	Huawei		N	
Suzuki	Ken-Ich	NTT			A
Tanaka	Keiji	KDDI	Y		
Ulm	John	Arris		N	
Zhang	Jin	Marvell Semiconductor			A

Totals:	16	13	6
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**Motion# 20**

Motion to extend discussion time for the purposes of holding a straw poll

Moved: Duane Remein

Second: Saifur Rahman

For: 30                      Against: 1              Abstain:

Technical ( $\geq 75\%$ )

Motion Passed

**Straw Poll #3**

Separate P802.3bn work into two efforts:

1. EPoC FDD single channel (192MHz FFT) working under existing PAR, focused to meet market needs
2. Move the TDD work to second track to be developed under a new 802.3 project, including EPoC TDD Mode, Multi-channel for both modes, MMP, and other enhancements into second project.

Note: this would authorize P802.3bn Chair to work with the 802.3 Chair and WG with goal of seeking project documents approval by 802.3 WG at 2014 March closing plenary meeting.

Yes: 19

No: 12

Abstain: 3

*[Chair's Note: During the processing of motions #19, #20, and Straw Poll #3, discussions in the meeting room became heated. One participant exceeded expected decorum and in a loud voice stated the proposed motion was a change from a separate group discussion in the hallway from the day before, demanded the motion be withdrawn, and referred to further discussion in separate group meetings outside of IEEE P802.3bn. The Chair reminded participants that they are individuals while in the Task Force meeting. After discussion ended, the Chair conducted a straw poll that indicated the motion did not have enough support for a technical approval however the Mover and Secunder wanted to go ahead with Motion #19. Upon reading the motion, the same previous individual requested a roll call vote with the added statement "If I'm going to end up missing my flight, I want to know who stabbed me in the back.". The Chair and Vice Chair conducted the roll call vote using the Task Force attendance book. During voting, one participant verbally stated that they felt compelled to change their intended vote because of the previous statement. The Chair and Vice Chair separately counted the vote tallies and produced the same results that the motion failed to achieve 75% and did not pass. The Chair announced the results. Another participant remarked to the Task Force that they felt the results were skewed.]*

**Motion# 21**

Move to extend the timeline one plenary cycle

Moved: Duane Remein

Second: Saifur Rahman

For: 30                      Against: 1              Abstain:

Technical ( $\geq 75\%$ )

Motion Passed

The Chair took Future meeting polls.

**Motion# 22**

Motion to adjourn

Moved: Duane Remein

**Second: not required**

Procedural (>50%)

Passed by Voice without opposition

12:45PM the meeting was adjourned.

## Meeting Attendance

The following represents the meeting attendance as initialed in the attendance binder that was passed around the meeting each day. 42 individuals indicated their attendance for this meeting. If an attendee has an affiliation in addition to or different from their Employer for this meeting, it should be so noted.

Last Name	First Name	Employer	Affiliation (If Different)	Tue	Wed	Thu
Allard	Michel	Cogeco Cable		X	X	X
Boyd	Ed	Xingtera		X	X	X
Brophy	Tim	Cisco		X	X	X
Brown	Alan	Aurora Networks		X	X	X
Dai	Eugene	Cox		X	X	X
Darling	Mike	Shaw Cable		X	X	X
Dickinson	John	Bright House Networks		X	X	X
ElBakoury	Hesham	Huawei		X	X	
Hajduczenia	Marek	Bright House Networks		X	X	X
Hirth	Ryan	Broadcom		X	X	X
Hou	Victor	Broadcom		X	X	X
Jones	Doug	Comcast		X		
Kliger	Avi	Broadcom		X	X	X
Knittle	Curtis	CableLabs		X	X	X
Kolze	Tom	Broadcom		X	X	X
Kramer	Glen	Broadcom		X	X	
Lessard	Andre	Commscope		X	X	X
Li	Dou	Peking University		X	X	
Lin	Rujian	Shanghai Luster Teraband Photonics		X	X	X
Liquan	Yuan	ZTE Corp		X	X	
Mallette	Edwin	Bright House Networks		X	X	X
Montreuil	Leo	Broadcom		X	X	X
Ng	Lup	Cortina Systems		X	X	X
Noll	Kevin	Time Warner Cable		X	X	X
Peters	Michael	Sumitomo		X	X	X
Powell	Bill	Alcatel-Lucent		X	X	X
Prodan	Rich	Broadcom		X	X	X
Rahman	Saifur	Comcast		X	X	X
Rahman	Syed	Huawei		X	X	X
Remein	Duane	Huawei		X	X	X
Schmitt	Matt	CableLabs		X	X	X
Shellhammer	Steve	Qualcomm		X	X	X

Shen	BZ	Broadcom		X	X	X
Solomon	Joe	Comcast		X	X	X
Sun	Yanbin	Huawei		X	X	X
Suzuki	Ken-Ich	NTT		X	X	X
Tanaka	Keiji	KDDI		X	X	X
Ulm	John	Arris		X	X	X
Welch	James	IneoQuest		X		
Wolfe	Ron	Aurora Networks		X	X	X
Zhang	Jin	Marvell Semiconductor		X	X	X
Zhao	Yuping	Peking University		X	X	