**(Unconfirmed)**
**IEEE P802.3bn EPoC PHY Task Force**
**January 22-24, 2014**
**Indian Wells, California, United States**
**Chair: Mark Laubach**
**Recording Secretary: Duane Remein**

## Summary:

The P802.3bn EPoC PHY Task Force met for two and one half days in Indian Wells, California. A total of 17 presentations were reviewed and 10 technical motions were passed, including 1 baseline proposal. A summary of decisions can be viewed at decisions and baseline proposals. Additionally, a comment resolution session was held for Task Force Draft D0.3.

## Wednesday, 22 January 2014

8:05 AM The Chair called the meeting to order. Introductions were held and each participant declared their employer and affiliation.

**Motion# 1**

Motion to approve minutes from 12-14 November 2013, Dallas, Texas, USA meeting:
unconfirmed_minutes_3bn_01_1113.pdf

Moved: Victor Hou
Second: John Ulm

Procedural (>50%)
Passed by Voice without opposition

The Chair covered the Meeting Agenda presentation, which included meeting decorum, ground rules, IEEE Structure, and IEEE Patent policy.

8:14 AM The chair made a call for patents. No responses were received.

The Chair reviewed the Attendance tool & book (which was distributed). The chair stressed that 802.3 is a group of individuals and that decorum should be observed. The chair reviewed Motion #19 from the Dallas meeting. There was a very short discussion on the topic of splitting the project. Other topics addressed in the opening presentation included: technical and baseline decision to date, drafting process, timeline. The Chair noted that there was poor overall response to the Draft D0.3 comment review and asked the Task Force to consider additional comment submission tool tutorials and reminded the participants to contact the Editors with any questions. The daily meeting agenda was reviewed.

**Motion# 2**

Motion to approve the agenda for this meeting.

Moved: Duane Remein
Second: Kevin Noll

Procedural (>50%)
Passed by Voice without opposition

## Presentations:

Duane Remein assumed the chair while Mark presented.

**Steve Shellhammer** — Opening report: TDD sub-Task Force (rev 01a) — **Qualcomm**
**Mark Laubach (presenter)** — **Broadcom**
TDD Sub-task Force activities since the Dallas meeting.

**Mark Laubach** — Opening report: PHY sub-Task Force — **Broadcom**
PHY Sub-Task force activities since the Dallas meeting.

Mark Laubach resumed as Chair.

**Duane Remein** — Opening Report: Editors — **Huawei**
Summary of comments received on draft 0.3.

**Mark Laubach** — Work Item Review — **Broadcom**
Review of work items list.

**Duane Remein** — Additional Clause 45 Registers — **Huawei**
Baseline document: remein_3bn_07_0114.pdf
This presentation suggested several MDIO register definitions including US & DS PHY Link starting frequency, PHY Link search parameters, DS OFDM starting frequency per RF channel and DS Profile modulation parameters.

**Ed Boyd** — Downstream Rate Adaption — **Xingtera**
This presentation proposed a mechanism to adapt the PCS data rate (10G) to the PMA data rate (line rate) and a PCS to PMA interface.

**Ed Boyd** — REPORT-GATE Format — **Xingtera**
This presentation suggested definition for the REPORT and GATE frames for EPoC. The definition of the REPORT frame would not include FEC and assume a 10Gbps data rate (as per 10G-EPON). The EPoC GATE would not account for US EPoC rate in the GATE Length, only in the assigned GATE Start time (i.e., GATE to GATE start times). The GATE length would assume a 10G rate as in 10G EPON.

**Ryan Hirth** — MPCP For EPoC (rev 01a) — **Broadcom**
**Glen Kramer**
**Avi Kliger**
**Leo Montreuil**
This presentation suggested definition for the GATE frames for EPoC include EPoC overhead and account for the EPoC rate in the time allocated (GATE Length).

**Avi Kliger** — Proposal to add a 96MHz upstream mode to EPoC (rev 01a) — **Broadcom**
**Richard Prodan**
This presentation proposed to add an option to allow a device to operate with a 96 MHz channel instead of a 192 MHz channel.

11:40 AM recessed for Lunch

1:35 PM reconvened

**Duane Remein** Coordination of PHY Discovery **Huawei**

This presentation proposed a MDIO register structure to control PHY Discovery windows.

Duane Remein assumed the chair while Mark presented.

**BZ Shen**
**Mark Laubach**
**Rich Prodan**
**Avi Kliger**
**Leo Montreuil**
Document Draft For Adopted FEC For PLC, FEC and CRC For Initial Ranging, FEC Fine Ranging and Constellation Mappings, and a Baseline Proposal For Other Elements of Initial and Fine Ranging
Baseline document: shen_3bn_01_0114.pdf
**Broadcom**

This presentation suggested some baseline text for the US PHY Link. Primary focus is on FEC and ranging signaling.

- *It was noted that the MAC address is increasing from 6 bytes to 8 bytes and EPoC will need to account for this.*

Mark Laubach resumed as Chair.

**Ed Boyd** Upstream Format **Xingtera**

This presentation discussed several possible simplifications to the US OFDM channel and concluded that ODFMA is significantly better than other possibilities and should be kept. A second subject addressed is 1D to 2D conversion

**Avi Kliger**
**BZ Shen**
**Leo Montreuil**
Resource Blocks for EPoC Considerations (rev 02a)
**Broadcom**

This presentation discussed the number of OFDMA symbols in a Resource Block. The conclusion is that the RB size should be configurable as 8, 12 or 16 symbols. The presentation also suggested specific pilot patterns for RB's with 8, 4 or 1 pilots. Lastly the presentation addressed needed gaps between grants.

**Leo Montreuil**
**Avi Kliger**
Burst Marker Analysis (rev 01a)
**Broadcom**

**Burst Marker Analysis** Leo Montreuil, Avi Kliger Broadcom

This presentation analyzed burst markers that are currently defined and identified some problematic corner cases. In particular silence before or after the burst can cause problems. The suggested improvement is to only use burst markers with equal numbers of P and N sub-carriers, this would significantly decrease the false detection rate.

**Leo Montreuil**
**Avi Kliger**
2-D Marker Sequences (rev 02a)
**Broadcom**

This presentation suggested using a 2d burst marker with equal P and N sub-carriers, possibly with power boosting. This overcomes problems identified in the current burst markers.

- *We continued a discussion on limiting the RB to a single SC (minimum RB size = 1 SC x 8 sym). There are possible benefits for this. Part of this discussion centered on making this the only possible RB size (i.e., 1x8, 1x12 & 1x16).*
- *There was a general discussion that a RB is made up of contiguous/adjacent SC's but not on a predefined grid. If a SC is nulled the RB that would "normally' contain that SC starts on the next non null SC (assuming there are sufficient SCs for the RB).*

- *Further discussed the 96 MHz option. There was a stated concern that the "1Gbps" objective would not be met. However there was also some desire to simplify the specification.*

**Straw Poll #1**

Change the upstream FDD OFDMA channel bandwidth from 192 MHz to 96 MHz. Maintain the same symbol time and sub-carrier width.

| | |
|---|---|
| Yes: | 22 |
| No: | 2 |
| Abstain: | 1 |

**Straw Poll #2**

In addition to 192 MHz, allow auto-negotiation to support FDD CNU capability with an upstream OFDMA channel bandwidth of 96 MHz. Maintain the same symbol time and sub-carrier width.

| | |
|---|---|
| Yes: | 4 |
| No: | 15 |
| Abstain: | 6 |

6:35 PM Recessed for the day.

## Thursday, 23 January 2014

9:00 AM reconvened.

The Chair reviewed the Attendance tool & book (which was distributed).

**Started comment resolution**

Duane Remein acting Chair

12:00 PM Recessed for Lunch

1:10 PM reconvened

6:30 PM recessed from comment resolution, 1 TR comment unresolved.

**Presentations (continued)**

**Richard Prodan** Upstream Codeword Filling (rev 01a) **Broadcom**

This presentation discussed using multiple FEC in the US with shortening. It detailed a method for codeword filling and determining how to shorten at the end of a burst. It presented a justification for using multiple codewords.

**Completed comment resolution.**

7:40 PM recessed for the evening.

## Friday, 24January 2014

8:00 AM reconvened.

The Chair reviewed the Attendance tool & book (which was distributed).

Duane Remein assumed the chair while Mark presented.

**Mark Laubach** Downstream Baseline Proposal **Broadcom**
**Rich Prodan** Baseline document: laubach_3bn_02_0114.pdf
**BZ Shen**
**Tom Kolze**
**Avi Kliger**
**Leo Montreuil**
**Victor Hou**

The presentation summarized a body of material that will be converted into IEEE Style and brought into the next meeting as a baseline proposal. It was noted that copying text material from the DOCSIS D3.1 PHY specification needs to be done with care as it needs to be put into IEEE standards preferred language and conventions format. Check with the Editors before submitting any baseline proposal draft presentations.

Mark Laubach resumed as Chair.

**Jin Zhang** Subcarrier Granularity for DS Bit Loading (rev 01a) **Marvell**

This presentation gave simulation results of assigning sub-carrier bit loading in grouped sub-carriers. The conclusion is that groups as large as 32 sub-carriers for the 4k FFT (64 for 8K FFT) do not have significant adverse effects on the channel.

*Chair's Note: Hyperlinks to presentation files were added to the following applicable straw poll and motions text as part of producing these minutes to aid in referencing by the reader. Any added links were not part of the original text.*

**Motion# 3**

Move to: Separate P802.3bn work into two efforts:

1. EPoC FDD work will continue under existing P802.3bn project documents.
2. TDD work to be spun off to a new 802.3 project, pending CFI, 802.3 working-group, and 802 EC confirmation.

Note: this would authorize P802.3bn Chair to work with the 802.3 Chair and WG with the goal of seeking study group approval for the EPoC-TDD study group by the 802 EC at 2014 March closing plenary meeting.

Moved: Eugene Dai
Second: Edwin Mallette

For: 22
Against: 0
Abstain: 4

Technical (>= 75%) Motion Passed

**Motion# 4**

Move to: Accept as baseline material the MDIO Registers outlined in remein_3bn_06_0114.pdf slides 4, 5, 6, 7, & 8 and incorporate into the draft.

Moved: Duane Remein
Second: Ed Boyd

For: 25
Against: 0
Abstain: 2
Technical (>= 75%) Motion Passed

**Motion# 5**

Move to: Use boyd_3bn_03_0114.pdf as a starting point Baseline for the Downstream GearBox including:

* Accurate Rate control for the PCS-to-PMA
* Accurate Rate control for the IDLE Deletion Function
* Bit Loading Configuration Switchover at PLC Boundaries

Moved: Ed Boyd
Second: Marek Hajduczenia

For: 25
Against: 0
Abstain: 2
Technical (>= 75%) Motion Passed

**Motion# 6**

Move to: Simplify the IDLE Deletion function into a single process with the data rate reference from the GearBox as described in boyd_3bn_03_0114.pdf as a starting point.

Moved: Ed Boyd
Second: Duane Remein

For: 23
Against: 0
Abstain: 2
Technical (>= 75%) Motion Passed

**Straw Poll #3**

I prefer GATE solution outlined in:

a) boyd_3bn_01_0114.pdf – grant length contains net bytes that CNU is allowed to send.
b) hirth_3bn_01a_0114.pdf – grant length represents total transmission time.
c) Needs more discussion and analysis after this meeting on the PHY conference calls.

a) 1
b) 8
c) 14

**Motion# 7**

Move to: Change the upstream FDD OFDMA channel bandwidth from 192 MHz to one 96 MHz or two 96 MHz multiplexed channels. Maintain the same symbol time and sub-carrier width.

Moved: Avi Kliger
Second: Eugene Dai

For: 10
Against: 11

Abstain: 4
Technical (>= 75%) Motion Failed

**Motion# 8**

Move to: Accept as a starting point the concepts outlined in remein_3bn_05_0114.pdf slides 2, 4, 7, 8 & 10 for initiation and control of the PHY Discovery window.

Moved: Duane Remein
Second: Saifur Rahman

For: 15
Against: 0
Abstain: 7
Technical (>= 75%) Motion Passed

**Motion# 9**

Move to: Adopt shen_3bn_01_0114.docx as a starting point for PLC FEC, initial ranging FEC and CRC, fine ranging FEC, constellation mappings and the other elements of initial and fine ranging for P802.3bn

Moved: BZ Shen
Second: Rich Prodan

For: 19
Against: 0
Abstain: 1
Technical (>= 75%) Motion Passed

**Motion# 10**

Move to: Adopt EPoC OFDMA upstream with 1D-to-2D translation as described in boyd_3bn_02_0114.pdf as a starting point.

Moved: Ed Boyd
Second: Eugene Dai

For: 20
Against: 0
Abstain: 1
Technical (>= 75%) Motion Passed

**Straw Poll #4**

Include options of subcarrier grouping for downstream bit loading. The maximum number of subcarriers in a bit loading group is TBD.

(Reference: zhang_3bn_01a_0114.pdf)

Yes: 1
No: 5
Abstain: 7
Too Soon to decide: 10

**Motion# 11**

Move to: Adopt the upstream codeword filling algorithm from prodan_3bn_01a_0114.pdf for EPoC.

Moved: Rich Prodan
Second: Leo Montreuil

For: 13
Against: 6
Abstain: 5
Technical (>= 75%) Motion Failed

**Motion# 12**

Move to accept in bulk the comment resolutions for all Editorial comments as recorded "8023bn Draft 0.3 Comment Proposed Responses 140108.pdf" and "8023bn Draft 0.3 LATE Comments Proposed Responses 140108.pdf" with the exception of 1231, 1386, & 1250.

Moved: Duane Remein
Second: Ed Boyd

For: 24
Against: 0
Abstain: 0
Technical (>= 75%) Motion Passed

*Chair's Note: the 8K FFT size (and all impact in the draft) was removed as part of the resolution for comment #1359. The passing of Motion #12 formalized the removal.*

*Chair's Note: the above two documents are in the P802.3bn private area.*

**Motion# 13**

Authorize the Editors to create Draft 0.4 from Draft 0.3 by incorporating approved baseline and comment resolution material from the January 2014 meeting as recorded in P8023bn_draft0d3_Comments_Approved_Responses.pdf.

Moved: Duane Remein
Second: Alan Brown

For: 23
Against: 0
Abstain: 0
Technical (>= 75%) Motion Passed

*Chair's Note: the above document is in the P802.3bn private area.*

**Motion# 14**

Move to: Specify three configurations for the number of symbols in a Resource Block: 8, 12 and 16

Moved: Avi Kliger

Second: Rich Prodan

For: 21

Against: 0

Abstain: 2

Technical (>= 75%) Motion Passed

*The Chair took a straw poll on future meeting attendance.*

**Motion# 15**

Move to adjourn

Moved: Ed Boyd

Second: Duane Remein

Procedural Passed by Voice without opposition

11:30 AM 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. 35 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) | Wed | Thu | Fri |
|---|---|---|---|---|---|---|
| Allard | Michel | Cogeco Cable | | X | X | X |
| Agata | Akira | KDDI | | X | X | |
| Allard | Michel | Cogeco Cable | | X | X | X |
| Boyd | Ed | Xingtera | | X | X | X |
| Brown | Alan | Aurora Networks, A Pace Company | | X | X | X |
| Chen | David | NSN | | X | | |
| Dai | Eugene | Cox | | | X | X |
| Darling | Mike | Shaw Cable | | X | X | X |
| ElBakoury | Hesham | Huawei | | X | X | X |
| Frazier | Howard | Broadcom | | X | X | |
| Guangseng | Wu | Huawei | | X | X | X |
| Hajduczenia | Marek | Bright House Networks | | X | X | X |
| Hou | Victor | Broadcom | | X | X | X |
| Kinnard | Brian | Commscope | | X | X | X |
| Kliger | Avi | Broadcom | | X | X | X |
| Knittle | Curtis | CableLabs | | X | X | X |
| Kolze | Tom | Broadcom | | X | X | X |
| Kramer | Glen | Broadcom | | X | X | X |
| Laubach | Mark | Broadcom | | X | X | X |
| Law | David | HP | | X | | |
| Lessard | Andre | Commscope | | X | X | |
| Li | Rick | Cortina Systems | | X | | |
| Mallette | Edwin | Bright House Networks | | X | X | X |
| Montreuil | Leo | Broadcom | | 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 |
| Remein | Duane | Huawei | | X | X | X |
| Shen | BZ | Broadcom | | X | X | |
| Suzuki | Ken-Ichi | NTT | | X | X | X |
| Thompson | Geoff | GraCaSI | | X | | X |
| Ulm | John | Arris | | X | X | X |
| Zhang | Jin | Marvell Semiconductor | | X | X | X |