(Unconfirmed Minutes)
IEEE P802.3bn EPoC PHY Task Force
January 22-25, 2013,
Phoenix, AZ
Chair: Mark Laubach
Recording Secretary: Duane Remein

Summary:

The P802.3bn Task Force met between Jan 22 and 25. The Task Force reviewed 27 presentations in total, 1 in the TDD Sub-Task Force, 5 in the PHY Sub-Task Force and the remainder in joint session. A total of ten technical motions were made, seven motions passed, two failed by vote, and one failed for lack of a second. One straw poll was taken.

Opening

The Chair opened the meeting on Wed. Jan 23, 2013 9:00 AM

The Chair proposed an agenda which was approved by voice vote (see motions section)

The Chair asked if anyone from the press was present, no responses were received. Chair notified the TF of the EPoC Private area and password, mentioning that all material in this area is for Task Force use and distribution only. The chair reviewed the Task Force ground rules, IEEE structure, IEEE meeting guidelines & affiliation by-laws, and attendance tool.

Wed. 9:12 AM The patent slides (1-4) were shown and a call for essential patents was made. No response to the call for essential patents was made.

Wed. 9:15 AM Introductions were made and affiliations declared.

The Chair reviewed motions made and approved at the last meeting, pointing out changes made by the 802.3 Working Group to TF Motion #7, WG Motion #10 during the closing plenary session of the WG on 15 November 2012. The Chair reviewed all technical motions approved to date.

The Chair reviewed the RF Spectrum, Evaluation Criteria and Requirements, and PHY Link ad hoc committees and noted all were extended until the March 2013 IEEE 802 plenary meeting. The Chair noted that two Sub-Task Forces were formed; TDD Sub-Task Force and PHY Sub-Task Force.

An informal communication was received from Mr. Yao, representing a number of Chinese MSOs. It was noted that this communication was note posted on the Task Force reflector. The Chair distributed this material on the reflector during the meeting. The items brought up in the communication will be addressed during ad hoc committee time during this meeting.

The Chair announced Editor assignments as; Duane Remein (Chief Editor), Marek Hajduczenia (Associate Editor), and Saifur Rahman (Clause Editor). The Task Force confirmed these appointments without objection.

The Chair suggested some time management guidelines to be used by the Task Force. For presentation discussion this includes; Queue to be closed at end of presentation time, 1 question per go at the mic, 2 minutes per question. Discussion on motions and straw polls; limited to 15 min., 2 min per person, 2 times in queue per person, Task Force can extend discussion time by vote. Time management issues should be addressed to the Chair of the session.

Wed. 11:26 AM The Task Force recessed until 12:30 PM.

Wed. 12:35 PM Reconvened. The Task Force followed the presentation agenda previously approved. See the Presentation section for a brief description of each presentation.

Wed. 5:51 PM   The Task Force recessed for the day.

Thurs. Morning Sub-Task Force meetings (see below)

Thurs. 1:35 PM The Chair called the meeting to order.

The Chair asked if there were any objections to a late proposal being added to the agenda, several comments about late proposals were made but there were no strong objections and the agenda was modified to allow the presentations.

The Task Force continued with presentations per the agenda.

Thurs. 5:15 PM the Task Force recessed for the day.

Fri. 9:05 AM the Chair called the meeting to order.

The chair noted that attendees should only sign the attendance book for the current day, no advanced attendance sign-in, no passed sign-ins. The Chair noted that registration for the March meeting closes today. Also registration (including hotel registration) is open for the May meeting. People were also advised to make reservations for the July meeting in Geneva (no reserved hotel block).

The Task Force continued with presentations per the agenda.

Motions # 3, 4, 5, 6, 7, 8 (see Motions section for details).

During the RF Spectrum closing the Task Force briefly discussed Mr. Yao's letter and recommended that the Chair make an informal response to Mr. Yao.

MMP ad hoc committee requested extension and expansion o f scope to include implementation of MMP if the ad hoc agrees that MMP should be supported. The Chair agreed to this proposal.

Motions # 9, 10, 11, 12 (see Motions section for details).

Straw Poll #1 (see Motions section for details).

12:08 AM New Business

The Task Force discussed how to treat late proposals.

The Task Force discussed how to conduct meeting (agenda order, how to solicit support for motions etc.).

Closing

Future Meetings

Interims

May 13 – 17, 2013	The Fairmont Empress Hotel	Victoria, B.C. Canada	Ethernet Alliance
Sep 2 – 6, 2013	York Racecourse	York, UK	ADVA

Plenary's

Mar 18-21 2013	Caribe Royale	Orlando, Florida USA
Jul 14-19 2013	ITU	Geneva, SWITZERLAND
Nov 10-15 2013	Hyatt Regency Dallas	Dallas, Texas USA

The Chair polled the Task Force on future meeting attendance.

Fri. 12:35 PM The Task Force meeting was adjourned by voice vote.

Presentations (listed in order presented)

Presenter   **Title**   **Affiliation**
Description.
Additional authors and affiliations

Steve Shellhammer   ad hoc report: Evaluation Criteria and Requirements   Qualcomm
Five calls were held, minutes posted and an issues list was maintained and updated approximately weekly. One presentation was reviewed. The ad hoc committee discussed delay, jitter, throughput, robustness, and installation support. Five recommendations were made to the Task Force. A short synopsis of communication from Mr. Yao was given.

Steve Shellhammer   ad hoc report: RF Spectrum   Qualcomm
Six calls were held, minutes posted and an issues list was maintained and updated approximately weekly. One presentation was reviewed. The ad hoc committee discussed RF spectrum open issues and specifications for exclusion bands. Six recommendations were made about exclusion sub-bands, and grouping of sub-carriers.

Jorge Salinger   ad hoc report: MMP   Comcast
The objectives and goals of the ad hoc were reviewed. The ad hoc met approximately 15 times. Several presentations were reviewed covering the benefits and possible implementations and complexities of MMP. No conclusions were made due to a lack of consensus. It was suggested that the charter of the ad hoc be expanded to include how MMP would be implemented (agreed by the Task Force Chair).

Ed Boyd   ad hoc report: PHY Link   Broadcom
The ad hoc committee held 7 calls, reviewed 3 presentations took 4 straw polls (these were presented to the Task Force). Discussions included; the number of CNUs supported, time required for link-up, required data rate (rough est. ~1 MHz), and the number of PHY-Link channels. A straw poll consensus is that the PHY Link should use 16QAM, share the same CP and symbol size with data channel. The PHY-Link is expected to work for both FDD and TDD.
Discussion on PAR & Scope followed, in particular about "minimal augmentation". It was suggested that the working group be kept abreast of any "stretching" of the existing PAR & scope. Possible alternatives are; 1) don't do TDD, 2) plead poor wording to the WG & modify PAR/5C as needed, 3) State the market demands TDD and start a different project to address this (new CFI) or 4) ignore issue.

Discussion on compatibility with 1588 and 802.1AS followed. Timing and delay due to TDD should be well publicized with Working Groups potentially impacted.

Duane Remein   **ad hoc report: Channel Model**   **Huawei**
The ad hoc committee held 7 conference call with an average of ~8 attendees on each call. Topics discussed were the parameter list and topology models.

Chair was assumed by Vice Chair while Mark Laubach presented.
Mark Laubach   **Comments on TF process and scope**   **Broadcom**
TF is self assessing, but input from outside, should still be considered. Action taken due to external input should be taken at an appropriate time frame. An issue has been raised about the Task Force scope related to TDD. A new PAR & Criteria may be subject to a larger review audience than previously (support for 802.1AS & 1588v2 required). If PAR & 5 Criteria need modification this should only be done once and needs to be done before going to Working Group Ballot. Need to "do our home work" (i.e., justify reasons for decisions taken & ability to meet 5 criteria).

The Chair was assumed by Mark Laubach.

Andrea Garavaglia   **Multiple Modulation and Coding**   **Qualcomm**
Showed a possible architecture supporting MMP. Briefly touched on control path information exchange. Illustrated changes to MAC Control state diagrams. Compared capacity performance using single profile and MMP using 4 profiles. Performance was assessed using an N+0 plant of known characteristics with a real world traffic profile.
Co-author: Nicola Varanese (Qualcomm)

John Ulm   **MMP Tool for Capacity and Gain Analysis**   **Motorola**
This presentation described the file "tool_ulm_mmp_efficiencies_01a_0113.zip" located in the Tools area.

Marek Hajduczenia   **MMP in EPoC, how hard can it be?**   **ZTE**
Presentation suggested that MMP overly complicates the PHY.

Eugene Dai   **EPoC Ethernet rate hierarchy and rate adaption**   **Cox**
This presentation suggested that EPoC define a specific set usable line rates (i.e., the line rate should not be infinitely variable).

Steve Shellhammer   **Channel Bonding**   **Qualcomm**
This presentation suggested an architecture to achieve channel bonding to allow multiple RF Channels to be bonded in the PHY layer.
Co-authors: Patrick Stupar, Andrea Garavaglia, Nicola Varanese, Christian Pietsch (all from Qualcomm)

Ed Boyd   **Delay / Jitter Performance**   **Broadcom**
Arguments against MMP and Channel bonding including; FEC inefficiencies (due to FEC codeword shortening), GATE delays due to frame sorting, jitter due to frame sorting, etc. A single large pipe was suggested as a solution for channel bonding.

Duane Remein   **Method to reduce DS jitter in EPoC**   **Huawei**
Suggested a way to reduce jitter in an MPP solution where frame sorting is done in the PHY layer.
Co-author: Hesham ElBakoury (Huawei)

Bill Powell   **EPoC System Level Synchronization Transport**   **Alcatel**

This presentation provided a summary of network synchronization requirements for various applications such as mobile backhaul, MEF CES, etc. It also reviewed synchronization distribution using IEEE 1588 and potential problems / solutions for passing synchronization over PON networks.

Andrea Garavaglia   **Data Rate Adaptation for EPoC (baseline proposal)**   **Qualcomm, ZTE**

This presentation proposed additional details, including state diagram modifications, on rate adaptation for both downstream and upstream.
Co-author: Marek Hajduczenia (ZTE)

Hal Roberts   **Multiple Modulation Profiles in the Upstream**   **Calix**

This presentation examined the need and benefit of multiple modulation profiles for the upstream data path.
Co-author: Eugene Dai (Cox)

Thushara Hewavithana Downstream FEC Proposal for EPoC   **Intel**

This presentation proposed using the DVB-C2 FEC. Also included in this presentation was a time interleaver (slide 10-13) but this is not part of the FEC proposal. Mark Laubach said that he was personally aware of potentially essential patents as it is known that DVB-C2 receivers are licensed by Sisvel property holding company (www.sisvel.com).

Rich Prodan   **LDPC FEC Proposal for EPoC**   **Broadcom**

This presentation compared several LDPC FEC codes newer than the DVB-C2 code. The LDPC MOCA 2.0 code was suggested as being good for both upstream and downstream.

Steve Shellhammer   **TDD Sub-Task Force report**   **Qualcomm**

Summary of Sub-Task Force meeting

The Chair was assumed by Steve Shellhammer while Mark Laubach presented.
Mark Laubach   **PHY Sub-Task Force report**   **Broadcom**

Summary of Sub-Task Force meeting

The Chair was assumed by Mark Laubach at the conclusion of the presentation.

See TDD Sub-Task Force meeting minutes for the following presentations:

Andrea Garavaglia   EPoC TDD

See PHY Sub-Task Force meeting minutes for the following presentations:

Leo Montreuil,   OFDM TX Symbol shaping
Avi Kliger,   OFDM Numerology for EPOC
Christian Pietsch   OFDM Numerology
Avi Kliger,   Proposal for PHY Signaling (PHY Link channel numerology)
Nicola Varanese   PHY Link

Motions and Strawpolls

Motion #   1

Motion to approve the minutes from 13-15 November 20912, San Antonio meeting.
Moved: Jorge Salinger
Second: Marek Hajduczenia

Procedural (> 50%)
Motion   Passed by voice without opposition

Motion #2

Move to approve the agenda for this meeting.
Moved: Jorge Salinger
Second: Marek Hajduczenia
Procedural (> 50%)
Motion Passed by voice without opposition

Motion #3

The downstream PHY Link Channel shall use a fixed modulation order of 16 QAM to carry PHY Link information.
Moved: Ed Boyd
Second: Kevin Noll
For: 39
Against: 0
Abstain: 0
Technical (≥75%)
Motion Passed

Motion #4

A CNU shall auto-detect the CP size and sub-carrier spacing of the downstream PHY Link Channel.
Moved: Ed Boyd
Second: Juan Montojo
For: 40
Against: 0
Abstain: 0
Technical (≥75%)
Motion Passed

Motion #5

The downstream PHY Link Channel shall use the same CP size and symbol duration as the data channel.
Moved: Ed Boyd
Second: Eugene Dai
For: 42
Against: 0
Abstain: 0
Technical (≥75%)
Motion Passed

Motion #6

Exclusion sub-bands can be on the lower portion of the OFDM channel, the upper OFDM channel, or within the OFDM channel.
Moved: Jorge Salinger
Second: Bill Keasler
For: 41
Against: 0
Abstain: 0
Technical (≥75%)
Motion Passed

Motion #7

Exclusion sub-bands can be configured by MDIO.
Moved: Duane Remein
Second:
For:
Against:
Abstain:
Procedural (> 50%)
Motion Failed for lack of a second

Motion #8

Adopt the DS Channel model parameter list shown in howald_01a_0113.pdf slides 3-7 as baseline starting point for the Node +4 topology.
Moved: Saifur Rahman
Second: Rob Howald
For: 41
Against: 0
Abstain: 4
Technical (≥75%)
Motion Passed

Motion #9

Consider the "Typical" column in howald_01a_0113.pdf slide 3-7 to be "Baseline plant conditions".
Moved: Jorge Salinger
Second: Rob Howald
For: 21
Against: 9
Abstain: 8
Technical (≥75%)
Motion Failed

Motion #10

Use gravaglia_02a_0113 as a starting point for development of a TDD baseline.
Moved: Jorge Salinger
Second: Juan Montojo
For: 22
Against: 5
Abstain: 11
Technical (≥75%)
Motion Passed

Motion #11

The standard shall define two downstream subcarrier spacings: 25 kHz and 50 kHz.
Moved: Eugene Dai
Second: Matt Schmitt
For: 37
Against: 0
Abstain: 3
Technical (≥75%)
Motion Passed

Motion #12

Adopt slides 9, 12, 13, 14, 15 and 16 of garavaglia_01a_0113.pdf as the starting point for development of a baseline for data rate adaptation function for EPoC.

Moved: Marek Hajduczenia
Second: Andrea Garavaglia
For: 15
Against: 9
Abstain: 16
Technical (≥75%)
Motion Failed

Motion #13

Moved to Adjourn
Moved: Duane Remein
Second: Ed Boyd
Procedural (> 50%)
Motion Passed by voice without opposition

Strawpoll #1

Adopt a data rate hierarchy for EPoC RF PHY. The actual granularity will be further defined.

Yes: 21
No: 0
Too soon to decide: 11

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TDD Sub-Task Force

9:10 AM Called to order by the Chair (Steve Shellhammer)

The chair outlined the duties and responsibilities of the Sub-Task Force (produce technically complete baseline proposals to create a draft specification)

TDD Sub-Task Force Presentations

Mr. Yao   Letter from Mr. Yao
Presented by Hesham ElBakoury. Suggested 64 MHz RF channels.

Andrea Garavaglia   EPoC TDD   Qualcomm
This proposal covered changes to various state diagrams needed to create TDD behavior. State diagrams reviewed included; CLT Control Multiplexer, CLT Control Multiplexer for local (TDD) grant, Gate processing CLT local (TDD) grant Activation (new). It is assumed that the upstream/downstream TDD ratio is relatively static (i.e., provisioned) and that the TDD cycle is communicated via the PHY-Link. Depending on PHY parameters, we may need to extend RTT range and/or REPORT size (amount of reportable time).

TDD Sub-Task Force Open discussion

TTD Functionality
1. Configuration of TDD Cycle
    • Tabulate a set of TTD cycles (depends on PHY)
    • Depends on OFDM symbol duration (symbol and CP), interleaver cycle, FEC code word cycle
    • MDIO to set the cycle in the PHY (at least at CLT)
    • Ensure the PHY Link protocol allows for all possible TDD cycles, for PHY Link discovery
    • PHY to communicate the TDD cycle in PHY Link Channel Descriptor
    • TDD Cycle is propagated periodically to the CNU using the PHY link
2. Modify CLT Multipoint MAC Control
    • Text to state that gate message are restricted for upstream transmission in the immediate upstream window
    • Add transmitAllowed signal
    • Add the list of items from garavaglia_02_0113
3. Make the MAC control client aware of the TDD cycle, by setting registers
4. Text modification for the PHY
    • Signal to PCS to indicate TX/RX switch (do not use real-time signaling from the MAC). Possibly accomplished by using the data detector (extend the state diagram), for CLT
    • Add a new function in the CNU to trigger between receive time and not-receive time
5. Consider supporting the delay registers to support network synchronization (TDD could support time-of-day delivery, it is probably not reasonable for TDD to provide frequency synchronization). Synchronization would apply to both FDD and TDD.

TDD Straw Poll #1

Do you support document garavaglia_02_0113.pdf with the changes suggested during the Thursday AM TDD Sub-Task force meeting, as a starting point for the development of a TDD Baseline?
    Yes 15
    No 0
    Need more detail   0
    Abstain   0

TDD Sub-Task Force Plans

It was agreed that the Sub-Task Force should schedule a weekly on Mondays at 10:00 AM EST for 1 hour. However, this call should be canceled by Friday at 5 PM EST if no presentations have been received by the Chair. Suggested time is.

Thurs. 12:00 PM Sub-Task Adjourned.

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PHY Sub-Task Force

Thursday 1/24 8:59 AM meeting called to order by the Chair (Mark Laubach)
Chair said that Victor Hou has volunteered to be Recording Secretary for this Sub-Task force session.
Chair circulated physical attendance book.

Presentation: OFDM TX Symbol Shaping
Presenter: Leo Montreuil (Broadcom)

Presentation: OFDM Numerology
Presenter: Avi Kliger (Broadcom)

Presentation: OFDM Numerology
Presenter: Christian Pietsch (Qualcomm)

Chair reminds group that any concerns and issues related to impairments should be fed into Channel Model ad hoc committee.
Chair called for 10-minute break at 10:49 AM.
Session resumed at 11:00 AM

Presentation: Proposal for PHY Signaling
Presenter: Avi Kliger (Broadcom)

Presentation: PHY Link
Presenter: Nicola Varanese (Qualcomm)

Chair said to please get back from lunch at 1:30 PM.
Chair reminded people to check email for updates to contributions.
Chair reminded people to socialize potential motions before Friday morning.
Session ended at 12:26 PM.

Meeting Attendance

The following represents the meeting attendance as initialed in the attendance binder that was passed around the meeting each day. 56 individuals indicated their attendance for this meeting.

Lastname	**Firstname**	**Affiliation**	**Wed**	**Thu**	**Fri**
Allard	Michel	Cogeco Cable	X	X	X
Anglade	Ony	Cox Communications	X	X	
Arunarthi	Venkat	Cortina Systems	X	X	X
Barr	David	Entropic Communications	X	X	X
Bevilacqua	John	Comcast	X	X	
Boyd	Ed	Broadcom	X	X	X
Braun	Ralf-Peter	Deutsche Telekom			X
Brophy	Tim	Cisco	X	X	X
Brown	Alan	Aurora Networks	X	X	X
Chang	Xin	Huawei		X	
Cooper	William	Self	X	X	X
Dai	Eugene	Cox	X	X	X
Darling	Mike	Shaw Cable	X	X	X
Dickinson	John	Bright House Networks	X	X	
ElBakoury	Hesham	Huawei	X	X	X
Emmendorfer	Michael	ARRIS	X	X	X
Garavaglia	Andrea	Qualcomm	X	X	X
Guangseng	Wu	Huawei	X	X	X
Hajduczenia	Marek	ZTE Corp	X	X	X
Hewaviathana	Thushara	Intel	X	X	X
Hou	Victor	Broadcom	X	X	X
Howald	Robert	Motorola Mobility	X	X	X
Jain	Rajeev	Qualcomm	X	X	X
Kasturia	Sanjay	Qualcomm	X	X	
Keasler	Bill	Ikanos Communications	X	X	X
Kinnard	Brian	Commscope	X	X	X

Lastname	Firstname	Affiliation	Wed	Thu	Fri
Kliger	Avi	Broadcom	X	X	X
Knittle	Curtis	CableLabs	X	X	X
Ko	Dylan	Qualcomm	X	X	X
Kolze	Tom	Broadcom	X	X	X
Laubach	Mark	Broadcom	X	X	X
Law	David	HP		X	X
Lessard	Anore	Commscope	X	X	
Liu	Alex	Qualcomm	X	X	
Mallette	Edwin	Bright House Networks	X	X	X
Montojo	Juan	Qualcomm	X	X	X
Montreuil	Leo	Broadcom	X	X	X
Ng	Lup	Cortina Systems	X	X	X
Noll	Kevin	Time Warner Cable	X	X	X
Pietsch	Christian	Qualcomm	X	X	X
Powell	Bill	Alcatel-Lucent	X	X	X
Prodan	Rich	Broadcom		X	X
Rahman	Saifur	Comcast	X	X	X
Remein	Duane	Huawei	X	X	X
Roberts	Hal	CALIX	X	X	X
Salinger	Jorge	Comcast	X	X	X
Schmitt	Matt	CableLabs	X	X	X
Seidenberg	Juergen	BKtel	X	X	
Shellhammer	Steve	Qualcomm	X	X	X
Shen	BZ	Broadcom	X	X	X
Solomon	Joe	Comcast	X	X	X
Staniec	Thomas	Cohere Networks	X	X	X
Tanaka	Keiji	KDDI	X	X	X
Thaler	Patricia	Broadcom		X	X

Lastname	Firstname	Affiliation	Wed	Thu	Fri
Ulm	John	Motorola Mobility	X	X	X
Varanese	Nicola	Qualcomm	X	X	X