Agenda and General Information

IEEE P802.3bn EPoC PHY Task Force

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Geneva, Switzerland,

September 27th - 28th, 2012

Agenda

- <<*Appointment of Recording Secretary*>>
- <<*Confirmation of Chair*>>
- Welcome and Introductions
- Approve Agenda
- Approve July 17/18 Minutes
- Goals for this meeting
- Reflector and Web
- Ground Rules
- IEEE
  - Structure, Bylaws and Rules
  - Call for Patents
  - Affiliation
  - IEEE Standards Process
- Liaisons and Communications
- Objectives Review
- Reflector use and Ad Hoc overview
- Presentations
- Timeline, Motions, and Closing Business
- Future Meetings

Task Force Decorum

- Photography or recording by permission only (2010 SASB Op Manual 5.3.3.4)
- Cell phone ringers off
- Press (i.e., anyone reporting publicly on this meeting) are to announce their presence (5.3.3.5)
- Wear your badges at all times in meeting areas
  - Help the hotel security staff improve the general security of the meeting rooms
  - **PCs HAVE BEEN STOLEN** at previous meetings
  - **DO NOT** assume that meeting areas are secure
- Please observe proper decorum in meetings

Goals for the meeting

- Adopt a timeline
- Document framework introduction
- Identify any project areas
  - Including plan for Channel Model

- Lay the ground work for the next meeting

Reflector and Web

- To subscribe to the EPoC reflector, send an email to:

    ListServ@ieee.org

    with the following in the body of the message (do not include "<>"):

    subscribe **stds-802-3-epoc** *<yourfirstname> <yourlastname>*

    end

- Send EPoC reflector messages to:

    stds-802-3-epoc@*listserv.ieee.org*

- Task Force web page URL:

    http://www.ieee802.org/3/bn

Task Force Private Area

- URL: http://www.ieee802.org/3/bn/private
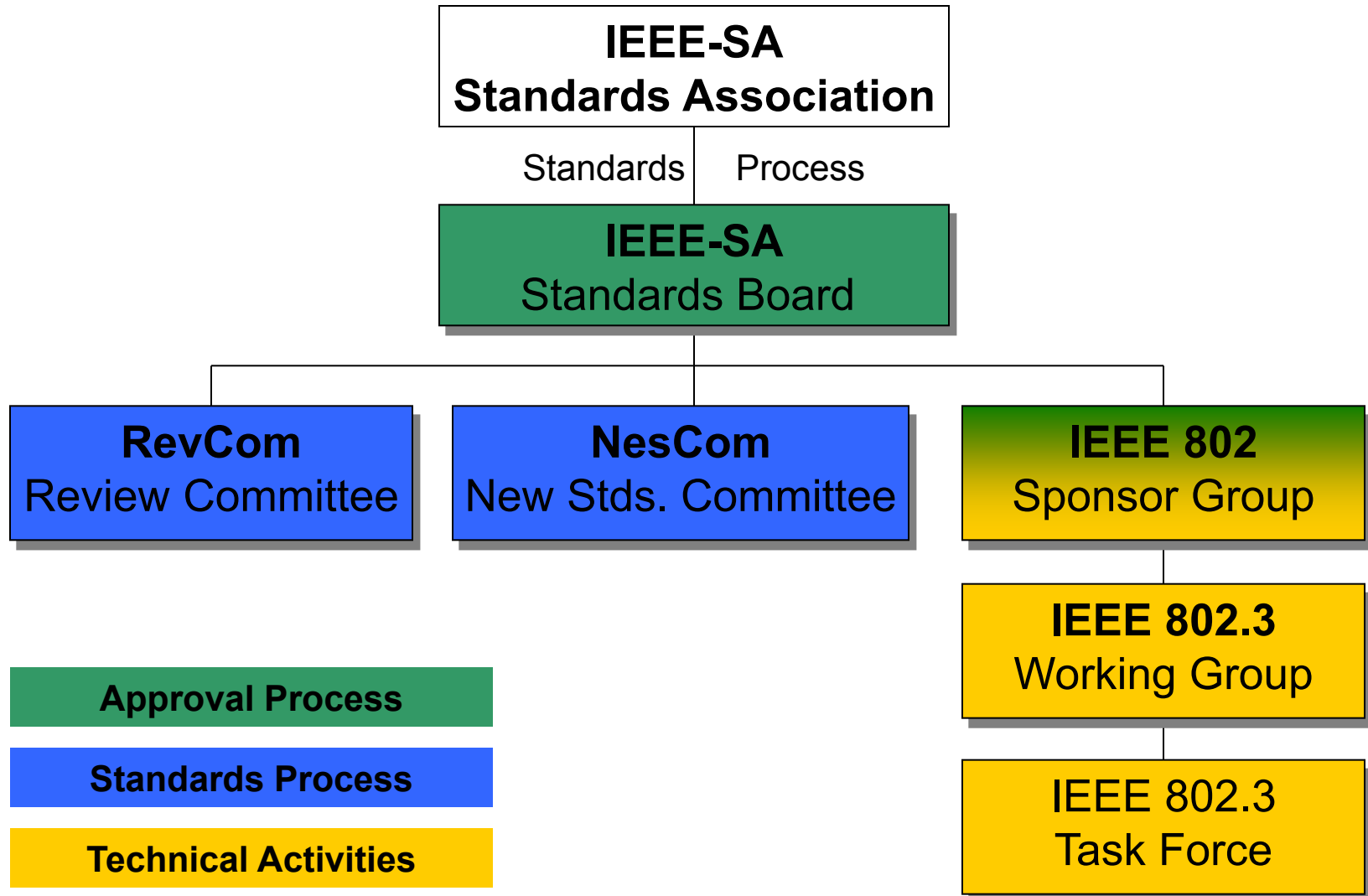 - Username: 802.3bn
  - Password: xxxx

- There are no private documents at this time
- Expected use: Task Force drafts

Ground Rules

- Based upon IEEE 802.3 Rules
  - Foundation based upon Robert's Rules of Order
  - Anyone in the room may speak
  - Anyone in the room may vote
- **RESPECT**… give it, get it
- NO product pitches
- NO corporate pitches
- NO prices!!!
  - This includes costs, ASPs, etc. no matter what the currency
- NO restrictive notices

IEEE Structure

IEEE-SA
Standards Association

Standards | Process

IEEE-SA
Standards Board

RevCom
Review Committee

NesCom
New Stds. Committee

IEEE 802
Sponsor Group

IEEE 802.3
Working Group

IEEE 802.3
Task Force

Approval Process

Standards Process

Technical Activities

Important Bylaws and Rules

- **IEEE-SA Operations Manual**
  http://standards.ieee.org/sa/sa-om.pdf

- **IEEE-SA Standards Board Bylaws**
  http://standards.ieee.org/guides/bylaws/sb-bylaws.pdf

- **IEEE-SA Standards Board Operations Manual**
  http://standards.ieee.org/guides/opman/sb-om.pdf

- **IEEE 802 LAN/MAN Standards Committee (LMSC) Policies and Procedures**
  http://standards.ieee.org/about/sasb/audcom/pnp/LMSC.pdf

- **IEEE 802 LAN/MAN Standards Committee (LMSC) Operations Manual**
  http://www.ieee802.org/PNP/2010-07/IEEE_802_LMSC_OM_approved_100716.pdf

- **IEEE 802 LAN/MAN Standards Committee (LMSC) Working Group (WG) Policies and Procedures**
  http://www.ieee802.org/PNP/2010-07/IEEE_802_LMSC_WG_PandP_approved_100716.pdf

- **IEEE 802.3 Working Group Operating Rules**
  http://ieee802.org/3/rules/P802_3_rules.pdf

Instructions for the WG Chair

The IEEE-SA strongly recommends that at each WG meeting the chair or a designee:

- **Show slides #1 through #4 of this presentation**
- **Advise the WG attendees that:**
  - The IEEE's patent policy is consistent with the ANSI patent policy and is described in Clause 6 of the *IEEE-SA Standards Board Bylaws*;
  - Early identification of patent claims which may be essential for the use of standards under development is strongly encouraged;
  - There may be Essential Patent Claims of which the IEEE is not aware. Additionally, neither the IEEE, the WG, nor the WG chair can ensure the accuracy or completeness of any assurance or whether any such assurance is, in fact, of a Patent Claim that is essential for the use of the standard under development.

- **Instruct the WG Secretary to record in the minutes of the relevant WG meeting:**
  - That the foregoing information was provided and that slides 1 through 4 (and this slide 0, if applicable) were shown;
  - That the chair or designee provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) of which the participant is personally aware and that may be essential for the use of that standard
  - Any responses that were given, specifically the patent claim(s)/patent application claim(s) and/or the holder of the patent claim(s)/patent application claim(s) that were identified (if any) and by whom.

- The WG Chair shall ensure that a request is made to any identified holders of potential essential patent claim(s) to complete and submit a Letter of Assurance.
- It is recommended that the WG chair review the guidance in *IEEE-SA Standards Board Operations Manual* 6.3.5 and in FAQs 12 and 12a on inclusion of potential Essential Patent Claims by incorporation or by reference.

  Note: **WG** includes Working Groups, Task Groups, and other standards-developing committees with a PAR approved by the IEEE-SA Standards Board.

25 March 2008 (updated 29 March 2011)

IEEE

(Optional to be shown)

Participants, Patents, and Duty to Inform

All participants in this meeting have certain obligations under the IEEE-SA Patent Policy.

- **Participants [Note: Quoted text excerpted from IEEE-SA Standards Board Bylaws subclause 6.2]:**
  - **"Shall inform the IEEE (or cause the IEEE to be informed)" of the identity of each "holder of any potential Essential Patent Claims of which they are personally aware" if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents**
    - **"Personal awareness" means that the participant "is personally aware that the holder may have a potential Essential Patent Claim," even if the participant is not personally aware of the specific patents or patent claims**
  - **"Should inform the IEEE (or cause the IEEE to be informed)" of the identity of "any other holders of such potential Essential Patent Claims" (that is, third parties that are not affiliated with the participant, with the participant's employer, or with anyone else that the participant is from or otherwise represents)**
- **The above does not apply if the patent claim is already the subject of an Accepted Letter of Assurance that applies to the proposed standard(s) under consideration by this group**
- **Early identification of holders of potential Essential Patent Claims is strongly encouraged**
- **No duty to perform a patent search**

◈IEEE

Patent Related Links

All participants should be familiar with their obligations under the IEEE-SA Policies & Procedures for standards development.

Patent Policy is stated in these sources:

IEEE-SA Standards Boards Bylaws

http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#6

IEEE-SA Standards Board Operations Manual

http://standards.ieee.org/develop/policies/opman/sect6.html#6.3

Material about the patent policy is available at

http://standards.ieee.org/about/sasb/patcom/materials.html

If you have questions, contact the IEEE-SA Standards Board Patent Committee Administrator at patcom@ieee.org or visit http://standards.ieee.org/about/sasb/patcom/index.html

This slide set is available at https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.ppt

IEEE

25 March 2008 (updated 29 March 2011)

Call for Potentially Essential Patents

- If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance:

  - Either speak up now or
  - Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible or
  - Cause an LOA to be submitted

◆IEEE

Other Guidelines for IEEE WG Meetings

- **All IEEE-SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.**

  - **Don't discuss the interpretation, validity, or essentiality of patents/patent claims.**

  - **Don't discuss specific license rates, terms, or conditions.**

    - Relative costs, including licensing costs of essential patent claims, of different technical approaches may be discussed in standards development meetings.

      - Technical considerations remain primary focus

  - **Don't discuss or engage in the fixing of product prices, allocation of customers, or division of sales markets.**

  - **Don't discuss the status or substance of ongoing or threatened litigation.**

  - **Don't be silent if inappropriate topics are discussed … do formally object.**

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See *IEEE-SA Standards Board Operations Manual*, clause 5.3.10 and "Promoting Competition and Innovation: What You Need to Know about the IEEE Standards Association's Antitrust and Competition Policy" for more details.
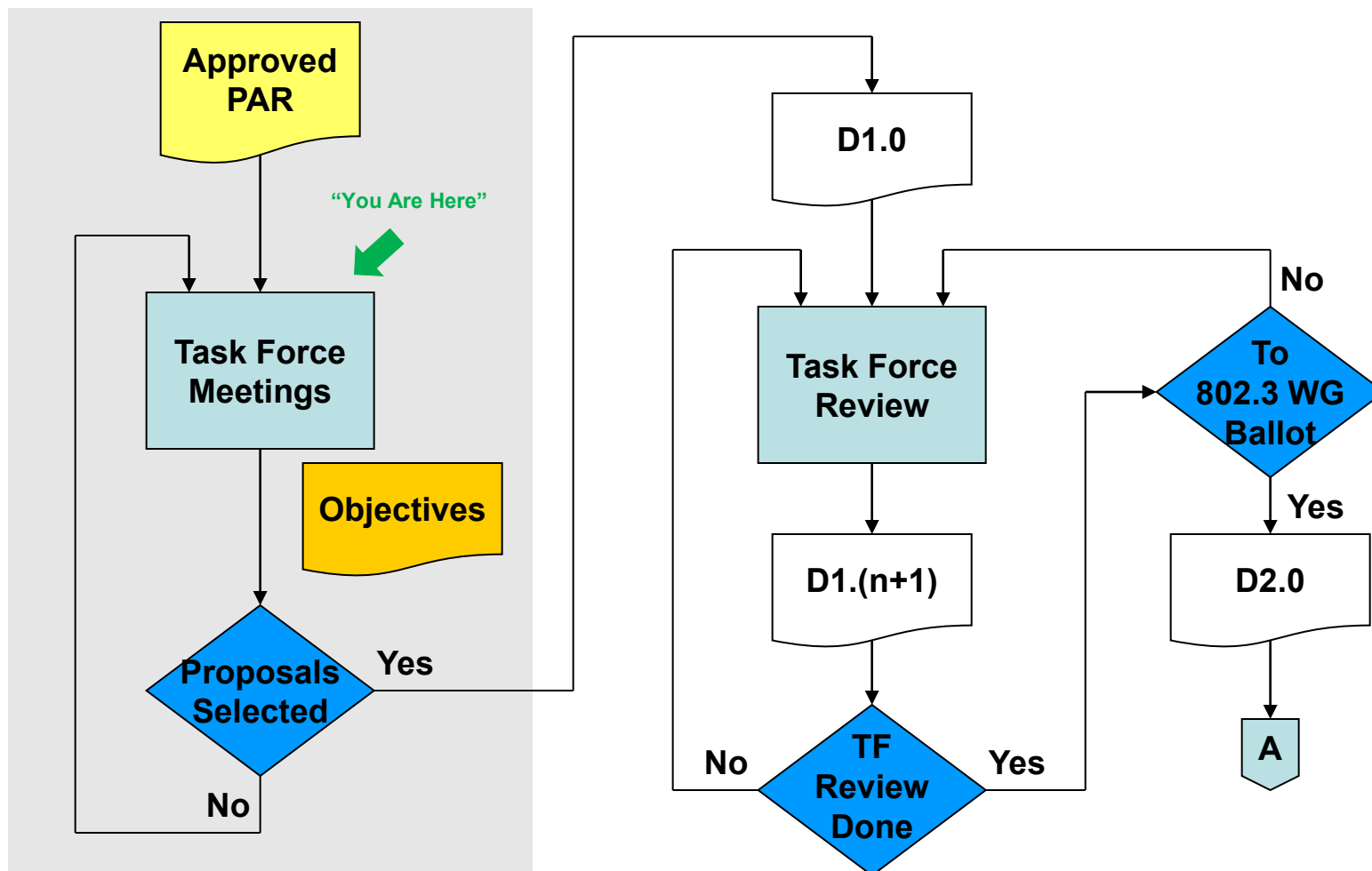
◆IEEE

Affiliation

- IEEE-SA Standards Board By-Laws, Section 5.2.1.5
    - (http://standards.ieee.org/guides/bylaws/sect5.html)
- Disclosure of Affiliation
    - "Every member and participant in a working group, Sponsor ballot, or other standards development activity shall disclose his or her affiliation."
- What is "Affiliation"
    - "An individual is deemed "affiliated" with any individual or entity that has been, or will be, financially or materially supporting that individual's participation in a particular IEEE standards activity. This includes, but is not limited to, his or her employer and any individual or entity that has or will have, either directly or indirectly, requested, paid for, or otherwise sponsored his or her participation."
- Affiliation and participation
    - "Failure to disclose every such affiliation may result in complete or partial loss of rights to participate in IEEE-SA activities. An individual is not excused from compliance with this policy by reason of any claim of a conflicting obligation (whether contractual or otherwise) that prohibits disclosure of affiliation."

Overview of IEEE 802.3 Standards Process (1/5)- Study Group Phase
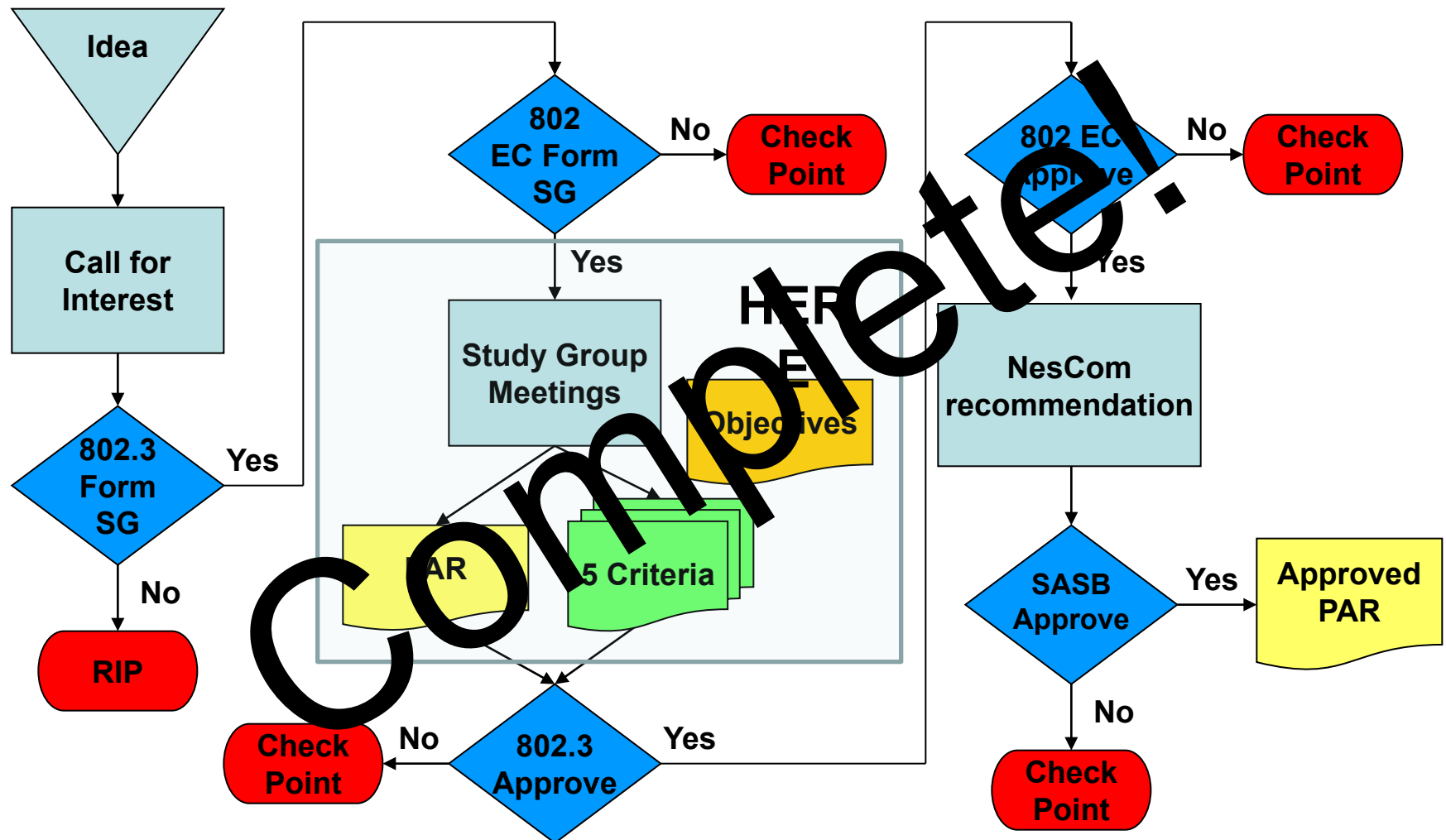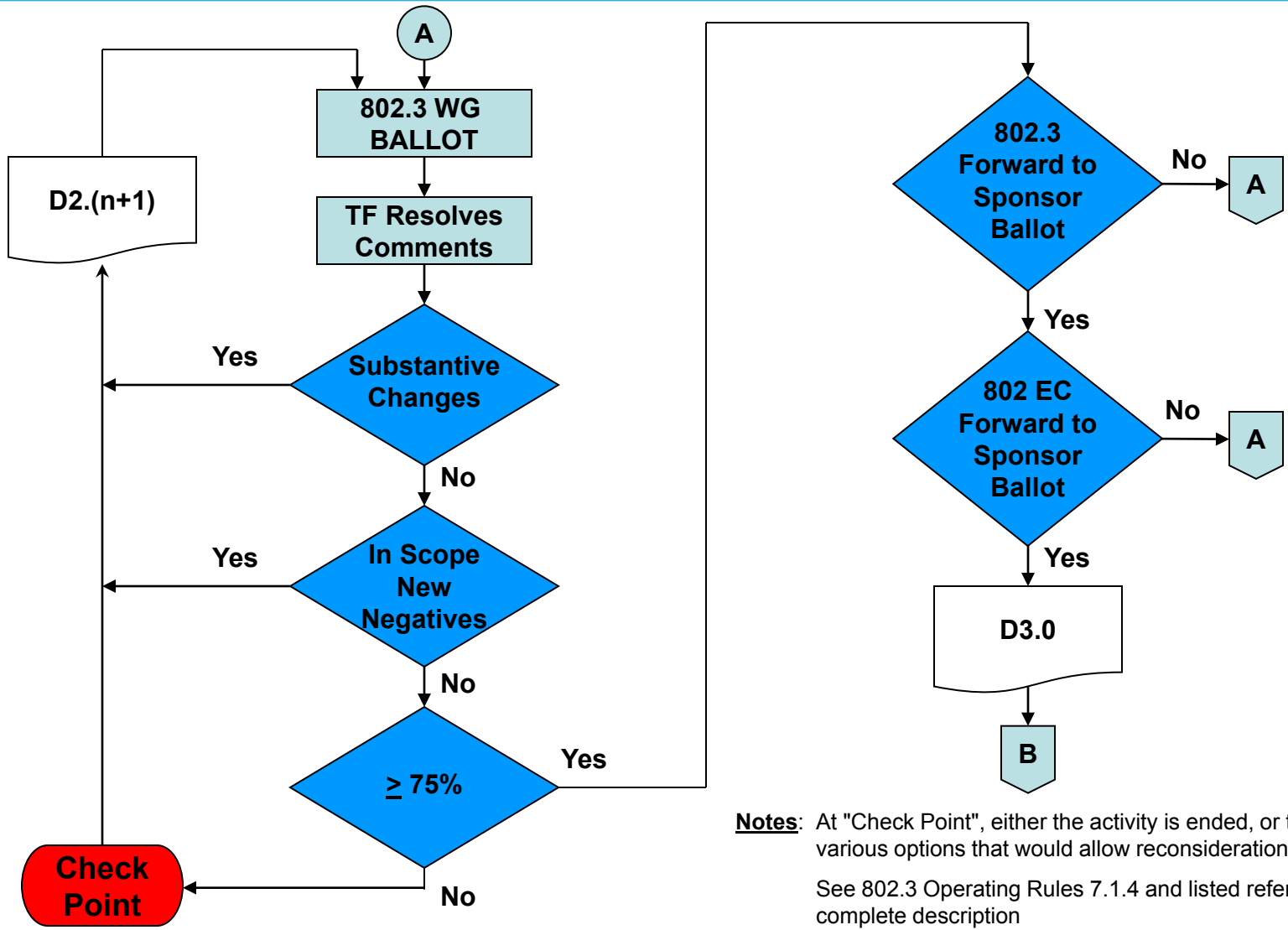

Note: At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

Overview of IEEE 802.3 Standards Process (2/5) – Task Force Comment Phase
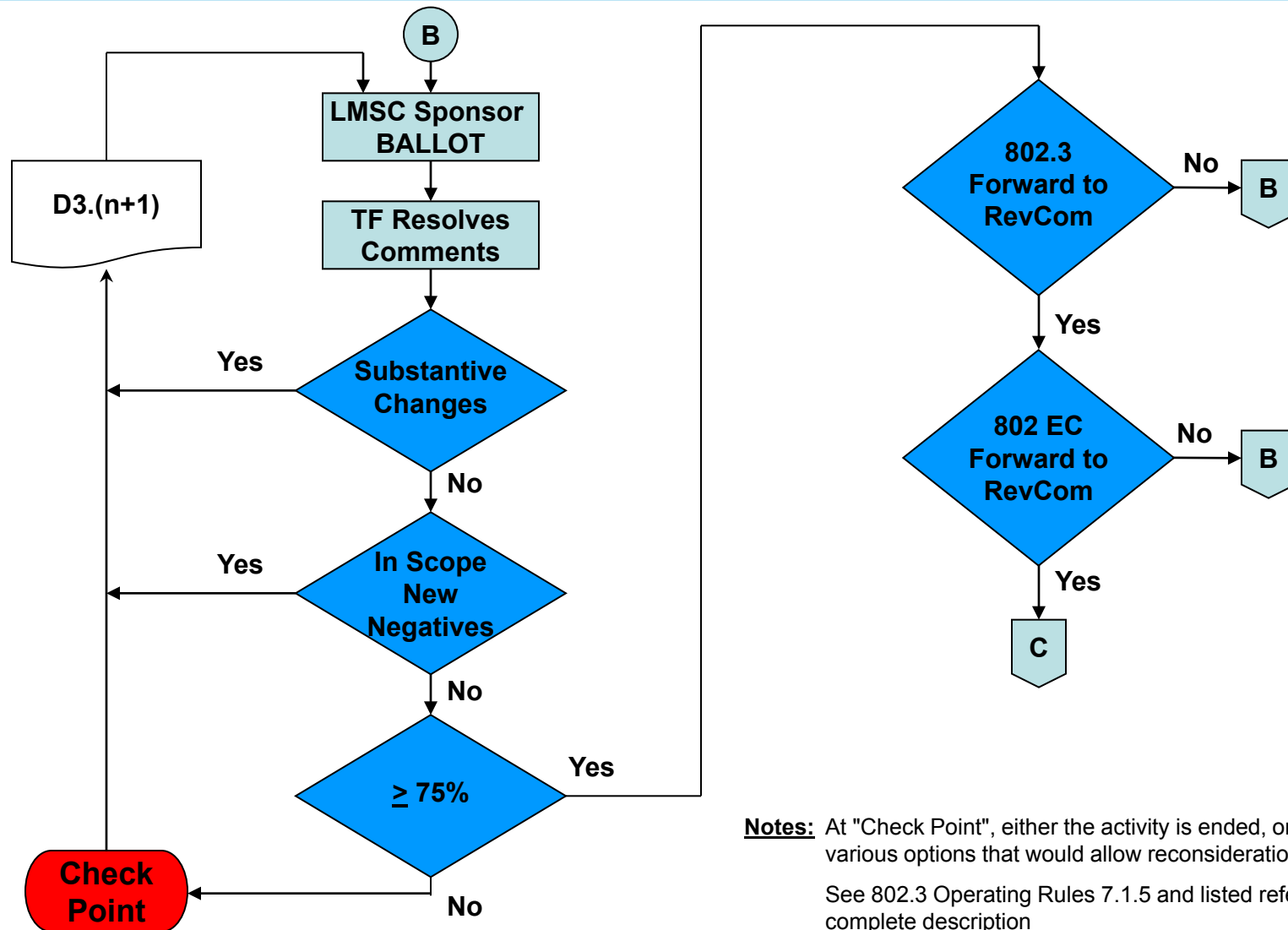
Notes: At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

See 802.3 Operating Rules 7.1.4 and listed references for complete description

Overview of IEEE 802.3 Standards Process (4/5)- Sponsor Ballot Phase
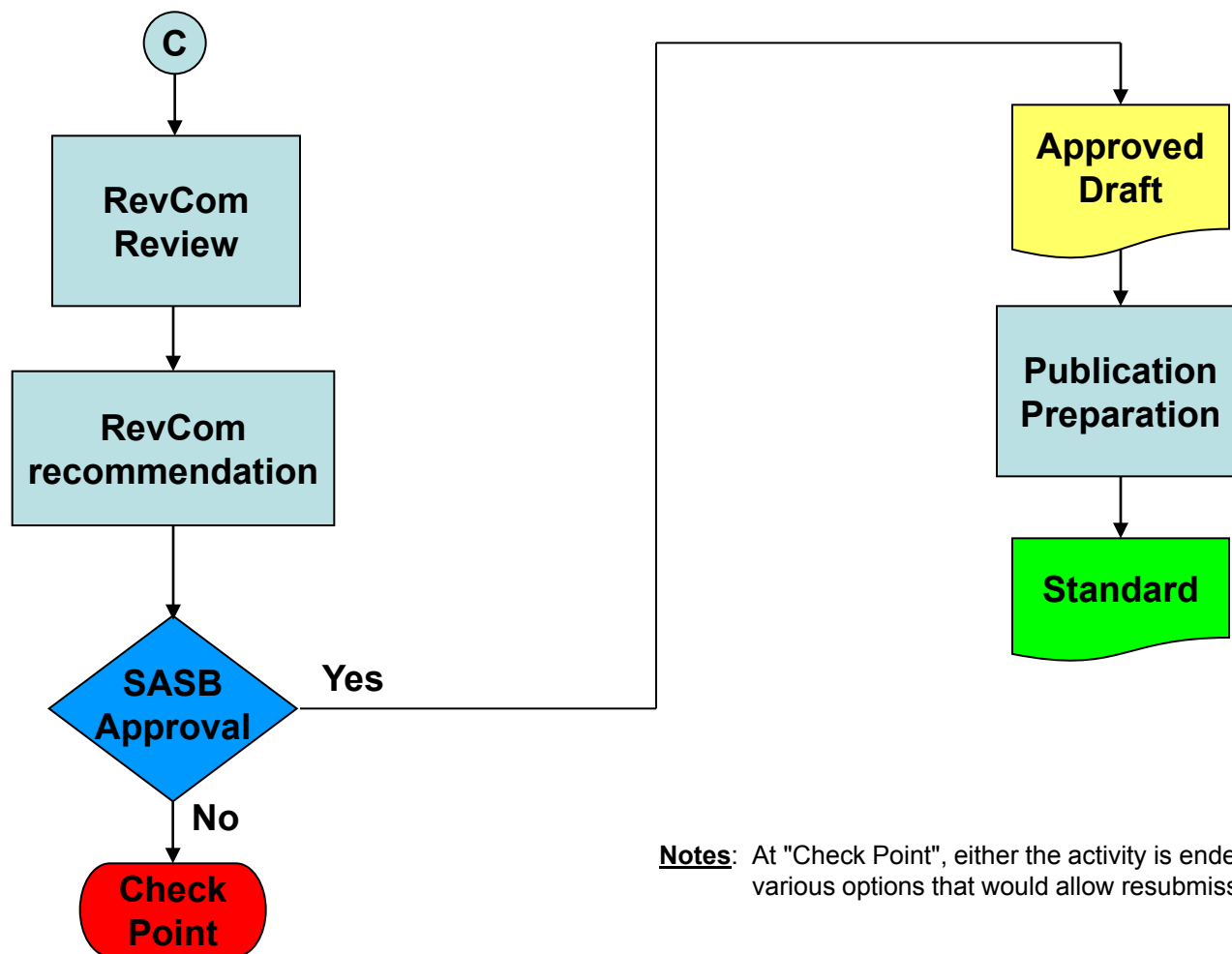

Notes: At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

See 802.3 Operating Rules 7.1.5 and listed references for complete description

Overview of IEEE 802.3 Standards Process (5/5) – Final Approvals / Standard Release

Notes: At "Check Point", either the activity is ended, or there may be various options that would allow resubmission for approval.

IEEE P802.3bn EPoC PHY Approved Project Documents

- ## PAR

  - http://www.ieee802.org/3/bn/P802_3bn_PAR_300812_approved.pdf

- ## 5 Criteria

  - http://www.ieee802.org/3/bn/EPoC_5Criteria_200712_approved.pdf

- ## Objectives

  - http://www.ieee802.org/3/bn/EPoC_objectives_190712_approved.pdf

IEEE P802.3bn EPoC Objectives

- Specify a PHY to support subscriber access networks capable of supporting burst mode and continuous mode operation using the EPON protocol and operating on point-to-multipoint RF distribution plants comprised of either amplified or passive coaxial media.

- Maintain compatibility with 1G-EPON and 10G-EPON, as currently defined in IEEE Std. 802.3 with minimal augmentation to MPCP and/or OAM if needed to support the new PHY.

- Define required plant configurations and conditions within an overall coaxial network operating model.

IEEE P802.3bn EPoC Objectives

- Provide a physical layer specification that is capable of:
  - A baseline data rate of 1 Gb/s at the MAC/PLS service interface when transmitting in 120 MHz, or less, of assigned spectrum under defined baseline plant conditions;
  - A data rate lower than the baseline data rate when transmitting in less than 120 MHz of assigned spectrum or under poorer than defined plant conditions;
  - A data rate higher than the 1Gb/s baseline data rate and up to 10 Gb/s when transmitting in assigned spectrum and in channel conditions that permit.

- PHY to support symmetric and asymmetric data rate operation.

IEEE P802.3bn EPoC Objectives

- PHY to support symmetric and asymmetric spectrum assignment for bidirectional transmission.

- PHY to support independent configuration of upstream and downstream transmission operating parameters.

- PHY to operate in the cable spectrum assigned for its operation without causing harmful interference to any signals or services carried in the remainder of the cable spectrum.

- PHY to have:
  - a downstream frame error ratio better than 10^{-6} at the MAC/PLS service interface;
  - an upstream frame error ratio better than 5×10^{-5} at the MAC/PLS service interface.

Chartered Ad Hoc

- Created (dissolved) by the TF Chair at anytime
- Specifically chartered with:
  - Name, purpose/deliverables, time length, Chair, other guidelines
- Meets at/between Task Force meetings to build consensus
- Each Ad Hoc meeting shall follow similar requirements
  - The Ad Hoc Chair facilitates process at meetings
  - Meeting announced in advance, prefer 7 days, recurring schedule optimal
  - Simple minutes due at end of every meeting: start/stop time, IEEE patent policy review confirmation, list of attendees
  - Consensus building limited to straw polls
  - Status report update at each TF meeting
- Expected output
  - Report, recommendations, documentation, tools, etc. from the Ad Hoc

- NOTE: investigating WebEx conference support

Presentation – Best Effort

- Late presentation request for consideration of being placed on the presentation schedule

Additional "Best Effort" Requests			Length
Marek Hajduczenia	ZTE	(Major) challenges ahead for EPoC	0:30

Presentations - Thursday

Thursday, September 27			Length	Time	Filename
David Law, Mark Laubach	HP, Broadcom	Agenda and General Information	1:00	**9:00 AM**	agenda_rev1_0912.pdf
Marek Hajduczenia	ZTE	Baseline Proposals for EPoC TF - the WHAT and the WHY	0:20	10:35 AM	hajduczenia_03_0912.pdf
Break			0:10	10:55 AM	
Jorge Salinger	Comcast	Developing the EPoC System and Device Specifications as a CL/MSO effort	0:20	11:05 AM	salinger_01_0912.pdf
Eugene Dai	Cox	Bandwidth Assignment method for EPOC	0:30	11:25 AM	dai_01_0912.pdf
Duane Remein	Huawei	EPoC Discover & Registration	0:20	11:55 AM	remein_01_0912.pdf
Lunch			1:00	12:15 PM	
Ed Boyd, Avi Kliger	Broadcom	EPoC PHY Link and Auto-Negotiation	0:30	1:30 PM	boyd_01_0912.pdf
Ed Boyd, Randy Sharpe, John Ulm, Rob Howald	Broadcom, Alcatel-Lucent, Motorola	EPoC Downstream Bonding	0:40	2:00 PM	boyd_02_0912.pdf
Andrea Garavaglia, Christian Pietsch	Qualcomm	OFDMA PHY for EPoC: a Baseline Proposal	0:55	2:40 PM	garavaglia_01_0912.pdf
Break			0:15	3:45 PM	
Nicola Varanese, Andrea Garavaglia	Qualcomm	Solutions for a flexible dual-mode TDD/FDD physical layer in EPoC (TDD feasibility Part II)	0:55	4:10 PM	varanese_02_0912.pdf
Andrea Garavaglia, Ed Boyd, Rick Li, Bill Powell, Hesham ElBakoury, David Barr	Qualcomm, Broadcom, Cortina, Alcatel-Lucent, Huawei, Entropic	EPoC Performance Model – Delay and Efficiency	0:55	5:05 PM	garavaglia_02_0912.pdf
Break			0:10	6:00 PM	
Andrea Garavaglia	Qualcomm	Spreadsheet for EPoC Performance Model – Delay and Efficiency	0:15	6:10 PM	garavaglia_03_0912.zip
Steve Shellhammer, Hesham ElBakoury	Qualcomm, Huawei	EPoC RF Bandwidth Task Force Choices	0:45	6:25 PM	shellhammer_01_0912.pdf
Marek Hajduczenia	ZTE	Baseline Proposals for EPoC TF	0:40	7:10 PM	hajduczenia_04_0912.pdf
~~Marek Hajduczenia~~	~~ZTE~~	~~Ask to present: (Major) challenges ahead for EPoC~~	~~0:30~~	~~7:50 PM~~	~~hajduczenia_07_0912.pdf~~
Break for Day				8:20 PM	

Presentations - Friday

Friday, September 28			Length	Time	Filename
Steve Shellhammer, Juan Montojo	Qualcomm	EPoC FDD Downstream RF Bandwidth – A Baseline Proposal	0:45	**8:15 AM**	shellhammer_02a_0912.pdf
Christian Pietsch, David Barr	Qualcomm, Entropic	Forward Error Correction – A Baseline Proposal	0:45	9:05 AM	pietsch_01a_0912.pdf
Nicola Varanese and Andrea Garavaglia	Qualcomm	Analysis on estimated SNR values on a generic cable plant	0:30	9:50 AM	varanese_01_0912.pdf
		Break	0:15	10:20 AM	
Marek Hajduczenia, John Dickinson, Kevin Noll, Mike Bennett, Wael Diab	ZTE, Brighthouse Networks, Time Warner Cable, Lawrence Berkeley National Labs, Broadcom	Power Saving for EPoC	0:20	10:40 AM	hajduczenia_05a_0912.pdf
Avi Kliger	Broadcom	OFDM Symbol size considerations for EPoC	0:55	11:20 AM	kliger_02a_0912.pdf
Avi Kliger, Leo Montreuil	Broadcom	Baseline Proposal For EPoC PHY	0:55	11:50 AM	kliger_01a_0912.pdf
		Lunch	1:00	12:45 PM	
Rich Prodan, Avi Kliger, Tom Kolze, BZ Shen	Broadcom	FEC for EPoC PHY	0:30	1:45 PM	prodan_01c_0912.pdf
Lup Ng	Cortina	MPCP Extensions for EPoC	0:30	2:15 PM	ng_01a_0912.pdf
Hesham Elbakoury	Huawei	Adaptive Bit Loading	0:30	2:45 PM	elbakoury_01_0912.pdf
		Break	0:15	3:15 PM	
Hesham Elbakoury	Huawei	Efficiency Considerations for EPoC PHY Design	0:30	3:30 PM	elbakoury_02_0912.pdf
Mark Laubach	Broadcom	Timeline, Straw Polls, Motions, Next Meeting	2:00	4:00 PM	
Adjourn				6:00 PM	

Attendance

- Tutorial Material on attendance tool
  - http://ieee802.org/3/minutes/mar11/0311_imat.pdf

- URL (Valid for this meeting only)
  - URL: https://imat.ieee.org
  - IEEE account login and password required
  - Sign in to "Attendance Tool"
  - Session password: "ituhost"

IEEE P802.3bn Timeline (Aggressive)

PAR Dates:
Sponsor: 11/2013
RevCom: 8/2014

Assumes no hiccups, no delays,
Highly Optimized to achieve fastest
possible schedule.

Requires: Channel Model complete and
adopted by Task Force at Nov 2012 plenary
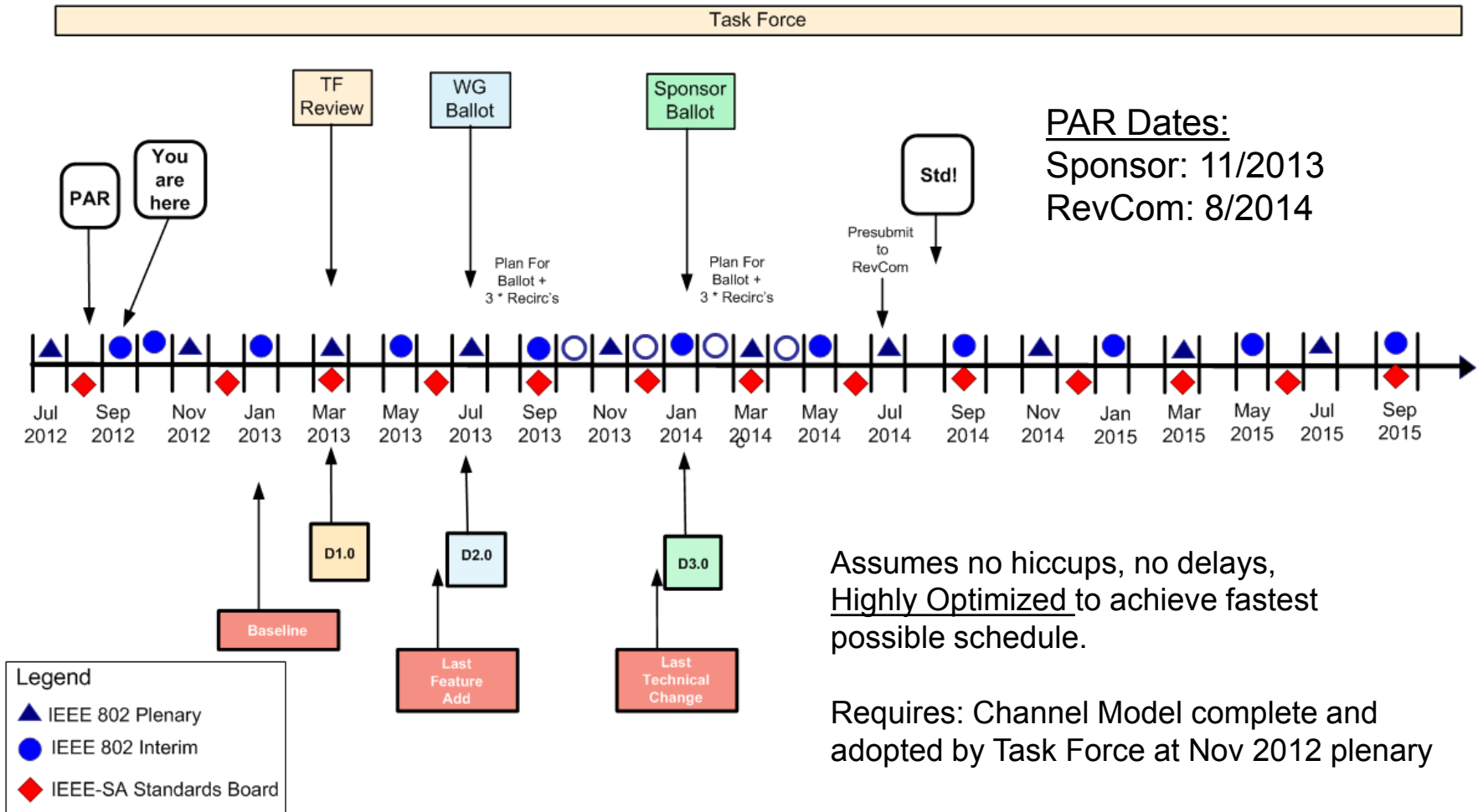
Consensus Challenge Items

- RF Bandwidth (RF Spectrum) *
- FDD Downstream is OFDM/OFDMA
- Bonding approach for downstream
- Rate adaptation, which layer and how
- FEC / Interleaving (error performance) (req: channel model)
- MPCP Changes
- Adaptive Bit Rate Loading
- PHY Link *
- Complexity of hardware scaling with "bandwidth"
- How we are going to do TDD
- Coding Efficiency gains vs cost
- Synchronization in terms of time / frequency (mobile backhaul)

- OFDM Numerology / FFT Size / Symbol Size / CP size (req: channel model)
- Framing Structure
- MAC layer efficiency
- PHY layer efficiency
- Energy Efficiency
- Subcarrier group

Low Hanging Fruit

- Downstream OFDM

- Upstream OFDMA

- Downstream LDPC

- Upstream LDPC

- Support for exclusion subbands (one or more subcarriers)

- Multiple modulation orders up to 4096QAM (either/both direction)

- In the downstream use OFDM blocks of 192MHz with FFT block frequency multiple of 10.24 MHz

- Support for multiple OFDM blocks for higher capacity

Ad Hoc on RF Spectrum

- Ad Hoc name: RF Spectrum

- Ad Hoc chair: Steve Shellhammer

- Time: until November 2012 plenary, extension possible

- Purpose/deliverables for November 2012 plenary
  - Continue work as started in shellhammer_01_0912.pdf
  - Contribute baseline recommendations on RF spectrum issues such as:
    - RF spectral allocation sizes, spectral mask(s), adjacent legacy service (e.g. analog and digital channel) operation requirements for non-interference, spurious noise emission requirements, symmetric and asymmetric spectrum assignment, etc.

- Notes:
  - RF frequency use consistent with Channel Model
  - Review relevant sections of CableLabs PHY/DRFI specifications for similar approaches

Ad Hoc on Evaluation Criteria

- Ad Hoc name: Evaluation Criteria and Requirements
- Ad Hoc chair: Steve Shellhammer
- Time: until January 2013 interim, extension possible
- Purpose/deliverables for November 2012 plenary
  - Recommendations for TF consideration for building "Informal Objectives" and other evaluation criteria and requirements used by the TF in technology selection consensus process, may include tools.
  - MSO requirements
- Notes:
  - Does not duplicate Channel Model activities
  - Review prior SG contributions and carry forward any essential informal objective, evaluation criteria, or requirements in recommendations

Ad Hoc on PHY Link

- Ad Hoc name: PHY Link

- Ad Hoc chair: Ed Boyd

- Time: until November 2012 plenary, extension possible

- Purpose/deliverables for November 2012 plenary

  – Recommendations for TF consideration for PHY Link "auto-negotiation" and "discovery".

Ad Hoc on Channel Model

- Ad Hoc name: Channel Model
- Ad Hoc chair: Duane Remein
  Channel model editor: Saifur Rahman
- Time: until Working Group ballot, extension possible
- Purpose/deliverables for November 2012 plenary
  - Channel Model recommendation for Task Force, including
    - "The Model", "How to use" documentation, Any tools, templates, etc.
  - Maintains / updates Channel Model for TF use
- Other requirements
  - Does not create "The Model"
  - Act's as focus for input from MSOs: e.g.,
    - North American
    - European
    - China
  - Evaluate need/desire for a channel model informative annex

Future IEEE P802.3bn Meetings

- See: http://www.ieee802.org/3/interims/index.html

- October 28th & 29th, 2012 - Interim, TF-only no other 802.3 meetings
  - Hangzhou, China
- November 11th -16th, 2012 - 802 Plenary
  - San Antonio, Texas
- January week of 21st, 2013 - 802.3 Interim
  - T. B. D.

- Anyone interested in hosting a interim meeting contact me or the IEEE 802.3 Executive Secretary Steve Carlson.

October 28th & 29th, 2012 - Interim

- Hangzhou, China

- Hosted by Huawei -> Thank you!

- Two days only, Sunday and Monday, 9AM to 5PM each day only

- Expect numerous presentations from individuals from the Chinese cable industry

- Presentations in English, however
  - Simultaneous translation for presentations and Q&A
  - Expect 100% extra time; e.g. a normal 30 minute presentation will take 60

- Priority to China related presentations
  - November plenary for presentations that can't fit on October agenda

- NEED HELP!
  - Solutions (volunteers) for "real time" translations

Future Meetings

I will attend the October interim __12__
I probably will attend the October interim _4__
I probably will not attend the October interim _2__
I will not attend an October interim _3___

I will attend the November plenary _20___
I probably will attend the November plenary _2__
I probably will not attend the November plenary _0__
I will not attend an November plenary _0___

Thank You!