IEEE p802.3bn EPoC

Channel Model Ad Hoc committee

Teleconference

Dec 6, 2012

Agenda

- Patents
- Minutes from previous call and Attendance
- Parameter List
- Static Model
- Action Items
- Plans & Action Items

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 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.

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(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

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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

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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

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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.**

    _____

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.

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Minutes

- minutes from 11/29 Call
  - Any corrections?

Parameter List

- We need to start filling in numbers!
- Are there any parameters that we can begin completing and distribute to the TF at large as tentative (i.e., we agree are at least close to final) so as to help other Ad Hoc progress?
- Updated Topologies per mallette_01_0312.pdf and several presentations from Hangzhou
  - Node +3, analog EPoC distribution
  - Node +3, digital EPON distribution
  - Node +0, last amplifier
  - Node +0, all passive
  - Node +0, no HFC

Node +3 (analog EPoC distribution)
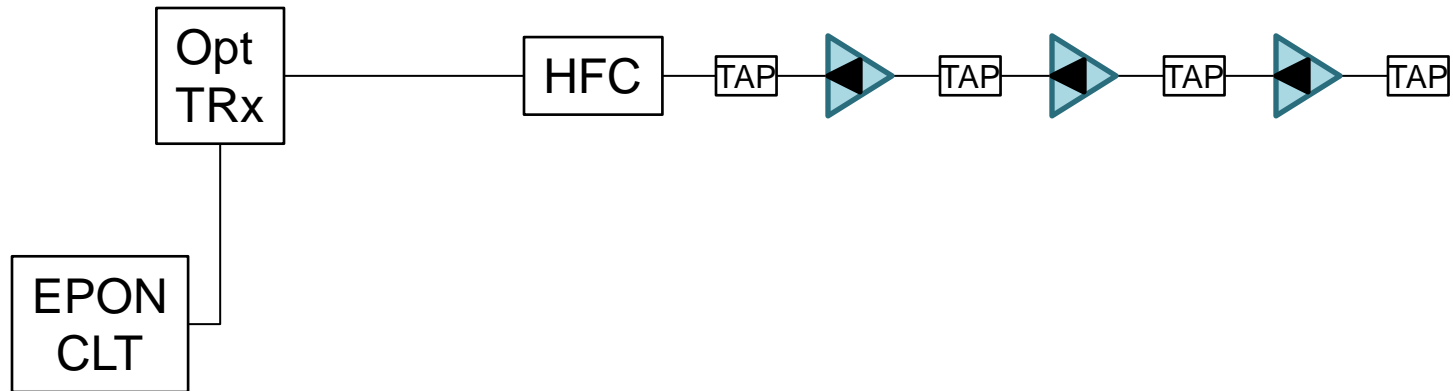
- Early Deployments
- Do we need to define a "Node+N" topology?
  - How big is N?
- Details needed:
  ◦ Diplexer connecting EPoC to COAX

- Topology parameters needed:
1. Optical reach of HFC networks
2. Optical reach of EPON networks
3. Channel loading of HFC networks (can all digital be assumed?)
4. Amplifier spacing; typical and max.
   ex: typical ≤ 800 ft. maximum ≤ 1500 ft.
5. Feeder cable types
6. Drop Cable types & reach

Node +3 (digital EPON distribution)
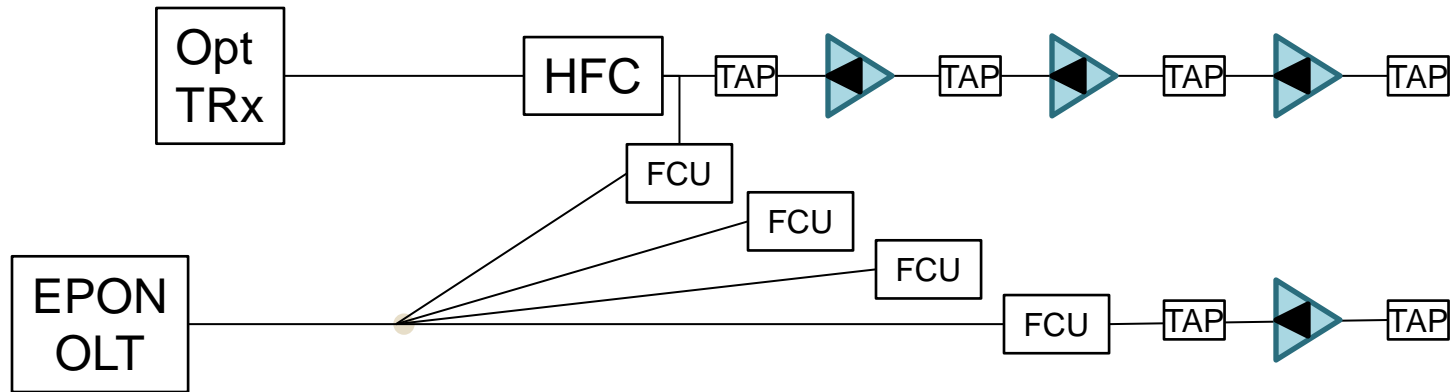
- Variations
  - Node +1 (single amp)
  - Node +2 (not shown)
- Do we need to define a "Node+N" topology?
  - How big is N?
- Details needed:
  ◦ Diplexer connecting EPoC to COAX

- Topology parameters needed:
1. Optical reach of HFC networks
2. Optical reach of EPON networks
3. Channel loading of HFC networks (can all digital be assumed?)
4. Amplifier spacing; typical and max.
   ex: typical ≤ 800 ft. maximum ≤ 1500 ft.
5. Feeder cable types
6. Drop Cable types & reach

Node +0 (Last Amp)

- Details needed:
  - Diplexer connecting EPoC to COAX
  - Blocking filter at Amp

- Topology parameters needed:
1. Optical reach of HFC networks
2. Optical reach of EPON networks
3. Channel loading of HFC networks (can all digital be assumed?)
4. Amplifier spacing; typical and max.
   ex: typical ≤ 800 ft. maximum ≤ 1500 ft.
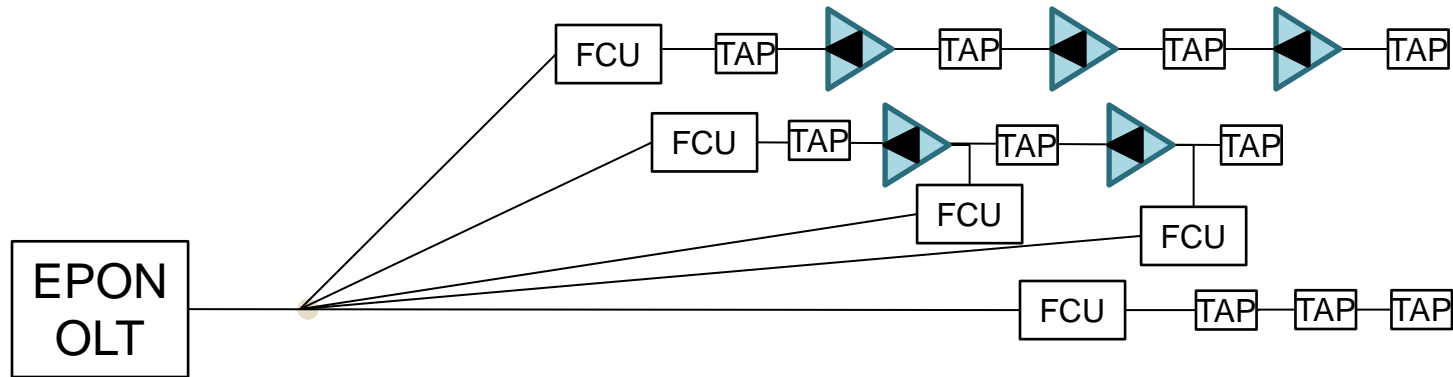5. Feeder cable types
6. Drop Cable types & reach

Node +0 (All Passive)
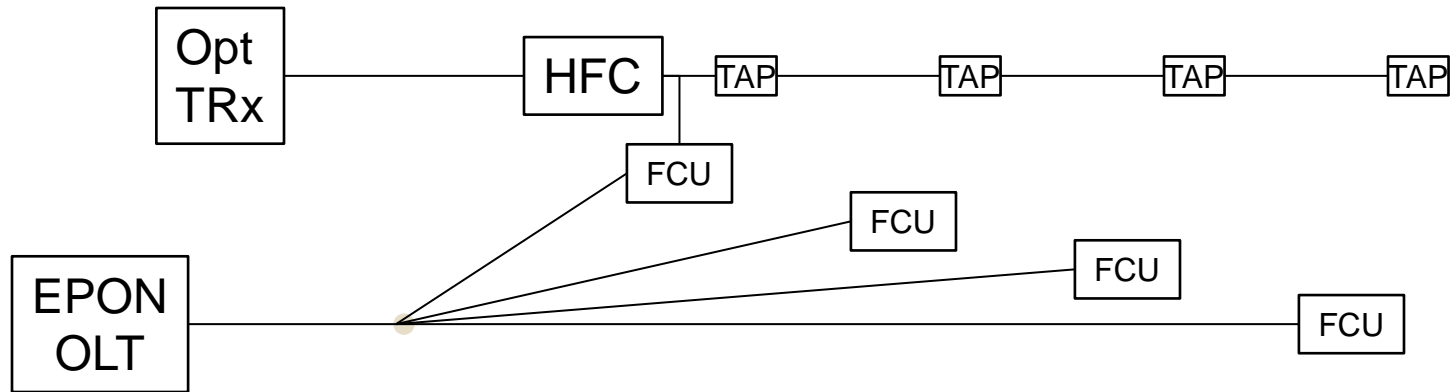
- Details needed:
  - Diplexer connecting EPoC to COAX

- Topology parameters needed:
1. Optical reach of HFC networks
2. Optical reach of EPON networks
3. Channel loading of HFC networks (can all digital be assumed?)
4. Amplifier spacing; typical and max.
   ex: typical ≤ 800 ft. maximum ≤ 1500 ft.
5. Feeder cable types
6. Drop Cable types & reach

EPoC Only (no HFC)

- Variations
  - Node +0 (last Amp)
  - Node + N (how big is N)

- Details needed:
  - Diplexer connecting EPoC to COAX

- Topology parameters needed:
  1. Optical reach of HFC networks
  2. Optical reach of EPON networks
  3. Channel loading of HFC networks (can all digital be assumed?)
  4. Amplifier spacing; typical and max.
     ex: typical ≤ 800 ft. maximum ≤ 1500 ft.
  5. Feeder cable types
  6. Drop Cable types & reach

Static Model

- ## Main author has withdrawn

- ## Some tools available on-line

  - See: http://www.elsevierdirect.com/v2/companion.jsp?ISBN=9780123744012
    Special thanks to Jim Farmer and Hesham ElBakoury

  - Cascaded Noise Distortion Calculator

  - Single-Wavelength Performance Calculator

  - Optical Crosstalk Individual Mechanisms

  - Optical Crosstalk Summary

  - Micro

  - Return Level Calculator

  - SOAR

Action Items & Plans

- ## San Antonio meeting

Item	Date	Assigned to	Status	Description	Response/Update
7	121010	D Remein	O	Start Parameter List	Initial version distributed 10/18 Updated 11/8, 11/14
9	121018	Marek Hajduczenia / Hal Roberts	O	Capture static model in Excel	See email
10	121128	D Remein	O	Get channel model data template completed for Chinese MSOs	from EPoC SIG 11/19/12
11	121128	D Remein	C	Align Ch Model Topologies with those previous presented.	12/6 - aligned to mallette_01_0312.pdf and several presentations from Hangzhou
12	121128	Hal Roberts / Saif Rahman	O	Align CH Model Tables presented in San Antonio.	

THANK YOU

Objectives (1/3)

- 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.

Objectives (2/3)

- **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.**

Objectives (3/3)

- 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.

Ad Hoc Mission Statement

- Ad Hocs purpose/deliverables are to:
  - Make Channel Model recommendations to the Task Force, including
    - "The Model", "How to use" documentation, Any tools, templates, etc.
  - Maintains & updates the 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

Ad Hoc Mission Statement

- ## Channel Model Purpose
  - ◦ Purpose 1: To facilitate the evaluation of multiple PHY modulation proposals for use in 802.3bn
  - ◦ Purpose 2: To facilitate the selection of a range of PHY parameters within the selected PHY proposal to allow adaption to changing PHY conditions within the coax environment

- ## Channel Model Scope
  - ◦ Model should be limited to the minimum set of critical parameters necessary for above purposes.

Tools

- Simulation
  - GNU Octave
  - MatLab

- Static Model (Excel)

- Parameter List(Excel)