IEEE 802.3 NGMMF Study Group Teleconference

Robert Lingle Jr., Acting Chair

IEEE 802.3 Next-gen 200G & 400G PHYs over fewer MMF Pairs Study Group

Employer & Affiliation: OFS

January 11, 2018

Web Meeting & Call-in Information

Click below and we will call you to join the meeting:

(Note: some users outside the US have complained that the dial-me feature for audio bridge does not work when clicking the link below, requiring you to dail-in to the audio bridge manually using one of the numbers listed below or at the website if your country is not listed.)

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Agenda

- Please record attendance with employer & affiliation to Mabud mchoudhury@ofsoptics.com

- IEEE 802 Participation

- Pre-PAR Patent Policy

- Approval of agenda & minutes of 12/18 teleconference

- Short discussion of project schedule options (15 min)

- Review draft PAR – led by Mabud Choudhury (< 30 min)

- Discussion of possible objectives (< 40 min)

- Contributions to support CSD responses, for which time has been requested (10 min)

- Preview any other draft contributions or proposals (you are encouraged to do so!)

Participation in IEEE 802 Meetings

Participation in any IEEE 802 meeting (Sponsor, Sponsor subgroup, Working Group, Working Group subgroup, etc.) is on an individual basis

- **Participants in the IEEE standards development individual process shall act based on their qualifications and experience. (https://standards.ieee.org/develop/policies/bylaws/sb_bylaws.pdf section 5.2.1)**

- **IEEE 802 Working Group membership is by individual; "Working Group members shall participate in the consensus process in a manner consistent with their professional expert opinion as individuals, and not as organizational representatives". (subclause 4.2.1 "Establishment", of the IEEE 802 LMSC Working Group Policies and Procedures)**

- **Participants have an obligation to act and vote as an individual and not under the direction of any other individual or group. A Participant's obligation to act and vote as an individual applies in all cases, regardless of any external commitments, agreements, contracts, or orders.**

- **Participants shall not direct the actions or votes of any other member of an IEEE 802 Working Group or retaliate against any other member for their actions or votes within IEEE 802 Working Group meetings, see https://standards.ieee.org/develop/policies/bylaws/sb_bylaws.pdf section 5.2.1.3 and the IEEE 802 LMSC Working Group Policies and Procedures, subclause 3.4.1 "Chair", list item x.**

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(Latest revision of IEEE 802 LMSC Working Group Policies and Procedures: http://www.ieee802.org/devdocs.shtml)

Guidelines for IEEE-SA 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.**

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

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.

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

IEEE 802.3 NGMMF SG Information

- Robert Lingle Jr., Acting Chair
- Home Page - http://www.ieee802.org/3/NGMMF/index.html
- Reflector Information - http://www.ieee802.org/3/NGMMF/reflector.html
- Deadline for requesting presentation slot in Geneva is Friday 1/12 midnight AOE
  - Requests received after this will be entertained if there is room in the schedule
- A draft of any relative cost analyses should be submitted for review and approval by Tuesday 1/16
- Deadline for receipt of contributions by chair is Thursday 1/18 midnight AOE

The Task Force is delayed by six months (rather than four) if we miss the opportunity to advance in March

- http://www.ieee802.org/3/100GEL/public/adhoc/dec20_17/kochuparambil_100GEL_adhoc_01_1217.pdf

Option 1	Approval Steps	Option 2
PAR, CSD, and Objectives in January	Study Group	PAR, CSD, and Objectives in March or May
March Plenary	Working Group	July Plenary
March 9th (Plenary)	WG Executive Committee	July 13th (Plenary)
	NesCom recommendation	
	Standards Board	
May Interim	**First Task Force Meeting**	**Nov Plenary**
(starts May 21st)		(misses Sept interim, 10-14th)

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The Task Force is delayed by six months (rather than four) if we miss the opportunity to advance in March

From kochuparambil_100GEL_adhoc_01_1217.pdf

Option 1

PAR, CSD, and Objectives in January

May Interim Task Force

- Make educated start for Objectives/CSD/PAR.

- May need further study and modification to objectives in Task Force,

- Allows us to move into baseline proposals when ready

- Will need to drive to high level consensus quickly

Option 2

PAR, CSD, and Objectives in March or May

Nov Plenary Task Force

- Do deeper study prior to Objectives/CSD/PAR

- Have more firm Objectives

- Head straight into baseline proposals once a Task Force.

- May need to wait a meeting cycle or two after consensus is formed due to scheduling/process

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A desirable timeline

- March 2018 – Request to become TF

- May 2018 – First TF meeting

- November 2018 - Baseline proposals in D1.0 and comments

- March 2019 – Generate D2.0 for WG ballot and comments

- November 2019 – Generate D3.0 for Sponsor ballot and comments

- June 2020 – Standard complete

"Motherhood & Apple Pie" Objectives

- These objectives are typically adopted for projects and are deemed relevant to this project

  1. Support full-duplex operation only
  2. Preserve the Ethernet frame format utilizing the Ethernet MAC
  3. Preserve the minimum and Maximum FrameSize of current Ethernet standard
  4. Provide appropriate support for OTN
  5. Specify optional Energy Efficient Ethernet (EEE) capability
  6. Support a BER of better than or equal to 10^{-13} at the MAC/PLS service interface (or the frame loss ratio equivalent)
     - NOTE the lower BER target value of 10^{-13} was adopted for 200Gb/s and 400 Gb/s Ethernet in 802.3bs and 802.3cd, whereas 10^{-12} has been used for 100 Gb/s and lower speeds

The MMF PMD landscape by fiber count, Baud rate, and modulation format

Technology (per fiber)	1 fiber pair	2 fiber pairs	4 fiber pairs	8 fiber pairs	16 fiber pairs
25G-λ NRZ	25G-SR		100G-SR4		400G-SR16
50G-λ NRZ				400G-SR8	
50G-λ PAM4	50G-SR	100G-SR2	200G-SR4	400G-SR8	
100G-λ PAM4	200G-SR1.2	200G-SR2	400G-SR4		
2x50G-λ PAM4		200G-SR2.2	400G-SR4.2	The module types shown in red would be formally within the scope of the SG, but many would lack technical feasibility or broad market potential	
4x25G-λ NRZ		200G-SR2.4	400G-SR4.4		
4x50G-λ PAM4	200G-SR1.4	400G-SR2.4			
8x50G-λ PAM4	400G-SR1.8				

Existing or in-progress IEEE standard

Multi-Wavelength Nomenclature
SRm.n   m = # fiber pairs   n = # wavelengths
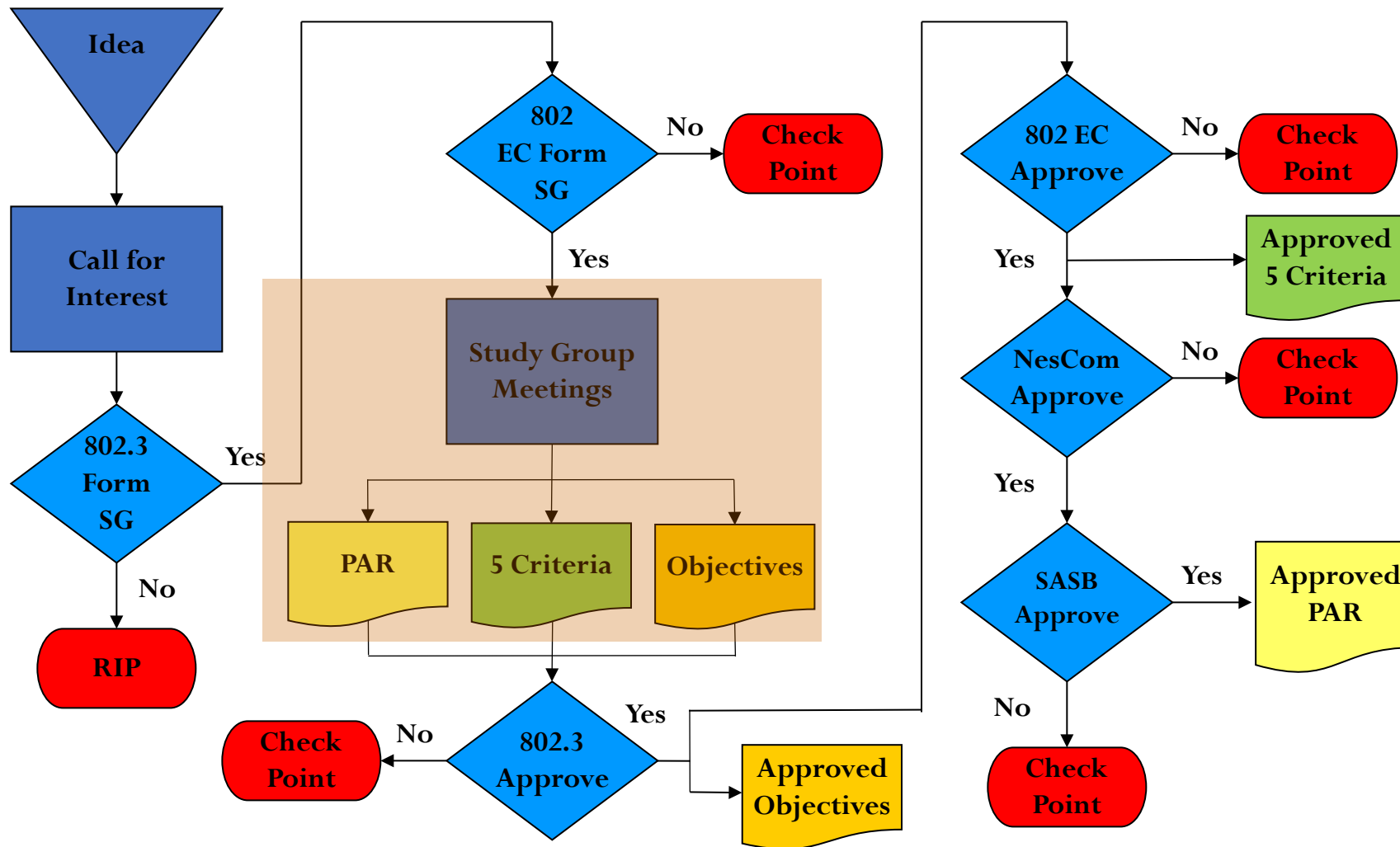
Specific objectives proposed for this project

- Provide physical layer specifications which support 200Gb/s operation over fewer than 4 pairs of MMF with channel lengths up to at least 100 m.

- Provide physical layer specifications which support 400Gb/s operation over fewer than 16 pairs of MMF with channel lengths up to at least 100 m.

Contributions requested / mentioned for Geneva

Rough Description of contribution, as I currently understand	Comments
Path Forward	Robert Lingle, Jr.
Proposed PMD Progression	Rick Pimpinella
NGMMF PHY Objectives	Steve Swanson
Draft PAR	Mabud Choudhury
Draft CSD responses	Mabud Choudhury
Document the applicability of the "motherhood & apple pie" objectives to this project	TBD
Establish that existing PCS/FEC clauses for 50G lanes support 200 & 400 Gb/s PMDs operating over fewer fiber pairs (BMP, TF)	Mark Gustlin
Plans to document bandwidths of OM3 & OM4 for shortwave multiplexing (TF)	Paul Kolesar and co-authors
Wavelength dependent channel performance (TF)	Rick Pimpinella
Modal bandwidth over wavelengths for OM3, OM4, OM5 (TF)	Paul Kolesar or other
TF of multiple wavelength transmission over MMF	Earl Parsons
Demonstrate TF for 200GBASE-SR1.4	Jonathan King
Demonstrate BMP for 200GBASE-SR1.4	James Young
Demonstrate EF, DI for 200GBASE-SR1.4	James Young
Channel Cost Analysis (EF)	Rick Pimpinella
TF for 400GBASE-SR4.2	Jonathan Ingham
TF for 400GBASE-SR4.2	Jonathan King
BMP, EF, DI for 400GBASE-SR4.2	TBD
EF, BMP, EF, DI for 400GBASE-SR8	TBD

Study Group Teleconference

Back Up Material from Previous Telecons

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