

Approved Minutes  
IEEE 802.3 Next-Gen 100 Gigabit Optical Ethernet Study Group  
Interim meeting  
Jan 24 – 25, 2012  
Newport Beach, CA, USA

Prepared by: Kapil Shrikhande, Dell

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**January 24, 2012**

The meeting was called to order at 8 a.m., on 24 Jan, 2012 by Dan Dove, Study Group Chair.

Kapil Shrikhande volunteered as Recording Secretary for this meeting.

Documentation for the Newport Beach meeting can be found at the meeting web-page:  
<http://www.ieee802.org/3/100GNGOPTX/public/jan12/index.html>

Review of unapproved minutes from the November 2011 plenary meeting.

Motion to approve minutes

M: Pete Anslow

S: Jonathan King

Passes by voice without opposition

Agenda and General Information

By: Dan Dove, SG Chair

See: [dove\\_01\\_0112\\_NG100GOPTX.pdf](#)

Motion to approve the agenda:

M: Steve Trowbridge

S: Scott Kipp

Passes by voice without opposition

The Chair asked if there are any reporters in the room. Scott Kipp said he would be writing a blog on the meeting in his role as the President of the Ethernet Alliance.

The Chair presented the Study Group decorum.

The Study Group was reminded that photographs or recordings are not allowed without permission.

The Chair presented the rest of the Agenda and General Information presentation

Start of technical presentations, at 8:40 a.m.

Presentation # 1

Title: Five Criteria Responses (strawman)

By: Dan Dove, HP

See: [dove\\_02\\_0112\\_NG100GOPTX.pdf](#)

Presentation # 2

Title: Objectives for Next Generation 100GbE Optical Interfaces  
By: Pete Anslow  
See: anslow\_01\_0112\_NG100GOPTX.pdf

During his presentation, Anslow also showed a spread-sheet showing Five Criteria coverage seen from Study Group presentations so far.  
The spread-sheet has been uploaded to the web-site immediately below anslow\_01  
See: 5C\_responses\_crosscheck\_06\_0112\_NG100GOPTX.pdf

Presentation # 3

Title: 100Gb/s SMF Standard Broad Market Potential Observations  
By: Chris Cole  
See: cole\_01a\_0112\_NG100GOPTX.pdf

Presentation # 4

Title: Solution Set Analyzer Update  
By: Paul Kolesar  
See: kolesar\_01a\_0112\_NG100GOPTX.pdf

Break 11:00 a.m.  
Reconvened at 11:10 am

Presentation # 5

Title: 100G Next Gen SR4 vis-à-vis SR10  
By: John Petrilla  
See: petrilla\_01\_0112\_NG100GOPTX.pdf

Presentation # 6

Title: 100G Next Gen Optics MMF ad hoc meetings review  
By: Jonathan King  
See: king\_01\_0112\_NG100GOPTX.pdf

Presentation # 7

Title: Supporting material for a 100Gb/s MMF objective  
By: Jonathan King  
See: king\_02\_0112\_NG100GOPTX.pdf

Lunch at 12:15 p.m.  
Reconvened at 1:15 p.m.

Presentation # 8

Title: Experimental Studies of VCSEL-MMF Transmission Impairments at 850nm  
By: Robert Lingle Jr.  
See: lingle\_01\_0112\_NG100GOPTX.pdf

Presentation # 9

Title: Towards Large-Scale Modeling of Equalized MMF-VCSEL links at 25Gb/s  
By: Robert Lingle Jr.

See: lingle\_02\_0112\_NG100GOPTX.pdf

Presentation # 10

Title: Reliability and Emerging Capabilities of 1060nm VCSELS

By: Robert Lingle Jr.

See: lingle\_03\_0112\_NG100GOPTX.pdf

The order of presentations was changed and Scott Kipp was requested to present ahead of Ali Ghiasi.

Presentation # 11

Title: Low cost 100GbE links

By: Scott Kipp

See: kipp\_01\_0112\_NG100GOPTX.pdf

Presentation # 12

Title: Measurements results of 25.78 GBd VCSEL over OM3 with and without equalization

By: Ali Ghiasi

See: ghiasi\_01a\_0112\_NG100GOPTX.pdf

Break 3:10 p.m.

Reconvened at 3:25 p.m.

Presentation # 13

Title: Simulations of 100G-SR4 link

By: Ali Ghiasi

See: ghiasi\_02a\_0112\_NG100GOPTX.pdf

The order of presentation was changed and Sudeep Bhoja was requested to present ahead of Andre Szczepanek

Presentation # 14

Title: Study of PAM modulation for 100GE over a single laser

By: Sudeep Bhoja

See: bhoja\_01\_0112\_NG100GOPTX.pdf

Presentation # 15

Title: Feasibility of Transimpedance Amplifiers and CDRs for PAM modulation

By: Andre Szczepanek

See: szczepanek\_01\_0112\_NG100GOPTX.pdf

Presentation # 16

Title: Mid-Range (MR) definition, comparisons and reach objective

By: John Petrilla

See: petrilla\_02a\_0112\_NG100GOPTX.pdf

The chair opened the floor for open discussion.

Meeting recessed for the day at 5:55 p.m.

## January 25, 2012

Meeting resumed by the Chair at 8 a.m.

The chair asked permission from the room to make a change to the minutes from the November 2011 plenary meeting, to edit Dirk Breuer's attendance record. There was no opposition.

The chair presented the agenda for the day.  
The chair covered study group decorum and ground rules.

Start of technical presentations, 8:30 a.m.

### Presentation # 17

Title: Feasibility of 1300nm Parallel Optics for 100GbE Short Reach SMF Interconnects

By: Jon Anderson

See: anderson\_01\_0112\_NG100GOPTX.pdf

### Presentation # 18

Title: Proposal for 100G PHY SMF Objective

By: Jon Anderson

See: anderson\_02\_0112\_NG100GOPTX.pdf

### Presentation # 19

Title: Economic Feasibility for NG 100G SMF Objective

By: Gary Nicholl

See: nicholl\_01\_0112\_NG100GOPTX.pdf

Break at 10:10 a.m.

Reconvened at 10:25 a.m.

### Presentation # 20

Title: Power and Complexity of 100G-SR4 Implementations

By: Ali Ghiasi

See: ghiasi\_03b\_0112\_NG100GOPTX.pdf

### Presentation # 21

Title: 100GE over SMF Using 4x10G DML and 4x25Gb/s Linear Equalizers

By: Winston Way

See: way\_01a\_0112\_NG100GOPTX.pdf

### Presentation # 22

Title: OIF-28G-VSR Channel Simulations

By: Andre Szczepanek

See: szczepanek\_02\_0112\_NG100GOPTX.pdf

### Presentation # 23

Title: The case for a 10dB CAUI-4

By: Andre Szczepanek  
See: szczepanek\_03\_0112\_NG100GOPTX.pdf

Break for lunch at 12 p.m.  
Reconvened at 1:20 p.m.

#### Presentation # 24

Title: CDRs, FEC, power and reach  
By: Piers Dawe  
See: dawe\_01b\_0112\_NG100GOPTX.pdf

#### Presentation # 25

Title: More Thoughts on FEC  
By: Gary Nicholl  
See: traverso\_01\_0112\_NG100GOPTX.pdf

The Chair reviewed the liaison letter from the OIF. It was decided that a response to this letter would be left for the March 2012 SG meeting. The letter has been uploaded to the web-page for review.  
See: OIF\_IEEE\_liaison\_20Dec11\_CEI28VSR.pdf

The Chair asked the group if there was any opposition to a late presentation by Chris Cole, Finisar.  
There was no opposition.

#### Late Presentation # 26

Title: PAM-N Eye Diagrams  
By: Chris Cole  
See: cole\_03\_0112\_NG100GOPTX.pdf

Break at 3:10 p.m.  
Reconvened at 3:45 p.m.

#### Motions

See: See: motions\_0112.pdf, which has been uploaded to the meeting web page

Adopt the following objective:

Define re-timed 4-lane 100G PMA to PMA electrical interfaces for chip to chip and chip to module applications

Moved: Tom Palkert

Second: Andre Szczepanek

Y: 90

N: 1

A: 7

Passes

#### Straw Polls

See: straw\_polls\_0112.pdf uploaded to the meeting web-page

Straw-poll # 1:

I plan to attend the IEEE Plenary in Waikoloa (March 2012)

Yes: 60

No:

Straw-poll # 2:

I plan to attend the IEEE Interim in TBD (May 2012)

Yes: 81

No:

Straw-poll # 3:

Chicago Rules (Y/N): N

I am ready to adopt an electrical interface objective in this meeting

Yes: 48

No: 12

Straw-poll # 4:

Chicago Rules (Y/N): N

I am ready to adopt an MMF objective in this meeting

Yes: 8

No: 52

Straw-poll # 5:

Chicago Rules (Y/N): N

I am ready to adopt a SMF objective in this meeting

Yes: 8

No: 53

Straw-poll # 6:

Chicago Rules (Y/N): 2 votes per person

This type of contribution would help me decide upon an MMF objective:

Measured results on Tx: 7

Measured results on Rx: 8

More detailed analysis of relative module cost: 26

More detailed analysis of module power and system host budget: 21

More detailed analysis of relative total link cost: 29

More detailed analysis of market need/applicability: 23

More detailed analysis of balance between reach and complexity: 26

Straw-poll # 7:

Chicago Rules (Y/N): 3 votes per person

This type of contribution would help me decide upon an SMF objective:

Measured results on Tx: 3

Measured results on Rx: 0

More detailed analysis of relative module cost: 24

More detailed analysis of module power and system host budget: 16

More detailed analysis of relative total link cost: 32

More detailed analysis of market need/applicability: 22

More detailed analysis of balance between reach and complexity: 12

More detailed analysis of customer sensitivity to parallel vs. duplex fiber: 35  
More detailed analysis of technical feasibility of PAM-n: 33  
More detailed analysis of technical feasibility of LISEs: 5

Straw-poll # 8

Chicago Rules (Y/N): Y

I believe the following are technically feasible

A: PAM-8 and PAM-16: 15

B: parallel SMF: 53

C: alternative NRZ WDM architectures: 43

Straw-poll #9

Chicago Rules (Y/N): Y

I believe the following are economically feasible

A: PAM-8 and PAM-16: 18

B: parallel SMF: 41

C: alternative NRZ WDM architectures: 17

Straw-poll #10

Chicago Rules (Y/N): Y

I believe the following satisfies broad market potential

A: PAM-8 and PAM-16: 25

B: parallel SMF: 23

C: alternative NRZ WDM architectures: 10

Total headcount taken at the end of straw-poll # 10 = 84

There were no more straw-polls from the floor.

Motion to adjourn

Moved: Hugh Barrass

Second: Jonathan King

Passes without opposition

Next-gen 100G Optics Study Group -- Attendee List  
 Interim meeting, January 2012, Newport Beach, CA

Last Name	First Name	Affiliation	Tuesday 01/24/2012	Wednesday 01/25/2012
Abbas	Ghani	Ericsson	Y	Y
Adee	Ran	Intel	Y	
Amezcuca	Adrian	Prysmian	Y	Y
Amleshi	Peerouz	Molex	Y	Y
Anderson	Jon	Opnext	Y	Y
Anslow	Pete	Ciena	Y	Y
Balasubramonian	Venugopal	Cortina	Y	Y
Baldwin	Thananya	Ixia	Y	Y
Bates	Stephen	PMC-Sierra		Y
Ben-Artsi	Lian	Marvell		Y
Bennett	Mike	LBNL	Y	Y
Berger	Chris	Luxtera	Y	Y
Bernstein	Gary	Leviton	Y	Y
Bhatt	Vipul	Lightwire	Y	Y
Bhoja	Sudeep	Broadcom	Y	Y
Bolig	Matt	Netlogic	Y	Y
Booth	Brad	Dell	Y	Y
Breuer	Dick	Duetsche Telekom	Y	Y
Brown	Matt	Applied Micro	Y	Y
Carroll	Martin	Verizon	Y	Y
Chalupsky	David	Intel	Y	Y
Chang	Frank	Vitesse	Y	Y
Chang	Jacky	HP	Y	Y
Cheng	Wheling	Juniper Networks	Y	Y
Choudhury	Mabud	Commscope	Y	Y
Coenen	Robert	Reflex Photonics	Y	Y
Cole	Chris	Finisar	Y	Y
Cui	Kai	Huawei	Y	Y
D'Ambrosia	John	Dell	Y	Y
Dawe	Piers	IPtronics	Y	Y
Diab	Wael	Broadcom	Y	Y
Dove	Dan	Applied Micro	Y	Y
Dudek	Mike	Qlogic	Y	Y
Flatman	Alan	LAN Technologies	Y	Y
Ganga	Ilango	Intel		Y
Ghiasi	Ali	Broadcom	Y	Y
Giundubogula	Sudhakar	Marvell	Y	Y



Goldgeier	Paul	ColorChip	Y	Y
Gustlin	Mark	XILINX	Y	Y
Hall	Eric	Aurrion	Y	Y
Hamano	Hiroshi	Fujitsu Labs	Y	Y
Healey	Adam	LSI	Y	Y
Heath	Jeff	Linear Technology	Y	Y
Hidaka	Yasuo	Fujitsu Lab of America	Y	Y
Ho	Francois	Inphi	Y	
Ishida	Osamu	NTT	Y	Y
Isono	Hideki	Fujitsu Optical Components	Y	Y
Jan	Filip	Maxim	Y	Y
Jani	Dharmesh	SemTech	Y	Y
Jiang	Wenbin	Cosemi	Y	Y
Jiang	Hongtu	Broadcom	Y	Y
Jimenez	Andrew	Anixter Inc.	Y	Y
Katsuhisa	Tawa	Sumitomo Electric		Y
Kimmtli	Myles	Emuley	Y	Y
King	Jonathan	Finisar	Y	Y
Kipp	Scott	Brocade	Y	
Kolesar	Paul	Commscope	Y	Y
Kono	Masahi	Hitachi	Y	Y
Latchman	Ryan	Mindspeed	Y	Y
LeCheminant	Greg	Agilent Technologies	Y	Y
Li	Mike	Altera	Y	
Lingle	Robert	OFS	Y	Y
Lusted	Kent	Intel		Y
Lutz	Sharon	US Conec Ltd	Y	Y
Lyubomirsky	Ilya	Finisar	Y	Y
Maguire	Valerie	Siemon	Y	Y
Maki	Jeffery	Juniper	Y	Y
Malkiman	Yonatan	Mellanox	Y	Y
Marris	Arthur	Cadence	Y	Y
Martin	Arlon	Kotura	Y	Y
Masood	Shariff	Commscope	Y	
McClay	Phil	TE Connectivity	Y	Y
McDonough	John	NEC America	Y	Y
Meier	Wolfgang	Emerson	Y	Y
Melitz	Richard	Intel		Y
Misek	Brian	Avago	Y	Y
Moeller	Merrick	Amphenol	Y	Y
Mohan	Jitendra	National Semiconductor	Y	Y

Moorhead	Andy	Infinera	Y	Y
Muyschondt	Henry	Most Cooperation	Y	
Nicholl	Gary	Cisco	Y	
Noh	George	Vitesse	Y	
Nowell	Mark	Cisco	Y	Y
Ofelt	David	Juniper	Y	
Pakravan	Farmad	Huawei		Y
Palkert	Tom	Xilinx/Molex	Y	Y
Parthasarathy	Vasu	Broadcom	Y	
Patel	Pravin	IBM	Y	Y
Pepper	Jerry	Ixia	Y	Y
Petrilla	John	Avago Technologies	Y	Y
Pickles	Tim	Surtec America Inc.	Y	Y
Pironska	Ed	Ideal	Y	
Rabinovich	Rick	Alcatel Lucent	Y	Y
Ressl	Michale	Hitachi Cable America	Y	Y
Rowe	David	Analog Devices	Y	
Salunke	Vineet	Cisco	Y	Y
Sambasivan	Sam	AT&T	Y	Y
Scott	Irwin	MoSys	Y	Y
Shanbhag	Megha	TE Connectivity	Y	Y
Shankar	Hari	Inphi	Y	Y
Shrikhande	Kapil	Dell	Y	Y
Sommers	Scott	Molex	Y	Y
SparrowHawk	Bryan	Leviton	Y	Y
Sprague	Ted	Infinera	Y	Y
St Peter	Matthew	Radisys	Y	Y
Stassar	Peter	Huawei	Y	Y
Stevens	Daniel	Fujitsu Semiconductor Europe	Y	Y
Suzakz	Tet	NEC	Y	Y
Swanson	Steve	Corning Inc	Y	Y
Szczepanek	Andre	Inphi	Y	Y
Taichi	Kogure	Opnext	Y	Y
Takatori	Hiroshi	FutureWei	Y	Y
Tan	I-Hsing	Avago	Y	Y
Tracy	Nathan	TE Connectivity	Y	Y
Trowbridge	Steve	Alcatel Lucent	Y	Y
Vaden	Sterling	Optical Cable	Y	Y
Vanderlaan	Paul	Nexans Inc	Y	Y
Verdiell	Marc	Samtec	Y	Y
Wang	Zhongfeng	Broadcom	Y	Y

Warren	David	HP	Y	Y
Way	Winston	Neophotonics	Y	Y
Wong	CK	FCI Mergeoptics	Y	Y
Woodruff	Bill	Broadcom		Y
Wu	Wendy	Netlogic		Y
Zhang	Kevin	JDSU	Y	Y
Zivny	Pavel	Tektronix	Y	Y