

## IEEE 802.3ck 100Gb/s, 200Gb/s and 400Gb/s Electrical Interfaces Task Force Ad Hoc meeting – June 20, 2018

Prepared by Kent Lusted.

The proposed agenda for today:

- Approval of the Agenda
- Approval of June 20 Ad Hoc Minutes
- IEEE Patent Policy reminder:
- IEEE Participation Requirements reminder
- Logistics for July Plenary meeting
- .3ck Ad Hoc –
  - Two Very Good Maximum Loss Ideal Transmission Lines for 100G – Mellitz
  - 802.3ck 100G serial copper MDIs – Palkert/Tracy/McSorley
  - Power Considerations for 400GAUI-4 – Welch
  - Suggested Packages for 100GEL – Ben-Artzi/Mellitz
  - RS(544,514) FEC performance with 4:1 interleaving – Anslow
  - COM 2.40 with 100GEL Configuration Suggestions – Mellitz

Presentations posted at: <http://www.ieee802.org/3/ck/public/adhoc/index.html>

Meeting began at ~7:00 a.m. Pacific by Beth Kochuparambil, Task Force Chair.

Meeting began with the agenda presentation:

[http://www.ieee802.org/3/ck/public/adhoc/july25\\_18/agenda\\_180725\\_3ck\\_adhoc.pdf](http://www.ieee802.org/3/ck/public/adhoc/july25_18/agenda_180725_3ck_adhoc.pdf)

The chair reminded participants to indicate full names and employer/affiliation correctly for the meeting minutes. Beth reminded participants to mute lines when not speaking and reviewed the steps to unmute.

Showed the links to the 100 Gb/s, 200 Gb/s, and 400 Gb/s Electrical Interfaces P802.3ck Task Force ad hoc page and the email reflector.

Presented the proposed agenda and asked if there was objection as written. The agenda was approved by the ad hoc.

Chair noted that the minutes from the previous meeting were recently posted to the ad hoc web page. Chair asked if there was opposition to approving them. No one responded.

Reminded participants of the IEEE patent policy. Chair asked if anyone was unfamiliar with the IEEE patent policy. No one responded.

Reminded participants of the IEEE Participation Requirements and showed the slide with the Participation requirements. Chair asked if anyone was unfamiliar with the IEEE Participation Requirements. No one responded.

## Agenda Items

### Task Force Update – Beth Kochuparambil

- The zip file contribution from Rich Mellitz is posted to the ad hoc website.
- Requests for presentations due Wednesday, August 31 AOE. Presentations due 5pm Pacific, Wednesday, September 5.
- The 3ck Task Force meets the week of September 10 in Spokane, WA. Meet on Wednesday and Thursday.
- Reviewed the current status of the Task Force.
- There are two more ad hoc meetings before September meeting: August 15 and August 29.

### Presentation #1:

“Two Very Good Maximum Loss Ideal Transmission Lines for 100G”, Rich Mellitz

See: [http://www.ieee802.org/3/ck/public/adhoc/july25\\_18/mellitz\\_3ck\\_adhoc\\_02\\_072518.pdf](http://www.ieee802.org/3/ck/public/adhoc/july25_18/mellitz_3ck_adhoc_02_072518.pdf)

- Channel details on slide 2.
- The zip file contribution from Rich Mellitz is posted to the ad hoc website. See: [http://www.ieee802.org/3/ck/public/adhoc/july25\\_18/mellitz\\_3ck\\_adhoc\\_02\\_072518\\_channels.zip](http://www.ieee802.org/3/ck/public/adhoc/july25_18/mellitz_3ck_adhoc_02_072518_channels.zip)
- These are simulation channels, not measured.

### Presentation #2:

“802.3ck 100G serial copper MDIs”, Tom Palkert

See: [http://www.ieee802.org/3/ck/public/adhoc/july25\\_18/palkert\\_3ck\\_adhoc\\_01\\_072518.pdf](http://www.ieee802.org/3/ck/public/adhoc/july25_18/palkert_3ck_adhoc_01_072518.pdf)

- Based on Clause 136 MDI types and add 2 more.
- There was a request for the S-parameter models for the newly proposed connectors that encompass the 100 Gbps rate.
- Discussed if it was necessary to include stacked type connectors.

### Presentation #3:

“Power Considerations for 400GAUI-4”, Brian Welch

See: [http://www.ieee802.org/3/ck/public/adhoc/july25\\_18/welch\\_3ck\\_adhoc\\_01\\_072518.pdf](http://www.ieee802.org/3/ck/public/adhoc/july25_18/welch_3ck_adhoc_01_072518.pdf)

- On Slide 4, the electrical PMA is the electrical I/O to the host interface.
- Analysis assumes the market desire to have 2x400G solutions in a “double density” connector such as QSFP-DD and OSFP.
- There was a request for more information on future optical technologies that could reduce power needs

**Presentation #4:**

“Suggested Packages for 100GEL”, Liav Ben-Artzi

See: [http://www.ieee802.org/3/ck/public/adhoc/july25\\_18/benartsi\\_3ck\\_adhoc\\_01\\_072518.pdf](http://www.ieee802.org/3/ck/public/adhoc/july25_18/benartsi_3ck_adhoc_01_072518.pdf)

- Discussed the package model options presented on slide 5.
- There was a request for real package models for correlation.

**Presentation #5:**

“RS(544,514) FEC performance with 4:1 interleaving”, Pete Anslow

See: [http://www.ieee802.org/3/ck/public/adhoc/july25\\_18/anslow\\_3ck\\_adhoc\\_01\\_072518.pdf](http://www.ieee802.org/3/ck/public/adhoc/july25_18/anslow_3ck_adhoc_01_072518.pdf)

- Previous presentations for P802.3cd or P802.3bs listed in the opening matter have a=0.5 data that participants can reference.
- There was a request for data that confirms the assumption of “a”, the error propagation value.
- It was noted that previous analysis in other Task Forces found that it was difficult to restrict the value of “a” during compliance testing.

**Presentation #6:**

“COM 2.40 with 100GEL Configuration Suggestions”, Rich Mellitz

See: [http://www.ieee802.org/3/ck/public/adhoc/july25\\_18/mellitz\\_3ck\\_adhoc\\_01\\_072518.pdf](http://www.ieee802.org/3/ck/public/adhoc/july25_18/mellitz_3ck_adhoc_01_072518.pdf)

- The VGA gain capability with abandoned.
- The C2M configuration sheet assumes a 12mm package.
- The method to deal with the conflict between the DFE and the first RXFFE is shown on slide 7.
- On slide 5, the jitter is not injected both at the RXFFE and the DFE points. Jitter is temporarily added at the RXFFE in order to determine the coefficients then removed.

Meeting ended at ~9:05 a.m. Pacific.

## List of attendees (captured from Webex tool)

<b>Name</b>	<b>Affiliation</b>	<b>Employed by</b>
Adam Healey	Broadcom	Broadcom
Adee Ran	Intel	Intel
Adrian Butter	Global Foundries	Global Foundries
Alex Levin	Microsoft	Microsoft
Ali Ghiasi	GhiasiQuantum & Huawei	GhiasiQuantum LLC
Andy Zambell	Amphenol	Amphenol
Arthur Marris	Cadence	Cadence
Beth Kochuparambil	Cisco	Cisco
Brian Holden	Kandou	Kandou
Brian Welch	Luxtera	Luxtera
David Malicoat	Senko & Aquantia	Malicoat Networking Solutions
David Ofelt	Juniper	Juniper
Derek Cassidy	BT	BT
Dino Pozzebon	Microsemi	Microsemi
Femi Akinwale	Intel	Intel
Fernando DeBerardinis	eSilicon	eSilicon
Frank Lambrecht	Gigamon	Gigamon
Gary Nicholl	Cisco	Cisco
Geoff Thompson	GraCaSI S.A./Ind	Independent
Geoff Zhang	Xilinx	Xilinx
George Zimmerman	ADI, APL Group, Aquantia, BMW, Cisco Systems, &Commscope	CME phy consulting
Greg LeCheminant	Keysight	Keysight Technologies
Hai-Feng Liu	Intel	Intel
Hormoz Djahanshahi	Microsemi	Microsemi
Jacov Brener	Marvell	Marvell
Jane Lim	Cisco	Cisco
Jayen Desai	Intel	Intel
Jeff Philips	Teledyne	Teledyne
Jeff Slavick	Broadcom	Broadcom
Jeff Twombly	Credo	Credo
Jeremy Stephens	Intel	Intel
jim nadolny	Samtec	Samtec
John Calvin	Vital Technical marketting	Vital Technical marketting
John Ewen	Globalfoundries	Globalfoundries
John Yurtin	Aptiv	Aptiv
Kai Yang	Global Foundries	Global Foundries
KengHua Chuang	HPE	HPE
Kent Lusted	Intel	Intel
Liav Ben-Artzi	Marvell	Marvell
Margaret	Cadence	Cadence

Mark Gustlin	Xilinx	Xilinx
Mau-Lin Wu	Mediatek	Mediatek
Mike Dudek	Cavium	Cavium
Mike Li	Intel	Intel
Pete Anslow	Ciena	Ciena
Phil Sun	Credo	Credo
Piers Dawe	Mellanox	Mellanox
Pirooz Tooyserkani	Cisco	Cisco
Rich Mellitz	Samtec	Samtec
Rick Pimpinella	Panduit	Panduit
Rick Rabinovich	Keysight	IXIA
Rita Horner	Synopsys	Synopsys
Rob Callan	Global Foundries	Global Foundries
Rob Stone	Broadcom	Broadcom
Steve Baumgartner	Global Foundries	Global Foundries
Steve Sekel	Keysight	Keysight
Ted Sprague	Infinera	Infinera
Thananya Baldwin	Ixia	Ixia
Tom Palkert	Molex/Macom	Molex/Macom
Toshiaki Sakai	Socionext	Socionext
Vivek Telang	Broadcom	Broadcom
Xiang	Huawei	Huawei
Yasuo Hidaka	Independent	Independent
Yuchun(Louis) Lu	Huawei	Huawei
Zvi Rechtman	Mellanox	Mellanox
Akinori Hayakawa	Fujitsu Labs	Fujitsu Labs
Alex Haser	Molex	Molex
Alexander Rysin	Mellanox	Mellanox
Amir Bar-Niv	Aquantia	Aquantia
Anadi Shukla	Cadence	Cadence
Andre Szczepanek	HSZ Consulting	HSZ Consulting
Arturo Pachon	TE Connectivity	TE Connectivity
Ben Jones (Xilinx)	Xilinx	Xilinx
Bilal Ahmad	Huawei	Huawei
Bill Kirkland	Semtech	Semtech
Bob Grow	RMG Consulting	RMG Consulting
Brad Booth	Microsoft	Microsoft
Brett McClellar	Marvell	Marvell
Bruce Champion	TE Connectivity	TE Connectivity
Burrell Best	Samtec	Samtec
Carl Posthuma	Nokia	Nokia
Chengbin Wu	ZTE	ZTE
Chien-Ping Kao	Intel	Intel
Chris DiMinico	PHY-SI	PHY-SI
Clint Walker	Intel	Intel

Craig Carlson	Cavium	Cavium
Dale Murray	Lightcounting	Lightcounting
Dave Estes	Spirent	Spirent
Dave Hess	Corddata	Corddata
Dave Lewis	Lumentum	Lumentum
David Chalupsky	Intel	Intel
David Chen	Applied Optoelectronics	Applied Optoelectronics
David Katz	Phoenix Contact	Phoenix Contact
David Law	HPE	HPE
David Piehler	Dell EMC	Dell EMC
David Tetzlaff	Rockley Photonics	Rockley Photonics
Ed Cady	Luxshare	Luxshare
Ed Frlan	Semtech	Semtech
Ed Nakamoto	Spirent	Spirent
Ed sayre	Samtech	Teraspeed
Erdem Matoglu	Amphenol	Amphenol
Eric Baden	Broadcom	Broadcom
Eric Baldwin	Broadcom	Broadcom
Fernando Villarreal	Cisco	Cisco
Flavio Marques	Furukawa Electric	Furukawa Electric
Francois Baeuregard	Belden	Belden
Frank Chang	Inphi	Inphi
Greg McSorley	Amphenol	Amphenol
Hans Lackner	QoSCom	QoSCom
Henry Chen	Broadcom	Broadcom
		Fujitsu Optical Components
Hideki Isono	Fujitsu Optical Components	Components
Hideki Kiuchi	JAE	JAE
Howard Heck	Intel	Intel
Hsinho Wu	Intel	Intel
Huang Xi	Huawei	Huawei
Hui Wang	Marvell	Marvell
Ilya Lyubumirshky	Inphi	Inphi
Jacky Chang	HPE	HPE
James Fife	Etopus	Etopus
James Wititex	Fluke	Fluke
Jaw De Crest	Amphenol	Amphenol
Jeff Lepak	UNH-IOL	UNH-IOL
Jeffery Maki	Juniper	Juniper
Jerry Pepper	Ixia	Ixia
		FutureWei (Subsidiary of Huawei)
John D'Ambrosia	FutureWei (Subsidiary of Huawei)	Huawei)
John Mein	Dust Photonics	Dust Photonics
John Nolan	Qlogic	Qlogic
Jon Lewis	Dell EMC	Dell EMC

Jonathan Ingham	Foxconn Interconnect Technology	Foxconn Interconnect Technology
Jonathan King	Finisar	Finisar
JuneHee Lee	Samsung	Samsung
Kapil Shrikhande	Innovium	Innovium
Karen Liu	Kaiaam	Kaiaam
KARTHIK		
GOPALAKRISHNAN	Inphi	Inphi
Ken Jackson	Sumitomo	Sumitomo
Kenneth Jackson (Sumitomo)	Sumitomo	Sumitomo
Kevin Zhang	IDT	IDT
Kohichi Tamura	Oclaro	Oclaro
Kumaran Krishnasamy	Broadcom	Broadcom
Larry McMillan	Western Digital	Western Digital
Lavi Koch	Mellanox	Mellanox
Liyang Sun	Huawei	Huawei
Marco Mazzini	Cisco	Cisco
Marco Vital	sicoya	sicoya
Marco Vitali	Sicoya	Sicoya
Marek Hajouczenia	Charter Communications	Charter Communications
Mark Kimber	Samtech	Samtech
Mark Nowell	Cisco	Cisco
Martin Langhammer	Intel	Intel
Martin White	Cavium	Cavium
Masashi Shimanouchi	Intel	Intel
Matt Brown	Macom	Macom
Megha Shanbhag	TE Connectivity	TE Connectivity
Mike Engbretson	GRL	GRL
Mike Hardwood	HSZ Consulting	HSZ Consulting
Mike Howard	HSZ Consulting	HSZ Consulting
Mike Ressi	Hitachi Cable America	Hitachi Cable America
Nathan Tracy	TE Connectivity	TE Connectivity
Nhat Nguyen	Rambus	Rambus
Paul Brooks	Viavi Solutions	Viavi Solutions
Paul Kolesar	CommScope	CommScope
Pavel Zivny	Tektronix	Tektronix
Peter Jones	Cisco	Cisco
Peter Stassar	Huawei	Huawei
Phong Pham	US Conec	US Conec
PV Sreekanta	Rowltel - India	Rowltel - India
Rajmohan Hegde	Broadcom	Broadcom
Ralf-Peter Braun	Deutsche Telecom	Deutsche Telecom
Ramin Farjadrad	Aquantia	Aquantia
Rich Baca	Microsoft	Microsoft

Robert Aekins	Legrand	Legrand
Robert Lingle	OFS Optics	OFS Optics
		Hewlett Packard
Roy Wang	Hewlett Packard Enterprise	Enterprise
Salvatore Rotolo	ST Microelectronics	ST Microelectronics
Scott Airwin	Mosys	Mosys
Scott Kipp	Broadcom	Broadcom
Scott Schube	Intel	Intel
Scott Sommers	Molex	Molex
Steffen Graber	Pepperl & Fuches	Pepperl & Fuches
Steve Gorshe	Microsemi	Microsemi
Steve Trowbridge	Nokia	Nokia
		Yamaichi Electronics,
Takeshi Nishimura	Yamaichi Electronics, USA	USA
TiDong Xu	ZTE	ZTE
Tim Pak	Luxshare	Luxshare
Tom Issenheth	Huawei	Issenhuth Consulting
Tomoo Takahara	Fujitsu Labs	Fujitsu Labs
Toshiyuki Moritake	JAE	JAE
Upen Kareti	Cisco	Cisco
Vipul Bhatt	Finisar	Finisar
Vittal Balasubramanian	Innovium	Innovium
Wendy Wu	Cadence	Cadence
Will Miller?	Wilder Tech	Wilder Tech
Yan Zhuang	Huawei	Huawei
Yang Zhiwei	ZTE	ZTE
Yasuaki Kawatsu	Apresia Systems	Apresia Systems
Zhang Yuambin	ZTE	ZTE
Zhenyu Liu	Credo	Credo
Zuowei Shen	Google	Google