Meeting Minutes

Group: IEEE 802.3ca 100G-EPON Task Force

Event: Task Force plenary meeting

Date: **From**: 14 Mar, 2016 **To**: 16 Mar 2016

Location: Macao, PRC

14 Mar 2016

1:10 PM – The meeting was called to order by the Working Group Chair. Duane Remein serving as recording secretary, introductions were made.

Motion #1
Approve the agenda for Task Force meeting to be held Mar 14-16 2016, in Macao, China, located in file http://www.ieee802.org/3/NGEPONSG/public/2016_03/ngepon_1603_agenda_v1.pdf
Moved: Jorge Salinger Seconded: Marek Hajduczenia
Procedural > 50% Passed by voice without opposition

Motion #2
Move to approve the minutes of the January meeting in Atlanta, GA USA as documented in minutes_unapproved_3ca_0116.pdf.
Moved: Duane Remein Seconded: Glen Kramer
Procedural > 50% Passed by voice without opposition

The Chair gave his opening report including meeting decorum, the Task Force reflector & WEB page, IEEE Organization & Bylaws, Guidelines for IEEE-SA Meetings. The IEEE patent policy was reviewed.

1:24 PM –A call for patents was made. No response was received.

The Chair reviewed the IEEE guideline for WG meeting and IEEE process, goals for meeting, project documents/objectives, and timeline. Future meeting (Whistler BC in May, San Diego in Jul) polls were taken.

Presentations and Discussion

1:32 AM –Presentations

Flexible and Extensible Architecture for Multiple Generations of NG-EPON
Glen Kramer Broadcom
This presentation addressed a high level discussion on a multi-generational NG-EPON architecture. It stressed that 1st generation should be lowest cost possible. Bandwidth distribution and capacity reduction were also addressed.
kramer_3ca_1a_0316.pdf

100G EPON ONU solution discussion and cost comparison

Dekun Liu Huawei Technologies

This presentation addressed relative costs of optics for 100G-EPON by comparing the costs of a single fixed wavelength transceiver, a tunable transceiver (single wavelength pair), and a 4 wavelength array transceiver.
liu_3ca_1_0316.pdf

Comments on NG-EPON architecture Yong Guo ZTE Corporation

This presentation addressed optical architecture and discussed tunable optics and optical arrays with some cost comparison data.
guo_3ca_1_0316.pdf

Proposal of NG-EPON to Support PtP WDM

Wilson (Wanhui) He Accelink Technologies

This presentation proposed adding P2P WDM ability to the 100G-EPON project.
he_3ca_1a_0316.pdf

Dual rate 25G-EPON Dan Geng ZTE Corporation

This presentation explored potential technical solutions for implementing 25G-EPON, and 10G-EPON (including 10/1G-EPON) transceivers within a single optical module.
geng_3ca_1_0316.pdf

Bonding requirements for 100GEPON Frank Effenberger Huawei Technologies

This presentation suggested that LAG and newer implementations of LAG are sufficient for bonding multiple channels together.
effenberger_3ca_1_0316.pdf

5:17 PM – recessed.

15 Mar 2016

8:04 AM – reconvened.

Presentations (continued)

Utilize 100G EPON Capacities with 4x25Gb/s Architecture

Eugene Dai Cox Communications

This presentation suggested that the standard allow 25G ONUs to be deployed on any one of the expected 4 wavelength pairs.
dai_3ca_1_0316.pdf

Fixed and Tunable Options for 100Gb/s EPON

Eugene Dai Cox Communications

This presentation suggested that the standard allow 25G ONUs wavelength to be either tunable or fixed. It asserted that fixed wavelength ONUs with managed color deployment would be lower cost than tunable optics devices with color configurable by protocol.
dai_3ca_2_0316.pdf

A proposal for Channel Bonding at MAC Control Sublayer

Glen Kramer Broadcom

This presentation illustrated a potential solution to channel bonding issues by introduction of an improved MPCP layer. DS frames are transmitted on lanes based on ONU capabilities and lane availability. Frame order is ensured by first bit arrival time. US frames are enqueued based on colored (lane specific) grants and frame order follows grant order.
kramer_3ca_2_0316.pdf

Multi-Channel Control Protocol for 100Gb/s EPON

Eugene Dai Cox Communications

This presentation explored differences between channel bonding at RS and at MPCP and suggested that bonding at MPCP layer is more flexible.
dai_3ca_3_0316.pdf

12:00 PM recessed, **1:10 PM** reconvened

Straw Poll #1
All 25G ONUs and 25G OLTs use the same wavelength pair for downstream and upstream transmission.
Agree: 17 Disagree:1 No opinion: 3

Motion #3
All 25G ONUs and 25G OLTs shall use the same wavelength pair.
Moved: Jorge Salinger Seconded: Marek Hajduczenia
For: 17 Against: 0 Abstain: 4
Technical ≥ 75% Passed

Straw Poll #2
All 50G ONUs and 50G OLTs shall use the same two wavelength pairs, one of which is the same wavelength pair as used by 25G ONUs and 25G OLTs.
Agree: 10 Against: 4 Abstain: 7

Motion #4
All 50G ONUs and 50G OLTs shall use the same two wavelength pairs.
Moved: Frank Effenberger Seconded: Glen Kramer
For: 22 Against: 0 Abstain: 3
Technical ≥ 75% Passed

Motion #5
All 100G ONUs and 100G OLTs shall use the same four wavelength pairs , two of which are the same wavelength pairs as used by 50G ONUs and50G OLTs.
Moved: Jorge Salinger Seconded: Duane Remein
For: 23 Against: 0 Abstain: 3
Technical ≥ 75% Passed

Straw Poll #3
Adopt the proposal for upstream bonding presented in kramer_3ac_2a_0316.pdf as baseline.
Agree: 8 Against: 4 Abstain: 13

Motion #6
Move to adopt the proposal for downstream bonding presented in kramer_3ac_2a_0316.pdf as baseline.
Moved: Jorge Salinger Seconded: Alan Brown
For: 16 Against: 0 Abstain: 8
Technical ≥ 75% Passed

100G 40km 4x25G NRZ LWDM APD RX Measurement Results
Chris Cole Finisar
This presentation summarized ongoing development of 25G optical receiver components (APD).
cole_3ca_1_0316.pdf

Leveraging the 25G ecosystem for low cost optical components
Ed Harstead Alcatel-Lucent
This presentation summarized optical component volumes being used for various 25G ecosystems. The conclusion is to use 25G DMLs (leveraging data center volumes) and 10G PON APDs.
harstead_3ca_1a_0316.pdf

25G NRZ Transmission Daisuke Umeda Sumitomo Electric
This presentation addressed NRZ modulation at 25Gbps / 20km. Several transmitters were evaluated. The conclusion was that an SOA-EML transmitter in O-band would be a good candidate technology.
umeda_3ca_1_0316.pdf

Technical feasibility of 25G/10G asymmetric transmission
Han Hyub Lee ETRI
This presentation summarized test results of several 25G optical transmitters and receivers. The conclusion was that coupling a 25G EML and 25G APD in the DS may be a solution, DML transmitters warrant further investigation for low cost.
lee_3ca_1_0316.pdf

Enhanced FEC for 100GEPON Frank Effenberger Huawei Technologies

This presentation summarized an initial exploration of enhanced FEC.
effenberger_3ca_2_0316.pdf

Symmetric 100G EPON proposals based on 10G-class optical components
Lilin Yi Shanghai Jiao Tong University
This presentation examined several optical transmitter technologies including EML, DML, chirp mitigation using Delay Interferometer (DI), and modulation type. The conclusion was that DML with DI using NRZ modulation is a potential solution for the DS. For the US direction an EML with PAM3/Duobinary with optical dispersion control may be an option.
yi_3ca_1_0316.pdf

25G base PHY wavelength plan Ed Harstead Alcatel-Lucent
This presentation explored wavelength plan issues and concluded that three options exist; ~1270 US / ~1310 DS, ~1270 US / ~1350 DS, ~1310 US/DS / ~1350 DS/US. It was noted that a dual rate 10G/25G receiver is feasible.
harstead_3ca_2a_0316.pdf

100G EPON wavelength plan discussion Dekun Liu Huawei Technologies
This presentation explored wavelength plan issues and concluded that US O-Band (~1350) is preferred for initial single channel system and the remaining O-band should be used for enhanced multi-wavelength systems. For DS it was suggested to use either C-band (~1555) or L-band (~1605).
liu_3ca_2_0316.pdf

NG-EPON wavelength plan Xingang Huang ZTE Corporation
This presentation explored wavelength plan issues and concluded that all 100G-EPON channels (US & DS) be confined to O-Band. Another option would be to reuse the 1577 nm wavelength for 25G channels in the 50/100G systems .
huang_3ca_1_0316.pdf

6:00 PM – recessed.

16 Mar 2016

8:32 AM – reconvened.

Presentations (continued)

Brief consideration about Loss budget and wavelength allocation
Tomoyuki Funada Sumitomo Electric
This presentation explored various challenges to meeting the 100G-EPON optical budget. The conclusion was that the group should adopt a wavelength plan of O-Band for both US and DS. Two options for the wavelength plan were suggested. In Option 1 the US channels included one 13nm 25G channel at 1321 plus four 25G channels at 800 GHz spacing between 1290 and 1306 nm and the DS channels would include five 25G channels at 800 GHz spacing between 1340 and 1360. For Option 2 the US was the same and the DS would be the same 800 GHz spacing between 1480 to 1500 nm.
funada_3ca_1_0316.pdf

Wavelength plan for PtP WDM Wilson (Wanhui) He Accelink Technologies

This presentation suggested a wavelength plan to accommodate P2P WDM in addition to 100G-EPON.
he_3ca_2_0316.pdf

Straw Poll #4
What is the importance of having a common PMD with a comparable ITU PON system?
Important: 10 Not Important: 6 No opinion: 9

Straw Poll #5
I would support an upstream wavelength range in O-band with 20nm wide for the 25G single channel system.
Agree: 13 Disagree: 8 No opinion: 4

Straw Poll #6
I prefer to have all wavelengths allocated in O-band.
Agree: 14 Disagree: 6 No opinion: 3

There was an extended discussion regarding the difference between a 1+3 wavelength system contrasted with a 1+4 system. It was agree that this topic deserves additional study and consideration.

Straw Poll #7
I prefer to have the 25G wavelength pair allocated in O-band.
Agree: 13 Disagree: 4 No opinion: 6

Straw Poll #8
I prefer to use NRZ transmission for 25G per channel operation.
Agree: 15 Disagree: 2 No opinion: 6

Motion #7
Move to adopt NRZ transmission for each 25G per channel.
Moved: Jorge Salinger Seconded: Duane Remein
For: Against: Abstain:
Technical ≥ 75% Motion Tabled by Motion #8

Motion #8

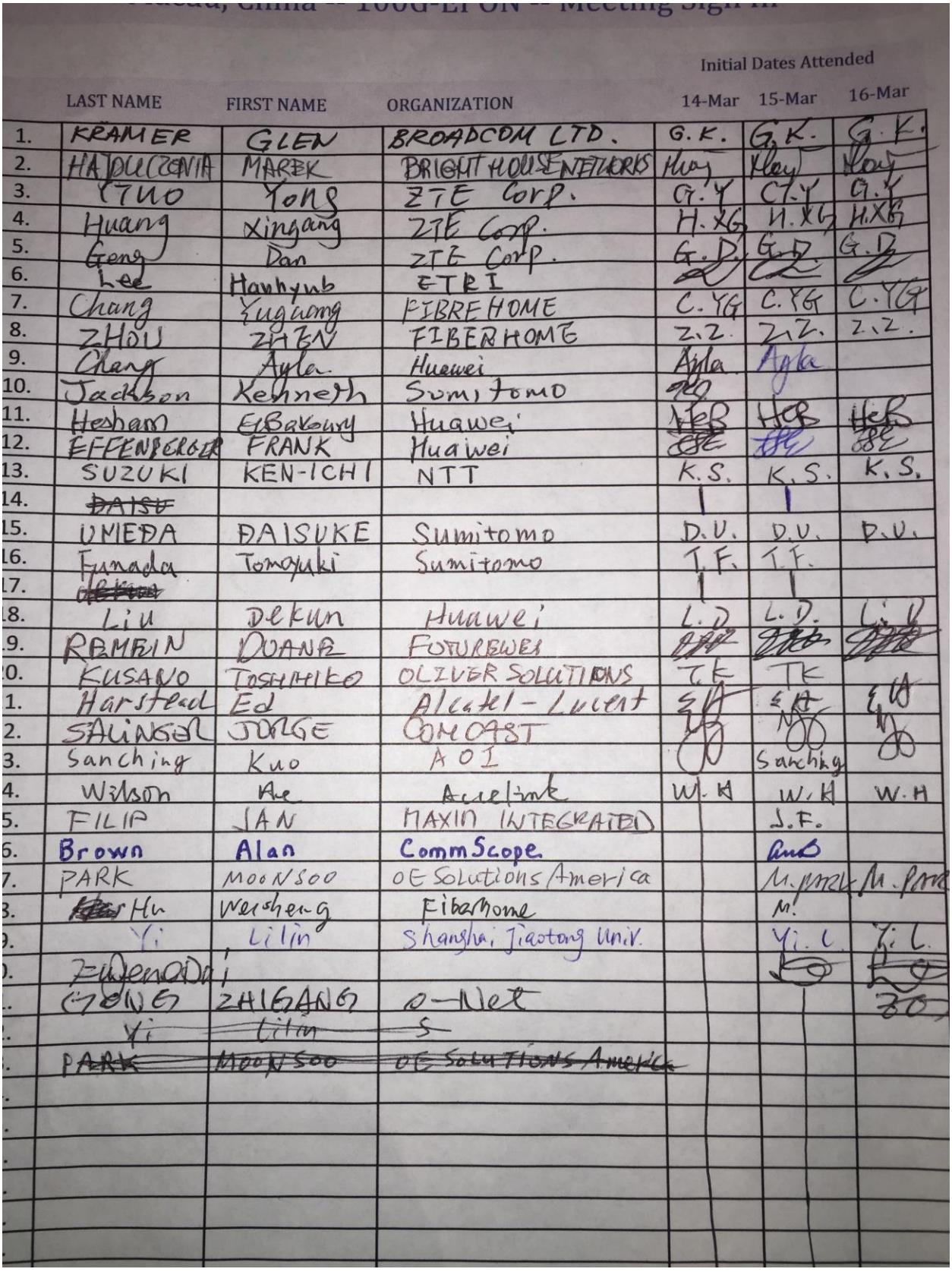
Move to Table motion #7 from the Macao Task Force meeting until end of May Task Force meeting.
Moved: Glen Kramer Seconded: Marek Hajduczenia
For: 20 Against: 0 Abstain: 3
Procedural > 50% Passed

The Chair presented his closing report which included a brief discussion of calls and the work plan. It was agree that all technical motions and the work plan are to be added to the Task Force Web site.
Questions and answers from the Atlanta meeting were briefly shown and will be posted to the Web site.

Motion #9
Adjourn
Moved: Duane Remein Seconded: Jorge Salinger
Procedural > 50% Passed by voice without opposition

12:00 PM The meeting was adjourned.

Attendance



	LAST NAME	FIRST NAME	ORGANIZATION	Initial Dates Attended 14-Mar	15-Mar	16-Mar
1.	KRAMER	GLEN	BROADCOM LTD.	G.K.	G.K.	G.K.
2.	HAJDUCZENIA	MAREK	BRIGHT HOUSE NETWORKS	Marek	Marek	Marek
3.	ITUO	YONG	ZTE Corp.	G.Y	G.Y	G.Y
4.	Huang	Xingang	ZTE Corp.	H.XG	H.XG	H.XG
5.	Geng	Dan	ZTE Corp.	G.D	G.D	G.D
6.	Lee	Hanhyub	ETRI			
7.	Chang	Yugwang	FIBREHOME	C.YG	C.YG	C.YG
8.	ZHOU	ZHEN	FIBERHOME	Z.Z.	Z.Z.	Z.Z.
9.	Chang	Ayla	Huawei	Ayla	Ayla	
10.	Jackson	Kehneth	Sumitomo			
11.	Hesham	ElBakoury	Huawei	HEB	HEB	HEB
12.	EFFENBERGER	FRANK	Huawei			
13.	SUZUKI	KEN-ICHI	NTT	K.S.	K.S.	K.S.
14.	~~DAISU~~					
15.	UMEDA	DAISUKE	Sumitomo	D.U.	D.U.	D.U.
16.	Funada	Tomoyuki	Sumitomo	T.F.	T.F.	
17.	~~DEKUN~~					
18.	Liu	Dekun	Huawei	L.D.	L.D.	L.D.
19.	REMEIN	DUANE	FUTUREWEI			
20.	KUSANO	TOSHIHIKO	OLIVER SOLUTIONS	TK	TK	
21.	Harstead	Ed	Alcatel-Lucent	EH	EH	EH
22.	SALINGER	JORGE	COMCAST			
23.	Sanching	Kuo	AOI		Sanching	
24.	Wilson	Ae	Accelink	W.H	W.H	W.H
25.	FILIP	JAN	MAXIM INTEGRATED		J.F.	
26.	Brown	Alan	CommScope		Alan	
27.	PARK	MOONSOO	OE Solutions America		M.Park	M.Park
28.	~~Hu~~ Hu	Weisheng	Fiberhome		M.	
29.	Yi	Lilin	Shanghai Jiaotong Univ.		Yi. L	Yi. L.
30.	Zhuendai					
31.	ZONG	ZHIGANG	O-Net			30
32.	Yi	~~Lilin~~	~~S~~			
33.	~~PARK~~	~~MOONSOO~~	~~OE SOLUTIONS AMERICA~~			