Meeting Minutes

Industry Connections NG-EPON Activities ad-hoc.

Marek Hajduczenia is acting chair at the start of the meeting due to Howard Frazier's travel delay. Chair called the meeting on Tue, May 13, 2014 at 09:13 AM.

The chair opened the meeting and introductions were made. Edwin Mallette volunteered to be recording secretary.

Chair displayed the agenda. A question rom the floor inquired as to the password of the IMAT tool. The chair gave brief instructions on how to access, use and sign-in to the IMAT attendance tool.

Motion to approve agenda

Approve the agenda as shown in "frazier_ngepon_01_0514.pdf", slide 2.

  Move: Kevin Noll
  Second: Jorge Salinger

Procedural >50%.

Result: Motion passed by voice vote without opposition.

Chair called for members of the press to announce themselves, went over meeting decorum, project goals, current status, goals for this meeting. See opening presentation. See opening presentation.

Chair announced at the time of the post of the opening presentation there were six presentations, however he noted that Curtis Knittle had provided a late presentation.

Ed Mallette reminded the chair about a motion to approve the meeting minutes. The chair displayed the meeting minutes. The chair indicated due to the late posting of the meeting minutes to the ad hoc website, he was postponing the meeting minutes approval until the end of the meeting.

Presentation #1:

Title: NG-EPON Coexistence Scenarios
Presenter: Liquan Yuan
Affiliation: ZTE Communications

Mr Yuan discussed EPONs WBF characteristics with RF overlay in the current ODN and talked about the impact the the NG-EPON wavelength plan. He indicated the c-

---

band 1530-1540nm is a possible good choice for the upstream band. For the downstream band there are a number of options for differing co-existance scenarios. Mr. Yuan provided considerations with regards to the WDM filter, such as pass band, insertion loss, isolation, etc and walked through a number of implementation examples.

Mr Yuan indicated that he wasn't sure if existing devices could be used with something in front of them to provide filtering, attempting to re-use existing equipment by adding additional capabilities.

Glen Kramer asked if 1G-EPON coexistence was an operator requirement. He indicated that maybe a narrower band would be useful to provide in the standard.

Mr. Yuan indicated that the depiction of OTDR using up to 1675 was just an example. Mr. Mallette indicated that his recollection was that in previous meeting a large operator had indicated that if they needed 1G-EPON coexistence that said operator would need support of the wider EPON upstream band because of the amount of early EPON equipment deployed. Duane Reimein asked if we need coexistence with the RF overlay band 1550 band. Mr. Mallette indicated that he hoped for his affiliation that RF overlay would be no longer required at that time.

Presentation #2:

Title: Survey for ODN Deployment
Presenter: Liquan Yuan
Affiliation: ZTE

Mr. Yuan proposed a series of questions to operators to obtain data from the operators including questions about what services are carried on a single fiber, what wavelength are used, distance/splitter ratio and the application model. Then he followed that question up with what do the operators expect for NG-EPON – services carried in one fiber, splitter ratio/distance, and bit rates. Mr. Yuan went on to propose a table to tabulate the results.

Glen Kramer indicated that they attempted such a survey in a previous effort and that IEEE legal slapped their hand. Mr Yuan responded clarified that "bit rate" on slide 3 is really line rate. Yukihiro-san indicated it was difficult to establish a company position because, in their case, NTT has multiple discrete divisions with differing requirements. Yukihiro-san further indicated that when we ignore co-existence it is very easy to make a system such as this. The chair indicated that rather than worry about trying some survey, the operators should bring in their own requirements – either personally or by proxy.

Presentation #3:

Title: Optical Fiber Cable Design & Reliability
Presenter: Patrick Van Vickle
Affiliation: Sumitomo Electric Lightwave

Mr. VanVickle provided a brief history of fiber design, Then he went over basics of some cable designs and talked about cable/fiber failures. He pointed out that the data of cable fiber failure was quite old and that design, coatings, materials of cables has come a long way and that the 3% of failures due to defective cable is probably a lot smaller today.

Mr VanVickle subdivided intrinsic failures failure in the failures of the fiber and the failures of the cable. He went through fiber failures including optical, mechanical, stress corrosion , and splice failure. Regarding splicing, Mr. VanVickle indicated that most failures don't occur at the splice, they occur at either side of the splice – thus the issue is not the splice itself, but the preparation to perform the splice. However academically this was based on an unprotected splice, which should not occur in production. Mr VanVickle then walked through scenarios of the Cable and Hardware reliability testing.

Mr. VanVickle indicated the reason bends weren't discussed in this presentation is because it depended on the location – MDU, for instance, is a different discussion which includes bends and tension, stapling, etc. But for outside drops to the home, there was a time when there was consideration for bend-insensitive cable in the outdoor plant, but that has gone back to traditional fiber (not bend-insensitive) as there aren't bends in the outside plant. The design of the cable in outside plant the strength elements prevent the cable from being bent such that the fiber would break.

Mr. Remein stated that basically the message he hears is that the fiber that's in the ground is good for 40 years, given something doesn't happen to it. Mr. VanVickle confirmed, given there isn't steam or backhoes involved.

Meeting break 10:30AM. Chair called the meeting back to order at 11:02AM.

The chair indicated that Glen Kramer would be the acting chair while Dr. Hajduczenia presented his contribution.

Presentation #4:

Title: MTU UP!
Presenter: Marek Hajduczenia
Affiliation: Bright House Networks.

Dr. Hajduczenia went over the history of MTU in EPON. He pointed out that the all 10G-EPON systems in production today support 2K MTU, but that point-to-point systems all 10G P2P interfaces support at least 9kB MTU.

Dr. Hajduczenia then talked about the main drivers toward 4kB, 9kB – cellular backhaul, business customers running distributed storage / cloud applications, and general customers demanding it because they want it.

As solution options, Dr. Hajduczenia provided fragmentation and support of larger Ethernet frame sizes and then went into detail about both options.

Presentation #5:

Title: Feasibility of high speed TDM in NG-EPON
Presenter: Duane Remein
Affiliation: Huawei

Mr Remein presented on general system requirements; data rate options asking the question of feasible wavelength speed in NG-EPON (25G or 40G downstream? 10G or 25G upstream?); link budget where they had performed some simulations at 25G in C-band and O-band; available wavelength resources; and technology and device maturity. Mr. Remein stated that his personal opinion is that we should look at redefining some of the original EPON wavelengths to possibly reclaim some of the O-band.

Mr. Remein confirmed that on slide 7 to get to 25G, 2.5 times the speed we would need 7.3dB additional link budget. Dr. Kramer stated that he agreed in general with the requirements on slide 3, but asked how these requirements are viewed in ITU-T. Mr. Remein stated that typically they show coexistence with GPON or XGPON, that ITU-T stresses coexistence quite a bit.

The chair indicated that Glen Kramer would be the acting chair while Dr. Hajduczenia presented his contribution.

<div style="border:1px solid black; padding:10px;">

Presentation #6:

Title: Ready to Give Up on TDM ?
Presenter: Marek Hajduczenia
Affiliation: Bright House Networks

Dr. Hajduczenia opened up stating that some suppliers were talking about giving up on TDM. However, he pointed to points as to the positives of TDM-PON, and moved into what NG-EPON needs to provide (lower cost, higher speed, higher capacity) compared to previous generations of EPON but that also NG-EPON will need tom compete with CWDM P2P access as well. Dr. Hajduczenia stated that there is no reason not to support TDM in NG-EPON and detailed his rationale and then walked through several TDM/WDM-PON approaches and the challenges with the approaches. Dr. Hajduczenia stated he would love to see the (Option C) – slide 9 – system particularly for business services.

</div>

For scenario B, Dr. Hajduczenia indicated he was trying to draw more of the downstream scenario (not necessarily upstream) though for business services its commonly symmetric. Dr. Hajduczenia stated that in the option-A approach (slide 6) it is multiple wavelengths and that the standard would provide the wavelength grid and some protocol extensions to select (in the tunable case) which wavelength.

Dr. Knittle asked if load balancing would be desired, precluded ? Dr. Hajduczenia indicated it would not be precluded, but even if it were allowed he did not think it would be done on a per burst basis, it would be done with planning.

Dr. Kramer asked if solution A is any different from XGPON2. Dr. Hajduczenia indicated that in his limited understanding it is the same, then went on to indicate that any wavelength one could theoretically provide a different higher level protocols – one GPON, one EPON, one P2P Ethernet, etc.

Meeting Break for lunch at 12:12. Meeting reconvened at 1:41PM.

<div style="border:1px solid black; padding:10px;">

Presentation #7:

Title:
Presenter: Curtis Knittle
Affiliation: Cablelabs

Dr. Knittle presented on the operator debate of EPON vs GPON starting with Ethernet framing vs Gem encapsulation and fragmentation in 2014 and then fast forwarded to a future state of 2018 where he suggests that fragmentation goes away as an issue (as both EPON and GPON would theoretically support fragmentation in 2018) and where Ethernet is the ubiquitous client layer. He drew as a possibility, a parallel with what happened in Wireless where a single wireless

</div>

standard emerged driving the cost curve down much more rapidly than when there were multiple competing standards. Essentially Dr. Knittle suggested that a single EPON-GPON standard could experience success similar to what the wireless industry saw with the LTE standard convergence.

There was a floor discussion about a possible joint meeting with participants from ITU-T SG15 and 802.3 to discuss possible OnePON / NG-EPON, NGPON2 alignment.

The chair and chief editor walked everyone through locating the draft of the report. It can be found at: http://www.ieee802.org/3/ad_hoc/ngepon/report/. The most up-to-date version as of this meeting is R0.5. It had not been uploaded as of this meeting date.

Contribution #8:

Title: Draft of the report (This link is R04.)
Presenter: Marek Hajduczenia
Affiliation: Bright House Networks

The chair displayed the draft of the report. He pointed to section 4, the Motivation which includes Background and market drivers, service requirements for high bandwidth, and market potential, how many ports you could see in the future. Section 6 would be updated per Dr. Kramer's previous discussion about statistical multiplexing in the access. The last sections including spectrum allocation, paths to higher aggregate capacity and optical components. For section 8.2, Dr. Hajduczenia indicated that material from Mr. Remein's contribution today on lab simulations and loss would be a good fit here. Section 9 is still bare and in need of additional material.

Dr. Kramer stated that within every section there should be some conclusion that narrows down the options, which will be the most difficult part of the activity. Dr. Kramer brought up the FSAN whitepaper published in IEEE Communications magazine. Dr. Kramer and Mr. Powell suggested that Mr. Frazier draft an email to Martin Carroll for release of that whitepaper. Dr. Kramer also took the action item to send an email to IEEE Communications magazine editors to request a copy of the whitepaper to place under password protection on the ad-hoc website for group access.

Mr. Frazier reclaimed the gavel from Dr. Hajduczenia at 2:20PM.

The group had a discussion about how comments could be provided to the editors with a number of suggestions. The chair indicated that we could use comment bubbles within Word to review and provide feedback of the draft for the next couple

cycles and see how it goes. In general there was some consensus that it's too early to utilize the 802.3 comment resolution tool.

The chair indicated that sections that are missing in the report get priority over everything else in the meeting. The chair then requested a motion to approve the meeting minutes; this activity had been deferred from the morning session to allow additional time to review the minutes.

Motion to approve meeting minutes

Motion to approve the meeting minutes from the March 2014 meeting.

      Move: Jorge Salinger
      Second: Curtis Knittle

Motion taken by voice vote >50%.

Result: Motion passed by voice vote without opposition.

The Chair asked how many would support spending Sunday afternoon walking through comments on the draft? The count was 8-10

The Chair indicated that we would request space to do the whole ad-hoc meeting from 1-6PM Sunday afternoon. The chair asked if there were any objections and there were none.

Straw Poll
(San Diego Meeting Attendance)
On the basis the meeting would occur on Sunday between 1PM-6PM.

- ➢ I will attend the meeting in July: 10
- ➢ I may attend the meeting in July: 6
- ➢ I may not attend the meeting in July: 1
- ➢ I will not attend the meeting in July: 1

The chair extended his deepest thanks to Dr. Hajduczenia for running the meeting in his absence.

Motion to Adjourn

Motion to adjourn.

      Move: Edwin Mallette
      Second: Kevin Noll

Meeting adjourned at 2:50PM

Lastname	Firstname	Affiliation	Tue
Agata	Naoki	KDDI R&D Labs	X
Akio	Tajima	NEC	X
Allard	Michel	Cogeco Cable	X
Chang	Xin	Huawei	X
ElBakoury	Hesham	Huawei	X
Frazier	Howard	Broadcom	X
Fujimoto	Yukihiro	NTT	X
Hajduczenia	Marek	Bright House Networks	X
Knittle	Curtis	CableLabs	X
Kramer	Glen	Broadcom	X
Laubach	Mark	Broadcom	X
Mallette	Edwin	Bright House Networks	X
Noll	Kevin	Time Warner Cable	X
Peters	Michael	Sumitomo	X
Powell	Bill	Alcatel-Lucent	X
Rahman	Saifur	Comcast	X
Remein	Duane	Huawei	X
Salinger	Jorge	Comcast	X
Tajima	Akio	NEC Corporation	X
Ten	Sergey	Corning	X
Ulm	John	ARRIS	X
Van Vickle	Patrick	Sumitomo	X
Yaun	Liquan	ZTE Corp	X