Minutes IEEE P802.3cy Greater than 10 Gb/s Electrical Automotive Ethernet PHY TF AdHoc meeting January 19, 2021

Prepared by Natalie Wienckowski

Proposed Agenda:

Title	Presenters(s)	Affiliation(s)
Agenda	Natalie Wienckowski (ad hoc Chair)	General Motors
TF Chair's Comments	Steve Carlson	High Speed Design, Robert Bosch GmbH, Ethernovia
Reduced Set of PHY Design Parameters	Hossein Sedarat	Ethernovia
General discussion of PHY	None	
P802.3cy To-do list	Natalie Wienckowski	General Motors
Closing Remarks	Steve Carlson	High Speed Design, Robert Bosch GmbH, Ethernovia

See adhoc webpage for agenda deck and presentations

Agenda/Admin Natalie Wienckowski as ad hoc chair:

Meeting began at 1:05 pm ET.

Introductions & Affiliations.

Presented file: cy_Task_Force_PHY_adhoc_agenda_01_19_21.pdf

1. Reviewed the Attendance information related to the ad hoc.
2. Displayed the Participation slide and reviewed it.
3. Displayed patent slide deck, and reviewed it.
   Call for Patents was made at 1:10 pm Eastern Time, none responded
4. Reminded participants to indicate full names and employer/affiliation for the meeting minutes.

Instructions for subscribing to the reflector may be found at http://www.ieee802.org/3/cy/reflector.html. If you cannot subscribe to the reflector for some reason, and need additional assistance please contact the Task Force chair.

Chair's comments: This special ad hoc is to allow our PHY experts to have more time to discuss items that there hasn't been enough time to dicuss during our regular ad hocs. Currently just this one meeting is scheduled. If this is valuable, we may schedule additional meetings in the future.

Presentations/Discussion:

Presentation: Reduced Set of PHY Design Parameters (Hossein Sedarat, Ethernovia)

Hossein presented a number of topics related to the PHY design. There was discussion on the slides as we went through them.

Slide 2 – Parameters in SNR Calculations
Hossein listed the different parameters used for SNR calculations. It would be desirable to separate the PHY parameters from the system parameters.
It was brought up that EMI is not on the list. It is hoped that EMI could be lumped in the PHY bucket. The issue is we don't have a good idea of what EMI we need to meet.

Slide 3 – Transmit PSD and Power
Hossein listed the issues with using ZOH for the PSD at the MDI. There is agreement that ZOH has potential issues.
CCC assume ZOH only impacts the receive path and echo.
There is a question on what is assumed for the spectral shaping. What is shown by Hossein is not what the CCC uses.
More information/discussion is needed on PCB and component loss.
A common definition of measurment points is needed from PHY to PHY. Chris DiMinico plans to provide this for the 1/26 meeting.

Slide 4 – Other Sources of Signal Loss that Hoseein assumes add up to about 1 dB.

Slide 5 – AFE Noise Floor. We need to agree on a reasonable value.
This is needed to be used when doing calculations, but does not go into the spec.

Slide 6 – Residual Echo
This is heavily dependent on the implementation

Slide 7 – FEC Coding Gain
FEC helps to deal with Impules noise and guassian noise.

Can the FEC help with EMI coverage?

FEC also helps with coding gain.

Slide 8 – Implementation Loss
This bucket includes multiple items. Every designer has their own unique allocation for this.
Implementation loss includes operation margins as well as physical parameters.

Slide 9 – Reduced Set of Parameters
The goal is to reduce the number of individual parameters and lump them in together.
Different designs and designers use different values for each of the parameters. We can get stuck discussing specific values for each.

There is a question if whether you have all the worst case noise sources at the same time is realistic or not. Each implementer can decide what they think is the worst case that they need to survive. The proposal is to just have a single value which no one needs to justify or provide a breakdown of the individual parts.

How do we agree on lumped values with less transparancy if the numbers are very different? Hossein's calculations show that the different total assumptions are very close so the individual parts that make it up aren't important.

Residual Echo is kept separate as this is dependent on the cable and could change as we get more information.

We haven't yet had any discussions on FEC. The spreadsheet assumes Reed-Soloman as was used in ch, but this is still subject to discussion and agreement. This shouldn't be eliminated before there is an agreement on this.

One of the purposes of the spreadsheet is to make the calculations transparent. The different items are included so you can see the impact of each change on the overall performance.

Slide 10 – Differences to Rconcile

There is a question as to what the Equivalent input noise floor is based on. Is this related to a specific IL? These values were not in a specific presenation, but were calculated by Hossein based on what was presented. Jonsson's was done based on a cable presented by Mueller.

Potential difference in C2M Loss is that Ragnar is including unkonwn component losses in the Implementation loss.

We need to look at the PSD value and PSD mask in the future.

Ragnar assumes the Transmit PSD is at the MDI so the C2M Loss is already incorported in the Transmit PSD.

Ragnar will present on the Noise Floor at a future date.

General Discussion:

IL- What is the advantage to a strawman vs. a baseline.
A strawman doesn't require a vote to select it, a baseline does.

The baseline goes into the draft and the strawman doesn't. However, either one can be changed. When we're online only, if there isn't unanimous agreement, we have to do a roll call which can take significant time compared to when we're in person.

Please review Ragnar's proposal for a piece-wise linear limit line for IL. He is interested in others' thoughts on this and whether this makes sense for a limit line.

There was a question on Ragnar's presentation from earlier today related to how the calculations were done for link segment length vs. PAM and cable IL model. Please contact Ragnar for specific explanations on the calculations that he did.
There is a question if the Tx Power should be the same for all PAM or should it be different? Ragnar will check the calculator for this.

Presentation: P802.3cy To-do list usage (Natalie Wienckowski, General Motors)

The To-Do list was updated. Participants are urged to review the list for topics they can support and for missing topics. Please send a message to the reflector with requested changes to the list.

The current list can be found on this page: To Do spreadsheets

Closing Discussion

Thomas Mueller will look into providing information on Common Mode Crosstalk or Mode Conversion with the shielded cables.

Based on previous testing the Thomas has done, the PCB design has a large impact on the ingress noise.

The meeting was helpful for Ragnar and Hossein who had a chance to discuss some topics in more detail today. It would be good if more

Meeting adjourned at 3:36 PM ET.

Attendees (snapshot of participants in meeting, email)

First	Last	Affiliation
Alireza	Razavi	Marvell
Brett	McClellan	Marvell
Curtis	Donahue	UNH-IOL
Daniel	Koppermüller	MD Elektronik
Erwin	Köeppendörfer	Leoni Kabel GmbH
Frank	McCarthy	Marvell
Haysam	Kadry	Ford
Hossein	Sedarat	Ethernovia

First	Last	Affiliation
Jim	Graba	Broadcom
Jonathan	Silvano de Sousa	GG - Austria
Joost	Briaire	Marvell
Larry	McMillan	Western Digital
Luisma	Torres	KDPOF
Martin	Glanzner	SEI ANTech Europe GmbH
Marty	Gubow	Keysight
Massad	Eyal	Valens
Michael	Reinhard	SEI ANTech
Mike	Tu	Broadcom
Natalie	Wienckowski	General Motors
Peter	Wu	Marvell
Ragnar	Jonsson	Marvell
Shivesh Kumar	Dubey	NXP
Sina	Barkeshli	
Stefan	Andrä	SEI ANTech – Europe GmbH
Stephan	Hartmann	Siliconally GmbH
Steve	Carlson	High Speed Design, Robert Bosch GmbH, Ethernovia
Sujan	Pandey	Huawei
Taiji	Kondo	MegaChips
Thomas	Müller	Rosenberger
Tom	Souvignier	Broadcom
Tzahi	Madgar	Valens
Venkateswara C.	Penumuchu	Marvell
Yong	Kim	Axonne
TOTAL	**33**	**Attendees**

Presenters (29)

- Alireza Razavi Guest
- Brett McClellan (Marvell) Guest
- Curtis Donahue Guest
- Daniel Koppermüller - MD Elektronik GmbH Guest
- Erwin Koeppendoerfer; Leoni Kabel GmbH Guest
- Frank McCarthy Guest
- Haysam M. Kadry (Ford) Guest
- Hossein Sedarat (Ethernovia) Guest
- Jim Graba (Broadcom) Guest
- Joost Briaire Guest
- Larry McMillan (Western Digital) Guest
- Luisma Torres (KDPOF) Guest
- Martin Glanzner, SEI ANTECH Guest
- Marty Gubow - Keysight Guest
- Michael Reinhard - SEI ANTech Guest
- Mike Tu (Broadcom) Guest
- Natalie A. Wienckowski
- Peter Wu, Marvell Guest
- Ragnar Jonsson (Marvell) Guest
- Shivesh Kumar Dubey, NXP Guest
- Stefan Andrä SEI ANTech Guest
- Stephan Hartmann - Siliconally GmbH Guest
- Steve Carlson (HSD, Bosch, Ethernovia) Guest
- Sujan Pandey (Huawei) Guest
- Taiji Kondo, MegaChips Guest
- Tom Souvignier (Broadcom) Guest
- Tzahi Madgar Guest
- Venkateswara C. Penumuchu Guest
- Yong kim [axonne] Guest

Müller, Thomas Guest

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