

# Minutes IEEE P802.3cy Greater than 10 Gb/s Electrical Automotive Ethernet PHY TF AdHoc meeting August 3, 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
Choice of Modulation	Hossein Sedarat	Ethernovia
Modulation Evaluation	Ragnar Jonsson	Marvell
Modulation SNR Margin Evaluation and Precoder Proposal for the 25G Automotive PHY	German Feyh Mike Tu Tom Souvignier	Broadcom
Nonlinear Precoding	Hossein Sedarat	Ethernovia
802.3cy coupling- and screening attenuation	Thomas Müller	Rosenberger
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 10:05 am ET.

## Introductions & Affiliations.

### Presented file: [cy Task Force adhoc agenda 08 03 21.pdf](#)

1. Reviewed the Attendance information related to the ad hoc.
2. Displayed patent slide deck and asked if any participant had not read the IEEE-SA Patent Slides slide set, none responded.  
Call for Patents was made at 10:09 am Eastern Time, none responded
3. Displayed the IEEE-SA Copyright policy slide and asked if any participant had not read the IEEE copyright slide set, none responded.
4. Displayed the IEEE-SA Participation slide and reviewed it.
5. 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:** Thanks for putting your employer and affiliation in the chat if you don't have them with your name. We will need to stay on schedule today due to the volume of presentations.

## **Presentations/Discussion:**

### **Presentation: Choice of Modulation (Hossein Sedarat, Ethernovia)**

Hossein presented his calculations on expected performance of different modulation options (PAM3, PAM4, PAM5, PAM6, PAM7, & PAM8) and provided his opinion on the best option.

There was a question related to the bit to PAM5 mapping and the complexity and whether this overhead was included. It has not been at this time. This would need to be considered before a final decision is made.

### **Presentation: Modulation Evaluation (Ragnar Jonsson, Marvell)**

Ragnar presented his calculations on expected performance of different modulation options (PAM2, PAM3, PAM4, PAM5, PAM6, PAM7, & PAM8). Based on the performance of different cables, PAM4 is either the best option or a good option for all cables.

Ragnar also presented information on some different RS FEC block sizes. There was a question on the "k" for the different lengths as only (360,326) was explicitly stated. He looked at each cable and calculated the best combination for each, but they aren't included here. The symbol rate is similar for all RS FEC codes, assuming the same modulation, e.g. all PAM4.

### **Presentation: Modulation SNR Margin Evaluation and Precoder Proposal for the 25G Automotive PHY (German Feyh, Mike Tu, Tom Souvignier; Broadcom)**

German presented his calculations on expected performance of different modulation options with 1.5 to 3.5 bits per symbol (3B2T, DSQ-8, PAM4, 32-Cross, DSQ-32, PAM8, DSQ-128). The preferred modulation is PAM4.

Propose using the optional precoder as defined by P802.3ch.

Some participants feel that the lower symbol rate may be worth doing a slightly more complex constellation, e.g. 32-Cross.

There was a question about why constant signal power instead of constant voltage was used. If constant voltage is used, PAM4 is a clear winner. There was a question as to which is the better one to use. German said he thinks constant voltage may be a better method, but may not be as common in IEEE802.3.

We will probably need to come up with a common set of parameters to use to evaluate the different modulation types or we will be comparing "apples and oranges". George Zimmerman will provide a presentation for the August 10<sup>th</sup> meeting.

## **Presentation: Nonlinear Precoding (Hossein Sedarat, Ethernovia)**

Hossein presented information on the precoder and proposed that we use the same precoder with the same method of selection as we did for P802.3ch.

## **Presentation: 802.3cy coupling- and screening attenuation (Thomas Müller, Rosenberger)**

Thomas presented some data on screening and coupling attenuation and proposed limits for these based on testing using the method defined in 149A. He provided test data on 5 samples tested to 9 GHz.

The ingress noise is highly dependent on the connection of the shield to the PCB. It can be as low as 1 mV for a properly terminated connector shield, or as high as 10 mV for a poorly terminated connector shield.

It's requested that some proposals for informative limits be provided for some of the internal test points being discussed to ensure proper terminations.

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

The to-do list was reviewed and updated. A new tab has been added with tasks to get to D1.0. 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**

Thank you to everyone for the tremendous amount of work.

Meeting adjourned at 11:59 AM ET.

## **Attendees (download participant list, email)**

First	Last	Affiliation
Bob	Grow	RMG Consulting
Brett	McClellan	Marvell
Chris	DiMinico	MC Communications, PHY-SI, SenTekse / Panduit
Christian	Neulinger	MD Elektronik
Clark	Carty	Cisco
Curtis	Donahue	Rohde & Schwarz)
Dave	Hess	Cord Data
Emilio	Cuesta	TE Connectivity
Eric	DiBiaso	TE Connectivity
Erwin	Köepfendorfer	Leoni Kabel GmbH

<b>First</b>	<b>Last</b>	<b>Affiliation</b>
George	Zimmerman	CME Consulting / ADI, APL Group, Cisco Systems, CommScope, Marvell, SenTekSe
German	Feyh	Broadcom
Harsh	Patel	Molex
Haysam	Kadry	Ford
Hossein	Sedarat	Ethernovia
Jamila	Borda	BMW
Jim	Graba	Broadcom
Jonathan	Silvano de Sousa	GG - Austria
Kambiz	Vakilian	Broadcom
Keisuke	Kawahara	FURUKAWA ELECTRIC
Louise	Yi	FIT
Manabu	Kagami	NITech (Nagoya Institute of Technology)
Marty	Gubow	Keysight
Matthew	Ronning	Sony
Michikazu	Aono	Yazaki
Mike	Tu	Broadcom
Natalie	Wienckowski	General Motors
Nobuyasu	Araki	Yazaki
Peter	Wu	Marvell
Ragnar	Jonsson	Marvell
Ralf	Peteranderl	Rosenberger
Rich	Boyer	Aptiv
Roland	Preis	MD Elektronik
Qiwen	Zhong	Huawei
Sami	Akin	VW
Steve	Carlson	High Speed Design, Robert Bosch GmbH, Ethernovia
Sujan	Pandey	Huawei
Taiji	Kondo	MegaChips
Thomas	Müller	Rosenberger
Tom	Souvignier	Broadcom
Yoshihiro	Niihara	Fujikura Ltd.
<b>TOTAL</b>	<b>41</b>	<b>Attendees</b>