Minutes IEEE 802.3cg AdHoc meeting MARCH 8, 2017

Prepared by George Zimmerman

Proposed Agenda:

1. Agenda George Zimmerman, CME Consulting/ADI, Aquantia, BMW, Commscope, LTC – Acting Ad hoc Chair, Chair IEEE 802.3cg Task Force
2. Simulations with Intrinsically Safe Component Values, Oisin O'cuanachain, ADI
3. Channel and Multidrop Considerations, Stefan Buntz, Daimler
4. Noise Environment for PHY Proposal Evaluation, Steffen Graber, Pepperl+Fuchs

Presentations posted at:

http://grouper.ieee.org/groups/802/3/cg/public/adhoc/index.html

Agenda/Admin George Zimmerman:

Meeting began at 7:04am PT.

1. Reviewed the task force web and reflector information related to the ad hoc.
2. Displayed and read the patent policy deck – at 7:10 AM the chair issued the call for patents. No participants responded.
3. Reminded participants to indicate full names and employer/affiliation correctly for the meeting minutes.
4. Presented the proposed agenda – no objection.

Presentations/Discussion.

Chair's Comments & Discussion George Zimmerman CME, TF Chair

- Areas of work to move along – at our Vancouver meeting we should be prepared to make progress on baseline proposals. The presentations at this adhoc should help that process. Particularly, we should try to adopt proposals for:
    - Link Segments – (we have had proposals for the long link segment, need more definition on the short link segment and multidrop, which will be discussed in this ad hoc)
    - Prepare to move forward on PHY baselines – we need information on the noise environments, as well as the multidrop link segments.
- Requests for presentations are still being accepted as we have the time, particularly if they move us forward.

Presentation: Simulations with Intrinsically Safe Component Values: Oisin O'cuanachain

This presentation was offered to move forward work on the PHY proposals. The presenter will not be present in Vancouver. The presenter reviewed PHY simulation results showing performance on:
the 1000m link segment:
http://www.ieee802.org/3/cg/public/Jan2017/diminico_01a_0117.pdf
the 4B3T PHY proposal:
http://www.ieee802.org/3/cg/public/Jan2017/Graber_10SPE_10_0117.pdf
and using circuit values proposed for intrinsically safe systems in:
http://www.ieee802.org/3/cg/public/adhoc/0117_cg_adhoc_IntrinsicSafety_r01.pdf.
Substantial system margin was shown for 1e-9 BER in an AWGN (2 sources at -115.4dBm/Hz each).

Additionally, the presenter discussed: (a) the relationship of intrinsically safe component values to the droop specification common in IEEE 802.3 PHYs; (b) that he understood the meaning of objective 10 (do not preclude operation in an intrinsically safe system) meant that a PHY could be designed to the 802.3cg specification to work in an intrinsically safe system, not that every PHY IC that makes a compliant 802.3cg port can be used in an intrinsically safe system, and (c) to clarify that when we say we specify a "PHY" it isn't limited to the "PHY IC" or "PHY chip", but includes the electrical interface, logical and behavioral aspects of the components from the MAC interface to the MDI plane.

Questions/Discussion:

- There was general agreement with the presenter's interpretation of the objective and the scope of the PHY.
- The presenter was asked about follow on steps to adopting a PHY baseline proposal. The presenter mentioned evaluating the PHY against the expected noise environments would be needed.

Presentation: Channel and Multidrop Considerations: Stefan Buntz

It is expected that this presentation will be combined with the considerations from Kaindl at the previous ad hoc, and presented in Vancouver. The presenter, Mr. Buntz, would not be present in Vancouver.
The presenter discussed several issues related to automotive use cases for the 802.3cg PHY, building on the previous ad hoc presentations from Michael Kaindl. These included:

- Possible relaxations in the channel configuration from that in 802.3bw – these included more flexible connector pinouts and might draw from CAN experience. Cable harness experts were requested to provide data on possible link segments.

- The frequency range of interest – from 2 MHz to 30 MHz. the presenter indicated that the frequency range for automotive applications would likely start at 2MHz, to both avoid noise sources at low frequencies, and to improve the relative cost of components for coupling power via PoDL. Using above 38 MHz would introduce new noise sources, and this was to be avoided as well.
- Multidrop system aspects – the presenter discussed 2 potential topologies for multidrop systems. One was the daisy-chain approach described by Kaindl, with a maximum length of 25m, and the other was a (passive) star-wired system, where several branches, each up to 8m, were connected together at the head-end unit. The presenter clarified that hybrid structures with both daisy-chain and star were not being addressed. Input from semiconductor vendors was sought on the feasibility of these reaches and configurations, along with the proper approach for termination.
- Discussion/questions:
    - The Chair requested that we work to make progress by presenting equations or models of link segment proposals. Either equations, complex frequency domain models, or other simulateable representation of the link segment alternatives desired (both for the multi drop and for the point to point) were desired.
    - Additionally, modeling the impact of the 2MHz highpass PoDL coupling network and operation at 15m was desired to determine whether the existing PHY proposal would work (participants noted that for 1km operation, transmission under 2MHz was desirable). Suggestion that there were simple modifications available to allow use of higher than Nyquist frequencies while maintaining the 4B3T baseband PAM and good operation on 1km , should they be needed.
    - Additionally, some form of simulation model for the different topologies was needed.
    - There was considerable discussion on termination of the multidrop components. A participant stated that the ECU's, which could be either the head end or leaf nodes on the multidrop network, could not be modified based on where they were located, so termination should either be automatically configured, uniform, or otherwise independent of the ECUs location.

Presentation: Noise Environment for PHY Proposal Evaluation : Steffen Graber

The presenter previewed a presentation which will be reviewed in Vancouver. The presentation covered a wide variety off issues related to PHY Proposal Evaluation, include 200m and 1000m link segment models, variation of link segment IL with temperature, collection of data for simulating the noise environment, a review of several noise sources, including radiated EMI, electrical transients from equipment, and noise from power circuits as part of the same system. The presenter also offered some benchmarks for noise immunity levels in existing industrial and process automation systems. Unfortunately, presentation was abbreviated due to time, and discussion was not complete.

Specifically, the presenter provided input for and asked for aid in gathering noise data from target environments; as well as presentations from those with experience from other PHYs (e.g., DSL) in radio interference in the band from approximately 500 kHz to 1.7 MHz.

Discussion/Questions:

- The presenter offered a method and block diagram, and requested others to help progress the work by gathering data on noise seen in their environments (see slides 8 & 9). One participant asked that given the prior presentations, gathering the noise to a bandwidth of at least 30 MHz would be useful.
- The presenter requested any feedback from those with experience in other systems impacted by medium frequency radio interference (e.g., 526.5 -1606.5 kHz in Europe, 530 -1720 kHz in America).
- Does the addition of a multidrop channel increase the effort in a PHY in comparison to a P2P channel only?
- Can the effect of a "chain node" be compared with the effect of an inline connector? 8 participants ~ 6 inliners?
- Is the effort that the head end must put in for address mapping and bandwidth reservation/allocation reasonable, or will it add significantly to complexity?
- What is the comparison between having a switch with multiple MACs in a point-to-point scenario relative to the MPCP model for EPON?

Closing

The meeting ended with the Chair thanking the presenters for helpful contributions, and a reminder that additional presentations for Vancouver, particularly those building on this discussion were being accepted and encouraged.

The meeting adjourned at – 9:10am PT

Attendees (from Webex + emails (to be added))

First Name	Last Name	Employer/Affiliation
Jim	Bauer	Marvell
Tobias	Belitz	Renesas
Piergiorgio	Beruto	Canovatech
Dale	Borgeson	Emerson
David	Brandt	Rockwell Automation
Theo	Brillhart	Fluke
Phillip	Brownele	TDK
Stefan	Buntz	Daimler
Steve	Carlson	HSD
Dick	Caro	CMC Associates
Clark	Carty	Cisco
Eric	DiBiaso	TE

Dominik	Dorner	Leoni
Alexander	Felgenhauer	Yazaki
Brian	Franchuck	Emerson
Matthias	Fritsche	HARTING Electronics GmbH
Claude	Gauthier	OmniPHY
Jens	Gottron	Siemens
Steffen	Graber	Pepperl+Fuchs
Craig	Gunther	Harmen
Matthias	Jaenecke	Yazaki
Chad	Jones	Cisco
Peter	Jones	Cisco
Olaf	Krieger	Volkswagen
Kirsten	Matheus	BMW
Mick	McCarthy	Analog Devices
Brett	McClellan	Marvell
Henry	Muyshondt	Microchip
Ulrich	Nowack	Delphi
Oisín	Ó'chuanachain	Analog Devices
Arkadiy	Peker	Microsemi
Vimalli	Raman	Yazaki
Dieter	Schicketanz	Consultant, Reutlingen University
Laura	Schweitz	Turck
Masood	Shariff	CommScope
Heath	Stewart	Linear Technology
Ching-Yao	Su	Realtek
Mehmet	Tazebay	Broadcom
Paul	Vanderlaan	Berk-Tek
Christoph	Weiler	Siemens
Daniel	Wiesmayer	DRÄXLMAIER
Peter	Wu	Marvell
Markus	Wucher	Endress+Hauser
Dayin	Xu	Rockwell Automation
George	Zimmerman	CME Consulting/ADI, Aquantia, BMW, Cisco, Commscope, LTC