

**IEEE P802.3ap Channel Model Ad Hoc
Teleconference Meeting Notes
December 15, 2004**

Meeting Summary

- Review of Agenda
 - Reference: http://ieee802.org/3/ap/public/channel_adhoc/agenda_c1_1204.pdf
- Rich Mellitz Presentation
 - Reference: http://ieee802.org/3/ap/public/channel_adhoc/mellitz_c1_1204.pdf
 - Specify the settling directly
 - But Rich's presentation showed that variation in implementation beyond TP1-TP4 causes significant differences
 - Doing IFFT's showed to be problematic
 - A pulse TDR exhibits similar behavior
 - S-parameters may not give the critical low frequency time behavior
 - Prescribed manner for converting from frequency to time domain
 - Problem - DC to 50 MHz not included, and extrapolation becomes an issue
 - For a channel – TDR/TDT
 - To derive pulse, delay a copy of the signal and then subtract it from the original
 - Problem - can't convolve with packaging effects
 - Equipment to measure to lower in frequency is discussed
 - Issues related to launch discussed
 - Can we learn anything from group delay? Still being investigated.
 - DC Response important for time domain behavior
 - Low frequency phase information provides information in time domain
 - Discussion wandered into measurement techniques, accuracy, use of data with simulation
 - Need to preserve passivity and causality
 - The quality of translation from frequency domain to time domain is of concern
 - Extrapolation to DC needs to be done so the channel is passive and causal
- Is frequency domain information sufficient to describe the channel?
 - Need to realize that there are different problems that are being addressed by informative and normative models.
 - Magnitude and time of reflections is the issue. We can't address this with a magnitude only mask set.
 - Key issue - identify settling time / energy
- Not clear that there is a way to just look at TP1-TP4 alone, and we may need to cascade with assumptions for TP4-TP5 and package. The frequency domain characteristics appear to be useful as an informative model, but in general it is not clear that they will fulfill the normative process.
- The current magnitude-only frequency domain approach is not sufficient. Magnitude and phase equates to time domain, which is why it is easy to consider going to time domain. We need to revisit to see if there is a way to bring phase information into the approach.
- The frequency only approach appears to be of use to board designers as an informative model.
- Crosstalk (MDNEXT, MDFEXT, and ACR)
 - Reference: http://ieee802.org/3/ap/public/sep04/dambrosia_03_0904.pdf
 - Normative or informative?
 - Use of time domain tools for measurement of low noise is plagued by instrumentation issues

- IEEE has traditionally characterized noise in the frequency domain
 - Is this sufficient?
- The way that crosstalk is applied is also an issue (correlated vs. uncorrelated)
 - Power sum as informative or normative,
 - Specify limits on number of aggressors?
 - Define a limit on total noise?
 - Define separate limits for correlated and uncorrelated noise?
- Proposed use of power-sum multi-disturber (total noise) and individual aggressor (correlated noise) limits.

Action Items

- Rich Mellitz
 - Include group delay and return loss in study of time- and frequency-domain correlation.
 - Include math for cascading devices with channel.
 - Define gamma for Tx and Rx included in the analysis.
- Shannon Sawyer
 - Run Tyco channels through Charles' technique and compare to StatEye with cascaded devices.
- John D'Ambrosia
 - Contact TDA for information on passivity and casualty.
- Brian von Herzen
 - Present argument to change power sum to voltage sum.

Attendance

First	Last	Dec. 15
Joe	Abler	
Andrew	Adamiecki	
Michael	Altmann	
Brian	Brunn	
Luke	Chang	
John	D'Ambrosia	X
Xiao-Ming	Gao	
Adam	Healey	
Steven	Krooswyk	
Aniruddha	Kundu	
Cathy	Liu	
Richard	Mellitz	
Gary	Oleynick	
William	Peters	
Petre	Popescu	
Shannon	Sawyer	
Jeff	Sinsky	
Vivek	Telang	
Peter	Tomaszewski	
Schelto	van Doorn	
Brian	von Herzen	

X = Meeting notes volunteer.