



PHY Modeling Plan

William Jones
Solarflare Communications

Objective

- **Establish a common ground that multiple participants in the modeling ad hoc can use to identify and to evaluate multiple approaches to achieving 10G on structured UTP.**
- **Plan attempts to capture the opinions appearing on the reflector up to the March 2003 meeting and the methodology of Sailesh Rao's 1000BASE-T Matlab code**

Cable Models

- **Use models determined in Cabling Ad Hoc**
- **Expected to be based on scaled measurements**
- **Scaling to be defined within the Cabling Ad Hoc**
- **Insertion Loss, NEXT, FEXT, Return Loss, ANEXT**

Other Noise Sources

- **Lower noise floor since ANEXT considered separately**
- **-143 dBm/Hz noise floor**

Capacity

- **4, 7, 10, 13 dBm launch power**
- **Transmit PSD can be specified or optimized through waterfilling**
- **Determine capacity as a function of different cancellation levels**
 - **40, 50, 60 dB NEXT**
 - **50, 60, 70 dB Echo**
 - **15, 20, 25 dB FEXT**
 - **5, 10, 15 dB ANEXT**

Optimal DFE SNR (Optional)

- **6 dB coding gain**
- **1e-10 BER**
- **For a candidate line code and transmit PSD, determine SNR and compute margin as a function of different cancellation levels**
 - **40, 50, 60 dB NEXT**
 - **50, 60, 70 dB Echo**
 - **15, 20, 25 dB FEXT**
 - **5, 10, 15 dB ANEXT**

Time Domain Complexity Evaluation (Optional)

- **For interference cancellation, Sailesh's Matlab code implements ideal cancellation. Specifically, an N tap canceller zeros out N terms of the impulse response.**
 - **Use same methodology to determine achievable cancellation as a function of finite canceller length**
- **For equalization, Sailesh's Matlab code implements the MMSE matrix solution for calculating finite length equalizers.**
 - **Use MMSE matrix solution to determine achievable SNR as a function of finite equalizer lengths**
- **Note: code assumes noise cancellation after FFE. Should we consider noise cancellation before FFE?**

Conclusion

- **Need to get consensus on the plan in order to move forward in a productive manner**