On The Need For Precoder Updates In Data Mode: Laboratory Results

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Introduction

- **There are two questions surrounding the use of TH precoding for 10GBase-T**
  - Initialization of the precoder
  - Data mode adaptation

- **This contribution addresses the latter by presenting laboratory results where the precoder and DFE are fixed in data mode**

- **The experiment uses 4D-TCM/PAM10 transceivers operating at 10Gbps**

- **Results extendable to TH precoded systems**

System Under Test

- **4D-TCM/PAM10**
  - **Linear precoder**
  - **Residual DFE**

- **The linear precoder was adapted and then fixed as part of startup**

- **The residual DFE was allowed to adapt for one billion frames in data mode and then frozen**

- **All other control loops were allowed to continue adapting, e.g., FFE, TRL, etc.**

Lab Setup

- **Data mode consisted of duplex 10G Ethernet traffic generated with Spirent test equipment**

- **1400 byte frames**

- **Periodically measured slicer SNR on all four pairs**

- **Measurement period was 30 minutes**

- **Estimation interval was 80 microseconds**

- **Test time was 19.5 hours**

- **65 billion frames transmitted**

- **1 CRC error recorded**

- **Channel configuration was 45m of Cat6**

Measured Slicer SNR
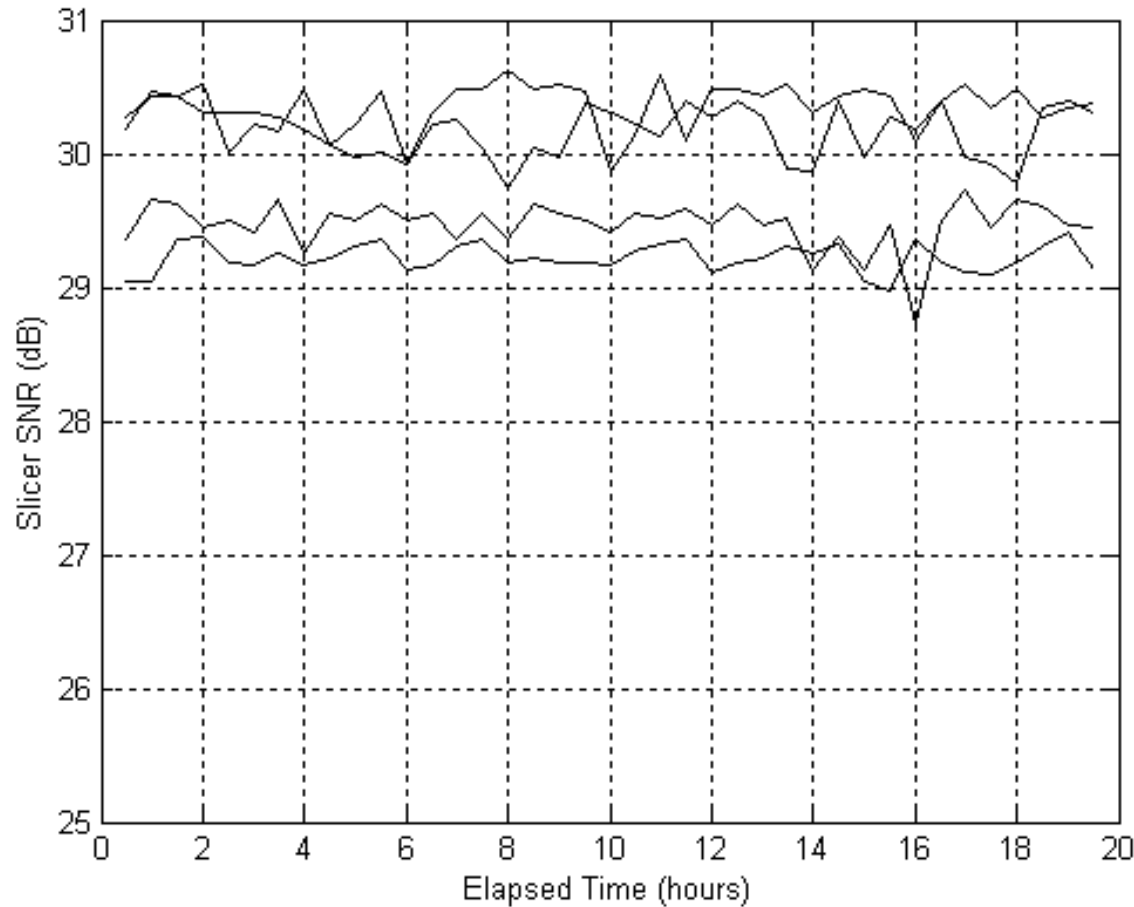
Std. Dev.
  A = .20 dB
  B = .19 dB
  C = .11 dB
  D = .18 dB

12:00 noon   7:30 am

Summary

- **Laboratory data has been presented that illustrated over an extended period of time that the slicer SNR does not vary appreciably**

- **Thus, with modest receiver equalization there is no need to update the TH precoder**