Feasibility of using White Noise Interference in the EIT Test

Vivek Telang

April 19, 2006

Recap: Comment 31

Comment Type TR

A sinusoid interferer does not accurately capture the intent of this test, which is to evaluate the tolerance of a receiver to a crosstalk interferer, for the following reasons:
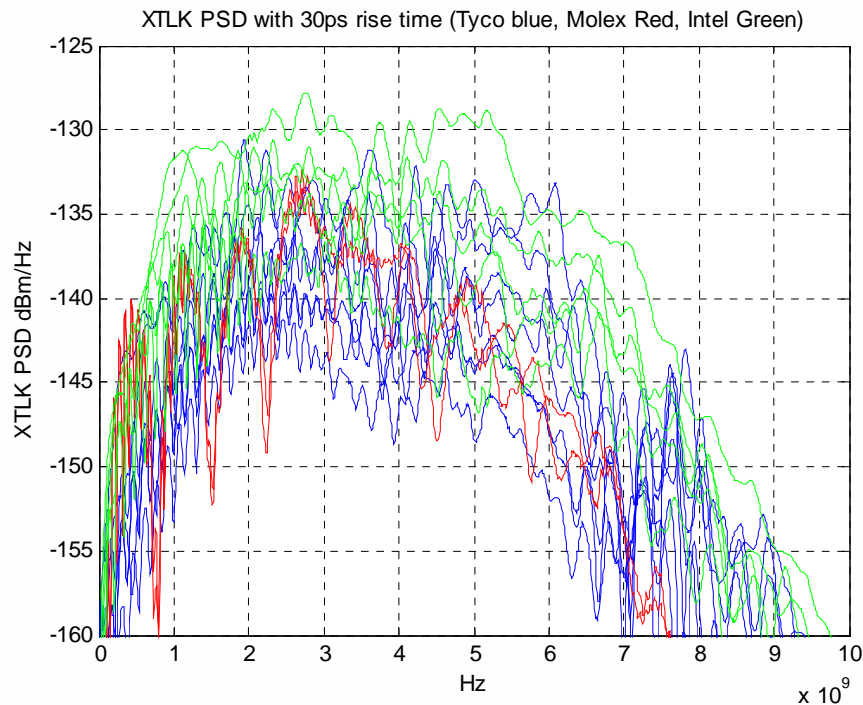
1. As pointed out by Fulvio in a recent channel ad-hoc conference call, the pdf (histogram) of a sinuoid is significantly different from that of a crosstalk interferer

2. A receiver could be ""built-to-the-test"" with a 2-tap predictive noise canceller that could effectively cancel any sinusoid in the signal passband. Clearly, this would have no correlation to the receiver's ability to tolerate real crosstalk (False Positive)

3. A well-designed receiver capable of tolerating crosstalk might fail this test for completeley different reasons, e.g. an adaptation loop might mistrain (False Negative)

For all the above reasons, this test should be designed to use a interference signal that is richer than a single sinusoid

Suggested Remedy

Define the EIT to use either white noise, or shaped (colored) noise to mimic a real crosstalk power sum. The shaping filter could be built fairly easily with either R,C components, or even using cabling or PCB traces. This approach has been used for crosstalk testing of 1000BASE-T PHYs, and is also currently being specified in the 10GBASE-T draft.

BROADCOM.

Connecting
e v e r y t h i n g®

Noise spectrum of Crosstalk

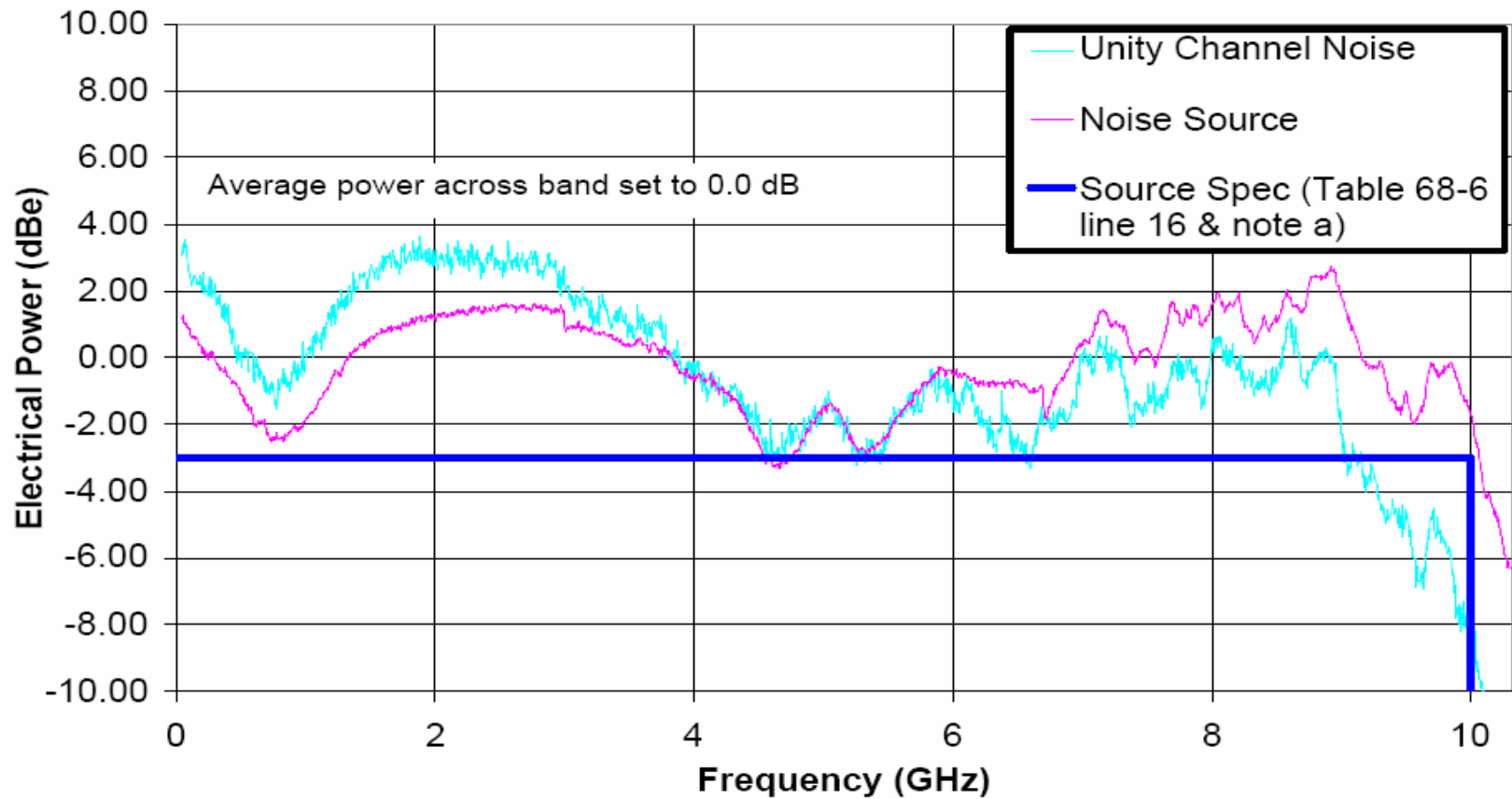XTLK PSD with 30ps rise time (Tyco blue, Molex Red, Intel Green)

Specifications of Noise Module

- NC1128: 10MHz – 10GHz
- NC1126A:
    - 2GHz – 6GHz
    - -110dBm/Hz
    - -14dBm
    - +/- 2.5dB flatness
    - 0.71uV/rootHz

BROADCOM.
Connecting
everything®

Noise Spectrum (Jim McVey)

Noise Spectrum through Unity Channel
and Stand-alone Noise Source Spectrum

Power and Bandwidth

- EIT Noise level required is -140 dBm/Hz

- This corresponds to a noise power of -37dBm, which is well within the power

- EIT noise bandwidth of 2GHz – 6GHz looks sufficient. This is well with the bandwidth spec of the noise module

Next Steps

- Buils a test setup using the Noise/Com modules
- Measure noise levels, bandwidth, flatness, cresting factor,etc.

BROADCOM.

Connecting
everything®

Backup Slides

Slide from Jim McVey's presentation

TP3 Tester Block Diagram

This is what we want

Split-Symmetric w/ Noise

10G-BASE-LRM September 2005 Nashua NH

Page: 3

Jim McVey