

Baseline Text for Clause 55.X MDI Specification and Environmental Specifications

Terry Cobb
Systimax

Presentation

- **A review of Clause 40.8 and 40.9: 1000BASE-T MDI specification and environmental specifications.**
- **Proposal for inclusion of these sub-clauses with changes to the 10GBASE-T draft.**

40.8.1 MDI connectors

- **Describes the eight pin connector.**
 - **Change reference to the latest revision.**

40.8.2 Crossover function

- **Describes the automatic MDI/MDI-X configuration.**
 - Change from optional to mandatory.
- **Add mandatory automatic polarity reversal for any pair.**

40.8.3 MDI electrical specifications

- **Describes the eight pin connector electrical specifications.**
 - **Change to Category 6 connector with appropriate references.**
 - **Change FEXT requirement to Cat 6 connector FEXT requirement extrapolated to 625 MHz (TBD).**

40.8.3.1 MDI return loss

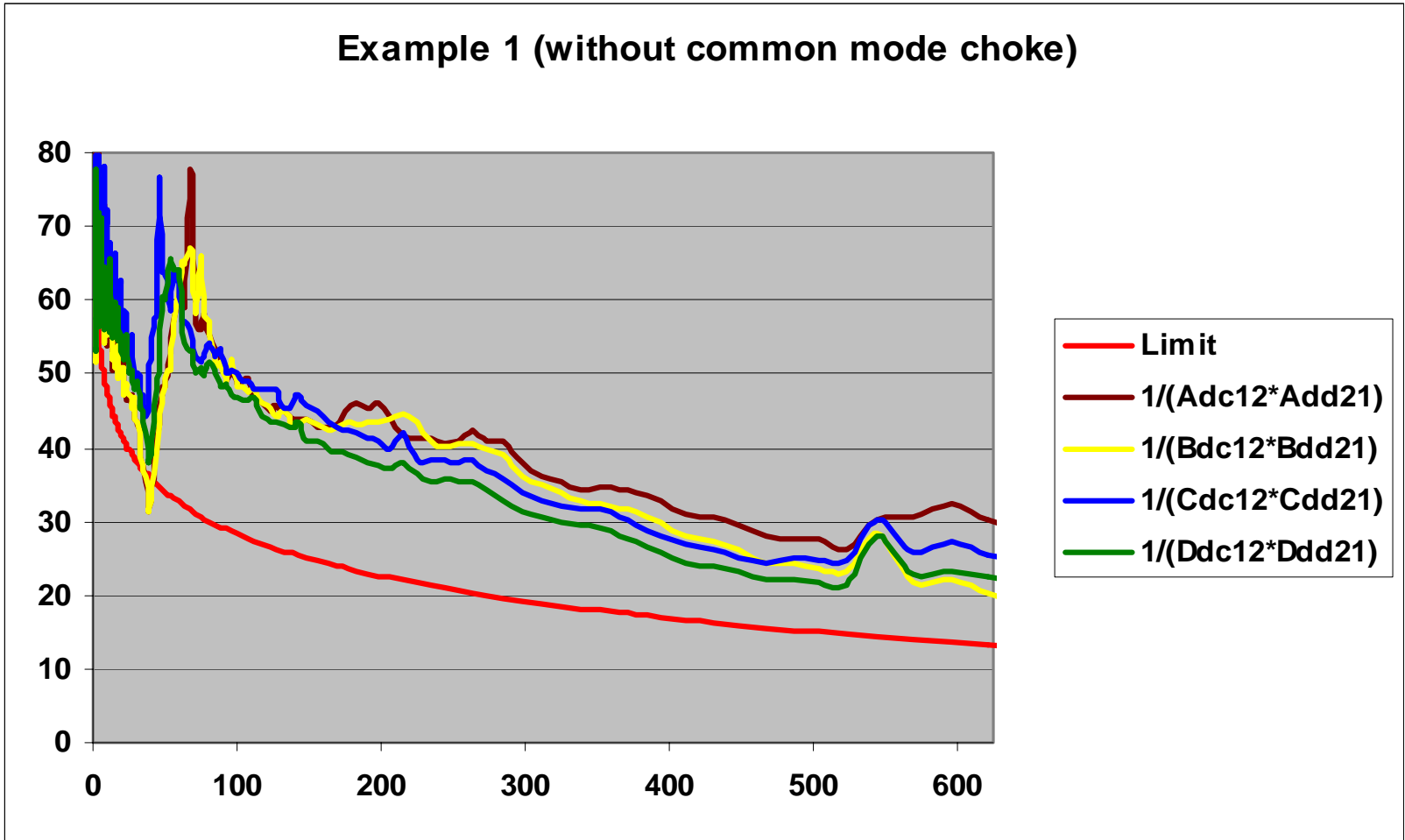
- **Defines the MDI return loss.**
 - **Change to the return loss as specified in motion by S. Gupta and approved at the May 2004 meeting.**

40.8.3.2 MDI Impedance balance

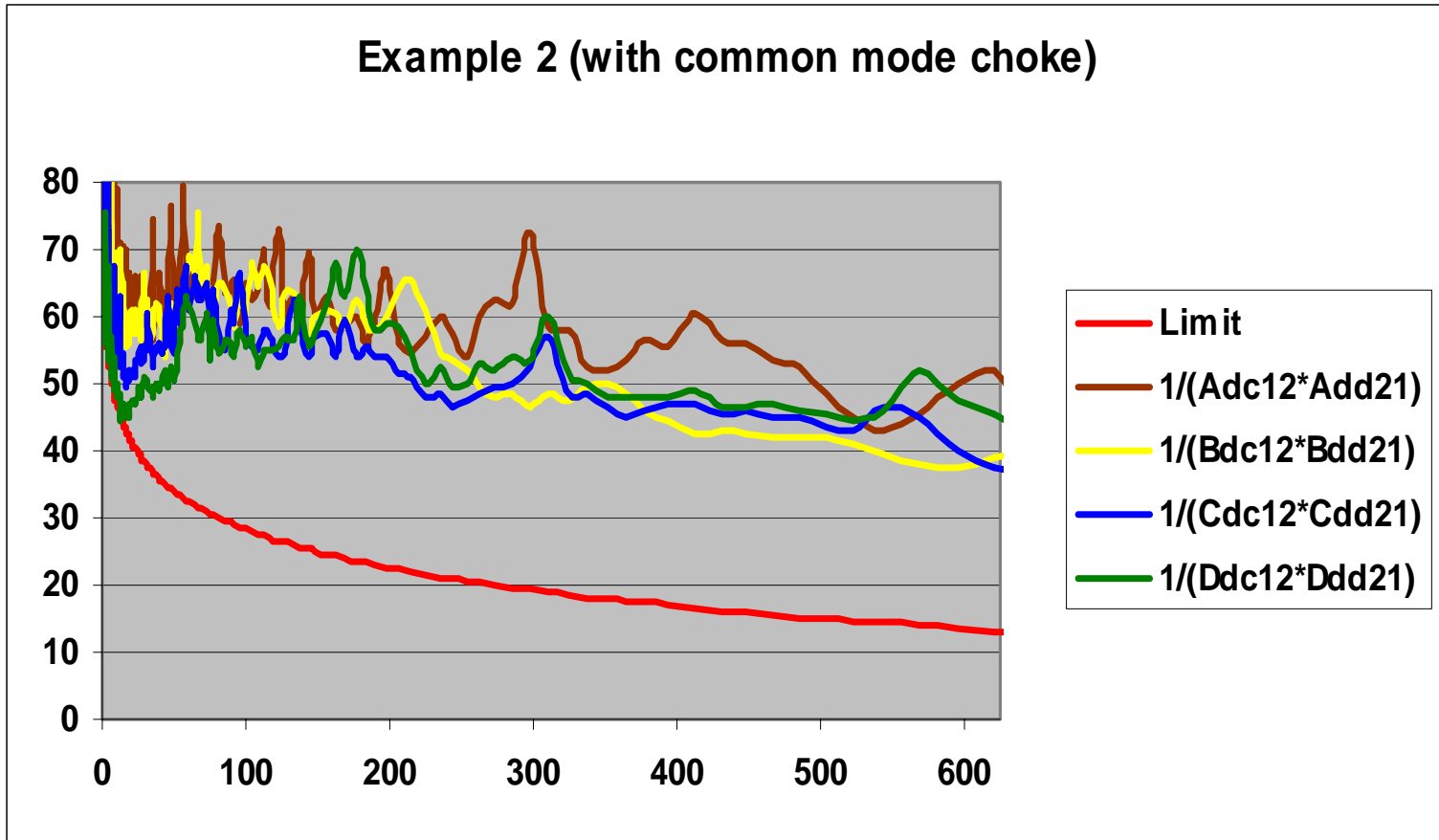
- **Defines the Impedance balance at the MDI connector.**
 - Defined as $34 - 19.2 \text{ LOG}(f/50)$
 - For reference compare limit to the channel model data on magnetics by calculating the Vcd11.

Comparison of Impedance balance to the Example Magnetics Models

Example 1 (without common mode choke)



Comparison of Impedance balance to the Example Magnetics Models



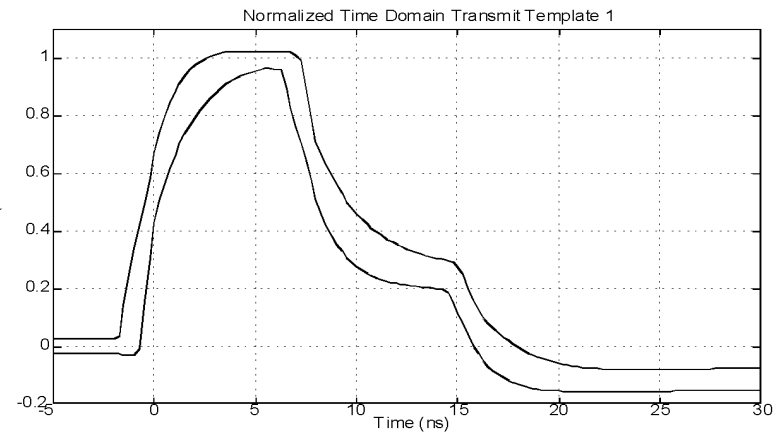
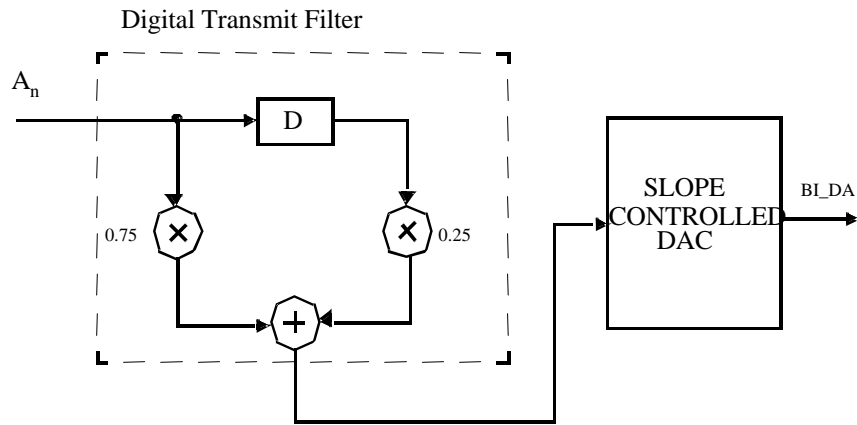
40.8.3.2 MDI Impedance balance

- **Significant improvement can be made by using the magnetics in example 2 with the common mode choke.**
- **The limit will depend more on what is required to meet the emissions objective or the common mode output due to magnetics balance.**
 - **Addressed in the following slides.**

40.8.3.3 MDI common-mode output voltage

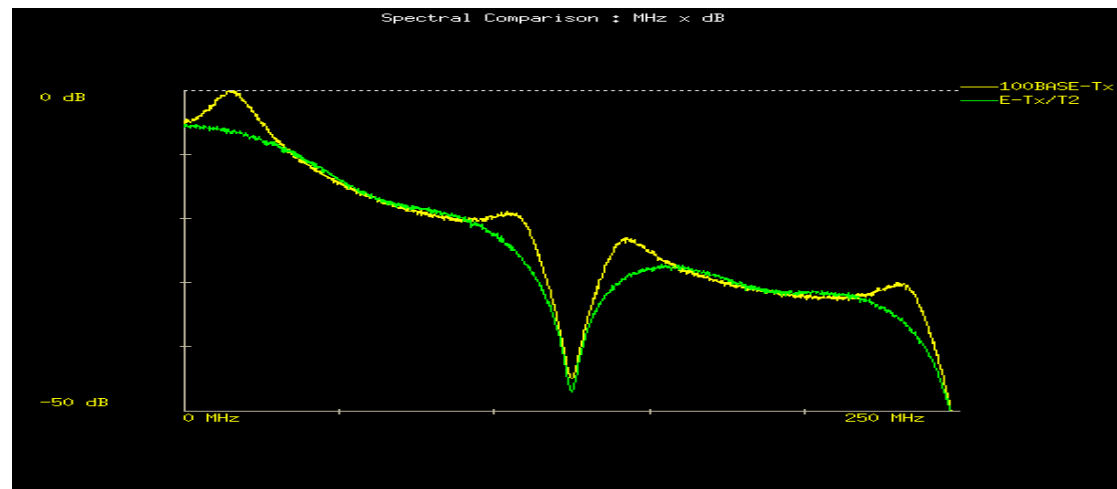
- **Defines the MDI common-mode output voltage.**
 - Specified at a maximum of 50 mV peak-to-peak.
 - The maximum needs to be decreased.
- **To determine what is required for 10GBASE-T:**
 - Assume that the common mode output should follow the same trend as 1000BASE-T in order to meet the emission requirements.

Transmitter



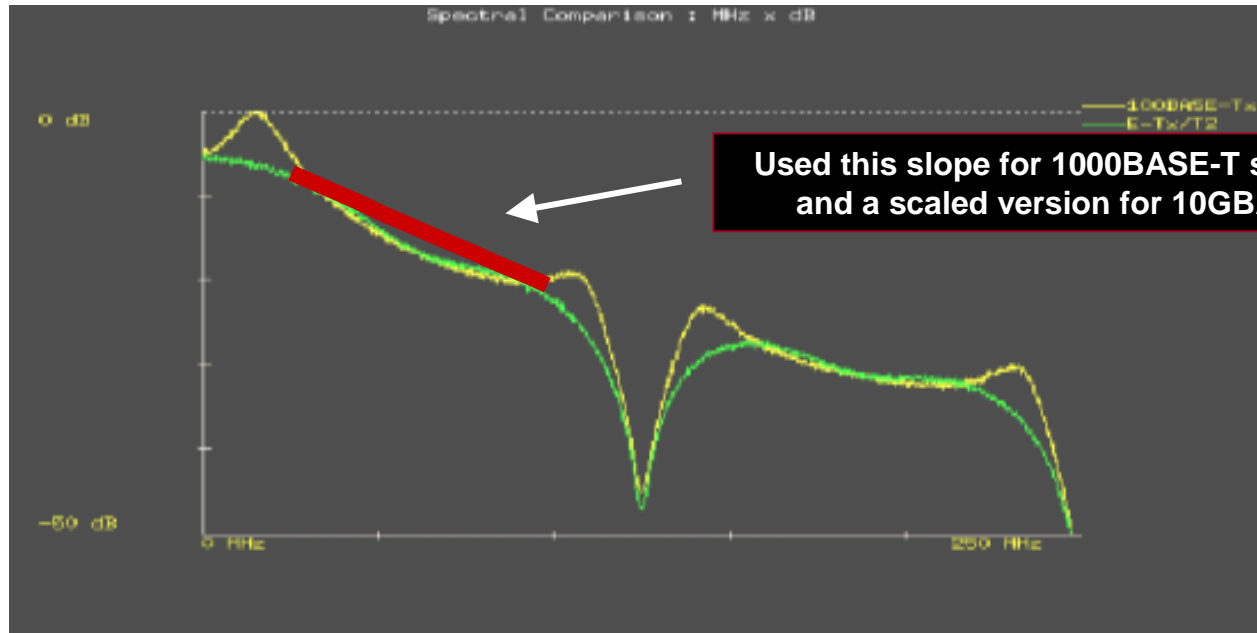
Example Implementation of Transmitter

Pulse Template



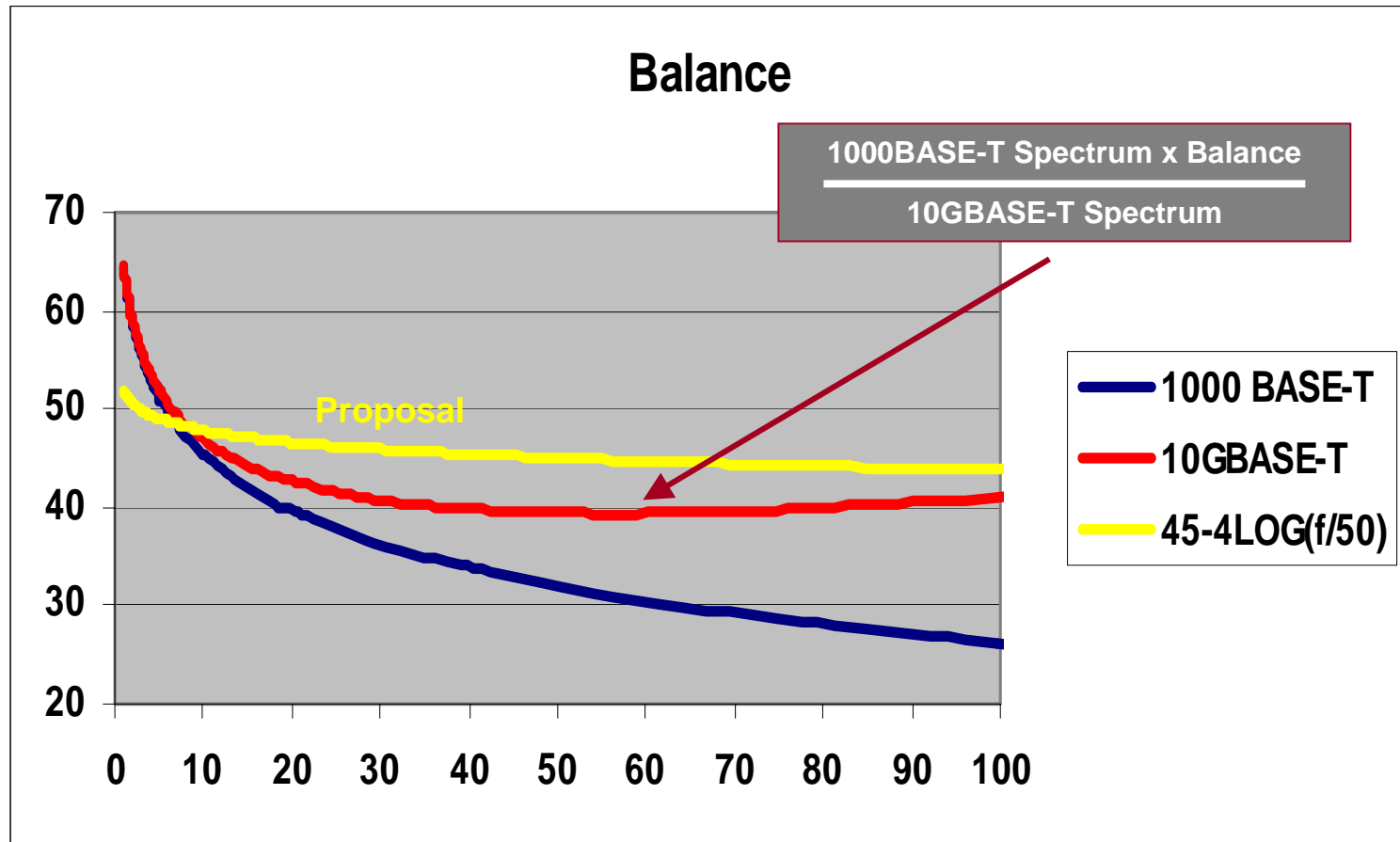
Transmit Spectrum of 1000BASE-T

1000BASE-T

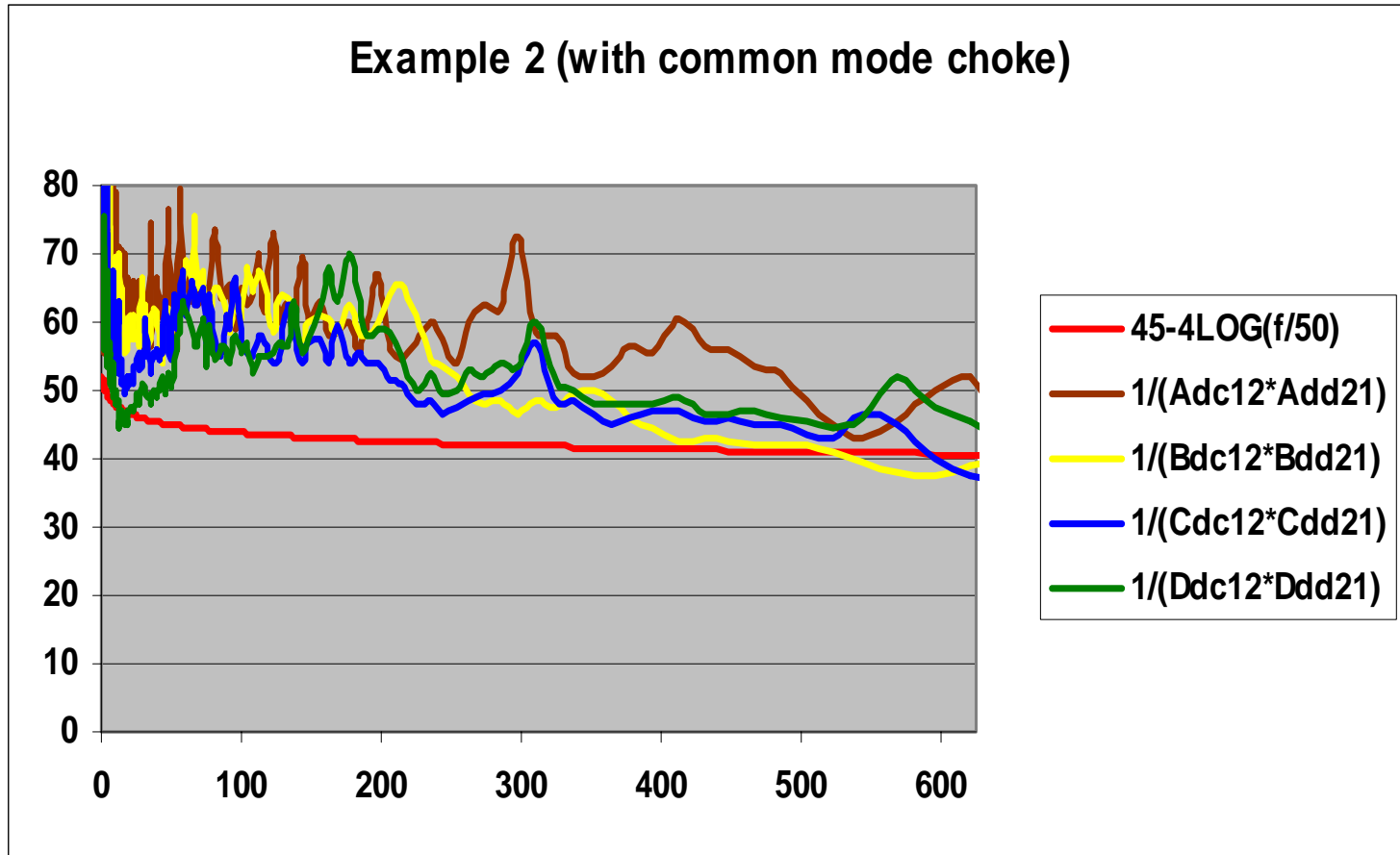


- **The common mode output for 1000BASE-T:**
 - Transmit Spectrum times the magnetics balance.
- **This should equal the same for 10GBASE-T**

Comparing 1000BASE-T to 10GBASE-T



Comparing to the Magnetics Models



40.8.3.2 and 40.8.3.3

- **Define the MDI Impedance balance 40.8.3.2**
 - $45 + 4 \text{ LOG } (f/50)$
- **And the common-mode output voltage 40.8.3.3**
 - maximum 15 mv peak to peak
- **Look at redefining measurement using a Network Analyzer set up.**

40.8.3.4 MDI fault tolerance

- **Defines the MDI requirements for withstanding the application of external faults.**
 - **Since most PHY's will be 1000BASE-T compliant use the clause as is.**
 - **Update to latest references**

40.9 Environmental specifications

- **Defines the environmental PHY requirements:**
 - **General Safety**
 - **Network Safety**
 - **Installation**
 - **Installation and maintenance guidelines**
 - **Telephony voltages**
 - **Electromagnetic emission**
 - **Temperature and humidity**
- **Since most PHY's will be 1000BASE-T compliant use the clause as is.**
 - **Update to latest references**