

VITESSE

Vitesse Measurement Results IEEE Channel Adhoc Test Boards

Majid Barazande-Pour
John Khoury
Glen Koziuk

September 27 - 29, 2004

IEEE 802.3ap Backplane Ethernet Task Force

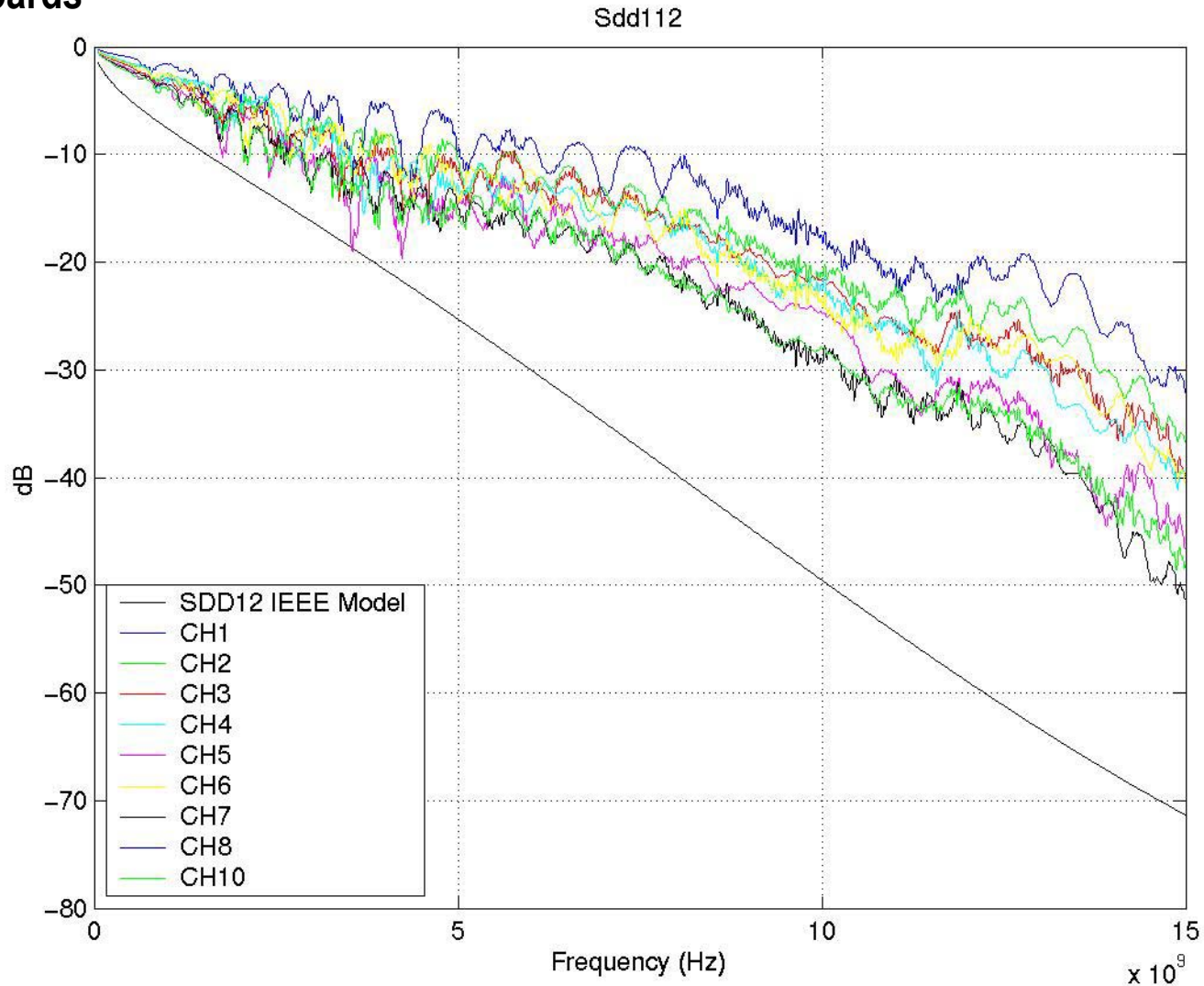
Ottawa, Canada

YOUR PARTNER FOR SUCCESS

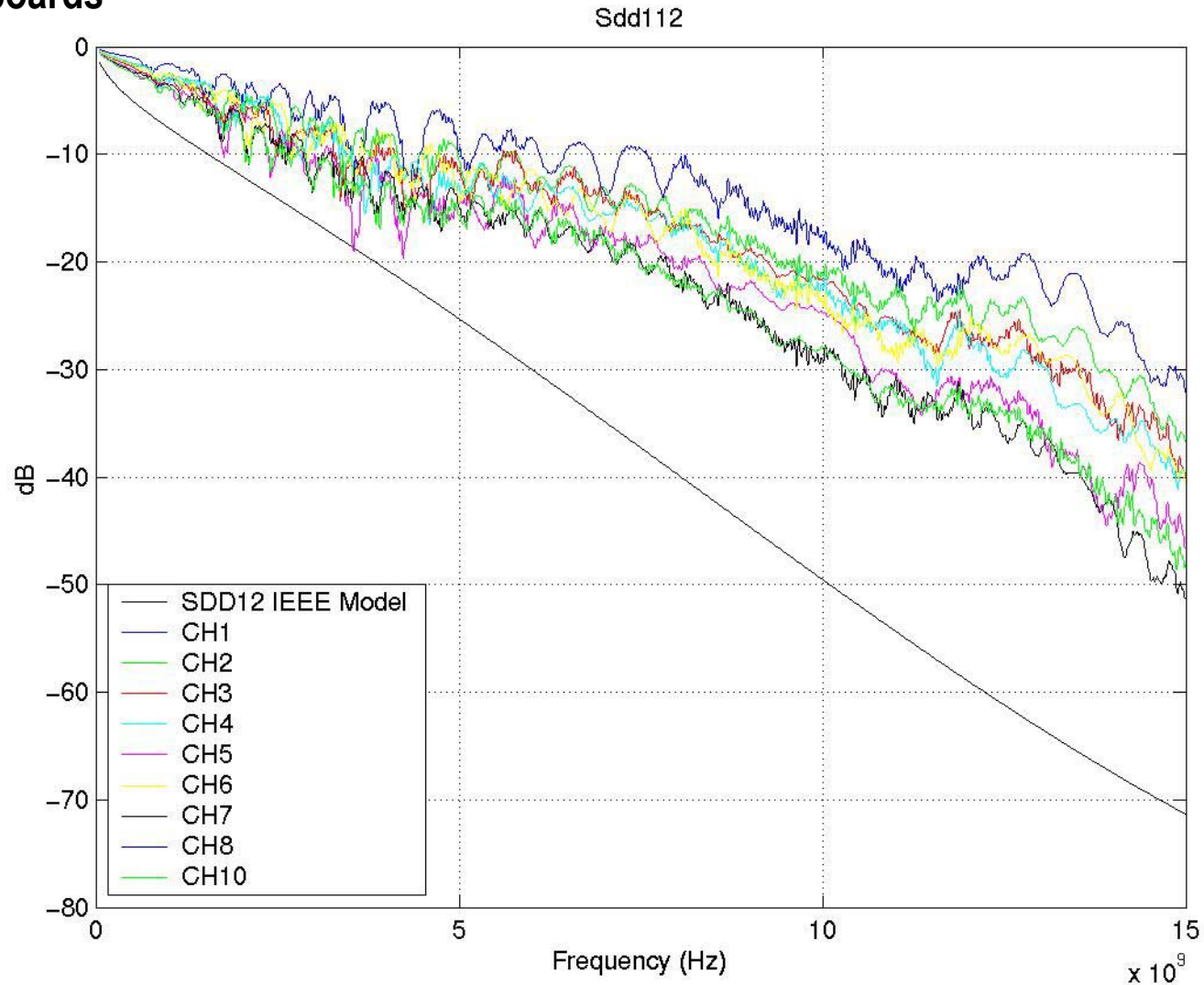
- ▶ Force10 channel adhoc test boards
 - ▶ First revision and second revision boards
- ▶ Single-ended measurements
- ▶ Differential S parameters were obtained from single-ended measurements using mathematical equations in MATLAB
- ▶ Each port was terminated with 50Ω loads when not used
- ▶ Each single-ended measurement took about 3 minutes
 - ▶ ~ 20 minutes for differential (6 - SE measurements)

- ▶ Instrument: Anritsu 37397C Vector Network Analyzer
40MHz - 65GHz
- ▶ Start Frequency: 50 MHz
- ▶ Stop Frequency: 16.05 GHz
- ▶ IF Bandwidth: 100Hz
- ▶ Averaging: 16
- ▶ Data Points: 1601
- ▶ Output Power: -7dbm

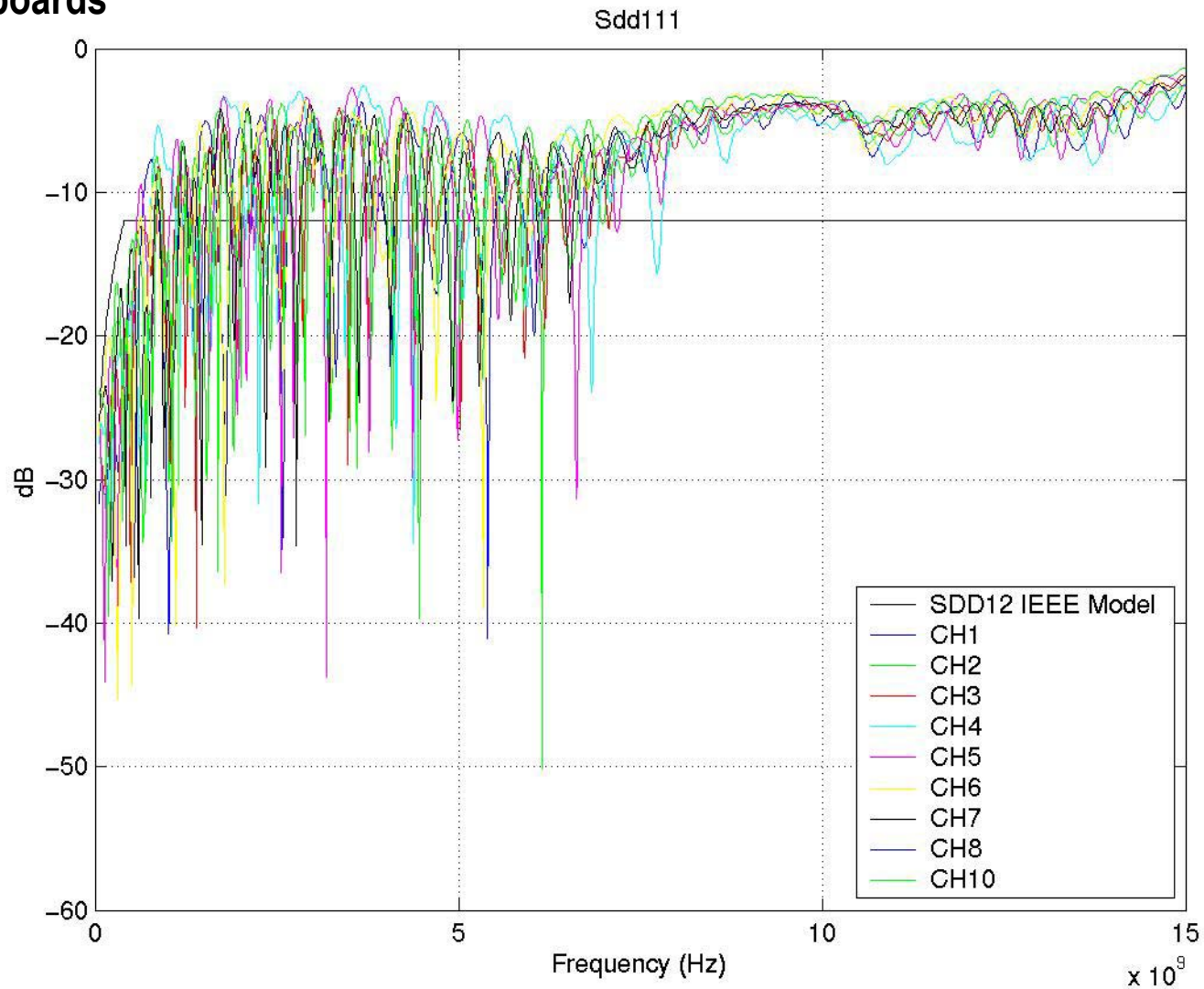
1st revision boards



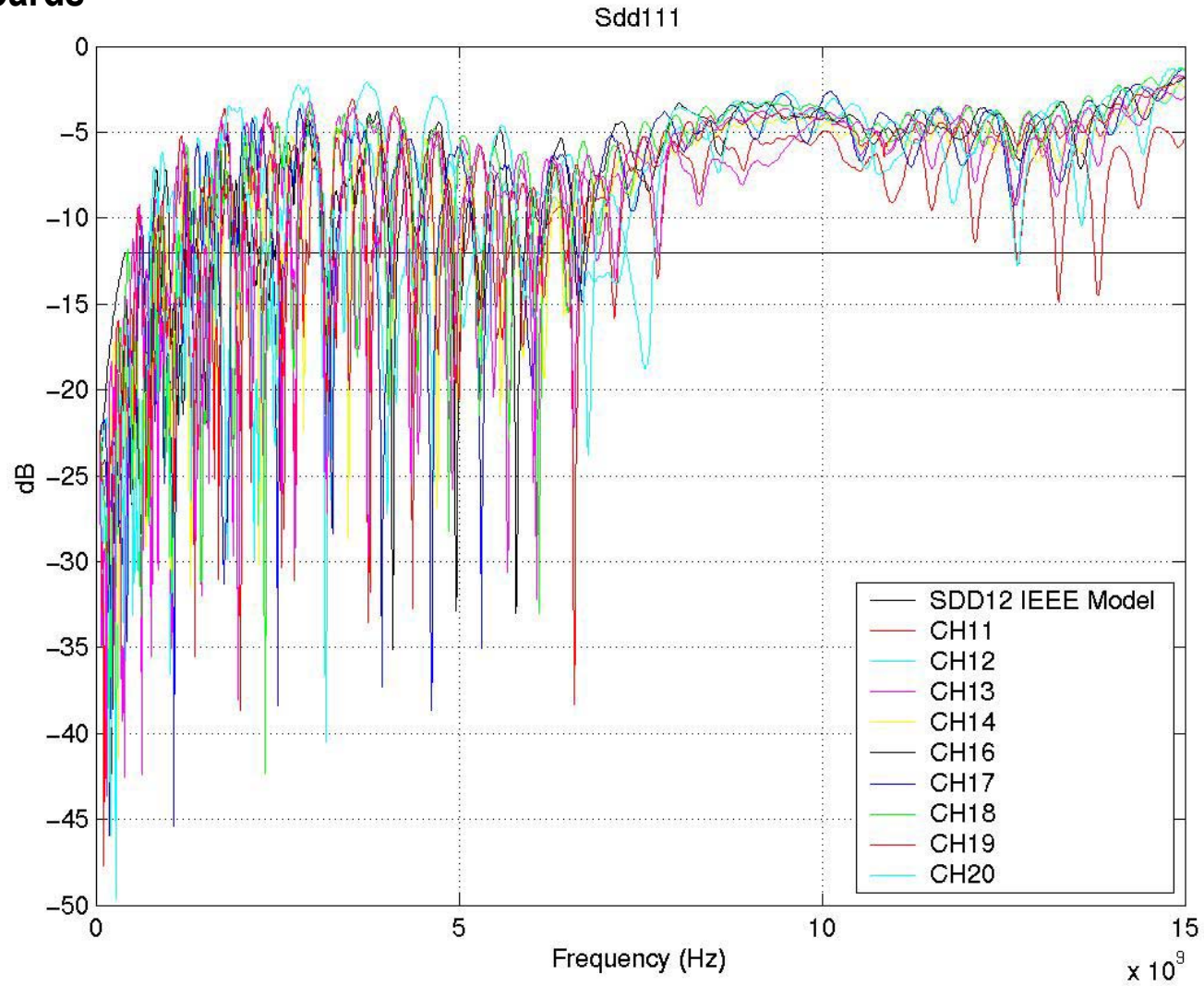
1st revision boards



1st revision boards



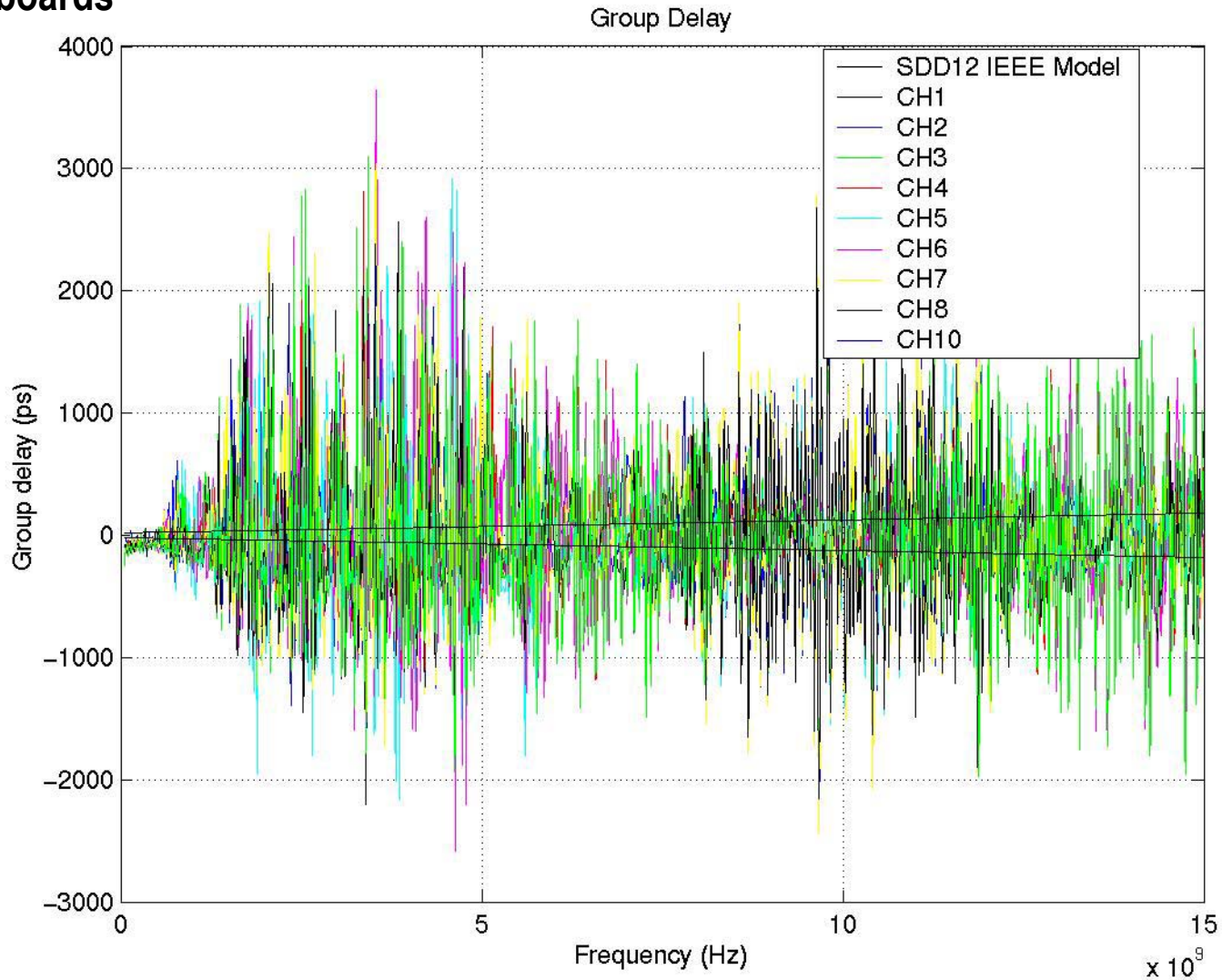
1st revision boards



Group Delay - CH1 to CH10

VITESSE

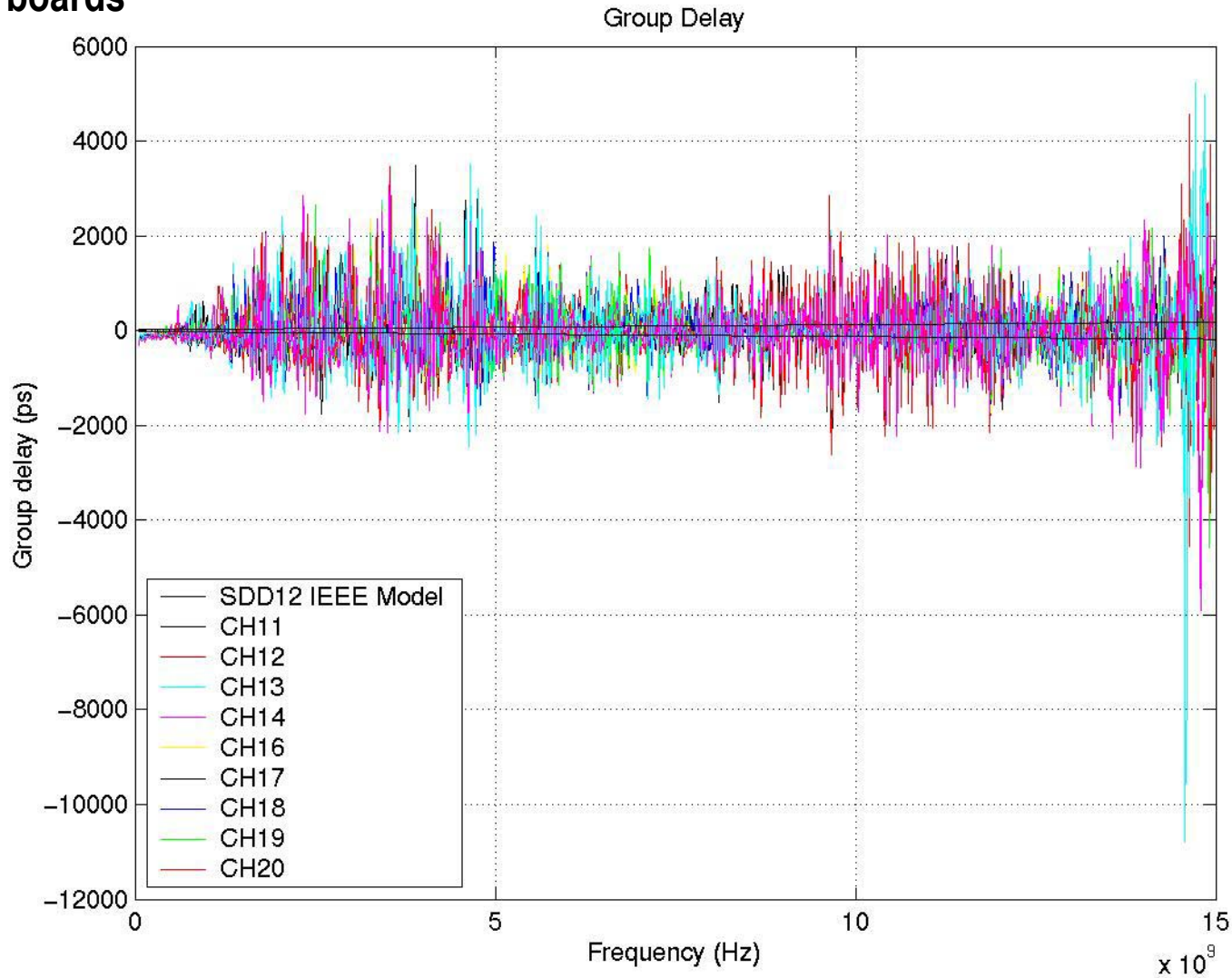
1st revision boards



Group Delay - Ch11 to CH20

VITESSE

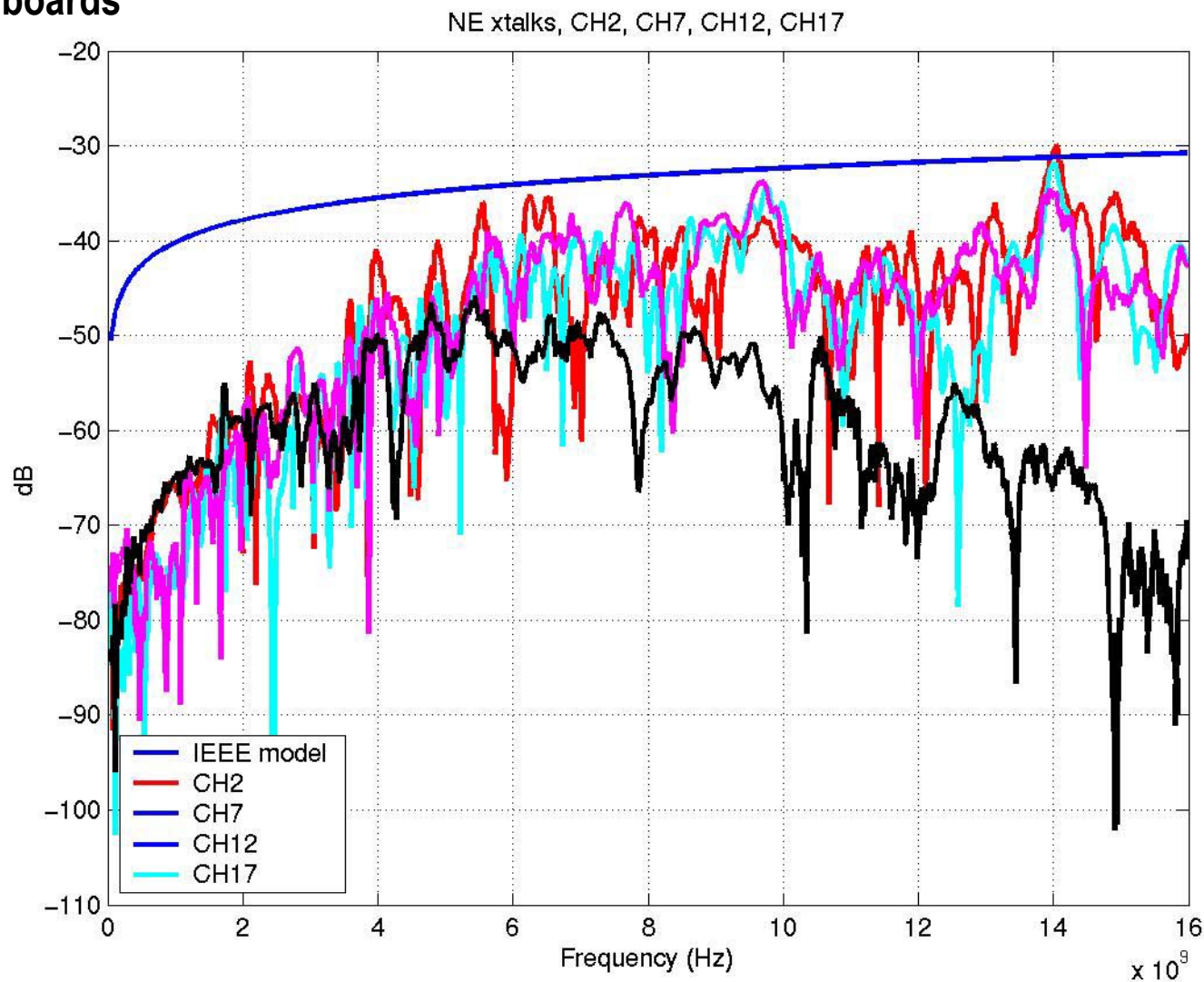
1st revision boards



Near End Xtalk - Channels 2, 7, 12 and 17

VITESSE

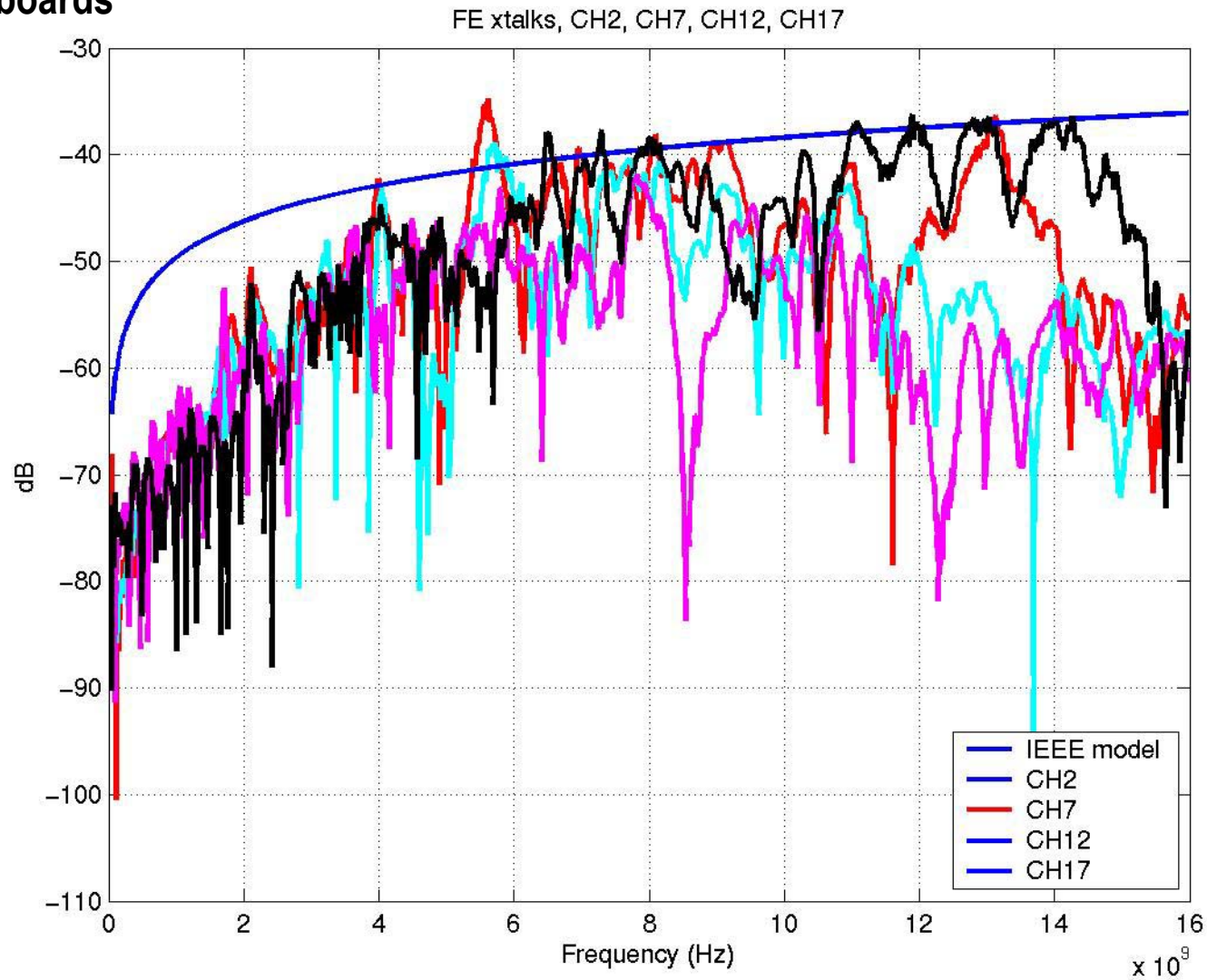
1st revision boards



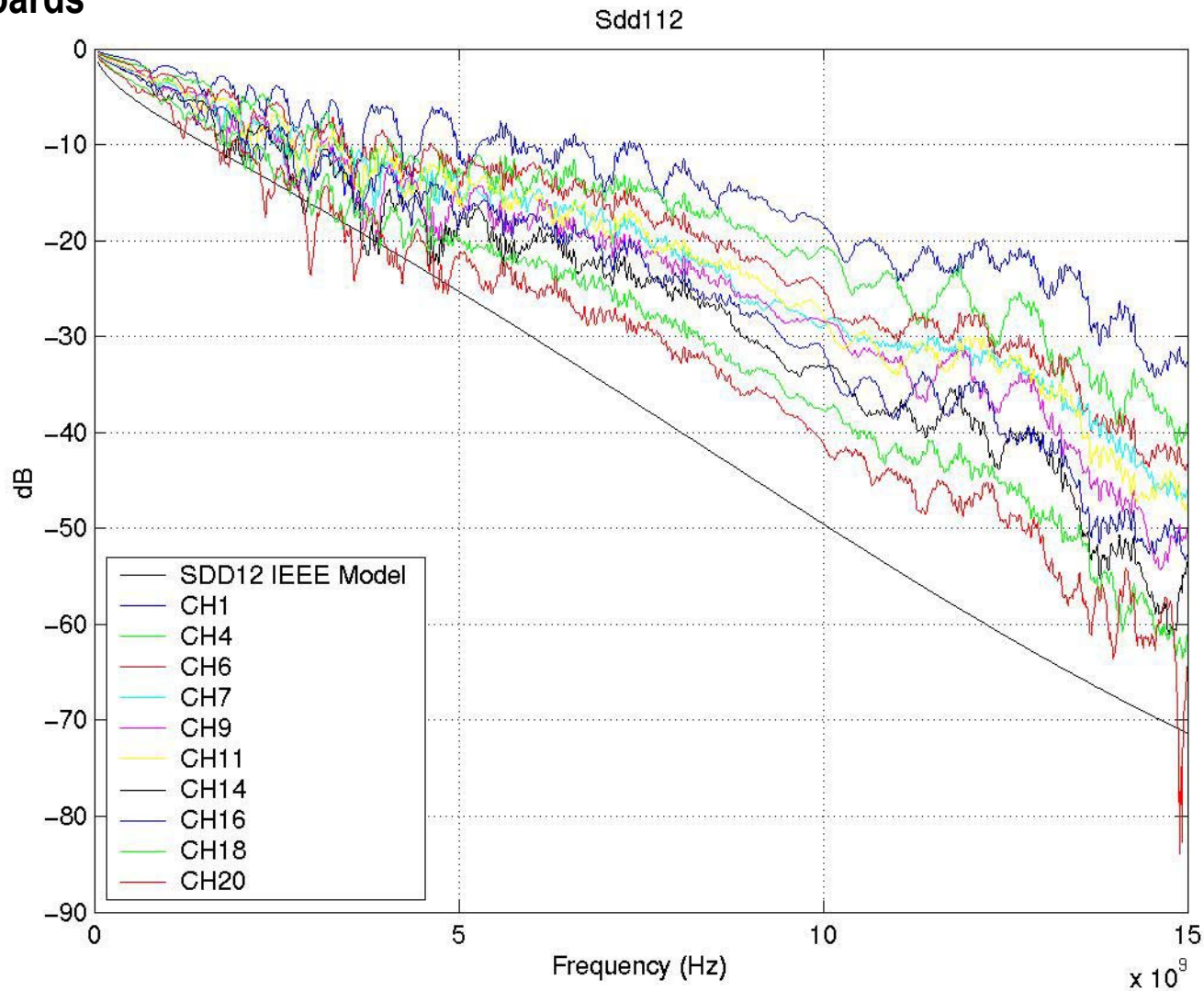
Far End Xtalk - Channels 2, 7, 12 and 17

VITESSE

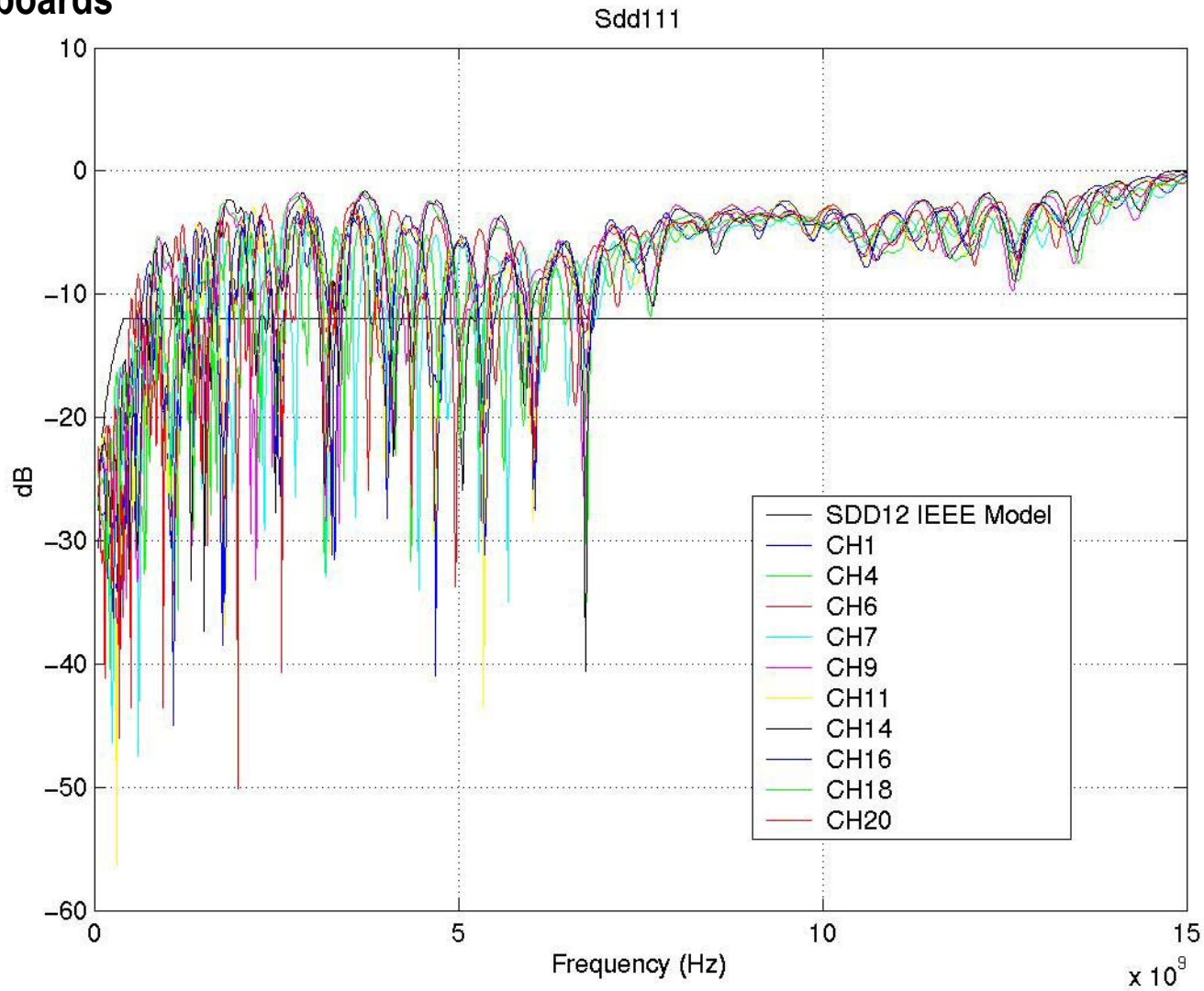
1st revision boards



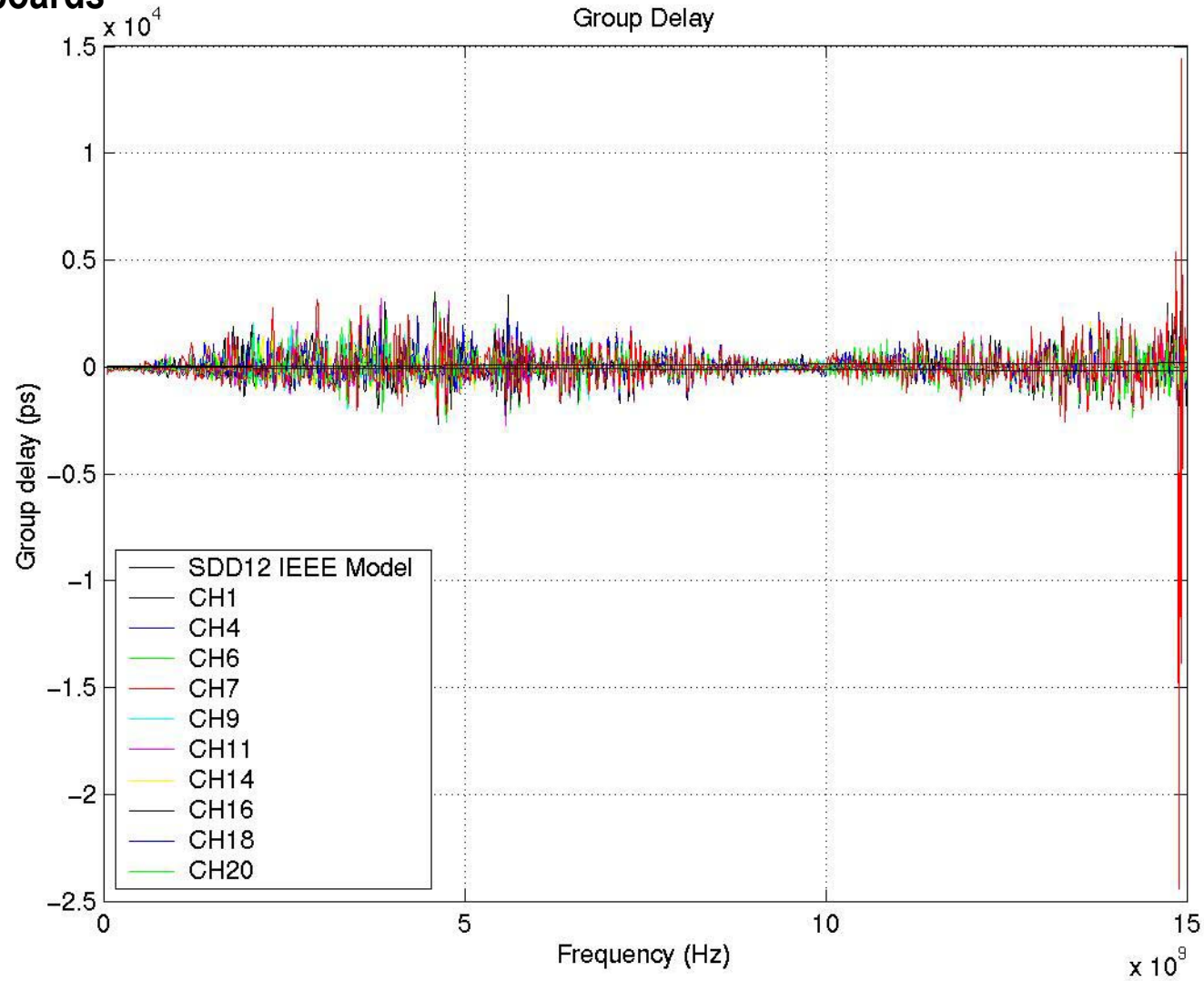
2nd revision boards



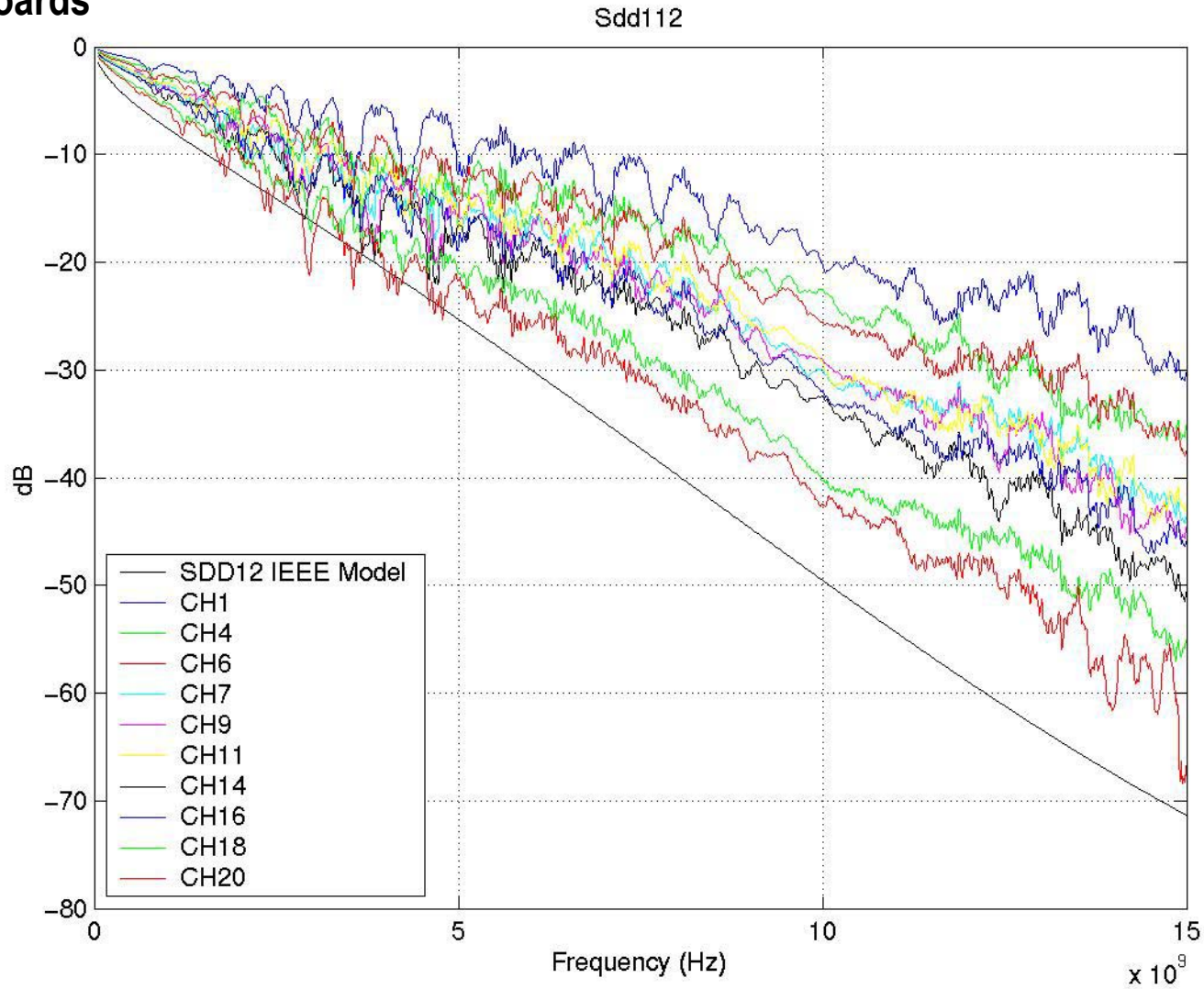
2nd revision boards



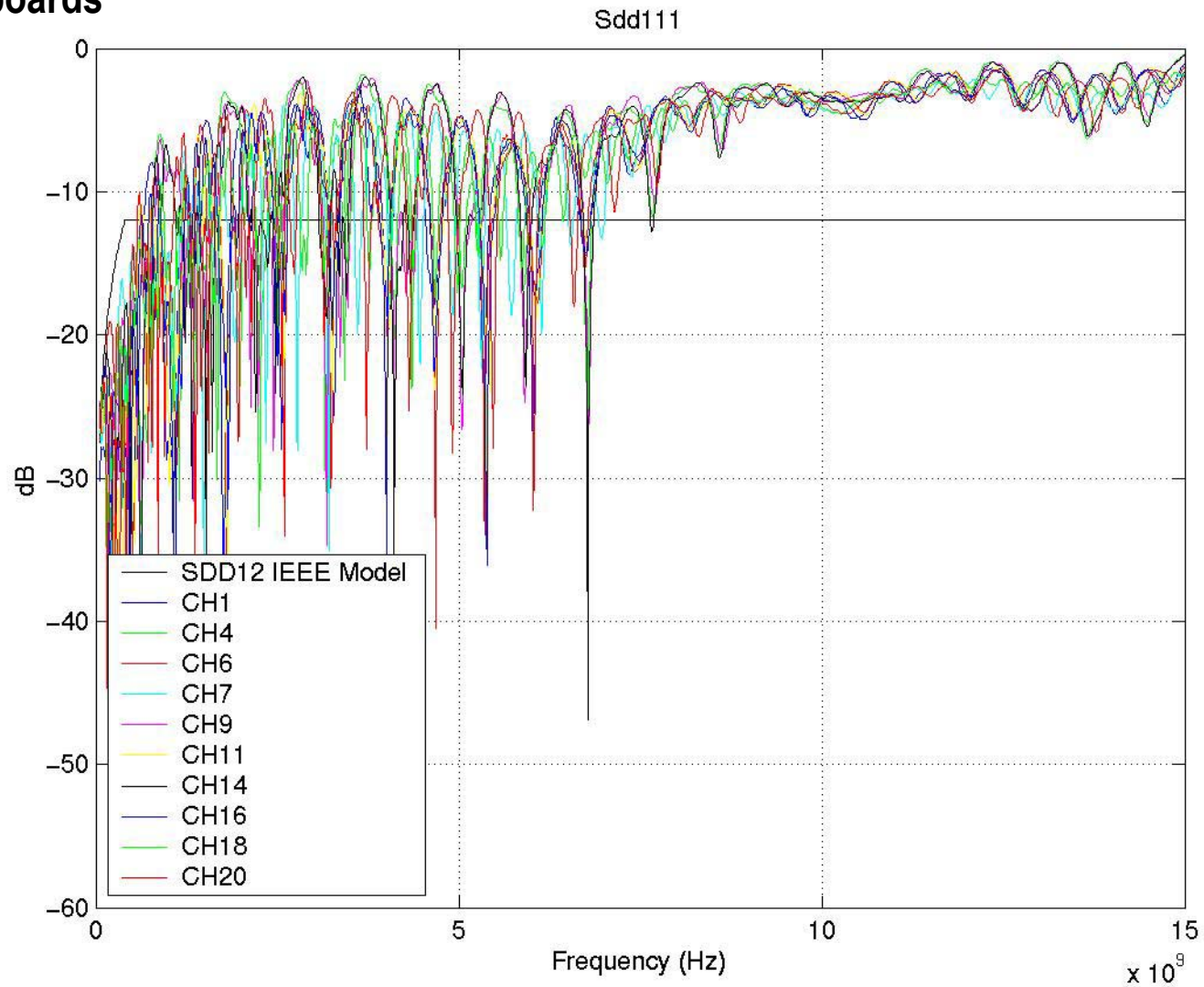
2nd revision boards



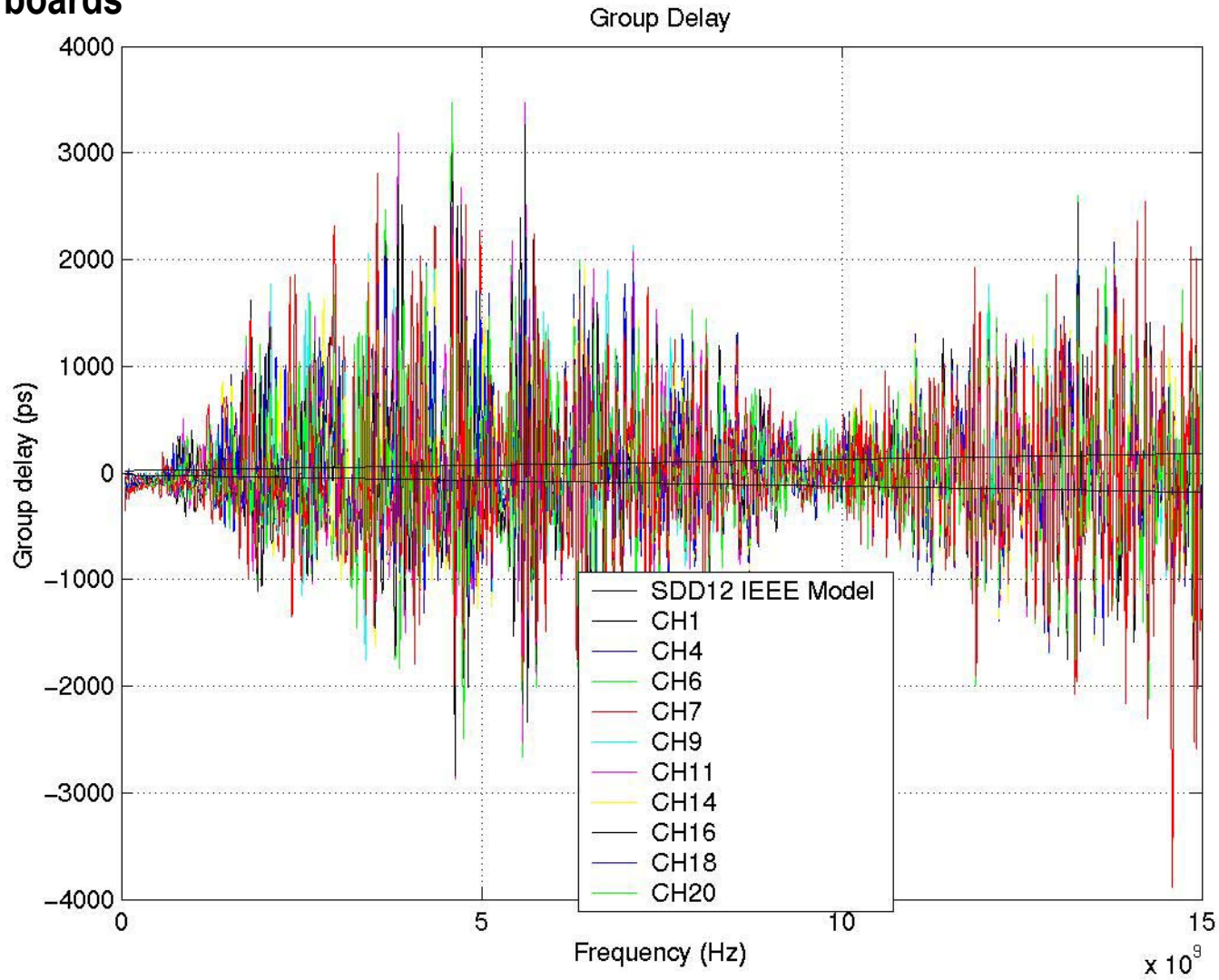
2nd revision boards

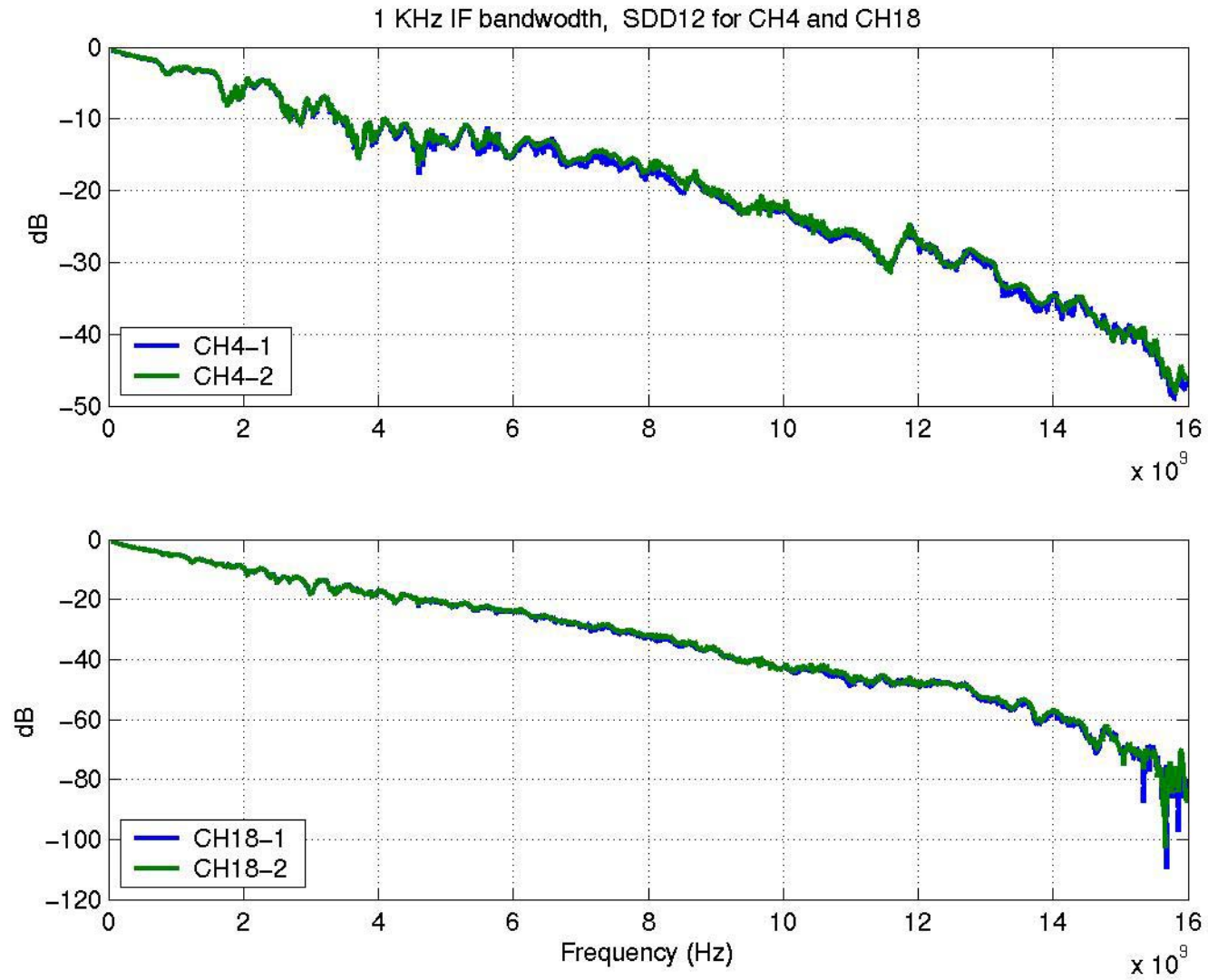


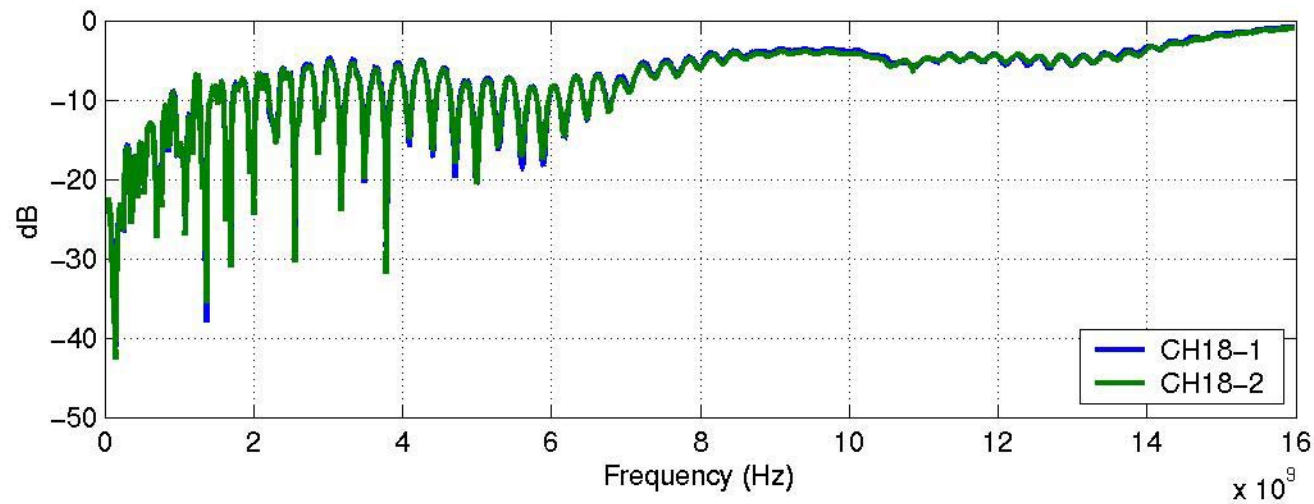
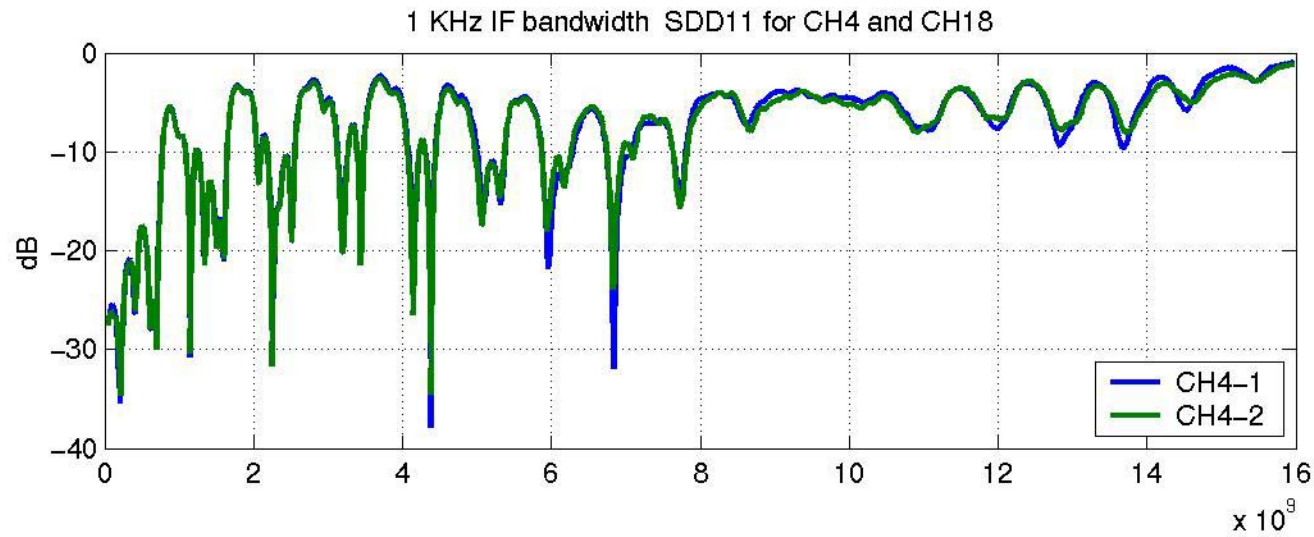
2nd revision boards



2nd revision boards

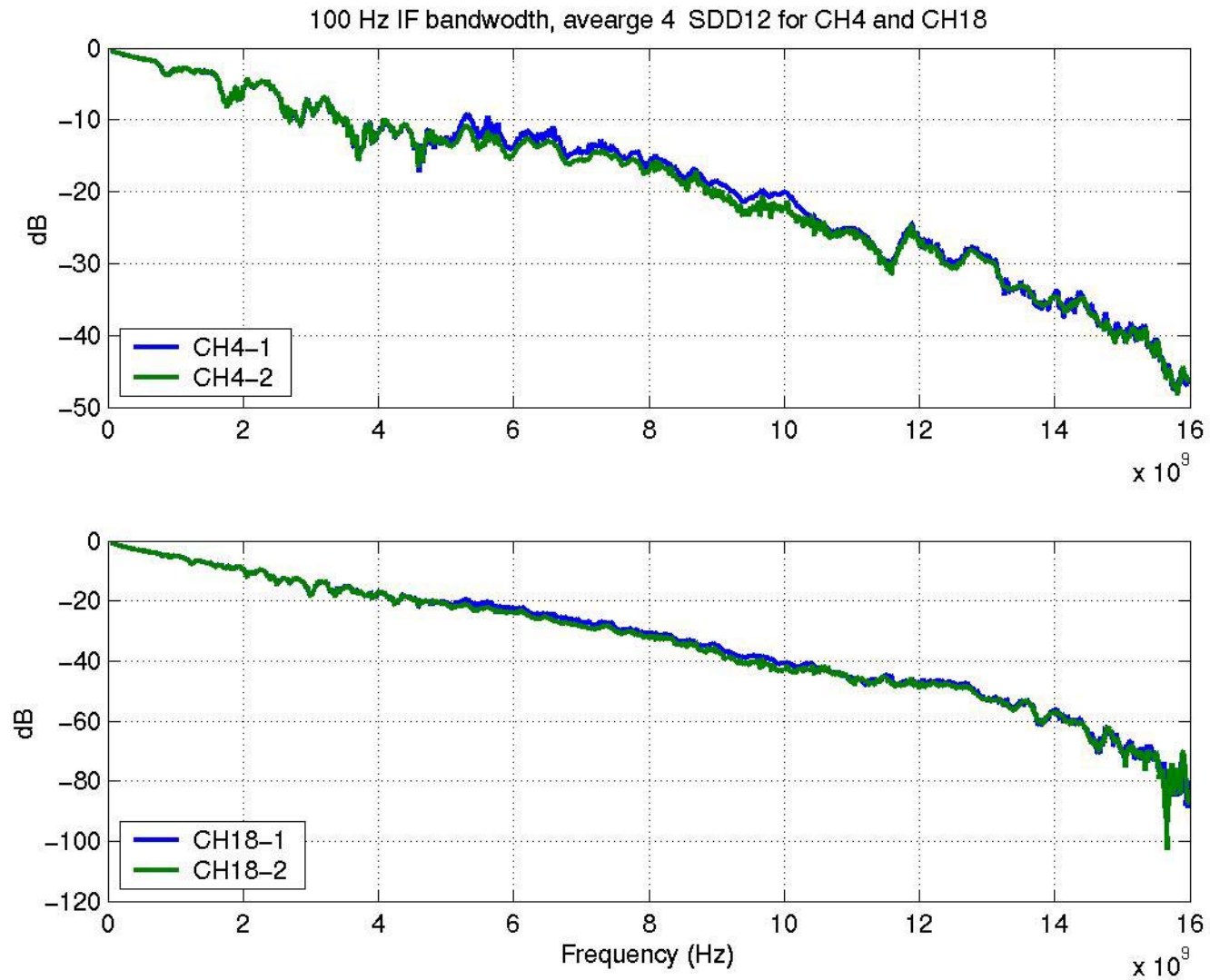




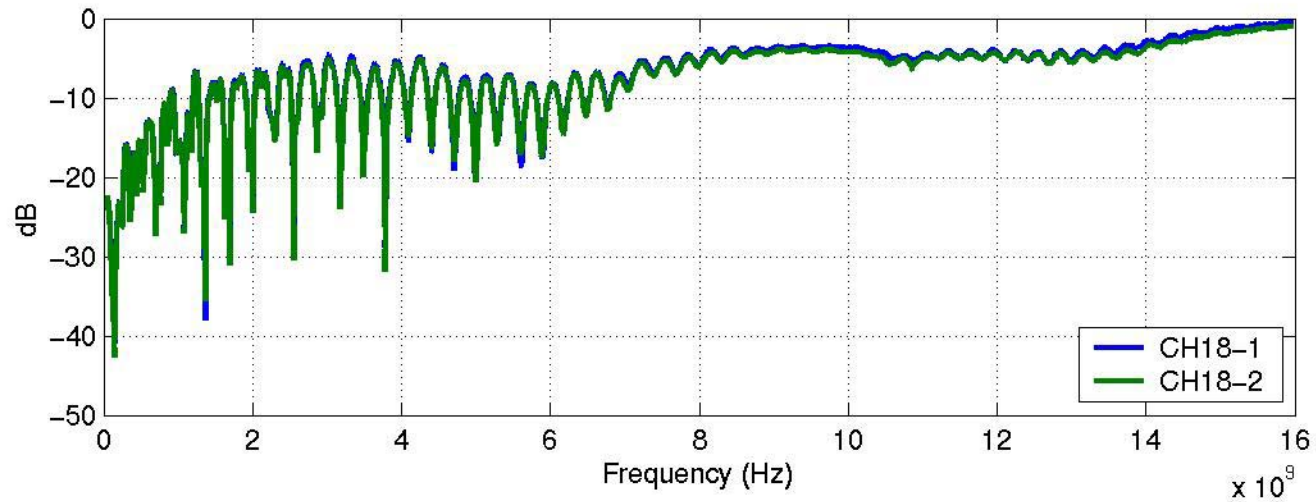
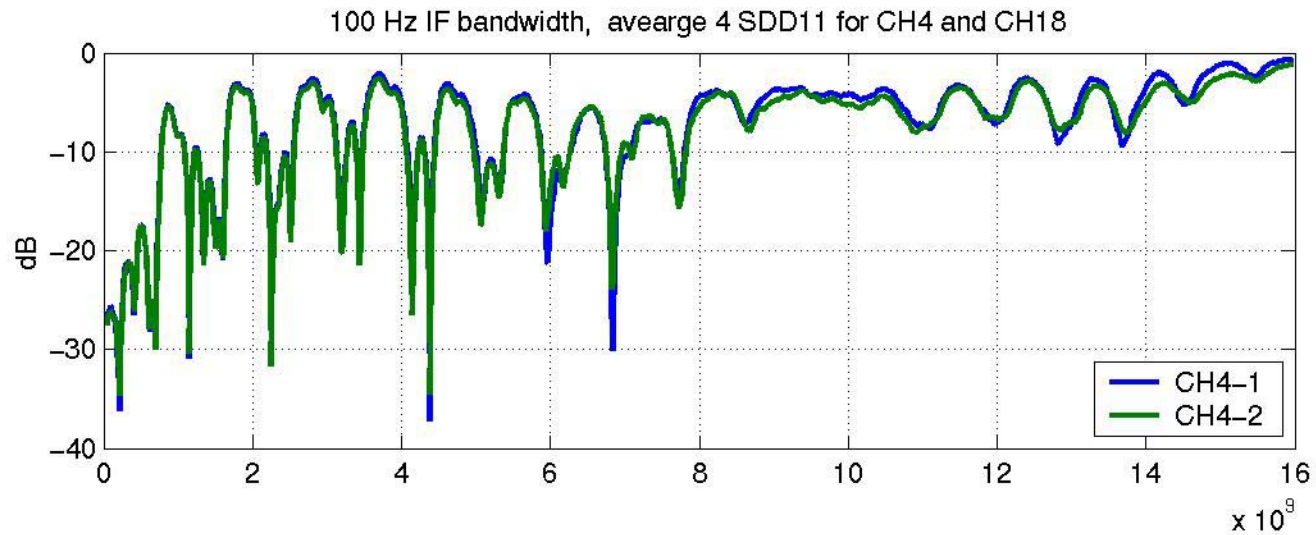


Sensitivity to Averaging Sdd12

VITESSE



Sensitivity to Averaging Sdd11



- ▶ Sdd12 limit is suitable for almost every channel
- ▶ Sdd11 and Group Delay limits need to be modified
- ▶ Near and Far end crosstalk are fine for single aggressor
 - ▶ Proper addition of crosstalk should be investigated
 - ▶ Only first revision boards crosstalk measurements
- ▶ Sdd11 and Sdd12 amplitudes are not very sensitive to IF Bandwidth of 100Hz or 1KHz
- ▶ IF Bandwidth of 1KHz results in faster measurement time
- ▶ Averaging of 4 and 16 provides similar results, but NOT significant saving in measurement time