1000-T Jitter Test Channel

Purpose: To show that the test channel used for jitter measurements used by the IOL is compliant with the IEEE 802.3 Standard.

References:

[1] IEEE Standard 802.3-2002, Subclause 40.6.1.1.1
[2] IEEE Standard 802.3-2002, Subclause 40.7

Last Modification: December 8, 2004 (Version 1.1)

Discussion:

Reference [1] describes the procedure for creating a worst case environment to test the jitter between a Master and Slave TX_TCLK. Reference [2] describes the specifications that are to be met for the entire test channel. The following tables and figures show that the test channel used by the InterOperability Lab is compliant with [2].

A Fluke DSP-4000 was used to measure the cable parameters. To verify compliance, an Agilent 4395A Network Analyzer was used to measure Attenuation and Return Loss. All data gathered was processed using Matlab.

Both attenuation and propagation delay are a function of cable length. The objective was to create a channel with marginal attenuation and propagation delay. Since there is no way to change one without affecting the other, the cable length was adjusted until both parameters passed. Unfortunately, this meant the propagation delay value was further from the limit than desired. The attenuation plot, which is marginal, is shown in figures 1 and 2. The propagation delay, while not marginal, is still high. This is shown in table 1.

Table 1: Propagation delay values for test channel.

Pair	Limit	Pair A	Pair B	Pair C	Pair D	Average
Delay (ns)	570	538	522	517	535	528

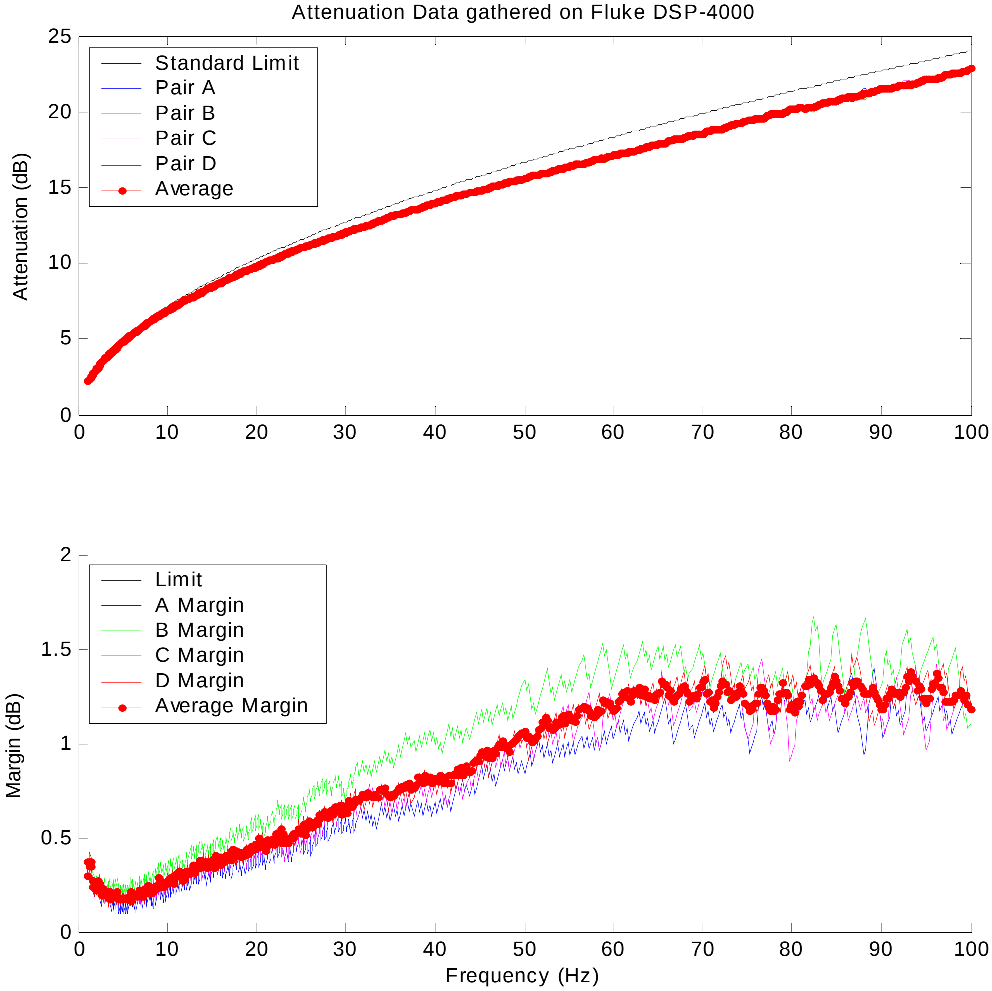

Figure 1: Attenuation data gathered using Fluke DSP-4000

Note: According to reference [1], the AVERAGE of the attenuation on all four pairs needs to pass. The average attenuation margin passes at all frequencies.

Table 2: Minimum margins for each pair

Test	Min. Margin (dB)
Pair A	0.0948
Pair B	0.1909
Pair C	0.1358
Pair D	0.1297
Average	0.1631

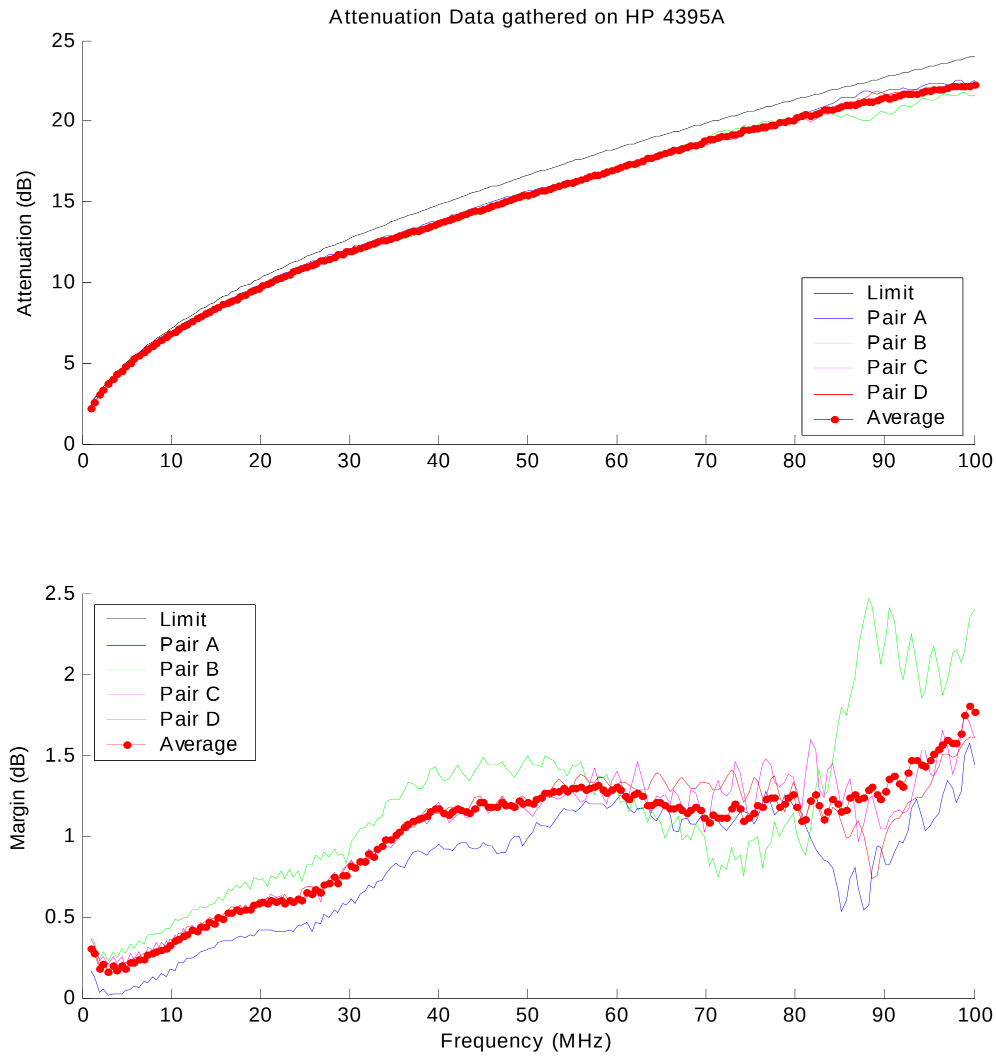

Figure 2: Attenuation data gathered using Agilent 4395A Network Analyzer

As the above figure shows, the average attenuation is below the limit over all frequencies. The minimum margin is 0.156.

Table 3: Minimum margins for each pair

Test	Min. Margin (dB)
Pair A	0.0187
Pair B	0.2303
Pair C	0.1966
Pair D	0.1718
Average	0.1563

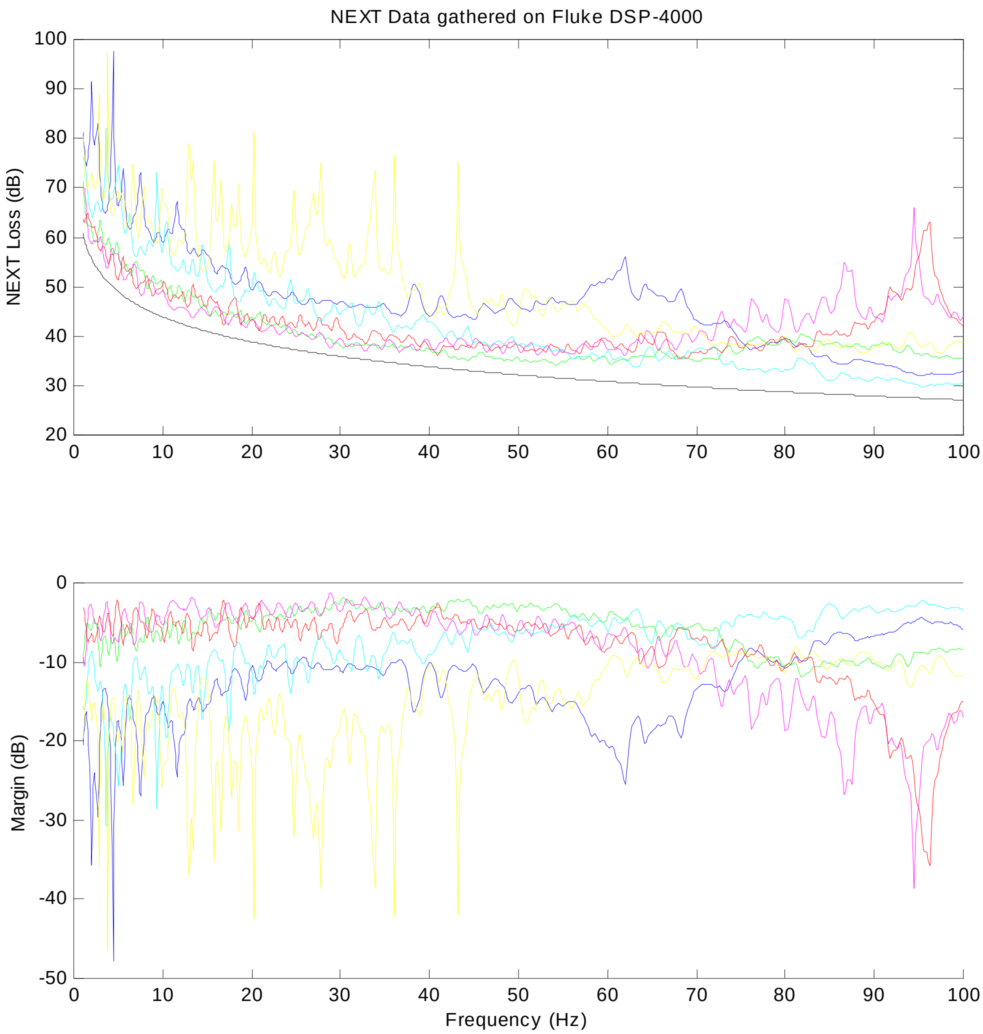

Figure 3: NEXT data for each test

Table 4: Minimum margins for each test

Test	Min. Margin (dB)
Pair A-Pair B	4.4411
Pair A-Pair C	1.7882
Pair A-Pair C	1.3178
Pair B-Pair C	2.1852
Pair B-Pair D	2.2564
Pair C-Pair D	8.0805
Average	6.6205

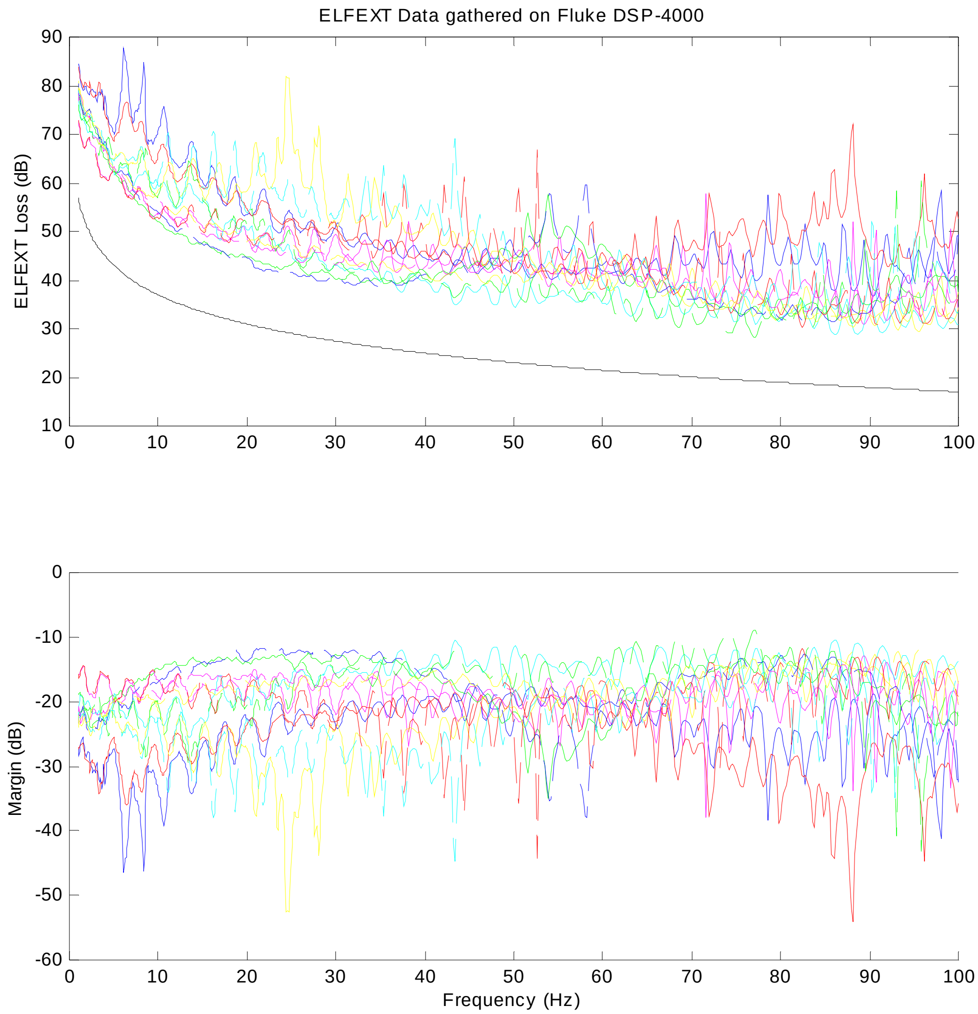

Figure 4: ELFEXT data for each test

Table 5: Minimum margins for each test

Test	Min. Margin (dB)
Pair A-Pair B	17.4173
Pair A-Pair C	12.4950
Pair A-Pair D	12.9268
Pair B-Pair A	18.2580
Pair B-Pair C	10.4900
Pair B-Pair D	12.7964
Pair C-Pair A	11.7292
Pair C-Pair B	8.9298
Pair C-Pair D	13.0103
Pair D-Pair A	11.7185
Pair D-Pair B	13.4379
Pair D-Pair C	12.0910
Average	16.8857

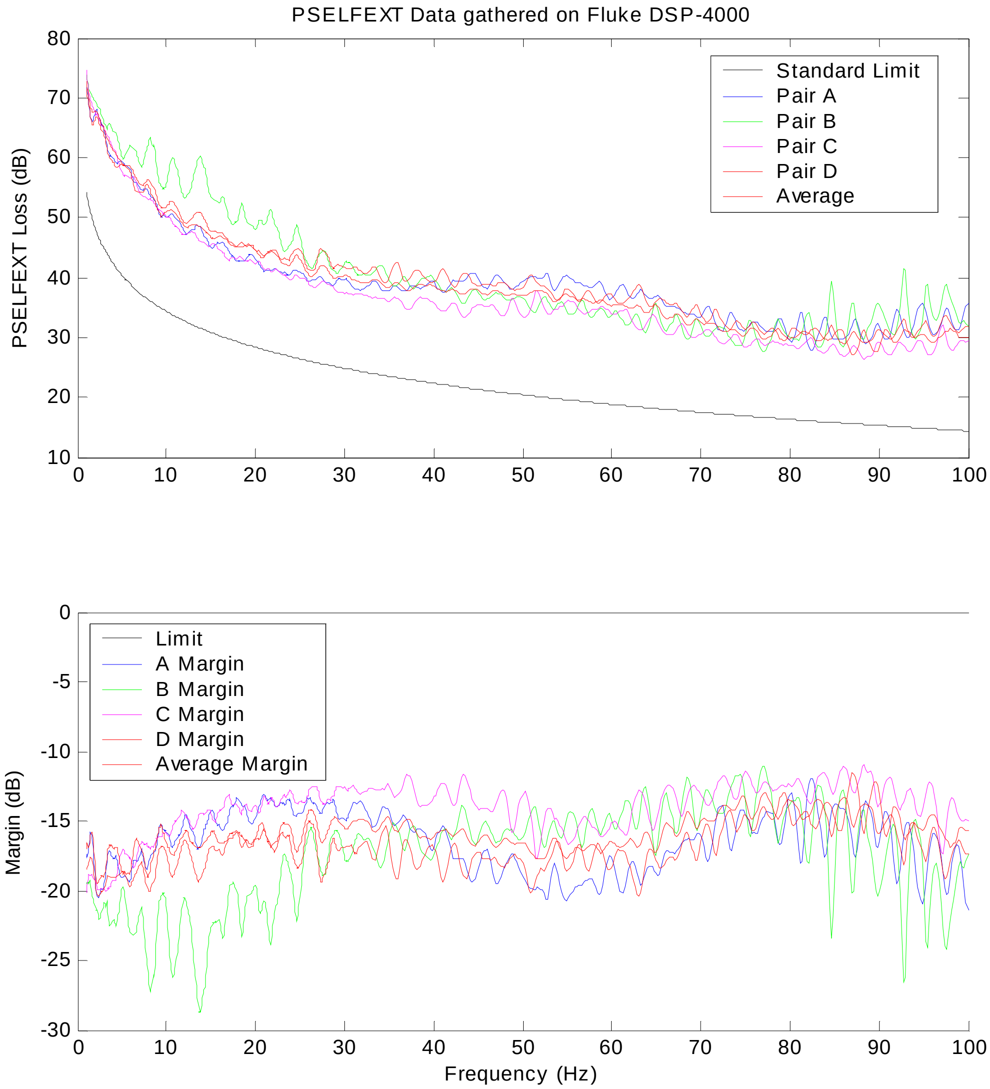

Figure 5: PSELFEXT data for each pair

Table 6: Minimum margins for each pair

Test	Min. Margin (dB)
Pair A	11.9185
Pair B	11.0298
Pair C	10.9290
Pair D	11.4904
Average	12.9523

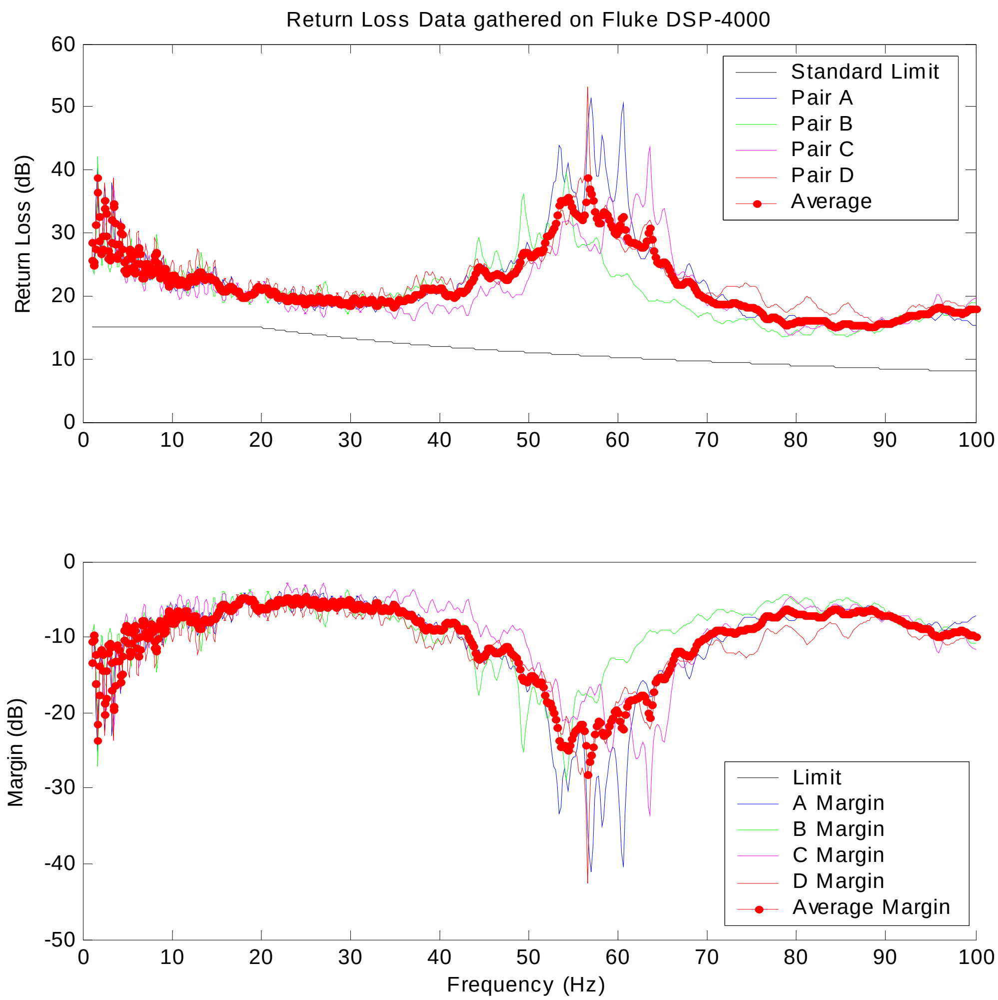

Figure 6: Return Loss data gathered using Fluke DSP-4000

Table 7: Minimum margins for each pair

Test	Min. Margin (dB)
Pair A	3.8394
Pair B	3.6342
Pair C	2.8881
Pair D	4.5000
Average	4.6441

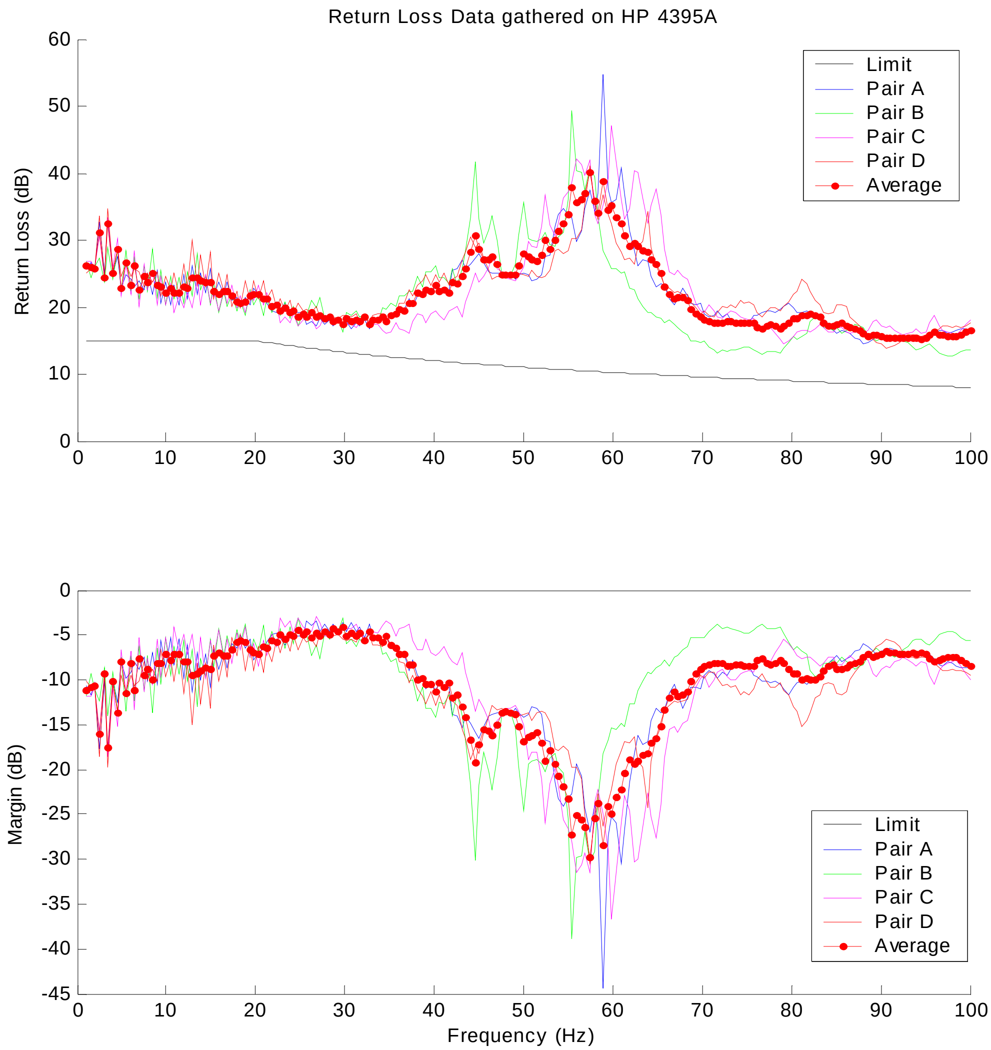

Figure 7: Return Loss data gathered using Agilent 4395A

Table 8: Minimum margins for each pair

Test	Min. Margin (dB)
Pair A	3.3785
Pair B	3.0998
Pair C	2.9915
Pair D	4.7835
Average	4.1805