

850nm VCSEL TP2 dependence from host emphasis

Cristiana Muzio, Carlo Mariotti and Marco Mazzini

Cisco

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With the aim to help the IEEE TF to solve any discussion about CL 86 nPPI TP1a Jitter spec, we include some results on SFP+ VCSEL-based interfaces.

Following the SFF-8431 test points (A equivalent to TP0 and B equivalent to TP1a), in the next slides we provide:

Point A: TX Host emphasis;

Point B: TX host jitter (DDJ, DDPWS, DJ) with PRBS9 sequence after 1.6" and 6" traces of Cisco Reference Card;

TP2: Analysis over three different SFP+ module manufacturers;
Mask Margin (PRBS31, 10 million samples, 0 hits);
PRBS9 DJ;
Optical eye diagrams for both 1.6" and 6" traces CRC

Summary plots with TP2 Mask Margins versus Electrical DJ for all three SFP+ modules, over 1.6" and 6" traces.

Test points A, B and TP2 over Vendor 1, Cisco Reference Card

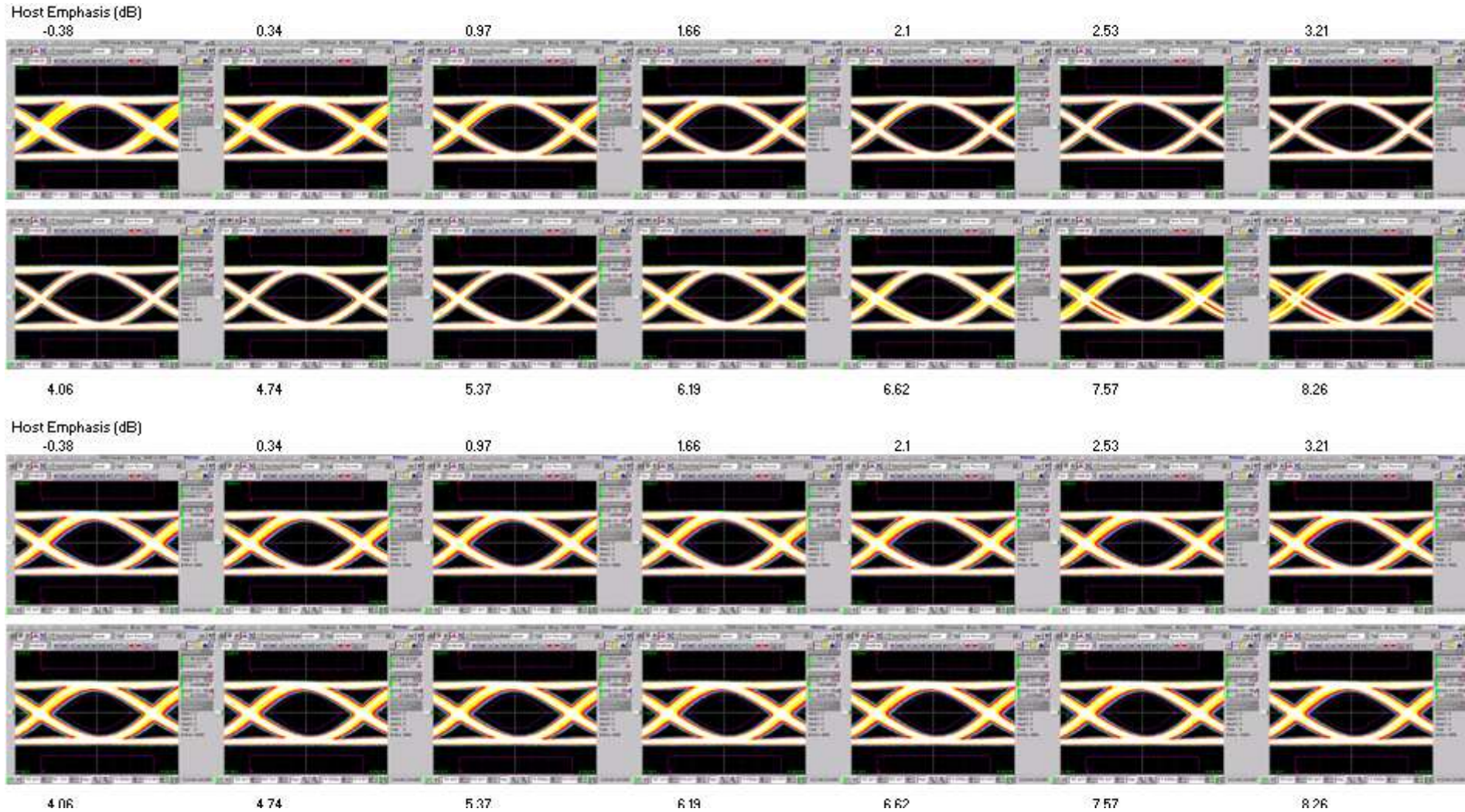
1.6 inches, NTV

Host emphasis at A (dB)	Jitter a B (ps, all measurements with PRBS9)				Optical TP2	
	DDJ	DDPWS	DJ	RJ	Mask Margin	Opt DJ (PRBS9)
-0.38	13.0	11.4	14.7	0.2	26	22.17
0.34	10.9	9.6	12.7	0.2	26	21.05
0.97	9.3	7.4	10.7	0.2	31	18.49
1.66	7.8	6.1	9.5	0.2	29	18.39
2.10	7.1	5.1	9.0	0.2	34	16.34
2.53	7.5	3.5	9.2	0.2	39	15.18
3.21	8.6	2.5	10.3	0.2	31	15.73
4.06	10.1	3.0	11.7	0.2	34	15.04
4.74	11.4	3.1	12.6	0.2	31	15.03
5.37	12.4	3.5	13.8	0.2	31	16.02
6.19	14.4	3.4	15.6	0.2	26	17.54
6.62	15.6	3.7	16.9	0.2	19	17.76
7.57	16.7	4.1	17.9	0.3	24	19.10
8.26	18.0	4.0	19.3	0.2	28	20.32

6 inches, NTV

Host emphasis at A (dB)	Jitter a B (ps, all measurements with PRBS9)				Optical TP2	
	DDJ	DDPWS	DJ	RJ	Mask Margin	Opt DJ (PRBS9)
-0.38	28.4	20.4	30.1	0.3	24	20.85
0.34	24.0	18.3	27.2	0.3	26	19.95
0.97	21.2	16.6	23.4	0.3	26	19.55
1.66	18.0	14.3	20.9	0.3	27	20.48
2.10	15.3	13.3	17.6	0.3	24	19.57
2.53	12.9	10.7	15.2	0.3	28	21.58
3.21	10.7	8.0	12.5	0.3	26	20.30
4.06	8.8	5.6	11.2	0.3	26	19.16
4.74	8.9	4.6	11.1	0.3	30	20.17
5.37	10.3	4.4	12.0	0.3	19	20.60
6.19	10.9	4.3	12.7	0.3	28	20.45
6.62	12.2	4.0	14.1	0.3	28	19.26
7.57	13.4	3.9	15.1	0.3	24	21.00
8.26	14.7	3.7	16.2	0.3	25	21.10

*Vendor 1, optical eye diagrams over Cisco Reference Card
1.6" (above) and 6" (below)*



Test points A, B and TP2 over Vendor 2, Cisco Reference Card

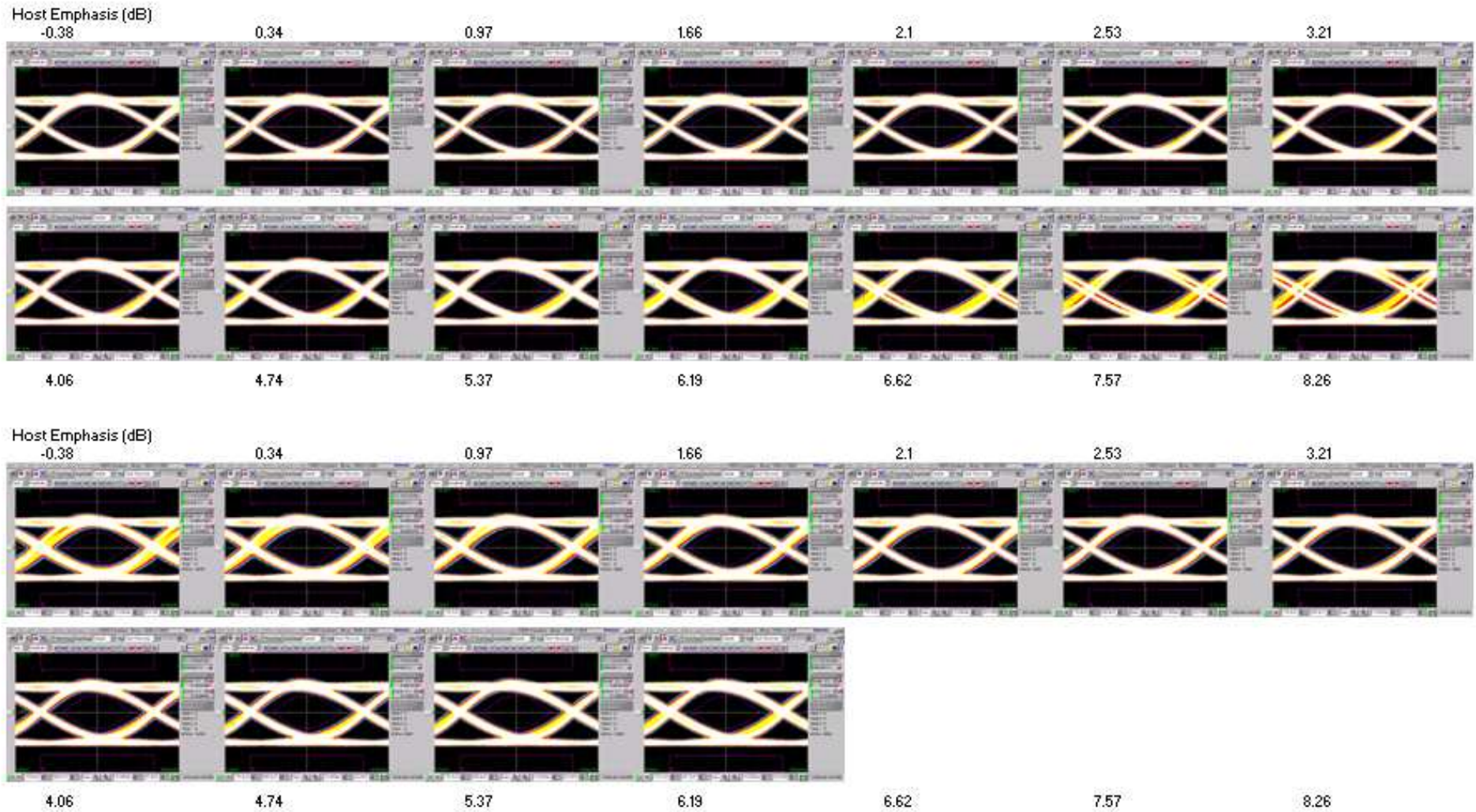
1.6 inches, NTN

Host emphasis at A (dB)	Jitter a B (ps, all measurements with PRBS9)				Optical TP2	
	DDJ	DDPWS	DJ	RJ	Mask Margin	Opt DJ (PRBS9)
-0.38	13.0	11.4	14.7	0.2	27	11.71
0.34	10.9	9.6	12.7	0.2	27	11.72
0.97	9.3	7.4	10.7	0.2	30	11.72
1.66	7.8	6.1	9.5	0.2	30	10.94
2.10	7.1	5.1	9.0	0.2	26	12.98
2.53	7.5	3.5	9.2	0.2	26	13.37
3.21	8.6	2.5	10.3	0.2	26	14.02
4.06	10.1	3.0	11.7	0.2	26	15.04
4.74	11.4	3.1	12.6	0.2	19	15.67
5.37	12.4	3.5	13.8	0.2	24	19.23
6.19	14.4	3.4	15.6	0.2	21	18.07
6.62	15.6	3.7	16.9	0.2	20	22.07
7.57	16.7	4.1	17.9	0.3	19	23.11
8.26	18.0	4.0	19.3	0.2	16	23.66

6 inches, NTN

Host emphasis at A (dB)	Jitter a B (ps, all measurements with PRBS9)				Optical TP2	
	DDJ	DDPWS	DJ	RJ	Mask Margin	Opt DJ (PRBS9)
-0.38	28.4	20.4	30.1	0.3	15	22.22
0.34	24.0	18.3	27.2	0.3	16	20.32
0.97	21.2	16.6	23.4	0.3	21	17.49
1.66	18.0	14.3	20.9	0.3	27	16.22
2.10	15.3	13.3	17.6	0.3	25	15.28
2.53	12.9	10.7	15.2	0.3	27	14.73
3.21	10.7	8.0	12.5	0.3	26	13.98
4.06	8.8	5.6	11.2	0.3	24	14.28
4.74	8.9	4.6	11.1	0.3	23	16.29
5.37	10.3	4.4	12.0	0.3	22	17.52
6.19	10.9	4.3	12.7	0.3	22	18.25
6.62	12.2	4.0	14.1	0.3		
7.57	13.4	3.9	15.1	0.3		
8.26	14.7	3.7	16.2	0.3		

*Vendor 2, optical eye diagrams over Cisco Reference Card
1.6" (above) and 6" (below)*



Test points A, B and TP2 over Vendor 3, Cisco Reference Card

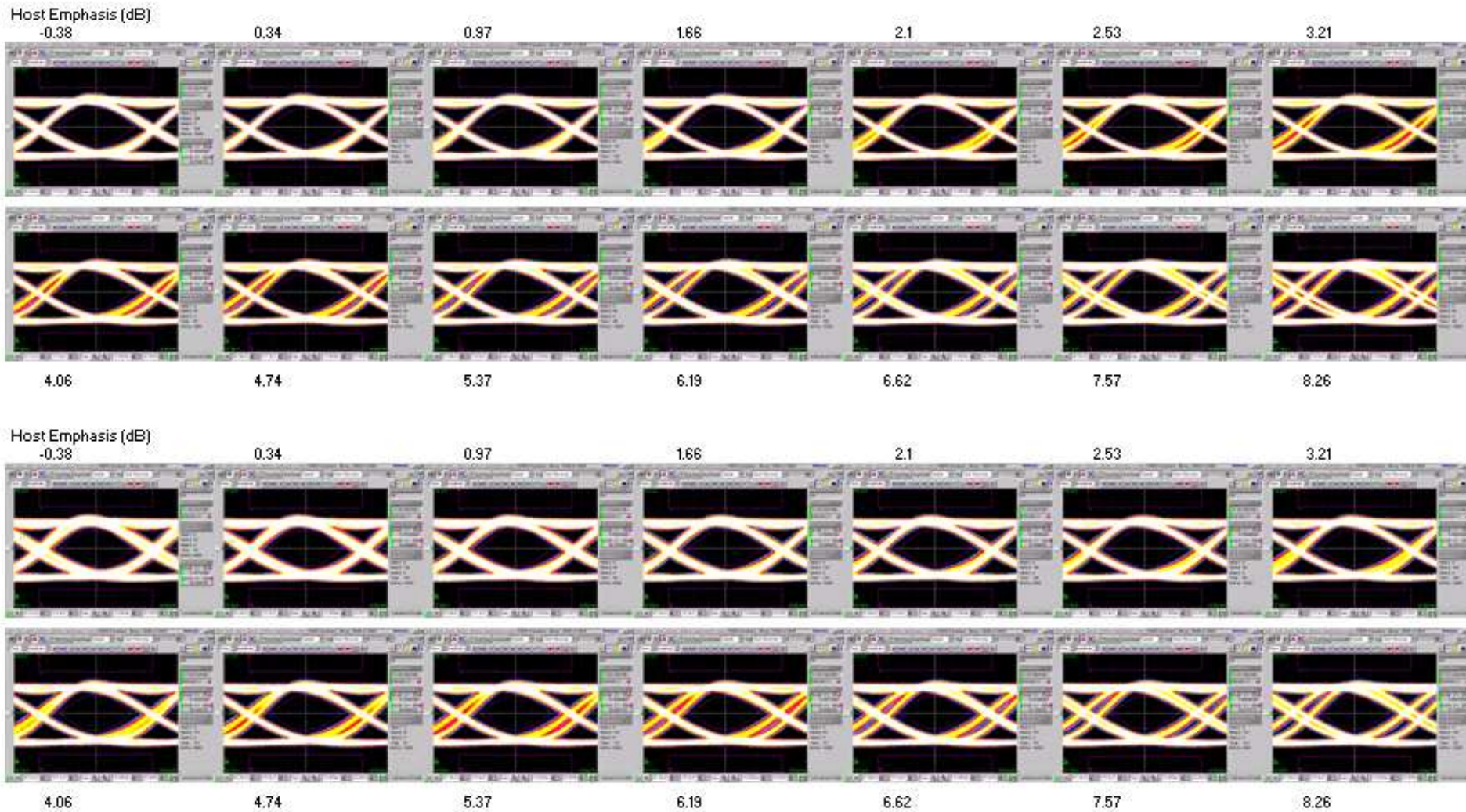
1.6 inches, NTV

Host emphasis at A (dB)	Jitter a B (ps, all measurements with PRBS9)				Optical TP2	
	DDJ	DDPWS	DJ (PRBS9)	RJ	Mask Margin	Opt DJ (PRBS9)
-0.38	13.0	11.4	14.7	0.2	29	17.85
0.34	10.9	9.6	12.7	0.2	23	17.46
0.97	9.3	7.4	10.7	0.2	26	15.53
1.66	7.8	6.1	9.5	0.2	21	16.58
2.10	7.1	5.1	9.0	0.2	19	16.87
2.53	7.5	3.5	9.2	0.2	22	18.28
3.21	8.6	2.5	10.3	0.2	23	20.53
4.06	10.1	3.0	11.7	0.2	23	20.93
4.74	11.4	3.1	12.6	0.2	16	22.14
5.37	12.4	3.5	13.8	0.2	16	23.29
6.19	14.4	3.4	15.6	0.2	14	25.17
6.62	15.6	3.7	16.9	0.2	11	26.89
7.57	16.7	4.1	17.9	0.3	8	27.69
8.26	18.0	4.0	19.3	0.2	7	30.96

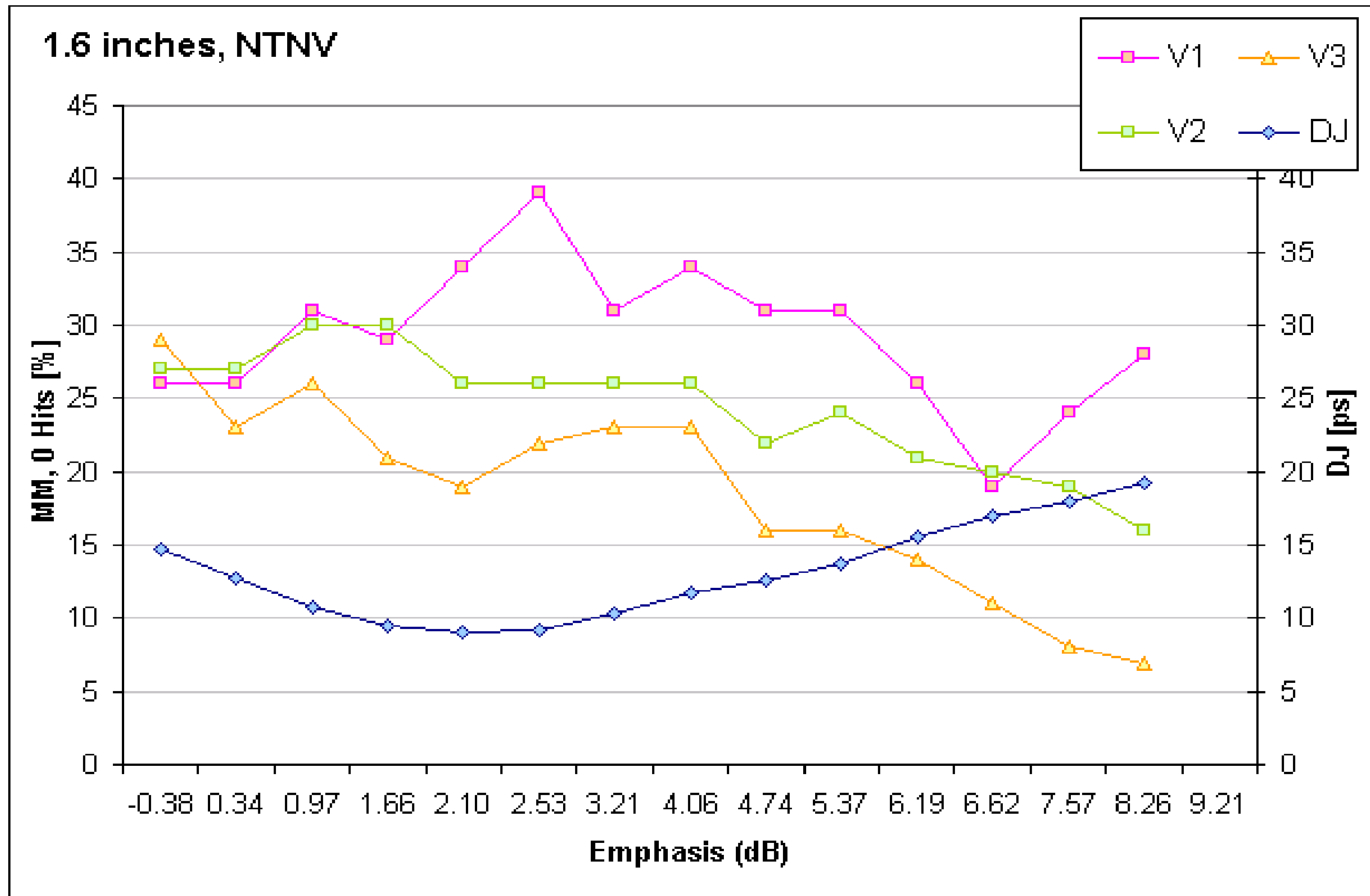
6 inches, NTV

Host emphasis at A (dB)	Jitter a B (ps, all measurements with PRBS9)				Optical TP2	
	DDJ	DDPWS	DJ	RJ	Mask Margin	Opt DJ (PRBS9)
-0.38	28.4	20.4	30.1	0.3	22	24.04
0.34	24.0	18.3	27.2	0.3	24	21.97
0.97	21.2	16.6	23.4	0.3	24	20.50
1.66	18.0	14.3	20.9	0.3	24	18.82
2.10	15.3	13.3	17.6	0.3	21	17.90
2.53	12.9	10.7	15.2	0.3	19	17.79
3.21	10.7	8.0	12.5	0.3	14	18.73
4.06	8.8	5.6	11.2	0.3	19	19.40
4.74	8.9	4.6	11.1	0.3	19	21.61
5.37	10.3	4.4	12.0	0.3	16	22.83
6.19	10.9	4.3	12.7	0.3	13	25.01
6.62	12.2	4.0	14.1	0.3	11	26.01
7.57	13.4	3.9	15.1	0.3	13	26.89
8.26	14.7	3.7	16.2	0.3	8	28.67

*Vendor 3, optical eye diagrams over Cisco Reference Card
1.6" (above) and 6" (below)*



*Summary plots of TP2 mask margins and Electrical DJ at B,
1.6" CRC*



*Summary plots of TP2 mask margins and Electrical DJ at B,
6" CRC*

