



COM Updates Proposal

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05/20/2015

Proposal Goals

- **Allow 3m NO-FEC cables to pass COM**
- **Distribute tightening of margin to many different parts of the channel**
- **Combines parts of what many groups are asking for**
 - Changing the Limit
 - Transmitter Changes
 - Package Model Changes
- **Provide a starting point for refinement and consensus building**

Methodology

› Improve package

- Die capacitance - C_d
- Package capacitance - C_p

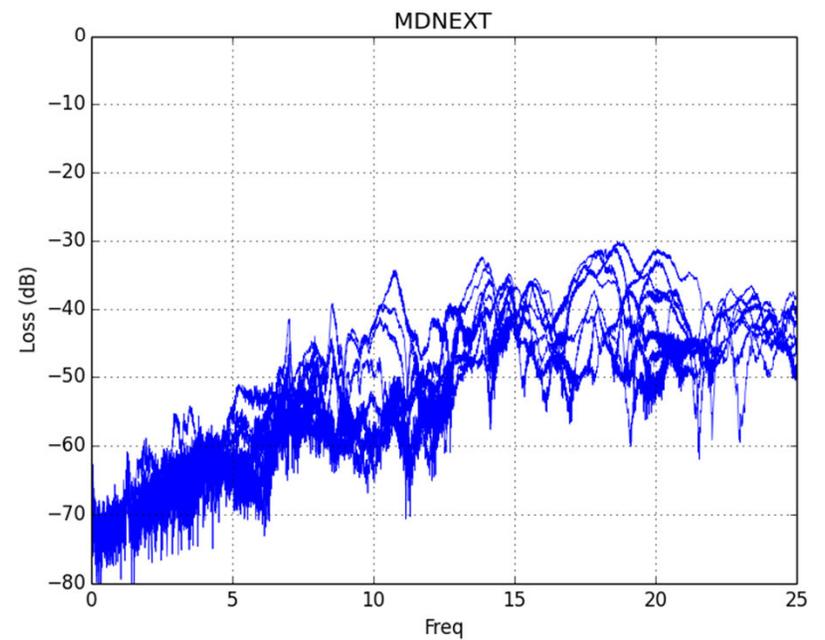
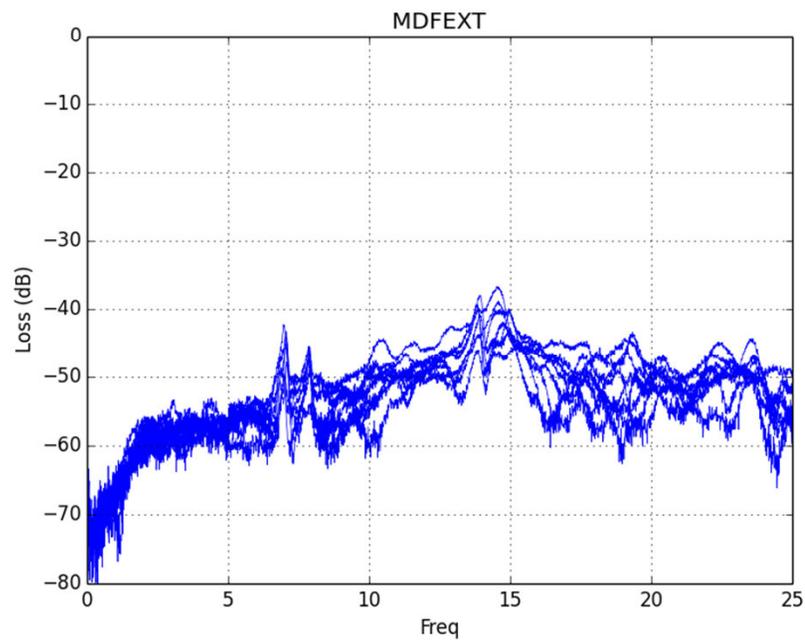
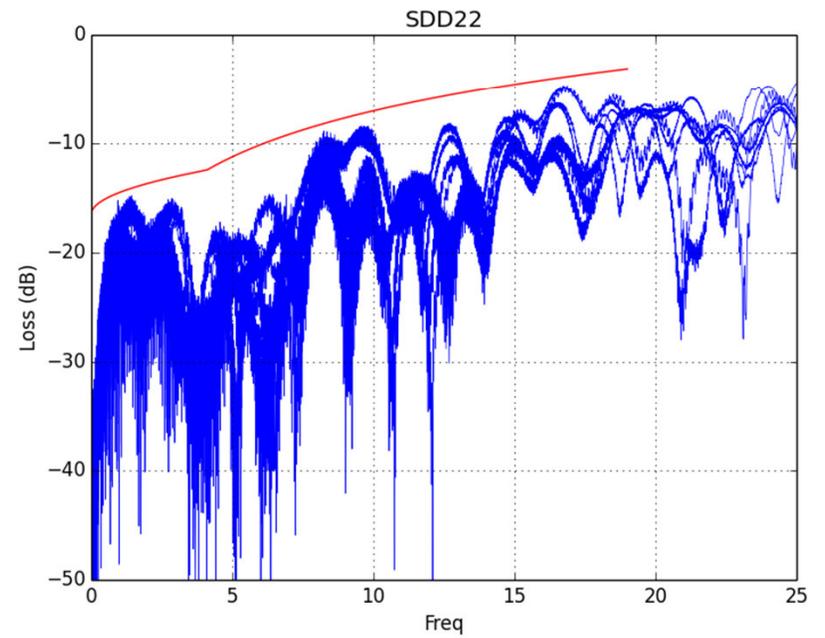
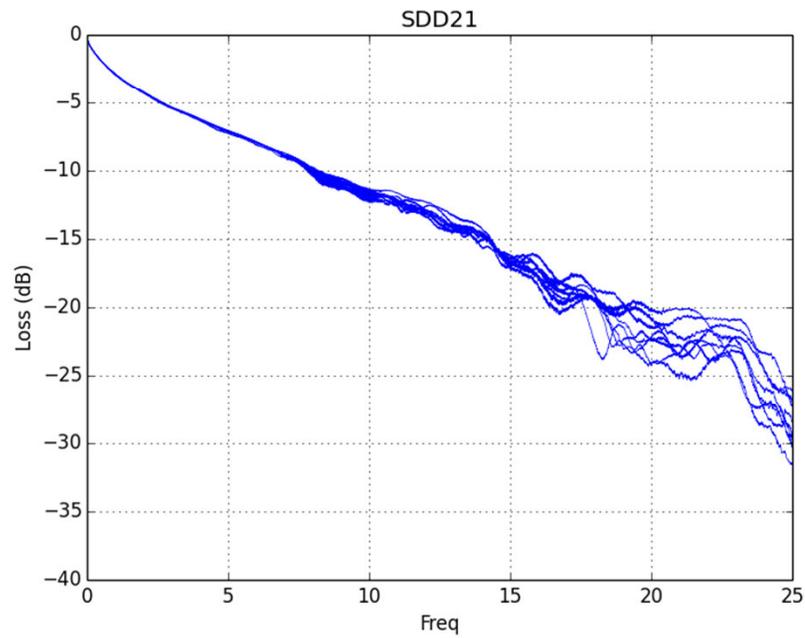
› Improve transmitter characteristics

- A_v
- A_{fe}
- SNR_TX

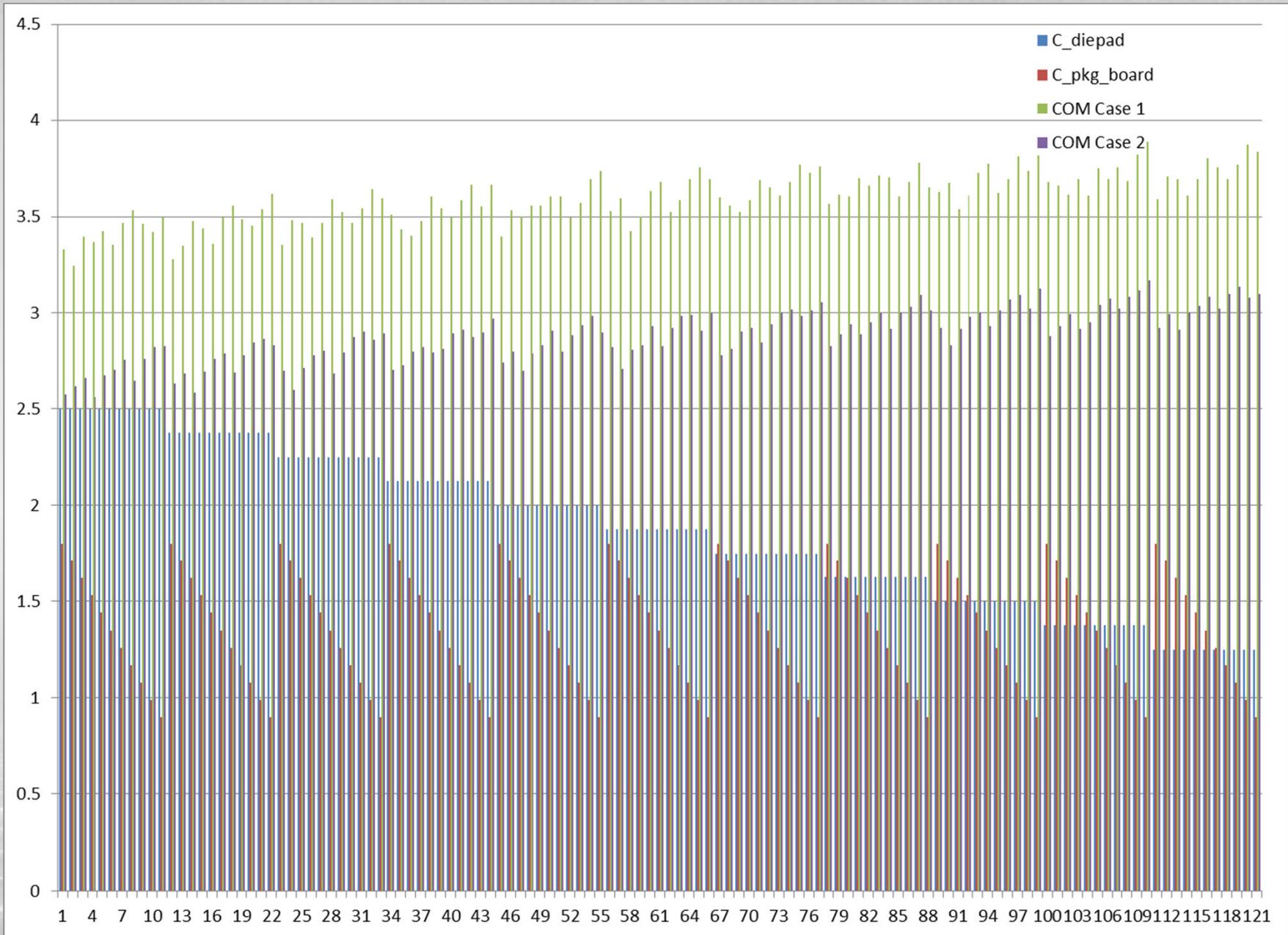
Methodology - Package

- Use worst case cable that still passes frequency domain spec
- select nominal pair
 - COM 2.5728
- Iteratively solve while lowering C_d and C_p by 5% until values reach 50%

3m 25 awg Break Out Cable



Finding the limits



Finding the limits

- › **Selected values that yield a COM slightly under passing**
 - $C_d = 2.0e-4$ nF 20% improvement
 - $C_P = 1.35e-4$ nF 25% improvement
- › **COM of 2.9046 dB**
- › **Improvement of 0.3318 dB**

Methodology - Transmitter

- › Take some of the changes proposed in [mellitz_040815_25GE_adhoc.pdf](#)
- › Change values for
 - $A_v = 0.43$
 - $A_{fe} = 0.43$
 - $SNR_{TX} = 28.3$ dB

Molex - Worst case 3m 25 awg Breakout Cable

Stock COM			With updates to COM			Changes in COM Value		
	Case 1	Case 2		Case 1	Case 2		Change Case 1	Change Case 2
P1 TX1	3.0946	2.423	P1 TX1	3.719	3.0586	P1 TX1	0.6244	0.6356
P1 TX2	3.0247	2.3732	P1 TX2	3.7675	2.9585	P1 TX2	0.7428	0.5853
P1 TX3	3.0259	2.292	P1 TX3	3.5901	3.0398	P1 TX3	0.5642	0.7478
P1 TX4	3.3307	2.5728	P1 TX4	4.0507	3.3179	P1 TX4	0.72	0.7451
P2 TX1	2.9027	2.2642	P2 TX1	3.4641	2.8735	P2 TX1	0.5614	0.6093
P2 TX2	2.9131	2.1124	P2 TX2	3.5787	2.8109	P2 TX2	0.6656	0.6985
P2 TX3	2.7567	2.0661	P2 TX3	3.3107	2.6361	P2 TX3	0.554	0.57
P2 TX4	2.4584	1.6505	P2 TX4	3.0612	2.3517	P2 TX4	0.6028	0.7012
Average COM	2.93835	2.219275	Average COM	3.56775	2.880875	Average Change	0.6294	0.6616
Average Margin	-0.06165	-0.78073	Average Margin	0.56775	-0.11913			
STD DEV	0.255994	0.281799	STD DEV	0.300011	0.292465			

Amphenol - 3m 26 awg Breakout cable

Stock COM			With updates to COM			Changes in COM Value		
	Case 1	Case 2		Case 1	Case 2		Change Case 1	Change Case 2
P1 TX1	2.7553	1.918	P1 TX1	3.4472	2.5352	P1 TX1	0.6919	0.6172
P1 TX2	3.287	2.368	P1 TX2	3.9405	3.1767	P1 TX2	0.6535	0.8087
P1 TX3	2.964	2.1045	P1 TX3	3.5516	2.7722	P1 TX3	0.5876	0.6677
P1 TX4	2.6797	1.7033	P1 TX4	3.2102	2.4174	P1 TX4	0.5305	0.7141
P2 TX1	2.6914	1.9031	P2 TX1	3.3672	2.5233	P2 TX1	0.6758	0.6202
P2 TX2	3.0561	2.2266	P2 TX2	3.8026	2.9828	P2 TX2	0.7465	0.7562
P2 TX3	2.837	1.9366	P2 TX3	3.4719	2.6764	P2 TX3	0.6349	0.7398
P2 TX4	2.9213	2.0946	P2 TX4	3.6312	2.8487	P2 TX4	0.7099	0.7541
Average COM	2.898975	2.031838	Average COM	3.5528	2.741588	Average Change	0.653825	0.70975
Average Margin	-0.10103	-0.96816	Average Margin	0.5528	-0.25841			
STD DEV	0.205507	0.209317	STD DEV	0.235547	0.256211			

TE - 3m 26 awg Breakout cable

Stock COM			With updates to COM			Changes in COM Value		
	Case 1	Case 2		Case 1	Case 2		Change Case 1	Change Case 2
P1 TX1	3.583	2.705	P1 TX1	4.3831	3.5067	P1 TX1	0.8001	0.8017
P1 TX2	3.404	2.55	P1 TX2	4.1778	3.3225	P1 TX2	0.7738	0.7725
P1 TX3	3.545	2.62	P1 TX3	4.2658	3.4406	P1 TX3	0.7208	0.8206
P1 TX4	3.595	2.707	P1 TX4	4.2548	3.3714	P1 TX4	0.6598	0.6644
P2 TX1	3.142	2.296	P2 TX1	3.7866	2.9907	P2 TX1	0.6446	0.6947
P2 TX2	3.118	2.343	P2 TX2	3.9036	2.94	P2 TX2	0.7856	0.597
P2 TX3	3.219	2.245	P2 TX3	3.8582	2.9964	P2 TX3	0.6392	0.7514
P2 TX4	3.202	2.424	P2 TX4	3.8754	3.0632	P2 TX4	0.6734	0.6392
Average COM	3.351	2.48625	Average COM	4.063163	3.203938	Average Change	0.7121625	0.7176875
Average Margin	0.351	-0.51375	Average Margin	1.063163	0.203938			
STD DEV	0.204031	0.18413	STD DEV	0.230682	0.229218			

Change the Limit

➤ **Select 2.5 dB as the new limit**

Molex with Proposed Changes		
	Case 1	Case 2
P1 TX1	3.719	3.0586
P1 TX2	3.7675	2.9585
P1 TX3	3.5901	3.0398
P1 TX4	4.0507	3.3179
P2 TX1	3.4641	2.8735
P2 TX2	3.5787	2.8109
P2 TX3	3.3107	2.6361
P2 TX4	3.0612	2.3517
Average COM	3.56775	2.880875
Average Margin	1.06775	0.380875
STD DEV	0.300011	0.292465

Amphenol with Proposed Changes		
	Case 1	Case 2
P1 TX1	3.4472	2.5352
P1 TX2	3.9405	3.1767
P1 TX3	3.5516	2.7722
P1 TX4	3.2102	2.4174
P2 TX1	3.3672	2.5233
P2 TX2	3.8026	2.9828
P2 TX3	3.4719	2.6764
P2 TX4	3.6312	2.8487
Average COM	3.5528	2.741588
Average Margin	1.0528	0.241588
STD DEV	0.235547	0.256211

TE with Proposed Changes		
	Case 1	Case 2
P1 TX1	4.3831	3.5067
P1 TX2	4.1778	3.3225
P1 TX3	4.2658	3.4406
P1 TX4	4.2548	3.3714
P2 TX1	3.7866	2.9907
P2 TX2	3.9036	2.94
P2 TX3	3.8582	2.9964
P2 TX4	3.8754	3.0632
Average COM	4.063163	3.203938
Average Margin	1.563163	0.703938
STD DEV	0.230682	0.229218

Conclusion

- **3m No-FEC cables now attainable**
- **Spreads the margin out more evenly**

Thank You

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