Relative Power of new channel data

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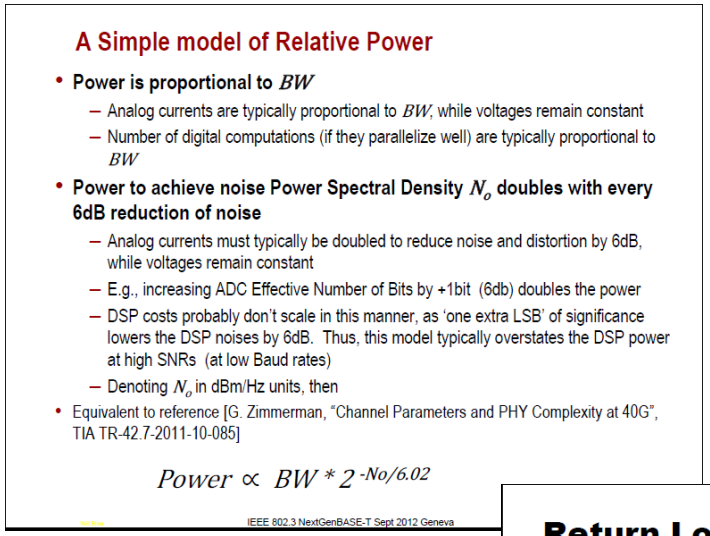
Introduction

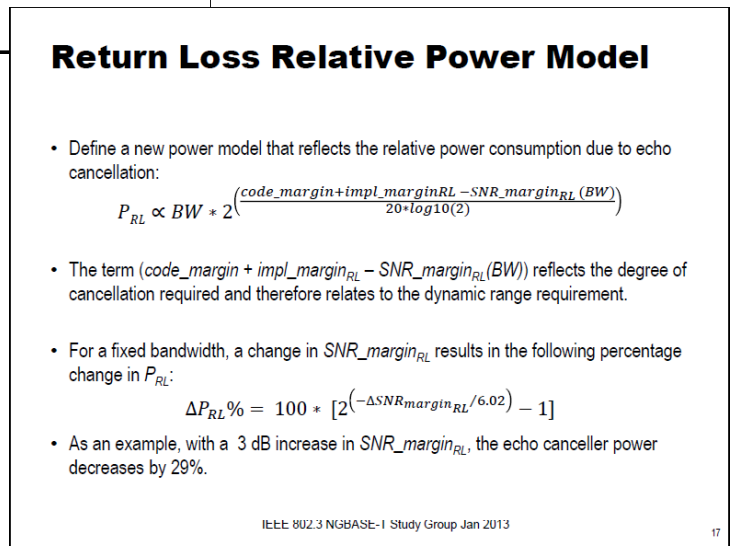
- Last Relative Power Consumption Analyses has been done in November 2013
- After the Dallas meeting important improvements have been presented within the Channel Ad Hoc
  - Cabling Channels with improved IL
  - Improved MDI including magnetics
- How are we doing on Relative Power today ?
- Power Consumption is still a concern : 4.X W to be reduced to 3.5W

Relative Power Model

- Earlier contributions from Bliss and Grimmwood have introduced the concept of Relative Power
- Nexans reconstructed the Relative Power Model using given formulars and applied calculations to concatenation of new datasets
- Modelling done by Jonathan Nevett (Nexans) & Dave Hess (CordData)



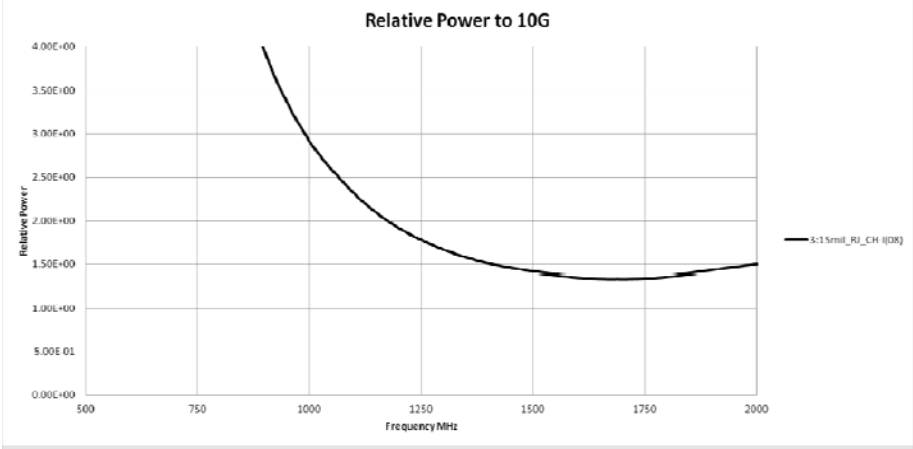
Bliss_01_0912.pdf



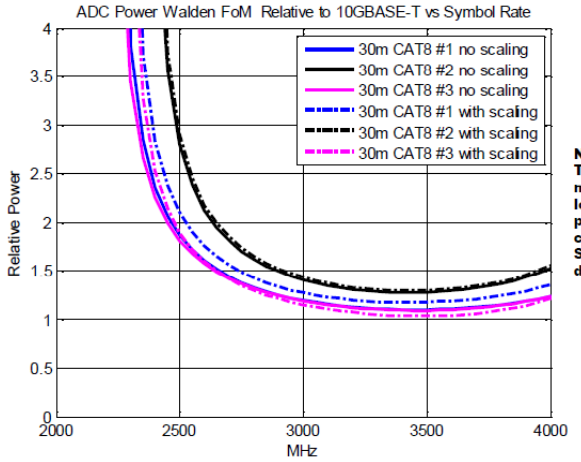
grimmwood_01_0113_NGBT.pdf

Sanity Check 1

- Simulated Case 1 using 8in/15mil PCB and ICM2 and Cat8 long channel
- Using the Cancellation Assumptions of 50dB for RL and 40dB for NEXT the results from previous work could be roughly matched



ADC Relative Power, ICM 8in/15mil PCB trace, 30m Cat8



Note:
The arithmetic mean insertion loss from all four pairs used to compute the SNR and dynamic range.

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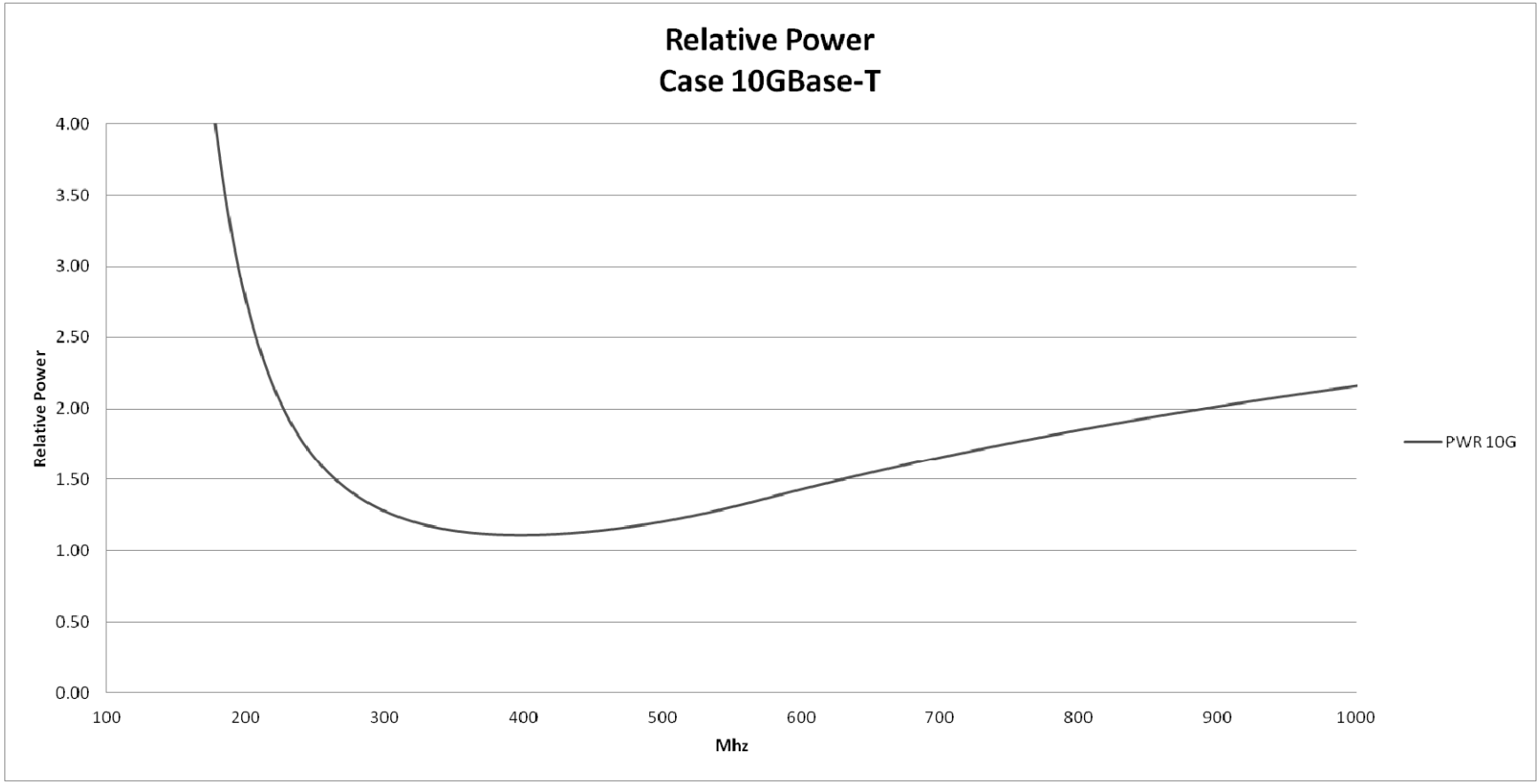
7

Grimmwood 3bq_01_1113.pdf

Sanity Check 2 : Example 10G

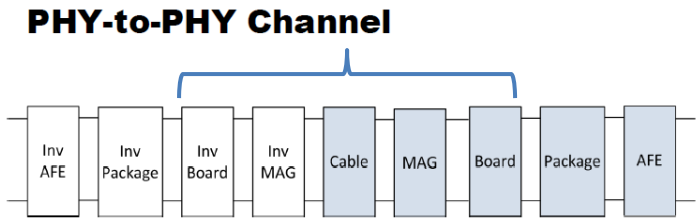
- Rel Power Model shows ~ 400MHz as best choice



16-port Phy Models

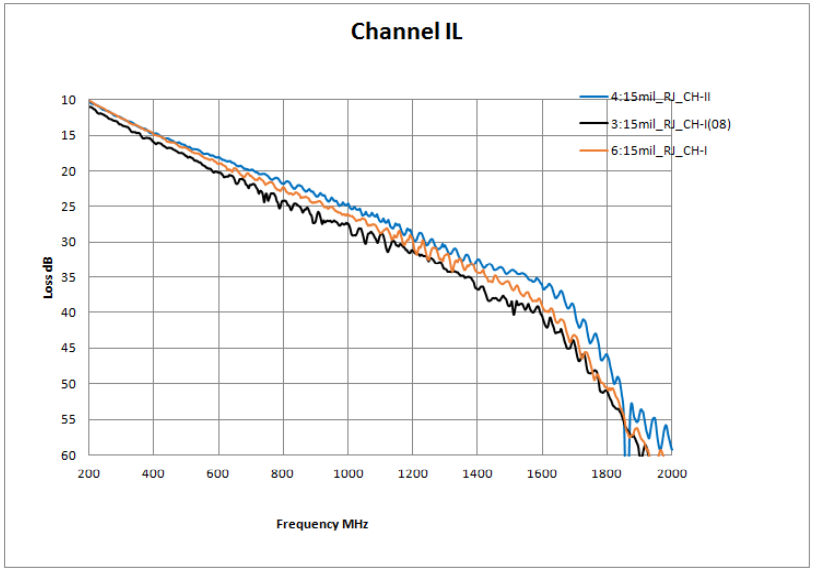
Following Data from Channel Ad Hoc was used :

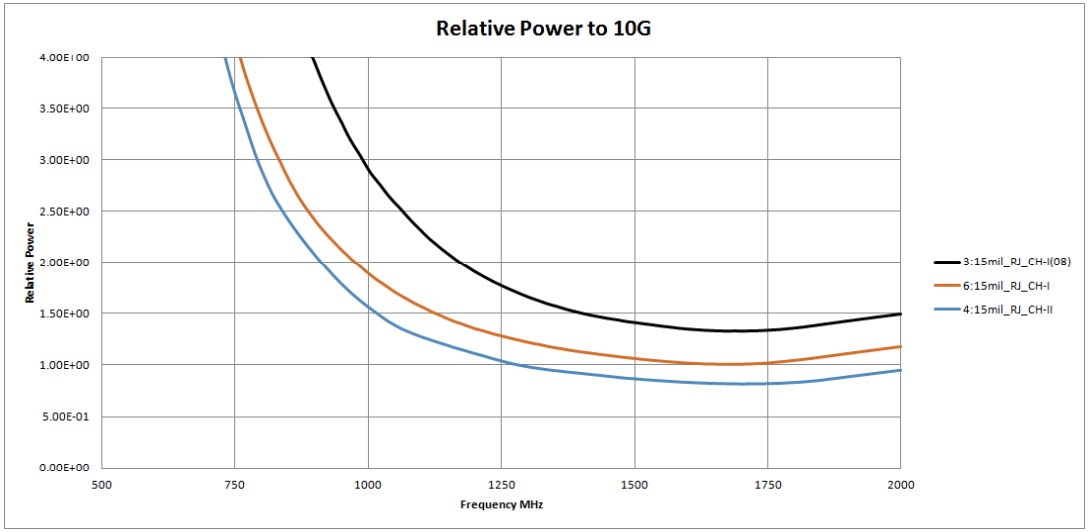
Filename	Shortnames	• Reasoning
• Board		
• 100ohms_8in_15mils_iso	: 15mil	• *Test Model/Match previous work*
• stackup2_2in_30mils_isolation_2GHz	: 25mil	• *Medium Case*
• MDI		
• BelICM2.S16P.zip	: RJ	• *RJ45 based MDI*
• Bel_ICM_ARJ45_1.zip	: ARJ	• *Improved MDI*
• Cabling		
• long_channel_3-24-3.s16p.rar	: CH-I(08)	• *Test Model/Match previous work*
• 11513_3-24-3_long_channel.zip	: CH-I	• *Better IL & Case for Cat8.1 / CH-I*
• Nexans Channel 3-24-3 no MDI.zip	: CH-II	• *Better IL (AWG22) & Case for Cat.8.2 / CH-II*
• Full Cases : Concatenation of 5 x S16P Files		



Impact of Improved Cabling IL

- Compared to November 2013 2 new long channels have been presented, mainly showing reduced insertion loss
- Both result in a significant reduction of Rel Power between

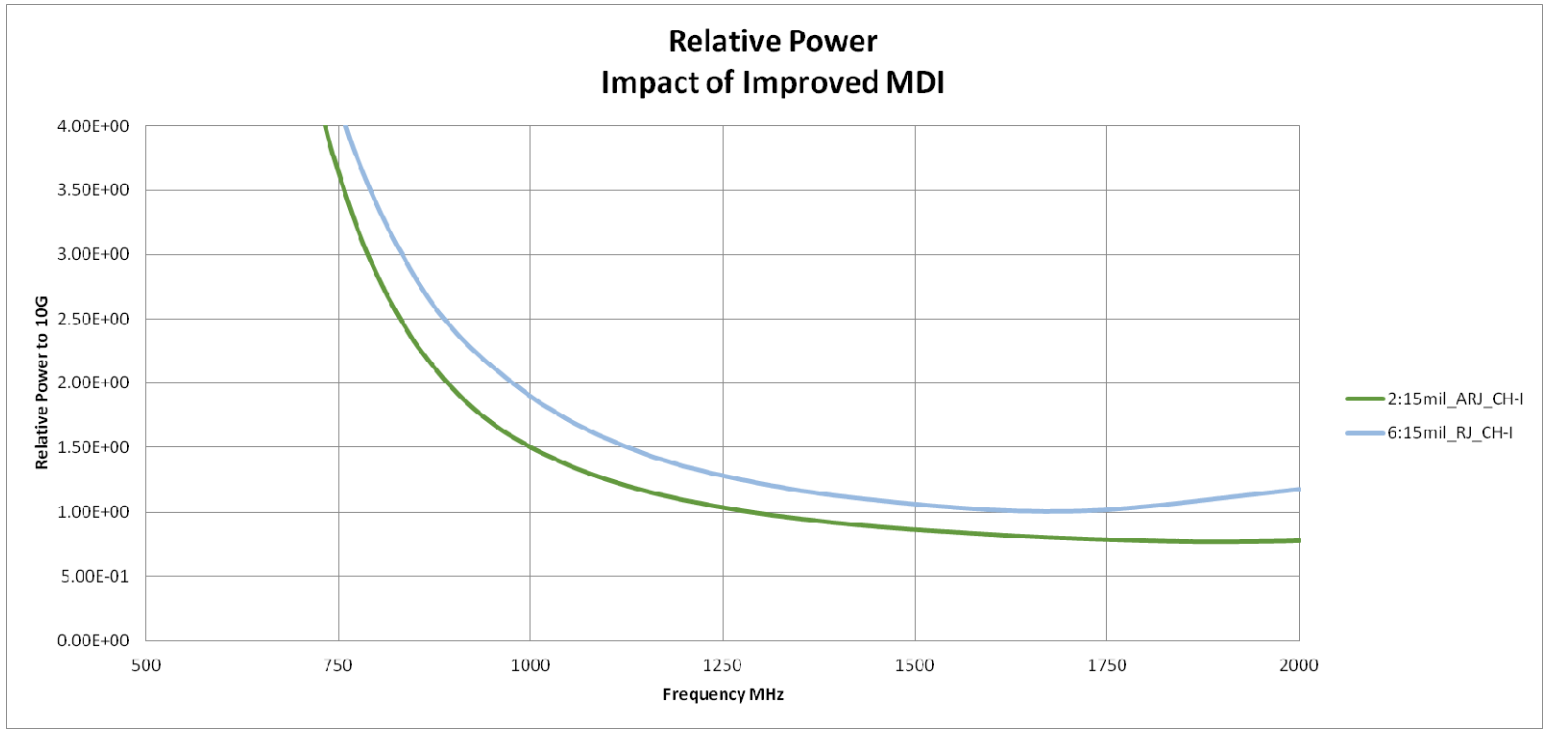




Case	P_{rel}
3	1.35
6	1.02
4	0.83

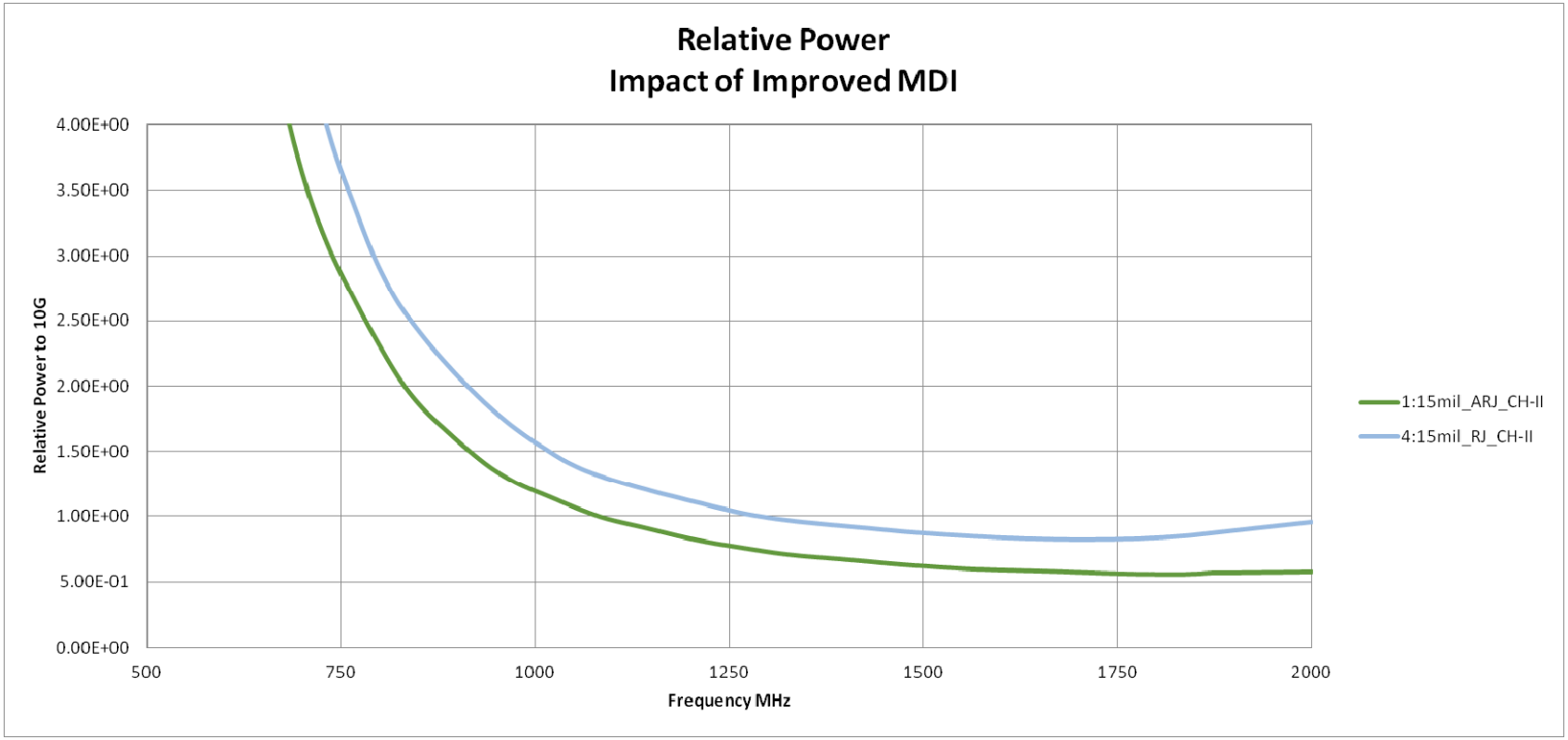
Impact of Improved MDI(1)

- February 2014 data for second MDI with Magnetics based on Non RJ45 has been presented



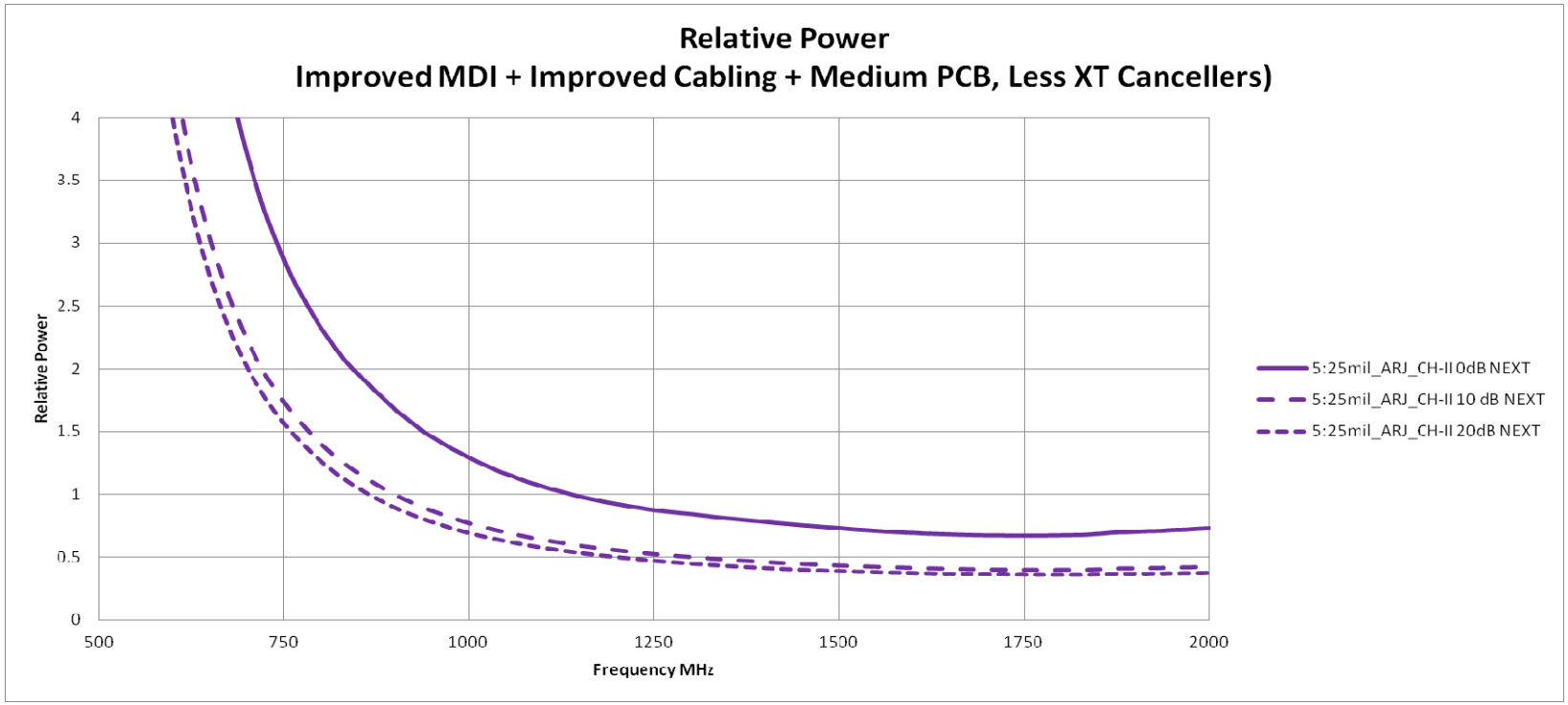
Case	P_{rel}
6	1.02
2	0.83

Impact of Improved MDI(2)



Case	P_{rel}
4	0.83
1	0.59

Case for No Next Cancellation



- With no Next Cancellation still P_{rel}=0.69 can be achieved
- Use of some Cancellation suggests additional savings but might be offset by cost of implementing and operating cancellers

Case	P_{rel}
5 + No Cancellation	0.69
5 + 10dB Cancellation	0.42
5 + 20 dB Cancellation	0.37

Conclusion

- Better Relative Cost compared to 10GBASE-T seems reachable
  - P_{rel} 0.83 Power can be achieved by CH-I / improved MDI with NEXT-Cancellation similar to 10GBase-T
  - P_{rel} of 0.69 can be achieved with CH-II cabling / improved MDI and No NEXT Cancellation
  - Lowest Relative Power Option is CH-II with Medium Grade PCB and some Xt Cancellation (P_{rel} =0,37)
- Due to high variation in Channel Performance, Phy Designers should use different channel cases to find best power options
- Input required related to Cost Trade Off for Use of Next Cancellation