

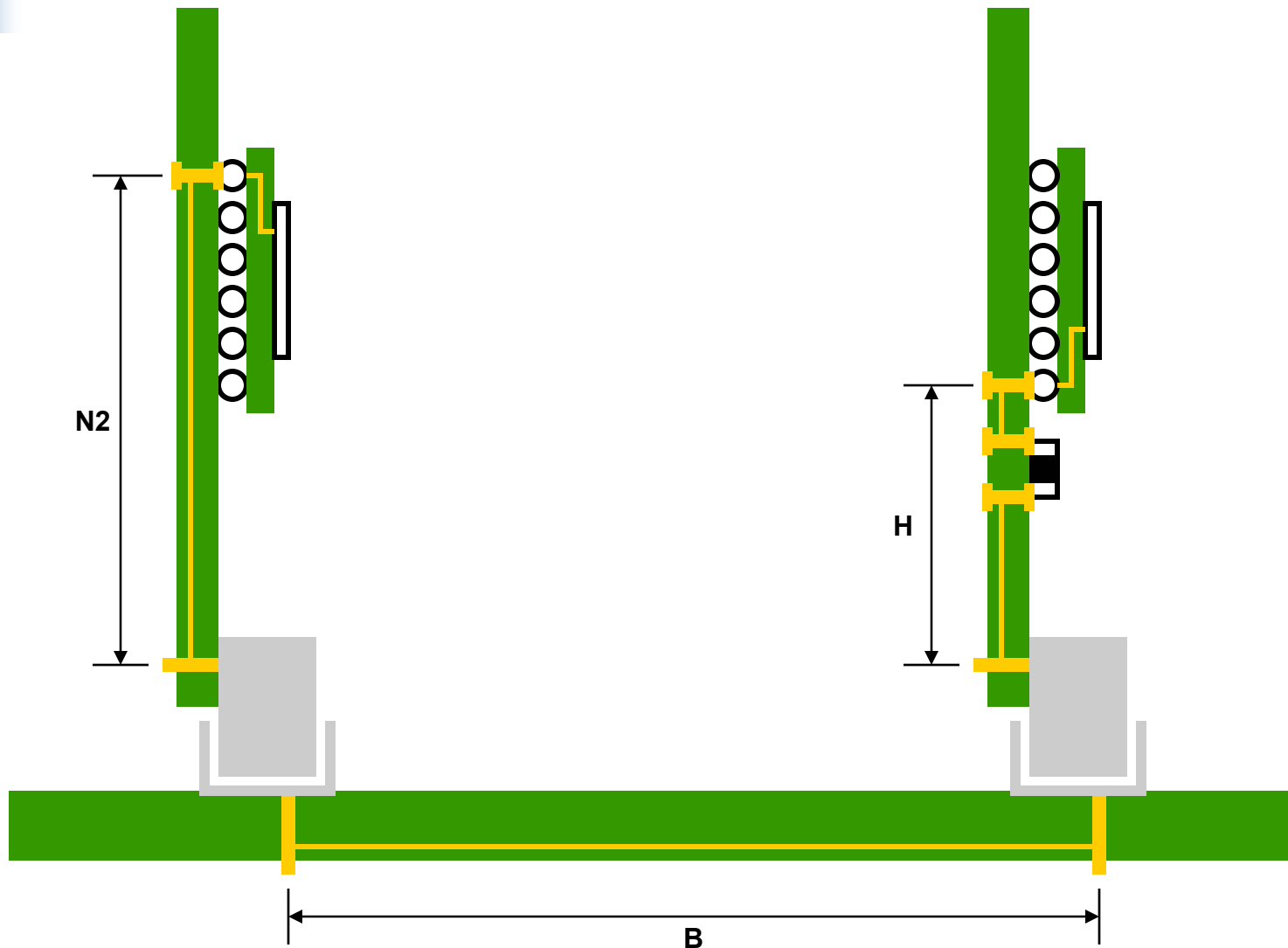


Channels for Consideration by the Signaling Ad Hoc

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Two-Connector Topology



Topology Data

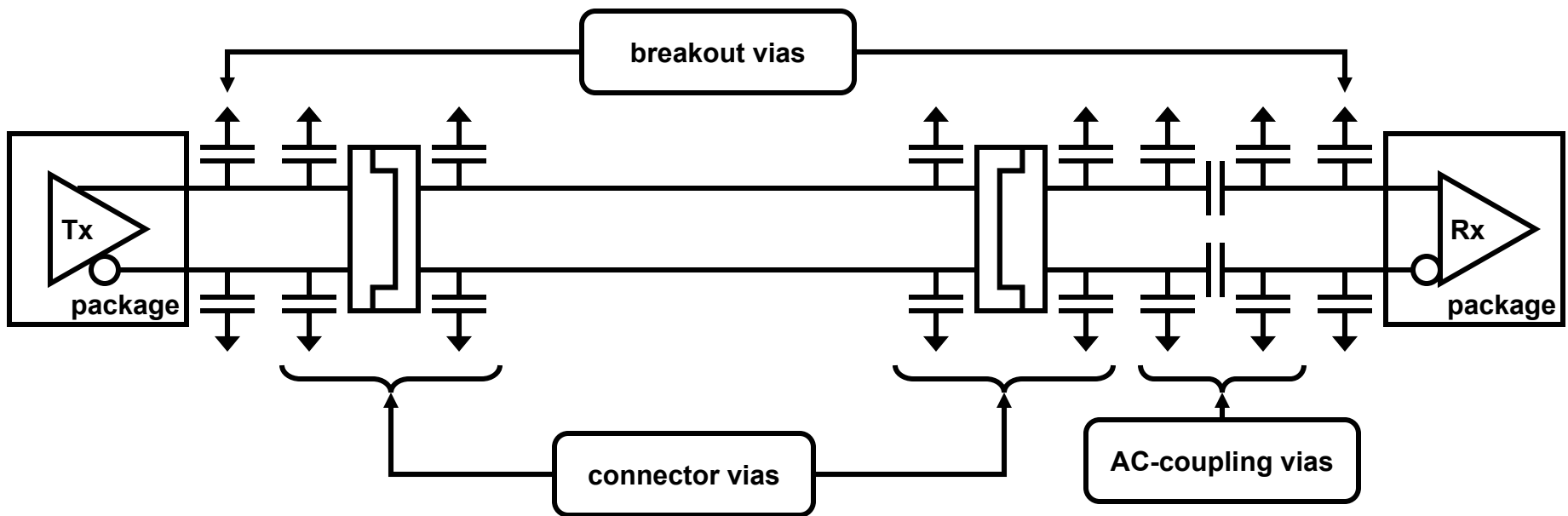
Description	N1	N2	B	H	Total	No. Connectors	AC / DC Coupling	Source
	(mm)	(mm)	(mm)	(mm)	(mm)			
Blade Server								
Proposed Worst-Case	76	102	533	127	838	3	AC	<i>koenen_01_0504.pdf</i>
ATCA								
Full Mesh (max)	0	127	533	127	787	2	AC	<i>(note 1)</i>
Switch / Router								
2 to 3 chassis/rack (min)	0	152	51	305	508	2	AC	<i>goergen_01_0304.pdf</i> <i>(note 2)</i>
2 to 3 chassis/rack (max)	0	152	559	305	1016			
5 to 8 chassis/rack (min)	0	127	51	229	406			
5 to 8 chassis/rack (max)	0	127	432	229	787			
					700	2	AC or DC	<i>mandich_01_0704.pdf</i>
					1000		AC	
ATCA Example (Star)								
min(B)	0	102	28	102	231	2	AC	<i>peters_01_0504.pdf</i>
max(B)	0	102	244	102	447			
Test Card								
CH1	0	102	76	102	279	2	DC	<i>goergen_02_0704.pdf</i>
CH18	0	254	508	254	1016			
CH16	76	76	76	178	406	3		
CH33	76	76	508	178	838			
Note 1: From PICMG 3.0 R1.0 AdvancedTCA Specification, December 30, 2002 (8.4.2.1 and 8.2.4.3).								
Note 2: Based on LC-2/SF-2. For minimum values, fabric position is assumed to be in the middle of the line cards. For maximum values, fabric position is assumed to be at the top of the line cards.								



Topology Observations

- Worst-case backplane trace length (B) is about 21" (533mm).
 - Applies to full-mesh and star applications where the hub cards are positioned at the top or bottom of the node cards.
 - This distance is reduced by centering the hub cards.
 - Example - Tyco Electronics Dual Star ATCA Backplane (Maximum length 9.8" (248 mm))
- Wide range of variability in the expected trace length on node / hub cards, 6" (152mm) median.
 - N2 = 3" (76mm) to 6" (152mm)
 - H = 3" to 12" (305mm)
 - Additional mezzanine connector and N1 = 3" for blade servers.
- AC-coupling is required by multiple applications.

Signal Path Model: Two Connectors





Recommended Channels of Interest

- 1m Channel “Improved FR-4”
 - 10” Line Card > 20” Backplane > 10” Line Card
- Adjacent Slots
 - 6” Line Card > \approx 1” Backplane (with stub) 6” Line Card
- ATCA Channels
 - Full Mesh
 - 6” Line Card > 20” Backplane > 6” Line Card
 - Dual Star
 - 6” Line Card > 10” Backplane (with and without stub) > 6” Line Card
- Different configurations of above scenarios based on different grades of “improved FR-4”

Summary of Proposed Test Cases

Case #	Line Card Length	Line Card Material	Backplane Length	Backplane Material	Backplane Stub	Comments
1	10"	- 13SI	20"	- 13SI	Bottom Layer Connection (or counterboring)	Tyco – Data to be available within 2 – 3 weeks Channel Model
2	10"	- 13	20"	- 13SI	Bottom Layer Connection (or counterboring)	Tyco – data available Margin Test Case
3	10"	- 6	20"	- 13SI	Bottom Layer Connection (or counterboring)	Tyco – data available Margin Test Case
4	5 – 6 "	-13	20"	- 13 SI	Bottom Layer connection (or counterboring)	Tyco – data available ATCA Full Mesh
5	5 – 6"	-13	10"	-13	Bottom Layer connection (or counterboring)	Tyco – data available ATCA Dual Star
6	5 - 6"	-13	10"	-13	With Stub	Tyco – data available ATCA Dual Star
7	5 – 6"	-13SI	1"	- 13SI	With Stub	Tyco – data available Adjacent Slot Testing

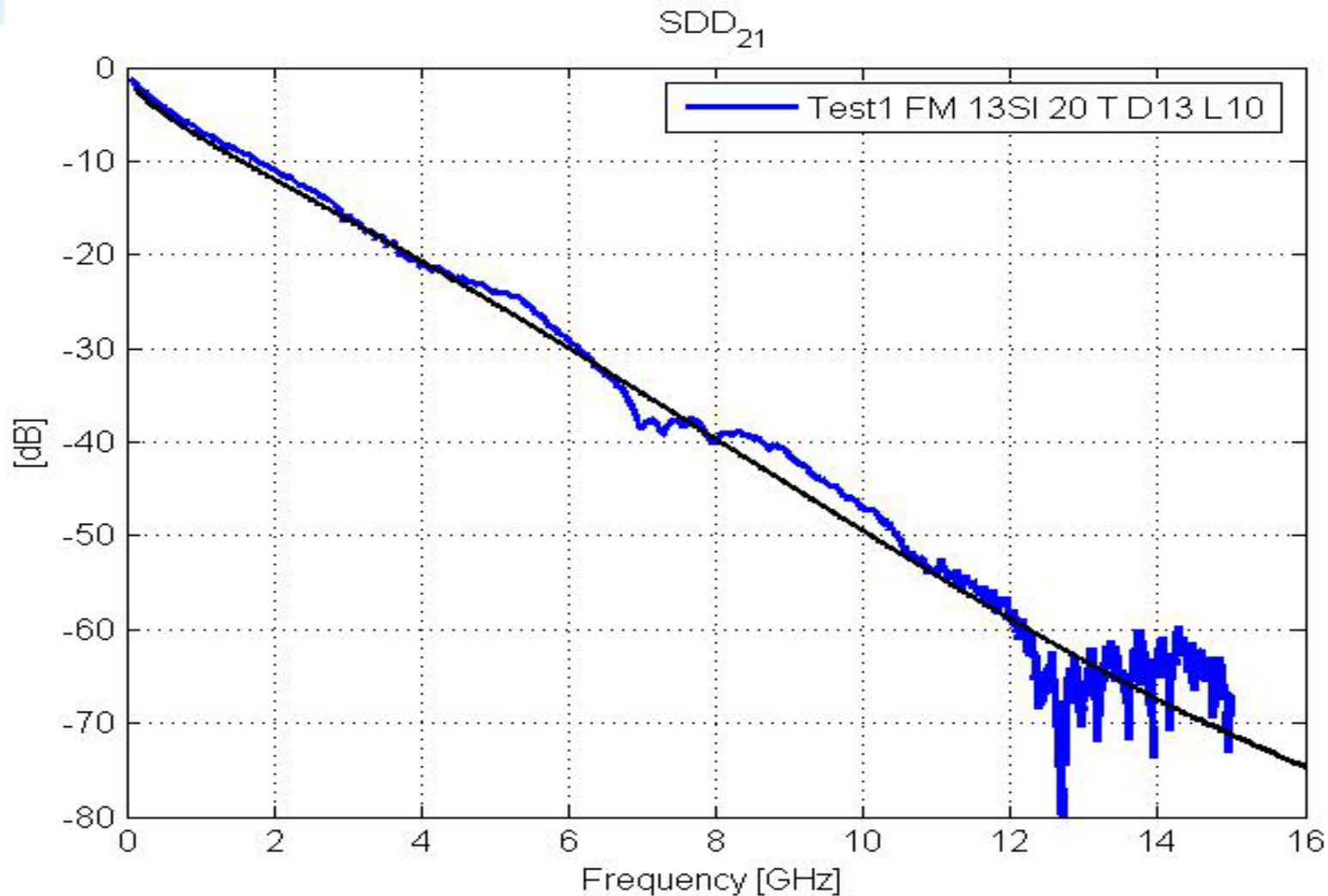
Note – All test cases shall include dominant adjacent NEXT and FEXT aggressors.



Case Channel #1

PENDING

Case Channel #2

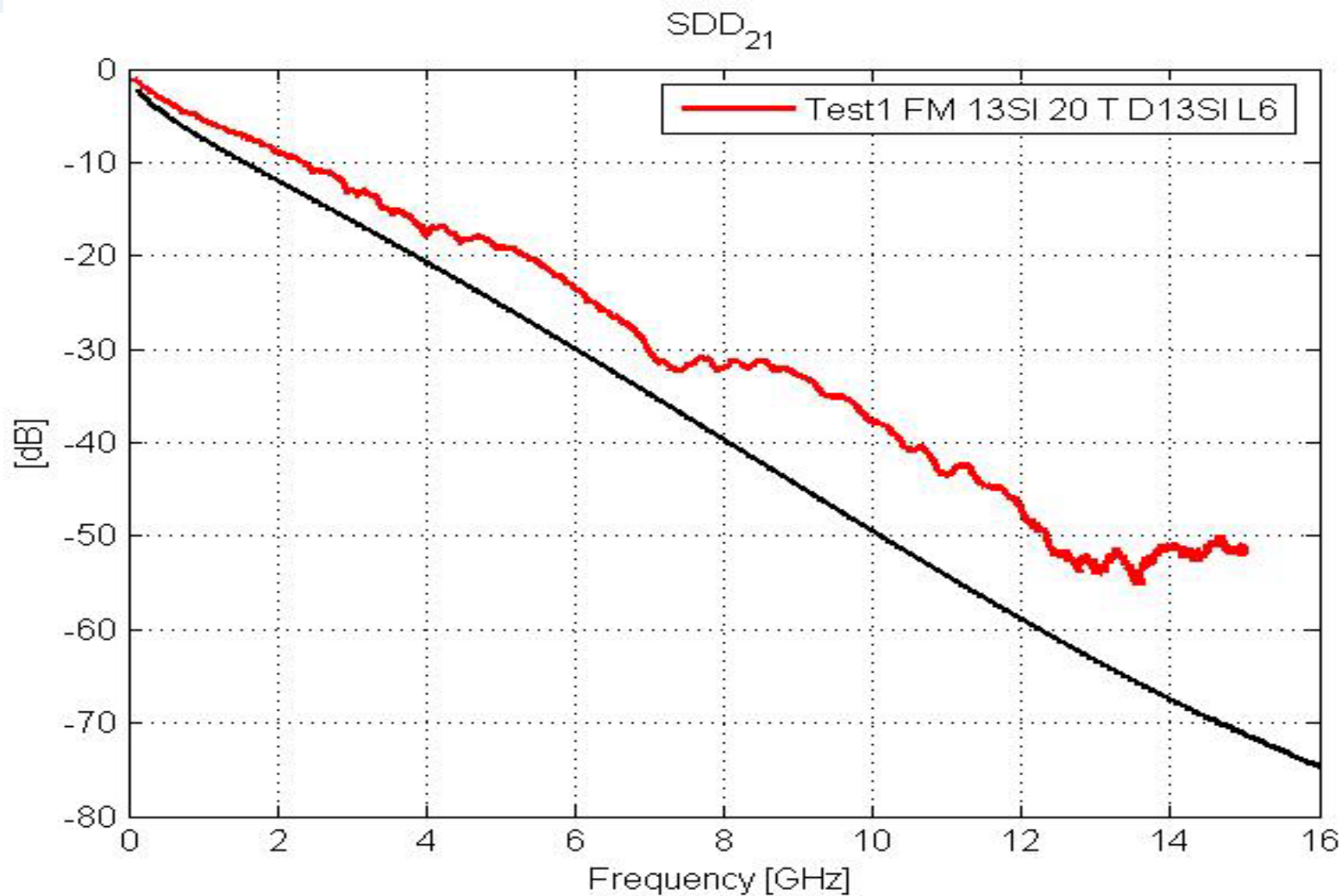




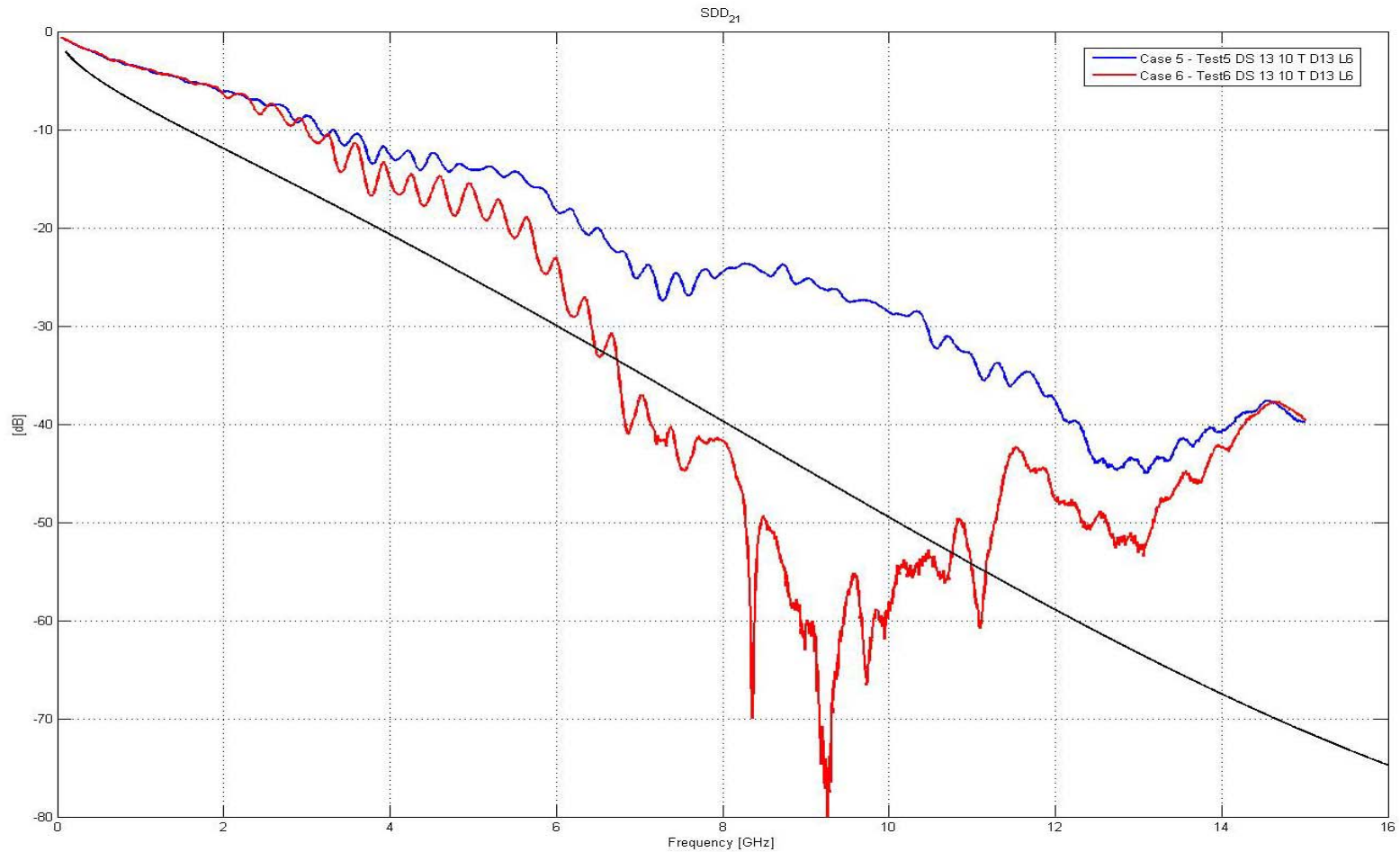
Case Channel #3

PENDING

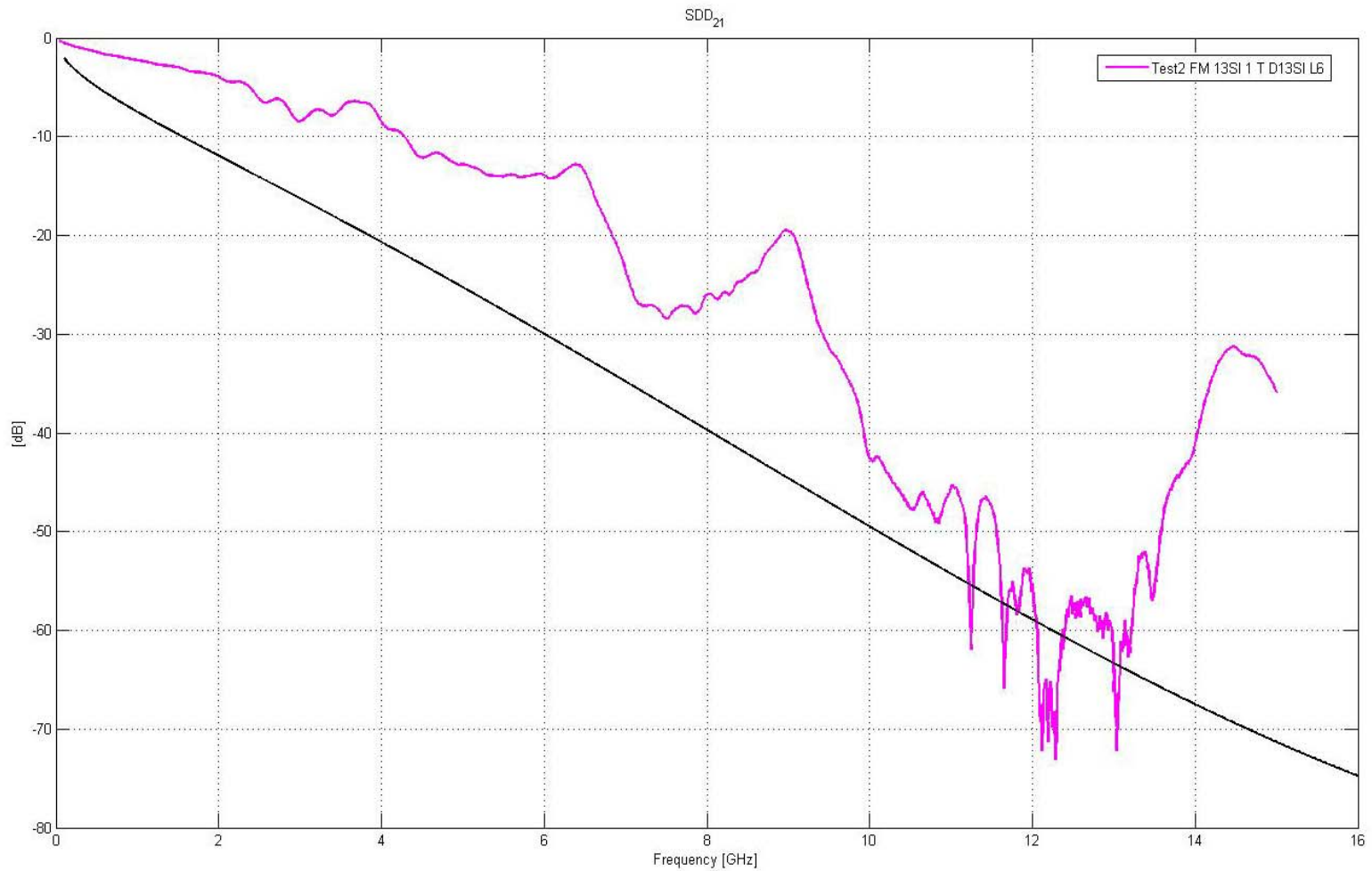
Case Channel #4



Case Channels #5 & 6



Case Channel #7





Other Areas to Explore

- Potential Items of Interest

- Stub effects? (Even if it violates the channel model?)
- Crosstalk – Different Pinouts
- Return Loss?
 - Requires good launch to see difference
 - Driven by daughtercard connection with further peaking caused by backplane layer connection
- Manufacturing variance?
- Environmental variance?