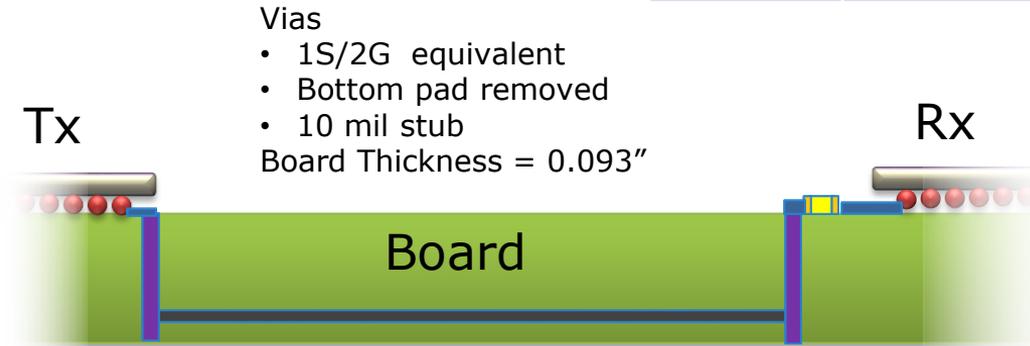


# 30dB Copper Channel: Maximum Loss Consideration

Richard Mellitz, Intel Corporation

# Approximate Topology – 1 Thru Channel - No Crosstalk

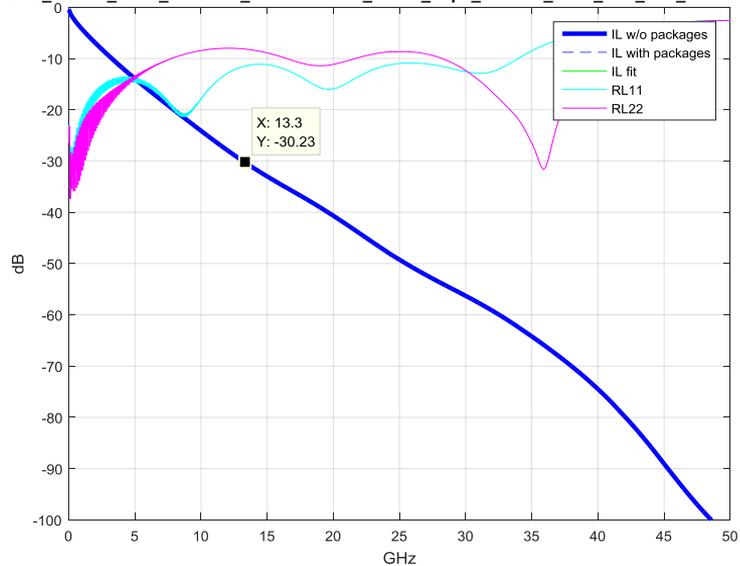
IL @ 13.28 GHz	Board Len
-30.1 dB	30"



Backplane Material loss  
0.94dB/in @ 12.89GHz

# Losses, TDR, SBR

mellitz\_030216\_50GE\_NGOATH\_adhoc--50GbE\_0conn\_Topo\_100ohm\_30dB\_thru\_50G\_NGOTH Losses



TDR response

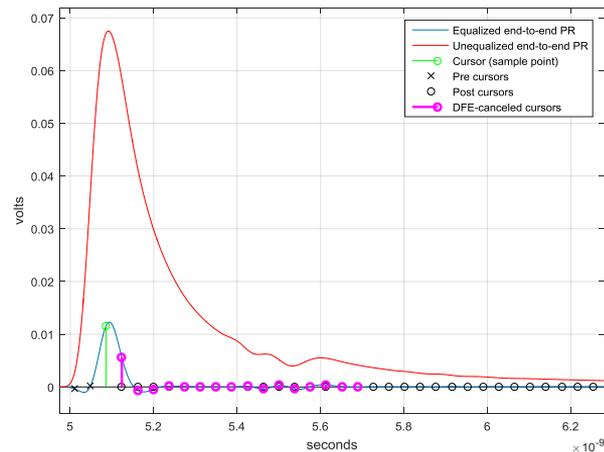
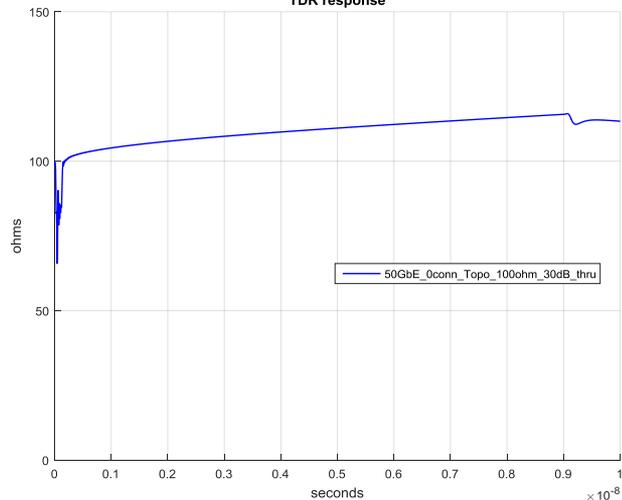


Table 93A-1 parameters			
Parameter	Setting	Units	Information
f_b	26.5625	GBd	
f_min	0.05	GHz	
Delta_f	0.01	GHz	
C_d	[2.8e-4 2.8e-4]	nF	[TX RX]
z_p select	[1 2]		[test cases to run]
z_p (TX)	[12 30]	mm	[test cases]
z_p (NEXT)	[12 12]	mm	[test cases]
z_p (FEXT)	[12 30]	mm	[test cases]
z_p (RX)	[12 30]	mm	[test cases]
C_p	[1.1e-4 1.1e-4]	nF	[TX RX]
R_0	50	Ohm	
R_d	[55 55]	Ohm	[TX RX]
f_r	0.75	*fb	
c(0)	0.6		min
c(-1)	[-0.15:0.05:0]		[min:step:max]
c(1)	[-0.35:0.05:0]		[min:step:max]
g_DC	[-15:1:0]	dB	[min:step:max]
f_z	10.625	GHz	
f_p1	10.625	GHz	
f_p2	1.00E+99	GHz	
A_v	0.45	V	
A_fe	0.45	V	
A_ne	0.65	V	
L	4		
M	32		
N_b	16	UI	
b_max(1)	0.5		
b_max(2..N_b)	0.2		
sigma_RJ	0.01	UI	
A_DD	0.02	UI	
eta_0	2.60E-08	V <sup>2</sup> /GH z	
SNR_TX	31	dB	
R_LM	0.95		
DER_0	1.40E-04		
Operational control			
COM Pass threshold	3	dB	
Include PCB	0	Value	0, 1, 2
g_DC_HP	[-4:1:0]		[min:step:max]
f_HP_PZ	0.6640625	GHz	

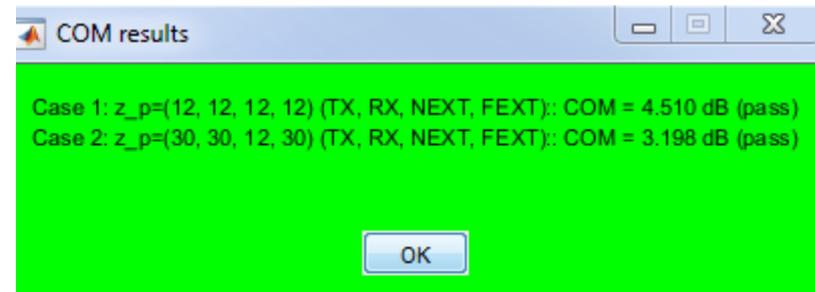
I/O control		
DIAGNOSTICS	1	logical
DISPLAY_WINDOW	1	logical
Display frequency domain	1	logical
CSV_REPORT	1	logical
RESULT_DIR	.\results\COM50_{date}\	
SAVE_FIGURES	0	logical
Port Order	[1 3 2 4]	
RUNTAG	50G_NGOTH	
Receiver testing		
RX_CALIBRATION	0	logical
Sigma_BBN_step	5.00E-03	V
IDEAL_TX_TERM	0	logical
T_r	8.00E-03	ns
T_r_filter_type	0	logical
T_r_meas_point	0	logical

Non standard control options		
INC_PACKAGE	1	logical
IDEAL_RX_TERM	0	logical
INCLUDE_CTLLE	1	logical
INCLUDE_TX_RX_FILTER	1	logical
COM_CONTRIBUTION	1	logical

Table 93A-3 parameters		
Parameter	Setting	Units
package_tl_gamma0_a1_a2	[0 1.734e-3 1.455e-4]	
package_tl_tau	6.141E-03	ns/mm
package_Z_c	85	Ohm

Table 92-12 parameters		
Parameter	Setting	Units
board_tl_gamma0_a1_a2	[0 4.114e-4 2.547e-4]	
board_tl_tau	6.191E-03	ns/mm
board_Z_c	110	Ohm
z_bp (TX)	151	mm
z_bp (NEXT)	72	mm
z_bp (FEXT)	72	mm
z_bp (RX)	151	mm

Possibly of interest



## COM table example