Considerations for 100 Gb/s per Lane Electrical Interfaces

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Purpose

- Consider connectors and PCB materials used in 802.3cd mated test fixtures as basis for feasibility of 100 Gb/s per Lane applications.

Scope

- To consider feasibility, minimum IL for each MTF 802.3cd connector type (MDI) that meets all of the other 802.3cd MTF requirements selected from multiple measurements presented.
- Presentation not intended to provide comparative IL for MDIs; better minimums are possible for each connector type.

Background

- 802.3cd link

136.8.1 Link block diagram

One direction of a 50GBASE-CR, 100GBASE-CR2, or 200GBASE-CR4 link is shown in Figure 136–2.

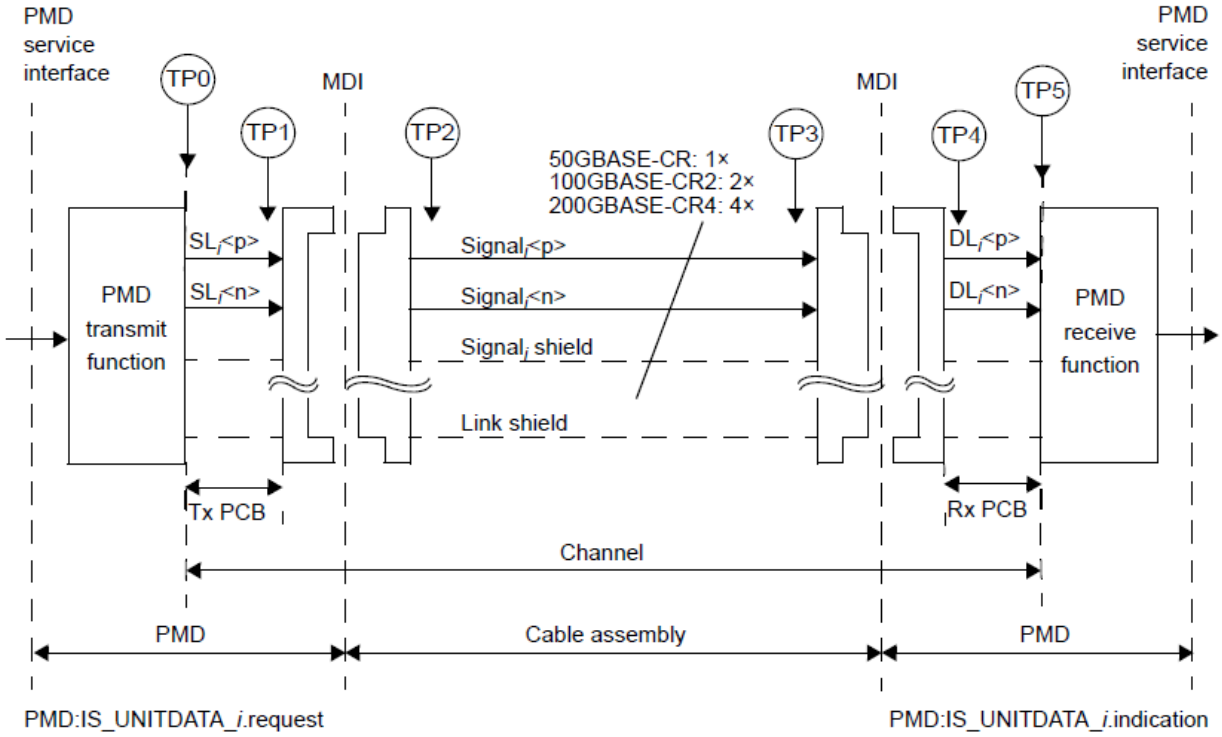


Figure 136–2—50GBASE-CR, 100GBASE-CR2 or 200GBASE-CR4 link (one direction is illustrated)

Background

- 802.3bs Host Loss Budget

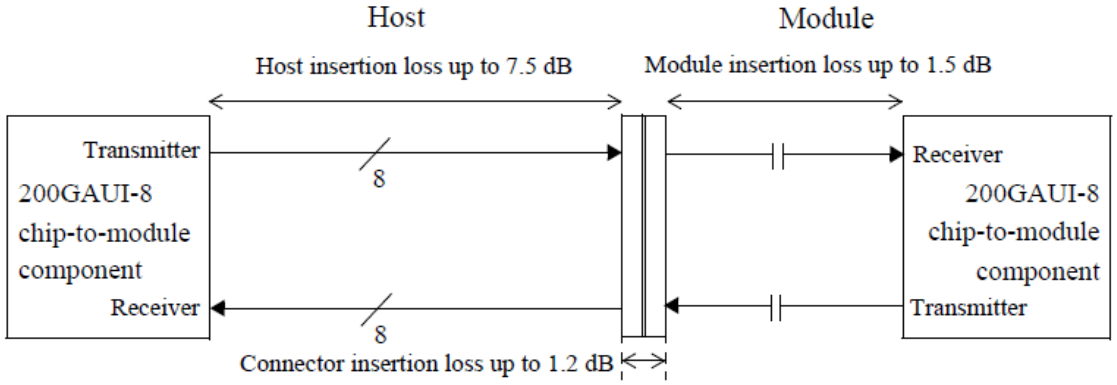
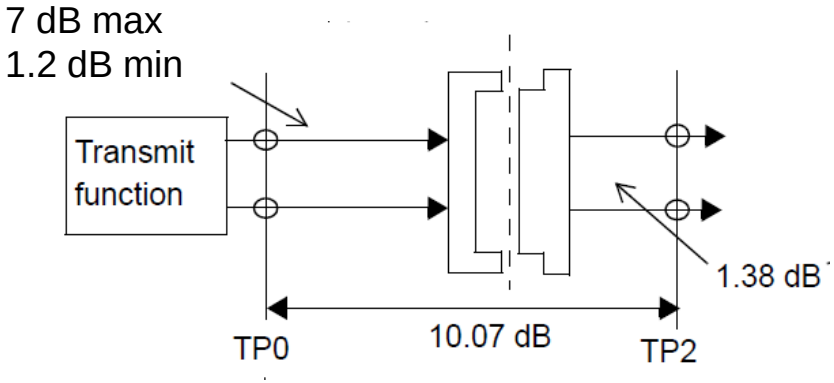


Figure 120C–2—200GAUI-8 chip-to-module insertion loss budget at 13.28 GHz

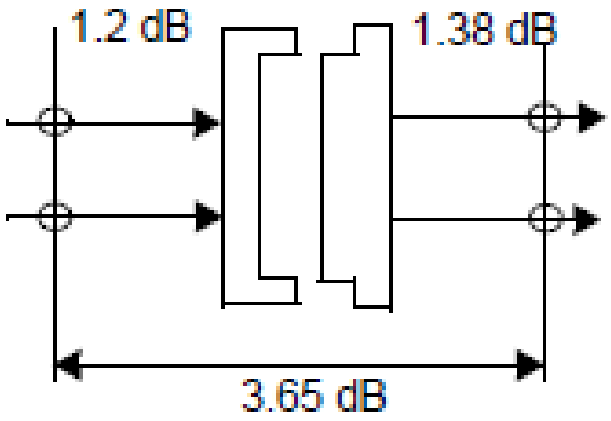
- 802.3cd Host Loss Budget insertion loss at 13.28 GHz



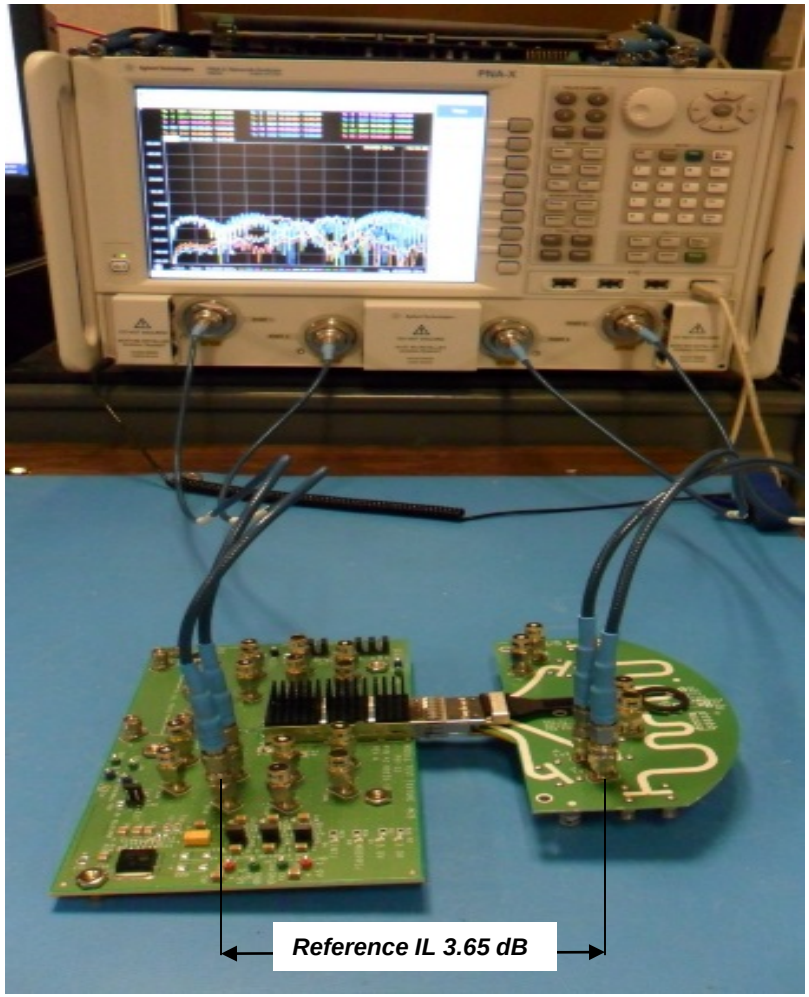
Background

- 802.3cd Mated Test Fixtures insertion loss budget at 13.28 GHz

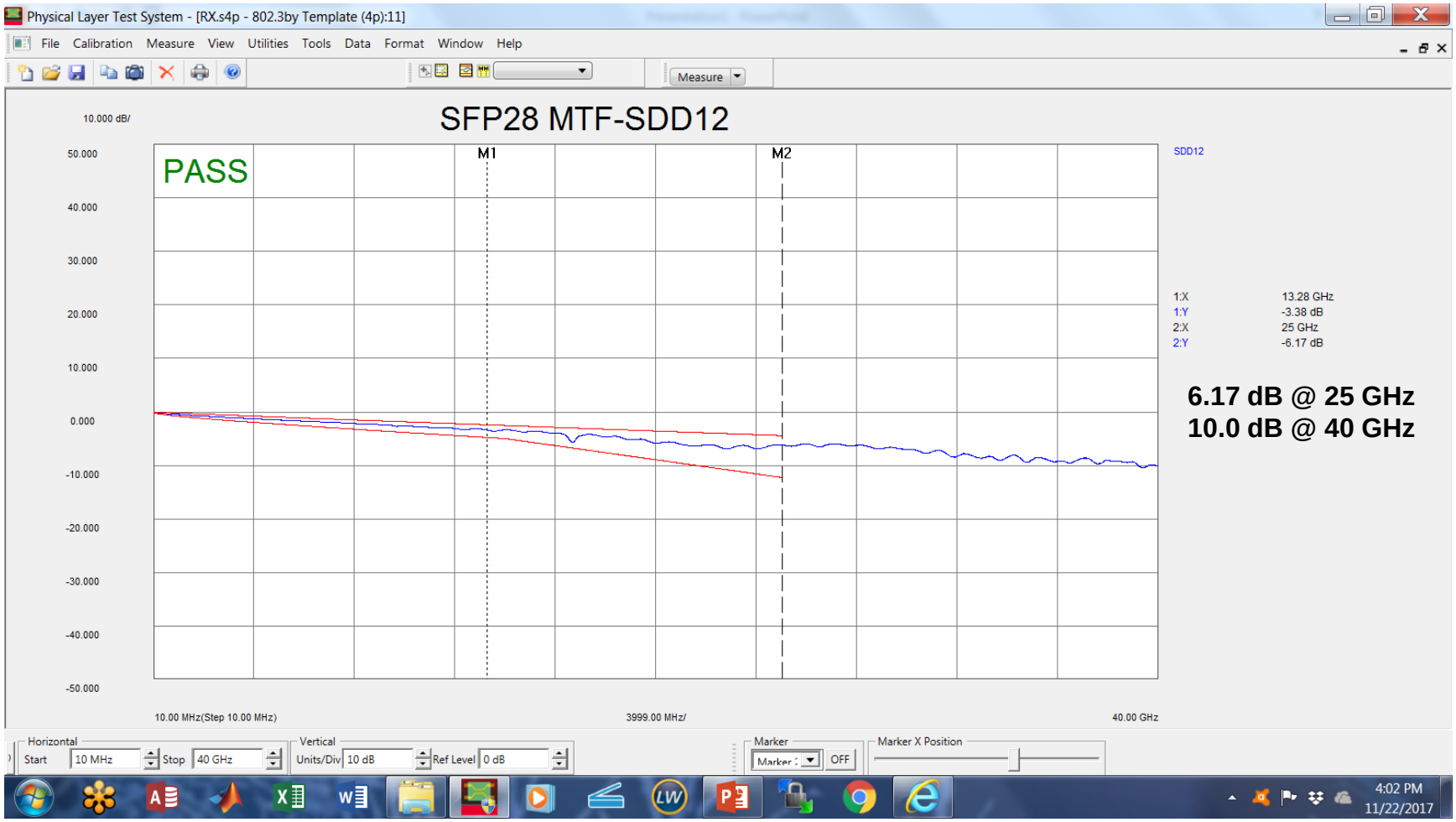
Reference MCB IL (1.2 dB)
same as Host IL min



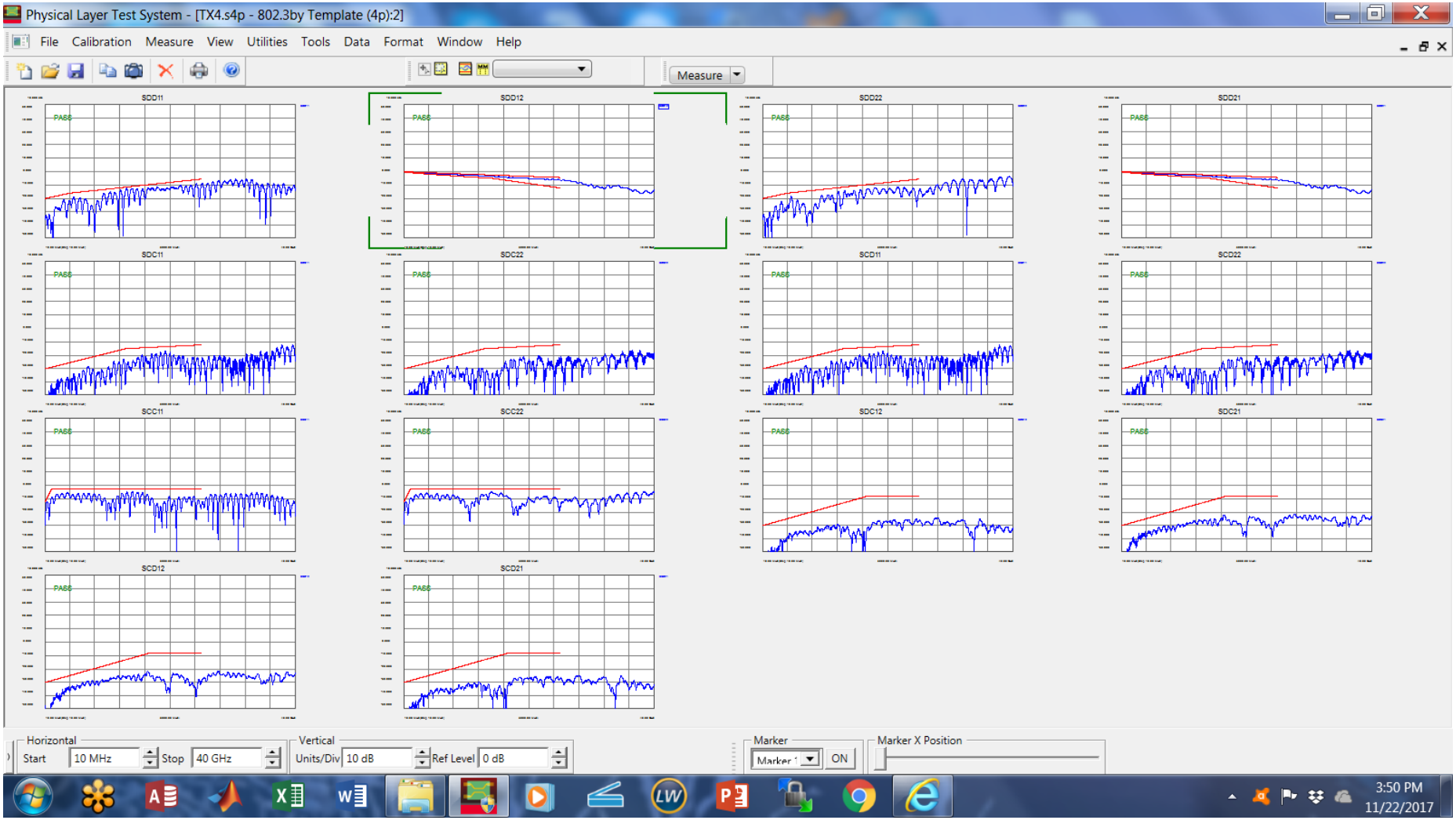
Mated cable assembly
and test point test fixture



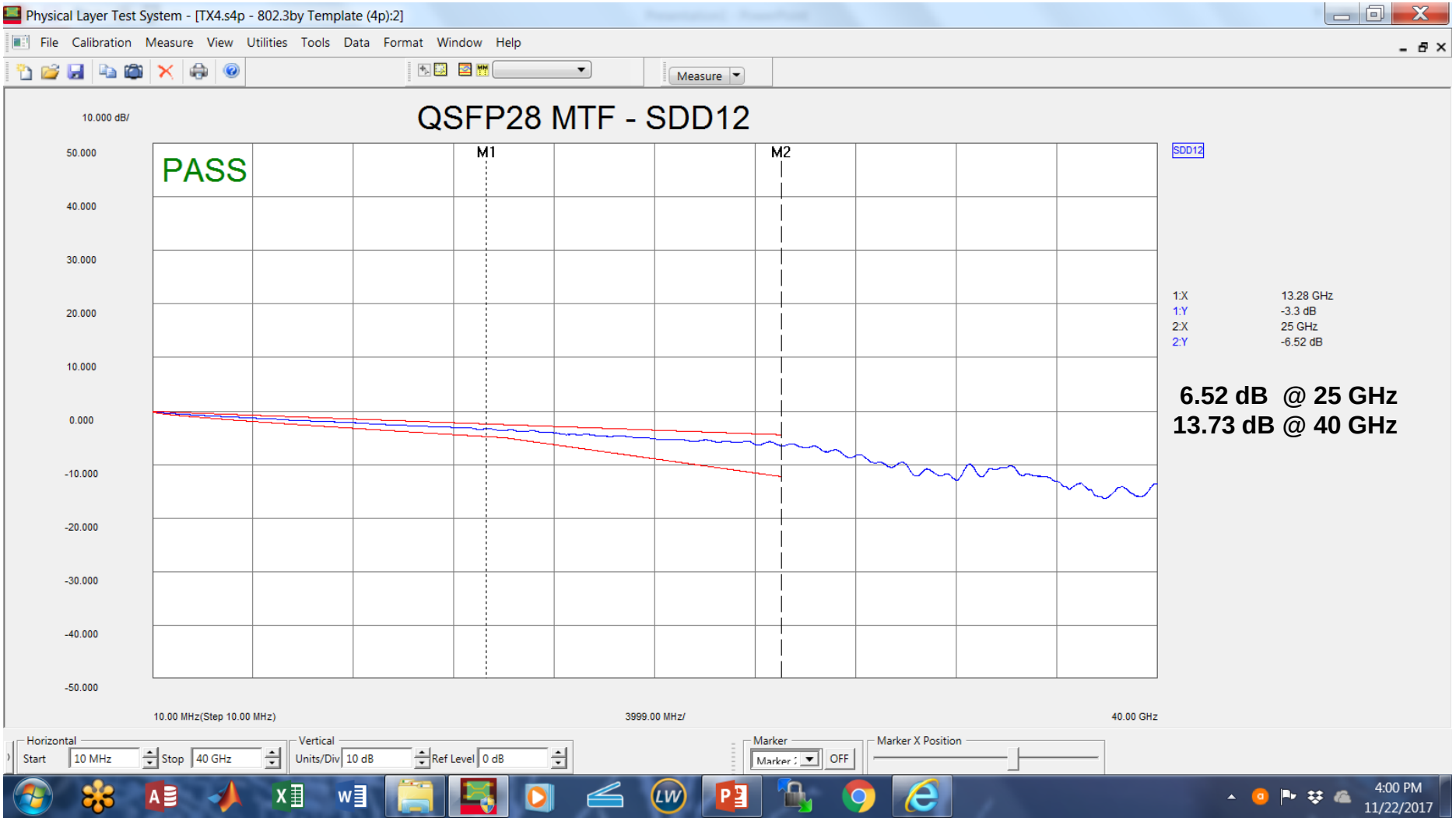
SFP28 Mated Test Fixture IL



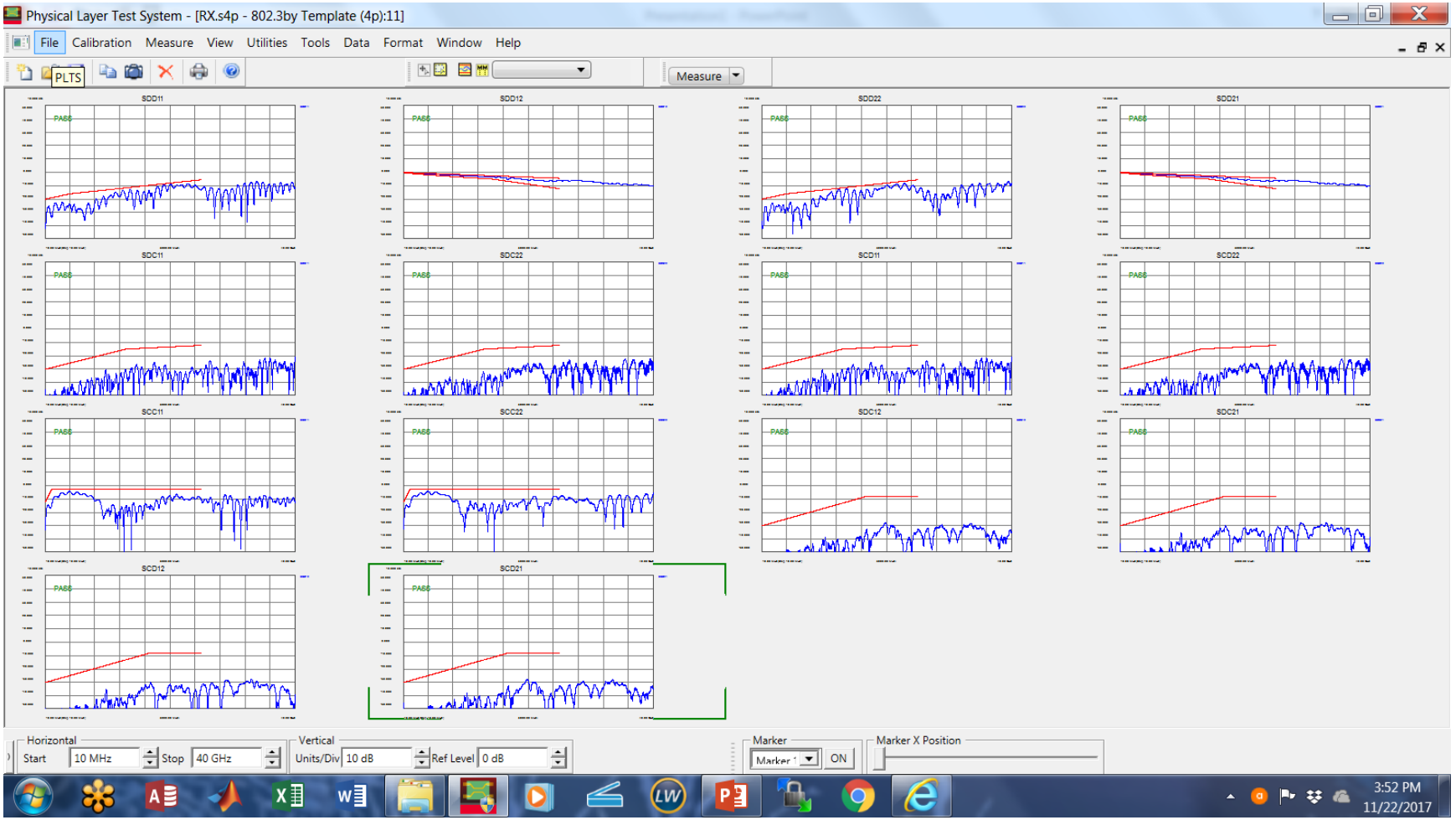
SFP28 Mated Test Fixture – S-parameters



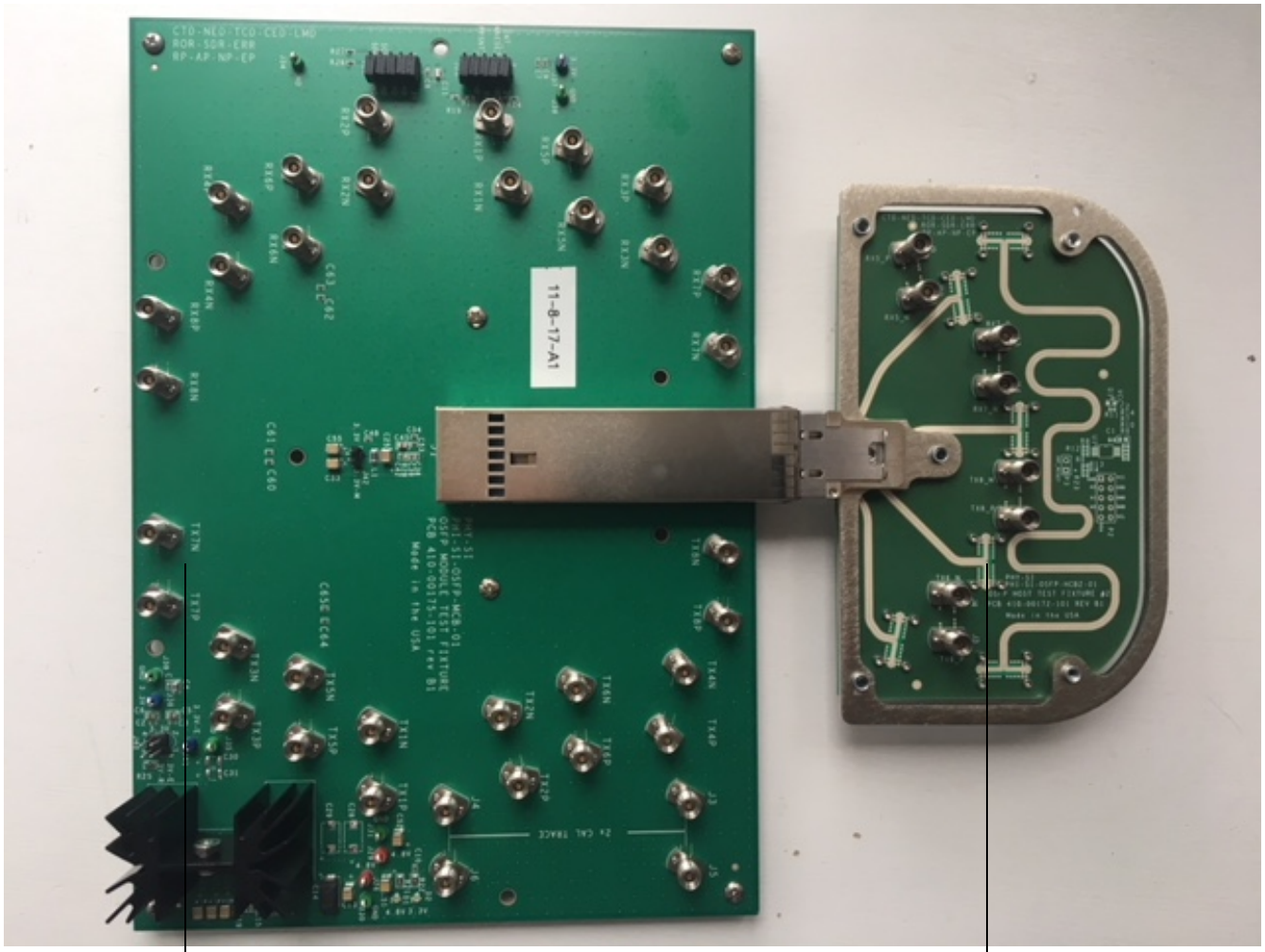
QSFP28 Mated Test Fixture IL



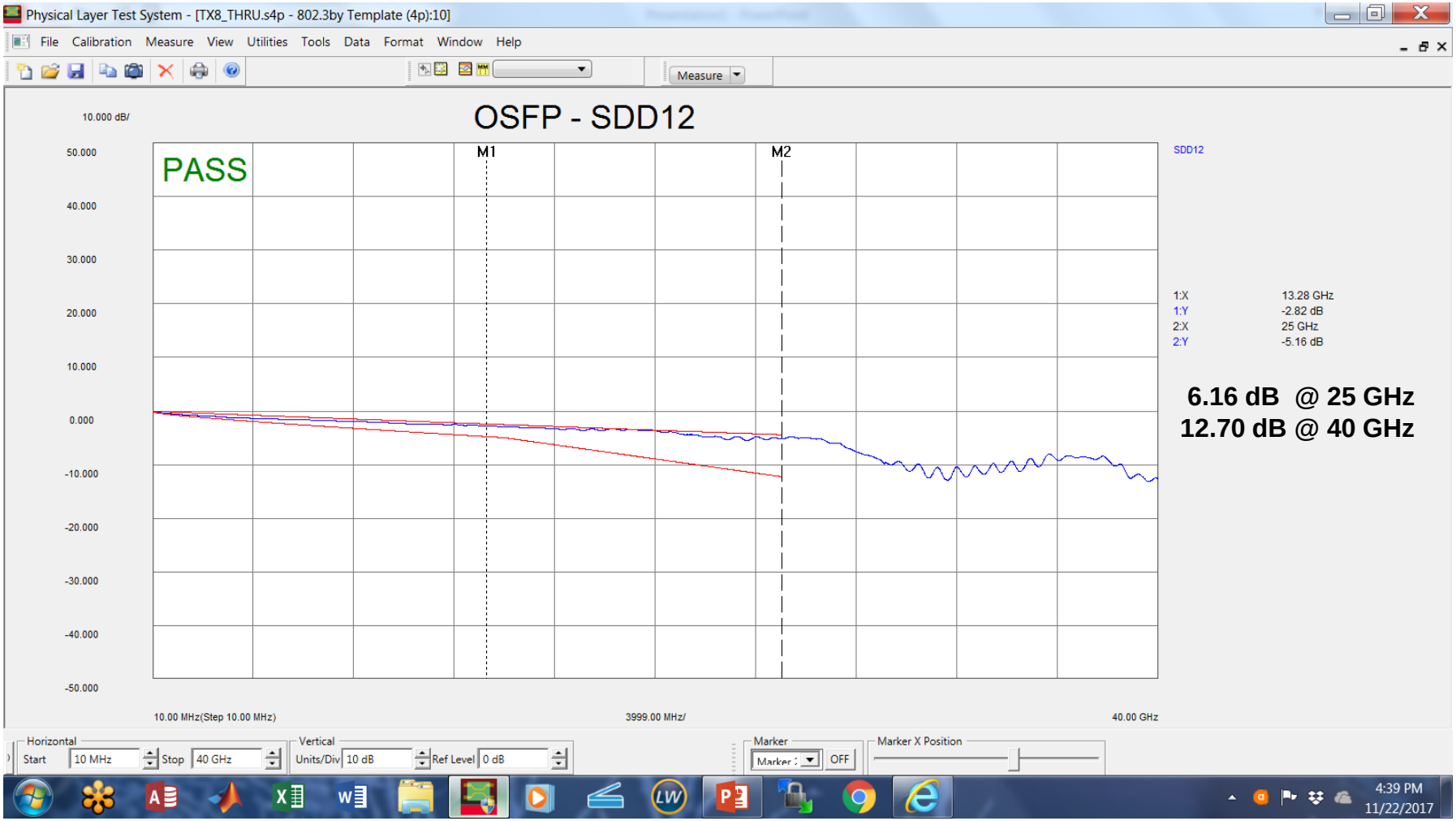
QSFP28 Mated Test Fixture – S-parameters



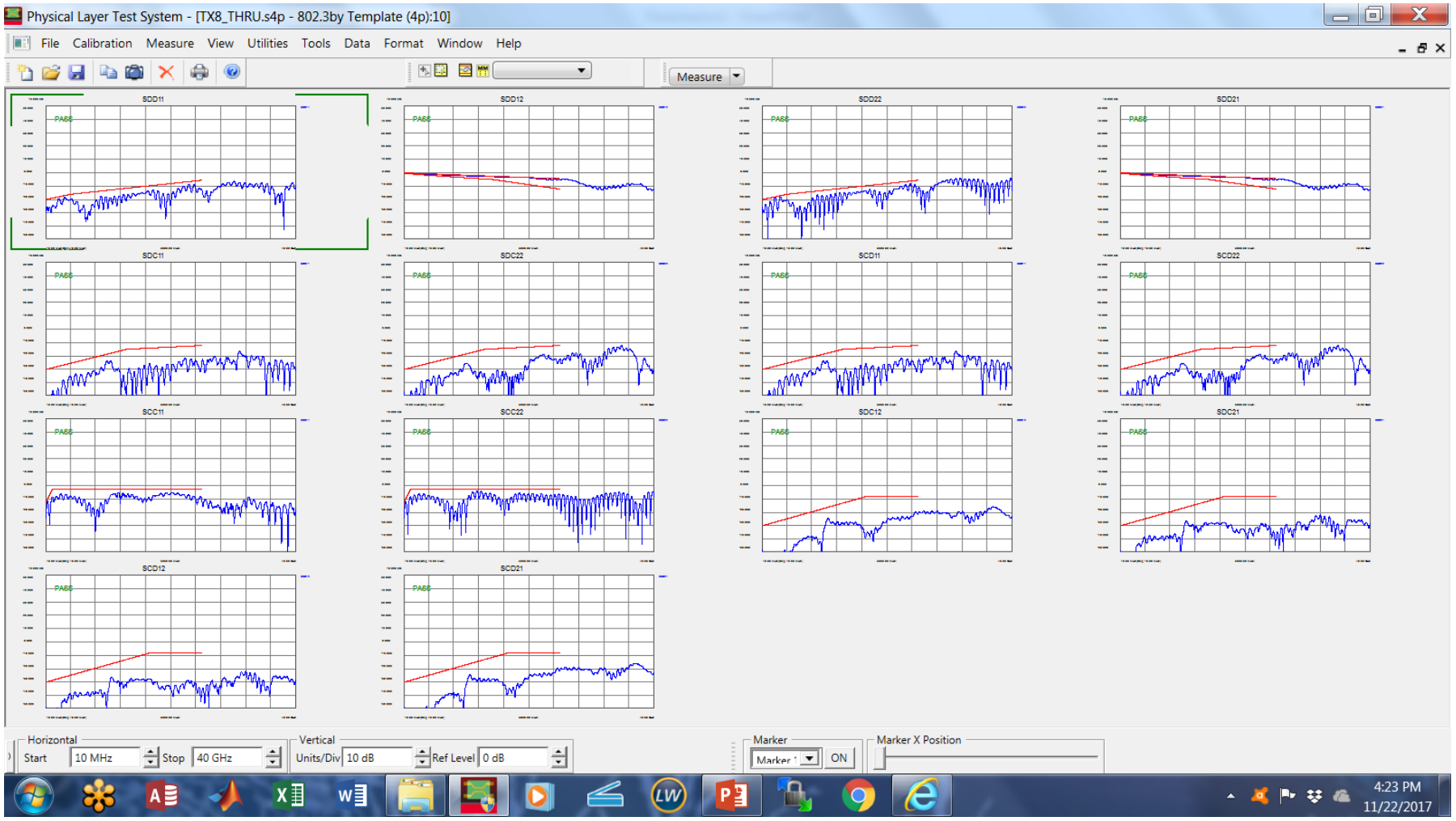
OSFP28 Mated Test Fixture IL



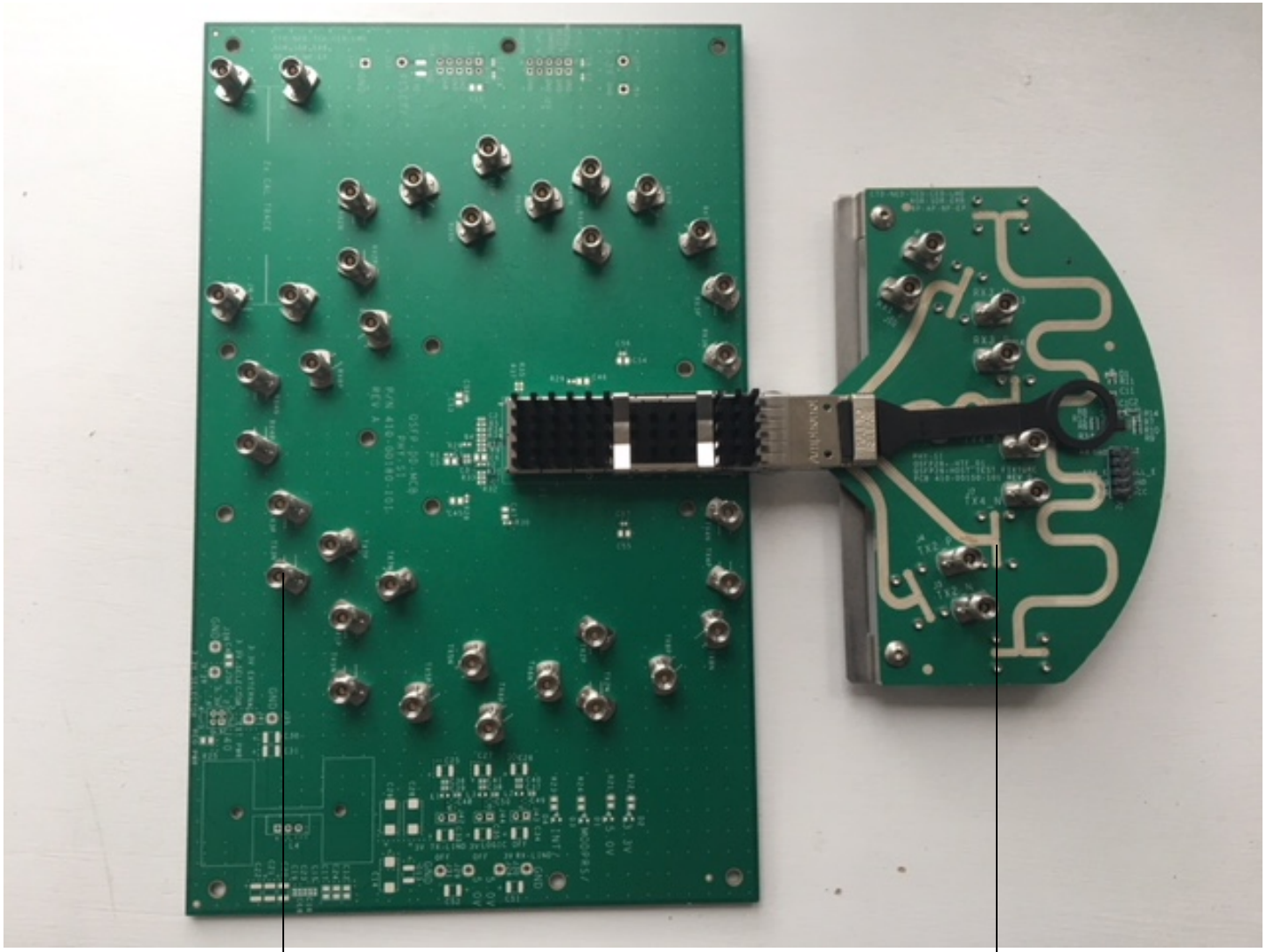
OSFP28 Mated Test Fixture IL



OSFP Mated Test Fixture – S-parameters

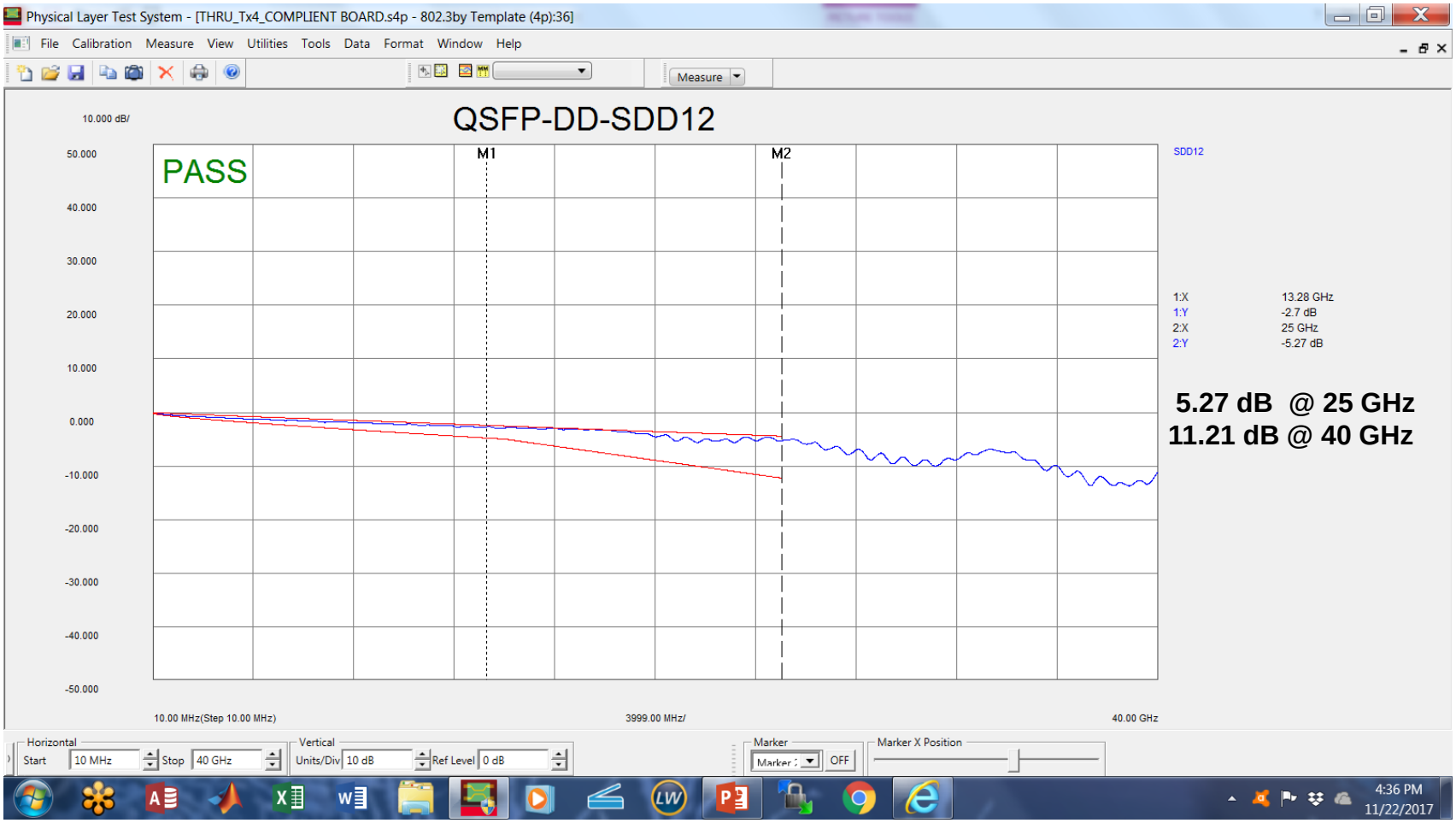


QSFP-DD Mated Test Fixture IL

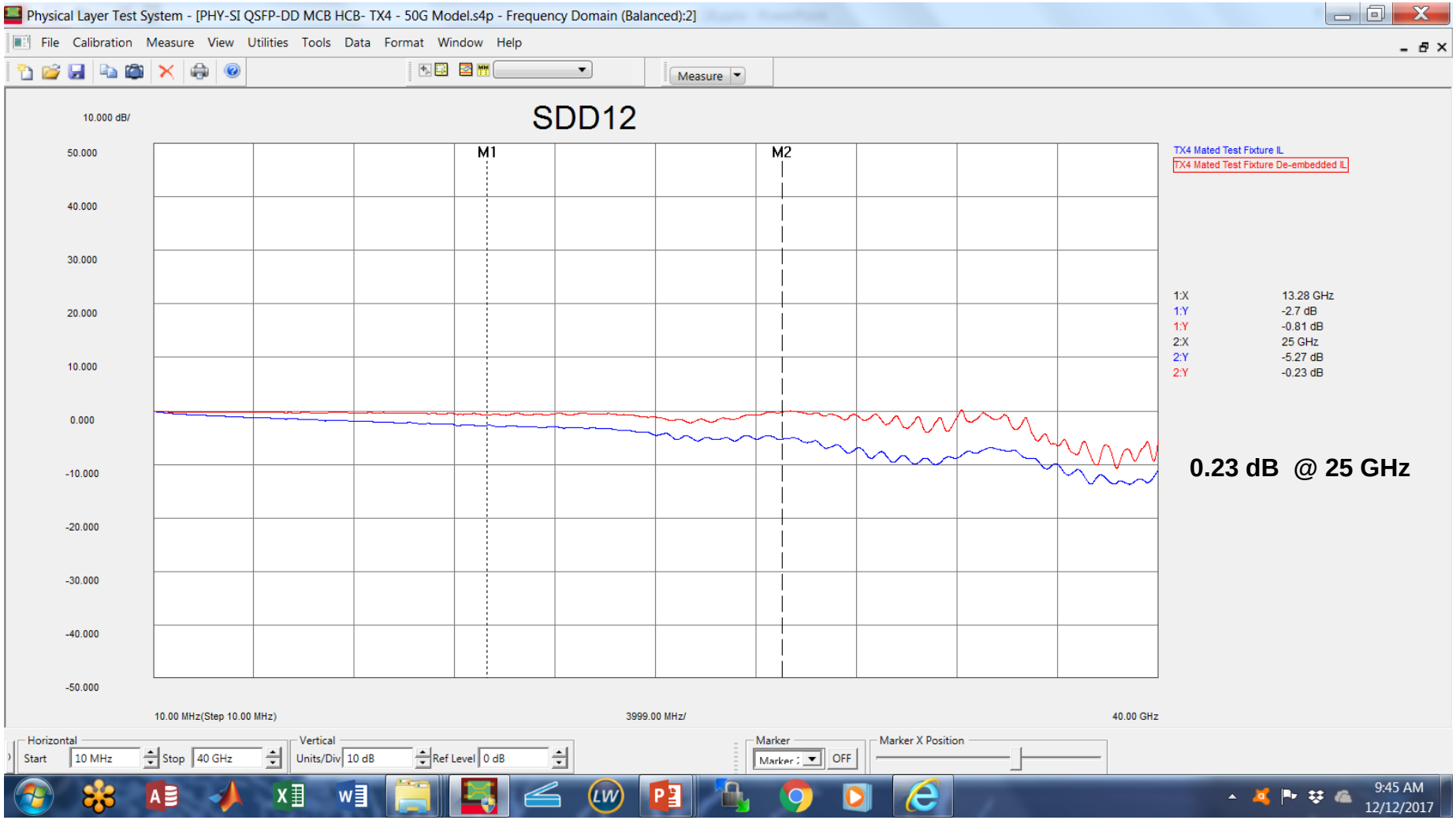


5.27 dB @ 25 GHz
11.21 dB @ 40 GHz

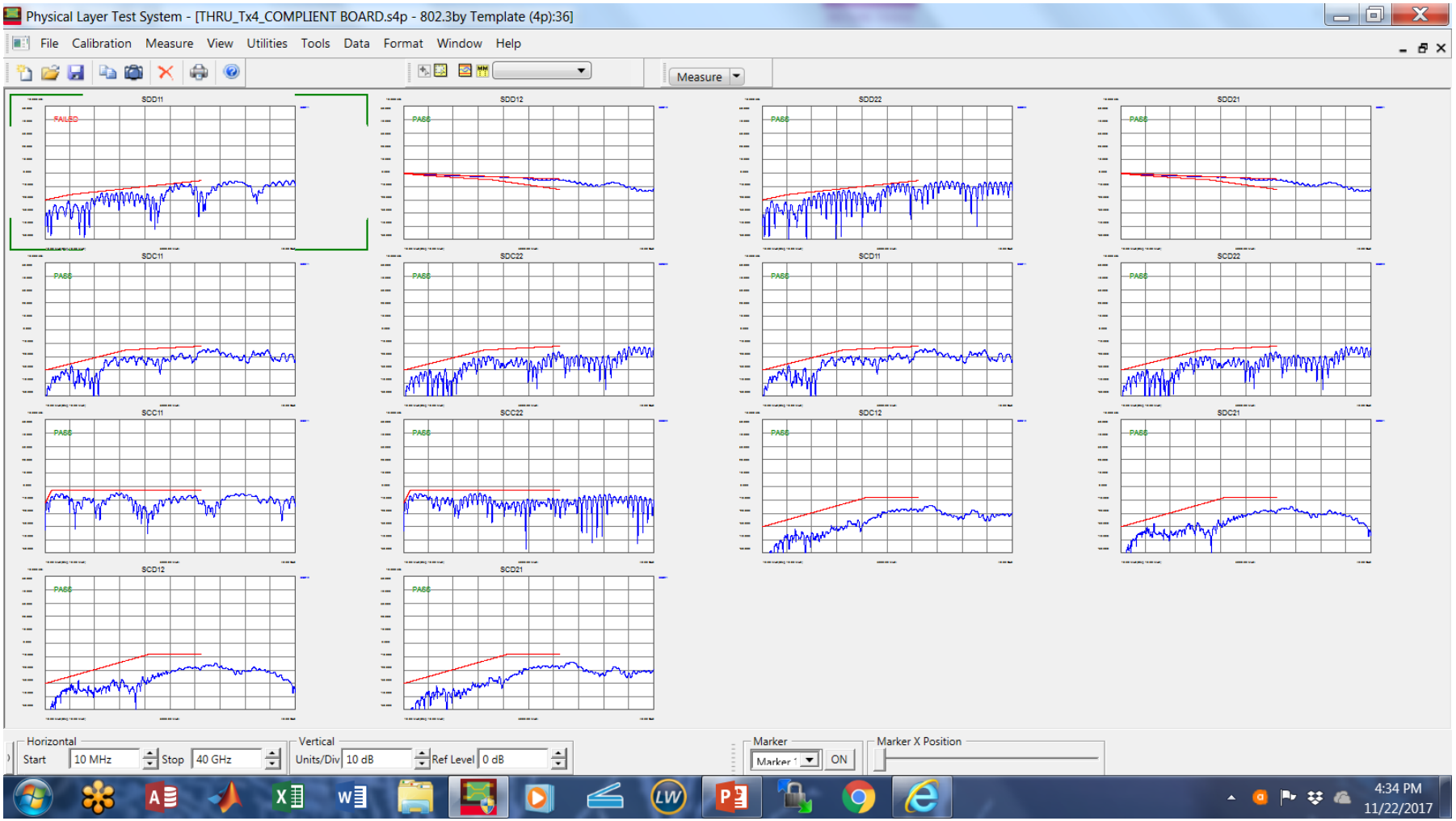
QSFP-DD Mated Test Fixture IL



QSFP-DD Mated Test Fixture IL – De-embedded



QSFP-DD Mated Test Fixture S-parameters



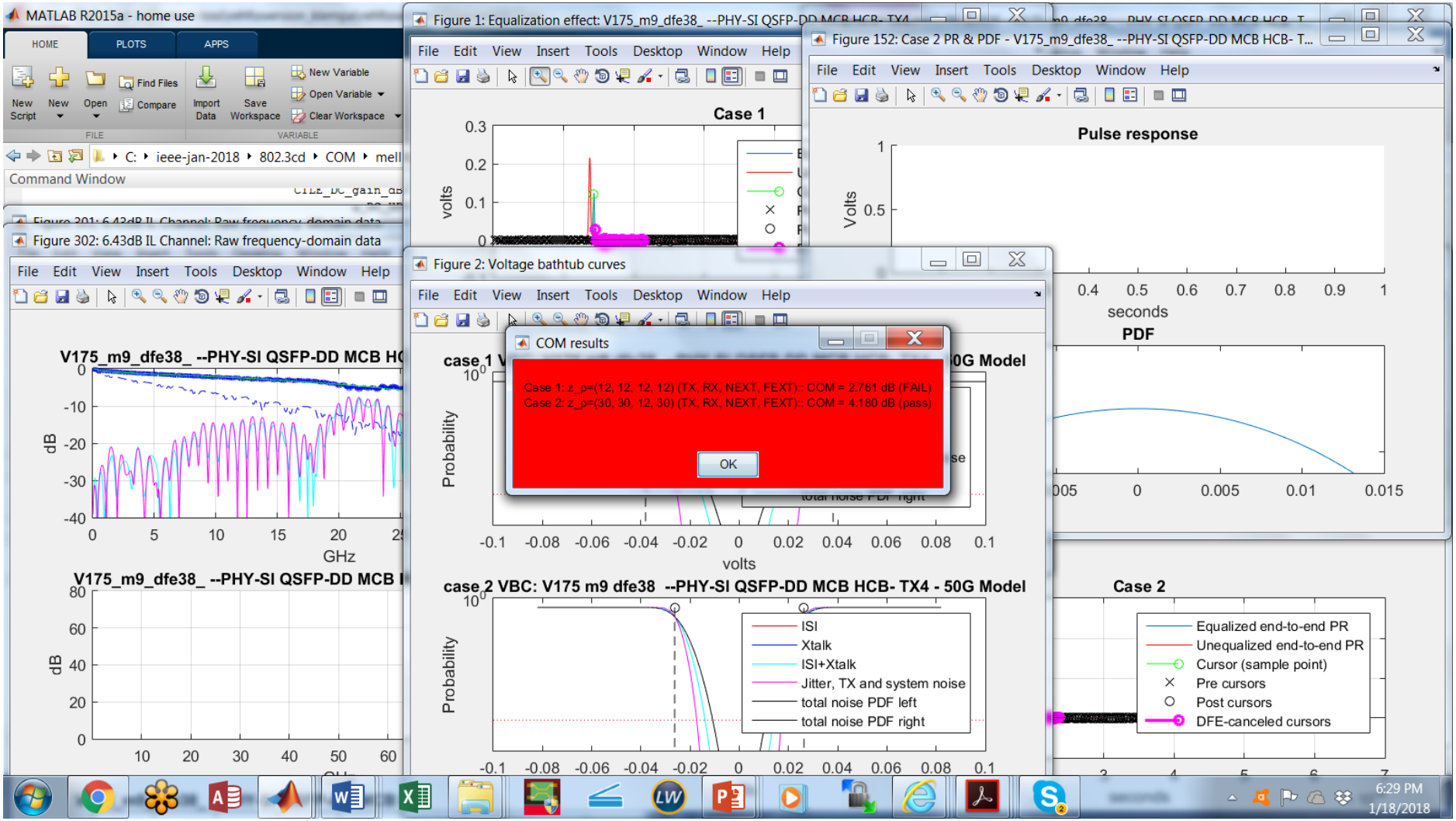
COM

- *12-Sept-2017 Rich Mellitz Samtec*
- *http://www.ieee802.org/3/cd/public/Sept17/ (associated COM zip file)*
  - *com_ieee8023_93a_200c.m*
  - *config_com_ieee8023_93a=100GBASE-KR_preCFI.xls*

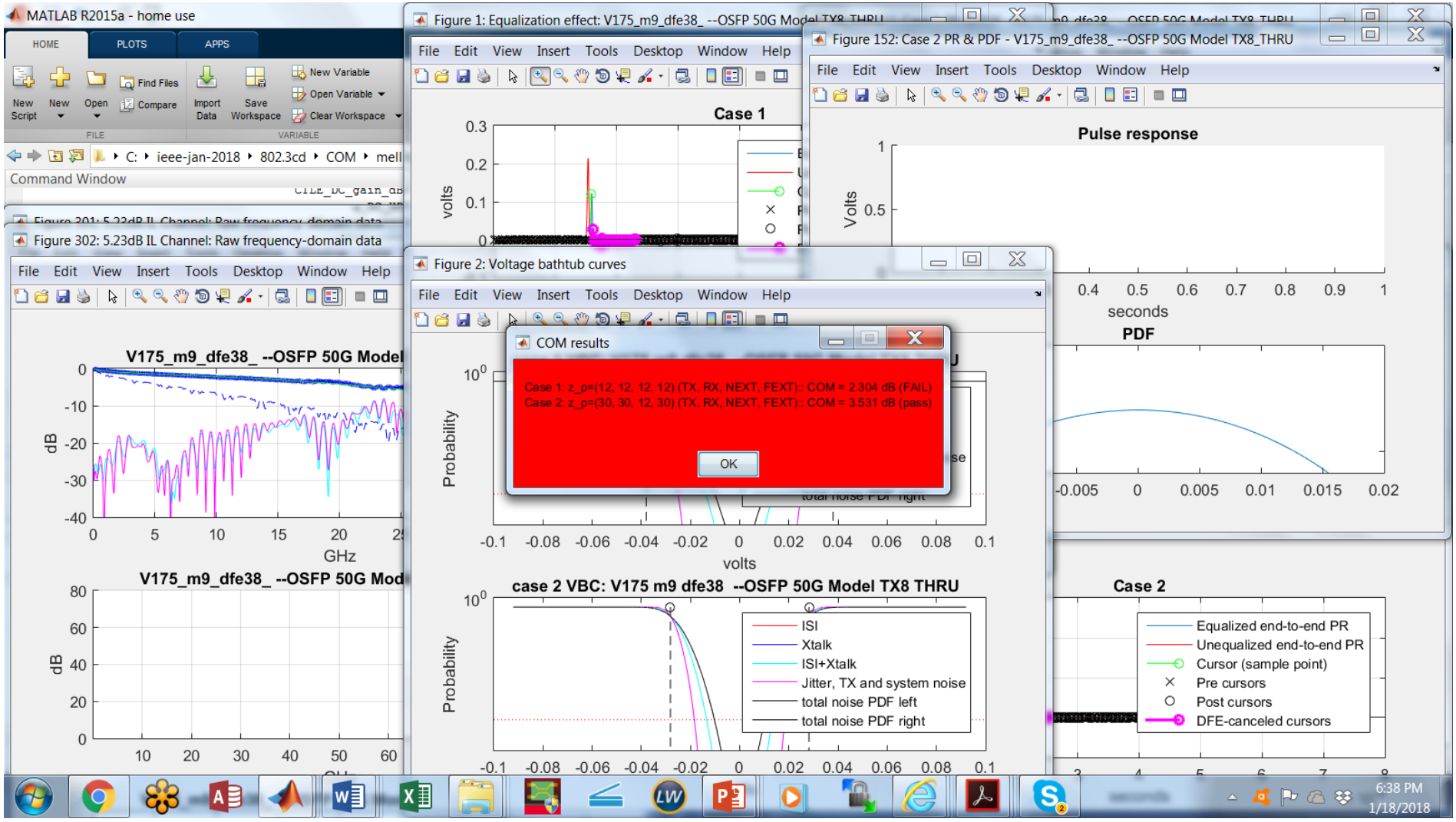
config_com_ieee8023_93a=100GBASE-KR_preCFI.xls

Table 93A-1 parameters			
Parameter	Setting	Units	Information
f_b	53.125	GBd	
f_min	0.05	GHz	
Delta_f	0.01	GHz	
C_d	[1.5e-4 1.5e-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	[1.0e-4 1.0e-4]	nF	[TX RX]
R_0	50	Ohm	
R_d	[55 55]	Ohm	[TX RX] or selected
f_r	0.75	*fb	
c(0)	0.6		min
c(-1)	[-0.25:0.05:0]		[min:step:max]
c(-2)	[0:0.025:0.15]		[min:step:max]
c(-3)	[-0.15:0.025:0]		[min:step:max]
c(-4)	0		[min:step:max]
c(1)	0		[min:step:max]
g_DC	[-20:1:0]	dB	[min:step:max]
f_z	21.25	GHz	
f_p1	21.25	GHz	
f_p2	106.25	GHz	
A_v	0.45	V	tdr selected
A_fe	0.45	V	tdr selected
A_ne	0.63	V	tdr selected
L	4		
M	32		
N_b	38	UI	
b_max(1)	0.7		
b_max(2..N_b)	0.2		
sigma_RJ	0.01	UI	
A_DD	0.02	UI	
eta_0	1.64E-08	V^2/GHz	
SNR_TX	33	dB	tdr selected
R_LM	0.95		
DER_0	1.00E-04		
Operational control			
COM Pass threshold	3	dB	
Include PCB	0	Value	0, 1, 2
g_DC_HP	[-9:1:-6]		[min:step:max]
f_HP_PZ	1.328125	GHz	

COM-QSFP-DD Lane - ~ 9 in



COM-OSFP Lane - ~ 9.5 in



Summary

- Connectors and PCB materials used in 802.3cd mated test fixtures used as basis for demonstrating feasibility of 100 Gb/s per lane applications.