Synthesized Cable Assembly for 0.3ck Project Advancement

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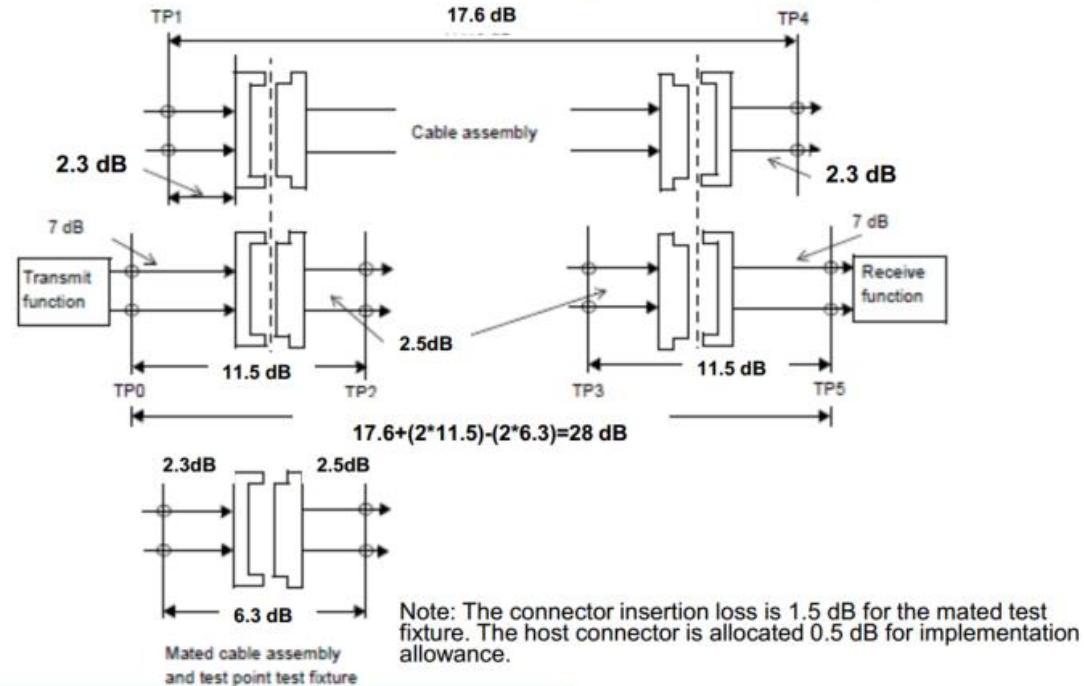
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Purpose

❑ Move the .3ck project a head

❑ Demonstrate synthesized s parameter channel models which can be used to address channel compliance topics

- COM parameters
- Package and PCB parameters

❑ Not intended to represent any particular cable assembly

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Use diminico_3ck_01_0918-review as a starting point

Cable assembly and Channel IL - Baseline

- Cable assembly Max IL dB @ 26.56 GHz= 10 (bulk cable) + (2*2.3) (TF) +(2*1.5) (connector) = 17.6 dB
- Cable assembly Min IL dB @ 26.56 GHz= 2.5 (bulk cable) + (2*2.3) (TF) +(2*1.5) (connector) = 10.1 dB
- Channel Max IL dB @ 26.56 GHz= 17.6 (Cable assembly) +2*11.5 (TP0-TP2)- (2*6.3) MTF = 28 dB
- Channel Min IL dB @ 26.56 GHz= 10.1 (Cable assembly) +2*11.5 (TP0-TP2)- (2*6.3) MTF = 20.5 dB
- Channel Max IL dB @26.56 GHz =10 (bulk cable)+(2*7) Host IL +(2*2) Host connector IL = 28 dB
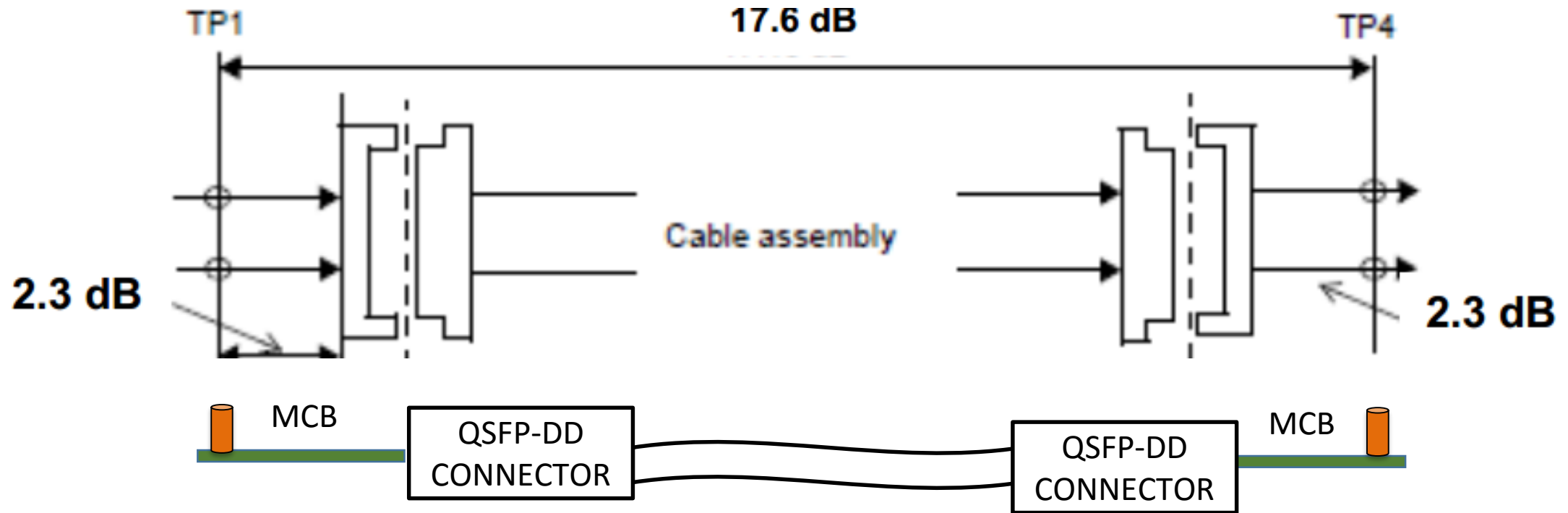
Note: The connector insertion loss is 1.5 dB for the mated test fixture. The host connector is allocated 0.5 dB for implementation allowance.

Adopt Channel and Cable Assembly IL @ 26.56 GHz with TBD

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Using legacy "long" pin

❑ QSFP-DD connector was not tuned for 100 G performance

❑ 2 meters of 10 dB of raw cable with 10 dB IL was synthesized based on measurement extrapolations

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Channel file list

qsfpddmtf-dd-2m-qsfpddmtf_V2_thru.s4p

7 FEXT

qsfpddmtf-dd-2m-qsfpddmtf_V2_fext1.s4p
qsfpddmtf-dd-2m-qsfpddmtf_V2_fext2.s4p
qsfpddmtf-dd-2m-qsfpddmtf_V2_fext3.s4p
qsfpddmtf-dd-2m-qsfpddmtf_V2_fext4.s4p
qsfpddmtf-dd-2m-qsfpddmtf_V2_fext5.s4p
qsfpddmtf-dd-2m-qsfpddmtf_V2_fext6.s4p
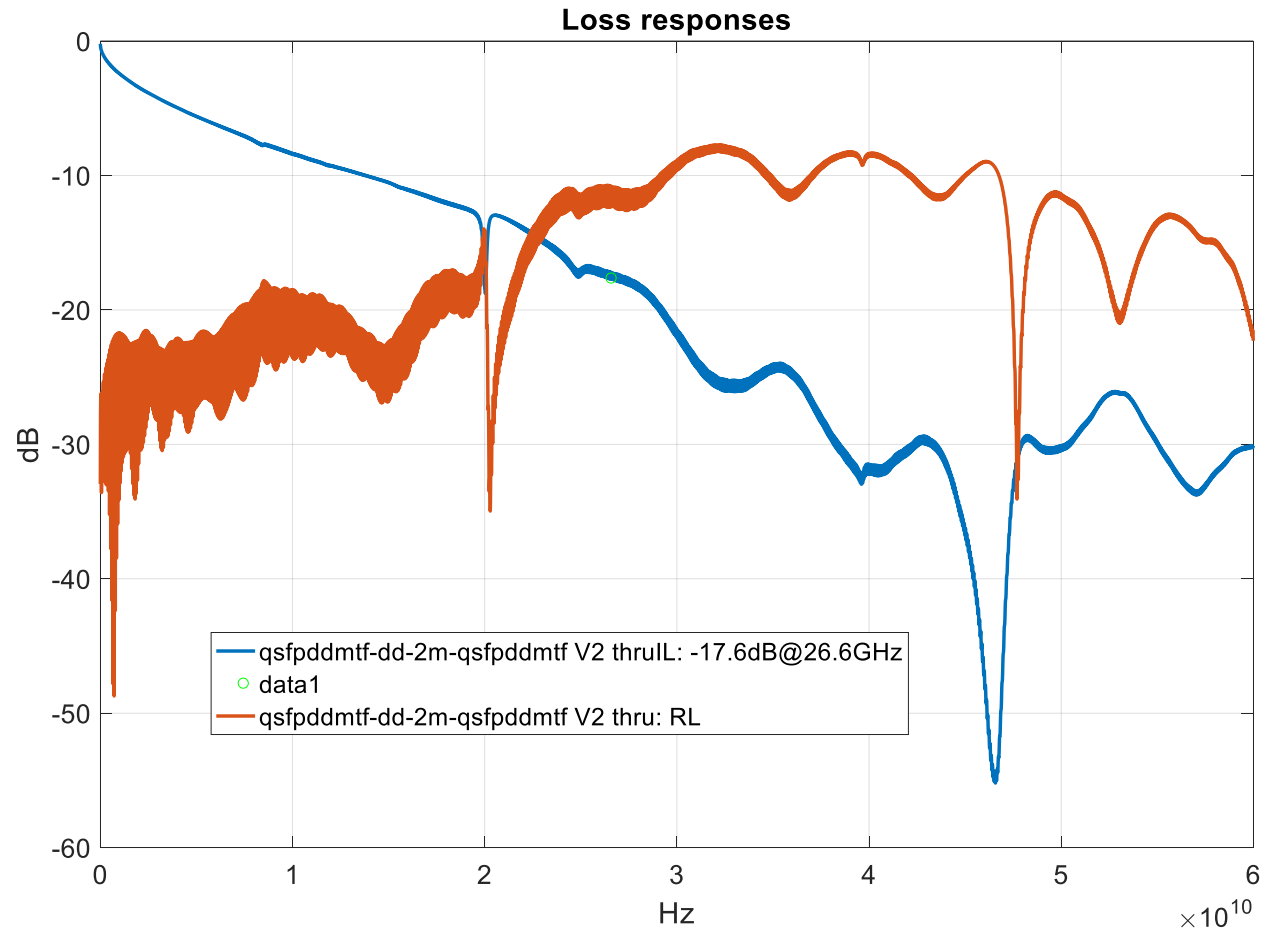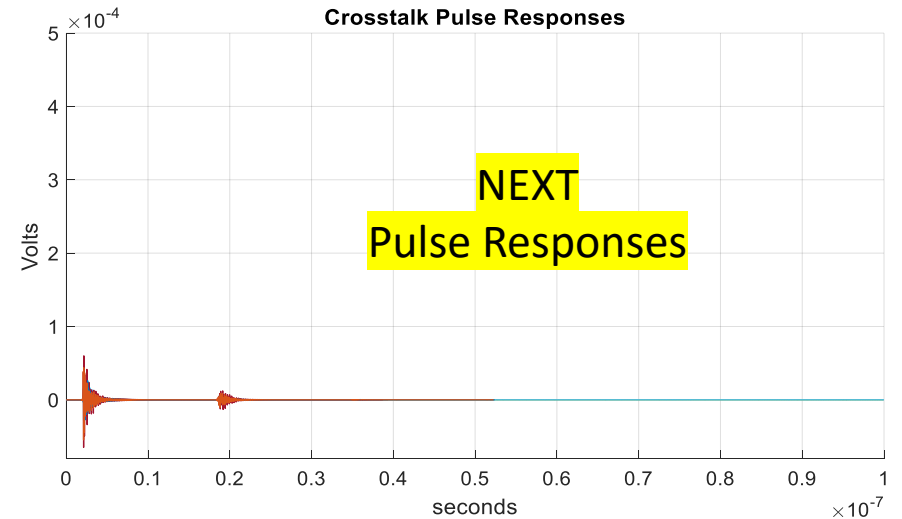qsfpddmtf-dd-2m-qsfpddmtf_V2_fext7.s4p

8 NEXT

qsfpddmtf-dd-2m-qsfpddmtf_V2_next1.s4p
qsfpddmtf-dd-2m-qsfpddmtf_V2_next2.s4p
qsfpddmtf-dd-2m-qsfpddmtf_V2_next3.s4p
qsfpddmtf-dd-2m-qsfpddmtf_V2_next4.s4p
qsfpddmtf-dd-2m-qsfpddmtf_V2_next5.s4p
qsfpddmtf-dd-2m-qsfpddmtf_V2_next6.s4p
qsfpddmtf-dd-2m-qsfpddmtf_V2_next7.s4p
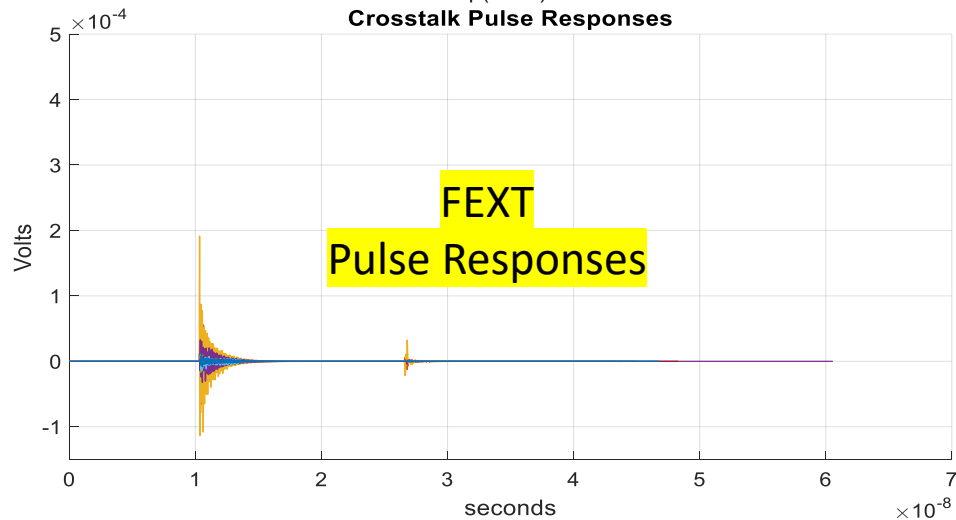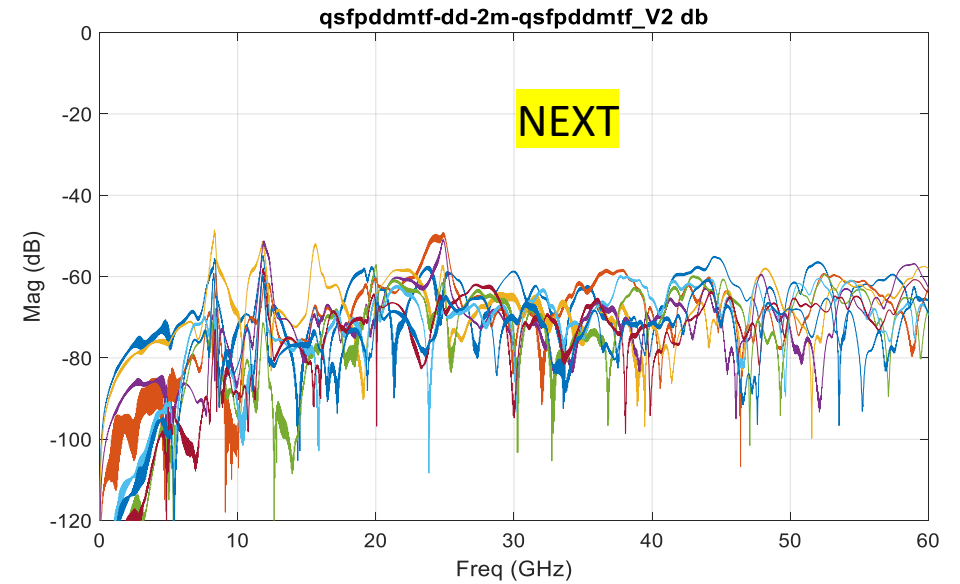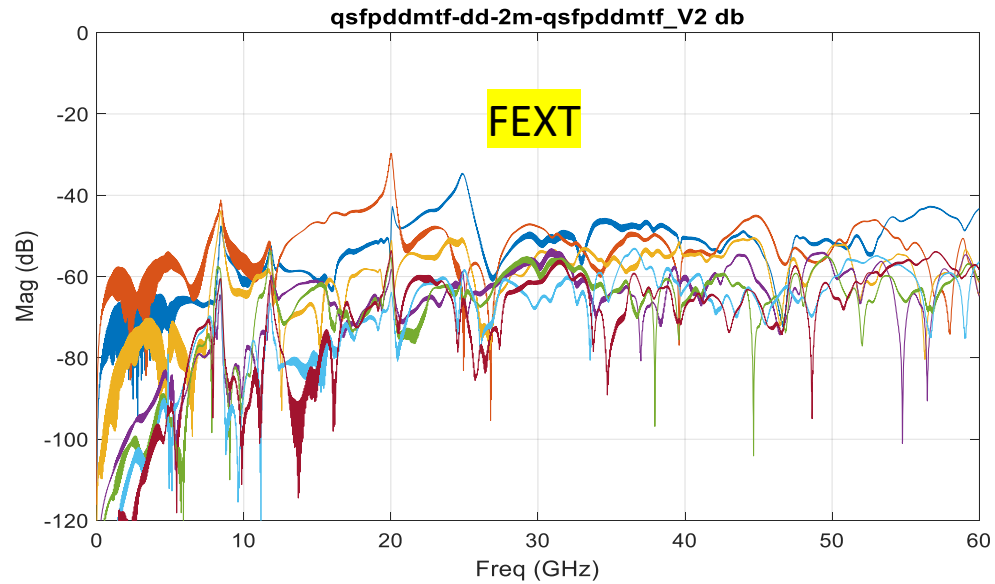qsfpddmtf-dd-2m-qsfpddmtf_V2_next8.s4p

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IL and RL

Loss responses

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NEXT and FEXT

COM Configuration Used for Next Slide Results

Parameter	Setting	Units	Information
f_b	53.125	GBd	
f_min	0.05	GHz	
Delta_f	0.01	GHz	
C_d	[1.1e-4 1.1e-4]	nF	[TX RX]
z_p select	[1 2]		[test cases to run]
z_p (TX)	[12 30; 1.8 1.8 ; 0 0 ; 0 0]	mm	[test cases]
z_p (NEXT)	[12 30; 1.8 1.8 ; 0 0 ; 0 0]	mm	[test cases]
z_p (FEXT)	[12 30; 1.8 1.8 ; 0 0 ; 0 0]	mm	[test cases]
z_p (RX)	[12 30; 1.8 1.8 ; 0 0 ; 0 0]	mm	[test cases]
C_p	[0.8e-4 0.8e-4]	nF	[TX RX]
C_v	[0 0]	nF	[TX RX]
R_0	50	Ohm	
R_d	[50 50]	Ohm	[TX RX]
A_v	0.41	V	
A_fe	0.41	V	
A_ne	0.6	V	
L	4		
M	32		
filter and Eq			
f_r	0.75	*fb	
c(0)	0.6		min
c(-1)	[-0.3:0.025:0]		[min:step:max]
c(-2)	[0:.025:0.1]		[min:step:max]
c(-3)	[0]		[min:step:max]
c(-4)	[0]		[min:step:max]
c(1)	[-0.3:0.05:0]		[min:step:max]
N_b	24	UI	
b_max(1)	0.7		
b_max(2..N_b)	0.2		
g_DC	[-20:1:0]	dB	[min:step:max]
f_z	21.25	GHz	
f_p1	21.25	GHz	
f_p2	53.125	GHz	
g_DC_HP	[-6:1:0]		[min:step:max]
f_HP_PZ	0.6640625	GHz	
ffe_pre_tap_len	**0**	UI	
ffe_post_tap_len	0	UI	
Include PCB	1	logical	

DIAGNOSTICS	1	logical	
DISPLAY_WINDOW	1	logical	
CSV_REPORT	1	logical	
RESULT_DIR	.\results\100GEL_WG_{date}\		
SAVE_FIGURES	0	logical	
Port Order	[1 3 2 4]		
RUNTAG	CR_eval_		
COM_CONTRIBUTION	0	logical	
Operational			
COM Pass threshold	3	dB	
ERL Pass threshold	10.5	dB	
DER_0	1.00E-04		
T_r	6.16E-03	ns	
FORCE_TR	1	logical	

TDR and ERL options		
TDR	1	logical
ERL	1	logical
ERL_ONLY	0	logical
TR_TDR	0.01	ns
N	1000	
TDR_Butterworth	1	logical
beta_x	1.70E+09	
rho_x	**0.25**	
fixture delay time	0	enter sec
Receiver testing		
RX_CALIBRATION	0	logical
Sigma BBN step	5.00E-03	V

Noise, jitter		
sigma_RJ	0.01	UI
A_DD	0.02	UI
eta_0	8.20E-09	V^2/GHz
SNR_TX	32.5	dB
R_LM	0.95	

Parameter	Setting	Units
package_tl_gamma0_a1_a2	[0 0.0007901838 0.00050925]	
package_tl_tau	6.325E-03	ns/mm
package_Z_c	[87.5 87.5 ; 92.5 92.5; 100 100 ; 100 100]	Ohm (tdr sel)

Table 92–12 parameters		
Parameter	Setting	
board_tl_gamma0_a1_a2	[0 3.8206e-04 9.5909e-05]	
board_tl_tau	5.790E-03	ns/mm
board_Z_c	90	Ohm
z_bp (TX)	119	mm
z_bp (NEXT)	119	mm
z_bp (FEXT)	119	mm
z_bp (RX)	119	mm

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Results

case 1: 12 mm PKG --qsfpddmtf-dd-2m-qsfpddmtf V2 thru

COM = 3.97 dB

- ISI
- Xtalk
- Jitter, SNR_TX, RL_M, eta_0 noise
- total noise PDF left
- total noise PDF right

case 2: 30 mm --qsfpddmtf-dd-2m-qsfpddmtf V2 thru

COM = 3.06 dB

- ISI
- Xtalk
- Jitter, SNR_TX, RL_M, eta_0 noise
- total noise PDF left
- total noise PDF right

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