COM 2.0

Richard Mellitz, Samtec

7/31/2017

V2.0 COM Changes

- No changes to COM computations
- Added PTDR and ERL for researching improvement in return loss specification.
- Corrected some reported calculations such as ICN
- Change names of some of reported calculations
- Added 2 more pre-cursors
- Included some more example configuration spread sheets

Added Fields in Configuration Spreadsheet

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	[1.8e-4 1.8e-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)	[-0.25:0.05:0]		[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	10	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^2/GHz	
SNR_TX	31	dB	
R_LM	0.95		
g_DC_HP	[-4:1:0]		[min:step:max]
f_HP_PZ	0.6640625	GHz	
DER_0	1.00E-05		

c(-4)	[0:0.025:05		[min:step:max]
c(-3)	[-0.15:0.05:0]		[min:step:max]
c(-2)	[0:0.01:0.1]		[min:step:max]

Added 2 more pre-cursors

I/O control		
DIAGNOSTICS	0	logical
DISPLAY_WINDOW	0	logical
Display frequency domain	1	logical
CSV_REPORT	1	logical
RESULT_DIR	.\results\D3p1_{date}\	
SAVE_FIGURES	1	logical
Port Order	[1 3 2 4]	
RUNTAG	C2C_	

Receiver testing		
RX_CALIBRATION	0	logical
Sigma BBN step	5.00E-03	V

Conditioning		
T_r	0.013	ns
FORCE_TR	1	logical
TDR	1	logical
ERL	1	logical
Z_t	50	ohms
ERL_ONLY	0	logical
TR_TDR	0.0189	ns
TDR_duration	5	
TDR_f_BT_3db	19.921875	GHz
TDR_Butterworth	1	logical

Non standard control options		
COM_CONTRIBUTION	0	logical

Operational control			
COM Pass threshold	3	dB	
Include PCB	0	Value	0, 1, 2

FORCE_TR	Forces a Gaussian transition time filter. Used to be a complicated collection of commands
TDR	Enable TDR (done on thru channel only)
ERL	Enable pulse TDR and effective return loss measurement
Z_t	List of TDR source impedances example [40 45 50]
ERL_ONLY	If set, COM is not run. ERL only is computed and reported
TR_TDR	Transition time for TDR
TDR_duration	Nnumber of times thru delay for TDR time window
TDR_f_BT_3db	Bessel Thomsen filter 3dB bandwidth (not used)
TDR_Butterworth	Enable receiver filter for PTDR

Fixes

- ICN calculated
- ILD_FOM updated to EQ93A-55
- Fixed problem in s21_to_impulse_DC when s parameters have a DC entry

Changed reported names

old report change		New V200 report
peak_interference_mV	renamed to	Peak_ISI_XTK_and_Noise_interference_at_BER_mV
peak_channel_interference_mV	renamed to	peak_ISI_XTK_interference_at_BER_mV
peak_ISI_mV	renamed to	peak_ISI_interference_at_BER_mV
peak_MDXTK_interference_mV	renamed to	peak_MDXTK_interference_at_BER_mV
peak_MDNEXT_interference_mV	renamed to	peak_MDNEXT_interference_at_BER_mV
peak_MDFEXT_interference_mV	renamed to	peak_MDFEXT_interference_at_BER_mV
equivalent_ISI_ICN	renamed to	total_IL_wpkgs_dB_at_Fnq
fit_loss_dB_at_Fnq	renamed to	IL_dB_channel_only_at_Fnq
IL_dB_at_Fnq	renamed to	fitted_IL_dB_at_Fnq

Removed

- peak_interference_at_BER
- sci_noise_FD_RMS
- cci_noise_TD_BER

Configuration Example Spreadsheets included

config_com_ieee8023_93a=100GBASE-CR4.xls
config_com_ieee8023_93a=100GBASE-KP4.xls
config_com_ieee8023_93a=100GBASE-KR4.xls
config_com_ieee8023_93a=100GBASE-KR_preCFI.xls
config_com_ieee8023_93a=200GAUI-4_and_400GAUI-8_C2C_bsD3p3_120d.xls
config_com_ieee8023_93a=200GAUI-4_and_400GAUI-8_C2M_bs120e_tp0_tp2.xls
config_com_ieee8023_93a=25GBASE-CR-L.xls
config_com_ieee8023_93a=25GBASE-CR-N.xls
config_com_ieee8023_93a=25GBASE-CR-S.xls
config_com_ieee8023_93a=25GBASE-KR-S.xls
config_com_ieee8023_93a=25GBASE-KR.xls
config_com_ieee8023_93a=50GBASE-CR_cdD2p0.xls
config_com_ieee8023_93a=50GBASE-KR_cdD1p3.xls
config_com_ieee8023_93a=50GBASE-KR_preCFI_NRZ.xls

(not official IEEE specifications)

New Data Reported

BER

equivalent_ICI_sigma_assuming_PDF_is_Gaussian_mV

MDNEXT_ICN_92_46_mV

MDFEXT_ICN_92_47_mV

equivalent_ICN_assuming_PDF_is_Gaussian_mV

SNR_ISI_XTK_normalized_1_sigma

COM_dB (duplicate of channel_operating_margin_dB)

Z11 (driving point Tx impedance only reported for Zt=50)

Z22 (driving point Rx impedance only reported for Zt=50)

ERL11 (Tx effective return loss for each Zt)

ERL22 (Rx effective return loss for each Zt)