

C2M Channel Analysis Trends Suggesting COM Parameters Path Forward – January 2024 Interim Update

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Introduction



- Update to contribution at 11 January 2024 electrical ad hoc
 - https://www.ieee802.org/3/dj/public/adhoc/electrical/24_0111/lusted_3dj_elec_01_240111.pdf

Channel File Sets

- ❑ akinwale_3df_01_2209
- ❑ akinwale_3df_01_2307
- ❑ lim_3dj_01n2_230629
- ❑ rabinovich_3dj_01_230116
- ❑ shanbhag_3dj_03a_2305
- ❑ weaver_3dj_elec_02_230831

Key COM Parameter Changes from Prior



- ❑ $DER_0 = 2E-5$
 - Was $2.5E-5$
- ❑ Sample_adjustment range is wider: [-16 18]
 - Was [-8 12]
- ❑ $R_d = 50$ ohm
 - Prior was $R_d = 45$ ohm
 - A_v changes as well to 0.413

C2M COM Configuration Spreadsheet

Package Loss = 2.4 dB, 7 dB, and 9.1 dB

Parameter	Setting	Units	Information
f_b	106.25	GBd	
f_min	0.05	GHz	
Delta_f	0.01	GHz	
C_d	[0.4e-4 0.9e-4 1.1e-4;0.4e-4 0.9e-4 1.1e-4]	nF	[TX RX]
L_s	[0.13 0.15 0.14; 0.13 0.15 0.14]	nH	[TX RX]
C_b	[0.3e-4 0.3e-4]	nF	[TX RX]
R_0	5.00E+01	Ohm	
R_d	[50 50]	Ohm	[TX RX]
A_v	0.413	V	vp/vf=
A_fe	0.413	V	vp/vf=
A_ne	0.608	V	
L	4		
M	32		
filter and Eq			
f_r	0.58	*fb	
c(0)	0.55		min
c(-1)	[-0.4:0.02:0]		[min:step:max]
c(-2)	[0:.02:0.1]		[min:step:max]
c(-3)	0		[min:step:max]
c(-4)	0		[min:step:max]
c(1)	[-0.2:0.05:0]		[min:step:max]
N_b	1	UI	
b_max(1)	0.75		As/dffe1
b_max(2..N_b)	1		As/dfe2..N_b
b_min(1)	0		As/dffe1
b_min(2..N_b)	-0.15	S	As/dfe2..N_b
g_DC	[-15:1:-3]	dB	[min:step:max]
f_z	25.16	GHz	
f_p1	40.00	GHz	
f_p2	56.00	GHz	
g_DC_HP	[-5:1:0]		[min:step:max]
f_HP_PZ	1.328125	GHz	
Butterworth	1	logical	include in fr
Local Search	2		
sample_adjustment	[-16 18]		

I/O control		
DIAGNOSTICS	0	logical
DISPLAY_WINDOW	0	logical
CSV_REPORT	0	logical
RESULT_DIR	.\results\C2M_{date}\	
SAVE_FIGURES	0	logical
Port Order	[1 3 2 4]	
RUNTAG	C2M TP1a_COM_model	
COM_CONTRIBUTION	0	logical
Operational		
ERL Pass threshold	10	dB
COM Pass threshold	3	db
DER_0	2.00E-05	
T_r	4.00E-03	ns
FORCE_TR	1	logical
Min_VEO_Test	0	mV
PMD_type	C2C	
T_O	50	mUI
samples_for_C2M	100	samples/UI
EW	0	
MLSE	0	

Noise, jitter		UI
sigma_RJ	0.01	UI
A_DD	0.02	V^2/GHz
eta_0	1.25E-08	dB
SNR_TX	33	
R_LM	0.95	

minutes_3cwfdfj_2309_unapproved
benartsi_3dj_01_2311
mli_3df_02_220316

Parameter	Setting	Units	Information
package_tl_gamma0_a1_a2	[5e-4 0.00065 0.0003]		
package_tl_tau	0.006141	ns/mm	
package_Z_c	[92 92 ; 70 70; 80 80; 100 100]	Ohm	
z_p select	[1 3 4]		[test cases to run]
z_p (TX)	[8 24 30 45 ; 1 1 1 1 ; 1 1 1 1 ; 0.5 0.5 0.5 0.5]	mm	[test cases]
z_p (NEXT)	[8 8 8 8 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
z_p (FEXT)	[8 24 30 45 ; 1 1 1 1 ; 1 1 1 1 ; 0.5 0.5 0.5 0.5]	mm	[test cases]
z_p (RX)	[8 8 8 8 ; 0 0 0 0 ; 0 0 0 0]	mm	[test cases]
C_p	[0.4e-4 0.4e-4]	nF	[TX RX]
Floating Tap Control			
N_bg	0	0 1 2 or 3 groups	
N_bf	4	taps per group	
N_f	60	UI span for floating taps	
bmaxg	0.2	max DFE value for floating taps	
B_float_RSS_MAX	0.1	rss tail tap limit	
N_tail_start	25	(UI) start of tail taps limit	
Filter: Rx FFE			
ffe_pre_tap_len	6	UI	
ffe_post_tap_len	120	UI	
ffe_tap_step_size	0		
ffe_main_cursor_min	0.7		
ffe_pre_tap1_max	0.7		
ffe_post_tap1_max	0.7		
ffe_tapn_max	0.7		
ffe_backoff	0		
TDR and ERL options			
TDR	1	logical	
ERL	1	logical	
ERL_ONLY	0	ns	
TR_TDR	0.01		
N	1000	logical	
TDR_Butterworth	1		
beta_x	0		
rho_x	0.618		
TDR_W_TXPKG	0	UI	
N_bx	20		
fixture delay time	[0 0]		
Tukey_Window	1		

COM (dB) vs IL die to die – 120 taps

