

COM 2.70 Update

Richard Mellitz, Samtec

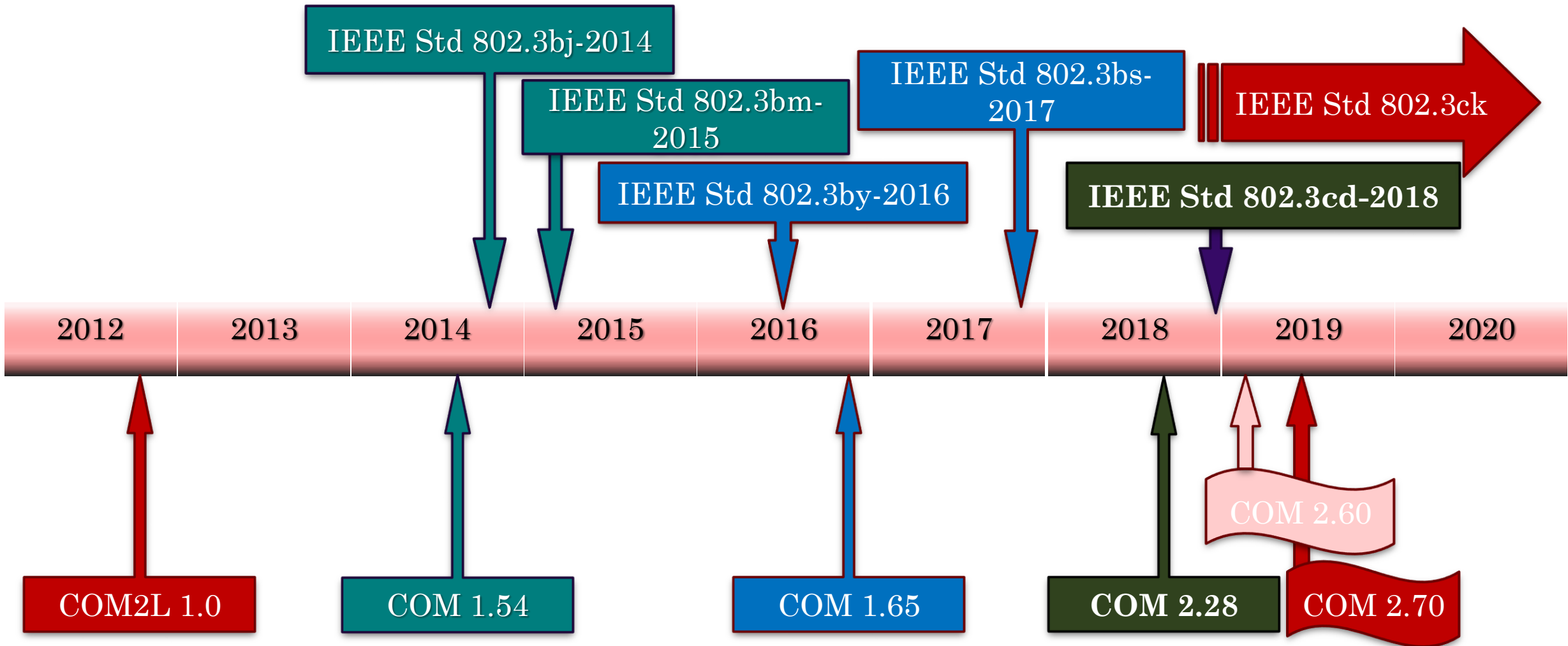
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IEEE 802.3 100 Gb/s, 200 Gb/s, and 400 Gb/s Electrical Interfaces Task Force Ad Hoc

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COM Timeline



COM 2.70 highlights

□ Floating DFE taps

- http://www.ieee802.org/3/ck/public/19_05/kareti_3ck_01b_0519.pdf
- http://www.ieee802.org/3/ck/public/19_05/heck_3ck_01_0519.pdf
- http://www.ieee802.org/3/ck/public/19_05/mellitz_3ck_01c_0519.pdf

□ Coil Circuit Improving C_d Termination – Adam Healey

□ Informative Eye Width Reported for C2M

COM 2.60 and Earlier Highlights

- ❑ Include package in ERL for C2M COM
- ❑ 2 to 4 transmission line package model
- ❑ Max DER at COM limit reported
- ❑ Computation speed up
- ❑ Rx FFE (vector forced) for C2M
 - http://www.ieee802.org/3/ck/public/18_07/mellitz_3ck_01_0718.pdf Slide 7
 - http://www.ieee802.org/3/ck/public/adhoc/oct03_18/mellitz_3ck_adhoc_01_100318.pdf Slide 10
- ❑ Other experimental features and bug fixes

Package Proposal with LC Termination Compensation (single sided model)

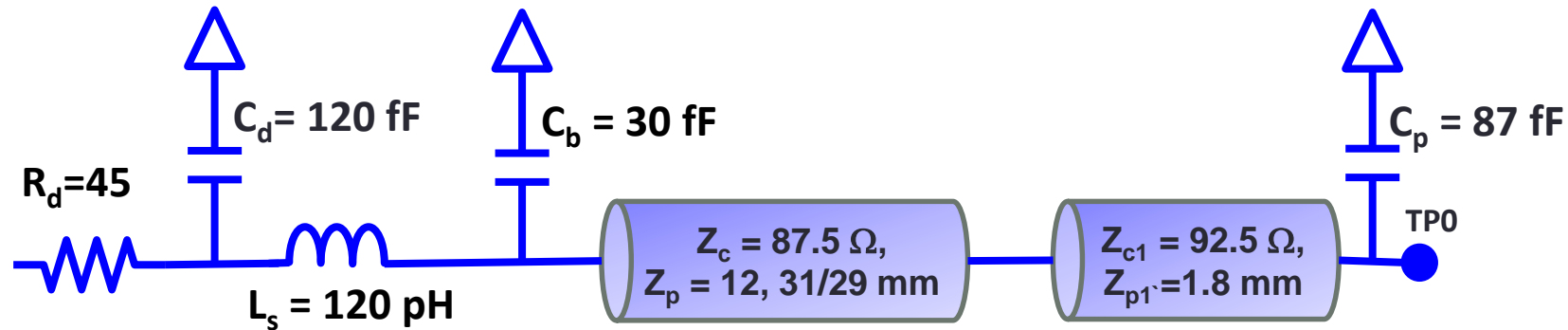
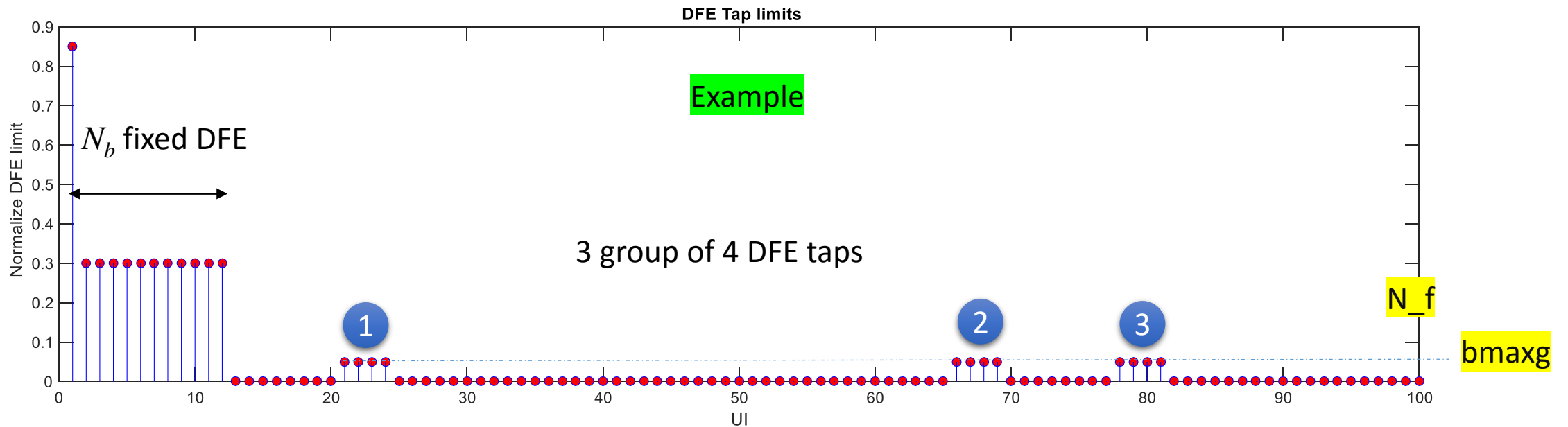


Table 93A-1 parameters			
Parameter	Setting	Units	Information
C_d	[1.2e-4 1.2e-4]	nF	[TX RX]
L_s	[0.12, 0.12]	nH	[TX RX]
C_b	[0.3e-4 0.3e-4]	nF	[TX RX]
z_p select	[1 2]		[test cases to run]
z_p (TX)	[12 31; 1.8 1.8]	mm	[test cases]
z_p (NEXT)	[12 29; 1.8 1.8]	mm	[test cases]
z_p (FEXT)	[12 31; 1.8 1.8]	mm	[test cases]
z_p (RX)	[12 2990; 1.8 1.8]	mm	[test cases]
C_p	[0.87e-4 0.87e-4]	nF	[TX RX]
R_0	50	Ohm	
R_d	[45 45]	Ohm	[TX RX]
A_v	0.39	V	vp/vf=.694
A_fe	0.39	V	vp/vf=.694
A_ne	0.578	V	

Table 93A-3 parameters		
Parameter	Setting	Units
package_tl_gamma0_a1_a2	[0 0.0009909 0.0002772]	
package_tl_tau	6.141E-03	ns/mm
package_Z_c	[87.5 87.5 ; 92.5 92.5]	Ohm

Parameters for Floating DFE Taps and Example Values Maybe Further Refined

Floating Tap Control		
N_{bg}	3	0 1 2 or 3 groups
N_{bf}	4	taps per group
N_f	100	UI span for floating taps
$bmaxg$	0.1	max DFE value for floating taps



KR Example Spread Sheet – Yellow is still WIP

config_example_ieee8023_93a=3ck_KR_mellitz_06_12_2019.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	[1.2e-4 1.2e-4]	nF	[TX RX]
L_s	[0.12, 0.12]	nH	[TX RX]
C_b	[0.3e-4 0.3e-4]	nF	[TX RX]
z_p select	[1 2]		[test cases to run]
z_p (TX)	[12 31; 1.8 1.8]	mm	[test cases]
z_p (NEXT)	[12 29; 1.8 1.8]	mm	[test cases]
z_p (FEXT)	[12 31; 1.8 1.8]	mm	[test cases]
z_p (RX)	[12 29; 1.8 1.8]	mm	[test cases]
C_p	[0.87e-4 0.87e-4]	nF	[TX RX]
R_0	50	Ohm	
R_d	[45 45]	Ohm	[TX RX]
A_v	0.39	V	vp/vf=.694
A_fe	0.39	V	vp/vf=.694
A_ne	0.578	V	
L	4		
M	32		
filter and Eq			
f_r	0.75	*fb	
c(0)	0.5		min
c(-1)	[-0.3:0.02:0]		[min:step:max]
c(-2)	[0:0.02:0.12]		[min:step:max]
c(-3)	[-0.06:0.02:0]		[min:step:max]
c(1)	[-0.2:0.05:0]		[min:step:max]
N_b	12	UI	
b_max(1)	0.85		
b_max(2..N_b)	0.3		
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	

I/O control			
DIAGNOSTICS	0	logical	
DISPLAY_WINDOW	0	logical	
CSV_REPORT	1	logical	
RESULT_DIR	.\results\100GEL_KR_{date}\		
SAVE_FIGURES	1	logical	
Port Order	[1 3 2 4]		
RUNTAG	KR_eval_		
COM_CONTRIBUTION	0	logical	
Operational			
COM Pass threshold	3	dB	
ERL Pass threshold	10	dB	
DER_0	1.00E-04		
T_r	6.16E-03	ns	
FORCE_TR	1	logical	
Include PCB	0	logical	
TDR and ERL options			
TDR	1	logical	
ERL	1	logical	
ERL_ONLY	0	logical	
TR_TDR	0.01	ns	
N	3000		
beta_x	2.53E+09		
rho_x	0.25		
fixture delay time	0	s	
TDR_W_TXPKG	0		
N_bx	24	UI	
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	33	dB	
R_LM	0.95		

Table 93A-3 parameters		
Parameter	Setting	Units
package_tl_gamma0_a1_a2	[0 0.0009909 0.0002772]	
package_tl_tau	6.141E-03	ns/mm
package_Z_c	[87.5 87.5 ; 92.5 92.5]	Ohm

Table 92-12 parameters 5.2dB at 26.56GHz		
Parameter	Setting	
board_tl_gamma0_a1_a2	[0 0.000599 0.0001022]	1.286 dB/in or 0.0506 dB/mm at 100 ohms
board_tl_tau	6.200E-03	ns/mm
board_Z_c	90	Ohm
z_bp (TX)	102.7	mm
z_bp (NEXT)	102.7	mm
z_bp (FEXT)	102.7	mm
z_bp (RX)	102.7	mm

Floating Tap Control		
N_bg	3	0 1 2 or 3 groups
N_bf	4	taps per group
N_f	40	UI span for floating taps
bmaxg	0.1	max DFE value for floating taps

yellow indicates WIP

Summary

- ❑ Recommend COM 2.70 for .3ck COM work
 - Regressed to COM 2.28 for .3cd all posted files with no COM differences
- ❑ Moving forward on refining
 - Floating DFE taps
 - Improved package modeling and termination capability
 - Rx and Tx reference equalization

Thank You!