ERL KR Device Update

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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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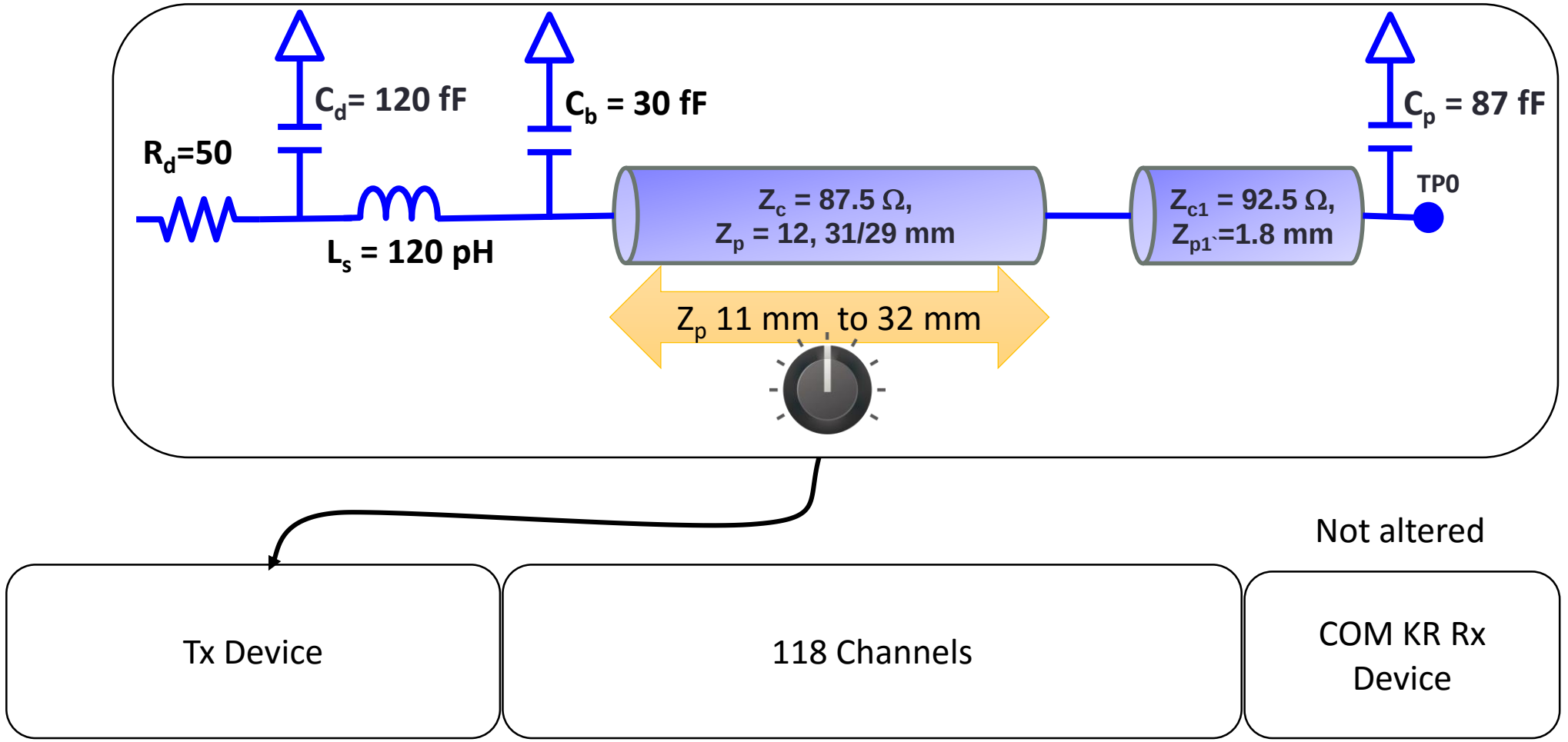
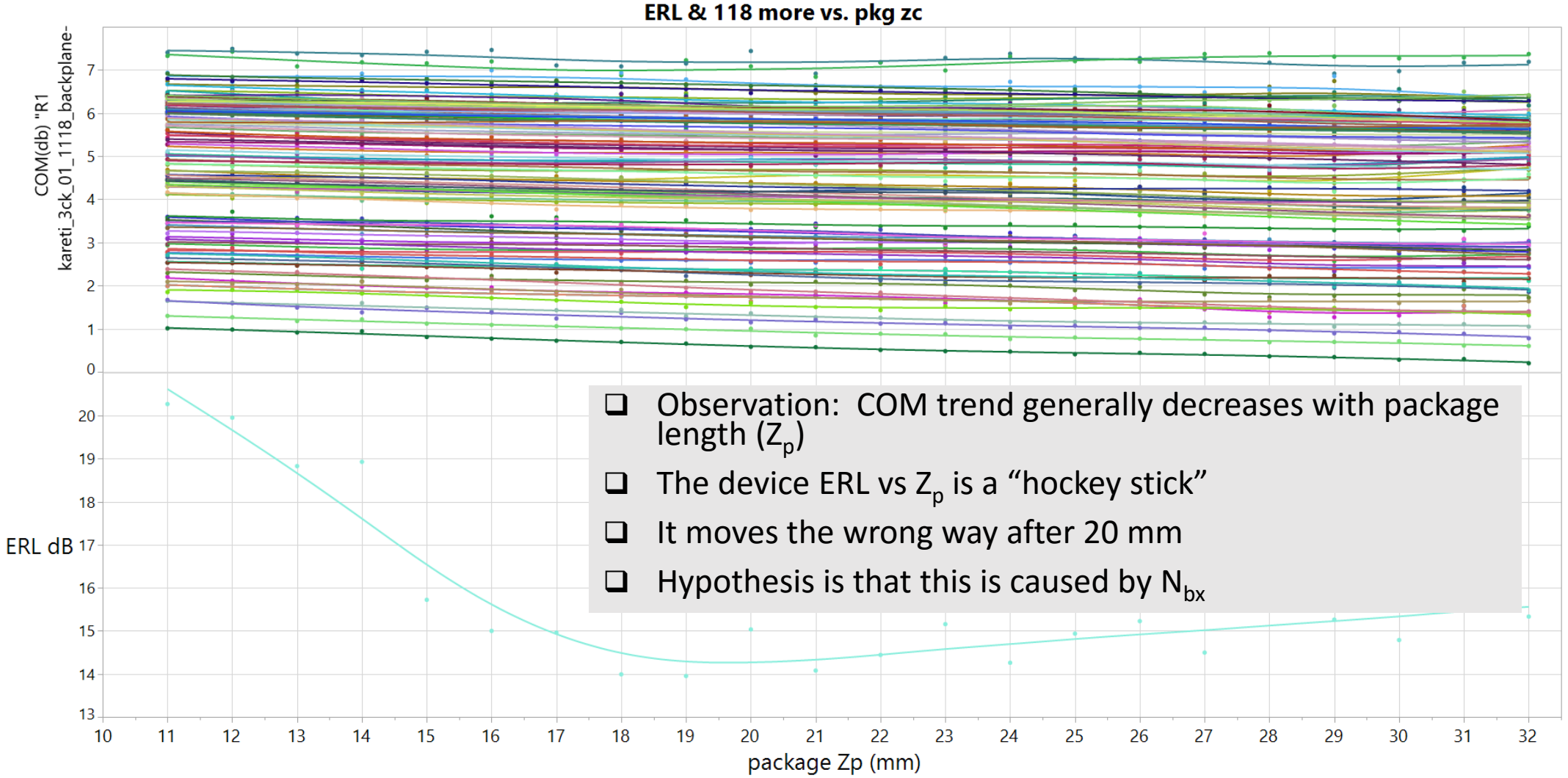
- Evaluate device ERL with N_{bx}=12
- Then evaluate device ERL for each N_{bx} and choose the best N_{bx}
- Compare ERL vs Package and COM
- Recommend parameters for device ERL

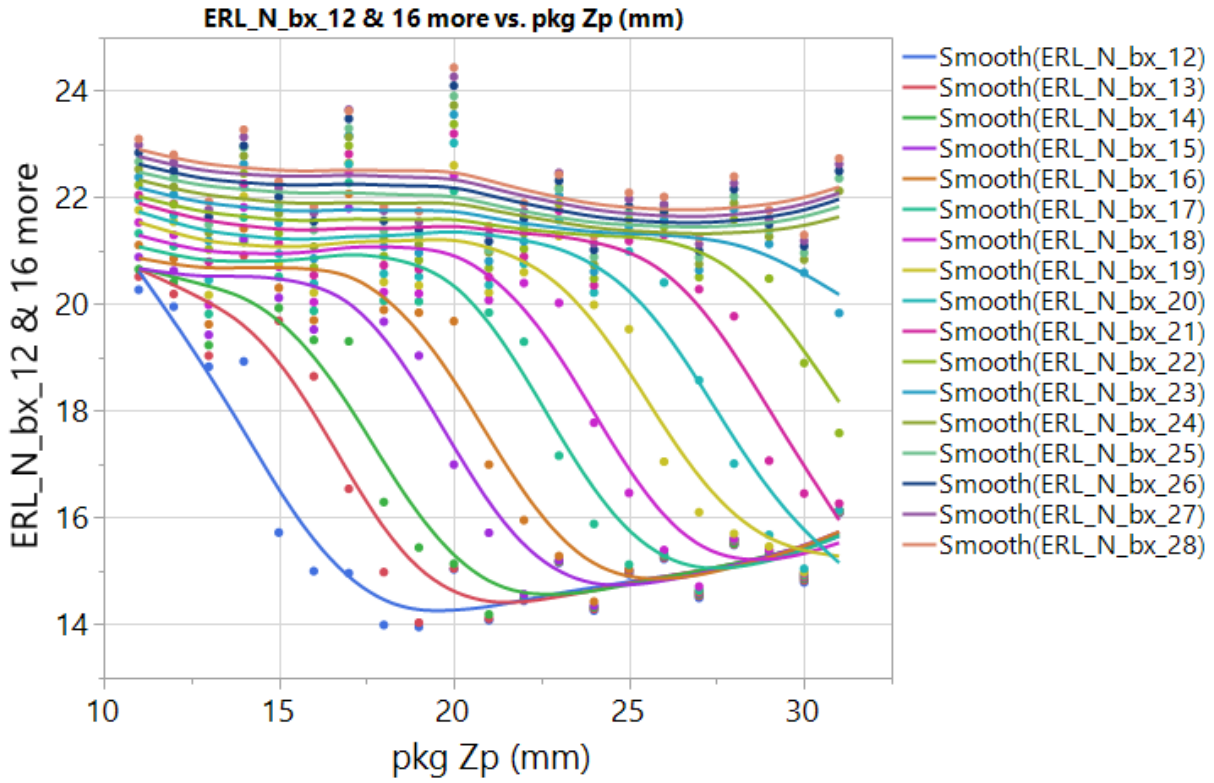
Sweep package length between 12 mm and 32 mm to produce ERL device variability

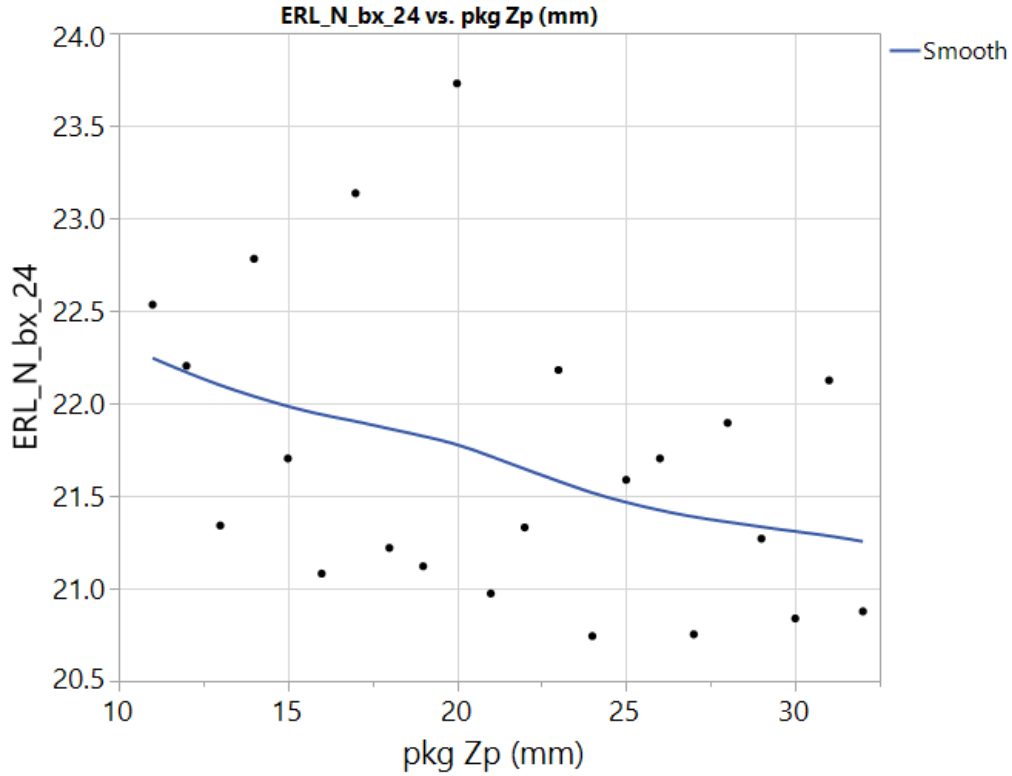


COM for 118 channels without crosstalk vs package length (Zp) and device ERL per mellitz_3ck_03a_0919 (N_{bx}=12)



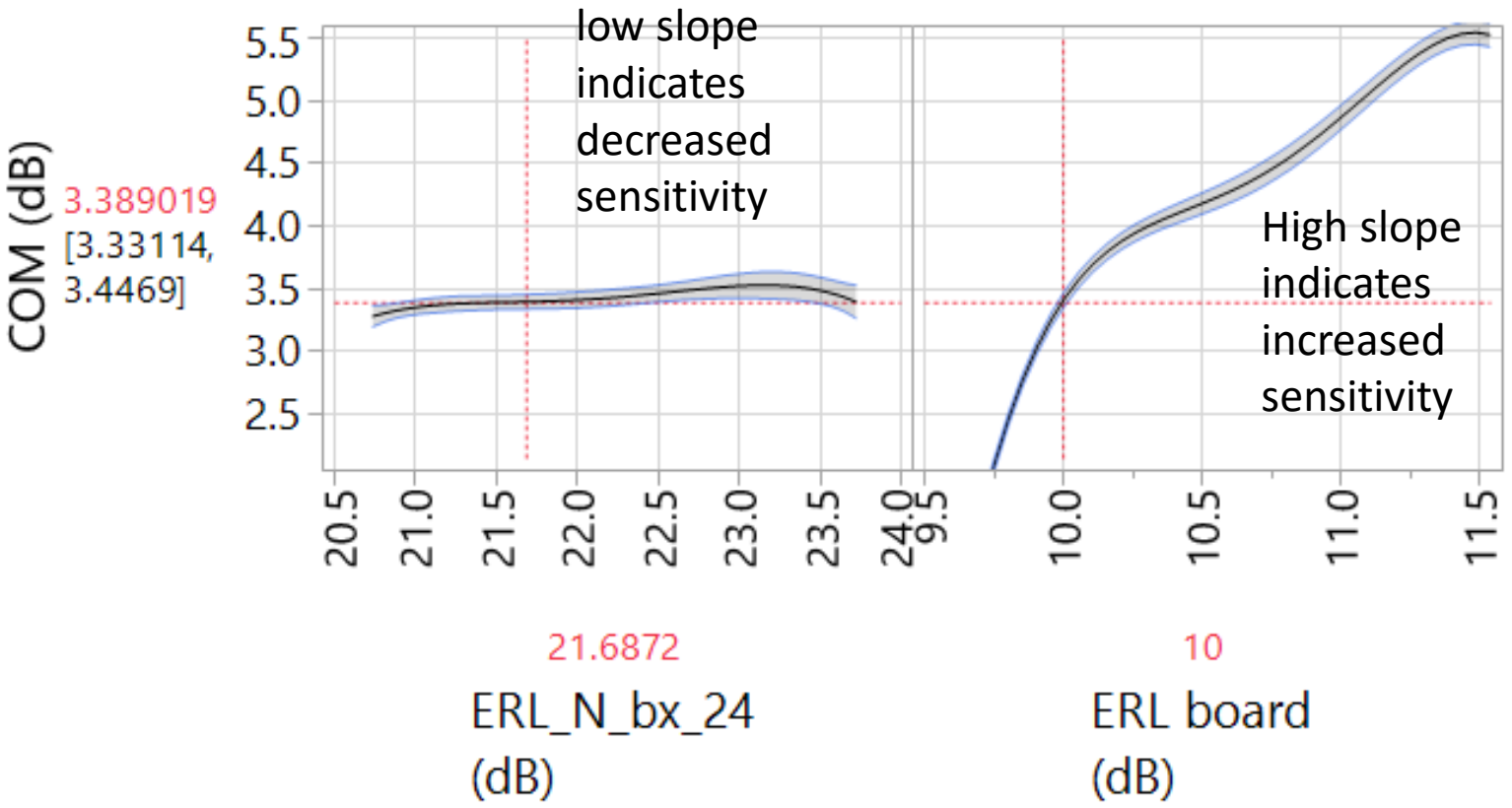
“Hockey stick” disappears at N_{bx} = 24



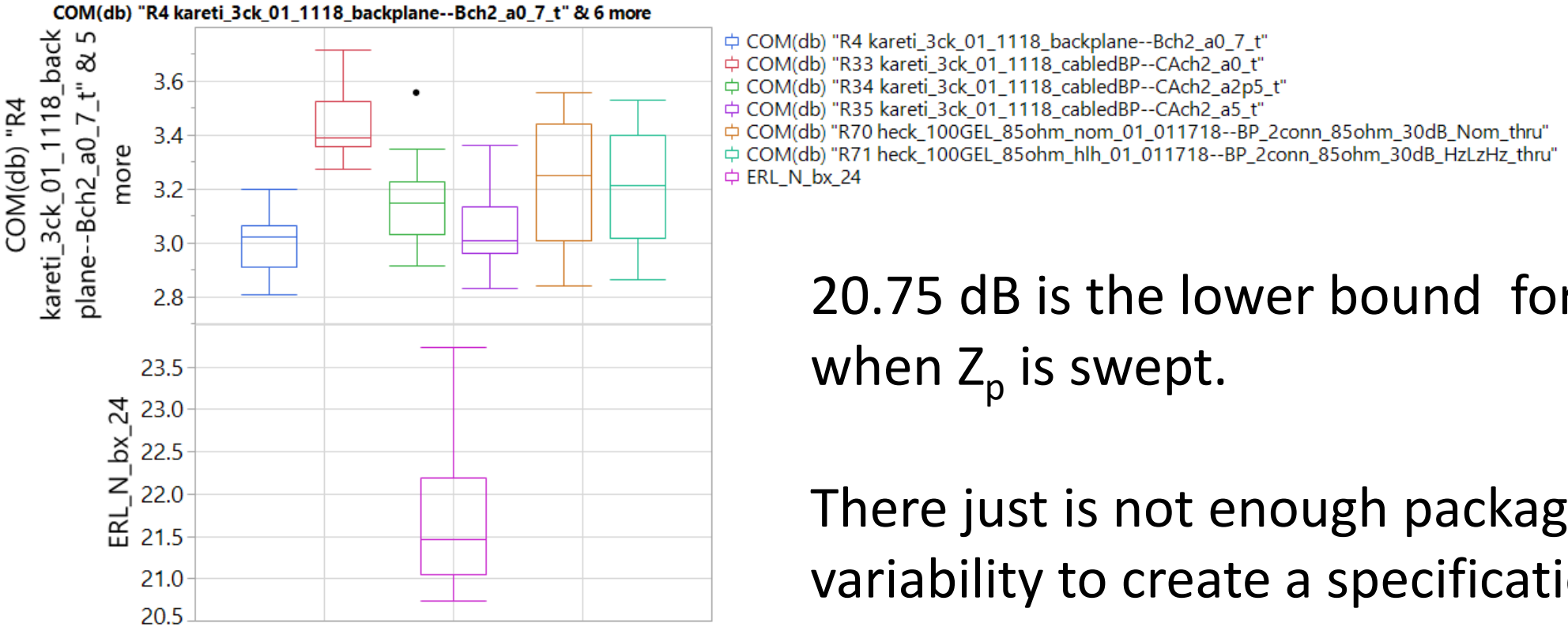


Channel to channel difference in ERL seems to be a bigger factor than package length

This is fit for channels with COM < 4.5 dB with swept package lengths.



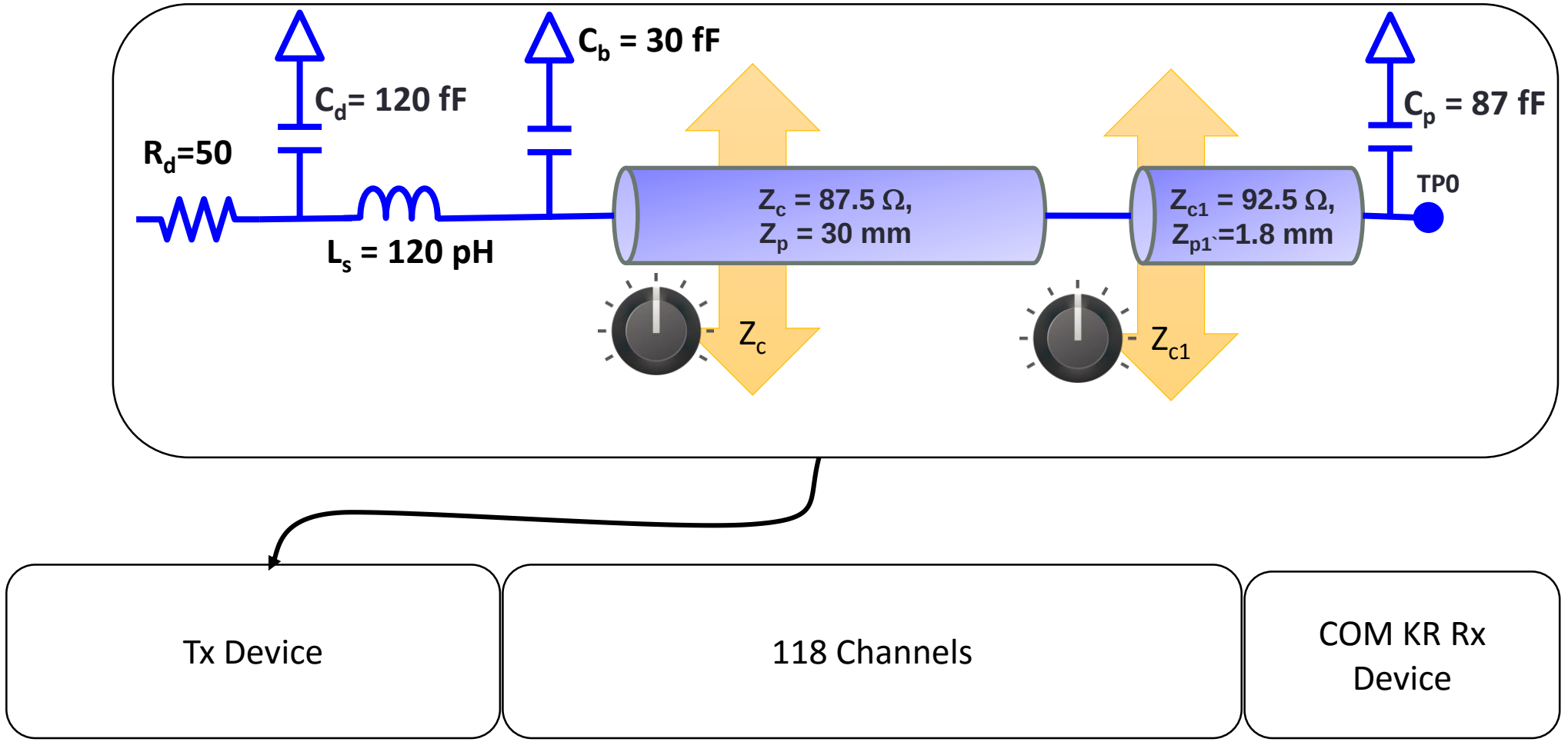
Variability for channel where ERL would apply (COM < 4 dB but COM > 2.8 dB



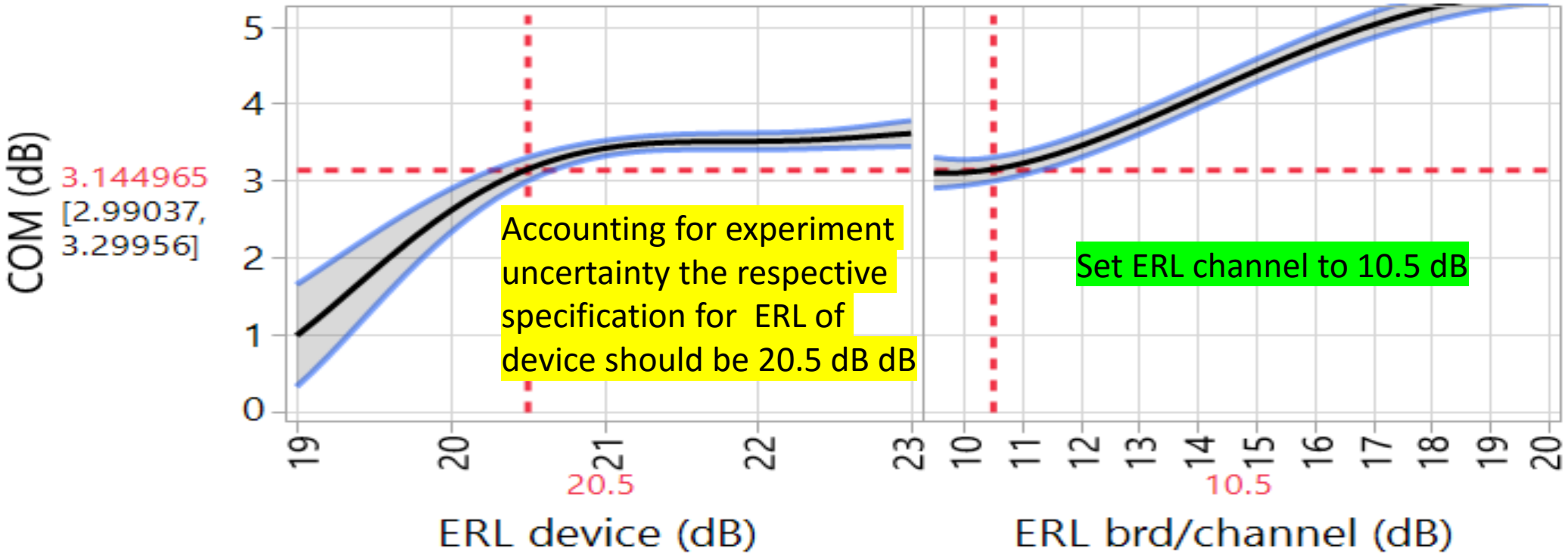
20.75 dB is the lower bound for ERL when Z_p is swept.

There just is not enough package ERL variability to create a specification from this data

Sweep impedance produces an even greater ERL device variability



The worse packages start to show the interrelation between ERL of a device and ERL of a channel



ERL Parameters for KR w/o test fixture

- ρ_x= 0.30
- β_x = 2.3407 GHz
- T_r = 10 ps
- N = 200
- N_{bx}= 24
- ERL_{min} = 20.50 dB
- Test fixture is an open issue

Thank You!

KR Configuration Spreadsheet Basis for COM Computations

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	[50 50]	Ohm	[TX RX]
A_v	0.415	V	
A_fe	0.415	V	
A_ne	0.608	V	
L	4		
M	32		
filter and Eq			
f_r	0.75	*fb	
c(0)	0.54		min
c(-1)	[-0.34:0.02:0]		[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)	0.2		
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	

I/O control		
DIAGNOSTICS	1	logical
DISPLAY_WINDOW	1	logical
CSV_REPORT	1	logical
RESULT_DIR	.\results\100GEL_KR_{date}\	
SAVE_FIGURES	0	logical
Port Order	[1 3 2 4]	
RUNTAG	KR_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	3000	
beta_x	2.3407E+09	
rho_x	0.19	
fixture delay time	[0 0]	[port1 port2]
TDR_W_TXPKG	0	
N_bx	12	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	8.2E-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
benartsi_3ck_01_0119 & mellitz_3ck_01_0119		

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	100	Ohm
z_bp (TX)	*110.3*	mm
z_bp (NEXT)	*110.3*	mm
z_bp (FEXT)	*110.3*	mm
z_bp (RX)	*110.3*	mm
C_0	[0.29e-4]	nF
C_1	[0.19e-4]	nF
Include PCB	**0**	**logical**

Floating Tap Control		
N_bg	3	0 1 2 or 3 groups
N_bf	3	taps per group
N_f	40	UI span for floating taps
bmaxg	0.2	max DFE value for floating taps

cable assemblies require this for each HCB

ICN parameters (v2.73)	
f_f	12.919
f_n	12.919
f_2	39.844
A_ft	0.600
A_nt	**0.600**

heck_3ck_03b_0319	**Adopted Mar 2019**
walker_3ck_01d_0719	**Adopted July 2019**
result of R_d=50	
benartsi_3ck_01a_0719	**no used for KR**
mellitz_3ck_03_0919	
under consideration	