COM and ERL update post d3.1

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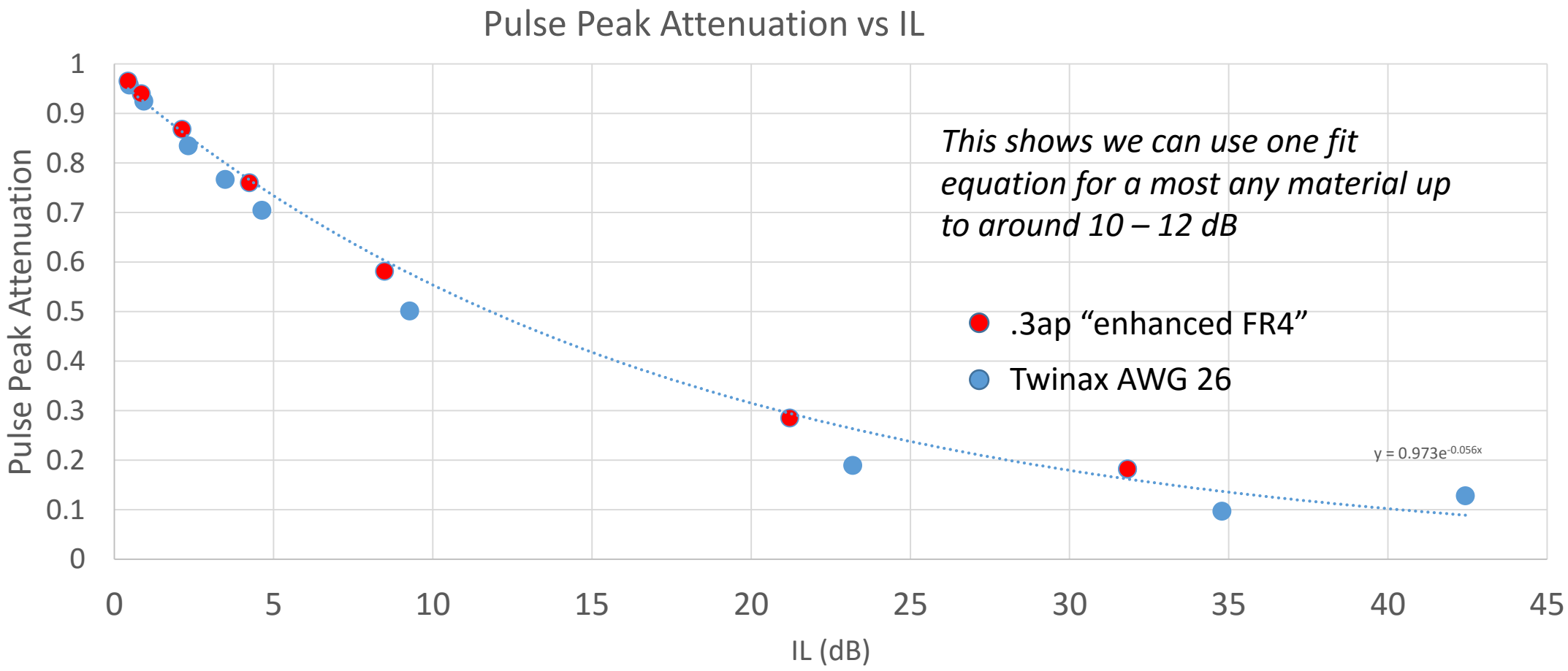
Overview of WIP

Clause	ERL Min (dB) D3.2	ρ_x D3.2	β_x D3.2	N D3.2	ERL Min (dB) D3.2 comment	ρ_x D3.2 comment	B_x D3.2 comment	N D3.2 comment
136 Tx Host	$8 - 40 \log_{10}\left(\frac{P_{max}}{V_f}\right)$	. 44	10.7	300	WIP	WIP	WIP	WIP
136 Rx Host	14.5	. 44	10.7	300	WIP	WIP	WIP	WIP
136 Cable Assembly	11	. 44	10.7	1000	WIP	WIP	WIP	WIP
137 Tx Device	16.1	.44	10.7	100	15	$e^{\frac{-ERL_{\min\_channel}}{20}} = 0.32$	1.7	100
137 Rx Device	16.1	.44	10.7	100	15	$e^{\frac{-ERL_{\min\_channel}}{20}} = 0.32$	1.7	100
137 Channel	10	0. 44	10.7	300?	10	$e^{\frac{-ERL_{\min\_devoce}}{20}} = 0.18$	1.7	1000

Re looking at IL and pulse (f_b=13.28 GHz) peak reduction

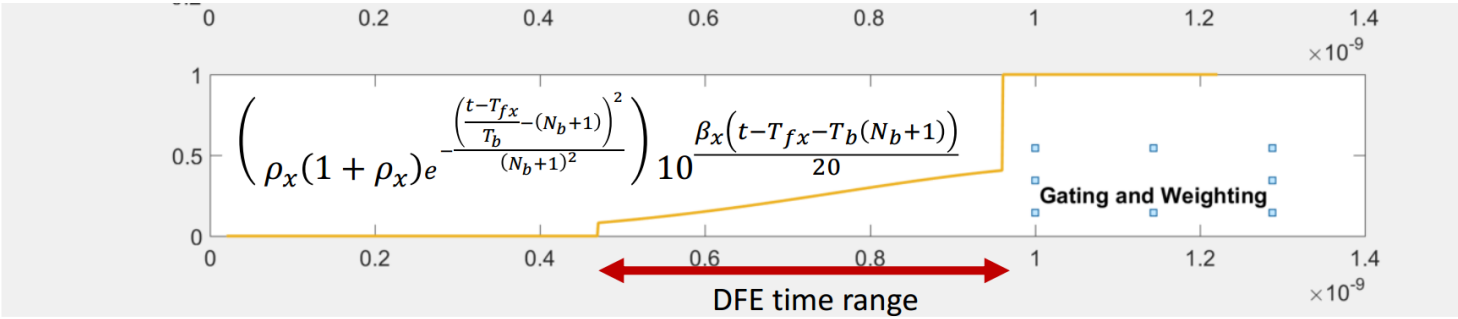
The pulse peak reduction will be used to determine β_x and which adjusts the pulse TDR for loss



Rethinking β_x

- T_b*N_b (12UI) is about the reflection delay of the long package
  → .452 ns (0.47 ns)
  - set reflection delay t_{rd}= 0.47 (ns)
- Let pa = peak attenuation and IL = insertion loss
- *pa = 0.973 e $^{-0.06\ IL}$;* fit from previous page
  - *IL for the long package (30 mm) = 3.3 dB*
- $\beta_x = \frac{pa}{t_{rd}}$ = 1.7 GHz

ρ_x should only act on the range for re-reflections of the DFE taps



mellitz_3cd_01_0118.

Where $G_{rr}(t)$ and $G_{loss}(t)$ are time gating weighting functions defined in Equation (93A–61) and Equation (93A–62) with t in nanoseconds.

$$G_{rr}(t) = \begin{cases} 0 & t < T_{fx} \\ \rho_x(1+\rho_x)\exp\left(-\dfrac{[(t-T_{fx})f_b-(N_{bx}+1)]^2}{(N_{bx}+1)^2}\right) & T_{fx} \le t < T_{fx}+\dfrac{N_{bx}+1}{f_b} \\ \rho_x(1+\rho_x) & t \ge T_{fx}+\dfrac{N_b+1}{f_b} \end{cases} \quad (93A\text{–}61)$$

Draft 3.1 should be 1

Where

t is the time in ns starting from the peak of the injected pulse

T_{fx} is twice the propagation delay in ns associated with the test fixture, obtained by measurement or inspection

339 / 409 208.95%

Now ρ_x makes the more sense

- $\rho_x = e^{\frac{-ERL_{min}}{20}}$

- For channels ERL limit = 10 dB
  - $\rho_x = 0.32$ to be used for devices
- For Tx and Rx devices ERL_{min}= 15 dB
  - $\rho_x = 0.18$ to be used for channels

Adjust COM examples spreadsheet parameters

137 Tx/Rx Device input file, s2p: like RL

Non standard control options			
COM_CONTRIBUTION	0	logical	
TDR	1	logical	
ERL	2	logical	
Z_t	50	ohms	
ERL_ONLY	1	logical	
TR_TDR	0.0189	ns	
TDR_duration	10		
N	100		
TDR_f_BT_3db	19.921875	GHz	
TDR_Butterworth	1	logical	
beta_x	1.70E+09		
rho_x	**0.32**		set to zero for no fixture for KR channel
fixture delay time	4.00E-10		

Operational control			
COM Pass threshold	3	dB	
ERL Pass threshold	15	dB	0, 1
Include PCB	0	Value	
Grr_limit	**1**		

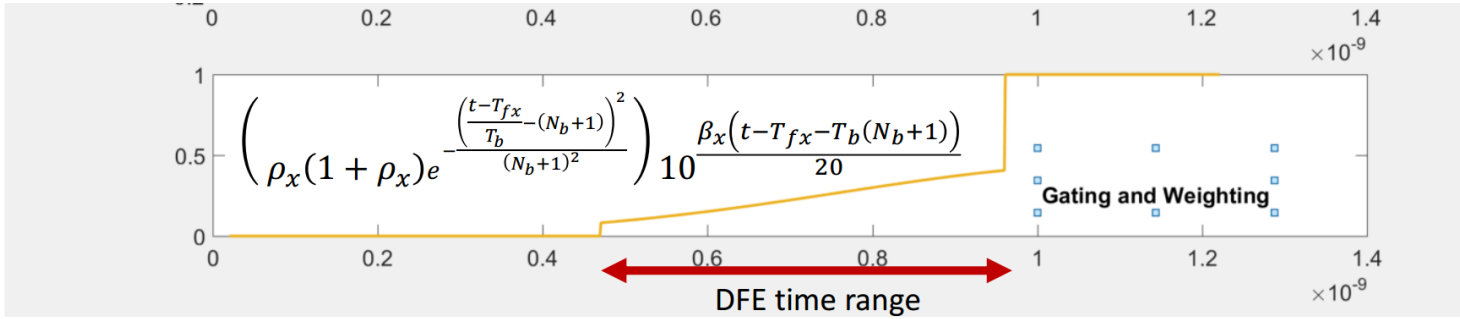
137 Channel input file: s4p

Non standard control options			
COM_CONTRIBUTION	0	logical	
TDR	1	logical	
ERL	1	logical	
Z_t	50	ohms	
ERL_ONLY	0	logical	
TR_TDR	0.0189	ns	
TDR_duration	10		
N	**1000**		
TDR_f_BT_3db	19.921875	GHz	
TDR_Butterworth	1	logical	
beta_x	1.70E+09		
rho_x	**0.18**		set to zero for no fixture for KR channel
fixture delay time	0.00E+00		

Operational control			
COM Pass threshold	3	dB	
ERL Pass threshold	10	dB	0, 1
Include PCB	0	Value	
Grr_limit	**1**		

*Grr_limit is already supported in COM 2.26

Moving on to Clause 136: Cable Assemblies and Host



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$$G_{loss}(t) = \begin{cases} 0 & t < T_{fx} \\ 10^{\frac{\frac{\beta_x}{f_b}[(t-T_{fx})f_b-(N_{bx}+1)]}{20}} & T_{fx} \le t < T_{fx} + \frac{N_{bx}+1}{f_b} \\ 1 & t \ge T_{fx} + \frac{N_{bx}+1}{f_b} \end{cases} \quad (93A\text{–}62)$$

Where

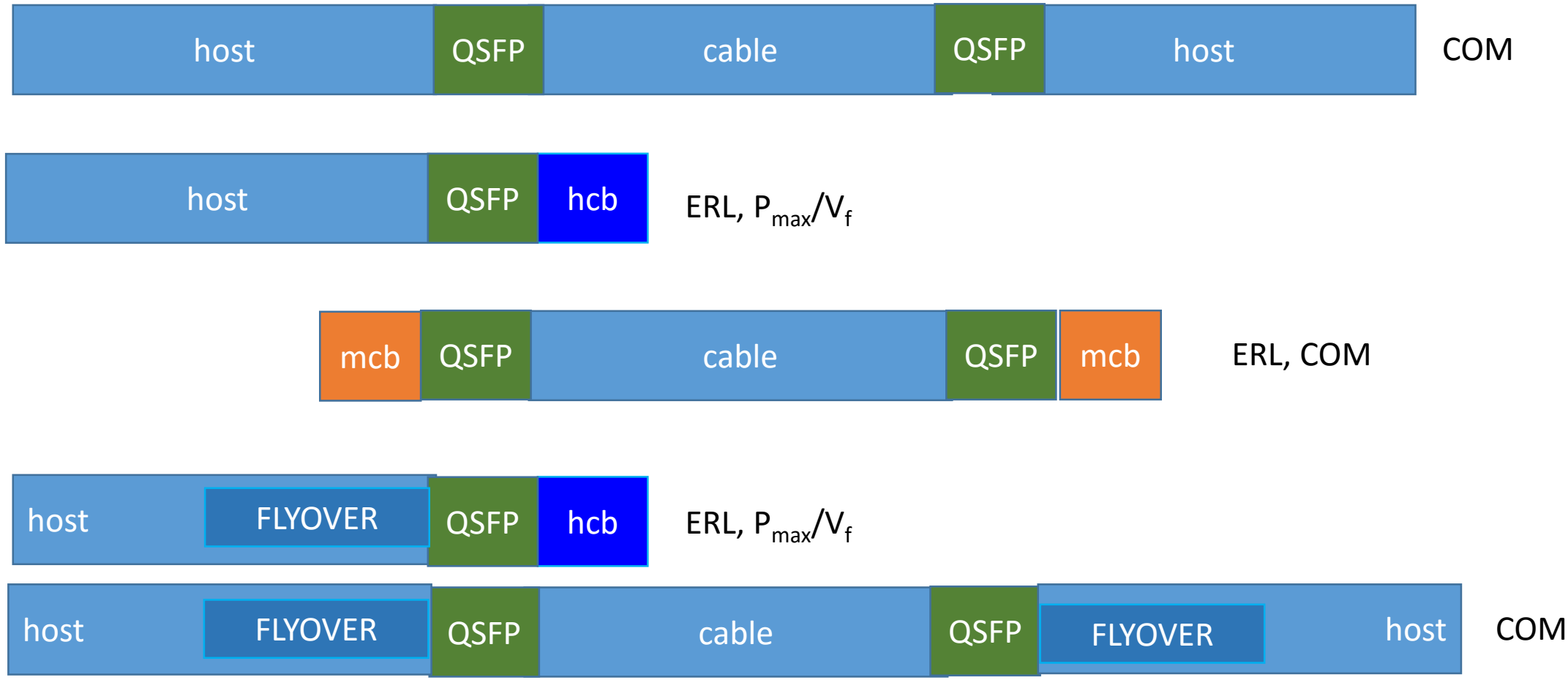
t is the time in ns starting from the peak of the injected pulse

T_{fx} is twice the propagation delay in ns associated with the test fixture, obtained by measurement or inspection

β_x, f_b, N_{bx} are supplied by the clause that invokes this method.

- Intentionally the package delay was within the reference receiver "DFE shadow"
  - So it was easy to use that number to adjust for the fact that short packages may perform better than long packages
- A host has much longer delay
- We should be able to use a different number for N_{bx}

Some more correlation work for Clause 136 is needed to determine values for N_{bx}, ρ_x, and β_x and ERL_{min} and better use P_{max}/V_f



Next

- Add parameter separation of N_{bx} for G_{rr} and G_{loss} to COM
- Determine sets of passing and failing cable assemblies
- Match with Host ERL and P_{max}/V_f
- Determine best set of parameters for optimizing the tradeoff between false pass and false fail