Transmitter Specifications for Cl137

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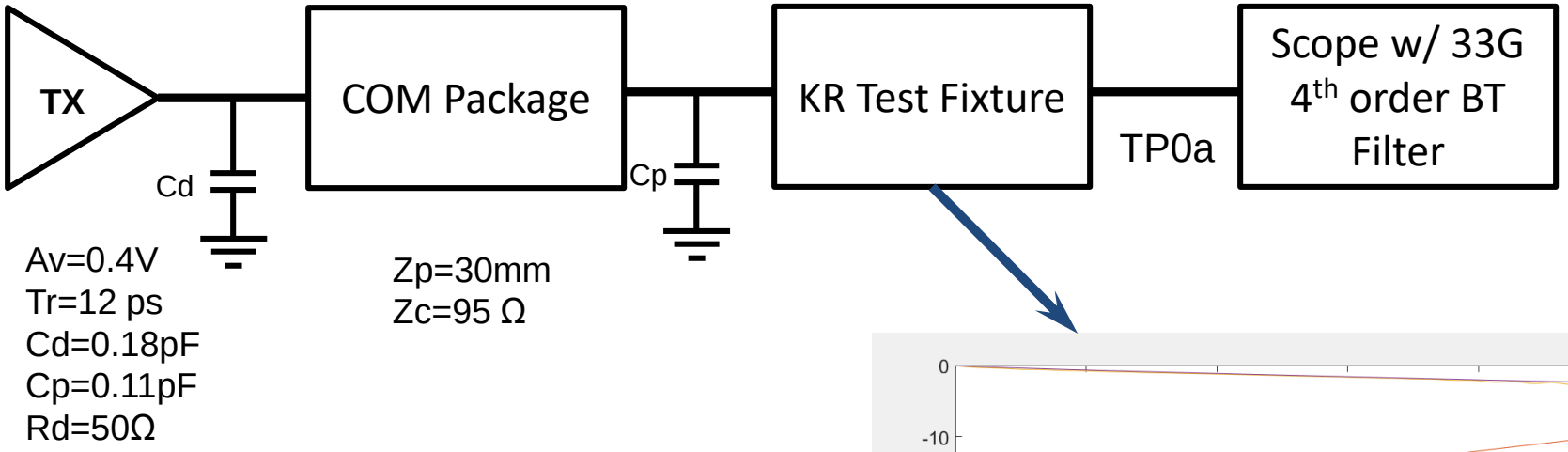
Introduction

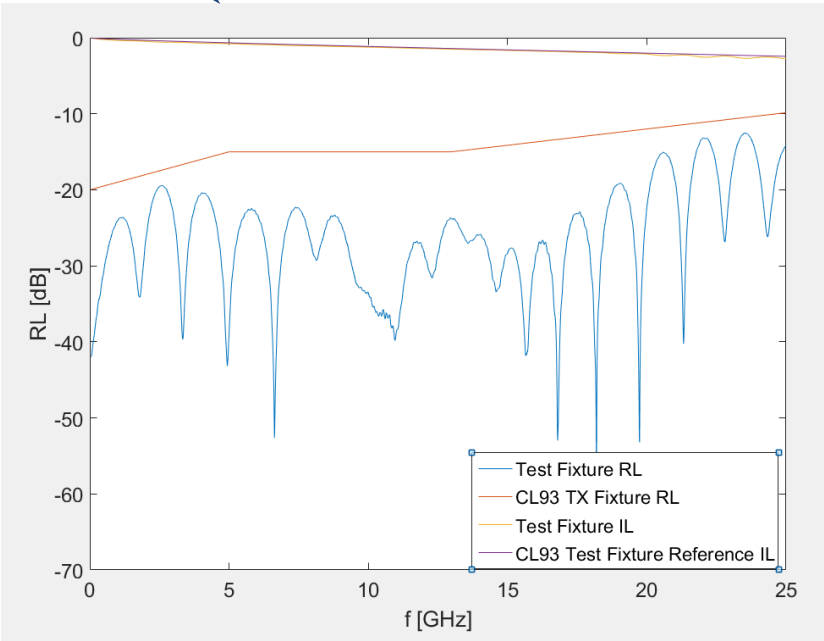
- Performance of COM TX, simulated at TP0a, is compared with the current CL137 limits
- Similar analysis for CR hosts was presented in dudek_3cd_01_0118.pdf
- ERL is suggested to replace the SNR_{ISI} specification. With that, currently this is informative and alignment of the TX specifications to COM is required.
- Related to comment 28

Methodology

- TX output waveform was generated with Av=0.4V and risetime of 12 ps (used in COM). COM channel up to TP0a (COM package and a compliant KR test fixture) was added to generate the waveforms at this test point.
- The waveforms were analyzed and results compared with Clause 137 TX specifications.

Simulation Setup





Actual measurement are expected to include additional impairments, such as reflections from test equipment, quantization effects, etc.

Results

	Simulated PRBS13Q @ TP0a		D3.1 Cl137 Limit	Comments
Rd [Ω]	50		NA	
Zc_pkg [Ω]	95		NA	
R_{LM}	0.998	0.948	0.95	
|EB+EC|	0	0.1	NA	
Pmax [V]	0.3501	0.3483	0.3	$0.75 \times Vf_{min}$
Sigma_e [V]	1.32e-3	3.7e-3	NA	
SNR_{ISI} [dB]	30.93	30.92	43	
SNDR [dB] (@Sigma_n = 0)	48.44	39.48	32.5	
Sigma_n [V] (TX_SNR=32.5 dB)	8.3e-3	8.26e-3	NA	$TX\_SNR = 20\log\frac{Pmax}{\sigma_n}$
SNDR [dB] (TX_SNR=32.5 dB)	32.39	31.71	32.5	$SNDR = 10log\frac{{P_{max}}^2}{\sqrt{{\sigma_e}^2 + {\sigma_n}^2}}$

PAM4 Levels: L0=-1; L1=(-1+EB)/3; L2=(1+EC/3); L3=1

Linear Fitting: Dp=3;Nb=12;Np=200;Nv=13

Conclusions and Proposed Changes

- COM reference transmitter would not meet the current spec limits of SNR_{ISI}. Therefore, the spec limits are more stringent then they need to be.
- The presented results are simulated. Measured values are expected to be worse, due to measurement impairments and limitations.
- Proposed TX specifications:
  - SNR_{ISI} = 30.5 dB
  - SNDR = 32 dB