Options for Resolving CR Host ERL and SNR_{ISI}

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Toc

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Overview of ERL Comments

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	$8 - 40\log_{10}\left(\frac{P_{max}}{V_f}\right)$	0.44	10.7	300	*see options*	.3	1.7	300
136 Rx Host	14.5	0.44	10.7	300	12	.3	1.7	300
136 Cable Assembly	11	0.44	10.7	1000	10.5	.25	1.7	1000
137 Tx Device	16.1	0.44	10.7	100	15	.32	1.7	100
137 Rx Device	16.1	0.44	10.7	100	15	0.32	1.7	100
137 Channel	10	0.44	10.7	300	10	0.18	1.7	1000

Perspective

Return loss (and ERL) is to mostly control component variability

- ❑ COM, receiver tests, and other transmitter test a have much stronger impact
- ❑ RL not as significant as the above
  - Because it the re-reflection which is important here and ERL is aimed at this
  - The transmitted signal which is reduced by RL is covered by COM, Rx test and Tx test.
- ❑ Certain business acumen may suggest that failing RL may not stop product shipments if they operate in a validation lab
- ❑ RL may be closer to a gas gage warning light than running out of gas

History

- .3bm SNR_{ISI}
  - Annex 120D 32.5 dB
- D3.1 SNR_{ISI}
  - CL 137 43 dB
  - CL 136 31.2 dB

Difference is DFE consideration

- Measurement challenges[1,2] suggested for measuring SNR_{ISI}
  - especially for more than 40 dB
  - ~ 30-35 dB is OK for measurment
- CL 136 CA COM shows correlation to SNR_{ISI}[3]
  - ERL correlates but better when adjusted by Pmax/Vf

[1] http://www.ieee802.org/3/cd/public/Sept17/rysin_3cd_02_0917.pdf

[2] 'Improving TDECQ and SNDR for better characterization of Serial Data signals, and path from mask test to TDEC, SNDR, and TDECQ measurement: SNDR', Richard Mellitz, Samtec; Pavel Zivny, Tektronix; Maria Agoston; Tektronix Kan Tan; Tektronix, DesignCon 2018

[3] http://www.ieee802.org/3/cd/public/Mar18/rysin_3cd_02b_0318.pdf

Option 1: SNR_{isi} > 31.5 dB

- Pros
  - Determining SNR_{ISI} at the 31.5 dB level is safely within measurement capability
  - SNR_{ISI} tracks COM (as does ERL)
- Cons
  - Some may not be comfortable with eliminating either ERL or RL.

Option 2: SNR_{isi} > 31.5 dB & Recommend ERL > 12 dB

- ❑ Pros
  - Determining SNR_{ISI} at the 31.5 dB level is safely within measurement capability
  - SNR_{ISI} tracks COM (as does ERL)
  - Some may have comfort with keeping a ERL.
    - I.e. it is a compromise.
- ❑ Cons
  - Measuring return loss s-parameters may require multi-party IP agreements
    - System provider, host provider, chip provider
    - Knowledge of Tx operation may be required
  - D3.2 requires information acquired during CR host transmitter testing
  - Not clear if adding a recommended ERL buys anything over SNR_{ISI}

Option 3: $ERL_{Tx} > 1- 40*log10(P_{max}/V_f)$ dB

- Pros
  - Favors low manufacturing scrap rates
- Cons
  - Some may think there are too many false passes
  - Two part measurement process may be confusing
    - "Spec'ing in this way indeed introduces some challenge to the test equipment, specifically in defining automated test suites, since it does require measuring both the waveform and the return loss." A. Rysin

Option 4: ERL_{TX} > 3- 40*log10(P_{max}/V_f) dB

- Pros
  - Favors very few false passes
- Cons
  - The cost is high scrap rates
  - Two part measurement process may be confusing
    - “Spec’ing in this way indeed introduces some challenge to the test equipment, specifically in defining automated test suites, since it does require measuring both the waveform and the return loss.” A. Rysin

Option 5: Keep ERL for Tx and Rx the same, ERL > 12 dB

- Pros
  - Simplified specification
- Cons
  - Does not address the Tx host loss impact but the P_{max}/V_f spec reduces impact
  - Some may think there are too many false passes

CL 136 Tx Host Reflection Control

- Recommend changes for and Grr, β_x, ρ_x and N in slide 3[1,2] but consider the following options:
- Option 1:
  - $SNR_{isi} > 31.5$ dB
- Option 2: ← My Choice
  - $SNR_{isi} > 31.5$ dB
  - Recommend ERL > 12 dB
- Option 3:
  - $ERL_{Tx} > 1- 40*\log10(P_{max}/V_f)$ dB
- Option 4:
  - $ERL_{Tx} > 3- 40*\log10(P_{max}/V_f)$ dB
- Option 5: Keep ERL for Tx and Rx the same
  - ERL > 12 dB

Do we revisit options at the Interim?

[1] http://www.ieee802.org/3/cd/public/adhoc/archive/mellitz_041818_3cd_adhoc.pdf
[2] http://www.ieee802.org/3/cd/public/adhoc/archive/mellitz_040418_3cd_adhoc-v2.pdf

Thank You!

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