

# Proposed $N_p$ Change for SNDR Measurement in CR (Comment #228)

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For IEEE 802.3ck

# Outlines

- Issues
- Recap
- Proposal

# Issues – Different $N_p$ in Clause 162 & 163

- Clause 162

- 162.9.4.3.3 Test channel calibration (for RX ITOL)

f) The  $SNR_{TX}$  value that results in the required COM value for the test is calculated. The injected noise (see 162.9.4.3.4) is set such that the SNDR matches the calculated  $SNR_{TX}$  value. SNDR is measured at the Tx test reference using the procedure in 120D.3.1.6, with the exception that the linear fit in 120D.3.1.3 is performed with a pulse length ( $N_p$ ) of 15 UI.

- Issues

- For TX SNDR calculation,  $N_p$  shall be long enough to cover all ‘linear response’, such as reflection due to package length
  - $N_p = 15$  is too small a value to cover the far-away ‘linear’ reflection for 100GBASE-CR1

- Clause 163

- 163.9.3.4 Receiver interference tolerance

f) For the calculation of test channel COM, the following parameters are based on values measured from the test transmitter. The parameter  $SNR_{TX}$  is set to the measured value of SNDR with  $N_p = 29$ , the parameter  $R_{LM}$  is set to the measured value of  $R_{LM}$ , and the parameters  $A_{DD}$  and  $\sigma_{RJ}$  are calculated from the measured values of  $J_{3u}$  and  $J_{RMS}$  using Equation (163–2) and Equation (163–3) respectively.

- $N_p = 29$  was proposed in

[li 3ck 01 1020](#)

- To consider TX + RX EQ capability to decide  $N_p$  value

# Recap from li\_3ck\_01\_1020

*Courtesy of Mike Li, Mike Dudek, Yasuo Hidaka*

- The intent was to change  $N_p = 29$  for both of KR & CR
  - Any how, no change had been applied to CR
- Proposal
  - Change  $N_p = 29$  for CR

## RX ITOL Np Setting Principles

- $N_p$  should be set equivalent to the reference TX + RX EQ capability
- $D_p$  should equal to the pre-tap length set in the COM + 1
- For KR and CR, a fixed reference RX equalization capability is difficult to establish, due to the fix + floating DFE tap architecture in the reference RX,  $N_p = 29$  is chosen in light of the CEI-112G-LR-PAM4

## RX ITOL Np Setting Proposal (in red) and Comparisons

Parameter	TX Np	RX Np	TX Dp	RX Dp	Notes
802.3ck (KR)	200	29	4	4	TX has no SNR ISI
802.3ck (C2C)	200	11	4	4	TX has no SNR ISI
802.3cd (KR)	200	13	2	2	TX has no SNR ISI
802.3bs (C2C)	200	13	2	2	TX has SNR ISI
CEI-112G-LR-PAM4	29	29	4	4	TX has no SNR ISI
CEI-112G-MR-PAM4	18	18	3	3	TX has no SNR ISI

# Proposal (Comment #288)

- Change  $N_p = 29$  in step f) in 162.9.4.3.3
  - f) The  $SNR_{TX}$  value that results in the required COM value for the test is calculated. The injected noise (see 162.9.4.3.4) is set such that the SNDR matches the calculated  $SNR_{TX}$  value. SNDR is measured at the Tx test reference using the procedure in 120D.3.1.6, with the exception that the linear fit in 120D.3.1.3 is performed with a pulse length ( $N_p$ ) of ~~15 UI~~ 29 UI

Thank You