SNDR:

Suggested resolution to comments: #64, #84, #121, **#122,** #123, #124, #136, #139, #147, and #153.

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We consider the transmitter to have 3 impairments:

1. Jitter
2. Linear fit error
3. Noise

We will not deal with jitter, it seems to be well covered in draft 2.2.

We will specify how to measure Linear fit error and Noise then sum them RSS as a single specified parameter.

Linear fit error

Averaged data will be used for the Linear fitting. For Clauses 92 and 93 this means going back to the methods called out in Draft 2.1 but for Clause 94 the method in Draft 2.2 is more appropriate. Change N_p the range of linear fit, to be the same as N_b the PMD dependent length of the reference receiver DFE. No separate spec on linear fit error.

Note:
Increasing N_p will substantially reduce linear fit error and should eliminate equalizable ISI leaving only unequalizable ISI, and nonlinearities which will be treated as noise.

Noise

Transmitter noise excludes effects due to jitter and unequalizable ISI but include everything else including power supply noise, crosstalk and other stuff. It is made on a run of at least 8 consecutive identical transmitted values. The measurement is the RMS value of a histogram made at the flattest portion of the run. The measurement is made on each possible transmitted value (2 for NRZ, 4 for PAM4) and averaged.

Any waveform which provides a run of at least 8 consecutive identical transmitted values can be used for making the measurement.

There is no independent spec on noise.

Previous specs for transmitter output noise and distortion are no longer needed.

Transmitter output noise and distortion

The actual spec is SNDR which is defined as

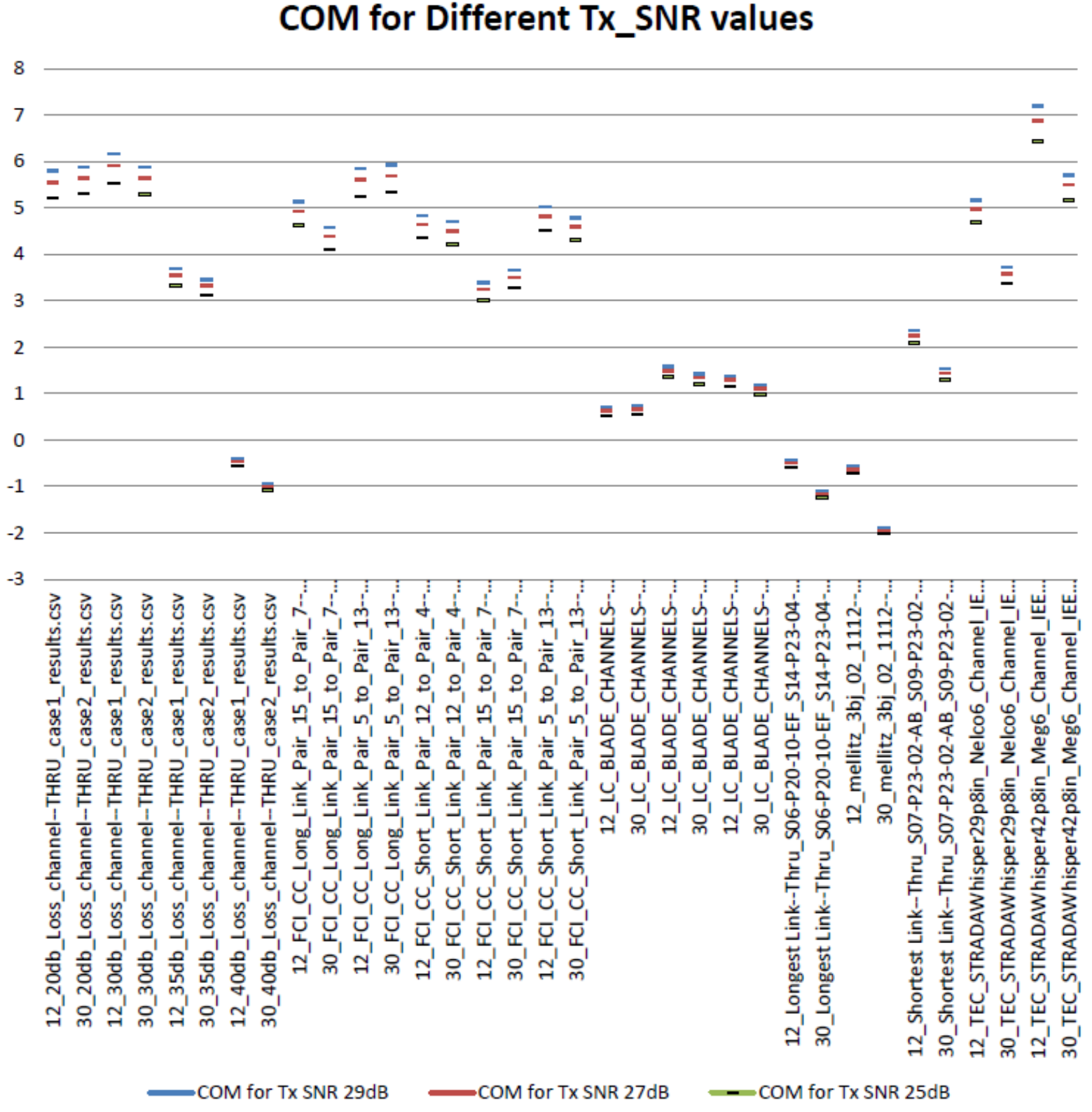
$$\mathrm{SNDR} = -10\log\left(\frac{noise^2 + linear\ \ fit\ error^2}{Linear\ \ fit\ \ pulse\ peak^2}\right)$$

The spec is SNDR ≥ 27 dB

The COM parameter SNR_{TX} is set to the specified SNDR

Note:

Rich Mellitz reports that changing SNR_{TX} from 29 dB as in D2.2 to 27 dB produces ~0.3 dB or less change in COM for all channels in his COM regression test suite with the amount of change much smaller for channels near the 3dB limit.


COM for Different Tx_SNR values
8
7
6
5
4
3
2
1
0
-1
-2
-3
12_20db_Loss_channel--THRU_case1_results.csv
30_20db_Loss_channel--THRU_case2_results.csv
12_30db_Loss_channel--THRU_case1_results.csv
30_30db_Loss_channel--THRU_case2_results.csv
12_35db_Loss_channel--THRU_case1_results.csv
30_35db_Loss_channel--THRU_case2_results.csv
12_40db_Loss_channel--THRU_case1_results.csv
30_40db_Loss_channel--THRU_case2_results.csv
12_FCI_CC_Long_Link_Pair_15_to_Pair_7--...
30_FCI_CC_Long_Link_Pair_15_to_Pair_7--...
12_FCI_CC_Long_Link_Pair_5_to_Pair_13--...
30_FCI_CC_Long_Link_Pair_5_to_Pair_13--...
12_FCI_CC_Short_Link_Pair_12_to_Pair_4--...
30_FCI_CC_Short_Link_Pair_12_to_Pair_4--...
12_FCI_CC_Short_Link_Pair_15_to_Pair_7--...
30_FCI_CC_Short_Link_Pair_15_to_Pair_7--...
12_FCI_CC_Short_Link_Pair_5_to_Pair_13--...
30_FCI_CC_Short_Link_Pair_5_to_Pair_13--...
12_LC_BLADE_CHANNELS--...
30_LC_BLADE_CHANNELS--...
12_LC_BLADE_CHANNELS--...
30_LC_BLADE_CHANNELS--...
12_LC_BLADE_CHANNELS--...
30_LC_BLADE_CHANNELS--...
12_Longest Link--Thru_S06-P20-10-EF_S14-P23-04-...
30_Longest Link--Thru_S06-P20-10-EF_S14-P23-04-...
12_mellitz_3bj_02_1112--...
30_mellitz_3bj_02_1112--...
12_Shortest Link--Thru_S07-P23-02-AB_S09-P23-02-...
30_Shortest Link--Thru_S07-P23-02-AB_S09-P23-02-...
12_TEC_STRADAWhisper29p8in_Nelco6_Channel_IE...
30_TEC_STRADAWhisper29p8in_Nelco6_Channel_IE...
12_TEC_STRADAWhisper42p8in_Meg6_Channel_IEE...
30_TEC_STRADAWhisper42p8in_Meg6_Channel_IEE...
COM for Tx SNR 29dB
COM for Tx SNR 27dB
COM for Tx SNR 25dB