Consensus building proposal for matching COM, TX, and RX specifications

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Objectives

- Amend the shortcomings in COM
- Stabilize the procedure; agree that only parameter changes are to be considered moving forward
- Keep our commitment to the project objectives
  - 35 dB loss channels for 100GBASE-KR4
  - 33 dB loss channels for 100GBASE-KP4
  - 5 meter cable assembly
- Facilitate technical feasibility of PHYs

Proposed changes (#1)

- Annex 93A
  - Adopt the accounting of TX noise into COM per ran_bj_01a_0713
- Clause 94
  - Adopt the changed SNDR definitions and limit in PAM-4 per ran_3bj_01a_0713
  - Add a new test pattern (see slide 7), and a new specified parameter R_{LM}
  - Define 2 package test cases in COM – 12 mm and 30 mm models
  - Align COM values for receiver interference tolerance test and channel specification. Use 3 dB for both.

Proposed changes (#2)

- Clause 93
  - Specify transmitter SNDR using same method as clause 94; Minimum value 29 dB; use SNDR when invoking annex 93C
  - Remove “normalized rms fitting error” specification
  - Change peak pulse to V_f minimum to 0.71, to facilitate 30 mm package traces (based on moore_3bj_02a_0713)
  - Define 2 package test cases in COM – 12 mm and 30 mm models
  - Align COM values for receiver interference tolerance test and channel specification. Use 3 dB for both.
    - 3 dB requirement for receiver implementation shown by two independent studies.

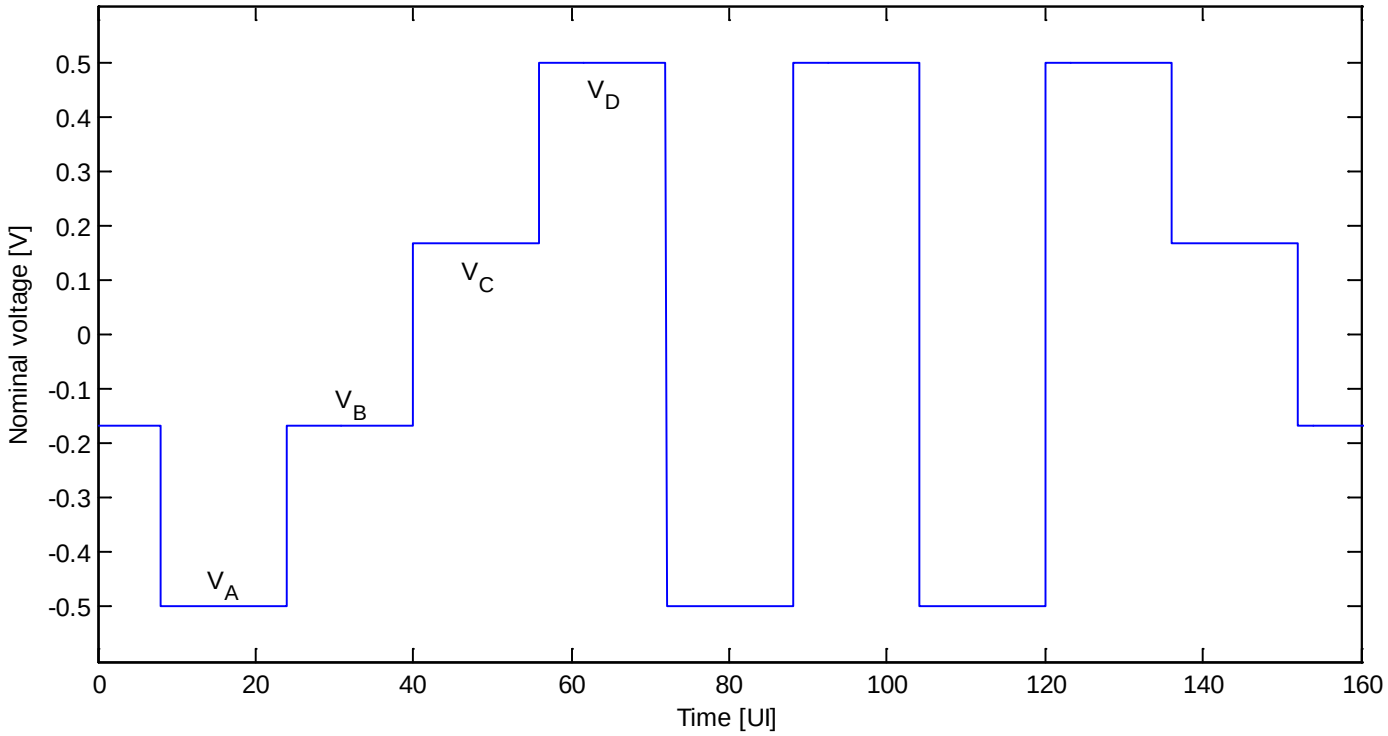
Proposed changes (#3)

- Clause 92
  - Specify transmitter SNDR using same method as clause 94; Minimum value 29 dB; use SNDR when invoking annex 93C
  - Remove “normalized rms fitting error” specification
  - Change peak pulse to V_f minimum to 0.45, to facilitate 30 mm package traces (based on moore_3bj_02a_0713)
  - Define 2 package test cases in COM – 12 mm and 30 mm models
  - Change minimum COM from 4 dB to 3 dB
    - Existing specifications cover most of the concerns of unknown host board characteristics

Details

- COM TX noise
  - Modeled as a Gaussian component, std proportional to the available signal (related to SNDR)
  - Required for completeness
- SNDR changes
  - Measure around middle of eye
  - Exclude the level mismatch contribution in PAM-4
  - Modify minimum values: 22 dB for PAM-4, 29 dB for NRZ – provide noise budget relief to allow meeting channel objectives
- Pulse peak changes
  - Allows 30 mm package traces, which we agree are required for broad market potential

Test pattern for level mismatch ratio measurement (Clause 94 only)



Equations for level mismatch ratio (Clause 94 only)

$$S_{min} = \frac{\min(V_D - V_C, V_C - V_B, V_B - V_A)}{2}$$

$$R_{LM} = \frac{6 \cdot S_{min}}{V_D - V_A}$$

Excluding level mismatch effect from SNDR (Clause 94 only)

$$V_{Avg} = \frac{V_A + V_B + V_C + V_D}{4}$$

$$ES_1 = \frac{V_B - V_{Avg}}{V_A - V_{Avg}}; ES_2 = \frac{V_C - V_{Avg}}{V_D - V_{Avg}}$$

In **94.3.12.6.1** step 3: For aligned symbol values x(n), use -1, -ES_1, ES_2, and 1