

# Comment 346: TP3 'match' test

Summary by Jonathan King

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# Comment 346 from Jonathan King

**CI 68 SC 68.6.9.1 P 28 L 31**

**Comment Type TR**

- The note referring to other implementations of the ISI generator should give a clear definition of what 'match' means for alternative implementations of the ISI generator. The degree of matching need not be specified (but is desirable), but a test for ensuring adequate matching should be described. The TWDP test is a good candidate for this; The TWDP value for the ISI generator should be equal to the max TWDP value in table 68-3
- *Suggested Remedy*  
Add a recommendation in the Note (line 31) that a TWDP test process be performed on the ISI generator, referencing the technique described in 68.6.6, and the max TWDP value described in table 68-3

# Background behind comment

## Effects that EDC would struggle to undo:

- Non-linear ISI
  - not generated by the channel, need to prevent it in the TP3 test
- Very long period ISI (longer than channel DMD)
  - DMD is limited in the channel to up to a 2-3 bit periods, need to prevent a TP3 test generating excessive 'DMD'

## TP3 stressed data waveform generator implementation

- Typically microwave 'plumbing' and/or transverse filter implementations
  - Reflections in interconnect produce long period, unequalizable, ISI
  - Non-linearity in E-O & ISI generator sections can result in non-linear ISI
    - Different implementations of the TP3 test would not necessarily have exactly  $0.75UI$  tap spacing or access to individual tap fractions as described in D2.0. Implementers can be expected to match the impulse response out of a TP3 stressed eye generator to the desired impulse response. In this case, non-linearity within the TP3 stressed eye generator can be compensated for by setting 'incorrect tap' weightings to result in a well matched impulse response at the output, but with the result that the response of the same test system to data is incorrect and non-linear (unequalizable) ISI is present.
  - TP3 tests specify a PIE-D for the impulse response but this does not catch either of these effects

# Proposal

- Need a test which catches non-linearity and long period reflections in the TP3 stressed eye generator implementation
  - typically not visible or quantifiable in a stressed eye diagram, impulse response measurement, or PIE-D( $\infty$ ) calculation based on impulse response capture
- Substitute a TWDP-like specification for each of the TP3 waveforms, with a suitable finite EDC emulation used in the TWDP calculation; this would catch both non-linear ISI and long period reflection effects
  - Specify the TP3 test waveforms as a TWDP(finite edc) value (equal to the PIE-D(finite) value for each of the corresponding TP3 stressors) +/-  $\Delta$  dB,
    - e.g. 4.25 dB +/-0.25dB
  - PIE-D(finite) to be selected
    - e.g. PIE-D(12,5) or PIE-D(8,3) ? as per previous work
  - The test process would be similar to a TWDP test - capture a  $2^9$  pattern from the TP3 test generator for each of the 3 tests, and calculate the noise penalty for an emulated finite length EDC (ie same as a TWDP test but without the emulated channel part of the TWDP code)
  - This approach would be consistent with the TP3 test waveform selection procedure proposed in ref 3.

# Some related comments and work

- 1) Comment 174 from Piers Dawe
- 2) Comment 393 from Tom Lindsey  
(both raise proposals for a finite EDC version of TWDP)
  
- 3) Ewen\_1\_0305  
proposes for finite PIE-D metric for TP3 stressors