802.3dj D2.3 Comment Resolution Electrical Track

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Introduction

- This slide package was assembled by the 802.3dj editorial team to provide background and detailed resolutions to aid in comment resolution.
- Specifically, these slides are for the various electrical-track comments.

TX noise model

Comment #39

TX noise model Comment #39

178A.1.7.3 Transmitter output noise

For a given sampling time $t_s^{(0)}$, the power spectral density of the sampled transmitter noise at the input to the receiver discrete-time equalizer is defined by Equation (178A–19).

$$S_{tn}(\theta) = 10^{-SNR_{TX}/10}\left|\mathrm{DFT}[h_{tn}(n)]\right|^2/f_b \qquad (178A\text{–}19)$$

Comment proposes to add a factor of σ_X^2 to the transmitter output noise spectral density

This factor was present in D1.3 but removed in response to comment #511 (see 8023dj_D1p3_comments_final_id_250212)

It was removed to make the noise model consistent with the definition of transmitter signal-to-noise-and-distortion ratio (SNDR)

The transmitter output noise model is intended to represent impairments related to SNDR

The SNDR definition does not include a factor of σ_X^2

$$SNDR = 10\log_{10}\left(\frac{P_{Signal}}{\sigma_e^2 + \sigma_n^2}\right)$$

$$P_{Signal} = \sum_{i=0}^{N_p-1} p(M \times i + m_0)^2$$

More importantly, the SNDR specification limits have been computed using the current transmitter output noise model (see comment #481 in 8023dj_D2p0_comments_final_id_v2 and the documentation referenced in that comment response)

TX noise model
Comment #39 continued

Reference transmitter does not meet SNDR requirements

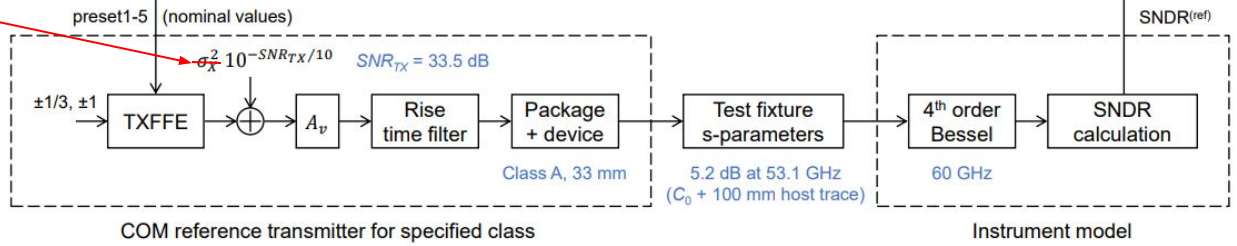
Coefficient initial conditions (nominal values)

Preset	c(−3)	c(−2)	c(−1)	c(0)	c(1)
1	0			1	0
2	0	0	0	0.5	0
3	0	0	−0.075	0.75	0
4	0	0.05	−0.2	0.75	0
5	−0.025	0.075	−0.25	0.65	0

Example calculation results

Preset	SNDR(ref), dB	Min. limit, dB
1	33.5	33.5
2	27.5	
3	30.7	
4	30.2	
5	28.7	

Error in slide



IEEE P802.3dj Task Force, November 2024 (r0) 5

Reference: healey_3dj_01_2411 slide 5

TX noise model
Comment #39 continued

Addition of a factor of σ_X^2 to the transmitter output noise model would make it inconsistent with the definition of SNDR.

The consequence would be that transmitter model used to compute Channel Operating Margin (COM) would not be consistent with transmitters that comply with the specification.

For the specification to be consistent, the σ_X^2 term would need to be added to the definition of SNDR, the SNDR limits would need to be adjusted accordingly, and the COM SNR_{TX} value may also need to be reconsidered.

Editors' recommendation:
Reject.
The draft is self-consistent as it is written.
The proposed change would introduce an inconsistency between the noise model and the definition of the impairment it is intended to represent.
A consensus proposal including a self-consistent set of changes could be considered during Standards Association ballot.

Connector Delineation

Comment #57

Topic
Comment

Topic

Comment #

Topic
Comment