TP1 J2 & J9 Constraints on DDJ Comment 131

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Presentation Overview

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Comment 131

- **‘*Comment (Type* TR):** With current set of specifications the SerDes transmitter may have very large amount of de-emphasis 3-5 dB resulting in significant distortion at TP1a and also see comment 216/218 on D2.1

  Suggested Remedy: The options here are either limit max DDJ to about 0.125 UI or max 3 dB de-emphasis, see ghiasi_03_0909**’**

- **Commentary:** While waveforms and eye diagrams where there is more than 3 dB emphasis can appear dramatic, by itself the amount of emphasis is largely irrelevant due to the limiting nature of the FO transmitter. Jitter induced by over or under equalization of the channel is relevant. Existing J2 and J9 requirements at TP1 will be examined to see if they provide sufficient jitter control.

Issue: Efficacy of J2 & J9 for limiting DDJ

- Background: For SR with PPI, 802.3ba has chosen J2 and J9 as metrics to control jitter. These metrics appear at TP1 and TP4 (DDPWS also appears at TP1) as primary controls along with eye masks. The issue to examine is how well these metrics, specifically the limits chosen for these metrics, constrain DDJ at TP1.

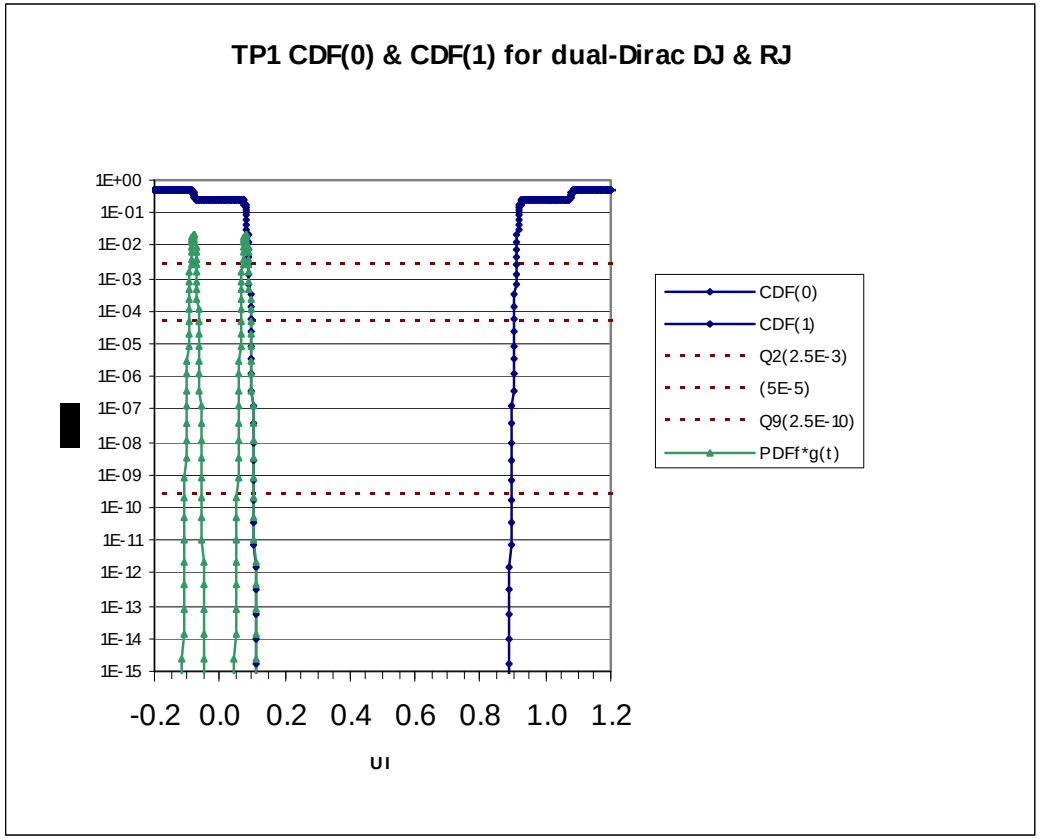
Conclusions

- At TP1, for the combined constraints of J2 (max = 0.18 UI), X1 = 0.11 UI and J9 (max = 0.26 UI), max DDJ is estimated at 0.16 UI. This falls within the RJ - DJ combinations expected to be tolerated by the base case transmitter. See petrilla_02_0509 for definition of the base case transmitter.
- Since existing TP1 limits max J2 = 0.18 UI and max J9 = 0.26 UI constraint jitter at TP1 such that the base case transmitter meets the TP2 TDP and eye mask requirements, no changes to the existing TP1 requirements are needed.

Analysis Approach

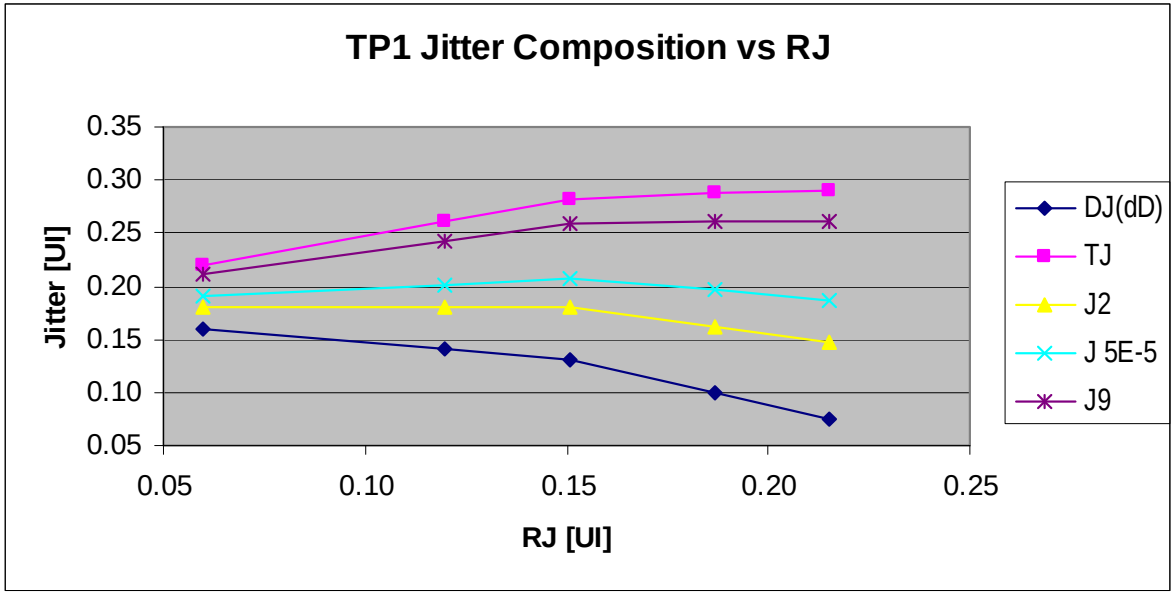
- For different jitter distributions, J2, J9 and TJ are estimated at TP1. In addition, estimates are made of jitter corresponding to the X1 coordinate for a 5E-5 hit ratio eye mask.
- The TP1 jitter combinations were used as inputs to an extended 10GbE link model. Results at TP2 were estimated for the base case transmitter. Jitter was estimated at the TP2 eye mask coordinates. TDP was estimated.

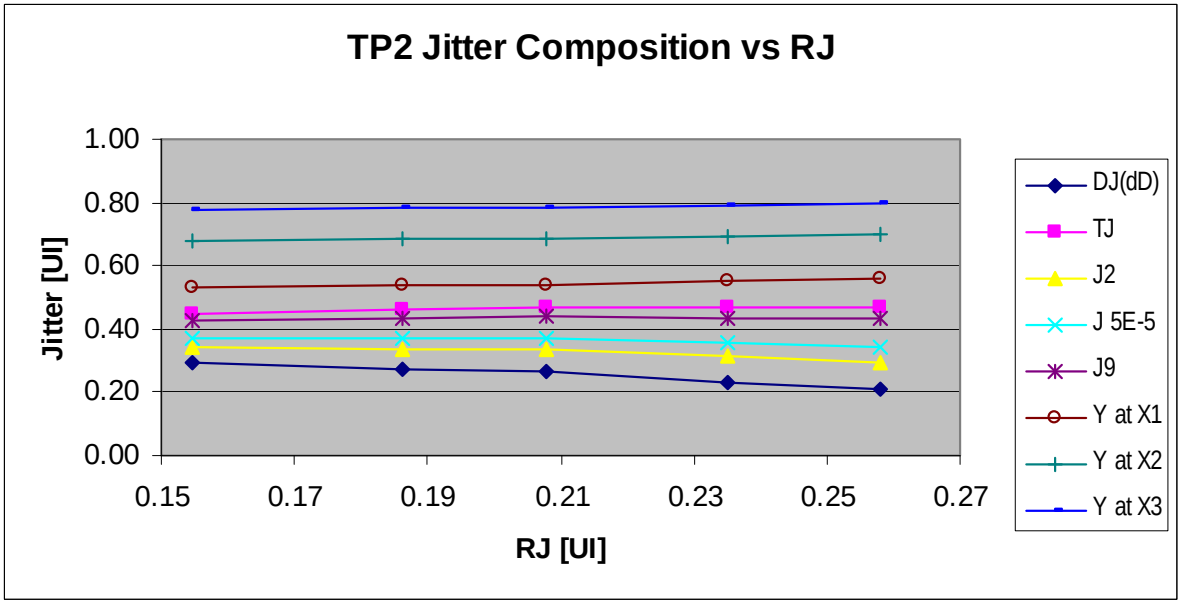
TP1 CDF for Low RJ & J2 Limited DJ



- **In this TP1 example, RJ is represented by the Gaussian distribution of 0.060 UI and DJ is represented by a dual-Dirac distribution of 0.160 UI that is scaled to yield J2 of 0.180 UI, the max limit for J2. Here J9 = 0.212 UI, and does not reach it's max limit of 0.26 UI.**
- **This dual-Dirac combination may be reasonably representative of over equalized channels where there is very low source RJ.**
- **These TP1 conditions presented to the base case transmitter are expected to yield a TDP of 3.55 dB less than the max TDP of 3.7 dB.**

TP1 & TP2 DJ(dD), J2, J 5E-5, J9 & TJ vs RJ





- **In the top chart, for a given RJ, DJ(dD) was increased until either J2 or J9 reached its max limit.**
- **In the bottom chart, these RJ and DJ(dD) values were applied as TP1 conditions for the base case transmitter and TP2 eye mask performance was evaluated by estimating the output amplitude for the eye mask x-coordinates.**
- **To clear the eye mask, the min value at X1 is 0.50, at X2 is 0.67, and at X3 is 0.73. The base case transmitter will clear the eye mask for all TP1 RJ, DJ(dD) combinations.**