Proposed Comment against 802.3ck D3.0

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Section: **163.9.3.5 Receiver interference tolerance**

NOTE 2—Calculation of A_{DD} requires that $(Q3d^2 + 1) \times J_{RMS}^2 \geq \left(\frac{J3u}{2}\right)^2$. If this does not hold, a different transmitter should be used in the test setup.

Users of BERTS today regularly encounter this condition, and is a source of ongoing questions and support issues. There is an existence proof that t he Rx calibration can be suitably achieved even when this discriminant is negative. Reference presentation by Yasuo, in April 2021

https://www.ieee802.org/3/ck/public/adhoc/apr14_21/hidaka_3ck_adhoc_01_041421.pdf

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Revised Equations

Based on only the closer gaussian distribution in dual dirac.

- Ignore the further gaussian distribution in dual dirac, because it is negligible.

- $Q_{3d} \equiv 3.0902\left(\approx Q^{-1}(1 \times 10^{-3})\right)$; Q at double probability of J_{3u}
- $D_{3d} = \left({Q_{3d}}^2 + 1\right) \times {J_{RMS}}^2 - \left(\frac{J_{3u}}{2}\right)^2$
- If $D_{3d} \geq 0$
  - $A_{DD} = \left(\frac{J_{3u}}{2} + Q_{3d}\sqrt{D_{3d}}\right)/\left({Q_{3d}}^2 + 1\right)$
  - $\sigma_{RJ} = \left(\frac{J_{3u}}{2} - A_{DD}\right)/Q_{3d}$
- If $D_{3d} < 0$
  - $Q_x = \sqrt{\left(\frac{J_{3u}}{2J_{RMS}}\right)^2 - 1}$; A solution of $D_{3d} = 0$ in terms of Q_{3d}
  - $A_{DD} = \left(\frac{J_{3u}}{2}\right)/\left({Q_x}^2 + 1\right)$
  - $\sigma_{RJ} = \sqrt{{J_{RMS}}^2 - {A_{DD}}^2}$

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If DJ component is small, this condition can arise. Increasing DJ is a method of solving this negative discriminant as it has a first order effect on ADD.

Proposed alternate wording of Note 2 as follows..

The Calculation of ADD may under certain conditions pose a negative discriminant. If this condition occurs, the recommended solution is to increase DJ to increase the ADD parameter. (as is illustrated on page 5 of Conversion of measured J3u and JRMS to ADD and RJ by Yasuo/Junqing of Credo