COM Commit Requests – 1 April 2024

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Commit Requests for COM 4.5

Today's focus

- [4p4_1] Error in implementing method of computing COM with Rx FFE
  - Submitter: Rich Mellitz
- [4p4_2] Reduce execution time when using Tx FFE
  - Submitter: Rich Mellitz
- [4p4_3] Change name of MLSE function in code to align with adopted shakiba_3dj_01b_2401 and adjust PSD calcuations
  - Submitter: Rich Mellitz
- [4p4_4] Floating tap algorithm "ISI" method gives better results than "FOM" method when 3 or more groups are used
  - Submitter: Rich Mellitz

4p4_1 (1 of 2)

❑ Description:

- Incorrect application of the new feed-forward equalizer transfer function to the computation of COM (specifically, SNR_TX)
  - See healey_3dj_01_2401 slide 14
  - COM can be up to 1.5 dB too high
- COM 4.4 uses equation 93A-49 to compute the noise terms for the RXFFE:
  - This equation did not comprehend the RXFFE functionality
  - Sigma_tx did not include RXFFE effect. However, all the other terms included it

$$\sigma_G^2 = \sigma_{TX}^2 + \sigma_{RJ}^2\sigma_X^2\sum_n h_J^2(n) + \eta_0\int_0^\infty \left|H_r(f)H_{ctf}(f)\right|^2 df + \sigma_{ne}^2 \qquad (93A\text{–}49)$$

- The correct equation to use for the computation of the noise terms is:

$$\sigma_G^2 = f_b\int_{-\pi}^{\pi}[S_{tn}(\theta) + S_{jn}^{(RJ)}(\theta) + S_{rn}(\theta)]\left|H_{rxffe}(\theta)\right|^2 d\theta \qquad (178A\text{–}30)$$

4p4_1 (2 of 2)

- Change the following COM functions:
  - create_Noise_PDF (where A_{ni} is determined)
    - Uses sigma_G from 178A.1.1.9
  - optimize_fom
    - OP.COMPUTE_COM add the same get_PSDs which were used for optimizing COM and for computing COM
  - get_PSDs
    - Compute the new sigma_G per 178A.1.1.9
    - Added a section using flag called OP.COMPUTE_COM to toggle between computation and optimization
  - com_ieee8023_93a
    - Report out of PSD results added
    - OP.COMPUTE_COM add the same get_PSDs which were used for optimizing COM and for computing COM

Thank You!