



# Discussion on Reference Receiver in COM

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# Outline

- Background & motivation
- Simulation platform & configurations
- COM value benchmark
- Summary

# Background & Motivation

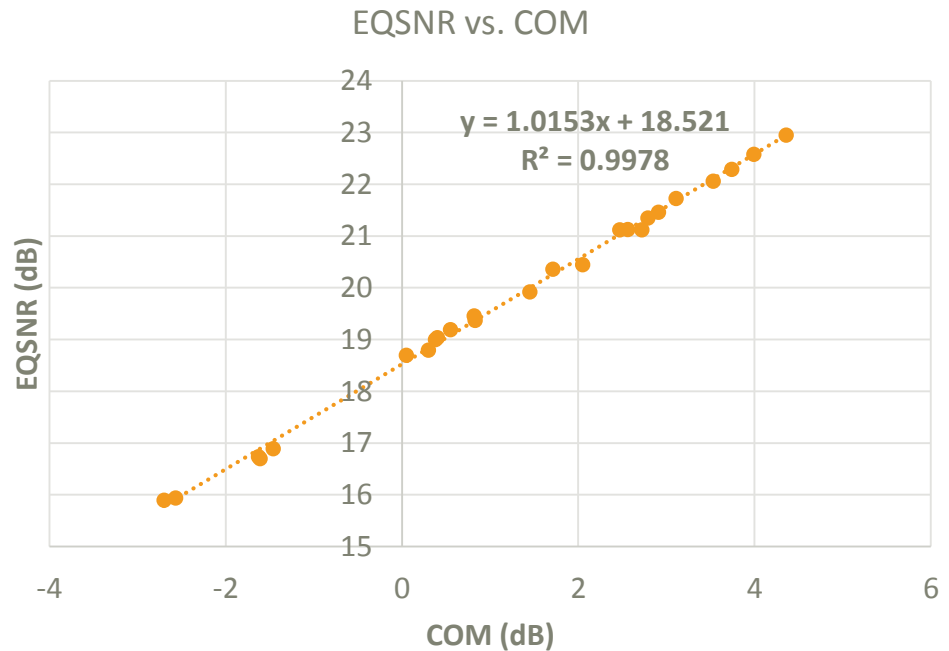
- For 112G KR & CR applications, one of the major Receiver architectures is ADC-based with digital Rx FFE & DFE
- Based on that, some contributions suggested to adopt “long Rx-FFE & 1-tap DFE” as reference Receiver in COM
  - But concerns of complexity raised by some
  - Intel proposed some simplified reference Receiver in COM (li\_ck\_02\_1118.pdf)
- This contribution tries to explore the difference among “long Rx-FFE & 1-tap DFE” vs. simplified reference Receiver
  - By analysis of all IEEE KR + CR channels, the difference is smaller than 0.5 dB for 90% of the channels
  - Simplified reference Receiver seems to be feasible

# Simulation MMSE Platform

- MediaTek proprietary MMSE platform
  - Adopt MMSE to calculate Rx FFE/DFE coefficients
  - Sampling point decided by Mueller-Muller TED
  - Clock jitters excluded
  - Output: EQSNR is transferred to COM by
    - $\text{EQSNR} = 1.0153 * \text{COM} + 18.521$
- Compare the following two configurations
  - Config0: Rx FFE(Pre:3, Post:n) + DFE(1)
  - Config2: Rx FFE(Pre:3, Post:0) + DFE(n)
  - Analysis for  $n = 12, 16, 20, 24$
- Channels under simulation
  - All IEEE KR + CR channels
  - TX 30mm & Rx 30mm package

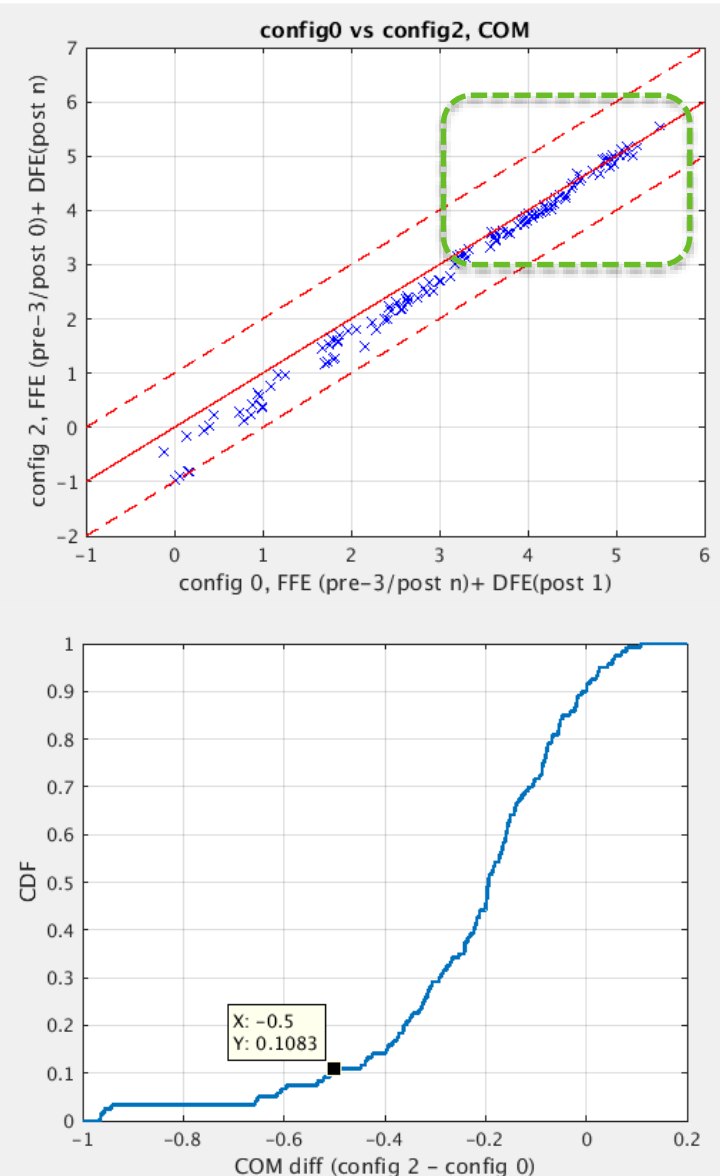
# Relationship between EQSNR & COM

- Based on COM 2.40 – Long DFE-based Rx
- By all IEEE KR & CR channels
- EQSNR is strongly correlated to COM by linear equation
  - $\text{EQSNR} = 1.0153 * \text{COM} + 18.521$
- The following analysis bases the above equation to transfer MMSE SNR to COM values



# Config2 vs Config0 – COM

- From COM perspective, difference among Config2 & Config0 are within 1dB
  - For COM wide range from 0 to 5.5 dB
  - The match is even better in the range of > 3dB
- From CDF, it shows that 90% of the channels are within 0.5 dB difference



# Summary

- Compared the COM values of the following two configurations
  - Config0: Rx FFE(Pre:3, Post:n) + DFE(1)
  - Config2: Rx FFE(Pre:3, Post:0) + DFE(n)
- The differences between them are small
  - 90% of IEEE KR & CR channels: < 0.5 dB difference
- Config2 could be adopted as reference Rx in COM



*everyday genius*