COM CONSENSUS MEETING REPORT

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02/03/2017

Problem statement

- Present COM uses 1 set of impedance parameters for the package and device. (Z_c ad R_d)
- These packages meet return loss and Tx specifications
- The current adopted COM model considers these parameter the worst case
- However, a ten percent variation of the impedance parameters specified in the draft may result in a lower COM.
  - These variations still meet return loss and transmitter specifications.
- The concern is that one could build a device with these variant characteristics, pass all device tests, and pass COM but still fail in a system
  - If true, this could be considered a “hole in the standard”?
- Data posted in hidaka_100516_3cd_adhoc suggests that COM for these variants has lower COM than computed by the present draft. i.e. the draft COM package is not worst case.
  - Illustrating what some consider a “Hole in the standard” or
  - Should we just consider the standard an acceptable level of confidence?
  - 24 posted backplane channels from Upen Reddy Kareti, Nathan Tracy, and Rich Mellitz were used acquire data for this analysis. IL range classes were 10 dB, 20dB, and 30dB.

Problem Refinement

- What is the correct answer for COM
  - The working assumption is the “correct answer” is the lowest value of COM for sweeping package and device impedance variants.
- COM goals
  - A simple and time efficient method for determining whether a channel is compliant or not.
  - A closed specification suggest a compliant device and compliant channel will operate.

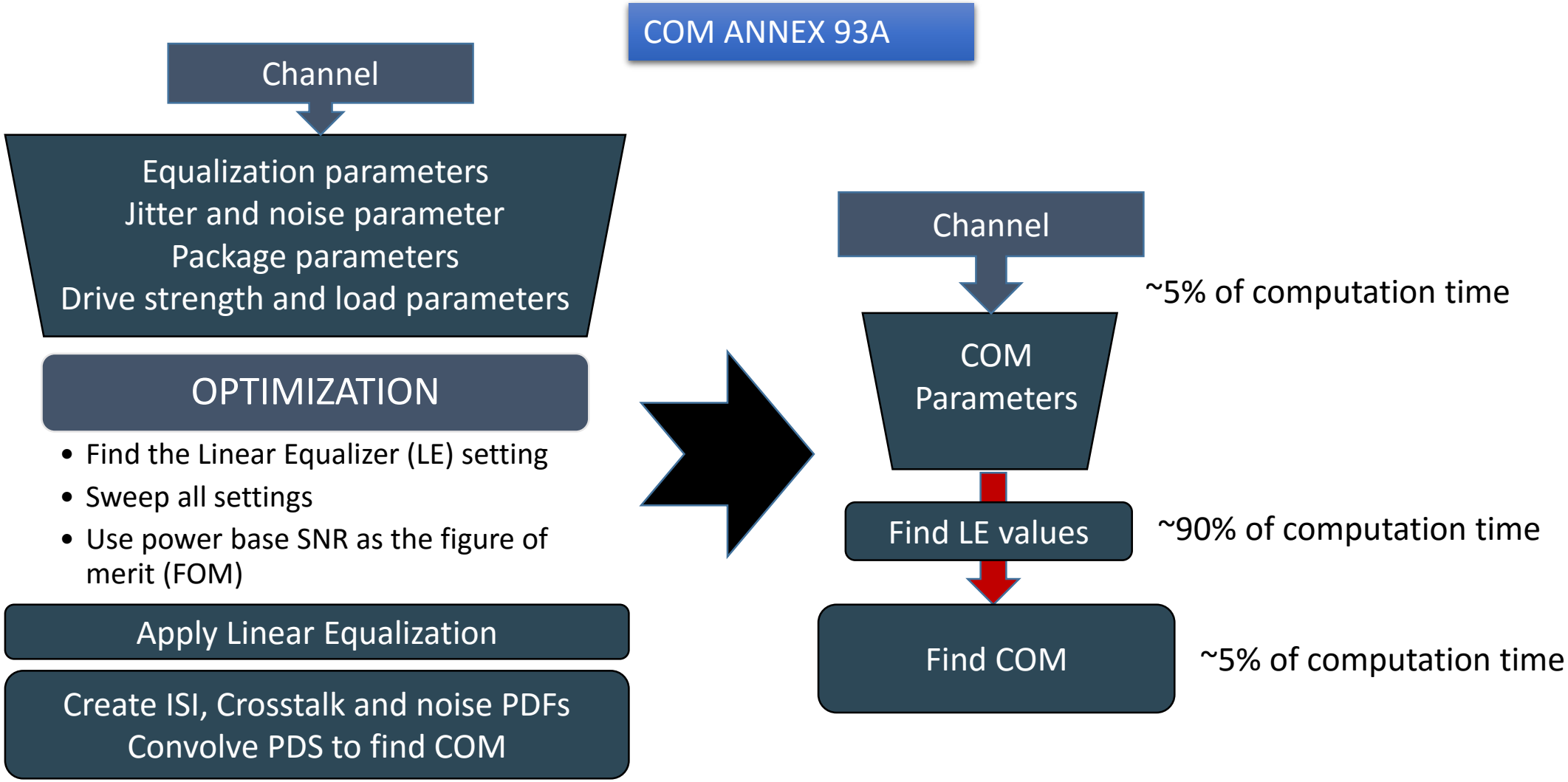
Agenda

- COM Criteria
- Simplified diagram of COM computation
- Proposals for enhancing COM computation with the purpose of getting closer to the “correct answer”
- Status of where we are in relation to “correctness”, simplicity, and computational efficiency

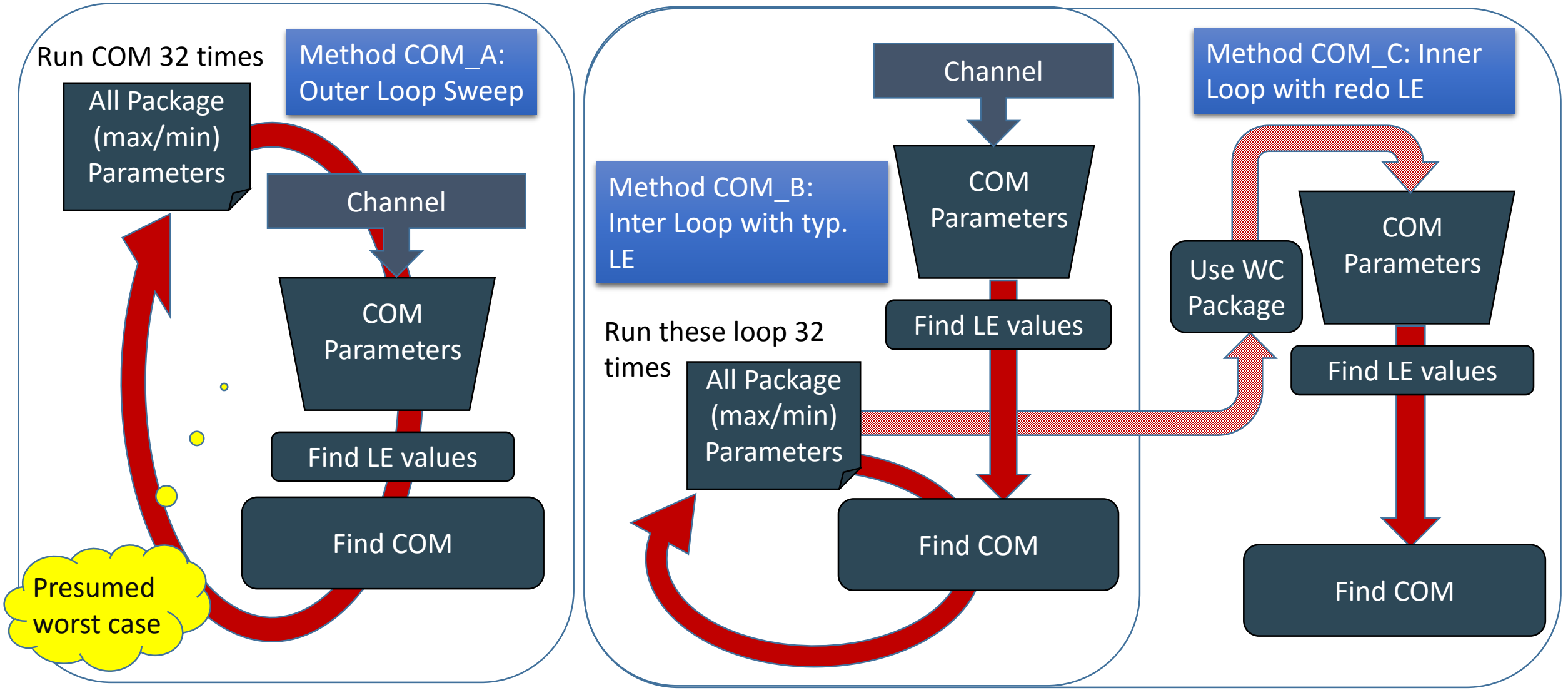
COM Criteria

- The current passing COM value is 3 dB.
- Grounding values
  - 3dB COM is approximately a 29% eye opening at the slicer.
  - The standard considers COM the minimum SNR margin a receiver needs.
    - I.e. the Rx budget after reference equalization and worst case noise/jitter
  - A reduction of 0.1 dB of COM changes the absolute eye opening by 0.8%
    - COM of 2.9 dB is approximately 28.2% eye opening (EO)
  - A 0.5% reduction of COM is a 4% absolute eye opening change (EO=25%)
  - A 1 dB COM reduction is 8.5% absolute eye opening change (EO=20.5%)
- We are considering that a 0.1 dB difference in COM computations for a single channel as “OK” and 1 dB as not OK.
  - Is this a reasonable engineering judgement?

COM Computation Process

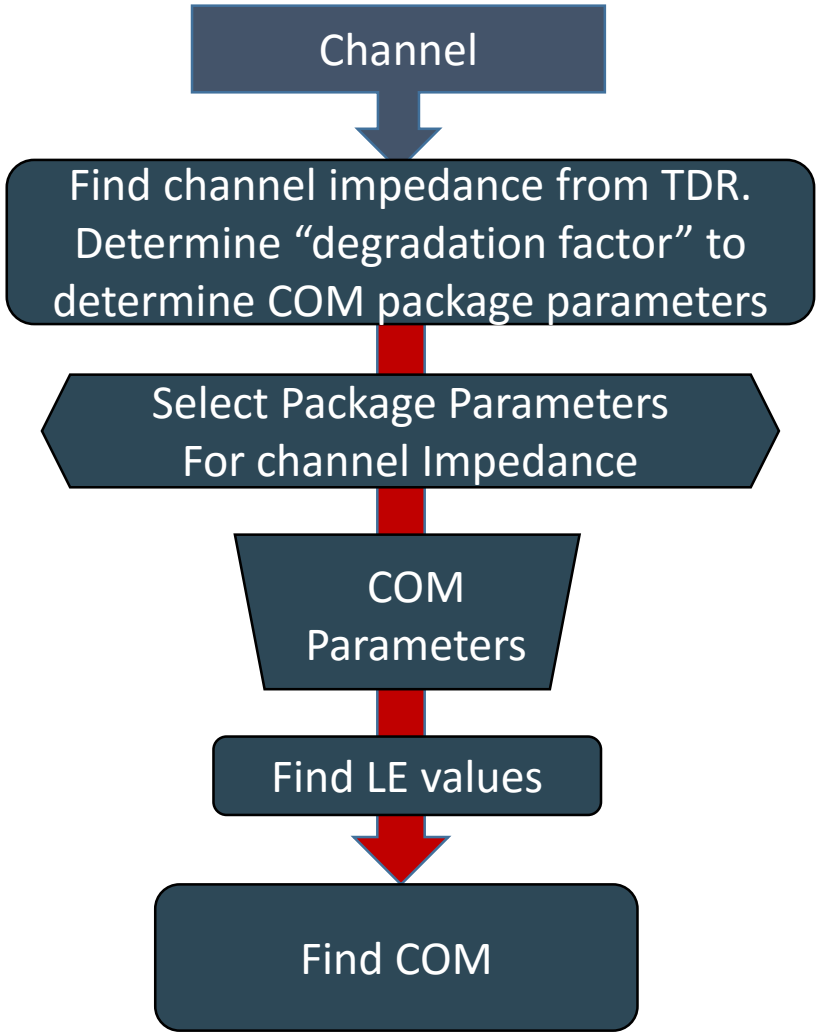


Summary of Yasuo Hidaka's Proposed Improved Methodologies



Another proposed improved methodology: TDR Method

Method COM_D: Channel TDR Method



Status and Summary

	Single Channel Benchmark Compute Time	Comments	Results
COM ANNEX 93A	13 minutes	Draft 2.1	Reference
Method COM_A: Outer Loop Sweep	2.5 hours	Sweep all max min Impedance parameters Suggest “hole in standard”	93 ohm target (0.7 dB lower, 0.4 average) 100 ohm target (0.9 dB lower, 0.5 dB average) **No 30db channels pass 3dB COM**
Method COM_B: Inter Loop with typ. LE	13 minutes	Typical impedance find linear equalization then sweep impedance	Still Studying. Trend is higher than Method A so far.
Method COM_C: Inner Loop with redo LE	26 minutes	Method B but redo finding linear equalization	Still Studying,
Method COM_D: TDR using “degradation factor”	13 minutes	Degradation factor could be improve from method B.	Still Studying

Next

Status Overview

- ❑ Presently we do not have sufficient data to change the draft
  - No 30dB channel passes COM 3dB with COM_A
- ❑ There seems to consensus there is a “hole in the standard” or at least a lack of confidence in the numbers
  - The question is what to do about it

Work in progress:

- ❑ There was a suggestion to include more channels
  - All published backplane channels have been considered
- ❑ Produce data for methods B, C, and D
- ❑ Investigate if method B and TDR might work better if the available signal is included in the algorithm.
  - Current proposed TDR selection does not appear to work better than anything else
- ❑ After we solve the above determine impact on CR (cables) and AUI.
  - This may impact ‘bs