Mask and noise effects for SRn

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• Looking to see if mask spec does what we think it does
• First case: SRn mask at TP1
Slow eye, mask at $5.10^{-5}$

- Slow marginal eye at B:
  - Gaussian risetime 50 ps before a 12 GHz BT observation filter
  - $SJ=0.02$ UI
  - Vertical noise causes nearly all the apparent random jitter
  - $TJ=0.284$ UI
- Mask 0% coordinates are 0.14, 0.35, 90, 350
- Mask +25% coordinates are 0.105, 0.2625, 101, 319
- D1.1 coordinates are 0.12, 0.33, 95, 350
- D1.1 eye could be much worse than shown and still pass the mask
- John Petrilla proposes 0.12, 0.25

Orange: 0% mask
Hits show extent of +25% mask
Note eye can be slower than mask and encroach corners significantly

Hits, no scope noise or jitter. Colours on log scale
Statistics at TP1a not same as at TP2

- Roughly, the horizontal effects propagate from B via TP2 to the decision circuit in a moderately linear way. Hence can use Gaussian statistics, with allowance for slew rate effects
- But the vertical effects don't propagate linearly
- There is a slicer or limiting amplifier in the laser driver whose PDF is completely unspecified, except that it is less than $2 \times \sim 90$ mV high to $\sim 10^{-7}$
- It could contain significant high probability effects e.g. patternning, hysteresis and still be a good transmitter with a respectable input eye
- But signal at TP2 will deteriorate disproportionately with a slow, noisy eye at TP1
Options

- Options are
  - Eliminate the ultra-slow eyes
    - Reduce X2
  - Eliminate the ultra-noisy eyes
    - Add Qsq spec and a requirement in words that baseline wander shall not cause significant degradation
      - Not a solid testable (objective) spec
    - Tighten up the statistical significance of the mask
      - Increases test time (x10 lanes!) and cost
    - Impose a relative mask
      - Keep Y2/Y1 to reasonable limit
      - Forces the eye to be relatively not too slow, good defence against patterning
      - No added test time, only test software to extract another conclusion from the same mask measurement
  - Other option?
Conclusion

• Add relative mask spec at TP1a
  – Objective and testable but does not add to test time, cost