



# Objective

- Stat Eye Analyses of IEEE Library That Include
  - New Intel Additions to IEEE Channel Library
  - Use Package Models from IEEE Library
- Compare Analyses to
  - Abler
  - Brink
  - Altmann
  - Informative Channel Model
- Provide Analyses by a Method that has Acceptance Across a Wider Group

# Stat Eye

- Channels Examined
  - All Tyco
  - Intel 0904
  - Intel 0605
  - Molex Inbound
- Conditions
  - See slides following summary
- Believed first Stat Eye Analyses that use Mellitz Package
- Does Not Include Phase Noise Amplification

# Results and Comparison

|              | Abler | Brink | Altmann | Stat Eye | Channel Model |
|--------------|-------|-------|---------|----------|---------------|
| <b>Molex</b> |       |       |         |          |               |
| In2          | Pass  |       |         | Pass     | Fail          |
| In3          | Fail  |       |         | Fail     | Fail          |
| In4          | Fail  |       |         | Fail     | Fail          |
| In5          | Pass  |       |         | Pass     | Fail          |
| Out2         | Pass  |       |         |          | Fail          |
| Out3         | Pass  |       |         |          | Fail          |
| Out4         | Pass  |       |         |          | Fail          |
| Out5         | Pass  |       |         |          | Fail          |
| <b>Intel</b> |       |       |         |          |               |
| B1_0904      | Pass  | Pass  | Pass    | Pass     | Fail          |
| B12_0904     | Pass  | Pass  | Pass    | Fail     | Pass          |
| B20_0904     | Pass  | Pass  | Pass    | Fail     | Fail          |
| M1_0904      | Pass  | Pass  | Pass    | Fail     | Pass          |
| M12_0904     |       |       |         | Fail     | Fail          |
| M20_0904     | Pass  | Pass  | Pass    | Fail     | Fail          |
| T1_0904      | Fail  | Fail  | Fail    | Fail     | Fail          |
| T12_0904     | Fail  | Fail  |         | Fail     | Fail          |
| T20_0904     | Fail  | Fail  |         |          | Fail          |
| <b>0605</b>  |       |       |         |          |               |
| B1_0605      |       |       |         | Pass     | Fail          |
| B12_0605     |       |       |         | Pass     | Fail          |
| B20_0605     |       |       |         | Pass     | Pass          |
| M1_0605      |       |       |         | Pass     | Fail          |
| M20_0605     |       |       |         | Pass     | Pass          |
| T1_0605      |       |       |         | Fail     | Fail          |
| T12_0605     |       |       |         | Fail     | Fail          |
| <b>Tyco</b>  |       |       |         |          |               |
| Tyco1        | Pass  | Pass  | Pass    | Pass     | Pass          |
| Tyco2        | Pass  | Pass  | Pass    | Pass     | Fail          |
| Tyco3        | Pass  | Pass  | Pass    | Fail     | Fail          |
| Tyco4        | Pass  | Pass  | Pass    | Pass     | Pass          |
| Tyco5        | Pass  | Pass  | Pass    | Pass     | Pass          |
| Tyco6        | Pass  | Pass  | Pass    | Fail     | Fail          |
| Tyco7        | Pass  | Pass  | Pass    | Pass     | Pass          |



# Observations

- Some correlation with previous analyses, but Stat Eye is generally more pessimistic
- Most Newer Intel Channels now passing Stat Eye
- Some Correlation with Informative Channel Model
  - Somewhat better than Abler, especially for Tyco Channels
- Actual performance will probably be worse than Stat Eye predictions because PNA not yet taken into account

# Summary

- Stat Eye Analyses of Most of the IEEE Channels Are Presented
- Includes Recent Library Additions By Intel
- Believed to be the first Stat Eye Analyses that include Package Model ("cap-like") from IEEE Library
- Comparison is Made with Previous Analyses and with the Informative Channel Model

# Acknowledgement

- A large amount of data is taken from D'Ambrosia "Informative Model / Simulation Comparisons for 10GBASE-KR" (dambrosia\_02\_0605)
- Help in running the Channel Model Tool was provided by Steve Krooswyk

# Stat Eye Conditions 1

- S params
  - Through
  - Crosstalk
    - 4 Tyco
    - 8 Intel
    - 7 Molex
  - Mellitz 'cap-like' package (both ends)



# Stat Eye Conditions 2

- Equalization
  - 3 tap FFE (1 precursor, 1 postcursor)
  - 5 tap DFE
- Jitter
  - Rx DJ 0.15 UIpp
  - Rx RJ 0.01 UIpp RMS
  - Tx DJ 0.15 UIpp
  - Tx RJ 0.01 UIpp RMS

# Stat Eye Conditions 3

- Amplitudes
  - Tx 800 mV ppd
  - Rx threshold 15 mV ppd
    - 1e-12 probability contour
- Filters
  - Tx – twopole at ( 7.5 GHz, 7.5 GHz)
  - Rx – none
- Bit Rate – 10.3125e9