

PIE Metric Simulations vs. Launch Condition

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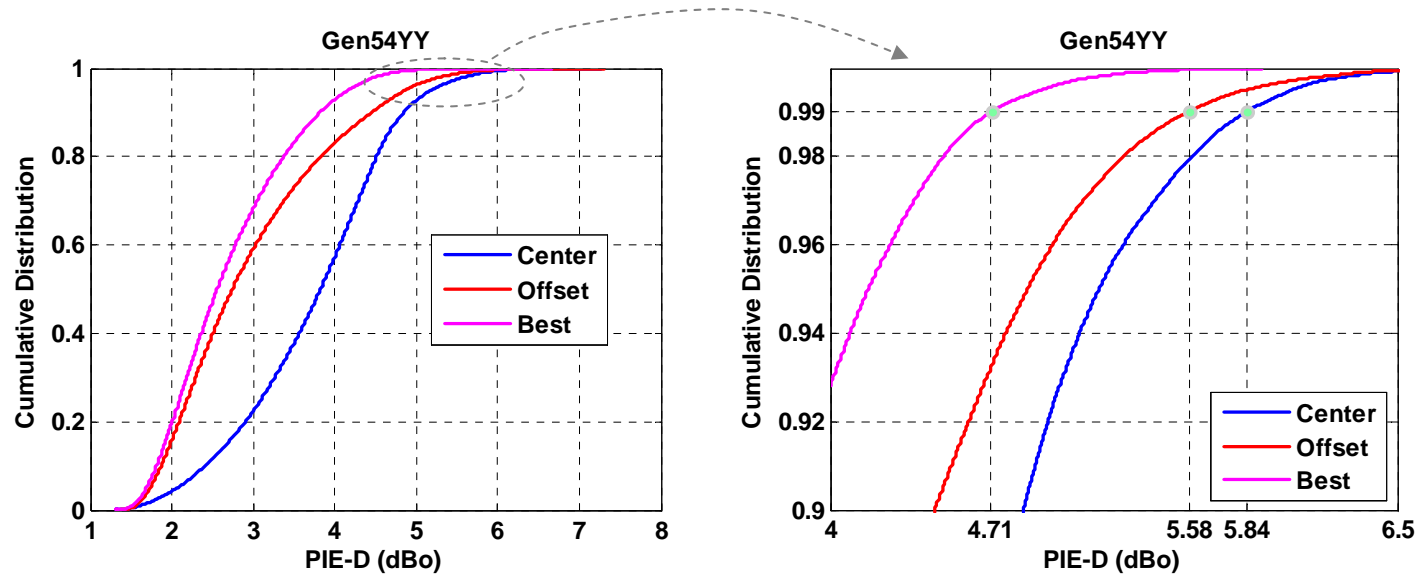
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Simulation Parameters

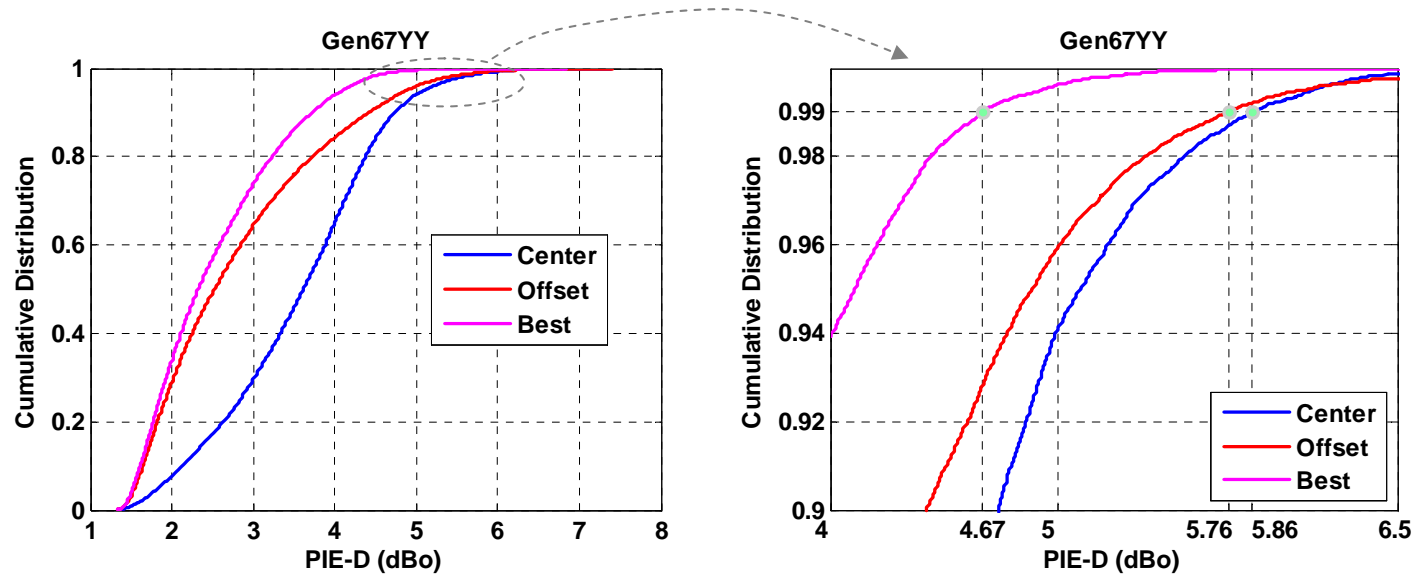
- Delay Sets
 - Gen54YY and Gen67YY delay sets with OFL bandwidth ≥ 500 MHz·km
 - 18 mode-groups used in simulations
- Connectors
 - 2 connectors with random offsets
 - Rayleigh distribution, mean= $3.58\mu\text{m}$, truncated at $7\mu\text{m}$
 - Use connector transfer matrix from Pepeljugoski/Ewen
- PIE Metrics
 - 47.1 ps, 20%-80% Gaussian Tx filter
 - 7.5GHz, 4th-order BT Rx filter
- Launch Conditions
 - SMF launch ($7\mu\text{m}$ FWHM)
 - Center Launch = uniform distribution between $0\mu\text{m}$ and $3\mu\text{m}$
 - Offset Launch = uniform distribution between $17\mu\text{m}$ and $23\mu\text{m}$
- Simulations
 - Each fiber + connector pair is defined as a *link*
 - PIE-D computed for each link for each *pair* of launches (center and offset)
 - Gen54YY
 - 45883 links x 28 launch pair combinations = 1,284,724 cases
 - Gen67YY
 - 5000 links x 28 launch pair combinations = 140,000 cases

Gen54YY Delay Set



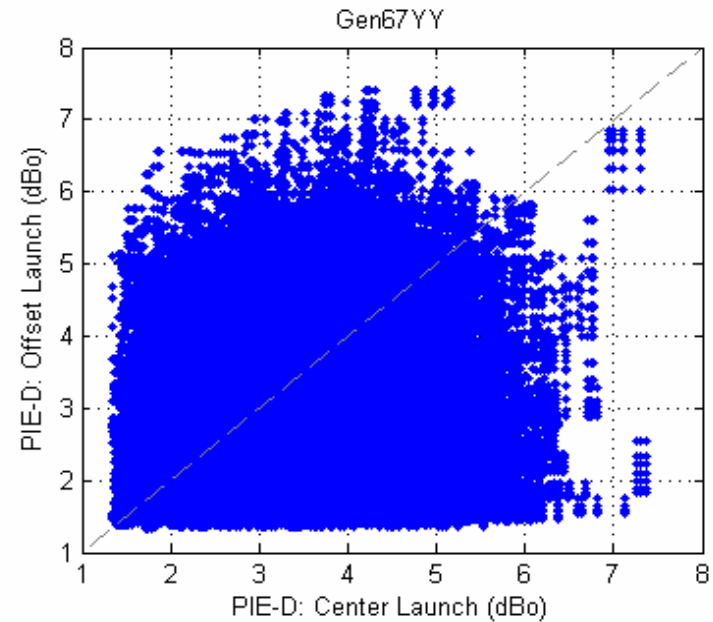
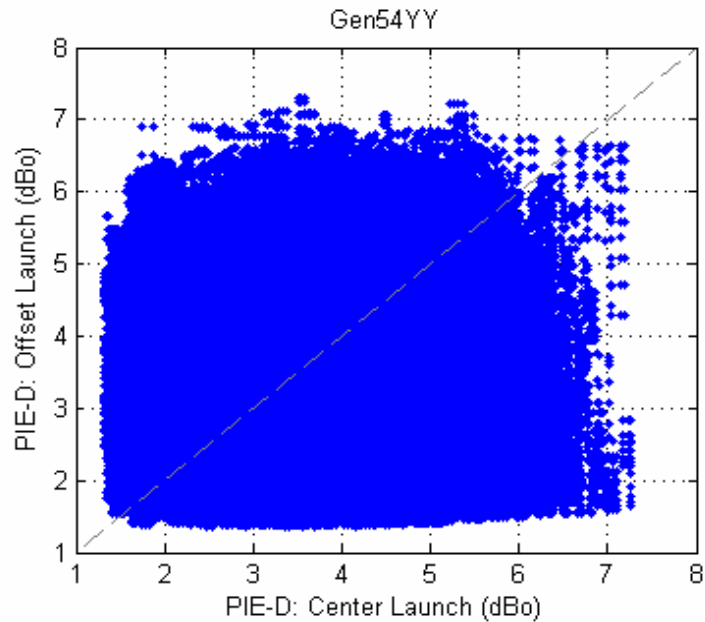
- Best Launch = minimum PIE-D for each link + launch pair combination
 - ~0.9 dB improvement allowing alternate launch

Gen67YY Delay Set



- Best Launch = minimum PIE-D for each link + launch pair combination
 - ~1.1 dB improvement allowing alternate launch

Offset/Center Launch Correlation



- No apparent correlation between offset and center launch performance

Summary

- Gen54YY and Gen67YY give similar results for PIE-D statistics
- Offset launch slightly better than center launch (with connectors)
- Alternative launch offers significant improvement in PIE-D
 - Choose the better of offset or center launch for each link
 - ~1 dB improvement in PIE-D