Deterministic Jitter Specification for Short Wavelength Links

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Link Simulation

- ▲ transmitter, receiver assumed to have worst case parameters
  - ● rise/fall time 48 ps (10-90%)
  - ● DCD 8ps
  - ● laser linewidth 0.35 nm
  - ● receiver bandwidth 8250 MHz
- ▲ fiber model takes into account actual fiber transfer function
  - ● worst jitter does not happen for lowest bandwidth
  - ● laser power coupled into fiber modes calculated

Link Simulation Outputs

▲ Intersymbol interference, jitter and retiming window calculated on 24000 simulated links

- generated links both inside and outside of TIA mask
- used laser encircled flux and fiber DMD mask as agreed by TIA FO-2.2.1
  - generated subset of links with passing specs, can find percentage of link failures
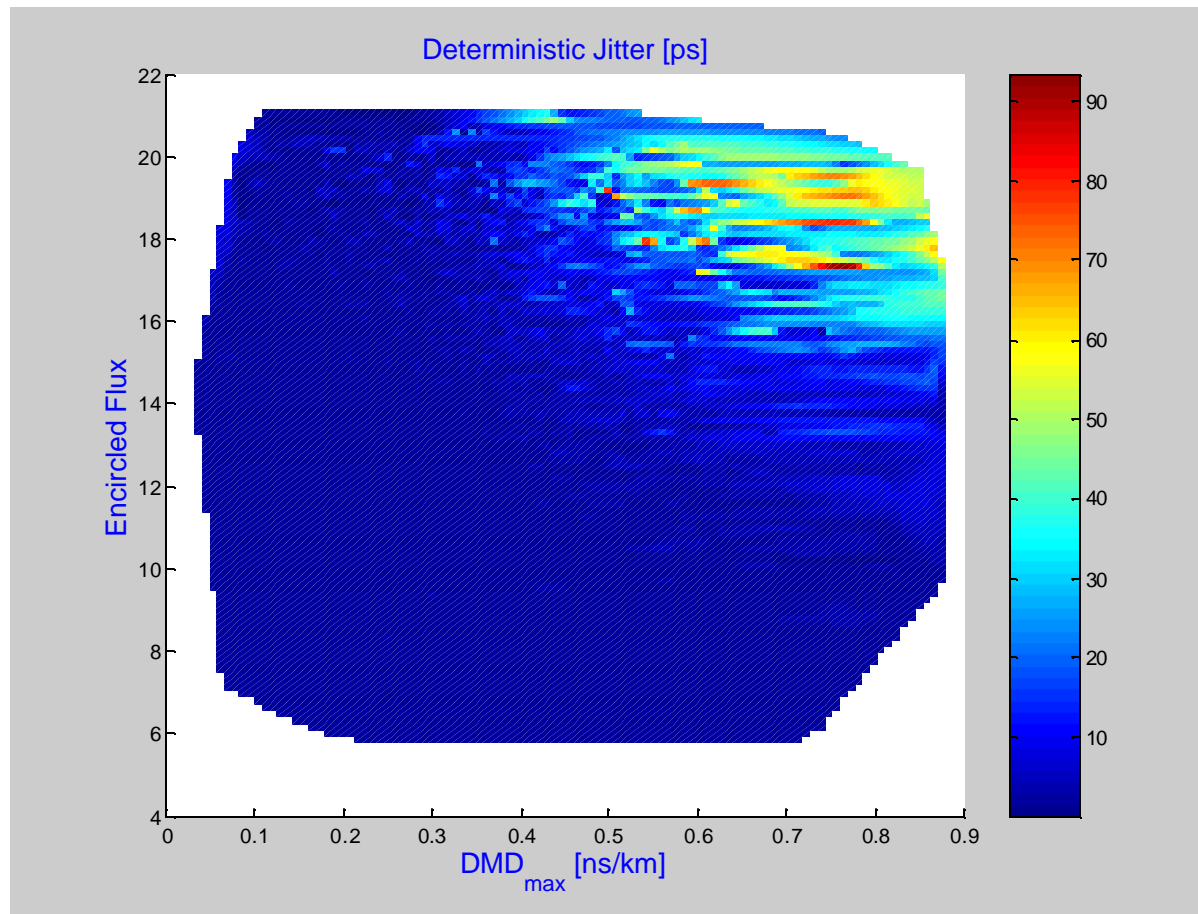
ISI for all links

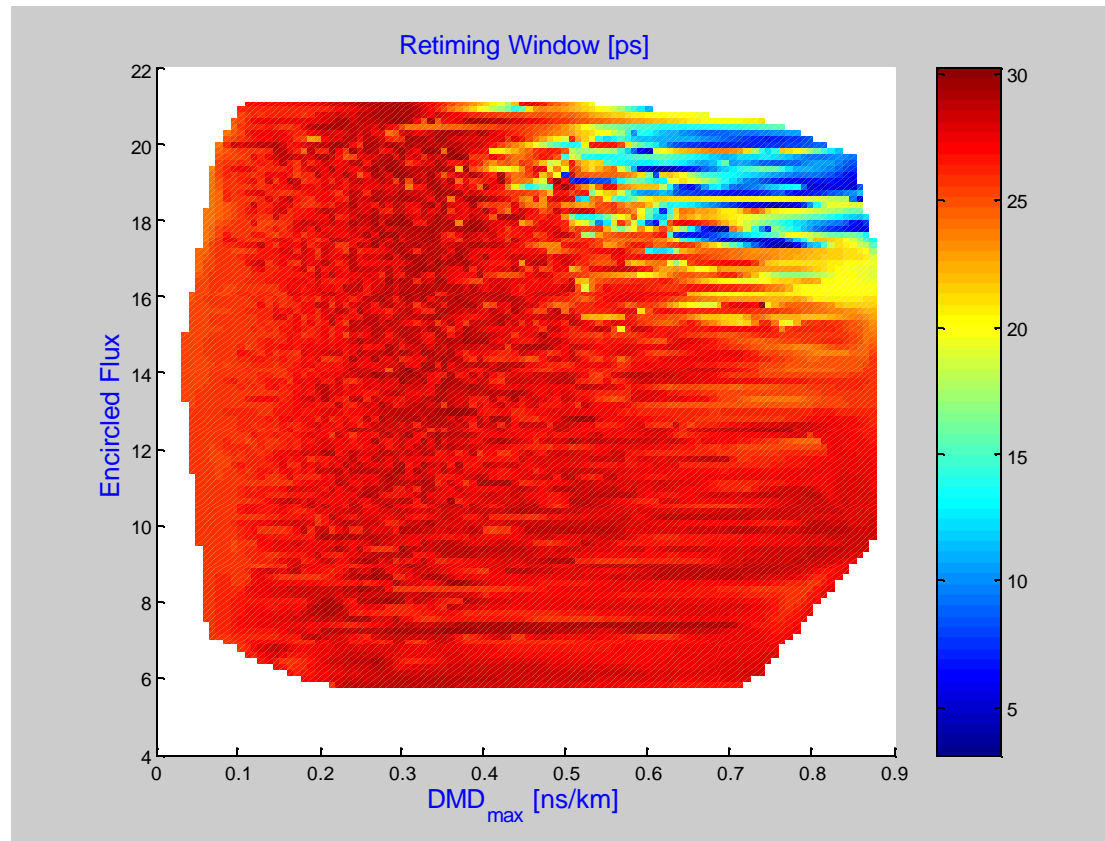▲ ISI penalty indicates that relaxed spec for fiber DMD and laser EF possible
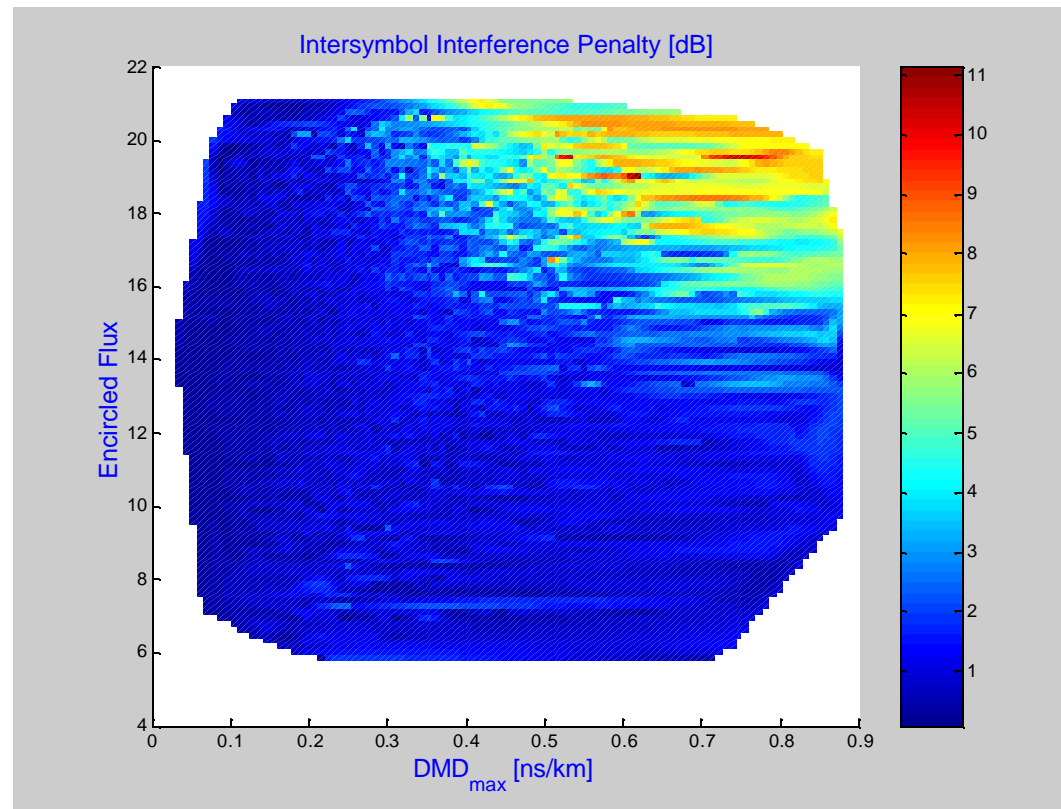
DJ for all links
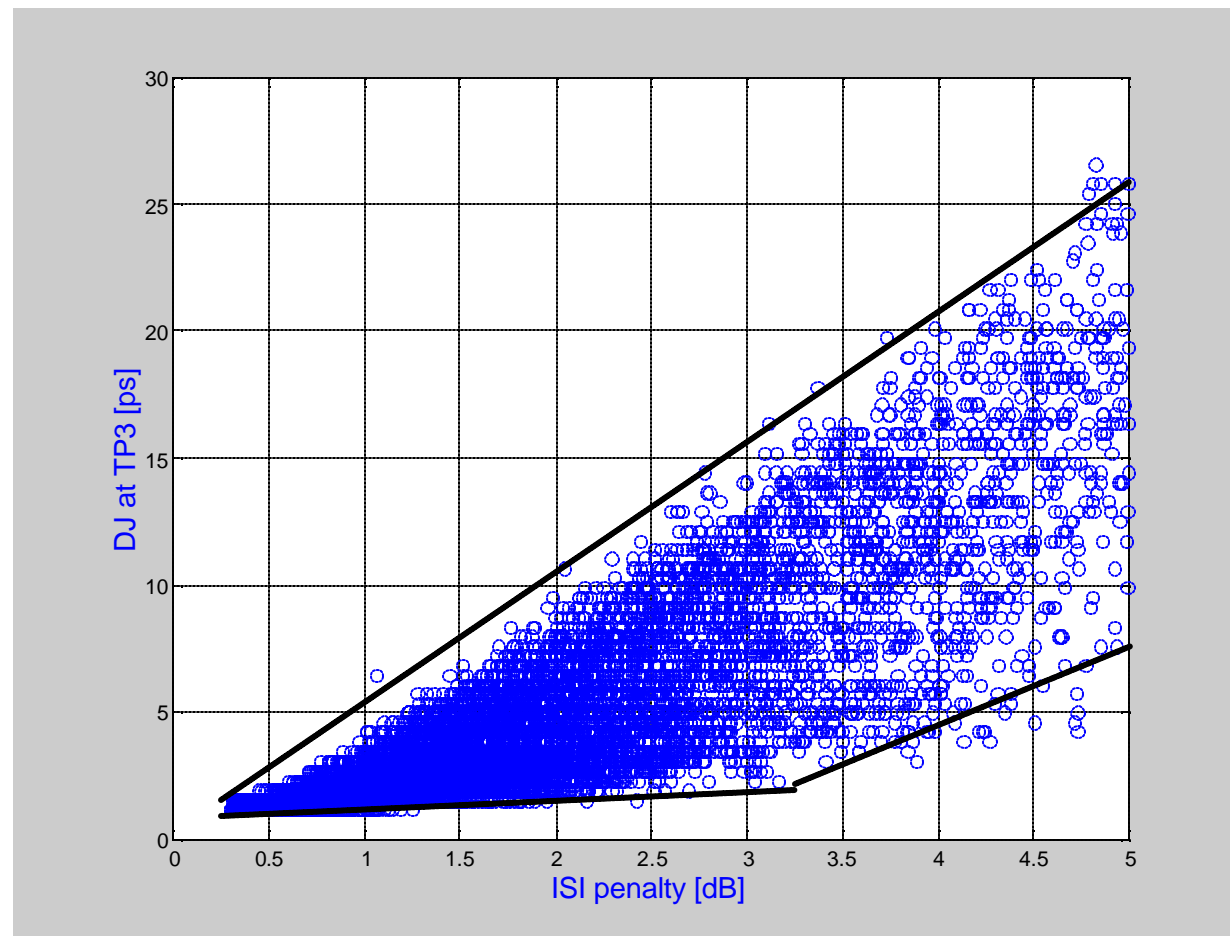
▲ Small DJ over wide range of parameters

RTW for all links

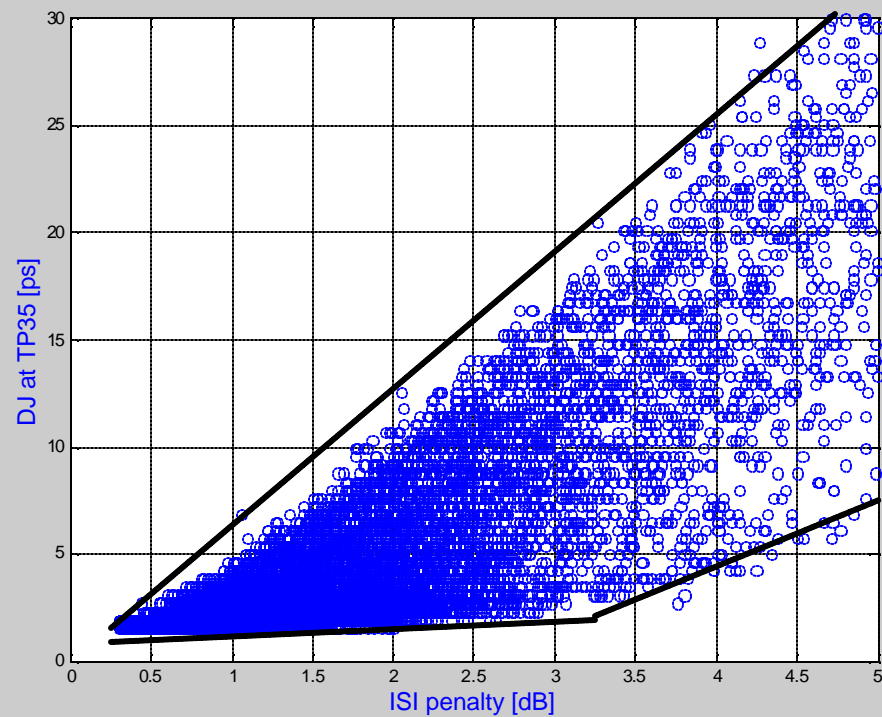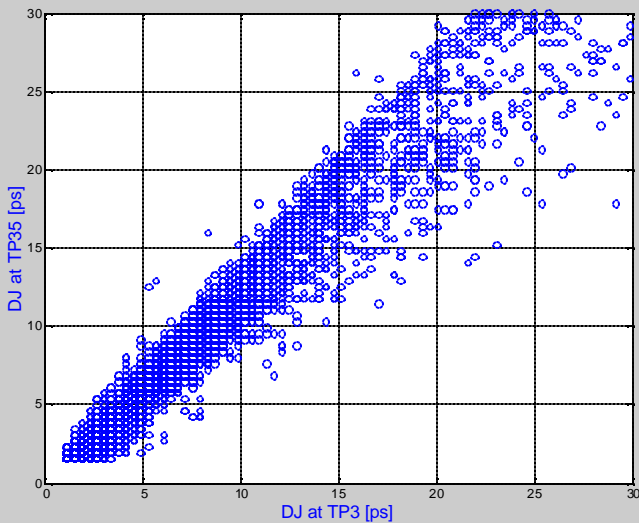▲ Large retiming window for wide range of DMD and EF values

DJ at TP3 vs. ISI for all links
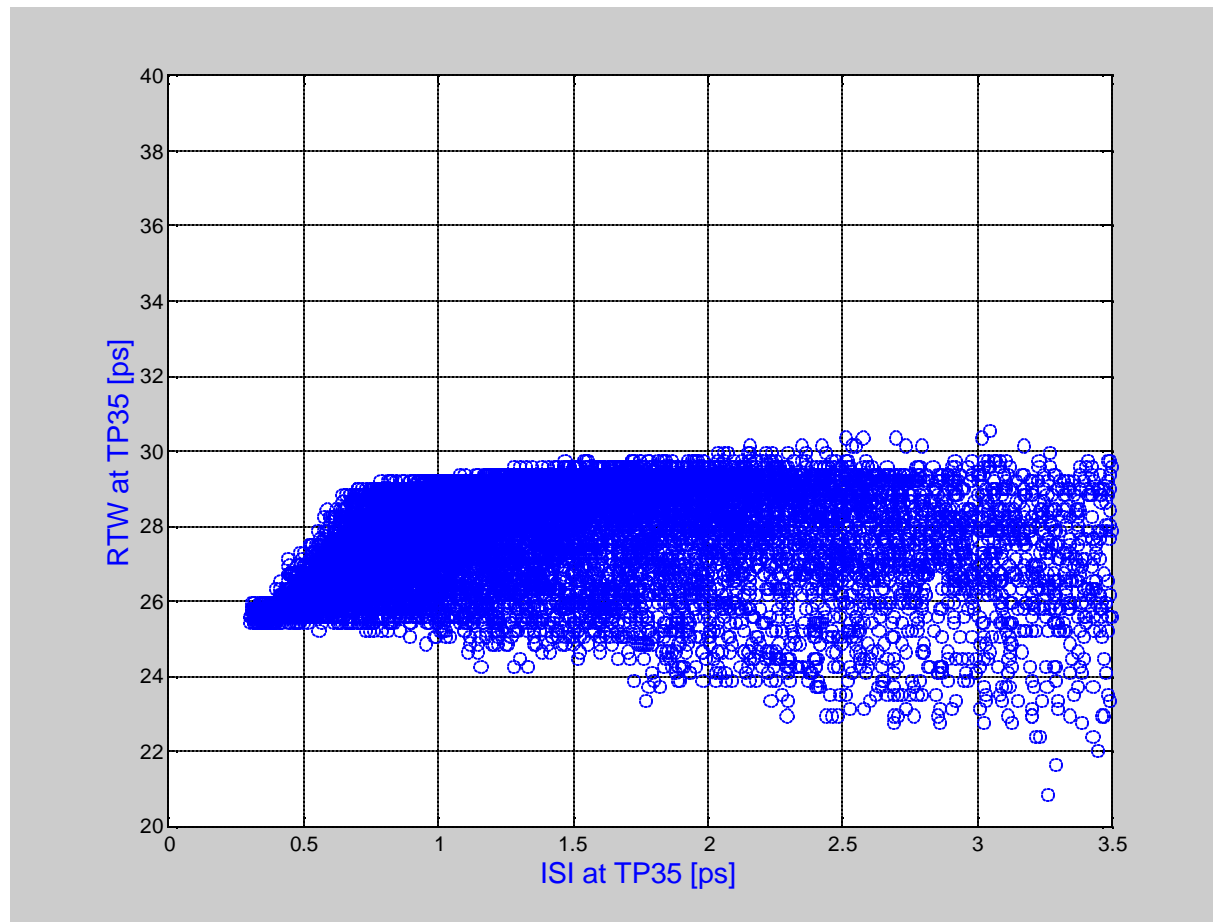
▲ fiber DJ contribution is ~ 12.5 ps (no TX jitter)

DJ at TP35 vs. ISI for all links

▲ fiber and receiver DJ contribution is ~ 20 ps (no TX jitter), BUT
▲ it may be higher if threshold is not non-ideal - need some extra margin
  ● noise changes threshold

RTW at TP35 vs. ISI for all

▲ retiming window is ~0.2 UI

Conclusion

▲ simulation tool enables estimates for DJ for short wavelength links

▲ The fiber contribution to the DJ is ~15 ps