40GE Serial Jitter Testing Considerations

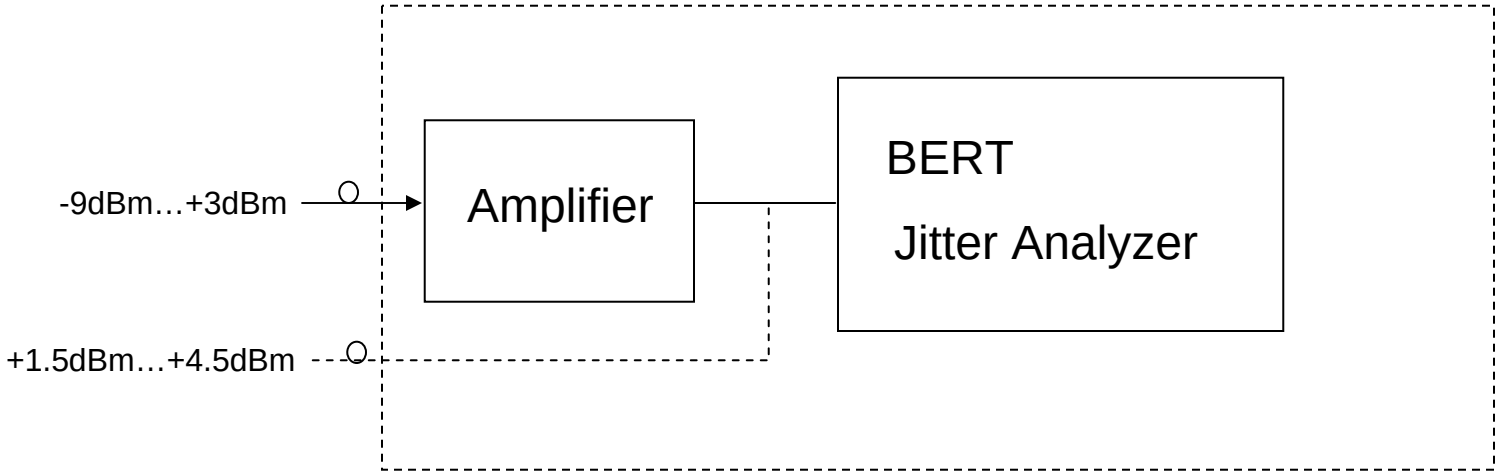
Norbert Folkens

Terminology

- EDFA
  - Erbium Doped Fiber Amplifier
- PDFA
  - Praseodymium Doped Fiber Amplifier
- SOA
  - Semiconductor Optical Amplifier

Look at EDFA replacement for 1310nm

- EDFA component a key piece of 40G 1550nm jitter testing for OTN/SDH/SONET today
  - EDFA is not compatible with 1310nm
- Amplification is required at 40G to operate below 0dBm
  - Measuring BERT & Jitter on a single interface requires an internal splitter
  - Sensitivity decreases with higher bandwidth



Example implementation of a 40GE 1310nm receiver

A look at EDFA Alternatives

- SOA
  - Show a pattern dependency
    - leads to signal overshoot and adds jitter
  - Can be used for a BERT tester but *not* for a jitter tester
  - Cannot be used to replace EDFA

- PDFA
  - Operates in the 1310nm range
  - Candidate substitute part for an EDFA (-9dBm…+3dBm)
  - But…

Discussion of best candidate EDFA replacement

- Performance:
  - Performance characteristics are comparable
- Cost:
  - Candidate is 10x component cost increase over EDFA
  - Overall design cost increase is ~14%
- Size:
  - Candidate is 3x footprint size increase over EDFA
  - 187.5cm2 vs. 63cm2
- Availability:
  - 1310nm based jitter tester does not exist today and would require a new design

Conclusion

- Selection of 1310nm for 40GE Serial would have a significant impact on the design and cost of jitter testing for same input power performance as 1550nm

- Support selection of 1550nm wavelength