The Future of High-Speed Access System-Technology

Digital Signal Processing (DSP)-era in optical access – 50 Gbit/s TDM-PON

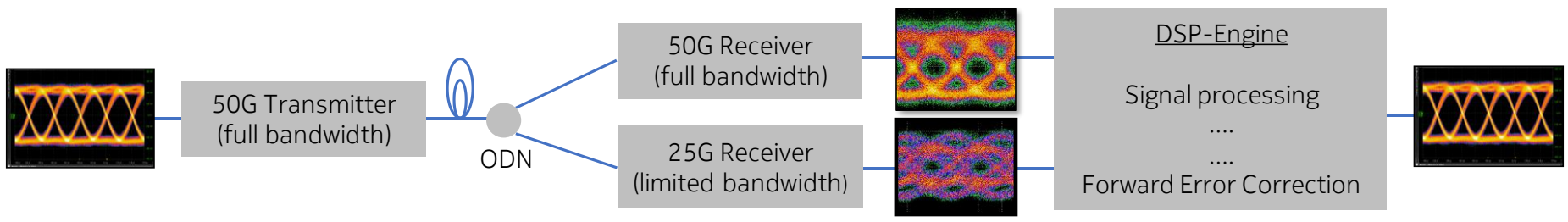
Challenges of 50G TDM-PON compared to 10G

- Need to bridge 7-10 dB sensitivity gap
- Transmission limitations from dispersion
- Reduced margins for implementation
- Unclear performance of 50G APD-TIA Rx

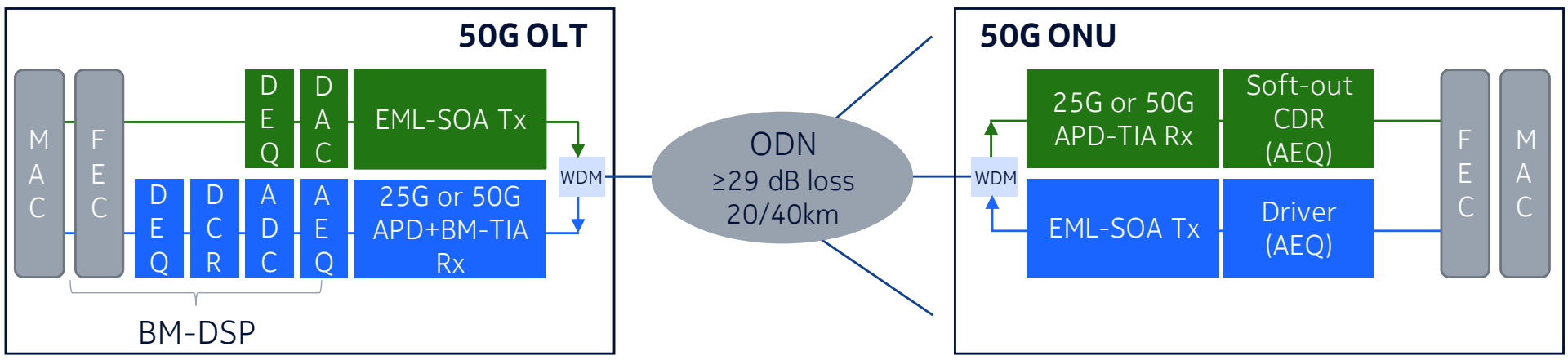
Solutions for 50G TDM-PON

- Optical amplification to boost Tx-power
- DSP to limit dispersion penalties
- DSP to mitigate burst-mode penalties
- DSP to allow 25G APD-TIA Rx re-use

Advantage of DSP-use



Current Bell Labs design of 50G TDM-PON

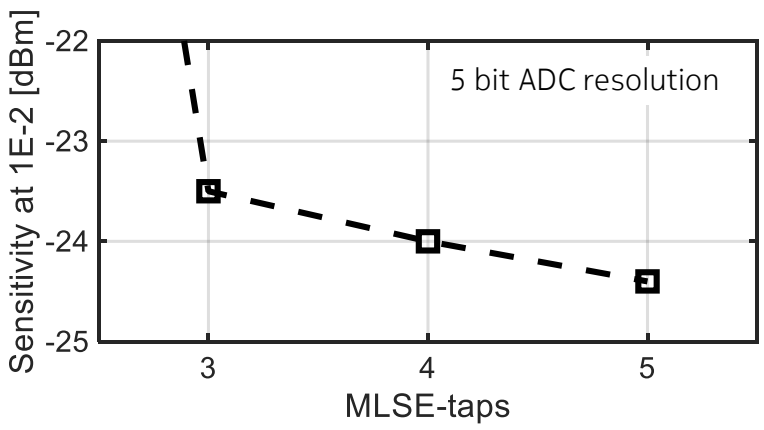


Bell Labs innovation & study for the DSP-era in PON

- Best in class optical devices (EML-SOA)
- Analog equalization (AEQ) at ONU
- Digital equalization (DEQ): FFE, DFE, MLSE
- Increase optical budget with LDPC-FEC
- Higher throughput by MAC & PMD connection
- Added flexibility: e.g. flex-rate

50G experiments with 25G APD-TIA Rx

- –24dBm @ 1E–2 BER achieved with MLSE



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