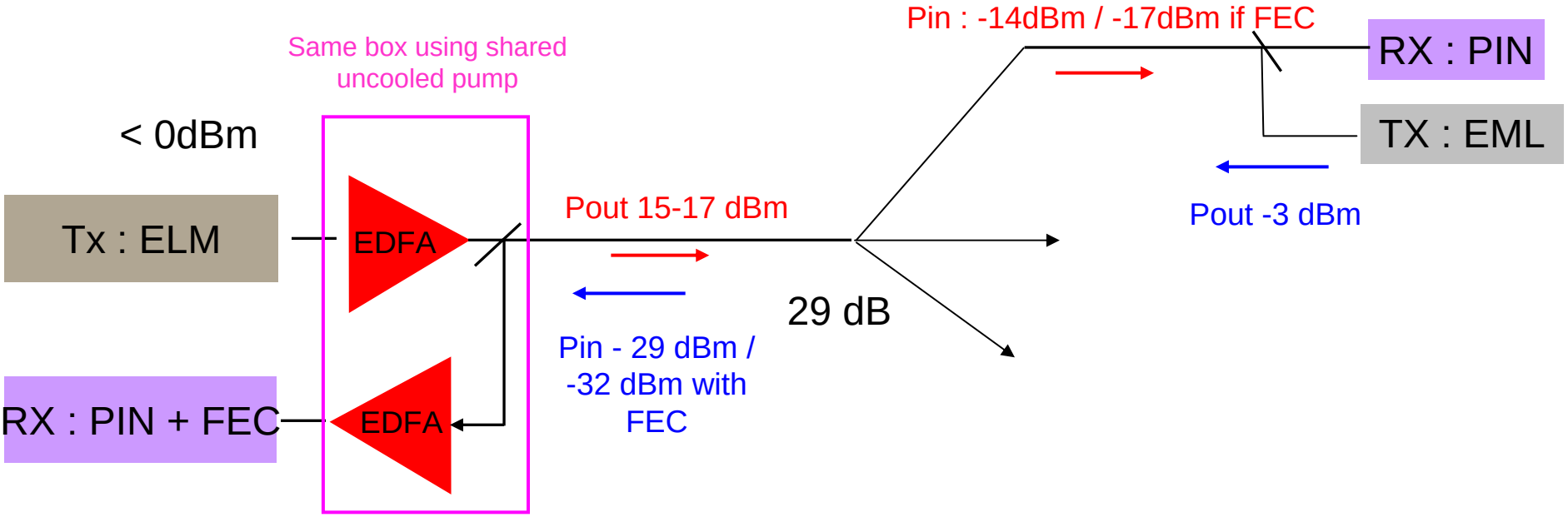
# Technical feasibility of EDFA based network architecture for 10GEPON

Pierre Doussiere, Erji Mao, Wenbin Jiang

11/08/06

# Proposed architecture




Basic ideas :

-To use PIN receiver at ONU

- No amplifier on ONU side (cost and eye safety)
  - High power at emission on down stream thanks to EML+ EDFA
  - High sensitivity at receiver on up stream thanks to optical EDFA preamplifier around 1535nm (higher on EDFA for better sensitivity)

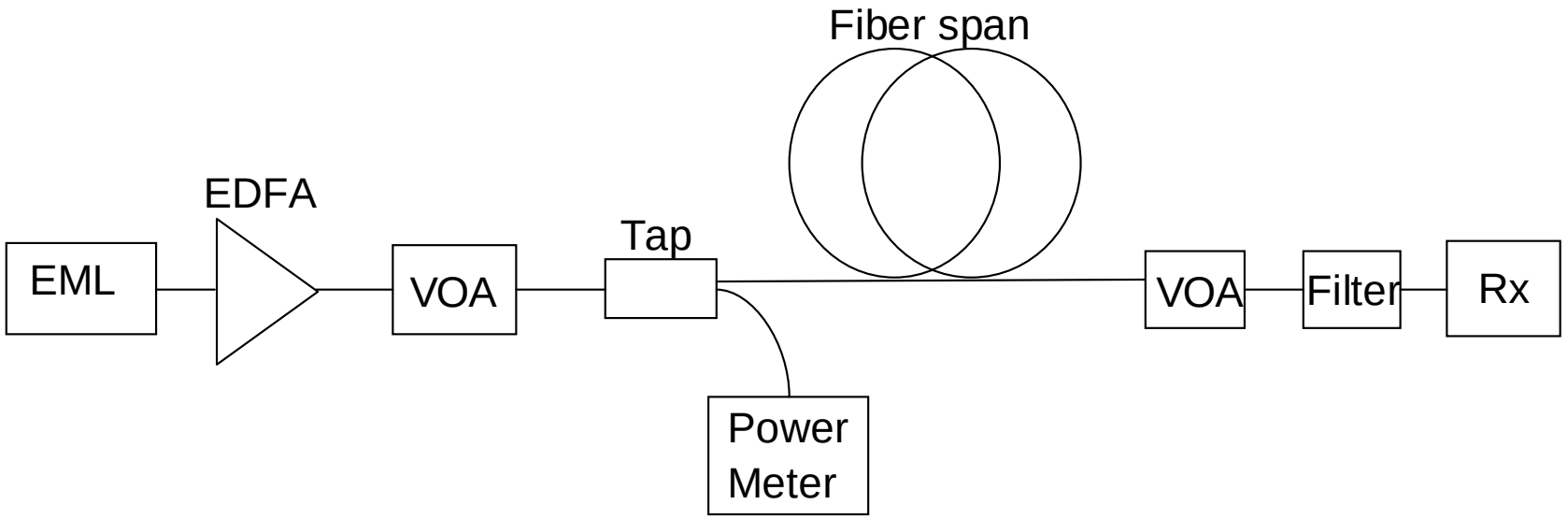
-GEPON and Video compatibility
  - Down stream > 1560 nm (Less Raman Xtalk for compatibility with Video Overlay at 1550nm)
  - Up stream -1535 +/- 3.5nm

# Down stream technical feasibility

- Goal of experiment: to study the feasibility of using EML-EDFA combination for downstream 10GEPON transmission

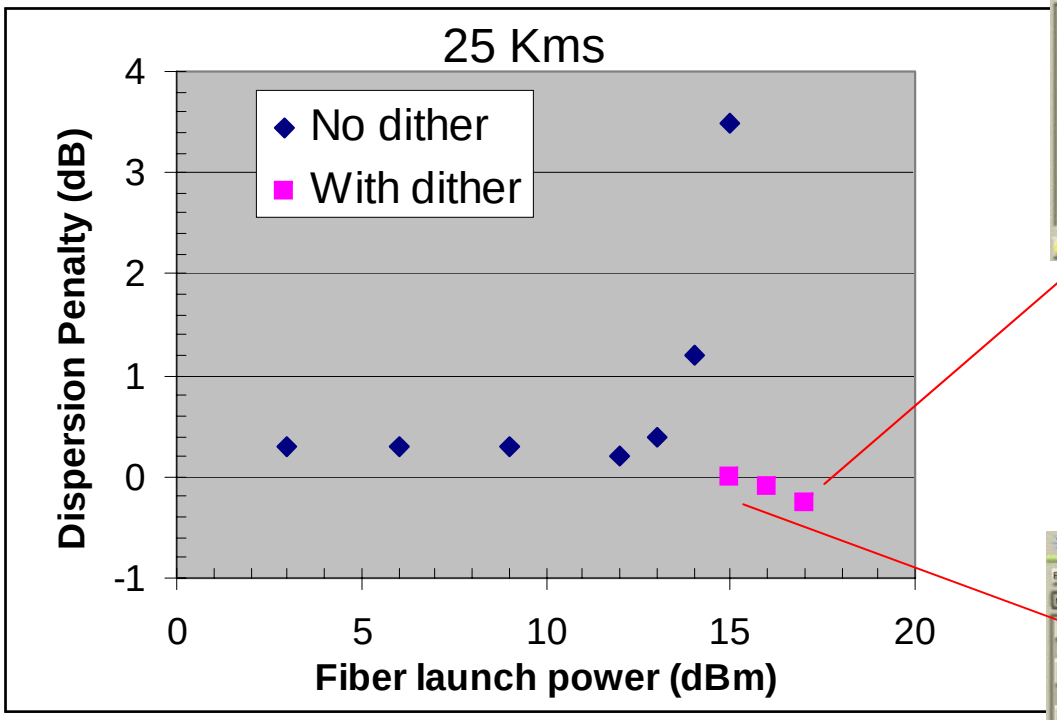
- Fiber span lengths used is 25km.

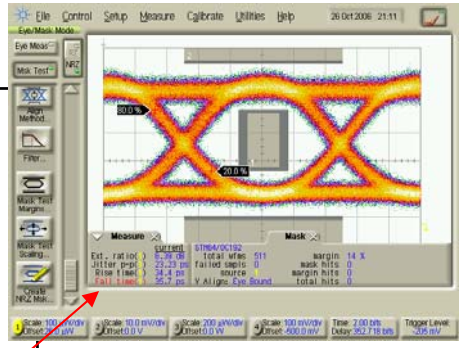
- Fiber launch power is up to 17dBm (controlled by VOA at launch end, with EDFA and EML operating conditions fixed)

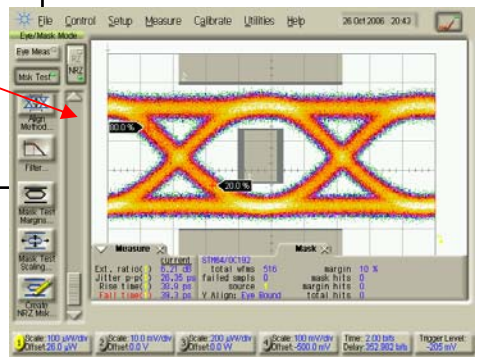


# Down stream technical feasibility results

- Using booster EDFA, dynamic can be easily scaled up to 32 dB (assuming -15 dBm sensitivity)
  - Need dithering to avoid SBS non-linear effect



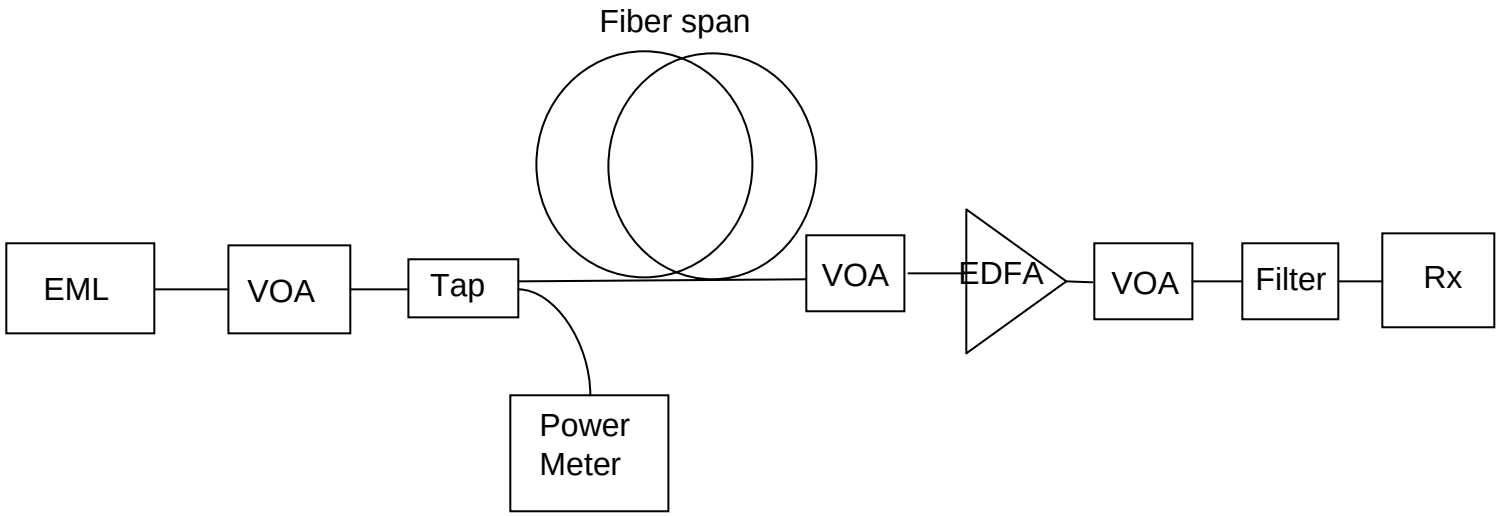




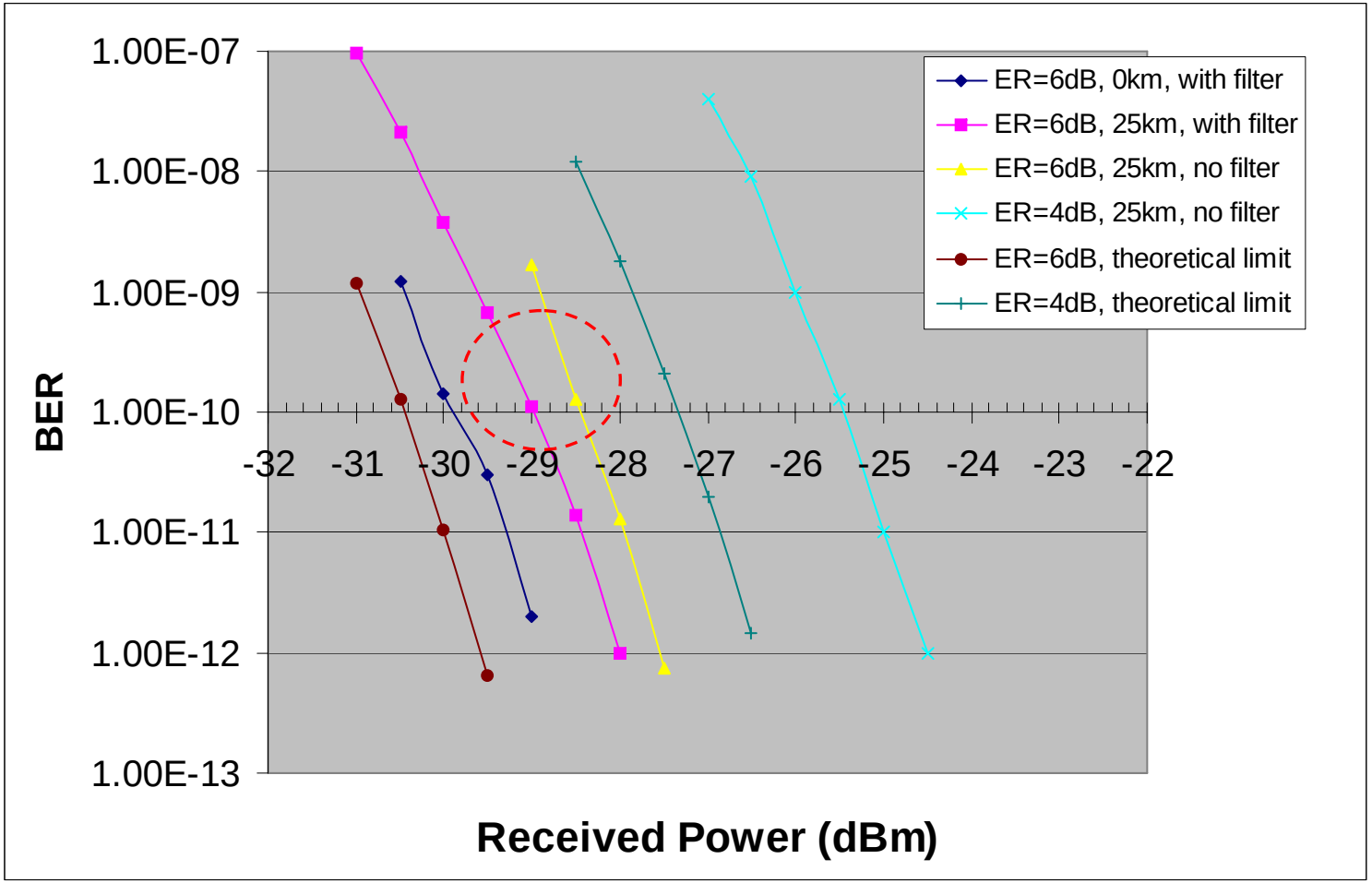
JDSU

# Up stream Technical feasibility

- Goal of experiment: to study the feasibility of using Pre-amplifier-EDFA combination for upstream 10GEPON transmission



# Up stream Technical feasibility : Results




Working at 1535nm avoid need for optical filter
Practical sensitivity is -28 dBm

# Conclusion

- EDFA based architecture provides the most cost effective approach for 10GEPON ONU as well as compatibility with existing GEPON.
- Down Stream : EDFA booster provides comfortable budget margin allowing PIN on ONU side.
- Up Stream :
  - EDFA pre-amp along with FEC can provide better than -30dBm sensitivity, allowing less than 0dBm emitted power on ONU.