



# **NexCor® Technology for Improved HFC and FTTH Access Networks**

- I. Introduction**
- II. NexCor® Technology**
- III. CATV Measurements**

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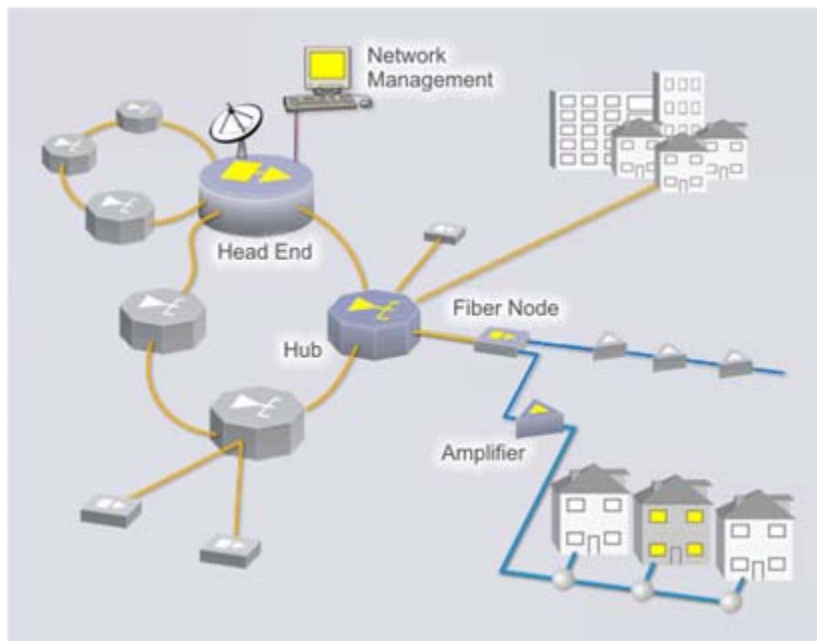
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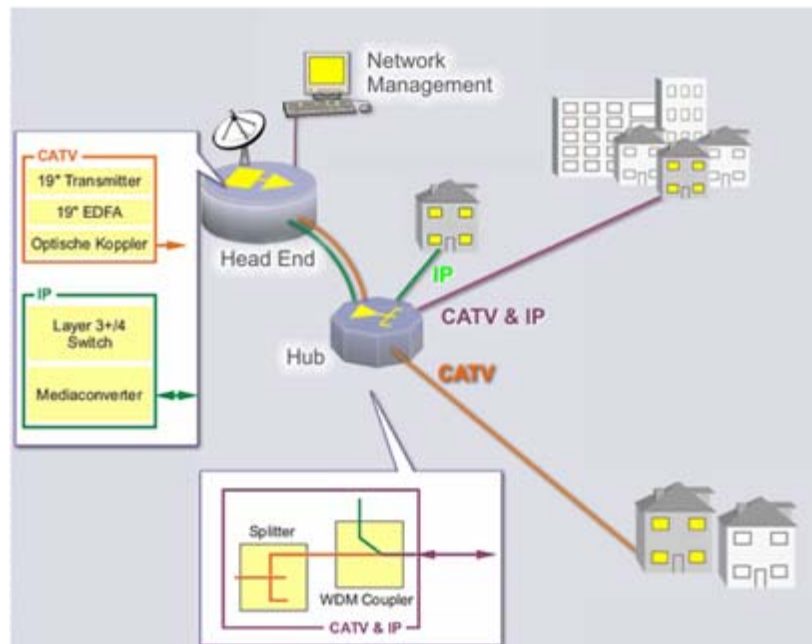


## I. Introduction: Optical Access Networks

### Hybrid Fiber Coax (HFC) Access Network



### Fiber To The Home (FTTH) Access Network



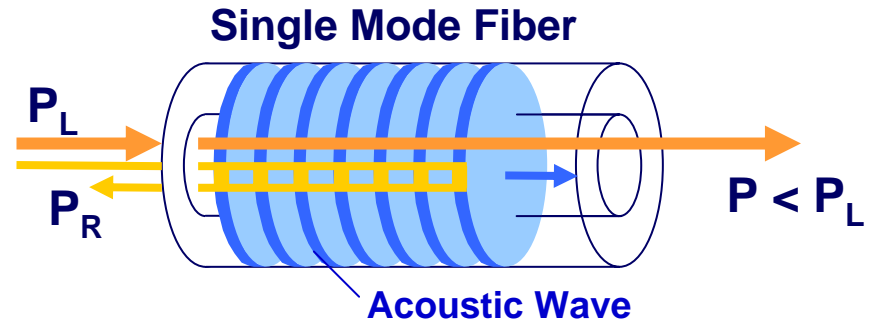
### Common Requirement:

**Long Fiber Distances – High Optical Budget – High Optical Power**



## Stimulated Brillouin Scattering SBS

- ▶ SBS occurs at high opt. power launched into the fiber (above SBS threshold  $P_L > P_{SBSt}$ )
- ▶ Optical power  $P_L$  generates an acoustic wave in the fiber
- ▶ The acoustic wave causes refractive-index variations and ultimately reverse-direction scattering of the optical signal ( $P_R$ )
- ▶ Result 1: loss of optical power at receiver
- ▶ Result 2: signal performance degradation (noise, nonlinearity)

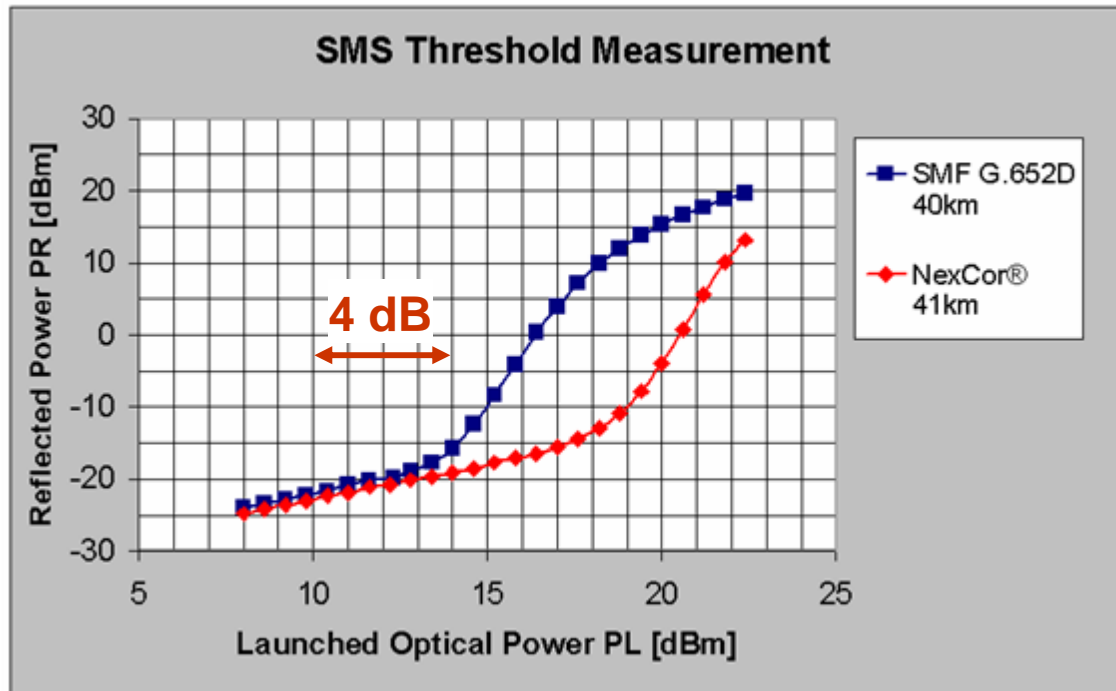
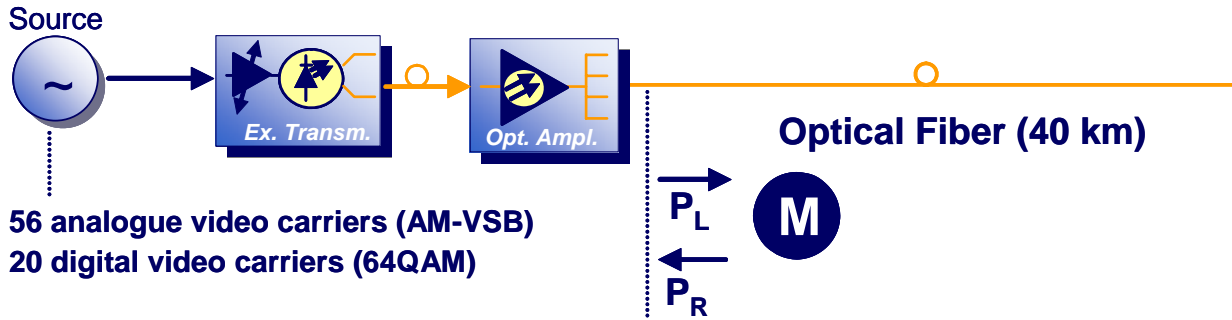


## NexCor® Technology of Corning:

- ▶ Suppressing SBS effect and increasing SBS threshold  $P_{SBSt}$  (by optimizing the fiber's refractive index profile)
- ▶ Being 100% backward-compatible to standard SMF G.652D



## III. Measurement: SBS Threshold



Measurement of

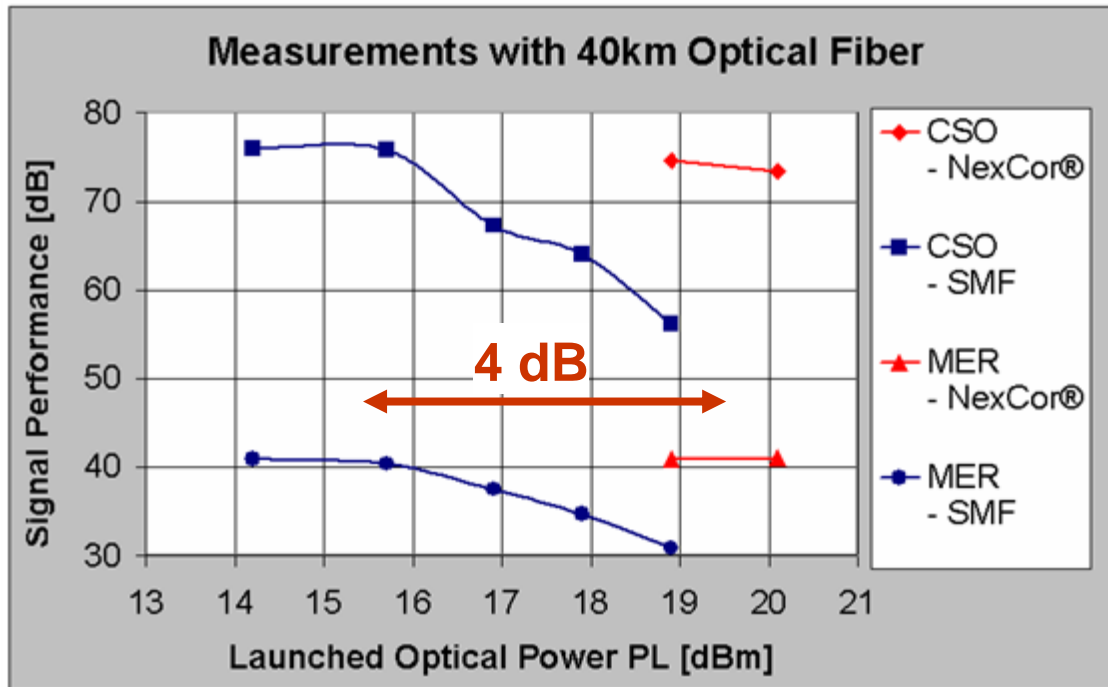
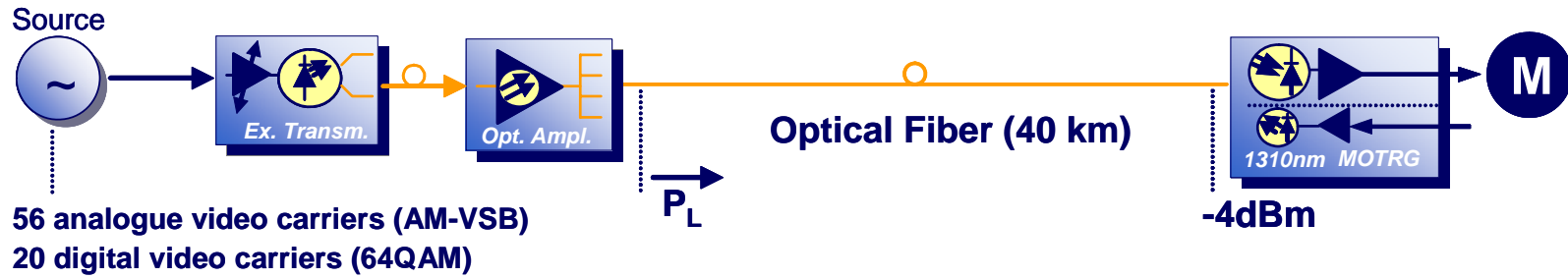
- ▶ launched ( $P_L$ )
- ▶ reflected ( $P_R$ )

optical power.

**Result:**  
**SBS threshold**  
 $P_{SBS}$  **increase**  
**of 4 dB!**



## III. Measurement: Ext. Mod. Transmitter



### Measurement of

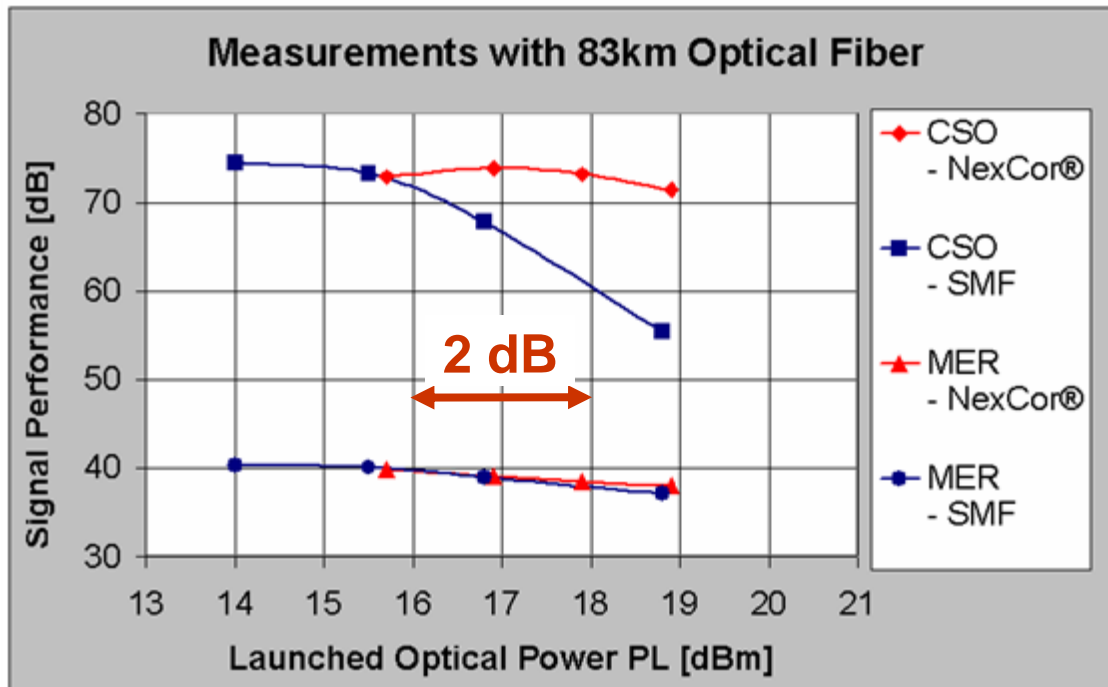
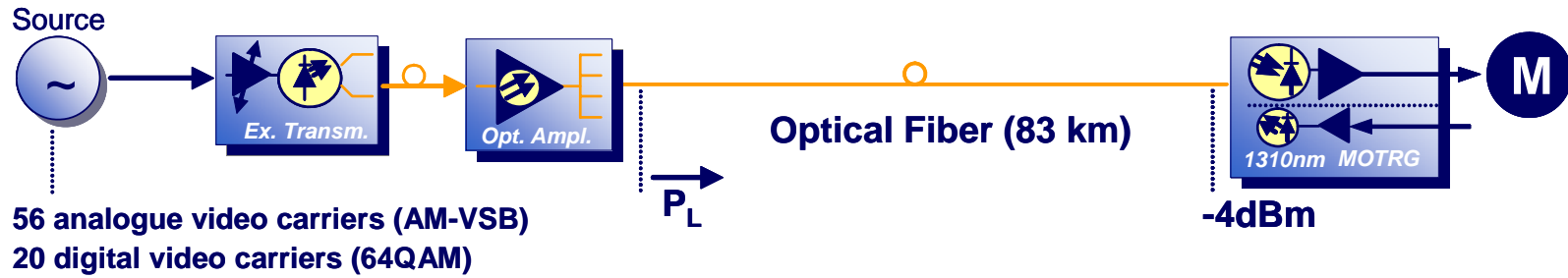
- ▶ launched power  $P_L$
- ▶ signal performance

### Result:

**Power  $P_L$  increase of 4 dB!**



## III. Measurement: Ext. Mod. Transmitter



### Measurement of

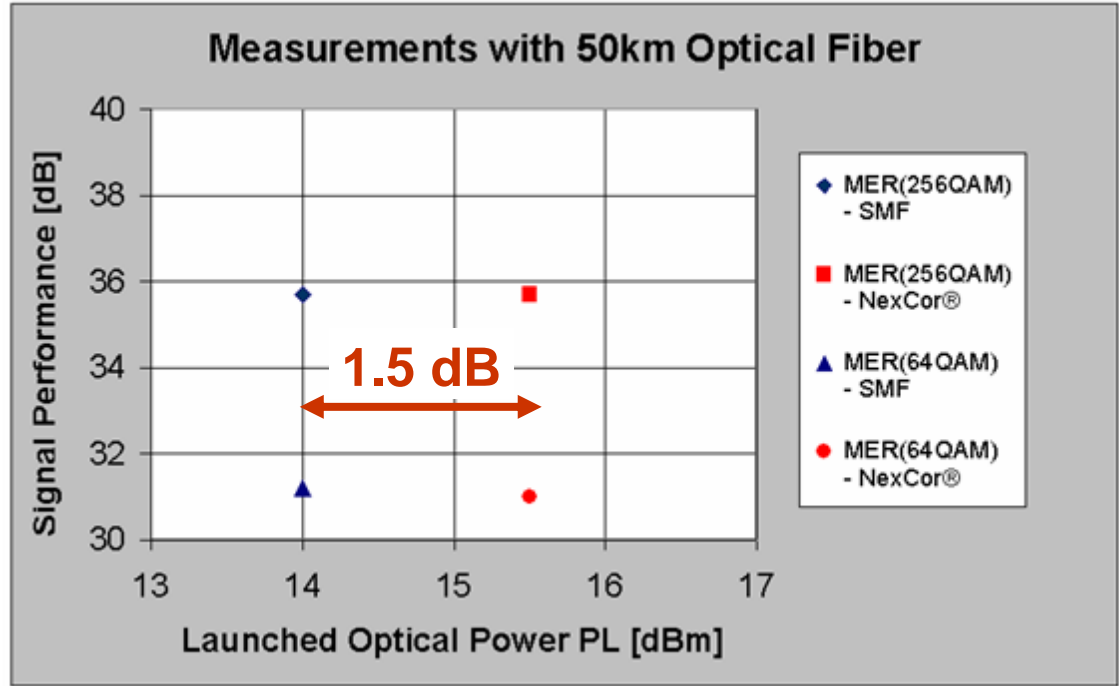
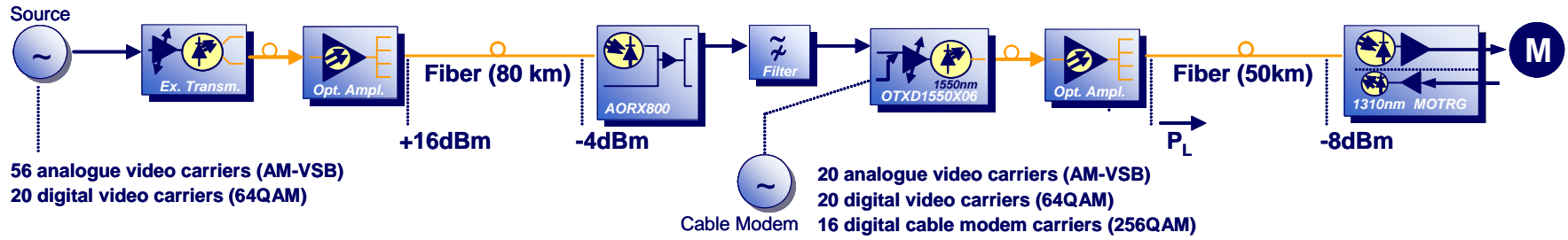
- ▶ launched power  $P_L$
- ▶ signal performance

### Result:

**Power  $P_L$  increase of 2...4 dB! (SPM emerging!)**



## III. Measurement: Dir. Mod. Transmitter



Measurement of

- ▶ launched power  $P_L$
- ▶ signal performance

**Result:**  
**Power  $P_L$  increase of 1.5 dB!**  
**(SPM emerging!)**



## **NexCor® Fiber Technology**

- ▶ **... is compatible to standard ITU-T G.652D fiber with respect to RF video transmission**
  - Applicable to FTTH networks (PONs, RF video overlay)
  - Applicable to HFC networks (CATV broadcasting)
  - Applicable to externally modulated analogue CATV transmitters
  - Applicable to directly modulated analogue CATV transmitters
- ▶ **... increases SBS threshold**
  - SBS threshold increase of 4 dB confirmed
  - **1.5...4 dB more optical power (optical budget increase)**
  - Providing high cost-saving potential for network implementation
- ▶ **Further experiments prove pure digital application (e.g. SDH), see Vaughn, Ruffin, Kobayakov, Woodfin, Mazzali, Whitman, Boskovic, Wagner, Kozischek and Meis, "Techno-economic study of the value of high stimulated Brillouin scattering threshold single-mode fiber utilization in fiber-to-the-home access networks," J. Opt. Netw. 5, 40-57 (2006)**



**Thank you for your attention!**



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