

Introduction

❖ Topic

- Integrated optical receivers in CMOS/BiCMOS technology (circuit part)
 - High-speed data transmission (Ref: Overview introduction)
 - Low-cost Radio-over-Fiber (RoF) systems (Ref: Overview introduction)

❖ Team members

- Team members: H.S Kang, M.J Lee, K.Y park, J.S Yoon
 - Physical photodetector modeling part : H.S Kang, M.J Lee
 - Electronic circuit part : K.Y park, J.S Yoon
(Transimpedance amplifier, Limiting amplifier ...)

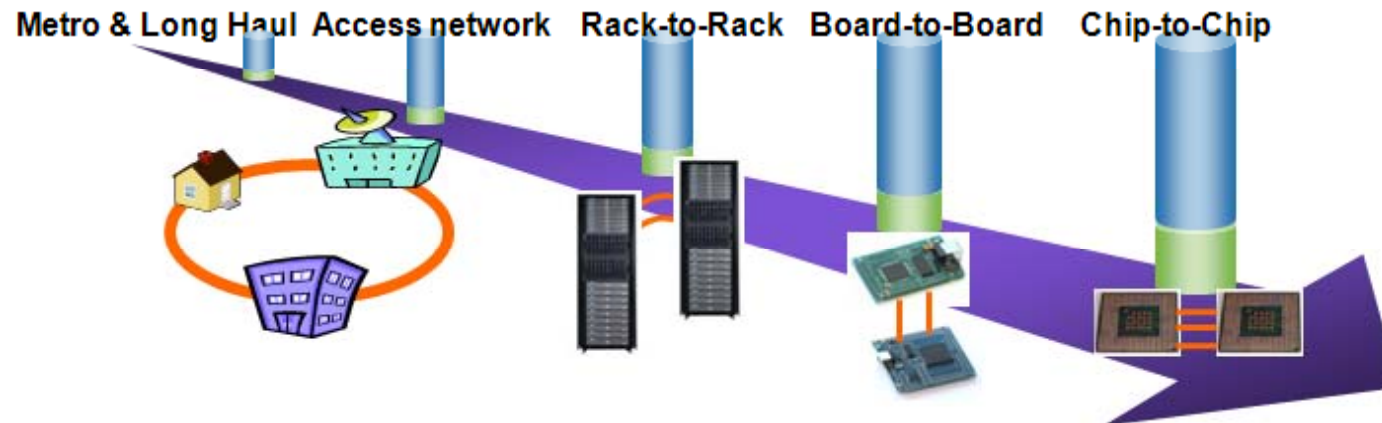
❖ Sponsor

- none

Research explanation

❖ Importance of research

- Evolution of optical communication



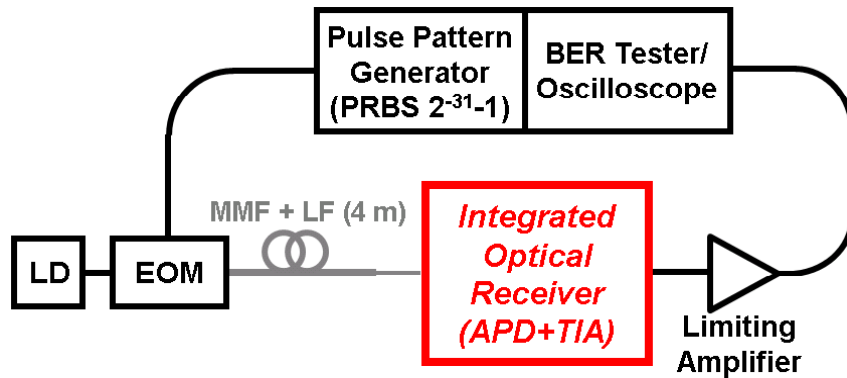
→ Cost issue !! (Increasing number of optical components)

Solution!!

CMOS integration(PD+electronic circuits)

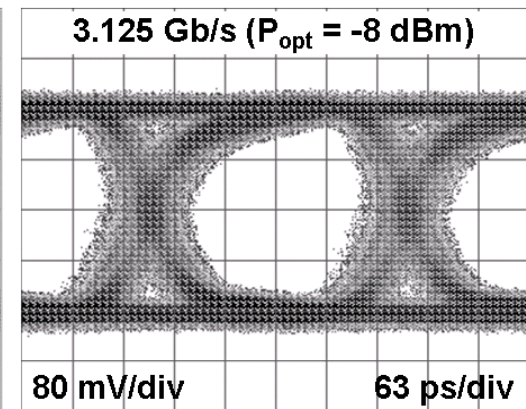
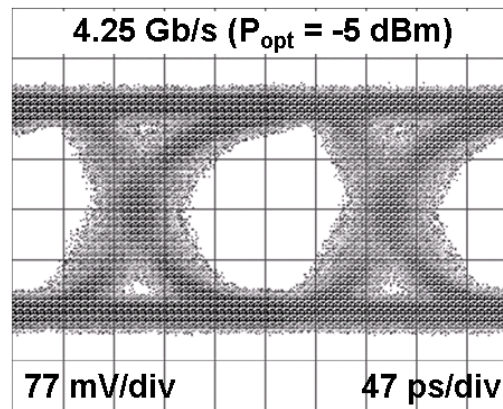
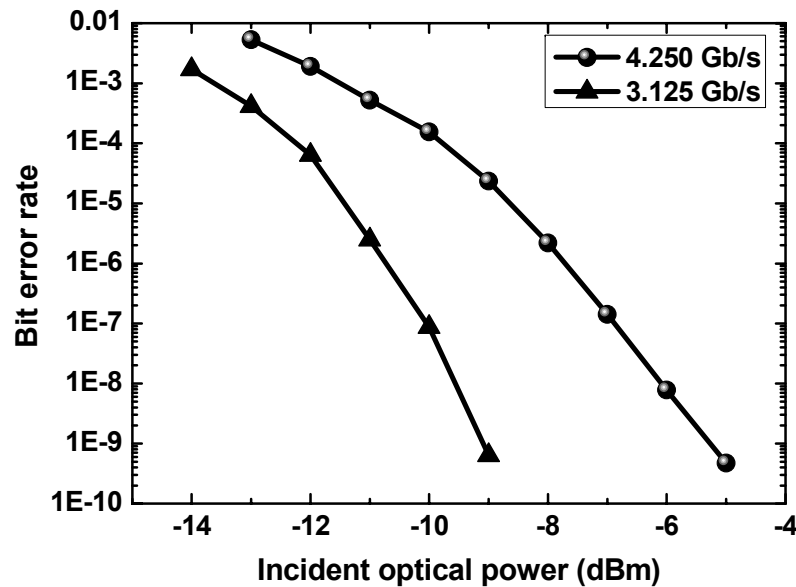
- Photodetection of 850nm optical signal
- Low cost compared with III-V compound semiconductor
- Universal platform for electronic circuits

High-speed data transmission (CMOS)

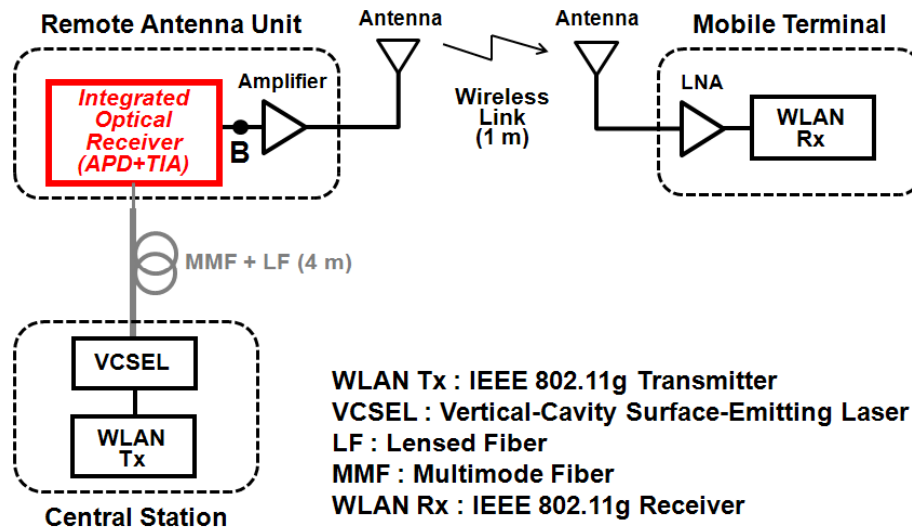


LD : 850-nm Laser Diode
 EOM : 20-GHz Electro-Optic Modulator
 MMF : Multimode Fiber
 LF : Lensed Fiber

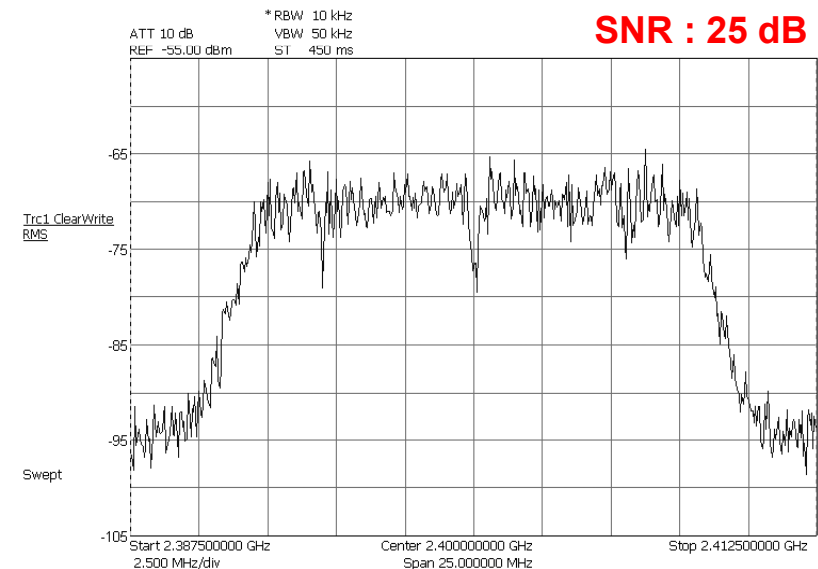
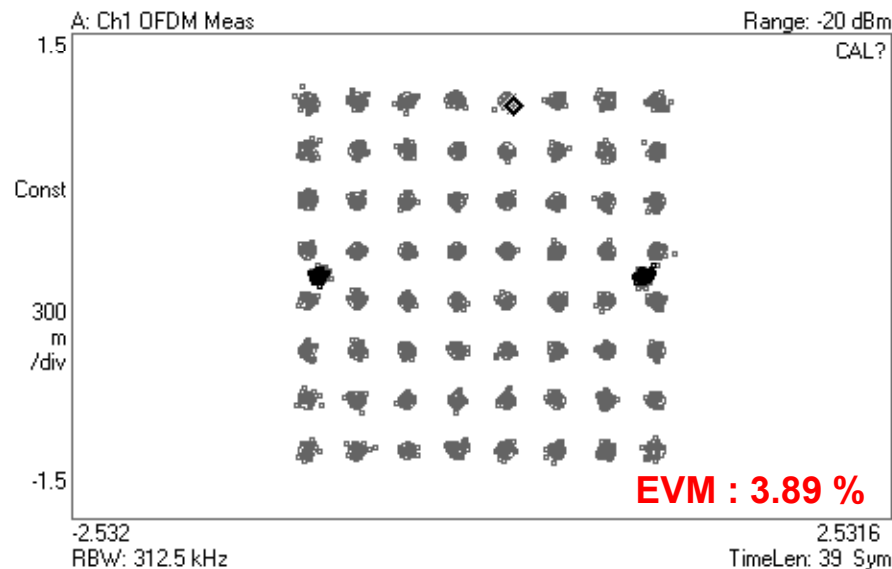
Process	Standard CMOS 0.13 μm technology
Data	Up to 4.25-Gb/s 2^{31} -1 PRBS
Chip area	0.38 x 0.38 mm ² (core)
Supply voltage	1.2 V (CMOS-APD : 10 V)
Power consumption	18 mW (only core circuit)



Radio-over-Fiber (RoF) systems



Process	Standard CMOS 0.13 μm technology
Data	IEEE 802.11g 54-Mb/s 64-QAM WLAN signals
Chip area	0.38 x 0.38 mm ² (core)
Supply voltage	1.2 V (CMOS-APD : 10.1 V)
Power consumption	18 mW (only core circuit)



High-speed data transmission (BiCMOS)

- ❖ BiCMOS 0.25- μm process
- ❖ Transimpedance gain : 60 dB Ω (Differential gain)
- ❖ 3-dB Bandwidth : 5 GHz
- ❖ Chip out : 2009. 03.