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)

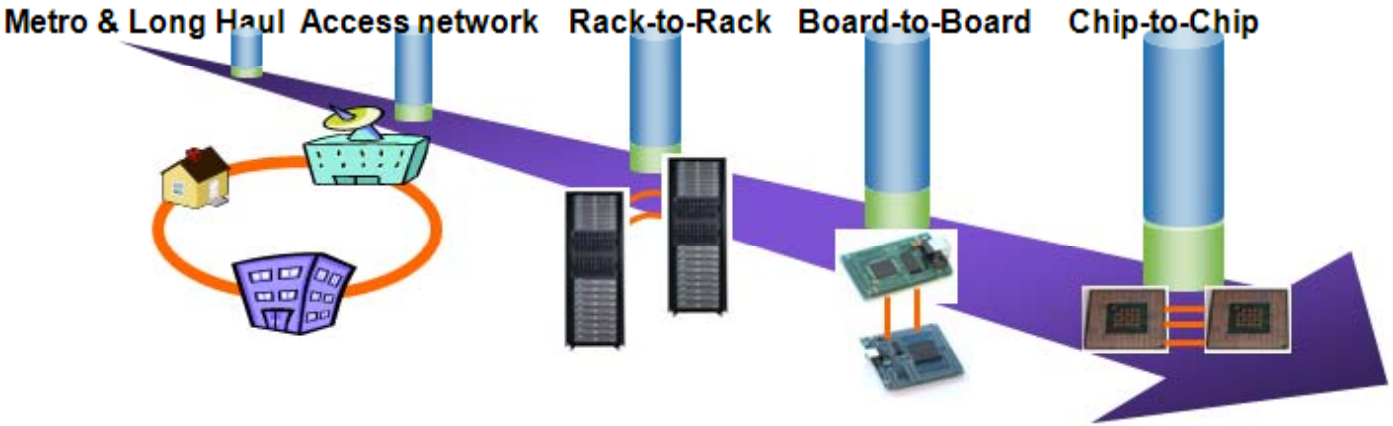
- Team members
  - Team members: H.S Kang, M.J Lee, K.Y park, J.S Yoon
    - Physical photodetector modeling part : H.S Kang, M.J Lee
    - Electronic circuit part : K.Y park, J.S Yoon
      (Transimpedance amplifier, Limiting amplifier ...)

- Sponsor
  - none

Research explanation

❖ Importance of research

- Evolution of optical communication



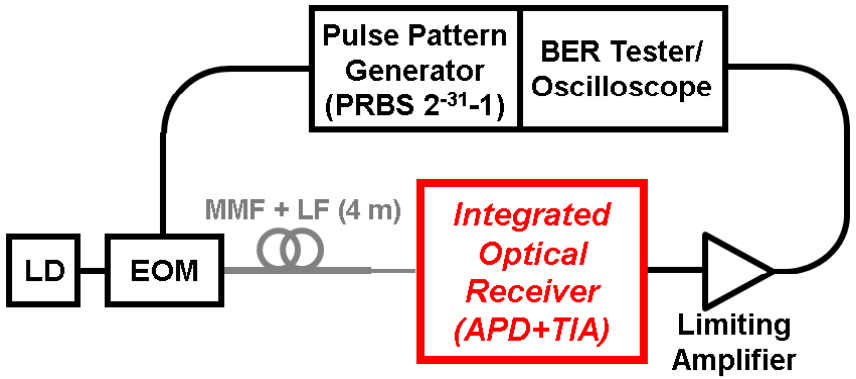
→ Cost issue !! (Increasing number of optical components)

Solution!!

CMOS integration(PD+electronic circuits)

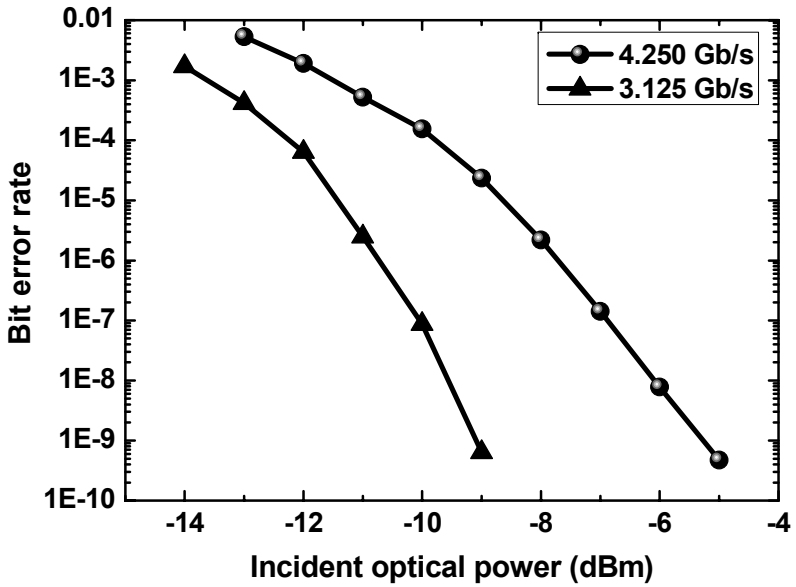
- Photodetection of 850nm optical signal
- Low cost compared with III-V compound semiconductor
- Universal platform for electronic circuits

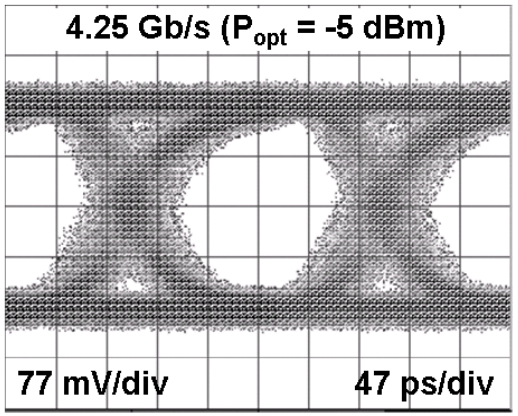
High-speed data transmission (CMOS)

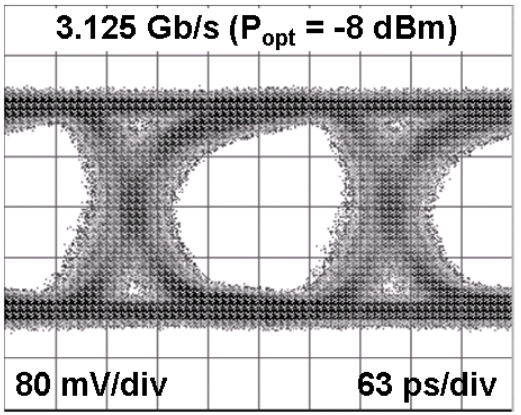


LD : 850-nm Laser Diode
EOM : 20-GHz Electro-Optic Modulator
MMF : Multimode Fiber
LF : Lensed Fiber

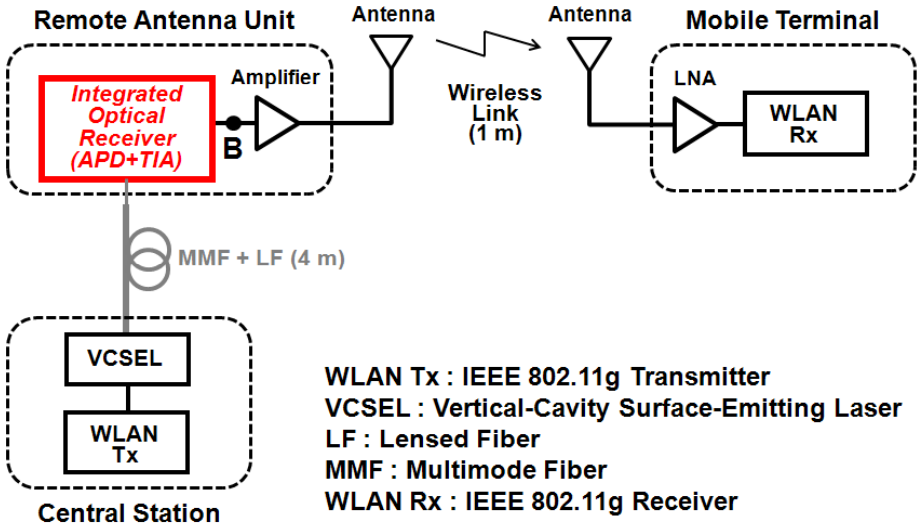
Process	Standard CMOS 0.13 μm technology
Data	Up to 4.25-Gb/s 2^{31}-1 PRBS
Chip area	0.38 x 0.38 mm^2 (core)
Supply voltage	1.2 V (CMOS-APD : 10 V)
Power consumption	18 mW (only core circuit)





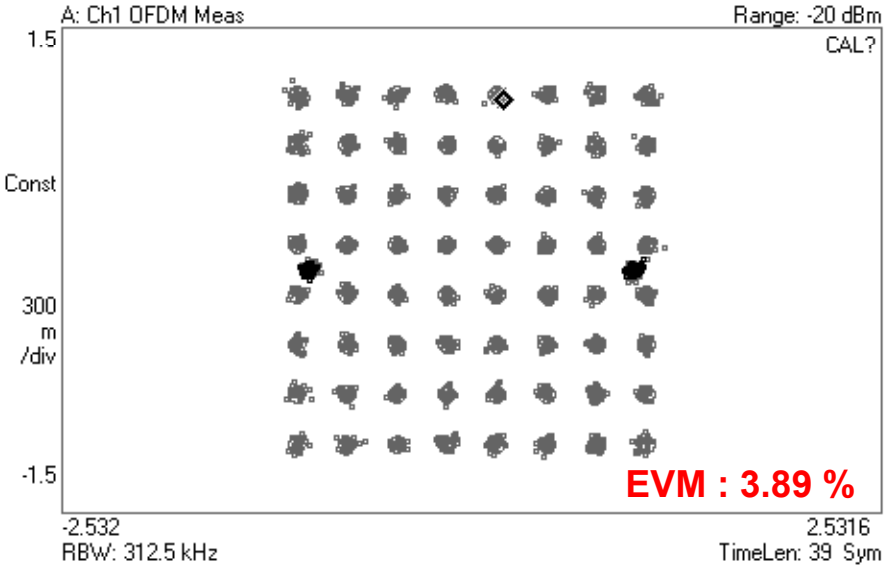


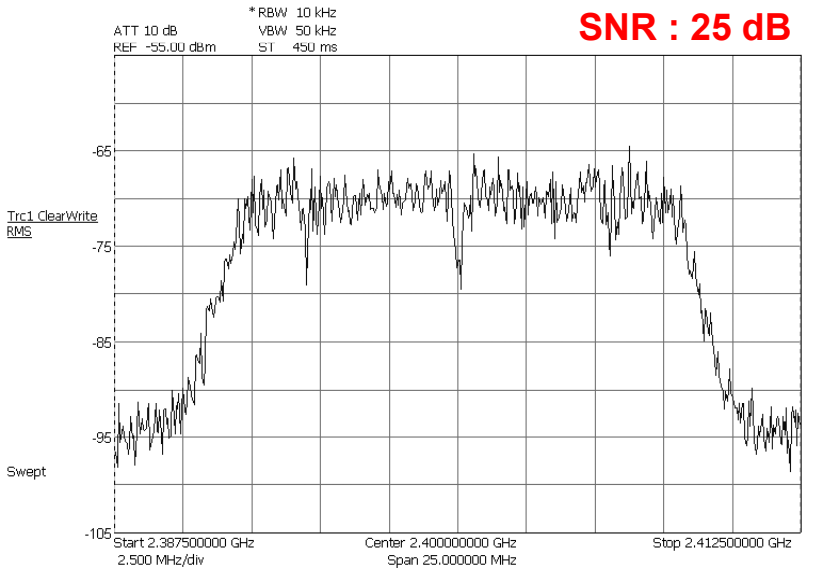
Radio-over-Fiber (RoF) systems



WLAN Tx : IEEE 802.11g Transmitter
VCSEL : Vertical-Cavity Surface-Emitting Laser
LF : Lensed Fiber
MMF : Multimode Fiber
WLAN Rx : IEEE 802.11g Receiver

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 dBΩ (Differential gain)
- 3-dB Bandwidth : 5 GHz
- Chip out : 2009. 03.