

Introduction

❖ Topic

- Wireless Transceiver SOC for 60GHz WPAN

❖ Team member

- Team member: D.H Kim, J.Y Kim, M.S Ko
 - 60GHz LNA: D.H Kim
 - 60GHz Oscillator: J.Y Kim
 - 60GHz Mixer: M.S Ko
 - High Speed MODEM: D.H Kim

❖ Sponsor

- 한국과학재단 특정기초 연구 - CMOS 기반 60GHz 광대역 송수신기 구현
- 서울시 신기술연구개발 지원사업 - 3Gbps급 밀리미터파 근거리 무선 통신 송수신기

Introduction



- A network for interconnecting devices centered around an individual person's workspace
- **Typical WPAN range < 10m**
- IEEE 802.15.3 is one of WPAN standard
 - Data rate: 11, 22, 33, 44 and 55Mbps
 - Ad-hoc peer-to-peer networking
 - Security
 - Low power consumption
 - Low cost



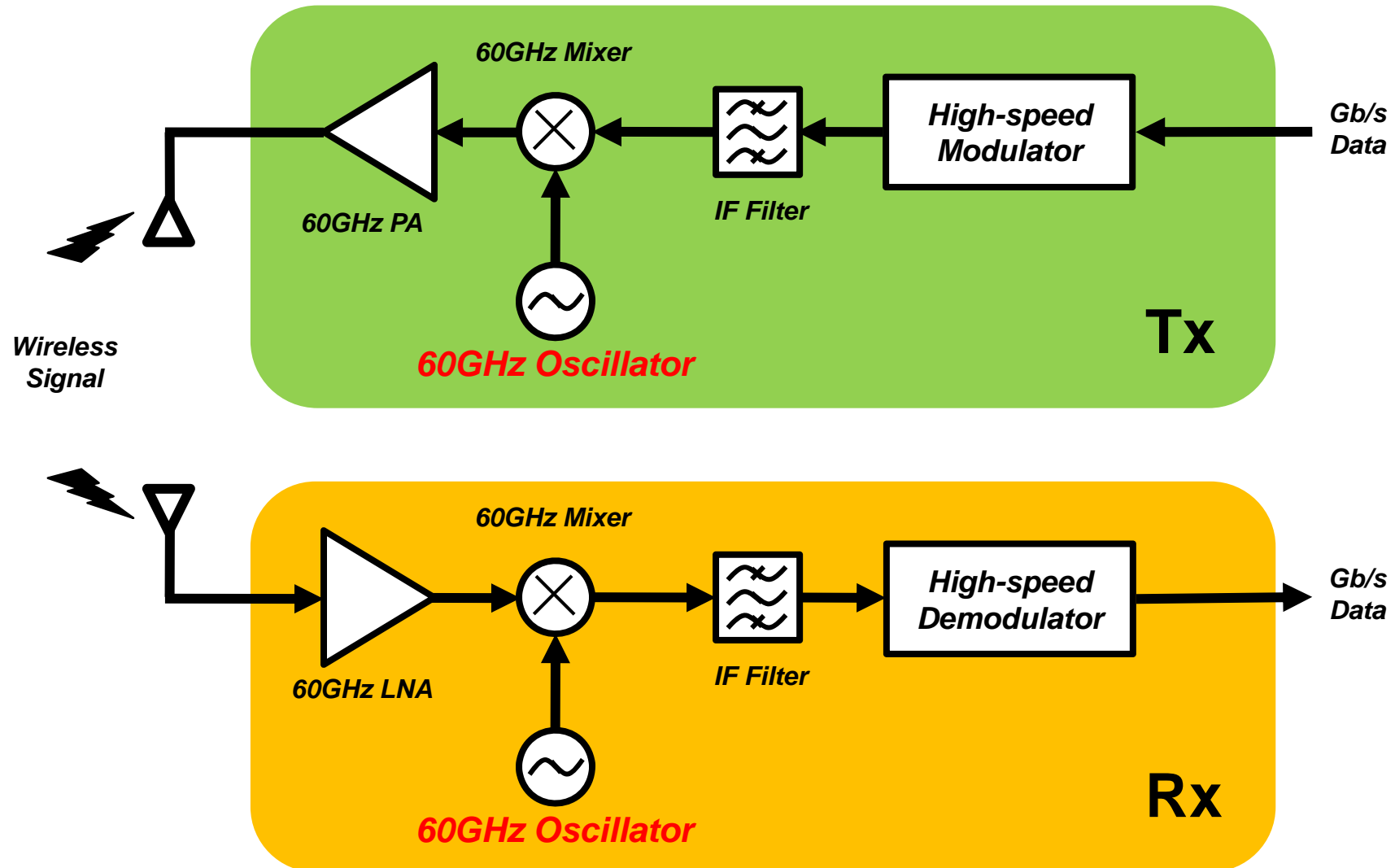
Demands for higher rate transmission (wireless HD video, wireless USB)



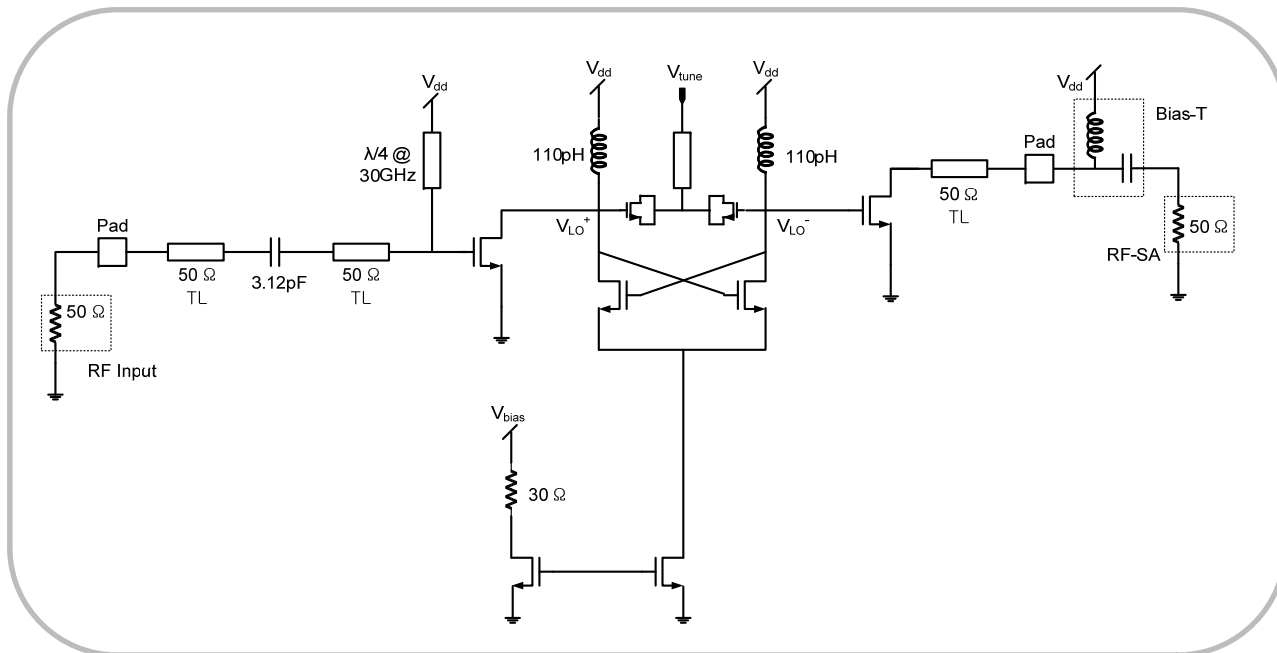
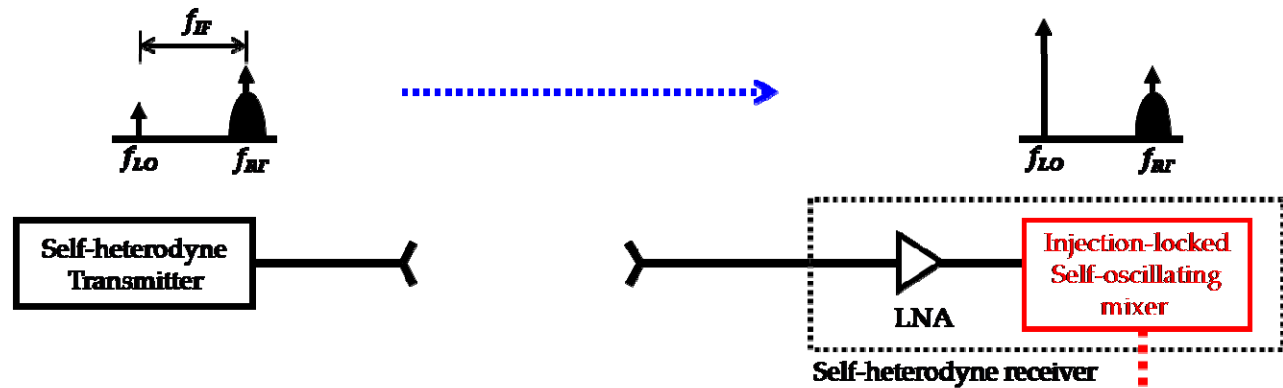
**Formation of IEEE 802.15.3c
Millimeter-wave WPAN for Gbps Tx**



60GHz Wireless Transceiver

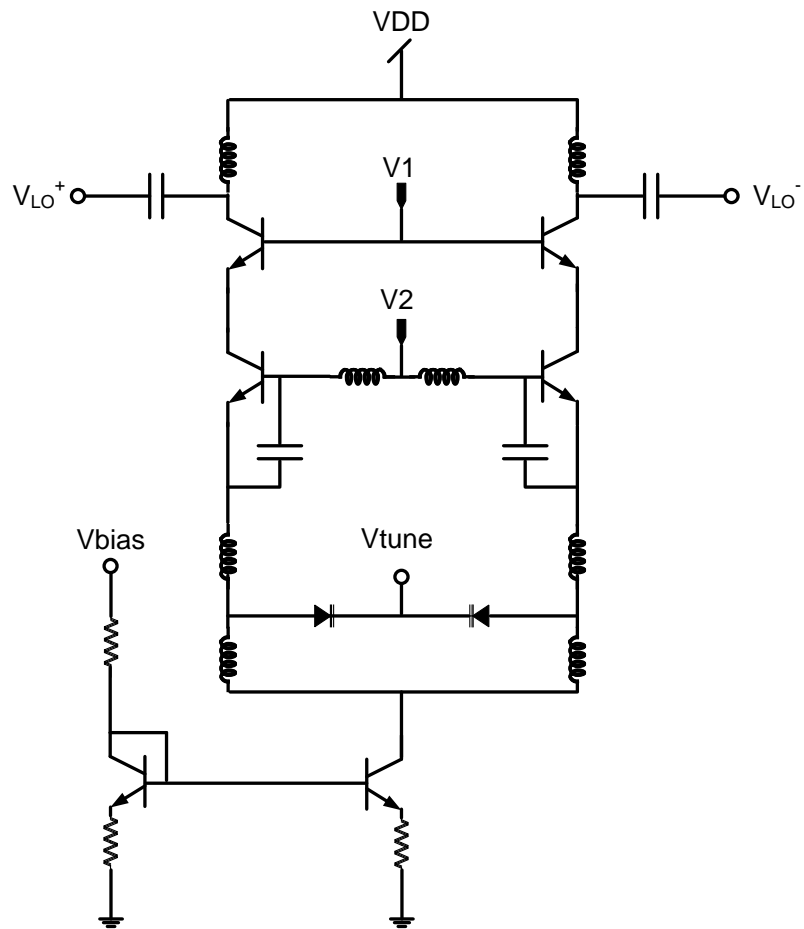


30GHz Self-oscillating mixer

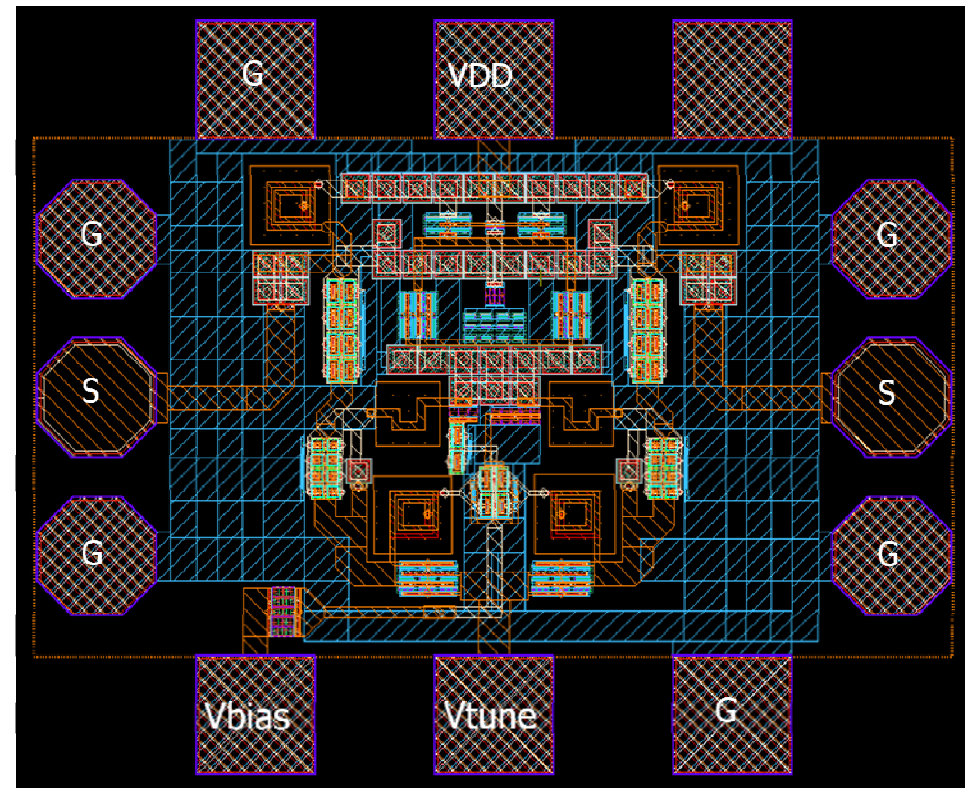


-Improved conversion gain
(high power LO)

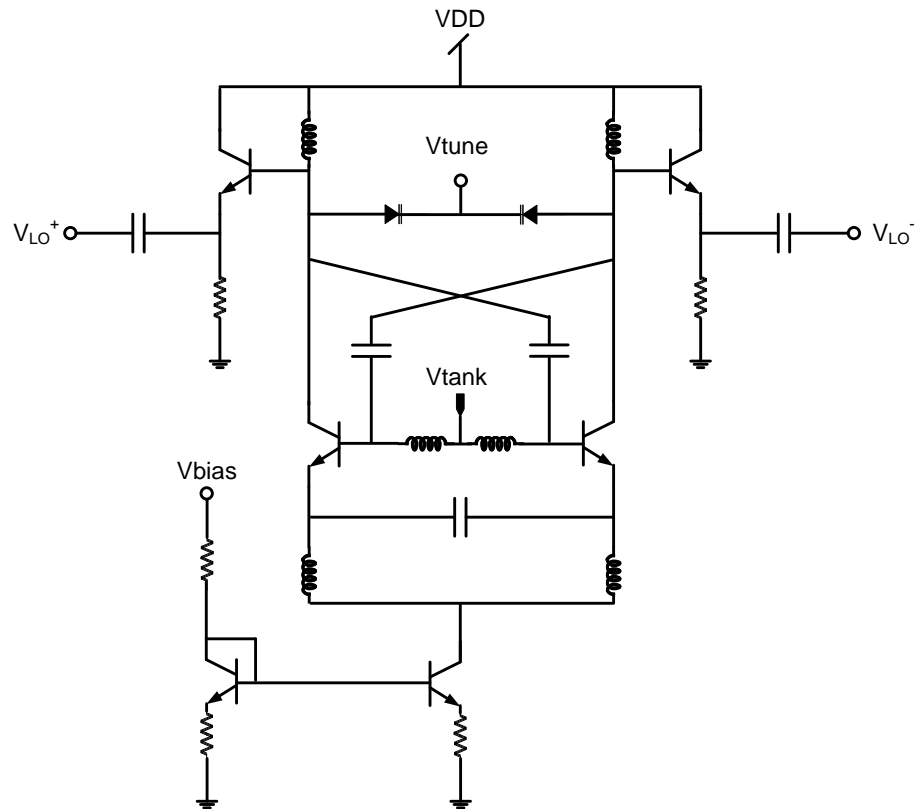
60GHz SiGe Colpitts Oscillator



- $f_o = 55\text{GHz}$
- Tuning range = 10GHz
- Output power = -1 dBm
- Phase noise = -98 dBc/Hz
- DC power consumption = $14.7\text{mA} \times 3.3\text{V} = 48.5\text{mW}$



60GHz SiGe Cross-Coupled OSC



- $f_0 = 60\text{GHz}$
- Tuning range = 6GHz
- Output power = -4 dBm
- Phase noise = -95 dBc/Hz
- DC power consumption = $18\text{mA} \times 2.5\text{V} = 45\text{mW}$

