Ultra-Low-Power RF CMOS Transceiver Design

Motivation: Ultra-Low-Power RF Circuit

Wireless Sensor Network (WSN)
- The significant challenges are minimization of the sensor device cost.
  e.g. Battery-less sensor device
  - Ultra-low-power RF
  - Energy harvesting (EH)...

Target: Ultra-low-power transceiver with low supply voltage operation

Low Supply Voltage Operation
- Low power consumption
- Low signal-to-noise-ratio (SNR)
- Low operational frequency
- Low voltage headroom

Impulse OOK Transmitter with RF Energy harvester[1]

System Architecture

- Simplification of power management
  - LDO-less, powered by directly by RF-EH
- Impulse Transmitter

Measurement Results

- Maximally digital architecture
  - Ultra-low power and superior energy per bit

Dickson-type RF Energy Harvester

- Threshold compensation
  - High conversion efficiency and sensitivity

Low power and low energy per bit were achieved under wide supply voltage range.