1S-21

A 0.5-V 5.8-GHz Low-Power Asymmetrical QPSK/OOK Transceiver for Wireless Sensor Network

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Background

- **Wireless Sensor Network (WSN)**
  - **req. :longer lifetimes and smaller volumes**

- **High power consumption in high freq. RF circuits**
- **Small size antenna in high freq.**
- **Low gain in small size antenna [1]**

[1] S. Oshima, et al., VLSI 2013

Low voltage RF

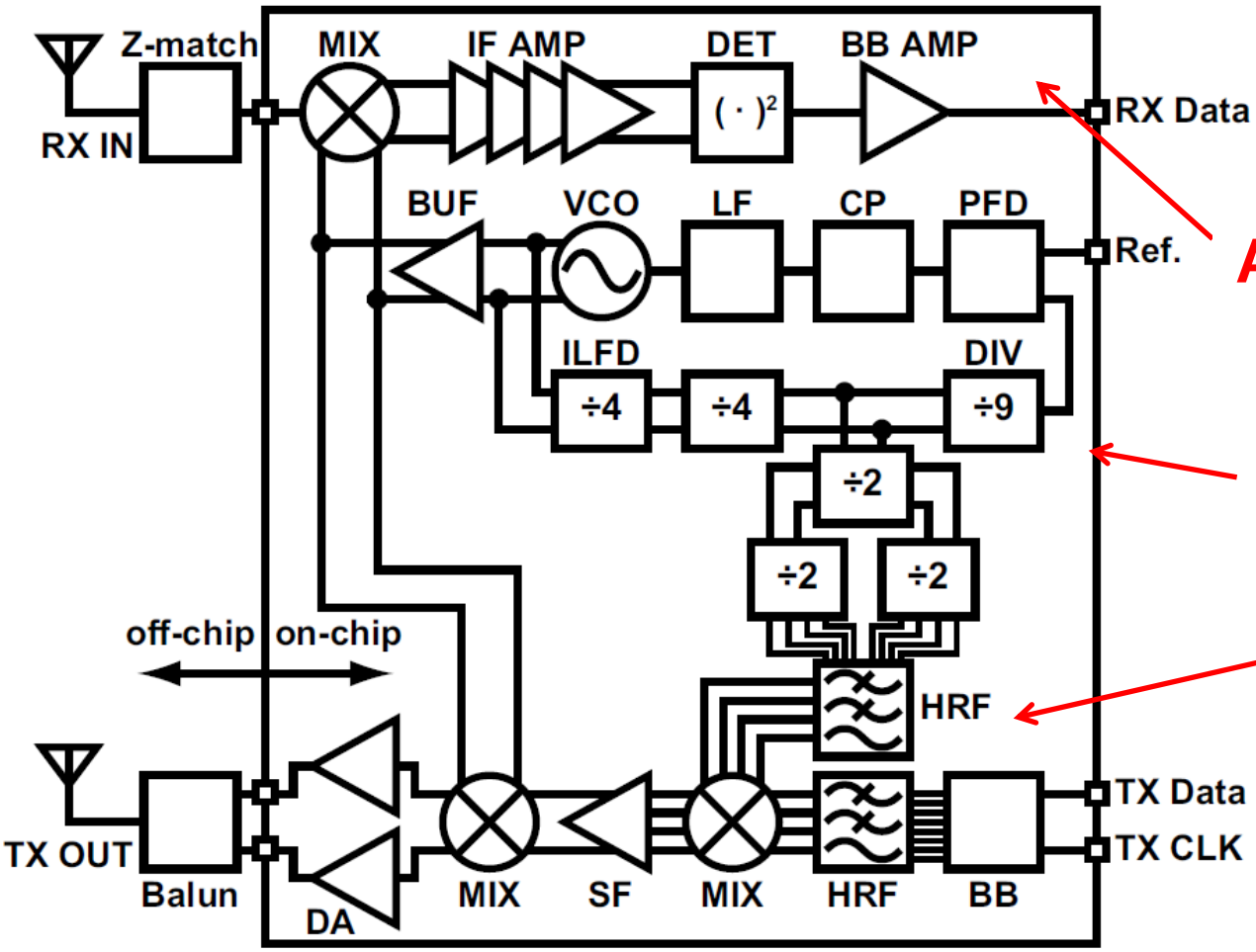
- **Low supply voltage for digital circuits**
  - ☺ Low power consumption

- **Low supply voltage for analog RF circuits**
  - ☺ Low power consumption
  - ☹ Low maximum operation frequency
  - ☹ Low SNR
  - ☹ Limited voltage headroom

Low power and low voltage Transceiver is essential for WSN

Proposed Transceiver

0.5V and 5.8GHz transceiver



Uncertain-IF and Active-Mixer first RX

PLL with ILFD and Current-reuse VCO

Inverter-based TX

Results

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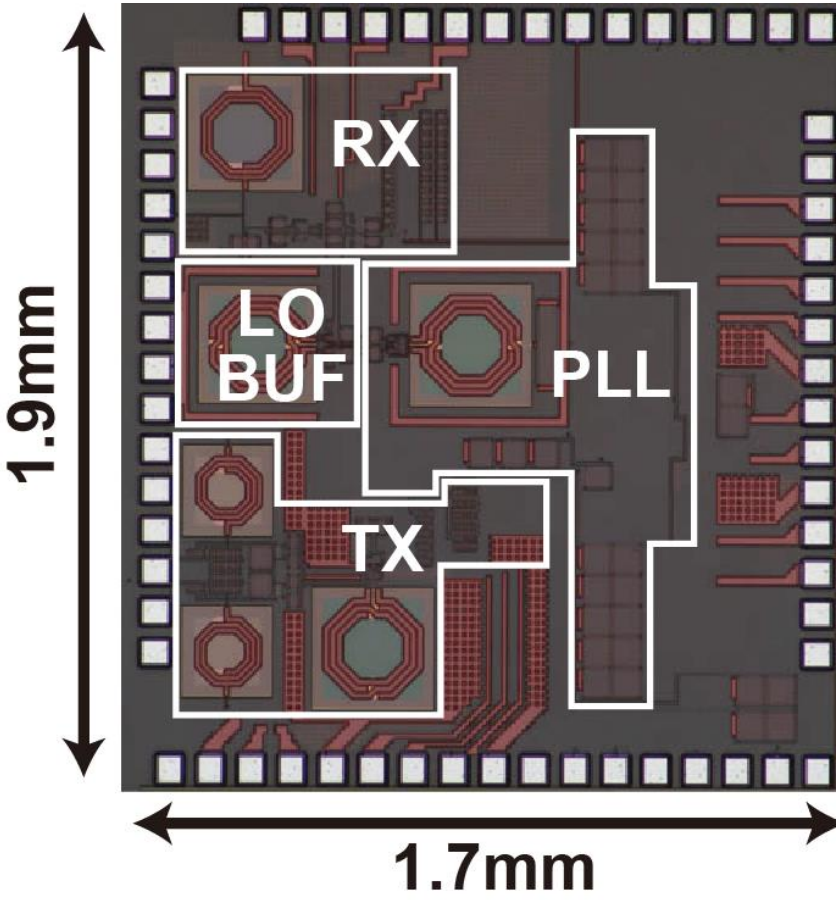

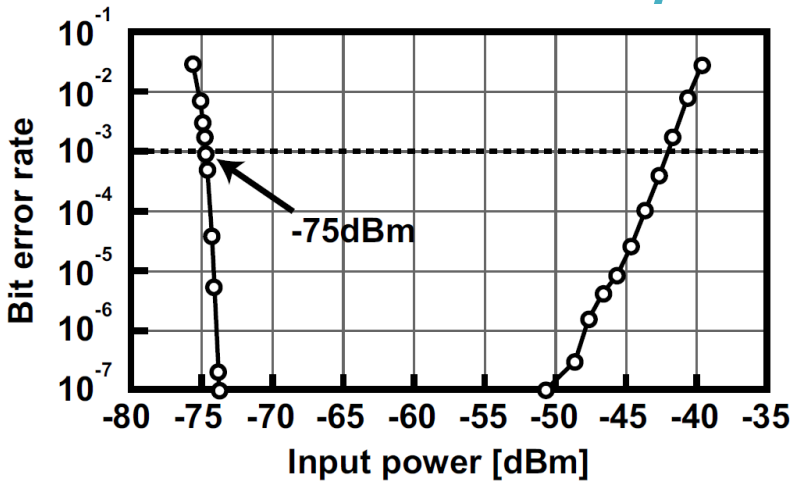

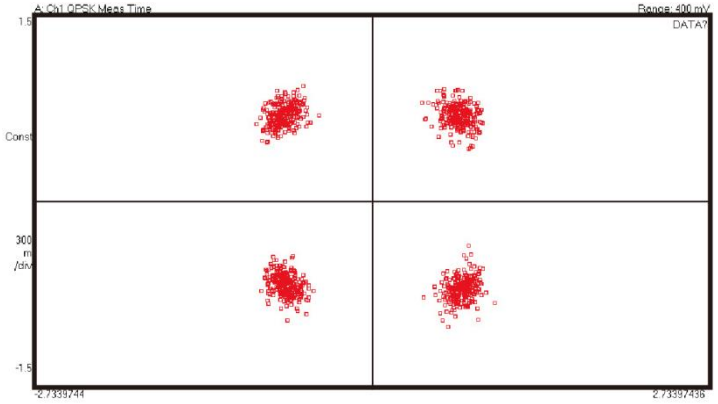

We achieved a 0.5-V 5.8-GHz Low Power Transceiver

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