4A-18

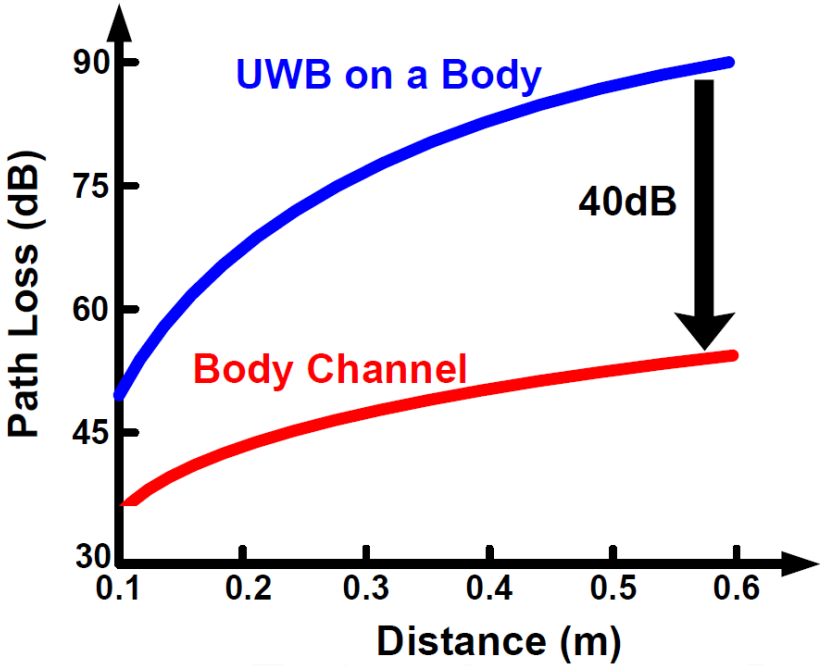
A 16.6-pJ/b 150-Mb/s Body-Channel Communication Transceiver with Decision Feedback Equalization Improving >200x Area Efficiency

Ji-Hoon Lee, Kwangmin Kim, Minsoo Choi,
Jae-Yoon Sim, Hong-June Park, and Byungsub Kim

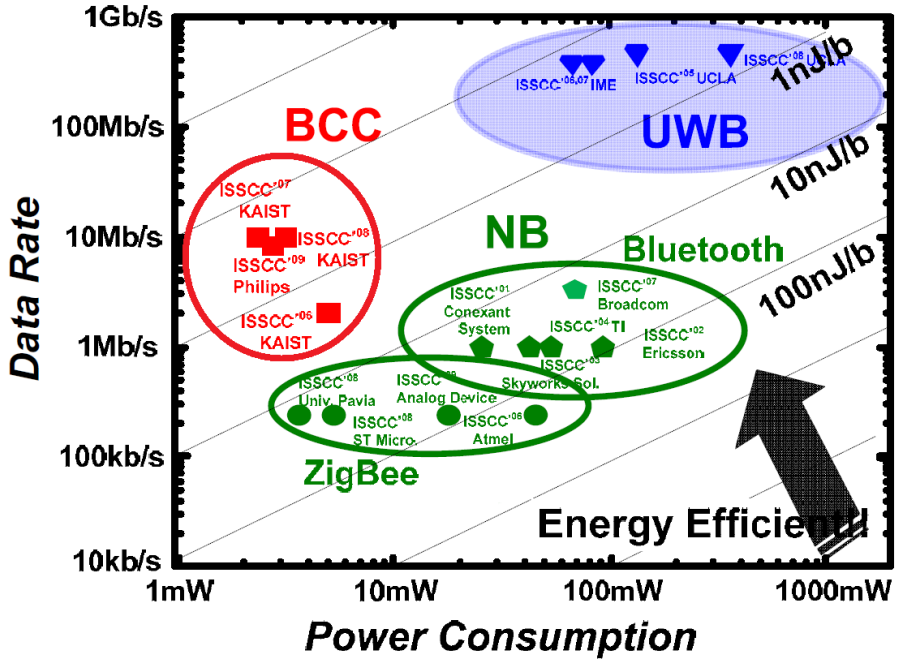
Pohang University of Science and Technology

Body-Channel Communication

- Narrowband (NB)
- Ultra-wideband (UWB) } Air
- Body-channel communication (BCC) } Human body



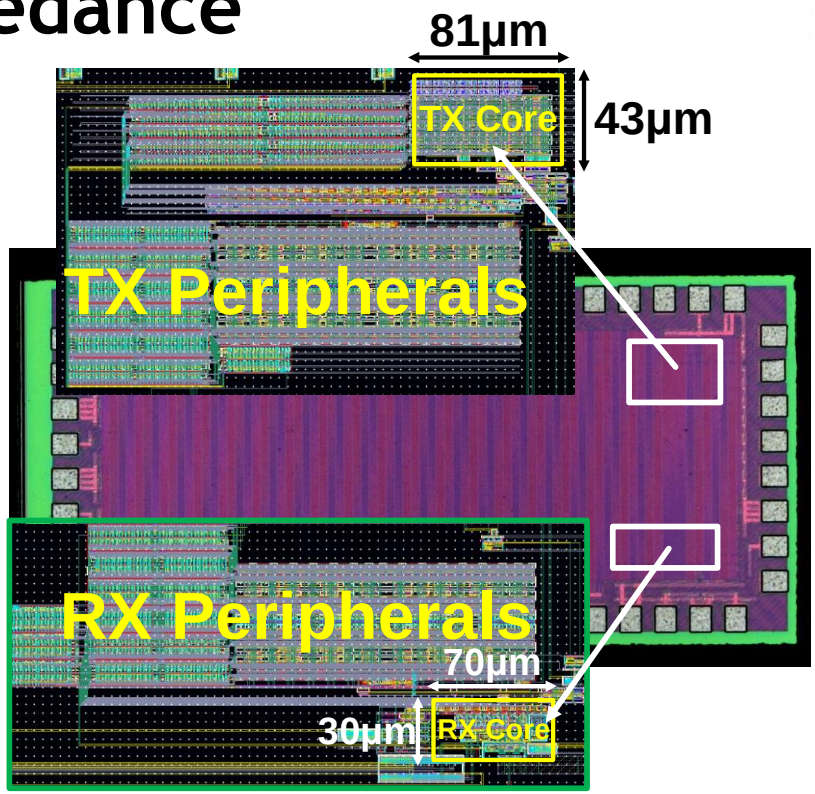
[1] A. Fort *et al*., "Ultra-wideband Channel for communication around the human body," *IEEE J. Sel. Areas Communications*
[2] J. Bae *et al*., *IEEE ISSCC*, Feb 2011

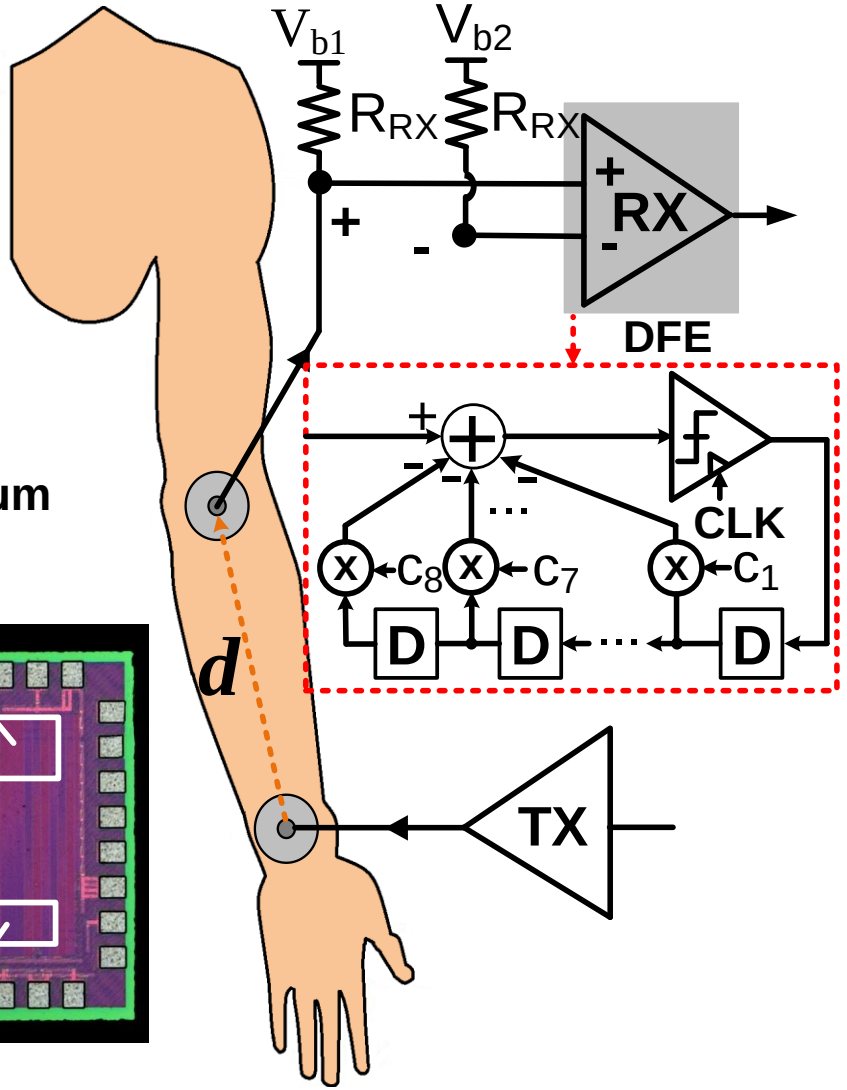


J. Bae *et al*., "A 0.24-nJ/b wireless body-area-network transceiver with scalable double-FSK modulation," *IEEE JSSC*

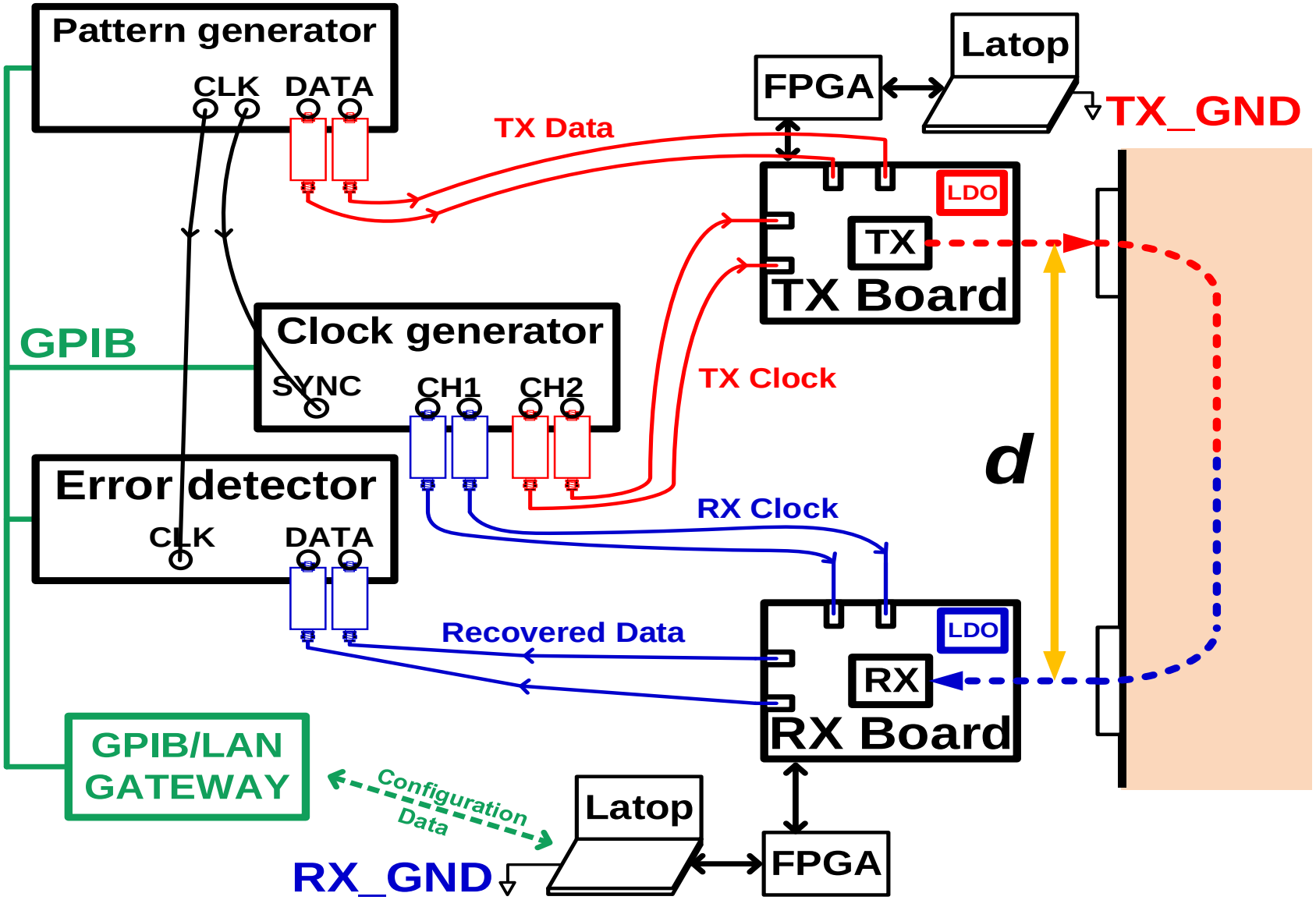
DFE-based BCC Transceiver

- Capacitive-coupling
- Voltage-mode TX
- Bias Voltage
- RX impedance
- DFE RX

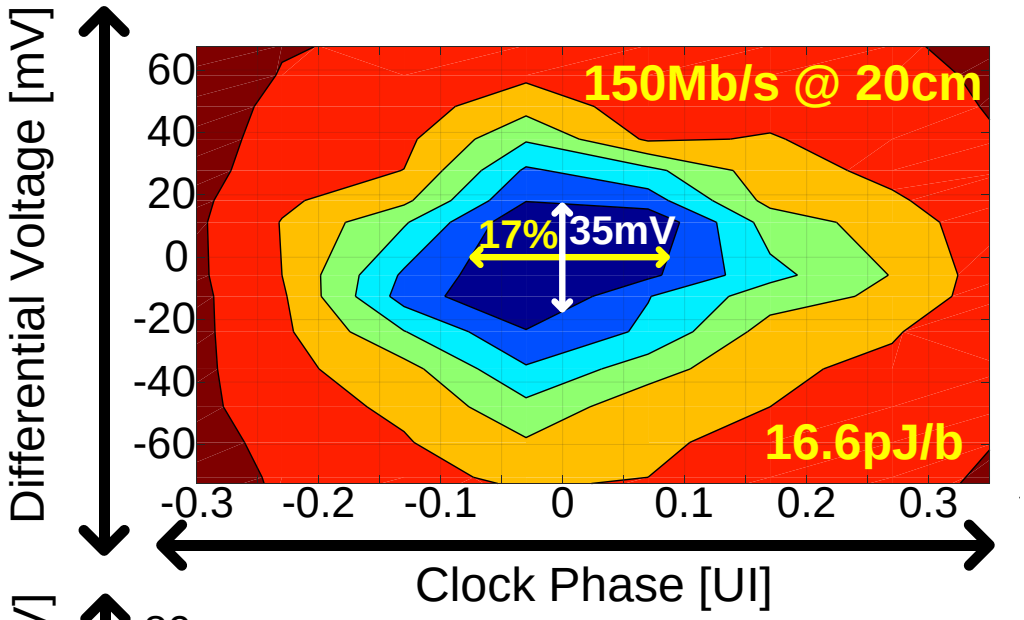


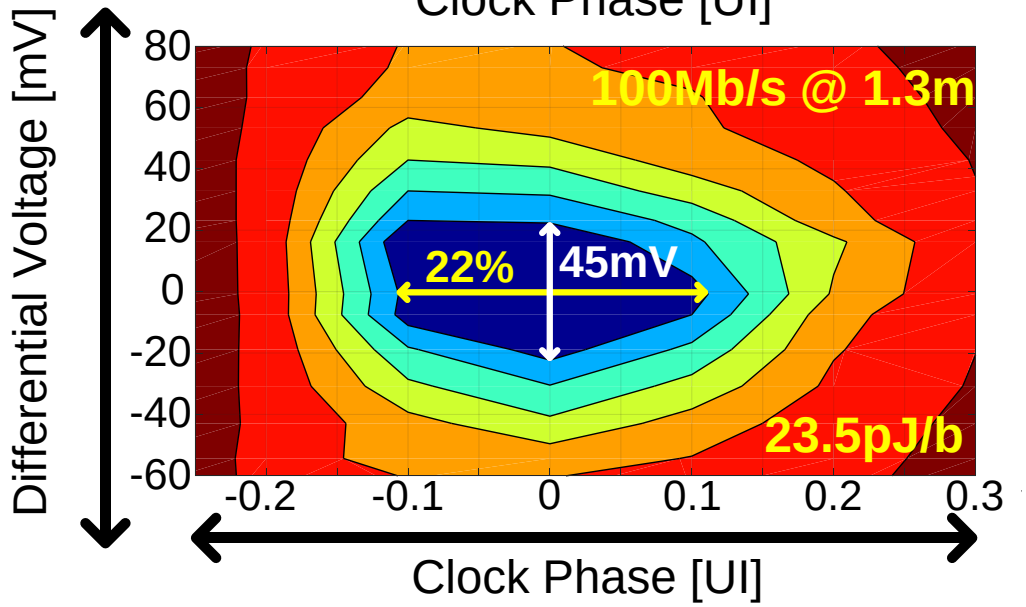


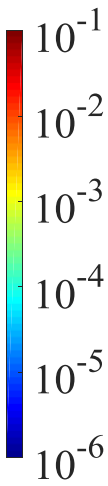
Measurement Setup

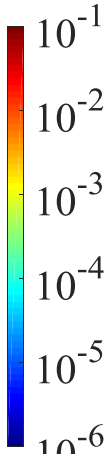


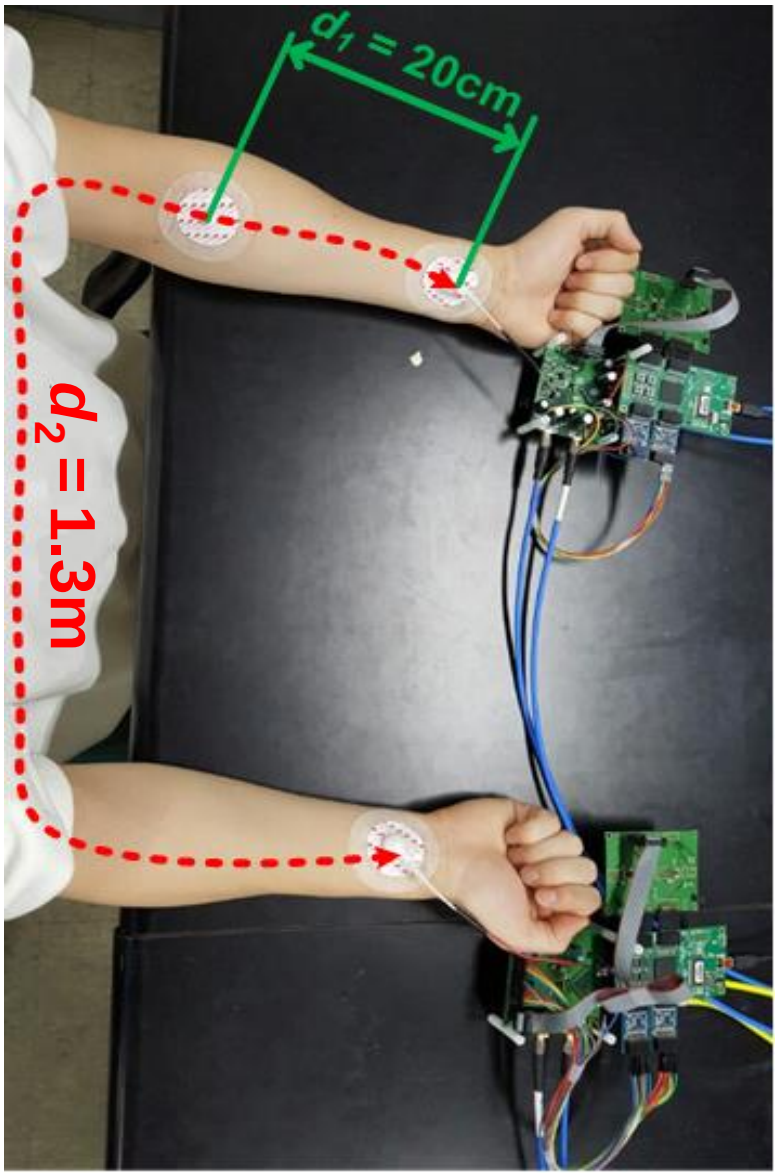
Results


150Mb/s @ 20cm
17%
35mV
16.6pJ/b
Differential Voltage [mV]
Clock Phase [UI]
60
40
20
0
-20
-40
-60
-0.3
-0.2
-0.1
0
0.1
0.2
0.3


100Mb/s @ 1.3m
22%
45mV
23.5pJ/b
Differential Voltage [mV]
Clock Phase [UI]
80
60
40
20
0
-20
-40
-60
-0.2
-0.1
0
0.1
0.2
0.3


10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}


10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}


d_1 = 20cm
d_2 = 1.3m