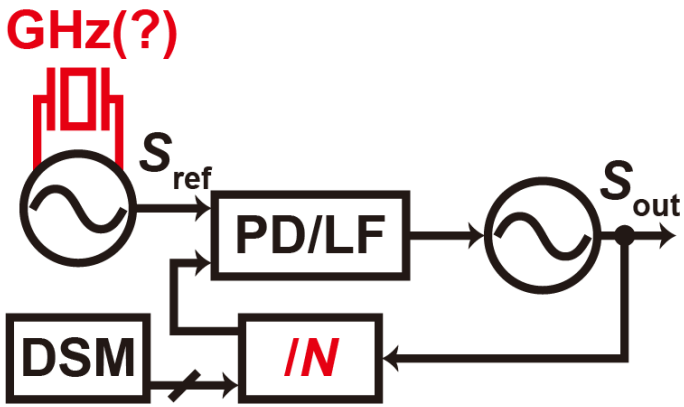
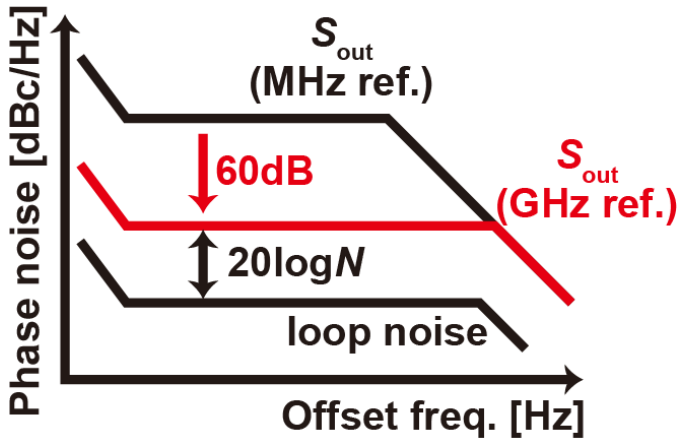
1S-20

Design of High-Frequency Piezoelectric Resonator-Based Cascaded Fractional-N PLL with Sub-ppb-Order Channel Adjusting Technique





$N = f_{out}/f_{ref}$

$S_{out} = N^2 \times$ (loop noise)

GHz-Reference:

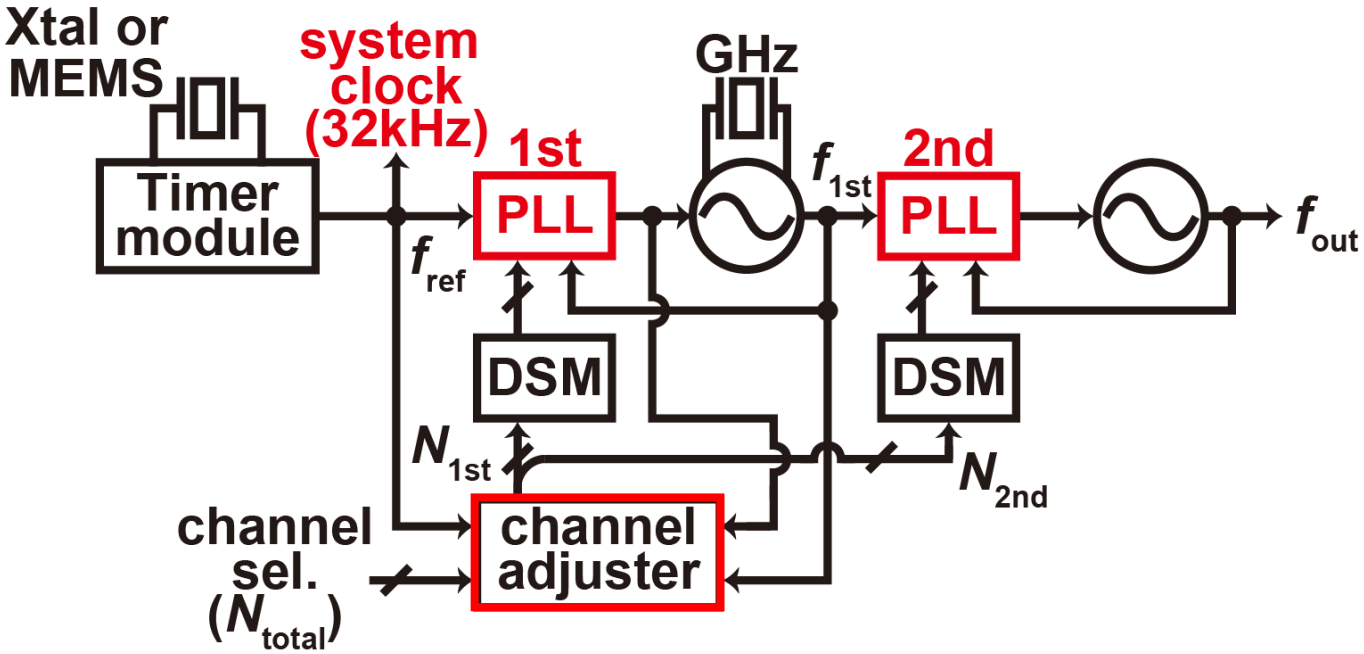
High-Frequency Piezoelectric Resonator

☺ High Q-factor, GHz resonance frequency

☹ **Large process variation**

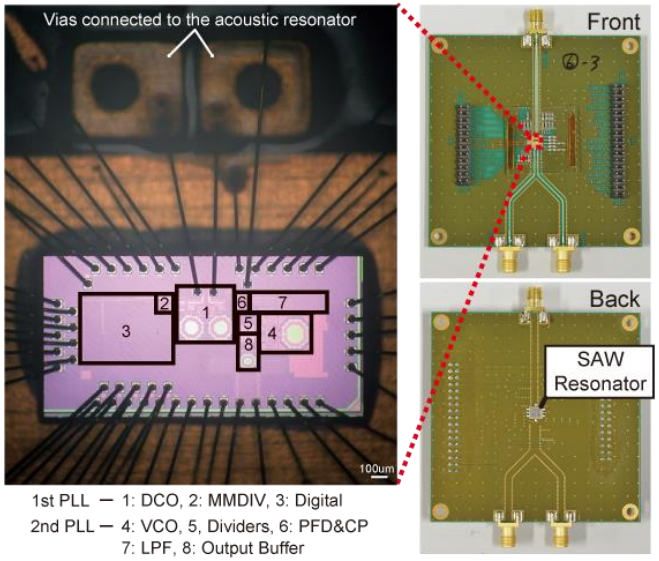
1S-20

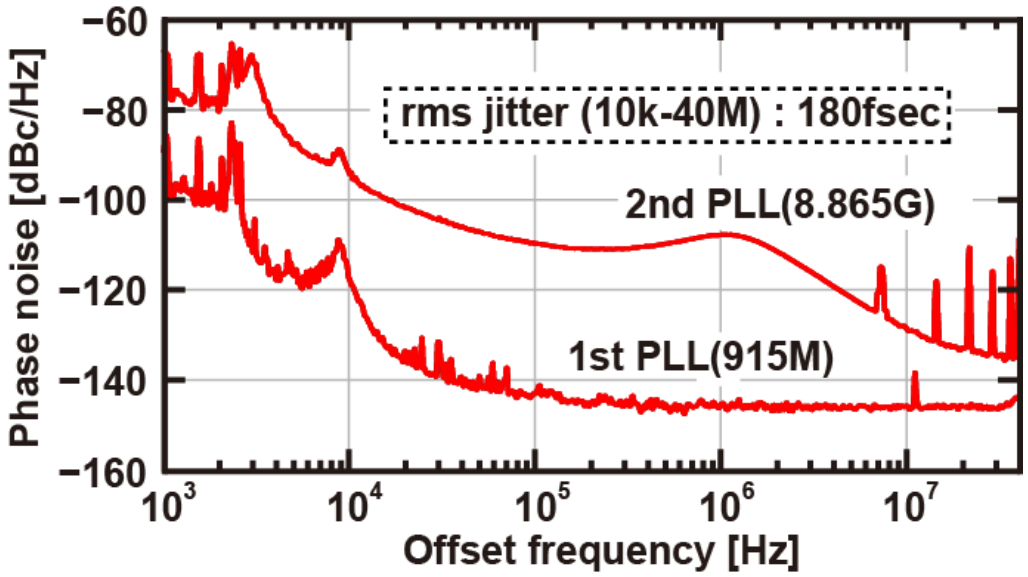
Approach of this work

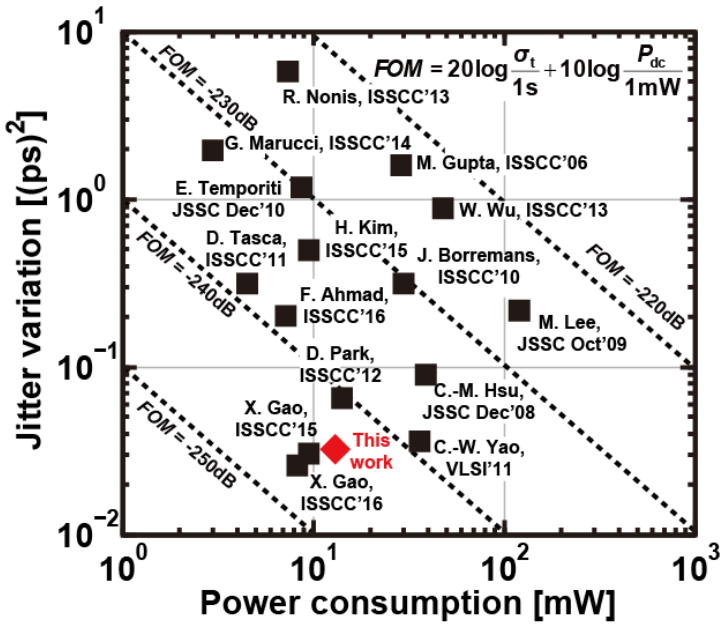


- Cascaded PLL
  - 1st-PLL : Frequency accuracy based on 32kHz-reference
  - 2nd-PLL: Low phase noise with GHz-reference
- Channel adjuster
  - N_{1st} : f_{1st} in tuning range
  - N_{2nd}: N_{total}/N_{1st}

Measurement result







- Fabricated in 65nm CMOS
- 915MHz SAW Resonator as PZR

FOM=−243.9dB

One of the best FOMs is achieved !!