

ABSTRACT

Design of Compact Frequency Synthesizer for Self-Calibration in RF Circuits.

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A compact frequency synthesizer based on a phase locked loop (PLL) is designed for the self-calibration in RF circuits. The main advantage of the presented frequency synthesizer is that it can be built in a small silicon area using MOSFET interface trap charge pump (ITCP) current generators. The ITCP current generator makes it possible to use small currents at nano-ampere levels so that small capacitances can be used in the loop filter. A large resistance, which is required to compensate for the reduced capacitances, is implemented using an operational transconductance amplifier (OTA). An ITCP current generator is used as a tail current source for the OTA in order to realize a small transconductance. The presented frequency synthesizer has the output frequency range from 570 MHz to 600 MHz with a 100 KHz frequency step. Total silicon area is about 0.3 mm^2 using AMIS $0.5 \text{ }\mu\text{m}$ CMOS technology, and the power consumption is 26.7 mW with 3 V single power supply.