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CMOS Ultrawideband Microwave Chaotic Oscillator

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In the report ring oscillator, capable to generate ultrawideband microwave chaotic signal with uniform power spectral density, is considered. This oscillator realized as an integrated microcircuit on 180 nm CMOS process and consists of three microwave amplifiers and a frequency selective circuit connected in series in a closed loop. Simulation results of the oscillator circuit, its topology and its experimental realization are presented. Basic dynamics of the oscillation modes is described. The fact of the chaotic oscillations generation is shown. Bifurcation phenomena are analyzed. It is proved that chaotic oscillations are excited on the basis of mechanism of double-frequency oscillations mode destruction.
The described CMOS oscillator can be used in different wireless communication applications as a compact device for ultrawideband microwave chaotic signal generation.