Abstracts

MMIC 14-GHz VCO and Miller Frequency Divider for Low-Noise Local Oscillators

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An MMIC voltage-controlled oscillator and an MMIC frequency divider are developed and applied to a 14-GHz low-noise local oscillator. To obtain both wide tuning range and low pulling figure, the source-follower FET circuit is used in the voltage-controlled oscillator. A wide-band balanced mixer and a filtering amplifier are integrated in a single chip and constitute the Miller frequency divider. The MMIC's were assembled into a 14-GHz phase-locked loop in order to demonstrate that they will operate as key components of low-noise oscillators. It is shown experimentally that even for low-Q MMIC circuitry, the carrier noise of the oscillator is reduced enough for practical purposes such as space-borne heterodyne receivers, transmitters, and radio repeaters in Ku-band satellite communication systems. Thus, prospects are bright for development of single-chip microwave low-noise oscillators.

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