Extremely Low-Phase Noise X-Band Field Effect Transistor Dielectric Resonator Oscillator

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The 9 GHz Field Effect Transistor (FET) Dielectric Resonator Oscillator (DRO) presented in this paper represents the best X-band DRO reported to date. The merit of the oscillator was determined by measuring the loaded quality factor, single sideband phase noise and frequency stability of the device. Additionally, the residual phase noise of the dielectric resonator and the FET amplifier were measured to determine the limiting element in the oscillator. The 9 GHz FET DRO displays a single sideband phase noise which is 3 dBc/Hz better than the previous state-of-the-art, while it exhibits a frequency stability of 0.65 ppm/K.

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