Abstracts

Phase-locked-loop control of active microstrip patch antennas

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Active patch antennas are simple to fabricate, compact, and low cost, but have inherently poor phase noise and stability. In this paper, a phase-locked loop (PLL) integrated with a 4-GHz active patch antenna was investigated in order to reduce the phase noise and stabilize the frequency of the oscillator. Both these aims were realized by careful integration and optimization of the PLL parameters. Experimental results showed that a phase noise reduction in excess of 55 dB was achieved using this technique. A standalone voltage-controlled oscillator and passive patch technique can provide lower phase noise, but the active patch lends itself to effective integration. Measurement techniques were demonstrated to measure the phase noise and stability of the patch oscillator.

❑ Return to main document.