Abstracts

Experiments on Injection Locking of Active Antenna Elements for Active Phased Arrays and Spatial Power Combiners

K. Chang, K.A. Hummer and J.L. Klein. "Experiments on Injection Locking of Active Antenna Elements for Active Phased Arrays and Spatial Power Combiners." 1989 Transactions on Microwave Theory and Techniques 37.7 (Jul. 1989 [T-MTT]): 1078-1084.

Two types of active antenna elements have been studied experimentally. One type uses a microstrip antenna with an active device mounted directly on the antenna. The other uses an active device coupled to a microstrip patch antenna through an aperture. Microstrip active antenna elements and two-element arrays have been demonstrated for both types of circuits. Injection locking of the antenna elements has been achieved through space and mutual coupling. The circuit Q factor was calculated based on the locking gain and the locking bandwidth. The power output from two elements has been successfully combined in free space with a combining efficiency of over 90 percent. For a single active antenna with a Gunn diode mounted directly on the patch, an electronic tuning range exceeding 9 percent has been achieved by varying the dc bias. The results should have many applications in low-cost active arrays, active transmitters, and spatial power combiners.

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