Abstracts

A novel amplifying antenna array using patch-antenna couplers-design and measurement

Chih-Hung Tsai, Y.A. Yang, Shyh-Jong Chung and Kai Chang. "A novel amplifying antenna array using patch-antenna couplers-design and measurement." 2002 Transactions on Microwave Theory and Techniques 50.8 (Aug. 2002 [T-MTT]): 1919-1926.

This paper proposes a novel amplifying antenna array using the patch-antenna coupler formed by placing one or two open-ended microstrip lines (coupled lines) near and along the nonradiating edge(s) of a patch antenna. An X-band five-element array with broadside 25-dB Chebyshev radiation is demonstrated. When the input signal is fed to the center element, with most of the power radiating from the antenna, part of it is tapped to the coupled lines, amplified by an FET amplifier, and fed to the next antenna element. This process is repeated after all the antenna elements are fed with suitable power. The amplitude distribution of the fields radiated from the antennas is controlled by the coupling coefficient from the patch to the coupled line, which, in turn, is governed by the coupling length and gap between the patch and line. The measured return loss of the designed five-element array is -27 dB at the center frequency of 10 GHz with 2% 10-dB bandwidth. The radiation pattern possesses a transmitting gain of 15.9 dB, a half-power beamwidth of 17/spl deg/, and a sidelobe level of -22 dB.

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