Abstracts

Integrated active antenna array using unidirectional dielectric radiators

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In this paper, design considerations and experimental investigations of an integrated active antenna for space power combining that makes use of unidirectional dielectric radiators (UDRs) are presented and discussed. Attractive electrical performance stemming from proprieties of nonradiating dielectric waveguide structures is used to design a prototype at a frequency of 14 GHz. A UDR feed circuit is implemented by microstrip lines and aperture-coupling is studied experimentally for arrays of two, four and eight radiators. Measurements show high coupling and radiation efficiencies of the proposed excitation method. A power-combining efficiency of 89% was measured and a gain of 23.1 dBi was achieved for an antenna with eight radiators and four amplifiers. It is also shown that such a circuit configuration allows the combination of planar Ku-band monolithic hybrid microwave integrated circuit and UDR components in flexible design of active array antennas.

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