Abstracts

High-gain meanderless slot arrays on electrically thick substrates at millimeter-wave frequencies

Meide Qiu, M. Simcoe and G.V. Eleftheriades. "High-gain meanderless slot arrays on electrically thick substrates at millimeter-wave frequencies." 2002 Transactions on Microwave Theory and Techniques 50.2 (Feb. 2002 [T-MTT]): 517-528.

Introduces new techniques and architectures for the implementation of linear slot arrays on electrically thick dielectric substrates at millimeter-wave frequencies. The slot arrays are fed by a coplanar waveguide series line and lead to high gain by utilizing the phase cancellation technique to reduce coupling to the dominant surface-wave mode. Unlike traditional designs, no meander lines are used in the proposed structures, easing their fabrication by eliminating the need for air bridges and leading to patterns with low cross-polarization and high gain. In addition, the option of including a backing ground reflector to render the patterns unidirectional is explored and implemented. In this latter case, it is shown that simultaneous reduction of the dominant surface-wave and TEM modes through phase cancellation can be achieved. The design of the proposed arrays is based on an intuitive transmission-line model, which enables the implementation of arrays with a gradual current taper and, thus, maximum gain. This study is verified experimentally around a nominal frequency of 27.8 GHz.

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