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Transmission-Line Metamaterial Design of an Embedded Line Source in a Ground Recess

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Abstract
A transmission-line metamaterial design of a material-embedded electric line source radiating inside a ground recess is investigated. The media embedding the recessed line source are designed such that the embedded current creates the same radiation pattern as a line source over a flat conducting ground plane. Transmission-line metamaterial unit cell designs for the embedding media obtained from the transformation electromagnetics design technique are shown. The metamaterial design of the overall embedded source configuration is numerically tested using circuit simulations. It is shown that the embedded-source design creates the same radiation characteristics as the line source above a flat ground plane at the design frequency.

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