Abstracts

Coupler-Type Bend for Pillbox Antennas

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A new type of 180° H-plane bend has been developed for use in double-layer pillbox antennas. This bend, called a coupler-type bend, permits complete coupling between two pillbox layers with a minimum of reflection, cross-polarization, and defocusing. It can be used with short focus antennas where large feed angles are involved. The coupler-type bend utilizes a metal plate between the pillbox layers; the plate coutains a pattern of holes which achieves the desired coupling. Analytical and experimental programs have been implemented to determine the optimum hole size and distribution. Simulation techniques in rectangular waveguide were employed for convenience in measurements. The bend design was measured to have a reflection less than 2 dB SWR over a ten percent frequency band; this is computed to contribute less than 0.2 dB SWR to the reflection seen by the feed-horn of a double-layer pillbox. The bend introduces less than --22 dB of cross-polarization in the antenna radiation. Measurements of a pillbox model incorporating the bend design have verified the predicted performance of the coupler-type bend.

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