Abstracts

Low-loss RF transport over long distances

M. Friedman and F. Fernsler. "Low-loss RF transport over long distances." 2001 Transactions on Microwave Theory and Techniques 49.2 (Feb. 2001 [T-MTT]): 341-348.

Electromagnetic RF energy can be transported over a kilometer or more using antennas, but the efficiency is low unless the injecting and receiving antennas are extremely large. Other means of transporting RF energy such as waveguides and coaxial lines are cumbersome, heavy, costly, and suffer large attenuation. This paper offers a different system for long-distance RF transportation. The key is to use nonradiating electromagnetic surface waves that propagate along thin metallic strips. This means of moving RF energy between two points is simple, inexpensive, lightweight, and has low attenuation. For example, the attenuation is less than 2 dB/km for an Al foil 6-cm wide and 0.002-cm thick. Thus, efficient guidance of surface waves over distances of many kilometers requires neither large antennas, waveguides, nor coaxial lines. Moreover, electric interference with the surroundings is minimized due to the large reduction in the radial extension of the electric field, and the conversion of the radiating electromagnetic waves to surface waves and back is efficient (up to 90%).

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