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(54) **INTEGRATED PLANAR ANTENNA PRINTED ON A COMPACT DIELECTRIC SLAB HAVING AN EFFECTIVE DIELECTRIC CONSTANT**

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(52) **U.S. Cl.** **343/770; 343/700 MS; 343/769**

(58) **Field of Search** **343/767, 769, 343/770, 700 MS, 795, 895, 753, 911 L, 911 R**

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(57) **ABSTRACT**

An integrated planar antenna including a metalized ground plane printed on a dielectric slab. One or more slot antenna elements are etched into the metalized layer, and resonate at a particular resonant frequency band. A plurality of voids extend through the slab and act to vary the dielectric constant of the slab so that resonant waves are suppressed in the slab, thus reducing power loss in the antenna. The voids can be selectively localized in the slab to provide various functions, such as impedance matching and reduction of antenna element coupling. The voids can take on any shape and configuration in accordance with a particular antenna design scheme so as to optimize the effective dielectric constant for a particular application. In one particular design, the voids are formed in a random manner completely through slab, and the voids have an opening diameter less than 1/20th of the operational wavelength of the antenna. The voids are formed by a suitable mechanical or laser drilling operation.

26 Claims, 6 Drawing Sheets

