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[54] **PLANAR ANTENNA INCLUDING A SUPERSTRATE LENS HAVING AN EFFECTIVE DIELECTRIC CONSTANT**

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[52] U.S. Cl. **343/753; 343/700 MS; 343/909; 343/911 R**

[58] Field of Search **343/753, 754, 343/911 R, 911 L, 770, 769, 767, 771, 853, 872, 700 MS, 909; 342/175**

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[57] **ABSTRACT**

A planar antenna that includes a high dielectric constant superstrate lens having a plurality of air holes that vary the actual dielectric constant of the lens to provide an effective dielectric constant superstrate lens. The holes 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 holes are formed in a random manner completely through superstrate lens, and the holes have an opening diameter less than 1/20th of the operational wavelength of the antenna. The holes act to vary the dielectric constant of the superstrate lens so that the resonant waves do not form in the lens, thus reducing power loss in the antenna. The holes are formed by a suitable mechanical or laser drilling operation.

31 Claims, 4 Drawing Sheets

