Kanlioglu, Osman, “Analysis and Design of Via Loaded Microstrip Antennas”

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Shorted Annular Ring Reduced Surface Wave Antennas (SAR-RSW) may be fabricated from annular ring microstrip antennas by short-circuiting the inner boundary to the conducting ground plane with conducting vias. For this and other application (e.g., miniaturization of antennas, dual band UHF antennas), circular arrays of shorting vias are encountered. An accurate analysis of such geometries is thus important. In the present investigation the analysis of a general circular array of vias is developed.

For comparison, two different models are used to calculate the reflection coefficient: cylinder model and strip model. An unknown current density is found using EFIE method. Analytical expressions are developed for reflection coefficient, sheet impedance and surface impedance models of the via array. Ansoft HFSS is used to verify the analytical results.

Also, as practical examples, several RSW-GPS Antennas, Miniaturized Circular Microstrip Antennas and Monopole-like Pattern UHF Band Antennas are developed using the analysis of circular via array.