Abstracts

Effect of internal reflections on the radiation properties and input impedance of integrated lens antennas-comparison between theory and measurements

M.J.M. van der Vorst, P.J.I. de Maagt, A. Neto, A.L. Reynolds, R.M. Heeres, W. Luinge and M.H.A.J. Herben. "Effect of internal reflections on the radiation properties and input impedance of integrated lens antennas-comparison between theory and measurements." 2001 Transactions on Microwave Theory and Techniques 49.6 (Jun. 2001, Part I [T-MTT]): 1118-1125.

This paper presents the effect of internal reflections on the beam pattern and input impedance of integrated lens antennas. A silicon lens was designed and manufactured, and measurements were conducted at a frequency of 100 (impedance) and 500 GHz (beam pattern). A frequency-dependence characterization of the beam pattern clearly showed the existence and impact of internal reflections. The measurements confirmed that most of the frequency variations of the beam pattern could be attributed to internal reflections, as predicted by the model. An on-wafer measurement strategy for determining the antenna impedance at millimeter-wave frequencies is presented. The validity of the model was also proven by an excellent match of the input impedance measurements and predictions. Not only the level, but also the oscillation on the impedance curve was predicted accurately. Initial space qualification was performed in the form of thermal cycling.

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