525. Title:A Ka-band quasi-optical power-divider basing on Talbot Effect of phase grating
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Abstract:A new design of quasi-optical (QO) power divider at millimeter wave band is presented in this article. The Talbot Effect of periodical phase grating is applied to realize power dividing with high efficiency. A novel periodic phase profile was adopted to make a linear region of zero diffraction filed. Then a closed metallic cavity can be used to screen the power divider with the wall placed in this region without disturbance to field distribution and efficiency degrading, which improves electromagnetic compatibility of QO power combining system greatly. The Scalar Diffraction theory is applied to analyze the "Talbot Pattern" and then generic algorithm is used to optimize the phase profile. A 1 x - 18 divider was designed and tested at 37.5GHz. The efficiency is tested to be 80.8%, which is well agreed with the simulated value of 88.7%. Since efficiency of QO power divider/combiner is essentially independent of the number of combining elements and the inter-element spacing, this technology can be extended to power dividing or combining of large number of ways up to THz band. © 2011 Wiley Periodicals, Inc. Microwave Opt Technol Lett 53:1331-1336, 2011; View this article online at wileyonlinelibrary.com. DOI 10.1002/mop.25975 Copyright