Low-Frequency Surface Plasmon Polaritons Guided on a Corrugated Metal Striplines with Subwavelength Periodical Inward Slits

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Abstract

A new type of stripline-based microwave transmission, which has relatively lower crosstalk compared with the conventional striplines, is proposed. The structure is formed by corrugated inward slit that is subwavelength scale on the edge of the stripline via the photolithography techniques. Numerical simulation is used to analyze the transmission and dispersion properties of this new stripline structure, and the results are experimentally verified in the frequency range from 200 MHz to 8 GHz. We found that spoof surface plasmon polaritons are supported on the new stripline structure whose electromagnetic fields are highly localized near the stripline, and hence the coupling is suppressed between the present type of stripline and the conventional stripline. For a structured stripline and a conventional stripline which are parallelly placed and separated by a distance of the stripline width, the crosstalk between them ranges from 17.13 to 64.89 dB, which is much lower than the crosstalk between two coupled conventional striplines. As this new type of stripline has such an important advantage, it would be applicable to high-density microwave circuits or high-speed circuits.

Keyword：Crosstalk . Spoof surface plasmon polaritons,Stripline