

## Liquid-Crystal Microwave Phase-Shifters for Electronic Scan Antennas

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Liquid crystals known for their applications in visualisation have interesting features for electrically tunable microwave devices [1-3]. These devices are based on strip-lines structures with modification of the guided wavelength obtained with external driving of the effective permittivity [2]. Here, we present an original phase-shifter using nematic liquid crystal and coplanar access lines. These phase-shifters were characterized in the frequency range 5 – 40GHz (figure 1). A phase-shift variation of 0.42°/GHz/cm is obtained for a driving of 10V. Several phase-shifters are integrated into an antenna network working at 32 GHz. Phase-shifters allow direction scanning.

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(2) B. Splingart, N. Tentillier, F. Huret, C. Legrand *Molecular Crystals and Liquid Crystals* **2001**, 368, pp183-190

(3) F. Dubois, F. Krasinski, B. Splingart, N. Tentillier, C. Legrand, A. Spadlo, R. Dabrowski *Japanese Journal of Applied Physics* **2008**, 47, pp3564-3567

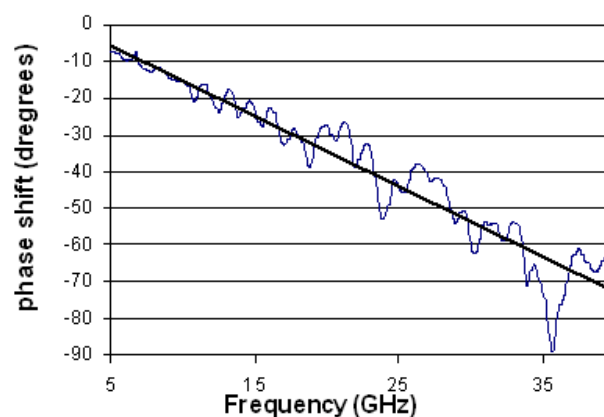


Figure 1. Phase-shift variation versus frequency (bias voltage 10V).