Abstracts

Ferroelectric Phase Shifters

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A diagram of the microstrip ferroelectric phase shifter is shown in Fig. 1(a). The nominal thickness of the ferroelectric material is 10 mils. As the dielectric constant of the ferroelectric is very high, the impedance af the microstrip line (/spl sim/15 mils wide) is comparatively low. For matching purposes quarter-wave transformers of Ti0/sub 2/ were used. A ceramic ferroelectric material containing 68.5 per cent SrTi0/sub 3/ and 31.5 per cent PbTi0/sub 3/ (PS 68.5) was used in the experiments. For a TEM-mode propagation the insertion phase of a transmission line of length 1 is given by beta 1. Fig. 2 shows the insertion phase of one of the units as measured with a phase discriminator. The total insertion phase at 3.05 Gc/S is 4.434 lambda. Substracting the insertion phase of the connectors and the quarter-wave transformers the insertion phase of the ferroelectric material alone is 3.486 lambda. On the application of a biasing voltage, the differential phase shift is given by Delta phi=(beta1 - beta2) where beta1 and beta2 are the phase constants without and with bias respectively.

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