Abstracts

Design and development of ferroelectric tunable microwave components for Kuand K-band satellite communication systems

F.A. Miranda, G. Subramanyam, F.W. Van Keuls, R.R. Romanofsky, J.D. Warner and C.H. Mueller. "Design and development of ferroelectric tunable microwave components for Kuand K-band satellite communication systems." 2000 Transactions on Microwave Theory and Techniques 48.7 (Jul. 2000, Part II [T-MTT] (Special Issue on Microwave and Communication Applications at Low Temperature)): 1181-1189.

Integration of a high-temperature superconductor with a nonlinear dielectric ferroelectric such as strontium titanate, i.e., SrTiO/sub 2/ (STO), has created a new class of electrically tunable low-loss microwave components. We have designed and fabricated frequency and phase agile components using a conductor/ferroelectric/dielectric two-layered microstrip configuration. Some examples of these components are: microstrip ring resonators, local oscillators, edge coupled filters, and phase-shifter circuits. These structures have been fabricated using YBa/sub 2/Cu/sub 3/O/sub 7-/spl delta// or gold conductor-based microstrip lines fabricated on lanthanum aluminate (LaAlO/sub 3/) or magnesium oxide (MgO) substrates coated with an STO thin film. Frequency and phase agility are achieved using the nonlinear dc electric-field dependence of the relative dielectric constant of STO ferroelectric thin him (E/sub rSTO/). In this paper, we will present an assessment of the progress that our group has achieved thus far toward integration of this technology into wireless and satellite communication systems.

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