

Printed Phase Shifters for Antenna Arrays

Speaker: Shokat Ganjehezadeh Rohani, Mahdi Haghzadeh, Craig Armiento, and Alkim Akyurtlu,
Electrical and Computer Engineering Department, Printed Electronics Research Collaborative,
Raytheon – UMass Lowell, Lowell, MA

E-Mail: Shokat_GanjehezadehRohani@student.uml.edu

Abstract

This work presents design and fabrication processes for creating fully printed flexible phase shifters for conformal flexible hybrid phased array antennas. In our previous work, a fully printable and conformal antenna array on a flexible substrate with a new Left-Handed Transmission Line (LHTL) phase shifter based on a Barium Strontium Titanate (BST)/polymer composite ink was computationally studied for radiation pattern correction and beam steering applications. In this work, additive manufacturing techniques were used to demonstrate experimentally phase shifters for beam steering capabilities for a planar array. An Aerosol Jet direct-write printer was used to print phase shifter with the BST ink that were integrated with a series fed antenna array. This talk will describe the design of the series fed array, design of the phase shifters, and details of the fabrication process will be described. Specifically, details of the optimization for the phase shifters and the resulting experimental results will be shown. This work demonstrates the specific technologies including direct writing processes for flexible antenna arrays and integration of low cost printed phase shifters.