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DESIGN OF WIDEBAND MICROSTRIP PATCH ANTENNA FOR DEEP SPACE COMMUNICATION

Abstract

The work describes the development of Microstrip patch antenna for deep space network operating in the multi band spectrum. To attain multiband functionality multiple Microstrip patch antenna is integrated to form an array. The array technique provides multiband resonance as well as efficient omnidirectional radiation pattern. The High Frequency Structure Simulator is used to evaluate the design outputs. The operating frequency is chosen on C band or X band spectrum and focused towards attaining results between the C and X bands. The C band requires less power to transmit rather than the K band transmission. Another disadvantage at the K band is 'Rain fading' where the signals are degraded at the rainfall and snowfall areas. C band operation proves efficient at these areas. And X band is proven to be a best communication spectrum for military applications as well as deep space networks. Thus the experimental analysis is focused at these bands. Further in the array design the reconfigurablity, switch insertion, matching network design, and other issues are addressed.

This work describes the integration of commercially available packaged radio frequency micro-electromechanical system (RF MEMS) switches with radiation pattern reconfigurable Microstrip antennas. Most applications of RF MEMS switches consider the switches as only circuit elements. In contrast, the implementation of packaged switches in this particular antenna must address not only the simple open/closed behavior of the switches but also their impact on the radiation characteristic of the reconfigurable antenna. Thus Details of the antenna design are shown, and the measured results for the constructed prototype are also exhibited and discussed.