Abstract

This paper deals with the fabrication and characterisation of microstrip patch antenna on a flexible substrate. The flexible planar antenna finds wide applications in defence, satellite, medical and automobile industries. Nowadays it is the most researched topics across the world. The flexible antenna gets conformal to the surface and can be used across curved surfaces. An antenna using room temperature vulcanizing silicone rubber compound is used as substrate on which the patch antenna is fabricated. Patch size was chosen such that the antenna resonates at 4.5 GHz. The substrate material used was characterised for its dielectric properties using Vector network analyzer (VNA). The resonant frequency does not show
variation when the antenna is folded up to an angle of 30° from its centre feed location. The antenna with measured substrate properties was also simulated in High Frequency Structure Simulator (HFSS). Measured results for resonance frequency are in close approximation with that of simulated one. Slight variation in resonant frequency may be due to finite ground plane dimensions and variation of feed location. Silicone compound offers the flexibility of adding magnetic materials to alter the dielectric and magnetic properties, resulting in further miniaturisation. The simulation and measured results suggest that flexible substrate antenna can be successfully used for miniaturisation and with curved surfaces.

References

- Xi, J., H. Zhu, and T. T. Ye, Exploration of printing-friendly RFID antenna designs on paper substrates; IEEE Int. Conf. on RFID, 38–44, April 2011.
- Sharma Neeraj, 2015; Comparative Study of Microstrip Rectangular Patch Antenna on different substrates for Strain Sensing Applications; ARPN Journal of Engineering and Applied Sciences Vol. 10, NO 19, October.
- Saini A, Thakur P., Matching permeability and permittivity of Ni0.5Zn0.3Co0.
Design and Fabrication of Microstrip Patch Antenna on Flexible Epoxy Substrate Material

2In0. 1Fe1. 9O4 ferrite for substrate of large bandwidth miniaturised antenna\textquotedblright, Journal of Material Science: Materials in Electronics (Springer), Vol. 27, Issue 3, pp 2816-2823, March 2016.

- Saini A, Rana K, Thakur A., Thakur P., Queffelec P., Mattei JL. \textquotedblright;Low pass Composite nano ferrite with matching permittivity and permeability in UHF band\textquotedblright; Material Research Bulletin, 76:94-9, 2016.


Index Terms

Computer Science Wireless

Keywords

Microstrip Antenna Flexible Substrate Hfss Vna.