Abstract

This paper presents a new method to improve isolation between two loop antennas with absorber cells exhibiting negative permittivity and permeability at the aimed frequency of 2.5 GHz [1]. The observed isolation was around -17 dBs when separation between Microstrip antennas was $\lambda/24$. The Separation of $\lambda/24$ was 5.2 mm at 2.5 GHz and it was insufficient to provide desired radiation pattern and impedance bandwidth. This paper aims at presenting a new technique of isolation between closely spaced antennas that are separated by a distance of $\lambda/16$ at 2.5 GHZ. This technique uses (metamaterials) MTM unit cell that exhibits negative permittivity and permeability. Insertion of negative permeability structure between two loop controls mutual coupling between them by controlling amount wave propagation due to surface wave and near field radiations [2]. Since material offers negative permeability, amount of magnetic coupling was reduced. The MTM Unit Cell having plasma frequency same as loop antenna resonating frequency was designed on FR4 dielectric material. From simulated results negative permeability had been extracted. The MTM is constructed using SRR (split ring resonator) and CSRR (complimentary split ring resonator). The desired result of this technique
Isolation Improvement between Closely Spaced Microstrip Loop Antennas using Metamaterial Structure

is to obtain isolation of more than -20dB at 2.5 GHz. Placement of MTM cell improves the isolation almost by -35 dBs. Remarkable improvement in -10 dB impedance bandwidth had been observed at 2.5 GHz. Proposed technique improves the impedance bandwidth for loop antenna for same number of loops and also improves its radiation pattern for minimum physical separation between loop antennas.

References


Index Terms

Computer Science Wireless

Keywords

Loop antenna, MTM, SRR, CSRR