MIMO-CSRR Antenna for ISM Band Applications

satish kumar (✉ satishattur@gmail.com)

L&T Technology Service <https://orcid.org/0000-0002-9920-1894>

Gunasekaran Thangavel

Higher Colleges of Technology

Said Amer Salim Al Ismaili Ismaili

Higher Colleges of Technology

Balambigai Subramanian

Kongu Engineering College

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Abstract

For the operation of 2.45GHz ISM band, a 2x2 Multiple Input Multiple Output (MIMO) antenna system is designed and fabricated. Complementary Split Ring Resonator (CSRR) is used in the MIMO patch and loaded on its ground plane to miniaturize the single antenna element. The single patch antenna element of 14x18 mm² is fixed in a board of the Designed MIMO antennae system measuring 100x50x0.8 mm³. The antenna is tested by measuring radiation pattern, gain, VSWR, mutual coupling and return loss. The results of the Designed antenna systems are in good agreement with the simulations. In comparison to a conventional microstrip antenna, the Designed antenna achieves a 75% reduction in the resonant frequency.

Full Text

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Figures

Figure 1

Geometry of the single patch: (a) front view; (b) back view

Figure 2

Geometry of the 2x2 MIMO Antenna: (a) front view; (b) back view

Figure 3

Simulated and measured return loss of single patch antenna

Figure 4

VSWR of the Single patch

Figure 5

Return loss of the mimo antenna

Figure 6

Radiation pattern of single path

Figure 7

Radiation pattern of MIMO path

Figure 8

Current Distribution of the Single Patch (a) front view (b) Back view

Figure 9

Current Distribution of MIMO Antenna (a) Antenna port 1 front view is active (b) Antenna port 4 front view is active (c) Antenna port 2 back view is active (d) Antenna port 3 back view is active

Figure 10

Mutual coupling of MIMO Antenna

(a)

(b)

Figure 11

Fabricated structures (a) front view (b) back view