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Gohar Varamini, Asghar Keshtkar, Mohammad Naser-Moghadasi

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Compact and miniaturized microstrip antenna based on Fractal and metamaterial loads with reconfigurable qualification

[1]Gohar Varamini, [2*]Asghar Keshtkar, [1]Mohammad Naser-Moghadasi

[1]Dept. of Electrical and Computer Eng., Science and Research Branch, Islamic Azad University, Tehran-Iran.

[2] Dept. of Engineering and Technology, Imam Khomeini International University (IKIU), Ghazvin, Iran.

E-mail: akeshtkar@gmail.com

[*]Corresponding Author: akeshtkar@gmail.com

Abstract: we have described a compact antenna based on fractal and metamaterial loads techniques. The microstrip patch antenna is assumed as a basic antenna and then the effect of fractal structures is implemented. The fractal patch is considered as a right-handed element and then by adding a left-handed element, the antenna miniaturization is achieved by using the metamaterial loads technique. The equivalent circuit is also used to describe the element effect on miniaturization and parametric models clarify them. The proposed antenna is modified for wireless applications and experimental results confirm our simulation results. In addition, we show that the proposed antenna is suitable for reconfigurable. By joining the unit cells together with various arrangements and changing the effective length, the various inductances can be obtained. Finally, by adding reconfigurable characteristic to the proposed antenna, the gain and radiation pattern can be controlled as shows in this paper. The patch antenna has low bandwidth and gain and so we have developed the patch antenna with defected ground to improve the bandwidth and the Frequency Selective Surface (FSS) is used to achieve higher gain and bandwidth. The final antenna is covering 2.4, 3.5 and 5.5 GHz with higher gain than the patch antenna.

Keywords: Microstrip antenna, metamaterial load, Reconfigurable, CRLH, defected grounded,