

Design and Analysis of Nano Fractal Antenna Protection Chip to overcome crimes against women and remedial measures

Aruna Rani, R. K. Singh, Ashish Negi

Abstract— In this paper novel technology fractal antenna structures are proposed to protect the women and girls from the crimes and brutal mishaps and to provide them a multifunctional, multiband “Nano fractal antenna protection chip”. The novel antenna structures have rectangular shaped and U shaped fractals slots. The novel fractal antennas can reduce the size of antenna and chip. The multi frequencies can be generated and bandwidth can be enhanced. This chip can be easily designed, fabricated and implemented. This chip will automatically activated at the time of abnormal activity. It also gives the remedies to use this technology for women protection. The paper also presents the prototype of the technology.

Index Terms— Fractal, antenna, Nano technology, protection chip, multiband antenna, rectangular, U slot..

I. INTRODUCTION

There are worldwide wireless technologies are available, as the science is at its boom to explore itself. Still we are lagging in the protection of women. Women in the city have several event of harassment to narrate. It is an everyday reality, only the form differs: groping, whistling, touching, pushing around, leaning over and verbal and physical advances. The research support and protect women at any place like autos, buses, trains, subways, streets, station, belong to women as much as they belong to men but is not safe for the women. In a survey conducted by Thomson Reuters trust law women, A hub of information and support for women’s right, India ranked with Afghanistan, Congo, and Somalia as for the most dangerous place for women. The safety increasing need of more compact and portable communications systems. Instead of carrying gadgets or mobile phones in our hand we may patch up or fabricate “Nano Fractal Antenna Protection Chip” with a women. The woman who will wear such chip either as a nano technology uniform[1] or in some other form of gadget will get connected with communication system or satellite and we can trace that women or girl. We can make such chip powerful by introducing the Nano cameras(Button size) and speakers and a safety alarm. Such chip may also be useful for various other defense purposes as per requirement. To implement such technology we need to minimize the size of circuit and shape of antenna. As the size of circuitry has

evolved to transmitter and receivers on a designed nano chip which is further augmented with safety alarm.

By the implementation of above technology, size of antenna will decrease without effecting the radiation efficiency. To minimize the antenna size without effecting the radiation efficiency fractal concept can be implemented. Fractals[2] are based on mathematical concept of geometry. The geometrical shape of fractal antennas has a large effective length, can be designed in various forms. The proposed technology is based on fractals of antenna, this will generate a multiband and multifunctional frequencies. These frequencies can be utilized for detecting 100% accuracy of the location.

II. PROTOTYPE DESIGNING AND FUNCTIONING OF NANO FRACTAL ANTENNA PROTECTION CHIP

At the first stage of designing, the fractals of rectangular and U slotted patch are generated. There is an important relation between antenna dimensions and wavelength. This relation states if antenna size is less than $\lambda/4$ (λ is wave length) then antenna is not efficient because radiation resistance, gain and bandwidth is reduced and therefore antenna size is increased. Fractal geometry is a very good solution for this problem. These structures are recognized by their self similarity[3] properties and fractional dimension. In the recent years, the geometrical properties of self-similar and space filling nature[4] has motivated antenna design engineers to adopt this geometry a viable alternative to meet the target of multiband operation. Fractional dimensions, self-similar and scaling properties, characterize these structures.

antenna are not the ones that we obtained after infinite iteration but those after finite iterations as desired by the designer. The space filling property[5] lead to curves that are electrically very long but fit into a compact physical space. This property can lead to the miniaturization of antennas. In different papers, microstrip fractal antenna has been studied in more cases, Sierpinski patch structure has been used that different researches have been done on size, dielectric layers and feed. In this paper a new rectangular and U slotted fractal is presented. This new fractal antenna has very high bandwidth and good properties.

The antenna has a simple rectangular structure as shown in Fig. 1. The dielectric chosen is Duroid substrate having $\epsilon_r = 2.4$ and a thickness h . The dimensions of patch are approximated by using basic design approach described for microstrip patch antenna[6].

Figure 1 shows the shape of rectangular fractal after 5(Rf1 to Rf5) iterations and Figure 2 shows U slot fractals(UF1 to UF3) after three iterations. These iterations will make significant affect on antenna.

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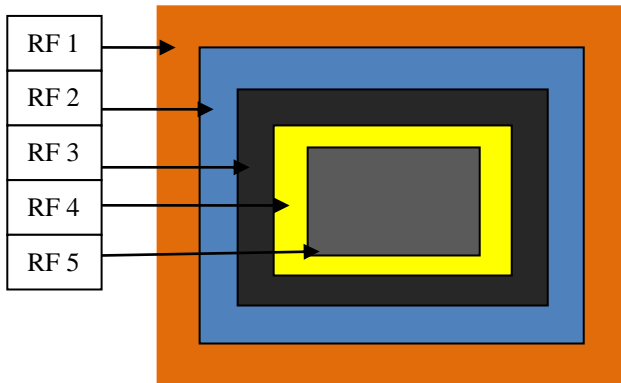


Fig. 1 Fractals of Rectangular Patch

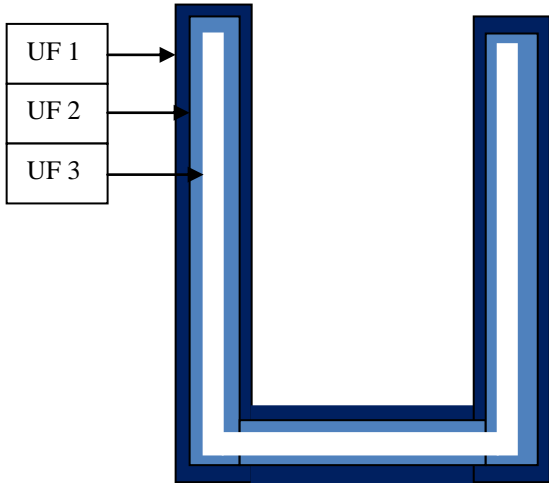


Fig. 2 Fractals of U slot Patch

Figure 3 and figure 4 are showing the rectangular fractals and U slotted fractals mounted on substrate of permittivity($\epsilon_r < 5$) and height h with coaxial feed. Figure 5 shows the nano fractal antenna protection chip. It is synchronized with a button size camera, very small speakers and a security alarm. These speakers are also synchronized with abnormal voice recognition system and a very small memory chip. Figure 6 is a flow diagram showing the functioning of the “nano fractal microstrip chip” and the synchronization of the fractal antenna chip with satellite, women protection unit and other units which are necessary. The chip is also has an auto recording system. Which will record the voice and video in memory. The fractal antenna can work from 500 MHz. to 20 GHz. Frequencies.

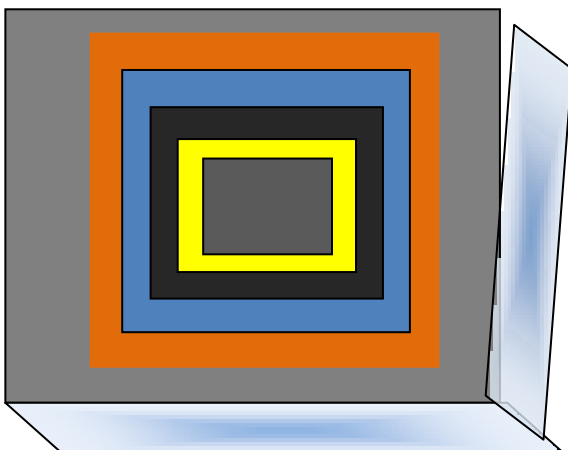


Fig. 3 Rectangular fractals on substrate of height h

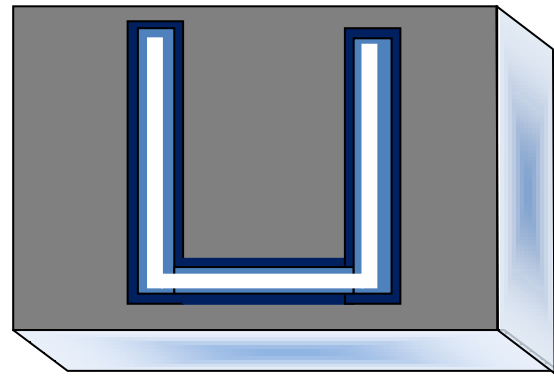


Fig. 4 U shaped fractals on substrate of height h

The protection chip will be activated when either red button on the chip is pressed or the abnormal voice of the girl or women is identified. At the same time the security alarm will bellow at her home, at police station, at women protection unit and at the place of event. Immediately the nearest Units of protection will come in action to protect the girl or women by finding the location through GPRS and by sending a team at the place of event.

The fractal antennas are powerful and reduced in size. Though the protection chip is just a theoretical adventure but it can be fabricated in real. This chip can be proven as very powerful tool for the protection of women.

III. CONCLUSION

The paper has successfully demonstrated the rectangular and U shaped fractal slot antenna and the nano fractal antenna protection chip. The paper has also successfully demonstrated the functioning and design of the chip and antenna.

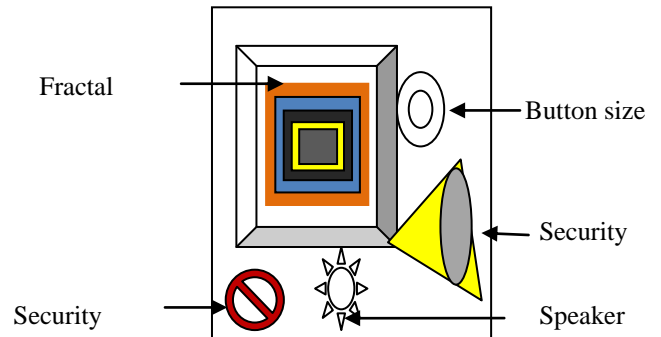


Fig. 5 Nano fractal antenna protection chip

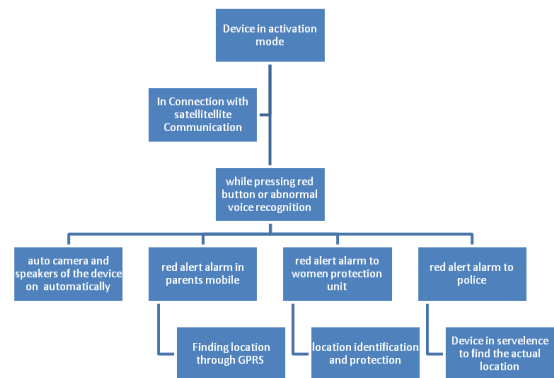


Figure 6 Functional flow diagram of Nano fractal protection chip

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