RECONFIGURABLE ANTENNA FOR SOFTWARE DEFINED RADIO

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***Abstract*—This Software defined radio is a radio in which some or all of their functions are software defined. Radio is a device that can transmit or receive signals in the radio frequency. The use of software defined radio (SDR) to make communications more flexible has greatly facilitated the design of cognitive radios, by making communications reconfigurable at lower layers of the networking stack. The major challenge is to design small antennas which can be operated at number of frequency bands. By tuning the frequency, single antenna can operate at different band of frequencies, for these reconfigurable antennas need to be used.**

Keywords—Return loss, Insertion loss , Reconfigurable.

I. INTRODUCTION

This Software defined radio system is a radio communication system, its modulation and demodulation will be done in the software. Software defined radio can be operated in radio frequency, so the antenna has to be designed to operate in the radio frequency range. Reconfigurable antenna is an important component in wireless communication system to operate in a number of bands.

There are so many antennas for software defined radio; they may be reconfigurable or normal antennas depending upon the applications. However, these antennas are optimized for one of the frequency bands and may require additional reconfigurable tuning circuits for good impedance matching. We propose a reconfigurable micro strip patch antenna with no additional matching circuits for WLAN systems at 2.4 GHz. 2.4 GHz band is commonly used by many WLAN systems. However, with many deployed systems at 2.4 GHz band, RF interference and noise level can be much higher at this band. The proposed reconfigurable antenna paves the way for an SDR or cognitive radio application where both frequency bands can be chosen to operate depending on the interference level for WLAN.

There are Two different types of frequency reconfigurable antennas are there, they are switchable and tunnable. In switchable reconfigurability, PIN diodes have been used so the antenna's operating frequencies can be tuneable for different applications. Varactor diode can also be used for tuning the antenna at different operating frequencies bands. A switchable design is proposed to switch the antenna between single, dual and tri bands applications.

Secondly, the designed antennas may fixed and can be modified to be reconfigurable with fine-tuning so that they can be used for more applications in both wireless and mobile applications with the ability to control the bands simultaneously or independently over a wide range.

II. DESIGN PROCESS

The antenna proposed in this paper is fixed reconfigurable antenna. The design present in this paper aims to combat the high profile and large size usually occur when designing antennas for low frequencies. Total size of proposed antenna is 50 x 50 including the ground plane. This antenna can be used in different wireless applications.

The designed antenna can be tuned over a wide range starting from 0.92 GHz to 2.9 GHz. Researches had developed many techniques to reach multiband operations. One of the techniques is to use different shaped slots to create a multiband antenna. Here U slot has been used for one patch and a rectangular slot has been used for another sub patch.

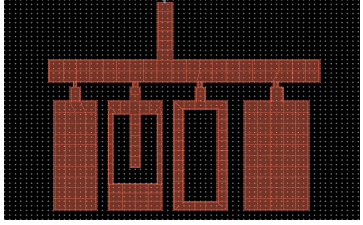

Fig 1:structure of proposed antenna

The structure of the proposed reconfigurable antenna is shown in fig 1 and the dimensions of proposed antenna are shown in table 1. Antenna consists of 4 sub patches which are fixed to the feed line, ground plane. The substrate used in proposed antenna is FR-4 and thickness is 1.6mm, dielectric constant is 4.6.

	Length (mm)	Width (mm)	Slot(length,width) (mm)
Sub Patch-1	24	8	--
Sub patch-2	24	10	U slot(19,7)
Sub patch-3	24	10	Sqare(14,6)
Sub patch-3	24	12	--
Feed line	12.5	3	
Shorted patch-1	3	2	
Shorted patch-2	3	2	
Shorted patch-3	3	2	
Shorted patch-4	3	2.5	
Total antenna	45.5	50	

Table 1. Dimensions of the proposed antenna

III. SIMULATED RESULTS

The proposed antenna was simulated in ADS software (advanced designed system). Here the four sub patches are fixed to the feed line by placing a small conductor strips in between the sub patches and a feed line. After simulating the antenna in ADS software the return loss can be obtained .the return loss of antenna is shown fig 3.

The simulated results of antenna can be verified by fabricating the antenna and measuring the return loss in network analyser. The proposed Can be fabricated on a PCB, and the thickness of the substrate is 1.6mm, dielectric constant is 4.4

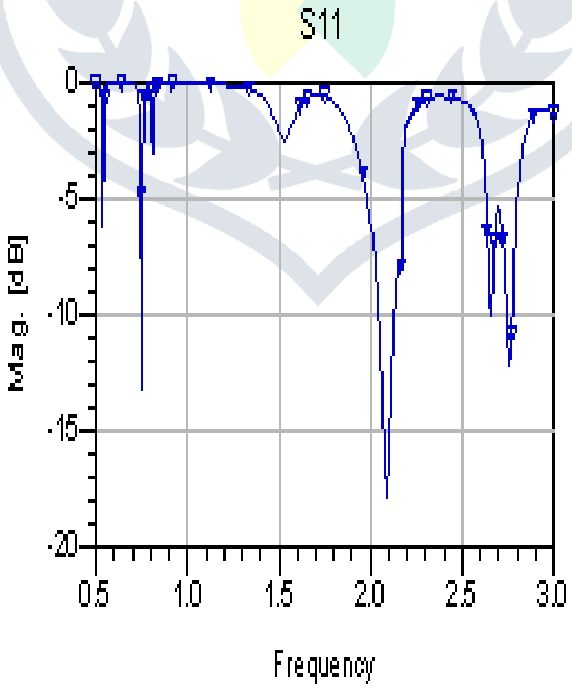

Fig 2. Return loss characteristics

IV. CONCLUSION

A reconfigurable microstrip patch antenna was proposed, and band switching is simply obtained by biasing the four sub patches with feed line. The antenna is well matched and achieves a gain of approximately 12 db. And the size of antenna is small wireless system. Simulation results and early measurement results will be presented at the conference.

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