Chapter 6

Conclusion and Future Scope

Research on microstrip antennas has no limit to enhance its performances. The future work is proposed to have further improvement in the antenna performance. Extensive Research work on microstrip antenna are finding extensive application in handheld mobile sets, direct broadcasting systems (DBS), direct to home systems (DTH) and global positioning systems (GPS) and modern wireless systems. The utility of these antennas in a way have completely changed the scenario of communication technology.

Due to its compactness, antennas are also required to provide circular polarization as required in satellite links.

To fulfill these requirements, we have carried out study of various modified microstrip patch geometrics with different techniques to enhance the bandwidth. Since the mathematical modeling of these modified microstrip antennas includes rigorous and complex mathematics, most of the scientists find it easy to simulate these geometrics using available EM simulation tool directly and verify the obtained results with measured results. Researchers having interest in mathematical modeling have enough scope of work in this direction. The antenna geometries with involved critical variations will need rigorous modeling due to involvement of boundary conditions. Most of the mathematical modeling is carried out by applying simple model like cavity model. More involved model like method of moments, FDTD, finite integration method and finite element method etc. require more modeling but provide much improved results in comparison to those achieved with transmission model and cavity model. The solution of wave equations under the presence of these boundaries conditions will also require development of software and hence scope of software development for designing of these patch antennas which are not regular in shape also exists. This creates a vast scope for the researchers interested in
computer programming. Since recent available software are very costly, development of own software tool as per requirement of work will be a useful effort for the community.

In this work, mainly focus to enhance the bandwidth of these microstrip antennas but there are two main limitations of these antennas one is narrow band width and other one is low gain. We concentrated ourselves on the bandwidth enhancement but we have not concentrated on the other limitation that is low gain of microstrip antennas. For practical purposes, antennas with higher bandwidth and high gain will be required. Therefore a vast scope exists for the development of microstrip antenna with higher gain. Circularly polarized antennas are also required in many practical applications. Circular polarization may be achieved easily by applying appropriate feed locations but circular polarization with better axial ratio is not easy to achieve with simple techniques. Axial ratio bandwidth close to 1.5% may be easily achieved with patch antennas but further improvement in this value is very difficult. A vast scope is also there in the development of circular polarized antennas.

In conclusion, this thesis has been successfully completely where in the end a broadband width is produced. A rectangular microstrip patch antenna was constructed on 47mm X 62mm substrate and fed by a coplanar wave guide feeding technique. The antenna gives the maximum bandwidth of 103% across the range of frequency 2.4 to 7 GHz. Due to its, light weight, low volume and small size this antenna is suitable for the wireless LAN applications. This thesis has provided an insight into design of novel multiband and broadband patch antennas useful for communication purposes. It will form a platform for researchers working in this field towards realizing the implementation of these geometries for current and future communication systems.