Chapter 6

Conclusion

This chapter summarizes and highlights the conclusions drawn from the present study. The research work accomplished in this thesis has focused on the design and development of different multiresonator circuits for spectral signature based chipless tag. Spectral signature based RFID tags are designed using standard planar resonator structures, antennas, filters, space filling curves, and fractals. In this thesis, a comprehensive study on the design, simulation, and testing of different multiresonating circuit for spectral signature based chipless tag are presented. The three novel multi resonator designs are presented in this thesis. They are Coupled bunch hair pin resonator, Open stub multi resonator placed inside transmission line and Shorted slot ground loop multiresonators. The advantage of the tag is its compact size and higher Q of resonators compared to other existing chipless RFID tag designs.

Coupled hair pin resonators have higher coupling compared to conventional line resonator and also it exhibits higher Q. In order to reduce the size of multiresonating circuit all resonators are combined together to form a bunch hairpin resonator. One arm of all hair pin resonators are common which provides same coupling strength. But each resonator works independently that helps data encoding.

Open stub resonators are quarter wave resonator which are placed inside the bifurcated transmission line that rejoins its far end to form a multiresonator with moderate Q. For the first time the idea of bifurcated line used for multiresonating applications. Open stub resonators are suitable option for spectral signature tags.
The subsequent work is concentric circular rings printed on the bifurcated transmission line which connected to ground through via. The loop resonators on bifurcated transmission line operate at half wavelength. To reduce overall size of tag, antenna size should be reduced and incorporated into the tag.

The main objectives of research work is to design and develop compact, narrow bandwidth multiresonators for chipless tag. Even though Preradovic et al presented a lot of published papers in spectral signature chipless tag, they all used only spiral resonators for band notch applications. Spiral resonator based multiresonators can be replaced easily by using the proposed multiresonators such as bunch hair pin resonator, shorted loop multiresonator on slotted ground, open stub multiresonator inside the modified line.

Based on the conclusions and limitations of the present work, prospects for future works are identified as below. The overall size of tag depends mainly on the size of antennas connected with it. So new reading technique to be proposed in future.

So far, the RFID tag has been designed to operate in predefined alignment situations and applications since the polarization of the antennas is crucial for successful reading. Further studies could focus on developing planar circularly polarized tag antennas which would remove the present stringent alignment requirements.
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List of Publications


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