CONCLUSION AND FUTURE WORK

Conclusion

This thesis presented the work on the analysis and design of UWB antenna and UWB MIMO antennas taking into consideration of two major performance characteristics, viz. isolation and bandwidth and further band notched characteristics has been introduced with this MIMO antenna design. The proposed antenna design has been discussed which satisfy the required isolation and bandwidth requirements with band notched characteristics.

Firstly, the planar dual band-notched monopole UWB antenna has been designed and discussed. A U-shaped half-wavelength slot is etched in the radiator to achieve a notch band at WiMAX frequencies and a pair of L-shaped quarter wavelength slots are inserted in the ground plane in order to get band notch function in 5-6 GHz band. The relationship between the total length of U-shaped and L-shaped slots and the band notch frequencies are discussed. It has been observed that the proposed UWB antenna has stable radiation pattern for the entire UWB spectrum.

Secondly, two element UWB MIMO antenna together with a decoupling network are designed and analyzed. The first UWB MIMO antenna with a common radiator was fed by two orthogonally oriented tapered CPW structures. In order to have better isolation between the antenna elements, a rectangular slot was introduced in the circular radiator. The proposed MIMO antenna have the measured impedance bandwidth of 3–12 GHz with the isolation better than 17 dB for the entire UWB spectrum. To get better insight of antenna
performance, a parametric analysis of different antenna design parameters was performed. The detailed investigation of diversity performance in terms of ECC and capacity loss was presented. Both of them were within their acceptable limits, which make it suitable candidate for WPAN and WBAN applications. The second UWB MIMO antenna on a single shared circular radiator with dual band rejection characteristics using the dual polarization method was designed and analyzed. The shared radiator was fed by two tapered orthogonal CPW feeding structures to obtain dual polarization. Good isolation was achieved by introducing a rectangular slot in the radiator and an inverted Y-shaped stub in the ground plane in the symmetrical plane of UWB MIMO antenna. The MIMO performance of proposed antenna is evaluated in terms of ECC and channel capacity loss. All of them were observed to be within their acceptable limit.

Finally, UWB MIMO slot antenna without any coupling network has been designed and analyzed. In this each antenna elements is realized by creating the slots of different dimensions in the ground plane. It was observed that the isolation between the UWB antenna elements is better than 19 dB over the entire UWB spectrum. The acceptable value of ECC guarantees good MIMO performance of the antenna.

**Future Work:**

- Using more sophisticated geometric configurations the work may further be extended to four-element MIMO antenna systems for the purpose of increasing channel capacity in high data-rate applications.
• It may also be extended to Triple-band (3.5/5.5/8.5 GHz) notched characteristics with two or four-element MIMO antenna systems for low interference to the users.
• Reconfigurable antenna elements may be used to enhance diversity performance
• Different other structures may be tried to further reduce the mutual coupling