CONCLUSIONS

The proposed work provides study of MIMO wireless systems with channel models, information capacity, Spatial Diversity techniques, Hardware test bed design of Alamouti STBC, Spatial multiplexing techniques like V-BLAST used with linear and non linear detectors in receiver design, Antenna subset selection methods, Novel techniques like Multi-user MIMO and OFDM and Test transmission of simple $2 \times 2$ MIMO model using micro strip patch antennas and performance limits of all these techniques.

10.1. The important conclusions from the present investigations:

From the extensive investigations reported in the previous chapters, the following important conclusions will resulted. They are:

- MIMO system gives high performances in terms of system capacity and reliability of radio communication. Receiver detection techniques such as MRC results in more robust system. (Reference: Chapter 4 and Chapter 9)

- The MIMO technology brings significant advances in spectral efficiency by employing several antennas at both ends of the communication system. (Reference: Chapter 3)

- Different channel models and correlated MIMO systems were also considered. Correlation occurs in rich scattering environment mainly when antennas are spaced close of each others. (Reference: Chapter 3)

- XPD affects the performances of the MIMO system in terms of the CCDF and the capacity. (Reference: Chapter 3)
- Performance evaluation of MIMO processing techniques such as diversity combining and antenna selection shows that reduction in the system hardware complexity by extracting sufficient performance from MIMO systems. Even OFDM method is also considered for increase in system capacity also saves half of system bandwidth.

(Reference: Chapter 4, Chapter 5, Chapter 7, Chapter 8)

- The antenna selection algorithm is intended to find the optimal subset of the transmit antennas and/or the optimal subset of the receive antennas to satisfy capacity system maximization. Nevertheless, it is obvious that the joint antenna selection at the transmitter and the receiver brings more complexity when the number of antennas increases.

(Reference: Chapter 7)

10.2. Scope of the MIMO Research field:

- Significant efforts are underway to develop and standardize MIMO channel models for different systems and applications. Understanding the information-theoretic performance limits of MIMO systems.

- Particularly in the multi user context, MIMO is an active area of research. Space–time code and receiver design with particular focus on iterative decoding and allowing low complexity implementation have attracted significant interest recently.

- The future scope of FPGA implementation work related to MIMO design problems is to improve the design with better iterative algorithms for further optimization in gate logic in Programmable Logic Devices. Different digital modulation techniques and detection techniques can be also tried out. Further improvements are the verification of hardware execution time; area occupied, and power consumption of the proposed design, which are the 3-dimensions of VLSI.
Finally, the better understanding of the MIMO system design requires knowledge of fundamental performance tradeoffs (such as Bit Error rate versus SNR). From a practical viewpoint, it requires enough understanding to build robust MIMO-based wireless solutions that address all layers of a wireless network in an integrated manner.