ACKNOWLEDGEMENTS

The whole duration of my Ph.D. study is filled with learning and experiences which are joyful as well as painful. This series of learning and experiences are possible because of many individuals who supported me in both direct and indirect ways. There would be no any progress without their generous and earnest support. I would like to express my gratitude to all those people who have been helping me during the Ph.D.

At first, I would like to express sincere gratitude to my respected supervisor, Prof. S. P. Singh, for his constant encouragement and support. It is his insight and immense knowledge about both theories as well as experiments that leads me step by step towards the completion of thesis. His sagacious guidance helped me all the time of research, writing papers and thesis. It has been a pleasure for me to be supervised by a great person with deep knowledge, patience, discipline, generosity and truthfulness.

I would also like to thank Dr. M. K. Meshram (associate professor at IIT(BHU)) for his valuable discussions, enthusiasm towards learning and also for providing measurement and fabrication facilities. I am also thankful to Prof. P. K. Jain, Prof. R. K. Srivastava, Prof. B. R. Vishvakarma, Prof. K. P. Singh, Prof. R. U. Khan, Dr. B. Jha, Dr. M. Thottappan, Dr. A. K. Singh and Dr. R. K. Gangwar (assistant professor, IIT ISM, Dhanbad) for their academic guidance, encouragement and best wishes.

My profound gratitude to Prof. S. Jit, Head, Department of Electronics Engineering, IIT (BHU), Varanasi for providing effective management, necessary facilities, valuable suggestions and support for success of this study. I would also like to acknowledge ministry of human resources and development (MHRD), India for providing financial support in terms of teaching assistantship.

My sincere appreciation also goes to Mr. Jayram and Mr. Bahadur Lal of microwave lab, for their kind assistance during measurements and experienced discussions. I am also thankful to Mr. Ramji Vishwakarma of Machine shop, Mr. Arvind Sharma of central instrumentations facility (CIF), Mr. K. K. Srivastava, Mr. Lalji and Mr. Vinay for their kind cooperation to fabricate the prototypes and precisely solder the connectors to the fabricated prototypes. I would also like to thank all library and office staffs for their friendly behaviour and help in all the way. Though there are many guidance and support from experts but the real work starts with qualitative colleagues. My genuine gratitude goes to late Dr. Gaurav Kumar Pandey who was not only the knowledgeable and caring lab mate but a very good friend. He helped me the most by his fruitful communications, expertise in simulation tools and fabrication of prototypes. His presence made this study enjoyable. It was my great fortune to have company of such supercalifragilisticexpialidocious person. Unfortunately, he left his body before the completion of this thesis.

My delightful thanks and appreciation also go to my other lab mates and colleagues: Dr. Pradutt Kumar Bharti, Ms. Soni Singh, Dr. Gargi Dixit, Dr. Hari Shankar Singh, Dr. Sunny Sharma, Dr. Pouria Kamalvand, Mr. Bhagirath Sahu, Mr. Mayank Agarwal, Mr. Ashis K. Behera, Mr. Sudhir Bhaskar, Mr. Brajveer Singh, Mr. Vipin Chaudhary, Mr. Veer Singh Gangwar, Dr. M. V. Swati, Ms. Ekta Goel, Dr. Sweta Chander, Mr. Sanjay Kumar, and Mr. Gopal Rawat. They shared their knowledge in all the possible way to complete the Ph.D. thesis and made me joyous during my tough time. Further, I would like to extend my special thanks to my friends: Dr. Madhu, Mrs. Shilpi, Ms. Reena, Dr. Nandini, Ms. Lata and Ms. Madhuri who continuously motivated me to work hard with patience.

I am deeply indebted to my beloved and respected parents my father Mr. D. L. Patre and mother Mrs. Chandrika Bai Patre along with all family members who are the backbone and origin of my life. Their unconditional love, heartfelt blessing, unshakable belief, and real moral support without complaint or regret have empowered me to complete the thesis.

The series of appreciation cannot be complete without mentioning my dear Guruji, Sri Sri Ravi Shankar (founder of The Art of Living) who blessed me with his profound breathing technique (Sudarshan Kriya) and meditation which tremendously helped me to get new ideas for Ph.D. work, calm my mind and handle emotions in all pleasant and unpleasant situations during joyful and painful days of this study. I am also thankful to my spiritual teachers and friends: Rajesh Bhaiya, Amod Bhaiya, Ramya di, Ram, Aayush, Pritam, Anoop, Archit, Suraj and Sweta. At last, I praise the holy city of Varanasi where I started my higher studies as well as spiritual journey.