Receiver-Initiated Asynchronous Duty Cycle Multi-Channel MAC Protocol for Wireless Sensor Networks

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Declaration

I **Mr. Taimur Malik Elahi (Enrol# 01-244122-022)** hereby declare that I have produced the work presented in this thesis, during the scheduled period of study. I also declare that I have not taken any material from any source except referred to wherever due that amount of plagiarism is within acceptable range. If a violation of HEC rules on researches occurred in this thesis, I shall be liable to punishable action under the plagiarism rules of the HEC.

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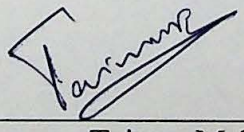

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DEDICATION

I give a special feeling of gratitude to my loving **mother**, whose words of inspiration and push for persistence ring in my ears. My eldest brother **Mr. Manzoor Khan** has never left my side and is very special.

I also dedicate this research work to my family members who have supported me throughout the procedure. I will always appreciate all they have done for me, for helping me develop my writing skills, and for the many hours of editing. All of you have been my best cheerleaders.

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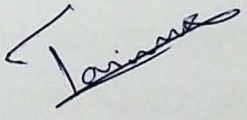

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ABSTRACT

Receiver-Initiated Asynchronous Duty Cycle Multi-Channel MAC Protocol for Wireless Sensor Networks

Primary objective of multichannel duty cycle MAC protocol is to conserve energy and use multiple channels to improve capacity. Many single channel synchronous and asynchronous duty cycle MAC protocols have been proposed in the literature. While using single channel in order to share all the information (control and DATA), these schemes encountered a lot of problems that decreased the efficiency of the entire network. In case of single channel transmission, a node has to wait longer and consumes more energy to occupy the channel under high traffic load. In contrast, a node having multi-channel consumes less energy for getting the channel and increases the throughput of the network. However, the existing single channel Mac protocols experience poor throughput and energy under high traffic loads. In this research study, an asynchronous receiver initiated Multichannel Duty cycle MAC (MD-MAC) protocol for wireless sensor networks has been proposed which uses receiver initiated approach to improve performance of RI-MAC under the high traffic load. In MD-MAC protocol, receiver selects a channel with the lowest data rate before starting the transmission. This selected channel ensures that latency is decreased, and throughput of the network is increased. We have evaluated MD-MAC protocol in diverse networks under heavy traffic loads. Obtained results reveal that MD-MAC protocol outperforms RI-MAC protocol in chain network, clique network, grid network and random network topologies.