**ABSTRACT**

As conventional communication techniques are reaching its limit in terms of bandwidth, there is a need to explore ways which can overcome the limitations of the current communication techniques. In most cases, the limiting factor for high data rates tends to be the bandwidth of the system. Signiﬁcant research efforts have been made towards eliminating this drawback of traditional systems while not causing any degradation in the quality of service. This has led to exploring the unused regions of the electromagnetic spectrum to make the switch from RF spectrum and its limited bandwidth. Visible light as a medium of communication is an ideal candidate due to its seemingly infinite bandwidth. Such a method of communication where visible light itself is a medium for data transfer is called Visible Light Communication (VLC). Our research demonstrates the same.

**LIST OF FIGURES**

**Sl**  **Figure Name Page. no.**

1 1.1 Representation of a VLC system 2

2 3.1 Block diagram for transmitter 8

3 3.2 LTspice simulation of MOSFET driver circuit 11

4 3.4 Block diagram of Receiver 12

5 3.5 Simulation of the frontend processing circuit 13

6 3.6 Frontend signal processing circuit for receiver 14

7 5.1 Simulation results of frontend circuitry 17

8 5.2 Output waveform of frontend circuit 18

9 5.3 Output of project first phase 12

10 5.4 32x32 Image to be transmitted 20

11 5.5 Matrix of 32x32 image to be transmitted 20

12 5.6 Matrix of 32x32 image to be received 21

13 5.7 Reconstructed 32x32 image 21

14 5.8 Matrix of 64x64 image transfer 22

15 8.1 Illustration representing application of VLC in different scenarios 26

**LIST OF ACRONYMS**

* VLC – Visible Light Communication
* TIA – Transimpedance Amplifier
* MOSFET – Metal Oxide Semiconductor Field Effect Transistor
* LED – Light Emitting Diode
* PWM – Pulse Width Modulation
* BW – Bandwidth
* RF – Radio Frequency
* IDE – Integrated Development Environment
* OpenCV – Open Source Computer Vision
* API – Application Program Interface
* ADC – Analog to Digital Converter
* BJT – Bipolar Junction Transistor
* UART – Universal Asynchronous Receiver Transmitter
* OOK – ON OFF Keying
* OFDM – Orthogonal Frequency Division Multiplexing
* MIMO – Multiple Input Multiple Output