

CHAPTER ONE INTRODUCTION

1.1 Preface

The two-way radio is often used to ensure the ability of emergency response agencies to talk across disciplines and jurisdictions via radio communication systems, exchanging voice and/or data with one another on demand, in real time, when needed, and as authorized. Improving Interoperability is for emergency response organizations to improve communication interoperability in their community or region.

And because communication is an ever increasing need for providing higher outreach. The traditional portable radios offer limited coverage area. However, a dedicated transceiver can help achieve the requisite coverage. A repeater is essentially a communication device which acts as a link between two radio operators to cover a large area. If a large coverage area is needed like city, county or even an entire state, a repeater system comes in handy [1].

The concept of repeaters is very simple .It receives a frequency from portable two-way radios, and re-transmits it at another frequency in real-time, and at a higher wattage than typical portable radios. This mechanism allows repeaters to broadcast to a much wider reception spectrum. Since it is capable of both transmitting and receiving at the same time, it is also called a ‘Transceiver’ [1].

Additionally, two-way radio repeaters can communicate with all RF receptors operating on the same RF channel. Since they use two different RF channels to carry the transmitted and received information frequencies, they can be truly bi-directional without any dependencies or interference with each other. During a

disaster, public safety organizations need to have immediate radio connection with each other. One solution is an interconnect system that, once set up and activated, can link incompatible radio systems through specialized hardware and software without requiring significant alterations to an agency's radio infrastructure. An interconnect system allows radios to communicate even if they are on different frequencies or have the same frequency band but different protocols. This system can link officers using an older radio system with officers using a newer technology or radios from a different vendor. In effect, the interconnect system establishes a gateway between otherwise incompatible systems [1].

1.2 Problem Statement

In an emergency situations such as a war or a natural disaster, communication is so critical and a simple information could be the difference between live or death. So the responsible bodies for public safety responders such as police department, fire department and other organizations, Need an intermediate communication with one another to ensure safety. However it may be difficult to interconnect between different public safeties organizations via radio systems due to. Incompatible radio systems, and different frequency bands or the organizations may have the same frequency band but different protocols. Also the problem of linking first responders using older radio systems with first responders using a newer technology or radios from a different vendor. All these problems could be overcome by implementing a system to ease the interconnection operation.

1.3 Proposed Solutions

A detailed study is provided in this thesis on two-way radio interconnection and through simulation by developing An interconnection system that interconnects two organizations to overcome the problems of different technologies, frequency bands and incompatible systems in general terms , by implementing an electrical circuit to link the two organization's radio bandsthrough relay.

1.4 Aim and Objectives

The main aim of this project is to implement a system to ensure band interconnection.

The objectives are to:

- To Ensure the coverage of a wide area
- To Improve Interoperability(interconnection) will improve communication, coordination, and cooperation between organizations.

1.5 Methodology

The thesis is based on simulation, to simulate a scenario of how the information signal travels through the circuit to link the two organizations.

Organization 1 and organization2 each with a dedicated radio, both radios are located in the same place (control room).the idea is to interconnect the two organizations so as to connect with one another , though they are working in different radio networks with different frequencies. To accomplish this information signal is taken from the radio speaker of org1 or in more specific terms the audio is extracted from the speaker accessory socket of organization1 and sent through the relaying system. The information is conveyed to organization 2 and all its members sharing its frequency. And conversely the same operation is done from organization2 to organization1.

1.6 Research Outline

Chapter one: Introduction, discuss Problem statement, proposed solution.

Chapter Two: a background about Two-way radio Communications interoperability, focus on Literature Review, and Related Work.

Chapter Three: system description and implementation

Chapter Four: simulation, and simulation results.

Chapter Five: Conclusions, Recommendations.