

# CONTENTS

**APPROVAL PAGE**

**LEMBAR PERNYATAAN ORISINALITAS**

**ABSTRACT** **i**

**PREFACE** **iii**

**CONTENTS** **iv**

**LIST OF FIGURES** **v**

**DAFTAR SINGKATAN** **vi**

**1 INTRODUCTION** **1**

- 1.1 Background . . . . . 1
- 1.2 Problem Identification . . . . . 3
- 1.3 Objective . . . . . 3
- 1.4 Scope of Work . . . . . 4
- 1.5 Research Methodology . . . . . 4
- 1.6 Structure of Thesis Proposal . . . . . 5

**2 BASIC CONCEPT** **6**

- 2.1 Software Defined Radio (SDR) . . . . . 6
- 2.2 Mobile Cognitive Radio Base Station (MCRBS) . . . . . 7
- 2.3 Global System for Mobile Communications (GSM) . . . . . 8
- 2.4 Universal Mobile Telecommunication System (UMTS) . . . . . 8
- 2.5 Long Term Evolution (LTE) . . . . . 9
- 2.6 5G New Radio (NR) Technology . . . . . 10
- 2.7 Mobile Station Identifiers . . . . . 10

**3 SYSTEM MODEL AND THE PROPOSED VICTIM FINDING SYSTEM** **12**

- 3.1 Research Flow . . . . . 12
- 3.2 Universal Software Radio Peripheral . . . . . 14

3.3	Study on Open Source Cellular Network Technology . . . . .	14
3.3.1	OpenBTS and OpenBTS-UMTS . . . . .	14
3.3.2	srsLTE . . . . .	15
3.3.3	Mobile Phone Auto Registration . . . . .	15
3.4	System Model . . . . .	15
3.5	The Proposed VFS System . . . . .	16
<b>4</b>	<b>PERFORMANCE ANALYSIS</b>	<b>18</b>
4.1	Simulation Results . . . . .	18
4.2	Experiment Results . . . . .	19
4.2.1	2G Cellular Communications-based Detection Experiment .	20
4.2.2	3G Cellular Communications-based Detection Experiment .	22
4.2.3	4G Cellular Communications-based Detection Experiment .	25
4.2.4	5G Cellular Communications-Based Detection Experiment .	27
4.2.5	RSSI Measurement Results . . . . .	28
<b>5</b>	<b>CONCLUSION</b>	<b>33</b>