

Table of Contents

ABSTRACT	i
DEDICATION	ii
ACKNOWLEDGEMENTS	iii
Table of Contents	iv
List of Tables	vi
List of Figures	vii
CHAPTER 1 INTRODUCTION	1
1.1. Background	1
1.2. Problem Identification	3
1.3. Objectives	5
1.4. Scope of Work	6
1.5. Expected Results	6
1.6. Research Methodology	7
CHAPTER 2 BASIC CONCEPT	8
2.1. Geoelectrical Resistivity Method	8
2.1.1. Principles of Geoelectrical Resistivity Measurement	10
2.1.2. Configuration of Electrodes	13
2.1.3. Geoelectric Measuring Technique	17
2.1.4. Computer-Controlled Multielectrode Systems on Conventional Equipment of Resistivity Method	19
2.2. Potential Divider	20
2.3. Wireless Sensor Network	21
2.4. Wireless Communication	22
2.4.1. Low Power Wide Area Network (LPWAN)	24
2.5. Long Range Communication	25
CHAPTER 3 SYSTEM MODEL AND THE PROPOSED RESISTIVITY METER MULTINODE	27
3.1. Design of Resistivity meter multinode	27
3.1.1 Main Unit	28

3.1.2 Multinode Block	33
3.1.3 Data Acquisition	35
3.2. Communication between Two Blocks	38
3.3. Block Diagram System.....	39
3.4. Optimization Algorithm	40
3.5. Performance Validation.....	43
CHAPTER 4 DATA PRESENTATION AND ANALYSIS OF THE PROPOSED RESISTIVITY METER MULTINODE	45
4.1. Data Presentation.....	46
4.1.1. Data Presentation of Main Unit Block.....	47
4.1.2. Data Presentation of Multinode Block	59
4.1.3. Time series of Wireless Geo-Electrical Resistivity Meter	72
4.1.4. Entire System Testing.....	73
4.1.5. Validating system on Geophysical Exploration	78
4.2. Data Analysis	82
4.2.1. Data Analysis of Main Unit Block	83
4.2.2. Data Analysis of Multinode Block	87
4.2.3. Data Analysis of Time Series of Wireless Multinode Resistivity Meter..	88
4.2.4. Data Analysis of Entire System Testing.....	89
4.2.5. Data Analysis of Validating system on Geophysical Exploration.....	91
4.3. Summary of Finding.....	92
CHAPTER 5 CONCLUSION AND RECOMMENDATIONS OF THE PROPOSED WIRELESS GEO-ELECTRIC RESISTIVITY METER.....	93
5.1. Conclusions	93
5.1. Recommendations	95
BIBLIOGRAPHY	96