

TABLE OF CONTENTS

APPROVAL PAGE

SELF DECLARATION AGAINST PLAGIARISM

ABSTRACT	iv
ACKNOWLEDGMENTS.....	v
PREFACE	vi
TABLE OF CONTENTS.....	vii
LIST OF FIGURES	x
LIST OF TABLES.....	xii
LIST OF ABBREVIATIONS	xv
CHAPTER I INTRODUCTION	1
1.1 Background	1
1.2 Problem Identification	3
1.3 Objective	3
1.4 Scope of Work.....	4
1.5 Research Method.....	4
1.6 Hypotheses	8
1.7 Research Methodology	9
CHAPTER II BASIC THEORY	11
2.1 Literature Review	11
2.2 5G Technology	12
2.3 5G Usage Scenario	13
2.4 5G Architecture	14
2.4.1 Non-Stand Alone	15
2.4.2 Stand Alone	16
2.5 Frequency Spectrum.....	17
2.6 Infrastructure Sharing	18
2.6.1 Passive Infrastructure Sharing	20
2.6.2 Active Infrastructure Sharing	21
2.6.3 Business/Ownership	24
2.7 Technical Analysis	25
2.7.1 Capacity Based Planning.....	25
2.7.2 Coverage based planning.....	29
2.7.3 5G Key Performance Indicator (KPI)	36

2.8	Techno-Economic Analysis	36
2.8.1	Capital Expenditure (CAPEX)	37
2.8.2	Operating Expenditure (OPEX).....	38
2.8.3	Revenue.....	38
2.8.4	Net Present Value (NPV)	39
2.8.5	Internal Rate of Return (IRR)	40
2.8.6	Payback Period (PP).....	41
2.8.7	Sensitivity Analysis	42
2.9	Regulation Analysis.....	42
CHAPTER III SYSTEM MODELS AND DESIGN	44
3.1	System and Scenario Models	44
3.1.1	Research Location.....	45
3.1.2	5G NR Technical Requirements	47
3.2	Simulation Scenario.....	47
3.2.1	Network Planning Simulation.....	47
3.2.2	Sharing Scenario	47
3.3	Data Capture Scenario	48
3.3.1	Collecting Data	48
3.3.2	Technical Aspect.....	49
3.3.3	Economy Aspect	54
3.3.4	Regulation Aspect.....	54
3.4	Scenario Analysis	55
3.4.1	Technical Analysis.....	55
3.4.2	Economic Analysis	55
3.4.3	Regulation Analysis	55
CHAPTER IV RESULTS AND ANALYSIS	56
4.1	Operatore Market Share	56
4.2	Technical Analysis	56
4.2.1	Capacity Based Planning Analysis	57
4.2.2	Coverage based planning Analysis	65
4.2.3	Comparison Number of gNodeB Capacity and Coverage based planning	69
4.2.4	Network Planning Simmulations	71
4.3	Economic Analysis	77
4.3.1	Capital Expenditure (CAPEX)	77
4.3.2	Operating Expenditure (OPEX).....	80

4.3.3	Revenue.....	82
4.3.4	Net Present Value (NPV)	85
4.3.5	Internal Rate of Return (IRR)	92
4.3.6	Payback Period (PP).....	95
4.3.7	Sensitivity Analysis	97
4.4	Regulation Analysis.....	98
4.4.1	Law Number 36 of 1999 (UU Nomor 36 Tahun 1999).....	99
4.4.2	Law No. 11 of 2020 concerning Job Creation (UU Nomor 11 Tahun 2020 Tentang Cipta Kerja).....	99
4.4.3	Government Regulation No. 46 of 2021 (Peraturan Pemerintah Nomor 46 Tahun 2021).....	100
4.4.4	Regulation of the Minister of Communication and Informatics of the Republic of Indonesia Number 5 of 2021 (Peraturan Menteri Komunikasi dan Informatika Republik Indonesia Nomor 5 Tahun 2021)	101
CHAPTER IV CONCLUSION, RECOMMENDATION AND FUTURE WORK		103
5.1	CONCLUSION	103
5.2	RECOMMENDATION	106
5.3	FUTRE WORK.....	107
REFERENCE		108