

TABLE OF CONTENTS

APPROVAL	i
SELF DECLARATION AGAINST PLAGIARISM	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
LIST OF CONTENTS	v
List of Figures	viii
List of Tables	x
Abbreviations	xi
Symbols	xii
1 INTRODUCTION	1
1.1 Background	1
1.2 Problems Definition	2
1.3 Reference Tracing	2
1.4 Research Purposes	3
1.5 Scope of Work	3
1.6 Research Hypotheses	3
1.7 Steps of Research	4
2 REVIEW OF LITERATURE AND STUDIES	6
2.1 LTE-A Resources Concept	6
2.2 Channel State Information	8
2.3 Carrier Aggregation	9
2.4 User-Chunk Grouping Process	10
2.5 Mean-Greedy Resource Allocation Algorithm	11
2.6 Inverse SNR Waterfilling Power Control	11
2.7 Spectral Efficiency	13
2.8 Energy Efficiency	15
2.9 Fairness System	15
2.10 Time Complexity	15

3 SYSTEM MODELLING	17
3.1 Model System Design	17
3.2 Problem Formulation	19
3.3 Research Flow	20
3.4 Design of Research	21
3.4.1 UCG Process and Modified Mean Greedy Algorithm	21
3.4.2 Inverse SNR Waterfilling Power Control	23
3.5 Simulation Process	23
3.5.1 Initialization process	23
3.5.2 UCG process	23
3.5.3 MG Allocation Algorithm	25
3.5.4 Inverse SNR Waterfilling Power Control Method	25
3.5.5 Performances Calculation	25
4 RESULT AND ANALYSIS	26
4.1 Spectral Efficiency	26
4.1.1 Simulation on 75-150 users	26
4.1.2 Simulation on 10-100 users	29
4.1.3 Simulation on varied cell coverage (1-2 km)	30
4.2 Energy Efficiency	31
4.2.1 Simulation on 75-250 users	31
4.2.2 Simulation on 10-100 users	33
4.2.3 Simulation on varied cell coverage (1-2 km)	33
4.3 System Fairness	34
4.3.1 Simulation on 75-150 users	34
4.3.2 Simulation on 10-100 users	37
4.3.3 Simulation on varied cell coverage (1-2 km)	37
4.4 Time Complexity	39
4.4.1 Time complexity of original MG algorithm	39
4.4.2 Time complexity of UCG-MG algorithm	41
4.4.3 Time complexity of MG-IWF algorithm	42
4.4.4 Time complexity of UCG-MG-IWF algorithm	43
4.5 Relationship Analysis	44
4.5.1 Simulation on 75-250 users	45
4.5.2 Simulation on 10-100 users	46
4.5.3 Simulation on varied cell coverage (1-2 km)	46
4.5.4 Time Complexity	47
4.6 Overall System Analysis	47
5 CONCLUSION AND FUTURE RESEARCH	50
5.1 Conclusion	50
5.2 Future Research	50
BIBLIOGRAPHY	50
A SNR Matrix for Each Carrier	53
B MG Matrix for Each Carrier	56

C MG-IWF Matrix for Each Carrier	59
D UCG-MG Matrix for Each Carrier	62
E UCG-MG-IWF Matrix for Each Carrier	65
F Source Code	68