

LIST OF TABLE

2.1	Typical range of dielectric permittivity of various materials	16
3.1	Specification of antenna	25
3.2	Initial dimensions of the microstrip antenna	27
3.3	Resonant frequency from Optimization L_g	28
3.4	Resonant frequency from Optimization W_g	29
3.5	Resonant frequency from Optimization L_p	31
3.6	Resonant frequency from Optimization W_p	31
3.7	Final dimensions of microstrip antenna	32
3.8	Comparison result initial and final design of microstrip antenna . . .	33
3.9	Simulation result of $\epsilon_{r2} = 2 - \epsilon_{r2} = 10$	35
3.10	Simulation result of various soil character	36
3.11	Comparison between specification and simulation result	37
4.1	Resonant Frequency Result Based on Theoretical	50
4.2	Resonant Frequency Result Based on Simulation	51
4.3	Table Relative Difference of Theoretical and Simulation (2 - 16) . .	54
4.4	Table Relative Difference of Theoretical and Simulation (17 - 30) . .	54
4.5	Resonant Frequency After Add Factor Correction	56
4.6	Comparison between simulation and fabricated result	60
4.7	Experimental result table Soil Sample 1 - 3	63
4.8	Dielectric permittivity soil result table	66
4.9	Resonant Frequency Result in First Area	70
4.10	Resonant Frequency Result in Second Area	72
4.11	Gravimetric Result	75
4.12	Comparison SWC gravimetric and antenna as microwave sensor for first scenario	76
4.13	Relative error of the proposed and theoretical formulation	77
4.14	SWC Percentage of Second Scenario (First Area)	78
4.15	SWC Percentage of Second Scenario (Second Area)	78