



**FACULTY OF ENGINEERING AND INFORMATION
TECHNOLOGY**

SCHOOL OF ENGINEERING

FINAL YEAR PROJECT

**DESIGNING AND COUPLING RECTANGULAR MICROWAVE
CAVITY RESONATOR**

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ABSTRACT

The study seeks to explore the standard of practice for student to perform invasive procedures on one another in the skills laboratory in the college of engineering. The objective of this study is to establish a designing and coupling rectangular microwave cavity resonator. A microwave rectangular cavity which is capable of resonating the TE_{101} mode at 10GHz is designed. The dimensions of the rectangular cavity walls are determined using the computer model (**MATLAB**). The datasets are analyzed in MATLAB and the final result is displayed through the monitor. An electric and magnetic field of Maxwell's equation is obtained using the calculated dimensions of the rectangular cavity walls. Transmission line analysis is used to do the impedance matching in terms of its impedance. Impedance matching scheme is done to show that line impedance is equals to load impedance, $Z_L=Z_0$.

The impedance matches the transmission line at the point where the stub joins the main transmission line, which called as stub matching. A triple stub tuner is used to match the load impedance to the characteristic impedance. The stub tuner's distances are adjusted until the reflection coefficient is achieved zero or the desired value. The impedance matching is done by computer model using MATLAB. Then the obtained matching is plotted on the impedance and admittance Smith Chart. The Smith Chart stub matching is able to cancel the susceptance value whichever occur to achieve an admittance value of 1. Some material presented in this thesis is accepted only by theory and therefore no reference is required. In this section also discussed some of the basic characteristics of antennas that will be needed for our study of communication system.