## **MICROWAVE TECHNIQUES EXPERIMENT #1**

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**Cut-off frequency** : The cutoff frequency of an <u>electromagnetic</u> waveguide is the lowest frequency for which a form will disseminate in it. Waves is not disseminated under the value of cut-off frequency.

 $f_c = \frac{c}{2} \sqrt{\left(\frac{m}{a}\right)^2 + \left(\frac{n}{b}\right)^2}$ 

C= velocity of light

m,n = mode numbers

a= long side

**b**= short side

dominant mode : Minimum frequency value of the cut-off frequency

cavity resonator : Cavity resonator is a device which is used to find the resonance value of signal.

**Oscillator :** Oscillator is an electronic circuit that produces a periodic, often a sine wave or square wave. Oscillators convert direct current (DC) from power supply to an alternating current (AC) signal.

**Resistive load**: Incoming signal is absorbed by resistive load ,that signal does not returns from there.

**Slotted waveguide** : Incoming signal is not absorbed in the slotted waveguide , that returns from there. In this way ,we obtain sinusoidal standing wave.

Waves is delivered decreasingly proportional to 1/R^3 from antenna. But that delivering is not same in wave guide. We usually use 0,1 and 1,0 values at dominant mode in the waveguide.

Firstly, we set the 'source' Attenuator to 20. Also we set the sensitivity control of the amplifier to maximum and adjust the 'load' Attenuator until a reading of about 3 is obtained on the meter.

<u>First experiment</u>; we used cavity resonator and we obtained resonance value of signals. Signal continuosly moved in this experiment. We find these values that are 10 mm first resonance, approximately 15 mm second resonance, approximately 20mm third resonance.

<u>Second experiment</u>; we used slotted waveguide. We obtained sinusoidal standing wave. We find minumum values of the wave .Also we obtained half of wavelength which is difference between the two minimum point of the wave. First minimum value of the signal is 26 mm, second minimum value of the signal is 44mm. We find the wavelength is (44-26) x 2=36 mm.