GUIDED WAVELENGTH MEAUSERMENT

Name: Sparsh Arya
Registration Number:17BEC0656
Slot: F1
Subject: Microwave Engineering

OBJECTIVE

- To find the measurement of guided wavelength
- To compute the average length of minima

Steps

- Set the Beam Voltage in the range of 245-247 V

- Start decreasing the Repeler Voltage and take the amplitude reading.

- The repeler voltage for which amplitude is maximum on the CRO is the Dominant Mode.

- Take the reading of the repeler voltage from the above step and set the power supply to that voltage

- Set range on VSWR instrument scale to the value, for which first red scale is between 0 to 10 dB or -10 to 0 dB.

Result

Resonance	Amplitude(mV)	V_{rep}(Repeler Voltage)
1	32	-267
2	50	-214
3	18	-186
4	18	-141
5	30	-27
6	10	-106

$$VSWR = 0dB(Normal)$$
$$P_{avg} = Range + Needle\ Value$$
$$= -38dB$$

Calculations

- First Minima: d1=8.12mm

- Second Minima: d2=10.41mm

- Third Minima: d3=12.77mm

- Fourth Minima: d4=14.94mm

$x1 = d2 - d1 = 2.29$

$$x2 = d3 - d2 = 2.36$$
$$x3 = d4 - d3 = 2.17$$

Average Minima $= \dfrac{x1+x2+x3}{3} = \dfrac{2.29+2.36+2.17}{3} = 2.27$mm

Guided wavelength λ_g = 2 x Average Minima = 4.54mm

Conclusion and Results

- The average power available from source is -38dB

- The average minima is 2.27 mm

- Thus the guided wavelength found is 4.54 mm

References

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