MICROWAVE TECNIQUES

EXPERIMENT #2

GROUP-6

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In this experiment, we performed measurement of VSWR.

VSWR: Voltage Standing Wave Ratio is described and two methods of measuring it are investigated.

The voltage standing wave ratio is then equal to:

$$ext{VSWR} = rac{|V_{ ext{max}}|}{|V_{ ext{min}}|} = rac{1+|\Gamma|}{1-|\Gamma|}.$$

r: reflection coefficient

For |r|=0, VSWR=1; min vale. For |r|=1, VSWR= ∞ ; max value.

Actually, we measure max. and min. currents, square of currents is equal to VSWR.

$$\therefore VSWR = \sqrt{\frac{i_{max}}{i_{min}}} \quad VSWR = \frac{e_{max}}{e_{min}}$$

EXPERIMENTAL PROCEDURE

Standing Wave Pattern(large VSWR): Firstly, we increased a little bit attenuator source value. Then, we took forward probe detector along a transmission line. We observed maximum and minumum amper values, distance values along the line. We couldn't calculate VSWR value , since we didn't observe imax value. It was larger than 5 mA, so our laboratory equipment has maximum current value as 5mA.



Standing Wave Pattern(small VSWR): We closed attenuator load gate. Energy of incident wave was decreased. Then we slided probe and we could observe imax value.



Double-minimum Method for Large VSWR:



In experiment, we calculated e^2min=0.8 mA , so 2*e^2min=1.6 mA

d=2 mm, A=14mm, λ =2*(32-14), λ =36mm

$$VSWR = \sqrt{1 + \frac{1}{\sin^2\left(\frac{\pi d}{\lambda}\right)}}$$