ICE-3104, Microwave Engineering Lab (Laboratory Exp. 1)



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- 1. Name of the experiment
- 2. Objectives
- 3. Theoretical background
- 4. Apparatus required
- 5. Experimental setup
- 6. Experimental data
- 7. Result analysis
- 8. Discussion

1. Name of the experiment Experiment name

e.g: 1. Study of Microwave laboratory components

2. Objectives

Describe what you want to do in this experiment and what is the purpose

3. Theoretical background

Detail information about the experiment.

4. Apparatus required

Equipment's with specification/parameters

For example: Variable attenuator

5. Experimental setup

Circuit diagram with procedure/description

6. Experimental data

Data that you took in the practical experiment

7. Result analysis

Describe the result that you obtained. Explain it with your own understanding.

8. Discussion

Describe if there is a result deviation between theoretical/expected and obtained/experimental result.

Find out the reason and explain it.

What kind of difficulties that you have faced during experiment. Propose a solution !!

Describe it in your own words. Don't copy

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Course No	Experiment No	
No. of Francisco		
Name of the Experiment		
Remarks		
mitted to:	Name	
	Roll No	
	SessionGroup	
	Date of Performance	
	Date of Submission	

2. Objectives:

- To familiarize with the microwave components
- Understanding the specifications and parameters
- To know the basic operation of the components

3. Theoretical background:

- Introduction to Microwave Engineering
- Different Microwave Frequency Bands
- Microwave Laboratory Components

4. Apparatus Required:

Frequency Meter

Band	x
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Calibration Accuracy	± 2%
Calibration Increment	5 MHz
Max. VSWR	1.28 At 10.5GHz
Return Loss	-18.2 At 10.5GHz



Variable attenuator

Band: X

Frequency Range(GHz): 8.2-12.4

Waveguide: WR-90

Flange: UG-39/U

VSWR Max.: 1.25 At 10.5GHz

Av. Power: 2 W

Return Loss: -19.23 At 10.5GHz



Directional Coupler

Band	х
Frequency Range(GHz)	8.2-12.4
Waveguide	WR-90
Flange	UG-39/U
Coupling (dB)	20 dB
Directivity (Min)	25 dB
Coupling Accuracy	± 1 dB



Waveguides

- A waveguide is a structure which guides energy waves such as electromagnetic waves or sound waves.
- ➤ There are different types of waveguides. The most common term is a **conductive metal pipe/line** used to carry high frequency radio waves, particularly microwaves.
- Waveguide are metallic lines similar in fashion to transmission lines which are used at microwave frequencies. They are typically utilized to connect receivers and transmitters with antennas.
- Waveguides can be used instead of coax lines.

Waveguides







Waveguides

There are several advantages of waveguides:

- > A waveguide is completely shielded.
- Waveguide has no trouble transmitting extremely high peak powers.
- ➤ The waveguide has an almost non-existent loss at microwave frequencies.
- Waveguides can also be pressurized with special gases to increase maximum power levels

Microwave Test Bench Series

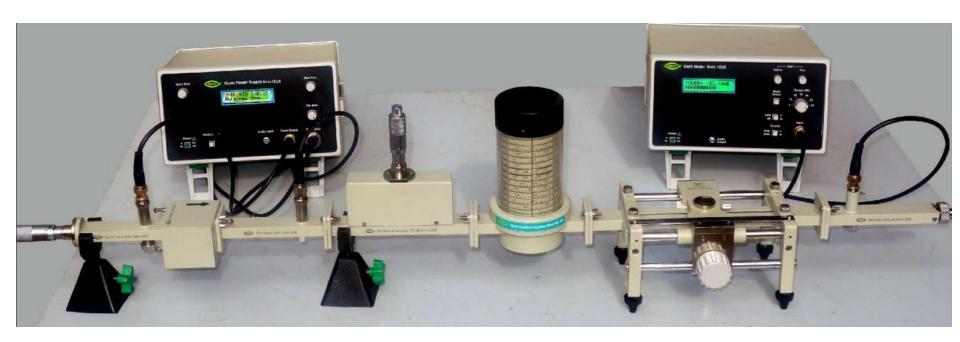
The Nvis 9000 series of Microwave Test Benches are precision made microwave systems, which use standard type rectangular waveguide components to illustrate the essential elements of this field for study.

The equipment consist of:

- A selection of wave-guide components
- The Power Supply for the microwave source
- A detector
- A meter, which monitors the detector output
- Provided with PC to PC communication in Gunn based Benches

Microwave Test Bench Series

The Nvis 9000 series of Microwave Test Benches are precision made microwave systems, which use standard type rectangular waveguide components to illustrate the essential elements of this field for study.



- 1. Klystron Power Supply
- 2. Klystron Mount
 - 3. Isolator
- 4. Variable Attenuator
- 5. Fixed Attenuator
- 6. Frequency Meter.
- 7. Detector Mount
- 8. Slotted Section
- Tunable Probe
- **10.** Matched Termination
- 11. SWR Meter
- 12. Slide Screw Tuner (S-S Tuner)
- 13. CRO (Cathode Ray Oscilloscope)

- Gunn Oscillator
- 2. Waveguide Twist
- PIN Modulator
- 4. Bend: E-Plane Bend, H-Plane Bend
- 5. Directional Coupler
- 6. Movable Short
- 7. Waveguide Antennas
- 8. TEE: E-Plane TEE
 H-Plane TEE
 Magic TEE

Any Question?

Thanks to All