



Electromagnetics Lab

DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING

Coordinator: Dr. Ashish Gupta

Location: Room No. 237, 2nd Floor, Sector-128 Campus

Objective

This lab is originally developed for carrying out the experiments for B.Tech. students as per the curriculum. The Electromagnetic lab is recently developed as a Research Centre for measurement facility of Microwave Devices apart from B. Tech. Curriculum. Moreover, this lab is facilitated with different kind of substrates such as Rogers Duroid, FR4 Glass Epoxy substrates etc. SMA connectors, RF cables in order to fabricate the planar microwave structures. Sooner this lab will be equipped with Automated Anechoic Chamber facility which is used to measure the absorption free far-field characteristics for Microwave Structures.

Hardware/Software Availability

X-Band Wave Guide Bench (Klystron Power Supply):

Waveguide is used to transfer the microwave power within a certain frequency range (in this case 8-12 GHz). This setup consists of many building blocks such as Klystron Power Supply, Klystron Oscillators, Isolators, Frequency meter, Slotted section followed by termination and VSWR Meter. Students can perform various experiments in their Electromagnetic Field Theory Lab as per their curriculum using below setup:

- Finding the broad dimensions of the waveguide,
- Determining input impedance of the given sample.
- Finding the characteristics of Microwave components such as Magic Tee, Directional couplers etc.



X-Band Wave Guide Bench (Gunn Power Supply):

- Waveguide is used to transfer the microwave power within a certain frequency range (in this case 8-12 GHz). This setup consists of many building blocks such as Gunn Power Supply, Klystron Oscillators, Isolators, Frequency meter, Slotted section followed by termination and VSWR Meter. Students can perform various experiments in their Electromagnetic Field Theory Lab as per their curriculum using below setup:
- Determine the I-V characteristics of Gunn Diode.
- Determining input impedance of the given sample.
- Finding the characteristics of Microwave components such as Magic Tee, Directional couplers etc.

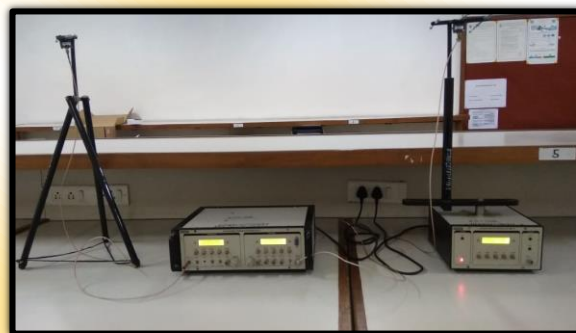


Antenna Training System (Model: ATS-2001):

This is an automated setup which is used to measure the radiation characteristics of given antenna. It consists of dedicated Transmitter and Receiver section followed by dc motor to rotate the antenna on its axis. It captures the power at each angle which helps to plot the radiation pattern of given antenna.

Applications:

- o Polar plots & polarization
- o Gain and beam width study
- o Element current, Front-back ratio study
- o Antenna-matching
- o Antenna's radiation pattern with distance



Spectrum Analyzer (Model- HMS1010)- (Upto 1GHz)/12098223):

A spectrum analyzer is a piece of electronic equipment that is used to measure the magnitude (amplitude or strength) of a given input signal set against the full frequency range of the instrument. It is primarily used to measure the strength of the spectrum of known and unknown signals.



Anritsu Microwave Site Master (Model-S820E) Handheld Vector Network Analyzer (1 MHz-30 GHz) with Coaxial Calibration Kit, Type K(F), DC To 30 GHz, 50(TOSLK50a-40):

This is a versatile device which is very useful for measuring the input characteristics of Microwave devices such as Antennas, Filters, Absorbers, Power dividers, directional couplers. etc. It is a vector network analyzer which provides magnitude of reflected and transmitter power along with the phase information. Moreover it can generate microwave power upto 23 dBm as microwave source.

Applications:

- o Materials characterization
- o Antenna characterization
- o Wafer-level characterization of active and passive devices.
- o Characterization of packaged or connectorized amplifiers and other active components (both linear and non-linear)
- o Characterization of frequency translation components
- o Characterization of passive components, such as filters, diplexers, etc.
- o Characterization of high-speed serial interconnects, such as backplanes, cables and connectors.



Glimpses of the Venue

