



Swami Keshvanand Institute of Technology, Management & Gramothan

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Point 4.1.1 Research Facilities in Electronics & Communication Engineering Department

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Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

Department of Electronics and Communication Engineering

Research Facilities in ECE Department

Microstrip antenna designing are the prominent field of working the researchers at PG and PhD level. It covers many fields' e.g. wireless communications, Bio medical devices, IOT etc. Electronics and Communication Department having two major facilities for this platform:

1. High Frequency Structural Simulator (Licensed Version) (25 user).
2. Vector Network Analyzer (14 GHz).

1. High Frequency Structural Simulator (HFSS)

We have the HFSS Licensed software of version 13 of the user 25. HFSSTM is an interactive software package for calculating the electromagnetic behavior of a structure. The software includes post-processing commands for analyzing this behavior in detail. All the structures designed for any specific application initially drawn on this simulator than the simulator will show the approximated behavior of that structure by giving the values of performance parameters, than this design will fabricated. And its parameter is now ready to measure. After Agreement of comparing the simulated and measured result the work is published. Sothis software is highly beneficial.

HFSS is used to compute:

- Basic electromagnetic field quantities and, for open boundary problems, radiated near and far Fields
- Characteristic port impedances and propagation constants.
- Generalized S-parameters and S-parameters renormalized to specific port impedances.
- The Eigen modes, or resonances, of a structure.

For this it needs to just draw the structure, specify material characteristics for each object, and identifyports and special surface characteristics. HFSS then generates the necessary field solutions andassociated port characteristics and S-parameters.

2. Vector Network Analyzer (VNA)

The Vector Network Analyzer is a measuring device. It can measure the S parameters of the fabricated structure. The range of this instrument which is available in our department is 14 GHz.it is two port handheld instruments. To validate the designed structure all the performance parameters e. g. S-parameters, gain, E and H fields should be measured and compared to our simulated results.

VNA is used to measure:

- Cable and Antenna Analysis
- Field Strength Measurement
- SCPI Code Compatibility
- Spectrogram
- Stimulus Response.

Technical Specifications	
Handheld/Modular	Yes
Maximum frequency	14 GHz
CAT/VNA Start Frequency	30 kHz
SA Start Frequency	5 kHz
Dynamic Range	91 dB
Output Power	-4 dBm
Number of Built-In Ports	2 ports
Cable and Antenna Analyzer	Yes - Standard
Spectrum Analyzer	Yes - Optional
Vector Network Analyzer	Yes - Optional
Additional CAT/VNA Based Features	<ul style="list-style-type: none"> • Quick Cal (Subset) • Vector Voltmeter • Mixed-Mode S-Parameters • TDR Cable Measurements
Additional SA Based Features	<ul style="list-style-type: none"> • Built - in Power meter • Extended range Transmission analysis
System Features	<ul style="list-style-type: none"> • Built-In DC Source • GPS Receiver - Internal Only
Standard Attenuator Range	30 dB
Overall Amplitude Accuracy	±0.5 dB
Bandwidth Options	5 MHz
Phase Noise @1 GHz (1 MHz offset)	-113 dBc/Hz
Applications-General Purpose	<ul style="list-style-type: none"> • AM/FM Tune and Listen • Cable and Antenna Analysis • Field Strength Measurement • SCPI Code Compatibility • Spectrogram • Stimulus Response

Current Utilization:

1. UG students are performing the RF simulation and its measurements as well use the HFSS software and VNA for designing the RF circuits for their projects. 70% UG students uses the software for the performing their projects on HFSS software and 50 % PG students do the dissertation work on it.
2. Outside the college many PG students are coming to our lab for measuring their results of antennas or RF circuits with the help of VNA (14 GHz).



N9916A FieldFox Handheld Microwave Analyzer, 14 GHz



Research Lab E&C Department