LAKSHMI NARAIN COLLEGE OF TECHNOLOGY EXCELLENCE

Antenna & Wave Propagation Lab
[EC-602]
Laboratory Manual

Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal

Submitted By: **Submitted To:**

Enrollment No:

Lakshmi Narain College of Technology Excellence, Bhopal
Department of Electronics & Communication Engineering

VISION OF THE DEPARTMENT

To become reputed in providing technical education in the field of electronics and communication engineering and produce technocrats working as leaders.

MISSION OF THE DEPARTMENT

1. ***To provide congenial academic environment and adopting innovative learning process.***

2. ***To keep valuing human values and transparency while nurturing the young engineers.***

3. ***To strengthen the department by collaborating with industry and research organization of repute.***

4. ***To facilitate the students to work in interdisciplinary environment and enhance their skills for employability and entrepreneurship.***

PROGRAM SPECIFIC OUTCOME (PSO)

PSO1: Analyze specific engineering problems relevant to Electronics & Communication Engineering by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

PSO2: Apply and transfer interdisciplinary systems and engineering approaches to the various areas, like Communications, Signal processing, VLSI and Embedded system, PCB Designing.

PSO3: Inculcate the knowledge of Engineering and Management principles to meet demands of industry and provide solutions to the current real time problems.

PSO4: Demonstrate the leadership qualities and strive for the betterment of organization, environment and society.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Recognize and apply appropriate experimental and scientific skills to solve real world problems to create innovative products and systems in the field of electronics and communication engineering.

PEO2: To evolve graduates with ability to apply, analyze, design in Electronics & Communication Systems.

PEO3: Motivate graduates to become responsible citizens with moral & ethical values for the welfare of Society.

PEO4: Inculcate the habit of team work with professional quality of leadership to become successful contributors in industry and/ or entrepreneurship in view of Global & National status of technology.

Lakshmi Narain College of Technology Excellence, Bhopal
Department of Electronics & Communication Engineering

Course Outcomes

Course- Antenna & Wave Propagation (EC-602)

CO-1. To study about potential and electromagnetic field.

CO-2. To study antenna fundamentals and network theorems.

CO-3. To learn or study about different types of antennas.

CO-4. To study about antenna aperture and slot.

CO-5. To study about designing of antennas for different radiation patterns and radio wave.

Antenna &Wave Propagation Lab Index (EC-602)

Sr. No.	List of Experiments	Date of Performing	Date of Submission	Remark
1	To study Reciprocity Theorem.			
2	To plot radiation pattern of Yagi -UDA 3 element folded dipole antenna.			
3	To plot radiation pattern of Yagi -UDA 5 element folded dipole antenna.			
4	To study radiation of field strength of radiated wave.			
5	Study of Log Periodic Antenna.			
6	To plot radiation pattern of Folded Dipole $\lambda/2$ antenna.			
7	To plot radiation pattern of Rhombus Antenna.			
8	To plot radiation pattern of Broad Side Array antenna.			
9	To plot radiation pattern of Slot antenna.			
10	To plot radiation pattern of Cut Paraboloid Reflector Antenna.			

Student Name: - ………………… Enrollment No.:- ………………...

Experiment No. - 1

Aim: - To study Reciprocity Theorem.

Apparatus:-

Detector, Antenna, Antenna Trainer Kit, Connecting Wires.

Theory:-

Reciprocity theorem is the most powerful theorem in the circuit and field theory both.

It states that, If an emf is applied to the terminals of an antenna no. 1 and the current measurement at the terminal of another antenna no. 2 then an equal current both in amplitude and phase will be obtained at the terminals of antenna no. 1. If the same emf is applied to the terminals of antenna no. 2.

It is a fundamental property of antennas that the electrical characteristics of an antenna described in the next section, such as gain, radiation pattern, impedance, bandwidth, resonant frequency and polarization, are the same whether the antenna is transmitting or receiving. For example, the "*receiving pattern*" (sensitivity as a function of direction) of an antenna when used for reception is identical to the radiation pattern of the antenna when it is *driven* and functions as a radiator. This is a consequence of the reciprocity theorem of electromagnetics. Therefore, in discussions of antenna properties no distinction is usually made between receiving and transmitting terminology, and the antenna can be viewed as either transmitting or receiving, whichever is more convenient.

A necessary condition for the aforementioned reciprocity property is that the materials in the antenna and transmission medium are linear and reciprocal. *Reciprocal* (or *bilateral*) means that the material has the same response to an electric current or magnetic field in one direction, as it has to the field or current in the opposite direction. Most materials used in antennas meet these conditions, but some microwave antennas use high-tech components such as isolators and circulators, made of nonreciprocal materials such as ferrite. These can be used to give the antenna a different behavior on receiving than it has on transmitting, which can be useful in applications like radar.

Mathematically:-

$$I_1=I_2 \text{ and } \mathcal{E}_{12}=\mathcal{E}_{21}$$

$$Z_m= \text{mutual impulse}$$

$$Z_m=Z_{12}=Z_{21}=\mathcal{E}_{12}/I_2=\mathcal{E}_{21}/I_1$$

$$\mathcal{E}_{12}/I_2=\mathcal{E}_{21}/I_1$$

Properties under Reciprocity

The properties of transmitting and receiving antenna that exhibit the reciprocity are −

- Equality of Directional patterns.
- Equality of Directivities.
- Equality of Effective lengths.
- Equality of Antenna impedances.

Equality of Directional patterns-

The radiation pattern of transmitting antenna1, which transmits to the receiving antenna 2 is equal to the radiation pattern of antenna2, if it transmits and antenna1 receives the signal.

Equality of Directivities -

Directivity is same for both transmitting and receiving antennas, if the directivities are same whether calculated from transmitting antenna's power or receiving antenna's power.

Equality of Effective lengths-

The value of maximum effective aperture is same for both transmitting and receiving antennas, is called equality of effective lengths.

Result:-

Reciprocity theorem is verified.

Student Name: - …………………   Enrollment No.:- ………………...

Observation Tables:-

Degree	Current(μA)	dB = 20 log (I)	Difference

Student Name: - …………………   Enrollment No.:- ………………...

Experiment No. - 2

Aim: - To plot radiation pattern of Yagi -UDA 3 element folded dipole antenna.

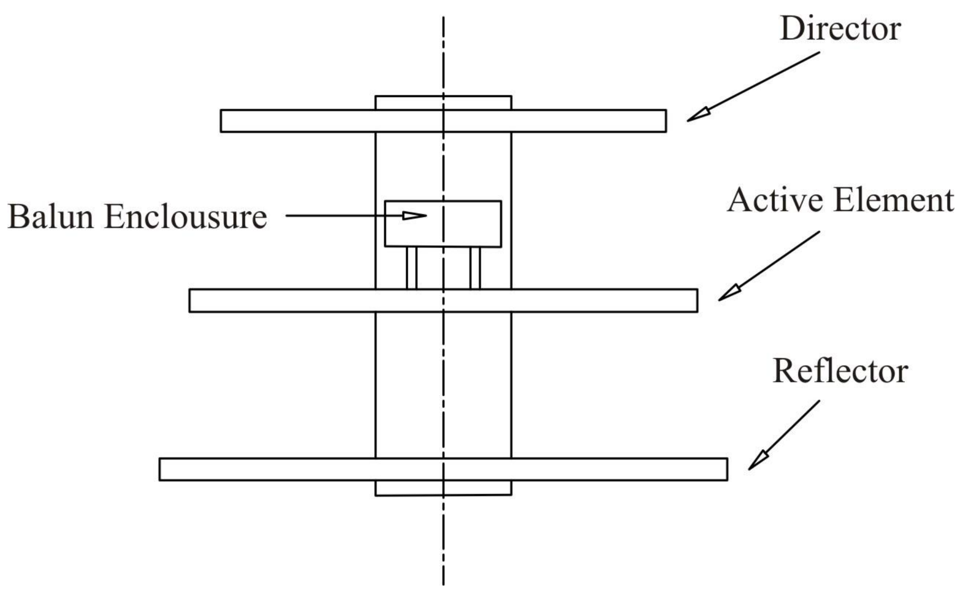
Apparatus:-

Detector, Antenna, Antenna Trainer Kit, Connecting Wires.

Theory:-

Yagi-Uda antenna is the most commonly used type of antenna for TV reception over the last few decades. It is the most popular and easy-to-use type of antenna with better performance, which is famous for its high gain and directivity the frequency range in which the Yagi-Uda antennas operate is around 30 MHz to 3GHz which belong to the VHF and UHF bands. The theoretical impedance of this antenna is 75. This is a very important antenna for unidirectional transmission. Yagi-UDA Antenna with folded or non-folded dipoles are widely used antennas. Behind the dipole they have reflectors and in front they have directors 1-3-5-7-9, etc.

The figure depicts a clear form of the Yagi-Uda antenna. The center rod like structure on which the elements are mounted is called as boom. The element to which a thick black head is connected is the driven element to which the transmission line is connected internally, through that black stud. The single element present at the back of the driven element is the reflector, which reflects all the energy towards the direction of the radiation pattern. The other elements, before the driven element, are the directors, which direct the beam towards the desired angle.



Yagi -UDA 3 Element Folded dipole antenna

Procedure:-

1. Get the setup ready.
2. Mount Yagi -UDA 3 Element Folded dipole on the top of the transmitting mast.
3. Ensure the following settings:
    - Both, transmitting and receiving antennas are facing each other in horizontal plane. Keep the distance around 100cm between them.
    - Transmitter is tuned for maximum forward power to transmit and receive optimum/ maximum radiations for the antenna under test,
    - DPM for FS adjust at transmitting unit is set for 100uA reading and DPM at RF detector unit is set for 70uA
    - Transmitting mast marker is at '0' degree position.
4. Now start taking the readings at the interval 20 degrees and tabulate the degree v/s μA readings of RF detector unit display.
5. Convert the noted micro Amp readings into dB using,

$$\boxed{dB = 20 \log (I)}$$

6. Now plot the polar graph on the supplied polar graph paper as per the converted dB readings against degrees of rotation.

Result:-

We have successfully plotted the radiation pattern of Yagi -UDA 3 element folded dipole antenna.

Student Name: - …………………   Enrollment No.:- ………………...

Observation table:-

Degree	**Current(μA)**	**dB = 20 log (I)**	**Difference**

Student Name: - …………………   Enrollment No.:- ………………...

Experiment No. - 3

Aim: - To plot radiation pattern of Yagi -UDA 5 element folded dipole antenna.

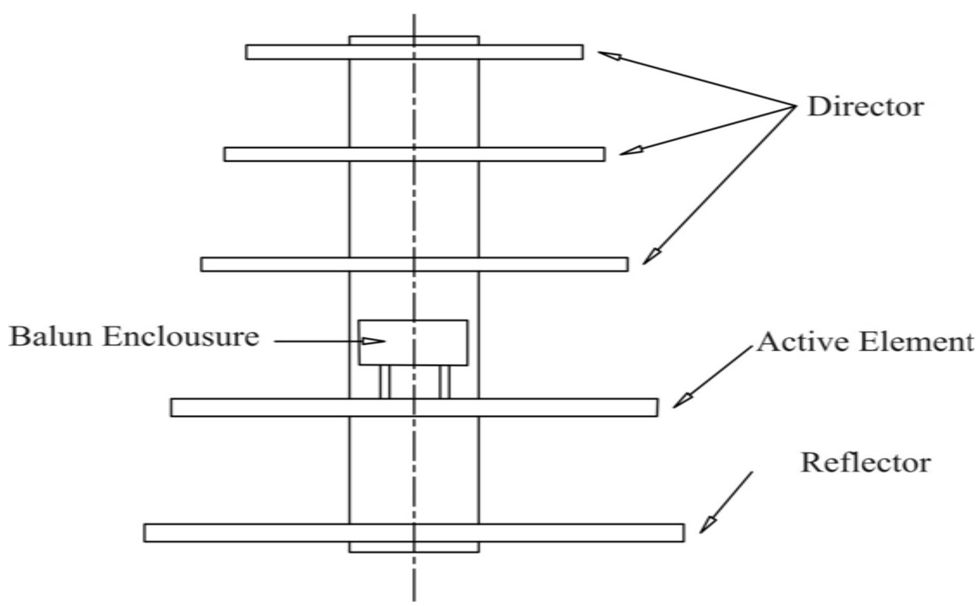
Apparatus:-

Detector, Antenna, Antenna Trainer Kit, Connecting Wires.

Theory:-

Yagi-Uda antenna is the most commonly used type of antenna for TV reception over the last few decades. It is the most popular and easy-to-use type of antenna with better performance, which is famous for its high gain and directivity The frequency range in which the Yagi-Uda antennas operate is around 30 MHz to 3GHz which belong to the VHF and UHF bands. The theoretical impedance of this antenna is 75. This is a very important antenna for unidirectional transmission. Yagi-UDA Antenna with folded or non-folded dipoles are widely used antennas. Behind the dipole they have reflectors and in front they have directors 1-3-5-7-9, etc.

The figure depicts a clear form of the Yagi-Uda antenna. The center rod like structure on which the elements are mounted is called as boom. The element to which a thick black head is connected is the driven element to which the transmission line is connected internally, through that black stud. The single element present at the back of the driven element is the reflector, which reflects all the energy towards the direction of the radiation pattern. The other elements, before the driven element, are the directors, which direct the beam towards the desired angle.



Yagi -UDA 5 Element Folded dipole antenna

Procedure:-

1. Get the setup ready.
2. Mount Yagi -UDA 5 Element Folded dipole on the top of the transmitting mast.
3. Ensure the following settings:
    - Both, transmitting and receiving antennas are facing each other in horizontal plane. Keep the distance around 100cm between them.
    - Transmitter is tuned for maximum forward power to transmit and receive optimum/ maximum radiations for the antenna under test,
    - DPM for FS adjust at transmitting unit is set for 100uA reading and DPM at RF detector unit is set for 70uA
    - Transmitting mast marker is at ‘0’ degree position.
4. Now start taking the readings at the interval 20 degrees and tabulate the degree v/s μA readings of RF detector unit display.
5. Convert the noted micro Amp readings into dB using,

$$\boxed{dB = 20 \log (I)}$$

6. Now plot the polar graph on the supplied polar graph paper as per the converted dB readings against degrees of rotation.

Result:-

We have successfully plotted the radiation pattern of Yagi -UDA 5 element folded dipole antenna.

<u>Student Name</u>: - …………………   <u>Enrollment No.</u>:- ………………...

Observation table:-

Degree	Current(μA)	dB = 20 log (I)	Difference

Student Name: - …………………   Enrollment No.:- ………………...

Experiment No. - 4

Aim: - To study radiation of field strength of radiated wave.

Apparatus:-

Detector, Antenna, Antenna Trainer Kit, Connecting Wires.

Theory:-

The objective of this exercise is to study the variation in the radiation strength at a given distance from the antenna. The detector will show a higher strength when it is nearer to the transmitting antenna and shall reduce gradually with increasing distance.

In physics, field strength means the magnitude of a vector-valued field (e.g., in volts per meter, V/m, for an electric field E). For example, an electromagnetic field results in both electric field strength and magnetic field strength. As an application, in radio frequency telecommunications, the signal strength excites a receiving antenna and thereby induces a voltage at a specific frequency and polarization in order to provide an input signal to a radio receiver. Field strength meters are used for such applications as cellular, broadcasting, wi-fi and a wide variety of other radio-related applications.

The space surrounding an antenna can be divided into three concentric regions: The reactive near-field (also called the inductive near field), the radiating near-field (Fresnel region) and the far-field (Fraunhofer) regions. These regions are useful to identify the field structure in each, although the transitions between them are gradual, and there are no precise boundaries.

The far-field region is far enough from the antenna to ignore its size and shape: It can be assumed that the electromagnetic wave is purely a radiating plane wave (electric and magnetic fields are in phase and perpendicular to each other and to the direction of propagation). This simplifies the mathematical analysis of the radiated field.

Procedure:-

1. Mount the Folded dipole as per previous excrement.
2. Keep the detector unit at a distance of approx. 1 ft. from the transmitting antenna and align it. Adjust level of RF Generator & Detector unit so that the reading is 40µA.
3. Note the above reading for 1 ft. distance.
4. Remove the detector to 2 ft. away.
5. Note the reading for 2 ft. distance.

6. Similarly take the readings for3, 4, 5, ft.
7. Plot a graph of readings with distance and see whether it is linear or non-linear.

Result:-

We have successfully study radiation of field strength of radiated wave.

Observation table:-

Distance	Current(µA)

Student Name: - ………………… Enrollment No.:- ………………...

Experiment No. - 5

Aim: - Study of Log Periodic Antenna.

Apparatus:-

Detector, Antenna, Antenna Trainer Kit, Connecting Wires.

Theory:-

Driven array is a family of half wave dipole antennas in which signal is applied to all the elements in parallel. This family included popular type of antennas such as

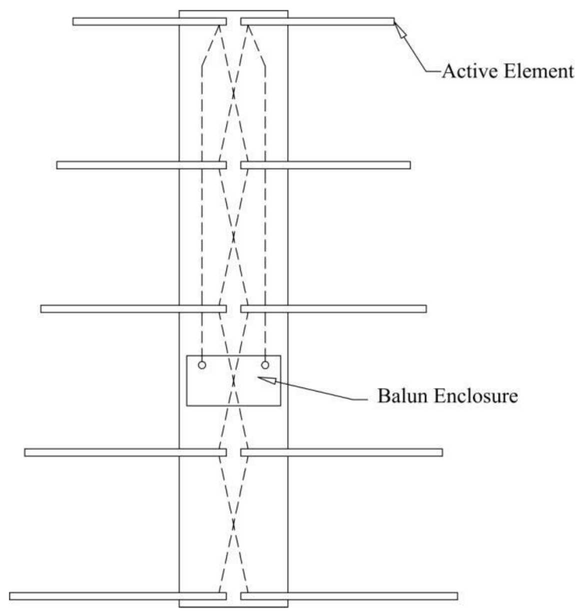
a. End fire array
b. Co-linear array
c. Broad side array
d. Log periodic antenna

Log Periodic Antenna:

The main feature of this antenna is frequency independence for both radiation resistance and pattern. The radiation pattern may be unidirectional or bidirectional. Bandwidth of 10:1 is easily achievable.

The array consists of number of dipoles of different lengths and spacing, and fed from a two wire line which is transposed between each adjacent pair of dipoles. The array is fed from narrow end and maximum radiation is in this direction. See next figure.
If a graph is drawn of antenna input impedance v/s frequency, a repetitive variation will be noticed. If plotted against log of frequency instead of frequency, then variation is periodic consisting of identical cycles. All other properties of antenna undergo similar variation especially radiation pattern. It is this behaviour of antenna, which has given, log periodic name.

This is a horizontally polarised antenna. Typical radiation pattern is shown in next figure.



Log Periodic antenna

Procedure:-

1. Get the setup ready.
2. Mount Log Periodic antenna on the top of the transmitting mast.
3. Ensure the following settings:
    - Both, transmitting and receiving antennas are facing each other in horizontal plane. Keep the distance around 100cm between them.
    - Transmitter is tuned for maximum forward power to transmit and receive optimum/ maximum radiations for the antenna under test,
    - DPM for FS adjust at transmitting unit is set for 100uA reading and DPM at RF detector unit is set for 70uA
    - Transmitting mast marker is at ‘0’ degree position.
4. Now start taking the readings at the interval 20 degrees and tabulate the degree v/s µA readings of RF detector unit display.
5. Convert the noted micro Amp readings into dB using,

$$\boxed{dB = 20 \log (I)}$$

6. Now plot the polar graph on the supplied polar graph paper as per the converted dB readings against degrees of rotation.

Result:-

We have successfully study Log Periodic Antenna.

Student Name: - …………………   Enrollment No.:- ………………...

Observation table:-

Degree	Current(μA)	dB = 20 log (I)	Difference

Experiment No. - 6

Aim: - To plot radiation pattern of Folded Dipole λ/2 antenna.

Apparatus:-

Detector, Antenna, Antenna Trainer Kit, Connecting Wires.

Theory:-

A folded dipole is an antenna, with two conductors connected on both sides, and folded to form a cylindrical closed shape, to which feed is given at the center. The length of the dipole is half of the wavelength. Hence, it is called as half wave folded dipole antenna.

Frequency range-

The range of frequency in which half wave folded dipole operates is around 3KHz to 300GHz. This is mostly used in television receivers.

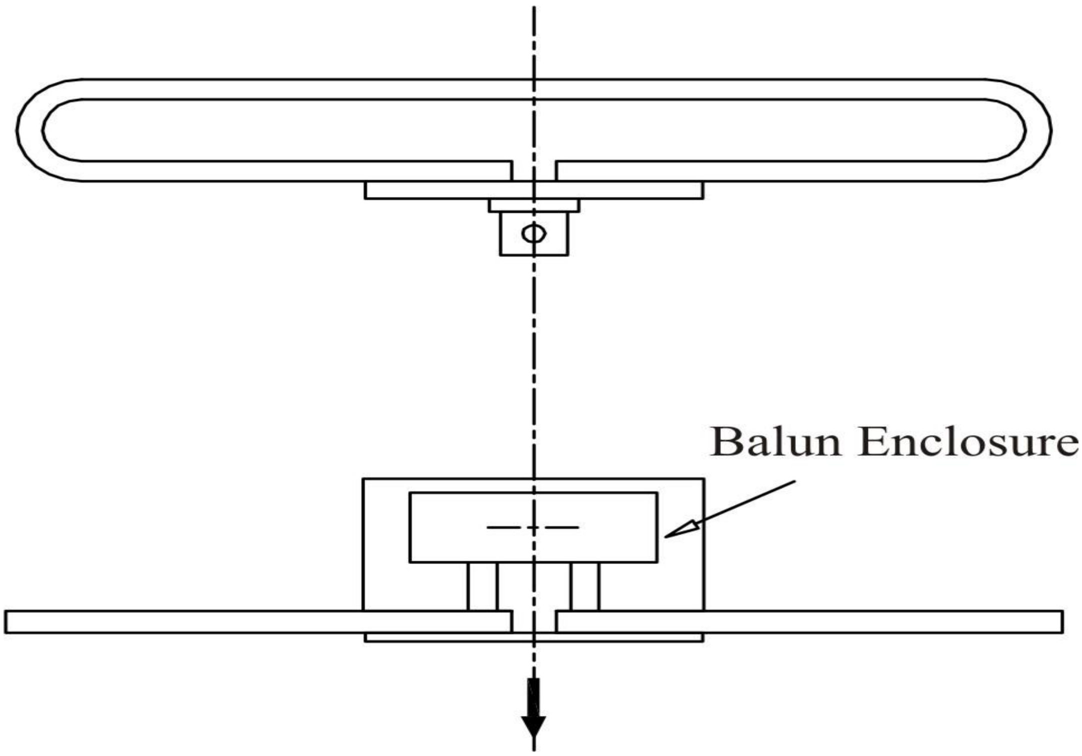
Radiation Pattern-

The radiation pattern of half-wave folded dipoles is the same as that of the half-wave dipole antennas. The following figure shows the radiation pattern of half-wave folded dipole antenna, which is Omni-directional pattern.
Half-wave folded dipole antennas are used where optimum power transfer is needed and where large impedances are needed.

Applications-

The following are the applications of half-wave folded dipole antenna −

- Mainly used as a feeder element in Yagi antenna, Parabolic antenna, turnstile antenna, log periodic antenna, phased and reflector arrays, etc.
- Generally used in radio receivers.
- Most commonly used in TV receiver antennas.



Folded Dipole λ/2 antenna

Procedure:-

1. Get the setup ready.
2. Mount Folded Dipole λ/2 antenna on the top of the transmitting mast.
3. Ensure the following settings:
    - Both, transmitting and receiving antennas are facing each other in horizontal plane. Keep the distance around 100cm between them.
    - Transmitter is tuned for maximum forward power to transmit and receive optimum/ maximum radiations for the antenna under test,
    - DPM for FS adjust at transmitting unit is set for 100uA reading and DPM at RF detector unit is set for 70uA
    - Transmitting mast marker is at ‘0’ degree position.
4. Now start taking the readings at the interval 20 degrees and tabulate the degree v/s µA readings of RF detector unit display.
5. Convert the noted micro Amp readings into dB using,

$$\boxed{dB = 20 \log (I)}$$

6. Now plot the polar graph on the supplied polar graph paper as per the converted dB readings against

degrees of rotation.

Result:-

We have successfully plotted the radiation pattern of Folded Dipole λ/2 antenna.

Observation table:-

Degree	Current(μA)	dB = 20 log (I)	Difference

Student Name: - …………………   Enrollment No.:- ………………...

Experiment No. - 7

Aim: - To plot radiation pattern of Rhombus Antenna.

Apparatus:-

Detector, Antenna, Antenna Trainer Kit, Connecting Wires.

Theory:-

The Rhombus Antenna is an equilateral parallelogram shaped antenna. Generally, it has two opposite acute angles. The tilt angle, θ is approximately equal to 90° minus the angle of major lobe. Rhombic antenna works under the principle of travelling wave radiator. It is arranged in the form of a rhombus or diamond shape and suspended horizontally above the surface of the earth.

Frequency range-

The frequency range of operation of a Rhombus antenna is around 3MHz to 300MHz. This antenna works in HF and VHF ranges.

Radiation Pattern-

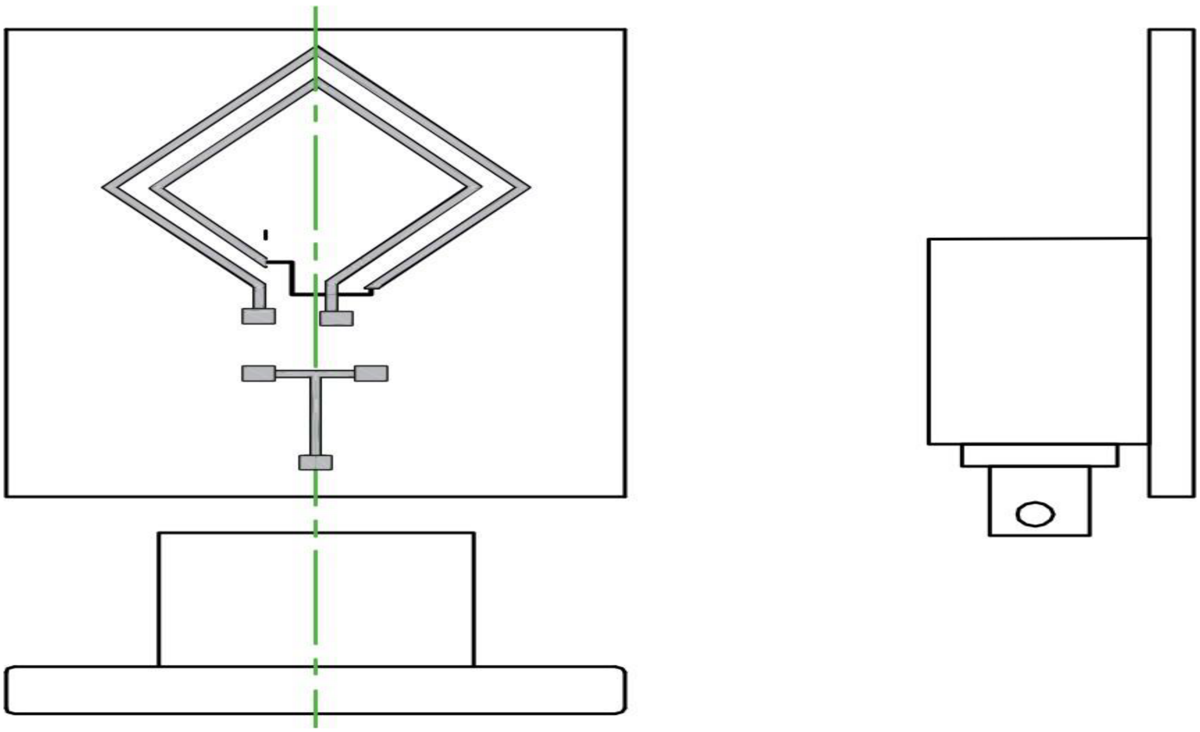
The radiation pattern of the rhombic antenna is shown in the following figure. The resultant pattern is the cumulative effect of the radiation at all four legs of the antenna. This pattern is uni-directional, while it can be made bi-directional by removing the terminating resistance.

The main disadvantage of rhombic antenna is that the portions of the radiation, which do not combine with the main lobe, result in considerable side lobes having both horizontal and vertical polarization.

Applications-

The following are the applications of half-wave folded dipole antenna −

- Used in HF communications
- Used in Long distance sky wave propagations
- Used in point-to-point communications



Rhombus antenna

Procedure:-

1. Get the setup ready.
2. Mount Rhombus antenna on the top of the transmitting mast.
3. Ensure the following settings:
   - Both, transmitting and receiving antennas are facing each other in horizontal plane. Keep the distance around 100cm between them.
   - Transmitter is tuned for maximum forward power to transmit and receive optimum/ maximum radiations for the antenna under test,
   - DPM for FS adjust at transmitting unit is set for 100uA reading and DPM at RF detector unit is set for 70uA
   - Transmitting mast marker is at '0' degree position.
4. Now start taking the readings at the interval 20 degrees and tabulate the degree v/s µA readings of RF detector unit display.
5. Convert the noted micro Amp readings into dB using,

$$\boxed{dB = 20 \log (I)}$$

6. Now plot the polar graph on the supplied polar graph paper as per the converted dB readings against degrees of rotation.

Result:-

We have successfully plotted the radiation pattern of Rhombus antenna.

Student Name: - ………………… Enrollment No.:- ………………...

Observation table:-

Degree	Current(μA)	dB = 20 log (I)	Difference

Student Name: - ………………… Enrollment No.:- ………………...

Experiment No. - 8

Aim: - To plot radiation pattern of Broad Side Array antenna.

Apparatus:-

Detector, Antenna, Antenna Trainer Kit, Connecting Wires.

Theory:-

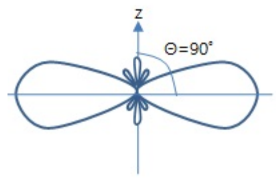
The antenna array in its simplest form, having a number of elements of equal size, equally spaced along a straight line or axis, forming collinear points, with all dipoles in the same phase, from the same source together form the broad side array.

Frequency range-

The frequency range, in which the collinear array antennas operate is around 30 MHz to 3GHz which belong to the VHF and UHF bands.

Radiation Pattern-

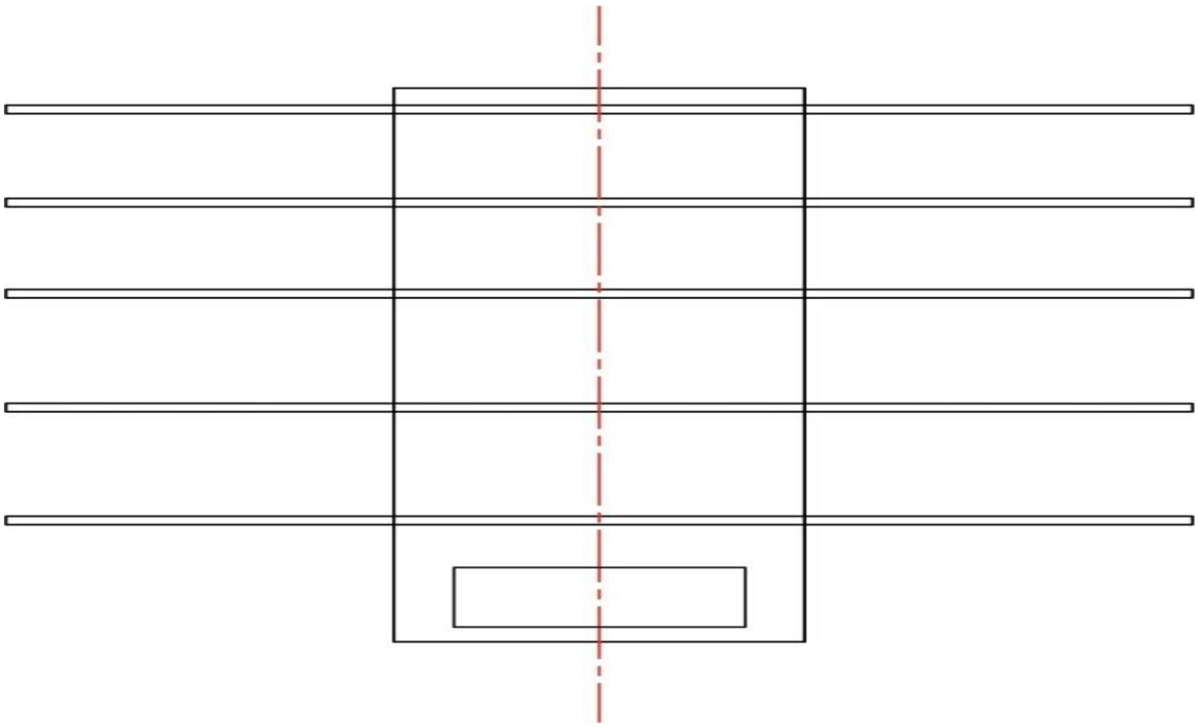
The radiation pattern of this antenna is bi-directional and right angles to the plane. The beam is very narrow with high gain.



The above figure shows the radiation pattern of the broad side array. The beam is a bit wider and minor lobes are much reduced in this.

Applications-

These generally find applications in overseas broadcasting systems.



Broad Side Array antenna

Procedure:-

1. Get the setup ready.
2. Mount Broad Side Array antenna on the top of the transmitting mast.
3. Ensure the following settings:
    - Both, transmitting and receiving antennas are facing each other in horizontal plane. Keep the distance around 100cm between them.
    - Transmitter is tuned for maximum forward power to transmit and receive optimum/ maximum radiations for the antenna under test,
    - DPM for FS adjust at transmitting unit is set for 100uA reading and DPM at RF detector unit is set for 70uA
    - Transmitting mast marker is at ‘0’ degree position.
4. Now start taking the readings at the interval 20 degrees and tabulate the degree v/s µA readings of RF detector unit display.
5. Convert the noted micro Amp readings into dB using,

$$\boxed{dB = 20 \log (I)}$$

6. Now plot the polar graph on the supplied polar graph paper as per the converted dB readings against degrees of rotation.

Result:-

We have successfully plotted the radiation pattern of Broad Side Array antenna.

Student Name: - …………………   Enrollment No.:- ………………...

Observation table:-

Degree	Current(μA)	dB = 20 log (I)	Difference

Student Name: - ………………… Enrollment No.:- ………………...

Experiment No. - 9

Aim: - To plot radiation pattern of Slot antenna.

Apparatus:-

Detector, Antenna, Antenna Trainer Kit, Connecting Wires.

Theory:-

A type of antenna with an opening cut of certain dimensions in a metallic conductor which is excited using a two-wire transmission line or coaxial cable is known as a slot antenna.

Frequency range-

These antennas operate in the frequency ranging between 300 MHz to 30 GHz.

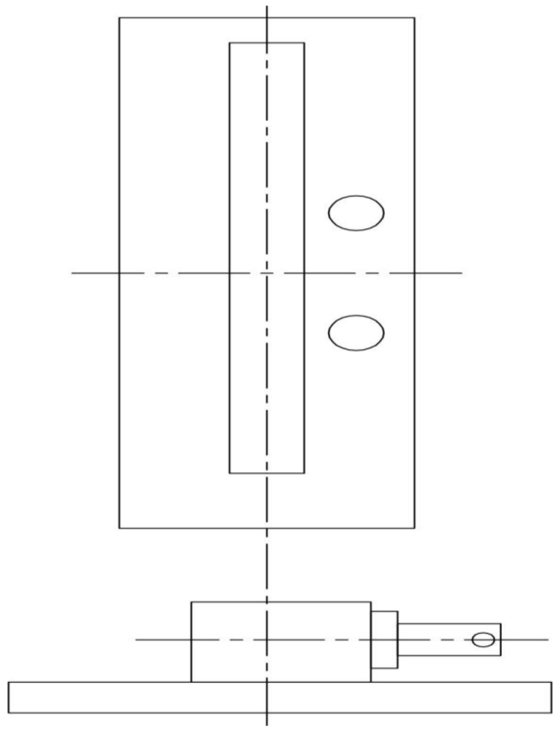
Radiation Pattern-

The radiation pattern of the Slot antenna is Omni-directional, just like a half-wave dipole antenna.

Applications-

The following are the applications of Slot antenna −

- Usually for radar navigational purposes
- Used as an array fed by a wave guide



Slot antenna

Procedure:-

1. Get the setup ready.
2. Mount Slot antenna on the top of the transmitting mast.
3. Ensure the following settings:
    - Both, transmitting and receiving antennas are facing each other in horizontal plane. Keep the distance around 100cm between them.
    - Transmitter is tuned for maximum forward power to transmit and receive optimum/ maximum radiations for the antenna under test,
    - DPM for FS adjust at transmitting unit is set for 100uA reading and DPM at RF detector unit is set for 70uA
    - Transmitting mast marker is at ‘0’ degree position.
4. Now start taking the readings at the interval 20 degrees and tabulate the degree v/s µA readings of RF detector unit display.
5. Convert the noted micro Amp readings into dB using,

$$\boxed{dB = 20 \log (I)}$$

Student Name: - ………………… Enrollment No.:- ………………...

6. Now plot the polar graph on the supplied polar graph paper as per the converted dB readings against degrees of rotation.

Result:-

We have successfully plotted the radiation pattern of Slot antenna.

Observation table:-

Degree	Current(μA)	dB = 20 log (I)	Difference

Experiment No. - 10

Aim: - To plot radiation pattern of Cut Paraboloid Reflector Antenna.

Apparatus:-

Detector, Antenna, Antenna Trainer Kit, Connecting Wires.

Theory:-

A type of reflector which has a reflecting surface having the shape of a paraboloid that is used to collect and re-radiated the electromagnetic energy is known as Parabolic Reflector. It is regarded as the simplest and popular form of reflector antenna.

These are known as microwave antennas as exhibit a wide range of use at microwave frequencies in terms of communication.

Frequency range-

The operating range offered by it is generally above 1 MHz. Thus, shows suitability in radio and wireless applications.

Radiation Pattern-

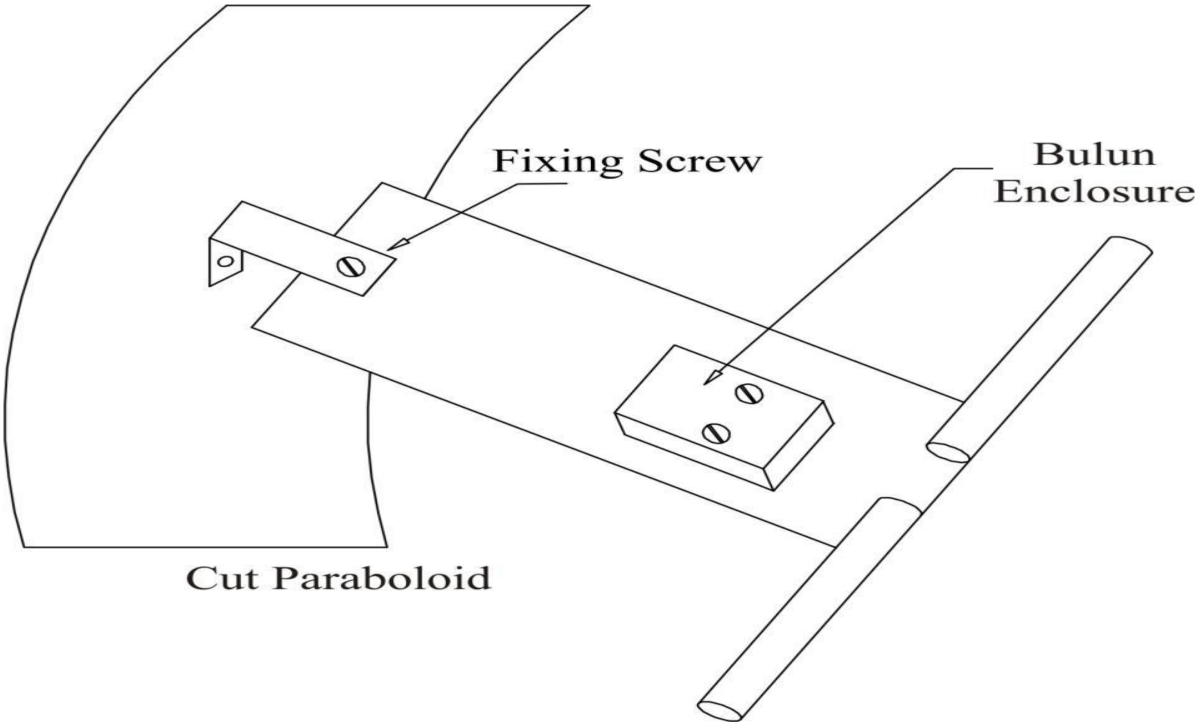
In parabolic antennas, virtually all the power radiated is concentrated in a narrow main lobe along the antenna's axis. The residual power is radiated in sidelobes, usually much smaller, in other directions. Because in parabolic antennas the reflector aperture is much larger than the wavelength, due to diffraction there are usually many narrow sidelobes, so the sidelobe pattern is complex.

Applications-

The high directive gain offered by these antennas makes it suitable for various applications like:

- Satellite communication
- TV signal broadcasting
- Wireless communication
- Radio astronomy
- Parabolic microphones and

- Lighting devices such as car headlights



Cut Paraboloid Reflector Antenna

Procedure:-

1. Get the setup ready.
2. Mount Cut Paraboloid Reflector Antenna on the top of the transmitting mast.
3. Ensure the following settings:
    - Both, transmitting and receiving antennas are facing each other in horizontal plane. Keep the distance around 100cm between them.
    - Transmitter is tuned for maximum forward power to transmit and receive optimum/ maximum radiations for the antenna under test,
    - DPM for FS adjust at transmitting unit is set for 100uA reading and DPM at RF detector unit is set for 70uA
    - Transmitting mast marker is at ‘0’ degree position.
4. Now start taking the readings at the interval 20 degrees and tabulate the degree v/s μA readings of RF detector unit display.

5. Convert the noted micro Amp readings into dB using,

$$\boxed{dB = 20 \log (I)}$$

6. Now plot the polar graph on the supplied polar graph paper as per the converted dB readings against degrees of rotation.

Result:-

We have successfully plotted the radiation pattern of Cut Paraboloid Reflector Antenna.

Observation table:-

Degree	Current(μA)	dB = 20 log (I)	Difference