The Parabolic Dish Antenna in Respect to Satelite Communication System

BY

ABDULSALAM IBRAHIM
Reg. No. 03/2001/051

OCTOBER 2004

TITLE PAGE

THE PARABOLIC DISH ANTENNA IN RESPECT TO SATELLITE COMMUNICATION SYSTEM

A PROJECT REPORT PRESENTED TO THE
ELECTRICAL AND ELECTRONIC DEPARTMENT,
SCHOOL OF TECHNICAL STUDIES, FEDERAL
COLLEGE OF EDUCATION (TECHNICAL) GOMBE

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE AWARD OF N.C.E. TECHNICAL CERTIFICATE

BY

ABDULSALAM IBRAHIM
REG. NO: 03/[illegible]/071

OCTOBER, 2007

APPROVAL PAGE

This project has been read and approved for the school of technical studies, Federal College of Education (Technical) Gombe.

By

Sign ---------- 05/11/04
Project Supervisor.

Sign ---------- 15/11/04
Head of Department.

DEAN
School of Technical Studies
Fed. Coll. of Educ. (T)
P.M.B. 0080 GOMBE

Sign ---------- 15/11/04
Director School of Technical Studies

DEDICATION

Iam dedicating this project to my parent Malam Ibrahim Abubakar and Malama Hafsatu Ibrahim for their care and support both academically and financially.

AKNOWLEDGEMENT

I must start by expressing my gratitude to the almighty Allah the Lord of the world, the creator and sustainer of all living, master of the day of doom! Whose special mercy, guidance and control make it possible for me to reach this far today.

In the course of this academic work, and indeed all the way before now, I had leaned, rested and was carried by the great shoulder o many people whose strong bones made me to stand up to days stress.

I would like to express my heartily sense of gratitude and appreciation to my father Mallam Ibrahim Abubakar as well as my mother Mallama Hafsatu Ibrahim whose financial and moral support has taken me thus far. I pray God reward them abundantly. Amen. Moral support played a greater role in taking me to greater heights in my search of this N.C.E Certificate, my sincere gratitude equally goes to my brothers and sisters Abdulrahman, Mohammad khaulatu, Saratu, Asiyatu, Mariyatu as well as my uncles Malam Sani, Mallam Salisu and their children respectively, whose love and care matter most.

Iam very grateful for the helping hand extended to me in the search of this academic excellence.

Special thanks of honour to my supervisor Malam Haruna Babaji who despite his tight schedules and numerous commitments was always ready to make vital comment and correction to my lapses as well as design this indeed stress me to achieve the best result.

My appreciation also goes to my colleague Mr. Adamu Mohammed Abubakar for his respectful contribution and reasonable suggestions in the realization this dream.

I finally acknowledge the support of my friends to mention but few, Isa A. Umar, Abubakar Moh'd, Kasimu A. Mudah and several others who are too numerous to mention here.

I pray to be sincere in my career. God bless all of us.

TABLE OF CONTENT

CHAPTER THREE

CHAPTER FOUR

CHAPTER FIVE

ABSTRACT

The theory, the definition of terms used and description of the component in relation to the transmitting and receiving, antenna, in respect to **parabolic dish** has been shown. The parabolic dish diagrammes and construction details problem and solution as well as the amendment were elaborated. The characteristics and frequency ranges, together with their radiation patterns were also highlighted. The general introduction of antenna and brief satellite communication system were enumerated. The method of evaluation including their short comment were also outline. The design procedure and details account of how the system would function section by section were clearly stated.

INTRODUCTION

An aerial also called antenna is that part of radio system which is designed to radiate and to receive electromagnetic energy (Radio wave) spectrum using some of modulation. A transmitting antenna converts the high frequency electrical current from the feeding lines into the Radio wave that spreads outward, however, the receiving antenna intercepts the radio wave from the surrounding and converts the energy back into the electrical energy that can be amplified and decoded by a receiver; similarly, in radio communication system, the base band signal is located in a specific part of the frequency, meanwhile, the main difference being that a transmitting antenna may handle very large power in kilowatts range while incase of receiving antenna, absorb very low power and may be very small (micro watts)

A Large proportion of domestic radio receiver operate in areas of good signal strength and frequently used some form of internal antenna of rather inefficient aerial anadem behind a picture rail. That is in case of receiving antenna for M.F and L.F and the most popular type is that using a Ferrite rod antenna.

A large number of antenna are in existence, but only four (4) among them are commonly used in modern radio telephony system, such type of antenna are:

1. PARABOLIC DISH ANTENNA
2. LOG PERIODIC ANTENNA
3. YAGI ANTENNA

But this project is mainly concerned with the above first mentioned antenna that is: (parabolic dish antenna)

CHAPTER ONE

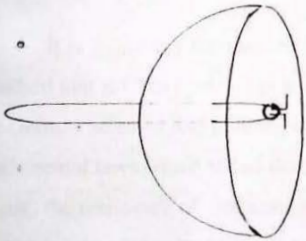
THE DESCRIPTION OF THE COMPONENTS

In this chapter, we are going to explain or describe the component and the application of the parabolic dish antenna, in respect, to satellite communication.

FRONT FEED

(4) FRONT FEED: A system of wire used to carry a signal an antenna and a transmitter / receiver. Often a coaxial cable is used, which acts to shield the signal from external interference.

In various feeds used with reflectors are show in figure 1.1 below and the design of a suitable feed system for the reflector constitutes an important task.



Dipole feed

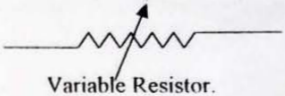
The purpose of the feed is to illuminate the reflector over its entire surface and to avoid spill over radiation. More over the illumination must be such so as to give the radiation pattern required. Various techniques must be employed and one of the usual is to use an illumination taper i.e. a falling off of primary bean intensity towards the edges of the reflector as a cosine taper or linear taper. An optimum taper exist which give best gain side lobe level, noise temperature e t c.

(2) RESISTORS

This is a device that opposes or retards the flow of current in electric circuit or conductor. The resistance of a circuit means the obstacles, retardation or opposition to flow of current in that particular circuit. The flow of electric charge through any material encounters an opposition due to collection between electron and electron of other atoms in the material that converts electrical energy into heat is called resistance.

Resistor symbolized by:

Fixed Resistor.



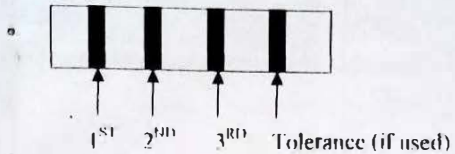
Variable Resistor.

It is frequently represented by the Greek omega and the standard unit is Ohm (—Ω—) in honour of George Sincon Ohm, the German scientist and philosopher who discovered the fundamental laws which stated that, in any given conductor or circuit, the resistance of that conductor or circuit is directly proportional to the voltage applied and inversely proportional to the current provided the term pecture of the conductor remains constraint". R=V

A Resistor can be fixed type or variable type as indicated above. The fixed one is the one that has polarity which can be tune by varying the resistance of a resistor in terms of manufacturing techniques, resistors are made up of carbon composition, deposited carbons high voltage ink film, metal glaze, wire wound and ceramic wire. Bnt the most current resistors used in electronic equipment or circuits are carbon composition and deposited carbon,

because of their cheap and improvement at lower current, but they have the disadvantage of making noise when current is passing through them.

RESISTOR COLOUR CODING



Frequency	Colour	
0	Black	
1	Brown	
2	Red	
3	Orange	
4	Yellow	
5	Green	
6	Blue	
7	Violet	
8	Grey	
9	White	
0.10	Silver	Used as multipliers (3rd band) only
0.1	Gold	

Tolerance 10% silver

5% Gold

- First band first figure of resistance value first significant figure.
- Second band second figure of resistance value second significant figure
- Third – band – number of zeros following second figure (multiplier).

Tolerance band – percentage tolerance of value (5% or 10%) No tolerance band used if the resistor has 20% tolerance.

Resistor values on components and in components list are often coded according to "BS1852". In this scheme, no decimal points are used and a value in ohms is indicated by, "R" Kilohms by k (notk), and a megohms by m. the lette5r "R", k or m is place of the decimal points with a zero in the leading position of the value is less than 10 ohms

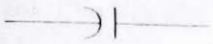
(3) CAPACITOR

It is an electronic device essentially made for storing electrical charges by electrostatic stress in the dielectric. The (word-condenser) as a misnomer, since a capacitor does not condense electricity as such, it merely stores it.

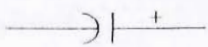
The capacitors consist of two conductors or metal plates or disc separated by a layer of an insulating medium called dielectric material, the dielectric can be aluminum disc, aluminum foul, or a thin film of metal applied to opposite side of a solid dielectric. The conducting surface also may be in the form of either circular (or rectangular) plates or by spherical or cylindrical shape. The ability to store electrons or to store electric charges is known as capacitance, the symbol is "C" the unit is farad "F" which is equal to, coulomb / volt Q/V (in honour of Michael Faraday). One farad is defined as the capacitance of a capacitor, which requires charges

of one coulomb to establish a potential difference (p.d) of one volt between its plates

- A one-farad capacitor connected to a one volt supply will store 6,280.000.000,000,000,000. Electrons (6.28×10^{16}electrons). Therefore, the farad is actually too large value for practical purposes other sub unit can be used such f, nf, pf e.t.c its symbol is shown below:



NON POLARIZED CAPACITOR



POLARIZED OR ELECTROLYTIC CAPACITOR

VARIABLE CAPACITOR

TYPES OF CAPACITORS

Capacitors are classified according to the mature of the dielectric

i) Air capacitor

ii) Variable Air di electric capacitor

iii) Paper (wax) capacitor

iv) Ceramic capacitor

CAPACITOR COLOUR CODING;

- B and A.B.C are used for coding values in pf in the same way as resistors – remember that 1000pf = inf = uf-
- B and D ⌒ Black – 20% white – 10%
- B and E ⌒ Red – 250 VDC working, Yellow- = 400xDc working.
- Colour code for small block capacitors (mainly polyester). Tantalum electrolytic capacitor are also sometimes colour coded, but with values in uf rather than pf.

Band	1	2	3	4
Black	-	0	x 1	10v
Brown	1	1	x10	
Red	2	2	x100	
Orange	3	3	-	
Yellow	4	4	-	6.3v
Green	5	5	-	16v
Blue	6	6	-	20v
Violet	7	7	-	
Grey	8	8	x0.01	25v
White	9	9	x0.1	3v
Pink				35v

(4) TRANSISTOR

It is a semi conductor device, which has three terminals and is made up of two P-N junctions.

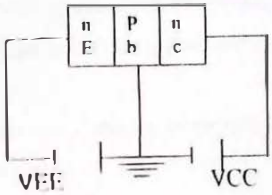
The transistor can be N P N or P N P. It is usually called bipolar transistor (B J T) because in a common Emmitter configuration the input is through the base, while the output is through the collector.

It has light input impedance and the low output impedence. It provides 180° phase slight between input and output signal, further more, it has a current gain.

$$h_{fe} = \frac{\Delta I C}{\Delta I B}$$

$$I C = hfe\ IB.$$

And its greater than unity (that is the gain) is:



COMMON BASE

For a common base configuration the input is through emitter and the output is through collector, the input impedances through is low, while the output impedence is high, because is this, it does not provide correct implication on but it uses in voltage and power amplification and then the gain is

h_{Fs} or α is less than unity (1)

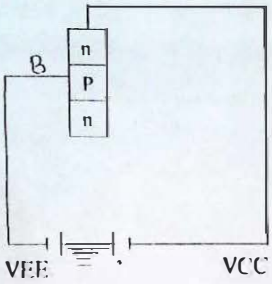
Further more, the input and output signal are in phase that is there are no phase invertion.

$$h_{Fs} = \frac{\Delta I C}{\Delta I C} \text{ Or } \alpha$$

While $I C = \alpha I E + I C B O$

α = alpha

$I C B O$ = Collector leakage current



COMMON COLLECTOR (CC)

Here the input is through the base and the output is through collector is known as the common collector configuration provide current and power amplification but it does not provide voltage amplification.

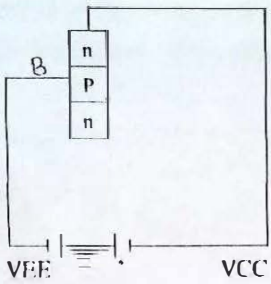
It has a light input impedance and the lower output inpedence of all the transistor configuration.

A transistor has the following characteristics, this include input characteristics, output characteristics. Transfer characteristics and feed back characteristics.

From above explanation about the operation, fabrication and characteristics of a transistor, we can say that, a transistor is a current control device both majority and minority carries are inter changeable in conductivity.

When a thin layer of P – Type material that forms the base an N.P.N transistor is produced. Furthermore, when a thin layer of dopt N-type is sand witched between two thicker layers of P-types, a P.N.P transistor is produced.

The three terminal of a transistor are: Emitter (E), Collector (c) And Base (B). The current flows as a result of electrons emitted from the emitter and collected by the collector, although not all the



COMMON COLLECTOR (CC)

Here the input is through the base and the output is through collector is known as the common collector configuration provide current and power amplification but it does not provide voltage amplification.

It has a light input impedance and the lower output inpedence of all the transistor configuration.

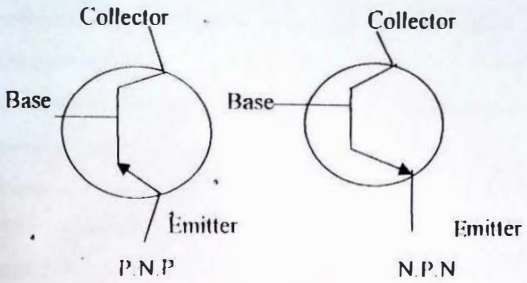
A transistor has the following characteristics, this include input characteristics, output characteristics. Transfer characteristics and feed back characteristics.

From above explanation about the operation, fabrication and characteristics of a transistor, we can say that, a transistor is a current control device both majority and minority carries are inter changeable in conductivity.

When a thin layer of P – Type material that forms the base an N.P.N transistor is produced. Furthermore, when a thin layer of dopt N-type is sand witched between two thicker layers of P-types, a P.N.P transistor is produced.

The three terminal of a transistor are: Emitter (E), Collector (c) And Base (B). The current flows as a result of electrons emitted from the emitter and collected by the collector, although not all the

electrons emitted by the emitter could reach the collector, some will be left across the base. It is symbolized by:

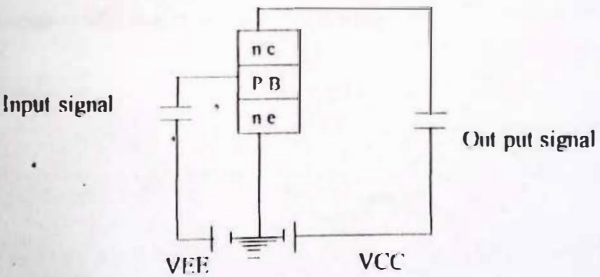


Usually the common method of fabricating transistor is the alloyed method. In these techniques, an N-type semi conductor material less than imm 2 act as the collector. A P-type base is then created by diffusion and connection to external circuit is provided by a metallic contact, the result is an N.P.N transistor. For the P.N.P, an N - type is created by the same process.

The region with higher doping level or much impurity is the collector. The region between emitter region. Like wise, the region between collector and base is known as collector base region or collector region.

Regard to the normal operation of a transistor, the emitter junction must be forward bias, this means that for an N.P.N transistor, the emitter base junction should be connected to the negalive terminal of the supply and the collector junction should be connected to the positive terminal of the supply. Covertly, if the transistor is P.N.P the emitter should be connected to the positive terminal of the negative supply...

In the design of a transistor, the base regions made up of very thin and it is mostly dop. However, a small amount of these carries approximately 1% is cut and collected by the base. The collector current is kept flowing since the emitter base junction is forward bias. While the emitter base junction on the other hand is reversed bias. Infact the collector base impedence is very high since it is essentially a reverse bias. A transistor can be applied, in many electronic circuits or we may expect it as versatile device. The circuit configuration of a transistor are categorized into three, that is common base (CB), common emitter circuit (CE) and common collector circuit (cc). The figure shows the following configurations.



COMMON EMITTER

(5) CONDUCTOR

It is a material that allows electricity to flow through it easily in fact all materials conduct and resist electricity to varying degrees but conductors offer very little resistance to the flow.

Any Conductor, or system of conductors which is subjected to a changing magnetic flux will have an e m.f induce in it. We often say that such an e m.f is due to "flux cutting" when a

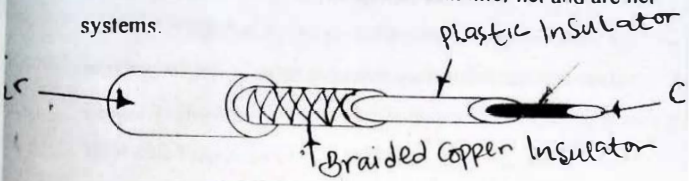
conductor is moved across a magnetic field, or when the field moves across the conductors. So here the main function of the conductor is to allow current to flow, the essence of conductor in this project is to transfer the current from one hole to another hole when the terminals of the components are not longer enough in action must be such so as to give the radiation pattern required.

(6) PARABOLIC DISH

This is also a component that helps in making a parabolic antenna. It's a large metal dish so soften a dipole and reflector array are mounted or rather positioning at the so call point of the dish. This used with some part (component) stated earlier to reflect the radio wave into atmosphere. It is a metal in nature; aluminum is been used for reflection. while some other component with a dipole receive radio energy or signal for feeding.

(7) COAXIAL CABLE

It got its name because of the way the two-conductor shar the same central axis along the length of the cable. You would probably have seen cable of this type used to link the aerial soc of your television and aerial. Figure below shows a cross sectio such a cable. Coaxial cable is used with inter net and arc net systems.



COAXIAL CABLE

A coaxial cable have an advantages and disadvantages.

A **ADVANTAGE OF COAXIAL CABLE**

i) Very fast rate of data transmission can be achieved.

ii) It is a mid priced cable

DISADVANTAGES OF COXIAL CABLE

i) It is thicker than unshielded twisted pair wire (UTP) cable and tends to be quite rigid, which can cause problems whe bending the cable in a small space, resulting in higher installation costs.

ii) It is suitable only for medium distances (typically 0.5km)

(8) MASS SUPPORT

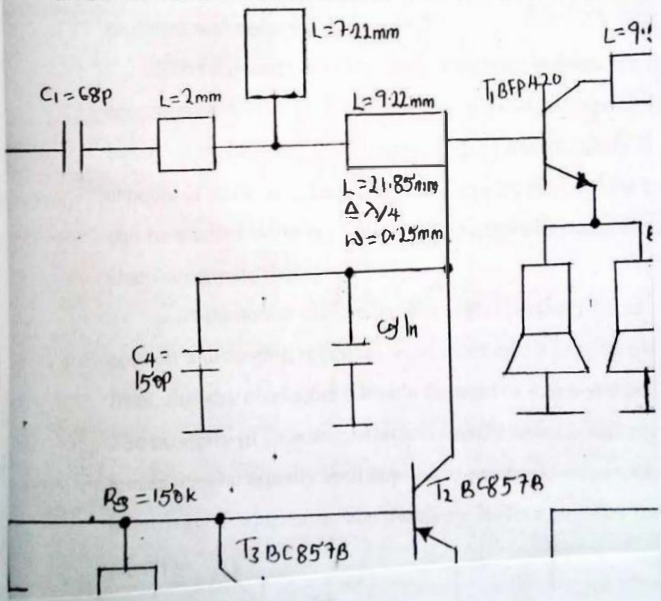
The mass support is the component and some time negligit the main function of this component is just to act or erected to th ground to support some types of antenna for example yagi and parabolic reflector.

It is a long tube or pipe formed by iron or steel used to increased the length of the antenna to the top, most of apartment for reception and radiated energy or signal.

In order to match the input and output ports, a well-defi emitter inductance is used as negative feedback. This acts to establish the transistor, decreasing the unusable gain. Without feedback the gain of the amplifier would be 17.5dB, but matchi and stability would be degraded. As the feedback is loss less, tl amplifier noise figure would remain 1.4dB.

A double transistor active stabilization is used for DC biasing, which provide a temperature stable current source. Figure 1. shows the circuit diagramme of low noise amplifier w BFP 420 Transistor (Front feed)

LOW NOISE AMPLIFIER (FRONT FEED) CIRCUIT D



CHAPTER TWO

The theory and details account on how the parabolic dish antenna would function section by section

(1) PARABOLIC REFLECTOR

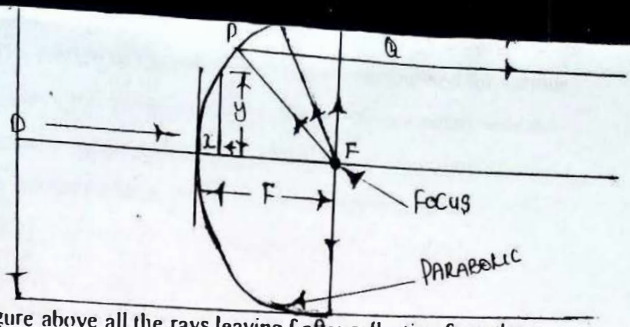
The paraholic reflector is a fovourite antenna for fixed point-to-point microwave communication system. It is relatively simple in construction and unless large in size, it is quite in expensive. Huge steer able parabolic dishes have been built for use with the radio telescopes, up to 200 ft in diameter, and mounted on a movable turret that allows rotation in both the horizontal and vertical directions to allow the tracking of moving target such as satellites and radio stars.

The dimensions of the many Parabolic antenna are large compared to the wave length used so, geometrical optics which is based up on rays and wave fronts, may be used to study certain aspects of those antennas. Some import properties of the reflector can be studied using ray optics. While others required the use of electromagnetic theory.

A parabolic surface has the useful property being able to convert a diverging spherical wave front into a parallel plane wave front, thereby producing a highly focused or narrowed pencil beam. The property of focusing, which is usually akin to high rays and lenses, can be equally well applied to parabolic reflectors at microwave frequencies. The parabolic surface satisfies the equation

$$Y^2 = 4fx$$

Where y is any ordinate at a point on the surface, f is the focal length of the surface and x is the corresponding abscissa; this is illustrated in figure below.



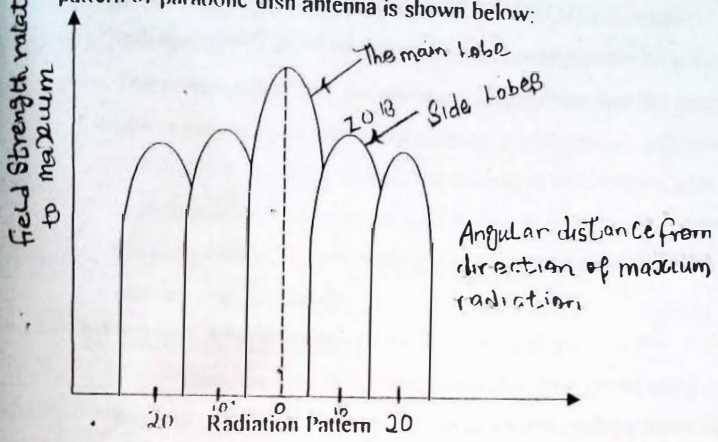
The figure above all the rays leaving f after reflection from the surface emerge parallel to one another and reach the plane YY' at the same time and so from an equiphase wave front. Hence, we have FP+PQ = FP' +PQ = a constant. Usually, the focus of f is al the plane wave front. Hence, D=4F is the diameter of a aperture. More generally, the F/D radio is important and in practice varies from 0.25 to 0.5 if this ratio is low, the reflector is not properly illuminated by radiation leaving the focal point and if too large, radiation is lost over the rim of the parabolic surface as spill over of great importance are the reflector and feed system. The overall far field radiation pattern depends upon various factors, which must be considered to give the best results.

(2) RADIATION PATTERN

This is the most important characteristic of an antenna. A convenient method is to transmit from a fixed distant secondary antenna ($r > 2D^2/\lambda$) and to rotate the primary antenna whose pattern is to be determined. The field strength and angular position of the primary antenna are noted at various angles.

To reduce reflection from nearly objects, a highly directional transmitting antenna may be used, such as a parabolic reflector rather than a horn. This is essentially important when measuring low side lobe level of the primary antenna. Absorbing materials may be placed at appropriate points to reduce object reflections.

The pattern of the primary antenna is determined for various polarization of the incident radiation and so the secondary antenna should have variable polarization. The figure of the radiation pattern of parabolic dish antenna is shown below:



The beam width of the parabolic reflector is related to the wavelength of the single and the diameter of the dish at its rim as well as to the illumination variation across the reflector surface. The first side lobes rise to only 13% of the main lobe intensity, and the beam width is a few digress. As the diameter is increased, the beam width decreases, according to the relationship. Where 0^0 is the beam width. D is the diameter of the reflector at the rim and l is the radiation wave length ; k is a constant depending on the illumination from the primary feed, with a value of about 60. Thus, for 0 – 10; D will need to about 6.1

(3) ANTENNA GAIN

As a consequence of its polar pattern, power radiated by an antenna may be concentrated in a particular direction. This directivity is usually expressed in term of its power gain G which is defined l a particular direction as

$$G = \frac{\text{Power radiated by an antenna}}{\text{Power radiated by reference antenna}}$$

The input power to both antenna is the same and the reference antenna usually chosen is the isotope or point source, which radiates equally in all directions or occasionally it may be a dipole. The power radiated by the antenna is slightly less than the input power because of losses in the antenna. An alternative definition which assumes 100% efficiency is defined as the directive gain D such that $G = n^D$ where $n < 1$ so G is slightly less than D. practice, the power gain G is commonly used it is expressed as a pure number or in decibel db.

(4) FREQUENCY RANGE

There are several DBS services around the world using frequencies in the band from 10.7 to 12.2 GHz for their down links. One common sub band is 107 to 11.5 GHz; another is 11.5 to 12.2 GHz. Down link signals reflected off the dish and focused on the LNB are then converted to the lower frequency 950 to 1550MHz band. This lower frequency signal is then amplified to db and seat via the coaxial to the DBS receiver.

But for this practical construction of parboil dish antenna in respect to low noise amplifier with BFP 420 transistor or any equivalent. the frequency range from 2.4 to 12.2 GHz.

CHAPTER THREE

CONSTRUCTION DETAILS

This method of construction parabolic dish antenna has been describe below:

The components are arranged to suit the design and the components are as follows:

1. **POWER SUPPLY:** this is referred to as a power unit to the low noise box. As all electrical and electronics graduates known that, for all electronic components to function properly, there is need for supply that will powered the entire component design in a given circuits.
2. **LOW NOISE BOX:** this is the front feed of the antenna, which has been designed from various electronic components, which are couple together to intercept the electromagnetic wave. The circuit also amplifies and transmits the intercepted via a coaxial cable to the television, receiver, for reproduction of the original intercepted signal into visual pictures. The circuit comprises of,two (2) transistors of BF 420 and BC 857B, and five(5) capacitors of value 150 Pico, inano, 150 Pico and 68 Pico. 0-------100 variable, and 47 (ohms) and lastly the conductors of value 2mm, 7.22mm, 9.22mm, 9.57mm, 12.81mm, and 3.44mm. Therefore, these components had been put together to suite and facilitate, the low noise box.

iii) **PARABOLIC DISH**: It is made up of metal in nature, which is converted with 7 stell of metal frame which gives a parabolic dish shape. The parabolic dish reflects the radio wave into atmosphere using some of modulation, and the parabolic dish has a diameter of (1500mm) or radius of 750mm wide. The long metal at the outer part of the parabolic dish inserted into mass support since the mass support is plumbing in nature. It is flexible which allows the system to be crank when searching the location of the signal more especially in satellite communication system.

Because the satellite is been fixed into atmosphere and is rotating due to the rotation of the earth, therefore it ca enable it to radiate and receive elect omagnetic wave spectrum. A cranking of the dish helps it to locate the directivity of the radio wave.

iv) **COPPER PLATES**: these are plates made from copper alloy. This has been critically analyzed by electronic scientist that copper has a good p operty of conducting electronical signal. As a result of that, copper material has been realized as a good conductor, similarly in this project copper plate are arranged to service the purpose of intercepting electromagnetic wave, as an input signal. Therefore, copper plates, serves the purpose of antenna.

(V) **COAXIAL CABLE:** Is been used to attach to the extreme end of both the copper metal and reflector. The coaxial feeder has no heat effect, no noise, coaxial feeder are available to provide useful signal band width of 60MHz or accommodate 140MHz per second digital. And the coaxial cable is 15 yard long.

But in respect to satellite communication the coaxial cable is t6o be attached to a decoder and from the decoder a coaxial cable is also connected to the receiver.

(VI) **INSULATOR:** it is also placed on to then woven wire at a focal point. All parabolic elements such as copper plates and circuit components were inserted so as to separate the above-mentioned component not to come in contact with one another. The insulator is made up of wooden material with a diameter of 25cm and 11.5cm width, and 6.5cm thickness. The copper plates are cited out from the insulator to intercept the signals.

(VII) **MASS SUPPORT:** This has been constructed from low carbon steel with a dimension of 200cm, or 2000mm long and a diameter of 15cm or 150 mm. The mass support is used to increase the length of parabolic dish or to support the whole system. The front feed (LNB) is been supported by a tubes of three (3) arms made up of metal, with a diameter equal to the radius of the dish. To obtain in focal point of the (L.B.N).

PROBLEM ENCOUNTERED DURING CONSTRUCTION OF PARABOLIC DISH ANTENNA.

In construction of parabolic dish antenna, I encountered some problems. Lack of original components to be used and some of the substitute component are not even found in this area and it is also very expensive.

THE SOLUTION TO THE ABOVE PROBLEMS

In this case, I use my own means to buy some précised components like coaxial cable, mass supports, seeking for substitution of the précised component, to produce my precise circuit that will operate within the range of bandwidth. The substitute components include.

i) BC 857B transistor.

ii) BFp 420 transistor.

iii) All the inductors in the precise circuit.

In the area of difficulties, my supervisor advice that the issue be left to dissolve in a smoke. I have the confidence, and have the ambition and determination to beat the best.

AMMENDMENT CARRIED OUT IN CONSTRUCTION

The original low noise box (L.N.B) is a pure metal case, but in my design, I used a wooden case as well as insulator.

Considering this, the wooden case will not prevent the low noise box (L.N.B) from undesirable elements not attack the circuit.

CHAPTER FOUR

EV LUATION

During the construction and design process, the below itemized components were tested:

i) Capacitor (ii) Resistor (iii) Transistor (iv) Inductor (v) Coaxial cable

i) **CAPACITOR:** All the capacitor specified in the circuit have been properly tested by using multi hope, avo meter. The capacitors were clearly identified in terms of voltage quantity as well as capacitors temperature range. Similarly the testing process gave a guide for easy coupling with less serious problem, during connection.

ii) **RESISTOR:** in a similar vain, the same procedure followed in testing the necessary resistors. An instrument, "avo" meter used to determined the actual characteristic features of the resistors used in the circuit, and for effective connection.

iii) **TRANSISTOR:** Is a semi conductor complex component with three (3) terminals known as Base (B) Emitter (E) and Collector (C).

This test is to identify the three (3) terminals as well as whether the transistor is N.P.N or P.N.P, the base is always the input terminal of the transistor. The tested transistor leads to the identification of the four characteristics, which include the input, output, feed back, and transfer characteristic.

iv) **INDUCTOR:** This is a common wire conductor, coiled at a certain number of turns, that provide the required flow of the load current (I L) depending on up on the number turns specified in the circuit. Therefore, the inductor had been tested

to confirm the effective flow of the electromagnetic signal through out the inductor.

v) **COXIAL CABLE:** the cable was tested using satellite cable, and another parabolic dish antenna. The tested cable was to ensure the effective flow of the electromagnetic signal through the cable from the satellite signal, or air time signal. The resistance of the cable were also tested and confirmed 750Ohms as specified by the manufacturing industry.

EVALUATION AFTER CONSTRUCTION

By using video and satellite sender, a video has been operated. and by using video sender nearby, by using electromagnetic wave. A television has been operated nearby, using telescopic antenna. with the T V receiver, the signal from video, using the same wave band (channel) then we shifted the television to a certain distance away, this process continued until a situation whereby the radio waves are no longer received by the television with the help of telescopic antenna.

It was then we attached our feeder of parabolic dish to the antenna terminals. The feeder has two terminals. We inserted the power supply plng in the receptacle pull out the power switch, and then the television was on. However, we continue to crank the parabolic dish trying to locate the directivity of the signal in (VHF) Programme using the same channel, that is the video channel and television channel and adjust the parabolic dish antenna, length, angle of altitude and its directional angle, until we got the desirable and brilliant picture as well as bright sound of the distance about 300 meters away.

Similarly, when watching a programme from satellite communication system, by turning the antenna towards the

direction, we receive the signal about 70 meters distance, when they receive a CNN programmes, similarly we crank the dish and turn on channel 2,3 and fairly on channel 5. And we also turn on channel 25 "GOMBE", We received their radio waves, at a distance of about 12 kilometers. All the four operations was done satisfactorily in a given time.

The parabolic antenna is also among the service of antenna that received the radio wave in satellite communication system.

Some times the antenna its omni directional properties. This is contrast to the dish with its property of focusing the radio wave into a narrow beam. Three (3) of the horn shapes are attached to the ends of wave guide of appropriate shape, when the satellite was launched in the orbit, the correct attitude with respect to earth has not been established so the directional antenna has not point correctly. And omni directional antenna (parabolic dish antenna) is therefore the only means of maintaining contact with the ground control and it is used until the attitude has been established. After this a parabolic dish antenna takes over.

But very unfortunately all our effort to link the parabolic dish antenna with the decoder, has proved abortive. But surely when connected to the decoder, it will intercept the radio wave from the surrounding and convert the energy back into the electrical energy.

CHAPTER FIVE

CONCLUSION

This project is mainly concerned with parabolic dish antenna and its application especially towards the improvement of the satellite communication system and draw back in some of the antenna performances.

Some effect of the electrical and radio wave on receiving antenna were discussed in details and the parabolic dish antenna radiate and received the electromagnetic wave spectrum using the same form of modulation.

LIMITATION AND DISAPPOINTMENT

As far as this project is concerned, many problems had been experienced during the construction and evaluation. Therefore, these problems include lack of decoder to test the circuit in respect to satellite communication system.

The problem of video sender to test the receiving efficiency of the antenna. Another limitation, lack of real or original components. Lastly in sufficient relevance material such as antenna text books on parabolic dish only, only utilize the little textbooks that are present in the school library to beat the best for the design.

RECOMMENDATION:

The school authority should provide the necessary materials or component to whom ever wants to carry out similar project on the above-mentioned topic, such as textbooks, and real or any equivalent component, which specified for the project. It is when the school authority provided more material that the students will succeed in hitting the target.

BIBLIOGRAPHY

i- Practical Electronics hand book fourth edition: by Tan. R. Sinclair

ii- Transistor circuit technique third edition by G.J.Ritchie Chapman and Hall.

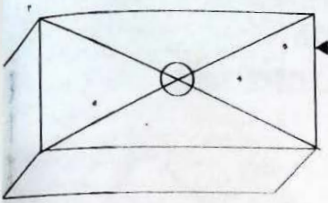
iii Antenna Toolkit by Joseph J. Carr K4IPV

iv Electronics Engineering fundamental VOL: I by Engr. Mrs. T.O Adeife Osemeikhain (1996)

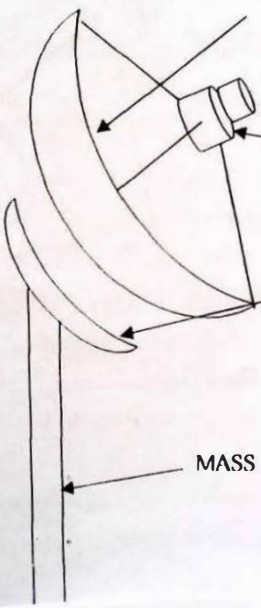
v- Introductory Radio and Television electronics by J.J Johnson and B.D Fletcher. Motivate series.

vi Engineer D. Isah: Paper presented at the Nigerian Institute of Transport Technology Zaria. Conference held on 20th august, 1998.

COMPONENT BEFORE ASSEMBLING APPENDIDIX 1



(L.N.B) FROND FEED PARASITIC ELEMENT.



APPENDIX 2
COMPONENT AFTER ASSEMBLING