Conclusion for the thesis

Technology, Information Technology

ICT THIS IS AN EXAMPLE FOR THE BACHELOR THESIS PROJECT First

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202322166 [Submission Date]

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CHAPTER 1: INTRODUCTION

Internet has increasingly been becoming the most important ‘ medium of communication’ in our everyday lives. Various electronic devices, multimedia as well as computers are all next to impracticable without internet. The internet help us retrieve files such as journals, websites, articles, and videos as well as other forms of documents, which we would need in our everyday live. Apart from retrieving files, we can also share them with other people

through uploading them on several networking websites or through sending them through an e-mail.

Over the past couple of years, internet has made a huge impact on our daily lives. However, rural areas of the world are lacking behind the modern world, in terms of growth as well as learning due to lack of exposure to the internet. This paper is seeks to examine the solutions to the rural sectors of the world with this regard.

1. 1 Antenna

Since using a cable is far too expensive as well as complex, we will study the use of an antenna instead. An antenna is not only inexpensive, but also very easy to install and use, as well as covers a greater area as compared to the cable. An antenna can make WLAN, WMAN, WPAN as well as WWAN very easy to use. Before I start my paper, it is essential to know certain properties of antennas, to get familiar with certain terms in the rest of my paper. An antenna has four different properties. The properties are as follows:

1. Gain

The term ‘ gain’ in an antenna refers to the strength of the radiation of the antenna. In case the antenna’s radiation is poor, it is referred to an antenna with a low gain.

2. Radiation Pattern

If the antenna is perpendicular to the wire, it is radiating electricity at its maximum. In case the pattern of the radiation is vertical to the whip, it could be labeled as omnidirectional. In case the whip is slightly tilted, the signal minimum, also known as the ‘ null’ tends to disappear. The reason why the radiation pattern is important is because one needs to ensure that in the

desired direction of communication, the null is not existent.

3. Polarization

Polarization refers to the orientation of the communication system. In case other antennas in a similar structure are oriented similarly, they are regarded as having similar polarization. In case the whip is vertical, while the antenna has a horizontal polarization, the communication pattern would not be very effective.

4. Impedance

One of the most essential concerns that would arise during this procedure would involve how well the power is transmitted to the antenna. In case the antenna's circuit is able to carry a load of 50 ohm, the antenna needs to have an ' impedance' of at least 50 ohms in order to maximize its results.

For my paper, I will use two different approaches in order to get signals from the wireless Internet service providers;

How to receive internet if the tower is on a far-flung area

How to receive internet in case of an absence of tower antenna

1. 2 The Principle of Work

An antenna is essentially an electronic device that converts the signal from the electric signal to electromagnetic waves in order to send or receive signals across different areas. By producing both electrical as well as magnetic waves, a wireless service produces a wave of consistent energy. These kinds of currents produce electrical and magnetic waves around the wires, and thus vary the current that is being generated. In case some other wire is located nearby, the electrical waves crossing the wire would induce another similar, but weaker electric current. In case the wire has a slightly

longer wavelength, it would radiate most of that current over longer distances.

One of the simple antennas is known as a ‘ whip’. This wire stands directly above a ground plane and can easily be found on multiple electronic devices such as radios, automobiles as well as cellular phones. This kind of an antenna device is usually used to send electricity to longer distances.

1. 2 Uses of Antennas

Because Antennas are extremely easy to use and carry, they are used in almost all the electronic devices available. They act as a line of sight for directional services between the transmission and receptional aerial for various directional services. Different systems that use antennas would include televisions, radios, radio broadcast, radars as well as space communications. Apart from them, antennas could also be used underwater or through rocks or soils. However, the frequencies would be shorter as compared to land.

In order to maximize the use of an antenna, it needs to be tilted horizontally as well as at a height, to get better coverage and signals. Radar systems essentially use antennas to detect various foreign signals.

CHAPTER 2: GETTING HIGH QUALITY SIGNALS

Firstly, we will examine the different ways through which we would be able to receive signals from a tower from long distance. In case a tower is not located within your vicinity, certain tools might be needed to receive better signals at your area. Some of those tools would include an antenna outdoor, antenna indoor as well as a booster.

Kohut, Milan. Wimax Outdoor Antenna. http://www. slavnet. com/page/4.

Web.

2. 1 Antenna Outdoor

Since the building’s wall often blocks the signals from entering the house, antennas are usually placed outside the house, most commonly at the rooftops. For the purpose of my report, I will use two different forms of antennas; Yagi antenna and sector antenna.

2. 1. 1 Yagi-Uda Antenna

Due to its narrow design, a Yagi-Uda antenna is more convenient as well as has a higher direction. It has a gain higher than 10dB and a frequency ranging from between 700 MHz to 2500 MHz. Yagi-Uda antenna works for twenty-four hours and operates in the HF to UHF bands (about 3 to 3 GHz). In addition to that, it works in the 2. 4 WLAN system. This form of an antenna is highly adaptive to all sorts of systems and can be used across a multi-point transmission system as well.

A Yagi antenna essentially comprises of a single element, usually known as a dipole antenna. It is the only element in the entire structure, which comprises of a source voltage or is actually excited. The remaining parasitic elements diffuse the energy only in a specific direction.

Kohut, Milan. The Yagi-Uda Antenna. http://www. antenna-theory. com/antennas/travelling/yagi. php. Web.

2. 1. 2 Sector Antenna

A sector antenna is essentially very similar to the Yagi antenna with just a few minor differences. Along with having a very narrow beam width, it has a higher range than that of the Yagi antenna. For a sector antenna, the router needs to define its IP address for it to work effectively. Normally, the

frequency range for this antenna varies from between 3400 to 3600. It is designed for a wireless access system and has a bandwidth of about 200 MHz. However, it is slightly difficult to install and hence, isn't as common as the Yagi antenna. Some of these sector antennas cover 30 ° while others cover up to 60 ° and 90 °.

Wi-Fi Tower with a sector antenna. http://www. hafeezcentre. pk/Internet-Devices/wifi-tower--sector-antenna-933690. html. Web.

2. 1. 3 Comparison between Yagi-Udi and Sector Antenna

The figure on the next page essentially shows the major similarities between a Yagi Antenna and a Sector Antenna. From the figure below, we can safely say that apart from a few minor differences, both the antennas are very similar in most of their properties. Furthermore, a Yagi-Uda antenna is slightly more convenient and has a higher direction as compared to the sector antenna.

Yagi Antenna

Sector Antenna

2. 2 Booster

An antenna amplifier, also known as an antenna preamp or antenna booster is essentially a small device that amplifies an antenna signal, usually into an output with the same impedance as the input impedance. It is typically 75 Ohm for a coaxial cable and 300 Ohm for a twin lead cable. For the purpose of my paper, I am using this antenna in specific, as it will link the antenna outdoor to the antenna indoor. Areas that have limited coverage such as structures with thick buildings or rural areas, antenna boosters could be very beneficial in order to get effective signals. A booster's simplest form is

basically, a length of wire that is placed near the antenna, in order to increase its length. Other forms of techniques use reflectors, that are aimed at boosting the signals and bouncing them onto the antenna in order to make them, more clear.

A wi-ex Personal Booster. http://paulstamatiou. com/review-wi-ex-zboost-zpersonal-cell-signal-booster/. Web.

2. 3 Antenna Indoor

An antenna indoor is used to receive signals within the structure, since the walls of the buildings often tend to block them. In order to arrange an antenna network within the building, we will use an antenna indoor, for the purpose of our report.

Gold Wireless Ceiling Antenna. http://www. interprojekt. com. pl/gold-wireless-indoor-5dbi-24ghz-omni-ceiling-antenna-p-852. html. Web.

Since these forms of antennas do not require mesh cables, it is very easy to install them and this would be beneficial in case of a greater number of floors where we would need antenna indoors

CHAPTER 3: GETTING THE INTERNET WITHIN THE RURAL AREAS

It is true that the highest priority in our lives remains the necessities such as water, food as well as basic infrastructure facilities. However, from a developmental standpoint, it would be safe to assume that in the next couple of years, internet access would be included in the list as well. In addition, most of the rural regions that I would be talking about in my paper would have wireless technology as the only viable solution. In areas where we would not have any antenna tower, for the purposes of my report, I will use Wi-Max portable to propagate the signal through using an antenna base,

antenna sector, satellite antenna, an amplifier as well as a booster.

Tools:

3. 1 Base Antenna (Telescope Mast)

A telescopic mast is essentially a base antenna that could be securely locked into place using a massive clamp. At the end of every tube, there is usually a color ring, approximately 20 cm long, beyond which it cannot be extended.

The Comet GP21vertical Base antenna. http://www. universal-radio. com/catalog/hamants/4703. html. Web.

3. 2 Satellite

A case-based Mobile Satellite System. http://www. groundcontrol. com/flyaway-mobile. htm. Web.

One of the biggest advantages of a satellite system is that it can be easily deployed as well as transported from anywhere. These portable satellite dishes are extremely beneficial in case an individual wants to access internet and do not include complex materials such as routers, radios or other necessary equipment in their pricing.

3. 3 Router

For the purpose of our report, I will use a MikroTIK router as it could adapt to any form of antenna. In addition to that, it is also a portable way of providing internet as well as easy-to-use.

Wireless Router Antenna. http://www. zaheerspeaks. com/wireless-router-antenna/. Web.

3. 4 Sector Antenna

Although not as common as yagi antenna, a sector antenna is designed for a

wireless access system and has a bandwidth of up to 200 MHz.

3. 5 Grid Antenna

In case, one only wants to link their internet to one tower antenna using only one satellite antenna, a grid antenna could be used.

Grid Parabolic Antenna. http://brand-markets. com/sort. asp? sort_id= 46. Web.

3. 6 Power Supplement

For the purpose of my assignment, I would either use solar energy or car batteries. The reason being, both forms of energies are harnessed through means, which would not extinguish in the short or the long term. These power supplements might be expensive, but they come under the range of renewable resources and thus, they would be extremely beneficial.

Solar energy has many benefits as compared to other forms of energy systems. The foremost advantage that solar energy has to offer is its sustainability in the end. Since the raw materials for this form of energy are unlimited, we could expect it to run in the long term. Furthermore, solar energy can run on very little sunlight. Even an amount of solar energy equal to 0. 02% of any other energy source can generate the same results. Apart from that, solar energy generally has no pollution as compared to other forms of energy sources. Due to its manufacturing and construction, they do carry with them many environmental costs. However, most of the costs are next to insignificant when compared with the amount of pollution emitted by other forms of fuel sources. Furthermore, this is suitable for the kind of a report I am writing, as this kind of energy is best suited to remote areas of

the world.

One of the major reasons for this is because solar energy does not require any energy grids. Granted, most of the states, especially in America, are already living without any energy grids due to other sorts of environmental as well as political concerns, some of the people who are living off the grid do not have any say in this. Solar energy cannot only provide energy to remote areas in these places, but also in places that are highly under-privileged, such as remote areas of Asia as well as Africa. An approximate 90 percent of the population living in these areas does not have any access to basic electricity and thus people here rely on other forms of energy, such as fuel-based lighting. This sort of energy carries with it, its own costs, in the forms of contamination of indoor air leading to jeopardized health as well as a decrease in the overall productivity. Furthermore, solar panels are economical, provide greener jobs, contain no moving parts, and thus, do not create any noise pollution.

Apart from this, solar energy provides a very reliable source of energy. It does not dry out due to overuse, it is continuous, and it is not affected by terrorism or economic or political turmoil or even disasters.

One of the major reasons why I decided to touch upon this topic in my report is because it is not only the under-developed nations that are suffering from this issue regarding the lack of wireless technology, but also certain areas within the developed nations. There is a significant amount of network infrastructure that has not yet been built to this day. Even though by making use of certain technologies, we might require a lot of initial expenditure, we could gain a lot in the longer term and eventually provide internet to the

rural areas as a result.

Practical Part

GETTING HIGH QUALITY SIGNALS

Requirements:

Antenna outdoor Router or booster Coaxial cable

Antenna indoor speed test website

The steps:

Because the antenna outdoor and indoor adaptive, I will not explain about the configuration of modem. Usually, it is automatic configuration and different from each others.

First, plug the adapter into electric socket to turn the modem on.

Second, turn on the modem.

Third, test the speed of internet before link the antennas because, I want to know the best direction to move the antenna to good position.

Fourth, link the yagi antenna into the router to amplify the signal.

Fifth, select the closet tower for you then test is the speed change to fast or no, if it doesnt change select to other tower like this picture.

Sixth, test again will see the speed increase up.

Finally, tight the antenna with strong iron or install it in the wall.

GETTING THE INTERNET WITHIN THE RURAL AREAS

The requirements

Sector antennas Winbox program Grid antenna

Router Laptop Electricity power

The steps:

Link the adapter in electricity socket to get an electricity power until see the lamp turn on.

Link the twisted pair cable between router board and internet modem to get an internet.

Link other twisted pair between router board and PC to edit the configuration easily by using the winbox program.

Link the sector antenna into router board to propagate the signal by antenna.

Open the program directly without installing because it is portable program.

First, click to the square number 1 to scan MAC address then click to MAC address in number 2 then click to connect.

Next, It prefer to reset the configuration click to new terminal then type " sys" to open system then type " reset"

To make wireless network first one should make a bridge to like between two WLAN.

See the figure. First, click to bridge then click to to make a bridge then click to apply then OK.

Then active the ports by click to Ports then click to add port by this symbol then select the port what you want. I will active the port for ether1 and Wlan1. Ether 1 for takes the internet from provider in switch. Moreover, WLAN for propagate and receive signal to other devices.

Next, go to interfaces to active the wlan by click for wlan1 then click to to active it.

After that, click to wireless to configure the Wireless and antenna. Click to this symbol then follow my instructions same the figure.

Change the mode to App Bridge to make the router access point to propagate the signal to many devices. Then change the band to 2GHz –B/G/N because the sector antenna is using the standards 2. 4 GHz. In addition, I use the standard N because most of new devices use this standards because it compatible to standard a and b. I change the frequency to the highest because my experiment to propagate to long distance. SSID it depends for name of the access point to let the people know the name of my network. After that click to apply then click to WDS.

WDS function responsible for distribute the system for wlan to let the system dynamic to use the configuration of WDS automatic then use the default bridge according of my bridge as I give it name bridge1then click to apply. Finally, give an IP for antennas card to let the people get an Internet from all antennas. click to IP then address to give IP address and subnet mask for the network .

Click to IP then routes to give the gateway for all the antennas with same internet not any antenna has different IP.

Insert the IP for gateway to share the network for all the sector antennas in same IP in the network.

Conclusion

This study has provided a way forward on ways to have a faster internet, in rural areas. It is notable that, poor communication infrastructure is an

impediment to superior internet connectivity. This follows that, the discussed kinds of antenna plays a fundamental role in enhancing internet connectivity and clarity. Most of the rural areas access modem based internet, which require an extra instrument such as the antenna to connect. This study provides numerous kinds of antennae and the attributed advantages and demerits. For instance, a sector antenna is designed for a wireless access system and has a bandwidth of up to 200 MHz. This implies that diverse antennae fit diverse wireless connectivity in a bid to improve the quality of the internet signal.

The use of antennae to facilitate the internet signal quality is advantageous in two primary ways, which include cost effective and ease in installation. In addition, this study provides knowledge of solar energy usage, which is economical and readily available. In the general perspective, wireless internet connectivity is a challenge in the developing countries and some regions of developed nations. This follows that, usage of such instruments, as antennae will increase both the connectivity space and quality of the signals.

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