

# Satellite Communication and Energy Conservation Theories

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## ABSTRACT

Satellite communication becomes inevitable in daily life. It is development of science, common media for most communications. Most inventions are properly engineered nowadays. Mobile, Internet, Radio, Television, climate condition reports, and many such advantages. There are many advantages and some disadvantages in using satellite communication, and some side effects. Proper usage of satellite communication makes a healthy environment, wastage of energy in terms of unnecessary disturbance should be avoided for a healthy environment. This journal briefly discusses how to use the satellite communication effectively in terms of energy conservation.

**KEYWORDS:** *Satellite communication, radio wave energy loss*

**How to cite this paper:** Palaniraj Kannapillai "Satellite Communication and Energy Conservation Theories" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-4 | Issue-1, December 2019, pp.699-701, URL: [www.ijtsrd.com/papers/ijtsrd29666.pdf](http://www.ijtsrd.com/papers/ijtsrd29666.pdf)



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## INTRODUCTION

Aero plane makes much noise. We are not avoiding it. It is a good human invention. It was not invented in first stretch directly with jumping from a mountain, it was developed step by step with engineering principles. Right Brothers invented Aero plane successfully after many failure attempts. It is a breakthrough in human invention. Similarly Satellite communication is also a breakthrough in human invention for communication. Mobile usage almost became a common practice for most humans. And some people are attaching mobile devices in their body. Daily News and Weather reports in Television are now very important to understand the current happenings in the world. Many predictions of satellite communication such as weather report safeguards humans from natural disasters.

## LITERATURE REVIEW

In a research conducted for studying the human body exposed to electromagnetic waves, Watanabe Soichi, and his colleagues, concludes, it makes significant effect on human body. In a frequency range higher than several hundred MHz, the dielectric relaxation of water molecules, which resonates near 22 GHz, similarly tests were conducted on blood.

Dr. Subha discussed the importance of radio waves, she explained the importance of wireless communication. She explains different radio signals, optimization and its importance.

S. S. S. Kalyan, explains the usage of satellite communication and requirement to use satellite communication in all fields. He explains the development in satellite communication and different satellites.

In a research conducted by P.Lunkenheimer, biological absorption of electromagnetic energy and dielectric water spectra is explained. Electromagnetic radiation absorption of water and it explains the peak response around 20 GHz in water and in all solutions.

Research conducted by Nigus Maregu explains the different types of diseases caused because of electromagnetic waves. Explains the importance of using smaller cell phones with low radiation and antenna with advanced technologies.

In a research conducted by Robin, he explains the eco generated in ice during radio wave propagation, and changes in velocity of sound.

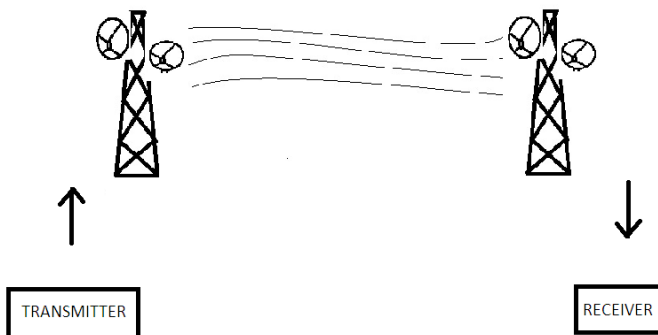
## DIFFERENT TYPES OF FREQUENCIES

There are three different types of frequency segregation. Infrasonic, Sonic and Ultrasonic frequencies. Frequencies which are in range of 20 Hz and 20,000 Hz are audible frequencies for human. Less than 20 Hz are infrasonic and more than 20,000 Hz are ultrasonic, radio frequencies are in frequency range more than 20,000 Hz. Approximate radio frequency range is 30 Hz to 300 GHz. Earthquake, waterfalls generates infrasonic waves, human talking is an example for audible frequencies, lightning and thunder develops ultrasonic waves, speakers generate artificial audible range of frequencies and human voice and most animals generate in audible range, some animals understands more extent of frequency ranges compared to humans. Audible frequencies of animals need to be considered because audible frequencies of animals are varying from humans. Some

animals can hear frequencies high in range of 1,00,000 Hz. Elephants can hear frequencies in range of 14 – 16 Hz. Whales can hear very low frequencies nearly 7 Hz under water. Cats can hear frequencies in range of 55 Hz to 79 KHz, Dogs can hear detect frequencies in range of 67 Hz to 45 KHz, Bats can detect and hear frequencies in range of 1 KHz to 200 KHz in different species. This kind of difference also need to be given importance in developing signals for satellite, and different medium it travels and the loss of energy because of such reasons were also need to be taken into account.

**WORKING PRINCIPLE**

Radio energies are generated and accelerated artificially using transmitters, and emitted in terms of radio waves through antenna and are received by receiver using antenna. Natural sources of radio waves are lightening and astronomical objects. Radio frequencies are in frequency range of 30 Hz to 300 Hz. GSM phones uses two types of bands, tri band(900/1, 800/1, 900 MHz or 850/1, 800/1, 900 MHz) or quad band (850/900/1. 800/1,900 MHz)



**FIG1. TRANSMISSION OF RADIO WAVES**

SL.NO.	TYPE OF WAVES	FREQUENCIES
1	Long wave(AM)	148.5-283.5KHz(LF)
2	Medium wave (AM)	525-1705 KHz(MF)
3	Short wave	2.3MHz - 26.1MHz(HF)
4	VHF (TV)	54-88MHz
5	FM Radio	76-108 MHz
6	VHF high(TV)	174-216 MHz
7	UHF (TV)	470 - 806 MHz

**TABLE 1: DIFFERENT FREQUENCIES**

Law of Conservation of Energy states that, “Energy can neither be created nor destroyed. But it can be transferred from one form to another form”. Electrical Energy is converted into radio waves into different forms of energy, which are high frequency waves, not audible for humans, transferred through different media, received through receiver, and again get converted into sound energy in terms of speakers, and human understandable audible signals. Some amount of energy is lost in terms of other absorbing material in nearby speakers and many such instruments nearby or in medium of transfer, path loss, such as absorbing signals, refracting signals, etc..

$$PL = 10n \log_{10} (D)+CS$$

Where,  
 PL is the path loss  
 D is the distance between the transmitter and receiver  
 CS is the constant for system losses  
 n is path loss exponent

Loss of energy in absorbing signals is converted into some other form of energy, and it sometimes disturbs other medium. Energy transmission in terms of mobile signal is converted into sound energy when it makes noise in speaker. It losses more amount of energy in water. Similarly, different energies need to be studied and should be used with less amount of energy loss. Energy loss in terms of heat in automotive vehicle is heavy, more amount of energy is converted from petrol or diesel is wasted into heat energy. Such kind of wastes should be avoided in mobile signals. When it is automotive vehicle it is loss is inside a vehicle, when it is a loss in radio signal, energy is transferred to other medium, so loss of energy should be reduced for safer usage of mobile signals.

**SIGNAL INTENSITY**

People behavior changes psychologically, time to sleep, wake up are becoming common for many people, other than the chances for signals to influence humans. There are many chances for satellite signals to get converted into understandable pattern for humans. Whenever mobile signal tries to reach a mobile, it makes noise in nearby speakers, many such energy losses, or transfer of energy which makes disturbance, so proper absorbing medium or instruments which can distract signals or resist signals should be used at required places.

In radio waves some are long waves, getting diffracted because of earth contour and travels along the contour of earth because of mountains and other similar objects on earth, which are called ground waves, and some are short waves, reflected to earth by ionosphere, and are called sky waves. So intensity of waves needs to be monitored for effective utilization.

**DIFFERENCE IN INTENSITY OF MOBILE SIGNALS**

There is heavy traffic in radio frequencies, since the speed and intensity are heavy, it does not makes any difference at current scenario, when the usage of radio signal increases, more chances to give importance.

Mobile signal intensity is high when it is used for talking, compared to messages or internet. There should be some provision for energy dissipation, or else there are more chances for side effects.

**OBSERVATIONS**

Similar pattern in people behavior such as many people tries to go to sleep, going to some place, etc. There are more chances for satellite communications to influence human activities.

More chances for throat irritation, head ache and other side effects because of heavy usage. More chances for such side effects in humans because of satellite communication. Experimental studies are proving the influence of electromagnetic waves in human anatomy. It can affect the blood circulation, and many parts in humans. More chances for disturbance in presence of mind and concentration.

**ENERGY LOSS CALCULATION AND RECTIFICATION**

Total Energy used in generating the radio waves can be calculated, and loss of energy estimation can help in calculating the losses. Rectifying the loss of energy can help in effective and safe utilization of satellite communication.

### PRECAUTIONS

Precaution measures need to be taken to reduce the indirect side effects of satellite communication. Mobile devices with proper manufacturing and shields can avoid wastage of energy. Radio wave propagation path need to be monitored and proper measures should be taken to avoid loss of energy.

### CONCLUSION

From the observations, it is found that, the radio frequencies of hearing are above humans and most animals, and so it does not makes any direct effect. There are many indirect side effects in human anatomy, resonance in water molecule and many such medium during travel of radio waves. Rectifying the loss of energy in transmission can reduce the losses and so, it reduces the side effects also. Monitoring different medium of transfer and path of transfer need to be monitored and prevented for loss of energy in transmission.

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