

PORTABLE SIGNAL JAMMER

Bhushan Bahalkar*, *Yash Boraste*, *Ketan Bhole*, *Abhishek Ghatkar

Department of Information Technology Students
MET's Bhujbal Knowledgecity Adgoan, Nashik, India

Abstract: This report presents the design, implementation, and testing of a cell phone jammer. The jammer will be working at GSM 900 and thus jams the three well-known carriers in India (Airtel, BSNL, VI, Jio, and Reliance). The designed jammer could be successful in jamming the various carriers in India as will be shown at the end of this report. Nowadays, mobile (or cell) phones are becoming essential tools in our daily life. Here in India, for example, with a rather low population (around 1 billion), various cell phone carriers are available. Needless to say, the wide use of mobile phones could create some problems as the sound of ringing becomes annoying or disruptive. This could happen in some places like conference rooms, law courts, libraries, lecture rooms, and mosques. One way to stop this disrupting ringing is to install a device in such places which will inhibit the use of mobiles, i.e., make them silent. Such a device is known as a cell phone jammer or "Signal jammer", which is some kind of electronic countermeasure device that can block the frequencies transmitted by cell phone towers and towers phone. The technology behind cell phone jamming is very simple. The jamming device broadcasts an RF signal in the frequency range reserved for cell phones that interferes with the cell phone signal, which results in a "no network available" display on the cell phone screen. However, recently, there has been an increasing demand for cell phone jammers. In this project, a device that will jam GSM 900 services and all other frequencies is to be designed, built, and tested.

Keywords: *Signal Jammer, Portable Jammer, Network Security, GSM jammer, Cellphone.*

1 INTRODUCTION

Communication is one of the necessities for human beings to live connect in this vast world. The traces of communication are first found in the ancient Persian kingdom where fire is used to communicate between distant places, it is followed by communication ways like pigeon post, and traditional postal service, followed by wired communication like telegram and telephone, and finally the introduction of wireless communications. With the introduction of wireless communication there came the introduction of mobile phones which changed the world into a global village where distance is no matter an obstacle to communication. Nowadays every communication device is either directly or indirectly using wireless communication.

Jammers work by outputting an RF signal at the same frequency expected by the device that's being jammed, but at a higher power compared to the normal signal. The jamming signal itself is usually random noise or a pure signal. The device being jammed will then receive the higher power Signal which is from the jammer, and then the devices can no longer function correctly. The jamming signal itself is usually random noise or a pure signal.

Jamming devices were first put into use by the military and armed forces' technical department. This interest comes from the fundamental objective of denying the successful transport of information from the sender (tactical commanders) to the receiver (the army personnel), and vice-versa. That being said, nowadays, mobile phones have become an essential tool in our daily life. Here in India, for example, with a rather High population (around 1.25 billion), a large number of mobile network carriers are available such as Airtel, Aircel, VI, Jio, Reliance, etc, which operate at GSM 900 frequency bands. Needless to say, the wide use of mobile phones could create various problems, but the sound of a ringing phone becomes annoying at certain times. This could happen in some really important public places thereby putting you in the limelight. Hence one simple way to stop this annoyance at some really important places is to install a device in such places which will inhibit the use of mobiles, i.e., make them obsolete. Such a device is known as a cell phone signal jammer, which is some kind of electronic countermeasure device. The technology behind cell phone jamming is very simple. The jamming device broadcasts an RF signal in the frequency range reserved for cell phones that interferes with the cell phone signal, which results in a "no network available" display on the cell phone screen. All phones within the effective radius of the jammer are silenced.

It should be mentioned that cell phone jammers are illegal devices in most countries. According to the Federal Communications Commission (FCC) in the USA: "The manufacture, importation, sale, or offer for sale, of devices designed to block or jam wireless transmissions is prohibited". However, recently, there has been an increasing demand for portable cell phone jammers across the globe, with that being said one should note that what we are presenting is totally concerning gaining knowledge and mainly for educational purposes only and that there is no intention for us to manufacture or sell these devices in India, or elsewhere. In this project. Using the device causes extensive disruption and involvement in the mobile signal operation, by affecting coverage and degradation of service for customers. In some cases, mobile users may not be aware of the blockade of their terminals as the above may not be evident until you make a call, in the case they receive a warning network is not available, seeing this affected their rights to access services, while not receive any communication on their mobile until they depart from the affected area. Considering the serious damage generated in the network and the allocation of user rights, it is understood critical control and restrict the supply of these teams, as well as limiting its sole use and exceptionally for public security cases such as in prisons.

However, we believe that in this particular case, the real solution is that the controls should be increased and that the prison authorities in each country take necessary measures to prevent the introduction and use of cell phones in those precinct measures. On the other hand, it has been increasingly widespread for these teams' private use, generating direct damage to mobile users, and companies have acquired and paid millions of dollars for the use, development, and exploitation of a valuable and finite well radio spectrum and network deployment. It will also be important to establish promptly far the responsibility of the dealer's telecommunication solution for the damages to the signal arrives.

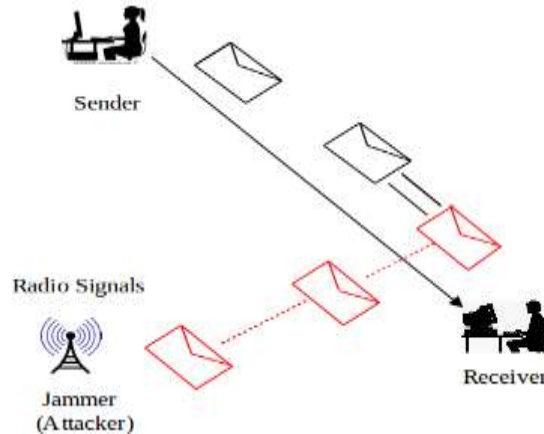


Fig 1 Working of the jamming device

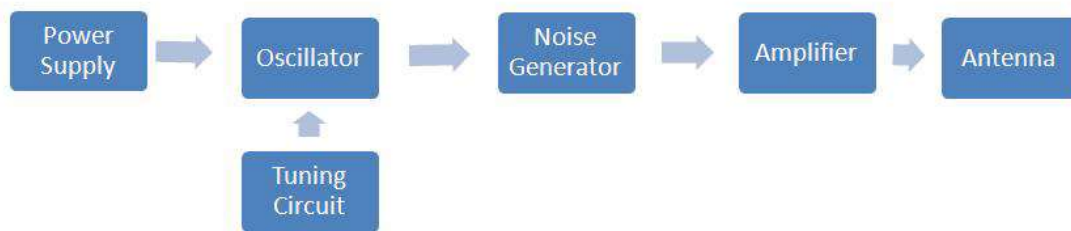


Fig 1.1 Block Diagram of a Jammer

1.1 History

The rapid proliferation of cells dates back to the early twenty-first century, close to a state of ubiquity that finally raises problems, such as its potential use to invade privacy or contribute to academic cheating. In addition, public reaction has been growing against that communicator device for its irruption in daily life. While the analog cellular phone often suffered from poor reception, and could even be disconnected by simple interference such as high-frequency noise, the digital phone is increasingly sophisticated, which has led such switches also to develop into more elaborate devices. Cell phone interference, is the most expensive alternative measure, such as the Faraday cage, most of which is suitable to protect building structures. They were originally developed for law enforcement, and the military could disrupt communications between criminals and terrorists. Some were also designed for the use of certain explosives detonated remotely. Civilian applications were evident so that over time, many companies originally contracted to design inhibitors that the government used, they chose to sell these devices to private entities. Since then, there has been a slow but steady increase in purchase and use, especially in major metropolitan areas. In most parts of the world using a blocker frequency (technically known as inhibitors of frequency) is regulated by the central government, and its use is only allowed for public forces and government agencies.

The technique used in most commercial jammers is based on noise attacks. In the previously designed cell phone jammers, designers came up with an electronic device that acts as a transmitter to transmit electromagnetic signals of respective frequency and higher power as used by GSM/DCS systems. In this technique, a voltage-controlled oscillator (VCO) plays a major role in generating the jamming frequency. In our research, we found that the above technique is complex as compared to our technique because our idea of jamming through spectrum distortion proves to be simpler, easier to fabricate, and cost-effective. The rapid proliferation of cell phones at the beginning of the 21st century to near-ubiquitous status eventually raised problems, such as their potential use to invade privacy or contribute to academic cheating. In addition, public the backlash was growing against the disruption cell phones introduced in daily life.

While older analog cell phones often suffered from poor reception and could even be disconnected by simple interference such as high-frequency noise, increasingly sophisticated digital phones have led to more elaborate counters. Cell phone jamming devices are an alternative to more expensive measures against cell phones, such as Faraday cages, which are most suitable as built-in

protection for structures. They were originally developed for law enforcement and the military to interrupt communications between criminals and terrorists. Some were also designed to foil the use of certain remotely detonated explosives. The civilian applications were apparent, so over time many companies originally contracted to design jammers for government use switched over to sell these devices to private entities. Since then, there has been a slow but steady increase in their purchase and use, especially in major metropolitan areas.

The main features of the project

1. User-friendly operation.
2. Very easy to operate.
3. Switch ON-OFF.
4. Activities display on the Phone display.
5. Jammer activation using a relay switch

What is “Signal Jammer”?

A Jammer is a device that blocks transmissions by creating interference. The jammer emits signals in the same frequency range that cell phones use, and within the range of a jammer a cell phone user may lose their signal. Jammers are usually undetectable, and users may experience minimal effects such as poor signal reception.

The most common types of this form of signal jamming are random noise, random pulse, and stepped tones, warbler, random keyed modulated CW, tone, rotary, pulse, spark, recorded sounds, gulls, and sweep through. Signal Jammer was originally developed for law enforcement and the military to interrupt communications between criminals and terrorists.

Some were also designed to foil the use of certain remotely detonated explosives.



Fig.3 Jamming Devices

1.4 Various types of Jammers



Fig 4 Types of jammer

Scope

As in most Asian countries, signal blockers of various kinds, are not available. Thus, restaurants, shops, theatres, cinemas, financial institutions, and others, install blockers so that customers or employees do not use the terminal within its facilities. The issue of mobile signal blocker has been treated at different times by the GSMA and have covered different aspects of their use, from regulatory aspects to security implications. An important case, we see with great concern is questions about the limitations of mobile

services in prisons in Honduras, Guatemala, and other countries in the region. Although use in prisons is not a new practice, this approach has not yet been in the debates of the GSMA.

Operators of mobile networks made large investments to provide coverage and capacity by installing radio base stations. Therefore, the indiscriminate use of blockers affects these investments because customers cannot make use of mobile services in the ranges of these blockers. To this end, this document has been agreed upon with industry, and other supranational bodies GSMA to provide a common position including the implications for the end user, which can be shared with telecommunications ministries and regulators. Cell phone jamming devices can be used originally for law enforcement and the military to interrupt communications by criminals and terrorists.

2 Literature Survey

In research, we found that the technique used in current jammers is a complex one compared to our technique because our idea of jamming through spectrum distortion proves to be simpler, easier to fabricate, and cost-effective. In their technique, a voltage-controlled oscillator (VCO) plays a major role in generating the jamming frequency. Cell phone jamming devices are an alternative to more expensive measures against cell phones, such as Faraday cages, which are most suitable as built-in protection for structures. The civilian applications were apparent, so over time many companies originally contracted to design jammers for government use switched over to sell these devices to private entities. Since then, there has been a slow but steady increase in their purchase and use, especially in major metropolitan areas. The techniques used in most commercial jammers is based on noise attack.

A cell phone jammer is a completely analog circuit. It is a step-by-step procedure for designing a mobile phone jammer.

GSM Architecture

GSM provides data and voice communication throughout a wide geographic area. GSM system divided large geographic areas between India into small radio areas (cells) that are interconnected to each other (Microwave connection). Each cell coverage area has one or several transmitters that communicates with mobile telephone within its coverage area. In the GSM system, the mobile handset is approach the mobile phone jamming system called the Mobile station (MS). A cell is formed by the Base Transceiver Station (BTS) coverage area, which serves the MS in its coverage area. Several BTS together are controlled by one Base Station Controller (BSC). The BTS and BSC together form Base Station Subsystem (BSS). The combed traffic of the mobile station in their respective cells is routed through a switch called Mobile Switch Center (MSC). Connection originating or terminating from an external telephone (PSTN) is handled by a dedicated Gateway Mobile Switching Center (GMSC).

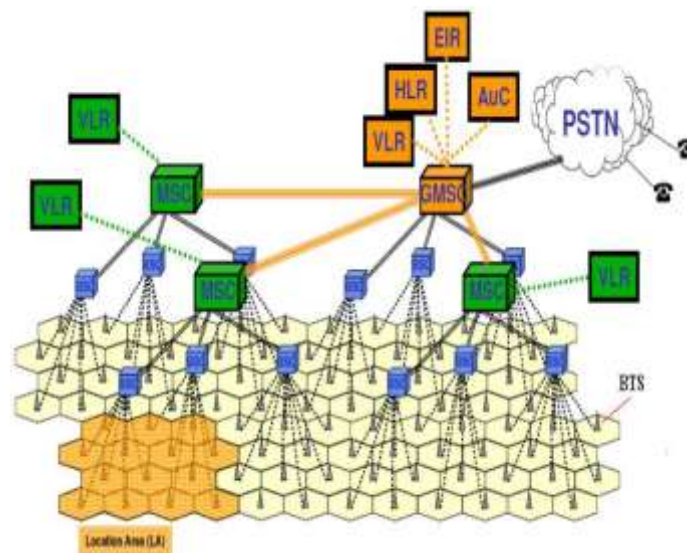


Fig 2 Basic Network Architecture

Base Station Center (BSC)

BSC is a high-capacity switch with radio communication and mobility control capabilities. The function of BSC is including radio channel allocation, location update, and handover, timing advance, power control, and paging. Figure 2.1 shows the architecture of the GSM network, the BSC is the center of different Base Transceiver Station (BTS).

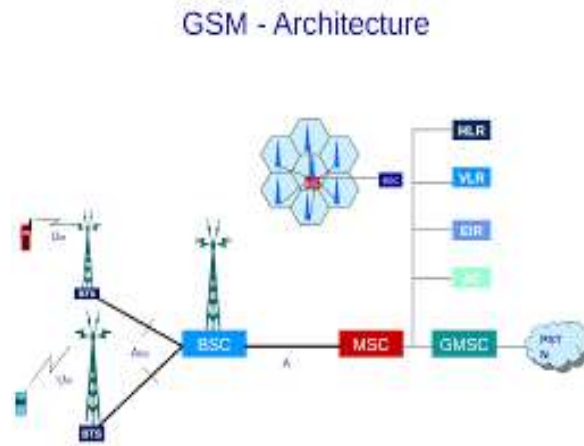


Fig 2.1 GSM Architecture

Main functions of the Base station center

- Control the handset between its BTSs.
- Switch traffic and signaling to/from the BTSs and MSC.
- Manage the interconnection between BTS's MSC.

Base Station Transceiver Architecture

A BTS is radio transceivers stations that communicate with the mobile station. It's bthe ackend to the BSC. More BTS is usually placed at the center of a cell. Its transmitting power defines the size of a cell. Each BTS contains TRX's called radio, each radio has a single frequency.

3 Problem Statement

Cell phones are everywhere these days and it's great to be able to call anyone at any time. Unfortunately, classrooms shopping malls, Temples, Libraries, and Hospitals all suffer from the spread of cell phones because not all cell phone users know when to stop talking to make sure that the use of mobile phones is eliminated when it does so the signal jammer will an important role. To overcome this problem we proposed this project idea.

4 Project Objectives

The project involves the design and development of cell phone jammers to block all the cell phones within the designated area, this device will disrupt cellular communication concerning the following:

- The system should be able to operate in the 900MHz band and other frequencies.
- It will be having a thirty-meter effective blocking radius.
- We can provide security to V.I.P. from the anti-social elements.
- Using cell phone jammers we can maintain law and order for maintaining peace.
- By cell phone jammers we can't disturb other people in public places like restaurants, and shopping places.
- It is very necessary to use cell phone jammers in Naxal-feared places. This helps the authorities to work their duty softly.

5 Motivation

This project is designed and constructed for educational purposes only as a partial fulfillment of the requirements for the award of a Bachelor of Engineering degree in Information Technology Engineering from Savitribai Phule Pune University. No commercial interest was attached to this work.

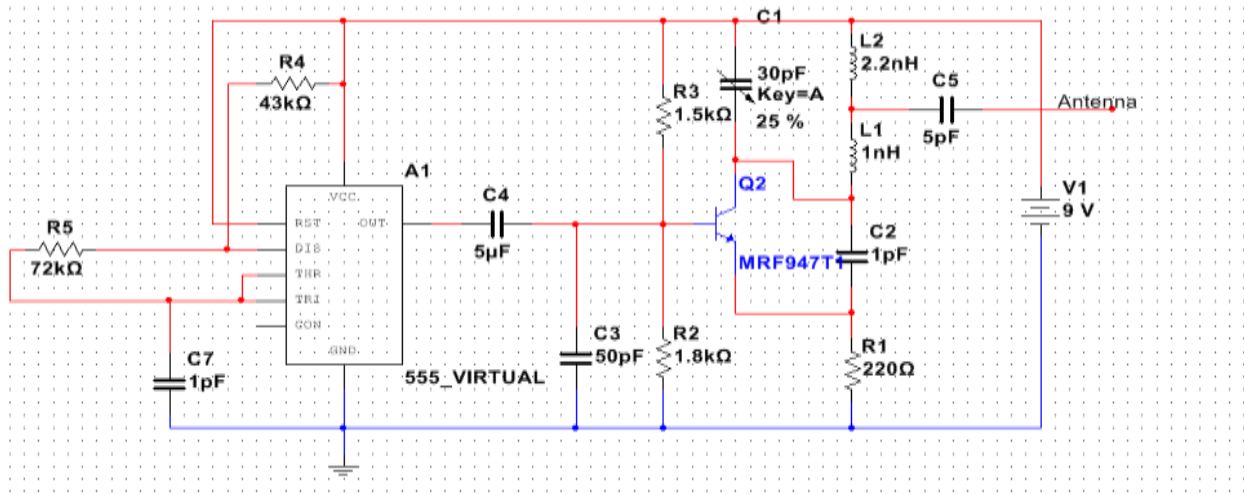
The time that will be taken to come up with this project will be from Jan 2022 to March 2023.

In this project, we used Global System for Mobile communications (GSM) frequency Band of 900-MHz and we considered all the down-link frequencies since it uses less power compared to the up-link frequencies.

Some parts of our design were also modified from the existing design to make us achieve our objectives.

If this project is put into public consumption it can be useful in the following ways;

- The main motivation behind this idea and project is to make our systems secure and make India powerful.
- Can be able to maintain complete silence in the library and lecture hall
- Can also avoid fraud in examination halls and disturbances in classrooms through the use of mobile phones.



- It can provide a completely calm and peaceful atmosphere in places like Hospitals churches, Mosques, courtrooms, and many others.

6 System Architecture

The proposed system is an IOT-based hardware system that can be accessed by users for any jamming purpose in the world. The system is providing a platform such as to secure the particular area where cell phones were not necessary to be used with multiple options. This device will help commercial or government organizations secure their systems, this system will completely secure any cell phone activity that is prohibited in the jammer area. The system aims to grant permission to the particular user that the jammer device owner wants. So that the device will be having every cell phone detail and IP address to our software side that can give you the privilege to grant particular device allowance. The main objective of this project is to build a hardware device with some software part that can block the signal frequencies completely so that cell phone users will not be able to interact with their cell phones due to losing the network. This system will be useful in multiple applications like conference halls, exam halls, temples, malls, etc. To design and come up with a system that would block the use of mobile phones by transmitting radio waves of the same frequencies as that of the mobile phone causing interference between the mobile phone and the Base Transceiver Station, hence the mobile phone displays "NO NETWORK" on the screen. To build a power supply that will distribute power to Other parts of the system for operation.

Specific Objectives:

- To construct the Intermediate Frequency section which helps to generate the tuning frequency signal to be fed in the RF section.
- To construct the Radio Frequency section which helps to generate RF signal that would create interference with signal from BTS to block transmission between mobile phone and BTS.
- To integrate the different sub-systems above to form one single system, that is the GSM mobile phone jammer device.

7 Project Methodology

After reviewing the literature, we had to draw a systematic plan of action that helped us with how, where, and when to execute every activity. The components of this plan of action include;

Research

Through research, we were able to dig deep into our project. For example, we understood its operation, what should be done to make it work, and all that we required to achieve the objective of the project.

Design

This is also another activity we had in our plan of action. Under design, factors like the cost of the components, the behavior of each component in the circuit, adjustment, and modification of the existing design, and time needed to complete the design were all put under consideration as we shall see details in the appendices of this report. Other components of this plan of action include; system implementation, system testing, and others that we were able to carry out.

Jammers can broadcast on any frequency and are effective against AMPS, CDMA, TDMA, GSM, PCS, DCS, iDEN, and Nextel systems. Old-fashioned analog cell phones and today's digital devices are equally susceptible to jamming. Disrupting a cell phone is the same as jamming any other type of radio communication. A cell phone works by communicating with its service network through a cell tower or base station. Cell towers divide a city into small areas or cells. A jamming device transmits on the same radio frequencies as the cell phone is 900MHz disrupting the communication between the phone and the cellphone base station in the town. It is called a "denial-of-service attack". The jammer denies service of the radio spectrum to the cell phone users within range of the jamming device. Older jammers sometimes were limited to working on phones using only analog or older digital mobile

phone standards. Newer models such as the double and triple band jammers can block all widely used systems (AMPS, iDEN, GSM, etc) and are even very effective against newer phones which hop to different frequencies and systems when interfered with. The power of the jammer's effect can vary widely based on factors such as proximity to towers, indoor and outdoor settings, presence of buildings and landscape, and even temperature and humidity play an important role.

Software/Hardware Requirements Hardware :

- Capacitors
- Integrated circuit
- Inductors
- Resistors
- Battery
- Transistors
- Jumper wires
- Circuit boards
- Solder wire
- Multisim software for circuit design
- Soldering gun
- Solderless breadboard
- Digital Multimeter

Software's:

- React
- PHP
- Python
- SQL
- Android Studio

8 Applications

In Military applications: Nowadays any disturbances caused by terrorists are antisocial elements is caused by using cellular phones and other wireless communication technologies. So there is a huge scope for using Jammers in military applications. There are incidents where the military of Pakistan country avoided many bomb blasts by using cell phone jammers as many bombs are detonated by using cell phones.

In Normal Day-to-Day Life: As many countries considered jamming an illegal activity and don't support private jamming there are some places like movie theaters, hospitals, and shopping malls where we can use the jammers to avoid disturbances. In important meetings signal jammers are used to avoid the leakage of information before officially announcing it.

Gas stations, the air entrainment station, the fuel depot, and the flammable explosive chemical warehouse, the refinery, the petrified factory, and so on need safety to protect the place: May avoid changing suddenly the detonation which the signal radiative generation Static electricity spark but causes, the fire. Posts the prohibition to dial the handset sign, does not have the initiative, this kind of accident all has the appearance in national many gas stations, to safeguard these important situations the security to be supposed to take the precautionary measure.

Governments, the enterprise's each kind of conference room: May avoid the handset ting disturbs and answers when the telephone breaks the leader to speak but interrupts its person holding a meeting

Hospitals: Might avoid the goon machine hour but causing the doctor to the hospital precision instrument equipment disturbance to misdiagnose has delayed the rescue patient, as well as was surgery doctor to answer the handset telephone disturbance attention, underwent the surgery to doctor the patient to be extremely disadvantageous.

Courts: May avoid the handset ting the disturbance, maintains the court conference site the dignity and the sacredness.

Libraries, New Bookstore: May avoid the handset ting and answer the telephone the noise builds to study the study peaceful environment.

Theatres: As the upscale recreation area, eliminates the handset ting noise to be possible to maintain the audience to the appreciation of the program the interest.

Tests places, examination center: May cease the examinee, monitor an exam the personnel to cheat using modern communication facilities.

Conclusion

Today there is expeditious growth in technology, for example in the mechanical industry, building and construction industry, food supplement industry, medical industry, sports industry, and electrical and electronics industry to mention but a few, is, therefore, no doubt that every technology has got its advantages and disadvantages.

With no exception, mobile phone communications have become one of the leading forms of communication with its ever-growing technology. For instance; they can support Games, online videos, e-commerce, and video conferencing social media like Facebook, WhatsApp, and Twitter, to mention but a few. All these have made mobile phones be used everywhere which become disruptive in some places like churches, Mosques, meeting places, courtrooms, road use, examination rooms, etc.

Therefore the main objective of this project was to design and build a system that can block the use of a mobile phone in such places where their use is not required by transmitting radio waves of the same frequencies as that of the mobile phone causing interference between mobile phone and the Base Transceiver Station, hence the mobile phone displays "NO NETWORK" on the screen.

References

- 1) Analysis of Jamming attacks on Wireless Sensor Networks (University of Hertfordshire) 2015
- 2) BLOCKING OF SIGNAL USING SIGNAL JAMMER International Journal of Current Research 9, Issue, 11, pp.61326-61329, November, 2017
- 3) IEEE std. 802.15.4 - 2003: Wireless Medium Access Control (MAC) and Physical Layer (PHY) specifications for Low Rate Wireless Personal Area Networks (LR-WPANs)
- 4) Intelligent Reflecting Surface Empowered Physical Layer Security: Signal Cancellation or Jamming? (IEEE2021)
- 5) International Journal of Computer Science and Mobile Computing (Survey on Detection and prevention of Jamming Attack in WC) 2015.
- 6) International Journal of Current Research Vol9, Issue 11 Nov 2017 Of Blocking of Signal using Signal Jammer
- 7) International Journal of Science and Research (IJSR), India Online ISSN: 2319-7064 Volume 2 Issue 4, April 2013 (Signal Jamming and its Modern Applications)
- 8) Literature Survey on Jamming Attack in Wireless Adhoc Network by IJEDR 2017 Volume 5, Issue 2, ISSN: 2321-9939
- 9) Survey on Detection and Prevention of Jamming Attack in Wireless Communication, IJCSMC, Vol. 4, Issue. 1, January 2015, pg.443 – 448
- 10) Texas Instrument (2014). 2.4 GHz IEEE 802.15.4 / ZigBee-ready RF Transceiver .[Online] available at : <http://www.ti.com/lit/ds/symlink/cc2420.pdf> [accessed 23/4/2105]