

## CELL PHONE JAMMER

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### ABSTRACT

In this study, we have proposed a general review of some of the effective jamming techniques used in wireless communication systems, as well as effective jamming migration techniques. Dissimilar cellular-systems process signals differently, and yet, all cell-phone-networks use radio-signals that can be interrupted or, even, blocked, completely. This highlights the design of a simple, low-cost mobile-phone- jammer and aims to present a solution for the problem of inappropriate-use of the cell-phones in restricted and prohibited-areas. The jamming is done by the releasing of noise (signal) of the same-frequency which is used by mobile-service-provider to destruct or cancel the user-signal. Its a device that transmit signal on the same frequency at which the GSM system operates, the jamming becomes success when the mobile phone's signal gets disabled in the region where the jammer is placed. The tactical commanders exercise control of their forces by using RF communications, the enemy has interest in the communications. This interest comes from the fundamental area of denying the successful transport of the information from the sender to the receiver.

At present the cell phone jammer are becoming civilian products rather than electronic warfare devices, because of the rising number of the mobile phone, users need to disable mobile phones in specific places where the ringing of cell phone would be disruptive. These places include temples, class rooms, libraries, seminar halls, meeting rooms, and other places where silence is appreciated. There are five types of jammers are known to be developed. Once the driver's cell phone is detected, a low-range jammer deactivates it leaving other passenger's cell phones and call wills drop.

**KEYWORDS:** Cell Phone, Signal, Jammer, Antenna, GSM.

### INTRODUCTION

The base-station which consists of a tower and equipments, from here the cell phone receives a small-building containing the radio- the signal.

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Each city/ town is divided into cell this is known as cellular-approach due to this the transmission of RF-signals is possible. Cell is the region (several-kilometres) around the tower in which each phone receive signal. A large-number of base-stations is required in each city/town. But the cost is relatively low because so many-people are using cell-phones. Mobile Switching Centre (MSC) is the central-office which is run by the carrier, it handles all the phone-connections like the normal land based phone-system, and controls the base-stations of the region. [1]. When a cell-phones is turned on, it reaches the nearest base station and establishes a connection-link and this process is called 'Registration'. The three-main-technologies used by cellular-phone providers are 2G, 3G, and 4G. The transmission-protocols are different for each-generation. The cellular-phone communication with the tower is instructed by the transmission protocols. Some examples are: Code division multiple-access (CDMA); Global system for mobile communications (GSM) CDMA 2000, Frequency division multiple access (FDMA); Time division multiple access (TDMA); Wideband code division multiple-access (WCDMA), and Time-division synchronous-code-division-multiple-access (TD-SCDMA). [13]

Cell phones are handheld like the two way radios. And like any radio a signal can be jammed. Cell phones are very useful because we are able to contact anyone at anytime but sometimes it become nuisance. Some cell phone users don't know when to stop talking. So we use a special electronic device known as Cell-phone Jammer which is a special abstract of Signal Jammer. Cell phone jammer is device used to restrict mobile phones receiving signal from the base station. They can be used anywhere but mostly used where phone calls are not to be allowed. Jammers are generally used in library, classrooms, temples, churches where silence is necessary. Also it is used in

Stadiums, Theatres, Seminar halls, meeting rooms, exam centers to avoid disturbance, further it used in Aircrafts to block unwanted signal frequency. This device creates a temporary "dead zone" to all cell phone traffic in their air system. Thus in such cases Signal Jamming will be beneficial. [13]

### **ANALOG CELL-PHONES**

The analog-cell-phone standard known as AMPS (Advanced-Mobile-Phone-System) was approved by the Federal Communication Commission, USA and first used in Chicago. The range of frequency is between 824 megahertz (MHz) and 894 MHz for analog-cell-phones. The governments required the presence of two-carriers in every-market, known as A- and B-carriers, in order to encourage competition and keep prices low. One of the carriers was normally the local-exchange carrier (LEC)-is the local-phone-company. Carriers A and B are each assigned 832 frequencies: 790 for voice and 42 for data. A pair of frequencies (one for transmit and one for receive) is used to create one channel. The frequencies used in analog-voice-channels are typically 30 kHz wide; the standard-size is 30 kHz was chosen because it gives voice- quality comparable to a wired-telephone. The receiving and transmitting-frequencies of each-voice-channel are separated by 45 MHz to keep them from interfering with one another.[17]

### **DIGITAL CELL-PHONES**

Like analog-phones, the digital- cell-phones use the same-radio-technology but in a different way; Analog-systems doesn't utilize the whole signal between the phone and the cellular-network; analog-signals can't be compressed and manipulated like digital-signal. In digital-phones the voice gets convert into binary-information (1s and 0s) and then it gets compress. With this compression, three to 10

digital cell-phone-calls can occupy the space of single-analog-call. [17]

We are fortunate to call anyone, 24/7, around the World. Unfortunately, restaurants, movie-theaters, shopping-malls, hospitals, banks, concerts, libraries, and churches all do suffer from the spread of cell-phones because most of the cell-phone-users couldn't recognize, or make any account, that it could be a restricted for mobile-use, or, even if they notice the instruction that the use is restricted, still, they don't follow it and keep-on talking, sometimes most of them do talk very-loudly, it's quite annoying and particularly disturbing because silence, peace or concentration is not maintained. People are losing the capacity to manage the boundaries between appropriate and inappropriate usage of cell-phones.[1,17]

## LITERATURE SURVEY

Jamming attack is a type of physical layer attack hence it becomes very important to study physical layer of wireless communication to protect the WSN from jamming attack. Radio is only one slice of the electromagnetic spectrum .Radio waves can travel through solid materials such as clothing, furniture and brick walls because radio energy requires no medium. Radio waves affect conductors like metal and form different types of energy Electrical signals, which means that radio waves cannot travel through metal walls but this also means that metal can be used in radio antennas on wireless module.[15]

The systems process signals differently for dissimilar, all cell-phone-networks use radio-signals that can be interrupted or even blocked completely. The jamming is done by releasing of signal (noise) of the same-frequency which is used by the mobile-service-provider to overpower and destruct the user-signal. The fabrication of the jammer is done with uncomplicated discrete components, inductors,

transistors, capacitors and resistors to generate the required frequency (noise) and then the frequency is amplified and generated to range of 800 MHZ to 1.4 GHZ in order to match the frequency of the mobile-phone signal transmitted by the base-station. [1]

One of the necessity for development of jammer is to reduce malpractices in examination centers which is an important area of research. Mobile phones are the major problems, which is aiding malpractices has been the creation of, its a good communication device but needs to keep away during examinations. In order to have a 100% assurance that no student can cheat with the mobile phone, a mobile detector system is used with a frequency jamming feature was developed using cell phone detection techniques of measuring a cell phone's electromagnetic properties, and also finding the identifiable signature, the RF spectrum is measured and the jamming requirements are met. [8]

## TECHNICAL ASPECTS

Five kinds of devices have been developed (Or being considered for development) for blocking Cell phones signal in certain specified area [6]:

- a. **Type 'A' Devices:** known as 'jammers'. It is made of several independent oscillators transmitting 'jamming Signals' which blocks frequencies used by mobile devices for calling.
- b. **Type 'B' Devices:** known as 'intelligent cellular disablers'. Normally it works as a detector. It detects signals receiving from the Base station to the Mobile, it signals the base station not to disrupt communication. This process of Detection and interruption of call establishment is done during the interval normally reserved for signaling and handshaking. The main advantage is This device can recognize emergency calls and

also can allow specific pre-registered users to use their mobile phones for a specified duration.

- c. **Type 'C' Devices:** known as 'intelligent beacon disablers'. This devices functions like 'beacons', i.e. they give instructions to any mobile device within the area of coverage to stop its ringer or its operation. The main problem is that these devices require intelligent handsets.
- d. **Type 'D' Devices:** known as 'Direct Receive and Transmit Jammers'. They act like a small independent base station. The jammer is operated in receive mode and will intelligently selective to interact and block the cell phone directly if it is within the area of jammer.
- e. **Type "E" Devices:** known as 'EMI Shield-Passive Jamming'. This device uses Electromagnetic Interference (EMI) suppression techniques to construct a Faraday cage. Which blocks, or greatly attenuates, virtually all the electromagnetic radiation from entering or leaving the cage.

With recent advances in EMI shielding techniques and commercially products available one could affordably implement this into the architecture of buildings so called "quiet-conference" rooms. This technique is used for EMI suppression to make the room into a so called Faraday cage. [2,5,7,9]

## FORMULAE

Type A jammer consists of a transmitter which continuously transmits the signal of frequency range used by mobile/pcs system, the jammer has drawback of continuous usage of output power and transmission of EMF signal in all directions without knowing that base station and mobile are trying to communicate with each other or not. This leads to the effect known as jamming which depends on the jamming to signal ratio (J/S), modulation scheme, channel coding and interleaving of the

target system. Jamming to Signal ratio can be measured with the Equation[2].

$$J/S = (P_j G_{jr} G_{rj} R_{tr} L_r) / (P_t G_{tr} G_{rt} R_{jl} L_j)$$

where:

- $P_j$  = jammer power
- $P_t$  = transmitter power
- $G_{jr}$  = antenna gain from jammer to receiver
- $G_{rj}$  = antenna gain from receiver to Jammer
- $G_{tr}$  = antenna gain from transmitter to receiver
- $G_{rt}$  = antenna gain from receiver to transmitter
- $B_r$  = communications receiver bandwidth
- $B_j$  = jamming transmitter bandwidth
- $R_{tr}$  = range between communications transmitter and receiver
- $R_{jt}$  = range between jammer and communications receiver
- $L_j$  = jammer signal loss (including polarization mismatch)
- $L_r$  = communication signal loss[9]

## WORKING PRINCIPLE

The technology used in mobile phone jammers breaks down the network between base station and the cell phone and sets out an RF signal with the same frequency range of cell phones and the phone doesn't receive any network. Within the frequency range of 800 to 1900 MHz the radius of cell phones can be in range of kilometers or feet for bigger units.[10,4]

The output power of the jamming device is measured in WATTS or DBM, (decibels per meter), or both. [11]

A detailed description of the design in form of a block diagram is given in Figure 1. The mobile detector and frequency jamming system is able to disable mobile phones in restricted area. The jamming system detects Global System for Mobile Communication (GSM) signals at 900MHz. The necessary components employed

in the construction are a signal detector with a monopole antenna, capacitors, light led, transistors and the power supply unit. The monopole antenna is tuned to 900MHz. Once the RF antenna receives wireless signal after the circuit has been powered by a 9Volts dc battery, the detector amplifies the received signal which in turn triggers the buzzer with resultant flickering of the LED when signal is detected and the Jammer will be manually switched ON.[8]

For the frequency to be jammed  $f=1/(2*\pi*(L*C))$  the capacitor used should be variable.

For value of an inductor for n no. of turns and d diameter, l length of coil.[3]

$$L=(d^2)*(n^2)/(18*d+40*l)$$

Selection of an antenna-with the usage of stick antenna or a wire of 30 cm for the range of 2

km. moreover monopole antenna is used in mobile jammers according to the required frequency to be jammed.

Length of antenna in general is equal to 1/4th of the transmitting wavelength.

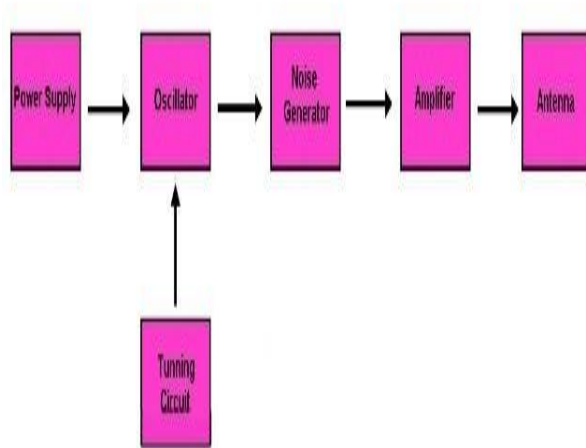
$$c=w*f, \text{ where wavelength is the } w.$$

Below given the Ratio formulae which gives the information about the maximum distance from which a jammer can be from the target and yet be effective.[4]

$$d_j=dt*((p_j/(p_t*k*(h_t/h_j)^2))$$

- a. dt= distance of enemy transmitter location
- b. p<sub>j</sub>=power output of jammer
- c. h<sub>t</sub>= height of enemy
- d. d<sub>j</sub>=distance of jammer to target receiver
- e. h<sub>j</sub>=height of jammer antenna
- f. p<sub>t</sub>=power output of enemy transmitter.
- g. k=jammer tuning accuracy factor.[4]

**WORKING CIRCUIT**



**Figure 1.Block Diagram of Mobile Jammer**

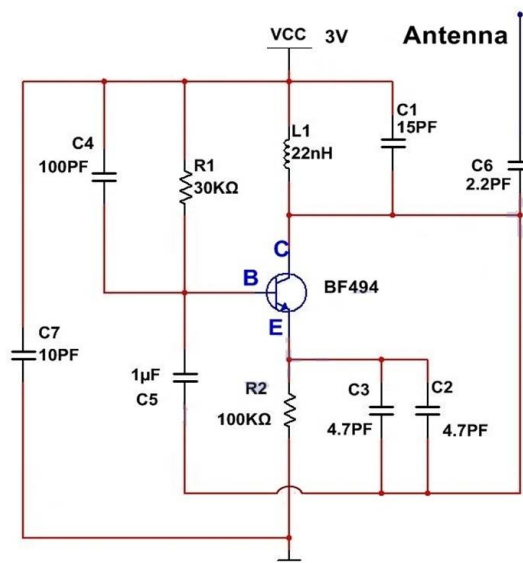


Figure 2. The Mobile Phone Jammer Circuit

For any jammer circuit, there are 5 main important circuits. When they are combined together, the output of that circuit will work as a jammer. The main circuits are

- a. Power Supply
- b. Voltage controlled Oscillator.
- c. Noise Pulse Generator
- d. RF Amplifier
- e. Transmitting Antenna

The RF amplifier circuit is made by the resistor R1, transistor Q1 and capacitors C4 & C5. Hence it will amplify the signal generated by the tuned circuit. The amplification signal is provided through C6 capacitor to the antenna. The DC will get removed by Capacitor C6 and allow only the AC signal to be transmitted through the air.

Here Inductor L1 and Capacitor C1 Works as oscillation and frequency generator, and for Amplification Transistor is used.

For instance, if mobile phones work at 500 MHz, we have to generate 500 MHz which have some noise to act as the blocking signal. Now the mobile phone receiver will not be able to figure out, which signal to receive. Hence we successfully blocked cell phone signals. Inductor L1 and Capacitor C1 a makes up the tuned

circuit. This circuit has zero resistance and acts as an oscillator. The tuned circuit is operated at resonance frequency.

When transistor Q1 is turned ON, the tuned circuit at the collector turns ON. The tuned circuit operation When the circuit is ON, voltage is stored in the capacitor. After completely charged of capacitor, it allows to flow the Charge (current) through the inductor. When current flows through the inductor, it stores magnetic energy corresponding to the voltage across the capacitor. When the charge of inductor reaches its maximum then the charge or voltage across the capacitor turns to Zero.

The magnetic charge through the device will ablated and conjointly this will charge the condenser in opposite or reverse polarity manner. After some time magnetic energy across the device ar totally zero because the capacitor gets charged up. Then the charge in capacitor will become zero since it transfers charge to inductor, and reverse happens after sometime and hence oscillation takes place and some frequency is generated. The oscillation stops once internal resistance is generated. The capacitors C2 and C3 generate noise pulses at the tuned circuit in randomly The RF amplifier

boosts the frequency generated by the tuned circuit. The frequency generated by the tuned circuit and the noise signal generated by the capacitors C2 and C3 is combined, amplified and transmitted.[3]

## CONCLUSION & FUTURE WORK

Jamming technique is very useful to disable cell phone in a particular range so that it will not affect the other base station transmission system. Mobile jammer can be used in practically any location, but are used in places where a phone call would be particularly disruptive like Temples, Libraries, Hospitals, Jail, small Seminar hall etc. The purpose Signal Jamming will make sure that no disturbance is created in the area where silence is appreciated. It stops the transmission and reception of signals in specific region and boundaries and does not interfere with the external boundary. The Mobile Phone Jammer Prohibition is strongly supported by industry. Notwithstanding the need to update it to take into account new frequency ranges used for wireless access services, it remains a useful and necessary regulatory measure. This project is designed partially till date and facing problem in power amplifier circuit design at which the frequency is matched, but not achieving proper output gain so that is can jam a particular signal for a particular range. After blocking GSM 900, DCS (Digital Cellular Systems) 1800, PSC (Personal Communications Services) 1900 and WCDMA 2100 MHZ the next target is blocking of 4G system that is 2400 MHZ. There are no rules against passive cell-phone blocking. According to law clearly prohibits using a device to actively disrupt a cell-phone signal. Cell phone control devices are worked by companies such that they do not jam the signal. Today most people use their mobile while driving in that situation most accident occurs. In future the jamming system will operates whenever the driver turn on the glow which

can reduce accident. The device receives radiation which is emitted by cell phone. The driver or passenger who is using mobile that can get detected by the device. The main concept of jamming is the transmit signal of the same-frequency which is using by mobile-service-provider to block the user-signal.

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