

Mobile Signal Jammer

Shaikh Sajid Ahmed Abusiddik, Ibrahim Abdul Majid Shaikh,
Geeta D Salunke



Electronics & Telecommunication AISSMS IOIT Pune,India

ss.champs23@gmail.com

Electronics & Telecommunication AISSMS IOIT Pune,India

ibrahims1697@gmail.com

Electronics & Telecommunication AISSMS IOIT Pune,India

geetasalunke@gmail.com

ABSTRACT

Jamming refers to making or creating a isolation between two or more entities such that they fail to establish connection between them .Using a mobile jammer a “no cell phone” zone can be successfully created such that the mobile communication will collapse, whose result is a mobile won’t be able to receive or make neither calls nor messages. Using a mobile jammer privacy of a region can be safeguarded. The need for jammer in today’s world is a must. As we are witnessing the high rate of digital advancement around us, humans are taking huge steps in electronic gadgets. Cell phone is an important discovery of human history and it has getting better as days are passing. Bad things come handy with good things. It can be said that cell phones is a legal weapon which can be taken probably easily everywhere, if used for a wrong reason. Mobile jammer can be used in schools and colleges during exams, hospitals, courts, military operations etc. Using jammers the use of cell phones can be abandoned. The leak of sensitive information can be minimized or bring to zero. The mobile phone jammer emits the radio signals of same frequencies as that of operating frequency of mobile phones, this creates a solid interference between the mobile and the tower and the connection is broken. When mobile jammer is switched on the mobile shows no services and in off state it allows all operation. Originally mobile jammers was used by military and intelligence departments to handle critical situations, like mobile phones were used to trigger explosive etc. But as looking in today’s scenario places like exam hall and conference hall needs jammers. In this project we are using microcontroller to control the jammer.

Keywords— Mobile jammer, privacy, sensitive information, military purpose etc.

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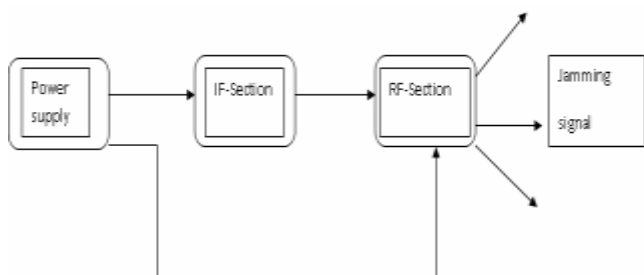
I. INTRODUCTION

A mobile jammer or blocker is a device that broadcasts the same signal of RF as of cell phones which interferes the communication between mobile and cell-phone base station that adequately weakens the signal strength of cell-phones within the jamming range, thus preventing them from transmitting and receiving the signals[1]. Jammers have both good and bad uses. These devices are indiscernible and the user may experience very slight effect of poor signal reception[1]. Jammers are mostly used in riotous area such as military, hospitals, libraries, restaurants, temples, etc. Mobile jammers were first

created by military for their operations[1]. The main agenda to create this device was to limit control their forces, an enemies had interest in those communications[2]. Nowadays, mobile phones are becoming vital equipment for people all over the world in day-to-day life. In this project, a device will be designed, built, and tested to jam a particular signal[2].

II. METHODOLOGY

Block Diagram:-



There are mainly four category in the block diagram of mobile signal jammer:

1. Power Supply:-

The requirement of mobile signal jammer is 9v DC and for microcontroller it is 5v DC. The 230v AC supply from wall outlet is needed to be brought to required values[2]. The major component power supply are transformer, rectifier, filter, and regulator. The transformer converts 230v AC to 0-12v AC. The rectifier is used to converts AC to pulsating DC. Either half or full rectifier wave can be used. We are using full wave rectifier rather than half wave rectifier as it has advantage of converting full Alternating Current cycle into pulsating Direct Current. A filter is used to remove the irregular rising and falling in the obtained DC voltage. A regulator is used to obtain a steady and stable DC voltage generated irrespective of the changes to input[2].

2. The IF Section:-

The IF section consists of noise generator, triangular wave generator and mixer. A VCO (Voltage Control Oscillator) is used to generate a triangular wave by feeding sufficient voltage to the oscillator circuit, the frequency of triangular wave depends upon input to VCO. An op-amp is deployed as summer, whose job is to add the generated noise and triangular wave[3].

3. The RF Section:-

RF section is a major setup of the project, it consist of Voltage Controlled Oscillator (VCO), RF Power amplifiers, and the antenna. The VCO is responsible to generate the frequency which is going to be the frequency equivalent of operating frequency of the cell phones. Power amplifier is used to increase the intensity of the generated RF signal which will hamper the range of jammer. Antenna is used to transmit the generated signal[4].

4. Design Parameter

There are many important factors need to be considered while designing a mobile signal jammer.

The frequency bands:-

There are two frequencies known as up-linking and down-linking frequencies used in mobile communication .We will be generating the frequency as of downlink frequency as the power requirement will be very low[5].

Distance to be jammed (D):-

The jamming distance depends on the power with which the jamming signal is being transmitted. higher the power of transmitted signal the greater the area will be covered[5].

Jamming-to-signal ratio J/S:-

The general equation of the jamming-to-signal ratio is given as follows:

$$\frac{J}{S} = \frac{P_j G_{jr} G_{rj}^2 R_{tr} L_r B_r}{P_t G_{tr} G_{rt}^2 R_{jr} L_j B_j}$$

Where:

P_j =jammer power,
 G_{jr} = antenna gain from jammer to receiver,
 G_{rj} =antenna gain from receiver to jammer,
 R_{tr} =range between communication transmitter and receiver,
 B_r =communication receiver bandwidth,
 L_r =communication signal loss,
 P_t =transmitter power,
 G_{tr} =antenna gain from transmitter to receiver,
 G_{rt} =antenna gain from receiver to transmitter,
 R_{jr} =range between jammer and communication receiver,
 B_j =jammer bandwidth, and
 L_j =jamming signal loss.

Power calculations:-

We need to find out the power of which the signal is to be transmitted. Taking SNR=9 dB and the maximum power signal for mobile receiver=-15 dBm, gives J=24 dBm. To calculate output power we need to consider free space loss to amount of power on mobile end[5].
 Output power=-24dBm+58dB = 34 dBm.

Free space loss:-

The free-space loss (or path loss) is given by:
 Path loss (dB) = 32.44 + 20 log D (km) + 20 log F (MHz).
 Where,
 D =Jammer range F =Frequency to be jammed
 Considering the maximum loss (worst case of F), lets us assume F=1800 MHz, it gives:
 F (dB) =32.44+20 log 0.01 + 20 log (1800) which gives
 F =58 db[5].

III. SIGNIFICANCE OF THE PROJECT

Mobile jammer can be used to maintain silence and preventing disturbances and carrying the work in more efficient way. Mobile signal helps military and intelligence to carry out operations smoothly. Attempts to trigger explosive can be discarded. Can be used in examination halls to for avoid unfair means. Can be used in hospitals like operation theatres where silence is to be maintained.

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