

Swapneet Oberoi<sup>1</sup>, Akanksha Thakare<sup>2</sup><sup>1</sup>UG Student, Department of E&TC, Jawaharlal Darda Institution of Engineering & Technology, Maharashtra, India  
*nankik.oberoi@gmail.com*<sup>2</sup>UG Student, Department of E&TC, Jawaharlal Darda Institution of Engineering & Technology, Maharashtra, India,  
*akankshathakare1201@gmail.com*

---

**Abstract**

The aim of this paper is to detect lost mobiles and to prevent misuse of mobile phones. Every day thousands of mobiles get misplaced or lost, which can be misused. Though the and from any misuse activities there exists the effective way for the blocking of the lost mobile to prevent unauthorized person from making and receiving the calls has been guaranteed by the manufacturers of the mobile with the help of International Mobile Equipment Identifier (IMEI). However there has been very little progress for the detection of the misplaced mobile phone. For detection of lost mobile SNIFFER plays a vital role .The sniffer device has to be designed precisely. The size should also be reduced for easy mobility for the purpose of detection of lost mobiles .The device can be termed as a Mobile Base Station which includes Sniffer Base Station, Unidirectional antenna and tracking software. The sniffer basically is a small base station that includes transceiver section. The SNIFFER must operate at such a unique frequency which is very much different from the frequency of the current cell in which the operation of detection is being carried out. The unidirectional antenna plays an important role as a device that is to be designed. There are certain boundary conditions that have to be qualified for the identification of lost mobile like the power of the mobile must be good enough, the mobile phone should not be in the shadowed region. Our paper seems to be a bit costlier for initial setup. But the cost is gradually reduced once effectively and efficiently utilized for the purpose of detection of lost mobiles.

**Index Terms:** Sniffer, BTS, MTSO, MSCS.

\*\*\*

**1. INTRODUCTION**

Each and every day there is thousands of mobiles get lost. To prevent unauthorized person from making and receiving the calls from the lost mobiles we use this technique. The effective method for the blocking of the lost mobile with the help of International Mobile Equipment Identifier (IMEI) can be used. The device can be called as a mobile Basestation that has Sniffer. The losses are increasing day by day there has been very little effort that has been done to find our lost mobile phone. This paper "Sniffer for Mobile Phones" proposes a method for solving this problem .The IMEI number embedded in the mobile phone that has been used for blocking calls it effectively used for the purpose of detection. The Sniffer is basically a transceiver that works in the different frequency. The sniffer device has to be designed precisely and size has to be reduced for easy mobility for the purpose of detections.

**1.1 About IMEI:**

The GSM MoU's IMEI (International Mobile Equipment Identity) numbering system is a 15 digit unique code that is used to identify the GSM/DCS/PCS

phone. When a phone is switched on, this unique IMEI number is transmitted and checked against data base of black listed or grey listed phones in the networks of EIR (Equipment ID Register). This EIR finds out if the phone can log onto the network to make and receive calls. To know the IMEI number the code \*#06# has to be pressed, the number will be displayed in the LCD screen it is unique number in every mobile phone. If the EIR and IMEI number matches, the network can do a number of things .For example grey list or black list a phone-

1. Grey listing will allow the phone to be used, but it can be tracked to see who is using it (via the SIM information).
2. Black listing will black list the phone from being used on any network where there is an EIR match.

**2. SNIFFER DESIGNING:**

As earlier stated about this proposal that it is about the detection mobile phone which get lost and for this we design a new device called the Sniffer. The Sniffer device can also be called as a mobile base station that has the following important components.

1. Sniffer (mobile) base station
2. Design of unidirectional antenna

### 3. Software for the tracking

#### 2.1 Sniffer Base Station:

The sniffer is a small base station, which includes transceiver section. It should operate at a frequency that is very much different from the frequency of the current cell using that is in which the operation of detection is being carried out. Some of the main important of the frequency is that it has to be generated by the transceiver section is around 900MHz range which is a VHF range and it is necessary to design the oscillator circuit for that frequency range. Another important feature is the cooling that has to be provided to the circuit while designing the circuit which is to be operated at 900MHz frequency range. Hence proper design of base station must be done in the design of sniffer. Mobile phones as well as the base station that has low power transmitter is also transmitting at low power. The transmitter of the sniffer should be a low power transmitter. This helps in the process of reducing the interference of the other devices that are in the other cells.

#### 2.2 Design of Unidirectional Antenna:

Though the transceiver in a sniffer plays a very important role in the detection of the mobile phone but however it is the directional antenna that has a major role in the designing of the transmitter. The directional antenna plays the role of eyes for the sniffer in order to detect the lost mobile phones. Hence the proper design of the directional antenna is necessary. Antenna is a device which works at different frequencies range for transmitting or receiving the signal containing data.

In general, antennas transmit power that depend on lobe pattern which is different from one antenna to the other antenna. The lobe pattern is a two dimensional diagrams which is used to show radiation pattern. Radiation pattern of directional antenna is given in fig.

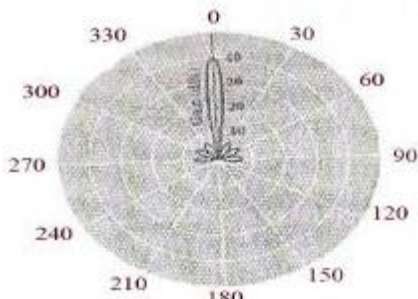


Fig Unidirection Antenna Radiation Pattern

In addition to all this it is important that the transmitter must be a low power transmitter. The Gain and directivity are intimately related with antennas. The directivity of any antenna is actually a statement of how the RF energy is focused with one or two directions. Because the amount of RF energy remains the constant,

but is distributed over lesser area, the apparent signal strength is higher. This apparent increase in strength of signal is called as the antenna gain. This antenna gain is measured in decibels over a dipole ( $\text{dB}_d$ ) or a theoretical construct called as a Isotropic radiator ( $\text{dB}_i$ ). The isotropic radiator is a spherical source of signal that radiates equally well in every directions. One way to observe the Omni directional pattern is that it is a slice taken horizontally through the three sphere of three dimensional. The graphical representation of Radiation pattern of the unidirectional antennas is shown in figure. The spherical co-ordination system contains three main components for the pattern representation and components are  $(R, \theta, \phi)$ . The shape of this radiation system is independent of  $R$ , as long  $R$  is chosen to be sufficiently large and too much greater than the wavelength as the largest dimension of the antenna. The magnitude of the field strength in any direction is different as it inverse with  $R$ . A complete radiation pattern needs representations of three dimensions. The other factors that are to be considered into account during the development of the antenna for the sniffer must be the gain and the directivity of antenna. As these features have a greater effect during designing of antenna. The gain of the antenna is defined as the ability of the antenna to generate the power in a specified direction. The power radiated per unit area in any direction is represented by the Pointing vector and is equals to

$$E_2/2 \text{ W/m}^2$$

The average power which gets radiated is given as

$$\Phi_{\text{avg}} = W/4\pi \text{ (watts per Ste radian)}$$

The Directivity of the antenna is actually the direction in which there is maximum gain of the radiation that is being radiated, the gain of the antenna is represented as a function of the angles. The value of directivity is same for a specified direction. In addition to the directivity and the gain of the antenna the other important factor that has to be taken into consideration is the power that is being generated by the antenna. The sum of power is given as  $W$  and is the summation of the generated power and the ohmic loss of the antenna. Here the  $W_1$  represents the losses of the antenna in ohm.

$$W_t = W_r + W_1$$

The power gain of the antenna is represented as

$$G_p = 4\pi/w_s t$$

The ratio of power to the directivity is given as a measure of efficiency of the antenna

$$G_p/g_d = W_r/(W_r + W_1)$$

The power radiated by the antenna must be properly designed as this causes more penetration of the electromagnetic radiation and thus it may have some effect in the cells near to it. The effective area of the antenna is another important factor that is mainly used

in the receiving antenna and it may be considered as the effective aperture or capture area and is connected to the directive gain of the antenna through the relation  $A = g_d \lambda^2 / 4$ . Since the sniffer device that is constructed is a device that has both the transmitting antenna and the receiving antenna. Effective gain has to be taken into consideration and this shows the ability of the antenna to capture the signal that the lost mobile is doing transmission.

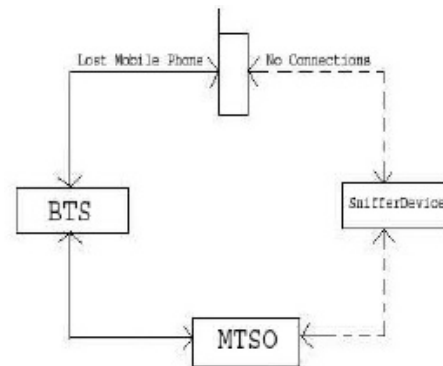
### 3. SOFTWARE FOR TRACKING:

The software part plays a important role in the tracking of the phone which get lost It is the base for the antenna to track the mobile which is lost the important feature of this software is that it helps in the process of creation of the data base and this is generally done using a Random Access Memory. The mobile phone that is lost has certain IMEI number that is embedded in the chip into it This RAM of the sniffer device stores the IMEI number of the lost mobile phone into it. Thus this acts as a Data base or the directory of the mobile phone which is lost. The software that is to be designed in such a way that the software has the input as the IMEI number of the lost mobile phone from the RAM and this ID done using the SQL query that takes the IMEI number. After getting the input of the lost mobile phones IMEI number it sees the comport for fetching the information if it obtains any signalling information from the lost device that might respond to the signal sent by the sniffer to get the response. The programming is done with C or Java language. However the C language is most preferred as it is easily embedded within the chips. With V B the front end is designed. The oracle SQL is the back end as it supports in retrieving the input data from the RAM with the help of query. But however the sample program that we have designed does not utilize the oracle it takes the input directly from the keyboard and this is an example and a dummy program that has been generated that helps in the understanding of how the device might work.

#### 3.1 Working of Sniffer:

The sniffer is basically a transceiver that works in the frequency which is operated in the special unused range by the service provided or it can be designed to operate at a frequency that is of much different frequency than the one that is being used by the nearby devices as there may be possibility of interference by the device with the devices in the nearby cells. The working for the device is as follows. The fig 2 &3 describes the working of the sniffer; as given in the fig2 it shows the normal operation of the mobile with the base station and there is a BTS that plays role of a middle man in the process of communication between the mobile and the MTSO which is popularly called as MSC or Mobile Switching Centre. There is always a two way communication

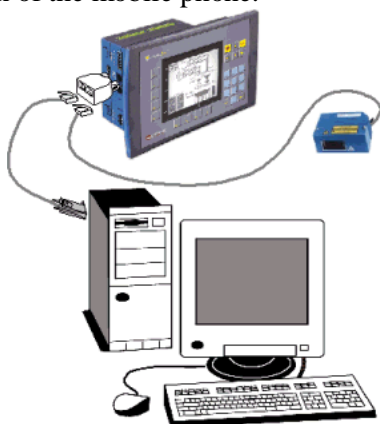
between devices used and just before the establishment of the communication the authentication of the SIM card which has the IMSI or the International Mobile Subscriber Identifier .This IMSI number supports in the authorization of the user which uses the device. The second authentication is the authentication of the handset, which is in EIR or the Equipment Identifier Register. This register is located at the MSC and it has the IMEI number of the lost handset and whether the signal is obtained from the normal one then the two way communication is obtained. The IMEI of the mobile phone which is lost the number once has been reported to the service provider, who keeps in track of the record of lost phones. The MTSO or the MSC which stays in track of all the mobile phones with IMEI number and the IMSI number contains the information of the lost mobile phones location which means the location of the cell where the lost device Is obtained because of the two way communication with the device the BTS of the lost device is obtained to MSC. From this information regarding the cell in which the device is located the sniffer device is established.



**Fig: 1The initial connection between the cellular network and lost mobile phone**

The next figure or the fig 2 represents the sniffer that gets into work for the role of detection of the device lost. After the information regarding the IMEI number of the lost device is taken by the MTSO or MSC .This is then given into the sniffers main memory the sniffer's located in particular cell gets into active state of detecting the lost device. The sniffer utilises a frequency which is different from the one that is being utilised by the base station and the located nearby cell. The base station discontinues the connection with the lost mobile phone, as there is a request regarding this action from the EIR part of the MSC. This causes the lost device to look for the BTS to get locked with since each base station does nothave authorization responsibility the lost devices end appropriate connection signal request. Now when the sniffer device is when deployed and this device has in built authorization capability the lost device search the sniffer to get itself locked to the sniffer frequency. While

the connection between the sniffer and the mobile phone is obtained; the IMEI of the lost mobile validated with the stored IMEI and after successful authorization the communication is set between the sniffer and the lost device is obtained. If the other devices is in the same try to set communication with the sniffer the access is denied and this is done at the validation based on the IME. Once the communication starts it is mainly with the antenna and the strength of signal of the device lost the location can be tracked. However the process of searching can also be done with the GPS system for more accurate and fast detection. The main necessity is that the sniffer is operated at a frequency that is different from the frequency adopted by the cell and nearby ones. Hence the interference from the nearby cell can be restricted. The directional antenna is used in searching the location of the mobile phone.

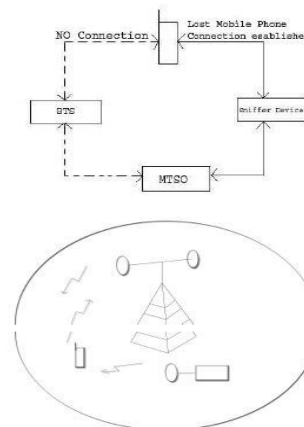


**Fig: 2 Connection of the sniffer device**

The sniffer shown in figure helps to communicate with the mobile which is lost. After getting connected with the mobile it develops a virtual cell pattern and thus helps in the detection of mobile phones which is lost. Here the signal strength of the received signal is obtained by the antenna pattern which is plotted once the signal of the mobile is obtained. The number of antenna pattern for different position of same mobile phone is used to search the exact location. But however in this process the directional antenna utilised much be of a very small beam width this supports in more accurate method of detection.

#### 4. CONCLUSION:

Since the boom of the mobile phone for the purpose of the communication there has been a large numbers of complaints with the mobile phone that is being lost and there has been no effective phenomenon developed for detecting the device lost. The given paper dealt about the development idea “Sniffer for the detection of Mobile phones lost” paves a way through which the lost mobile phones can be found. But the method of detection is yet to be developed through the software and demo has been introduced and is with the authors.



**Fig: Sniffer communicating**

The demo has been written in VB that gives the overall view of how the lost mobile is being inspected and the software has been written in C language. The SQL has to be utilised for the purpose of querying and the internal architecture is of lesser complexity compared with the base station as it mainly considers the control signal and there is no need for the process of voice. The design involved the following:

Design of the sniffer base station design of unidirectional antenna and development of software for tracking. Though this process appears to be a little bit complicated involving the design of the sniffer but however for large scale detection the overall effective cost for the design and the detection scales down. There are certain limitations or criteria that have to be considered for the detection of the lost mobile like the power of the mobile should be good enough, the mobile phone should not be in the region which is shadow etc., but all though this method can be modified by utilizing modern technologies and devices.

#### 5. REFERENCES:

1. Asrodia, P. & Patel, H. (2012). Network Traffic Analysis Using Packet Sniffer International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 www.ijera.com (Vol. 2, 3, pp.854-856)
2. Flor, N.V. & Guillory, K. (2011). Technology Corner: Internet Packet Sniffers Journal of Digital Forensics, Security and Law, Vol. 6(1).
3. Azeem Ush Shah Khan, Mohammed Naved Qureshi, Mohammed Abdul Quadeer, Anti-Theft Application for android devices, 978-4799-2527-8/2014IEEE
4. S. Satya Sri Ambica, P. Padma Priya, Dr.N.Srinivasu, “Sniffer Technology to Detect Lost Mobile”, International Journal of Engineering Trends & Technology, volume 4, issue4 –April 2013.