

MOBILE PHONE HARMNESS RADIATION CALCULATOR

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Abstract—In this paper initiate a creating awareness among the frequent mobile user. Mobile phones growth has been increasing day by day in the running world. The mobile phone usage is enormous in the world even a child having a mobile phone in his hand. While considering the radiation of the mobile phone it is very harmful for human being depending upon the different ages of people. To give some solution to reduce the mobile phone radiation and protect our self from the radiation. This paper implemented in embedded system and SAR shield to reduce the radiation exposure of the mobile phone. To give the comparison between the radiation exposure of different mobile phone in different network modes like 1G, 2G, 3G and penetration of radiation in different age people and their respective weight and how to reduce the exposure using the SAR shield. It is applicable for mobile shop whenever the customer buys the mobile phone seller should check the radiation exposure in front of customer without using SAR shield and also check the radiation exposure with SAR shield to customer know the effects of mobile phone radiation.

Keywords—Mobile phone Radiation, SAR shield, Radiation exposure of different mobiles.

1. INTRODUCTION

Mobile phone uses electromagnetic radiation in the form of microwave range. Other digital wireless systems, such as data communication networks, produce similar radiation. In 2013, International Agency for Research on Cancer (IARC) classified mobile phone radiation could be some risk of carcinogenicity, so additional research into the long-term, heavy use of mobile phones needs to be conducted. RF radiation causes the cancer to the human being after long time but it'll affect in the future.

Our project mainly based on creating awareness to the people about the effects of mobile phone radiation. In India most of them using low cost mobile phones. These mobile phones are producing more radiation which is injurious to our human health. Before buying a mobile phone we see the all the features of mobile phone but no one see the radiation level of that mobile phone. Our project will indicate the level of mobile phone radiation that means high, medium or low. In mobile phone centers the sellers should check the mobile phone radiation level in front of customers. This will be helpful to create the awareness to the people and they will definitely take it as a feature then they buy low radiation mobile phones.

Jenvey,S.[1] presents a survey of Measurements have been taken of the electromagnetic field distribution around a mobilephone which was transmitting CW at 890 MHz The measurements were taken using a mobilephone with a short monopole antenna and were then repeated with a reflector (that is supposed to protect the head from radiation) interposed between the head and the radiating antenna. Measurements of field magnitude and phase were made so that animations of the propagating fields could be observed. Comparisons of

the field distributions and conclusions recording the effectiveness of the reflector could then be made.

LiMa[2] proposed to Nowadays, many large examinations need to use mobilephone shielding devices. Many students and parents feel concern about the electromagnetic radiation effect of mobilephone shielding devices. This paper considers the comprehensive effect of mobilephone from the electromagnetic radiation intensity, the main radiation direction and the distance with the radiation source. This paper designs the exam electromagnetic radiation prediction system of mobilephone shielding devices. By comparing the calculating results of prediction system with the real measuring results, the effectiveness of the prediction system can be verified. The electromagnetic radiation effect of mobilephone shielding devices is analyzed quantitatively according to the china electromagnetic.

LiYang[3] presents the harm of mobilephoneradiation to human body is usually divided into two effects which are respectively thermal effect and non-thermal effect. It is evident that the great mass of papers are based on the SAR (Specific Absorption Rate) to investigate all kinds of SAR values including the theoretical and simulated results, using different electromagnetic calculation methods in which FDTD is most popular. The theoretical calculations of SAR make us understand that how the electromagnetic energy from the mobilephoneradiation distributes in the human head, but it is hard to validate the authenticity by the way of experiments. If electromagnetism radiation in the microwave frequencies is the same as the ionizing radiation to affect the DNA, result in rupture of the chemical bonds and conduce to the DNA damage, the mobilephoneradiation causing cancer will make theory

become reality based on the hypothesis about gene mutation inducing cancer. Thus it can be seen that these problems are needed to have more deep studies from the micro cosmic domain.

Mat.D.[4] presents the Mobilephones produce radio frequency signal that is transferred as Electromagnetic radiation (EMR). EMR has the ability to penetrate through semi solid substances especially human body's tissues and caused dielectric heating. This effect can be classified as thermal and non-thermal radiation. The skin near ear skull region is very thin compare to other part of human body. When using mobilephone for a longer period of time, this area absorbs EMR easily that can affects human immune systems. This effect resulted the increased of temperature near the ear skull region. Experimental study was conducted by using a volunteer to examine the effect of EMR produced by two different mobilephones with serving frequency of 900MHz and 1800MHz. This study was done in a laboratory for average of 45 minutes of talking time. Data is collected every 5 minutes using thermal imaging camera and thermal couples' probes. It is shown that temperature near the ear-skull region increased rapidly at the average of 2-4°C differences compare to before the used of mobilephone. When using adds in tools, the temperature rose more gradually and minimally. It is proven that the EMR would not cause any adverse effect towards human health such as cancer or tumor.

Mat.D.A.A.[5] presents Electromagnetic radiation produce by mobilephone and the relationship with the human's health is not a new issue nowadays. Since the used of mobilephone had increased rapidly over the past few years, people are becoming more concern with their health when dealing with the so-called electromagnetic radiation. This type of radiation would leads to heating of body tissue at specific rate called the thermal radiation. Thermal radiation depends on the frequency of the energy, the power density of the radio frequency field that strikes the body and the polarization of wave. This paper will discuss on the result collected from the thermal radiation generated by handheld mobilephone with frequency of 900 MHz towards adult human head. The analysis is conducted in a laboratory with average of 45 minutes talking hour with two different types of mobilephone, internal and external antenna. The results show an increase of heat especially at the place near the ear skull after 45 minutes of operation. When comparing both different types of mobilephone, mobilephone with external antenna produce more heat compared to mobile phone with internal antenna.

Rajan,S.P.[6] presents As mobile phones have become more essential and necessary handheld devices in present world generation. Because of the cost reduction and simplicity of mobile phones, the number of mobile users, particularly children, increases drastically within few years. But the effect of mobile Electro Magnetic (EM) radiation on children is more

severe than adults. This paper investigates a method to limit radiation of mobile antenna using impedance matching technique by varying the length of antenna. We make use of simulation tool called Advanced Design System (ADS). The characteristics of impedance of antenna placed inside the TEM (Transverse Electromagnetic) cell are measured

Seker,S.S.[7] presents It is important to be able to quantify both the absorption of electromagnetic energy in the human body and the resulting thermal effect. In this study, the specific absorption rate (SAR) of electromagnetic radiation from mobilephones on the human head was investigated. As it is not possible to perform the experiments on human in vivo, the human head and the antenna radiated in 900 MHz were simulated. In this study, the spherical model as single layer and three layers was simulated by using Agilent High Frequency Structure Simulator, which employs the finite element method (FEM), and the EM power absorption rate of tissue was calculated by a C++ program. The results were compared with the results of the studies in the literature and a good agreement was obtained. To evaluate the efficiency of the method, a rat head was simulated and the results were compared with the experimental results obtained from the in vivo experiments conducted on the rats.

ShaonanYan[8] presents the radiated emission of the mobile phone is a very important EMC evaluating performance. In this paper a method and a setup to measure the radiated emission of the handset and its accessories according to related standards have been presented. Moreover, we introduce the test results of the popular mobile phone. Aiming at the excess radiated emission from a developing handset, we analyzed and found the source of that by means of measurements and other EMC diagnostic technologies, and eventually we put forward the method of controlling the radiated emission.

Shalatonin,V.I.[9] presents It is shown that an impact of the weak EM radiation on people leads supposedly to the next sequence of events: EM radiation rear modulation of an organism biological EM field rear accumulation of energy and information in human body fluids rare change of the functional activity of cells and organism rear disease. A phenomenon of accumulation of mobilephoneradiation in distilled water has been studied experimentally.

This paper mainly focused on harmfulbio effects of mobilephoneradiation. In this study, we calculate the SAR in human head under electromagnetic radiation with a simplified model of the human head and the mobilephone antenna based on FDTD algorithm. We then analyze the influence of the frequency of mobilephones and the distance between the antenna and the human head. Our conclusion is that higher frequency and longer distance can possibly reduce danger.

B.BLOCK DIAGRAM:

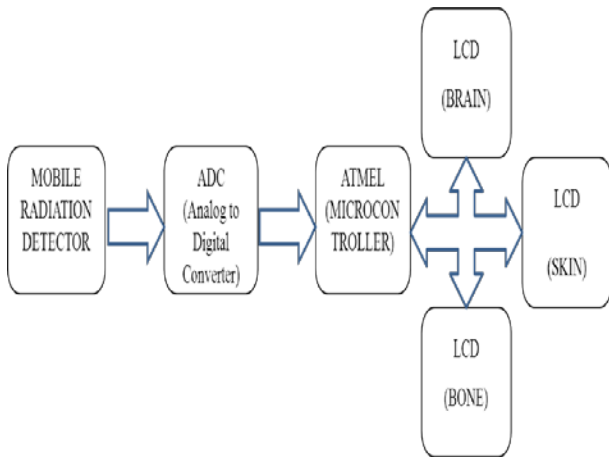


Fig.1.block diagram of mobile phone radiation calculator

C.DESCRPTION

RADIATION DETECTOR CIRCUIT:

The transmission frequency of a mobile phone ranges from 0.9GHz to 3GHz.This circuit able to catch this signal. Here using capacitor and inductor it act as a loop antenna.it will help detecting the radiation by using antenna.ADC CONVERTOR (Analog to Digital):

The output of the radiation detector circuit is analog value but microcontroller only process the digital value because of that we convert the analog into the digital before we given to the microcontroller.

MICROCONTROLLER (AT80C51):

This is an ATMEL family Microcontroller. The digital value from the ADC convertor is given to the Microcontroller. We already programmed the process of Microcontroller have to do and it will produce the output according to the program.

LCD DISPLAY AND LED'S:

This LCD display is interfaced with the Microcontroller. This will shows the value in terms of GHZ(Giga Hertz).We used three LED'S this indicate the radiation level is high, medium or low.

8051 MICROCONTROLLER:

8051 is a fast compatible microcontroller with a redesigned processor core without wasted clock and

memory cycles. Typically, the instruction executing time of 8051 is 1.5 to 3 times faster than that of traditional 8051, depending on the type of instruction. In general, the overall performance is about 2.5 times better than the original for the same crystal speed. Consequently, it is a fully static CMOS design; it can also be operated at a lower crystal clock. It contains In-System Programmable (ISP) 128 KB bank-addressed Flash EPROM; 4KB auxiliary Flash EPROM for loader program; on-chip 1 KB MOVX SRAM; 6-ch PWM outputs; power saving modes. This product is proper to use in plate display application with cost effectiveness.

FEATURES:

- 8-bit CMOS microcontroller
- High speed architecture of 4 clocks/machine cycle
- Pin and instruction-set compatible with standard 80C52
- Dual 64KB In-System Programmable Flash EPROM banks (APFlash0 and APFlash1)
- 4KB Auxiliary Flash EPROM for loader program (LD Flash)
- 256 bytes scratch-pad RAM 1 KB on-chip SRAM for MOVX instruction.
- Four 8-bit I/O Ports; Port 0 has internal pull up resistors enabled by software
- Three 16-bit Timers
- 7 interrupt sources with two levels of priority
- On-chip oscillator and clock circuitry
- One enhanced full duplex serial port
- One extra 4-bit I/O port, chip select
- Programmable Watchdog Timer
- 6 channels of 8 bit PWM
- Software Reset
- Software programmable access cycle to external RAM/peripherals
- Code protection

D.RESULT AND DISCUSSION:

These results show that radiation emerged in different parts in human body. The absorption rate found in skin, bone, brain etc., to take the calculation among the different parts by using with shield and without shield. The result is below.

- $SAR = \frac{\sigma \cdot E^2}{P}$
- σ = Conductivity of biological material
- E = Electric field strength of radiation in voltage
- P = Weight of a person

TAB1:ELECTRIC FIELD STRENGTH

MATERIAL	θ	P(WEIGHT OF A PERSON IN KG)	ELECTRIC FIELD STRENGTH(VOLT)
Skin	0.7	10-70	0.34-0.40
Bone	0.17	10-70	0.34-0.40
Brain	1.1	10-70	0.34-0.40
After using the RF shield	0.0016	10-70	0.34-0.40

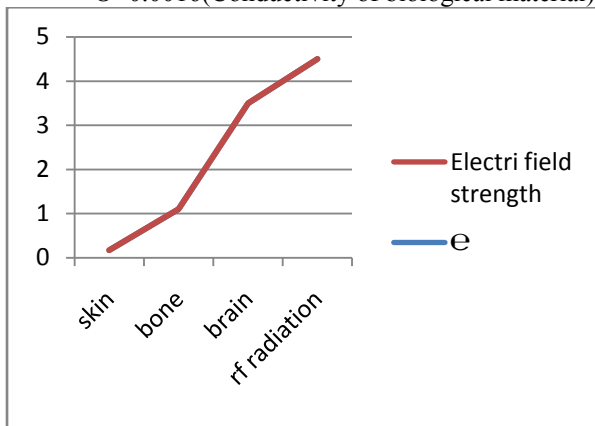
EXAMBLE FOR BRAIN:

BEFORE USING SHIELD:

- $\theta=1.1$ (Conductivity of biological material)
- $E=0.34$ (Electric field strength of radiation in voltage)
- $P=10-70$ kg(Weight of a person)

AFTER USING SHILED:

- $\theta=0.0016$ (Conductivity of biological material)



Age	SAR value (w/gram)	Effects
6 to 13	4.23	DNA changes in the human body.
14 to 21	2.5	Reduce the white cells in the blood.
>35	1.8	Causes the cancer after long time.

Table.3 Age limit based SAR value calculation

CONCLUSION:

Fig.2 graph for electric field strength

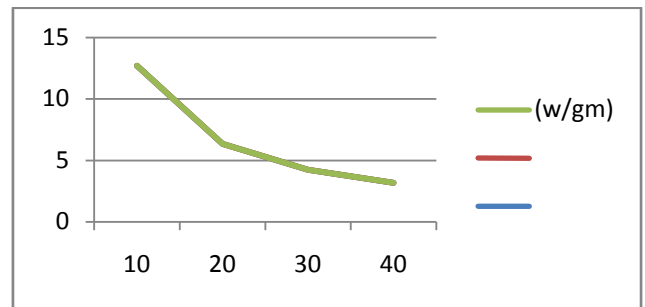


Fig.3(a) Absorption rate without SAR field

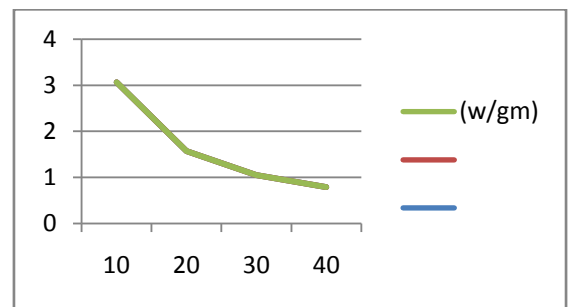


Fig.3(b) Absorption rate with SAR field

AGE LIMIT BASED SAR VALUE CALCULATIONS:

AGES	SAR VALUES (w/gram)	EFFECTS
0 to 6	12.7	Affects the brain cells. Reduce the memory capability.

It is concluded that using SAR the radiation shield to reduce the effects of radiation and penetration to the human body in different parts like bone, brain, skin. To avoid such kind of Defective know the effects of radiation and avoid the over frequently using long time of usage of mobile phones for unknown purpose. Protect ourselves from the radiation.

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