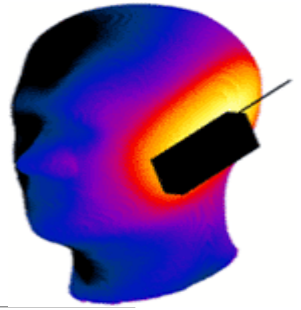


- Specific absorption rate for frequency range used in GSM 900 and GSM 1800 MHz



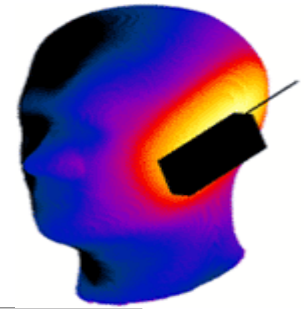
Glara Fuad Hasan

Abstract

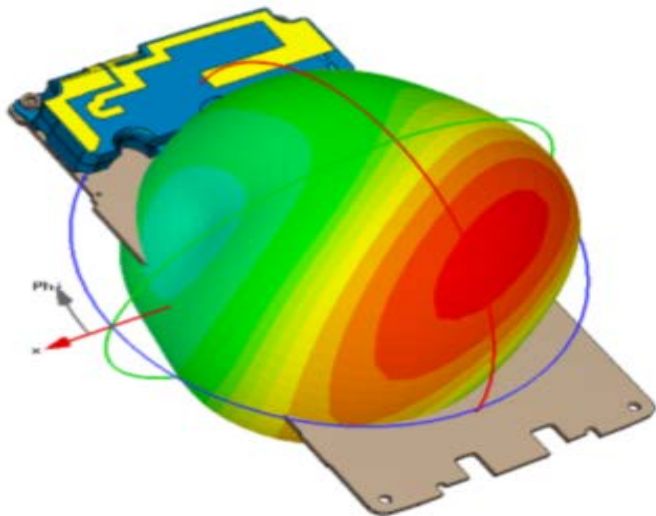


Investigation a specific absorption rate (SAR) on human exposure from range frequency wireless communication, electrical conductivity on the SAR values calculated by MATLAB program code for the eye, brain and nerve tissues exposed to RF fields for of the mobile operators, for the general public and occupational workers of frequency ranges covered in 900 to 1800 MHz for mobile operators.

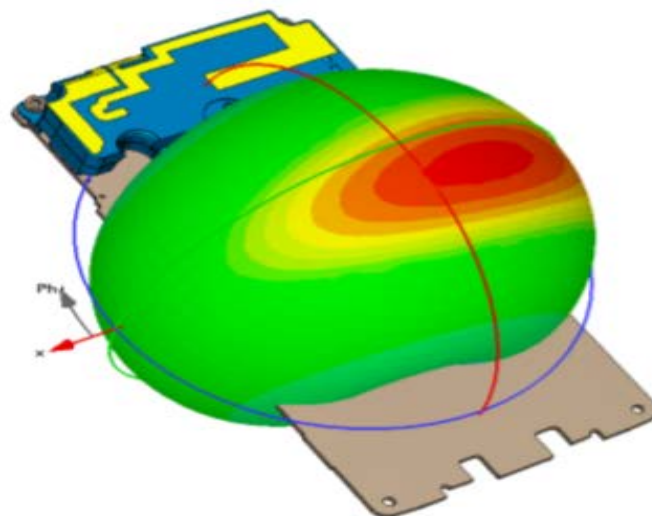
Two main standards:



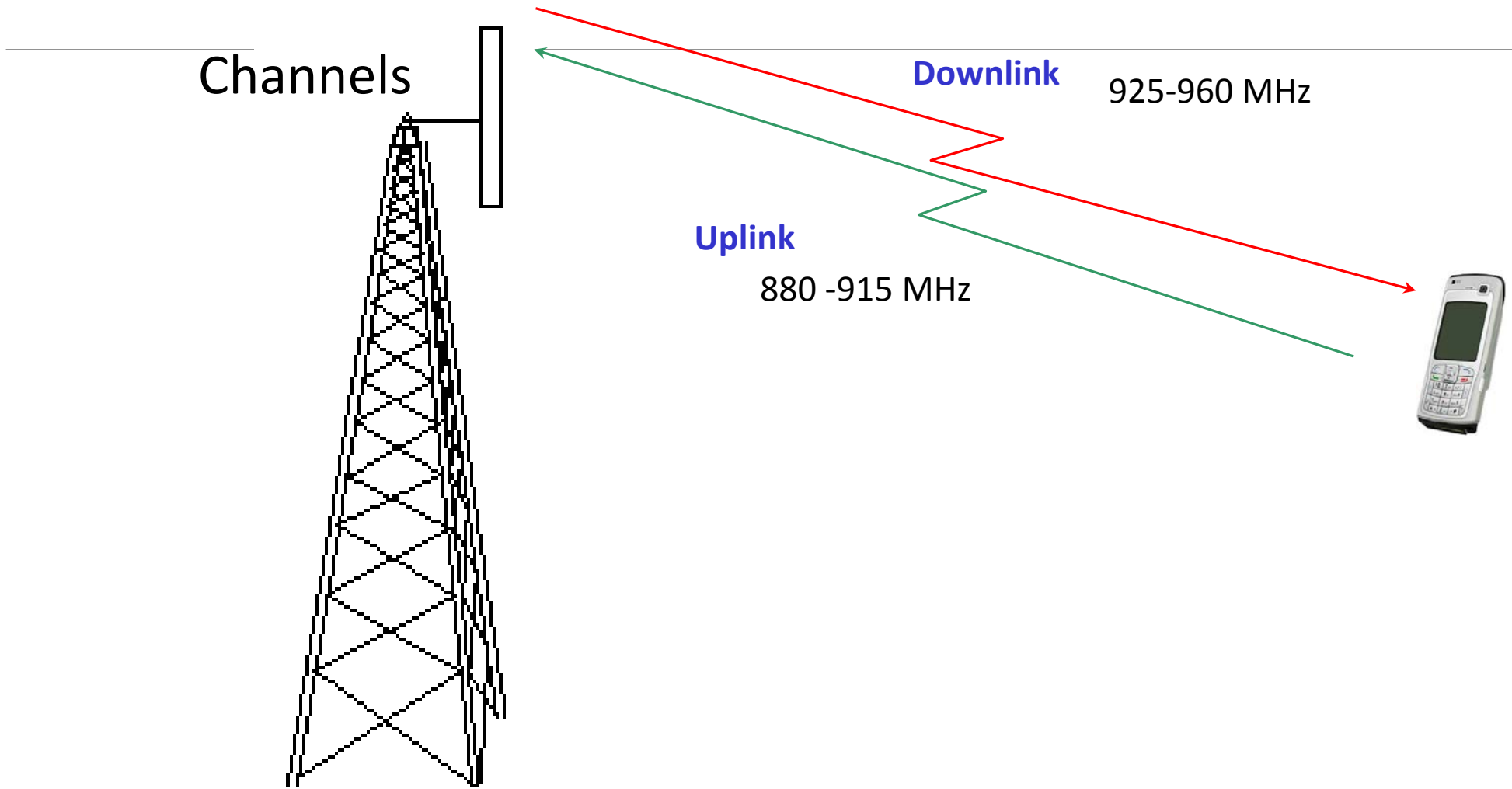
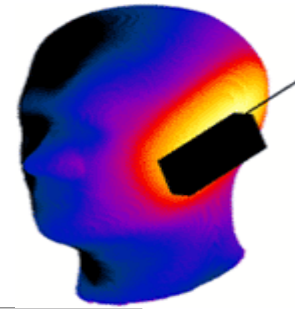
900 MHz



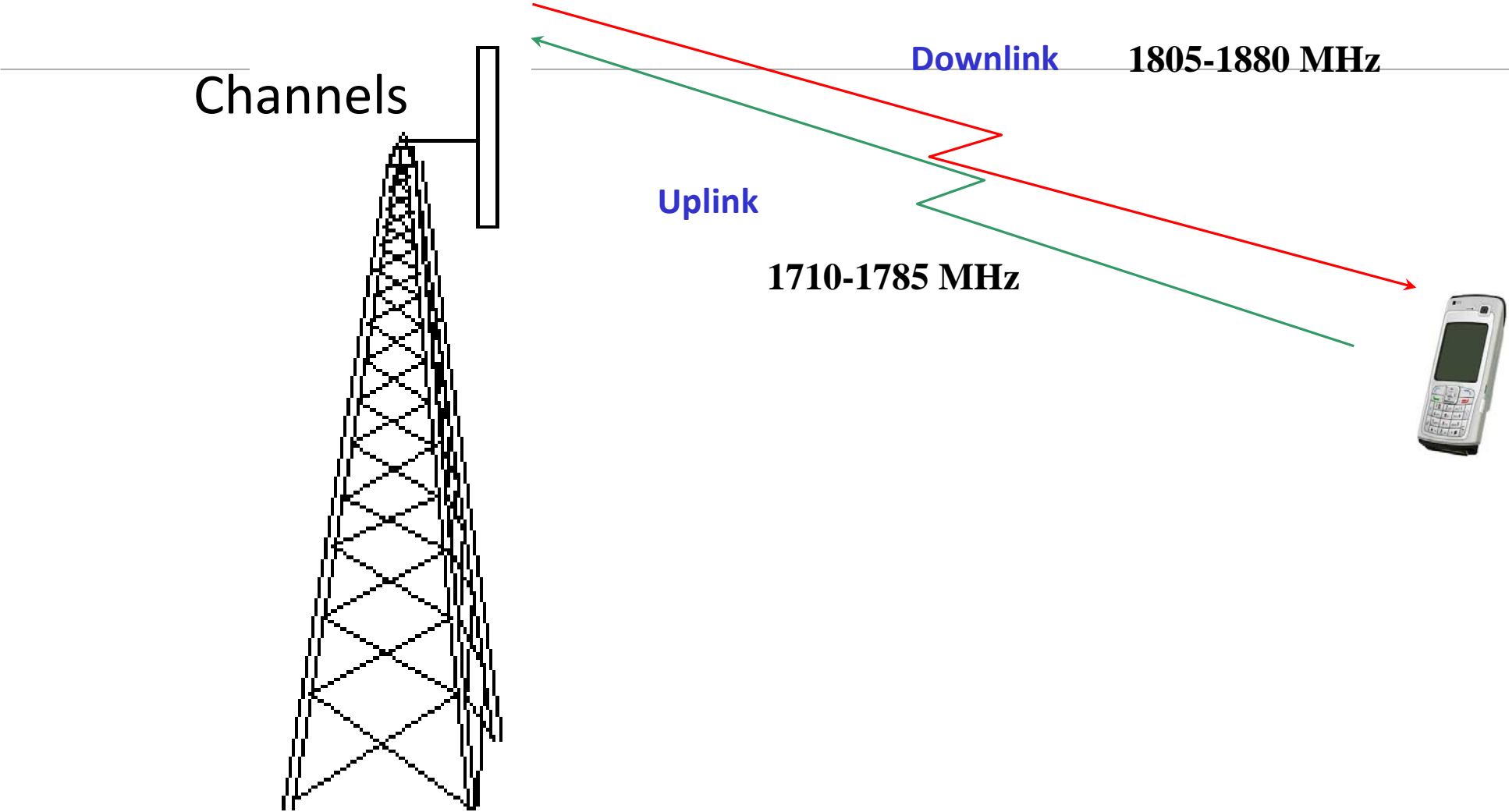
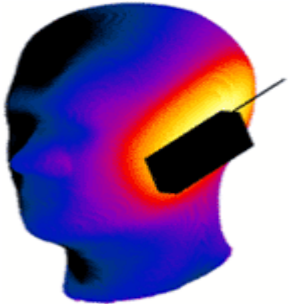
1800 MHz



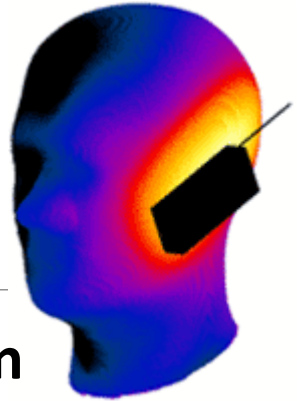
GSM 900 MHz Channels



GSM 1800 MHz Channels



Specific Absorption Rate SAR



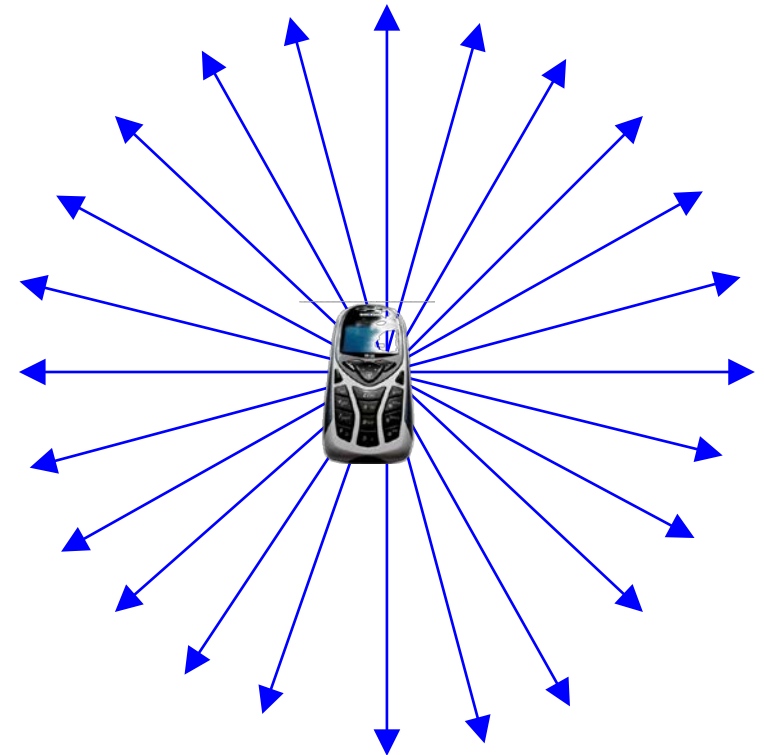
SAR is a parameter to measure the rate of absorption of energy by the human body when it is exposed to a RF Electromagnetic .

$$\text{SAR} = \frac{\sigma E_i^2}{\rho}$$

Electrical Conductivity (s/m)

Electrical Field (v/m)

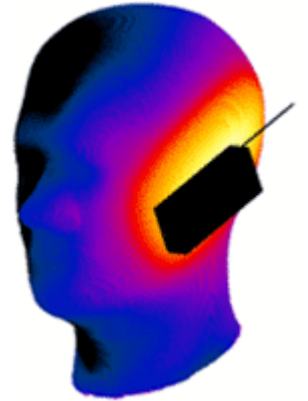
Material Dencity (Kg/m3)



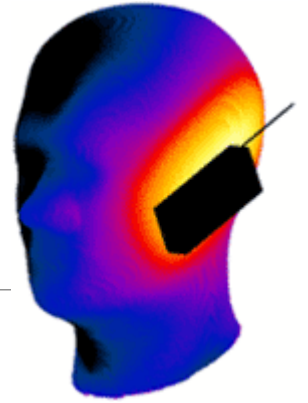
We calculations SAR, using the Matlab code, at frequencies of 800 and 1900 MHz, and we have obtained the results shown in figures 1,2 and 3, respectively, for SAR values. At 900 MHz, we can observe lowest SAR value Moreover, a higher SAR is observed for the higher frequency is obtained at 1800 MHz .

To study any difference in the energy absorption inside the nerve, brain and eyes depending on the electrical conductivity and frequency .we can see with increasing electrical conductivity and frequency increase SAR values, especially for frequency Up to 1500 MHz of mobile operator's higher SAR values.

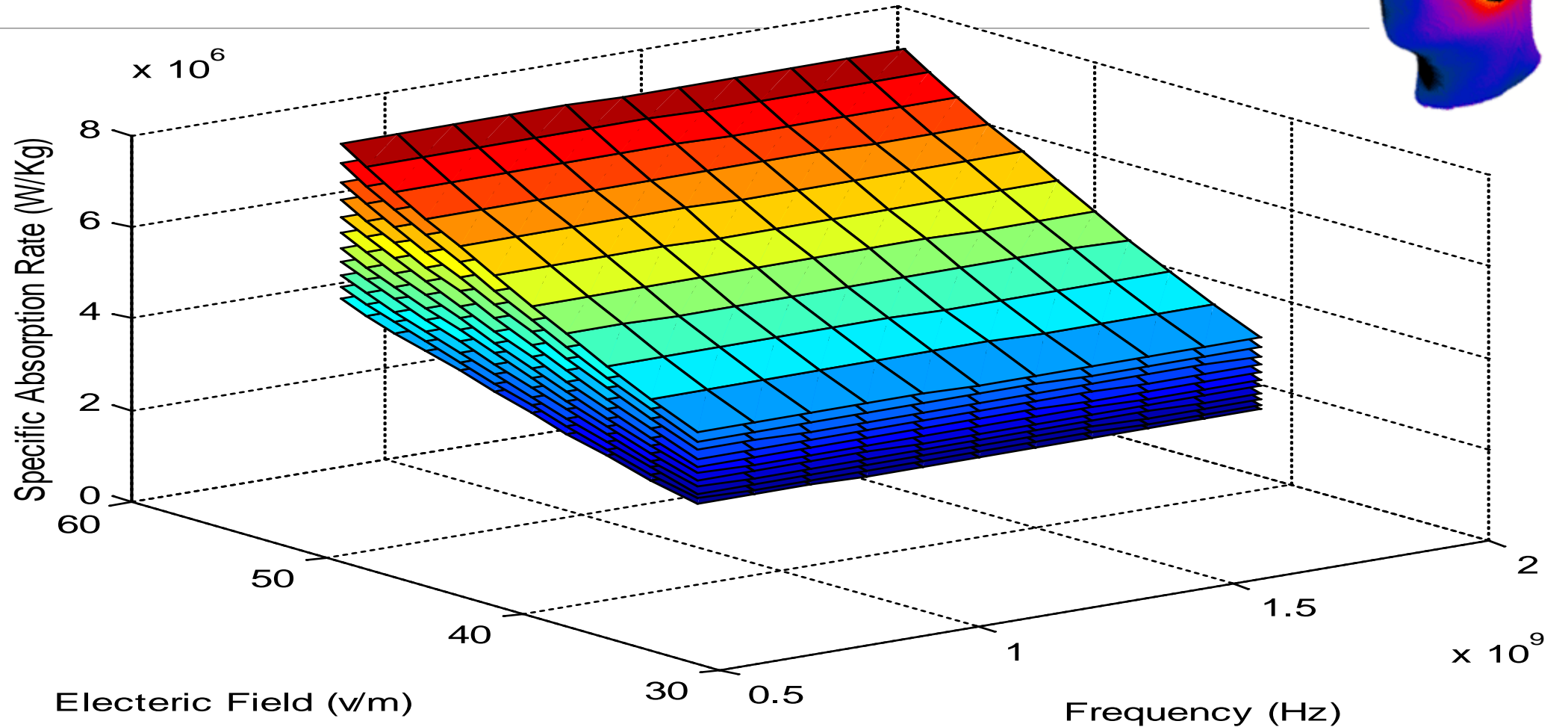
The SAR value should then depend mainly on the induced electric field produced from EMF. More specifically it (SAR) is proportional to the square of the intensity of the induced electric field and is inversely proportional to the square of distance from the source to the tissue element. Figures 1, 2 and 3 show the results for SAR, respectively for the general public and occupational workers. Fig. 1 shows the results obtained for the tissues nerve, Fig. 2 brain and Fig. 3 eye .



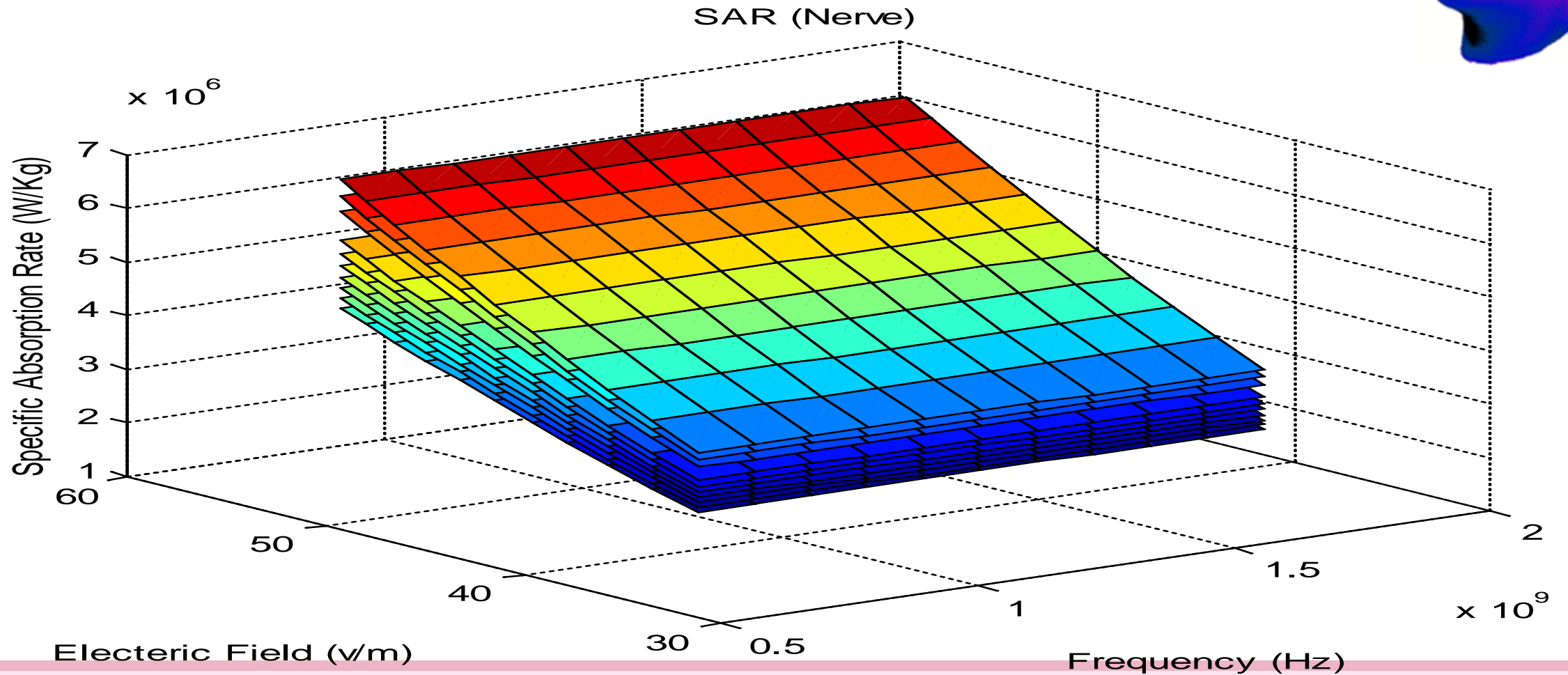
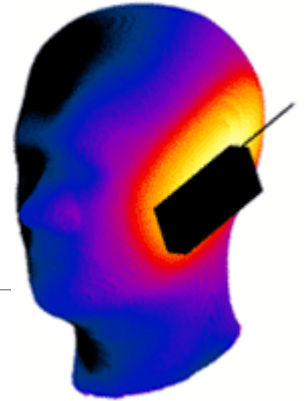
Specific Absorption Rate for Eye lens



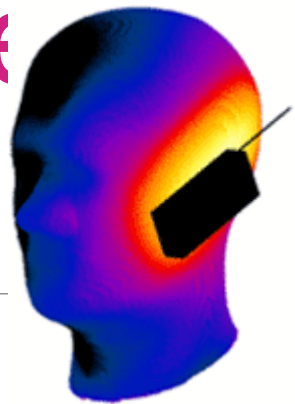
SAR for Eye (Lens)



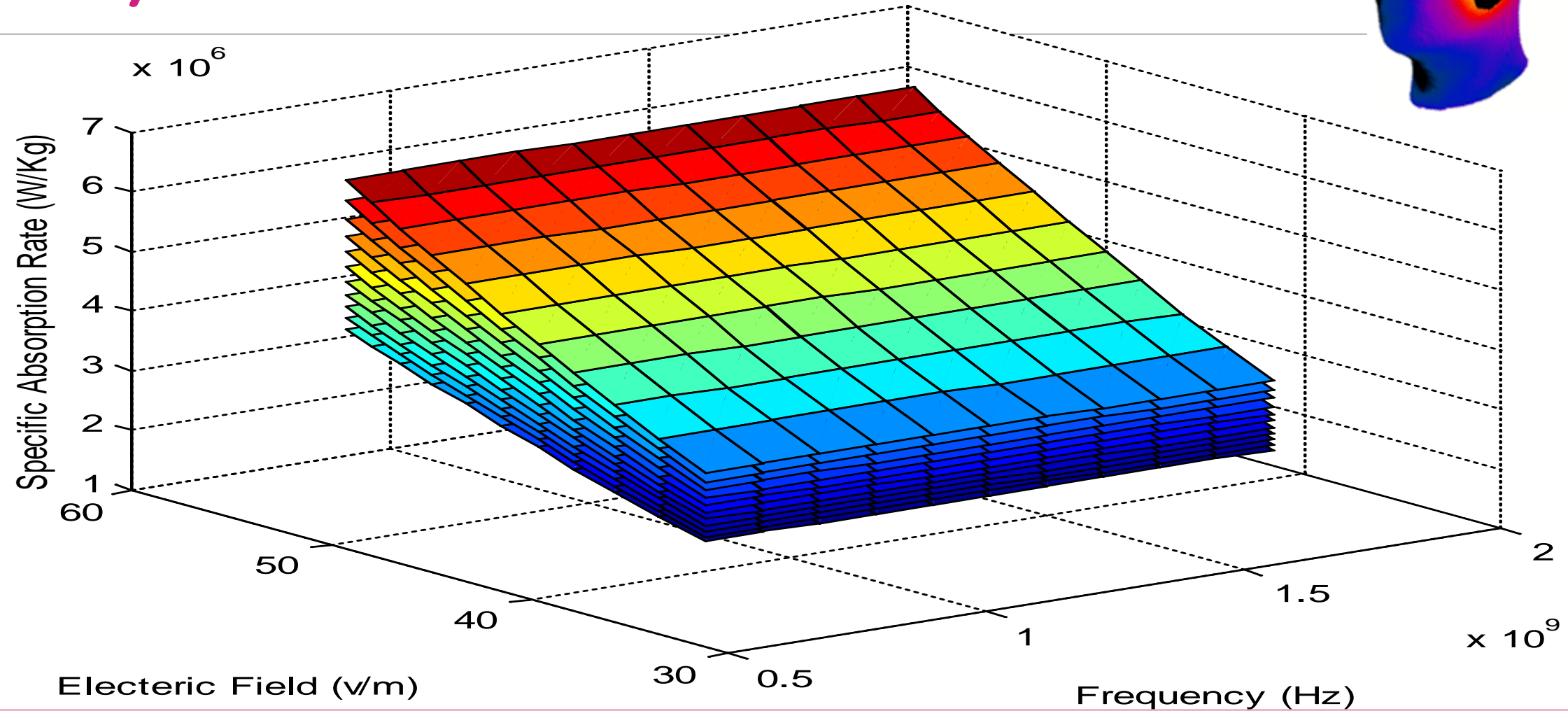
Specific Absorption Rate for Nerve



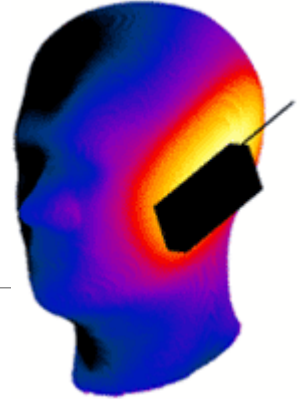
Specific Absorption Rate for Brain(white Matter)



SAR Brain (White Matter)



Conclusion



In this work SAR Calculate were done for specific absorption rate (SAR) and consequent rise of temperature in human tissues with increasing frequency. SAR values rise were calculated for the eye, nerve and brain tissues exposed to RF fields for of the mobile operators. Among the tissues, eyes showed the highest and brain the lowest SAR values.

Generally, the highest SAR values ($= 1.6 \text{ W/kg}$), still remaining within the FCC (Federal Communications Commission) and other safety limits ($= 1.6 \text{ W/kg}$). Up to 960 MHz of frequency the mobile operators. Up to 1500 MHz of frequency the mobile operators higher SAR values.

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