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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ANALYSIS OF POSSIBLE SOLUTIONS FOR PROBLEMS CAUSED WITH 5G COMMUNICATION FOR HUMAN HEALTH

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ABSTRACT:

- With the advancing technology, the popularity of wireless communication applications demanding bandwidth requiring data rates of the order of Gb/s, exploration of frequency spectrum such as millimetre wave has begun.
- Radiation can affect human health, short time health effects include, aches, pains and skin burns whereas long term effects may even lead to cancers and tumours. In our present study, it is proposed to find the feasible solutions that can be done to prevent radiation from smart devices to enter humans.
- A Faraday cage distributes that charge or radiation around the cage's exterior, it cancels out electric charges or radiation within the cage's interior.
- Lead shielding is a process where we use the characteristics of lead like density. Because of lead's density and large number of electrons, it is well suited to scatter electromagnetic radiation. We can develop this idea in making mobile cases.

INTRODUCTION:

- ✓ In telecommunications, 5G is the forthcoming revolution of mobile technology. This increases EMR that already exists.
- ✓ One method to reduce effect of radiation is Faraday cage. A Faraday cage is an enclosed space used to block EMF.
- ✓ Faraday cage protect the interior from outer EMR if the conductor is thick enough and holes are notably smaller than the wavelength of the radiation, the materials used to make Faraday cage are aluminium foil, copper.
- ✓ In Lead shielding method we use lead as a form of radiation guard to shield individuals or objects from radiation so as to reduce the effective impact.

ISSUES:

S. No	Health Effects	Problems Caused
1.	Neurological Effects	Brain Tumor, Alzheimer's, Cognitive Impairment, Sleep Disturbance.
2.	Cellular Effects	DNA Damage, Leukemia, skin cancer, Infertility, Toasted skin syndrome
3.	Well-being	Electromagnetic Sensitivity, Stress.

TECHNICAL APPROACHES:

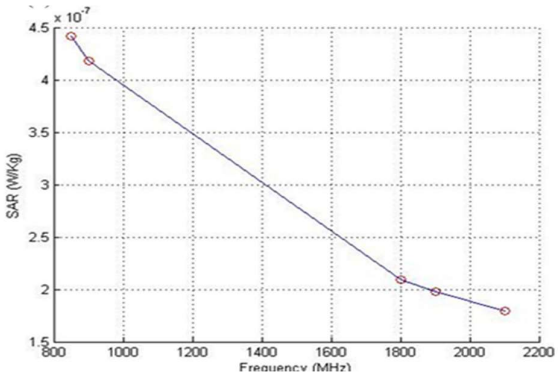
- ✓ In Lead shielding, we use Electroplating. It is the procedure of coating a metal with a thin coating of another metal by electrolysis. It prevents oxidation and improves corrosive resistance.
- ✓ Specific absorption rate is used as a measure of rate at which energy is absorbed per unit mass by a human body when exposed to radio frequency (RF)
- ✓ Skin Depth is depth until which current flows in a conductor. The skin depth can be calculated using the following formula:

$$\delta = \sqrt{\frac{2}{2 * \pi * f * \mu * \sigma}}$$

REQUIREMENTS:

- ✓ PC
- ✓ MATLAB SIMULATION SOFTWARE
- ✓ 5G network device

COMPARISION BETWEEN *SAR* & *FREQUENCY*



ELECTROMAGNETIC SHIELDING

FARADAY CAGE

CONCLUSION:

- ✓ Based on our analysis, we conclude that there are some fears running around 5G. In current development cycle 5G is essential to reach the data requirements in this era but should also ensure the health and safety of humans to ensure less impact of Electromagnetic radiation on humans.
- ✓ Faraday cage is one such technique where we try to improve conventional faraday cage based on the rule that the holes need to be no larger than 1/10 of the wavelength of the signal and trying to alter them based on the signal strength coming.
- ✓ Lead shielding which can be implemented by electroplating need to be studied further to find a feasible solution.

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