

UNIVERSITI TEKNOLOGI MARA

**RADIO FREQUENCY RADIATION AT
SATELLITE EARTH STATION AND THE
EFFECT TO OCCUPATIONAL WORKERS AND
GENERAL PUBLIC**

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ABSTRACT

This paper presents on Radio Frequency (RF) Radiation at Satellite Earth Station and the effect to occupational workers and members of the public. This research and measurement was requested by OSH Committee, Satellite Earth Station, Telekom Malaysia Berhad due to concern raised by their workers and member of the public about potential health hazard caused by the RF radiation emitted at Satellite Earth Station. This study shall produce the Radio Frequency radiation strength at Satellite Earth Station and the measurement will include the electric field strength, magnetic field strength and power density at determined locations at the Satellite Earth Station. In general, results of the research indicate that the radio frequency radiation present in the Satellite Earth Station were measurable but of very low levels. The research and measurement was carried at three (3) Telekom Malaysia Earth Stations which are Cyberjaya Satellite Earth Station, Kuantan Satellite Earth Station and Melaka Satellite Earth Station. The data measurements were taken from 17th November 2014 until 28th November 2014. The result of the measured radiations is evaluated based on the exposure limits and the recommendations set by Malaysian Communications and Multimedia Commission (MCMC) and International Commission on Non-Ionizing Radiation Protection (ICNIRP) for occupational workers and members of the public. At Cyberjaya Satellite Earth Station, the averaged Electric field for frequency from 3MHz – 18GHz measured over six minutes were found to fluctuate between 0.0856V/m to 5.7069V/m which the highest level that corresponds to about 9.36% from the MCMC exposure limit for public. As for Kuantan Satellite Earth Station, the averaged Electric field for frequency from 3MHz – 18GHz measured over six minutes were found to fluctuate between 0.0113V/m to 0.5769V/m with the highest level is 0.95% from MCMC exposure limit for public. Lastly, for Melaka Satellite Earth Station, the averaged Electric field for frequency from 3MHz – 18GHz measured over six minutes were found to fluctuate between 0.0161V/m to 0.6782V/m in which the highest level is 1.11% from MCMC exposure limit for public. Based on the evidences presented, the researcher is convinced that the health hazard is minimized and the radio frequency radiation at Satellite Earth Station has no adverse effect to the health, and the claim done by workers and member of the public at the Satellite Earth Station is unfounded and baseless.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

For the past few years, there's been a greater issue in the prospects for negative effects on health due to exposure to radiofrequency radiation, especially RF radiated by wireless communication devices. In terms of sciences of health, the connections may have enthusiasm for its unknown impacts to humankind [10].

Radio Frequency (RF) radiation is a sort of energy that exists in wave form which travels through space. Radio Frequency radiation is comprises of waves of electric and magnetic energy which oscillate in phase perpendicular to each other and perpendicular to the direction of energy propagation.

Radio waves and microwaves which radiated by transmitting antennas are examples of RF energy. In order to indicate the existence of RF energy, Radio Frequency (RF) field term may be used. RF energy is mostly used in providing telecommunications services such as radio and television broadcasting, cellular telephones, radio communications, microwave point-to-point links, and satellite communication.

Electromagnetic fields (EMF) are exists in the environment but cannot be seen by human's bare eyes. EMF is usually referred in terms of electric field and magnetic fields. Electric fields are made by contrasts in voltage, in which the higher the voltage, the better is definitely the resultant field. Magnetic fields are made when electric current streams, in which the more prominent the current, the stronger the magnetic field. An electric field will exist even when there is no current flowing. However, on the off chance that current does flow, the strength of the magnetic field will fluctuate with power consumption but the electric field strength will be constant. The quality of the electric field is measured in volts per meter (V/m) while the strength of the magnetic field is measured in amperes per meter (A/m). Alternatively in EMF research, researchers specify a related quantity, the flux density in microtesla, μT [9].

The electricity that comes out of power socket has related low recurrence electromagnetic fields. Furthermore, different sorts of higher frequency waves are