

HEALTH AND HIGH FREQUENCY ELECTROMAGNETIC FIELDS

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ABSTRACT

In view of increasing proliferation of radio and microwave frequency fields to which people in the course of their every day life, questions have been raised regarding their safety. Obviously, these fields provide the society with invaluable services such as communication, navigation, defence and so many other applications.

Physically, these fields are known to interact with the human body and under some circumstances it may affect the human health. Presently, the concern comes from two main factors: the presence of field sources very close to the human head and eye in particular and the uncertainty regarding the low level fields amplitude modulated at ELF. This study provides an overview of this issue. It gives details of the engineering research that has resulted in setting the safety standards. It highlights the experimental investigations that lead to the development of protection guidelines.

Moreover it presents result using a CAD package regarding the distribution of fields due to the presense of a monopole antenna near a model of human body. Also, included in the study is the measurement of power levels available in our environment at different frequencies.

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CHAPTER 1

1.0 INTRODUCTION

1.1 General

The literature on RF bioeffects comprises thousands of papers on all aspects of this topic presented in various scientific journals, reports, and symposia. From this enormous literature, there has been a lot of information, often conflicting, on health effects of electromagnetic energy. Some of the articles published seem to be sensationalism just to write papers. Some may seek to warn their readers of what they consider to be a very real danger. Other papers seek to assure the public that although there are dangers from, burns, shock, there are no low level non-thermal hazards. In fact, the main interest in this field has been stimulated by the public concerns. These concerns are categorized into two ranges of frequencies : power frequency lines (50-60 Hz), and radio frequencies. A significant progress has been done in understanding the mechanisms of interactions of radio frequency with the biological materials. This resulted in releasing recommendations regarding the safety regulations in many national and international standards. A major one is the 1991 IEEE standard approved in September 1991 [1].

The object of this paper is to supply the reader with information necessary to make intelligent analysis of research and investigation on health problems due to non-ionizing high frequency electromagnetic fields. Highlights of the engineering research and experimental investigations with animals leading to the development