



MONITORING OF ENVIRONMENTAL LOW FREQUENCY MAGNETIC FIELDS

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Abstract

With a view to make a long term survey of the magnetic fields generated by the power line sources, appliances or, generally, by the low frequency magnetic field sources, a tri-axis magnetic field meter was proposed. Referring to the magnetic field sensor, both the characteristic proportional of the field strength and proportional to the time derivate of the field strength were considered. Thus, two active magnetic field meters working in 40 Hz – 200 kHz frequency range were designed. In this mode it is possible to make the time domain or/and the frequency domain magnetic field measurement in a frequency range considered unitary from biological and health effects point of view. By using three orthogonal magnetic field sensors, and an electronic processing system it is possible to obtain the waveforms of the three orthogonal components, H_1 , H_2 , H_3 of the magnetic field vector. Based on the root mean square (r.m.s.) values of these orthogonal field components, the r.m.s. value of the resultant magnetic field vector was determined. Also, it is possible to determine the peak values of the magnetic fields. The recording, processing and storage of the data were made by software, using a National Instruments acquisition system connected at a portable computer. This proposed measurement system is autonomous, portable and it is able to make automate measurements of the fields with storage of data, being adequate to long term survey of magnetic fields. Using these presented measurement systems, comparative measurements and a survey of background magnetic fields in residential areas and in some special places, namely near some appliances, near power line systems and in hospitals electrotherapy rooms, were made.

Key words: active magnetic field sensor, electromagnetic environment, magnetic fields measurements, three-axis meter

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