

Electromagnetic Field Measurements Around High-Voltage Substations in Residential Areas: A Case Study from Tirana

The operation of high-voltage electrical substations in or near residential areas has raised public concern about potential adverse health effects from chronic exposure to power-frequency electromagnetic fields. This study aims to assess the intensity of electromagnetic fields around several substations in Tirana city, Albania, and evaluate compliance with international safety guidelines. Measurements of the electric field strength (E, in V/m) and magnetic flux density (B, in μT) were carried out at multiple points and distances around five representative substations using an isotropic field analyzer (Narda EHP-50F probe, 1 Hz–400 kHz range). The measurement campaign spanned different times of day (08:00–18:00) to capture typical operating conditions. The resulting data indicate that the electromagnetic field levels around these substations remain below the reference limits recommended by ICNIRP for general public exposure (5 kV/m for electric fields, 100 μT for magnetic fields). Peak electric field values on substation perimeters approached ~5 kV/m, while peak magnetic field values were on the order of a few μT , which is only a few percent of the allowed limit. These results provide evidence that typical urban substations, even when located near populated areas, do not exceed established safety limits, thereby offering reassurance regarding public electromagnetic exposure. The study's methodology and findings serve as a basis for informed guidelines and communication about environmental electromagnetic fields around power infrastructure.

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