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RESEARCH ON THE LEVEL OF ELECTROMAGNETIC RADIATION IN DIFFERENT OFFICE SPACES

Gheorghita Tanase, Elena Bucur, Ileana Crina Nicolescu, Valeriu Danciulescu, Andreea Cozea, Mihai Bratu, Mihaela Petrescu

National Research and Development Institute for Industrial Ecology – ECOIND, 57-73 Drumul Podu Dambovitei Street, district 6, 060652, Bucharest, poluare.aer@incdecoind.ro, Romania

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Introduction

Electromagnetic radiation is present all around the air in the environment as well as in the air inside the rooms. Exposure to electromagnetic radiation at home or at work is coming simultaneously from several sources such as the indoor ones, represented by the equipments specific to the activity carried out (household appliances, IT, industrial, telephony, etc.) along with the outdoor ones, represented by location-specific industrial installations (transformation points, electrical panels of buildings, telecommunications antennas on or near buildings, high voltage lines, etc.). In this paper, the level of electromagnetic radiation present in different rooms was studied. Sources that can emit electromagnetic waves were considered. The dispersion map for the studied premises was made in order to highlight the dispersion of the waves in the room.

Materials and methods

The detection of electromagnetic waves were performed in different spaces of INCD-ECOIND building with different fields of activity, using SPECTRAN NF-5035 equipment (Figure 1), which allowed the measurement of low, medium, high electromagnetic fields.

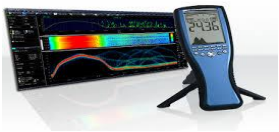

Fig.1.SPECTRAN NF-5035 equipment

Seven rooms of interest were chosen to measure the intensity of the electric field and the induction of the magnetic field.
The number of equipments, the volume of the rooms, the number of people and the occupancy rate were presented in Table 1.

Table 1. Electric field intensity measurements

Room Code	Equipments	Floor	Room Volume	Number of people	Occupancy rate, pers/100m^3
E5-17	4 computers, 1 copier	5	58 m^3	4	6.9
E3-13	5 computers, 1 copier	3	44 m^3	5	11.4
E3-12	3 computers	3	35 m^3	3	8.6

E1-01	2 computers, 1 copier	1	98 m^3	2	2.0
E1-02,	3 computers	1	81 m^3	2	2.5
E1-12	12 computers, 6 copiers	1	192 m^3	10	5.2
D-02	1 computer	D	62 m^3	1	1.6

Results and conclusions

The values of electric field intensity obtained from the indoor air detections were below the reference levels for exposing people to electromagnetic waves (Figure 2).

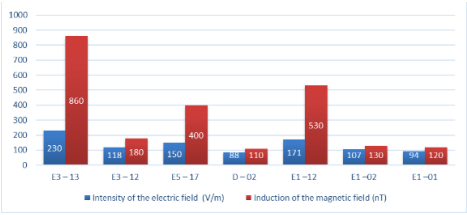

Fig.2. Compared values of electric field intensity and induction of the magnetic field

In room E3 -13 the registered volumes of 230 V/m of the electric field intensity and 860 nT of the magnetic field induction, were within the limits according to reference levels E (V/m). The spatial distribution of intensity of the electric field E (V/m) values was performed using Surfer software application (Figure 3).

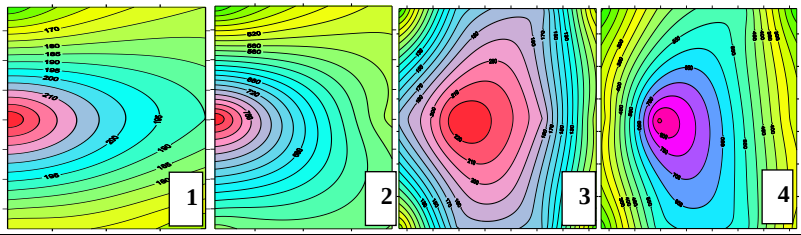

Fig. 3. The spatial distribution of electric field intensity measured values

The spatial distribution revealed that a contouring of a concentric distribution around the maximum value of 230 V/m of the electric field intensity, but not clearly defined as a result of a small number of 6 determinations. It was noticed a contouring of a concentric distribution determined by the maximum value of 860nT up to 680nT, of the magnetic field induction, but the isolines were not closed due to a small number of 6 measured values. A concentric distribution that decreases from the maximum value of 230 V/m to 180 V/m, of the electric field intensity was observed, and then the isolines decrease in a position relatively parallel to the A-B direction.

Moreover, a relatively concentric distribution that decreases from the maximum value of 860nT to 650nT, of the magnetic field induction, and then the isolines decrease in a position parallel to the A-B direction. The determined values were below the limit, according to legislation.