

Exposure Assessment of Library Workers to Magnetic Fields from the EAS System

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Safety of intermediate frequency electromagnetic fields (IF-EMF) has become a matter of concern with the coming use of those fields for wireless power transfer (WPT) systems for electric vehicle (EV) chargers. It is urgently required to investigate the safety of IF-EMF in advance to the penetration of this technology.

Electromagnetic article surveillance (EAS) systems have been the strongest sources of IF-EMF currently encountered in daily lives. It is warranted to examine possible association between EAS magnetic field exposure and health to explore the safety of IF-EMF of WPT in advance. On this background we started with the investigation of magnetic fields from EAS.

Precision and reliability of exposure assessment is crucially important. Thus we chose a population of library workers. We measured the magnetic fields from both EAS gate and book-check-unit. Spatial distributions of magnetic field vector components are measured in consideration of the phase differences between magnetic flux density vector components.

Although EAS gate for libraries emit varieties of frequencies magnetic fields (220 Hz – 14 kHz), the spatial distributions of the fields around the gates are found relatively similar to each other. An example of magnetic field distribution is shown Fig.1(a). The result suggested that exposures of the library workers can be estimated from the distance between their working desk and the nearest EAS gate panel. The number of occasion to pass through or near the gate should also be taken into account.

In addition to the exposures to the magnetic fields from the gate, those from the book-check-units should be considered. The unit emits pulsed magnetic fields of high peak amplitude up to tens of milli-tesla in the vicinity of the unit. The field strength, however, decreases rapidly with distance and is rather small in the space where human body exists. An example of the field vector distribution is shown in Fig.1(b).

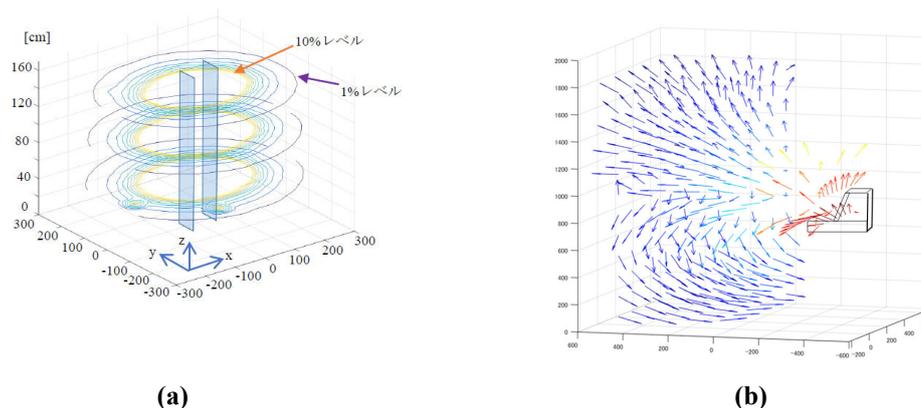


Figure 1. Distributions of magnetic fields from EAS gate (a) and book-check-unit (b)

The exposure assessment based on the measured field distribution and questionnaire is expected to provide quantitative data on the exposures of library workers.

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