

## Possible Exposure of Persons with Cardiac Pacemakers to Extremely Low Frequency (ELF) Electric and Magnetic Fields

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**Abstract :** The number of persons with implanted cardiac pacemakers (PM) has increased in Western countries. The aim of this paper is to investigate the possible situations where persons with a PM may be exposed to extremely low frequency (ELF) electric (EF) and magnetic fields (MF) that may disturb their PM. Based on our earlier studies, it is possible to find such high public exposure to EFs only in some places near 400 kV power lines, where an EF may disturb a PM in unipolar mode. Such EFs cannot be found near 110 kV power lines. Disturbing MFs can be found near welding machines. However, we do not have measurement data from welding. Based on literature and earlier studies at Tampere University of Technology, it is difficult to find public EF or MF exposure that is high enough to interfere with PMs.

**Keywords :** cardiac pacemaker, electric field, magnetic field, electrical engineering

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