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Dear Editor

The figure for the Canadian Safety Code 6 standard for 450 MHz electromagnetic radiation you quoted in the last issue (Mar. 30, p.7) is almost correct.* It is in error only in giving the units as microwatts per cubic centimetre, when all radiation in Canada should be quoted in watts per square metre or multiples thereof (Canadian Metric Practice Guide CAN/CSA-Z234.1-89).

The re-adjusted figure is 3 watts per square metre. This compares with the average radiation of the sun at noon on a very clear day on a surface tilted toward the sun of about 1000 watts per square metre.

If you locked yourself in a well-insulated room with no lights on, at a temperature of around 20 degrees Celsius, then the infrared (blackbody) radiation from the walls, floor, and ceiling of the room would be about 420 watts per square metre. Life is, evidently, full of dangers.

Regards

* The printed figure was 300 $\mu W/cm^3$ (microwatts per cubic centimetre)

**Background**:

Units used to express the strength of electric, magnetic, and electromagnetic fields are confusing. In the far-field (greater than one wavelength from the source), the relationship between the electric and magnetic fields is determined by the properties of free space and it is usually only the power of the electromagnetic field that matters. The electrical engineers convention is to express this in watts per square metre, [ $W/m^2$ ].

In the near-field (less than one wavelength from the source), there is no fixed relationship between the electric and magnetic fields, or the power of the source.

Electric fields are usually measured in volts per metre, [ V/m ], and there is no confusion. Magnetic fields are however a different story. They can be measured in tesla [T], gauss [G], or amps per metre [ A/m ]. The choice arises because the permeability of free space is a defined constant. The preferred unit in discourses on health and magnetism is millionths of a tesla or microtesla [μT].

1 G = 100 μT; 1 mG (milligauss) = 0.1 μT
1 A/m = 4π/10 μT = 1.26 μT (in free space)

A 3 $W/m^2$ electromagnetic wave has field strengths of 34 V/m and 0.1 μT.

The "fair weather" electrostatic field in the atmosphere is around 130 V/m.
The magnitude of the Earth's magnetic field at Gabriola's latitude is around 60 μT.

There's more at http:www.nickdoe.ca/pdfs/Webp52c.pdf