

Formulas for Unit Conversion Charts

I've found the following formulas convenient when reading research papers or published tables showing the results of electromagnetic field studies done in different countries, or with different instruments. The conversion charts I have also published (at http://www.geopathfinder.com/Conversion_Chart.pdf) are set up with Decibel-milliwatts (dBm) as the anchor point, shown in whole units for convenience. The next two columns relate to electric fields (kV/m & V/m). After that, the next six columns are power levels. And the final four columns are concerned with magnetic fields. The calculations in the charts all revolve around Watts per square meter (W/m^2). So to find the other values if you know W/m^2 , here are the formulas I used to get them:

$$V/m = \sqrt{W/m^2 \times 377} \quad \text{Volts per meter} = \text{the square root of the product of Watts per square meter times 377}$$

$$kV/m = V/m / 1,000 \quad \text{Kilo-volts per meter} = \text{Volts per meter divided by 1,000}$$

$$mW/cm^2 = W/m^2 / 10 \quad \text{Milli-Watts per square centimeter} = \text{Watts per square meter divided by 10}$$

$$\mu W/m^2 = W/m^2 \times 1,000,000 \quad \text{Micro-Watts per square meter} = \text{Watts per square meter times one million}$$

$$\mu W/cm^2 = W/m^2 / .01 \quad \text{Micro-Watts per square centimeter} = \text{Watts per square meter divided by .01}$$

$$nW/cm^2 = W/m^2 / .000,01 \quad \text{Nano-Watts per square centimeter} = \text{Watts per square meter divided by .000,01}$$

$$pW/cm^2 = W/m^2 / .000,000,01 \quad \text{Pico-Watts per square centimeter} = \text{Watts per square meter divided by .000,000,01}$$

$$A/m = \sqrt{W/m^2 / 377} \quad \text{Amps per meter} = \text{the square root of the product of Watts per square meter divided by 377}$$

$$mG = W/m^2 / 23.9 \quad \text{Milli-Gauss} = \text{Watts per square meter divided by 23.9}$$

$$\mu T = W/m^2 / 239 \quad \text{Micro-Teslas} = \text{Watts per square meter divided by 239}$$

$$nT = W/m^2 / 239,000 \quad \text{Nano-Teslas} = \text{Watts per square meter divided by 239,000}$$

Some other useful conversion formulas are :

$$mG = (A/m)^2 \times 15.774059$$

$$A/m = \sqrt{mG / 15.774059}$$

$$nT = mG \times 100$$

$$mG = nT / 100$$

$$A/m = \sqrt{nT / 1,577.4059}$$

$$nT = (A/m)^2 \times 1,577.4059$$

$$V/m = W/m^2 / A/m$$

$$V/m = (mW/cm^2 \times 10) / A/m$$

$$A/m = W/m^2 / V/m$$

$$A/m = (mW/cm^2 \times 10) / V/m$$

And some useful predictive (but possibly inaccurate*) conversions between electric, magnetic, and power units:

$$V/m = \sqrt{nT \times 90,103}$$

$$V/m = \sqrt{mG \times 9,010.3}$$

$$nT = (V/m)^2 / 90,103$$

$$mG = (V/m)^2 / 9,010.3$$

$$W/m^2 = (V/m)^2 / 377$$

$$mW/cm^2 = (V/m)^2 / 3,770$$

$$W/m^2 = (A/m)^2 \times 377$$

$$mW/cm^2 = (A/m)^2 \times 37.7$$

*These may not perfectly correlate with measured field readings, depending on wiring configurations and other conditions.

Also, in the conversion tables, you'll find some numbers abbreviated with an exponential notation. For instance, 2.41E-07 is really 2.41 times 10 to the negative seventh power, or 0.000000241. And 7.63E+08 is really 7.63 times ten to the eighth power, or 763,000,000.0. Count the digits before/after the decimal points and you'll get the idea!