Speed of EM wave in vacuum

Recall fundamental constants of electricity and magnetism:

$$\varepsilon_0 = 8.85 \times 10^{-12} C^2/Nm^2 \qquad \mu_0 = 4\pi \times 10^{-7} Tm/A$$

"Permittivity of free space" (electricity)   "Permeability of free space" (magnetism)

Now multiply them:

$$\varepsilon_0\mu_0 = 8.85 \times 10^{-12}\frac{C^2}{Nm^2} \times 4\pi \times 10^{-7}\frac{Nm}{Cm/s \; C/s}$$

$$= 1.11 \times 10^{-17}\frac{s^2}{m^2}$$

Note:

1T = 1 N/Cm/s (from F = qvBsin(θ))
1A = 1 C/s (from I = ΔQ/Δt)

$$\boxed{c = \frac{1}{\sqrt{\varepsilon_0\mu_0}} = 3.0 \times 10^8 m/s}$$