

HISTORY OF ELECTROMAGNETICS

- 600 B.C. — 1st record of electric and magnetic behavior by Thales of Miletus
- 1600 — William Gilbert postulates that earth is a giant magnet, does first recorded experimentation with electricity and magnetism
- 1750 — terms 'positive' and 'negative' charge coined by Ben Franklin
- 1785 — forces between charges measured by Charles Coulomb
- 1800 — Voltaic pile (battery) invented by Alessandro Volta
- 1819 — Hans Christian Oersted finds current produces magnetic field
- 1820 — force between current carrying wires found by André Marie Ampère
- 1826 — Ohm's Law published by Georg Simon Ohm
- 1831 — Michael Faraday finds that time-varying magnetic fields create electric fields (LONDON)
- 1873 — James Clerk Maxwell formulates Maxwell's equations, predicts presence of electromagnetic waves
- 1887 — Heinrich Hertz detects electromagnetic waves
- 1901 — Marconi transmits and receives radio waves across the Atlantic Ocean

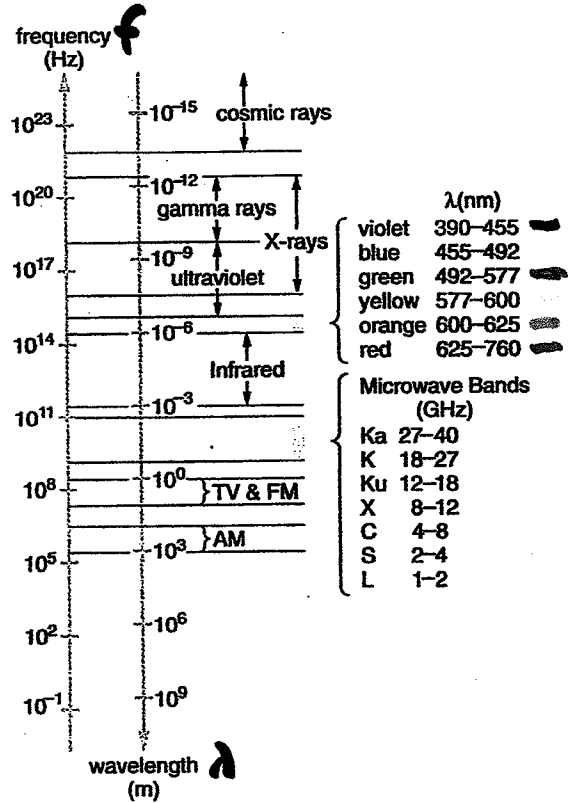
magnetic compass ~ 1000

I. Newton ~ 1700
inverse square law, $1/R^2$, for gravity;
calculus (light, prisms, refraction, static electricity)

JOSEPH HENRY (ALBANY, N.Y.)

J. Biot, F. Savart
quantified force law 1820

ELECTROMAGNETIC SPECTRUM



$$c = \lambda f$$

atomic & molecular absorption

wpe (plasma frequency)

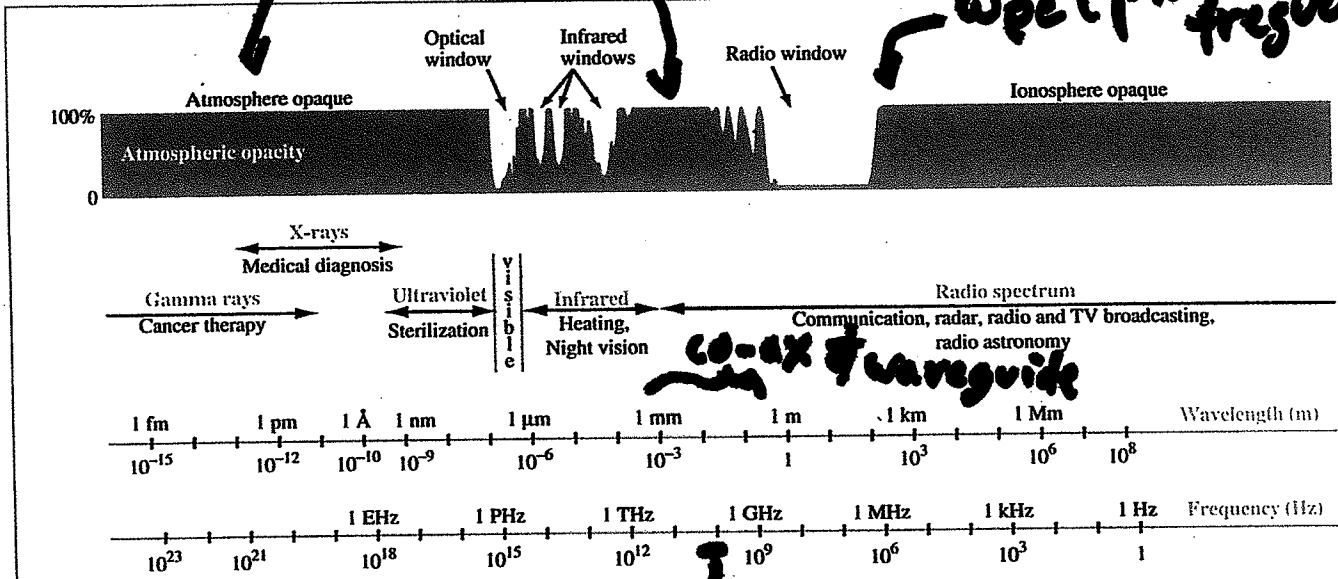


Figure 1-15: The electromagnetic spectrum.

X-band

8-12 GHz

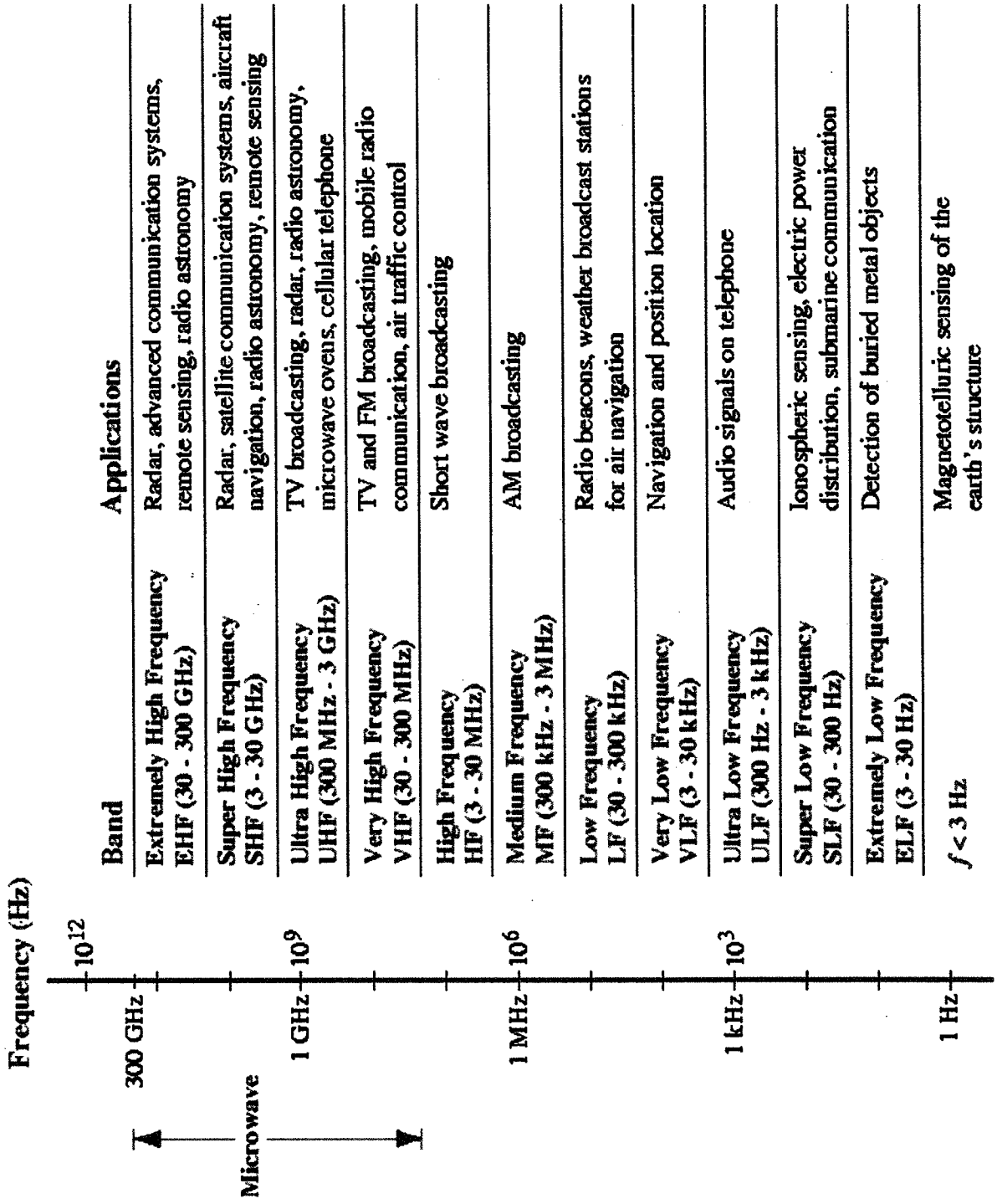


Figure 1-16