Introduction
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Introduction to EMC

Problem of EMI and EMC – definitions [MODULE 1.1]

Common sources of transients [MODULE 1.2]
Common EMC units
Common-mode (CM) and differential mode (DM) currents and voltages

Exercises [MODULE 1.3]
Exercises

I) Searching the internet, find at least five examples of electromagnetic interference problems described by consumers, in trade journals etc.

As an example, here is one case described.

Electric wheelchairs erratic due to EMI

Wheelchairs have come in for special scrutiny by the FDA (the US Food and Drug Agency). A few months ago, the agency ordered makers of wheelchairs to shield them and to educate users about the potential hazards of interference. The FDA acted after receiving "many reports of erratic unintentional powered wheelchair movements." These included sudden starts that caused wheelchairs to drive off curbs and piers when nearby police, fire or CB transmitters were activated. Miraculously, no fatal injuries have been reported.

(But broken limbs have occurred as a result of such interference - editor.) (Compliance Engineering - European Edition September/October 1994, www.ce-mag.com.)

As much as possible, decompose the problem into source of EMI (emitter), the receptor, and the coupling path
Exercises

II Convert the following frequencies into wavelength

1. AM radio at 950 kHz
2. FM radio at 89 MHz
3. Television broadcasting at 500 MHz
4. GPS at 1400 MHz
5. Microwave oven at 2.4 GHz
6. Radar at 76 GHz
7. Signal propagation in a coaxial cable at 500 MHz, relative permittivity of dielectric 2.2
8. Two equipments are connected by a coaxial cable which form a transmission line. The physical length of the cable is 0.6 m. The relative permittivity of the insulation is 2.1. State whether this transmission line is 'electrically long' or 'electrically short' at the following frequencies.
   a) 50 Hz, b) 2 kHz, c) 100 kHz, d) 33 MHz   e) 280 MHz   f) 900 MHz
III Convert the following into desired units

a) 1 mA in dBA, dBμA
b) 1 mW in dBW, dBμW
c) 0.5 μV/m in dBmV/m, dBV/m
d) 1 V/m in dBV/m, dBmV/m, dBμV/m, dBkV/m

f) 43 dBmW in mW, W
g) 48 dBmA in mA, A
h) -54 dBmV in V, mV, μV
i) 60 dBμV/m in μV/m, mV/m, V/m