Topic 6: Radiation Fundamentals

Academic Year 2013 - 2014

P1.- Suppose a transmission power P_{Tx} = 6dBW. Obtain:

a) The radiation intensity and the radiation density, at a distance of 100m, of an isotropic antenna.
b) The radiation intensity and the radiation density, at a distance of 200m, of a directive antenna with gain 3dB.

P2.- Obtain:

a) The gain of an antenna with directivity 19dBi and efficiency 84,5%.
b) The directivity of an antenna with gain 15,54dB and efficiency 90%.

P3.- Prove that the basic losses in dB are:

$$L_{bf}(dB) = 92{,}45 + 20\log f(GHz) + 20\log d(km)$$

or

$$L_{bf}(dB) = 32{,}45 + 20\log f(MHz) + 20\log d(km)$$

P4.- Suppose a communication system in free space, with frequency 2,4GHz and isotropic antennas. The transmission power is 1W and the sensitivity (minimum received power) is -60dBm. Obtain:

a) The maximum distance of the link.
b) The maximum distance of the link taking into account a polarization loss of 1,5dB.
c) If the link distance was 500m and it could change the transmitting antenna, what is the minimum G_{Tx} required?
d) In a 500m link with the original antennas, what is the maximum frequency at which the link would be feasible?