

ITRAINONLINE MMTK

Exercises: Basic Radio Physics

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Exercise 1: Electromagnetic fields and waves

Question: What is the wave length of a 900 MHz electromagnetic wave?

Answer:

Question: What is the wavelength of visible light, roughly?

Answer:

Question: What is the polarization of the electromagnetic field emitted by a dipole?

Answer:

Question: VSAT satellites often used for Internet connectivity are geostationary satellites at a height of 35,785 km above the equator. What minimum delay (latency) does this imply for data travelling over VSAT?

Answer:

Question: A specific radio device has a timeout window of 10 microseconds – this means, it expects an answer from the other end within 10 microseconds. From how many kilometres of distance would this begin to affect the radio link?

Answer:

Exercise 2: Electromagnetic spectrum

Question: What are the relevant frequency ranges for wireless networking?

Answer:

Question: Which of the following devices could potentially interfere with a wireless network?

- a) Wireless microphone in a conference room
- b) Microwave oven in a kitchen
- c) Mobile phone
- d) Rontgen (X-Ray) lab in a hospital
- e) Car or diesel engine

Answer:

Exercise 3: Radio wave propagation

Question: If you have to reach clients within a village with trees and various types of buildings, which frequency would be the best choice? Discuss!

- a) 915 MHz
- b) 2.4 GHz
- c) 5.8 GHz

Answer:

Question: How wide does the radio 'line' of sight become for a 100 km link – roughly? Some centimetres, some meters, some kilometres?

Answer:

Question: What materials and substances should you most look out for when planning a wireless link? In other words, what will cause most problems?

Answer:

Exercise 4: Working with dBs

Question: Express these values in dBm / mW

16 dBm = mW

.... dBm = 200 mW