Wireless Security

Wireless: Terms and Calculations

Weight: /1.15% Marks:  /51

Student Name: Coleton Sanheim

Student ID: 000862545 Date: 10/01/2020

# Introduction

Before we can enter into defending and penetrating wireless networks we need to understand the terms and infrastructure that will be used. Lab activities in this course will be marked in class. You must bring this document to every lab in the module. All activities must be completed and then marked by the instructor before you move on to the next. To avoid a mark of zero for an activity, contact the instructor immediately if for any reason you cannot complete the activity or if the activity was left unmarked by the instructor.

# Background Reading

* Industry Canada Canadian Table of Frequency Allocations
* Wikipedia article on frequency
* Wikipedia article on ISM bands
* Basic trigonometric identities: <https://evgenii.com/blog/basic-trigonometric-identities/>
* Trigonometric equations and identities:

<https://www.khanacademy.org/math/trigonometry/trig-equations-and-identities>

# Lab Activity 1.1: Regulator Agency

What is the name of the regulatory agency governing radio frequencies in Canada?

**Department of Innovation, Science and Economics Canada** (2 points)

What is the name of the regulatory agency governing radio frequencies in Japan?

**Ministry of Internal Affairs and Communications** (2 points)

**Instructor sign-off:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (5 points)

# Lab Activity 1.2: ISM Frequencies

Write out the ISM bands associated with Wifi:

**IEEE 802.11 2.45 GHz and 5.8 GHz (Center frequency)** (2 points)

**Instructor sign-off:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (5 points)

# Lab Activity 1.3: Wavelength and Frequency

Wavelength is measured in meters and refers to the distance between two (typically) crests or troughs.

|  |
| --- |
| By Dicklyon,Richard F. Lyon - Own work, *CC* BY-SA 3.0 Figure 1: https://commons.wikimedia.org/w/index.php?curid=7184592 |

now

*Frequency* = *velocity/ A*

which gives us the number of cycles per second

For example a radio signal, travelling at approximately the light speed, has a frequency lM *Hz=* lxl06 = 1000000

and a wavelength of

*c / freq= 300xl06mps/lxl06cps = 300m*

where msp is meters per second and cps is cycles per second.

This becomes very important as we look at antennas where full, quarter and half wavelengths are used in design and identification! Get use to the values, frequency estimation can be useful when looking at a target in the field.

Question: Fill in the table (21 points)

|  |  |  |
| --- | --- | --- |
| Frequency | Wavelength | Within ISM Band  (True/False) |
| 1 MHz | 300 m | **False** |
| 97.5 MHz | **3.08 m** | **False** |
| 902 MHz | **33.2 cm** | **True** |
| **14.99 MHz** | 20 m | **False** |
| **99.93 MHz** | 3 m | **False** |
| **2.99 GHz** | 10 cm | **False** |
| 2.4 GHz | **12.5 cm** | true |
| 5.180 GHz | **5.79 cm** | **False** |
| 5.825 GHz | **5.15 cm** | **True** |
| **3.75 MHz** | 80 m | **False** |
| **7.5 MHz** | 40 m | **False** |
| 27 MHz | 11.11 m | **True** |

**Instructor sign-off:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (5 points)

# Lab Activity 1.4: Document the 3 similarities and differences each of 802.11 & 802.3

Similarities: (2 points)

E.g. transmit data from source to destination

**Both 802.11 and 802.3 are layer 2 frames**

**They are both commonly used protocols to access the internet**

Differences: (2 points)

E.g. Physical Media differences, 802.3 - cooper wire 802.11 – radio waves

**Frame size, 802.3 has a max payload of 1500 bytes, 802.11 has a max payload of 2300 bytes**

**MAC addressing, 802.11 has much more complex MAC addressing than 802.3**

**Instructor sign-off:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (5 points)