**Assignment 1**

**Electromagnetic spectrum**

**John Mumm**

The electromagnetic spectrum is the arrangement of the different radiation wavelengths and how much energy they give off. The table below shows you the different wavelengths of the spectrum, the frequency, and Energy the waves give off.

Table : Electromagnetic spectrum with calculated frequencies and energy.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| wave length (µm) | c (µm/s) | frequency (Hz) | h (J\*s) | E (J) | Wave Regions |
| 0.000001 | 299.7 | 299700000 | 6.63E-34 | 1.99E-25 | Gamma |
| 0.00001 | 299.7 | 29970000 | 6.63E-34 | 1.99E-26 | Gamma |
| 0.0001 | 299.7 | 2997000 | 6.63E-34 | 1.99E-27 | X rays |
| 0.001 | 299.7 | 299700 | 6.63E-34 | 1.99E-28 | X rays |
| 0.01 | 299.7 | 29970 | 6.63E-34 | 1.99E-29 | X rays |
| 0.1 | 299.7 | 2997 | 6.63E-34 | 1.99E-30 | UV |
| 0.4 | 299.7 | 749.25 | 6.63E-34 | 4.96E-31 | Violet |
| 0.446 | 299.7 | 671.9730942 | 6.63E-34 | 4.45E-31 | Blue |
| 0.5 | 299.7 | 599.4 | 6.63E-34 | 3.97E-31 | Green |
| 0.578 | 299.7 | 518.5121107 | 6.63E-34 | 3.44E-31 | Yellow |
| 0.592 | 299.7 | 506.25 | 6.63E-34 | 3.35E-31 | Orange |
| 0.6 | 299.7 | 499.5 | 6.63E-34 | 3.31E-31 | Red |
| 0.7 | 299.7 | 428.1428571 | 6.63E-34 | 2.84E-31 | Red |
| 1 | 299.7 | 299.7 | 6.63E-34 | 1.99E-31 | Near IR |
| 10 | 299.7 | 29.97 | 6.63E-34 | 1.99E-32 | Thermal IR |
| 100 | 299.7 | 2.997 | 6.63E-34 | 1.99E-33 | Far IR |
| 1000 | 299.7 | 0.2997 | 6.63E-34 | 1.99E-34 | Far IR |
| 10000 | 299.7 | 0.02997 | 6.63E-34 | 1.99E-35 | Micro wave |
| 100000 | 299.7 | 0.002997 | 6.63E-34 | 1.99E-36 | Micro wave |
| 1000000 | 299.7 | 0.0002997 | 6.63E-34 | 1.99E-37 | Radio wave |
| 10000000 | 299.7 | 0.00002997 | 6.63E-34 | 1.99E-38 | Radio wave |

There has always been a debate at where different kinds of waves start and end in the electromagnetic spectrum. Going through a few textbooks and sights online (NASA, USGS), I found out that this debate is mainly in the IR section. Visible light can have differences between the colors but it is minor in the wavelength differences. As I mentioned earlier the big difference is in the IR section with were near-, mid-, and thermal- or Far- infrared is. Between the four sources I used there is differences between names of the sections of the infrared and whether there is a far infrared. Both USGS and NASA Imagers disagree if there is thermal infrared and also where far infrared begins. The two textbooks that I read through the electromagnetic spectrum sections both agree on the same sections of where the different waves are except if there is a far-infrared section. It seems that if Mid- and thermal and Far IR can differ by measurements of up to 1 to 10 micrometers. Above is a combined idea of where the regions are located for different waves.

REFRENCES:

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