# FCC ID : 2AE7M-DB3046

## RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

| Frequency Range(MHz) | Electric Field Strength(V/m) | Magnetic Field Strength(A/m) | Power Density($mW/cm^2$) | Average Time |
|---|---|---|---|---|
| **(A) Limits for Occupational/Control Exposures** | | | | |
| **300-1500** | **--** | **--** | **F/300** | **6** |
| **1500-100000** | **--** | **--** | **5** | **6** |
| **(B) Limits for General Population/Uncontrol Exposures** | | | | |
| **300-1500** | **--** | **--** | **F/1500** | **6** |
| **1500-100000** | **--** | **--** | **1** | **30** |

**11.1 Friis transmission formula: Pd= (Pout*G)\ ($4*pi*R^2$)**

Where

Pd= Power density in $mW/cm^2$

Pout=output power to antenna in mW

G= Numeric gain of the antenna relative to isotropic antenna

Pi=3.1416

R= distance between observation point and center of the radiator in cm

Pd the limit of MPE, 1mW/cm$^2$. If we know the maximum gain of the nd total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

### 11.2 Measurement Result

2.4G WIFI ANT A:

| modulation | Channel Freq. (MHz) | Measured power (dBm) | Tune-up power (dBm) | Max tune-up power (dBm) | Antenna Gain Numeric | Evaluation result (mW/cm2 ) | Power density Limits (mW/cm2 ) |
|---|---|---|---|---|---|---|---|
| 11b | 2.412 | 16.67 | 15 to 17 | 17 | 1 | 0.0100 | 1 |
| | 2.437 | 16.55 | 15 to 17 | 17 | 1 | 0.0100 | 1 |
| | 2.462 | 17.21 | 16 to 18 | 18 | 1 | 0.0126 | 1 |
| 11g | 2.412 | 22.03 | 21 to 23 | 23 | 1 | 0.03991 | 1 |
| | 2.437 | 22.14 | 21 to 23 | 23 | 1 | 0.03991 | 1 |
| | 2.462 | 22.67 | 21 to 23 | 23 | 1 | 0.03991 | 1 |
| 11n HT20 | 2.412 | 22.39 | 21 to 23 | 23 | 1 | 0.03991 | 1 |
| | 2.437 | 22.19 | 21 to 23 | 23 | 1 | 0.03991 | 1 |
| | 2.462 | 22.72 | 21 to 23 | 23 | 1 | 0.03991 | 1 |

2.4G WIFI ANT B:

| modulation | Channel Freq. (MHz) | conducted power (dBm) | Tune-up power (dBm) | Max tune-up power (dBm) | Antenna Gain Numeric | Evaluation result (mW/cm2 ) | Power density Limits (mW/cm2 ) |
|---|---|---|---|---|---|---|---|
| 11b | 2.412 | 16.82 | 15 to 17 | 17 | 1 | 0.0100 | 1 |
| | 2.437 | 16.76 | 15 to 17 | 17 | 1 | 0.0100 | 1 |
| | 2.462 | 17.27 | 16 to 18 | 18 | 1 | 0.0126 | 1 |
| 11g | 2.412 | 22.34 | 21 to 23 | 23 | 1 | 0.03991 | 1 |
| | 2.437 | 22.09 | 21 to 23 | 23 | 1 | 0.03991 | 1 |
| | 2.462 | 22.78 | 21 to 23 | 23 | 1 | 0.03991 | 1 |
| 11n HT20 | 2.412 | 22.43 | 21 to 23 | 23 | 1 | 0.03991 | 1 |
| | 2.437 | 22.18 | 21 to 23 | 23 | 1 | 0.03991 | 1 |
| | 2.462 | 22.83 | 21 to 23 | 23 | 1 | 0.03991 | 1 |

5G WIFI ANT0

| Band | modulation | Channel Freq. (MHz) | conducted power (dBm) | Tune-up power (dBm) | Max tune-up power (dBm) | Antenna Gain Numeric | Evaluation result (mW/cm2 ) | Power density Limits (mW/cm2 ) |
|---|---|---|---|---|---|---|---|---|
| UNII Band I | 11a | 5180 | 10.72 | 9 to 11 | 11 | 1 | 0.0025 | 1 |
| | | 5200 | 9.49 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| | | 5240 | 9.16 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| UNII Band III | | 5745 | 9.61 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| | | 5785 | 9.04 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| | | 5825 | 5.95 | 4 to 6 | 6 | 1 | 0.0008 | 1 |
| UNII Band I | 11n (VHT20) | 5180 | 10.82 | 9 to 11 | 11 | 1 | 0.0025 | 1 |
| | | 5200 | 9.83 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| | | 5240 | 9.53 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| UNII Band III | | 5745 | 9.46 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| | | 5785 | 9.18 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| | | 5825 | 5.81 | 4 to 6 | 6 | 1 | 0.0008 | 1 |
| UNII Band I | 11ac (VHT20) | 5180 | 11.14 | 10 to 12 | 12 | 1 | 0.0032 | 1 |
| | | 5200 | 10.49 | 9 to 11 | 11 | 1 | 0.0025 | 1 |
| | | 5240 | 10.09 | 9 to 11 | 11 | 1 | 0.0025 | 1 |
| UNII Band III | | 5745 | 10.11 | 9 to 11 | 11 | 1 | 0.0025 | 1 |
| | | 5785 | 7.73 | 6 to 8 | 8 | 1 | 0.0013 | 1 |
| | | 5825 | 6.38 | 5 to 7 | 7 | 1 | 0.0010 | 1 |
| UNII Band I | 11n (VHT40) | 5190 | 9.18 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| | | 5230 | 8.44 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| UNII Band III | | 5670 | 8.38 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| | | 5795 | 7.00 | 6 to 8 | 8 | 1 | 0.0013 | 1 |
| UNII Band I | 11ac (VHT40) | 5190 | 9.28 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| | | 5230 | 8.46 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| UNII Band III | | 5670 | 8.64 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| | | 5795 | 6.85 | 5 to 7 | 7 | 1 | 0.0010 | 1 |
| UNII Band I | 11ac (VHT80) | 5210 | 7.96 | 6 to 8 | 8 | 1 | 0.0013 | 1 |
| UNII Band III | | 5775 | 6.75 | 5 to 7 | 7 | 1 | 0.0010 | 1 |

5G WIFI ANT1

| Band | modulation | Channel Freq. (MHz) | conducted power (dBm) | Tune-up power (dBm) | Max tune-up power (dBm) | Antenna Gain Numeric | Evaluation result (mW/cm2 ) | Power density Limits (mW/cm2 ) |
|---|---|---|---|---|---|---|---|---|
| UNII Band I | 11a | 5180 | 11.31 | 10 to 12 | 12 | 1 | 0.0032 | 1 |
| | | 5200 | 11.15 | 10 to 12 | 12 | 1 | 0.0032 | 1 |
| | | 5240 | 11.52 | 10 to 12 | 12 | 1 | 0.0032 | 1 |
| UNII Band III | | 5745 | 10.70 | 9 to 11 | 11 | 1 | 0.0025 | 1 |
| | | 5785 | 8.47 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| | | 5825 | 7.07 | 6 to 8 | 8 | 1 | 0.0013 | 1 |
| UNII Band I | 11n (VHT20) | 5180 | 11.76 | 10 to 12 | 12 | 1 | 0.0032 | 1 |
| | | 5200 | 11.26 | 10 to 12 | 12 | 1 | 0.0032 | 1 |
| | | 5240 | 11.55 | 10 to 12 | 12 | 1 | 0.0032 | 1 |
| UNII Band III | | 5745 | 10.70 | 9 to 11 | 11 | 1 | 0.0025 | 1 |
| | | 5785 | 8.50 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| | | 5825 | 6.90 | 5 to 7 | 9 | 1 | 0.0016 | 1 |
| UNII Band I | 11ac (VHT20) | 5180 | 11.33 | 10 to 12 | 12 | 1 | 0.0032 | 1 |
| | | 5200 | 10.48 | 9 to 11 | 11 | 1 | 0.0025 | 1 |
| | | 5240 | 10.70 | 9 to 11 | 11 | 1 | 0.0025 | 1 |
| UNII Band III | | 5745 | 8.93 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| | | 5785 | 7.47 | 6 to 8 | 8 | 1 | 0.0013 | 1 |
| | | 5825 | 5.36 | 4 to 6 | 6 | 1 | 0.0008 | 1 |
| UNII Band I | 11n (VHT40) | 5190 | 9.31 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| | | 5230 | 8.46 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| UNII Band III | | 5670 | 8.40 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| | | 5795 | 6.86 | 5 to 7 | 7 | 1 | 0.0011 | 1 |
| UNII Band I | 11ac (VHT40) | 5190 | 9.25 | 8 to 10 | 10 | 1 | 0.0020 | 1 |
| | | 5230 | 8.73 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| UNII Band III | | 5670 | 8.43 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| | | 5795 | 6.89 | 5 to 7 | 7 | 1 | 0.0011 | 1 |
| UNII Band I | 11ac (VHT80) | 5210 | 8.04 | 7 to 9 | 9 | 1 | 0.0016 | 1 |
| UNII Band III | | 5775 | 6.82 | 5 to 7 | 7 | 1 | 0.0010 | 1 |

Bluetooth DSS

| modulation | Channel Freq. (MHz) | conducted power (dBm) | Tune-up power (dBm) | Max tune-up power (dBm) | Antenna Gain Numeric | Evaluation result (mW/cm2 ) | Power density Limits (mW/cm2 ) |
|---|---|---|---|---|---|---|---|
| GFSK | 2402 | -0.51 | -1 to 1 | 1 | 1 | 0.00025 | 1 |
| | 2441 | -0.06 | -1 to 1 | 1 | 1 | 0.00025 | 1 |
| | 2480 | **0.56** | -1 to 1 | 1 | 1 | 0.00025 | 1 |
| pi/4-DQPSK | 2402 | -1.46 | -2 to 0 | 0 | 1 | 0.00020 | 1 |
| | 2441 | -0.74 | -1 to 1 | 1 | 1 | 0.00025 | 1 |
| | 2480 | -0.43 | -1 to 1 | 1 | 1 | 0.00025 | 1 |
| 8DPSK | 2402 | -1.39 | -2 to 0 | 0 | 1 | 0.00020 | 1 |
| | 2441 | -0.30 | -1 to 1 | 1 | 1 | 0.00020 | 1 |
| | 2480 | -0.28 | -1 to 1 | 1 | 1 | 0.00020 | 1 |

Bluetooth DTS

| modulation | Channel Freq. (MHz) | conducted power (dBm) | Tune-up power (dBm) | Max tune-up power (dBm) | Antenna Gain Numeric | Evaluation result (mW/cm2 ) | Power density Limits (mW/cm2 ) |
|---|---|---|---|---|---|---|---|
| GFSK | 2402 | 0.46 | -1 to 1 | 1 | 1 | 0.00025 | 1 |
| | 2440 | 1.47 | 0 to 2 | 2 | 1 | 0.00032 | 1 |
| | 2480 | **1.74** | 0 to 2 | 2 | 1 | 0.00032 | 1 |