

## MPE Calculation

Regulation(s): Part 1.1310, Part 2.1091

Method: KDB447498 D01v06

| RF feature(Mode)   | Frequency range (MHz) |   |          | Max Target Power (dBm) | ANT Gain (dBi) | Maximum EIRP (dBm) | Maximum EIRP (mW) | Maximum power density (mW/cm <sup>2</sup> ) | Requirement (mW/cm <sup>2</sup> ) |
|--------------------|-----------------------|---|----------|------------------------|----------------|--------------------|-------------------|---------------------------------------------|-----------------------------------|
| Bluetooth(1Mbps)   | 2 402.00              | ~ | 2 480.00 | 3.00                   | -0.18          | 2.82               | 1.915             | 0.000 4                                     | 1.000 0                           |
| Bluetooth(2,3Mbps) | 2 402.00              | ~ | 2 480.00 | -2.50                  | -0.18          | -2.68              | 0.540             | 0.000 2                                     | 1.000 0                           |
|                    |                       | ~ |          |                        |                |                    |                   |                                             |                                   |
|                    |                       | ~ |          |                        |                |                    |                   |                                             |                                   |
|                    |                       | ~ |          |                        |                |                    |                   |                                             |                                   |
|                    |                       | ~ |          |                        |                |                    |                   |                                             |                                   |
|                    |                       | ~ |          |                        |                |                    |                   |                                             |                                   |
|                    |                       | ~ |          |                        |                |                    |                   |                                             |                                   |

Note: Please refer to the operation description for Max tune-up power.

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user.

The MPE sample calculation for this exposure is shown below.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 1.915 / (4 \times 20^2 \times \pi) \\
 &= 0.000 \text{ mW/cm}^2
 \end{aligned}$$

### - Note

S= Maximum power density(mW/cm<sup>2</sup>)

EIRP= Equivalent Isotropic Radiated Power(mW)

R= Distance to the center of the radiation of the antenna(20cm)

### Part 1.1310

#### ▪ Limits for Maximum Permissible Exposure (MPE)

| Frequency range (MHz) | Electric Field strength (V/m) | Magnetic field strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|-----------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| 0.3 ~ 1.34            | 614                           | 1.63                          | *100                                | 30                       |
| 1.34 ~ 30             | 824/f                         | 2.19 / f                      | *180 / f <sup>2</sup>               | 30                       |
| 30 ~ 300              | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300 ~ 1,500           |                               |                               | f / 1500                            | 30                       |
| 1,500 ~ 100,000       |                               |                               | 1.0                                 | 30                       |

Conclusion : The exposure condition of this device is compliant with FCC

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|------------------|-----------------------|---|----------|------------------------|----------------|--------------------|-------------------|---------------------------------------------|-----------------------------------|
| WLAN(802.11b)    | 2 412.00              | ~ | 2 462.00 | 5.00                   | -0.01          | 4.99               | 3.156             | 0.000 7                                     | 1.000 0                           |
| WLAN(802.11a)    | 5 180.00              | ~ | 5 240.00 | 8.00                   | -0.61          | 7.39               | 5.483             | 0.001 1                                     | 1.000 0                           |
| WLAN(802.11a)    | 5 260.00              | ~ | 5 320.00 | 8.00                   | -0.18          | 7.82               | 6.054             | 0.001 3                                     | 1.000 0                           |
| WLAN(802.11a)    | 5 500.00              | ~ | 5 720.00 | 6.00                   | -0.77          | 5.23               | 3.335             | 0.000 7                                     | 1.000 0                           |
| WLAN(802.11a)    | 5 745.00              | ~ | 5 825.00 | 3.00                   | -0.18          | 2.82               | 1.915             | 0.000 4                                     | 1.000 0                           |
|                  |                       | ~ |          |                        |                |                    |                   |                                             |                                   |
|                  |                       | ~ |          |                        |                |                    |                   |                                             |                                   |
|                  |                       | ~ |          |                        |                |                    |                   |                                             |                                   |

Note: Please refer to the operation description for Max tune-up power.

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The MPE sample calculation for this exposure is shown below.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 3.156 / (4 \times 20^2 \times \pi) \\
 &= 0.001 \text{ mW/cm}^2
 \end{aligned}$$

### - Note

S= Maximum power density(mW/cm<sup>2</sup>)

EIRP= Equivalent Isotropic Radiated Power(mW)

R= Distance to the center of the radiation of the antenna(20cm)

### Part 1.1310

#### ▪ Limits for Maximum Permissible Exposure (MPE)

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|-----------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| 0.3 ~ 1.34            | 614                           | 1.63                          | *100                                | 30                       |
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| 30 ~ 300              | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300 ~ 1,500           |                               |                               | f / 1500                            | 30                       |
| 1,500 ~ 100,000       |                               |                               | 1.0                                 | 30                       |

**Conclusion : The exposure condition of this device is compliant with FCC**

## RF Exposure Compliance for simultaneous operations

- Worst case for simultaneous operations
- BT + WLAN(5GHz)

| RF feature or mode                    | BT      | WLAN    | - | - | - | - | - | Σ of MPE ratios |
|---------------------------------------|---------|---------|---|---|---|---|---|-----------------|
| Band(Worst case)                      | 2.4GHz  | 5GHz    | - | - | - | - | - |                 |
| Power Density (mW/cm <sup>2</sup> )   | 0.000 4 | 0.001 3 | - | - | - | - | - |                 |
| Requirement (mW/cm <sup>2</sup> )     | 1.000 0 | 1.000 0 | - | - | - | - | - |                 |
| MPE ratio (Power Density/Requirement) | 0.000 4 | 0.001 3 | - | - | - | - | - |                 |
| Worst case(MPE ratio)                 | 0.000 4 | 0.001 3 | - | - | - | - | - | 0.001 7         |

- Requirement = Σ of MPE ratios ≤ 1

**Conclusion :** The exposure condition of this device is compliant with FCC rules.