

## MPE Calculation

Regulation(s): Part 1.1310, Part 2.1091

Method: KDB447498 D01v06

| RF feature(Worst Mode) | Frequency range (MHz) |   |          | Max Target Power (dBm) <sup>Note</sup> | ANT Gain (dBi) | Maximum EIRP (dBm) | Maximum EIRP (mW) | Maximum power density (mW/cm <sup>2</sup> ) | Requirement (mW/cm <sup>2</sup> ) |
|------------------------|-----------------------|---|----------|----------------------------------------|----------------|--------------------|-------------------|---------------------------------------------|-----------------------------------|
| 802.11b                | 2 412.00              | ~ | 2 462.00 | 17.50                                  | -1.80          | 15.70              | 37.154            | 0.007 4                                     | 1.000 0                           |
| 802.11a                | 5 180.00              | ~ | 5 240.00 | 13.00                                  | -0.50          | 12.50              | 17.783            | 0.003 6                                     | 1.000 0                           |
| 802.11n(HT20)          | 5 260.00              | ~ | 5 320.00 | 13.00                                  | 0.50           | 13.50              | 22.388            | 0.004 5                                     | 1.000 0                           |
| 802.11a                | 5 500.00              | ~ | 5 720.00 | 13.00                                  | 0.40           | 13.40              | 21.878            | 0.004 4                                     | 1.000 0                           |
| 802.11n(HT40)          | 5 755.00              | ~ | 5 795.00 | 13.50                                  | 0.40           | 13.90              | 24.548            | 0.004 9                                     | 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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 37.154 / (4 \times 20^2 \times \pi) \\
 &= 0.007 \text{ mW/cm}^2
 \end{aligned}$$

### - 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**

## MPE Calculation

Regulation(s): Part 1.1310, Part 2.1091

Method: KDB447498 D01v06

| RF feature(Worst Mode) | Frequency range (MHz) |   |          | Nominal. Target Power(dBm) | Tolerance (dB) | ANT Gain (dBi) | Maximum EIRP (dBm) | Maximum EIRP (mW) | Maximum power density (mW/cm <sup>2</sup> ) | Requirement (mW/cm <sup>2</sup> ) |
|------------------------|-----------------------|---|----------|----------------------------|----------------|----------------|--------------------|-------------------|---------------------------------------------|-----------------------------------|
| NR Band n2             | 1 850.00              | ~ | 1 910.00 | 23.0                       | 2.7            | -0.9           | 24.80              | 301.996           | 0.060 1                                     | 1.000 0                           |
| NR Band n5             | 824.00                | ~ | 849.00   | 23.0                       | 2.7            | -0.7           | 25.00              | 316.228           | 0.063 0                                     | 0.549 0                           |
| NR Band n12            | 699.00                | ~ | 716.00   | 23.0                       | 2.7            | -0.9           | 24.80              | 301.996           | 0.060 1                                     | 0.466 0                           |
| NR Band n66            | 1 710.00              | ~ | 1 780.00 | 23.0                       | 2.7            | 0.1            | 25.80              | 380.190           | 0.075 7                                     | 1.000 0                           |
| NR Band n77            | 3 450.00              | ~ | 3 550.00 | 22.5                       | 2.5            | -3.5           | 21.50              | 141.254           | 0.028 2                                     | 1.000 0                           |
| NR Band n77            | 3 700.00              | ~ | 3 980.00 | 22.5                       | 2.5            | -4.8           | 20.20              | 104.713           | 0.020 9                                     | 1.000 0                           |
| Band14                 | 788.00                | ~ | 798.00   | 23.0                       | 2.7            | -0.3           | 25.40              | 346.737           | 0.069 0                                     | 0.525 0                           |
|                        |                       | ~ |          |                            |                |                |                    |                   |                                             |                                   |

Note: The above LTE values are taken from certified module.(FCC ID: BEJTM15FNNATY0)

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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 301.996 / (4 \times 20^2 \times \pi) \\
 &= 0.060 \text{ mW/cm}^2
 \end{aligned}$$

### - 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**

## RF Exposure Compliance for simultaneous operations

- Worst case for simultaneous operations
- WLAN(2.4GHz) + LTE Band 14

| RF feature or mode                    | WLAN    | LTE     | - | - | - | - | - | Σ of MPE ratios |
|---------------------------------------|---------|---------|---|---|---|---|---|-----------------|
| Band(Worst case)                      | 2.4GHz  | Band 14 | - | - | - | - | - |                 |
| Power Density (mW/cm <sup>2</sup> )   | 0.007 4 | 0.069 0 | - | - | - | - | - |                 |
| Requirement (mW/cm <sup>2</sup> )     | 1.000 0 | 0.525 0 | - | - | - | - | - |                 |
| MPE ratio (Power Density/Requirement) | 0.007 4 | 0.131 4 | - | - | - | - | - |                 |
| Worst case(MPE ratio)                 | 0.007 4 | 0.131 4 | - | - | - | - | - | 0.138 8         |

- Requirement = Σ of MPE ratios ≤ 1

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