

## RF EXPOSURE EVALUATION

### MPE-Based Exemption

#### Applicable Standard

According to subpart 15.247 (i) and subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 v01 Interim General RF Exposure Guidance

MPE-Based Exemption:

General frequency and separation-distance dependent MPE-based effective radiated power(ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(3)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

| RF Source frequency (MHz) | Threshold ERP (watts) |
|---------------------------|-----------------------|
| 0.3-1.34                  | $1,920 R^2$ .         |
| 1.34-30                   | $3,450 R^2/f^2$ .     |
| 30-300                    | $3.83 R^2$ .          |
| 300-1,500                 | $0.0128 R^2 f$ .      |
| 1,500-100,000             | $19.2 R^2$ .          |

R is the minimum separation distance in meters

f = frequency in MHz

For multiple RF sources: Multiple RF sources are exempt if:

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

**Result**

| Mode      | Frequency (MHz) | Tune up conducted power <sup>#</sup> (dBm) | Antenna Gain <sup>#</sup> |       | ERP   |        | Evaluation Distance (m) | ERP Limit (mW) |
|-----------|-----------------|--------------------------------------------|---------------------------|-------|-------|--------|-------------------------|----------------|
|           |                 |                                            | (dBi)                     | (dBd) | (dBm) | (mW)   |                         |                |
| BT        | 2402-2480       | 13.0                                       | -4.32                     | -6.47 | 6.53  | 4.50   | 0.2                     | 768            |
| BLE       | 2402-2480       | 10.5                                       | -4.32                     | -6.47 | 4.03  | 2.53   | 0.2                     | 768            |
| 2.4GWi-Fi | 2412-2462       | 24.0                                       | -4.32                     | -6.47 | 17.53 | 56.62  | 0.2                     | 768            |
| LTE B2    | 1850-1910       | 25.0                                       | 1.55                      | -0.60 | 24.40 | 275.42 | 0.2                     | 768            |
| LTE B4    | 1710-1755       | 25.0                                       | 1.23                      | -0.92 | 24.08 | 255.86 | 0.2                     | 768            |
| LTE B5    | 824-849         | 25.0                                       | -4.62                     | -6.77 | 18.23 | 66.53  | 0.2                     | 422            |
| LTE B7    | 2500-2570       | 25.0                                       | 1.78                      | -0.37 | 24.63 | 290.40 | 0.2                     | 768            |
| LTE B25   | 1850-1915       | 25.0                                       | 1.55                      | -0.60 | 24.40 | 275.42 | 0.2                     | 768            |
| LTE B26   | 814-849         | 25.0                                       | -4.62                     | -6.77 | 18.23 | 66.53  | 0.2                     | 417            |
| LTE B38   | 2570-2620       | 25.0                                       | 1.58                      | -0.57 | 24.43 | 277.33 | 0.2                     | 768            |
| LTE B41   | 2496-2690       | 25.0                                       | 1.78                      | -0.37 | 24.63 | 290.40 | 0.2                     | 768            |
| LTE B66   | 1710-1780       | 25.0                                       | 1.60                      | -0.55 | 24.45 | 278.61 | 0.2                     | 768            |

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.

2. The BT and 2.4G Wi-Fi cannot transmit at same time.

3. 0dBd=2.15dBi

Simultaneous transmitting consideration (worst case):

The ratio=  $ERP_{2.4G\ Wi-Fi}/limit + ERP_{LTE\ B7}/limit = 56.62/768 + 290.40/768 = 0.452 < 1.0$

So simultaneous exposure is compliant.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

**Result: Compliant**