

FCC ID : EMOIBTW39V2

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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = Power density in mW/cm²

P_{out} =output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

π =3.1416

R = distance between observation point and center of the radiator in 20cm

P_d the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

11.2 Measurement Result

| Channel Freq. (MHz) | modulation | conducted power (mW) | conducted power (dBm) | Tune-up power (dBm) | Max tune-up power (dBm) | Antenna Gain Numeric | Evaluation result (mW/cm ²) | Power density Limits (mW/cm ²) |
|---------------------|----------------|----------------------|-----------------------|---------------------|-------------------------|----------------------|---|--|
| BT: | | | | | | | | |
| 2402 | GFSK | 4.06 | 6.08 | 5dBm to 7dBm | 7 | 1 | 0.00100 | 1 |
| 2441 | GFSK | 4.46 | 6.49 | 5dBm to 7dBm | 7 | 1 | 0.00100 | 1 |
| 2480 | GFSK | 3.40 | 5.32 | 5dBm to 7dBm | 7 | 1 | 0.00100 | 1 |
| 2402 | $\pi/4$ -DQPSK | 3.28 | 5.16 | 5dBm to 7dBm | 7 | 1 | 0.00100 | 1 |
| 2441 | $\pi/4$ -DQPSK | 4.24 | 6.27 | 5dBm to 7dBm | 7 | 1 | 0.00100 | 1 |
| 2480 | $\pi/4$ -DQPSK | 3.87 | 5.88 | 5dBm to 7dBm | 7 | 1 | 0.00100 | 1 |
| 2402 | 8DPSK | 2.95 | 4.70 | 3dBm to 5dBm | 5 | 1 | 0.00063 | 1 |
| 2441 | 8DPSK | 3.10 | 4.91 | 3dBm to 5dBm | 5 | 1 | 0.00063 | 1 |
| 2480 | 8DPSK | 2.32 | 3.66 | 3dBm to 5dBm | 5 | 1 | 0.00063 | 1 |

BLE:

| Channel Freq. (MHz) | modulation | conducted power (mW) | conducted power (dBm) | Tune-up power (dBm) | Max tune-up power (dBm) | Antenna Gain Numeric | Evaluation result (mW/cm ²) | Power density Limits (mW/cm ²) |
|---------------------|------------|----------------------|-----------------------|---------------------|-------------------------|----------------------|---|--|
| BLE: | | | | | | | | |
| 2402 | GFSK | 2.30 | 3.62 | 3dBm to 5dBm | 5 | 1 | 0.00063 | 1 |
| 2440 | GFSK | 3.08 | 4.88 | 3dBm to 5dBm | 5 | 1 | 0.00063 | 1 |
| 2480 | GFSK | 2.92 | 4.66 | 3dBm to 5dBm | 5 | 1 | 0.00063 | 1 |

RF EXPOSURE (BT+BLE) = 0.001+0.00063=0.00163 mW/cm² <1 mW/cm²

Note: Antenna gain: 0 dBi