# RF Exposure evaluation

# FCC ID: 2A26P-RA003

## 1. Reference

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

KDB447498 D01: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies

## 2. Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

| Frequency Range(MHz) | Electric Field Strength(V/m) | Magnetic Field Strength(A/m) | Power Density ($mW/cm^2$) | Averaging Time (minute) |
|---|---|---|---|---|
| Limits for Occupational/Controlled Exposure | | | | |
| 0.3 – 3.0 | 614 | 1.63 | (100) * | 6 |
| 3.0 – 30 | 1842/f | 4.89/f | ($900/f^2$)* | 6 |
| 30 – 300 | 61.4 | 0.163 | 1.0 | 6 |
| 300 – 1500 | / | / | f/300 | 6 |
| 1500 – 100,000 | / | / | 5 | 6 |

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

| Frequency Range(MHz) | Electric Field Strength(V/m) | Magnetic Field Strength(A/m) | Power Density ($mW/cm^2$) | Averaging Time (minute) |
|---|---|---|---|---|
| Limits for Occupational/Controlled Exposure | | | | |
| 0.3 – 3.0 | 614 | 1.63 | (100) * | 30 |
| 3.0 – 30 | 824/f | 2.19/f | ($180/f^2$)* | 30 |
| 30 – 300 | 27.5 | 0.073 | 0.2 | 30 |
| 300 – 1500 | / | / | f/1500 | 30 |
| 1500 – 100,000 | / | / | 1.0 | 30 |

F=frequency in MHz

*=Plane-wave equivalent power density

# 3. MPE Calculation Method

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01

**$S=PG/4\pi R^2$**

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna

# 4. Result

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, r =20cm, as well as the gain of the used antenna is 0.5 dBi for 2.4GHz, the RF power density can be obtained.

For 2.4Ghz wifi

| Frequency (MHz) | Max. Output Power (dBm) | Max. Output Power (mW) | Antenna Gain (Numeric) | Power Density At 20 cm ($mW/cm^2$) | Power Density Limit FCC ($mW/cm^2$) | Test Results |
|---|---|---|---|---|---|---|
| 2412 | 18.99 | 79.2501 | 1.1220 | 0.0177 | 1.0000 | PASS |
| 2437 | 19.58 | 90.7821 | 1.1220 | 0.0203 | 1.0000 | PASS |
| 2462 | 19.33 | 85.7038 | 1.1220 | 0.0191 | 1.0000 | PASS |
| 2422 | 19.08 | 80.9096 | 1.1220 | 0.0181 | 1.0000 | PASS |
| 2452 | 19.15 | 82.2243 | 1.1220 | 0.0184 | 1.0000 | PASS |

For BLE

| Frequency (MHz) | Max. Output Power (dBm) | Max. Output Power (mW) | Antenna Gain (Numeric) | Power Density At 20 cm ($mW/cm^2$) | Power Density Limit FCC ($mW/cm^2$) | Test Results |
|---|---|---|---|---|---|---|
| 2402 | 4.15 | 2.6002 | 1.1220 | 0.0006 | 1.0000 | PASS |
| 2440 | 5.06 | 3.2063 | 1.1220 | 0.0007 | 1.0000 | PASS |
| 2480 | 5.24 | 3.3420 | 1.1220 | 0.0007 | 1.0000 | PASS |

# 5. Conclusion

The SAR evaluation is not required.