

RF Exposure Compliance Requirement

Model no.: SPM-208L

1. Standard requirement

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 limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

(a) Limits for Occupational / Controlled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S)(mW/cm ²) | Averaging Times E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 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 |
| 1500-100000 | -- | -- | 5 | 6 |

(b) Limits for General Population / Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S)(mW/cm ²) | Averaging Times E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|--|--|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f ²)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | -- | -- | F/1500 | 30 |
| 1500-100000 | -- | -- | 1.0 | 30 |

Note: f=frequency in MHz; *Plane-wave equivalent power density

2. MPE Calculation Method

$$E (V/m) = (30 * P * G)^{0.5} / d \quad \text{Power Density: } Pd(W/m^2) = E^2 / 377$$

E=Electric Field (V/m)

P=Peak RF output Power (W)

G=EUT Antenna numeric gain (numeric)

d= Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = (30 * P * G) / (377 * d^2)$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

3. Calculated Result and Limit

WIFI:

Peak Output Power = 16.15dBm(max.value declared by client), antenna gain = 0.71dBi

| Frequency (MHz) | Antenna Gain (Numeric) | Peak Output Power (dBm) | Peak Output Power (mW) | Power Density (S) (mW/cm ²) | Limit of Power Density (S) (mW/cm ²) | Test Result |
|-----------------|------------------------|-------------------------|------------------------|---|--|-------------|
| 2412-2462 | 1.18 | 16.15 | 41.21 | 0.00965 | 1 | Complies |

MPE ratio:

$$0.00965(mW/cm^2) / 1(mW/cm^2) = 0.00965$$

Bluetooth(BLE):

Peak Output Power = 1.12dBm(max.value declared by client), antenna gain = 0.71dBi

| Frequency (MHz) | Antenna Gain (Numeric) | Peak Output Power (dBm) | Peak Output Power (mW) | Power Density (S) (mW/cm ²) | Limit of Power Density (S) (mW/cm ²) | Test Result |
|-----------------|------------------------|-------------------------|------------------------|---|--|-------------|
| 2402-2480 | 1.18 | 1.12 | 1.29 | 0.00030 | 1 | Complies |

MPE ratio:

$$0.00030 (mW/cm^2) / 1 (mW/cm^2) = 0.00030$$

Bluetooth(BT):

Peak Output Power = 0.84dBm(max.value declared by client), antenna gain = 0.71dBi

| Frequency (MHz) | Antenna Gain (Numeric) | Peak Output Power (dBm) | Peak Output Power (mW) | Power Density (S) (mW/cm ²) | Limit of Power Density (S) (mW/cm ²) | Test Result |
|-----------------|------------------------|-------------------------|------------------------|---|--|-------------|
| 2402-2480 | 1.18 | 0.84 | 1.21 | 0.00028 | 1 | Complies |

MPE ratio:

$$0.00028 \text{ (mW/cm}^2\text{)}/1\text{(mW/cm}^2\text{)}=0.00028$$

Sum of the MPE ratio for all simultaneously transmitting antennas:

$$0.00965+0.00030+0.00028 = 0.01023 < 1$$

According to MPE test Exclusion condition in KDB 447498 (D01) General RF Exposure Guidance D01 v06, the MPE report is not required.

Test Location:

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch

All tests were performed at:

Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China