

## FCC RF Exposure

**FCC ID:** 2AIFX-OP2200V

**Applicant:** SHENZHEN OPURES TECHNOLOGY CO.,LTD

Exposure category: General population/uncontrolled environment

EUT Type: Production Unit

Device Type: Embedded WiFi module

Refer Standard: FCC Part 2.1091: Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)

### FCC MPE Limited:

| Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                          |
|-----------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| 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                       |
| 300-1500                                            | /                             | /                             | f/1500                              | 30                       |
| 1500-100,000                                        | /                             | /                             | 1.0                                 | 30                       |

Test Data

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

2.4G WLAN Antenna Gain information

Antenna Gain: 2dBi

**Maximum Conduct output Power:**

| Test mode | Channel | Frequency (MHz) | ANT Gain(dBi) | Max. RF Power(dBm) | Tolerance $\pm$ (dB) |
|-----------|---------|-----------------|---------------|--------------------|----------------------|
| 802.11b   | 1       | 2412            | 2.0           | 18.41              | $18 \pm 1$           |
|           | 6       | 2437            | 2.0           | 18.22              | $18 \pm 1$           |
|           | 11      | 2462            | 2.0           | 17.98              | $18 \pm 1$           |
| 802.11g   | 1       | 2412            | 2.0           | 22.34              | $22 \pm 1$           |
|           | 6       | 2437            | 2.0           | 22.17              | $22 \pm 1$           |
|           | 11      | 2462            | 2.0           | 22.11              | $22 \pm 1$           |
| 802.11n20 | 1       | 2412            | 2.0           | 22.05              | $22 \pm 1$           |
|           | 6       | 2437            | 2.0           | 22.01              | $22 \pm 1$           |
|           | 11      | 2462            | 2.0           | 21.82              | $22 \pm 1$           |
| 802.11n40 | 3       | 2422            | 2.0           | 21.46              | $21 \pm 1$           |
|           | 6       | 2437            | 2.0           | 21.22              | $21 \pm 1$           |
|           | 9       | 2452            | 2.0           | 21.35              | $21 \pm 1$           |

| Test mode | Channel | Frequency (MHz) | ANT Gain(dBi) | Max. RF Power(dBm) | Tolerance $\pm$ (dB) |
|-----------|---------|-----------------|---------------|--------------------|----------------------|
| BLE       | 0       | 2402            | 2.0           | -0.93              | $-1.0 \pm 1$         |
|           | 19      | 2441            | 2.0           | -0.83              | $-1.0 \pm 1$         |
|           | 39      | 2480            | 2.0           | -0.65              | $-1.0 \pm 1$         |

| EDR Test Mode  | Channel | Frequency (MHz) | Max. RF Power(dBm) | ANT Gain(dBi) | Tolerance $\pm$ (dB) |
|----------------|---------|-----------------|--------------------|---------------|----------------------|
| GFSK           | 0       | 2402            | 6.67               | 2.0           | $6.5 \pm 1$          |
|                | 39      | 2441            | 7.04               | 2.0           | $6.5 \pm 1$          |
|                | 78      | 2480            | 6.95               | 2.0           | $6.5 \pm 1$          |
| $\pi/4$ -DQPSK | 0       | 2402            | 6.25               | 2.0           | $6.5 \pm 1$          |
|                | 39      | 2441            | 6.62               | 2.0           | $6.5 \pm 1$          |
|                | 78      | 2480            | 6.46               | 2.0           | $6.5 \pm 1$          |
| 8- DPSK        | 0       | 2402            | 6.32               | 2.0           | $6.5 \pm 1$          |
|                | 39      | 2441            | 6.70               | 2.0           | $6.5 \pm 1$          |
|                | 78      | 2480            | 6.57               | 2.0           | $6.5 \pm 1$          |

**Calculation results (for 2.4G WIFI): pass**

| Mode      | Frequency (MHz) | Maximum tune up power(dBm) | RF distance(cm) | Result (mW/cm2) | Ratio  | Limit (mW/cm2) |
|-----------|-----------------|----------------------------|-----------------|-----------------|--------|----------------|
| 802.11b   | 2412            | 19                         | 20              | 0.025           | 0.025  | 1.0            |
|           | 2437            | 19                         | 20              | 0.025           | 0.025  |                |
|           | 2462            | 19                         | 20              | 0.025           | 0.025  |                |
| 802.11g   | 2412            | 23                         | 20              | 0.063           | 0.063  |                |
|           | 2437            | 23                         | 20              | 0.063           | 0.063  |                |
|           | 2462            | 23                         | 20              | 0.063           | 0.063  |                |
| 802.11n20 | 2412            | 23                         | 20              | 0.063           | 0.063  |                |
|           | 2437            | 23                         | 20              | 0.063           | 0.063  |                |
|           | 2462            | 23                         | 20              | 0.063           | 0.063  |                |
| 802.11n40 | 2422            | 22                         | 20              | 0.05            | 0.05   |                |
|           | 2437            | 22                         | 20              | 0.05            | 0.05   |                |
|           | 2452            | 22                         | 20              | 0.05            | 0.05   |                |
| BLE       | 2402            | 0                          | 20              | 0.0003          | 0.0003 |                |
|           | 2441            | 0                          | 20              | 0.0003          | 0.0003 |                |
|           | 2480            | 0                          | 20              | 0.0003          | 0.0003 |                |
| BT EDR    | 2402            | 7.5                        | 20              | 0.002           | 0.002  |                |
|           | 2441            | 7.5                        | 20              | 0.002           | 0.002  |                |
|           | 2480            | 7.5                        | 20              | 0.002           | 0.002  |                |

**Simultaneous MPE**

| No. | Transmitter Combinations | Scenario Supported or not |
|-----|--------------------------|---------------------------|
| 1   | WIFI+BT                  | Yes                       |

**Max Simultaneous MPE calculation results:**

| No. | Mode    | MPE Ratio   | Results         |
|-----|---------|-------------|-----------------|
| 1   | WIFI+BT | 0.063+0.002 | 0.065<1.0(pass) |