# FCC RF EXPOSURE REPORT

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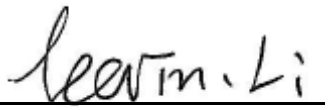
|---|---|---|
| Applicant | : | IGRS Engineering Lab (Shenzhen) Ltd |
| Address | : | 6F, Block A3,Cyber-tech Zone,Gaoxin Ave.7th.S.Hi-Tech Industrial Park, Nanshan District, Shenzhen, China |
| Equipment | : | Wireless module |
| Model No. | : | MW50A |
| Trade Name | : | N/A |
| FCC ID. | : | 2A3LP-MW50A |

**I HEREBY CERTIFY THAT :**

**The sample was received on Sept. 27, 2021 and the testing was completed on Oct. 26, 2021 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.**

Approved by:



**Leevin Li /Supervisor**

## Contents

# History of this test report

■ Original

☐ Additional attachment as following record:

| Attachment No. | Issue Date | Description |
|---|---|---|
| DEFJ2109065 | Oct. 26, 2021 | Original |
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# 1. Test Configuration of Equipment under Test

## 1.1 Feature of Equipment

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|---|---|
| Equipment | Wireless module |
| Model Name | MW50A |
| Model Discrepancy | N/A |
| Frequency Range | BT/BLE/ WIFI 2.4G: 2400MHz-2483.5MHz<br>WIFI 5G: 5150MHz-5350MHz, 5470-5725MHz,<br>5725MHz -5850MHz |
| Modulation Type | BT: GFSK, π/4-DQPSK, 8DPSK<br>BLE: GFSK<br>802.11b: CCK, DQPSK, DBPSK<br>802.11a/g: 64-QAM,16-QAM, QPSK, BPSK<br>802.11n: 64-QAM,16-QAM, QPSK, BPSK<br>802.11ac: 256-QAM,64-QAM,16-QAM, QPSK, BPSK |
| Data Rate | BT:<br>GFSK:1Mbps, π/4-DQPSK: 2Mbps, 8DPSK:3Mbps<br>BLE:<br>GFSK: 1Mbps&2Mbps<br>WIFI 2.4G:<br>802.11b: 1, 2 ,5.5,11Mbps<br>802.11g: 6,9,12,18,24,36,48,54Mbps<br>802.11n: HT20 reach up to 144.4Mbps, HT40 reach up to 300Mbps<br>WIFI 5G:<br>802.11a: 6,9,12,18,24,36,48,54Mbps<br>802.11n: HT20 reach up to 144.4Mbps, HT40 reach up to300Mbps<br>802.11ac: VHT20 reach up to 173.3Mbps, VHT40 reach up to 400Mbps, VHT80 reach up to 866.7Mbps |
| Antenna Type | BT/BLE: PIFA Antenna<br>WIFI 2.4G/5G: PIFA Antenna |
| Operating Voltage | 5 V±10% |

Note: For more details, please refer to the User's manual of the EUT.

## 1.2 General Information of Test

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|---|---|
| Test Site | **Cerpass Technology Corporation(Cerpass Laboratory)**<br>Address: Room 102, No. 5, Xing'an Road, Chang'an Town, Dongguan City, Guangdong Province<br>Tel: +86-769-8547-1212<br>Fax: +86-769-8547-1912 |
| FCC Designation No.: | CN1288 |

## 2. Radio Frequency Exposure

| | |
|---|---|
| **Device category** | ☐ Portable (<20cm separation)<br>☒ Mobile (>20cm separation) |
| **Exposure classification** | ☐ Occupational/Controlled exposure (S = 5mW/cm$^2$)<br>☒ General Population/Uncontrolled exposure (S=1mW/cm$^2$) |
| **Antenna diversity** | ☐ Single antenna<br>☒ Multiple antennas<br>☐ Tx diversity<br>☐ Rx diversity<br>☒ Tx/Rx diversity |
| **Evaluation applied** | ☒ MPE Evaluation*<br>☐ SAR Evaluation<br>☐ N/A |

**TEST RESULTS**

No non-compliance noted.

**Calculation**

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

*Where* *E = Field strength in Volts / meter*
*P = Power in Watts*
*G = Numeric antenna gain*
*d = Distance in meters*
*S = Power density in milliwatts / square centimeter*

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

*P (mW) = P (W) / 1000 and*
*d (cm) = d(m) /100*

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$ ***Equation 1***

*Where* *d = Distance in cm*
*P = Power in mW*
*G = Numeric antenna gain*
*S = Power density in mW / cm$^2$*

**Maximum Permissible Exposure**

**Bluetooth**

| Mode | Channel Frequency (MHz) | Max. Conducted output power (dBm) | Max. Tune up power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm2) |
|---|---|---|---|---|---|---|
| Bluetooth EDR | 2402-2480 | 7.69 | 8.69 | 4.78 | 20 | 0.004 |
| Bluetooth LE | 2402-2480 | 7.98 | 8.98 | 4.78 | 20 | 0.005 |

**Wlan**

**SISO**

| Channel Frequency (MHz) | Max. Conducted output power (dBm) | Max. Tune up power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density ($mW/cm^2$) |
|---|---|---|---|---|---|
| 2412-2462 | 22.32 | 23.32 | 4.60 | 20 | 0.123 |
| 5150-5250 | 14.13 | 15.13 | 4.94 | 20 | 0.020 |
| 5250-5350 | 14.02 | 15.02 | 5.05 | 20 | 0.020 |
| 5470-5725 | 14.88 | 15.88 | 4.88 | 20 | 0.024 |
| 5725-5850 | 12.81 | 13.81 | 4.53 | 20 | 0.014 |

**MIMO**

**ANT A**

| Channel Frequency (MHz) | Max. Conducted output power (dBm) | Max. Tune up power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density ($mW/cm^2$) |
|---|---|---|---|---|---|
| 2412-2462 | 22.21 | 23.21 | 4.60 | 20 | 0.120 |
| 5150-5250 | 13.57 | 14.57 | 5.35 | 20 | 0.020 |
| 5250-5350 | 14.02 | 15.02 | 5.05 | 20 | 0.020 |
| 5470-5725 | 14.29 | 15.29 | 5.57 | 20 | 0.024 |
| 5725-5850 | 11.63 | 12.63 | 5.59 | 20 | 0.013 |

**ANT B**

| Channel Frequency (MHz) | Max. Conducted output power (dBm) | Max. Tune up power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density ($mW/cm^2$) |
|---|---|---|---|---|---|
| 2412-2462 | 21.83 | 22.83 | 4.10 | 20 | 0.098 |
| 5150-5250 | 14.13 | 15.13 | 4.94 | 20 | 0.020 |
| 5250-5350 | 11.34 | 12.34 | 4.68 | 20 | 0.010 |
| 5470-5725 | 14.88 | 15.88 | 4.88 | 20 | 0.024 |
| 5725-5850 | 12.81 | 13.81 | 4.53 | 20 | 0.014 |

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits :

| Simultaneous transmission mode | The sum of the ratios | Result |
|---|---|---|
| ANT A+ANT B | 0.120/1+0.098/1 | 0.218＜1 |

**Maximum Permissible Exposure (Co-location)**

the sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits :

| Simultaneous transmission mode | The sum of the ratios | Result |
|---|---|---|
| Bluetooth +WLAN | 0.005/1+0.120/1+0.098/1 | 0.223＜1 |

**Conclusion**

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

**----------End of the report ----------**