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# RF Exposure Evaluation Report

**Report No. :** CQASZ20210701124E-02  
**Applicant:** XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD.  
**Address of Applicant:** (5/F) NO.168, QIANPU ROAD, SIMING DISTRICT, XIAMEN, CHINA.  
**Equipment Under Test (EUT):**  
**Product:** Massage Chair  
**Model No.:** EI-8502A, Maxim 3D LE  
**Test Model No.** Maxim 3D LE  
**Brand Name:** N/A  
**FCC ID:** YMX-EI8502A-01  
**Standards:** 47 CFR Part 1.1307  
47 CFR Part 1.1310  
KDB447498D01 General RF Exposure Guidance v06  
**Date of Receipt:** 2021-07-20  
**Date of Test:** 2021-07-20 to 2021-08-10  
**Date of Issue:** 2021-09-02  
**Test Result :** PASS\*

\*In the configuration tested, the EUT complied with the standards specified above

**Tested By:**

*Lewis Zhou*

( Lewis Zhou )

**Reviewed By:**

*Rock Huang*

( Rock Huang )

**Approved By:**

*Jack ai*

( Jack ai )



## 1 Version

### Revision History Of Report

| Report No.           | Version | Description    | Issue Date |
|----------------------|---------|----------------|------------|
| CQASZ20210701124E-02 | Rev.01  | Initial report | 2021-09-02 |

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### 3 General Information

#### 3.1 Client Information

|                          |                                                                                                           |
|--------------------------|-----------------------------------------------------------------------------------------------------------|
| Applicant:               | XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD.                                                       |
| Address of Applicant:    | (5/F) NO.168, QIANPU ROAD, SIMING DISTRICT, XIAMEN, CHINA.                                                |
| Manufacturer:            | XIAMEN HEALTHCARE ELECTRONIC CO., LTD.                                                                    |
| Address of Manufacturer: | 65-66#, 62-63#Building, Siming Zone, Tongan Industrial District, Xiamen City, Fujian Province, P.R. China |
| Factory:                 | XIAMEN HEALTHCARE ELECTRONIC CO., LTD.                                                                    |
| Address of Factory:      | 65-66#, 62-63#Building, Siming Zone, Tongan Industrial District, Xiamen City, Fujian Province, P.R. China |

#### 3.2 General Description of EUT

|                                    |                                                                                                                    |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Product Name:                      | Massage Chair                                                                                                      |
| All Model No.:                     | EI-8502A, Maxim 3D LE                                                                                              |
| Test Model No.:                    | Maxim 3D LE                                                                                                        |
| Trade Mark:                        | N/A                                                                                                                |
| EUT Supports<br>Radios application | 2402-2480MHz                                                                                                       |
| Hardware Version:                  | V1.1                                                                                                               |
| Software Version:                  | V1.0                                                                                                               |
| Power Supply:                      | Rating: 110-120V~ 60Hz<br>Rated current: 1.1A                                                                      |
| Product Type:                      | <input type="checkbox"/> Mobile <input type="checkbox"/> Portable <input checked="" type="checkbox"/> Fix Location |
| Test Software of EUT:              | FCCAssist 1.0.0.2                                                                                                  |
| Antenna Type:                      | PCB antenna                                                                                                        |
| Antenna Gain:                      | -1.39dBm                                                                                                           |

## 4 MPE Evaluation

### 4.1 RF Exposure Compliance Requirement

#### 4.1.1 Limits

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency range<br>(MHz)                                       | Electric field<br>strength<br>(V/m) | Magnetic field<br>strength<br>(A/m) | Power density<br>(mW/cm <sup>2</sup> ) | Averaging time<br>(minutes) |
|----------------------------------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------|-----------------------------|
| <b>(A) Limits for Occupational/Controlled Exposures</b>        |                                     |                                     |                                        |                             |
| 0.3–3.0 .....                                                  | 614                                 | 1.63                                | *(100)                                 | 6                           |
| 3.0–30 .....                                                   | 1842/f                              | 4.89/f                              | *(900/f <sup>2</sup> )                 | 6                           |
| 30–300 .....                                                   | 61.4                                | 0.163                               | 1.0                                    | 6                           |
| 300–1500 .....                                                 | .....                               | .....                               | f/300                                  | 6                           |
| 1500–100,000 .....                                             | .....                               | .....                               | 5                                      | 6                           |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                                     |                                     |                                        |                             |
| 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                          |

F= Frequency in MHz

Friis Formula

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

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

#### 4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

#### 4.1.3 EUT RF Exposure Evaluation standalone operations

##### 1) For BT Classic (for CSR chip)

Antenna Gain: -1.39 dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.726 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

##### Measurement Data

| GFSK mode        |                            |                            |                       |       |
|------------------|----------------------------|----------------------------|-----------------------|-------|
| Test channel     | Peak Output Power<br>(dBm) | Tune up tolerance<br>(dBm) | Maximum tune-up Power |       |
|                  |                            |                            | (dBm)                 | (mW)  |
| Lowest(2402MHz)  | -0.480                     | -0.5±1                     | 0.5                   | 1.122 |
| Middle(2441MHz)  | 0.500                      | 0.5±1                      | 1.5                   | 1.413 |
| Highest(2480MHz) | 1.970                      | 2.0±1                      | 3.0                   | 1.995 |
| π/4DQPSK mode    |                            |                            |                       |       |
| Test channel     | Peak Output Power<br>(dBm) | Tune up tolerance<br>(dBm) | Maximum tune-up Power |       |
|                  |                            |                            | (dBm)                 | (mW)  |
| Lowest(2402MHz)  | 0.100                      | 0±1                        | 1.0                   | 1.259 |
| Middle(2441MHz)  | 1.090                      | 1.0±1                      | 2.0                   | 1.585 |
| Highest(2480MHz) | 2.480                      | 2.5±1                      | 3.5                   | 2.239 |

The worst case:

| Maximum tune-up Power<br>(mW) | Antenna Gain<br>(dBi) | Power Density<br>at R = 20 cm<br>(mW/cm²) | Limit | Result |
|-------------------------------|-----------------------|-------------------------------------------|-------|--------|
| 2.239                         | -1.39                 | 0.00032                                   | 1.0   | PASS   |

Note: 1) Refer to report No. CQASZ20210701124-01E for EUT test Max Conducted Peak Output Power value.

2)  $P_d = (P_{out} * G) / (4 * \pi * R^2) = (2.239 * 0.726) / (4 * 3.1416 * 20^2) = 0.00032$