

# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

**Test Report No.** : W174R-D078  
**AGR No.** : A172A-234  
**Applicant** : BODYFRIEND Co.,Ltd.  
**Address** : 163 Yangjaecheon-ro Gangnam-gu Seoul South Korea 06302  
**Manufacturer** : BODYFRIEND Co.,Ltd.  
**Address** : 163 Yangjaecheon-ro Gangnam-gu Seoul South Korea 06302  
**Type of Equipment** : Massage Chair  
**FCC ID.** : 2ALS5-BFR-8000US  
**Model Name** : REX-L  
**Serial number** : N/A  
**Total page of Report** : 8 pages (including this page)  
**Date of Incoming** : March 05, 2017  
**Date of issue** : April 25, 2017

## SUMMARY

The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.247*  
 This test report only contains the result of a single test of the sample supplied for the examination.  
 It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:  <hr style="border: 0.5px solid black;"/> Jae-Ho Lee / Chief Engineer ONETECH Corp.	Approved by:  <hr style="border: 0.5px solid black;"/> Keun-Young, Choi / Vice President ONETECH Corp.
---	---

**CONTENTS****PAGE**

<b>1. VERIFICATION OF COMPLIANCE .....</b>	<b>4</b>
<b>2. GENERAL INFORMATION .....</b>	<b>5</b>
<b>2.1 PRODUCT DESCRIPTION .....</b>	<b>5</b>
<b>2.2 ALTERNATIVE TYPE(S)/MODEL(S); ALSO COVERED BY THIS TEST REPORT. ....</b>	<b>5</b>
<b>3. EUT MODIFICATIONS.....</b>	<b>5</b>
<b>4. MAXIMUM PERMISSIBLE EXPOSURE.....</b>	<b>6</b>
<b>4.1 RF EXPOSURE CALCULATION .....</b>	<b>6</b>
<b>4.2 EUT DESCRIPTION.....</b>	<b>7</b>
<b>4.3 CALCULATED MPE SAFE DISTANCE.....</b>	<b>8</b>

### Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
W174R-D078	April 25, 2017	Initial Issue	All

### DOCUMENT HISTORY

Revision No.	Issued Date	Revisions	Effect Section
Original	April 25, 2017	Initial Issue	-
Revision 01	April 28, 2017	Remove safety distance / Modified power density	4.3 Calculated MPE Safe Distance
Revision 02	May 09, 2017	Modified power density	4.3 Calculated MPE Safe Distance

**1. VERIFICATION OF COMPLIANCE**

Applicant : BODYFRIEND Co.,Ltd.  
 Address : 163 Yangjaecheon-ro Gangnam-gu Seoul South Korea 06302  
 Contact Person : Kiseop, Park / Senior Research Engineer  
 Telephone No. : +82-2-3448-8980  
 FCC ID : 2ALS5-BFR-8000US  
 Model Name : REX-L  
 Serial Number : N/A  
 Date : April 25, 2017

EQUIPMENT CLASS	DSS – PART 15 SPREAD SPECTRUM TRANSMITTER
E.U.T. DESCRIPTION	Massage Chair
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

## 2. GENERAL INFORMATION

### 2.1 Product Description

The BODYFRIEND Co.,Ltd., Model REX-L (referred to as the EUT in this report) is a Massage Chair. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Massage Chair	
OPERATING FREQUENCY	2 402 MHz ~ 2 480 MHz	
RF OUTPUT POWER	1 Mbps	2.87 dBm
	2 Mbps	1.46 dBm
	3 Mbps	1.60 dBm
NUMBER OF CHANNEL	79 Channels	
MODULATION TYPE	GFSK for 1 Mbps, $\pi/4$ -DQPSK for 2 Mbps, 8-DPSK for 3 Mbps	
ANTENNA TYPE	PIFA Antenna	
ANTENNA GAIN	-5.98 dBi	
LIST OF EACH OSC. OR CRYSTAL. FREQ.(FREQ.>=1 MHz)	24 MHz	
RATED SUPPLY VOLTAGE	AC 120 V	

### 2.2 Alternative type(s)/model(s); also covered by this test report.

-. None

## 3. EUT MODIFICATIONS

-. None

## 4. MAXIMUM PERMISSIBLE EXPOSURE

### 4.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment are  $f/1500$  mW/cm<sup>2</sup> for the frequency range between 300 MHz and 1 500 MHz and 1.0 mW/cm<sup>2</sup> for the frequency range between 1 500 MHz and 100 000 MHz.

The electric field generated for a 1 mW/cm<sup>2</sup> exposure is calculated as follows:

$$E = \sqrt{(30 * P * G) / d}, \text{ and } S = E^2 / Z = E^2 / 377, \text{ because } 1 \text{ mW/cm}^2 = 10 \text{ W/m}^2$$

Where

S = Power density in mW/cm<sup>2</sup>, Z = Impedance of free space, 377 Ω

E = Electric field strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combining equations and rearranging the terms to express the distance as a function of the remaining variable

$$d = \sqrt{(30 * P * G) / (377 * 10 S)}$$

Changing to units of mW and cm, using  $P \text{ (mW)} = P \text{ (W)} / 1 000$ ,  $d \text{ (cm)} = 0.01 * d \text{ (m)}$

$$d = 0.282 * \sqrt{(P * G) / S}$$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm<sup>2</sup>

**4.2 EUT Description**

Kind of EUT	Massage Chair	
Operating Frequency Band	<input type="checkbox"/> Wireless Microphone: 494.000 MHz ~ 501.000 MHz and 498.200 MHz ~ 505.200 MHz <input type="checkbox"/> WLAN: 2 412 MHz ~ 2 462 MHz <input type="checkbox"/> WLAN: 5 180 MHz ~ 5 240 MHz <input type="checkbox"/> WLAN: 5 745 MHz ~ 5 825 MHz <input checked="" type="checkbox"/> Bluetooth: 2 402 MHz ~ 2 480 MHz <input type="checkbox"/> Bluetooth BLE: 2 402 MHz ~ 2 480 MHz	
MAX. RF OUTPUT POWER	1 Mbps	2.87 dBm
	2 Mbps	1.46 dBm
	3 Mbps	1.60 dBm
Antenna Gain	-5.98 dBi	
Exposure Evaluation Applied	<input checked="" type="checkbox"/> MPE <input type="checkbox"/> SAR <input type="checkbox"/> N/A	

\*2.4GHz & 5GHz can not transmit at the same time

### 4.3 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Operating Freq. Band (MHz)	Operating Mode	Target Power W/tolerance	Max tune up power		Antenna Gain		Power Density (mW/cm <sup>2</sup> ) @ 20 cm Separation	Limit (mW/cm <sup>2</sup> )
		(dBm)	(dBm)	(mW)	Log	Linear		
2 402 ~ 2 480	1 Mbps	2.37 ± 0.5	2.87	1.94	-5.98	0.252	0.000 10	1.00
	2 Mbps	0.96 ± 0.5	1.46	1.40			0.000 07	1.00
	3 Mbps	1.1 ± 0.5	1.60	1.45			0.000 07	1.00