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RF Exposure Evaluation Report

Report No. :	CQASZ20191101135E-04
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.:	EC-7510A, BK-750
Test Model No.:	EC-7510A
Brand Name:	N/A
FCC ID:	YMX-EC7510A
Standards:	47 CFR Part 1.1307 47 CFR Part 2.1093 KDB447498D01 General RF Exposure Guidance v06
Date of Receipt:	2019-11-11
Date of Test:	2019-11-11 to 2019-11-26
Date of Issue:	2019-11-26
Test Result :	**PASS***

Tested By: Tom chen. ***(Tom chen)***

Reviewed By: Aaron Ma ***(Aaron Ma)***

Approved By: ***(Jack Ai)***

SHENZHEN HUAXIA TESTING TECHNOLOGY CO., LTD. CQA 华夏准测 APPROVED

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

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20191101135E-04	Rev.01	Initial report	2019-11-26

2 Contents

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

3.2 General Description of EUT

Product Name:	Massage Chair
Model No.:	EC-7510A, BK-750
Test Model No.:	EC-7510A
Trade Mark:	N/A
Hardware Version:	V1.0
Software Version:	V1.0
Sample Type:	☐ Mobile ☐ Portable ☒ Fix Location
Power Supply:	120V60Hz

3.3 General Description of BT

Operation Frequency:	2402MHz~2480MHz
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Test Software of EUT:	RDA ToolKit 8.03.02 (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	2.0dBi

3.4 General Description of BLE

Operation Frequency:	2402MHz~2480MHz
Modulation Type:	GFSK
Transfer Rate:	1Mbps
Number of Channel:	40
Test Software of EUT:	EMI_TEST_v1.1 (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	3.0dBi

3.5 General Description of WIFI

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Channel Separation:	5MHz

Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20) : OFDM (64QAM, 16QAM, QPSK, BPSK)
Transfer Rate:	IEEE for 802.11b: 1Mbps/2Mbps/5.5Mbps/11Mbps IEEE for 802.11g : 6Mbps/9Mbps/12Mbps/18Mbps/24Mbps/36Mbps/48Mbps/54Mbps IEEE for 802.11n(HT20) : 6.5Mbps/13Mbps/19.5Mbps/26Mbps/39Mbps/52Mbps/58.5Mbps/65Mbps
Test Software of EUT:	EspRFtestTool (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	2.0dBi

Note:

Model No.: EC-7510A, BK-750

Only the model EC-7510A was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance and model name.

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measuremen or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

4.1.2 Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

f(GHz) is the RF channel transmit frequency in GHz
Power and distance are rounded to the nearest mW and mm before calculation[17]
The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

4.1.3 EUT RF Exposure

1) For BT

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-6.010	-7.0±1	-6.0	0.251
Middle(2441MHz)	-5.950	-6.5±1	-5.5	0.282
Highest(2480MHz)	-4.950	-5.5±1	-4.5	0.355
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-6.350	-7.0±1	-6.0	0.251
Middle(2441MHz)	-5.960	-6.5±1	-5.5	0.282
Highest(2480MHz)	-5.070	-6.0±1	-5.0	0.316
8DPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-6.000	-6.5±1	-5.5	0.282
Middle(2441MHz)	-5.600	-6.5±1	-5.5	0.282
Highest(2480MHz)	-4.610	-5.5±1	-4.5	0.316

Worst case: GFSK						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	-6.000	-6.5±1	-5.5	0.282	0.087	3.0
Middle (2441MHz)	-5.600	-6.5±1	-5.5	0.282	0.088	
Highest (2480MHz)	-4.610	-5.5±1	-4.5	0.316	0.100	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20191101135E-01

2) For BLE

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	1.26	0.5±1	1.5	1.413
Middle(2440MHz)	1.6	1.0±1	2.0	1.585
Highest(2480MHz)	2.15	1.5±1	2.5	1.778

Worst case: GFSK						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	1.26	0.5±1	1.5	1.413	0.438	3.0
Middle (2440MHz)	1.6	1.0±1	2.0	1.585	0.495	
Highest (2480MHz)	2.15	1.5±1	2.5	1.778	0.560	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20191101135E-02

3) For WIFI

Measurement Data

IEEE for 802.11b mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	7.66	7.0±1	8.0	6.310
Middle(2437MHz)	7.5	7.0±1	8.0	6.310
Highest(2462MHz)	7.85	7.0±1	8.0	6.310
IEEE for 802.11g mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	7.53	7.0±1	8.0	6.310
Middle(2437MHz)	7.39	6.5±1	7.5	5.623
Highest(2462MHz)	7.45	6.5±1	7.5	5.623
IEEE for 802.11n(HT20) mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	7.37	6.5±1	7.5	5.623
Middle(2437MHz)	7.3	6.5±1	7.5	5.623
Highest(2462MHz)	7.2	6.5±1	7.5	5.623

Worst case: 802.11b mode						
Channel	Average Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2412MHz)	7.66	7.0±1	8.0	6.310	1.960	3.0
Middle (2437MHz)	7.5	7.0±1	8.0	6.310	1.970	
Highest (2462MHz)	7.85	7.0±1	8.0	6.310	1.980	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

Remark: The Max Conducted Average Output Power data refer to report Report No.: CQASZ20191101135E-03

WIFI, BDR, EDR and BLE can not simultaneous transmitting at same time.