

RF Exposure Evaluation Report

Report Reference No......: **MTWG2208267-H**

FCC ID.....: **2A77F-0336**

Compiled by

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Supervised by

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Date of issue.....: **September 20, 2022**

Representative Laboratory Name.: **Shenzhen Most Technology Service Co., Ltd.**

Address: No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park,
Nanshan, Shenzhen, Guangdong, China.

Applicant's name.....: **Andover Audio LLC**

Address: 15 High St North Andover Massachusetts United States 01845

Test specification/ Standard: **47 CFR Part 1.1307**

47 CFR Part 2.1093

TRF Originator: Shenzhen Most Technology Service Co., Ltd.

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Test item description: **TURNTABLE SPEAKER SYSTEM**

Trade Mark: N/A

Manufacturer: **Xiamen Tech-Sound Co.,Ltd**

Model/Type reference.....: SPINBASE MAX

Listed Models: N/A

Modulation Type: GFSK, $\pi/4$ DQPSK, 8DPSK

Operation Frequency.....: From 2402MHz to 2480MHz

Hardware Version.....: V_3.0

Software Version: BK3266_Spinbase MAX_release.20220617

Rating: AdapterInput: AC100-240V~50/60HZ1.2AOutput : 24VDC/2.5A

Result.....: **PASS**

TEST REPORT

Equipment under Test : TURNTABLE SPEAKER SYSTEM

Model /Type : SPINBASE MAX

Listed Models : N/A

Remark : N/A

Applican : **Andover Audio LLC**

Address : 15 High St North Andover Massachusetts United States
01845

Manufacturer : **Xiamen Tech-Sound Co.,Ltd**

Address : NO.170,Ji Yin Road, Tong An District , Xiamen , China.

Test Result:**PASS**

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

1. Revision History

Revision	Issue Date	Revisions	Revised By
00	2022.09.20	Initial Issue	Alisa Luo

2. SAR Evaluation

RF Exposure Compliance Requirement

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 measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

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 (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	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/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 1 mW/cm². 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.

EUT RF Exposure

BT classic

GFSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2402MHz)	-0.923	-0.923 ± 1	0.077
Middle(2441MHz)	-1.143	-1.143 ± 1	-0.143
Highest(2480MHz)	-1.508	-1.508 ± 1	-0.508

π /4DQPSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2402MHz)	0.859	0.859 ± 1	1.895
Middle(2441MHz)	0.722	0.722 ± 1	1.722
Highest(2480MHz)	0.328	0.328 ± 1	1.328

8DPSK			
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power
			(dBm)
Lowest(2402MHz)	1.113	1.113 ± 1	2.113
Middle(2441MHz)	0.969	0.969 ± 1	1.969
Highest(2480MHz)	0.609	0.609 ± 1	1.609

Worst case: 8DPSK						
Channel	Maximum Peak Conducted Output Power (dBm)	Maximum Peak Conducted Output Power (MW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Highest(2402 MHz)	2.113	1.62	0.8431	0.0004	1.0	Pass

Note: 1) Refer to report **MTWG2208267-R1** for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (1.62 * 1.21) / (4 * 3.1416 * 20^2) = 0.0004$

Note: 3) EUT's Bluetooth module is more than 20cm away from the human body.

BLE

GFSK				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-0.815	-0.815 ± 1	0.185	1.04
Middle(2440MHz)	-0.911	-0.911 ± 1	0.089	1.02
Highest(2480MHz)	-1.370	-1.370 ± 1	-0.370	0.92

Worst case: GFSK						
Channel	Maximum Peak Conducted Output Power (dBm)	Maximum Peak Conducted Output Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Highest(2402 MHz)	0.185	1.04	0.8431	0.0002	1.0	Pass

Note: 1) Refer to report **MTWG22040322-R2** for EUT test Max Conducted average Output Power value.

Note: 2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (1.04 * 1.21) / (4 * 3.1416 * 20^2) = 0.0002$

Note: 3) EUT's Bluetooth module is more than 20cm away from the human body.

.....THE END OF REPORT.....