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RF Exposure Evaluation Report

Report No. : CQASZ20210600799E-03
Applicant: ACOUSTMAX INTERNATIONAL CO., LTD
Address of Applicant: Unit D16/F Cheuk Nang Plaza 250 Hennessy Road WanchaiHongKong.
Equipment Under Test (EUT):
Product: ROCKIN' ROLLER 270 SPEAKER, Rockin'Roller 270 X
Model No.: MNRR270, MNRR270-X, MNRR270-C, MNRR270-EU, MNRR270 Plus, MNRR270X, MNRR270X-C, MNRR270-EU, MNRR270-X Plus, MNRR300, MNRR300-C, MNRR300-X
Test Model No. MNRR270-X
Brand Name: MONSTER
FCC ID: 2AAIN-MNRR270X
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2021-06-02
Date of Test: 2021-06-02 to 2021-06-15
Date of Issue: 2021-06-15
Test Result : **PASS***

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

Tested By:

Lewis Zhou

(Lewis Zhou)

Reviewed By:

Jun Li

(Jun Li)

Approved By:

Sheek, Luo

(Sheek Luo)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20210600799E-03	Rev.01	Initial report	2021-06-15

2 Contents

	Page
1 VERSION.....	2
2 CONTENTS.....	3
3 GENERAL INFORMATION.....	4
3.1 CLIENT INFORMATION.....	4
3.2 GENERAL DESCRIPTION OF EUT.....	4
4 RF EXPOSURE EVALUATION.....	5
4.1 RF EXPOSURE COMPLIANCE REQUIREMENT.....	5
4.1.1 <i>Limits</i>	5
4.1.2 <i>Test Procedure</i>	5
4.1.3 <i>EUT RF Exposure Evaluation standalone operations</i>	6

3 General Information

3.1 Client Information

Applicant:	ACOUSTMAX INTERNATIONAL CO., LTD
Address of Applicant:	Unit D16/F Cheuk Nang Plaza 250 Hennessy Road WanchaiHongKong.
Manufacturer:	ACOUSTMAX INTERNATIONAL CO., LTD
Address of Manufacturer:	Unit D16/F Cheuk Nang Plaza 250 Hennessy Road WanchaiHongKong.
Factory:	Heyuan Zhongdian Nanwei Technology Co., Ltd
Address of Factory:	Zone 23-11, Longling Industrial Park, Yuancheng District, Heyuan City (plant B), Guangdong, China

3.2 General Description of EUT

Product Name:	ROCKIN' ROLLER 270 SPEAKER, Rockin'Roller 270 X	
All Model No.:	MNRR270, MNRR270-X, MNRR270-C, MNRR270-EU,MNRR270 Plus, MNRR270X, MNRR270X-C, MNRR270-EU, MNRR270-X Plus, MNRR300, MNRR300-C, MNRR300-X	
Test Model No.:	MNRR270-X	
Trade Mark:	MONSTER	
EUT Supports Radios application	BT and BLE: 2402-2480MHz	
Hardware Version:	V4.0	
Software Version:	V4.0	
Power Supply:	AC 100-240V / 50/60Hz , 100W	
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location	
Test Software of EUT:	FCCAssist 2.4	
Antenna Type:	PCB antenna	
Antenna Gain:	BLE	0dBi
	BT	0dBi

4 RF Exposure 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 (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.

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: 0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.0 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-0.730	-2±1	-0.5	0.891
Middle(2441MHz)	-1.330	-2.5±1	-1	0.794
Highest(2480MHz)	-2.180	-3±1	-2	0.631
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	2.120	1±1	2	1.585
Middle(2441MHz)	1.260	0±1	1	1.259
Highest(2480MHz)	0.170	-1±1	0	1
8DPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	2.140	1±1	2	1.585
Middle(2441MHz)	0.560	-0.5±1	0.5	1.122
Highest(2480MHz)	0.720	-0.5±1	0.5	1.122

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Result
1.585	0	0.0003	PASS

Note: 1) Refer to report No. CQASZ20210600799E-01 for EUT test Max Conducted Peak Output Power value.

2) $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (1.585 \cdot 1) / (4 \cdot 3.1416 \cdot 20^2) = 0.0003$

2) For BLE (for REALTEK chip)

Antenna Gain: 0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.0 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-0.3	-1±1	0	1.000
Middle(2440MHz)	-0.14	-1±1	0	1.000
Highest(2480MHz)	0.04	-1±1	0	1.000

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
1.000	0	0.0002	1.0	PASS

Note: 1) Refer to report No. CQASZ20210600799E-02 for EUT test Max Conducted Peak Output Power value.

2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (1.000 * 1) / (4 * 3.1416 * 20^2) = 0.0002$