

TEST REPORT

Applicant: Tivoli Audio, Inc.
Address: 28 Atlantic Ave, Ste 133 Boston, MA 02110
Equipment Type: Portable AM/FM Radio with Bluetooth
Model Name: PALBT
Brand Name: Tivoli Audio
FCC ID: 2AO3C-PALBTII
Test Standard: 47 CFR Part 2.1091
(refer section 3.1)
Test Date: Apr. 30, 2022 – May 15, 2022
Date of Issue: R } 2022 5 15

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Yu Yingyuan

Checked by: Liyao Zong

Approved by: Wei Yanquan
(Chief Engineer)

Yu Ying Yuan

Liyao. Zong

Wei Yanquan

Revision History		
Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Jun. 06, 2022</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION	3
1.1	Identification of the Testing Laboratory	3
1.2	Identification of the Responsible Testing Location	3
2	PRODUCT INFORMATION	4
2.1	Applicant Information.....	4
2.2	Manufacturer Information	4
2.3	Factory Information	4
2.4	General Description for Equipment under Test (EUT)	4
2.5	Ancillary Equipment.....	4
2.6	Technical Information	5
3	SUMMARY OF TEST RESULT	6
3.1	Test Standards	6
4	DEVICE CATEGORY AND LEVELS LIMITS	7
5	ASSESSMENT RESULT	9
5.1	Output Power	9
5.2	Turn-up power	9
5.3	RF Exposure Evaluation Result	9
5.4	Conclusion.....	9

1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.
Description	All measurement facilities used to collect the measurement data are located at Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Tivoli Audio, Inc.
Address	28 Atlantic Ave, Ste 133 Boston, MA 02110

2.2 Manufacturer Information

Manufacturer	Tivoli Audio, Inc.
Address	28 Atlantic Ave, Ste 133 Boston, MA 02110

2.3 Factory Information

Factory	Hansong (Nanjing) Technology Ltd.
Address	8th Kangping Road, Jiangning Economy and Technology Development

2.4 General Description for Equipment under Test (EUT)

EUT Name	Portable AM/FM Radio with Bluetooth
Model Name Under Test	PALBT
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	VM1.0
Software Version	V1.26
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	tivoli audio
	Model No.	heldee-247-01T
	Serial No.	N/A
	Capacitance	2750 mAh
	Rated Voltage	7.4 V
	Limited Voltage	8.4 V
	Manufacturer	dongguan heldee

2.6 Technical Information

Network and Wireless connectivity	Bluetooth (BR+EDR)
-----------------------------------	--------------------

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	Bluetooth	
Frequency Range	Bluetooth	2400 ~ 2483.5 MHz
Antenna Type	Bluetooth	PCB
Exposure Category	General Population/Uncontrolled Exposure	
EUT Stage	Mobile Device	

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices
2	KDB 447498 D01 v06	447498 D01 General RF Exposure Guidance D01 v06

4 DEVICE CATEGORY AND LEVELS LIMITS

Mobile Derives:

CFR Title 47 §2.1091(b)

(b) For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

FCC KDB 447498 D01 General RF Exposure Guidance v06 Limit

Devices operating in standalone mobile exposure conditions may contain a single transmitter or multiple transmitters that do not transmit simultaneously. A minimum test separation distance ≥ 20 cm is required between the antenna and radiating structures of the device and nearby persons to apply mobile device exposure limits. The distance must be fully supported by the operating and installation configurations of the transmitter and its antenna(s), according to the source-based time-averaged maximum power requirements of § 2.1091(d)(2). In cases where cable losses or other attenuations are applied to determine compliance, the most conservative operating configurations and exposure conditions must be evaluated. The minimum test separation distance required for a device to comply with mobile exposure conditions must be clearly identified in the installation and operating instructions, for all installation and exposure conditions, to enable users and installers to comply with RF exposure requirements. For mobile devices that have the potential to operate in portable device exposure conditions, similar to the configurations described in § 2.1091(d)(4), a KDB inquiry is required to determine the SAR test requirements for demonstrating compliance.

When the categorical exclusion provision of § 2.1091(c) applies, the minimum test separation distance may be estimated, when applicable, by simple calculations according to plane-wave equivalent conditions, to ensure the transmitter and its antenna(s) can operate in manners that meet or exceed the estimated distance. The source-based time-averaged maximum radiated power, according to the maximum antenna gain, must be applied to calculate the field strength and power density required to establish the minimum test separation distance. When the estimated test separation distance becomes overly conservative and does not support compliance, MPE measurement or computational modeling may be used to determine the required minimum separation distance.

According to FCC Part 1.1307, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the commission's guidelines.

Limits for General Population/ Uncontrolled Exposure			
Frequency Range (MHz)	Electric Field Strength(E)(V/m)	Magnetic Field Strength (H)(A/m)	Power Density (S)(mW/cm ²)
0.3-1.34	614	1.63	(100)*
1.34-30	824/f	2.19/f	(180/f ²)*
30-300	27.5	0.073	0.2
300-1500			f/1500
1500-100,000			1.0

MPE calculation formula

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = power density

P = output power (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Separation distance between radiator and human body (cm)

5 ASSESSMENT RESULT

5.1 Output Power

Bluetooth			
Mode	BR+EDR		
	GFSK	$\pi/4$ -DQPSK	8-DPSK
Peak Power (dBm)	3.09	3.99	4.16
Note: This report listed the worst case peak power value, please refer to Report No. BL-SZ2240941-601 for more details.			

5.2 Turn-up power

Mode	Range (dBm)
Bluetooth	2.50-4.50

5.3 RF Exposure Evaluation Result

Evolution mode	Maximum peak output power (dBm)	Antenna Gain (typical) (dBi):	Total Power (mw)	Distance (cm)	Limit of Power Density (mW/cm ²)	Power Density (mW/cm ²)	Verdict
Bluetooth	4.50	2.3	4.79	20	1	0.001	Pass

5.4 Conclusion

This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. The report without China inspection body and laboratory Mandatory Approval (CMA) mark has no effect of proving to the society.
3. For the report with CNAS mark or A2LA mark, the items marked with "☆" are not within the accredited scope.
4. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the "inspection and testing dedicated stamp" or test report stamp.
5. The test data and results are only valid for the tested samples provided by the customer.
6. This report shall not be partially reproduced without the written permission of the laboratory.
7. Any objection shall be raised to the laboratory within 30 days after receiving the report.

--END OF REPORT--