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Shenzhen Branch**

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Report No.: SZEM171101182704

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SAR Evaluation Report

Application No.: SZEM1711011827CR
Applicant: TEAC Corporation
Address of Applicant: 1-47 Ochiai, Tama-shi, Tokyo, 206-8530, Japan
Manufacturer: TEAC Corporation
Address of Manufacturer: 1-47 Ochiai, Tama-shi, Tokyo, 206-8530, Japan
Factory: DONGGUAN TEAC ELECTRONICS CO., LTD.
Address of Factory: No.1 Shangxing Lu, Shangjiao Community, Changan Town, Dongguan City, Guangdong, China

Equipment Under Test (EUT):
EUT Name: USB DAC/HEADPHONE AMPLIFIER
Model No.: UD-505
FCC ID: XEG-UD505
Trade mark: TEAC
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06

Date of Receipt: 2017-11-23
Date of Test: 2017-12-06 to 2018-01-12
Date of Issue: 2018-01-19

Test Result :	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Keny Xu
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-01-19		Original

Authorized for issue by:				
				
		Leo Lai /Project Engineer		
				
		Eric Fu /Reviewer		



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4 General Information

4.1 General Description of EUT

Power supply:	AC 120V/60Hz
BLE:	
Frequency Range:	2402MHz to 2480MHz
Bluetooth Version:	4.2
Modulation Type:	GFSK,
Antenna Type:	PCB
Antenna Gain:	-3.0dBi
BT:	
Frequency Range:	2402MHz to 2480MHz
Bluetooth Version:	4.2
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Antenna Type:	PCB
Antenna Gain:	-3.0dBi



4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.



5 SAR Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 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

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.

5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



5.1.3 EUT RF Exposure Evaluation

Antenna Gain: -3dBi

For BT:

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.5 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conduct Peak power (including Tune-up tolerance) (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Result
Highest	2480	5.73	3.74	0.0004	1	PASS

Note: Refer to report No. SZEM171101182702 for EUT test Max Conducted Peak Output Power value.

The distancer (5th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For BLE:

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.5 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conduct Peak power (including Tune-up tolerance) (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Result
Highest	2480	5.62	3.65	0.0004	1	PASS

Note: Refer to report No. SZEM171101182703 for EUT test Max Conducted Peak Output Power value.

The distancer (5th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.