



No. 1 Workshop, M-10, Middle section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057
Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

Report No.: SZEM150300134903
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SAR Evaluation Report

Application No.: SZEM1503001349CR
Applicant: Creative Labs Inc.
Manufacturer: Creative Technology Ltd.
Product Name: Sound Blaster FREE
Model No.(EUT): SB1660
Trade Mark: Creative
FCC ID: IBAAVPSB1660
Standards: 47 CFR Part 1.1307 (2014)
47 CFR Part 2.1093 (2014)
KDB447498D01 General RF Exposure Guidance v05r02
Date of Receipt: 2015-03-30
Date of Test: 2015-04-09 to 2015-04-16
Date of Issue: 2015-04-27

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

Authorized Signature:



Jack Zhang
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
00		2015-04-27		Original

Authorized for issue by:			
Tested By		 _____ (Eric Fu) /Project Engineer	2015-04-16
			Date
Prepared By		 _____ (Jade Chen) /Clerk	2015-04-27
			Date
Checked By		 _____ (Owen Zhou) /Reviewer	2015-04-27
			Date

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4 General Information

4.1 Client Information

Applicant:	Creative Labs Inc.
Address of Applicant:	1901, McCarthy Boulevard, Milpitas, CA 95035, United States
Manufacturer:	Creative Technology Ltd.
Address of Manufacturer:	31, International Business Park, #03-01 Creative Resource, Singapore 609921

4.2 General Description of EUT

Product Name:	Sound Blaster FREE	
Model No.:	SB1660	
Trade Mark:	Creative	
Operation Frequency:	2402MHz~2480MHz	
Bluetooth Version:	V4.0 dual mode	
Test Power Grade:	100,15 for Classic mode ; 0 for BLE mode (manufacturer declare)	
Test Software of EUT:	Blue test 3 (manufacturer declare)	
Sample Type:	Portable production	
Antenna Type :	Integral	
Antenna Gain	-0.61dBi	
USB Cable:	Shielded 40cm	
Power Supply:	USB Charge	
	Battery	DC 3.7V 2200mAh
For Classic Mode		
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)	
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK	
Number of Channel:	79	
Hopping Channel Type:	Adaptive Frequency Hopping systems	
For BLE Mode		
Modulation Type:	GFSK	
Number of Channel:	40	

Model No.: SB1660

There are two kinds of color for this model, since the circuitry design, PCB layout, electrical components used, internal wiring and functions were identical for both models. Only different on the black & white color of the casing.





4.3 Test Location

All tests were performed at:

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

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.

4.4 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.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

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

4.5 Deviation from Standards

None.

4.6 Abnormalities from Standard Conditions

None.

4.7 Other Information Requested by the Customer

None.



5 SAR Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v05r02

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.

5.1.2 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:

$$\left[\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} \right] \cdot \sqrt{f(\text{GHz})} \leq 3.0$$
 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

$f(\text{GHz})$ is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation¹⁷

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



5.1.3 EUT RF Exposure

For Classic Mode:

The Max Conducted Peak Output Power is dBm in highest channel(2.480GHz);

The best case gain of the antenna is -0.61dBi.

$$\text{EIRP} = 2.34\text{dBm} - 0.61\text{dBi} = 1.73\text{dBm}$$

1.73dBm logarithmic terms convert to numeric result is nearly 1.489mW

According to the formula. calculate the EIRP test result:

$$\left[\frac{(\text{max. power of channel, including tune-up tolerance, mW})}{(\text{min. test separation distance, mm})} \right] \cdot \sqrt{f(\text{GHz})}$$

$$\text{General RF Exposure} = (1.489\text{mW} / 5 \text{ mm}) \times \sqrt{2.480\text{GHz}} = 0.7385 \text{ ①}$$

SAR requirement:

$$S = 3.0 \text{ ②};$$

$$\text{①} < \text{②}.$$

So the SAR report is not required.

For BLE Mode:

The Max Conducted Peak Output Power is 2.97dBm in highest channel(2.480GHz);

The best case gain of the antenna is -0.61dBi.

$$\text{EIRP} = 2.97\text{dBm} - 0.61\text{dBi} = 2.36\text{dBm}$$

2.36dBm logarithmic terms convert to numeric result is nearly 1.722mW

According to the formula. calculate the EIRP test result:

$$\left[\frac{(\text{max. power of channel, including tune-up tolerance, mW})}{(\text{min. test separation distance, mm})} \right] \cdot \sqrt{f(\text{GHz})}$$

$$\text{General RF Exposure} = (1.722\text{mW} / 5 \text{ mm}) \times \sqrt{2.480\text{GHz}} = 0.854 \text{ ③}$$

SAR requirement:

$$S = 3.0 \text{ ④};$$

$$\text{③} < \text{④}$$

So the SAR report is not required.