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Report No.: SZEM141000556803  
Page: 1 of 8

## SAR Evaluation Report

**Application No.:** SZEM1410005568RF  
**Applicant:** Koss Corporation  
**Manufacturer:** Koss Corporation  
**Factory:** Dongguan Tai Sing Audio Technology Limited  
**Product Name:** Bluetooth Headset  
**Model No.(EUT):** BT540i  
**Trade Mark:** KOSS  
**FCC ID:** L76BT540I2  
**Standards:** 47 CFR Part 1.1307(2013)  
47 CFR Part 2.1093 (2013)  
KDB447498D01 General RF Exposure Guidance v05  
**Date of Receipt:** 2014-10-11  
**Date of Test:** 2014-10-15 to 2014-10-20  
**Date of Issue:** 2014-10-22

<b>Test Result :</b>	<b>PASS*</b>
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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		2014-10-22		Original

Authorized for issue by:			
Tested By		 <hr/> (Chris Zhong)/Project Engineer	2014-10-20
			Date
Prepared By		 <hr/> (Sade Luo) /Clerk	2014-10-22
			Date
Checked By		 <hr/> (Emen Li) /Reviewer	2014-10-24
			Date

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## 4 General Information

### 4.1 Client Information

Applicant:	Koss Corporation
Address of Applicant:	4129 N. Port Washington Avenue, Milwaukee, WI 53212
Manufacturer:	Koss Corporation
Address of Manufacturer:	4129 N. Port Washington Avenue, Milwaukee, WI 53212
Factory:	Dongguan Tai Sing Audio Technology Limited
Address of Factory:	Tai Sing Industrial Road, Bai Zhou Bian Village, Dong Cheng, Dongguan City, Guangdong Province 523113, P.R.China

### 4.2 General Description of EUT

Product Name:	Bluetooth Headset
Model No.:	BT540i
Trade Mark:	KOSS
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	Bluetooth 4.0 dual
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
Sample Type:	Portable production
Test Software of EUT:	CSR BlueSuite (manufacturer declare)
Antenna Type :	Integral
Antenna Gain:	0dBi
Battery:	DC 3.7V 230mAh (Li-ion Rechargeable Battery)
Power Supply:	USB charge
Test Voltage:	AC 120V 60Hz DC 3.7V battery fully charged
USB Charging Cable:	126cm(Unshielded)
AUX Cable:	138cm(Unshielded)



### **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 3m Semi-anechoic chamber, Full-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.: R-2197, G-416, 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 v05

##### 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  $\leq 50$  mm are determined by:

$$\left[ \frac{(\text{max. power of channel, including tune-up tolerance, mW})}{(\text{min. test separation distance, mm})} \cdot \sqrt{f(\text{GHz})} \right] \leq 3.0$$
 for 1-g SAR and  $\leq 7.5$  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 calculation<sup>17</sup>

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  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 classical mode:

The Max Conducted Peak Output Power is 3.01dBm in highest channel(2.480GHz);

The best case gain of the antenna is 0dBi.

$$\text{EIRP} = 3.01\text{dBm} + (0)\text{dBi} = 3.01\text{dBm}$$

3.01dBm logarithmic terms convert to numeric result is nearly 1.9999mW

According to the formula. calculate the EIRP test result:

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

$$\text{General RF Exposure} = (1.9999\text{mW} / 5 \text{ mm} ) \times \sqrt{2.480\text{GHz}} = 0.6299 \text{ ①}$$

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 2.20dBm in highest channel(2.480GHz);

The best case gain of the antenna is 0dBi.

$$\text{EIRP} = 2.20\text{dBm} + (0)\text{dBi} = 2.20\text{dBm}$$

2.20dBm logarithmic terms convert to numeric result is nearly 1.6596mW

According to the formula. calculate the EIRP test result:

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

$$\text{General RF Exposure} = (1.6596\text{mW} / 5 \text{ mm} ) \times \sqrt{2.480\text{GHz}} = 0.5227 \text{ ①}$$

SAR requirement:

$$S = 3.0 \text{ ② ;}$$

$$\text{①} < \text{②}.$$

So the SAR report is not required.