



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

Email: ee.shenzhen@sgs.com

Report No.: SZEM161100971903

Page: 1 of 7

SAR Evaluation Report

Application No.: SZEM1611009719CR
Applicant: BRAGI GMBH
Manufacturer: BRAGI GMBH
Factory: VTech (Dongguan) Communications Ltd.
Product Name: The Headphone
Model No.(EUT): H1001-01
Trade Mark: Bragi
FCC ID: 2AF5TH1001R
Standards: 47 CFR Part 1.1307 (2015)
47 CFR Part 2.1093 (2015)
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2016-11-17
Date of Test: 2016-11-21
Date of Issue: 2016-12-08

Test Result :	PASS*
----------------------	--------------

* 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.

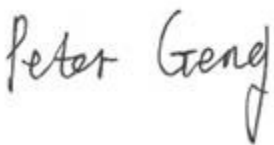
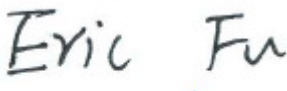
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2016-12-08		Original

Authorized for issue by:				
Tested By				2016-11-21
				Date
Checked By				2016-12-08
				Date
		(Peter Geng) /Project Engineer		
		(Eric Fu) /Reviewer		



3 Contents

	Page
1 COVER PAGE	1
2 VERSION	2
3 CONTENTS	3
4 GENERAL INFORMATION	4
4.1 CLIENT INFORMATION	4
4.2 GENERAL DESCRIPTION OF EUT	4
4.3 TEST LOCATION	5
4.4 TEST FACILITY	5
4.5 DEVIATION FROM STANDARDS	5
4.6 ABNORMALITIES FROM STANDARD CONDITIONS	5
4.7 OTHER INFORMATION REQUESTED BY THE CUSTOMER	5
5 SAR EVALUATION	6
5.1 RF EXPOSURE COMPLIANCE REQUIREMENT	6
5.1.1 Standard Requirement	6
5.1.2 Limits	6
5.1.3 EUT RF Exposure	7



4 General Information

4.1 Client Information

Applicant:	BRAGI GMBH
Address of Applicant:	Sendlinger Strasse 7 / Angerblock 2. OG, 80331 München, Germany
Manufacturer:	BRAGI GMBH
Address of Manufacturer:	Sendlinger Strasse 7 / Angerblock 2. OG, 80331 München, Germany
Factory:	VTech (Dongguan) Communications Ltd.
Address of Factory:	Xia Ling Bei Management Zone, Liaobu Town, Dongguan City, Guangdong Province, China

4.2 General Description of EUT

Product Name:	The Headphone
Model No.:	H1001-01
Trade Mark:	Bragi
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	Bluetooth 4.0 dual
Antenna Type:	LDS Antenna
Antenna Gain:	-6dBi
Power Supply:	Left headphone: DC 3.7V, 50mAh rechargeable battery; Right headphone: DC 3.7V, 100mAh rechargeable battery Which both charged by the docking(Charged from Adapter via USB cable)
Product details:	H1001-01 consists of a left earplug, a right earplug, a USB charging line and a charging case.
For Classic mode:	
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels:	79
For BLE mode:	
Modulation Type:	GFSK
Number of Channel:	40
For NFMI mode:	
Operation Frequency:	10.579MHz
Antenna Type:	Loop Antenna



4.3 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.

4.4 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.

- **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 10m Semi-anechoic chamber and Shielded Room 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 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.

4.5 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 v06

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:

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

$f(\text{GHz})$ 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

At frequencies below 100 MHz, the following may be considered for SAR test exclusion:

a) The power threshold at the corresponding test separation distance at 100 MHz in below step 1) is multiplied by $[1 + \log(100/f(\text{MHz}))]$ for test separation distances > 50 mm and < 200 mm

The power threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$ for test separation distances ≤ 50 mm.

$$[\text{Power allowed at numeric threshold for 50 mm in step 1)} + (\text{test separation distance} - 50 \text{ mm}) \cdot (f(\text{MHz})/150)] \text{ mW, at 100 MHz to 1500 MHz}$$

When an antenna qualifies for the standalone SAR test exclusion of 4.3.1 and also transmits simultaneously with other antennas, the standalone SAR value must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:³⁶

1)
$$\left[\frac{(\text{max. power of channel, including tune-up tolerance, mW})}{(\text{min. test separation distance, mm})} \cdot \sqrt{f(\text{GHz})} \right] \leq x \text{ W/kg, for test separation distances } \leq 50 \text{ mm;}$$

where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.

2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distance is > 50 mm.



5.1.3 EUT RF Exposure

For Classic mode:

The Max Conducted Peak Output Power is 3.78dBm in middle channel(2.440GHz);

3.78dBm logarithmic terms convert to numeric result is nearly 2.39mW

According to the formula. calculate the test exclusion thresholds:

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

General RF Exposure = $(2.39\text{mW} / 5 \text{ mm}) \times \sqrt{2.440\text{GHz}} = 0.75$ ①

SAR requirement:

S= 3.0 ② ;

① < ②.

So the SAR report is not required.

For BLE mode:

The Max Conducted Peak Output Power is 4.47dBm in highest channel(2.480GHz);

4.47dBm logarithmic terms convert to numeric result is nearly 2.80mW

According to the formula. calculate the test exclusion thresholds:

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

General RF Exposure = $(2.80\text{mW} / 5 \text{ mm}) \times \sqrt{2.480\text{GHz}} = 0.88$ ①

SAR requirement:

S= 3.0 ② ;

① < ②.

So the SAR report is not required.

For NFMI mode:

The maximum conducted output power specified is -36.3dBm = 0.0002mW

The SAR Exclusion Threshold Level for 10.579MHz when the minimum test separation distance is < 50mm:

$$= 474 * [1 + \log(100/f(\text{MHz}))]/2$$

$$= 468.2 \text{ mW}$$

Since the source-based time-averaging conducted output power is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.

For Bluetooth and NFMI mode transmit simultaneously:

According to the formula

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot \sqrt{f(\text{GHz})/7.5} \text{ W/kg}$$

For Bluetooth:

SAR test exclusion = $(2.80\text{mW} / 5 \text{ mm}) \times \sqrt{2.480\text{GHz}/7.5} = 0.1173 \text{ W/kg}$

For NFMI mode:

SAR test exclusion = $(0.0002\text{mW} / 5 \text{ mm}) \times \sqrt{0.010579\text{GHz}/7.5} = 5.485 \times 10^{-7} \text{ W/kg}$

The total SAR test exclusion $\approx 0.1173 \text{ W/kg} < 1.6 \text{ W/kg}$

So the SAR report is not required.