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

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SAR Evaluation Report

Application No.:	SZEM1702000802CR
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
Equipment Under Test (EUT):	
EUT Name:	The Dash Pro
Model No.:	B1002-01R
Trade mark:	Bragi
FCC ID:	2AF5T-B1002R
Standards:	47 CFR Part 1.1307 (2016) 47 CFR Part 2.1093 (2016) KDB447498D01 General RF Exposure Guidance v06
Date of Receipt:	2017-02-13
Date of Test:	2017-02-14 to 2017-03-17
Date of Issue:	2017-04-20
Test Result :	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

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.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2017-04-20		Original

Authorized for issue by:				
Tested By		Hank Yan		2017-04-20
		Hank Yan /Project Engineer		**Date**
Checked By		Eric Fu		2017-04-20
		Eric Fu /Reviewer		**Date**

3 Contents

4 General Information

4.1 General Description of EUT

Power Supply:	Right headphone: DC 3.7V, 100mAh rechargeable battery Charged by the docking(Charged from Adapter via USB cable)
For Classic mode:	
Operation Frequency:	2402MHz~2480MHz
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channel:	79
Sample Type:	Portable production
Antenna Type:	Integral
Antenna Gain:	-6dBi
For BLE mode:	
Operation Frequency:	2402MHz~2480MHz
Modulation Type:	GFSK
Number of Channel:	40
Sample Type:	Portable production
Antenna Type:	Integral
Antenna Gain:	-6dBi
For NFMI mode:	
Operation Frequency:	10.54MHz
Antenna Type:	Loop Antenna

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

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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 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.

4.4 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 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:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

f(GHz) is the RF channel transmit frequency in GHz
Power and distance are rounded to the nearest mW and mm before calculation[17]
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(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 ½ for test separation distances ⩽ 50 mm.

[Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] 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) [(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√f(GHz)/x] W/kg, for test separation distances ≤ 50 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 2.86dBm in middle channel(2.441GHz);

2.86dBm logarithmic terms convert to numeric result is nearly 1.932mW

According to the formula. calculate the test exclusion thresholds:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)]

General RF Exposure = (1.932mW / 5 mm) x √2.441GHz = 0.60 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 0.15dBm in highest channel(2.440GHz);

0.15dBm logarithmic terms convert to numeric result is nearly 1.035mW

According to the formula. calculate the test exclusion thresholds:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)]

General RF Exposure = (1.035mW / 5 mm) x √2.440GHz = 0.32 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 -36.14dBm = 0.0002mW

The SAR Exclusion Threshold Level for 10.54MHz when the minimum test separation distance is < 50mm:

= 474 * [1 + log(100/f(MHz)]/2

= 468.6 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

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√f(GHz)/7.5] W/kg

For Bluetooth:

SAR test exclusion = (1.932mW / 5 mm) x √2.441GHz/7.5 = 0.0805 W/kg

For NFMI mode:

SAR test exclusion = (0.0002mW / 5 mm) x √0.01054GHz/7.5 = $1*10^{-6}$ W/kg

The total SAR test exclusion ≈ 0.0805 W/kg < 1.6 W/kg

So the SAR report is not required.