



1 Cover PageDSS

RF MPE REPORT

Application No.: SHEM1805004270CR
FCC ID: SVC-PF2I
IC: 152C-PF2I
Applicant: Lenbrook Industries Limited
Address of Applicant: 633 Granite Court, Pickering, Ontario, Canada L1W 3K1
Manufacturer: Lenbrook Industries Limited
Address of Manufacturer: 633 Granite Court, Pickering, Ontario, Canada L1W 3K1
Factory: HANSONG(NANJING) TECHNOLOGY LTD.
Address of Factory: 8th Kangping Road, Jiangning Economy and Technology Development Zone, Nanjing, 211106, China.

Equipment Under Test (EUT):

EUT Name: Portable Wireless Music Streaming Speaker
Model No.: Pulse Flex 2i
Trade mark: Bluesound
Standard(s) : FCC Rules 47 CFR §2.1091
KDB447498 D01 General RF Exposure Guidance v06
RSS-102 Issue 5 (March 2015)

Date of Receipt: 2018-05-31
Date of Test: 2018-08-31 to 2018-09-18
Date of Issue: 2018-12-14

Test Result:	Pass*
---------------------	--------------

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

Parlam Zhan
E&E Section 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.



Unless otherwise agreed in writing, 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.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

NO.588 West Jindu Road, Songjiang District, Shanghai, China 201612

t(86-21) 61915666 f(86-21) 61915678 www.sgsgroup.com.cn

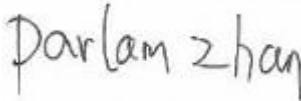
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

Testing Center EMC Services Inspection & Testing Services

中国·上海·松江区金都西路588号 邮编: 201612

t(86-21) 61915666 f(86-21) 61915678 sgs.china@sgs.com

Revision Record			
Version	Description	Date	Remark
00	Original	2018-12-14	/

Authorized for issue by:			
		 _____ Vincent Zhu	
		Vincent Zhu / Project Engineer	
		 _____ Parlam Zhan	
		Parlam Zhan /Reviewer	

2 Contents

	Page
1 COVER PAGE	1
2 CONTENTS	3
3 GENERAL INFORMATION	4
3.1 CLIENT INFORMATION	4
3.1 GENERAL DESCRIPTION OF E.U.T.	4
3.2 TECHNICAL SPECIFICATIONS	4
3.3 TEST LOCATION	6
3.4 TEST FACILITY	6
4 TEST STANDARDS AND LIMITS	7
4.1 FCC RADIOFREQUENCY RADIATION EXPOSURE LIMITS:	7
4.2 IC RADIOFREQUENCY RADIATION EXPOSURE LIMITS:	7
5 MEASUREMENT AND CALCULATION	8
5.1 MAXIMUM TRANSMIT POWER	8
5.2 MPE CALCULATION	10

3 General Information

3.1 Client Information

Applicant:	Lenbrook Industries Limited
Address of Applicant:	633 Granite Court, Pickering, Ontario Canada L1W 3K1
Manufacturer:	Lenbrook Industries Limited
Address of Manufacturer:	633 Granite Court, Pickering, Ontario Canada L1W 3K1
Factory:	HANSONG(NANJING) TECHNOLOGY LTD.
Address of Factory:	8th Kangping Road, Jiangning Economy and Technology Development Zone, Nanjing, 211106, China.

3.1 General Description of E.U.T.

Power supply:	AC 100-240V~50/60Hz
Test voltage:	AC 120V 60Hz
Cable:	AC Cable 180cm

3.2 Technical Specifications

Antenna Gain	2 dBi
Antenna Type	Integral Antenna
Channel Spacing	1MHz
Modulation Type	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels	79
Operation Frequency	2402MHz to 2480MHz
Spectrum Spread Technology	Frequency Hopping Spread Spectrum(FHSS)

2.4G WiFi

Antenna Gain	0dBi
Antenna Type	PIFA Antenna
Channel Spacing	5MHz
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels	802.11b/g/n(HT20): 13
Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2472MHz
Power Class	>=10mW

5G WiFi

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
Modulation Type:	Band 1	802.11a/n(HT20)/ac(HT20)	5180-5240	4
		802.11n(HT40)/ac(HT40)	5190-5230	2
		802.11ac(HT80)	5210	1
Channel Spacing:	802.11a/n(HT20)/ac(HT20): 20MHz 802.11n(HT40)/ac(HT40): 40MHz 802.11ac(HT80): 80MHz			
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
Modulation Type:	Band 3	802.11a/n(HT20)/ac(HT20)	5745-5825	5
		802.11n(HT40)/ac(HT40)	5755-5795	2
		802.11ac(HT80)	5775	1
Channel Spacing:	802.11a/n(HT20)/ac(HT20): 20MHz 802.11n(HT40)/ac(HT40): 40MHz 802.11ac(HT80): 80MHz			
Antenna Gain	2.90dBi			

3.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shanghai Branch
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

3.4 Test Facility

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

- CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 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.

- NVLAP (Certificate No. 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program(NVLAP). Certificate No. 201034-0.

- FCC –Designation Number: CN5033**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN5033. Test Firm Registration Number: 479755.

- Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1.

- VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm ²)	Averaging time(minutes)
300MHz~1.5GHz	f/1500	30
1.5GHz~100GHz	1.0	30

4.2 IC Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.2, RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

For 2.4G device, the limit of worse case is 2.68 W

For 5G device, the limit of worse case is 4.5 W

5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM180500427001 & SHEM180500427002& SHEM180500427003.

For BT

Test Mode	Test Frequency (MHz)	Output Power (dBm)	Reading Power (mW)
GFSK	2402	7.46	5.57
	2441	8.16	6.55
	2480	8.27	6.71
$\pi/4$ DQPSK	2402	7.37	5.46
	2441	8.04	6.37
	2480	8.09	6.44
8DPSK	2402	7.57	5.71
	2441	8.25	6.68
	2480	8.32	6.79

For 2.4G WiFi:

Test Mode	Test Frequency (MHz)	Output Power (dBm)	Reading Power (mW)
802.11b	2412	15.58	36.14
	2437	15.22	33.27
	2462	15.45	35.08
802.11g	2412	14.90	30.90
	2437	14.73	29.72
	2462	14.88	30.76
802.11 n20	2412	14.63	29.04
	2437	14.36	27.29
	2462	14.58	28.71
802.11 n40	2422	14.67	29.31
	2437	14.54	28.44
	2452	14.79	30.13

For 5G WiFi:

Test Mode	Test Channel	Power (dBm)	EIRP (dBm)	EIRP (mW)
802.11a	5180	10.13	13.03	20.09
	5220	11	13.9	24.55
	5240	10.81	13.71	23.50
	5745	8.11	11.01	12.62
	5785	8.59	11.49	14.09
	5825	9.14	12.04	16.00
802.11n20	5180	8.33	11.23	13.27
	5220	8.95	11.85	15.31
	5240	8.7	11.6	14.45
	5745	5.96	8.86	7.69
	5785	6.37	9.27	8.45
	5825	6.95	9.85	9.66
802.11n40	5190	8.6	11.5	14.13
	5230	8.61	11.51	14.16
	5755	6.55	9.45	8.81
	5795	6.82	9.72	9.38
802.11ac20	5180	8.24	11.14	13.00
	5220	9.11	12.01	15.89
	5240	9.17	12.07	16.11
	5745	6.12	9.02	7.98
	5785	6.38	9.28	8.47
	5825	7.03	9.93	9.84
802.11ac40	5190	8.76	11.66	14.66
	5230	8.56	11.46	14.00
	5755	6.76	9.66	9.25
	5795	6.88	9.78	9.51
802.11ac80	5210	10.52	13.42	21.98
	5775	10.22	13.12	20.51

5.2 MPE Calculation

For FCC:

For 2.4G WiFi

The best case gain of the antenna is 0dBi, 0dB logarithmic terms convert to numeric result is nearly 1

The Max Conducted Output Power is 36.14mW(0.036W);

For 5GHz WiFi

The best case gain of the antenna is 2.9dBi, 2.9dB logarithmic terms convert to numeric result is nearly 1.95

The Max Conducted Output Power is 12.59mW(0.012W);

According to the formula $S = \frac{PG}{4R^2\pi}$, we can calculate S which is MPE.

Note:

1) P (Watts) = Power Input to antenna = $10^{\frac{dBm}{10}} / 1000$

2) G (Antenna gain in numeric) = $10^{\frac{Antenna gain in dBi}{10}}$

3) R = distance to the center of radiation of antenna (in meter) = 20cm

4) MPE limit = 1mW/cm²

For WiFi:

$$2.4\text{GHz WiFi: } S = \frac{PG}{4R^2\pi} = \frac{36.14 \times 1.000}{4 \times 400 \times 3.14} = 0.007 \text{ mW/cm}^2$$

$$5\text{GHz WiFi: } S = \frac{PG}{4R^2\pi} = \frac{12.59 \times 1.95}{4 \times 400 \times 3.14} = 0.005 \text{ mW/cm}^2$$

For BT

The Max Conducted Peak Output Power is 6.79mW

The best case gain of the antenna is 2dBi. 2dB logarithmic terms convert to numeric result is nearly 1.58

$$\text{So, } S = \frac{PG}{4R^2\pi} = \frac{6.79 \times 1.58}{4 \times 400 \times 3.14} = 0.002 \text{ mW/cm}^2$$

The BT and the 2.4G WiFi modules can simultaneous transmitting. But the maximum rate of MPE is $\frac{0.002}{1.0} + \frac{0.007}{1.0} = 0.009 \leq 1.0$.

The BT and the 5G WiFi modules can simultaneous transmitting. But the maximum rate of MPE is $\frac{0.002}{1.0} + \frac{0.005}{1.0} = 0.007 \leq 1.0$

according to the KDB447498 section 7.2 determine the device is exclusion from SAR test.

For IC:

For BT:

$$E.I.R.P. = P \cdot G = 0.00679 \times 1.58 = 0.011W < 2.68W$$

For 2.4GHz WiFi:

$$E.I.R.P. = P \cdot G = 0.03614 \times 1.00 = 0.036W < 2.68W$$

For 5GHz WiFi:

$$E.I.R.P. = P \cdot G = 0.01259 \times 1.95 = 0.025W < 4.5W$$

BT and 2.4G WiFi modules can simultaneous transmitting, so the maximum rate of MPE is $0.011 + 0.036 = 0.047W < 2.68W$

BT and 5G WiFi modules can simultaneous transmitting, so the maximum rate of MPE is $0.011 + 0.025 = 0.036W < 2.68W$

So, the device is exclusion from SAR test.

--End of the Report--