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

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1 Cover Page

RF MPE REPORT

Application No.:	SZEM1709010188CR (SHEM1709006020CR)
Applicant:	Lenbrook Industries Limited
FCC ID:	SVC-NADD3020V2
IC:	152C-NADD3020V2
Equipment Under Test (EUT): **NOTE:** The following sample(s) was/were submitted and identified by the client as	
Product Name:	Hybrid Digital Amplifier
Model No.(EUT):	D3020
Standards:	FCC Rules 47 CFR §2.1091 KDB447498 D01 General RF Exposure Guidance v06 RSS-102 Issue 5 (March 2015)
Date of Receipt:	2017-09-08
Date of Test:	2017-09-21 to 2017-10-28
Date of Issue:	2017-11-23
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.

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00	/	2017-11-23	/	Original

Authorized for issue by:				
Tested By		Foray chen		2017-10-31
		Foray Chen /Project Engineer		**Date**
Checked By		Eric Fu		2017-11-23
		Eric Fu /Reviewer		**Date**

2 Contents

3 General Information

3.1 Client Information

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

3.1 Technical Specifications

Power supply:	DC 6V, 4* AA size battery
Operating frequency:	2402-2480MHz
Bluetooth version:	BT4.0 dual mode
Modulation type	Classic BT: GFSK,π/4-DQPSK, 8DPSK 4.0 LE: GFSK
Number of channels:	Classic BT: 79 4.0 LE: 40
Antenna type	PCB
Antenna gain	2dbi

3.2 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
Tel: +86 755 2601 2053 Fax: +86 755 2671 0594
No tests were sub-contracted.

3.3 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 –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• 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 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

5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on Appendix 15.247-BLE.

Test mode	Test Frequency (MHz)	Output Power (dBm)	Output Power (mW)
BLE	2402	-2.085	0.62
	2440	-0.957	0.80
	2480	0.503	1.12

The Power Data is based on Appendix 15.247-BT

Test Mode	Test Channel	Power[dBm]	Output Power (mW)
BT	2402	-3.24	0.47
	2441	1.721	1.49
	2480	2.199	**1.66**
	2402	-7.894	0.16
	2441	-2.733	0.53
	2480	-2.173	0.61
	2402	-7.778	0.17
	2441	-2.563	0.55
	2480	-2.201	0.60

5.2 MPE Calculation

The Max Conducted Peak Output Power is 1.66 mW(0.00166W);

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

For FCC:

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^ (Antenna gain in dBi /10)
3) R = distance to the center of radiation of antenna (in meter) = 20cm
4) MPE limit = 1mW/cm²

S= $\frac{PG}{4R^2\pi}$ =$\frac{1.66\times1.58}{4\times400\times3.14}$ =0.00052 mW/cm²

For IC:

E.I.R.P.= P*G= 0.00166×1.56=0.0026W＜2.68W

So the device is exclusion from SAR test.

--End of the Report--