RF Exposure Evaluation Declaration

FCC ID:	SVC-BLSP43A
Applicant:	Lenbrook Industries Limited
Product:	Wireless Streaming Sound System
Model No.:	PULSE SOUNDBAR+
Brand Name:	BLUESOUND
FCC Classification:	FCC Part 15 Spread Spectrum Transmitter (DSS) Digital Transmission System (DTS) Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s):	Part 2.1091
Result:	Complies

Reviewed By: Kevin Guo

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2105RSU032-U10	Rev. 01	Initial Report	2022-08-16	Valid

CONTENTS

1. General Information

1.1. Applicant

Lenbrook Industries Limited

633 Granite Court, Pickering, Ontario L1W 3K1, Canada

1.2. Manufacturer

Lenbrook Industries Limited

633 Granite Court, Pickering, Ontario L1W 3K1, Canada

1.3. Testing Facility

☐	**Test Site – MRT Suzhou Laboratory**				
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China **Laboratory Location (Suzhou - SIP)** 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
	Laboratory Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☐	**Test Site – MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**Test Site – MRT Taiwan Laboratory**				
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	Wireless Streaming Sound System
Model No.	PULSE SOUNDBAR+
Wi-Fi Specification	802.11a/b/g/n/ac
Bluetooth Specification	V4.2 single mode for BR/EDR
Antenna Information	Refer to section 1.5
Working Voltage	100-240V ~ 50/60Hz, 80W

Remark:

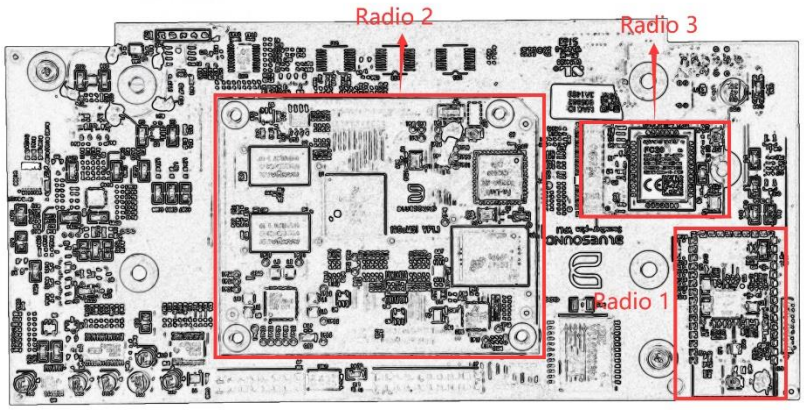
1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.
2. The device (FCC ID: SVC-BLSP43A) is based on the authorized device (FCC ID: SVC-BLSP43B, Original Grant Date: 08/04/2022) to change the Radio 2 from 19SoM with FC20 to 19SoM with 8223A. Others are the same with the authorized device. Details are shown in section 1.8 of this report.

1.5. Antenna Details

Antenna Type	Frequency Band (MHz)	T_X Paths	Antenna Gain (dBi)
Bluetooth			
PIFA Antenna	2402 ~ 2480	1	0
Radio 2 Wi-Fi Antenna			
PIFA Antenna	2400 ~ 5850	1	0
Radio 3 Wi-Fi Antenna			
PIFA Antenna	2400 ~ 5850	1	0

1.6. Description of Operating Paths

Operating Mode	Radio 1 (CSR8675)	Radio 2 (19SoM with 8223A)	Radio 3 (FC20)
DSS (2402 ~ 2480MHz)	√	×	×
DTS (2412 ~ 2462MHz)	×	√	√
NII (5180 ~ 5240MHz)	×	√	√
NII (5260 ~ 5320MHz)	×	√	×
NII (5500 ~ 5720MHz)	×	√	×
NII (5745 ~ 5825MHz)	×	√	√



Remark:

1. "√" means "Support", "X" means "Not support".
2. Radio 1, Radio 2 and Radio 3 can transmit simultaneously, but Radio 2 and Radio 3 will not work at the same frequency, such as Radio 2 works at Wi-Fi 2.4G, Radio 3 will work at Wi-Fi 5G automatically at this time.
3. Wi-Fi 2.4G and 5G of Radio 2 or Radio 3 cannot transmit simultaneously.

1.7. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 2.1091 & KDB 447498 D04 Interim General RF Exposure Guidance v01

2. RF Exposure Evaluation

2.1. Test Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Limits For Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*($900/f^2$)	<6
30-300	61.4	0.163	1.0	<6
300-1,500	--	--	f/300	<6
1,500-100,000	--	--	5	<6
(B) Limits for General Population/ Uncontrolled Exposures				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*($180/f^2$)	<30
30-300	27.5	0.073	0.2	<30
300-1,500	--	--	f/1500	<30
1,500-100,000	--	--	1.0	<30

f= frequency in MHz. * = Plane-wave equivalent power density.

2.2. MPE Exemptions

For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph §1.1307(b)(2) of this section): A single RF source is exempt if:

(Option A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(ii)(A) of this section.
Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A);

(Option B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P is given by:

$P\ th(mW) = \{ERP_{20cm}(d\ /\ 20cm)^x$ d ≤ 20cm

$P\ th(mW) = \{ERP_{20cm}$ 20cm < d ≤ 40cm

Where

$x = -log_{10}\left(\frac{60}{ERP_{20cm}\sqrt{f}}\right)$ and f is in GHz;

and

$ERP_{20cm}(mW) = \{2040f$ 0.3GHz ≤ f < 1.5GHz

$ERP_{20cm}(mW) = \{3060$ 1.5GHz ≤ f ≤ 6GHz

(Option C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to §1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1920R^2$
1.34-30	$3450R^2/f^2$
30-300	$3.83R^2$
300-1,500	$0.0128R^2/f$
1,500-100,000	$19.2R^2$

For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those is paragraph §1.1307(b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(B) of this section for P_{th}, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

$\boldsymbol{P_i}$ = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source *i* at a distance between 0.5 cm and 40 cm (inclusive).

$\boldsymbol{P_{th,i}}$ = the exemption threshold power (P_{th}) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source *i*.

$\boldsymbol{ERP_j}$ = the ERP of fixed, mobile, or portable RF source *j*.

ERP$_{th,j}$ = exemption threshold ERP for fixed, mobile, or portable RF source *j*, at a distance of at least λ/2π according to the applicable formula of paragraph §1.1307(b)(3)(i)(C) of this section.

Evaluated$_k$ = the maximum reported SAR or MPE of fixed, mobile, or portable RF source *k* either in the device or at the transmitter site from an existing evaluation at the location of exposure.

Exposure Limit$_k$ = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source *k*, as applicable from §1.1310 of this chapter.

2.3. Test Result

Product	Wireless Streaming Sound System
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.5.

Radio	Test Mode	Frequency Band (MHz)	Conducted Power (dBm)	Tune-up Power (dBm)	Antenna Gain (dBi)	Tune-up EIRP (dBm)
Radio 1	Bluetooth	2402 ~ 2480	8.88	9.0	0	9.0
Radio 2	802.11b/g/n	2412 ~ 2462	21.02	21.5	0	21.5
Radio 2	802.11a/n/ac	5180 ~ 5240 5260 ~ 5320 5500 ~ 5720 5745 ~ 5825	14.52	15.0	0	15.0
Radio 3	802.11b/g/n	2412 ~ 2462	20.36	21.0	0	21.0
Radio 3	802.11a/n/ac	5180 ~ 5240 5745 ~ 5825	20.51	21.0	0	21.0

Note: Tune-up power was declared by manufacturer.

For single RF source, Option B

Radio	Test Mode	λ / 2 π (m)	R (m)	Turn-up ERP (mW)	Threshold ERP (mW)	Power Density (mW/cm^2)	Limit (mW/cm^2)
Radio 1	Bluetooth (DSS)	0.0199	0.20	4.8	3060	0.0016	< 1
Radio 2	Wi-Fi (DTS)	0.0198	0.20	86.1	3060	0.0281	< 1
Radio 2	Wi-Fi (NII)	0.0092	0.20	19.3	3060	0.0063	< 1
Radio 3	Wi-Fi (DTS)	0.0198	0.20	76.7	3060	0.0250	< 1
Radio 3	Wi-Fi (NII)	0.0092	0.20	76.7	3060	0.0250	< 1

Note: R is from user manual.

For multiple RF sources

According to the description of remark 2 in the section 1.6 of this report,

So the Max Simultaneous Transmission = 4.8/3060 + 86.1/3060 + 76.7/3060 = 0.0548 < 1

The End