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Shenzhen, Guangdong, China 518057

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RF Exposure Evaluation Report

Application No.: SZEM1707007363CR(GZEM1707004195CR)

Applicant: Harman International Industries, Inc.

Address of Applicant: 8500 Balboa Boulevard, Northridge, California, 91329, United States

Manufacturer: Harman International Industries, Inc.

Address of Manufacturer: 8500 Balboa Boulevard, Northridge, California, 91329, United States

Factory: Guoguang Electric Co., Ltd.

Address of Factory: No.8 Jinghu Road, Xinya Street, Huadu Reg, Guangzhou, China

EUT Name: JBL Wireless Speaker-Primary **Model No.:** CONTROL XSTREAM Primary

Trade mark: JBL

FCC ID: APICNTRLXSTRMP

Standards: 47 CFR Part 1.1307 (2016)

47 CFR Part 1.1310 (2016)

Date of Receipt: 2017-07-13

Date of Test: 2017-07-27 to 2017-08-15

Date of Issue: 2017-09-19

Test Result : PASS*



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.

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



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2 Version

	Revision Record					
Version	Chapter	Date	Modifier	Remark		
01		2017-09-19		Original		

Authorized for issue by:		
	Benson Wang	
	Benson Wang /Project Engineer	
	Eric Fu	
	Eric Fu /Reviewer	



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4 General Description of EUT

Product Name:	Product Name: JBL Wireless Speaker-Primary				
Model No.:	CONTROL X	STREAM Primary			
Trade mark:	JBL				
For BLE:					
Operation Frequency:	2402MHz~24	80MHz			
Bluetooth Version:	BT 4.2 Dual r	mode			
Modulation Type:	GFSK	GFSK			
Number of Channel:	40				
Antenna Type:	PIFA				
Antenna Gain:	Antenna 1: 2.25dBi; Antenna 2: 2.17dBi Two antennas can not simultaneous transmission.				
For BT:					
Operation Frequency:	2402MHz~24	ŀ80MHz			
Bluetooth Version:	BT 4.2 Dual r	mode			
Modulation Technique:	Frequency H	opping Spread Spectrum(FHS	SS)		
Modulation Type:	GFSK, π/4D0	QPSK, 8DPSK			
Number of Channel:	79				
Hopping Channel Type:	Adaptive Frequency Hopping systems				
Antenna Type:	PIFA				
Antenna Gain:	Antenna 1: 2.25dBi; Antenna 2: 2.17dBi				
For 0.40 wife	Two antenna	s can not simultaneous transr	nission.		
For 2.4G wifi:	T.===				
Operation Frequency:		o/g/n(HT20): 2412MHz to 246			
Channel Numbers:		o/g, IEEE 802.11n HT20: 11 (Channels		
Channel Separation:	5MHz				
Type of Modulation:	IEEE for 802.	.11b: DSSS(CCK,DQPSK,DB .11g : OFDM(64QAM, 16QAM	I, QPSK, BPSK)		
		.11n(HT20) : OFDM (64QAM,	16QAM, QPSK,BP	SK)	
Antenna Type:	PIFA				
Antenna Gain:		.25dBi, Antenna 2: 2.17dBi s can not simultaneous transı	nission.		
For 5G wifi:					
	Band	Mode	Frequency	Number	
	ll .		Range(MHz)	of	
			. (3.195(101112)		
Operation Frequency:	channels			channels	
	UNII Band	IEEE 802.11a	5180-5240	4	
	l I	IEEE 802.11n/ac 20MHz	5180-5240	4	
		IEEE 802.11n/ac 40MHz	5190-5230	2	

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		IEEE 802.11ac 80MHz	5210	1	
	UNII Band	IEEE 802.11a	5260-5320	4	
	II-A	IEEE 802.11n/ac 20MHz	5260-5320	4	
		IEEE 802.11n/ac 40MHz	5270-5310	2	
		IEEE 802.11ac 80MHz	5290	1	
	UNII Band	IEEE 802.11a	5500-5700	11	
	II-C	IEEE 802.11n/ac 20MHz	5500-5700	11	
		IEEE 802.11n/ac 40MHz	5510-5670	5	
		IEEE 802.11ac 80MHz	5530-5610	2	
	UNII Band	IEEE 802.11a	5745-5825	5	
	Ш	IEEE 802.11n/ac 20MHz	5745-5825	5	
		IEEE 802.11n/ac 40MHz	5755-5795	2	
		IEEE 802.11ac 80MHz	5775	1	
Type of Modulation:	IEEE 802.11a: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11n: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11ac: OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)				
Antenna type:	PIFA	,		·	
Antenna gain	Antenna 1:3.69dBi; Antenna 2:3.68dBi Two antennas can not synchronous transmission.				



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4.1 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.

4.2 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.

4.3 Deviation from Standards

None.

4.4 Abnormalities from Standard Conditions

None.

4.5 Other Information Requested by the Customer

None.



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5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

According to FCC Part1.1310: 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 part1.1307(b)

Table 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
(A) Lim	its for Occupational	//Controlled Exposu	res	
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4.89/f 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 6
(B) Limits	for General Populati	on/Uncontrolled Exp	oosure	
0.3–1.34	614 824/f 27.5	1.63 2.19/f 0.073	*(100) *(180/f²) 0.2 f/1500 1.0	30 30 30 30 30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $Pd = (Pout*G)/(4*Pi*R^2)$

Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE, 1 mW/cm2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



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4.1.3 EUT RF Exposure Evaluation

For BT/BLE

Antenna 1: 2.25dBi; Antenna 2: 2.17dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.68 / 1.65 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Max Conducted	Output Power	Power Density	Limit	MPE	Result
Peak Output	to Antenna	at R = 20 cm		Ratios	
Power (dBm)	(mW)	(mW/cm ²)			
4.75	2.99	0.001	1.0	0.001	PASS

For 2.4G WIFI

Antenna 1: 2.25dBi; Antenna 2: 2.17dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.68 / 1.65 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Max Conducted	Output Power	Power Density	Limit	MPE	Result
Peak Output	to Antenna	at R = 20 cm		Ratios	
Power (dBm)	(mW)	(mW/cm ²)			
17.75	59.57	0.02	1.0	0.02	PASS

For 5GHz

Antenna 1:3.69dBi; Antenna 2:3.68dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.34/2.33 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Max Conducted	Output Power	Power Density	Limit	MPE	Result
Peak Output	to Antenna	at R = 20 cm		Ratios	
Power (dBm)	(mW)	(mW/cm²)			
12.31	17.02	0.008	1.0	0.008	PASS

For 5.2GHz property

Antenna A:3.0dBi; Antenna B:3.0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.0/2.0 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Max Conducted Peak Output	Output Power to Antenna	Power Density at R = 20 cm	Limit	MPE Ratios	Result
Power (dBm)	(mW)	(mW/cm²)		Hatios	
10.61	11.51	0.0046	1.0	0.0046	PASS



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For 5.8GHz property

Antenna A:3.2dBi; Antenna B:3.2dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.09/2.09 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	MPE Ratios	Result
9.31	8,53	0.0035	1.0	0.0035	PASS

The distancer (3RD column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

1) . exposure conditions for simultaneous transmission operations

- 1. The BT/Wifi module has two antennas, but it can't simultaneous transmission.
- 2. The 5.2/5.8GHz property module has two antennas, but it can't simultaneous transmission.
- 3. only for the one of the antenna with the BT/Wifi module and one of the antenna with the 5.2/5.8GHz property can simultaneous transmission.
- So, Simultaneous transmission SAR test is not required, because the Max. sum of the MPE ratios is 0.02+0.0046=0.0246<1.