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Shenzhen Branch**

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Report No.: SZEM180700575203
Page: 1 of 7

RF Exposure Evaluation Report

Application No.: SZEM1807005752CR
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: TCL TECHNOLOGY ELECTRONICS (HUIZHOU) CO., LTD
Address of Factory: Section 19, Zhongkai High-tech development Zone, Huizhou City, Guangdong Province, China
Section 37, Zhongkai High-tech development Zone, Huizhou City, Guangdong Province, China
EUT Name: 2.1 Soundbar with Wireless Subwoofer
Model No.: JBL Bar2.1-T
Trade mark: JBL
FCC ID: APIJBLBAR21CT
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
Date of Receipt: 2018-07-02
Date of Test: 2018-07-18 to 2018-07-30
Date of Issue: 2018-08-16

Test Result :	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu
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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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-08-16		Original

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

3 Contents

	Page
1 COVER PAGE.....	1
2 VERSION	2
3 CONTENTS	3
4 GENERAL DESCRIPTION OF EUT	4
4.1 TEST LOCATION	5
4.2 TEST FACILITY	5
4.3 DEVIATION FROM STANDARDS.....	5
4.4 ABNORMALITIES FROM STANDARD CONDITIONS	5
4.5 OTHER INFORMATION REQUESTED BY THE CUSTOMER	5
5 RF EXPOSURE EVALUATION	6
5.1 RF EXPOSURE COMPLIANCE REQUIREMENT	6
5.1.1 <i>Limits</i>	6
5.1.2 <i>Test Procedure</i>	6
5.1.3 <i>EUT RF Exposure Evaluation</i>	7

4 General Description of EUT

Power supply:	Powered by AC 120V 60Hz
For BT:	
Bluetooth Version:	BT4.2 dual mode
Operation Frequency	2402MHz to 2480MHz
Spectrum Spread Technology	Frequency Hopping Spread Spectrum(FHSS)
Number of Channels	79
Modulation Type	GFSK, $\pi/4$ DQPSK, 8DPSK
Channel Spacing	1MHz
Antenna Type	Integral
Antenna Gain	3.29dBi
For BLE:	
Bluetooth Version:	BT 4.2 Dual mode
Operation Frequency	2402MHz to 2480MHz
Number of Channels	40
Modulation Type	GFSK
Channel Spacing	2MHz
Antenna Type	Integral
Antenna Gain	3.29dBi
For 5.8GHz	
Operation Frequency	5743MHz-5840MHz
Modulation Type	GFSK
Number of Channels	35
Antenna Type	Integrated PCB antenna
Antenna Gain	Antenna 1: 2.85dBi; Antenna 2: 2.85dBi The two antennas and match circuit are the identical and only one antenna is selected for use at any one time, through the on-board Transmit-receive/Diversity RF switch.

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 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 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.

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/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled 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
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
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
300–1500			f/1500	30
1500–100,000			1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is 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.

5.1.3 EUT RF Exposure Evaluation

For BT & BLE

Antenna: 3.29dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.13 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Max Conducted Output Power (including tune-up tolerance) (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	MPE Ratios	Result
2.95	1.97	0.0008	1.0	0.0008	PASS

For 5.8G property

Antenna: 2.85dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.93 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Max Conducted Output Power (including tune-up tolerance) (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	MPE Ratios	Result
12.80	19.05	0.007	1.0	0.007	PASS

exposure conditions for simultaneous transmission operations:

The soundbar has two modules: Bluetooth and 5.8G property module, they can simultaneous transmission at the same time.

For 5.8G property module: The two antennas and match circuit are the identical and only one antenna is selected for use at any one time, through the on-board Transmit-receive/Diversity RF switch.

So, Simultaneous transmission SAR test is not required, because the Max. sum of the MPE ratios is $0.0008+0.007=0.0078<1$.

- End of the Report -