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Shenzhen Branch

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RF Exposure Evaluation Report

Application No.:	SZEM1506003796CR
Applicant:	Polk Audio
Manufacturer:	Polk Audio
Factory	Zhao Yang Electronic (ShenZhen) Co., Ltd.
Product Name:	wireless all-in-one speaker system
Model No.(EUT):	OMNI S6
Trade Mark:	POLK
FCC ID:	WLQOMNIS6
Standards:	47 CFR Part 1.1307 (2014) 47 CFR Part 1.1310 (2014)
Date of Receipt:	2015-07-31
Date of Test:	2015-08-03 to 2015-08-12
Date of Issue:	2015-08-13
Test Result :	**PASS***

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

Authorized Signature:

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.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2015-08-13		Original

Authorized for issue by:				
Tested By		(Owen Zhou) /Project Engineer		2015-08-12 **Date**
Prepared By		(Hedy Wen) /Clerk		2015-08-13 **Date**
Checked By		(Eric Fu) /Reviewer		2015-08-13 **Date**

3 Contents

4 General Information

4.1 Client Information

Applicant:	Polk Audio
Address of Applicant:	5601 Metro Drive Baltimore, Maryland, 21215, USA
Manufacturer:	Polk Audio
Address of Manufacturer:	5601 Metro Drive Baltimore, Maryland, 21215, USA
Factory:	Zhao Yang Electronic (ShenZhen) Co., Ltd.
Address of Factory:	Section A, 4th Floor, Building 1 & Building 2, De Yong Jia Industrial Park, Guang Qiao Road, Yu Lv Community, Gong Ming Street, Guang Ming New District, Shenzhen, Guangdong, P.R.C

4.2 General Description of EUT

Product Name:	wireless all-in-one speaker system			
Model No.:	OMNI S6			
Trade Mark:	POLK			
Sample Type:	Fixed production			
Antenna Type:	Integral			
AUX Cable:	150cm			
Power Supply:	AC 100-240V 50/60Hz			
For 2.4 GHz				
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz			
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n(HT20): 11 Channels IEEE 802.11n(HT40): 7 Channels			
Channel Separation:	5MHz			
Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n(HT20 and HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)			
Test Power Grade:	802.11b :15dBm@11Mbps; 802.11g:10 dBm@54Mbps; 802.11n20(2.4G):10 dBm@MCS7; 802.11n40(2.4G) :10 dBm@MCS7; (manufacturer declare)			
Test Software of EUT:	teraterm.exe (manufacturer declare)			
Antenna Gain:	2.28dBi			
For 5GHz				
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII	IEEE 802.11a	5180-5240	4

	Band I	IEEE 802.11n 20MHz	5180-5240	4
		IEEE 802.11n 40MHz	5190-5230	2
	UNII Band II-A	IEEE 802.11a	5260-5320	4
		IEEE 802.11n 20MHz	5260-5320	4
		IEEE 802.11n 40MHz	5270-5310	2
	UNII Band II-C	IEEE 802.11a	5500-5700	11
		IEEE 802.11n 20MHz	5500-5700	11
		IEEE 802.11n 40MHz	5510-5670	5
	UNII Band III	IEEE 802.11a	5745-5825	5
		IEEE 802.11n 20MHz	5745-5825	5
		IEEE 802.11n 40MHz	5755-5795	2
Type of Modulation:	IEEE 802.11a: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11n: OFDM(BPSK/QPSK/16QAM/64QAM)			
Test Power Grade:	802.11a :13 dBm@54Mbps； 802.11n20(5G) :11 dBm@MCS7； 802.11n40(5G) :11 dBm@MCS7；(manufacturer declare)			
Test Software of EUT:	teraterm.exe (manufacturer declare)			
Antenna Gain:	3.92dBi			

4.3 Test Location

All tests were performed at:

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

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.4 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.

- **VCCI**

  The 10m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) 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 – Registration No.: 556682**

  SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

  Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-2.

4.5 Deviation from Standards

None.

4.6 Abnormalities from Standard Conditions

None.

4.7 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: 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.

4.1.3 EUT RF Exposure Evaluation

For 2.4GHz WIFI

Antenna Gain: 2.28dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.69 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
2412	18.84	76.56	0.026	1.0	PASS

Note: Refer to report No. SZEM150600379602 for EUT test Max Conducted Peak Output Power value.

For 5GHz WIFI

Antenna Gain: 3.92dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.47 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
5785	13.84	24.21	0.012	1.0	PASS

Note: Refer to report No. SZEM150600379603 for EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.