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Report No.: SHEM170500284903
Page: 1 of 8

1 Cover Page

RF MPE REPORT

Application No.:	SHEM1705002849CR
Applicant:	Bosch Security Systems Inc
FCC ID:	ESVEEVOLVE50
Equipment Under Test (EUT):	
NOTE: The following sample(s) was/were submitted and identified by the client as	
Product Name:	Self-powered column speaker system
Model No.(EUT):	EVOLVE 50
Add Model No.:	EVOLVE 50-SB-US, EVOLVE 50-SB-EU, EVOLVE 50-SB-AP, EVOLVE 50-SW, EVOLVE 50-TB, EVOLVE 50-TW
Standards:	FCC Rules 47 CFR §2.1091
Date of Receipt:	2017-05-17
Date of Test:	2017-06-14 to 2017-06-26
Date of Issue:	2017-07-26
Test Result:	Pass*

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

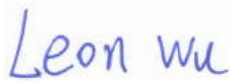
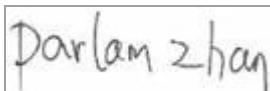


Parlam Zhan
E&E Section Manager
SGS-CSTC (Shanghai) Co., Ltd.

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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Revision Record				
Version	Chapter	Date	Modifier	Remark
00	/	2017-07-26	/	Original

Authorized for issue by:			
Tested By	 Leon_wu /Project Engineer	2017-06-26	Date
Checked By	 Parlam Zhan /Reviewer	2017-06-26	Date

2 Contents

	Page
1 COVER PAGE.....	1
2 CONTENTS	3
3 GENERAL INFORMATION	4
3.1 CLIENT INFORMATION.....	4
3.1 GENERAL DESCRIPTION OF E.U.T.....	4
3.2 TECHNICAL SPECIFICATIONS	4
3.3 TEST LOCATION	5
3.4 TEST FACILITY	5
4 TEST STANDARDS AND LIMITS	6
4.1 FCC RADIOFREQUENCY RADIATION EXPOSURE LIMITS:	6
4.2 IC RADIOFREQUENCY RADIATION EXPOSURE LIMITS:.....	6
5 MEASUREMENT AND CALCULATION	7
5.1 MAXIMUM TRANSMIT POWER	7
5.2 MPE CALCULATION.....	7
6 EUT CONSTRUCTIONAL DETAILS.....	8

3 General Information

3.1 Client Information

Applicant:	Bosch Security Systems Inc
Address of Applicant:	130 Perinton Parkway,Fairport,NY,USA
Manufacturer:	Bosch Security Systems Inc
Address of Manufacturer:	130 Perinton Parkway,Fairport,NY,USA
Factory:	Speaker Electronic (Jia Shan) CO.,Ltd
Address of Factory:	No.8,Development,ZoneRoad,Huimin,Sub-district,Jiashan,Country,Zhejiang 314112,P,R,China

3.1 General Description of E.U.T.

Product Description:	Fixed product with BT function
Rated Input:	AC 100-230V 50/60Hz
Test Voltage:	AC 120V 60Hz

3.2 Technical Specifications

Operation Frequency:	2402MHz-2480MHz
Bluetooth Version:	BT 3.0 + HS
Modulation Type:	GFSK, $\pi/4$ DQPSK,8DPSK
Number of Channel:	79
Antenna Type	PCB Antenna
Antenna Gain	1.54 dBi

3.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666

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3.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 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.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868, C-4336, T-2221, G-830 respectively.

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 the RF Test Report SHEM170500284902

Test Mode	Test Frequency (MHz)	Output Power (dBm)	Output Power (mW)
GFSK	2402	1.15	1.30
	2441	0.60	1.15
	2480	3.38	2.18
π/4DQPSK	2402	-1.32	0.74
	2441	1.24	1.33
	2480	2.25	1.68
8DPSK	2402	-1.20	0.76
	2441	1.61	1.45
	2480	2.49	1.77

5.2 MPE Calculation

For BT 3.0 The Max Conducted Peak Output Power is 3.48dBm (2.23mW);

For B LE module has granted, The Max Conducted Peak Output Power is 2.16dBm (1.64mW) from report 19660174 001 ;

The best case gain of the antenna for BT 3.0 is 1.54dBi. 1.54dB logarithmic terms convert to numeric result is nearly 1.43, and the best case gain of the antenna for B LE is 0.5dBi. 0.5dB logarithmic terms convert to numeric result is nearly 1.12.

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

$$\text{For BT 3.0, } S = \frac{PG}{4R^2\pi} = \frac{2.23 \times 1.43}{4 \times 400 \times 3.14} = 0.0006 \text{ mW/cm}^2$$

$$\text{For BLE, } S = \frac{PG}{4R^2\pi} = \frac{1.64 \times 1.12}{4 \times 400 \times 3.14} = 0.0004 \text{ mW/cm}^2$$

BT 3.0 modules and BLE modules can simultaneous transmitting, so the maximum rate of MPE is

$$\frac{0.0006}{1.0} + \frac{0.0004}{1} = 0.001 \leq 1.0. \text{ according to the KDB447498 section 7.2 determine the device is}$$

exclusion from SAR test.

6 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

--End of the Report--