## **EMC TEST REPORT**

For

Dongguan Juling Electronics Technology Co., Ltd.

Bluetooth Headphone

Model No.: HE09

Additional Model No.: HE01, HE02, HE03, HE04, HE05, HE08, HE14, HE16

Prepared for : Dongguan Juling Electronics Technology Co., Ltd.

Address : Jiuwei Industrial Zone, Qishi Town, Dongguan City, Guangdong, China

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.

Address : 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an

District, Shenzhen, Guangdong, China

Date of receipt of test sample : January 14, 2014

Number of tested samples : 1

Serial number : Prototype

Date of Test : January 14, 2014 - January 22, 2014

Date of Report : January 22, 2014



## EMC TEST REPORT ETSI EN 301 489-17 V2.2.1 (2012-09)

Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC)standard for radio equipment; Part 17: Specific conditions for Broadband Data Transmission Systems

Report Reference No	: LCS140114249TE
Date of Issue	: January 22, 2014
Testing Laboratory Name	: Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	. 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure	<ul> <li>Full application of Harmonised standards</li> <li>Partial application of Harmonised standards</li> <li>Other standard testing method</li> </ul>
Applicant's Name	: Dongguan Juling Electronics Technology Co., Ltd.
Address	: Jiuwei Industrial Zone, Qishi Town, Dongguan City, Guangdong, China
Test Specification	
Standard	ETSI EN 301 489-1 V1.9.2 (2011-09) ETSI EN 301 489-17 V2.2.1 (2012-09)
Test Report Form No	: LCSEMC-1.0
TRF Originator	: Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	: Dated 2011-03

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Trade Mark : N/A

Model/ Type reference : HE09

Ratings : DC 3.7V by battery(360mAh)

Recharge Voltage: DC 5V/0.22A

Positive : Positive

Compiled by: Supervised by:

I'm shon Jon show

Fox Zhang/ Technique principal

Approved by:

Gavin Liang/ Manager

January 22, 2014

Date of issue

Test Report No.: LCS140114249TE

# **EMC -- TEST REPORT**

Type / Model..... : HE09 EUT.....: Bluetooth Headphone Applicant.....: : Dongguan Juling Electronics Technology Co., Ltd. Address...... Jiuwei Industrial Zone, Qishi Town, Dongguan City, Guangdong, China Telephone.....: : / Fax....: : / Manufacturer.....: : Dongguan Juling Electronics Technology Co., Ltd. Address...... : Jiuwei Industrial Zone, Qishi Town, Dongguan City, Guangdong, China Telephone....:: / Fax..... : / Factory.....: Dongguan Juling Electronics Technology Co., Ltd. Address...... : Jiuwei Industrial Zone, Qishi Town, Dongguan City, Guangdong, China Telephone.....: : / Fax....: : /

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

# **TABLE OF CONTENTS**

1. GENERAL INFORMATION	5
1.1. PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	
1.2. Objective	
1.3. RELATED SUBMITTAL(S)/GRANT(S)	
1.4. Test Methodology	
1.5. FACILITIES	
1.6. SUPPORT EQUIPMENT LIST	
1.7. EXTERNAL I/O	6
1.8. LABORATORY ACCREDITATIONS AND LISTINGS	
1.9. MEASUREMENT UNCERTAINTY	6
1.10. DESCRIPTION OF TEST MODES	
2. SUMMARY OF TEST RESULTS	7
3. RADIATED DISTURBANCE	8
3.1. RADIATED EMISSION LIMIT	8
3.2. TEST EQUIPMENT	
3.3. TEST CONFIGURATION.	
3.4. TEST PROCEDURE	
3.5. Test Data	9
4. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST	12
4.1. Performance criteria for Continuous phenomena applied to Transmitter (CT)	12
4.2. PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO TRANSMITTER (TT)	
4.3. PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA APPLIED TO RECEIVER (CR)	
4.4. PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO RECEIVER (TR)	12
5. ETSI EN 301 489-17 V2.2.1 §7.2 – RF ELECTROMAGNETIC FIELD (80 MHz -1000 MH	z and 1400
MHz –2700 MHz)	
5.1. TEST EQUIPMENT.	
5.2. TEST CONFIGURATION	
5.3. TEST STANDARD	14
5.4. TEST PROCEDURE	
5.5. Test Data	14
6. ELECTROSTATIC DISCHARGE	16
6.1. TEST EQUIPMENT.	
6.2. Test Configuration	
6.3. TEST PROCEDURE	
6.4. Test Data	17
7. TEST SETUP PHOTOGRAPHS	19
7.1.PHOTO OF RADIATED MEASUREMENT	
7.2.Photo of Radio-frequency, Continuous radiated disturbance	
7.3.PHOTO OF ELECTROSTATIC DISCHARGE TEST	20
O MANUEL COURSED / A DDD OVAL HOLDED DECLADATION	21

#### 1. GENERAL INFORMATION

## 1.1. Product Description for Equipment Under Test (EUT)

EUT : Bluetooth Headphone

Model No. : HE09

Frequency Range : 2402.00-2480.00MHz

Channel Number : 79 channel for Bluetooth V4.0 (DSS)

40 channels for Bluetooth V4.0 (DTS)

Channel Spacing : 1MHz for Bluetooth V4.0 (DSS)

2MHz for Bluetooth V4.0 (DTS)

Modulation Type : GFSK,  $\pi/4$ -DQPSK, 8-DPSK

Bluetooth Version : V4.0

Antenna Gain : Integral antenna, 2.0dBi(Max.)

Input Voltage : DC 3.7V by battery(360mAh)

Recharge Voltage: DC 5V/0.22A

## 1.2. Objective

ETSI EN 301 489-1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electro Magnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
ETSI EN 301 489-17	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment Part 17: Specific conditions for Broadband Data Transmission Systems

The objective is to determine EUT compliance with ETSI EN 301 489-1 V1.9.2 (2011-09) and ETSI EN 301 489-17 V2.2.1 (2012-09).

#### 1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

#### 1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V1.9.2 (2011-09) and ETSI EN 301 489-17 V2.2.1 (2012-09).

#### 1.5. Facilities

All measurement facilities used to collect the measurement data are located at 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 1.6. Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate

#### 1.7. External I/O

I/O Port Description	Quantity	Cable	
USB Port	1	N/A	

## 1.8. Laboratory Accreditations And Listings

Site Description

EMC Lab. : Accredited by CNAS, June 04, 2010

The Certificate Registration Number. is L4595.

Accredited by FCC, April 22, 2011

The Certificate Registration Number. is 899208.

Accredited by Industry Canada, May. 02, 2011 The Certificate Registration Number. is 9642A-1

Name of Firm : Shenzhen LCS Compliance Testing Laboratory Ltd.

Site Location : 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District,

Shenzhen, Guangdong, China

## 1.9. Measurement Uncertainty

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.42dB	
Uncertainty for Radiation Emission test in 3m chamber	3.54dB	Polarize: V
(30MHz to 1GHz)	4.10dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber	2.08dB	Polarize: H
(1GHz to 25GHz)	2.56dB	Polarize: V

#### 1.10. Description Of Test Modes

#### MODE 1:

Normal Operating (Bluetooth is active)

MODE 2:

Idle

<sup>\*\*\*</sup>Note: All test modes were tested, but we only recorded the worst case in this report.

# 2. SUMMARY OF TEST RESULTS

Rule	Description of Test	Result
§7.1	Reference to clauses EN 301 489-1 §8.4 AC mains power input/output ports	N/A
§7.1	Reference to clauses EN 301 489-1§8.3 DC power input/output ports	N/A*
§7.1	Reference to clauses EN 301 489-1 §8.2 Enclosure of ancillary equipment measured on a stand alone basis	Compliant
§ <b>7.1</b>	Reference to clauses EN 301 489-1 §8.5 Harmonic current emissions (AC mains input port)	N/A
§ <b>7.1</b>	Reference to clauses EN 301 489-1 §8.6 Voltage fluctuations and flicker (AC mains input port)	N/A
§ <b>7.</b> 1	Reference to clauses EN 301 489-1§8.7 Telecommunication ports	N/A*
§7.2	Reference to clauses EN 301 489-1 §9.3 Electrostatic discharge (EN 61000-4-2)	Compliant
§7.2	Reference to clauses EN 301 489-1 §9.2 Radio frequency electromagnetic field (80 MHz to 1 000 MHz and 1 400 MHz to 2 000 MHz)(EN 61000-4-3)	Compliant
§7.2	Reference to clauses EN 301 489-1§9.4 Fast transients, common mode (EN 61000-4-4)	N/A
§7.2	Reference to clauses EN 301 489-1§9.8 Surges (EN 61000-4-5)	N/A
§7.2	Reference to clauses EN 301 489-1§9.5 Radio frequency, common mode (EN 61000-4-6)	N/A
§7.2	Reference to clauses EN 301 489-1 §9.6 Transients and surges in the vehicular environment (ISO 7637-2)	N/A*
§7.2	Reference to clauses EN 301 489-1§9.7 Voltage dips and interruptions (EN 61000-4-11)	N/A

## 3. RADIATED DISTURBANCE

## 3.1. Radiated Emission Limit

ETSI 301 489-1 V1.9.2 (2011-09)/EN 55022 Class B

#### Limits for radiated disturbance Blow 1GHz

FREQUENCY	DISTANCE	FIELD STRENGTHS LIMIT		
(MHz)	(Meters)	(dBµV/m)		
30 ~ 230	3	40		
230 ~ 1000	3	47		

Note: (1) The smaller limit shall apply at the combination point between two frequency bands. (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

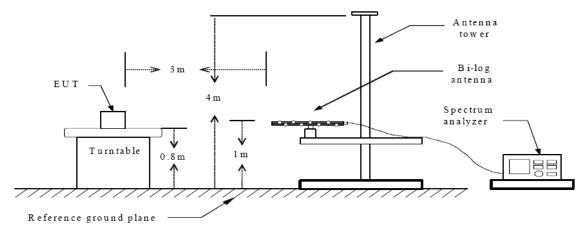
# Limits for radiated disturbance Above 1GHz

FREQUENCY (MHz)	DISTANCE (Meters)	Average Limit (dBµV/m)	Peak Limit (dBμV/m)			
1000-3000	3	50	70			
3000-6000 3 54 74						
Note: The lower limit applies at the transition frequency.						

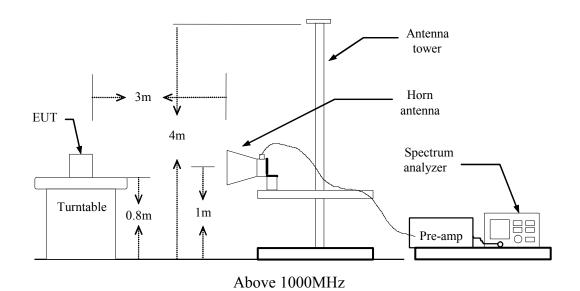
## 3.2. Test Equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	101142	2013-06-18	2014-06-17
2	EMI Test Receiver	ROHDE & SCHWARZ	ESPI	101840	2013-06-18	2014-06-17
3	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03СН03-НҮ	2013-06-18	2014-06-17
4	Amplifier	SCHAFFNER	COA9231A	18667	2013-06-18	2014-06-17
5	Amplifier	Agilent	8449B	3008A02120	2013-06-16	2014-06-15
6	Amplifier	MITEQ	AMF-6F-260 400	9121372	2013-06-16	2014-06-15
7	Spectrum Analyzer	Agilent	E4407B	MY4144029 2	2013-06-16	2014-06-15
8	Signal analyzer	Agilent	E4448A(Exte rnal mixers to 40GHz)	US44300469	2013-06-16	2014-06-15
9	Loop Antenna	R&S	HFH2-Z2	860004/001	2013-06-18	2014-06-17
10	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2013-06-10	2014-06-09
11	Horn Antenna	EMCO	3115	6741	2013-06-10	2014-06-09
12	Horn Antenna	SCHWARZBECK	BBHA9170	BBHA91701 54	2013-06-10	2014-06-09
13	RF Cable-R03m	Jye Bao	RG142	CB021	2013-06-18	2014-06-17
14	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03СН03-НҮ	2013-06-18	2014-06-17

## 3.3. Test Configuration



Below 1000MHz

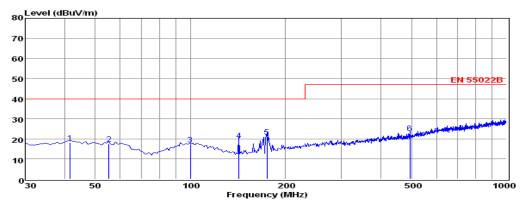


#### 3.4. Test Procedure

Please refer to ETSI EN 301 489-1 Clause 8.2.3 and EN 55022 Clause 6 for the measurement methods.

## 3.5. Test Data

The worst test mode of the EUT was Mode 1, and its test data was showed as the follow:



Env./Ins: 24°C/56%

EUT: Bluetooth Headphone

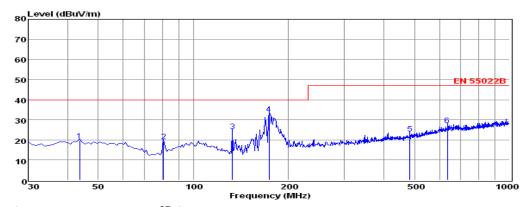
M/N: HE09 Power Rating: DC 3.7V Test Mode: Mode 1 Operator: Tree

Memo:

VERTICAL pol:

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dВ	dB/m	dBuV/m	dBuV/m	dВ	
1	41.64	3.97	0.50	13.57	18.04	40.00	-21.96	QP
2	55.22	4.02	0.46	13.01	17.49	40.00	-22.51	QP
3	99.84	3.47	0.60	13.15	17.22	40.00	-22.78	QP
4	142.52	10.32	0.71	8.21	19.24	40.00	-20.76	QP
5	174.53	11.21	0.73	9.29	21.23	40.00	-18.77	QP
6	494.63	5.04	1.50	16.44	22.98	47.00	-24.02	QP

Note: 1. All readings are Quasi-peak values. 2. Measured= Reading + Antenna Factor + Cable Loss 3. The emission that ate 20db blow the offficial limit are not reported



24°C/56% Env./Ins:

Bluetooth Headphone EUT: M/N: HE09

Power Rating: DC 3.7V Mode 1 Test Mode: Operator: Tree

Memo: pol: HORIZONTAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dВ	dB/m	dBuV/m	dBuV/m	dВ	
1	43.58	5.68	0.41	13.56	19.65	40.00	-20.35	QP
2	80.44	9.86	0.65	8.70	19.21	40.00	-20.79	QP
3	132.82	14.79	0.74	8.72	24.25	40.00	-15.75	QP
4	173.56	22.91	0.91	9.22	33.04	40.00	-6.96	QP
5	483.96	5.53	1.39	16.17	23.09	47.00	-23.91	QP
6	636.25	7.21	1.71	18.58	27.50	47.00	-19.50	QP

Note: 1. All readings are Quasi-peak values. 2. Measured= Reading + Antenna Factor + Cable Loss 3. The emission that ate 20db blow the offficial limit are not reported

<b>Test Mode:</b> Mode 1(above 1GHz)	Tested by: Andy
<b>Test voltage:</b> DC 3.7V by battery	Test Distance: 3m
<b>Detector Function:</b> Peak+AV	Test Results: Passed

Polarization	Frequency MHz	Emission Level dBµV/m		Limits dBµV/m		Margin dBμV/m	
	1402.53	55.45	37.66	70.00	50.00	-14.55	-12.34
	1855.24	54.60	35.12	70.00	50.00	-15.40	-14.88
Horizontal	3217.61	56.41	32.92	74.00	54.00	-17.59	-21.08
понгонцан	3963.19	60.47	36.93	74.00	54.00	-13.53	-17.07
	4449.68	61.89	39.48	74.00	54.00	-12.11	-14.52
	4864.23	63.35	37.58	74.00	54.00	-10.65	-16.42
	1383.15	53.91	34.40	70.00	50.00	-16.09	-15.60
	1875.30	58.07	34.88	70.00	50.00	-11.93	-15.12
Vertical	3226.21	58.05	37.51	74.00	54.00	-15.95	-16.49
Vertical	3734.08	61.75	36.59	74.00	54.00	-12.25	-17.41
	4446.38	59.93	38.14	74.00	54.00	-14.07	-15.86
	4855.59	63.49	36.47	74.00	54.00	-10.51	-17.53

<sup>1.</sup> Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

<sup>2.</sup> Measurements above show only up to 6 maximum emissions noted.

<sup>3.</sup> Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

#### 4. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST

## 4.1. Performance criteria for Continuous phenomena applied to Transmitter (CT)

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.

Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

#### 4.2. Performance criteria for Transient phenomena applied to Transmitter (TT)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

## 4.3. Performance criteria for Continuous phenomena applied to Receiver (CR)

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

## 4.4. Performance criteria for Transient phenomena applied to Receiver (TR)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

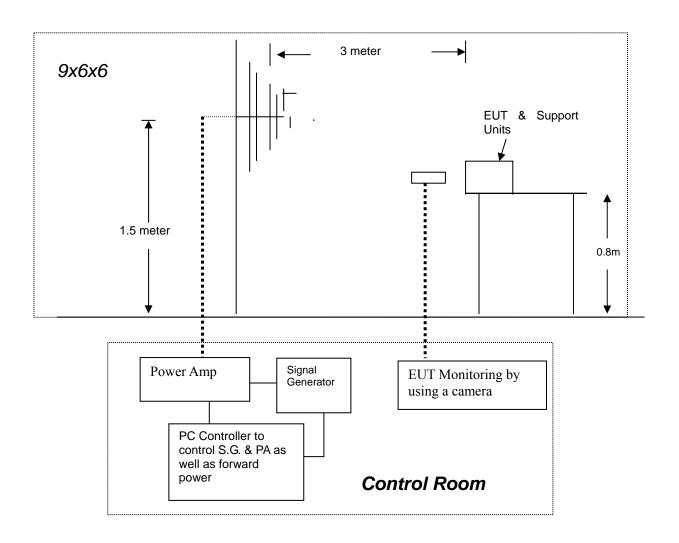
# 5. ETSI EN 301 489-17 V2.2.1 $\S7.2-$ RF ELECTROMAGNETIC FIELD (80 MHz -1000 MHz and 1400 MHz -2700 MHz)

Please refer to ETSI EN 301 489-1, ETSI EN 301 489-17 and EN 61000-4-3.

## 5.1. Test Equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Cal.
1	Signal Generator	R&S	SMR40	10016	2013-06-16	2014-06-15
2	Amplifier	AR	500A100	17034	2013-06-18	2014-06-17
3	Amplifier	AR	100W/1000M1	17028	2013-06-18	2014-06-17
4	Isotropic Field Monitor	AR	FM2000	16829	2013-06-18	2014-06-17
5	Isotropic Field Probe	AR	FP2000	16755	2013-06-18	2014-06-17
6	Bi-conic Antenna	EMCO	3108	9507-2534	2013-06-18	2014-06-17
7	By-log-periodic Antenna	AR	AT1080	16812	2013-06-18	2014-06-17
8	EMS Test Software	ROHDE & SCHWARZ	ESK1	N/A	2013-06-18	2014-06-17

## 5.2. Test Configuration



#### 5.3. Test Standard

ETSI 301 489-1 V1.9.2 (2011-09)/ (EN 61000-4-3: 2006+A1: 2008+A2: 2010)

Test level 2 at 3V / m

#### **Test Level**

Level	Field Strength V/m		
1.	1		
2.	3		
3.	10		
X	Special		

Performance criterion: A

#### **5.4. Test Procedure**

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen. All the scanning conditions are as follows:

	Condition of Test	Remarks		
2. 3. 4.	Fielded Strength Radiated Signal Scanning Frequency Dwell time of radiated Waiting Time	3 V/m (Severity Level 2) Unmodulated 80 – 1000 1400-2700MHz 0.0015 decade/s 3 Sec.		

#### 5.5. Test Data

PASS.

Please refer to the following page.

RF I	RF Field Strength Susceptibility Test Results					
Standard	☐ IEC 61000-4-3					
Applicant	Dongguan Juling El	Dongguan Juling Electronics Technology Co., Ltd.				
EUT	Bluetooth Headphor	ne	Temperature	24℃		
M/N	HE09		Humidity	53%		
Field Strength	3V/m		Criterion	A		
<b>Test Mode</b>	Mode 1		Test Engineer	Andy		
Frequency Range	80-1000MHz, 1.4G	Hz-2.7GHz,	Test Date	January 18, 2013		
Modulation	□None □	☐ Pulse ☑	IAM 1KHz 80%			
Steps	1%					

Field	Modulation	Polarity	Position	Observation	Result
3V/m	Yes	H/V	Right, Left, Front, Back	CT, CR	PASS
3V/m	Yes	H/V	Right, Left, Front, Back	CT, CR	PASS
3V/m	Yes	H/V	Right, Left, Front, Back	CT, CR	PASS
3V/m	Yes	H/V	Right, Left, Front, Back	CT, CR	PASS

Note:

During the test, the communication link is maintained. Unintentional transmission is not founded from the EUT.

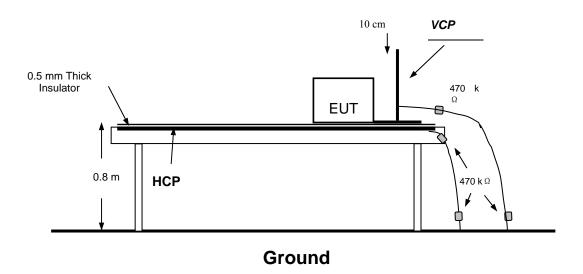
#### 6. ELECTROSTATIC DISCHARGE

Please refer to ETSI EN 301 489-1 and EN 61000-4-2.

#### **6.1. Test Equipment**

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Cal.
1	ESD Simulator	KIKUSUI	KC001311	KES4021	2013-06-18	2014-06-17

#### **6.2.** Test Configuration



EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.5 by 1.0-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

#### 6.3. Test Procedure

ETSI 301 489-1 V1.9.2 (2011-09)/ EN 61000-4-2: 2009 Test level 3 for Air Discharge at  $\pm 8$  kV Test level 2 for Contact Discharge at  $\pm 4$  kV

#### 6.3.1. Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

#### 6.3.2. Contact Discharge

All the procedure shall be same as Section 6.3.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

#### 6.3.3. Indirect Discharge For Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

## 6.3.4. Indirect Discharge For Vertical Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

#### 6.4. Test Data

PASS.

Electrostatic Discharge Test Results				
Standard	☐ IEC 61000-4-2   ☑ EN 61000-4-2			
Applicant	Dongguan Juling Electronics Technology (	Co., Ltd.		
EUT	Bluetooth Headphone	Temperature	24℃	
M/N	HE09	Humidity	54%	
Criterion	В	Pressure	1021mbar	
Test Mode	Mode 1	Test Date	January 18, 2013	
Test Engineer	Andy			

## **Test Result Of Mode 1**

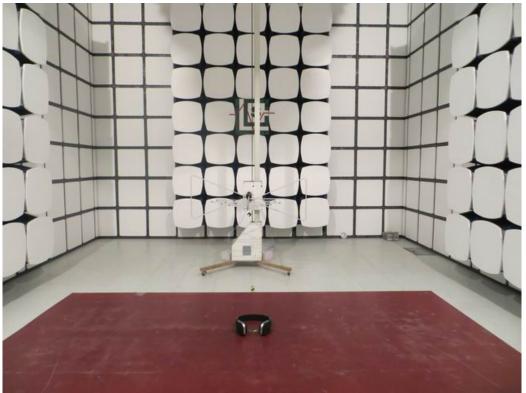
Test Voltage	Coupling	Observation	Result (Pass/Fail)
±2KV, ±4kV	Contact Discharge	TT, TR	Pass
±2KV, ±4kV, ±8kV	Air Discharge	TT, TR	Pass
±2KV, ±4kV	Indirect Discharge HCP	TT, TR	Pass
±2KV, ±4kV	Indirect Discharge VCP	TT, TR	Pass

Note:

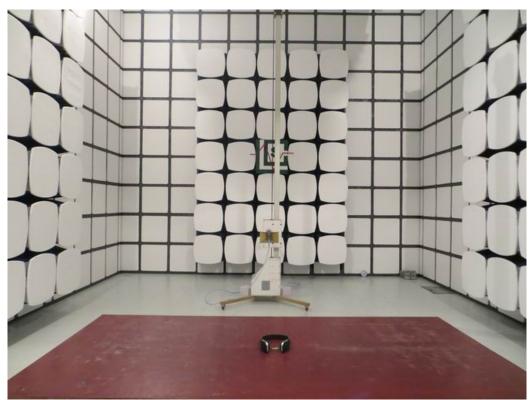
During the test, the communication link is maintained. Unintentional transmission is not founded from the EUT.

## 7. TEST SETUP PHOTOGRAPHS

## 7.1.Photo of Radiated Measurement

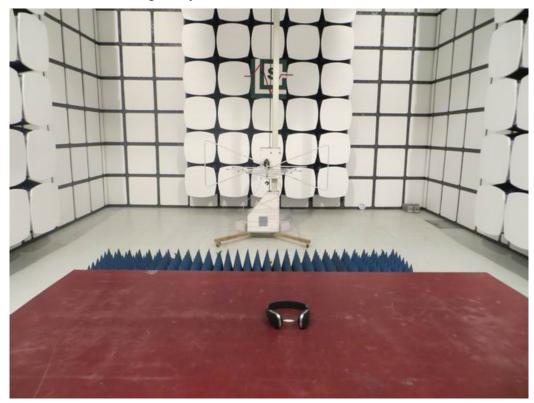


Below 1G



Above 1G

# 7.2. Photo of Radio-frequency, Continuous radiated disturbance



# 7.3.Photo of Electrostatic Discharge Test



## 8. MANUFACTURER/ APPROVAL HOLDER DECLARATION

The following identical model(s):

HE01	HE02	HE03	HE04
HE05	HE08	HE09	HE14
HE16			

Belong to the tested device:

Product description : Bluetooth Headphone

Model name : HE09

Remark: PCB board, structure and internal of these model(s) are the same, So no additional models were tested.

-----THE END OF REPORT-----