

FCC TEST REPORT

FCC ID : WC2DS-456

Applicant : **Wonders Industrial Development (Shenzhen) Co., Ltd.**
DOSS Industrial Zone, Qiping Kengdu Industrial Area, Guihua Village,
Guanlan Town, Baoan District, Shenzhen, China

Equipment Under Test (EUT) :


Product description : IPOD WIRELESS SPEAKER

Model No. : DS-456, DS-482, DS-483, DS-609, DS-495, DS-464, DS-472, DS-492,
4015111, 4015110

Standards : FCC 15 Paragraph 15.249

Date of Test : June 20, 2008

Test Engineer : **Nunu Deng**

Reviewed By : 

PERPARED BY:

Waltek Services (Shenzhen) Co., Ltd.

8C, West Tower, Aidi Building, No.5003 Binhe Rd, Futian District, Shenzhen 518045,
Guangdong, China.

Tel: 86-755-83551033

Fax: 86-755-83552400

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3 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 10GHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	PASS

4 General Information

4.1 Client Information

Applicant: **Wonders Industrial Development (Shenzhen) Co., Ltd.**
Address of Applicant: DOSS Industrial Zone, Qiping Kengdu Industrial Area, Guihua Village, Guanlan Town, Baoan District, Shenzhen, China
Manufacturer: **Wonders Industrial Development (Shenzhen) Co., Ltd.**
Address: DOSS Industrial Zone, Qiping Kengdu Industrial Area, Guihua Village, Guanlan Town, Baoan District, Shenzhen, China

4.2 General Description of E.U.T.

Product description: IPOD WIRELESS SPEAKER
Model No.: DS-456, DS-482, DS-483, DS-609, DS-495, DS-464, DS-472, DS-492, 4015111, 4015110

4.3 Details of E.U.T.

Power Supply: Adapter input: 100-240V 50/60Hz 0.6A
Adapter output: 9V 1.5A

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a IPOD WIRELESS SPEAKER. The standards used were FCC 15 Paragraph 15.249, Paragraph 15.207, Paragraph 15.209, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35.

4.6 Test Facility

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

- **FCC – Registration No.: 994117**

SEM. Test Compliance Service Co., Ltd. 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 994117, May 11, 2008.

4.7 Test Location

All Emissions tests were performed at:-

SEM Test Compliance Service Co., Ltd. at 3/F., Jinbao Commerce Bldg., Xin'an Fanshen Rd., Bao'an District, Shenzhen, 518101, China

5 Equipment Used during Test

Items	Equipments	Manufacture	Model	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	ROHDE&SCHWARZ	ESPI	101206	2008/1/25	1 year
2	Spectrum Analyzer	Agilent	E4402B	US41192821	2008/1/25	1 year
3	L.I.S.N.	SCHWARZBECK	NSLK8126	8126-224	2008/1/25	1 year
4	L.I.S.N.	EMCO	3825/2	11967C	2008/1/25	1 year
5	RF LIMITER	Agilent	11867A	MY42241685	2008/1/25	1 year
6	Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2008/1/25	1 year
7	Test Receiver	ROHDE&SCHWARZ	ESVB	825471/005	2008/1/25	1 year
8	Amplifier	Agilent	8447F	3113A06717	2008/1/25	1 year
9	RF Switch	EM	EMSW18	SW060023	2008/1/25	1 year
10	Positioning Controller	C&C	CC-C-1F	N/A	2008/1/25	1 year
11	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2008/1/25	1 year
12	Horn Antenna	SCHWARZBECK	BBHA9120D	665	2008/1/25	1 year
13	Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2008/1/25	1 year

6 Conducted Emission Test

Product Name:	IPOD WIRELESS SPEAKER
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:	June 20, 2008
Frequency Range:	150 kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9 kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

6.1 Test Equipment

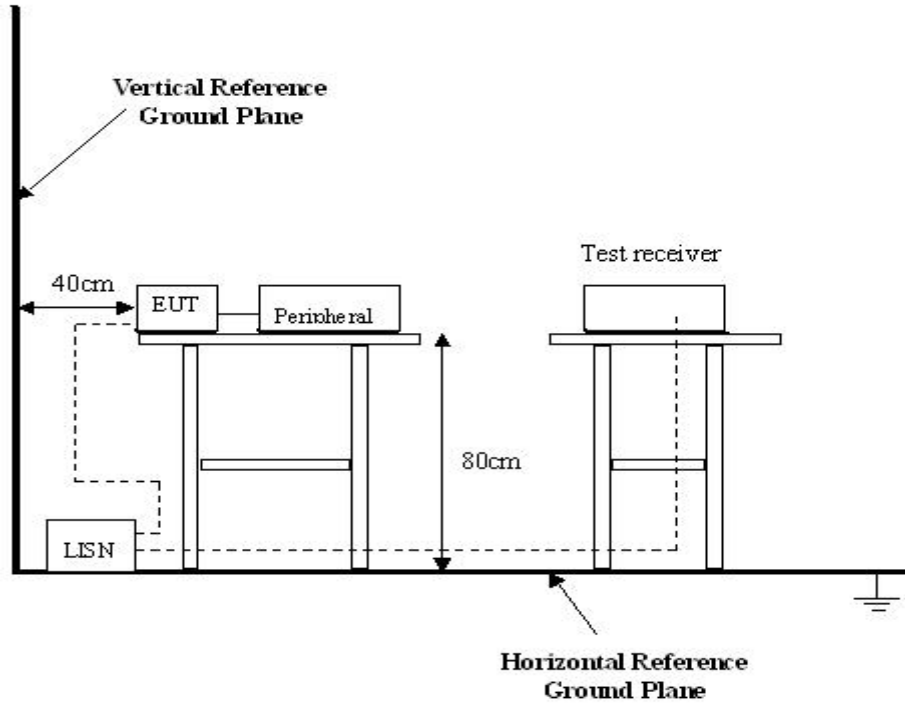
Please refer to Section 5 this report.

6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4: 2003. The frequency spectrum from 150kHz to 30MHz was investigated.
2. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.3 Conducted Test Setup

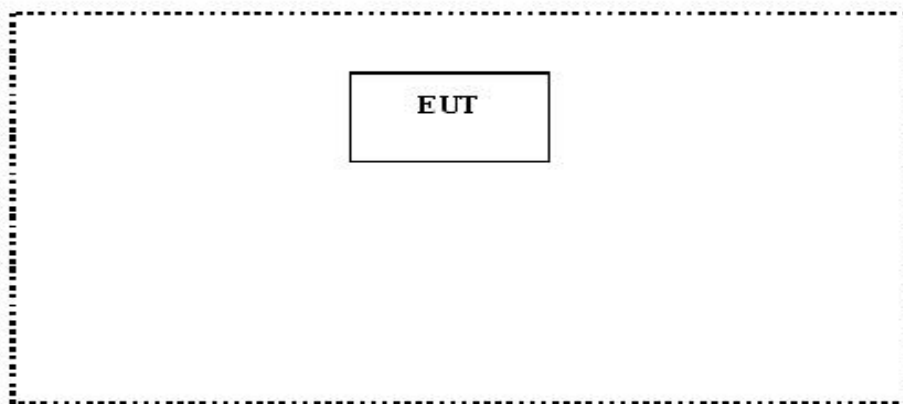
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



6.4 EUT Operating Condition

Operating condition is according to ANSI C63.4: 2003.

- A. Setup the EUT and simulators as shown on follow.
- B. Enable RF signal and confirm EUT active.
- C. Modulate output capacity of EUT up to specification.



6.5 Conducted Emission Limits

66-56 dB μ V/m between 0.15MHz & 0.5MHz

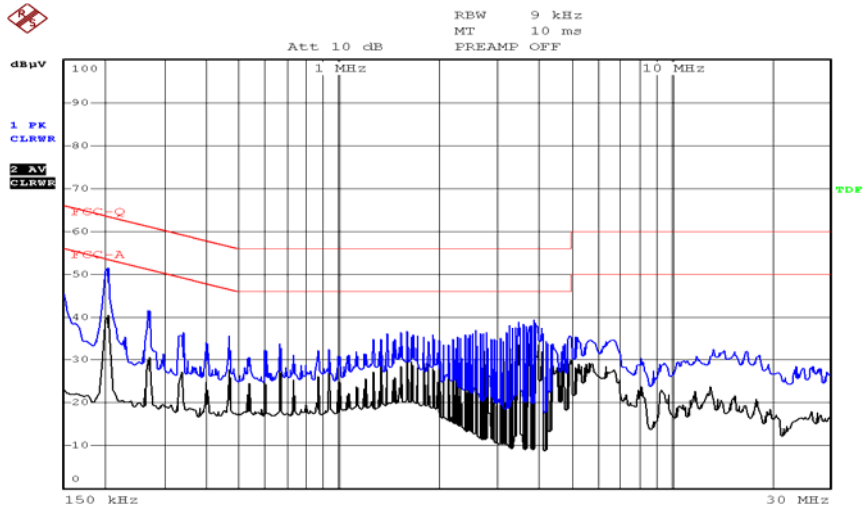
56 dB μ V/m between 0.5MHz & 5MHz

60 dB μ V/m between 5MHz & 30MHz

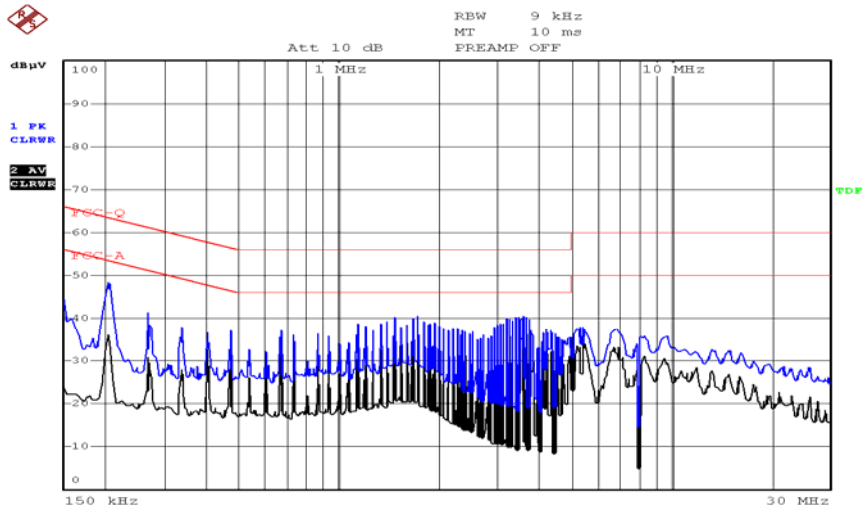
Note: In the above limits, the tighter limit applies at the band edges.

6.6 Conducted Emission Test Result

Live Line



Neutral Line



6.7 Measurement Data

Freq. MHz	Line	QP Reading dBuV	FCC 15 Limit dBuV	Margin dB	AV Reading dBuV	FCC 15 Limit dBuV	Margin dB
0.20	Live	46.0	63.6	17.6	37.1	53.6	16.5
3.80	Live	32.0	56.0	24.0	27.5	46.0	18.5
0.21	Neutral	45.2	63.2	18.0	36.5	53.2	16.7
3.60	Neutral	33.4	56.0	22.6	25.8	46.0	20.2

7 Radiation Emission Test

Product Name:	IPOD WIRELESS SPEAKER
Test Requirement:	FCC Part15 Paragraph 15.249
Test Method:	Based on FCC Part15 Paragraph 15.31 and Paragraph 15.33
Test Date:	June 20, 2008
Frequency Range:	30MHz to 10GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

7.1 Test Equipment

Please refer to Section 5 this report.

7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase centre variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

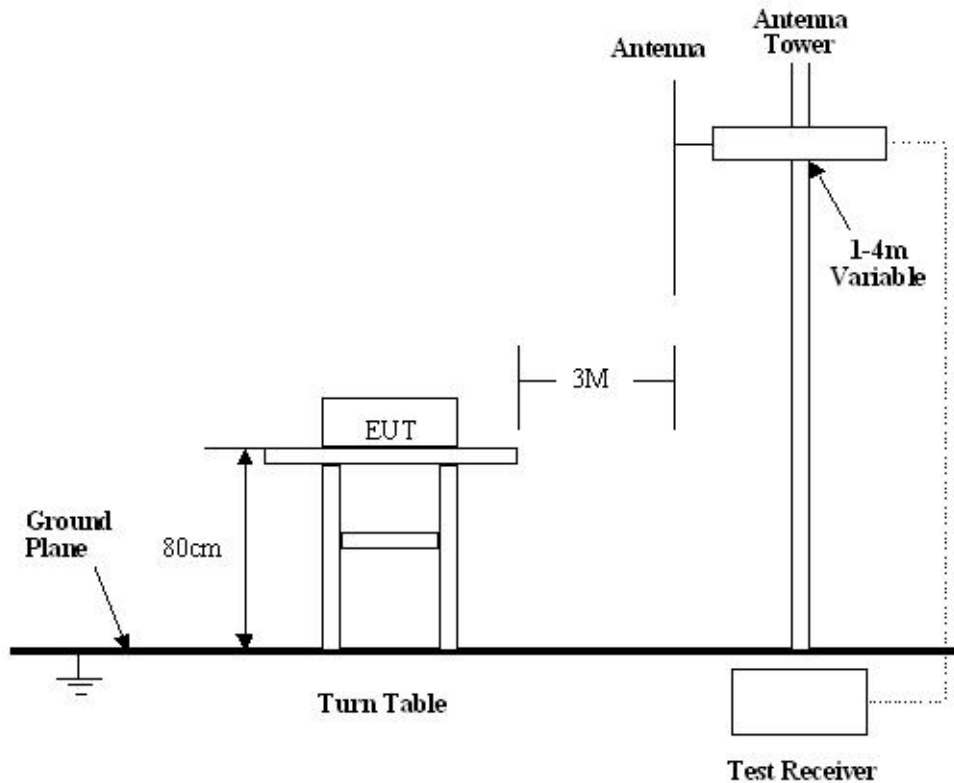
Based on ANSI C63.4: 2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at SEM. EMC Lab is +4.0 dB.

7.3 Test Procedure

1. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
2. All data was recorded in the peak and average detection mode.
3. The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.
4. According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a permanent antenna, fulfill the requirement of this section.

7.4 Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003, The specification used in this report was the FCC Part15 Paragraph 15.249 and Paragraph 15.209 limits.



7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.249 Rules, the system was tested to 10000 MHz.

Start Frequency.....	30 MHz
Stop Frequency.....	10000 MHz
Sweep Speed	Auto
IF Bandwidth.....	100 kHz
Video Bandwidth.....	1 MHz
Quasi-Peak Adapter Bandwidth	120 kHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	1MHz

7.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of $-7\text{dB}\mu\text{V}$ means the emission is $7\text{dB}\mu\text{V}$ below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

7.7 Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.249 standards.

7.8 EUT Operating Condition

Same as section 6.4 of this report.

7.9 Radiated Emissions Limit

A. FCC Part 15 subpart C Paragraph 15.249 Limit

Fundamental Frequency	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928MHz	50	94	500	54
2400-2483.5 MHz	50	94	500	54
5725-5875 MHz	50	94	500	54
24.0-24.25GHz	250	108	2500	68

- Note:**
- (1) RF Voltage(dBuV)=20 log RF Voltage(uV)
 - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 - (3)The emission limit in this paragraph is based on measurement instrumentaion employing an average detector.Measurement using instrumentation with a peak detector function,corresponding to 20dB above the maximum permitted average limit.
 - (4) Above 1GHz,do a Peak and average measurements for all emissions,Limit for peak is 94dBuvV/m,According to Part15.35(b) and average is 54BuvV/m.

B. Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency(MHZ)	Distance(m)	Field strength(dBuV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- Note:**
- (1) RF Voltage(dBuV)=20 log RF Voltage(uV)
 - (2) In the Above Table,the tighter limit applies at the band edges.
 - (3) Distance refers to the distance in meters between the measuring instrument antenna.

7.10 Radiated Emissions Test Result

Formula of conversion factors: the field strength at 3m was established by adding
The meter reading of the spectrum analyzer (which is set to read in units of dBuV)
To the antenna correction factor supplied by the antenna manufacturer. The antenna
Correction factors are stated in terms of dB. The gain of the pressletor was accounted
For in the spectrum analyser meter reading.

Example:

Freq(MHz) Meter Reading +ACF=FS
33 20dBuV+10.36dB=30.36dBuV/m @3m

Radiated Emission Test Data

Test Voltage: 120VAC

Test Mode: TX On

Temperature: 24 °C

Humidity: 52%RH

Test Result: PASS

Remarks: 30-1000MHz radiation test no significant emissions above the equipment noise floor
were detected.

1GHz-10GHz Radiated Emission Data

Frequency (MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
915.00	AV	Vertical	72.32	94.00	21.68	1.5	90
915.00	AV	Horizontal	71.15	94.00	22.85	1.5	120
1830.00	AV	Vertical	35.68	54.00	18.32	1.5	45
2745.00	AV	Vertical	34.44	54.00	19.56	1.5	90
3660.00	AV	Vertical	35.79	54.00	18.21	1.5	90
4575.00	AV	Vertical	36.02	54.00	17.98	1.5	120
5490.00	AV	Vertical	34.88	54.00	19.12	1.5	45
6405.00	AV	Vertical	36.43	54.00	17.57	1.5	120
7320.00	AV	Vertical	34.76	54.00	19.24	1.5	180
8235.00	AV	Vertical	35.99	54.00	18.01	1.5	90
9150.00	AV	Vertical	35.84	54.00	18.16	1.5	60
1830.00	AV	Horizontal	35.45	54.00	18.55	1.5	180
2745.00	AV	Horizontal	34.05	54.00	19.95	1.5	45
3660.00	AV	Horizontal	35.62	54.00	18.38	1.5	45
4575.00	AV	Horizontal	35.84	54.00	18.16	1.5	180
5490.00	AV	Horizontal	34.75	54.00	19.25	1.5	45
6405.00	AV	Horizontal	35.95	54.00	18.05	1.5	60
7320.00	AV	Horizontal	34.71	54.00	19.29	1.5	120
8235.00	AV	Horizontal	35.92	54.00	18.08	1.5	90
9150.00	AV	Horizontal	35.61	54.00	18.39	1.5	90
915.00	PK	Vertical	85.32	114.00	28.68	1.5	90
915.00	PK	Horizontal	83.15	114.00	30.85	1.5	90
1830.00	PK	Vertical	40.25	74.00	33.75	1.5	120
2745.00	PK	Vertical	41.17	74.00	32.83	1.5	120
3660.00	PK	Vertical	41.58	74.00	32.42	1.5	90
4575.00	PK	Vertical	42.66	74.00	31.34	1.5	90
5490.00	PK	Vertical	41.34	74.00	32.66	1.5	45
6405.00	PK	Vertical	41.62	74.00	32.38	1.5	60
7320.00	PK	Vertical	42.47	74.00	31.53	1.5	60
8235.00	PK	Vertical	41.60	74.00	32.40	1.5	100
9150.00	PK	Vertical	42.59	74.00	31.41	1.5	120
1830.00	PK	Horizontal	40.22	74.00	33.78	1.5	45
2745.00	PK	Horizontal	41.05	74.00	32.95	1.5	90

3660.00	PK	Horizontal	41.43	74.00	32.57	1.5	180
4575.00	PK	Horizontal	42.56	74.00	31.44	1.5	120
5490.00	PK	Horizontal	41.33	74.00	32.67	1.5	45
6405.00	PK	Horizontal	41.54	74.00	32.46	1.5	180
7320.00	PK	Horizontal	42.36	74.00	31.64	1.5	120
8235.00	PK	Horizontal	41.48	74.00	32.52	1.5	90
9150.00	PK	Horizontal	42.37	74.00	31.63	1.5	90

Note: Above 1GHz,do a Peak and average measurements for all emissions,Limit for peak is 74dBuvV/m,According to Part15.35(b) and average is 54BuvV/m.

8 Band Edge

8.1 Test Equipment

Please refer to Section 5 this report.

8.2 Test Procedure

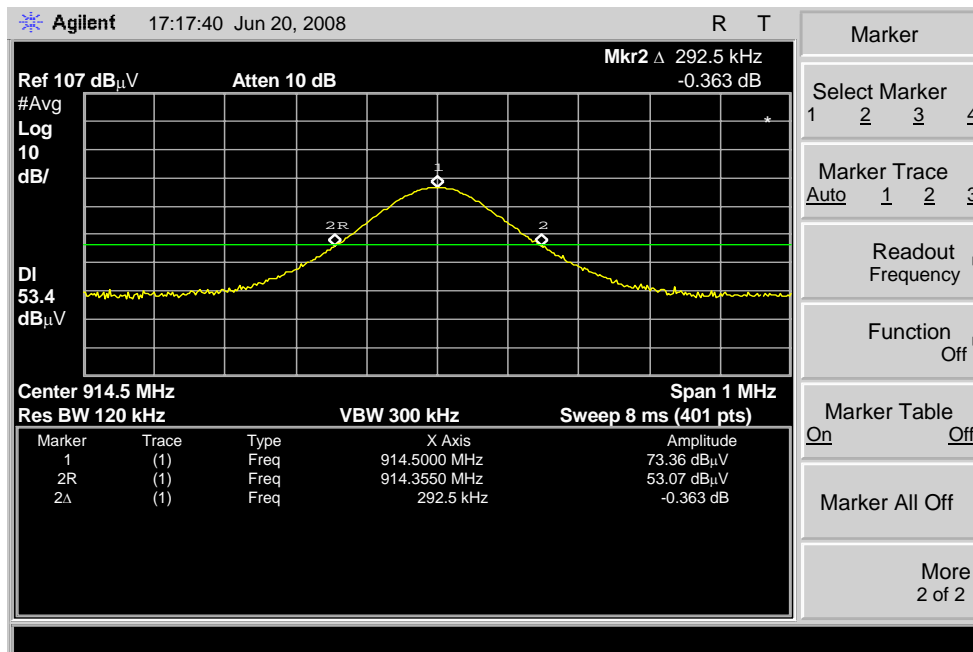
1. The EUT, peripherals were put on the turntable which table size is 1mX1.5m, table high 0.8m. All set up is according to ANSI C63.4: 2003.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 120kHz RBW and 300kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

8.3 Band Edge

Requirements: FCC 15.249(d), the emission power at the START and STOP frequencies shall be at least 50dB below the level of the fundamental or to the general radiated emission limits in FCC 15.209.

8.4 Band Edge Test Result

Product Name: IPOD WIRELESS SPEAKER
 Test Item: Band Edge Test
 Test Voltage: 120VAC
 Test Mode: TX On
 Temperature: 24 °C
 Humidity: 52%RH



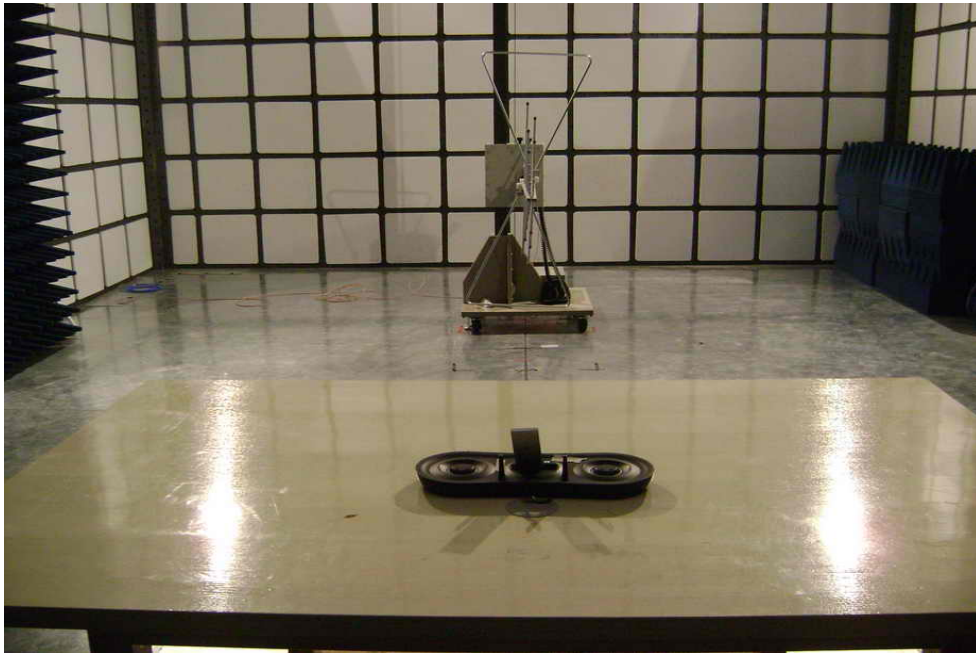
- Note:**
- (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.
 - (2) This device does meet the FCC requirement.

9 Photographs of Testing

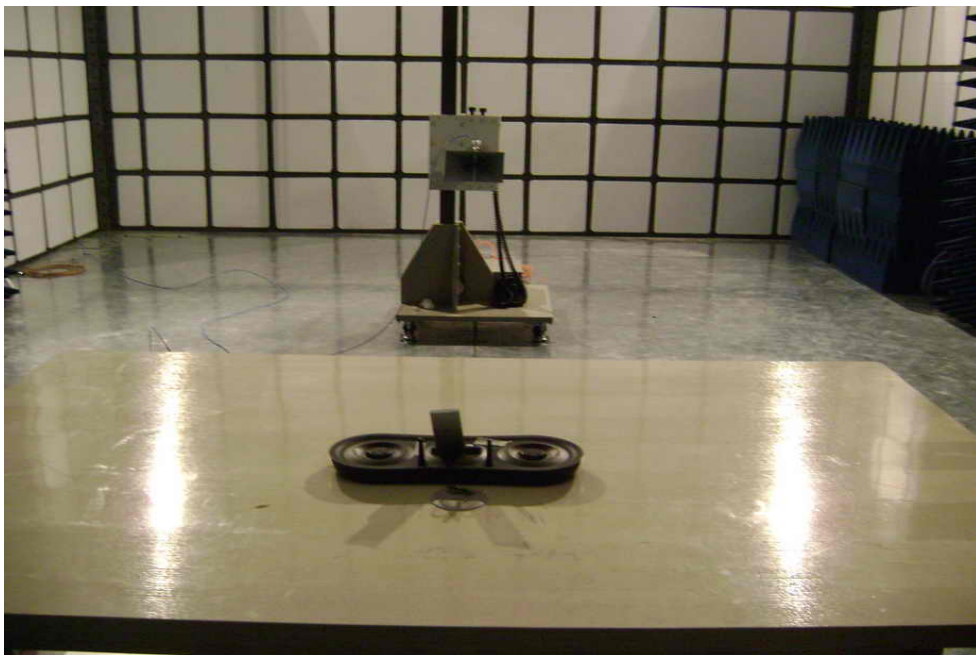
9.1 Conducted Emission Test View



9.2 Radiation Emission Test View For 30MHz-1000MHz



9.3 Radiation Emission Test View For 1GHz-10GHz



10 Photographs - Constructional Details

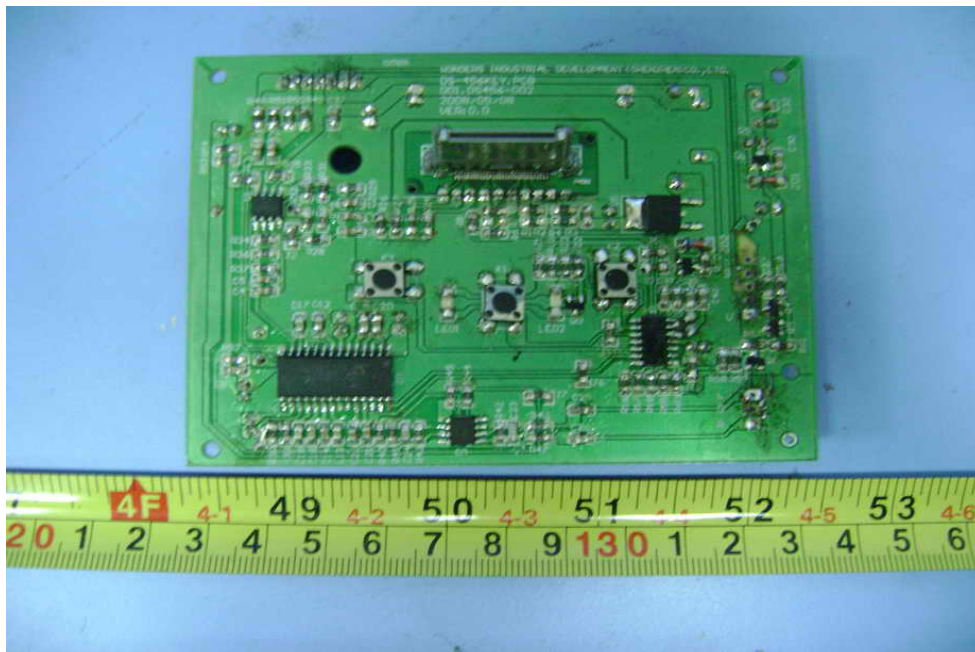
10.1 EUT - Front View



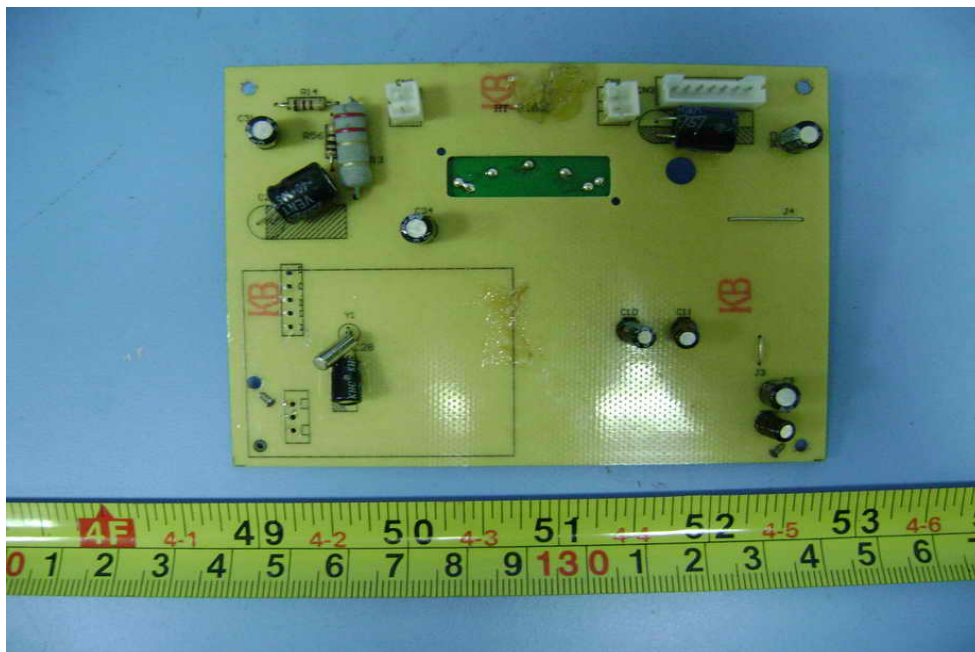
10.2 EUT - Back View



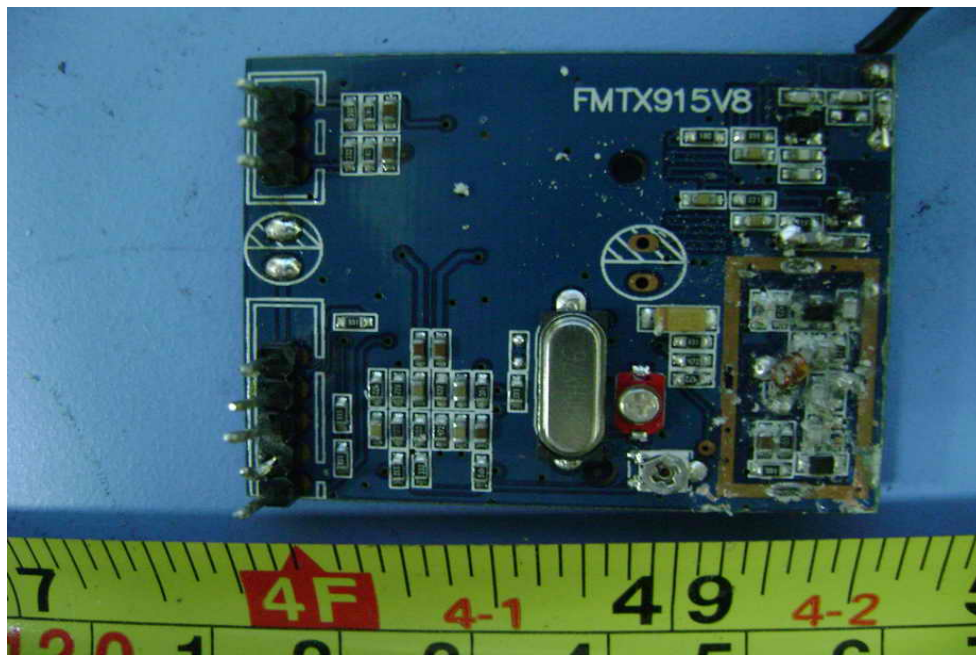
10.3 PCB1 - Front View



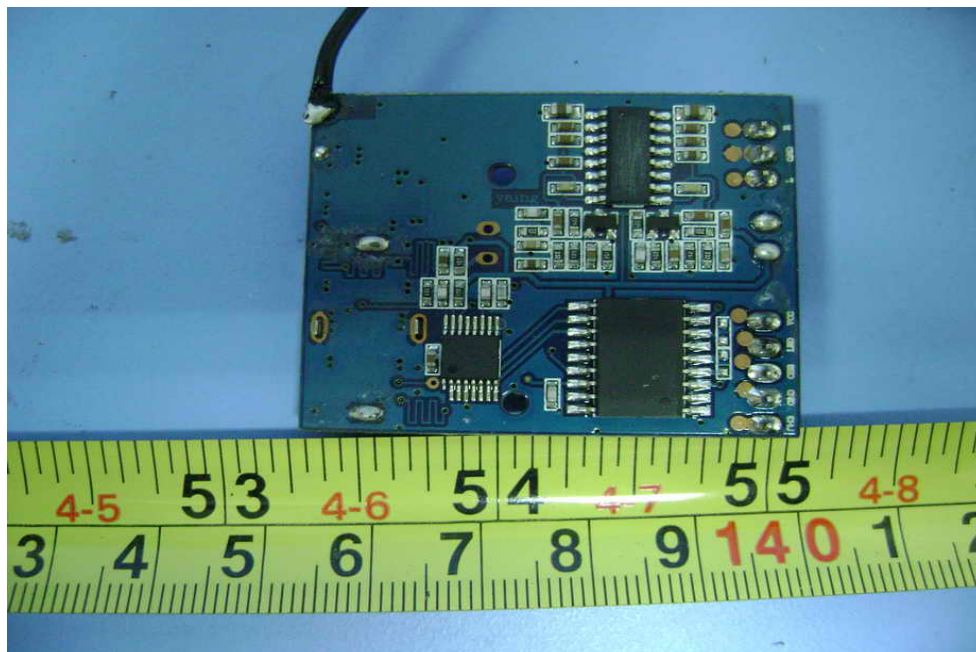
10.4 PCB1 - Back View



10.5 PCB2 - Front View



10.6 PCB2 - Back View



11 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT
EUT Bottom View/proposed FCC Mark Location

