

FCC TEST REPORT

FCC ID : WC2DS-987

Applicant : **Wonders Technology Co., Ltd.**

Address : DOSS Industrial Zone, Qiping Kengdu Industrial Area, Guihua Village,
Guanlan Town, Baoan District, Shenzhen, China

Equipment Under Test (EUT) :

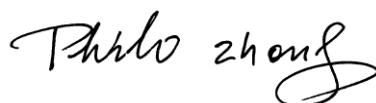
Product description : Wireless Speaker

Model No. : DS-987,40-285

Standards : FCC 15 Paragraph 15.249

Date of Test : August 24, 2009

Test Engineer : **Olic huang**

Reviewed By : 

PERPARED BY:

Waltek Services (Shenzhen) Co., Ltd.

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11 FCC ID LABEL30

3 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 10GHz)	FCC PART 15: 2007	ANSI C63.4: 2003	Class B	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2007	ANSI C63.4: 2003	Class B	PASS
Occupied Bandwidth	FCC PART 15: 2007	ANSI C63.4: 2003	Note	PASS

Note: Please refers to the FCC PART 15.249 for the more details

4 General Information

4.1 Client Information

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

Manufacturer: **Wonders Technology 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: Wireless Speaker
Model No.: DS-987,40-285

Model Description: The components of PCB and circuit of EUT are identical except the color and appearance of EUT. DS-987 is the test sample.

4.3 Details of E.U.T.

Power Supply: Adapter Input: 100-240VAC, 50/60Hz
Adapter Output: 9.0VDC, 1.5A

4.4 Description of Support Units

The EUT has been tested as a transmitter unit.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a 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:

- **IC – Registration No.:7760A**

Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration No.:7760A,July 24,2008.

- **FCC – Registration No.: 880581**

Waltek Services (Shenzhen) 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 No.:880581, June 24, 2008.

4.7 Test Location

All Emissions tests were performed at:-

Waltek Services(Shenzhen) Co., Ltd. at 1/F, Fukangtai Building,West Baima Rd., Songgang Street, Baoan District, Shenzhen 518105, China.

5 Equipment Used during Test

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
EMC Analyzer	Agilent/ E7405A	MY451149 43	W2008001	9k-26.5GHz	Aug-09	Aug-10	Wws200 81596	±1dB
Trilog Broadband Antenne 30-3000 MHz	SCHWARZB ECK MESS-ELEK TROM/ VULB9163	336	W2008002	30-3000 MHz	Aug-09	Aug-10		±1dB
Broad-band Horn Antenna 1-18 GHz	SCHWARZB ECK MESS-ELEK TROM/ VULB9163	667	W2008003	1-18GHz	Aug-09	Aug-10		f<10 GHz: ±1dB 10GHz<f< 18 GHz: ±1.5dB
Broadband Preamplifier 0.5-18 GHz	SCHWARZB ECK MESS-ELEK TROM/ BBV 9718	9718-148	W2008004	0.5-18GHz	Aug-09	Aug-10		±1.2dB
10m Coaxial Cable with N-male Connectors usable up to 18GHz,	SCHWARZB ECK MESS-ELEK TROM/ AK 9515 H	-	-	-	Aug-09	Aug-10		-
10m 50 Ohm Coaxial Cable with N-plug, individual length, usable up to 3(5)GHz, Connector	SCHWARZB ECK MESS-ELEK TROM/ AK 9513				Aug-09	Aug-10		
Positioning Controller	C&C LAB/ CC-C-IF				N/A	N/A		
Color Monitor	SUNSP0/ SP-14C				N/A	N/A		
Test Receiver	ROHDE&SC HWARZ/ ESPI	101155	W2005001	9k-3GHz	Aug-09	Aug-10	Wws200 80942	±1dB
EMI Receiver	Beijingkehua n	KH3931		9k-1GHz	Aug-09	Aug-10		
Two-Line V-Network	ROHDE&SC HWARZ/ ENV216	100115	W2005002	50Ω/50μH	Aug-09	Aug-10	Wws200 80941	±10%
Absorbing Clamp	ROHDE&SC HWARZ/ MDS-21	100205	W2005003	impandance50 Ω loss : 17 dB	Aug-09	Aug-10	Wws200 80943	±1dB

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
10m 50 Ohm Coaxial Cable with N-plug, individual length, usable up to 3(5)GHz, Connectors	SCHWARZECK MESS-ELEKTROM/ AK 9514				Aug-09	Aug-10		
Digital Power Analyzer	Em Test AG/Switzerland/ DPA 500	V0745103095	W2008012	Power: 2000VA Vol-range: 0-300V Freq_range: 10-80Hz	Aug-09	Aug-10	Wwd20081185	Voltage distinguish:0.025% Power_freq distinguish:0.02Hz
Power Source	Em Test AG/Switzerland/ ACS 500	V0745103096	W2008013	Vol-range: 0-300V Power_freq: 10-80Hz				
Electrostatic Discharge Simulator	Em Test AG/Switzerland/DITO	V0745103094	W2008005	Contact discharge: 500V-10KV Air discharge: 500V-16.5KV	Aug-09	Aug-10	Wwc20082400	7.5A current will be changed in $V_m=1.5V$
RF Generator	TESEQ GmbH/ NSG4070	25781	W2008008	Fraq-range: 9K-1GHz RF voltage: -60 dBm-+10dBm	Aug-09	Aug-10	Wws20081890	Power_freq distinguish:0.1Hz RFelectricity distinguish:0.1 B
CDN M-Type	TESEQ GmbH/ CDN M016	25112	W2008009	Voltage correct factor 9.5 dB	Aug-09	Aug-10	Wwc20082396	150K-80MHz: $\pm 1dB$ 80-230MHz: -2-+3dB
EM-Clamp	TESEQ GmbH/ KEMZ 801	25453	W2008010	Freq_range: 0.15-1000 MHz	Aug-09	Aug-10	Wwc20082397	0.3-400 MHz: $\pm 4dB$ Other freq: $\pm 5dB$
Attenuator 6dB	TESEQ GmbH/ ATN6050	25365			Aug-09	Aug-10	Wws20081597	
All Modules Generator	SCHAFFNER/6150	34579	W2008006	voltage:200V-4.4KV Pulse current: 100A-2.2KA	Aug-09	Aug-10	Wwc20082401	voltage: $\pm 10\%$ Pulse current: $\pm 10\%$
Capacitive Coupling Clamp	SCHAFFNER/ CDN 8014	25311			Aug-09	Aug-10	Wwc20082398	-

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
Signal and Data Line Coupling Network	SCHAFFNER/ CDN 117	25627	W2008011	1.2/50 μ S	Aug-09	Aug-10	Wwc20082399	-
AC Power Supply	TONGYUN/ DTDGC-4				Aug-09	Aug-10	Wws20080944	-
Exposure Level Tester ELT-400	Narda Safety TEST Solutions/2304/03	M-0155	w2008022	Test freq range: 1 – 400kHz	Aug-09	Aug-10	Wwd20081191	Test uncertainty: 1 – 120kHz: \pm 1.83%, 120 kHz-400 kHz: \pm 4.06%
Magnetic Field Probe 100cm ²	Narda Safety TEST Solutions/2300/90.10	M-1070	w2008021	Test freq range: 1 – 400kHz				Test uncertainty: 1Hz-10Hz: \pm 16.2%, 10Hz -120kHz: \pm 2.2%, 120 kHz-400 kHz: \pm 4.7%
Active Loop Antenna Charger 10kHz-30 MHz	Beijing Dazhi / ZN30900A	-	-	10kHz-30MHz	Aug-09	Aug-10		\pm 1dB

6 Conducted Emission Test

Product Name:	Wireless Speaker
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:	August 24, 2009
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

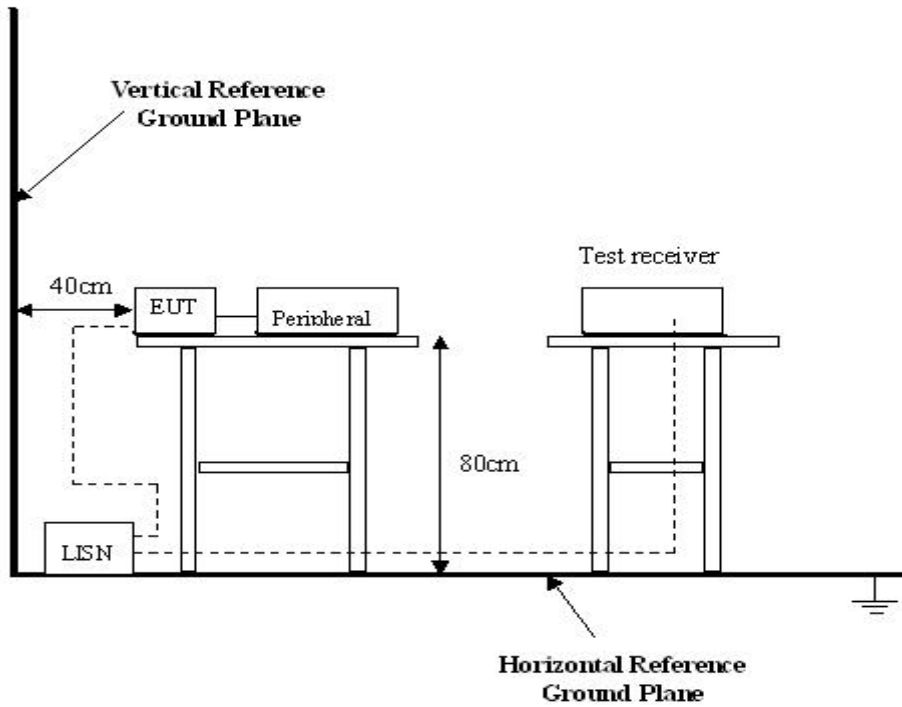
Please refer to Section 5 this report.

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

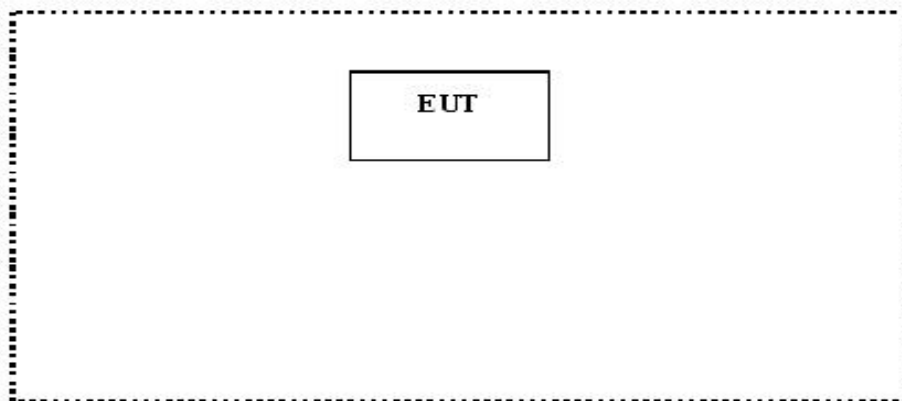
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



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

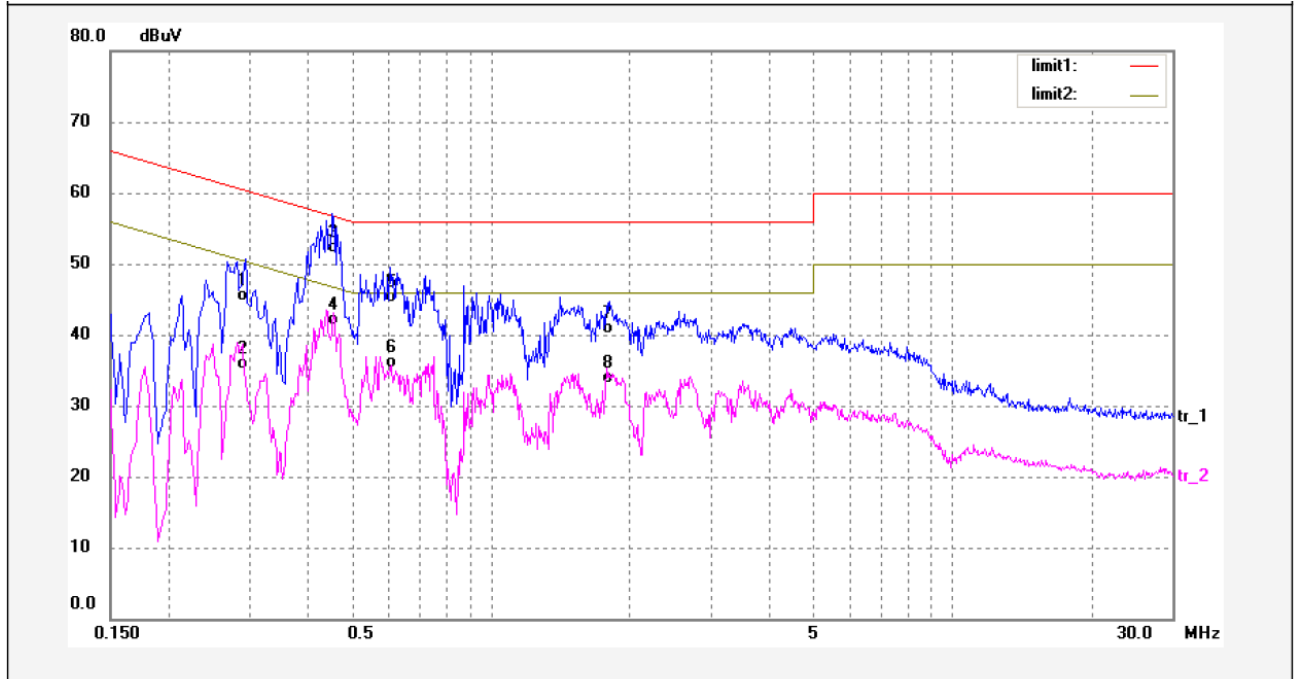
Note: In the above limits, the tighter limit applies at the band edges.

Remark: the EUT was tested on two modes: charging mode and normal working mode, and the worse case was charging mode, so the data show was the charging mode only.

6.6 Conducted Emission Test Result

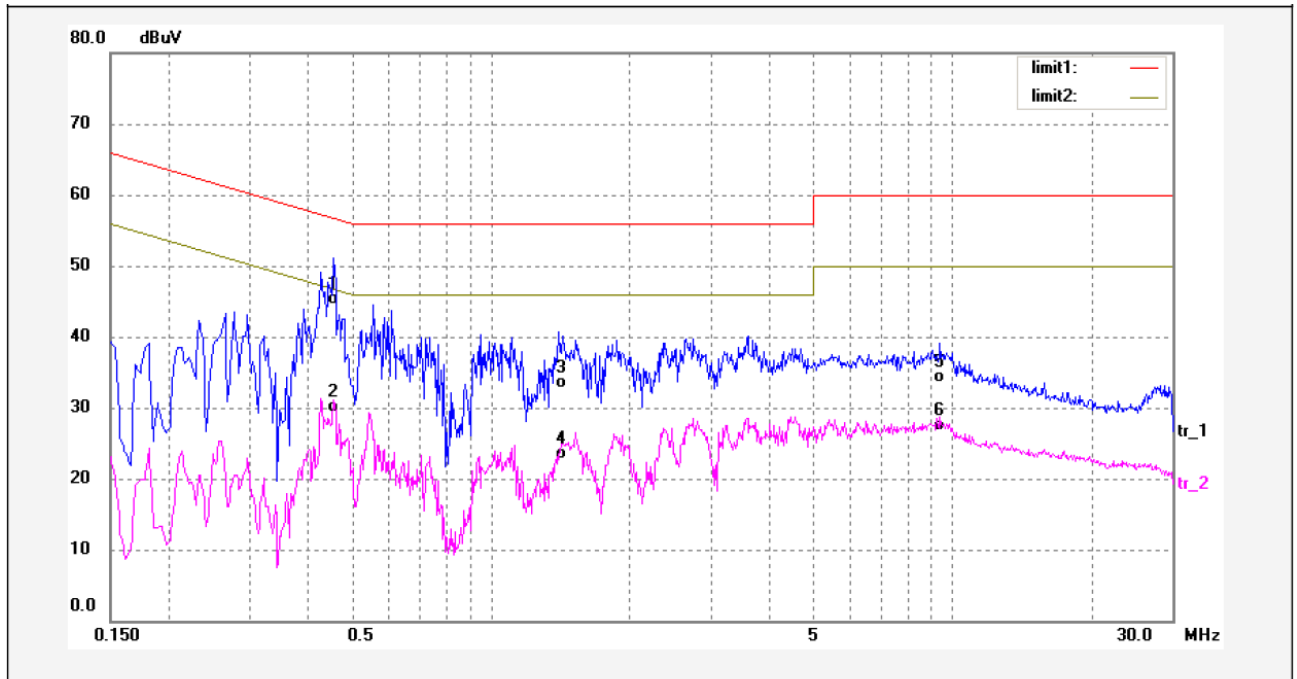
Charging Mode

Live Line



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.2940	34.37	10.35	44.72	60.41	-15.69	QP	
2	0.2940	24.79	10.35	35.14	50.41	-15.27	AVG	
3	0.4540	41.13	10.35	51.48	56.80	-5.32	QP	
4	0.4540	30.87	10.35	41.22	46.80	-5.58	AVG	
5	0.6060	34.24	10.36	44.60	56.00	-11.40	QP	
6	0.6060	24.96	10.36	35.32	46.00	-10.68	AVG	
7	1.8180	29.73	10.37	40.10	56.00	-15.90	QP	
8	1.8180	22.75	10.37	33.12	46.00	-12.88	AVG	

Neutral Line



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.4580	34.24	10.35	44.59	56.73	-12.14	QP	
2	0.4580	18.93	10.35	29.28	46.73	-17.45	AVG	
3	1.4100	22.44	10.36	32.80	56.00	-23.20	QP	
4	1.4100	12.31	10.36	22.67	46.00	-23.33	AVG	
5	9.4020	23.06	10.45	33.51	60.00	-26.49	QP	
6	9.4020	16.32	10.45	26.77	50.00	-23.23	AVG	

7 Radiation Emission Test

Product Name:	Wireless Speaker
Test Requirement:	FCC Part15 Paragraph 15.249
Test Method:	Based on FCC Part15 Paragraph 15.31 and Paragraph 15.33
Test Date:	August 24, 2009
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.

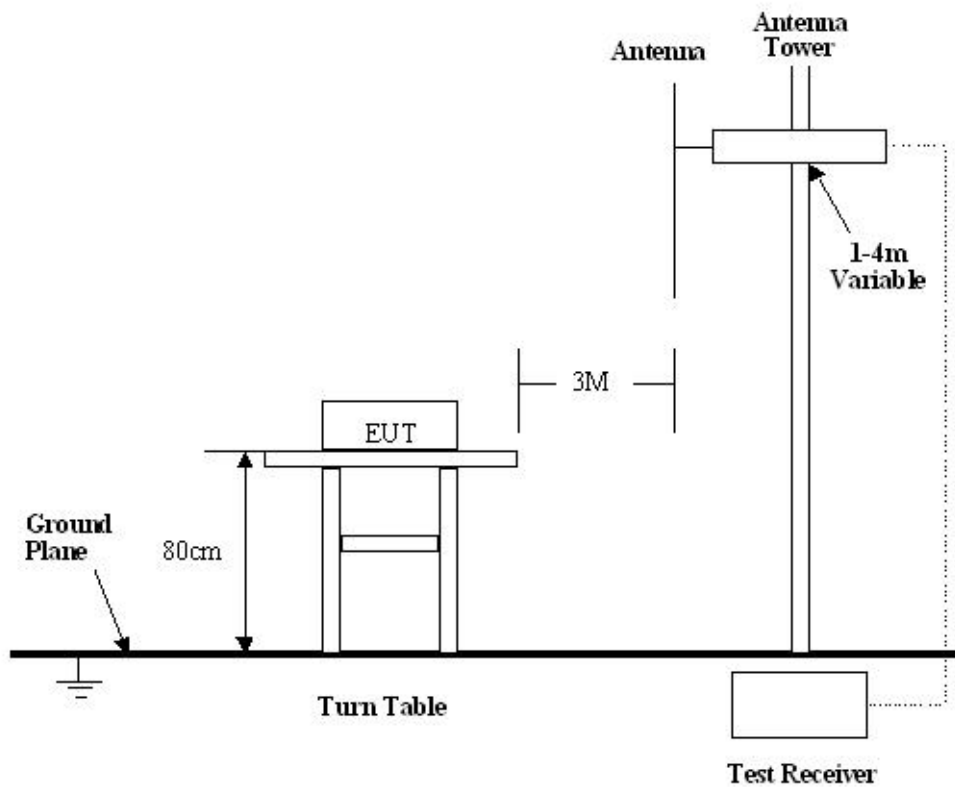
Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Waltek EMC Lab is ± 5.03 dB.

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 Part15 Paragraph 15.249, 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, fulfil 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 10GHz.

Below 1GHz

- Start Frequency..... 30 MHz
- Stop Frequency..... 1000 MHz
- Sweep Speed Auto
- IF Bandwidth..... 120 KHz
- Video Bandwidth..... 100KHz
- Quasi-Peak Adapter Bandwidth 120 KHz
- Quasi-Peak Adapter Mode Normal
- Resolution Bandwidth 100KHz

Above 1GHz

Start Frequency..... 1000 MHz
 Stop Frequency..... 10000 MHz
 Sweep Speed Auto
 IF Bandwidth..... 120 KHz
 Video Bandwidth..... 1 M Hz
 Quasi-Peak Adapter Bandwidth 120 KHz
 Quasi-Peak Adapter Mode Normal
 Resolution Bandwidth 1M Hz

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 -7dB μ V means the emission is 7dB μ 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 6.10, 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 94dBuV/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 Mode: TX On
Temperature: 25.5 °C
Humidity: 51%RH
Test Result: PASS

30MHz-1GHz Radiated Emission Data

Remark: Three channels were tested and the worst case was channel 1, so the data were shown
as follow:

Below 1GHz

Frequency(MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
Channel 1							
48.02	QP	Vertical	33.36	40.00	6.64	1.1	60
457.02	QP	Vertical	42.32	46.00	3.68	1.0	90
658.09	QP	Vertical	39.48	46.00	6.52	1.1	135
45.36	QP	Horizontal	32.32	40.00	7.68	1.2	120
457.23	QP	Horizontal	40.89	46.00	5.11	1.0	20
658.45	QP	Horizontal	39.63	46.00	6.34	1.2	100

1GHz-10GHz Radiated Emission Data

Frequency(MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
Channel 1							
914.00	AV	Vertical	76.98	94.00	17.02	1.5	180
914.00	AV	Horizontal	83.21	94.00	10.79	1.5	45
1824.00	AV	Vertical	35.11	54.00	18.89	1.5	180
2742.00	AV	Vertical	42.65	54.00	11.35	1.5	90
3656.00	AV	Vertical	36.12	54.00	17.88	1.5	60
4570.00	AV	Vertical	37.33	54.00	16.67	1.5	180
5484.00	AV	Vertical	37.45	54.00	16.55	1.5	45
6398.00	AV	Vertical	36.15	54.00	17.85	1.5	120
7312.00	AV	Vertical	36.48	54.00	17.52	1.5	180
8226.00	AV	Vertical	37.04	54.00	16.96	1.5	90
9140.00	AV	Vertical	36.12	54.00	17.88	1.5	60
1824.00	AV	Horizontal	35.43	54.00	18.57	1.5	180
2742.00	AV	Horizontal	46.35	54.00	7.65	1.5	45
3656.00	AV	Horizontal	35.11	54.00	18.89	1.5	180
4570.00	AV	Horizontal	36.81	54.00	18.19	1.5	90
5484.00	AV	Horizontal	35.44	54.00	18.56	1.5	60
6398.00	AV	Horizontal	34.38	54.00	19.62	1.5	180
7312.00	AV	Horizontal	33.77	54.00	20.23	1.5	45
8226.00	AV	Horizontal	32.48	54.00	21.52	1.5	45
9140.00	AV	Horizontal	31.92	54.00	22.08	1.5	180
914.00	PK	Vertical	98.00	114.00	16.00	1.5	45
914.00	PK	Horizontal	103.22	114.00	10.78	1.5	60
1824.00	PK	Vertical	52.00	74.00	22.00	1.5	180
2742.00	PK	Vertical	58.99	74.00	15.01	1.5	90
3656.00	PK	Vertical	47.24	74.00	26.76	1.5	60
4570.00	PK	Vertical	47.34	74.00	26.66	1.5	90
5484.00	PK	Vertical	46.78	74.00	27.22	1.5	45
6398.00	PK	Vertical	46.79	74.00	27.21	1.5	60
7312.00	PK	Vertical	45.33	74.00	28.67	1.5	60
8226.00	PK	Vertical	43.56	74.00	30.44	1.5	45
9140.00	PK	Vertical	42.34	74.00	31.66	1.5	60

1824.00	PK	Horizontal	52.32	74.00	21.68	1.5	60
2742.00	PK	Horizontal	56.32	74.00	17.68	1.5	90
3656.00	PK	Horizontal	46.35	74.00	27.65	1.5	90
4570.00	PK	Horizontal	45.44	74.00	28.56	1.5	45
5484.00	PK	Horizontal	44.33	74.00	29.67	1.5	60
6398.00	PK	Horizontal	43.56	74.00	30.44	1.5	60
7312.00	PK	Horizontal	42.34	74.00	31.66	1.5	60
8226.00	PK	Horizontal	41.88	74.00	32.12	1.5	120
9140.00	PK	Horizontal	41.25	74.00	32.75	1.5	45

Note: Above 1GHz, do a Peak and average measurements for all emissions, limit for peak is 74BuvV/m, according to Part 15.35(b) and average is 54BuvV/m.

8 Occupied Bandwidth

8.1 Test Equipment

Please refer to Section 5 this report.

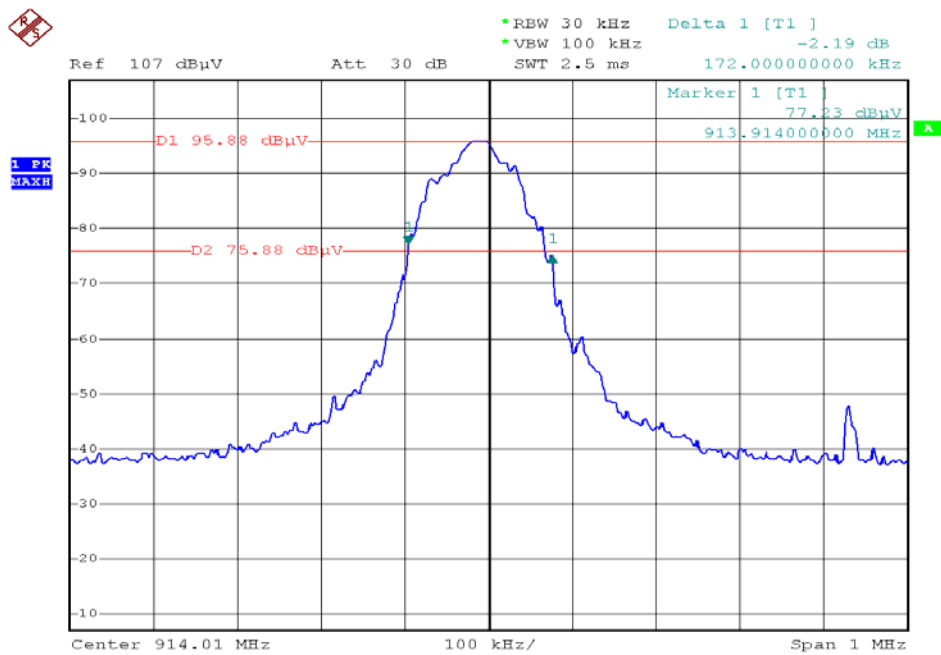
8.2 Test Procedure

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 100KHz RBW and 100KHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

8.3 Band Edge Test Result

Product Name: Wireless Speaker
Test Item: Occupied Bandwidth Test
Test Mode: TX On
Temperature: 25.5 °C
Humidity: 51%RH

Channel 1



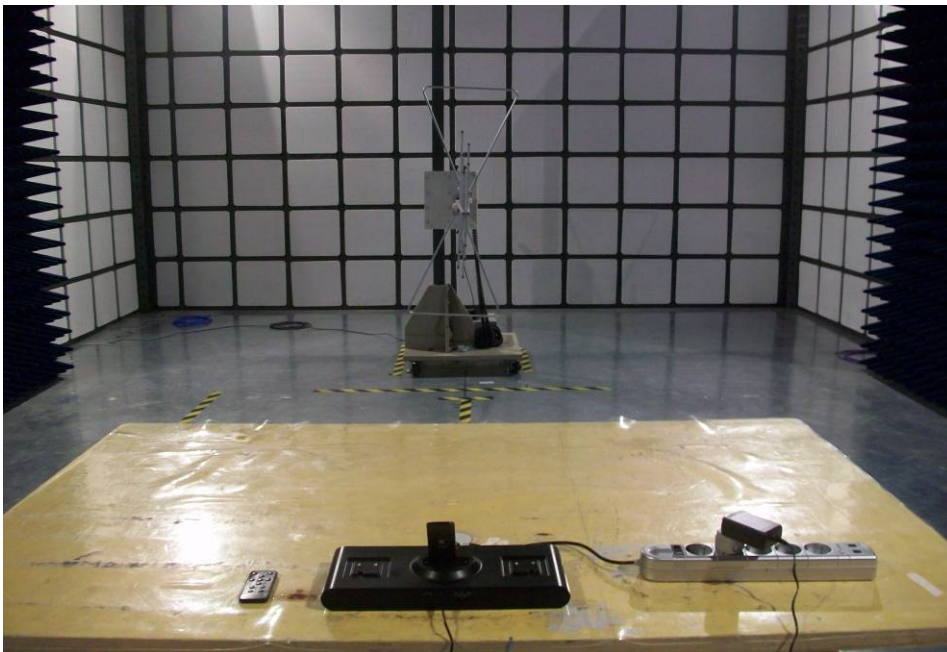
- Note:**
- (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.249.
 - (2) This device does meet the FCC requirement.

9 Photographs of Testing

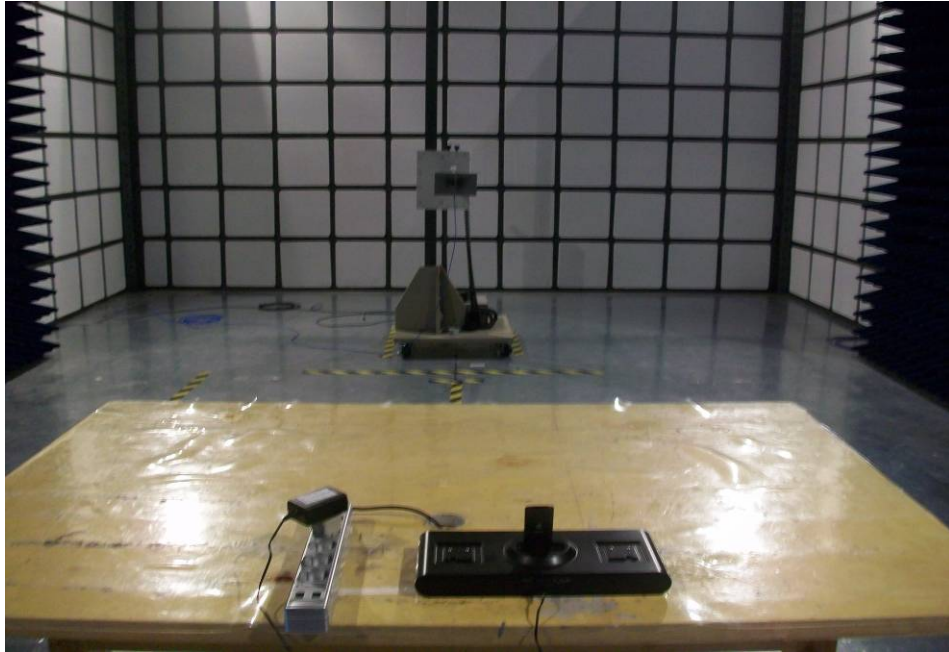
9.1 Conduction Emission Test View



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 - Component View



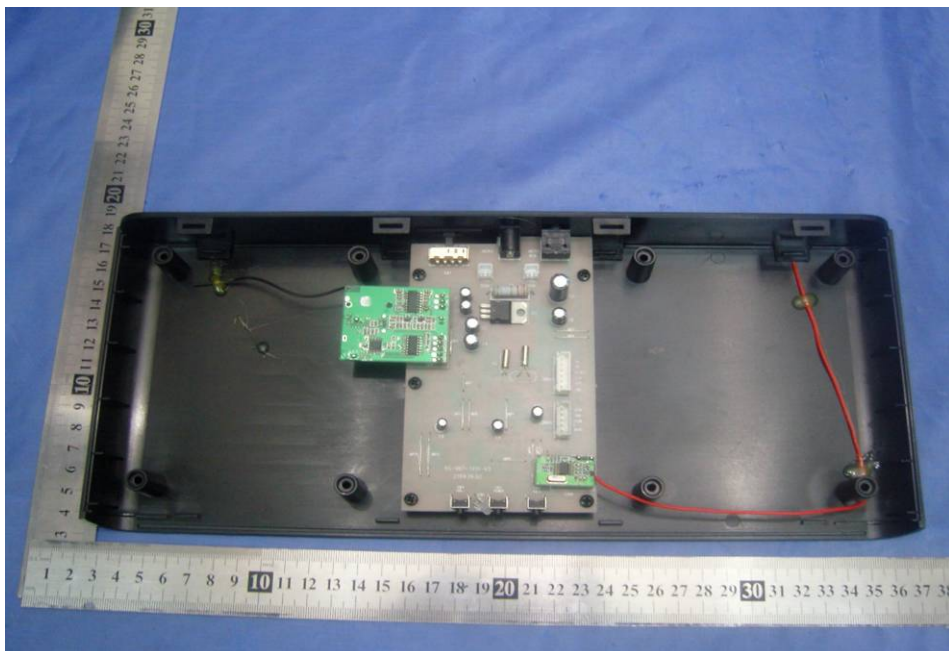
10.2 EUT - Front View



10.3 EUT - Back View



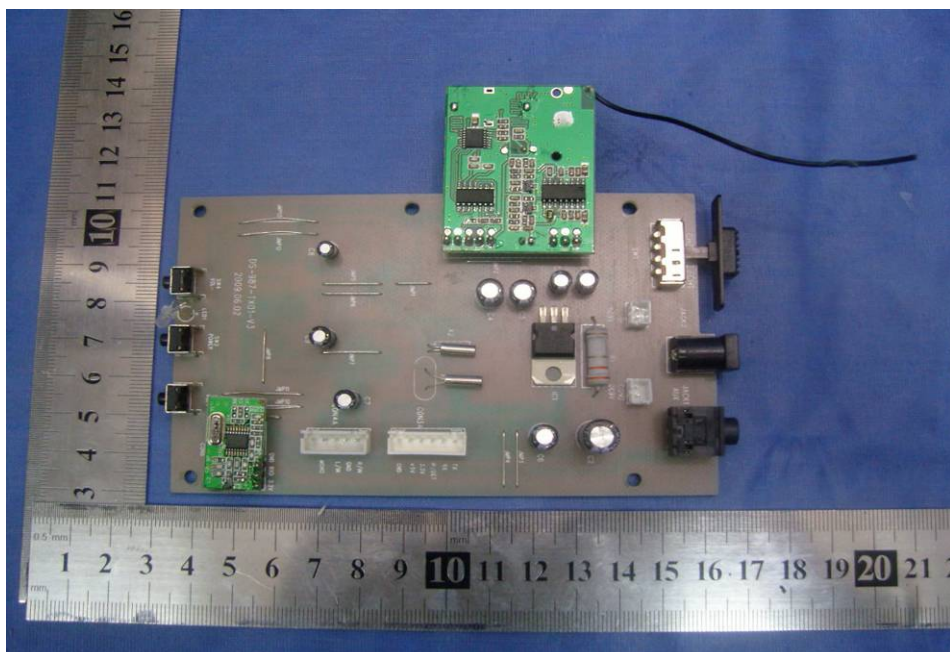
10.4 EUT - Open View



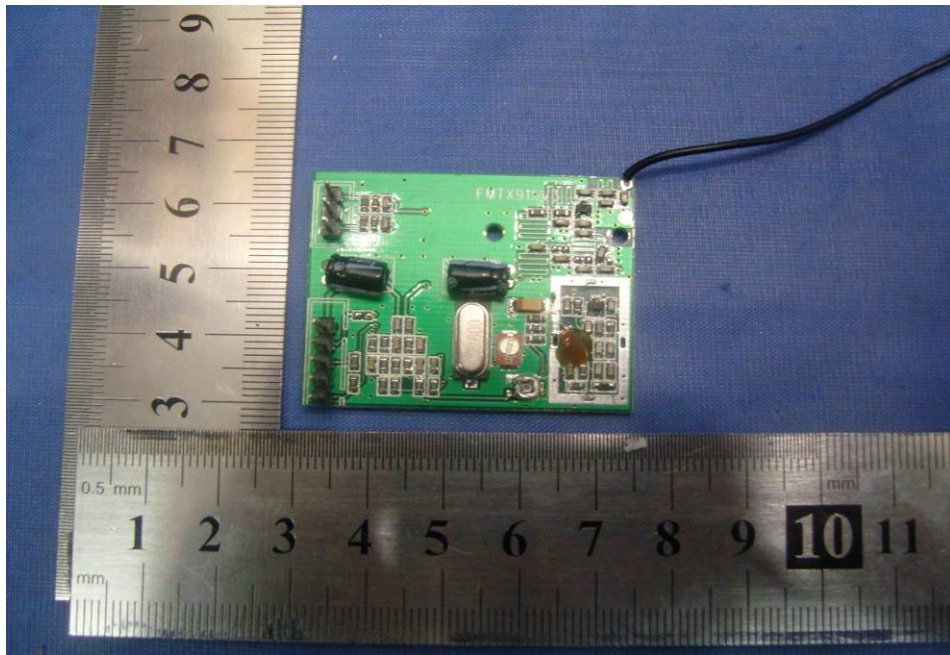
10.5 PCB1 of EUT -Front View



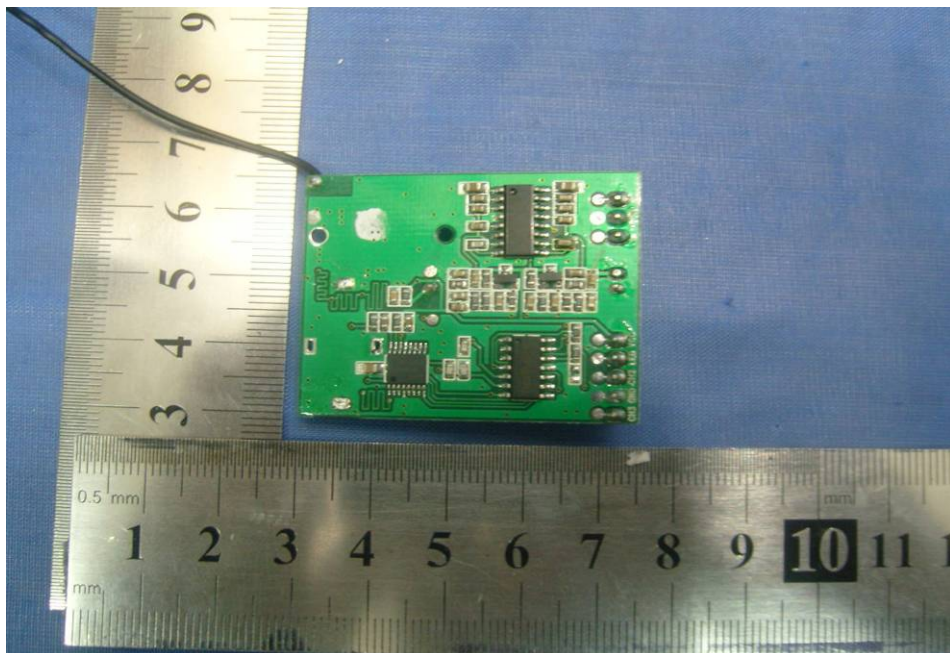
10.6 PCB1 of EUT- Back View



10.7 PCB2 of EUT- Front View



10.8 PCB2 of EUT- 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

