

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT  
INTENTIONAL RADIATOR CERTIFICATION TO  
FCC PART 15 SUBPART B &C REQUIREMENT**

*OF*

**Wireless Speaker**

**MODEL No.: BT-SS90138W**

**Trademark: LIOWN**

**FCC ID: W24BT-SS90138W**

**REPORT NO: E0901003F**

**ISSUE DATE: January 14, 2009**

*Prepared for*

**SHENZHEN LIOWN ELECTRONICS COMPANY LIMITED.**

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*Prepared by*

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## VERIFICATION OF COMPLIANCE

Applicant:	SHENZHEN LIOWN ELECTRONICS COMPANY LIMITED. Room#515, EastCoast Building Nanshan, Shenzhen, Guangdong, China.
Product Description:	Wireless Speaker
Trademark:	LIOWN
Model Number:	BT-SS90138W
File Number:	E0901003F
Date of Test:	January 04, 2009 to January 13, 2009

### We hereby certify that:

The above equipment was tested by SHENZHEN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.249.

The test results of this report relate only to the tested sample identified in this report.

*Approved By*



**David Lee / Q.A. Manager**  
**SHENZHEN EMTEK CO., LTD.**

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## **1. GENERAL INFORMATION**

### **1.1 Product Description**

The SHENZHEN LIOWN ELECTRONICS COMPANY LIMITED.. Model: BT-SS90138W (referred to as the EUT in this report) The EUT is an short range, lower power, Wireless Speaker designed as an " Input Device". It is designed by way of utilizing the FM modulation achieves the system operating.

A major technical descriptions of EUT is described as following:

- A). Operation Frequency:CH1: 925.8MHz, CH2:926.6MHz, CH3: 927.4MHz
- B). Modulation: FM
- C). Number of Channel: 3
- D). Antenna Designation: internal
- E). Power Supply: DC 12V with Adaptor

### **1.2 Related Submittal(s) / Grant (s)**

This submittal(s) (test report) is intended for FCC ID: W24BT-SS90138W filing to comply with Section 15.249 of the FCC Part 15, Subpart B and Subpart C Rules, The composite system (receiver) is compliance with Subpart B is authorized under a VoC procedure.

### **1.3 Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

### **1.4 Special Accessories**

Not available for this EUT intended for grant.

### **1.5 Equipment Modifications**

Not available for this EUT intended for grant.

## 1.6 Test Facility

### Site Description

#### EMC Lab.

: Accredited by CNAS, 2005.11.02  
The certificate is valid until 2010.11  
The Laboratory has been assessed and proved to be in compliance  
with CNAS-CL01: 2006(identical to ISO/IEC17025: 2005)  
The Certificate Registration Number is L2291

Accredited by TUV Rheinland Guangzhou, 2008.3  
The Laboratory has been assessed according to the requirements  
ISO/IEC 17025

Accredited by FCC, March 18, 2008  
The Certificate Registration Number is 709623.

Accredited by Industry Canada, May 24, 2008  
The Certificate Registration Number is 46405-4480

#### Name of Firm

: SHENZHEN EMTEK CO., LTD

#### Site Location

: Bldg 69, Majialong Industry Zone,  
Nanshan District, Shenzhen, Guangdong, China

## 2. System Test Configuration

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. the Tx frequency was fixed which was for the purpose of the measurements.

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the **frequency range between 0.15 MHz and 30MHz** using **CISPR Quasi-Peak and average detector mode**.

#### 2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

### 2.4 Limitation

#### (1) Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

**Note:**

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### Radiated Emissions FCC Rule: 15.249(a)

FCC Part 15, Subpart C Section 15.249. The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Frequency(MHz)	Filed Strength of Fundamental(at 3m)		Filed Strength of Harmonics(at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
902-928	114	94	74.0	54.0
2400-2483.5	114	94	74.0	54.0
5725-5875	114	94	74.0	54.0
24000-24250	128	108	88.0	68.0

### Radiated Emissions

#### FCC Rule: 15.249(d)(e)

FCC Part 15, Subpart C Section 15.209 limit of radiated emission for frequency below 1000GHz. The emissions from an intentional radiator shall not exceed the field strength level specified in the following table:

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance(m)	Field strength at 3m $\text{dB}\mu\text{V/m}$
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark: 1. Emission level in  $\text{dB}\mu\text{V/m}=20 \log (\mu\text{V/m})$   
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

### FCC Part 15, Section 15.35(b) limit of radiated emission for frequency above 1000MHz

Frequency(MHz)	Class A( $\text{dB}\mu\text{V/m}$ )(at 3m)		Class B( $\text{dB}\mu\text{V/m}$ )(at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

## 2.5 Configuration of Tested System

**Fig. 2-1 Configuration of Tested System**

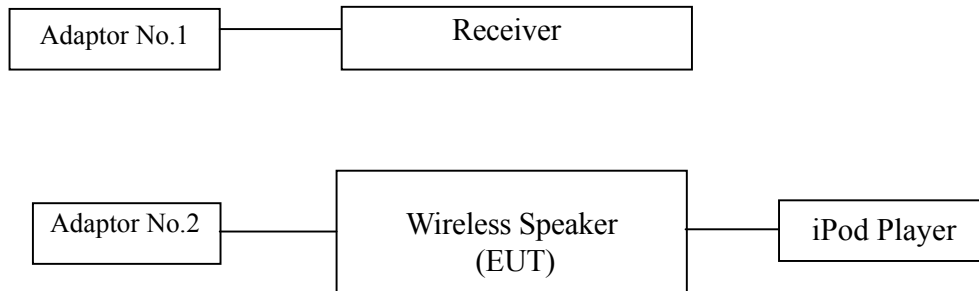


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
1.	Wireless Speaker	LIOWN	BT-SS90138W	W24BT-SS90138W	N/A	<b>EUT</b>
3.	iPod Player	Apple	A1136	N/A	N/A	
4.	Adaptor No.1	SR	YS01-120010U	N/A	N/A	
5.	Adaptor No.2	SR	YS01-120010U	N/A	N/A	

**Note:**

- (1) Unless otherwise denoted as EUT in 『Remark』 column , device(s) used in tested system is a support equipment.



### 3. Summary Of Test Results

<b>FCC Rules</b>	<b>Description Of Test</b>	<b>Result</b>
§ 15.207	Conducted Emission	Compliant
§ 15.249 (a),(b),(d) (e) § 15.209	Radiated Emission	Compliant
§15.203	Antenna Requirement	Compliant

### 4. Description of test modes

The EUT (Wireless Speaker) has been tested under normal operating condition. Three channels of EUT (CH1, CH2, CH3 ) have been chosen for testing under Normal Operating condition. In this report, all the measured datum of the three channels have been reported. No software used to control the EUT for staying in continuous transmitting mode for testing.

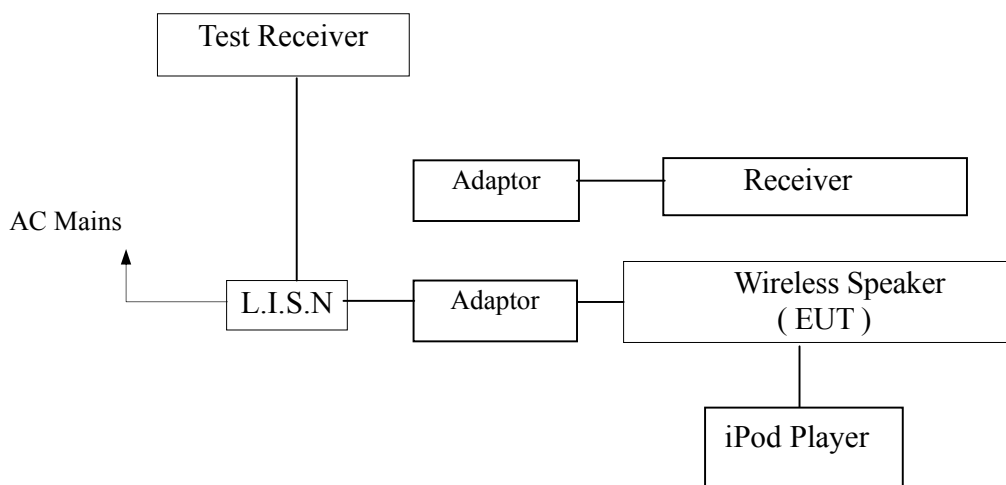
<b>Channel</b>	<b>Frequency(MHz)</b>
1	925.8MHz
2	926.6MHz
3	927.4MHz

## 5. Conducted Emissions Test

### 5.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the three highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### 5.2 Test SET-UP (Block Diagram of Configuration)



### 5.3 Measurement Equipment Used:

Conducted Emission Test Site # 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/29/2008	05/29/2009
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2008	05/29/2009
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2008	05/29/2009
50ΩCoaxial Switch	Anritsu	MP59B	M20531	05/29/2008	05/29/2009

#### 5.4 Measurement Result:

Date of Test:	January 06, 2009	Temperature:	22°C
Frequency Detector:	0.15~30MHz	Humidity:	50%
Test Result:	PASS	Test Mode:	On

Test Line	Frequency MHz	Emission Level QP dB(μV)	Emission Level AV dB(μV)	Limits QP dB(μV)	Limits AV dB(μV)	Margin QP dB(μV)	Margin AV dB(μV)
Neutral	0.175	36.97	21.06	64.72	54.72	-27.75	-33.66
	0.350	35.14	20.60	58.96	48.96	-23.82	-28.36
	0.830	32.61	15.73	56.00	46.00	-23.39	-30.27
	2.330	37.23	20.59	56.00	46.00	-18.77	-25.41
	7.600	36.69	23.99	60.00	50.00	-23.31	-26.01
	22.800	36.10	22.85	60.00	50.00	-23.90	-27.15
Line	0.175	37.33	24.66	64.72	54.72	-27.39	-30.06
	0.320	34.84	22.48	59.71	49.71	-24.87	-27.23
	0.552	32.82	19.41	56.00	46.00	-23.18	-26.59
	<b>2.470</b>	<b>38.15</b>	<b>23.45</b>	<b>56.00</b>	<b>46.00</b>	<b>-17.85</b>	<b>-22.55</b>
	7.600	36.20	25.81	60.00	50.00	-23.80	-24.19
	22.800	32.65	18.72	60.00	50.00	-27.35	-31.28
Remark: The worst emission is detected at <b>2.470MHz</b> with corrected <b>QP</b> signal Level of <b>38.15 dBμV</b> (Limit is 56.00 dBμV).When the <b>Line</b> of the EUT is connected to L.I.S.N							

### 5.5 Conducted Measurement Photos:



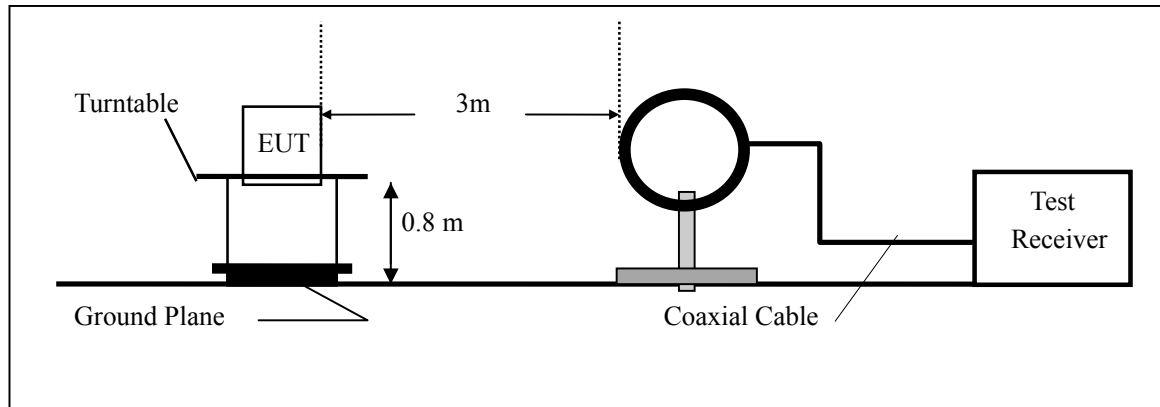
## **6. Radiated Emission Test**

### **6.1 Measurement Procedure**

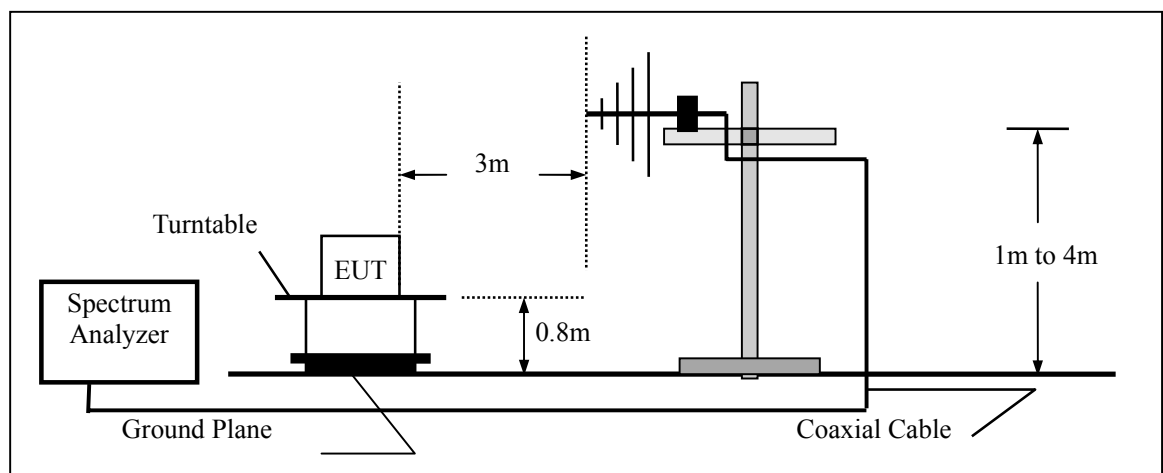
- 1 The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

## 6.2 Test SET-UP (Block Diagram of Configuration)

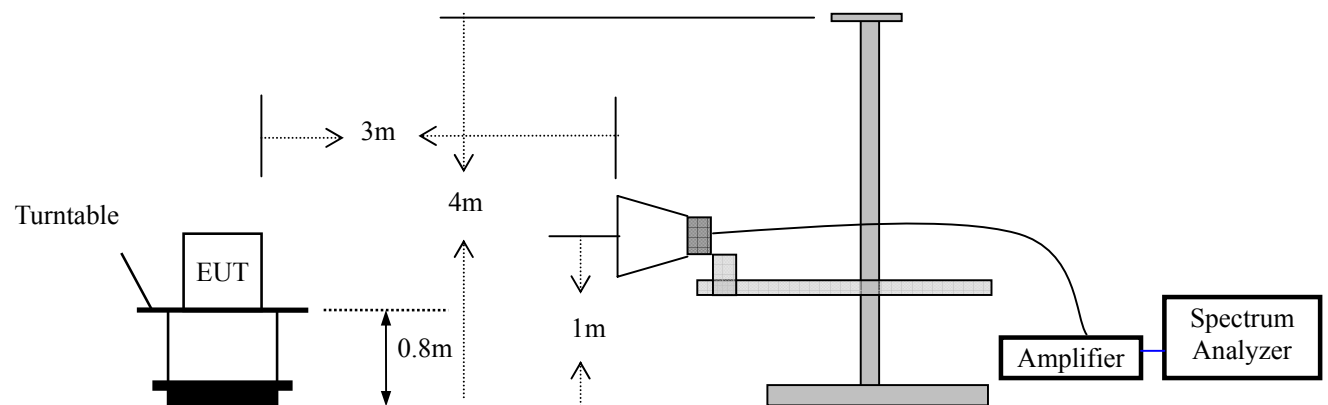
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



### 6.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSP7	839511/010	05/29/2008	05/29/2009
Spectrum Analyzer	HP	E4407B	839840481	05/29/2008	05/29/2009
EMI Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/29/2008	05/29/2009
Pre-Amplifier	HP	8447D	2944A07999	05/29/2008	05/29/2009
Bilog Antenna	Schwarzbeck	VULB9163	142	05/29/2008	05/29/2009
Loop Antenna	ARA	PLA-1030/B	1029	05/29/2008	05/29/2009
Horn Antenna	Electro-Metrics	EM-6961	103314	05/29/2008	05/29/2009
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/29/2008	05/29/2009

### 6.4 Radiated Measurement Result

Operation Mode: iPod Playing      Test Date : January 05, 2009  
Frequency Range: 30~1000MHz      Temperature : 28 °C  
Test Result: PASS      Humidity : 65 %  
Measured Distance: 3m      Test By: Andy  
Test Item: Spurious Radiated Emission Data

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
35.423	V	30.52	40.00	-9.48	PK
54.240	V	29.29	40.00	-10.71	PK
124.560	V	27.25	43.50	-16.25	PK
180.175	V	32.14	43.50	-11.36	PK
463.705	V	42.10	46.00	-3.90	PK
942.484	V	43.20	46.00	-2.80	PK
56.426	H	25.18	40.00	-14.82	PK
92.823	H	23.26	43.50	-20.24	PK
178.630	H	24.30	43.50	-19.20	PK
285.635	H	28.32	46.00	-17.68	PK
463.702	H	43.65	46.00	-2.35	PK
940.97	H	43.21	46.00	-2.79	PK

**Note:** (1) All Readings are Peak Value.  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss  
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

**No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.209.**

Operation Mode: iPod Playing                      Test Date : January 05, 2009  
Operation Frequency: 925.8MHz                      Temperature : 28 °C  
Test Result: PASS                      Humidity : 65 %  
Measured Distance: 3m                      Test By: Andy  
Test Item: Fundamental and Harmonics Radiated Emission Data

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
925.8(F)	V	96.44	88.25	114	94	-17.56	-5.75
1851.6	V	58.46	46.55	74	54	-15.54	-7.45
2777.4	V	60.64	48.56	74	54	-13.36	-5.46
3703.2	V	58.43	45.21	74	54	-15.57	-8.79
4629.0	V	57.28	44.79	74	54	-16.72	-9.21
5554.8	V	55.22	46.56	74	54	-18.78	-7.44
6480.6	V	51.35	41.45	74	54	-22.65	-12.55
7406.4	V	58.68	47.45	74	54	-15.32	-6.55
8332.2	V	56.56	46.82	74	54	-17.44	-7.18
9258.0	V	54.66	46.31	74	54	-19.34	-7.69
925.8(F)	H	95.65	87.34	114	94	-18.35	-6.66
1851.6	H	64.61	49.64	74	54	-9.39	-4.36
2777.4	H	62.45	49.46	74	54	-11.55	-4.54
3703.2	H	57.43	47.36	74	54	-16.57	-6.64
4629.0	H	55.14	45.54	74	54	-18.86	-8.46
5554.8	H	57.35	46.51	74	54	-16.65	-7.49
6480.6	H	60.44	44.76	74	54	-13.56	-9.24
7406.4	H	55.76	44.66	74	54	-18.24	-9.34
8332.2	H	57.58	46.23	74	54	-16.42	-7.77
9258.0	H	55.24	43.45	74	54	-18.76	-10.55

**No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.249.**

**Note:** (1) All Readings are Peak Value and AV.  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss  
(3) The average measurement was not performed when the peak measured data under the limit of average detection.



Operation Mode: iPod Playing      Test Date : January 05, 2009  
Operation Frequency: 926.6MHz      Temperature : 28 °C  
Test Result: PASS      Humidity : 65 %  
Measured Distance: 3m      Test By: Andy  
Test Item: Fundamental and Harmonics Radiated Emission Data

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
926.6(F)	V	98.86	89.75	114	94	-15.14	-4.25
1853.2	V	62.54	47.43	74	54	-11.46	-6.57
2779.8	V	60.22	46.43	74	54	-13.78	-7.57
3706.4	V	58.11	47.54	74	54	-15.89	-6.46
4633.0	V	54.54	43.32	74	54	-19.46	-10.68
5559.6	V	56.32	45.34	74	54	-17.68	-8.66
6486.2	V	58.47	43.65	74	54	-15.53	-10.35
7412.8	V	56.45	42.66	74	54	-17.55	-11.34
8339.4	V	55.67	43.76	74	54	-18.33	-10.24
9266.0	V	59.78	44.74	74	54	-14.22	-9.26
926.6(F)	H	97.56	88.42	114	94	-16.44	-5.58
1853.2	H	62.15	48.34	74	54	-11.85	-5.66
2779.8	H	59.78	45.80	74	54	-14.22	-8.20
3706.4	H	58.34	47.43	74	54	-15.66	-6.57
4633.0	H	56.31	45.56	74	54	-17.69	-8.44
5559.6	H	59.62	46.46	74	54	-14.38	-7.54
6486.2	H	54.21	42.26	74	54	-19.79	-11.74
7412.8	H	53.62	43.14	74	54	-20.38	-10.86
8339.4	H	50.56	42.54	74	54	-23.46	-11.46
9266.0	H	55.76	44.67	74	54	-18.24	-9.33

**No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.249.**

**Note:** (1) All Readings are Peak Value and AV.  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss  
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode: iPod Playing      Test Date : January 05, 2009  
Operation Frequency: 927.4MHz      Temperature : 28 °C  
Test Result: PASS      Humidity : 65 %  
Measured Distance: 3m      Test By: Andy  
Test Item: Fundamental and Harmonics Radiated Emission Data

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
927.4(F)	V	101.35	89.36	114	94	-13.65	-4.64
1854.8	V	63.24	49.37	74	54	-10.76	-4.63
2782.2	V	60.65	48.51	74	54	-13.35	-5.49
3709.6	V	59.54	47.56	74	54	-14.46	-6.44
4637.0	V	58.79	45.67	74	54	-15.21	-8.33
5564.4	V	55.42	43.56	74	54	-18.58	-10.44
6491.8	V	55.72	42.12	74	54	-18.28	-11.88
7419.2	V	59.98	45.78	74	54	-14.02	-8.22
8346.6	V	57.53	43.23	74	54	-16.47	-10.77
9274.0	V	58.51	44.59	74	54	-15.49	-9.41
927.4(F)	H	99.45	88.32	114	94	-14.55	-5.68
1854.8	H	63.25	47.82	74	54	-10.75	-6.18
2782.2	H	61.33	46.73	74	54	-12.67	-7.27
3709.6	H	59.45	46.42	74	54	-14.55	-7.58
4637.0	H	57.33	45.34	74	54	-16.67	-8.66
5564.4	H	55.24	43.56	74	54	-18.76	-10.44
6491.8	H	58.42	45.80	74	54	-15.58	-8.20
7419.2	H	54.12	41.45	74	54	-19.88	-12.55
8346.6	H	57.47	43.71	74	54	-16.53	-10.29
9274.0	H	54.41	43.52	74	54	-19.59	-10.48

**No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.249.**

**Note:** (1) All Readings are Peak Value and AV.  
(2) Emission Level= Reading Level+Probe Factor +Cable Loss  
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

### 6.5 Radiated Measurement Photos:



## **7. Occupied Bandwidth**

### **7.1 Measurement Procedure**

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Set SPA Center Frequency = fundamental frequency, RBW=100KHz, VBW=300KHz.
4. Set SPA Max hold. Mark peak.

### **7.2 Test SET-UP(Block Diagram of Configuration)**

Same as 6.2 Radiated Emission Measurement.

### **7.3 Measurement Equipment Used:**

Same as 6.3 Radiated Emission Measurement.

### **7.4 Measurement Results:**

The field strength of any emission which appear outside of this band shall not exceed the general radiated emission limits in section 15.209.

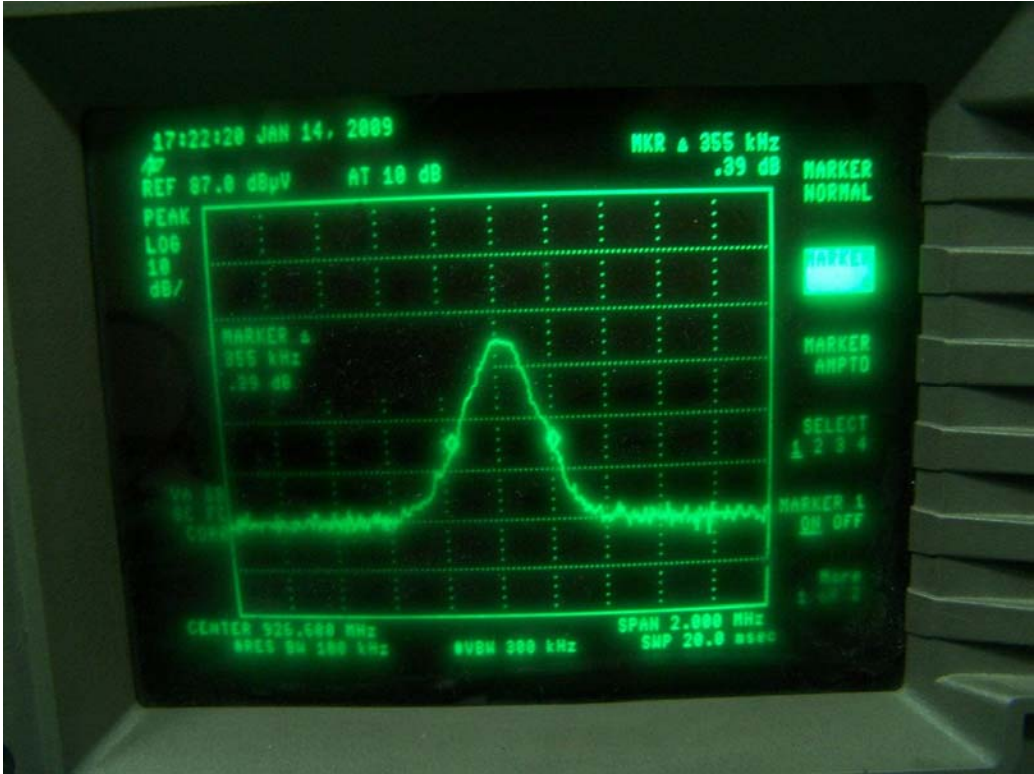
Refer to attached data chart.

Band Width Test Data:

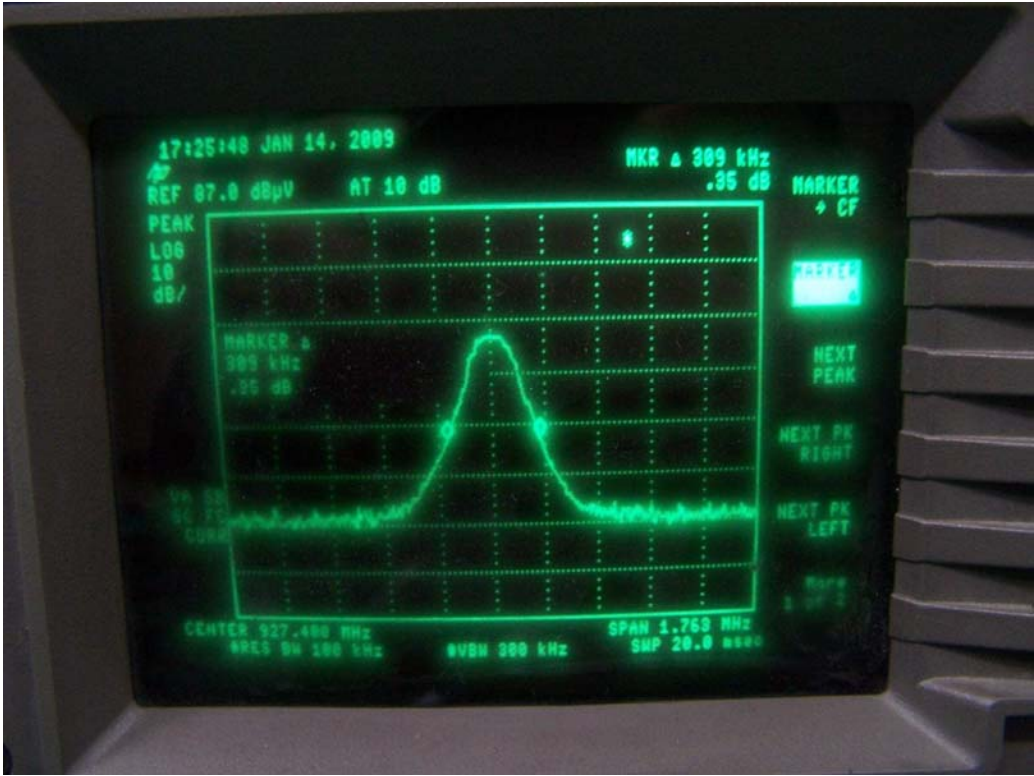
CH1:



CH2:



CH3:



## **8. Antenna Application**

### **8.1 Antenna requirement**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible part shall be used with the device, The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section, The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### **8.2 Antenna construction and directional gain**

An internal specify type antenna was used.