


FCC PART 15.109
MEASUREMENT AND TEST REPORT
FOR

Shenzhen Sungworld Electronics Co., LTD.

4#, North District, Shangxue Industrial Park, Bantian, Long Gang District,

Shenzhen, China

FCC ID: W13A13SOUND

Report Concerns: Original Report	Equipment Type: Sound Box
Model:	<u>A13 Sound Box</u>
Report No.:	<u>STR08078064I</u>
Test/Witness Engineer:	<u>Jason</u>
Test Date:	<u>2008-07-12 to 2008-07-18</u>
Issued Date:	<u>2008-07-22</u>
Prepared By:	SEM.Test Compliance Service Co., Ltd. 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C. (518101)
Approved & Authorized By:	 _____ Jandy So / PSQ Manager

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Shenzhen sungworld Electronics Co., LTD.
Address of applicant: 4#, North District, Shangxue Industrial Park, Bantian, Long Gang District, Shenzhen, China

Manufacturer: Shenzhen sungworld Electronics Co., LTD.
Address of manufacturer: 4#, North District, Shangxue Industrial Park, Bantian, Long Gang District, Shenzhen, China

General Description of E.U.T

Items	Description
EUT Description:	Sound Box
Trade Name:	/
Model No.:	A13 Sound Box
Rated Voltage:	DC 9V
Rated Current:	/
Size:	15X15X15 cm
For more information refer to the circuit diagram form and the user's manual.	

The test data is gathered from a production sample provided by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the Shenzhen Sungworld Electronics Co., LTD. in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart B, and section 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the Operating Instructions.

1.5 Test Facility

The Laboratory 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 files which the Registration No.: **994117**. Measurement required was performed at laboratory of SEM.Test Compliance Service Co., Ltd. at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C. (518101).

1.6 EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the system components. The test software, provided by the customer, is started while the EUT is on to simulate the normal work.

1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
Canon	SD Card	/	/

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Power Cable	0.6	Shielded	With Core

2. SUMMARY OF TEST RESULTS

Description of Test	Result
§15.107 (a) Conducted Emission	Compliant
§15.109(a) Radiated Emission	Compliant

3. §15.107 (a)- CONDUCTED EMISSION

3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 1.5 dB.

3.2 Test Equipment List and Details

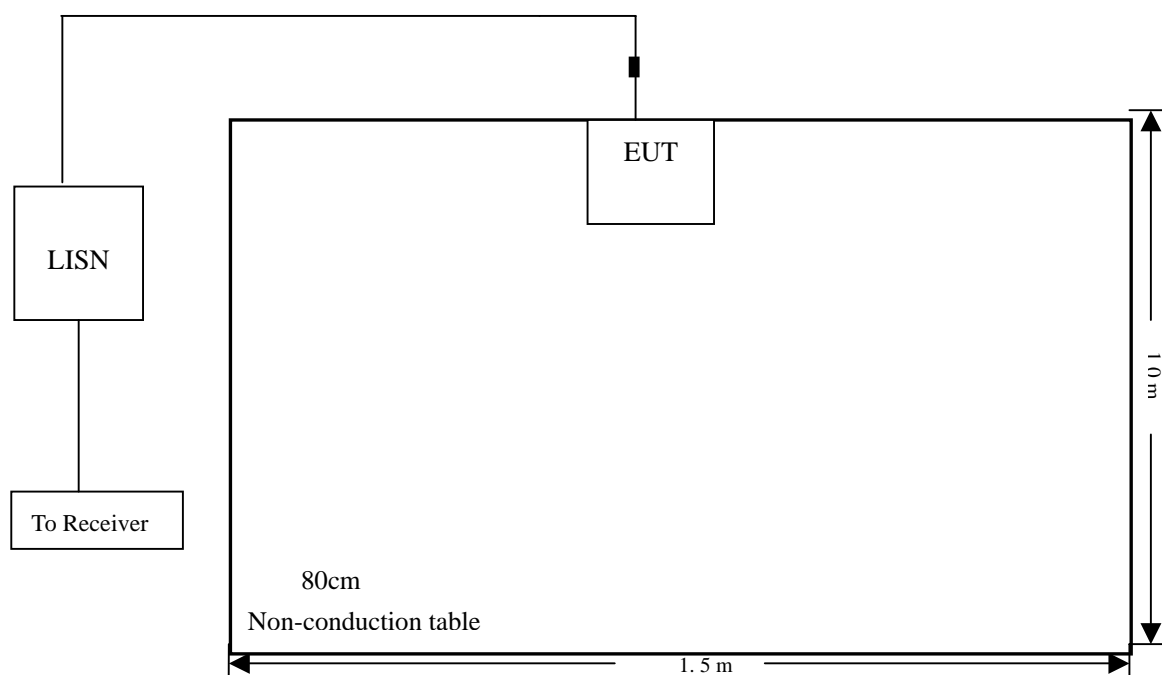
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESCS30	830245/009	2008-01-25	2009-01-24
AMN	Rohde & Schwarz	ESH2-Z5	100002	2008-01-25	2009-01-24
Limiter	Rohde & Schwarz	ESH3-Z2	357.8810.52	2008-01-25	2009-01-24
AMN	Rohde & Schwarz	ESH3-Z5	828304/014	2008-01-25	2009-01-24
Spectrum Analyzer	Aglient	E4402B-ESA	US41192821	2008-01-25	2009-01-24

3.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.107 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

3.4 Basic Test Setup Block Diagram



3.5 Environmental Conditions

Temperature:	18° C
Relative Humidity:	55%
ATM Pressure:	1012 mbar

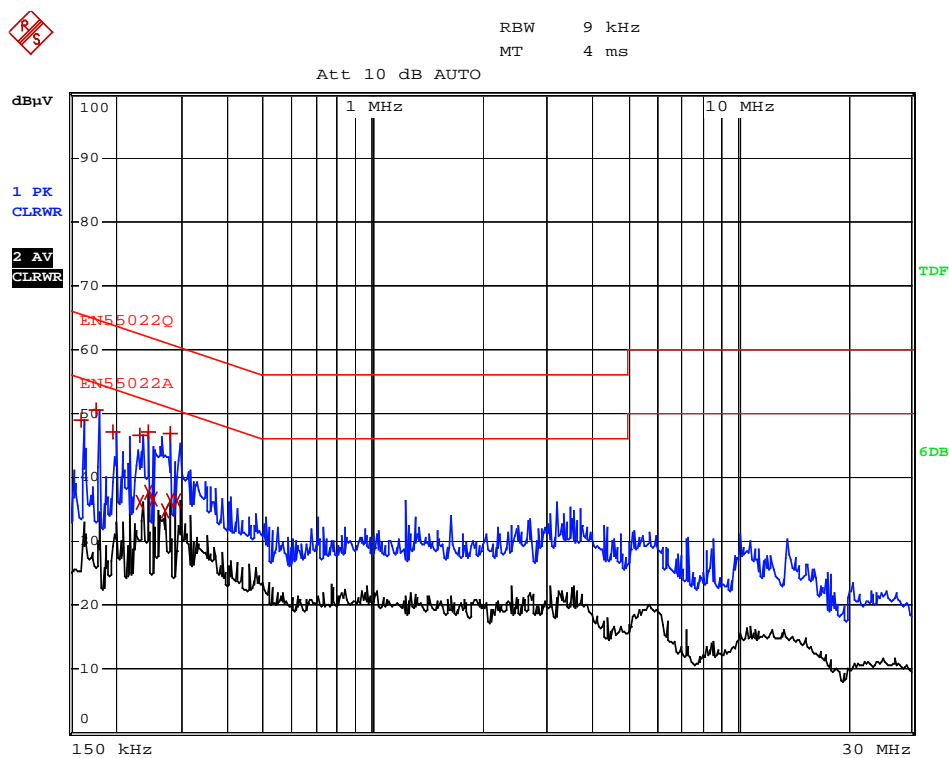
3.6 Summary of Test Results/Plots

According to the data in section 3.8, the EUT complied with the FCC 15B Conducted margin for a Class B device, with the *worst* margin reading of:

-10.8 dB μ V at 0.27MHz in the Line mode, 0.15-30MHz

3.7 Conducted Emissions Test Data

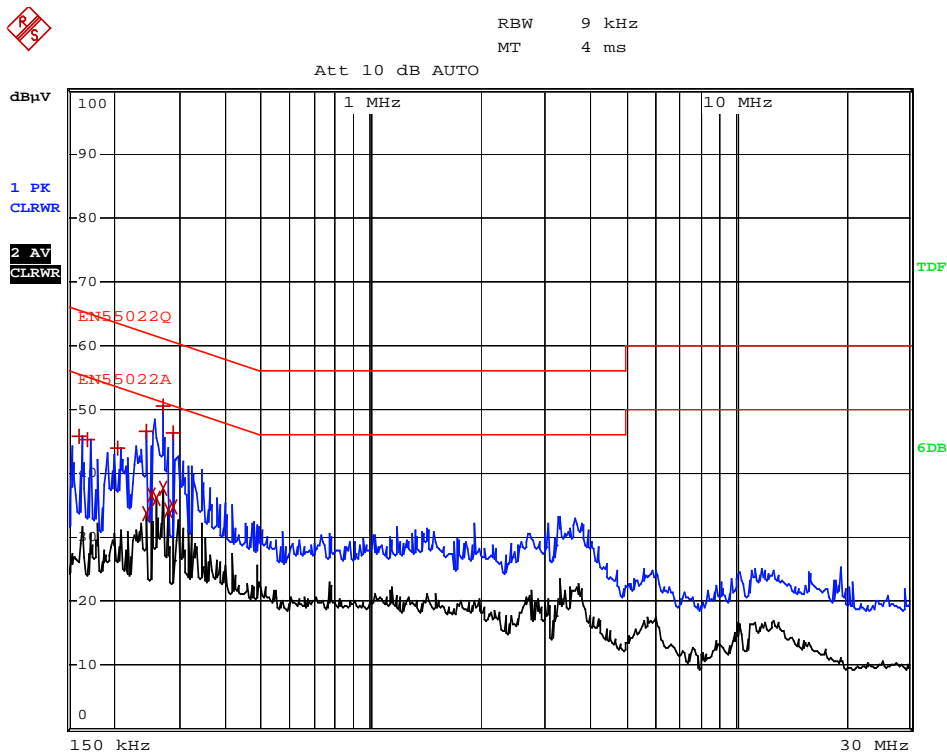
LINE CONDUCTED EMISSIONS				FCC 15B CLASS B	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB μ V	QP/Ave/Pk	Line/Neutral	dB μ V	dB
0.27	50.3	Pk	Line	61.12	-10.8
0.27	37.7	Ave	Line	51.12	-13.4
0.28	47.0	Pk	Neutral	60.88	-13.9
0.29	36.5	Ave	Neutral	50.41	-14.0
0.18	50.5	Pk	Neutral	64.58	-14.1
0.29	46.3	Pk	Line	60.64	-14.3
0.24	37.7	Ave	Neutral	52.03	-14.4
0.28	36.4	Ave	Neutral	50.88	-14.5
0.24	47.2	Pk	Neutral	62.03	-14.8
0.25	36.7	Ave	Neutral	51.76	-15.1
0.25	36.6	Ave	Line	51.76	-15.2
0.24	46.7	Pk	Line	62.03	-15.3
0.26	36.1	Ave	Line	51.5	-15.4
0.23	46.7	Pk	Neutral	62.31	-15.6
0.29	34.9	Ave	Line	50.64	-15.8
0.23	36.1	Ave	Neutral	52.31	-16.2
0.27	34.9	Ave	Neutral	51.12	-16.2
0.16	49.0	Pk	Neutral	65.36	-16.3
0.20	47.2	Pk	Neutral	63.69	-16.5
0.28	34.4	Ave	Line	50.88	-16.5
0.24	33.8	Ave	Line	52.03	-18.2
0.21	43.9	Pk	Line	63.37	-19.5
0.16	45.7	Pk	Line	65.36	-19.6
0.17	45.3	Pk	Line	64.96	-19.7

Plot of Conducted Emissions Test Data*Conducted Disturbance**EUT: Sound Box**M/N: A13 Sound Box**Operating Condition: Playing**Test Specification: N*

Date: 12.JUL.2008 15:45:13

Plot of Conducted Emissions Test Data

Conducted Disturbance
EUT: Sound Box
M/N: A13 Sound Box
Operating Condition: Playing
Test Specification: L



Date: 12.JUL.2008 15:43:21

4. §15.109(a)- RADIATED EMISSION

4.1 Measurement Uncertainty

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2008-01-25	2009-01-24
Positioning Controller	C&C	CC-C-1F	N/A	2008-01-25	2009-01-24
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2008-01-25	2009-01-24
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2008-01-25	2009-01-24
RF Switch	EM	EMSW18	SW060023	2008-01-25	2009-01-24
Amplifier	Agilent	8447F	3113A06717	2008-01-25	2009-01-24
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2008-01-25	2009-01-24
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	25498514	2008-01-25	2009-01-24

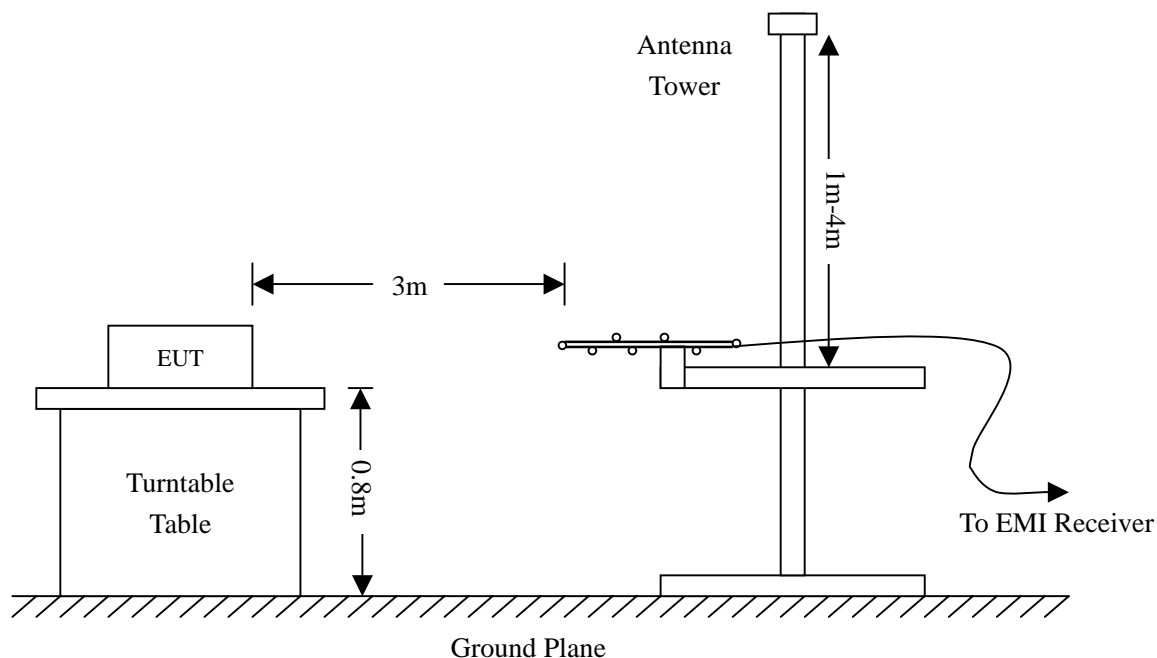
Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 3.0 dB.

4.2 Test Equipment List and Details

4.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 and FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.



4.4 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency 30 MHz
 Stop Frequency 1000 MHz
 Sweep Speed Auto
 IF Bandwidth 10 kHz
 Quasi-Peak Adapter Bandwidth 120 kHz
 Quasi-Peak Adapter Mode Normal

4.5 Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15B Limit}$$

4.6 Environmental Conditions

Temperature:	22° C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

4.7 Summary of Test Results/Plots

According to the data, the EUT complied with the FCC 15B Class B standards, and had the worst margin of:

-11.77 dB μ V at 53.756 MHz in the Vertical polarization, Playing Mode, 30 MHz to 1 GHz, 3Meters
-9.48 dB μ V at 965.474 MHz in the Horizontal polarization, Downloading Mode, 30 MHz to 1 GHz, 3Meters

Plot of Radiation Emissions Test Data

Radiated Emission

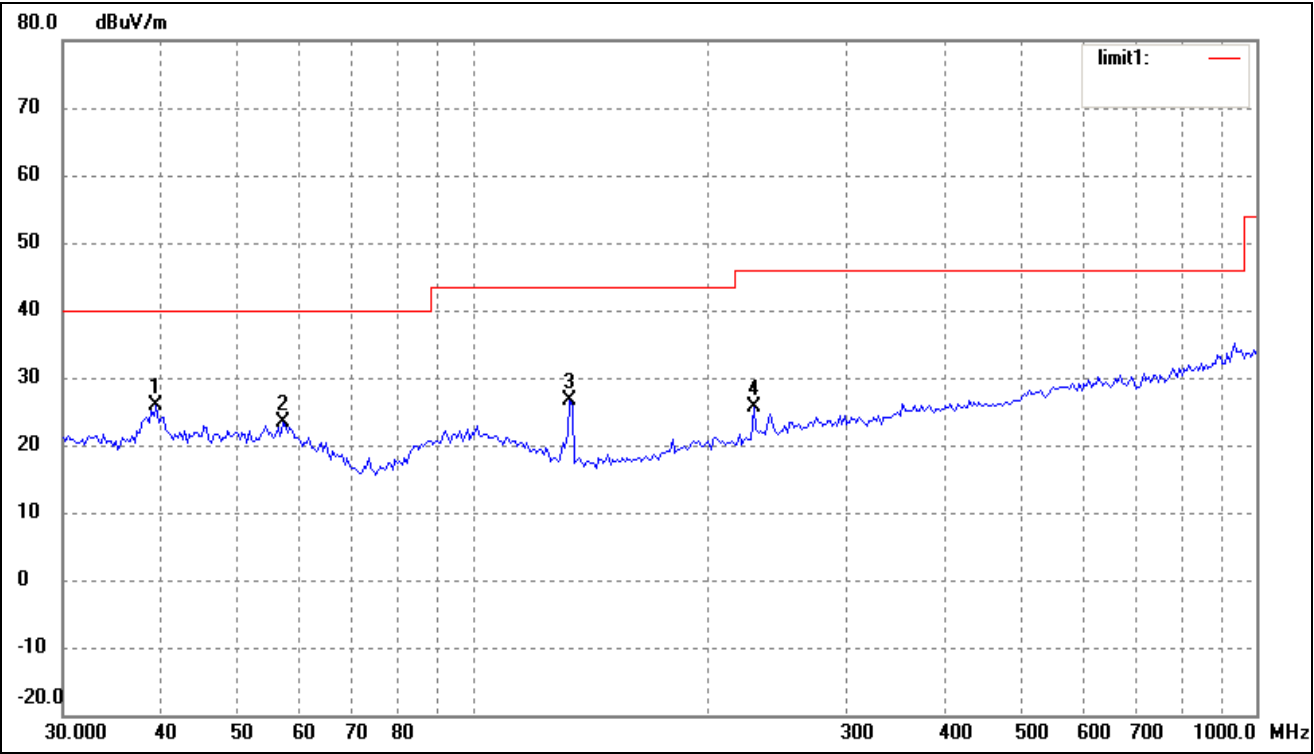
EUT: Sound Box

M/N: A13 Sound Box

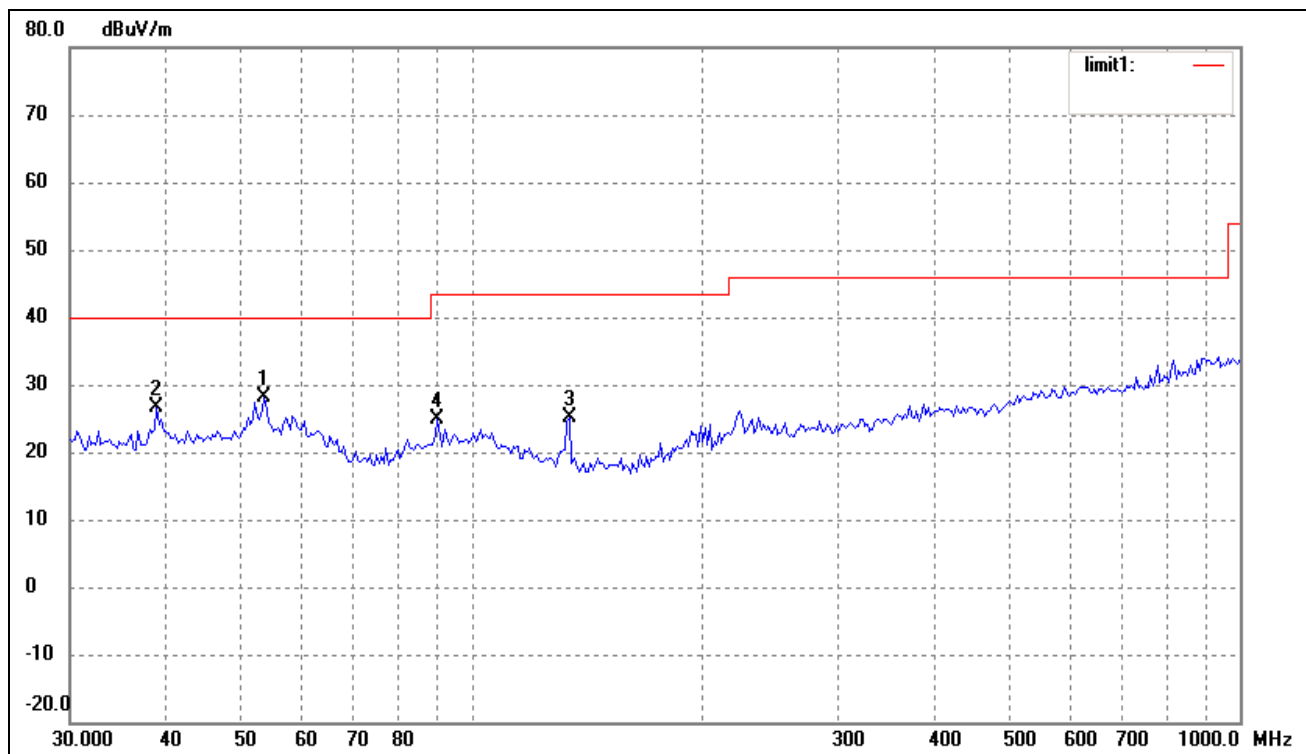
Operating Condition: Playing

Test Specification: Horizontal & Vertical

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	39.4588	17.88	7.99	25.87	40.00	-14.13	260	121	peak
2	57.2654	15.82	7.66	23.48	40.00	-16.52	228	100	peak
3	133.0809	22.29	4.38	26.67	43.50	-16.83	235	130	peak
4	228.6173	17.83	7.79	25.62	46.00	-20.38	241	105	peak

Plot of Radiation Emissions Test Data*Radiated Emission**EUT: Sound Box**M/N: A13 Sound Box**Operating Condition: Playing**Test Specification: Horizontal & Vertical**Vertical:*

No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	53.7559	20.41	7.82	28.23	40.00	-11.77	220	160	peak
2	38.9081	18.86	7.84	26.70	40.00	-13.30	212	121	peak
3	134.0194	20.81	4.32	25.13	43.50	-18.37	280	140	peak
4	90.4198	17.63	7.16	24.79	43.50	-18.71	231	125	peak

Plot of Radiation Emissions Test Data

Radiated Emission

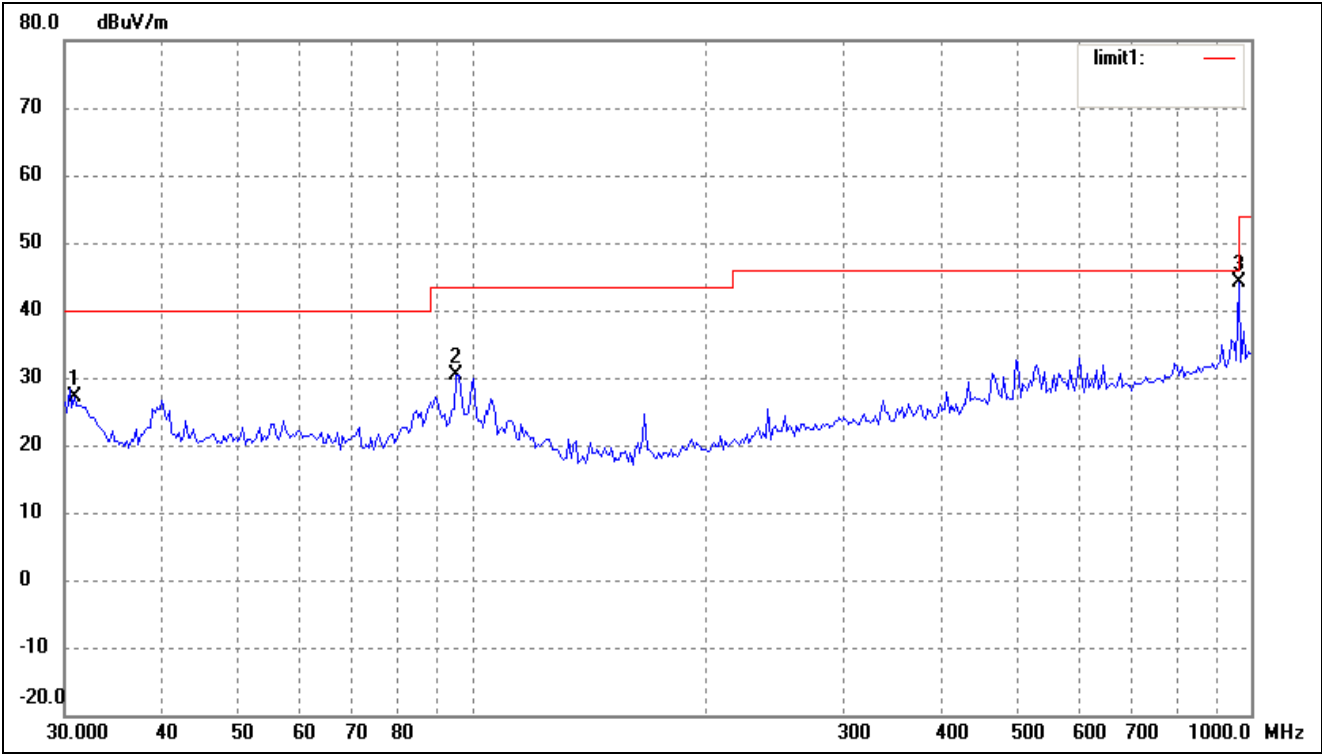
EUT: Sound Box

M/N: A13 Sound Box

Operating Condition: Downloading

Test Specification: Horizontal & Vertical

Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	30.8552	20.29	6.77	27.06	40.00	-12.94	226	140	peak
2	95.6485	22.31	8.10	30.41	43.50	-13.09	264	115	peak
3	965.4742	26.25	17.78	44.03	54.00	-9.97	105	10	peak

Plot of Radiation Emissions Test Data

Radiated Emission

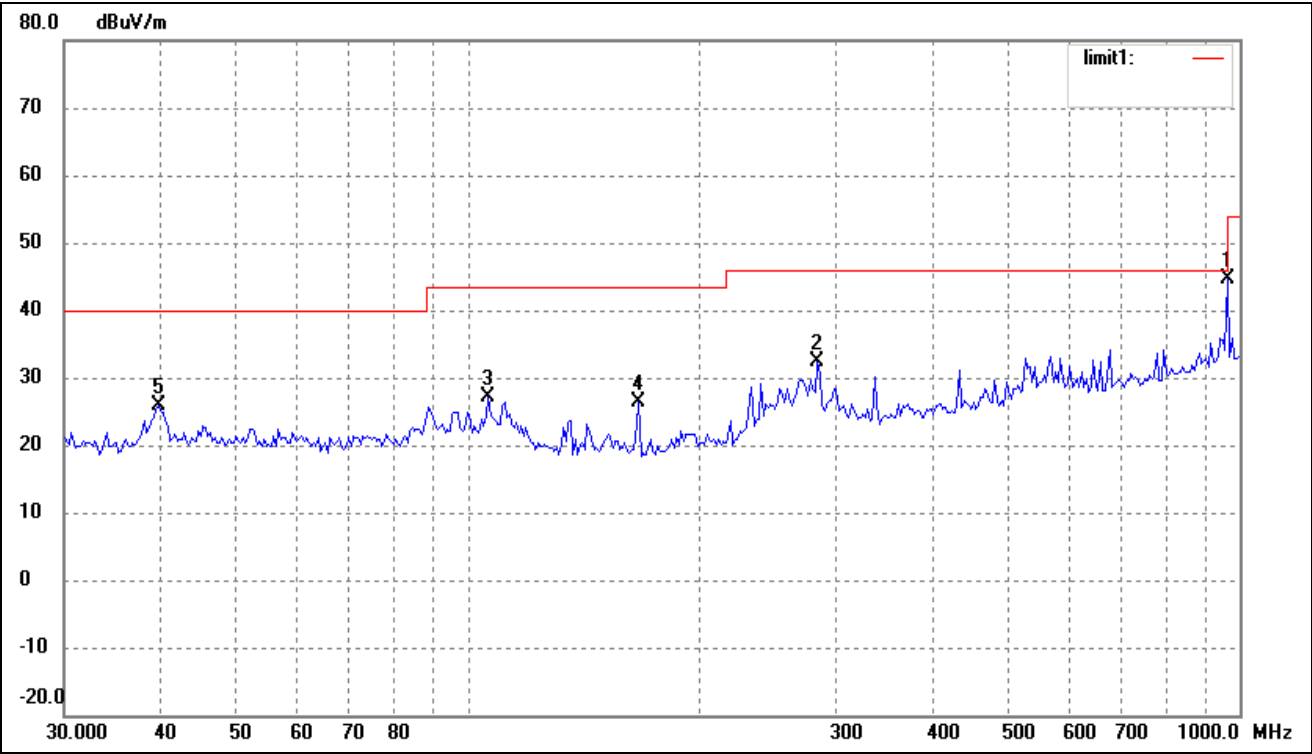
EUT: Sound Box

M/N: A13 Sound Box

Operating Condition: Downloading

Test Specification: Horizontal & Vertical

Horizontal:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	965.4742	26.74	17.78	44.52	54.00	-9.48	250	120	peak
2	284.2607	22.88	9.58	32.46	46.00	-13.54	241	108	peak
3	106.2812	19.12	7.90	27.02	43.50	-16.48	225	115	peak
4	166.6385	21.53	4.77	26.30	43.50	-17.20	320	100	peak
5	39.7371	17.93	8.07	26.00	40.00	-14.00	257	120	peak