

**FCC PART 15 CLASS B  
MEASUREMENT AND TEST REPORT**

For

**Gajah International (HK) Co., Ltd**

18/F Bel Trade Commercial Building, 1-3, Burrows Street, Wan Chai, Hong Kong

**FCC ID: UFKTB200200**

<b>Report Type:</b> Original Report	<b>Product Type:</b> TV-BOX
<b>Test Engineer:</b>	<u>Mick Yin</u> <i>Mick Yin</i>
<b>Report Number:</b>	<u>RSZ120920003-00A</u>
<b>Report Date:</b>	<u>2012-10-17</u>
<b>Reviewed By:</b>	<u>Sula Huang</u> <i>Sula Huang</i> RF Engineer
<b>Test Laboratory:</b>	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 <a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a>

Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP\*, or any agency of the Federal Government.

\* This report may contain data that are not covered by the NVLAP accreditation and shall be marked with an asterisk "★"

## **TABLE OF CONTENTS**

<b>GENERAL INFORMATION.....</b>	<b>3</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	3
OBJECTIVE .....	3
RELATED SUBMITTAL(S)/GRANT(S) .....	3
TEST FACILITY .....	3
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>5</b>
DESCRIPTION OF TEST CONFIGURATION .....	5
EUT EXERCISE SOFTWARE .....	5
EQUIPMENT MODIFICATIONS .....	5
REMOTE OR SUPPORT EQUIPMENT LIST AND DETAILS .....	5
EXTERNAL I/O CABLE.....	5
BLOCK DIAGRAM OF TEST SETUP .....	6
<b>SUMMARY OF TEST RESULTS.....</b>	<b>7</b>
<b>FCC §15.107 – AC LINE CONDUCTED EMISSIONS.....</b>	<b>8</b>
MEASUREMENT UNCERTAINTY .....	8
EUT SETUP.....	8
EMI TEST RECEIVER SETUP.....	8
TEST PROCEDURE .....	9
TEST EQUIPMENT LIST AND DETAILS.....	9
CORRECTED FACTOR & MARGIN CALCULATION .....	9
TEST RESULTS SUMMARY .....	9
TEST DATA .....	9
<b>FCC §15.109 - RADIATED EMISSIONS .....</b>	<b>12</b>
MEASUREMENT UNCERTAINTY .....	12
EUT SETUP.....	12
EMI TEST RECEIVER SETUP.....	13
TEST PROCEDURE .....	13
TEST EQUIPMENT LIST AND DETAILS.....	13
CORRECTED AMPLITUDE & MARGIN CALCULATION .....	13
TEST RESULTS SUMMARY .....	14
TEST DATA .....	14

## GENERAL INFORMATION

---

### Product Description for Equipment under Test (EUT)

The *Gajah International (HK) Co., Ltd*'s product, model number: *TB2002 (FCC ID: UFKTB200200)* or the "EUT" as referred to in this report was a *TV-BOX*, which was measured approximately: 179.7 cm (L) x 119.6 cm (W) x 29.6 cm (H), rated input voltage: DC 5V from adapter. The highest Operating Frequency is 1.2 GHz.

Adapter Information: AC ADAPTER  
Model: HND050200U;  
Input: 100-240V~ 50/60Hz 0.35A MAX;  
Output: DC 5.0V 2.0A

*\* All measurement and test data in this report was gathered from production sample serial number: 1209106 (Assigned by BACL, Shenzhen). The EUT supplied by applicant was received on 2012-09-20.*

### Objective

This report is prepared on behalf of *Gajah International (HK) Co., Ltd* in accordance with Part 2-Subpart J, Part 15- Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15 Class B.

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

FCC Part 15.247 DTS submission with FCC ID: UFKTB200200.

### Test Facility

The Test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a typical mode which is provided by manufacture.

The EUT was tested together with the below additional components and configuration, such case produced the worst emission level that was selected to test and recorded in this report.

Test mode 1: Play video&audio file (HDMI)

Test mode 2: Play video&audio file (AV)

After the preliminary scan, the following test mode was found to produce the highest emission level.

Test mode 1: Play video&audio file (HDMI)

### EUT Exercise Software

No Exercise Software was used

### Equipment Modifications

No modification was made to the EUT tested.

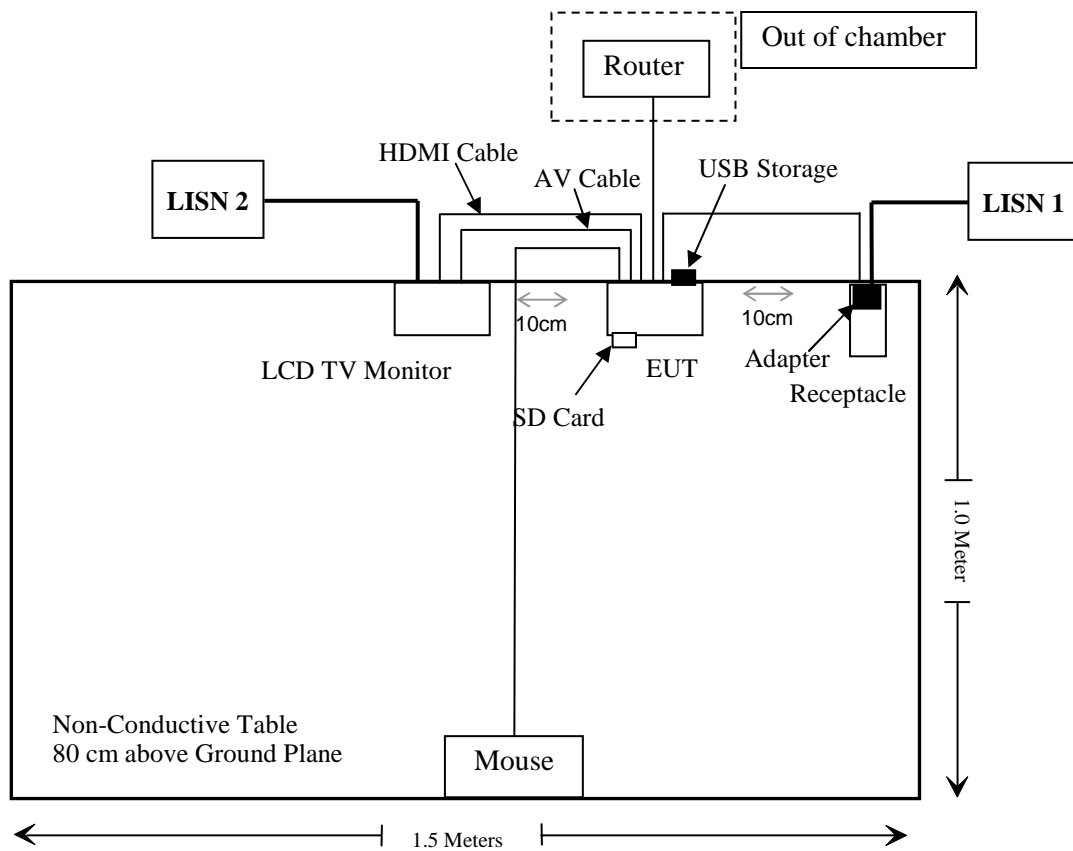
### Remote or Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
SAMSUNG	LCD TV MONITOR	225MS	CR22HVIP401073M
Kingston	USB Storage	2GB	N/A
SAGEMCOM	Modem/Router	F@st 3804	LK11153DP530005
Kingston	SD Card	2GB	--
DELL	Mouse	MOC5UO	G1900NKD

### External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielded Detachable HDMI Cable with core	2.0	EUT	LCD TV MONITOR
Unshielded Detachable RJ45 Cables	10.0	EUT	Router
Unshielded DC Power Cable	1.5	EUT	Adapter
Shielded Detachable USB Cable	1.5	EUT	Mouse
Unshielded Detachable AV Cables	1.5	EUT	LCD TV MONITOR

## Block Diagram of Test Setup



## SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	AC Line Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

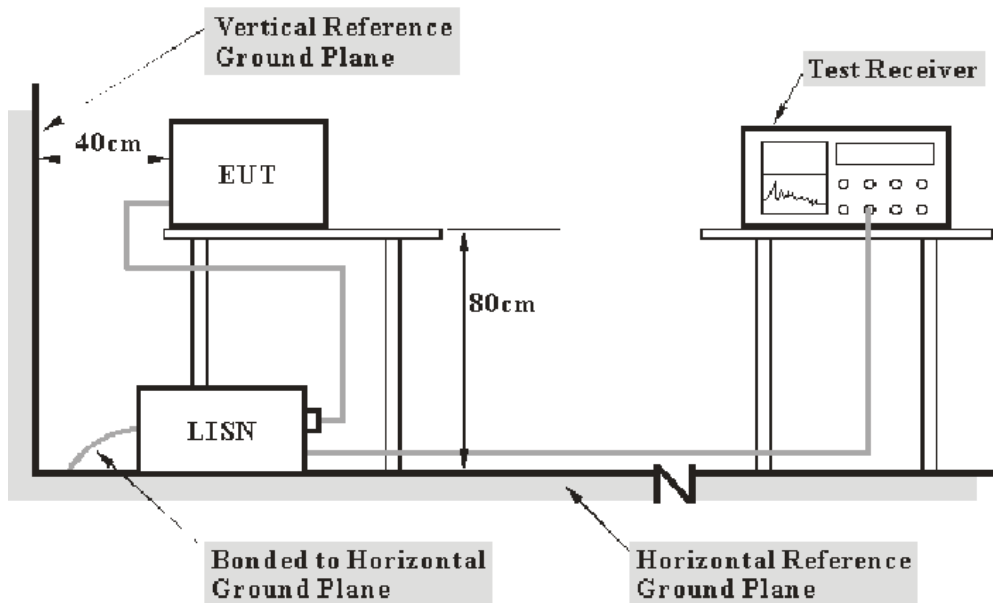
## FCC §15.107 – AC LINE CONDUCTED EMISSIONS

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on CISPR 16-4-2, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 2.4 dB.(k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

### EUT Setup



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.4-2009. The related limit was specified in FCC Part 15.107 Class B.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

### EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

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

<u>Frequency Range</u>	<u>IF B/W</u>
150 kHz – 30 MHz	9 kHz



## Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2011-11-24	2012-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-11-17	2012-11-16
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Rohde & Schwarz	Attenuator	ESH3Z2	DE25985	2012-07-08	2013-07-07
BACL	CE Test software	BACL-CE	V1.0	-	-

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Pulse Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Pulse Limiter Attenuation}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107, with the worst margin reading of:

**14.53 dB at 0.175 MHz** in the **Line** conducted mode

## Test Data

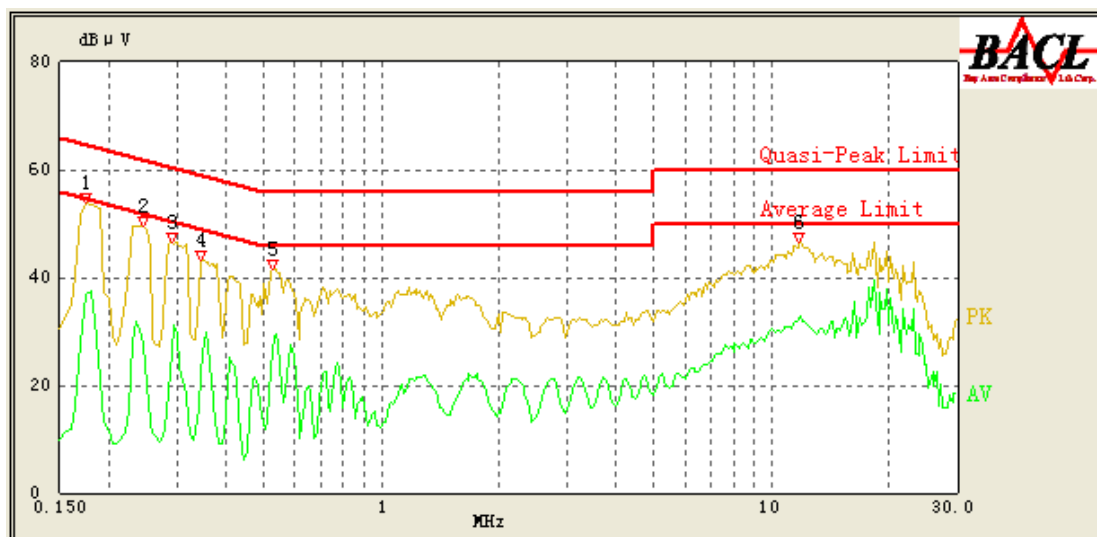
### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	100.0 kPa

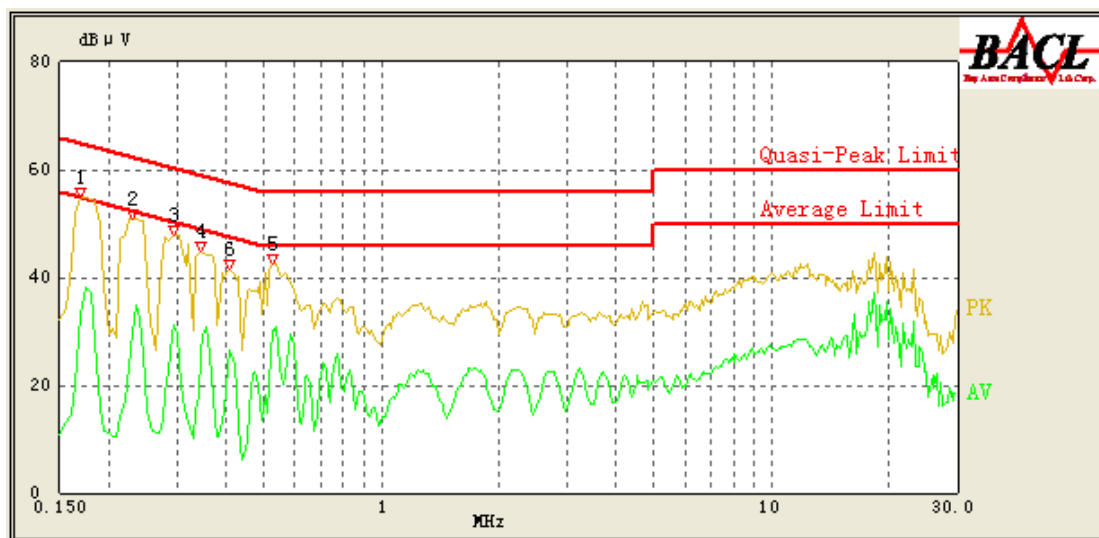
*The testing was performed by Mick Yin on 2012-09-26.*

Test Mode: Play video&audio file (HDMI) - (worst case)

### AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/ QP/Ave.)
0.175	50.76	10.27	65.29	14.53	QP
11.775	32.57	10.78	50.00	17.43	Ave.
0.175	36.87	10.27	55.29	18.42	Ave.
0.290	42.68	10.26	62.00	19.32	QP
0.525	36.60	10.25	56.00	19.40	QP
0.525	26.55	10.25	46.00	19.45	Ave.
0.245	43.78	10.26	63.29	19.51	QP
11.800	39.31	10.79	60.00	20.69	QP
0.345	38.10	10.26	60.43	22.33	QP
0.245	27.37	10.26	53.29	25.92	Ave.
0.290	26.04	10.26	52.00	25.96	Ave.
0.345	21.93	10.26	50.43	28.50	Ave.

**AC 120V/60 Hz, Neutral**

Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/ QP/Ave.)
0.525	30.28	10.24	46.00	15.72	Ave.
0.170	49.65	10.24	65.43	15.78	QP
0.230	46.13	10.25	63.71	17.58	QP
0.295	43.81	10.25	61.86	18.05	QP
0.525	37.76	10.24	56.00	18.24	QP
0.295	31.14	10.25	51.86	20.72	Ave.
0.345	39.27	10.25	60.43	21.16	QP
0.410	26.60	10.25	48.57	21.97	Ave.
0.170	33.07	10.24	55.43	22.36	Ave.
0.410	36.18	10.25	58.57	22.39	QP
0.230	29.81	10.25	53.71	23.90	Ave.
0.345	26.03	10.25	50.43	24.40	Ave.

Note:

1) Corrected Amplitude = Reading + Correction Factor

2) Correction Factor = LISN/ISN VDF (Voltage Division Factor) + Cable Loss + Pulse Limiter Attenuation

The corrected factor has been input into the transducer of the test software.

3) Margin = Limit – Corrected Amplitude

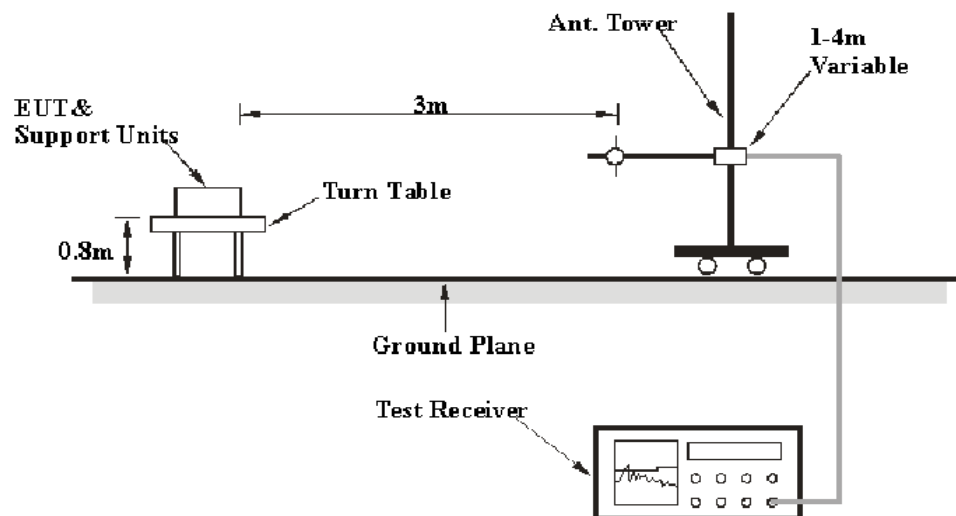
## FCC §15.109 - RADIATED EMISSIONS

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in 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 center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB. (k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

### EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15.109 Class B limits.

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.

The adapter was connected to a 120V/60Hz AC power source.

## EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 GHz.

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

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>	<i>Detector</i>
30MHz – 1000 MHz	120 kHz	300 kHz	QP
Above 1 GHz	1MHz	3 MHz	Peak
Above 1 GHz	1MHz	10 Hz	Ave.

## Test Procedure

During the radiated emissions test, the adapter was connected to AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode from 30 MHz to 1 GHz, Peak and average detection mode above 1 GHz.

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07
HP	Amplifier	8447E	1937A01046	2011-11-24	2012-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2012-11-27
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2012-03-08	2013-03-08
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2012-11-30
R&S	Auto test Software	EMC32	V6.30	-	-

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp (Shenzhen). attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Corrected Amplitude & Margin Calculation

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

$$\text{Correction Factor} = \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Results Summary

According to the data in the following table, the worst margin reading is below:

**1.6 dB at 125.001525 MHz in the Vertical polarization**

## Test Data

### Environmental Conditions

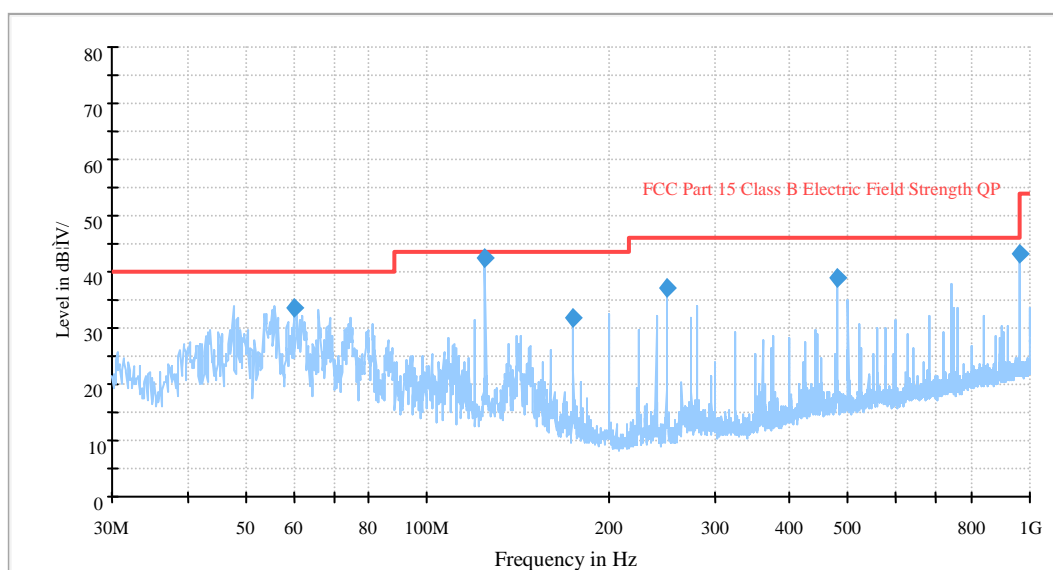
Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

The testing was performed by Mick Yin on 2012-09-26.

Test Mode: Play video&audio file (HDMI)-(worst case)

### 1) 30 MHz-1 GHz:

Auto Test(FCC 15 Class B)



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
60.228750	33.7	106.0	V	35.0	-20.7	40.0	6.3
125.001525	41.9	109.0	V	200.0	-13.4	43.5	1.6*
175.015000	31.7	107.0	V	24.0	-16.0	43.5	11.8
250.068750	37.1	108.0	V	213.0	-15.8	46.0	8.9
479.958750	39.0	112.0	V	312.0	-10.1	46.0	7.0
959.987500	43.2	114.0	V	225.0	-2.9	46.0	2.8*

**2) 1 – 6 GHz**

Frequency	Receiver		Turntable	Rx Antenna		Corrected Factor	Corrected Amplitude	FCC PART 15B Class B	
(MHz)	Reading (dB $\mu$ V)	Detector (PK/QP/Ave.)	Degree	Height (m)	Polar (H/V)	(dB)	(dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
2492.9	28.88	Ave.	225	1.1	V	7.21	36.09	54	17.91
2492.9	26.12	Ave.	125	1.3	H	7.21	33.33	54	20.67
2492.9	43.4	PK	225	1.1	V	7.21	50.61	74	23.39
1330.7	50.1	PK	87	1.2	V	0.19	50.29	74	23.71
2492.9	42.26	PK	125	1.3	H	7.21	49.47	74	24.53
1330.7	29.14	Ave.	87	1.2	V	0.19	29.33	54	24.67
1330.7	45.23	PK	33	1.1	H	0.19	45.42	74	28.58
1330.7	22.13	Ave.	33	1.1	H	0.19	22.32	54	31.68

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor=Antenna factor (RX) +cable loss – amplifier factor

Margin = Limit- Corrected Amplitude

\*Within measurement uncertainty!

**\*\*\*\*\* END OF REPORT \*\*\*\*\***