

FCC PART 15.249

TEST REPORT

For

**SHENZHEN J & S TECHNOLOGY &
DEVELOPMENT CO., LTD.**

Unit 806, Tower A, Skyworth Bldg., Gaoxin South 1st Ave., Shenzhen, Guangdong, China

FCC ID: ADNJSC-GA003

Report Type: Original Report	Product Type: Smart TV Controller (Transmitter)
Test Engineer: <u>Gardon Zhang</u> 	
Report Number: <u>RSZ130328001-00</u>	
Report Date: <u>2013-06-04</u>	
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The SHENZHEN J&S TECHNOLOGY & DEVELOPMENT CO., LTD's product, model number: JSC-GA003 (FCC ID: ADNJSC-GA003) or the "EUT" in this report was a Smart TV Controller, which was measured approximately: 15.0 cm (L) x 8.65 cm (W) x 1.7 cm (H), rated with input voltage: DC 3.7V Li-ion battery.

Note: Product Smart TV Controller, model JSC-GA001, JSC-GA002, JSC-GA003, JSC-GA004, JSC-GA005, JSC-GW001, JSC-GW002, JSC-GW003, JSC-GW004 and JSC-GW005 are electrically identical, they have the same PCB layout and schematic, the difference between them is just the model number due to the marketing purpose, which was explained in the attached declaration letter. Model JSC-GA003 was selected for fully testing, which was stated and guaranteed by the applicant.

** All measurement and test data in this report was gathered from production sample serial number: 1303110 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2013-03-28.*

Objective

This report is prepared on behalf of SHENZHEN J&S TECHNOLOGY & DEVELOPMENT CO., LTD in accordance with Part 2-Subpart J, and Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.209 and 15.249 rules.

Related Submittal(s)/Grant(s)

No related submittal(s)

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

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.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

No exercise software.

Equipment Modifications

No modification was made to the EUT tested.

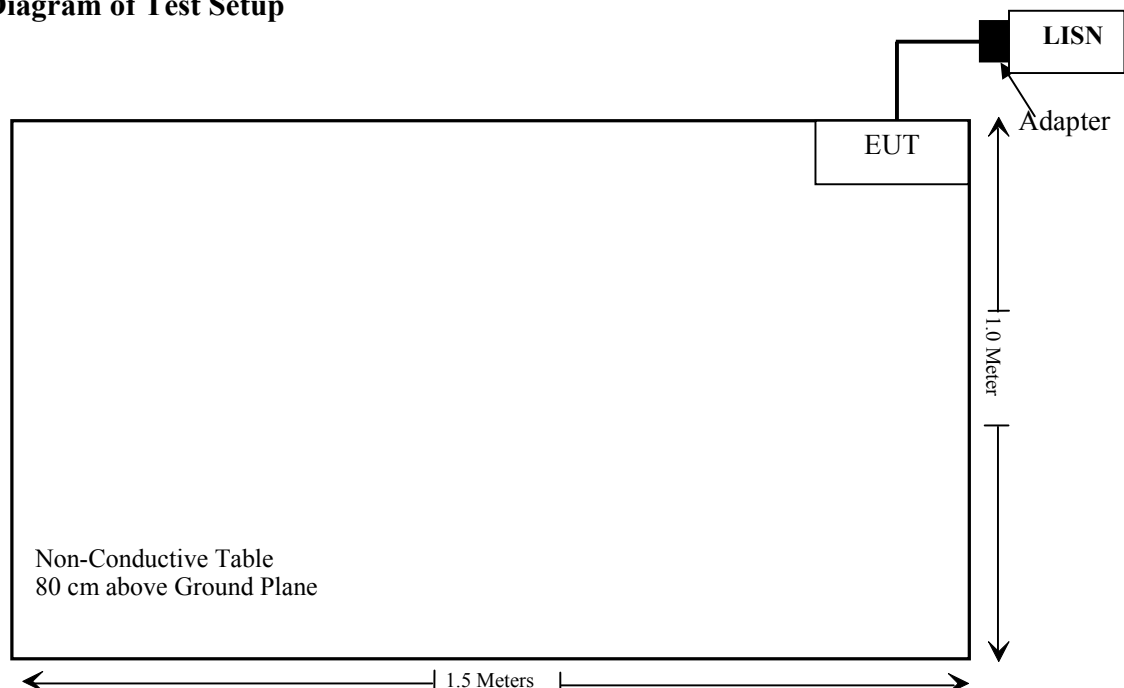
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Shenzhen sdl electronic&technology co.,ltd	Adapter	M49-050050	N/A

External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable Adapter Cable	2.0	EUT	Adapter

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	Conducted Emissions	Compliance
§15.205, §15.209, §15.249	Radiated Emissions	Compliance
§15.215(c)	20 dB Emission Bandwidth Testing	Compliance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Antenna Connector Construction

The EUT has a PCB antenna arrangement, which was permanently attached and the gain was 2 dBi, fulfill the requirement of this section. Please refer to EUT photos.

Result: Compliant

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

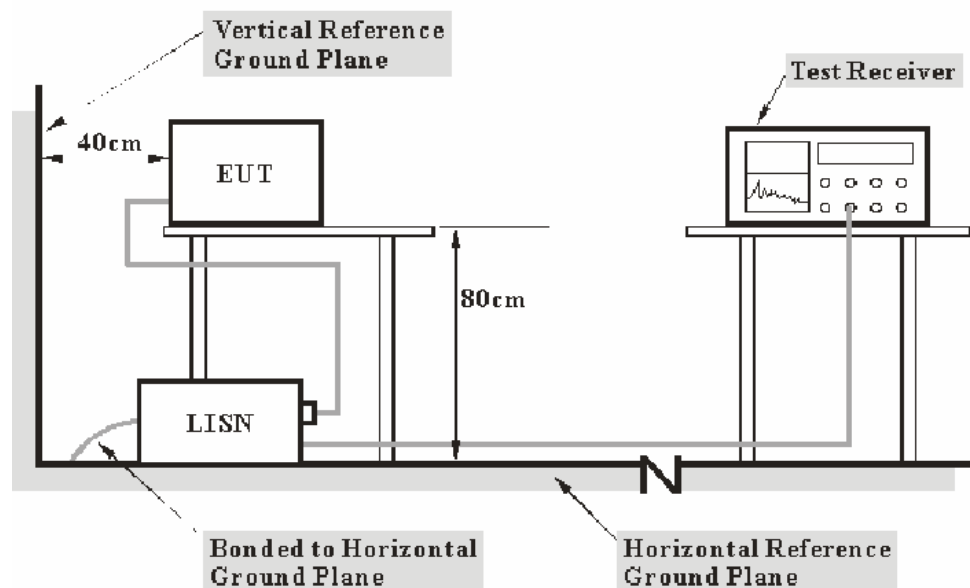
FCC §15.207

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 Laboratory Corp. (Shenzhen) is 2.4 dB (k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for 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 setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The related limit was specified in FCC Part 15.207.

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:

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

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the 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	ESCI	101122	2012-08-08	2013-08-08
Rohde & Schwarz	1st LISN	ESH2-Z5	892107/021	2012-08-22	2013-08-22
COM-POWER	2nd LISN	LI-200	12208	NCR	NCR
BACL	CE Test software	BACL-CE	V1.0	-	-

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

22.4 dB at 0.533730 MHz in the **Line** conducted mode

Test Data

Environmental Conditions

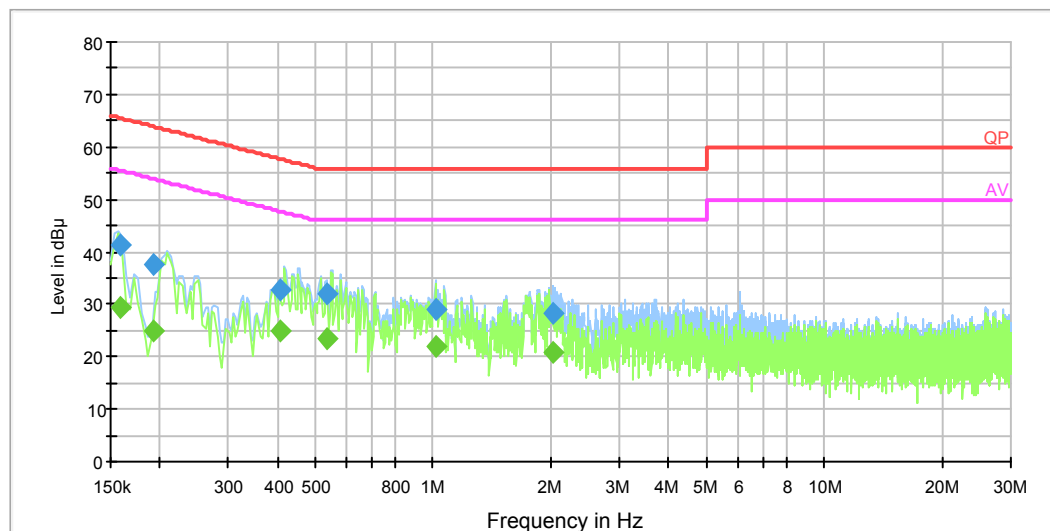
Temperature:	25°C
Relative Humidity:	56%
ATM Pressure:	100.0 kPa

The testing was performed by Gardon Zhang on 2013-05-31.

Test mode: Charging & Transmitting

AC 120V/60 Hz, Line

EMI Auto Test L

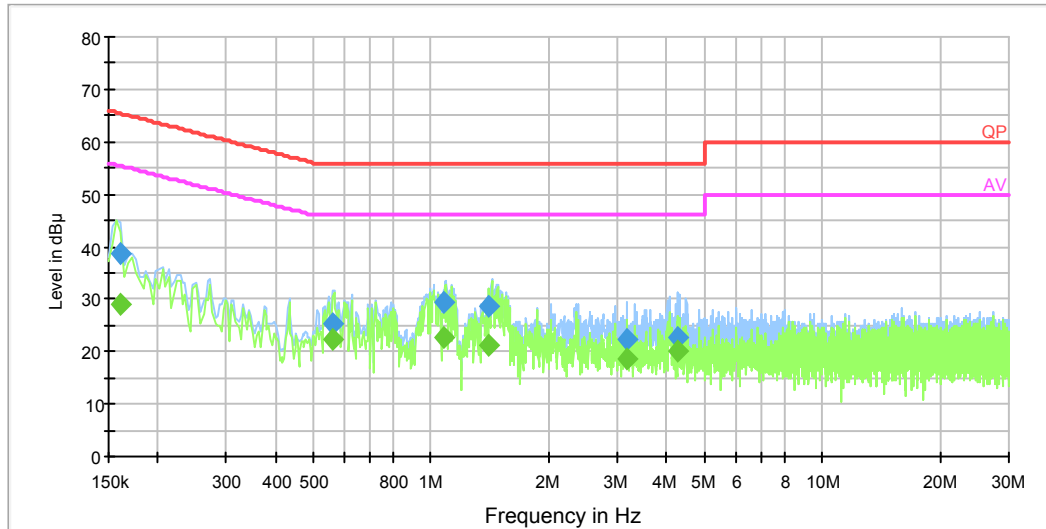


Quasi-peak detection mode

Frequency (MHz)	Corrected Amplitude (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Remark (PK/ QP/Ave.)
0.533730	32.1	0.4	56.0	23.9	QP
0.158495	41.4	0.3	65.5	24.1	QP
0.405308	32.9	0.4	57.7	24.8	QP
0.192583	37.5	0.3	63.9	26.4	QP
1.022023	28.9	0.4	56.0	27.1	QP
2.029633	28.2	0.4	56.0	27.8	QP

Average detection mode

Frequency (MHz)	Corrected Amplitude (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Remark (PK/ QP/Ave.)
0.533730	23.6	0.4	46.0	22.4	Ave.
0.405308	24.9	0.4	47.7	22.8	Ave.
1.022023	21.8	0.4	46.0	24.2	Ave.
2.029633	20.9	0.4	46.0	25.1	Ave.
0.158495	29.3	0.3	55.5	26.2	Ave.
0.192583	25.0	0.3	53.9	28.9	Ave.

AC 120V/60 Hz, Neutral**EMI Auto Test N****Quasi-peak detection mode**

Frequency (MHz)	Corrected Amplitude (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Remark (PK/ QP/Ave.)
0.161199	38.7	0.3	65.4	26.7	QP
1.073843	29.2	0.4	56.0	26.8	QP
1.410863	28.6	0.4	56.0	27.4	QP
0.563121	25.4	0.4	56.0	30.6	QP
4.266324	22.8	0.4	56.0	33.2	QP
3.166244	22.5	0.4	56.0	33.5	QP

Average detection mode

Frequency (MHz)	Corrected Amplitude (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Remark (PK/ QP/Ave.)
1.073843	22.8	0.4	46.0	23.2	Ave.
0.563121	22.3	0.4	46.0	23.7	Ave.
1.410863	21.4	0.4	46.0	24.6	Ave.
4.266324	19.9	0.4	46.0	26.1	Ave.
0.161199	29.2	0.3	55.4	26.2	Ave.
3.166244	18.7	0.4	46.0	27.3	Ave.

FCC §15.205, §15.209 & §15.249 - RADIATED EMISSIONS

Applicable Standard

As per FCC §15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC §15.249 (c), Field strength limits are specified at a distance of 3 meters.

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

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.

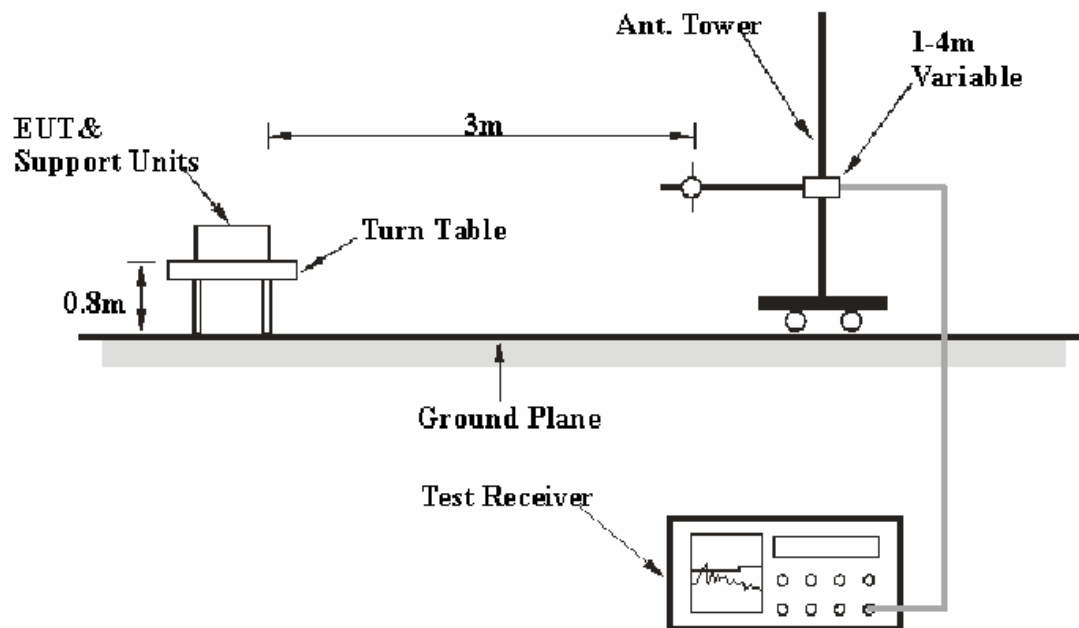
Based on CISPR 16-4-2 The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB. (k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for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

Test Equipment Setup

The spectrum analyzer or receiver is set as:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

EUT Setup



The radiated emission and out of band emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2009 The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

Test Procedure

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

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2012-11-24	2013-11-24
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2012-11-24	2013-11-24
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
Mini-Circuits	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-24
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13
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 requirements that traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 & 15.205 & 15.249, with the worst margin reading of:

8.42 dB at 7440 MHz in the Horizontal polarization

Test Data**Environmental Conditions**

Temperature:	25°C
Relative Humidity:	56%
ATM Pressure:	100.0 kPa

The testing was performed by Gardon Zhang on 2013-05-31.

Test mode: Transmitting

30 MHz - 25 GHz

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.249/205/209		
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (2405 MHz)										
177.7	49.24	QP	24	1.3	V	-16.0	33.24	43.5	10.26	Spurious
2405	83.08	PK	158	1.1	H	6.13	89.21	114	24.79	Fundamental
2405	59.73	Ave.	158	1.1	H	6.13	65.86	94	28.14	Fundamental
2405	81.61	PK	169	1.3	V	6.13	87.74	114	26.26	Fundamental
2405	50.87	Ave.	169	1.3	V	6.13	67.00	94	27.00	Fundamental
7215	26.54	Ave.	117	1.4	H	17.06	43.60	54	10.40	Harmonic
9620	24.17	Ave.	93	1.2	V	19.28	43.45	54	10.55	Harmonic
7215	44.67	PK	117	1.4	H	17.06	61.73	74	12.27	Harmonic
4810	28.33	Ave.	257	1.3	H	12.40	40.73	54	13.27	Harmonic
4810	48.24	PK	257	1.3	H	12.40	60.64	74	13.36	Harmonic
9620	38.55	PK	93	1.2	V	19.28	57.83	74	16.17	Harmonic
2386.3	27.13	Ave.	156	1.5	V	6.13	33.26	54	20.74	Spurious
2496.2	25.99	Ave.	18	1.2	V	7.21	33.20	54	20.80	Spurious
2312.7	27.29	Ave.	116	1.2	V	5.48	32.77	54	21.23	Spurious
2496.2	40.99	PK	18	1.2	V	7.21	48.20	74	25.80	Spurious
2386.3	41.72	PK	156	1.5	V	6.13	47.85	74	26.15	Spurious
2312.7	41.84	PK	116	1.2	V	5.48	47.32	74	26.68	Spurious
Middle Channel (2446 MHz)										
177.7	48.68	QP	32	1.3	V	-16.0	32.68	43.5	10.82	Spurious
2446	83.42	PK	202	1.0	H	7.21	90.63	114	23.37	Fundamental
2446	58.77	Ave.	202	1.0	H	7.21	65.98	94	28.02	Fundamental
2446	80.24	PK	52	1.4	V	7.21	87.45	114	26.55	Fundamental
2446	56.27	Ave.	52	1.4	V	7.21	63.48	94	30.52	Fundamental
7338	28.57	Ave.	243	1.4	H	16.49	45.06	54	8.94	Harmonic
7338	47.66	PK	243	1.4	H	16.49	64.15	74	9.85	Harmonic
9784	24.20	Ave.	108	1.3	H	19.40	43.6	54	10.4	Harmonic
4892	29.35	Ave.	165	1.0	H	12.46	41.81	54	12.19	Harmonic
4892	47.47	PK	165	1.0	H	12.46	59.93	74	14.07	Harmonic
9784	39.24	PK	108	1.3	H	19.40	58.64	74	15.36	Harmonic
2496.5	26.19	Ave.	311	1.0	H	7.21	33.4	54	20.6	Spurious
2488.7	26.17	Ave.	62	1.2	H	7.21	33.38	54	20.62	Spurious
2382.1	26.98	Ave.	351	1.3	V	6.13	33.11	54	20.89	Spurious
2496.5	41.02	PK	311	1.0	H	7.21	48.23	74	25.77	Spurious
2488.7	40.82	PK	62	1.2	H	7.21	48.03	74	25.97	Spurious
2382.1	41.75	PK	351	1.3	V	6.13	47.88	74	26.12	Spurious

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.249/205/209		
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)	Comment
High Channel (2480 MHz)										
177.7	49.57	QP	136	1.2	V	-16.0	33.57	43.5	9.93	Spurious
2480	81.24	PK	44	1.1	H	7.21	88.45	114	25.55	Fundamental
2480	59.21	Ave.	44	1.1	H	7.21	66.42	94	27.58	Fundamental
2480	79.38	PK	298	1.0	V	7.21	86.59	114	27.41	Fundamental
2480	57.35	Ave.	298	1.0	V	7.21	64.56	94	29.44	Fundamental
7440	29.68	Ave.	345	1.0	H	15.90	45.58	54	8.42	Harmonic
4960	31.64	Ave.	99	1.1	H	12.50	44.14	54	9.86	Harmonic
9920	24.14	Ave.	180	1.2	V	19.38	43.52	54	10.48	Harmonic
7440	47.14	PK	345	1.0	H	15.90	63.04	74	10.96	Harmonic
4960	50.06	PK	99	1.1	H	12.50	62.56	74	11.44	Harmonic
9920	39.20	PK	180	1.2	V	19.38	58.58	74	15.42	Harmonic
2483.5	50.36	PK	90	1.0	V	7.21	57.57	74	16.43	Spurious
2483.5	29.90	Ave.	90	1.0	V	7.21	37.11	54	16.89	Spurious
2485.6	29.82	Ave.	204	1.3	V	7.21	37.03	54	16.97	Spurious
2485.6	49.66	PK	204	1.3	V	7.21	56.87	74	17.13	Spurious
2322.3	26.68	Ave.	186	1.5	H	5.48	32.16	54	21.84	Spurious
2322.3	40.89	PK	186	1.5	H	5.48	46.37	74	27.63	Spurious

Note:

1. Corrected Factor=Antenna factor (RX) +cable loss – amplifier factor
2. Corrected Amplitude = Corrected Factor + Receiver Reading
3. Margin = Limit- Corrected Amplitude

FCC §15.215(c) - 20 dB EMISSION BANDWIDTH TESTING

Requirement

Per §15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through §15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
HP	Amplifier	8447E	1937A01046	2012-08-09	2013-08-08
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2011-11-28	2014-11-27

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Test Data

Environmental Conditions

Temperature:	25°C
Relative Humidity:	56%
ATM Pressure:	100.0 kPa

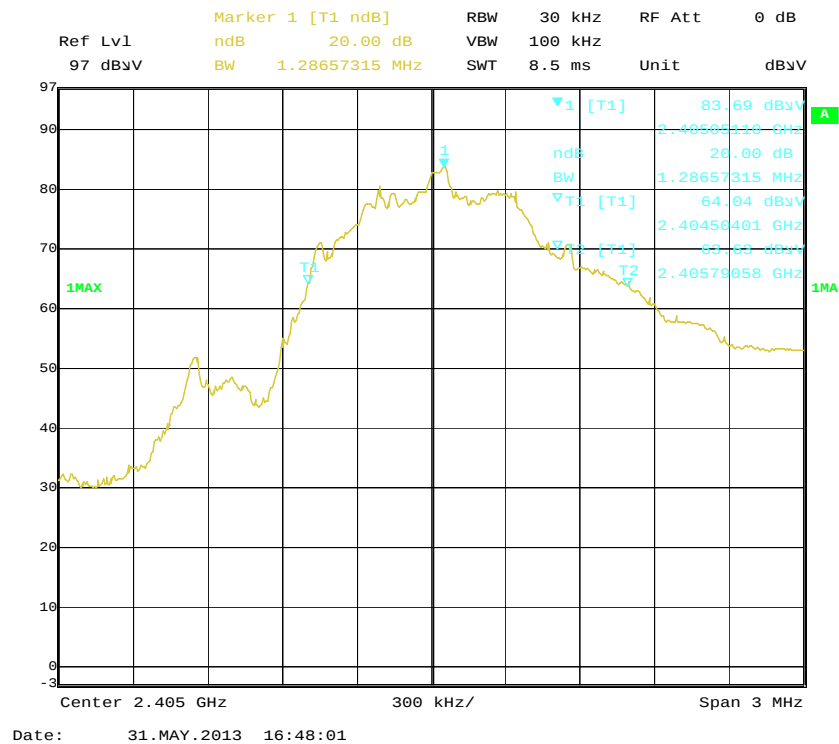
The testing was performed by Gardon Zhang on 2013-05-31.

Test Mode: Transmitting

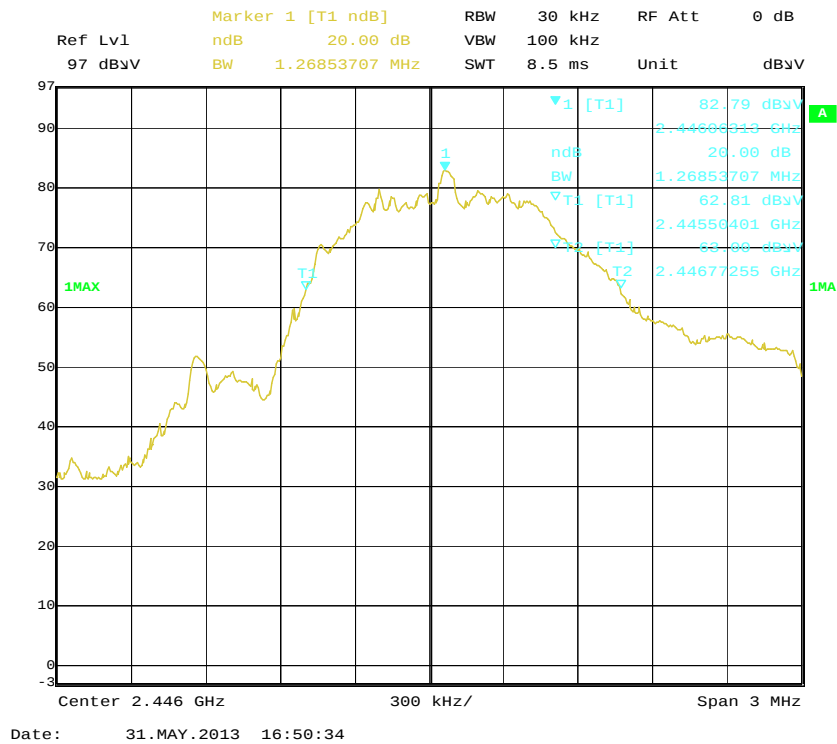
Test Result: Pass, Please refer to the following table and plots.

Channel	Frequency (MHz)	20 dB Emission Bandwidth (MHz)
Low	2405	1.287
Middle	2446	1.269
High	2480	1.635

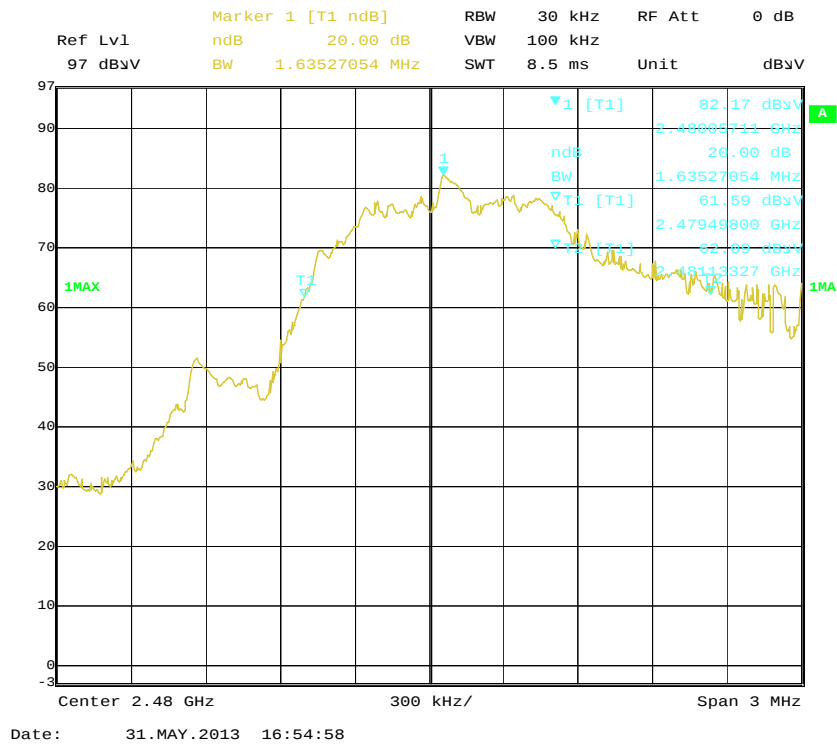
Low Channel



Middle Channel



High Channel



PRODUCT SIMILARITY DECLARATION LETTER



Joyful Life with Smart Solutions

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2013-5-30

Product Similarity Declaration

To Whom It May Concern,

We, SHENZHEN J&S TECHNOLOGY & DEVELOPMENT CO., LTD hereby declare that our Smart TV Controller, Model Number: JSC-GA001, JSC-GA002, JSC-GA004, JSC-GA005, JSC-GW001, JSC-GW002, JSC-GW003, JSC-GW004, JSC-GW005 are electrically identical with JSC-GA003 that was certified by BACL. They are only different in model names due to marketing purpose .

Please contact me if you have any question.

Signature:

Stanley Huang
CEO

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