



NVLAP LAB CODE 200707-0



FCC PART 15.249

MEASUREMENT AND TEST REPORT

For

Chuang feng Electronics Co., Ltd.

HuaLi Industrial Zone, SongBoTang, ChangPing Town,

DongGuan City, Guangdong, China

FCC ID: UK5NANO

Report Type: Original Report	Product Type: 2.4GHz Micro Receiver
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Report Number: RSZ10061081-B	
Report Date: 2010-07-02	
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" (Rev.2)

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Chuang feng Electronics Co., Ltd.* 's product, model *KM-1036W* (FCC ID: *UK5NANO*), or the "EUT" as referred to in this report is a *2.4GHz Micro Receiver* which measures approximately: 1.6375 cm L x 1.15 cm W x 0.5 cm H, rated input voltage: DC 5.0V from PC.

** All measurement and test data in this report was gathered from production sample serial number: 1006005 (Assigned by BACL, Shenzhen). The EUT was received on 2010-06-10.*

Objective

This Type approval report is prepared on behalf of *Chuang feng Electronics 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, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules.

Related Submittal(s)/Grant(s)

Part of the system Submitted with the FCC ID: UK5KM1036W.

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.

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 in 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 November 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

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 a National Institute of Standards and Technology (NIST) accredited laboratory, under the 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

Justification

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

Equipment Modifications

No modifications were made to the unit tested.

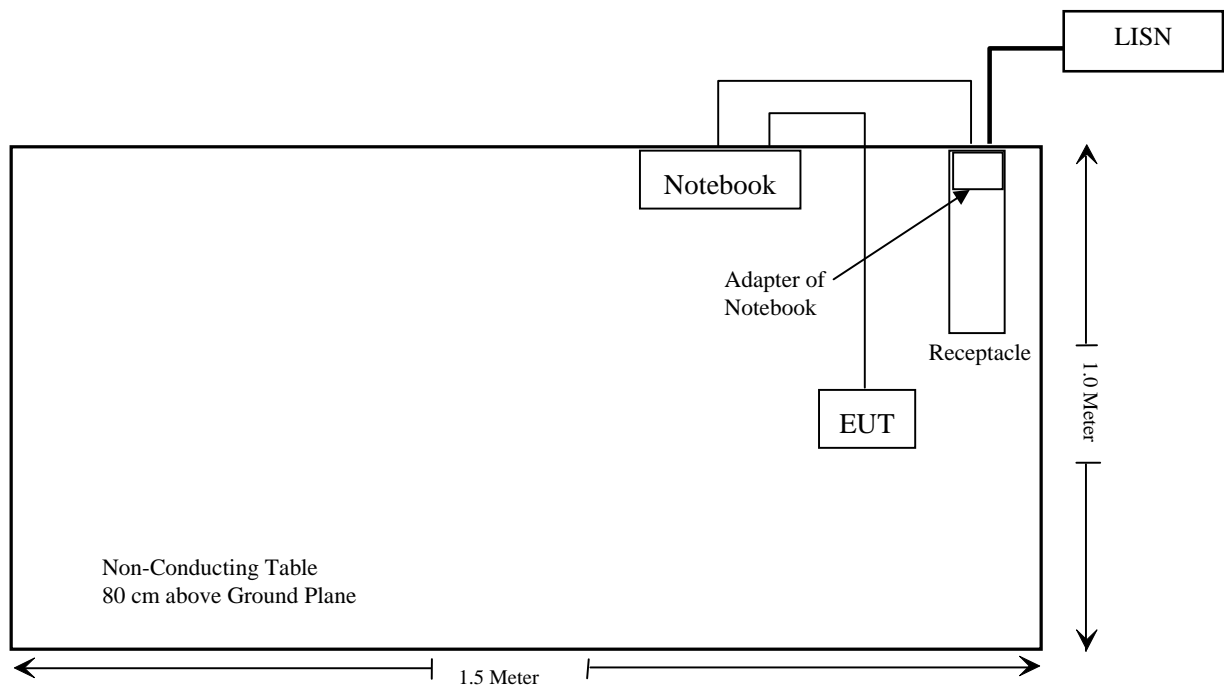
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
COMPAQ	Notebook	Evo N610C	N/A	DoC

External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable USB Cable	0.5	Notebook	NANO
Unshielded Detachable Power Cable	1.2	Notebook	AC mains

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conduction Emissions	Compliant
§15.205(a), §15.209(a), 15.249(a), §15.249(c), §15.35	Radiated Emissions	Compliant
§15.249(d)	Out of Band Emissions	Compliant
§15.215(c)	20dB Bandwidth	Compliant

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to FCC §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 printed antenna on PCB, which in accordance to FCC §15.203, is considered sufficient to comply with the provisions of this section.

Result: Compliant.

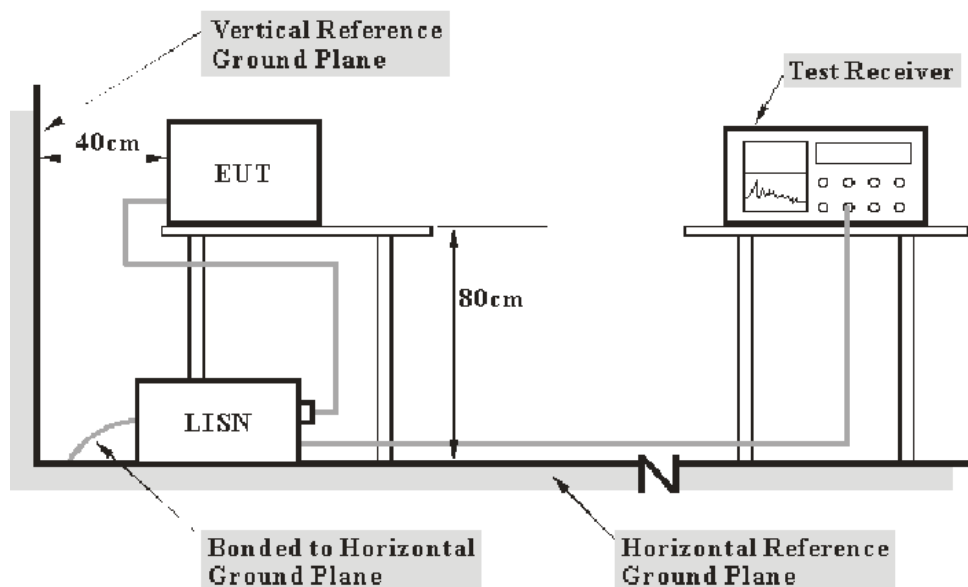
Please refer to the EUT photos.

Applicable Standard

Measurement Uncertainty

Based on NIS 81, 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.

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 spacing between the peripherals was 10 cm.

The Host PC 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2010-03-03	2011-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2010-03-09	2011-03-08

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

Test Procedure

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 Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.249, and 15.207, with the worst margin reading of:

8.82 dB at 8.570 MHz in the **Line** conductor mode

8.71 dB at 9.290 MHz in the **Neutral** conductor mode

Test Data

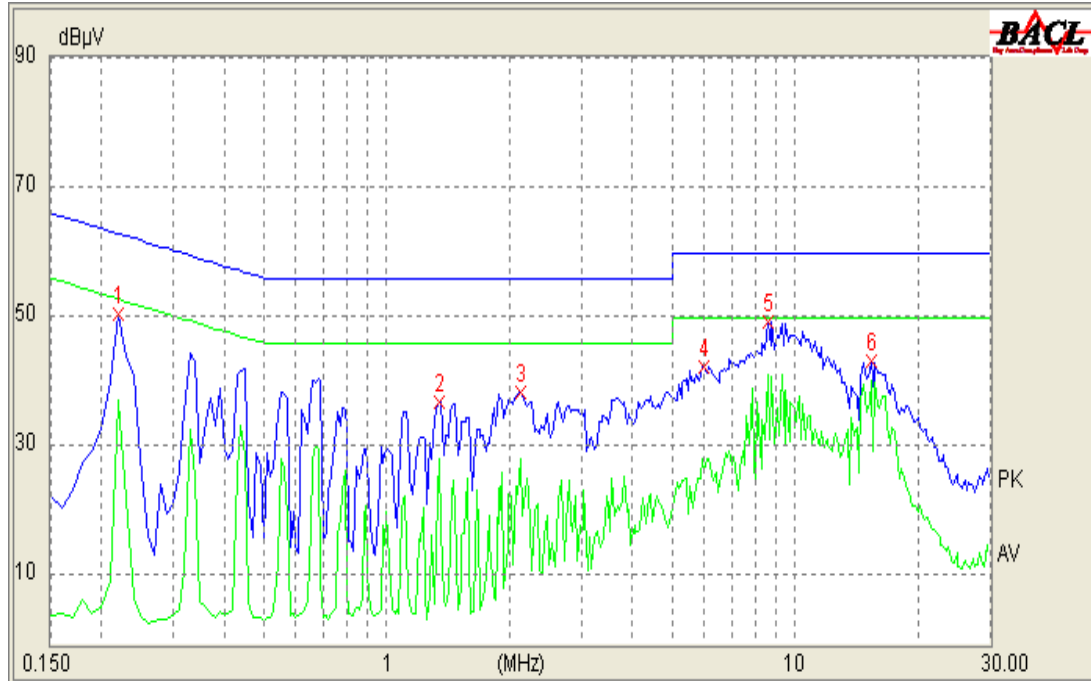
Environmental Conditions

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

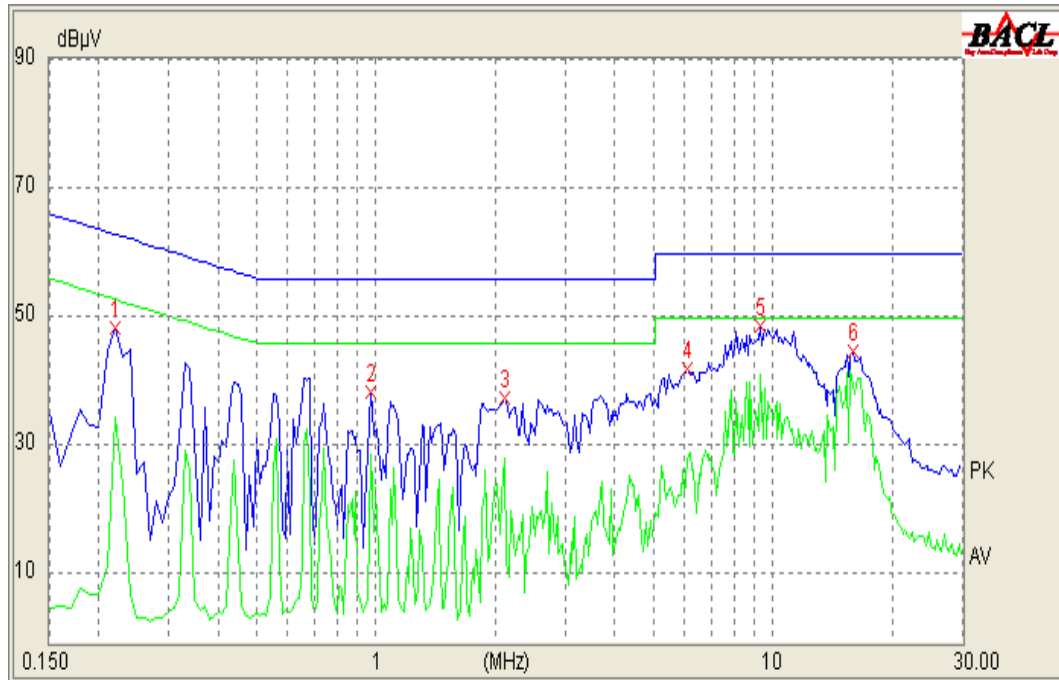
* The testing was performed by Felix Li on 2010-06-30.

Test Mode: Transmitting (worse case)

120 V/60 Hz, Line:



Conducted Emission			FCC Part 15.207		
Frequency (MHz)	Correction Factor (dB)	Cord. Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark (PK/AV/QP)
8.570	10.20	41.18	50.00	8.82	AV
15.440	10.30	40.45	50.00	9.55	AV
0.220	10.10	48.31	62.92	14.61	QP
8.570	10.20	44.49	60.00	15.51	QP
0.220	10.10	37.37	52.92	15.55	AV
2.140	10.10	28.50	46.00	17.50	AV
1.350	10.10	28.42	46.00	17.58	AV
15.440	10.30	41.49	60.00	18.51	QP
2.140	10.10	37.00	56.00	19.00	QP
1.350	10.10	32.61	56.00	23.39	QP
5.970	10.20	36.53	60.00	23.47	QP
5.980	10.20	26.47	50.00	23.53	AV

120 V/60 Hz, Neutral:

Conducted Emission			FCC Part 15.207		
Frequency (MHz)	Correction Factor (dB)	Cord. Result (dBμV)	Limit (dBμV)	Margin (dB)	Remark (PK/AV/QP)
9.290	10.20	41.29	50.00	8.71	AV
0.970	10.10	46.53	56.00	9.47	QP
15.920	10.30	39.65	50.00	10.35	AV
9.290	10.20	45.16	60.00	14.84	QP
0.220	10.10	46.53	62.92	16.39	QP
0.970	10.10	28.84	46.00	17.16	AV
2.110	10.10	28.31	46.00	17.69	AV
0.220	10.10	34.60	52.92	18.32	AV
15.920	10.30	41.23	60.00	18.77	QP
2.110	10.10	34.57	56.00	21.43	QP
6.120	10.20	27.99	50.00	22.01	AV
6.100	10.20	34.42	60.00	25.58	QP

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

Applicable Standard

As per §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 §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 NIS 81, 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.

Test Equipment Setup

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

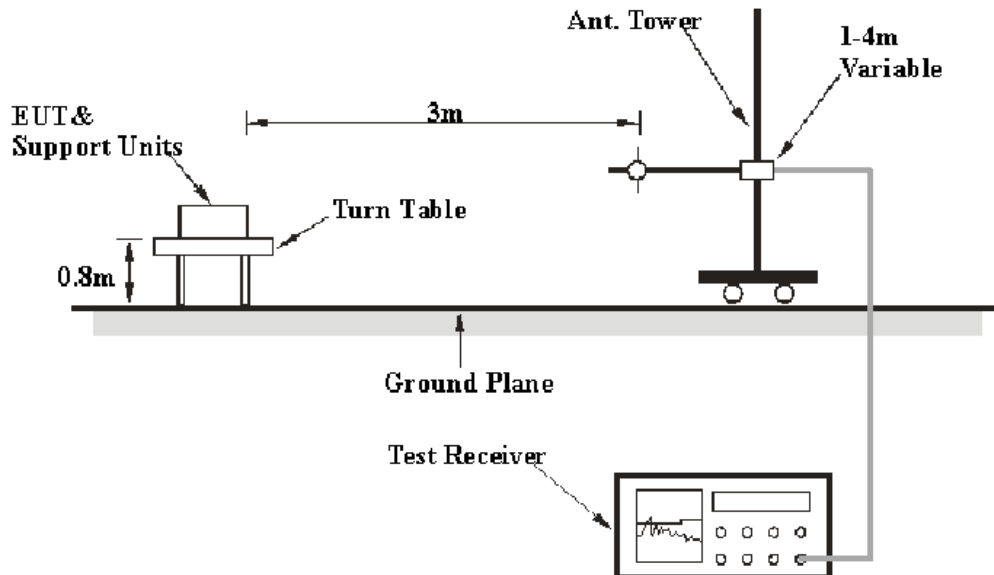
$$\text{RBW} = 100 \text{ kHz} / \text{VBW} = 300 \text{ kHz} / \text{Sweep} = \text{Auto}$$

Above 1000 MHz:

$$\text{Peak: RBW} = 1 \text{ MHz} / \text{VBW} = 1 \text{ MHz} / \text{Sweep} = \text{Auto}$$

$$\text{Average: RBW} = 1 \text{ MHz} / \text{VBW} = 10 \text{ Hz} / \text{Sweep} = \text{Auto}$$

EUT Setup



The radiated emission and out of band emission tests were performed in the 3 meters chamber B, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.249 limits.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2009-08-02	2010-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2010-03-11	2011-03-11
HP	Amplifier	2VA-213+	T-E27H	2010-03-08	2011-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-07

* **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.

Test Procedure

For the radiated emissions test, the EUT, and all support equipment power cords was connected to the AC floor outlet.

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 mete, 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 7 dB 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 data in the following table, the EUT complied with the FCC Part 15.209 & 15.249, with the worst margin reading of:

Below 1 GHz:

3.8 dB at 799.903000 MHz in the Horizontal polarization

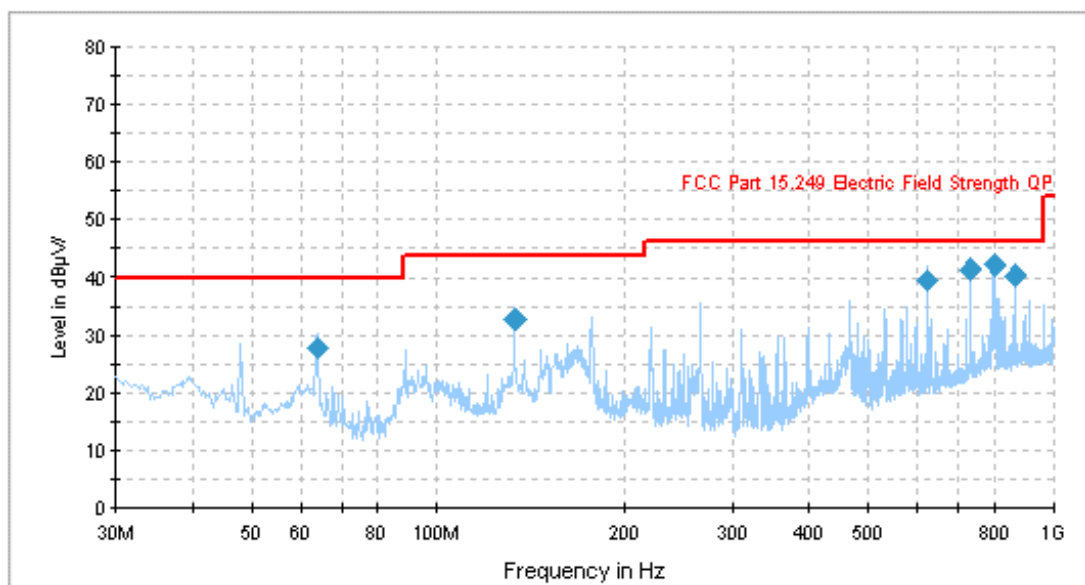
Above 1 GHz:

4.46 dB at 4810 MHz in the Horizontal polarization (Low Channel)
6.04 dB at 2439 MHz in the Horizontal polarization (Middle Channel)
4.49 dB at 4952 MHz in the Horizontal polarization (High Channel)

Test Data**Environmental Conditions**

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

The testing was performed by Felix Li on 2010-06-29.

Below 1 GHz:

Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
799.903000	42.2	287.0	H	7.0	-1.3	46.0	3.8*
728.994000	41.6	101.0	V	313.0	-3.6	46.0	4.4
864.143000	40.3	120.0	V	208.0	-1.0	46.0	5.7
624.098250	39.7	101.0	V	7.0	-7.4	46.0	6.3
133.192500	32.7	185.0	H	123.0	-14.0	43.5	10.8
64.061250	27.8	101.0	V	25.0	-19.7	40.0	12.2

*Within measurement uncertainty.

Above 1 GHz:

Freq. (MHz)	S.A. Reading (dBμV/m)	Detector (PK/AV)	Turntable Direction Degree	Test Antenna			Cable Loss (dB)	Amp. Gain (dB)	Cord. Amp. (dBμV/m)	FCC 15.249 & 15.209		
				Height (m)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (2405 MHz)												
4810	36.45	AV	254	1.67	H	36.3	4.3	27.51	49.54	54	4.46	harmonic
4810	32.83	AV	23	1.35	V	35	4.3	27.51	44.62	54	9.38	harmonic
2312	34.86	AV	75	1.22	H	30.9	3.03	27.54	41.25	54	12.75	spurious
2405	74.31	AV	28	1.55	H	30.9	3.03	27.54	80.7	94	13.30	Fund.
2405	71.48	AV	188	1.20	V	30.3	3.03	27.54	77.27	94	16.73	Fund.
2312	31.12	AV	357	1.48	V	30.3	3.03	27.54	36.91	54	17.09	spurious
4810	37.54	PK	254	1.67	H	36.3	4.3	27.51	50.63	74	23.37	harmonic
4810	33.52	PK	23	1.35	V	35	4.3	27.51	45.31	74	28.69	harmonic
2312	35.90	PK	75	1.22	H	30.9	3.03	27.54	42.29	74	31.71	spurious
2405	74.89	PK	28	1.55	H	30.9	3.03	27.54	81.28	114	32.72	Fund.
2405	72.75	PK	188	1.20	V	30.3	3.03	27.54	78.54	114	35.46	Fund.
2312	32.25	PK	357	1.48	V	30.3	3.03	27.54	38.04	74	35.96	spurious
Middle Channel (2439 MHz)												
2439	81.57	AV	249	1.30	H	30.9	3.03	27.54	87.96	94	6.04	Fund.
2439	79.43	AV	261	1.30	V	30.3	3.03	27.54	85.22	94	8.78	Fund.
4878	26.70	AV	244	1.78	H	36.3	4.3	27.51	39.79	54	14.21	harmonic
4878	26.85	AV	330	1.35	V	35	4.3	27.51	38.64	54	15.36	harmonic
2439	82.01	PK	249	1.30	H	30.9	3.03	27.54	88.4	114	25.60	Fund.
4878	34.31	PK	244	1.78	H	36.3	4.3	27.51	47.4	74	26.60	harmonic
2439	79.78	PK	261	1.30	V	30.3	3.03	27.54	85.57	114	28.43	Fund.
4878	33.31	PK	330	1.35	V	35	4.3	27.51	45.1	74	28.90	harmonic
High Channel (2476 MHz)												
4952	36.42	AV	144	1.12	H	36.3	4.3	27.51	49.51	54	4.49	harmonic
2476	77.89	AV	66	1.50	H	30.9	3.03	27.54	84.28	94	9.72	Fund.
2476	76.37	AV	190	1.50	V	30.3	3.03	27.54	82.16	94	11.84	Fund.
4952	27.96	AV	5	1.10	V	35	4.3	27.51	39.75	54	14.25	harmonic
2496	25.66	AV	26	1.33	H	31.2	3.8	27.54	33.12	54	20.88	spurious
2496	25.41	AV	360	1.86	V	30.9	3.8	27.54	32.57	54	21.43	spurious
4952	38.83	PK	144	1.12	H	36.3	4.3	27.51	51.92	74	22.08	harmonic
4952	33.72	PK	5	1.10	V	35	4.3	27.51	45.51	74	28.49	harmonic
2476	78.47	PK	66	1.50	H	30.9	3.03	27.54	84.86	114	29.14	Fund.
2476	77.63	PK	190	1.50	V	30.3	3.03	27.54	83.42	114	30.58	Fund.
2496	35.09	PK	26	1.33	H	31.2	3.8	27.54	42.55	74	31.45	spurious
2496	34.56	PK	360	1.86	V	30.9	3.8	27.54	41.72	74	32.28	spurious

FCC §15.249(d) – OUT OF BAND EMISSIONS

Applicable Standard

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.

Test Procedure

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, 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 at the band edge. The receiving antenna should be changed the polarization both of horizontal and vertical.

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

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 NIS 81, 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.

Test Equipment Setup

The spectrum analyzer or receiver is set as:

Above 1000 MHz:

Peak: RBW = 1MHz / VBW = 3MHz / Sweep = Auto
Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
HP	Amplifier	2VA-213+	T-E27H	2010-03-08	2011-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04

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

Test Data**Environmental Conditions**

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

**The testing was performed by Felix Li on 2010-06-28.*

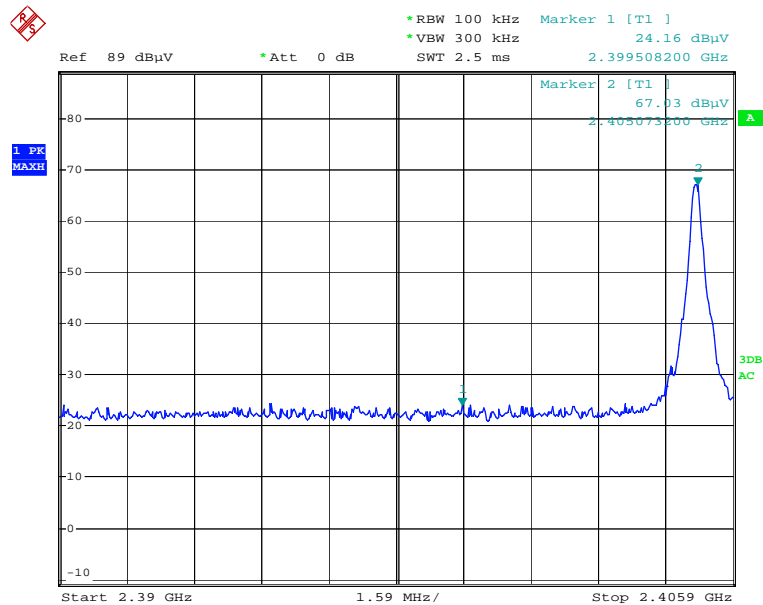
Test Result: Compliant

Please refer to the following table and plots.

Test Mode: Transmitting (worse case)

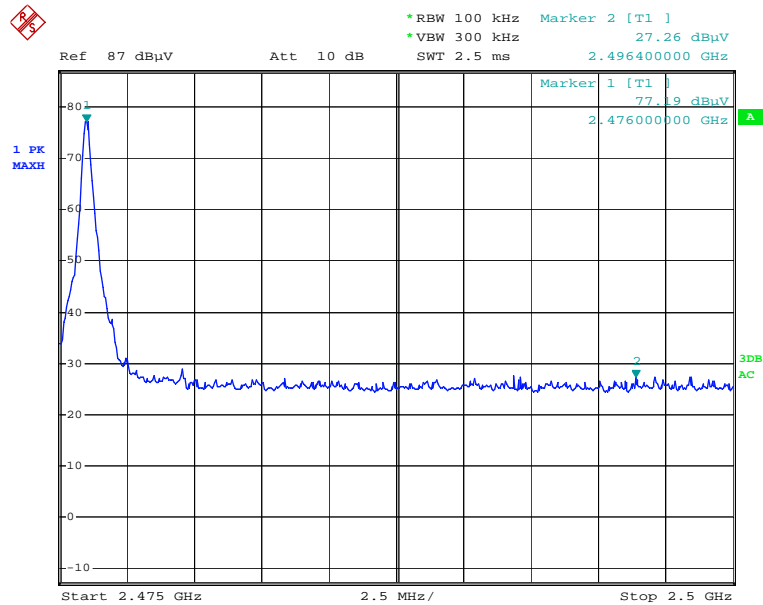
Freq. (MHz)	S.A. Reading (dBμV/m)	Detector (PK/AV)	Turntable Direction Degree	Test Antenna			Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dBμV/m)	FCC 15.209	
				Height (m)	Polar (H/V)	Loss (dB)				Limit (dBμV/m)	Margin (dB)
2390 MHz-2400 MHz											
2399.5	16.48	AV	56	1.20	H	33.9	3.18	26.85	26.71	54	27.29
2399.5	24.16	PK	56	1.20	H	33.9	3.18	26.85	34.39	74	39.61
2483.5 MHz-2500 MHz											
2496.4	19.67	AV	256	1.70	H	33.9	3.03	26.83	29.77	54	24.23
2496.4	27.26	PK	256	1.70	H	33.9	3.03	26.83	37.36	74	36.64

Left Side



Date: 28.JUN.2010 15:02:56

Right Side



Date: 28.JUN.2010 14:54:27

FCC §15.215(c) – 20 dB BANDWIDTH

Applicable Standard

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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
HP	Amplifier	2VA-213+	T-E27H	2010-03-08	2011-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04

* **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.

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 indicated 20dB bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

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

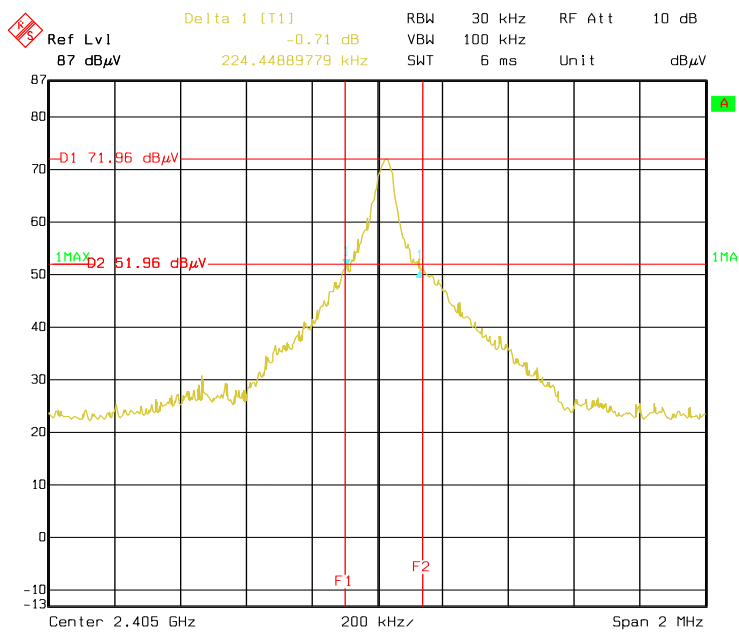
The testing was performed by Felix Li on 2010-07-01.

Test Mode: Transmitting

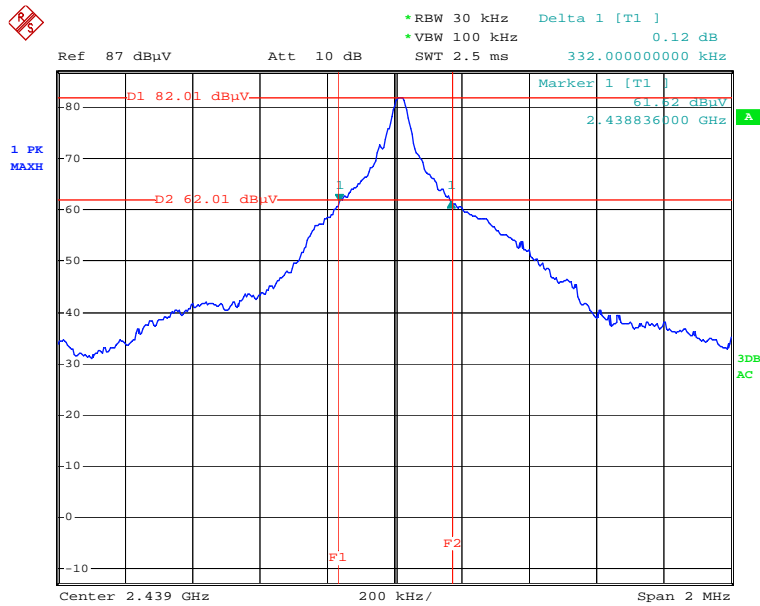
Please refer to the plot and tabular data sheet attached.

Channel Frequency (MHz)	20 dB Bandwidth (kHz)
2405	224
2439	332
2476	320

Low Channel

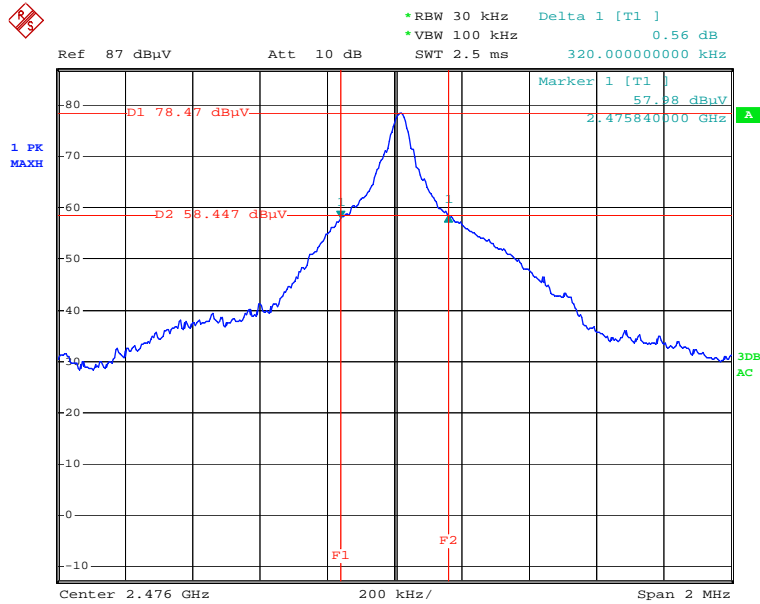


Middle Channel



Date: 1.JUL.2010 11:51:30

High Channel



Date: 1.JUL.2010 11:34:28

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