



NVLAP LAB CODE 200707-0



FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

EXVISION INDUSTRIES LIMITED

RM/B, FLAT/13, KIUFU COMM BLDG, 300-306 LOCKHART,
WAN CHAI, HONG KONG

FCC ID: W8Y-263R

Report Type: Original Report	Product Type: Handheld Color Video Monitor
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Report Number: <u>RSZ09031803</u>	
Report Date: <u>2009-04-20</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. (Shenzhen). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP*, NIST, or any agency of the Federal Government.

* 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 *EXVISION INDUSTRIES LIMITED*'s product, model number: 263R or the "EUT" as referred to in this report is a *HANDHELD COLOR VIDEO MONITOR*, which measures approximately: 3.5 cm L x 6.8 cm W x 13.0 cm H, rated input voltage: DC 6V adapter.

Adapter Information:

Model: AD150600500;
Input: AC 120 V 250mA 60Hz;
Output: DC 6V 500mA

*Note: This is a wireless monitor receiver, it use 2.4GHz frequency transmitting data. The product will verify data and acknowledge the wireless monitor transmitter once AV signal is received. So you can use the wireless monitor receiver to monitor for the technical parameters. As following:

Frequencies: 2408.625-2469.375 MHz;
Transmission Power: <10 dBm;
Modulation mode: FHSS/GFSK;
19 channels are available for 263R and operate at 2408.625, 2412, 2415.375, 2418.75, 2422.125, 2425.5, 2428.875, 2432.25, 2435.625, 2439, 2442.375, 2445.75, 2449.125, 2452.5, 2455.875, 2459.25, 2462.625, 2466, 2469.375 MHz.

** All measurement and test data in this report was gathered from production sample serial number: 0903049 (Assigned by BACL). The EUT was received on 2009-03-18.*

Objective

This Type approval report is prepared on behalf of *EXVISION INDUSTRIES LIMITED* in accordance with Part 2, Subpart J, 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 15.247 rules.

Related Submittal(s)/Grant(s)

No Related Submittals.

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 emissions measurement was performed and 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

Description of Test Configuration

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

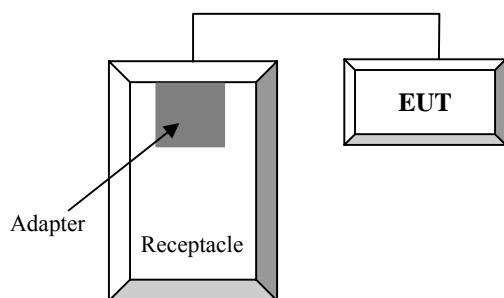
Equipment Modifications

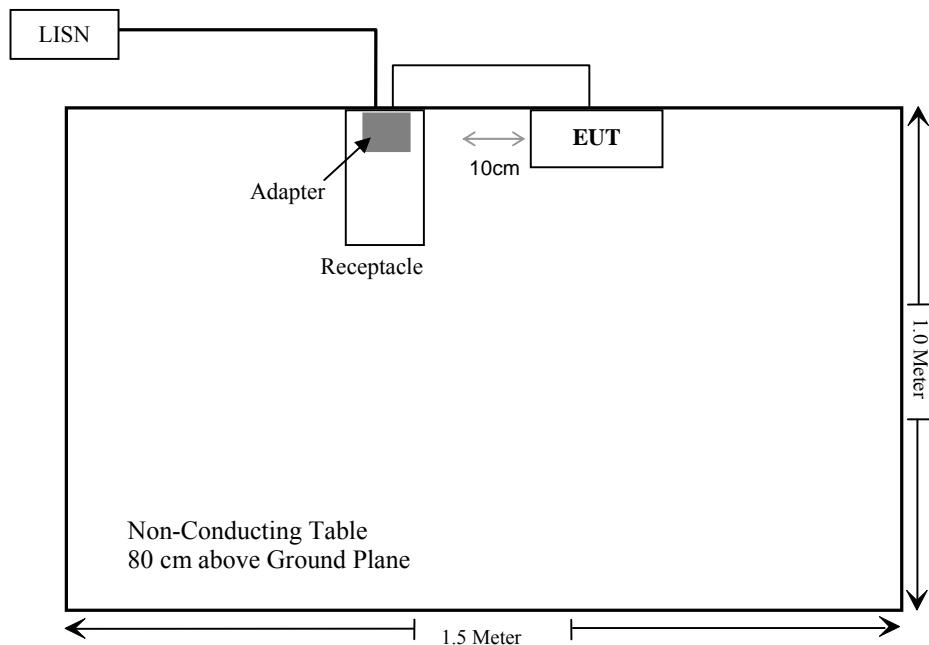
No modification was made to the unit tested.

External I/O Cable

Cable Description	Length (m)	From Port	To
Unshielded Undetachable DC Power Cable	2.0	EUT	Adapter

Configuration of Test Setup



Block Diagram of Test Setup

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	Conducted Emissions	Compliant*
§15.205, §15.209, §15.109, §15.247(d)	Radiated Emissions	Compliant*
§15.247 (a)(1)	20 dB Bandwidth	Compliant
§15.247(a)(1)	Channel Separation Test	Compliant
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliant
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliant
§15.247(b)(1)	Peak Output Power Measurement	Compliant
§15.247(d)	Band edges	Compliant

* Within measurement uncertainty.

CFR47 §15.247 (i) and §2.1093 - RF EXPOSURE**Standard Applicable**

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to FCC Exclusion list, In the following table, f_{GHz} is mid-band frequency in GHz, and d is the distance to a person's body, excluding hands, wrists, feet, and ankles.

Exposure category	<u>low threshold</u>	<u>high threshold</u>
general population	$(60/f_{\text{GHz}})$ mW, $d < 2.5$ cm $(120/f_{\text{GHz}})$ mW, $d \geq 2.5$ cm	$(900/f_{\text{GHz}})$ mW, $d < 20$ cm
occupational	$(375/f_{\text{GHz}})$ mW, $d < 2.5$ cm $(900/f_{\text{GHz}})$ mW, $d \geq 2.5$ cm	$(2250/f_{\text{GHz}})$ mW, $d < 20$ cm

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When *routine SAR evaluation* is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

Measurement Result:

This is a portable device and the Max peak output power is 5.6 mW < 24.3 mW = $(60/2.469375\text{GHz})$ mW
The SAR measurement is not necessary.

CFR47 §15.203 - ANTENNA REQUIREMENT**Standard Applicable**

According to CFR47 § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party 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.

Antenna Connector Construction

The EUT has a solder antenna on PCB. The maximum gain is 0 dBi; please refer to the EUT internal photos.

Result: Compliant.

CFR47 §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

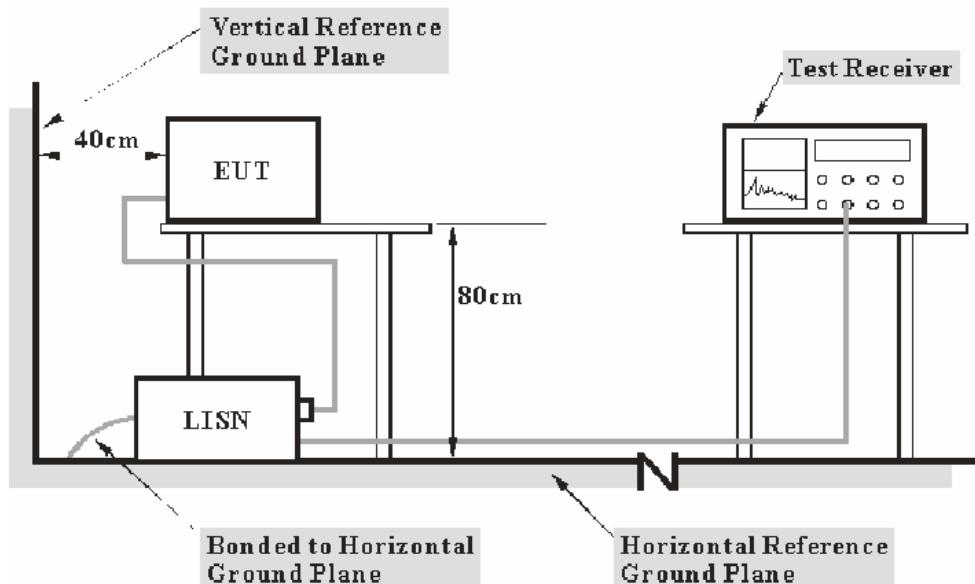
CFR47 §15.207

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 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 setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 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 of EUT 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12208	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2009-03-25	2010-03-25
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2009-03-25	2010-03-25

* Com-Power's LISN were used as the supporting equipment.

* **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

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 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:

0.60 dB at 0.5900 MHz in the Neutral conductor mode

Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

* The testing was performed by Kvass Yang on 2009-04-08.

Test Mode: Transmitting

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	Amplitude (dB μ V)	Detector (QP/AV)	Conductor (Line/Neutral)	Limit (dB μ V)	Margin (dB)
0.5900	45.40	AV	Neutral	46.00	0.60*
0.5900	54.60	QP	Neutral	56.00	1.40*
0.5900	54.00	QP	Line	56.00	2.00*
0.5900	43.40	AV	Line	46.00	2.60
0.1650	61.30	QP	Line	65.21	3.91
0.9900	50.20	QP	Neutral	56.00	5.80
0.2000	56.90	QP	Line	63.61	6.71
0.1600	58.60	QP	Neutral	65.46	6.86
0.1900	55.10	QP	Neutral	64.04	8.94
0.1650	46.20	AV	Line	55.21	9.01
0.2000	43.50	AV	Line	53.61	10.11
0.1600	44.40	AV	Neutral	55.46	11.06
2.1850	44.10	QP	Neutral	56.00	11.90
0.9950	33.40	AV	Neutral	46.00	12.60
0.9950	42.10	QP	Line	56.00	13.90
0.1900	40.10	AV	Neutral	54.04	13.94
0.9950	29.90	AV	Line	46.00	16.10
2.1450	39.70	QP	Line	56.00	16.30
2.1350	29.30	AV	Line	46.00	16.70
29.8750	42.60	QP	Neutral	60.00	17.40
2.1950	28.20	AV	Neutral	46.00	17.80
30.0000	31.80	AV	Line	50.00	18.20
30.0000	39.00	QP	Line	60.00	21.00
28.1000	28.10	AV	Neutral	50.00	21.90

* Within measurement uncertainty.

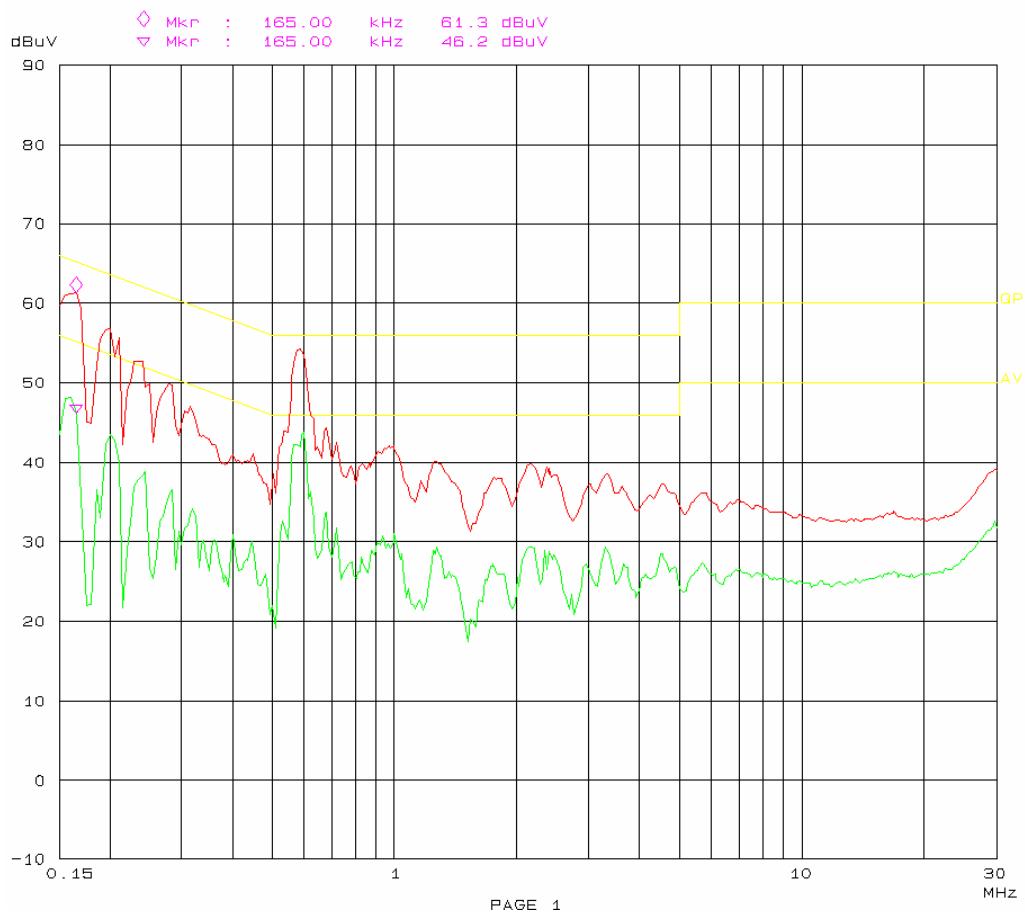
Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.

Conducted emission

FCC PART 15

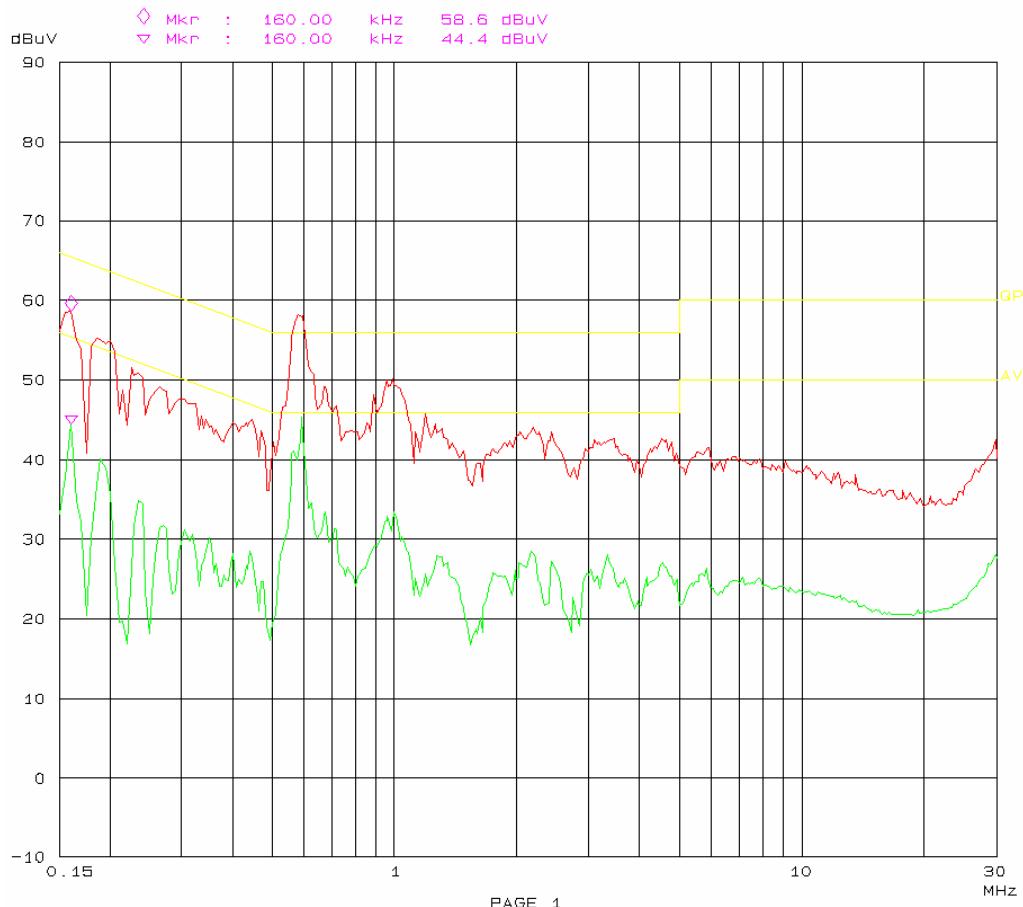
Manuf: Exvision Industries Limited M/N: 263R
Op Cond: Transmitting
Operator: Kvass
Test Spec: AC 120V/60Hz L
Comment: Temp: 24 Hum: 50%
BACL



Conducted emission

FCC PART 15

Manuf: Exvision Industries Limited M/N: 263R
Op Cond: Transmitting
Operator: Kvass
Test Spec: AC 120V/60Hz N
Comment: Temp: 24 Hum: 50%
BACL



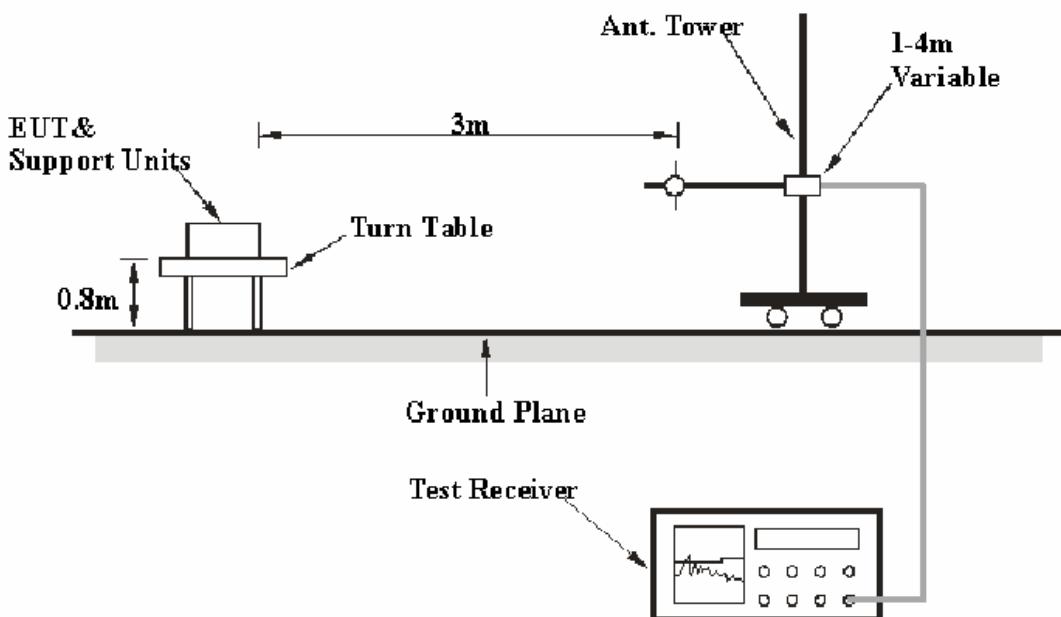
CFR47 §15.205, §15.209, §15.247 - RADIATED EMISSIONS**Applicable Standard**

CFR47 §15.205; §15.209; §15.109; §15.247 (d).

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.

EUT Setup

The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.247 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 of EUT was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W
30MHz – 1000 MHz	100 kHz	300 kHz
1000 MHz – 25 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2008-11-15	2009-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-10-16	2009-10-16
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
HP	Amplifier	8449B	3008A00277	2008-09-29	2009-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09	2009-05-09

*** 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 adapter 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.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz and peak and Average detection modes for frequencies above 1GHz.

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 maximum 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 Title 47, Part 15, Subpart C, section 15.205, 15.209, 15.109, and 15.247, with the worst margin reading of:

Transmitting mode (Below 1GHz):

1.1 dB at **33.683125** MHz in the **Vertical** polarization

Transmitting mode (Above 1 GHz):

0.27 dB at **9634.5** MHz in the **Vertical** polarization (Low Channel)

0.04 dB at **9756** MHz in the **Horizontal** polarization (Middle Channel)

0.51 dB at **9877.5000** MHz in the **Horizontal** polarization (High Channel)

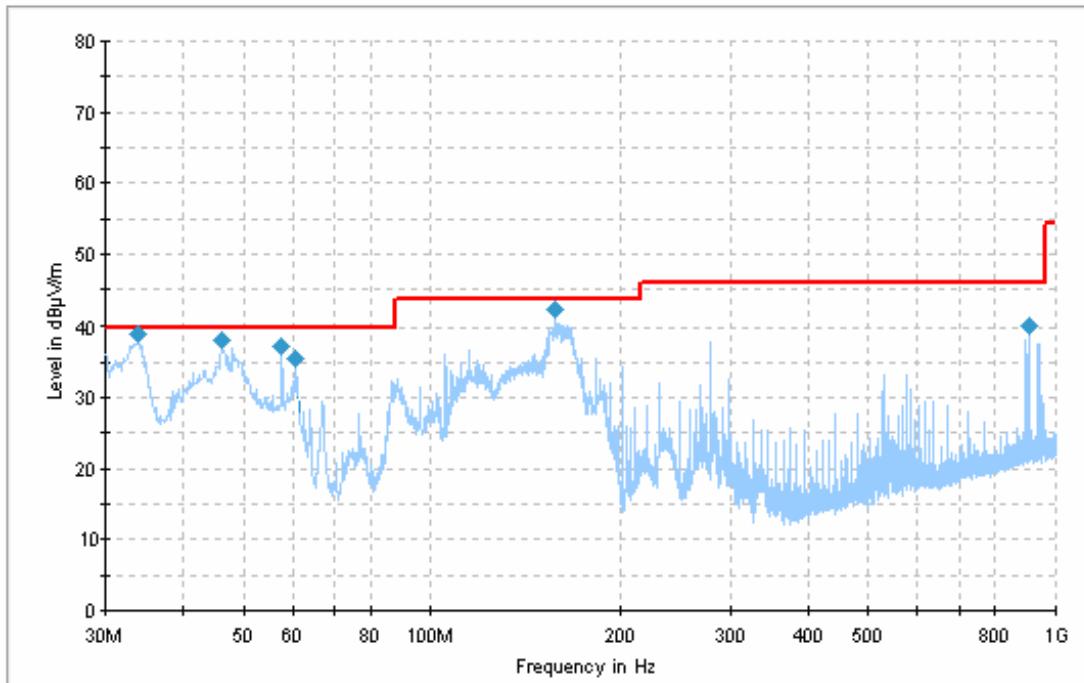
Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* The testing was performed by Kvass Yang on 2009-04-10, 2009-04-20.

Test Mode: Transmitting (Below 1 GHz) for worst case



Frequency (MHz)	Corrected Amp. (dB μ V/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dB μ V/m)	Margin (dB)
33.683125	38.9	109.0	V	286.0	-11.1	40.0	1.1*
157.629425	42.1	108.0	V	287.0	-18.2	43.5	1.4*
46.351600	37.8	109.0	V	287.0	-18.7	40.0	2.2*
57.611125	36.1	110.0	V	223.0	-21.5	40.0	3.9*
60.847300	34.5	122.0	V	316.0	-21.7	40.0	5.5
905.963750	37.8	401.0	V	115.0	-3.6	46.0	8.2

* Within measurement uncertainty.

Test Mode: Transmitting (Above 1 GHz)

Freq. (MHz)	S.A. Reading (dB μ V/m)	Detector PK/QP/AV	Direction Degree	Test Antenna			Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dB μ V/m)	Margin (dB)	Remarks
Low Channel (2408.625 MHz)												
9634.5	36.84	AV	360	1.6	V	40.1	10.79	34.0	53.73	54	0.27*	harmonic
7225.875	39.80	AV	263	1.8	V	38.0	9.15	33.6	53.35	54	0.65*	harmonic
9634.5	34.74	AV	149	1.8	H	41.4	10.79	34.0	52.93	54	1.07*	harmonic
4817.25	42.83	AV	180	1.6	V	35.0	7.56	33.7	51.69	54	2.31*	harmonic
7225.875	36.75	AV	268	1.6	H	39.2	9.15	33.6	51.50	54	2.50*	harmonic
4817.25	40.56	AV	270	1.6	H	36.3	7.56	33.7	50.72	54	3.28*	harmonic
9634.5	46.21	PK	230	1.8	H	41.4	10.79	34.0	64.40	74	9.60	harmonic
9634.5	46.37	PK	358	1.3	V	40.1	10.79	34.0	63.26	74	10.74	harmonic
7225.875	47.99	PK	268	1.6	V	38.0	9.15	33.6	61.54	74	12.46	harmonic
7225.875	45.07	PK	168	1.6	H	39.2	9.15	33.6	59.82	74	14.18	harmonic
4817.25	48.34	PK	250	1	V	35.0	7.56	33.7	57.20	74	16.80	harmonic
4817.25	46.63	PK	49	1.2	H	36.3	7.56	33.7	56.79	74	17.21	harmonic
Middle Channel (2439 MHz)												
9756	35.76	AV	270	1.6	H	41.4	10.8	34.0	53.96	54	0.04*	harmonic
7317	40.13	AV	90	1.2	V	38.0	9.15	33.6	53.68	54	0.32*	harmonic
9756	36.50	AV	180	1.6	V	40.2	10.8	34.0	53.50	54	0.50*	harmonic
7317	36.18	AV	261	1.0	H	39.2	9.15	33.6	50.93	54	3.07*	harmonic
4878	36.25	AV	270	1.6	H	36.3	7.56	33.7	46.41	54	7.59	harmonic
4878	36.73	AV	180	1.6	V	35.0	7.56	33.7	45.59	54	8.41	harmonic
9756	47.1	PK	49	1.2	H	41.4	10.8	34.0	65.30	74	8.70	harmonic
9756	45.24	PK	250	1.0	V	40.2	10.8	34.0	62.24	74	11.76	harmonic
7317	47.39	PK	180	1.3	H	39.2	9.15	33.6	62.14	74	11.86	harmonic
7317	48.51	PK	180	1.0	V	38.0	9.15	33.6	62.06	74	11.94	harmonic
4878	45.89	PK	49	1.2	H	36.3	7.56	33.7	56.05	74	17.95	harmonic
4878	46.99	PK	250	1.0	V	35.0	7.56	33.7	55.85	74	18.15	harmonic
High Channel ((2469.375 MHz)												
9877.500	34.84	AV	149	1.8	H	41.5	10.95	33.8	53.49	54	0.51*	harmonic
9877.500	35.19	AV	360	1.6	V	40.3	10.95	33.8	52.64	54	1.36*	harmonic
7408.125	36.79	AV	268	1.6	H	39.4	9.17	33.6	51.76	54	2.24*	harmonic
7408.125	36.64	AV	263	1.8	V	38.1	9.17	33.6	50.31	54	3.69*	harmonic
4938.75	38.62	AV	270	1.6	H	36.4	7.8	33.7	49.12	54	4.88	harmonic
4938.75	38.64	AV	180	1.6	V	35.2	7.8	33.7	47.94	54	6.06	harmonic
9877.500	43.69	PK	250	1.4	H	41.5	10.95	33.8	62.34	74	11.66	harmonic
9877.500	42.23	PK	358	1.3	V	40.3	10.95	33.8	59.68	74	14.32	harmonic
7408.125	44.43	PK	168	1.3	H	39.4	9.17	33.6	59.40	74	14.60	harmonic
7408.125	44.85	PK	268	1.5	V	38.1	9.17	33.6	58.52	74	15.48	harmonic
4938.75	45.75	PK	49	1.6	H	36.4	7.8	33.7	56.25	74	17.75	harmonic
4938.75	46.51	PK	250	1.4	V	35.2	7.8	33.7	55.81	74	18.19	harmonic

* Within measurement uncertainty.

Spurious emission in restricted band

Freq. (MHz)	S.A. Reading (dB μ V/m)	Detector (PK/AV)	Direction Degree	Test Antenna			Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	FCC Part 15.247/209	
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dB μ V/m)	Margin (dB)
2386.99	42.8	AV	158	1.42	H	30.75	7.80	33.90	47.45	54	6.55
2489.48	41.54	AV	296	2.00	H	30.52	8.01	33.90	46.17	54	7.83
2386.99	46.44	PK	158	1.42	H	30.75	7.80	33.90	51.09	74	22.91
2489.48	46.01	PK	296	2.00	H	30.52	8.01	33.90	50.64	74	23.36

CFR47 §15.247(a) (1)-CHANNEL SEPARATION TEST**Applicable Standard**

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-10-16	2009-10-16

*** 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. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

Test Data**Environmental Conditions**

Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* The testing was performed by Kvass Yang on 2009-04-03.

Test Result: Compliant.

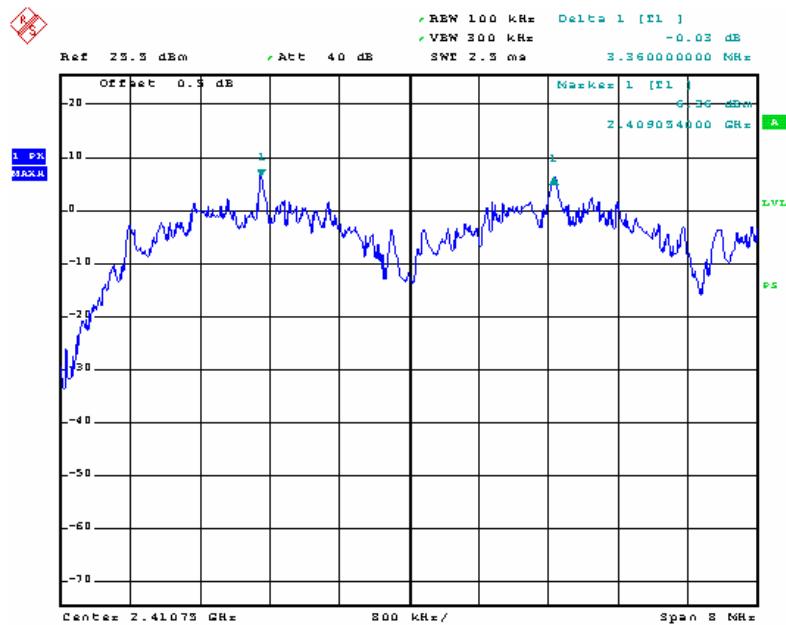
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2408.625			
Adjacent Channel	2412.000	3.360	2.23	Pass
Mid Channel	2439.000			
Adjacent Channel	2442.375	3.376	2.21	Pass
High Channel	2466.000			
Adjacent Channel	2469.375	3.392	2.21	Pass

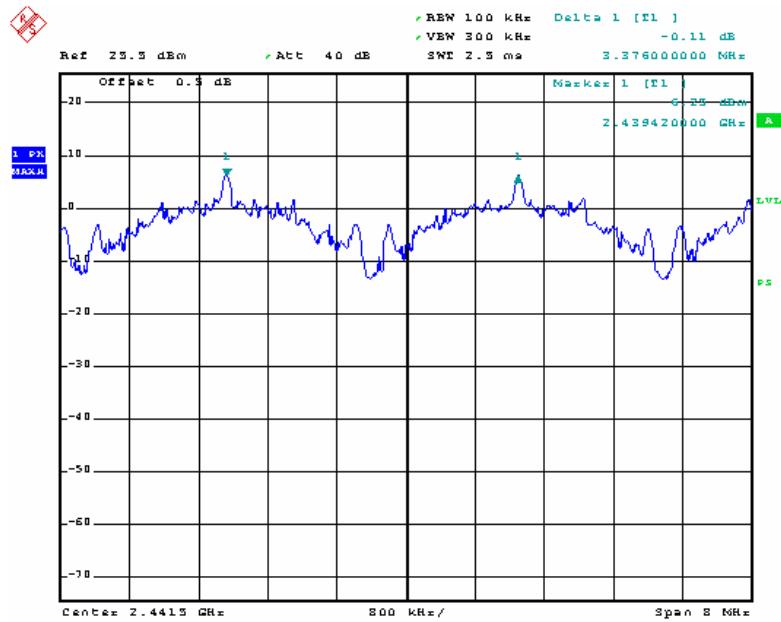
Please refer to the following plots.

Low Channel



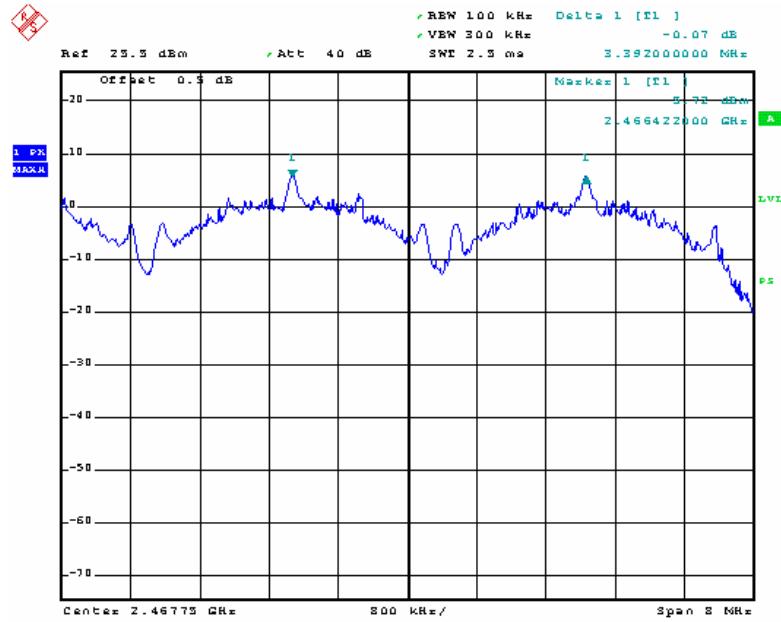
Date: 3.APR.2009 22:09:45

Middle Channel



Date: 3.APR.2009 21:59:11

High Channel



Date: 3.APR.2009 22:07:55

CFR47 §15.247(a) (1) – 20dB BANDWIDTH TESTING**Applicable Standard**

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-10-16	2009-10-16

*** 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 were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data**Environmental Conditions**

Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* The testing was performed by Kvass Yang on 2009-04-20.

Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Occupied Bandwidth (MHz)
Low	2408.625	3.488
Middle	2439.000	3.728
High	2469.375	3.712

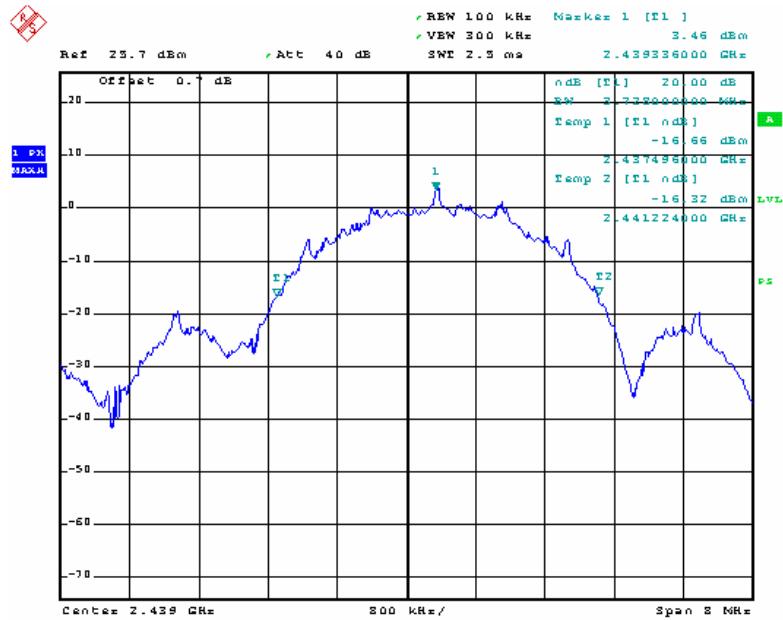
Please refer to the following plots.

Low Channel



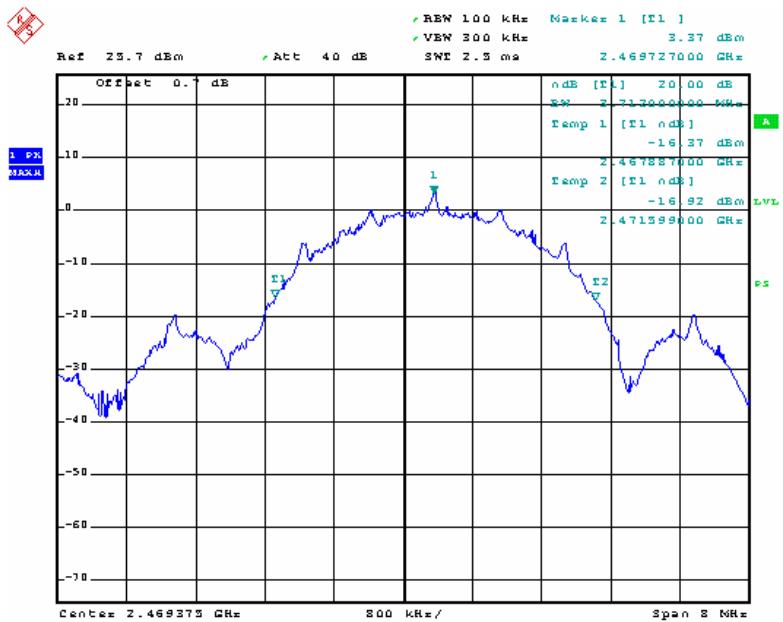
Date: 20.APR.2009 20:38:45

Middle Channel



Date: 20.APR.2009 20:35:07

High Channel



Date: 20.APR.2009 20:33:57

CFR47 §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL TEST**Applicable Standard**

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-10-16	2009-10-16

*** 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 (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Test Data**Environmental Conditions**

Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

** The testing was performed by Kvass Yang on 2009-04-02.*

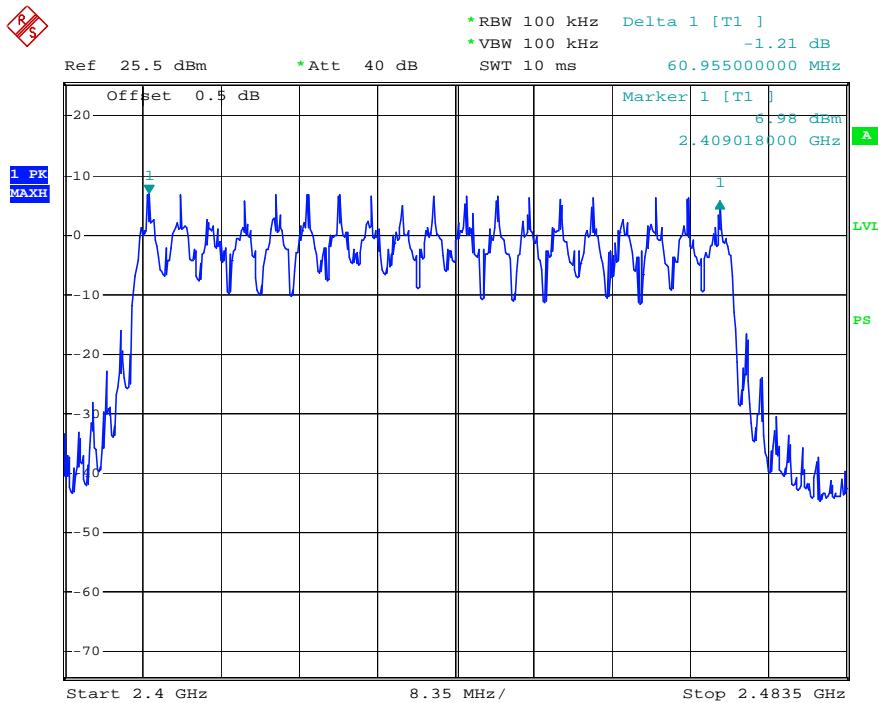
Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	19	≥ 15

Number of Hopping Channels



Date: 2.APR.2009 19:25:33

CFR47 §15.247(a) (1) (iii) -TIME OF OCCUPANCY (DWELL TIME)**Applicable Standard**

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-10-16	2009-10-16

*** 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

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 X channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= time slot length * hope rate/ number of hopping channels * 7.6s
Hop Rate=13/s

Test Data**Environmental Conditions**

Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* The testing was performed by Kvass Yang on 2009-04-02 and 2009-04-03.

Test Result: Compliant.

Please refer to following tables and plots

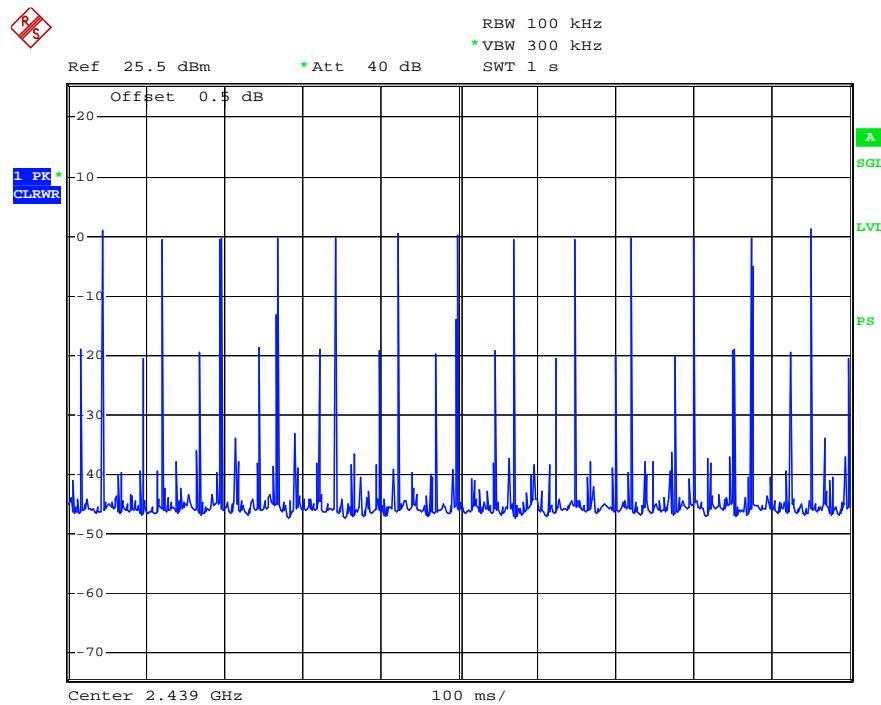
Test Mode: Transmitting

Dwell time =pulse time *13*(19*0.4) seconds

Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
Low	0.565	0.0558	0.4	Pass
Middle	0.560	0.0553	0.4	Pass
High	0.565	0.0558	0.4	Pass

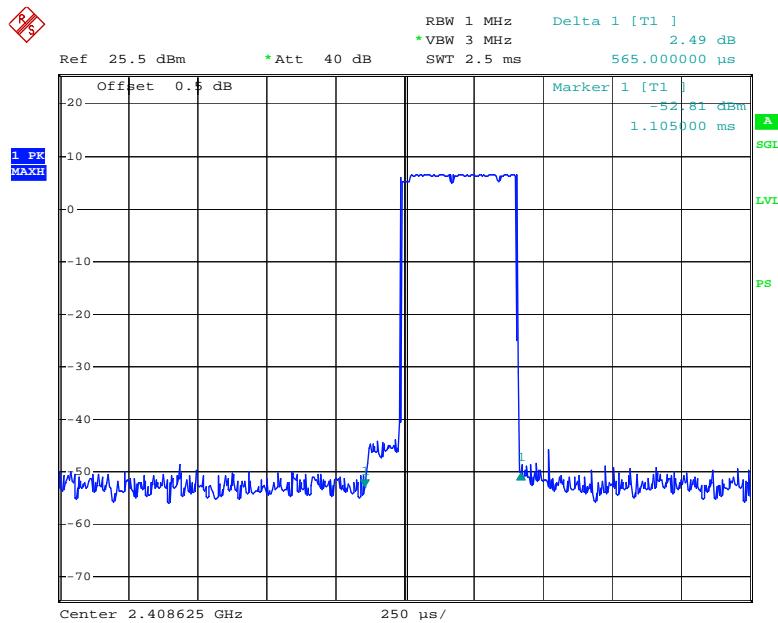
Please refer to the following plots.

Hopping Rate:



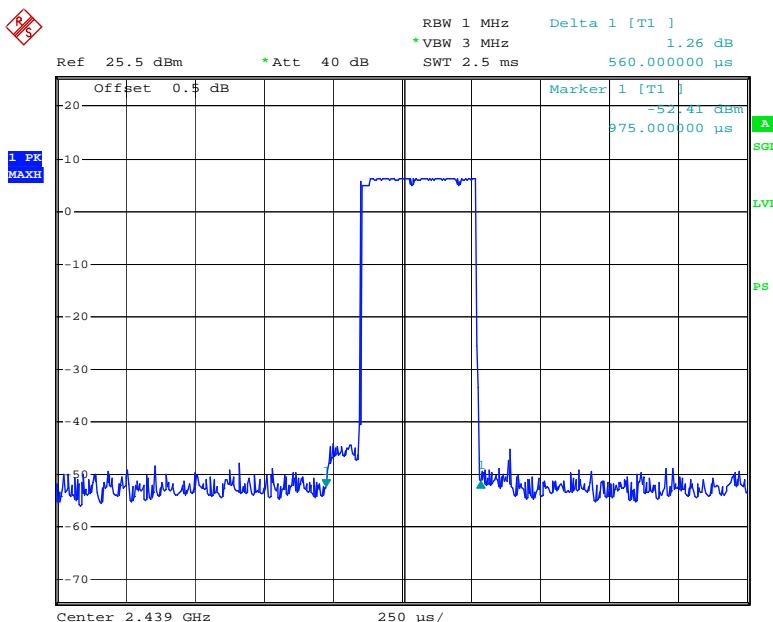
Date: 2.APR.2009 21:36:14

Low Channel

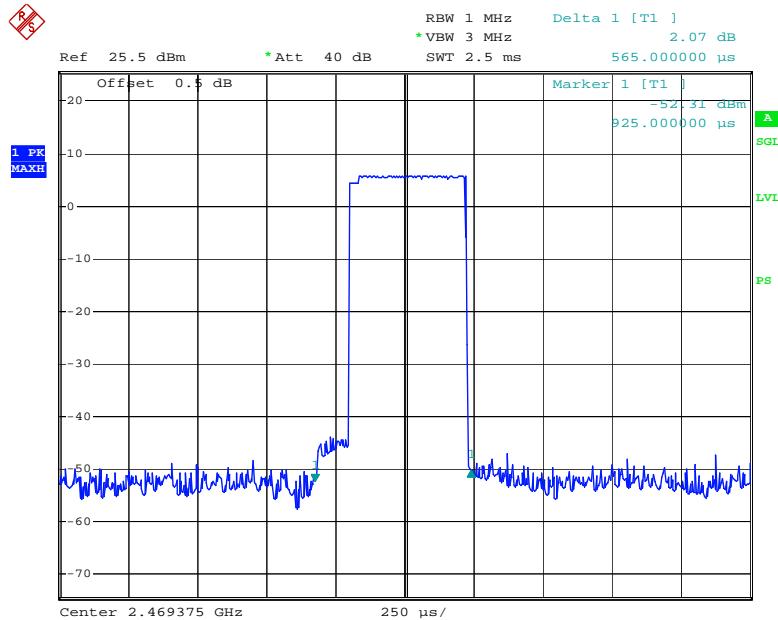


Date: 3.APR.2009 22:18:34

Middle Channel



Date: 3.APR.2009 22:13:38

High Channel

Date: 3.APR.2009 22:16:45

CFR47 §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-10-16	2009-10-16

*** 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. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

** The testing was performed by Kvass Yang on 2009-04-05.*

Test Result: Compliant.

Please refer to following table.

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Output Power		FCC Part 15C Limit (mw)
		(dBm)	(mw)	
Low	2408.625	6.7	4.7	125
Mid	2439.000	7.2	5.2	125
High	2469.375	7.5	5.6	125

CFR47 §15.247(d) - BAND EDGES TESTING**Applicable Standard**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-10-16	2009-10-16

* **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. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=100kHz, VBW=300kHz.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Data

Environmental Conditions

Temperature:	27 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

*The testing was performed by Kvass Yang on 2009-04-10.

Test Result: Compliant

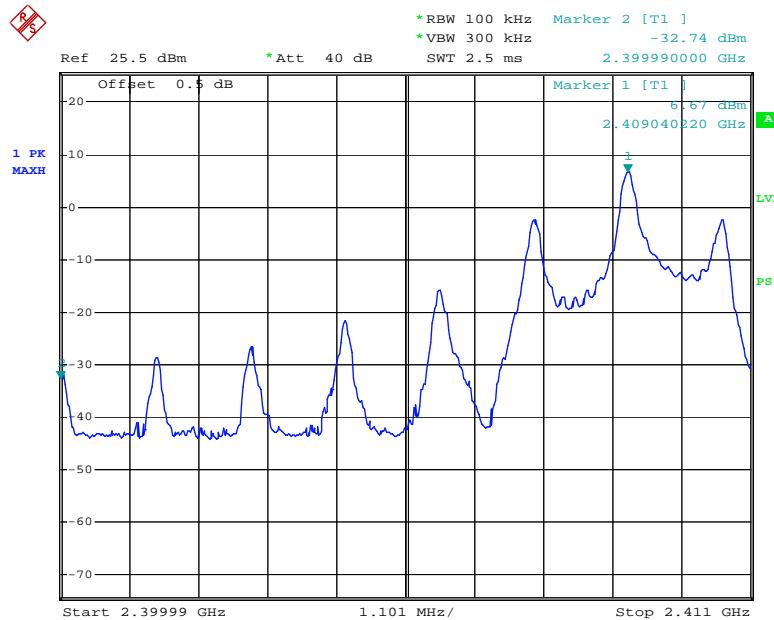
Please refer to the following table and plots.

Test Mode: Transmitting

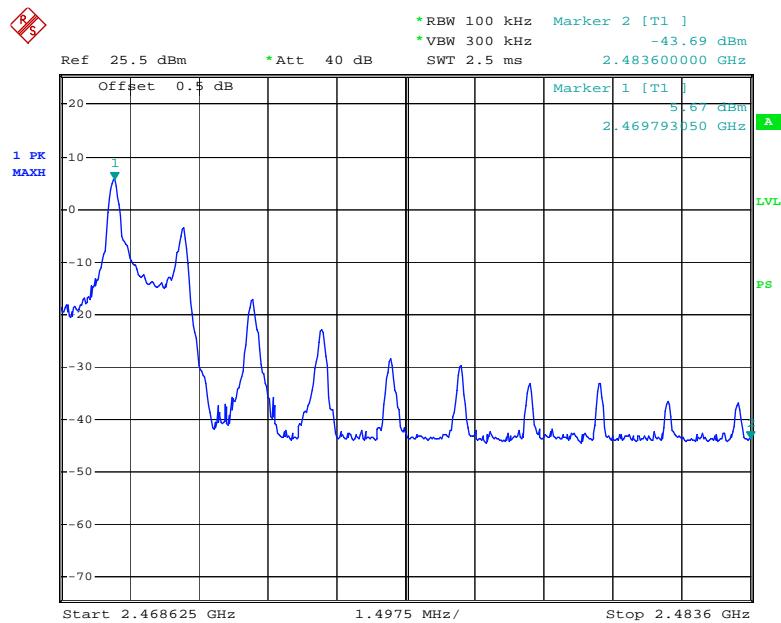
Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2399.990	39.41	20
2483.600	49.36	20

Note: The point fall into the stricted band was in FCC 15.209, please refer to the restrict band testing.

Band Edge: Left Side



Date: 10.APR.2009 22:44:26

Band Edge: Right Side

Date: 10.APR.2009 22:34:29

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