NVLAP LAB CODE 200707-0

FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Shenzhen Gospell Smarthome Electronic Co., Ltd.

5Floor/Block 2, Vision (SZ) Park, Hi-Tech Industrial Park,

Shenzhen, Guangdong, P.R. of China

FCC ID: TW5GD8219

Report Type:	**Product Type:**
Original Report	2.4 GHz Wireless Camera

Test Engineer:	Vicent Kang
Report Number:	RSZ09121802
Report Date:	2010-01-26
Reviewed By:	Merry Zhao EMC Engineer
Prepared By:	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

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Gospell Smarthome Electronic Co., Ltd.'s* product, model number: *GD8219 (FCC ID: TW5GD8219)* or the "EUT" as referred to in this report is a *2.4 GHz wireless Camera,* which measures approximately: 37 cm L x 10.5 cm W x 10 cm H, rated input voltage: DC 5Vadapter.

Adapter Information: SWITCHING MODE POWER SUPPLY
MODEL: GP006AU
INPUT: 100-240V 50/60Hz 0.3A
OUTPUT: 5V 1A 5VA Max LPS

** All measurement and test data in this report was gathered from production sample serial number: 0912059 (Assigned by BACL, Shenzhen). The EUT was received on 2009-12-18.*

Objective

This Type approval report is prepared on behalf of *Shenzhen Gospell Smarthome Electronic Co., Ltd. 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)

N/A

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).

NVLAP 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).

EUT Exercise Software

N/A.

Equipment Modifications

No modification was made to the unit tested.

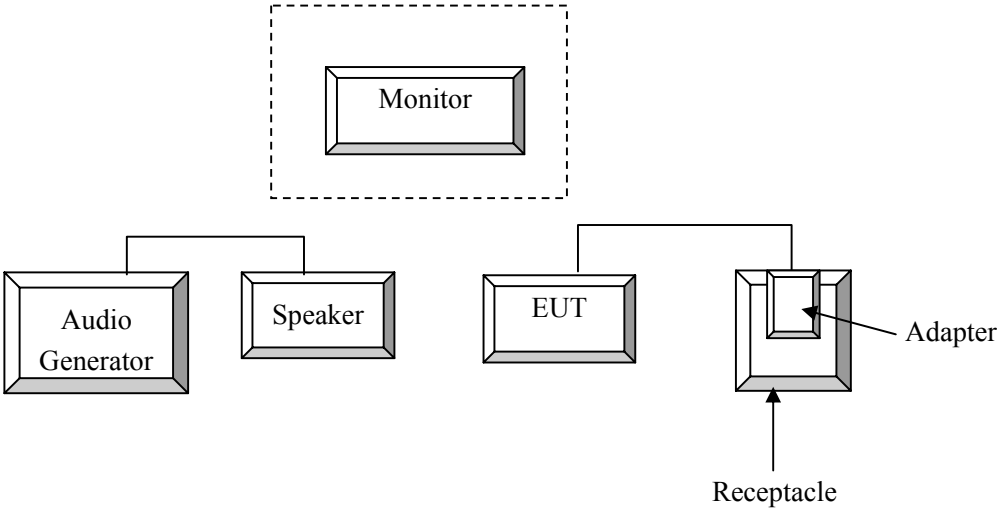
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Gospell	2.4GHz Wireless Camera with monitor (Monitor)	GD7611	N/A	DoC
NANYAN	Audio Generator	NY2201	019596	DoC
RCA	AUDIO SPEAKER	RTD170	N/A	DoC

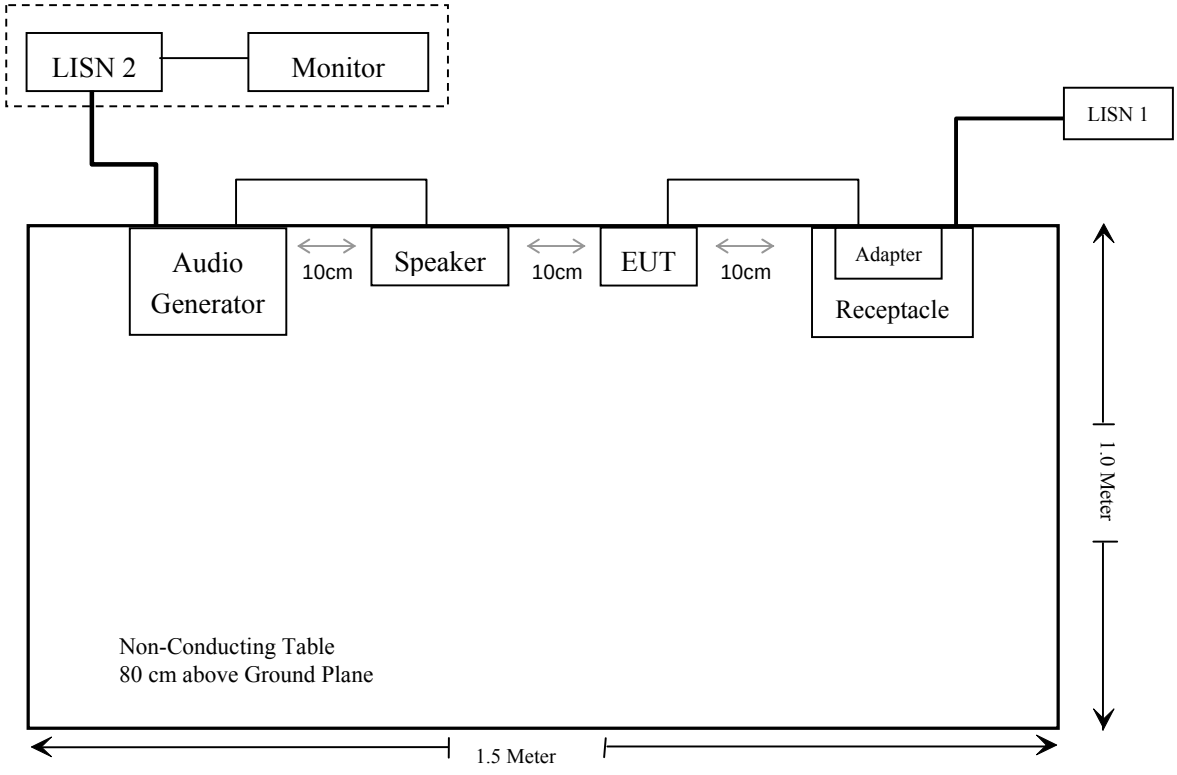
External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable Power Cable	1.8	Adapter	EUT

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247(i), §1.1307 (b)(1), §2.1091	Maximum Permissible exposure (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conducted Emissions	Compliant
§15.205, §15.209, §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

Note: *With measurement uncertainty

FCC §15.247(i) & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to FCC §15.247(i) and §2.1091 (Mobile Devices) RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

Note: f = frequency in MHz
* = Plane-wave equivalent power density

MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power (dBm):	12.88
Maximum peak output power (mW):	19.409
Prediction distance (cm):	20.0
Prediction frequency (MHz):	2475
Antenna Gain, typical (dBi):	1.0
Maximum Antenna Gain (numeric):	1.259
Power density at predication frequency and distance (mW/cm^2):	0.00386
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0

Result:

The predicted power density level at 20 cm is 0.00386 mw/cm^2 which is below the uncontrolled exposure limit of 1.0 mw/cm^2, The EUT is used at least 20 cm away from user's body. It is determined as mobile equipment and complies with the MPE limit.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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 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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has an integral antenna on PCB, which in accordance to section 15.203, is considered sufficient to comply with the provisions of this section, the maximum antenna gain is 1.0 dBi.

Result: Compliant.

FCC §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

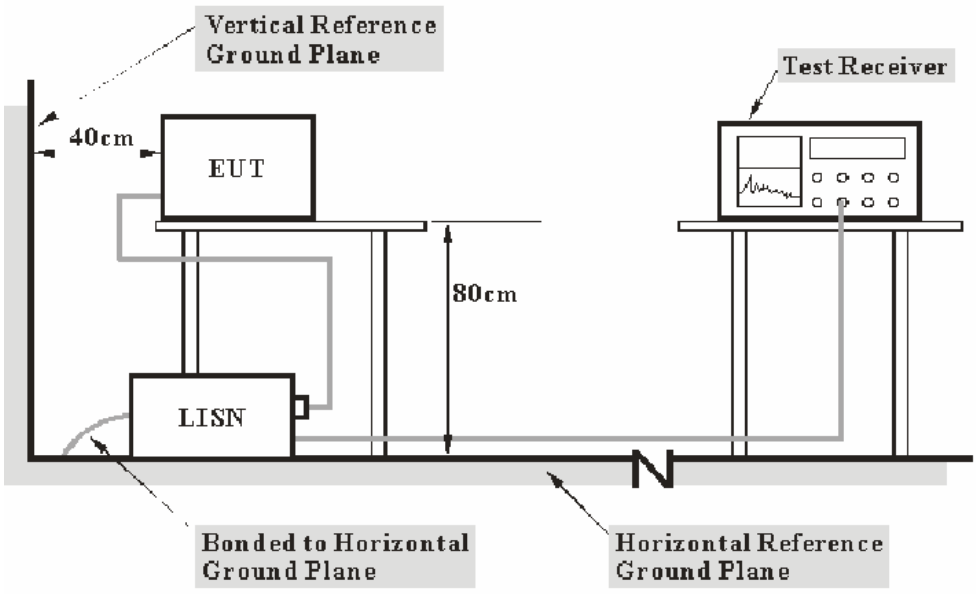
FCC §15.207

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 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 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:

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
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2009-04-28	2010-04-27
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2009-04-28	2010-04-27

*** 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 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:

7.50 dB at **25.7700 MHz** in the **Neutral** conductor mode

Test Data

Environmental Conditions

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

** The testing was performed by Vicent Kang on 2009-12-18.*

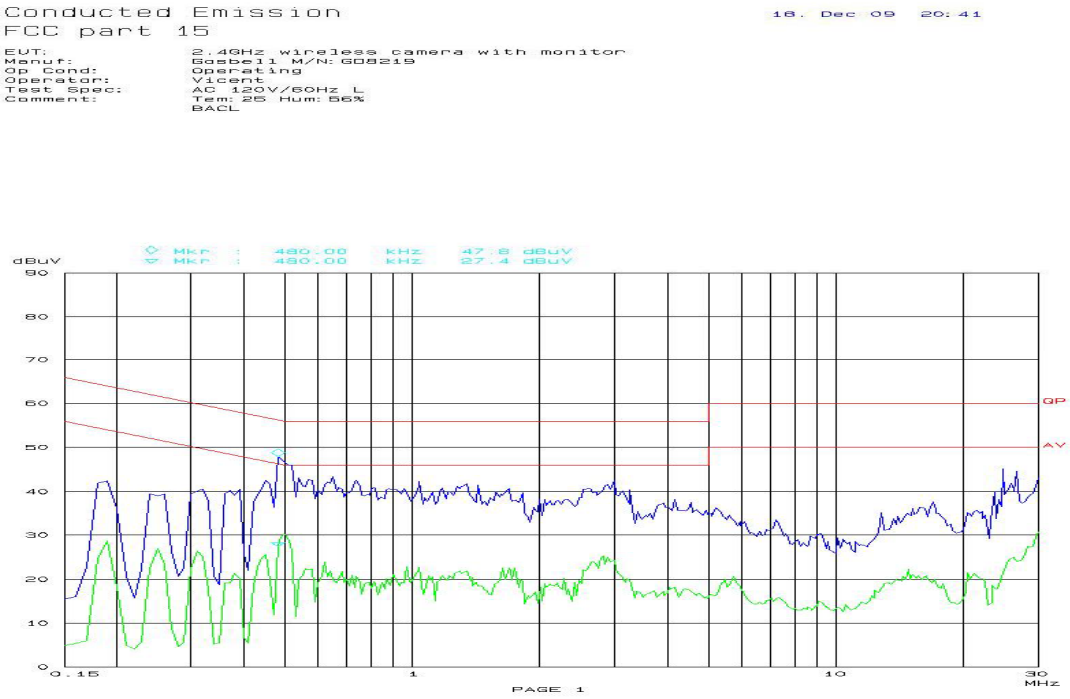
Test Mode: Operating (Transmitting)

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	**Amplitude (dBµV)**	**Detector (QP/AV)**	**Conductor (Line/Neutral)**	**Limit (dBµV)**	**Margin (dB)**
25.7700	52.50	QP	Neutral	60.00	7.50
0.4800	48.00	QP	Neutral	56.34	8.34
0.4800	47.80	QP	Line	56.34	8.54
0.6500	44.20	QP	Neutral	56.00	11.80
2.8600	43.80	QP	Neutral	56.00	12.20
2.9900	42.50	QP	Line	56.00	13.50
0.4500	42.60	QP	Line	56.88	14.28
24.6500	45.10	QP	Line	60.00	14.90
0.3200	41.30	QP	Neutral	59.71	18.41
0.4800	27.40	AV	Line	46.34	18.94
0.3200	40.60	QP	Line	59.71	19.11
0.4500	25.60	AV	Line	46.88	21.28
2.8600	24.40	AV	Neutral	46.00	21.60
2.9900	24.40	AV	Line	46.00	21.60
0.1900	42.40	QP	Line	64.04	21.64
0.1900	42.10	QP	Neutral	64.04	21.94
0.4800	22.50	AV	Neutral	46.34	23.84
0.3200	25.00	AV	Line	49.71	24.71
25.8600	25.00	AV	Neutral	50.00	25.00
25.8700	24.70	AV	Line	50.00	25.30
0.1900	28.70	AV	Line	54.04	25.34
0.1900	25.90	AV	Neutral	54.04	28.14
0.3200	21.20	AV	Neutral	49.71	28.51
0.6500	17.20	AV	Neutral	46.00	28.80

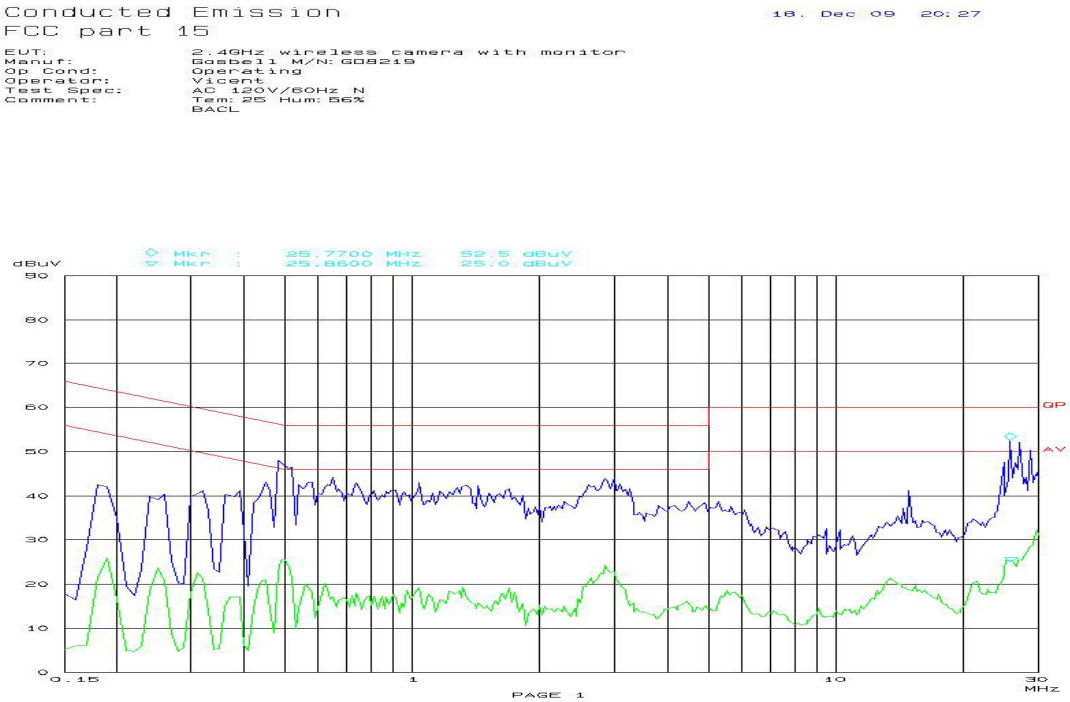
Plot(s) of Test Data

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

120 V/60 Hz, Line:



120 V/60 Hz, Neutral:



FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

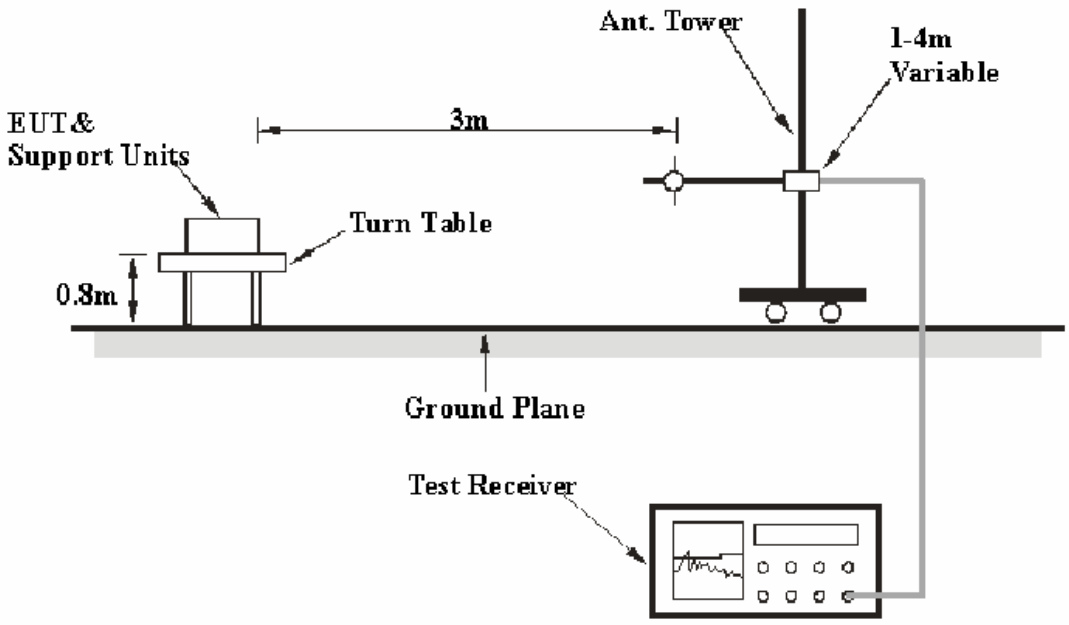
FCC §15.247 (d); §15.209; §15.205;

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 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***	***Dectector***
30MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	AV

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2009-08-02	2010-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-08

*** 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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit – 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 and 15.247, with the worst margin reading of:

Below 1 GHz:

2.6 dB at **35.215750 MHz** in the **Vertical** polarization

Above 1 GHz:

Low Channel**: 7.65 dB** at **4822.00 MHz** in the **Vertical** polarization
Middle Channel**: 6.99 dB** at **4886.00 MHz** in the **Vertical** polarization
High Channel**: 5.64 dB** at **4950.00 MHz** in the **Vertical** polarization

Test Data

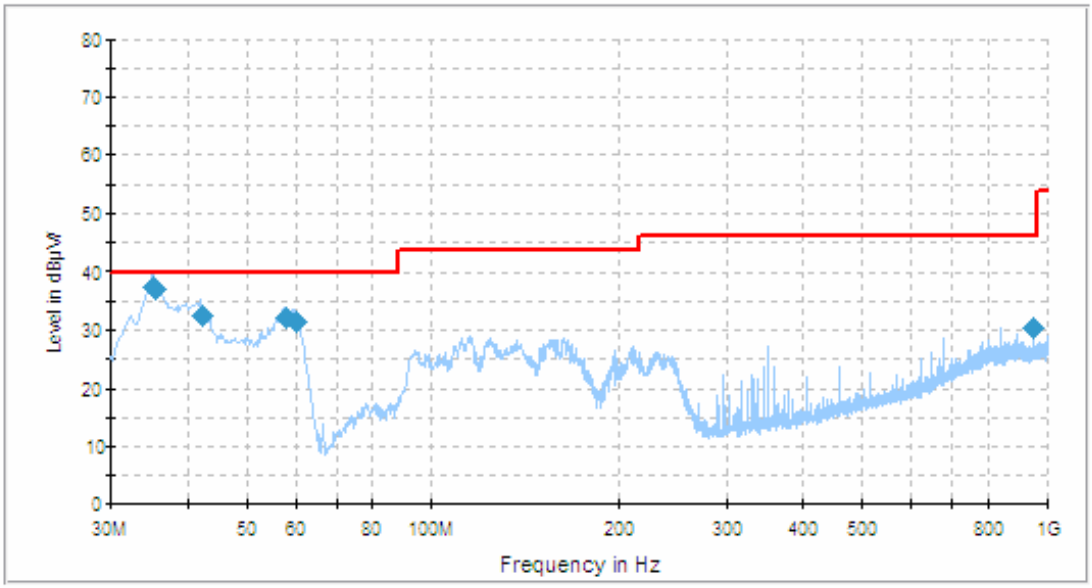
Environmental Conditions

Temperature:	27 °C
Relative Humidity:	52 %
ATM Pressure:	100.0kPa

The testing was performed by Vicent Kang on 2010-01-25

Below 1 GHz:

Test Mode: Transmitting



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
35.215750	37.4	120.0	V	194.0	-10.0	40.0	2.6*
35.422500	37.3	100.0	V	165.0	-10.1	40.0	2.7
42.227250	32.7	121.0	V	64.0	-14.7	40.0	7.3
58.026750	32.2	101.0	V	347.0	-19.7	40.0	7.8
60.100000	31.7	100.0	V	64.0	-19.9	40.0	8.3
944.991000	30.4	171.0	V	16.0	-0.6	46.0	15.6

Note: * Within measurement uncertainty.

Above 1 GHz:

Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209			
Frequency (MHz)	S.A. Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. (dB)	Cord. Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (2411 MHz)												
4822.00	36.19	AV	180	1.05	V	36.30	7.56	33.70	46.35	54	7.65	harmonic
4822.00	36.66	AV	240	1.02	H	35.00	7.56	33.70	45.52	54	8.48	harmonic
2347.28	38.45	AV	355	1.30	H	30.90	7.90	33.90	43.35	54	10.65	spurious
4822.00	50.79	PK	180	1.05	V	36.30	7.56	33.70	60.95	74	13.05	harmonic
4822.00	51.94	PK	240	1.02	H	35.00	7.56	33.70	60.80	74	13.20	harmonic
2386.80	35.29	AV	352	1.50	V	30.30	7.90	33.90	39.59	54	14.41	spurious
2160.66	34.30	AV	154	1.55	V	30.30	6.32	34.00	36.92	54	17.08	spurious
2347.28	51.60	PK	355	1.30	H	30.90	7.90	33.90	56.50	74	17.50	spurious
2154.72	32.62	AV	225	2.0	H	30.00	6.32	34.00	34.94	54	19.06	spurious
2386.80	47.06	PK	352	1.50	V	30.30	7.90	33.90	51.36	74	22.64	spurious
2160.66	48.22	PK	155	1.55	V	30.30	6.32	34.00	50.84	74	23.16	spurious
2154.72	47.35	PK	225	2.00	H	30.00	6.32	34.00	49.67	74	24.33	spurious
Middle Channel (2443 MHz)												
4886.00	36.85	AV	178	1.03	V	36.30	7.56	33.70	47.01	54	6.99	harmonic
4886.00	36.06	AV	250	1.00	H	35.00	7.56	33.70	44.92	54	9.08	harmonic
2234.02	38.70	AV	130	1.07	V	30.30	6.32	34.00	41.32	54	12.68	spurious
4886.00	50.13	PK	178	1.03	V	36.30	7.56	33.70	60.29	74	13.71	harmonic
1725.74	38.81	AV	175	1.37	H	28.80	5.99	34.20	39.40	54	14.60	spurious
4886.00	50.20	PK	250	1.00	H	35.00	7.56	33.70	59.06	74	14.94	harmonic
2234.02	49.07	PK	130	1.07	V	30.30	6.32	34.00	51.69	74	22.31	spurious
1725.74	50.19	PK	175	1.37	H	28.80	5.99	34.20	50.78	74	23.22	spurious
High Channel (2475 MHz)												
4950.00	38.71	AV	35	1.10	H	35.40	7.95	33.70	48.36	54	5.64	harmonic
4950.00	37.15	AV	355	1.10	V	36.60	7.95	33.70	48.00	54	6.00	harmonic
4950.00	52.49	PK	35	1.10	H	35.40	7.95	33.70	62.14	74	11.86	harmonic
4950.00	51.29	PK	355	1.10	V	36.60	7.95	33.70	62.14	74	11.86	harmonic
2490.89	35.09	AV	275	1.30	H	30.90	7.90	33.90	39.99	54	14.01	spurious
2487.82	32.90	AV	225	1.50	V	30.30	7.90	33.90	37.20	54	16.80	spurious
1638.52	37.23	AV	150	1.15	H	27.80	5.62	34.40	36.25	54	17.75	spurious
1275.36	38.77	AV	280	1.20	V	24.80	5.11	34.80	33.88	54	20.12	spurious
2487.82	47.24	PK	225	1.50	V	30.30	7.90	33.90	51.54	74	22.46	spurious
2490.89	46.54	PK	275	1.30	H	30.90	7.90	33.90	51.44	74	22.56	spurious
1638.52	49.64	PK	150	1.15	H	27.80	5.62	34.40	48.66	74	25.34	spurious
1275.36	50.23	PK	280	1.20	V	24.80	5.11	34.80	45.34	74	28.66	spurious

FCC §15.247(a)(1)-CHANNEL SEPARATION TEST

Applicable Standard

Frequency hopping systems shall have hoping 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	2009-11-07	2010-11-06

*** 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:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

** The testing was performed by Vicent Kang on 2010-01-21*

Test Result: Compliant.

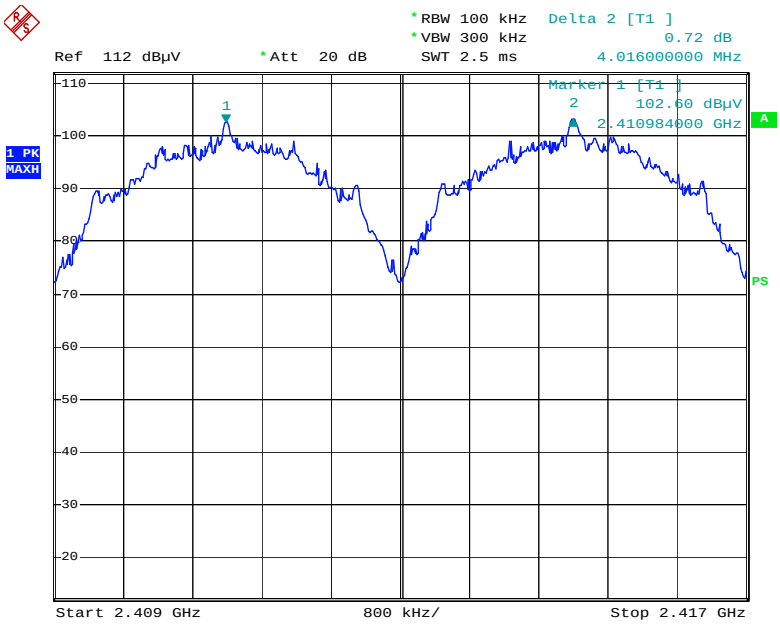
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2411	4.016	2.320	Pass
Adjacency Channel	2415			
Middle Channel	2443	4.016	2.453	Pass
Adjacency Channel	2447			
High Channel	2471	4.016	2.493	Pass
Adjacency Channel	2475			

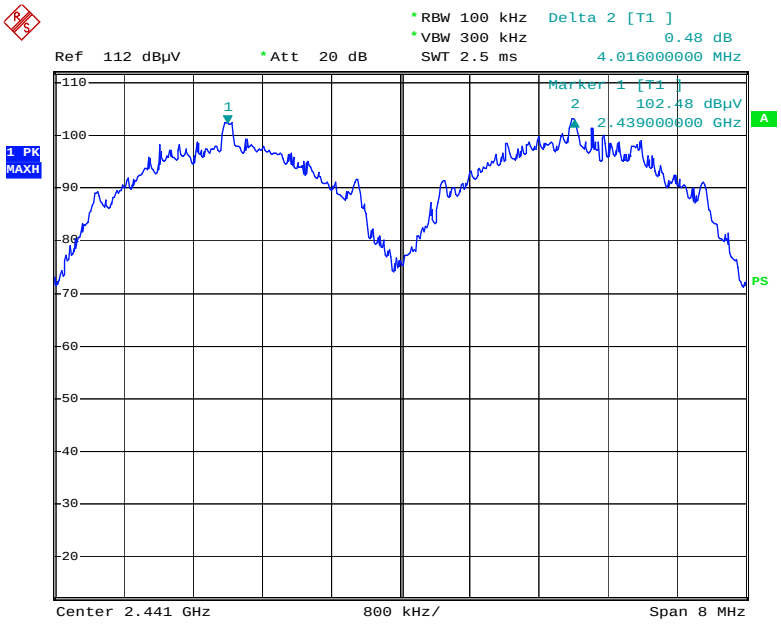
Please refer to the following plots.

Low Channel



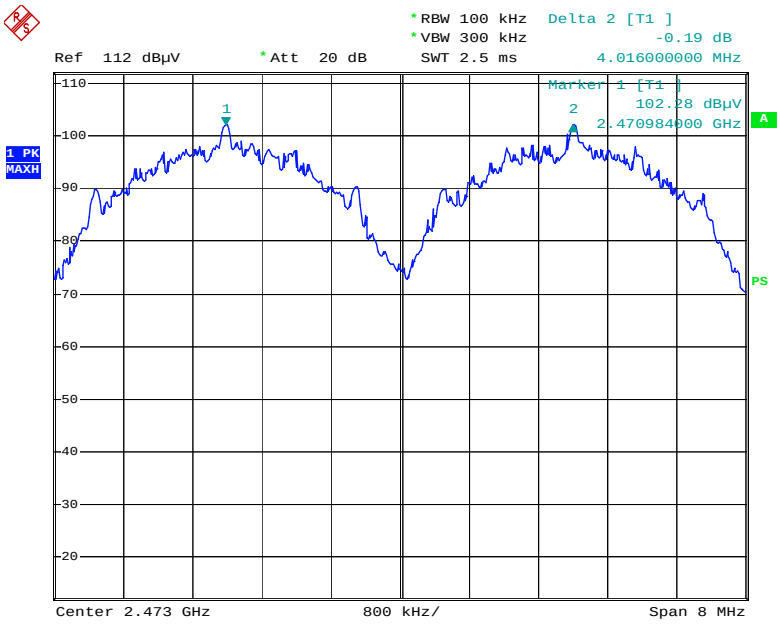
Date: 21.JAN.2010 13:22:26

Middle Channel



Date: 21.JAN.2010 13:23:15

High Channel



Date: 21.JAN.2010 13:24:07

FCC §15.247(a)(1) – 20 dB 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	2009-11-07	2010-11-06

*** 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:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

** The testing was performed by Vicent Kang on 2010-01-21.*

Test Result: Compliant.

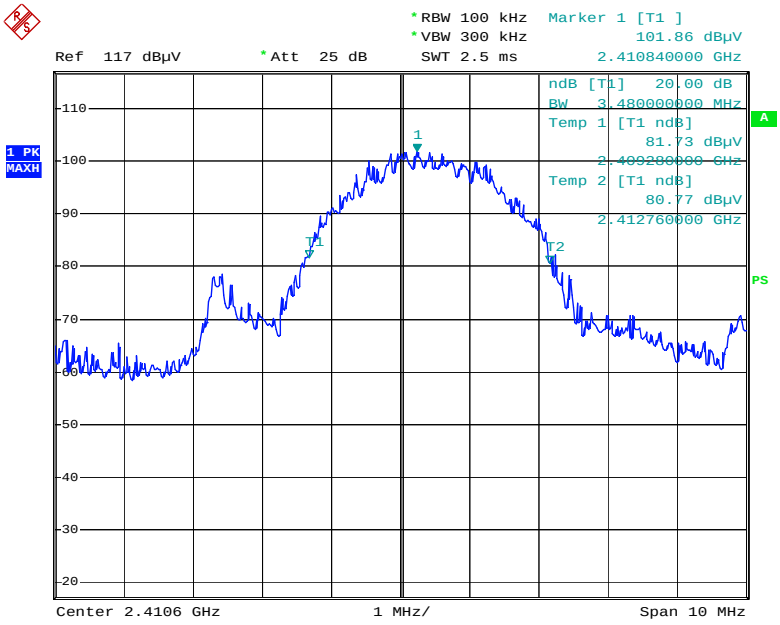
Please refer to following tables and plots

Test Mode: Transmitting

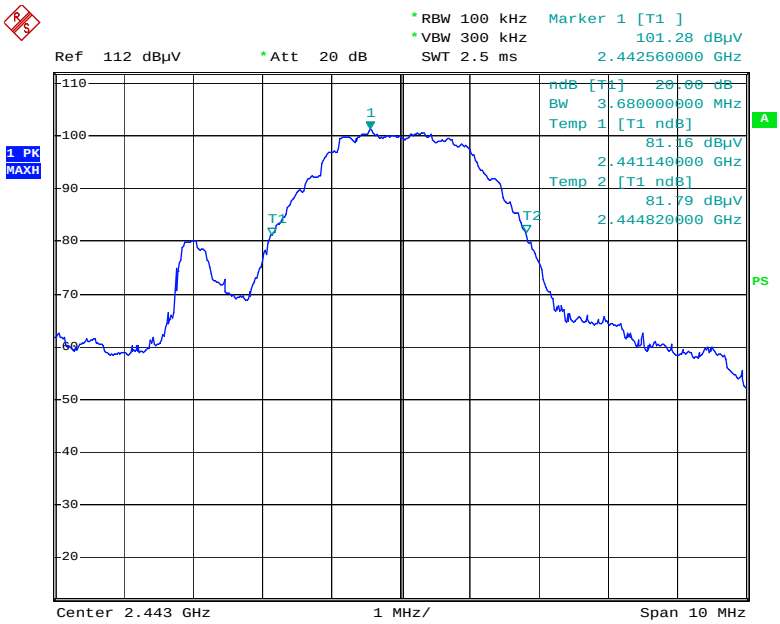
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low Channel	2411	3.480
Middle Channel	2443	3.680
High Channel	2475	3.740

Please refer to the following plots.

Low Channel

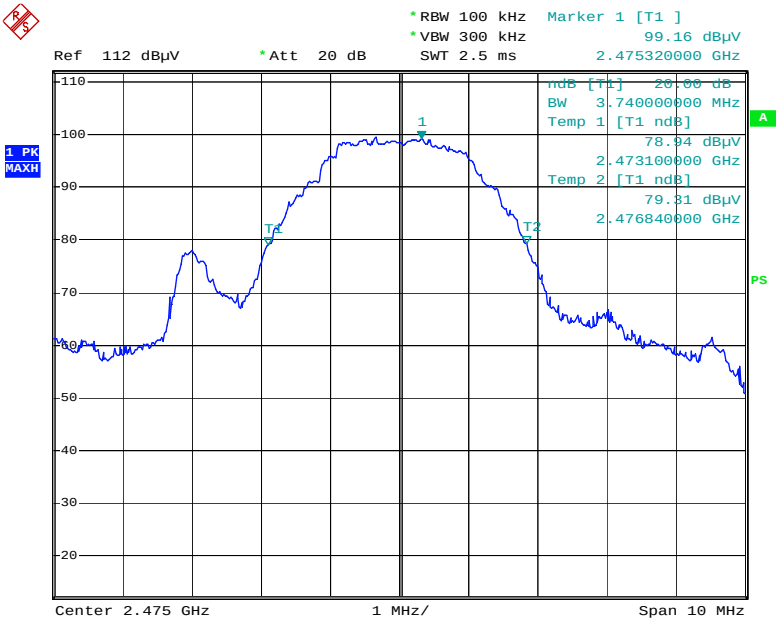


Middle Channel



Date: 21.JAN.2010 12:03:07

High Channel



Date: 21.JAN.2010 12:47:22

FCC §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	2009-11-07	2010-11-06

*** 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:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

The testing was performed by Vicent Kang on 2010-01-21.

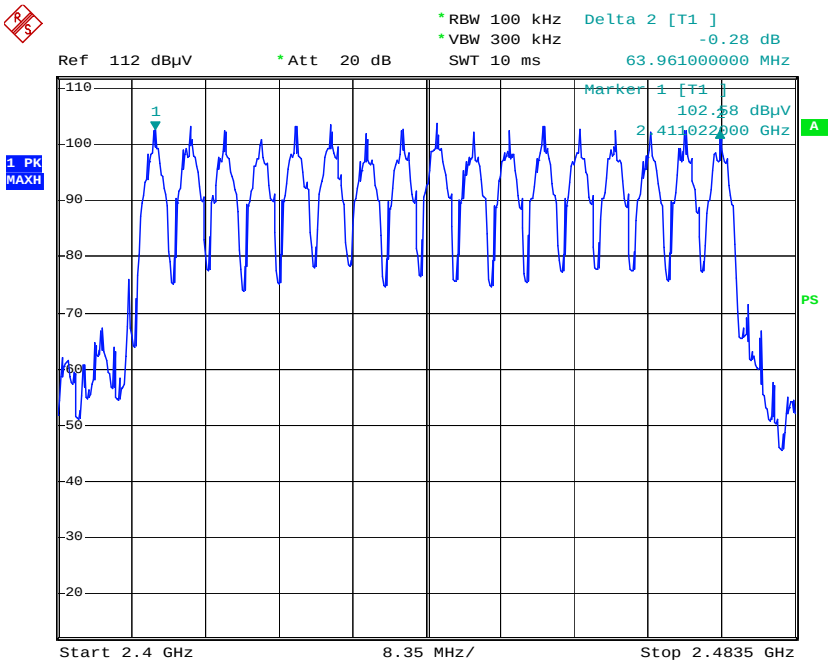
Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2402-2480	17	>15

Number of Hopping Channels



Date: 21.JAN.2010 13:19:17

FCC §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	2009-11-07	2010-11-06

*** 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 = Pulse time*(700/2/17)*6.8/1000S

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

** The testing was performed by Vicent Kang on 2010-01-21.*

Test Result: Compliant.

Please refer to following tables and plots

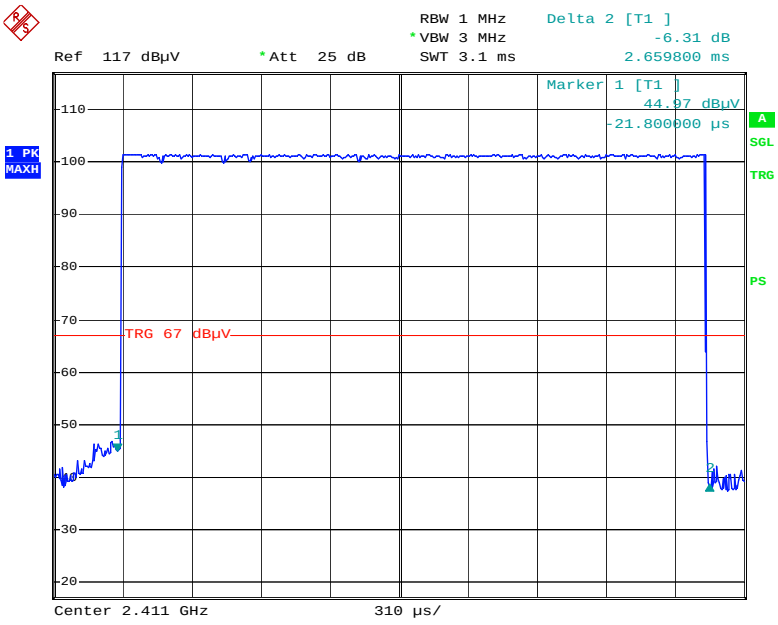
Test Mode: Transmitting

Channel	Pulse Width (ms)	Dwell Time (Sec)	Limit (Sec)	Result
Low	2.6598	0.3724	0.4	Pass
Midl	2.6536	0.3715	0.4	Pass
High	2.6598	0.3724	0.4	Pass

Note: Dwell time = Pulse time(700/2/17)*6.8/1000S*

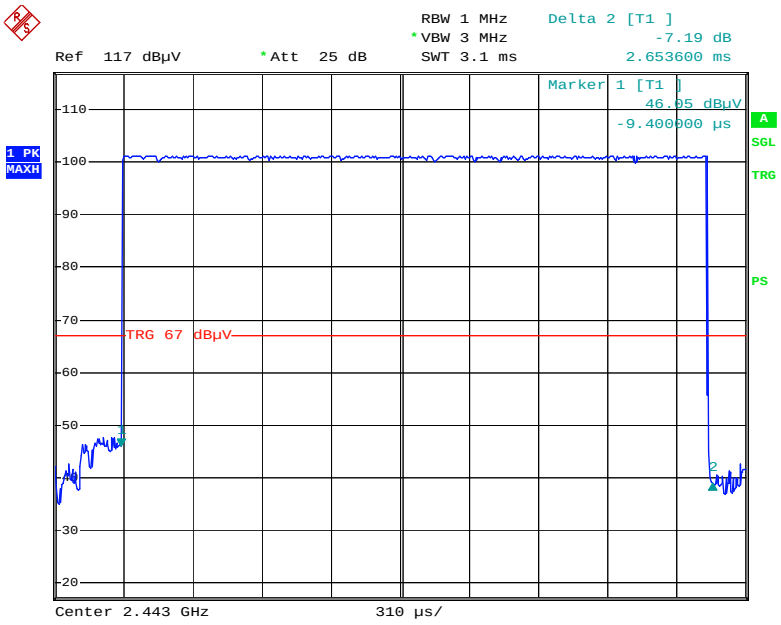
Please refer to the following plots.

Low Channel



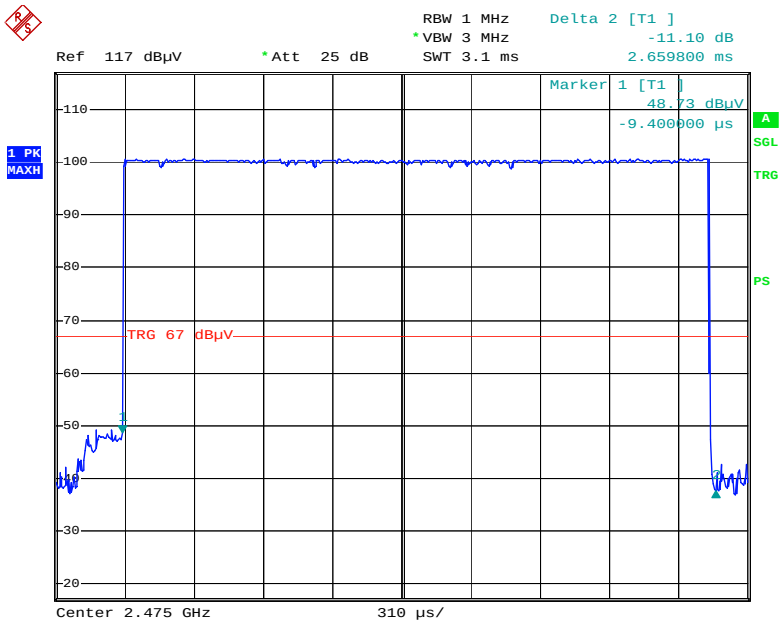
Date: 21.JAN.2010 11:04:41

Middle Channel



Date: 21.JAN.2010 11:05:39

High Channel



Date: 21.JAN.2010 11:06:15

FCC §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
HP	Amplifier	HP8447D	2944A09795	2009-08-02	2010-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-08

*** 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

FCC DA 00-705 (March 30, 2000)

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

** The testing was performed by Vicent Kang on 2010-01-21.*

Test Result: Compliant.

Test Mode: Transmitting

Frequency (MHz)	S.A. Reading (dBμV/m)	Detector (PK/AV)	Table Direction Degree	Test Antenna		Cable Loss (dB)	Pre-Amp. (dB)	Cord. Amp. (dBμV/m)	EIRP (dBm)
				Height (m)	Factor (dB/m)				
2411	103.16	PK	73	1.0	30.6	7.90	34	107.66	12.39
2443	103.43	PK	72	1.0	30.6	7.91	34	107.94	12.67
2475	103.63	PK	58	1.0	30.6	7.92	34	108.15	12.88

Note: P (dBm) = E (dBμV/m) – 95.27

FCC §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
HP	Amplifier	HP8447D	2944A09795	2009-08-02	2010-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-05-05	2010-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-07-08	2010-07-08

*** 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. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then 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=1MHz, VBW=3MHz.
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:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

**The testing was performed by Vicent Kang on 2010-01-21.*

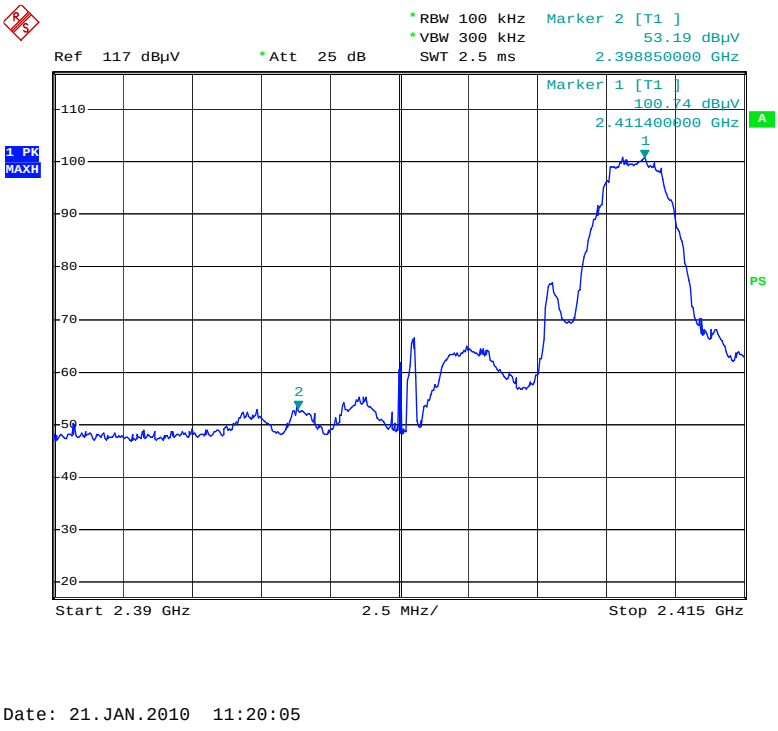
Test Result: Compliant

Test Mode: Transmitting

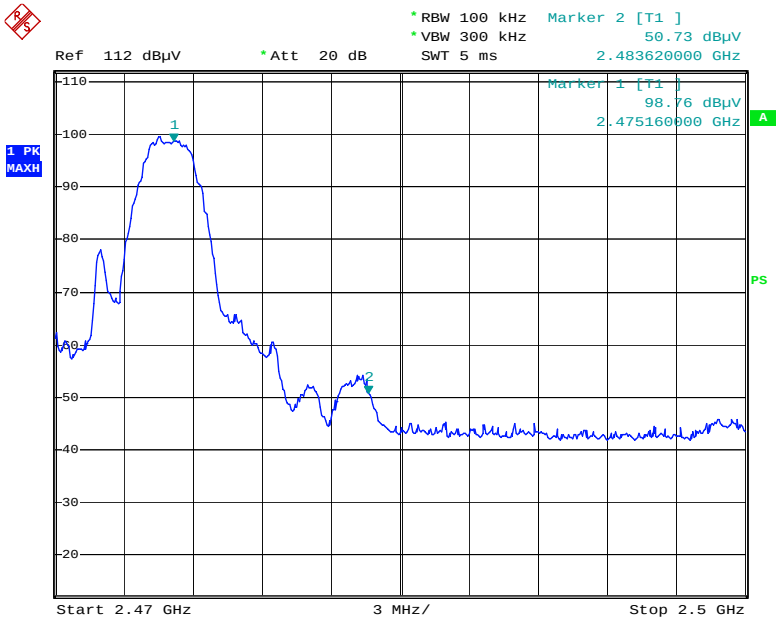
Frequency (MHz)	Delta Peak to Band Emission (dB)	Limit (dB)
2398.850	47.55	20
2483.620	48.03	20

Please refer to follow plots:

Band Edge: Left Side



Band Edge: Right Side



Date: 21.JAN.2010 12:49:34

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