NVLAP LAB CODE 200707-0

FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Alpha Comm Enterprises, Inc.

1500 Lakes Pkwy Suite B, Lawrenceville,

GA 30043, USA

FCC ID: X6HNUVELLI1500

Report Type:	**Product Type:**
Original Report	Bluetooth Gateway

Test Engineer:	Phoenix Liu
Report Number:	RSZ10020504
Report Date:	2010-02-09
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

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Alpha Comm Enterprises, Inc.*'s product, model number: *NUV1500 (FCC ID: X6HNUVELLI1500)* or the "EUT" as referred to in this report is a *Bluetooth gateway* works with or without existing based telephone services, which measures approximately: 9.5 cm L x 5.5 cm W x 1.25 cm H, rated input voltage: DC 6.0V adapter.

Adapter Information:
Model: DU060050D
Input: 120VAC 60Hz 15W
Output: 6VDC 500mA

** All measurement and test data in this report was gathered from production sample serial number: 1002017 (Assigned by BACL). The EUT was received on 2010-02-05.*

Objective

This Type approval report is prepared on behalf of *Alpha Comm Enterprises, Inc. 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.

This measurement and test report only pertains to the Bluetooth portion of the EUT; for measurement and test results to the GSM 1900 function please refer to report RSZ09051901-2224 issued by Shenzhen BACL.

Related Submittal(s)/Grant(s)

No related submittal(s).

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).

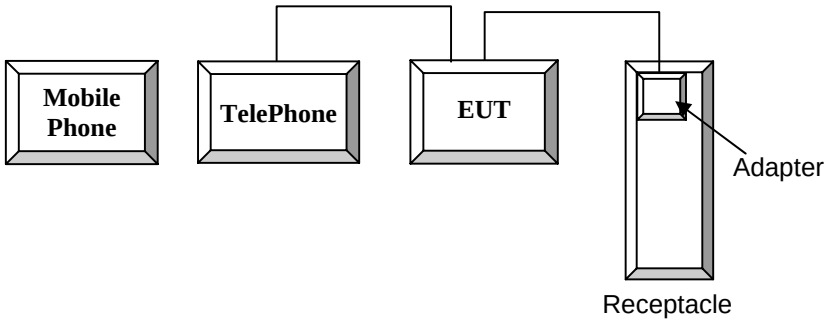
Equipment Modifications

No modification was made to the unit tested.

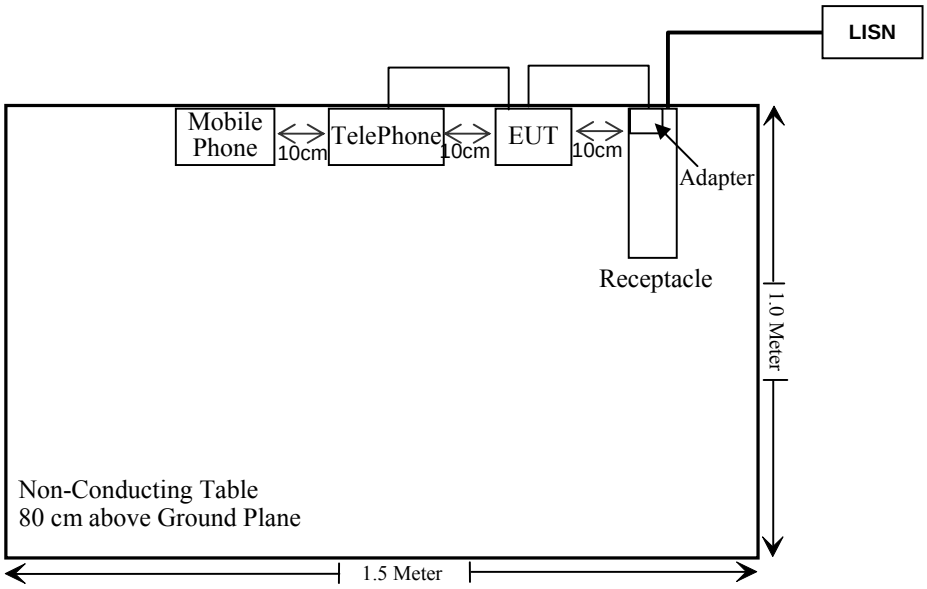
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Nokia	Mobile Phone	RM-367	LJPRM-367	ID

Configuration of Test Setup



Block Diagram of Test Setup



Note： The mobile phone was connect to EUT by bluetooth as a support device.

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247(i), §2.1091	RF Exposure	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

FCC §15.247(i) & §2.1091 - RF EXPOSURE

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 at antenna input terminal (dBm):	3.87
Maximum peak output power at antenna input terminal (mW):	2.438
Prediction distance (cm):	20.0
Prediction frequency (MHz):	2440
Antenna Gain, typical (dBi):	0
Maximum Antenna Gain (numeric):	1.0
Power density at predication frequency and distance (mW/cm^2):	0.000448
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1.0

Test Result

The highest power density level at 20 cm is 0.000448 W/cm², which is below the uncontrolled exposure limit of 1.0 mW/cm² at 2.4 GHz

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 use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has one antenna and it is for Bluetooth, the gain is 0 dBi. The antenna is permanently attached.

Result: Compliant.

FCC §15.207(a) - CONDUCTED EMISSIONS

Applicable Standard

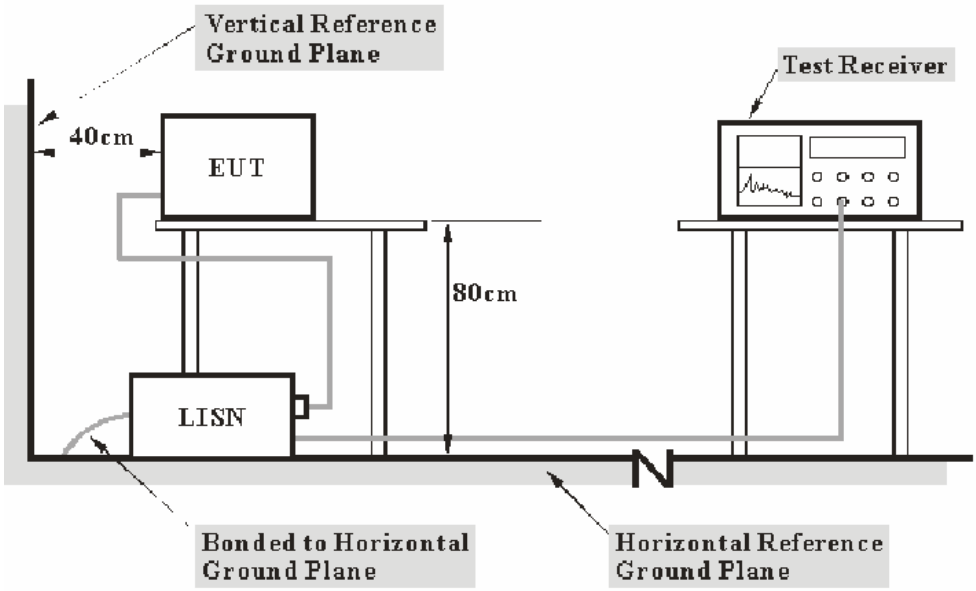
FCC §15.207

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 external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

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
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	2009-04-28	2010-04-27
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2009-04-28	2010-04-27

***** 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:

8.25 dB at **0.4300 MHz** in the **Neutral** conductor mode

Test Data

Environmental Conditions

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

The testing was performed by Phoenix Liu on 2010-02-08.

Test Mode: Charing and Bluetooth communication

Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	**Amplitude (dBµV)**	**Detector (QP/AV)**	**Conductor (Line/Neutral)**	**Limit (dBµV)**	**Margin (dB)**
0.4300	49.00	QP	Neutral	57.25	8.25
0.2450	48.80	QP	Line	61.92	13.12
0.1600	52.30	QP	Neutral	65.46	13.16
0.1500	51.20	QP	Line	66.00	14.80
0.7350	41.10	QP	Neutral	56.00	14.90
0.6250	37.20	QP	Line	56.00	18.80
8.8000	25.50	AV	Line	50.00	24.50
1.5650	30.00	QP	Line	56.00	26.00
1.1920	29.50	QP	Neutral	56.00	26.50
8.2900	20.40	AV	Neutral	50.00	29.60
8.8000	30.20	QP	Line	60.00	29.80
8.2900	29.30	QP	Neutral	60.00	30.70
0.4300	16.10	AV	Neutral	47.25	31.15
1.1800	24.30	QP	Neutral	56.00	31.70
2.0300	24.30	QP	Line	56.00	31.70
2.0500	14.00	AV	Line	46.00	32.00
1.1920	12.10	AV	Neutral	46.00	33.90
0.7350	12.00	AV	Neutral	46.00	34.00
0.2450	17.50	AV	Line	51.92	34.42
1.1800	11.20	AV	Neutral	46.00	34.80
0.6250	11.20	AV	Line	46.00	34.80
1.5700	10.00	AV	Line	46.00	36.00
0.1600	18.70	AV	Neutral	55.46	36.76
0.1500	17.10	AV	Line	56.00	38.90

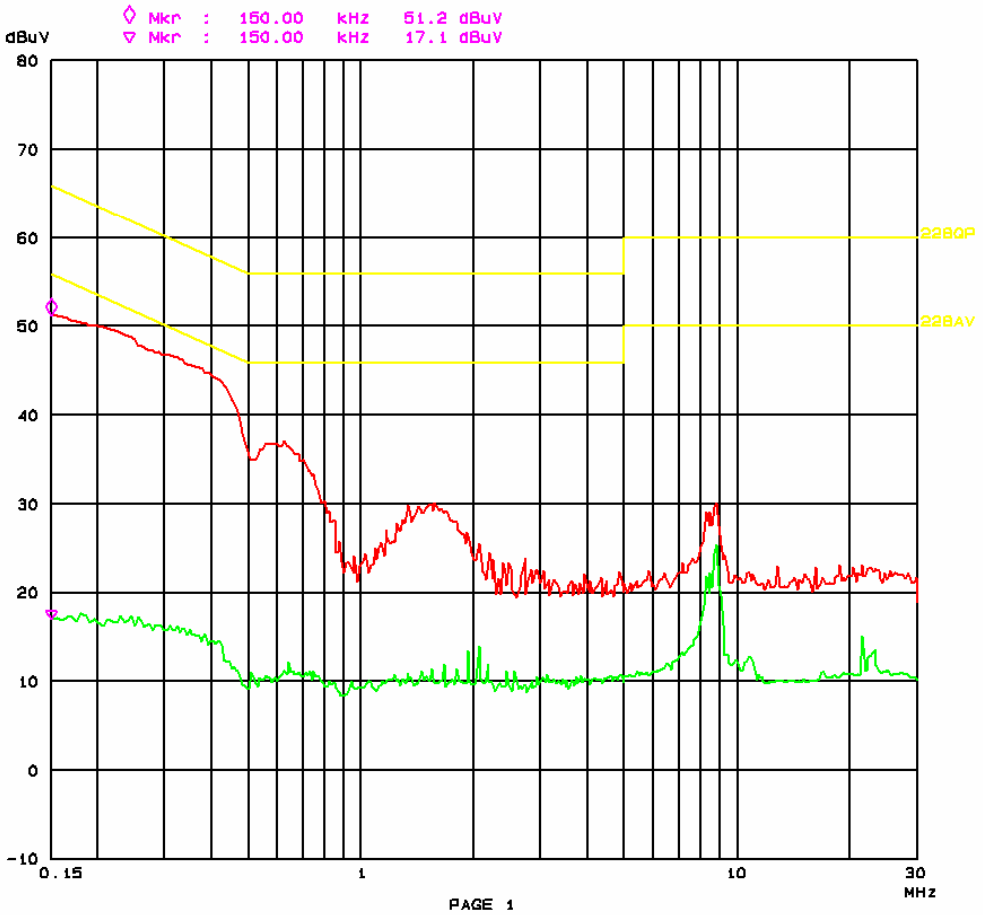
Plot(s) of Test Data

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

120V/60 Hz, Line:

Conduction emission
FCC 15.207

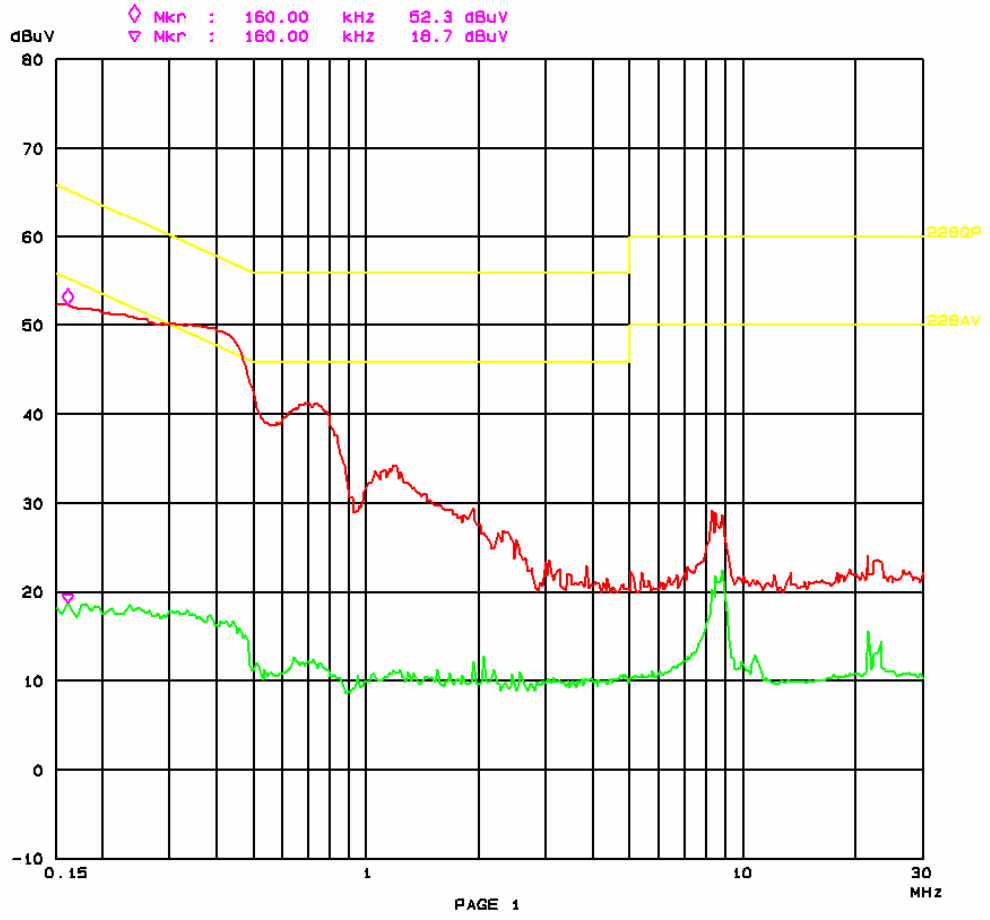
EUT:	Bluetooth M/N: NUV1500
Manuf:	Alpha
Op Cond:	Charing and Bluetooth communication
Operator:	Phoenix
Test Spec:	AC 120V/60Hz L
Comment:	Tem: 25 Hum: 56%
	BACL



120V/60 Hz, Neutral:

Conduction emission
FCC 15.207

EUT:	Bluetooth M/N: NUV1500
Manuf:	Alpha
Op Cond:	Charing and Bluetooth communication
Operator:	Phoenix
Test Spec:	AC 120V/60Hz N
Comment:	Tem: 25 Hum: 56%
	BACL



FCC §15.205, §15.209 & §15.247 - RADIATED EMISSIONS

Applicable Standard

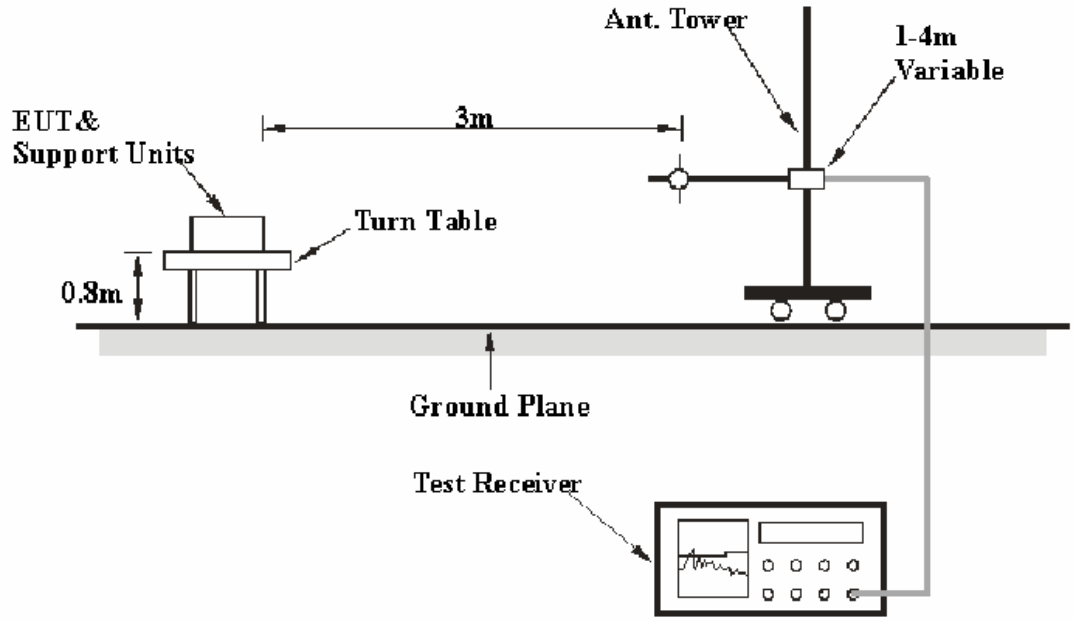
FCC §15.205; §15.209; §15.247 (d)

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.

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	2009-08-02	2010-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06
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	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10
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

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 maximum 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:

Transmitting mode (Below 1GHz):

4.6 dB at **319.997250** MHz in the **Vertical** polarization

Transmitting mode (Above 1 GHz):

4.32 dB at **1602.15** MHz in the **Vertical** polarization (Low Channel)
4.61 dB at **1627.81** MHz in the **Vertical** polarization (Middle Channel)
5.95 dB at **1654.14** MHz in the **Horizontal** polarization (High Channel)

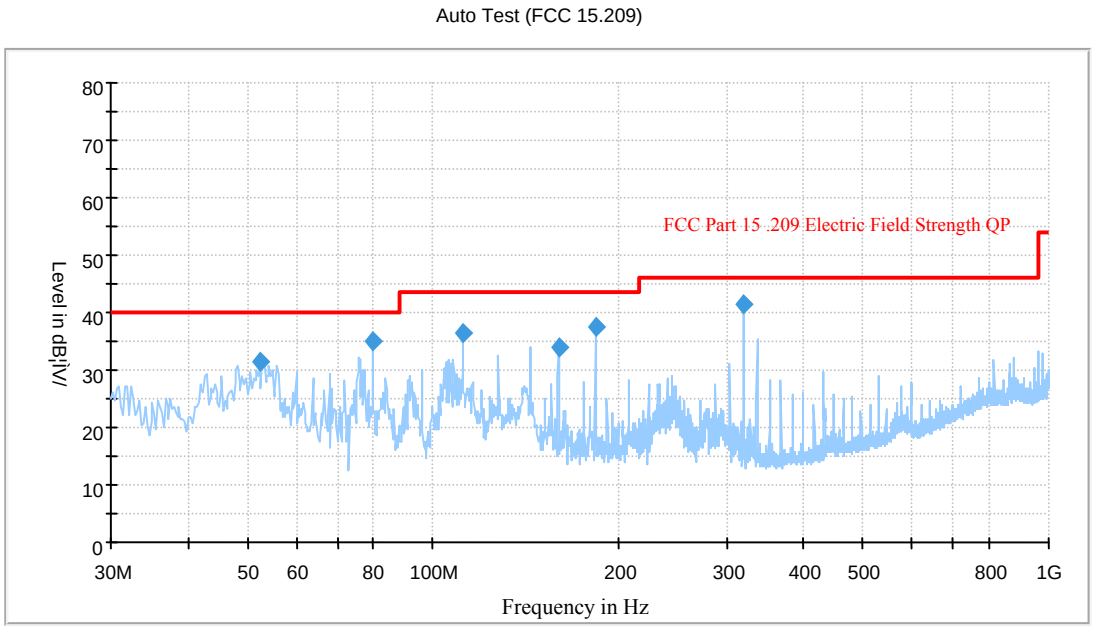
Test Data

Environmental Conditions

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

The testing was performed by Phoenix Liu on 2010-02-08.

Below 1 GHz:



Frequency (MHz)	Corrected Amp. (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
319.997250	41.4	102.0	V	244.0	-14.1	46.0	4.6
80.019000	34.9	102.0	V	191.0	-20.1	40.0	5.1
183.988000	37.6	331.0	V	263.0	-15.9	43.5	5.9
111.999500	36.5	102.0	V	7.0	-14.6	43.5	7.0
52.370750	31.5	102.0	V	94.0	-19.2	40.0	8.5
160.003500	34.1	102.0	V	128.0	-15.3	43.5	9.4

Above 1 GHz:

Freq. (MHz)	S.A. Reading (dBµV/m)	Detector PK/QP/AV	Direction Degree	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	Remarks
Low Channel (2402 MHz)												
1602.15	54.06	AV	35	1.2	V	24.80	5.62	34.8	49.68	54	4.32	spurious
1602.15	49.22	AV	220	1.5	H	25.90	5.62	34.8	45.94	54	8.06	spurious
7206	31.15	AV	80	1.6	H	39.20	9.12	33.6	45.87	54	8.13	harmonic
7206	32.01	AV	70	1.2	V	38.00	9.12	33.6	45.53	54	8.47	harmonic
4804	35.30	AV	150	1.2	V	35.00	7.90	33.7	44.50	54	9.50	harmonic
4804	32.21	AV	183	1.5	H	36.30	7.90	33.7	42.71	54	11.29	harmonic
7206	45.12	PK	70	1.6	H	39.20	9.12	33.6	59.84	74	14.16	harmonic
7206	46.32	PK	60	1.2	V	38.00	9.12	33.6	59.84	74	14.16	harmonic
4804	50.15	PK	180	1.2	V	35.00	7.90	33.7	59.35	74	14.65	harmonic
4804	47.20	PK	183	1.5	H	36.30	7.90	33.7	57.70	74	16.30	harmonic
1602.15	54.50	PK	220	1.5	H	27.50	5.62	34.4	53.22	74	20.78	spurious
1602.15	57.50	PK	20	1.2	V	24.80	5.62	34.8	53.12	74	20.88	spurious
Middle Channel (2441 MHz)												
1627.81	50.57	AV	45	0	V	27.80	5.62	34.6	49.39	54	4.61	spurious
1627.81	47.76	AV	30	1.0	H	27.50	5.62	34.4	46.48	54	7.52	spurious
4882	33.19	AV	175	1.0	H	36.30	8.86	33.7	44.65	54	9.35	harmonic
4882	33.19	AV	185	1.1	V	35.00	8.86	33.7	43.35	54	10.65	harmonic
4882	49.71	PK	180	1.2	H	36.30	8.86	33.7	61.17	74	12.83	harmonic
4882	47.74	PK	180	1.2	V	35.00	8.86	33.7	57.90	74	16.10	harmonic
1627.81	54.38	PK	30	1.0	V	27.80	5.62	34.6	53.20	74	20.80	spurious
1627.81	53.15	PK	45	1.2	H	27.50	5.62	34.4	51.87	74	22.13	spurious
High Channel (2480 MHz)												
1654.14	49.78	AV	30	1.0	H	27.5	5.37	34.6	48.05	54	5.95	spurious
1654.14	49.16	AV	0	1.0	V	27.8	5.37	34.6	47.73	54	6.27	spurious
4960	32.10	AV	0	1.0	H	36.3	8.86	33.7	43.56	54	10.44	harmonic
4960	32.10	AV	20	1.0	V	35.0	8.86	33.7	42.26	54	11.74	harmonic
4960	47.66	PK	20	1.2	H	36.3	8.86	33.7	59.12	74	14.88	harmonic
4960	47.66	PK	0	1.2	V	35.0	8.86	33.7	57.82	74	16.18	harmonic
1654.14	53.78	PK	30	1.0	V	27.8	5.37	34.6	52.35	74	21.65	spurious
1654.14	53.58	PK	0	1.2	H	27.5	5.37	34.6	51.85	74	22.15	spurious

Spurious emission in restricted band

Freq. (MHz)	S.A. Reading (dBµV/m)	Detector PK/QP/AV	Direction Degree	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	Remarks
2387.45	33.47	AV	0	1.0	V	33.9	7.9	30.3	44.97	54	9.03	spurious
2484.89	33.53	AV	0	1.1	H	33.9	7.9	30.9	44.43	54	9.57	spurious
2484.89	32.35	AV	0	1.0	V	33.9	7.9	30.3	43.85	54	10.15	spurious
2387.45	31.93	AV	0	1.1	H	33.9	7.9	30.9	42.83	54	11.17	spurious
2387.45	47.35	PK	30	1.2	V	33.9	7.9	30.3	58.85	74	15.15	spurious
2484.89	47.20	PK	10	1.1	H	33.9	7.9	30.9	58.10	74	15.90	spurious
2484.89	45.91	PK	0	1.2	V	33.9	7.9	30.3	57.41	74	16.59	spurious
2387.45	45.26	PK	20	1.2	H	33.9	7.9	30.9	56.16	74	17.84	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 20 dB 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	2009-11-24	2010-11-23
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10

*** 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 Phoenix Liu on 2010-02-06.

Test Result: Compliant.

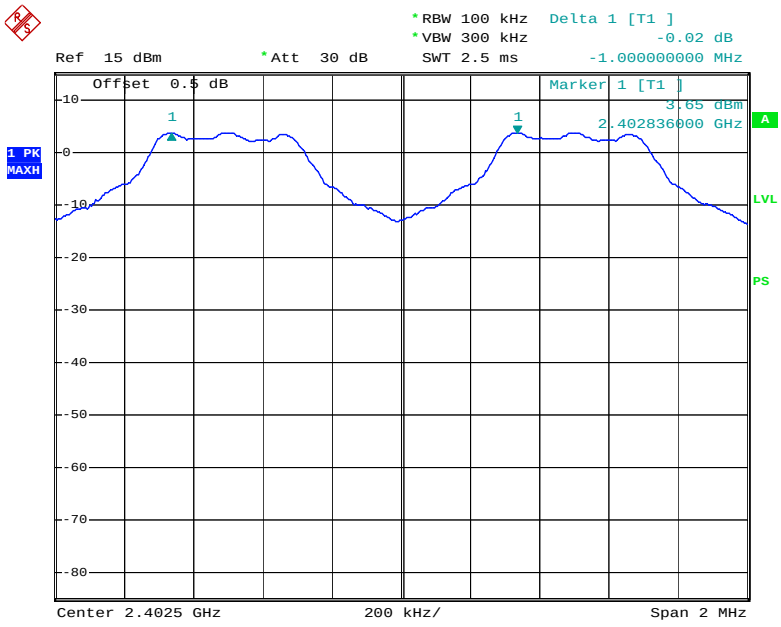
Please refer to following tables and plots

Test Mode: Transmitting

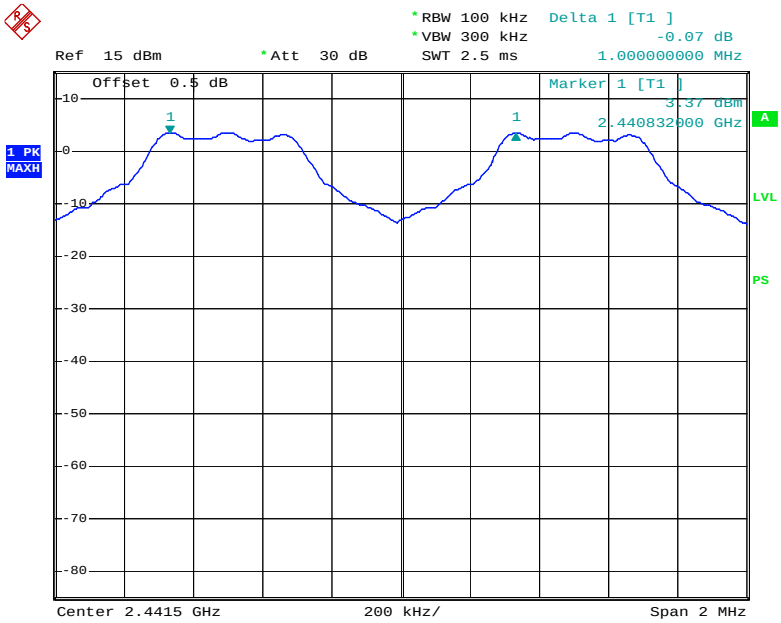
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.000	0.613	Pass
Adjacent Channel	2403			
Mid Channel	2441	1.000	0.616	Pass
Adjacent Channel	2442			
High Channel	2480	1.000	0.616	Pass
Adjacent Channel	2479			

Please refer to the following plots.

Low Channel

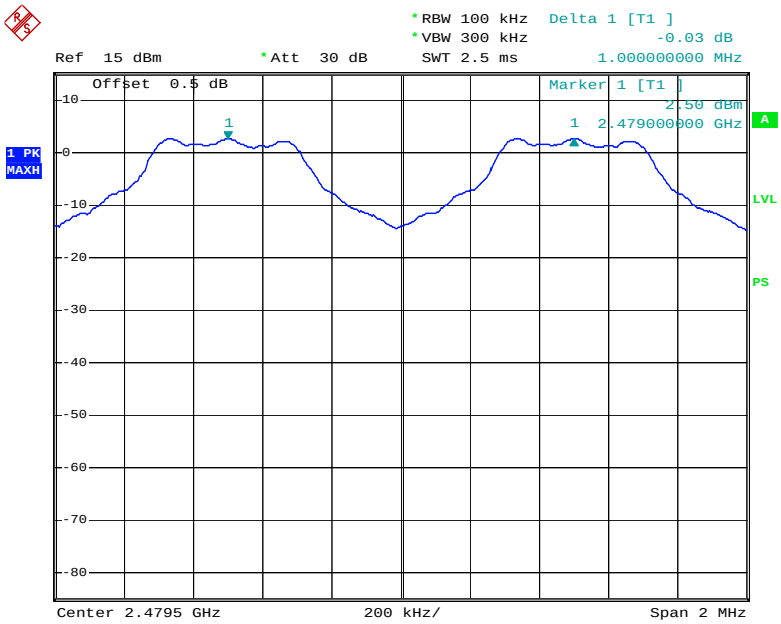


Middle Channel



Date: 6.FEB.2010 00:01:27

High Channel



Date: 6.FEB.2010 00:02:27

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 125 mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10

*** 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 Phoenix Liu on 2010-02-06.

Test Result: Compliant.

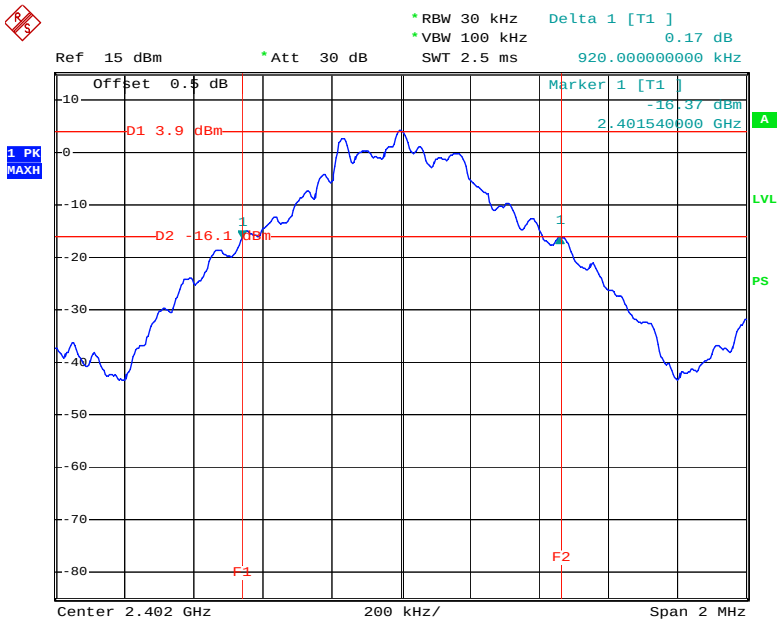
Please refer to following tables and plots

Test Mode: Transmitting

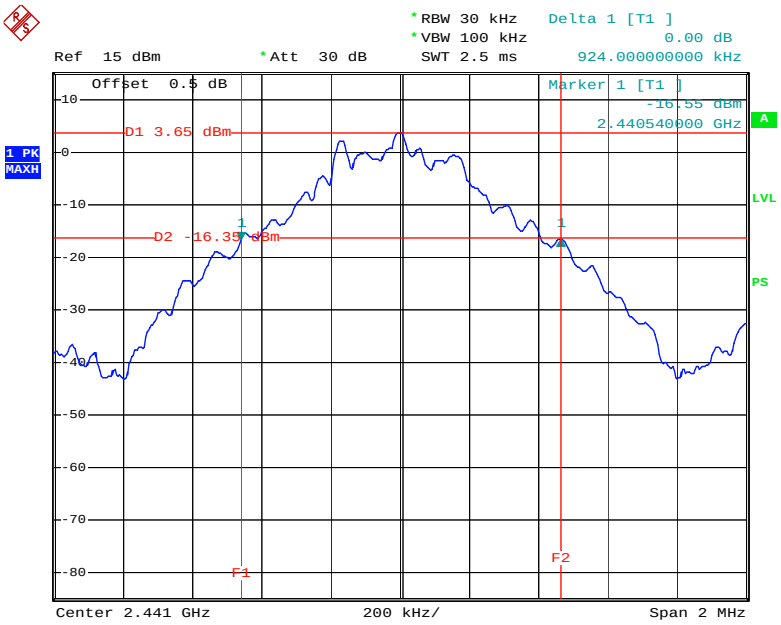
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	0.920
Middle	2441	0.924
High	2480	0.924

Please refer to the following plots.

Low Channel

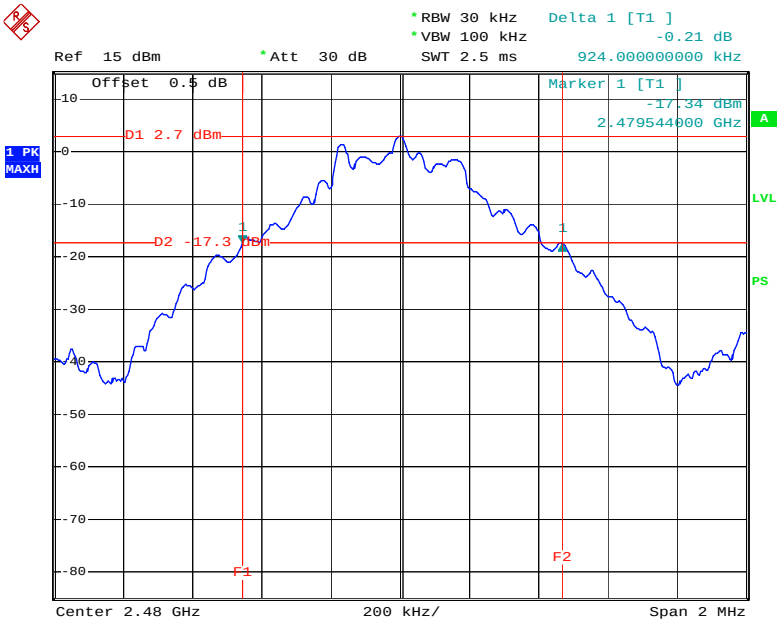


Middle Channel



Date: 6.FEB.2010 01:52:10

High Channel



Date: 6.FEB.2010 01:53:40

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	2009-11-24	2010-11-23
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10

*** 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 Phoenix Liu on 2010-02-06.

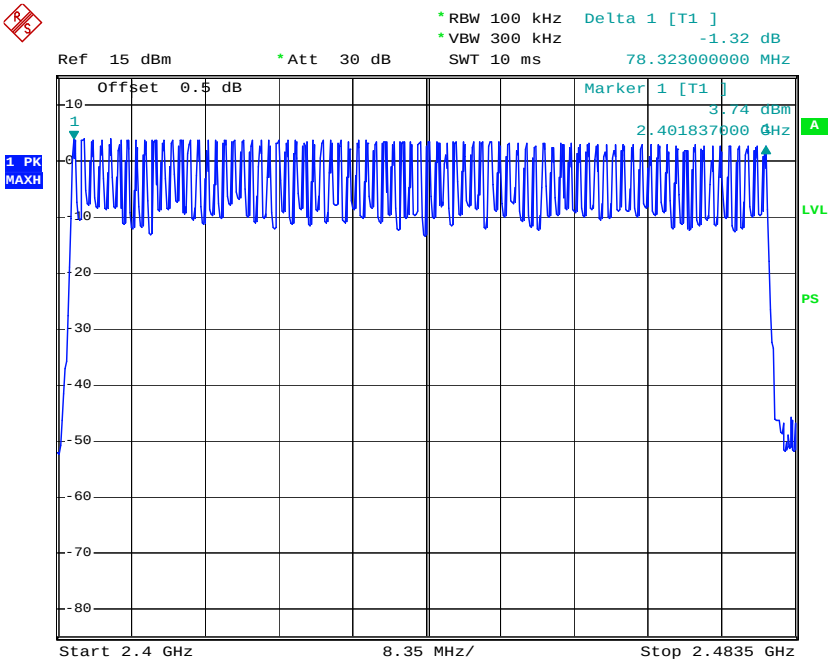
Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	79	≥ 15

Number of Hopping Channels



Date: 6.FEB.2010 00:07:16

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	2009-11-24	2010-11-23
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10

*** 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 * 31.6s
Hop rate=1600/s

Test Data

Environmental Conditions

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

The testing was performed by Phoenix Liu on 2010-02-06.

Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

DH 1 Mode:

Channel	Pulse Width (ms)	Dwell Time (Sec)	Limit (Sec)	Result
Low	0.565	0.1808	0.4	Pass
Middle	0.575	0.1840	0.4	Pass
High	0.565	0.1808	0.4	Pass

Note: Dwell time=Pulse width (ms) × (1600 /2 / 79) ×31.6 Second

DH 3 Mode:

Channel	Pulse Width (ms)	Dwell Time (Sec)	Limit (Sec)	Result
Low	1.850	0.2960	0.4	Pass
Middle	1.850	0.2960	0.4	Pass
High	1.840	0.2944	0.4	Pass

Note: Dwell time=Pulse width (ms) × (1600 /4 / 79) ×31.6 Second

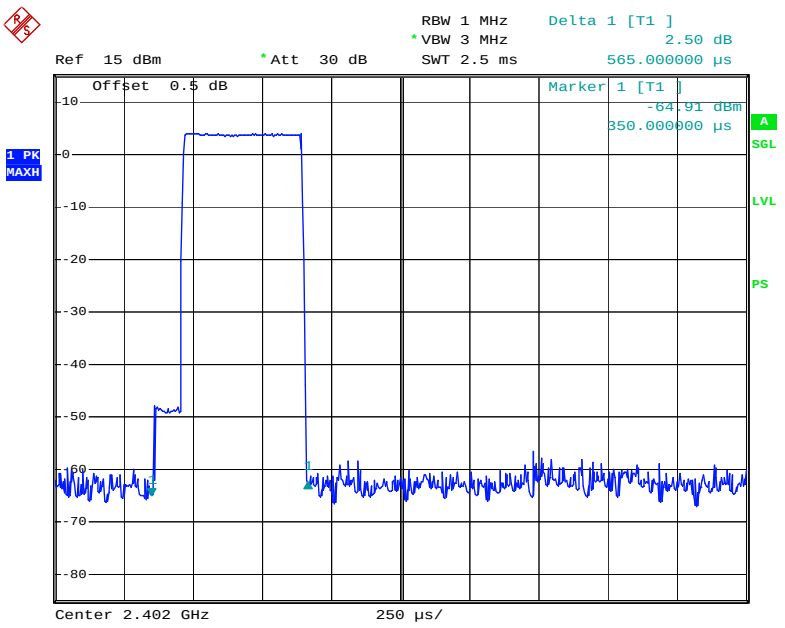
DH 5 Mode:

Channel	Pulse Width (ms)	Dwell Time (Sec)	Limit (Sec)	Result
Low	3.120	0.3328	0.4	Pass
Middle	3.120	0.3328	0.4	Pass
High	3.120	0.3328	0.4	Pass

Note: Dwell time=Pulse width (ms) × (1600 / 6 /79) ×31.6 Second

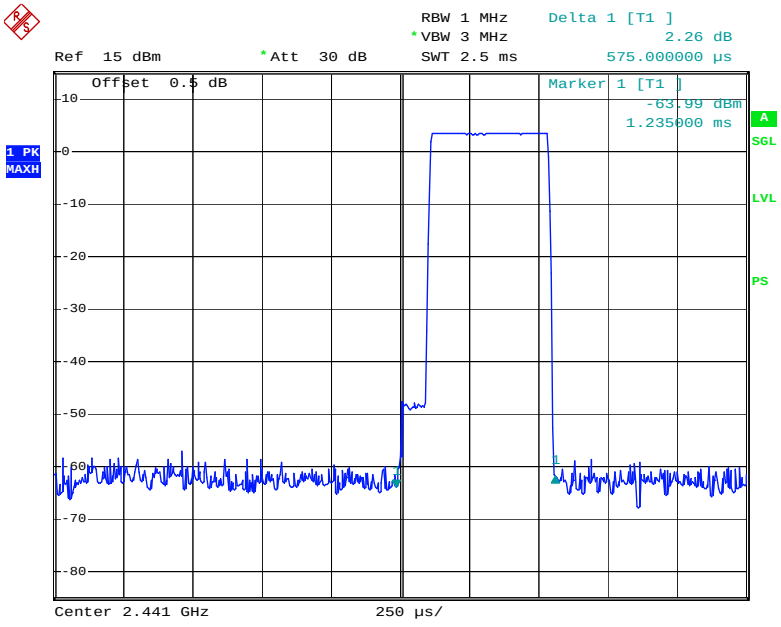
Please refer to the following plots.

Low Channel for DH1



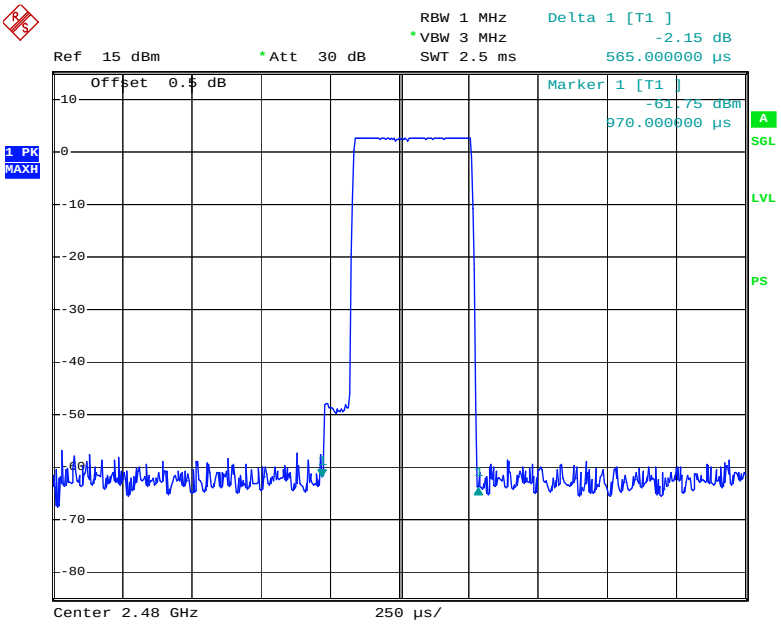
Date: 6.FEB.2010 00:56:55

Middle Channel for DH1



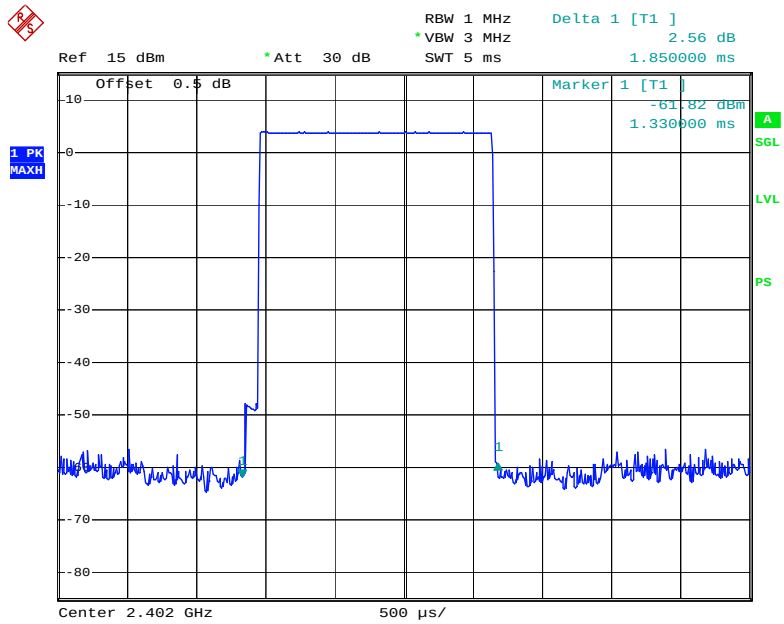
Date: 6.FEB.2010 00:58:09

High Channel for DH1



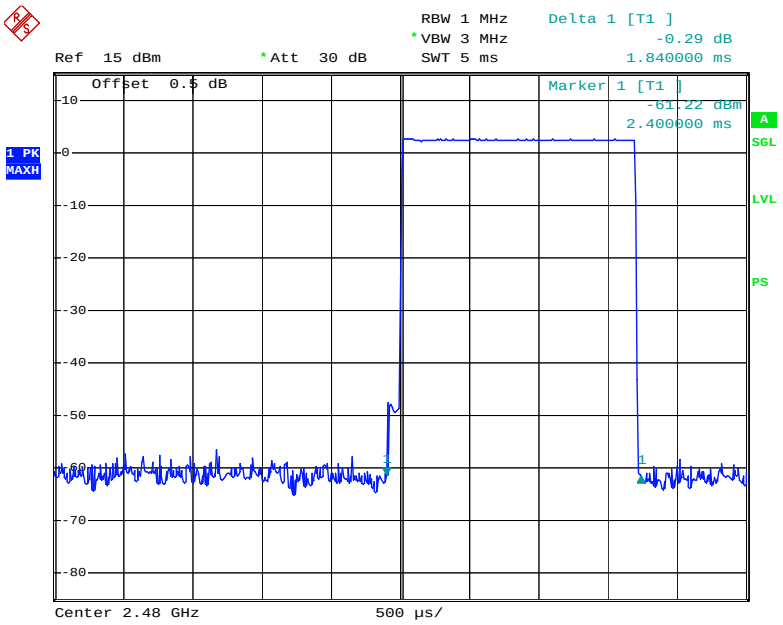
Date: 6.FEB.2010 00:58:56

Low Channel for DH3



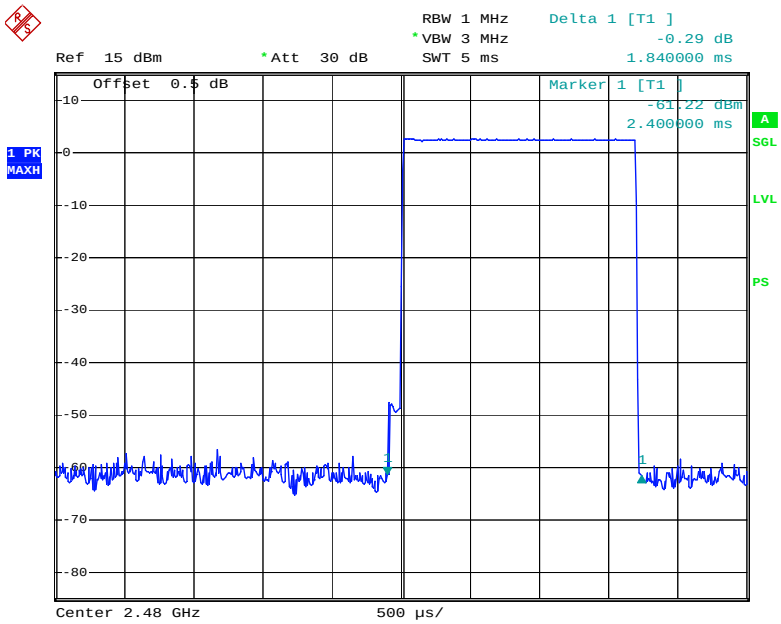
Date: 6.FEB.2010 01:47:10

Middle Channel for DH3



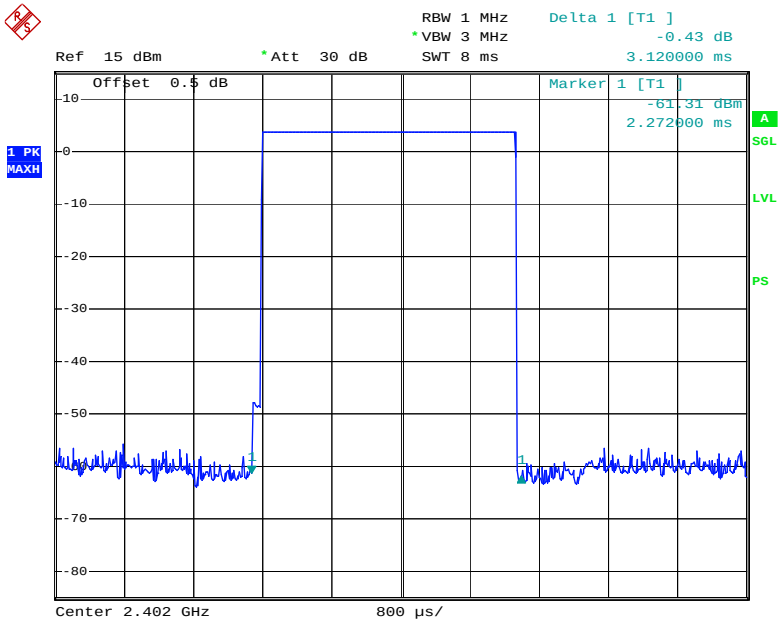
Date: 6.FEB.2010 01:07:26

High Channel for DH3



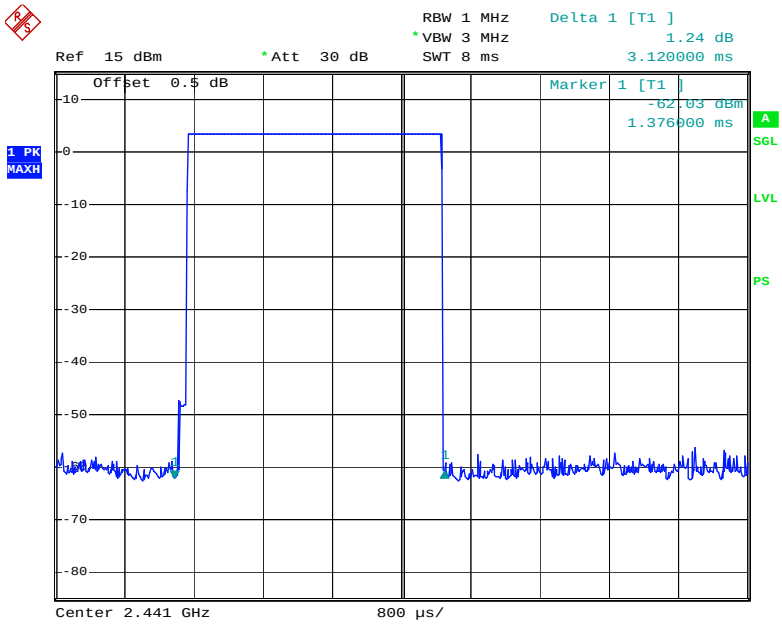
Date: 6.FEB.2010 01:07:26

Low Channel for DH5



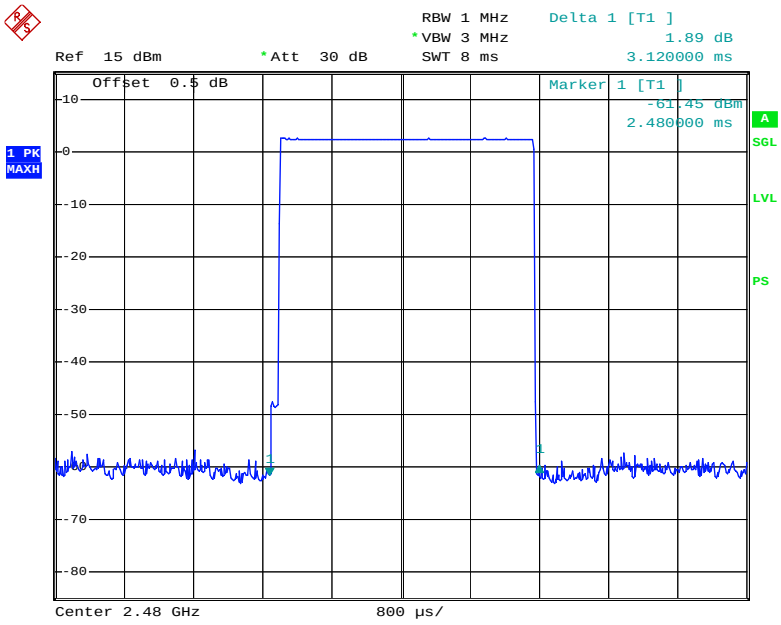
Date: 6.FEB.2010 01:11:13

Middle Channel for DH5



Date: 6.FEB.2010 01:10:28

High Channel for DH5



Date: 6.FEB.2010 01:12:31

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.

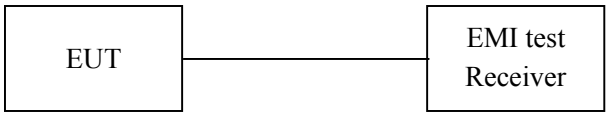
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10
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

1. Place the EUT on a bench and set 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

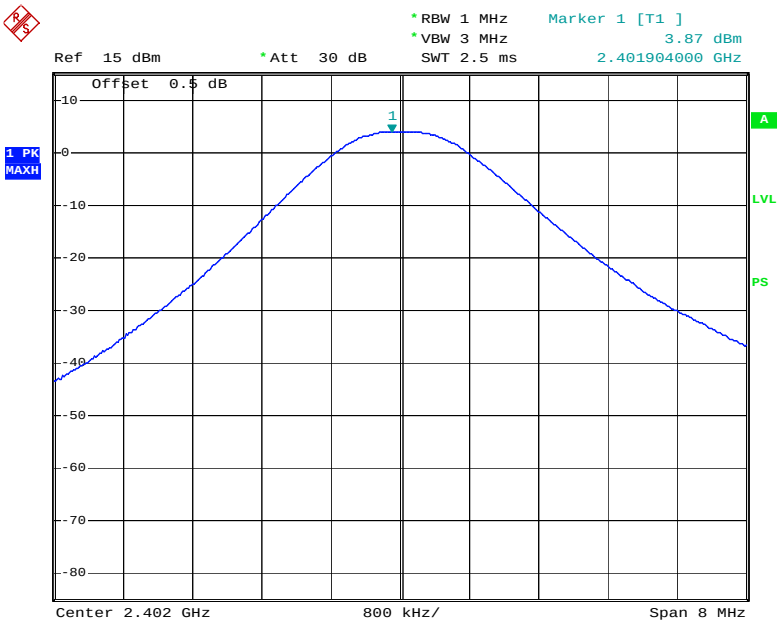
The testing was performed by Phoenix Liu on 2010-02-06.

Test Result: Compliant.

Test Mode: Transmitting

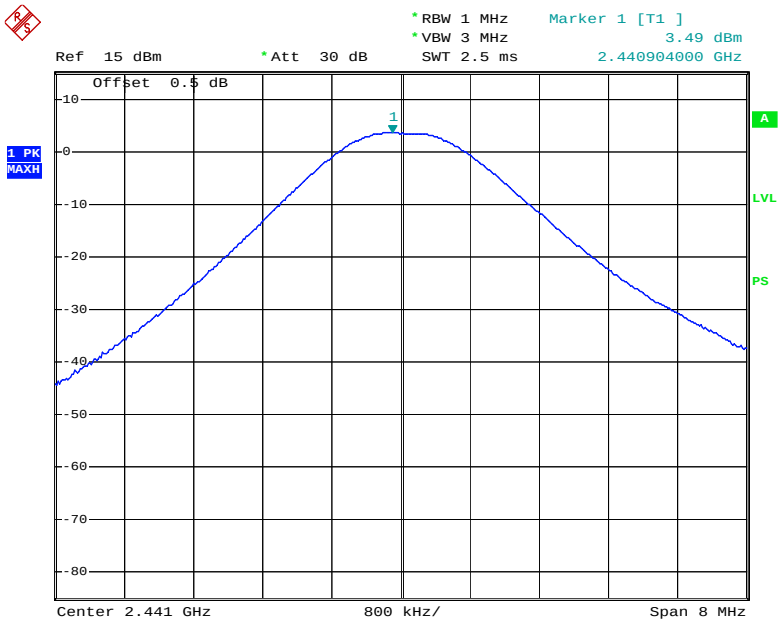
Channel	Channel Frequency (MHz)	Conducted Output Power		Limit (mw)
		(dBm)	(mw)	
Low channel	2402	3.87	2.44	125
Middle channel	2441	3.49	2.23	125
High channel	2480	2.58	1.81	125

Low Channel



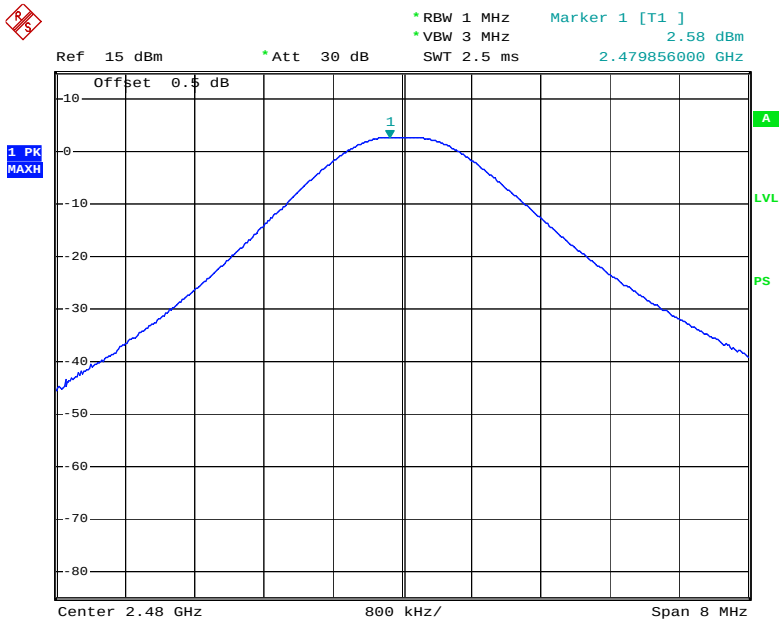
Date: 6.FEB.2010 00:11:37

Middle Channel



Date: 6.FEB.2010 00:09:16

High Chanel



Date: 6.FEB.2010 00:08:56

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
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-06-11	2010-06-10

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

The testing was performed by Phoenix Liu on 2010-02-06.

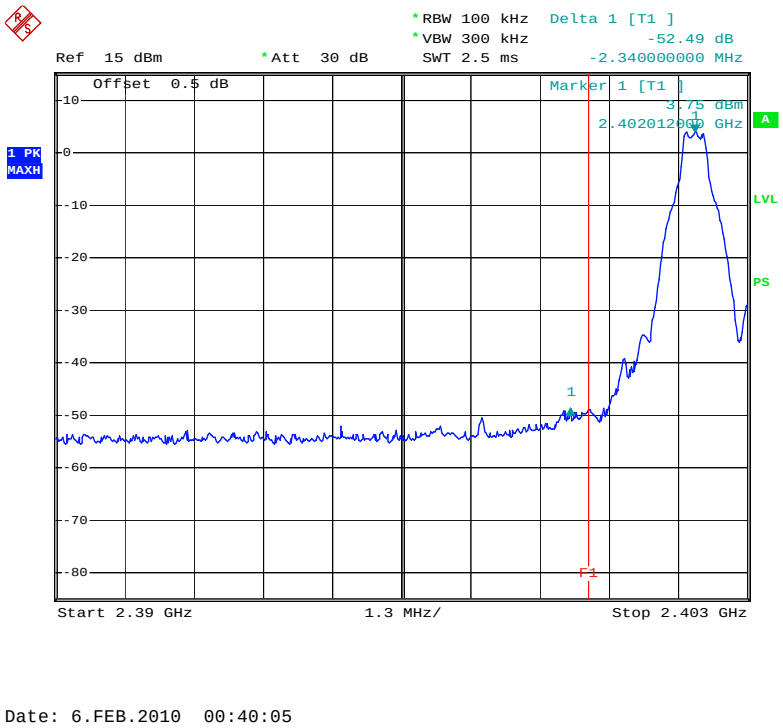
Test Result: Compliant, please refer to the following table and plots.

Test Mode: Transmitting

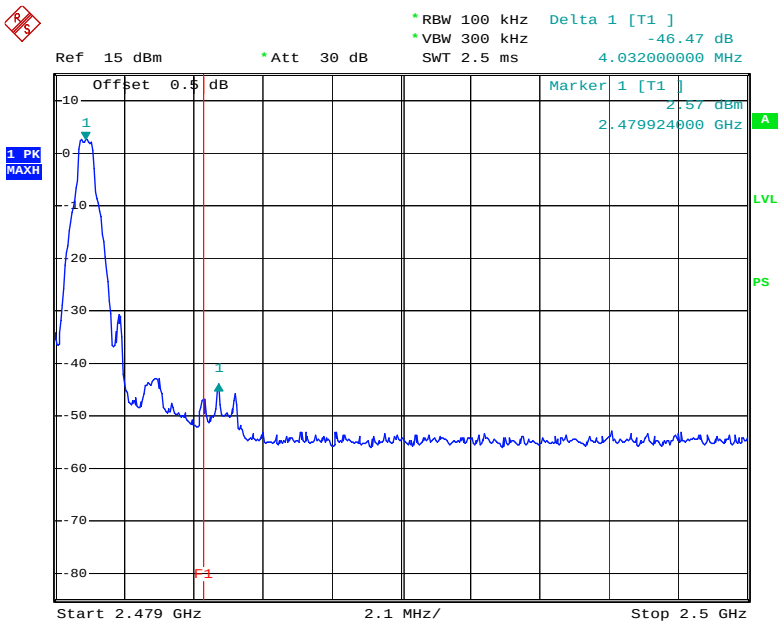
Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
2399.672	52.49	20
2483.956	46.47	20

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

Band Edge: Left Side



Band Edge: Right Side



Date: 6.FEB.2010 00:41:39

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