NVLAP LAB CODE 200707-0

FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Neo-Telecom Corporation

7th Floor, 674-24, Anyang Dong, Manan GU,

Anyang City, Kyunggi Do, Korea

FCC ID: WYHIR1000-IR2000

Report Type:	**Product Type:**
Original Report	WiFi Internet Radio

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Report Number: RSZ08120806

Report Date: 2009-01-16

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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" (Rev.2)

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Neo-Telecom Corporation's* product, model number: *IR2000 o*r the "EUT" as referred to in this report is a *Wifi Internet Radio,* which measures approximately: 25.0 cm L x 14.0 cm W x 14.0 cm H, input voltage: DC 12V Adapter.

Adapter:
Model: S120S100C1;
Input: 100-240V~50/60Hz 0.45A max;
Output: 12V---1A.

Note1: The models *IR1000, IR2000,* which were explained in the DECLARATION, so we selected the *IR2000 to test.*

** All measurement and test data in this report was gathered from production sample serial number: 0812017 (Assigned by BACL, Shenzhen). The EUT was received on 2008-12-08.*

Objective

This Type approval report is prepared on behalf of *Neo-Telecom Corporation 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 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 04, 2004. 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

For 802.11b and 802.11g mode, 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

EUT was tested with Channel 1, 6 and 11.

The worst case data rate is determined with the data rate with highest output power. For 802.11b mode, 1 Mbps data rate was chosen for full testing. For 802.11g mode, 6 Mbps data rate was chosen for full testing.

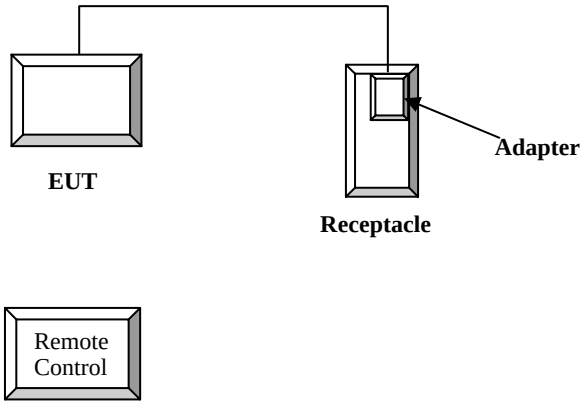
Equipment Modifications

No modification was made to the unit tested.

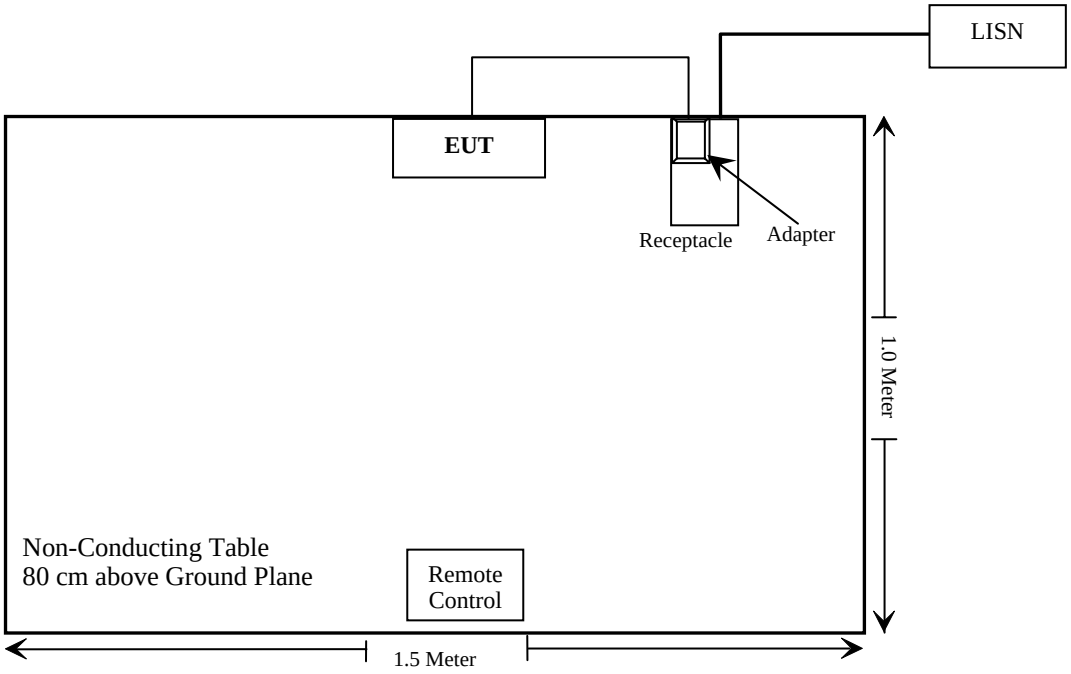
External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable Power Cable	1.3	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)	RF Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205	Restricted Bands	Compliance
§15.209, §15.205, 1§15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

§15.247 (i) and §1.1307 (b) (1) - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Standard Applicable

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

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				
0.3–3.0	614	1.63	*(100)	30
3.0–30	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

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

Result

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

S = power density (in appropriate units, e.g. mW/cm2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally ***numeric*** gain.
D = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

802.11b mode:

Maximum peak output power at antenna input terminal: 17.53(dBm)
Maximum peak output power at antenna input terminal: 56.6 (mW)
Prediction distance: >20 (cm)
Predication frequency: 2462 (MHz)
Antenna Gain (typical): 0(dBi)
Antenna Gain (typical): 1 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.011(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

802.11g mode:

Maximum peak output power at antenna input terminal: 14.08(dBm)
Maximum peak output power at antenna input terminal: 25.59 (mW)
Prediction distance: >20 (cm)
Predication frequency: 2462(MHz)
Antenna Gain (typical): 0(dBi)
Antenna Gain (typical): 1 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0051 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

The EUT complies with 20 cm distance.

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used 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 47 CFR 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 a solder antenna on PCB. The maximum gain is 0 dBi; please refer to the EUT internal photos.

Result: Compliance.

§15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

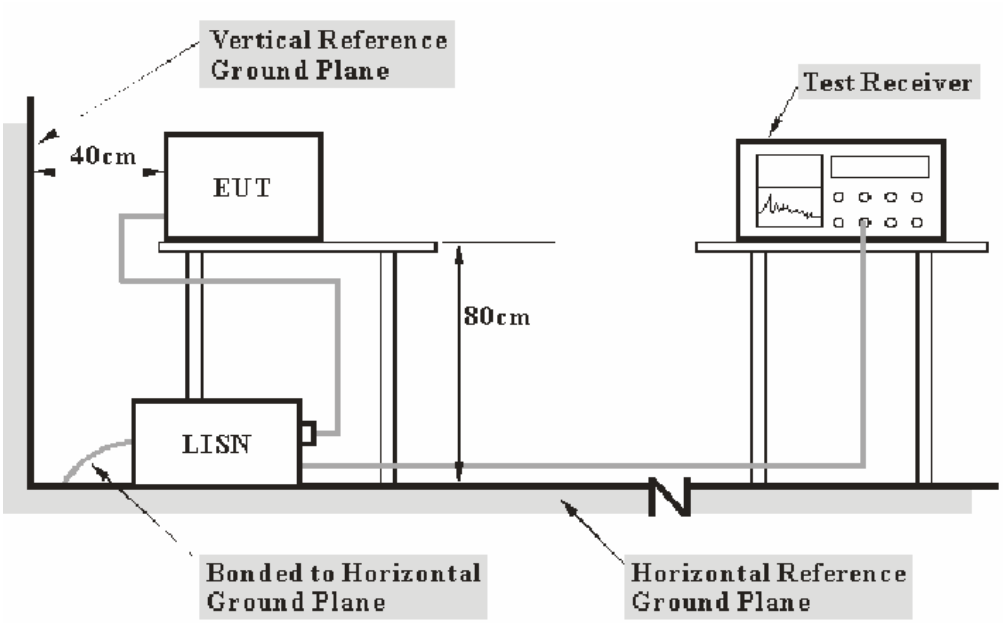
CFR47 §15.207

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 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	DE25330	2008-03-25	2009-03-25
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2008-03-25	2009-03-25

*** 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 1, the host PC and the monitor was connected to the LISN 2.

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:

802.11b: 7.60 dB at **2.7750 MHz** in the **Neutral** conductor mode

802.11g: 4.90 dB at **0.5500 MHz** in the **Line** conductor mode

Test Data

Environmental Conditions

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

The testing was performed by Chris Peng on 2008-12-30.

Test Mode: Transmitting (802.11b)

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	**Amplitude (dBµV)**	**Detector (QP/AV)**	**Conductor (Line/Neutral)**	**Limit (dBµV)**	**Margin (dB)**
2.7750	48.40	QP	Neutral	56.00	7.60
0.5250	47.60	QP	Line	56.00	8.40
1.0950	46.90	QP	Neutral	56.00	9.10
2.3700	46.00	QP	Line	56.00	10.00
0.5250	34.50	AV	Line	46.00	11.50
0.2700	47.20	QP	Line	61.12	13.92
2.7800	30.90	AV	Neutral	46.00	15.10
0.2500	45.00	QP	Neutral	61.76	16.76
0.1500	48.90	QP	Line	66.00	17.10
2.3800	27.20	AV	Line	46.00	18.80
0.2700	31.90	AV	Line	51.12	19.22
0.3750	38.80	QP	Neutral	58.39	19.59
0.2500	32.00	AV	Neutral	51.76	19.76
5.3900	34.60	QP	Neutral	60.00	25.40
28.0800	34.20	QP	Neutral	60.00	25.80
5.0450	33.10	QP	Line	60.00	26.90
28.2450	33.00	QP	Line	60.00	27.00
0.3750	20.20	AV	Neutral	48.39	28.19
28.3150	21.70	AV	Neutral	50.00	28.30
28.1650	21.10	AV	Line	50.00	28.90
1.0950	16.40	AV	Neutral	46.00	29.60
5.4150	17.60	AV	Neutral	50.00	32.40
5.0150	16.00	AV	Line	50.00	34.00
0.1500	15.80	AV	Line	56.00	40.20

Test Mode: Transmitting (802.11g)

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	**Amplitude (dBμV)**	**Detector (QP/AV)**	**Conductor (Line/Neutral)**	**Limit (dBμV)**	**Margin (dB)**
0.5500	41.10	AV	Line	46.00	4.90
2.7050	48.60	QP	Neutral	56.00	7.40
0.5500	48.00	QP	Line	56.00	8.00
1.1050	47.20	QP	Neutral	56.00	8.80
1.1000	36.50	AV	Neutral	46.00	9.50
2.3300	46.20	QP	Line	56.00	9.80
0.2750	40.60	AV	Line	50.97	10.37
0.2750	46.80	QP	Line	60.97	14.17
2.7250	31.80	AV	Neutral	46.00	14.20
0.2800	45.80	QP	Neutral	60.82	15.02
2.3400	30.90	AV	Line	46.00	15.10
0.2800	34.80	AV	Neutral	50.82	16.02
0.1500	49.40	QP	Line	66.00	16.60
0.1500	48.40	QP	Neutral	66.00	17.60
28.1050	34.50	QP	Neutral	60.00	25.50
5.4050	34.20	QP	Neutral	60.00	25.80
29.4850	33.70	QP	Line	60.00	26.30
28.1350	21.80	AV	Neutral	50.00	28.20
7.7550	29.30	QP	Line	60.00	30.70
29.2200	19.30	AV	Line	50.00	30.70
5.3850	15.90	AV	Neutral	50.00	34.10
7.7200	12.00	AV	Line	50.00	38.00
0.1500	17.10	AV	Neutral	56.00	38.90
0.1500	16.80	AV	Line	56.00	39.20

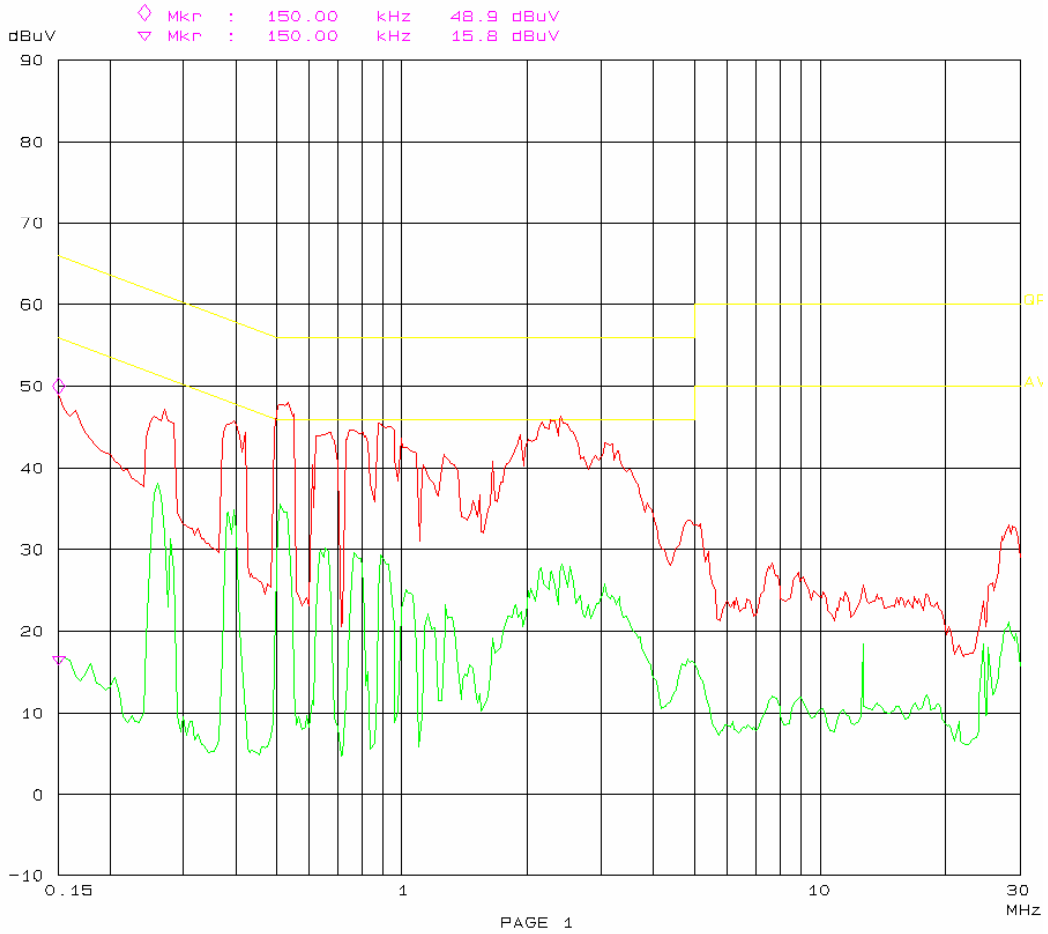
Plot(s) of Test Data

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

802.11b

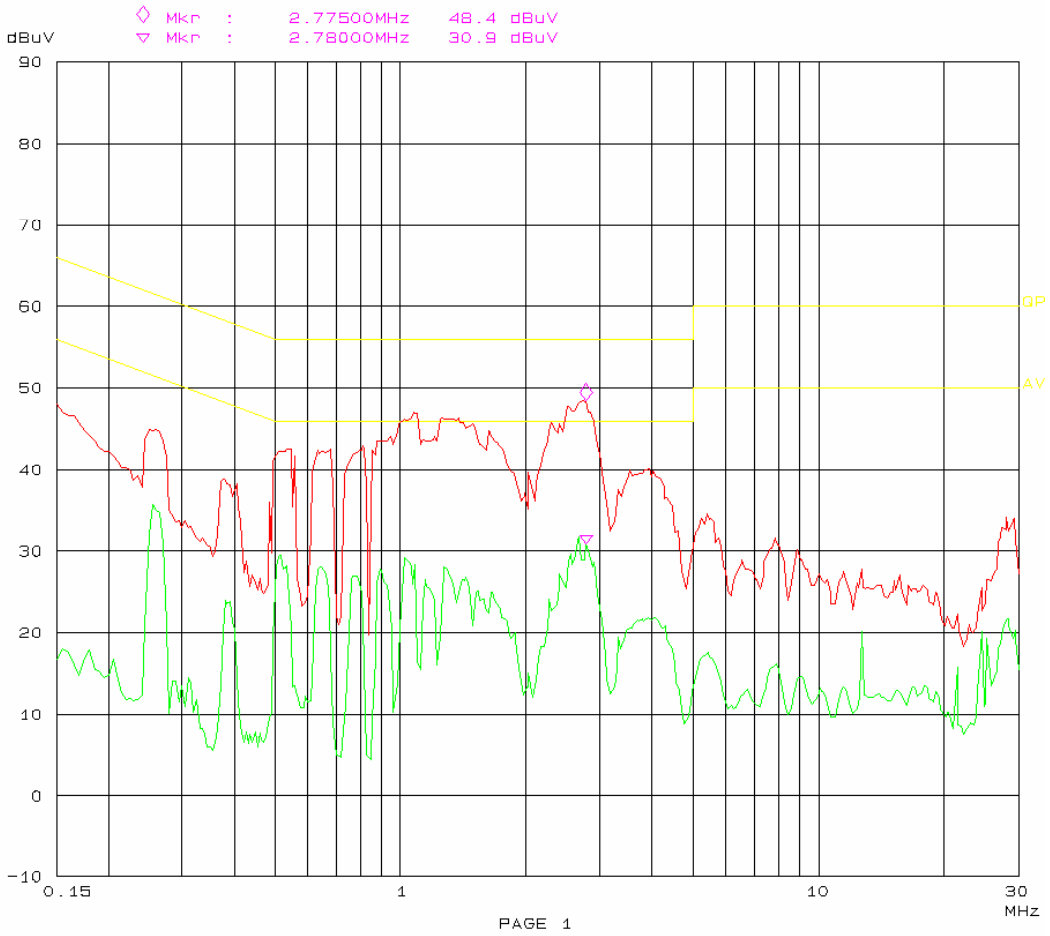
Conducted Emission
FCC 15.207

EUT:	WIFI INTERNET RADIO M/N: IR2000
Manuf:	NEO-TELECOM
Op Cond:	Transmitting
Operator:	Chris
Test Spec:	AC 120V/60Hz Line
Comment:	Temp: 25 Hum: 56%
	BACL



Conducted Emission
FCC 15.207

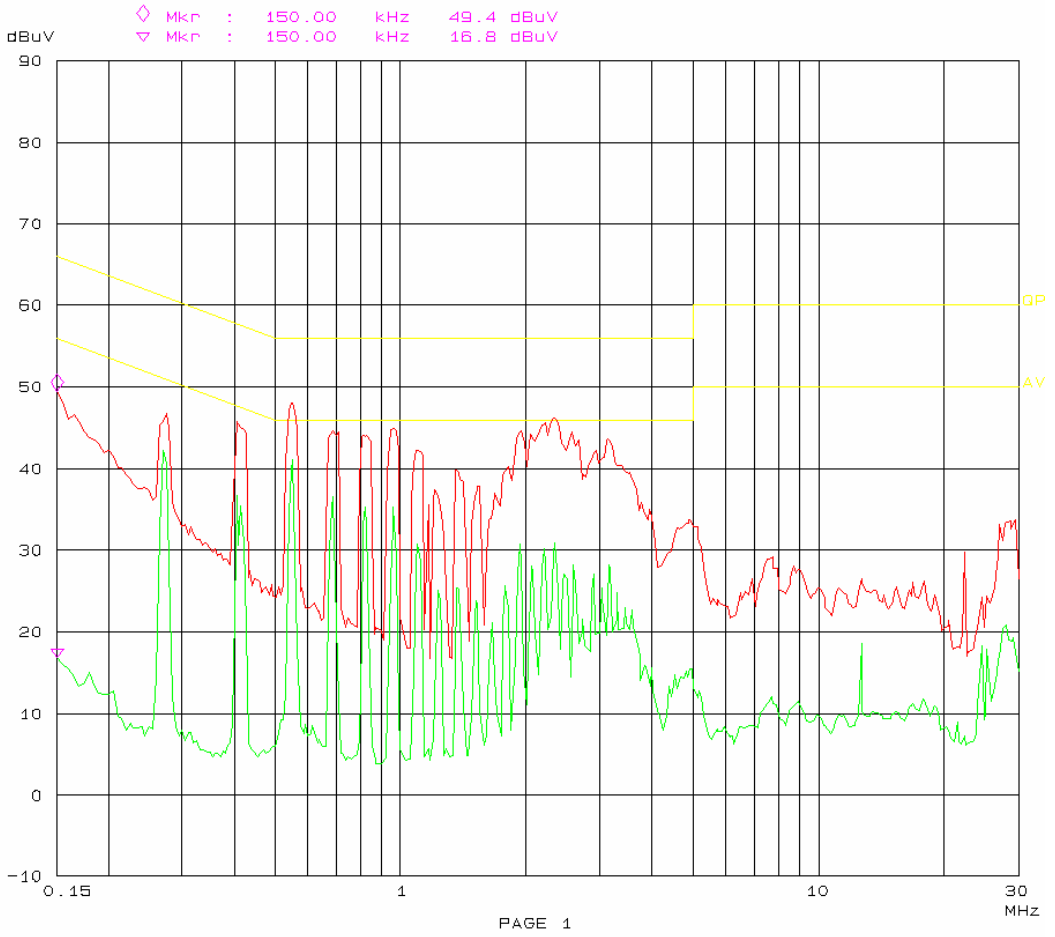
EUT:	WIFI INTERNET RADIO M/N: IR2000
Manuf:	NEO-TELECOM
Op Cond:	Transmitting
Operator:	Chris
Test Spec:	AC 120V/60Hz neutral
Comment:	Temp: 25 Hum: 56%
	BACL



802.11g

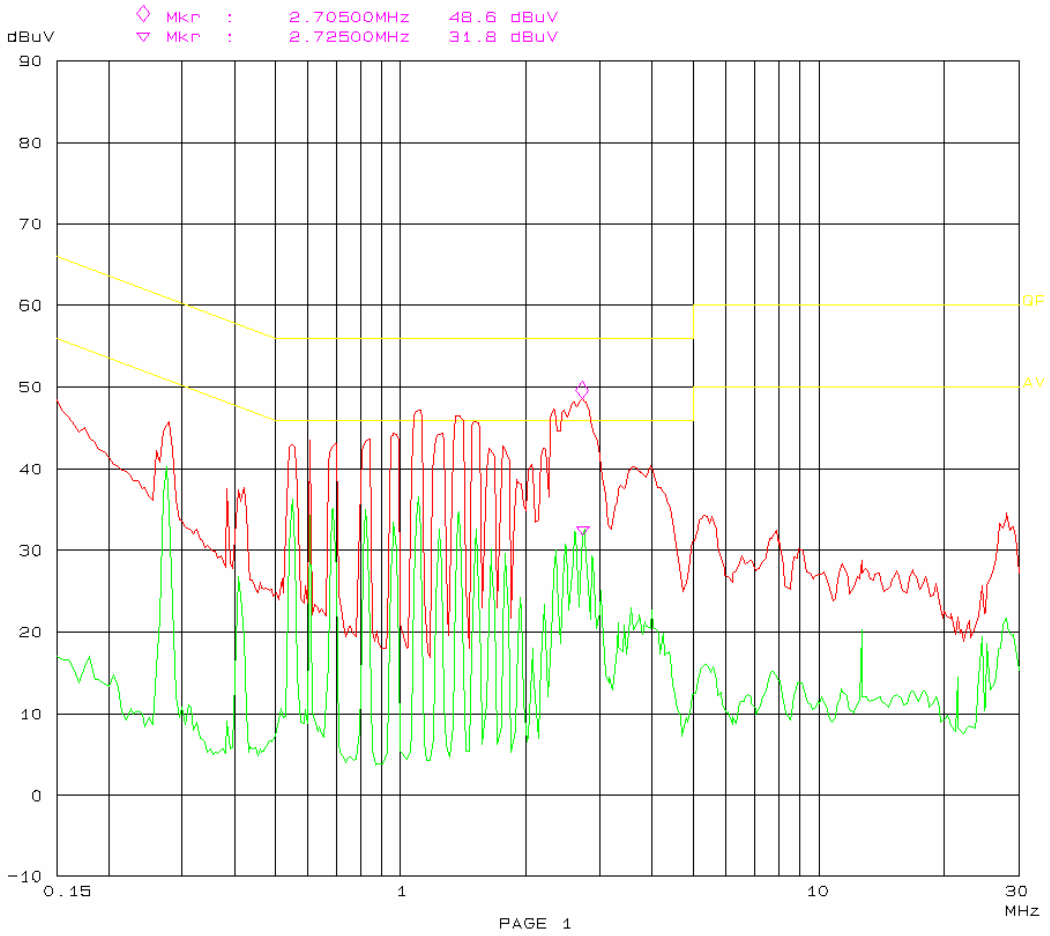
Conducted Emission
FCC 15.207

EUT:	WIFI INTERNET RADIO M/N: IR2000
Manuf:	NEO-TELECOM
Op Cond:	Transmitting
Operator:	Chris
Test Spec:	AC 120V/60Hz Line
Comment:	Temp: 25 Hum: 56%
	BACL



Conducted Emission
FCC 15.207

EUT:	WIFI INTERNET RADIO M/N: IR2000
Manuf:	NEO-TELECOM
Op Cond:	Transmitting
Operator:	Chris
Test Spec:	AC 120V/60Hz Neutral
Comment:	Temp: 25 Hum: 56%
	BACL



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

Applicable Standard

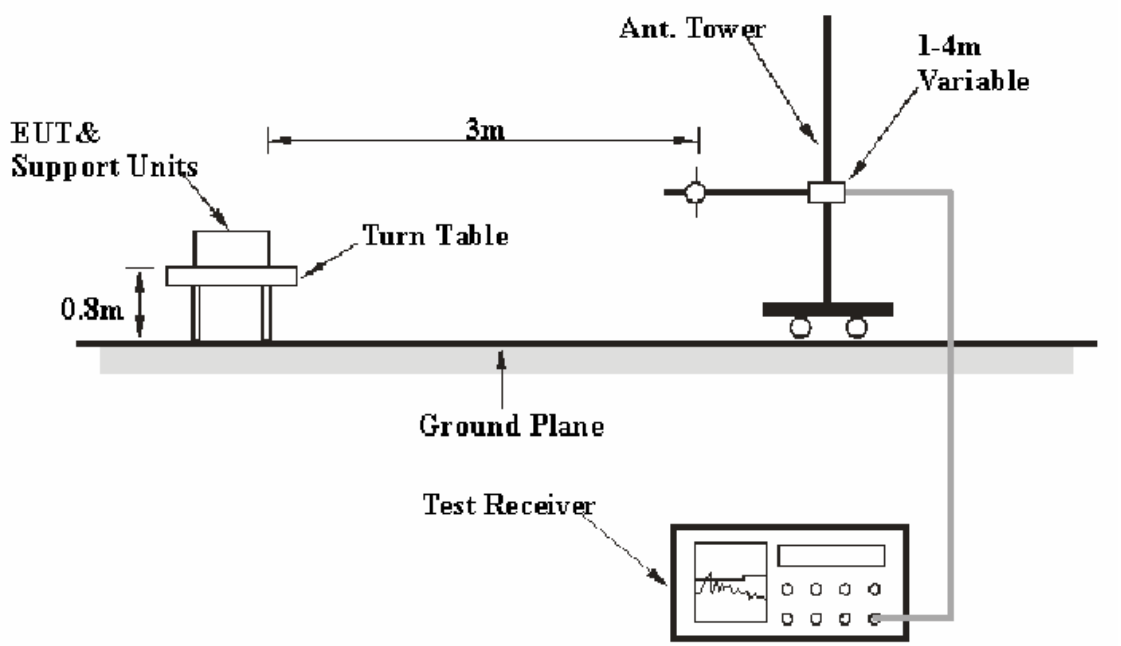
FCC §15.247 (d); §15.209; §15.205;

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 Part 15.209 15.205 and 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***
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	8447E	1937A01046	2008-11-15	2009-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2008-11-07	2009-11-06
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2008-04-12	2009-04-11
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	2008-08-28	2009-08-27

*** 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, the host PC and monitor were 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 for Class B. 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 15.209, 15.205, and 15.247, with the worst margin reading of:

30 -1000 MHz:

802.11b: 0.4 dB at **114.099150 MHz** in the **Horizontal** polarization
802.11g: 1.5 dB at **54.856250 MHz** in the **Vertical** polarization

Above 1GHz:

4.01 dB at **4824 MHz** in the **Horizontal** polarization**, 802.11b Low Channel**
3.04 dB at **4874 MHz** in the **Horizontal** polarization**, 802.11b Middle Channel**
3.25 dB at **4924 MHz** in the **Horizontal** polarization**, 802.11b High Channel**

8.69 dB at **4824 MHz** in the **Horizontal** polarization**, 802.11g Low Channel**
7.22 dB at **4874 MHz** in the **Horizontal** polarization**, 802.11g Middle Channel**
6.21 dB at **4924 MHz** in the **Horizontal** polarization**, 802.11g High Channel**

Test Data

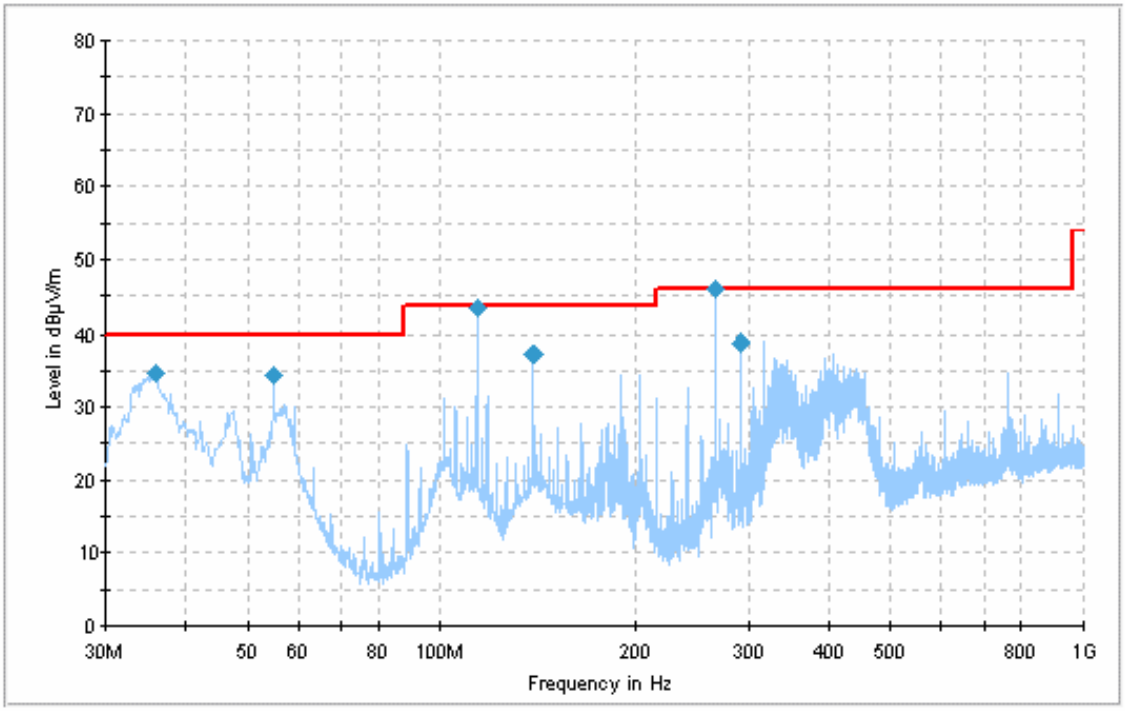
Environmental Conditions

Temperature:	24 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Chris Peng on 2008-12-25.

30-1000 MHz:

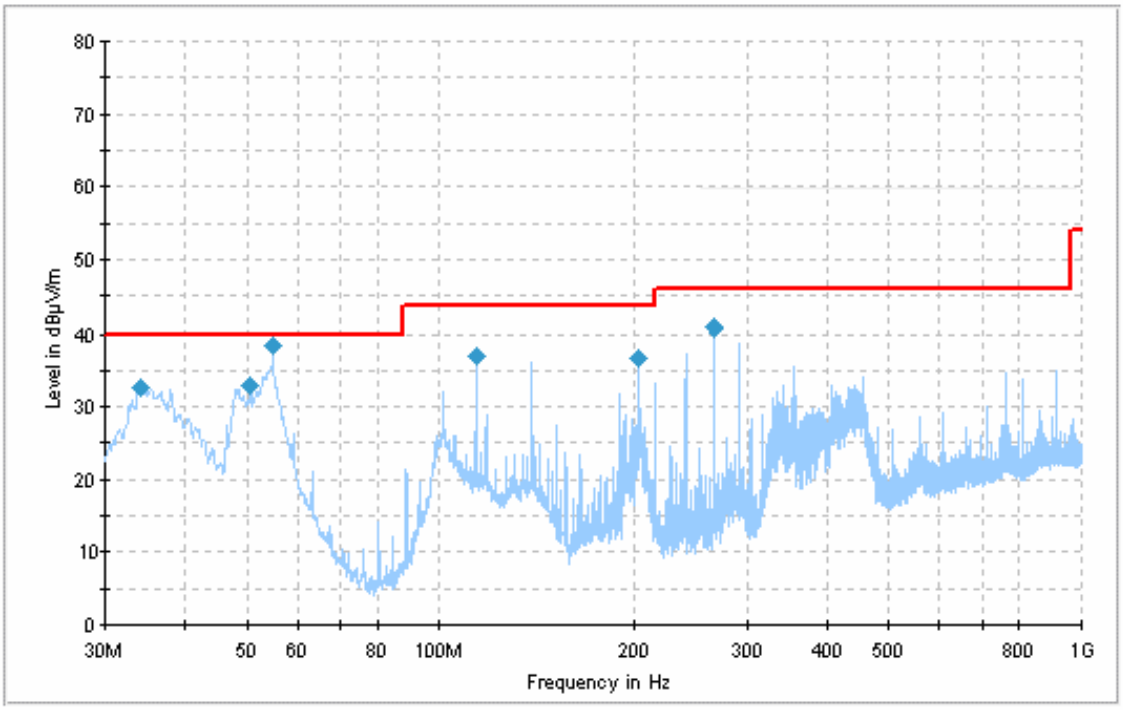
Test Mode: Transmitting (802.11b)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
114.099150	43.1	291.0	H	126.0	-19.1	43.5	0.4*
266.230100	45.5	128.0	H	81.0	-15.0	46.0	0.5*
35.941250	34.7	100.0	V	194.0	-12.4	40.0	5.3
54.947675	34.5	104.0	V	215.0	-21.3	40.0	5.5
139.453950	37.2	102.0	V	256.0	-18.7	43.5	6.3
291.536250	38.8	120.0	H	246.0	-12.3	46.0	7.2

** Within measurement uncertainty.*

Test Mode: Transmitting (802.11g)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
54.856250	38.5	102.0	V	52.0	-20.4	40.0	1.5*
266.203175	40.6	123.0	H	93.0	-15.0	46.0	5.4
114.096075	37.1	287.0	H	125.0	-19.1	43.5	6.4
202.587450	36.6	167.0	H	291.0	-17.0	43.5	6.9
50.612500	32.8	101.0	V	37.0	-21.3	40.0	7.2
34.238450	32.5	103.0	V	352.0	-11.4	40.0	7.5

** Within measurement uncertainty.*

Above 1GHz:

802.11b mode:

Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209			
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (2412 MHz)												
4824	41.13	AV	46	1.2	H	35.00	7.56	33.70	49.99	54	4.01	Harmonic
4824	39.78	AV	139	1.0	V	35.00	7.56	33.70	48.64	54	5.36	Harmonic
4824	56.00	PK	46	1.2	H	35.00	7.56	33.70	64.86	74	9.14	Harmonic
7236	31.20	AV	336	1.0	H	38.00	9.12	33.60	44.72	54	9.28	Harmonic
7236	31.12	AV	38	1.0	V	38.00	9.12	33.60	44.64	54	9.36	Harmonic
4824	53.31	PK	139	1.0	V	35.00	7.56	33.70	62.17	74	11.83	Harmonic
7236	43.44	PK	336	1.0	H	38.00	9.12	33.60	56.96	74	17.04	Harmonic
7236	43.15	PK	38	1.0	V	38.00	9.12	33.60	56.67	74	17.33	Harmonic
Middle Channel (2437 MHz)												
4874	41.86	AV	245	1.5	H	35.20	7.60	33.70	50.96	54	3.04*	Harmonic
4874	41.02	AV	180	1.0	V	35.20	7.60	33.70	50.12	54	3.88*	Harmonic
4874	58.76	PK	120	1.0	V	35.20	7.60	33.70	67.86	74	6.14	Harmonic
4874	57.71	PK	245	1.5	H	35.20	7.60	33.70	66.81	74	7.19	Harmonic
7311	32.46	AV	180	1.0	V	38.10	9.17	33.60	46.13	54	7.87	Harmonic
7311	31.44	AV	56	1.2	H	38.10	9.17	33.60	45.11	54	8.89	Harmonic
7311	46.58	PK	180	1.0	V	38.10	9.17	33.60	60.25	74	13.75	Harmonic
7311	43.56	PK	56	1.2	H	38.10	9.17	33.60	57.23	74	16.77	Harmonic
HighChannel (2462 MHz)												
4924	41.50	AV	255	1.0	V	35.20	7.75	33.70	50.75	54	3.25*	Harmonic
4924	41.24	AV	180	1.4	H	35.20	7.75	33.70	50.49	54	3.51*	Harmonic
4924	58.65	PK	180	1.4	H	35.20	7.75	33.70	67.90	74	6.10	Harmonic
4924	58.45	PK	255	1.0	V	35.20	7.75	33.70	67.70	74	6.30	Harmonic
7386	32.14	AV	179	1.2	H	38.10	9.17	33.60	45.81	54	8.19	Harmonic
7386	31.57	AV	303	1.0	V	38.10	9.17	33.60	45.24	54	8.76	Harmonic
7386	46.72	PK	179	1.2	H	38.10	9.17	33.60	60.39	74	13.61	Harmonic
7386	45.85	PK	303	1.0	V	38.10	9.17	33.60	59.52	74	14.48	Harmonic

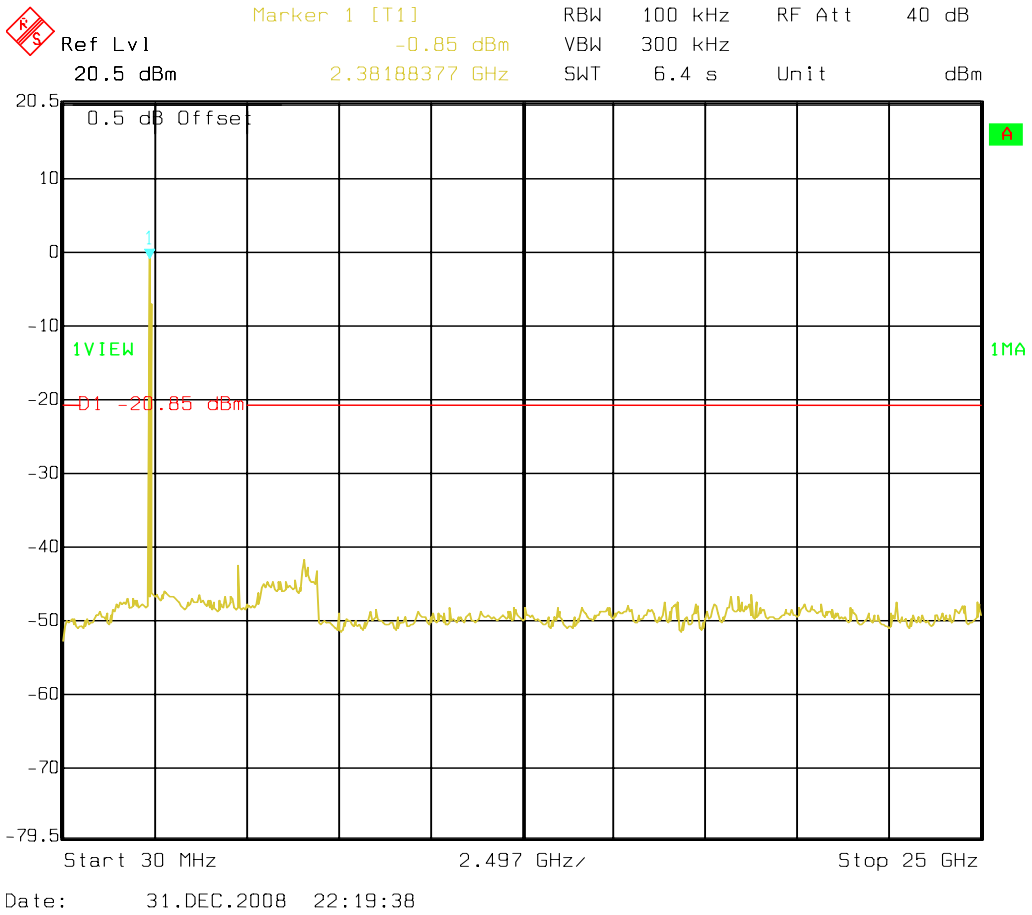
** Within measurement uncertainty.*

802.11g mode:

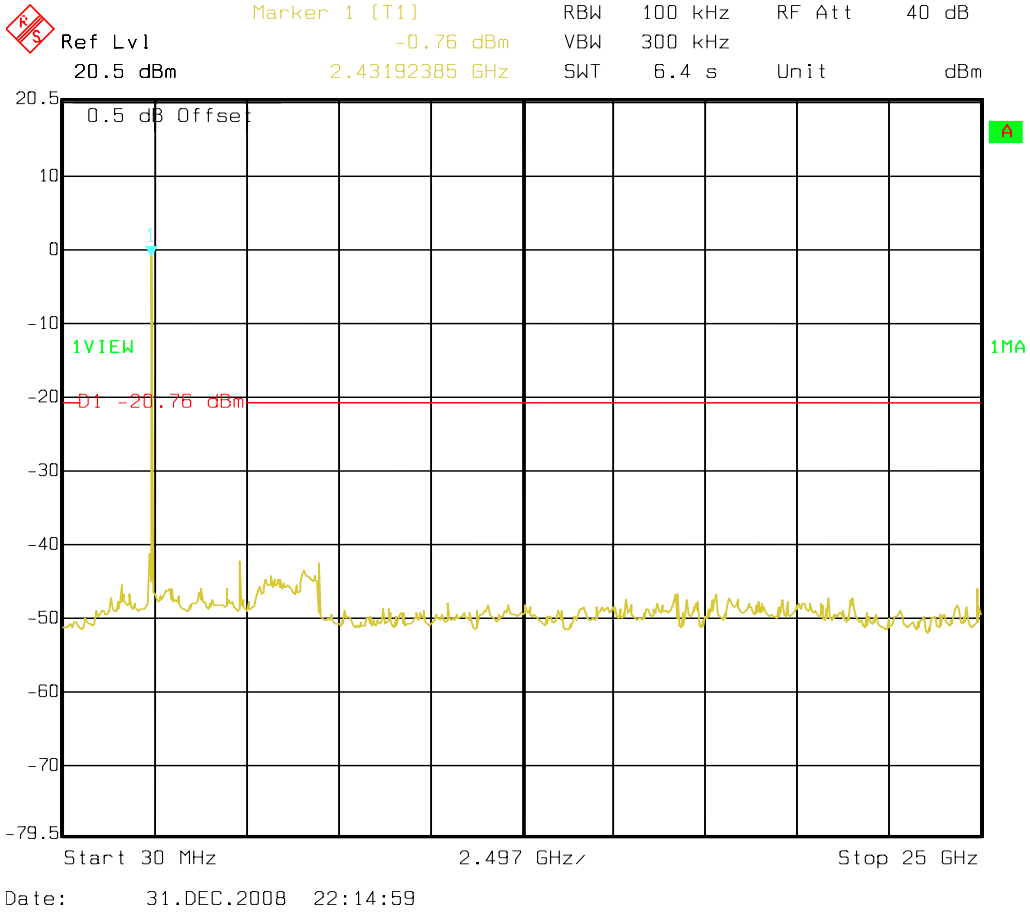
Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209			
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre -Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (2412 MHz)												
4824	36.45	AV	45	1.2	H	35.00	7.56	33.70	45.31	54	8.69	Harmonic
7326	31.00	AV	273	1.2	H	38.00	9.12	33.60	44.52	54	9.48	Harmonic
7326	31.00	AV	145	1.0	V	38.00	9.12	33.60	44.52	54	9.48	Harmonic
4824	34.23	AV	96	1.0	V	35.00	7.56	33.70	43.09	54	10.91	Harmonic
4824	49.52	PK	45	1.2	H	35.00	7.56	33.70	58.38	74	15.62	Harmonic
4824	48.77	PK	96	1.0	V	35.00	7.56	33.70	57.63	74	16.37	Harmonic
7326	43.56	PK	273	1.2	H	38.00	9.12	33.60	57.08	74	16.92	Harmonic
7326	42.10	PK	145	1.0	V	38.00	9.12	33.60	55.62	74	18.38	Harmonic
Middle Channel (2437 MHz)												
4874	37.68	AV	135	1.5	H	35.20	7.60	33.70	46.78	54	7.22	Harmonic
7311	31.41	AV	260	1.2	H	38.10	9.17	33.60	45.08	54	8.92	Harmonic
7311	31.05	AV	236	1.0	V	38.10	9.17	33.60	44.72	54	9.28	Harmonic
4874	35.27	AV	145	1.0	V	35.20	7.60	33.70	44.37	54	9.63	Harmonic
4874	51.64	PK	145	1.0	V	35.20	7.60	33.70	60.74	74	13.26	Harmonic
4874	51.11	PK	135	1.5	H	35.20	7.60	33.70	60.21	74	13.79	Harmonic
7311	43.20	PK	260	1.2	H	38.10	9.17	33.60	56.87	74	17.13	Harmonic
7311	41.50	PK	236	1.0	V	38.10	9.17	33.60	55.17	74	18.83	Harmonic
HighChannel (2462 MHz)												
4924	38.54	AV	140	1.3	H	35.20	7.75	33.70	47.79	54	6.21	Harmonic
4924	37.64	AV	180	1.0	V	35.20	7.75	33.70	46.89	54	7.11	Harmonic
7386	31.10	AV	172	1.5	H	38.10	9.17	33.60	44.77	54	9.23	Harmonic
7386	31.00	AV	137	1.0	V	38.10	9.17	33.60	44.67	54	9.33	Harmonic
4924	52.85	PK	140	1.3	H	35.20	7.75	33.70	62.10	74	11.90	Harmonic
4924	51.71	PK	180	1.0	V	35.20	7.75	33.70	60.96	74	13.04	Harmonic
7386	42.30	PK	172	1.5	H	38.10	9.17	33.60	55.97	74	18.03	Harmonic
7386	41.37	PK	137	1.0	V	38.10	9.17	33.60	55.04	74	18.96	Harmonic

Antenna Port Conducted Spurious Emissions

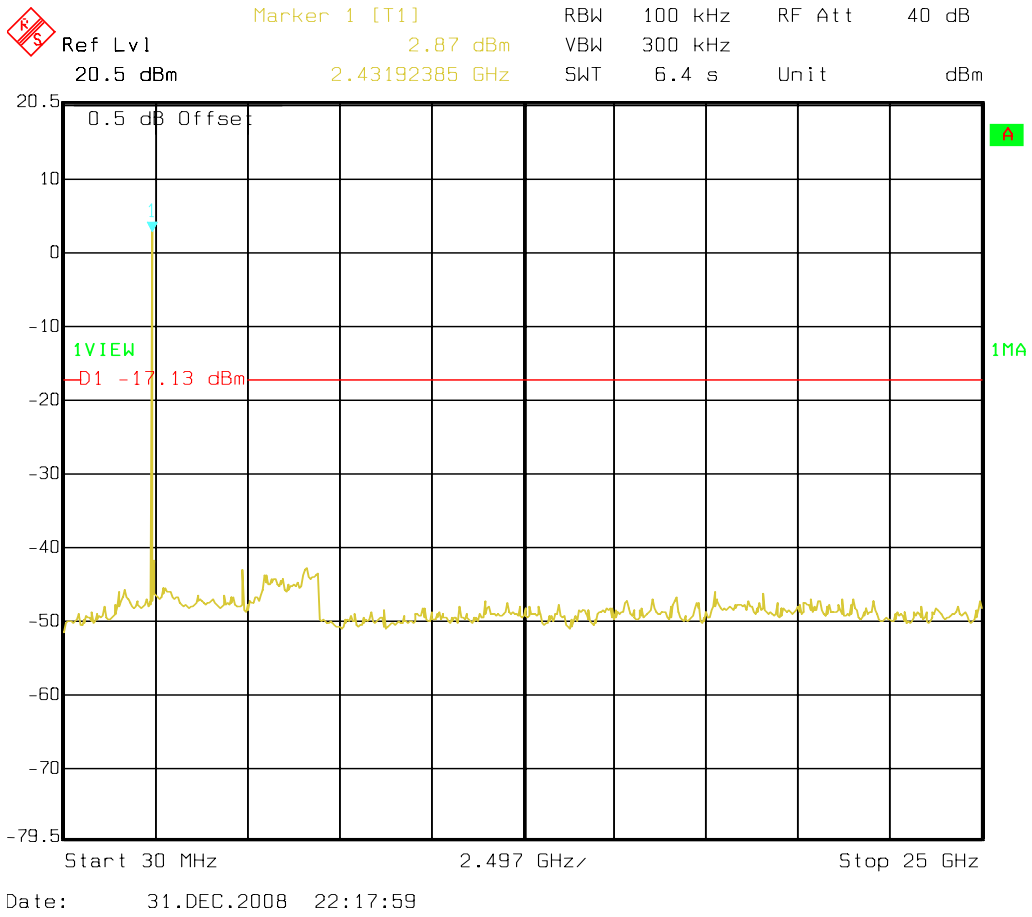
802.11b Low Channel



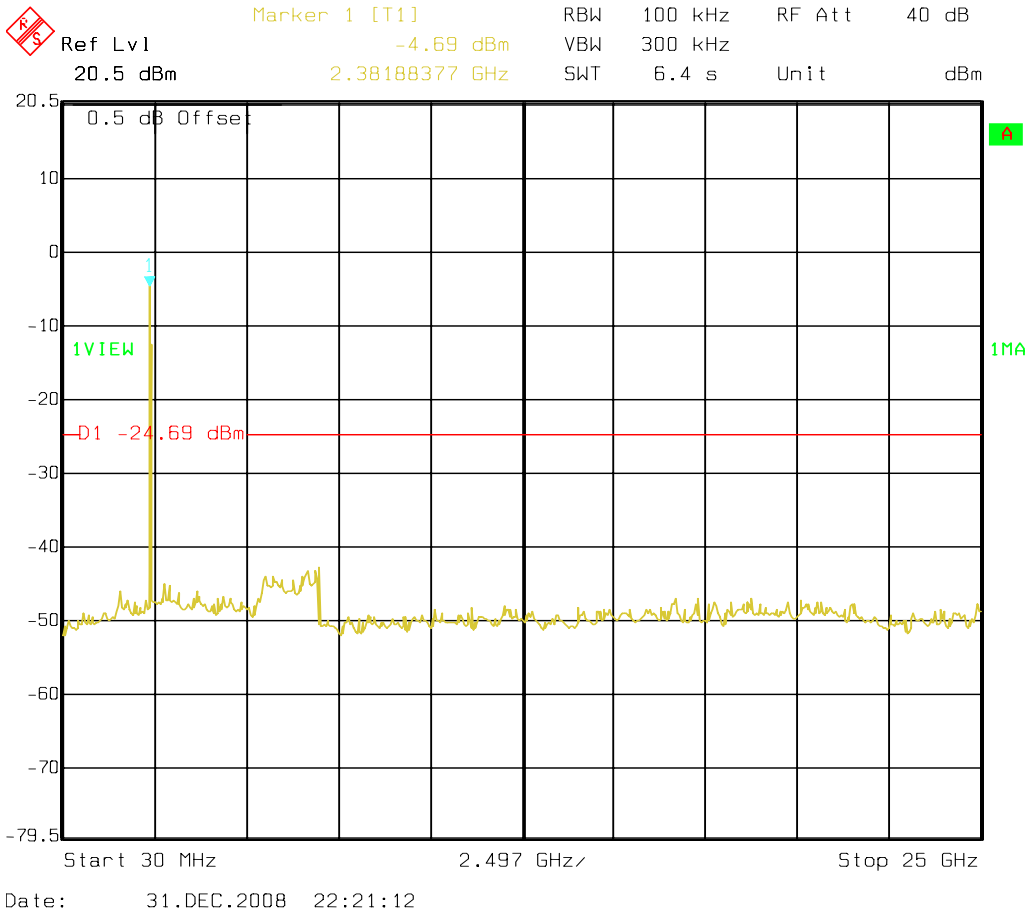
802.11b Middle Channel



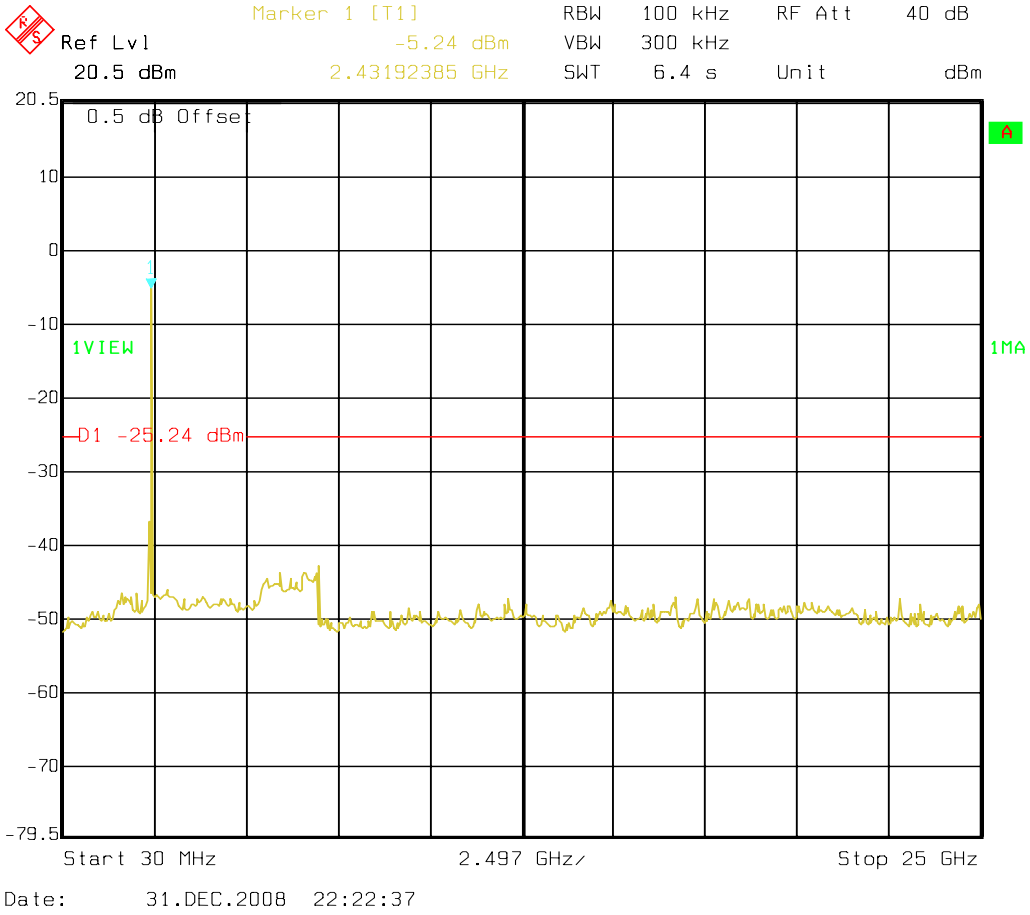
802.11b High Channel



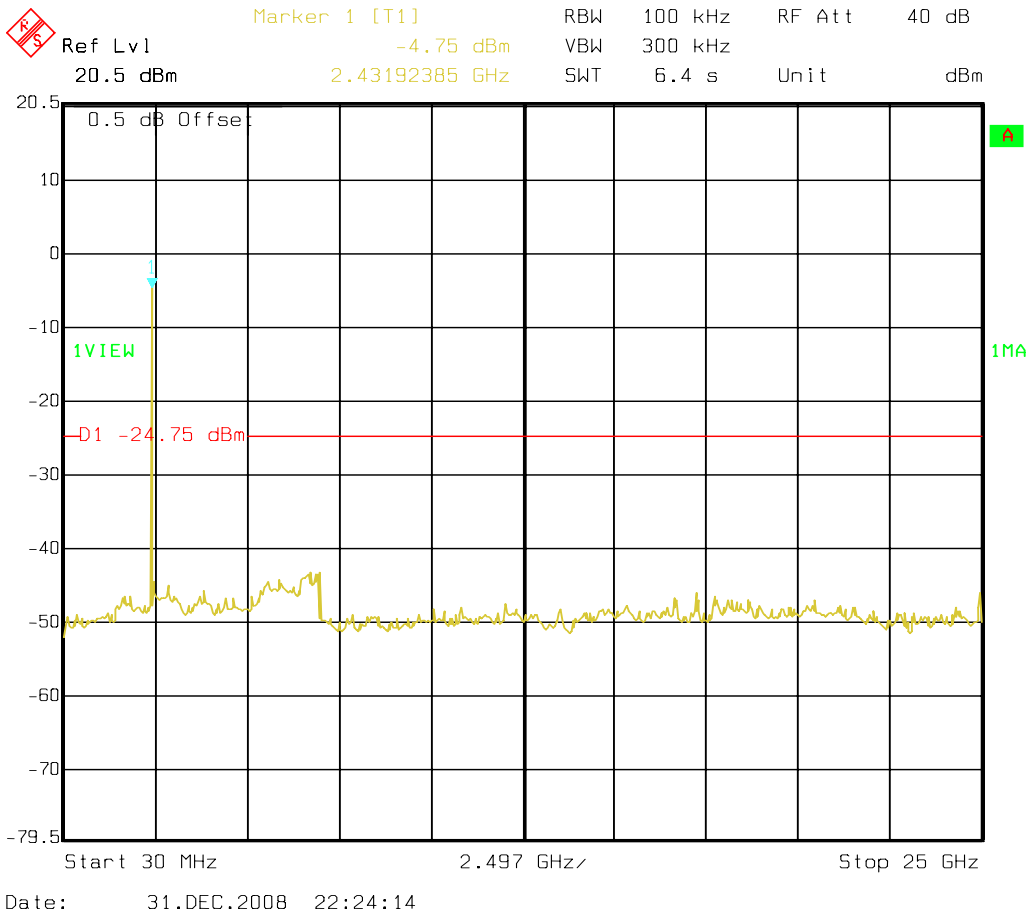
802.11g Low Channel



802.11g Middle Channel



802.11g High Channel



§15.247(a) (2) – 6dB BANDWIDTH TESTING

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06

*** 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 6 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:	25 °C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

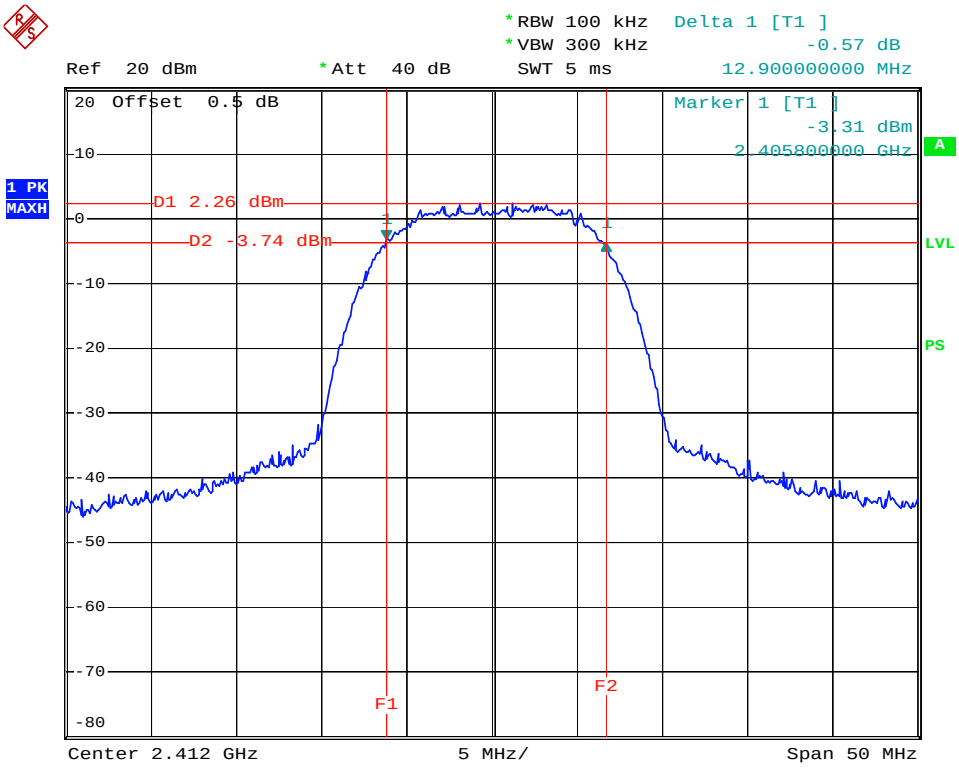
The testing was performed by Chris Peng on 2008-12-30.

Test Result: Compliance.

Please refer to the following tables and plots.

Channel	Channel Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)	Limit (kHz)
802.11b Mode				
1	2412	11	12900	＞500
6	2437	11	12500	＞500
11	2462	11	12600	＞500
802.11g Mode				
1	2412	54	16300	＞500
6	2437	54	16500	＞500
11	2462	54	16500	＞500

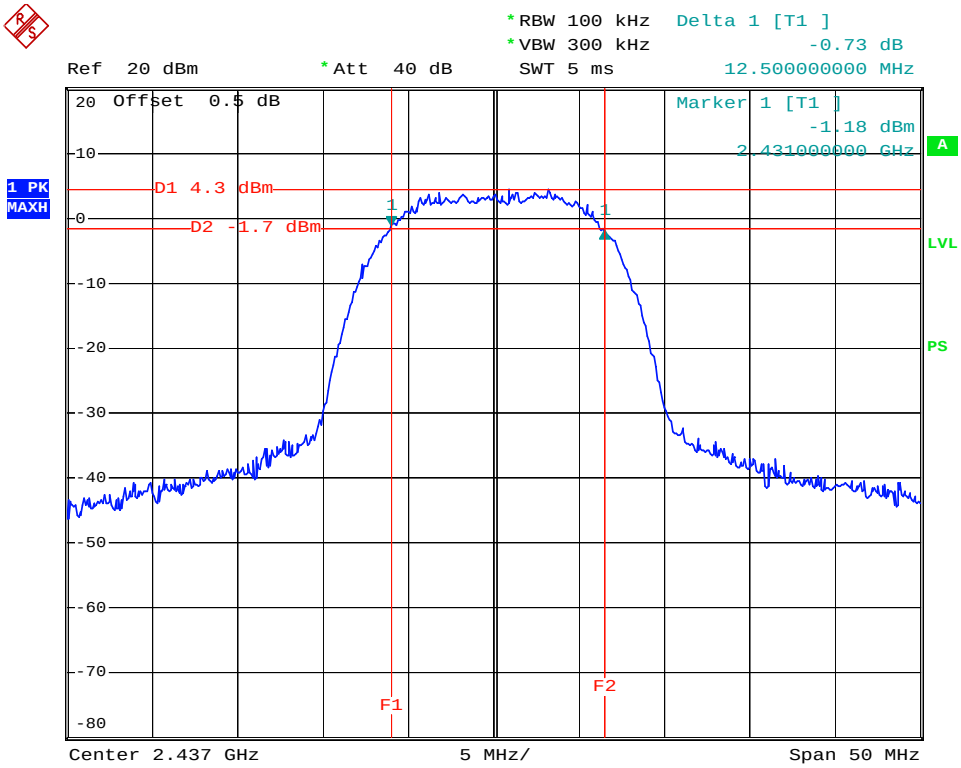
802.11b Low Channel



802.11b,low channel,6dB bandwidth

Date: 30.DEC.2008 21:47:10

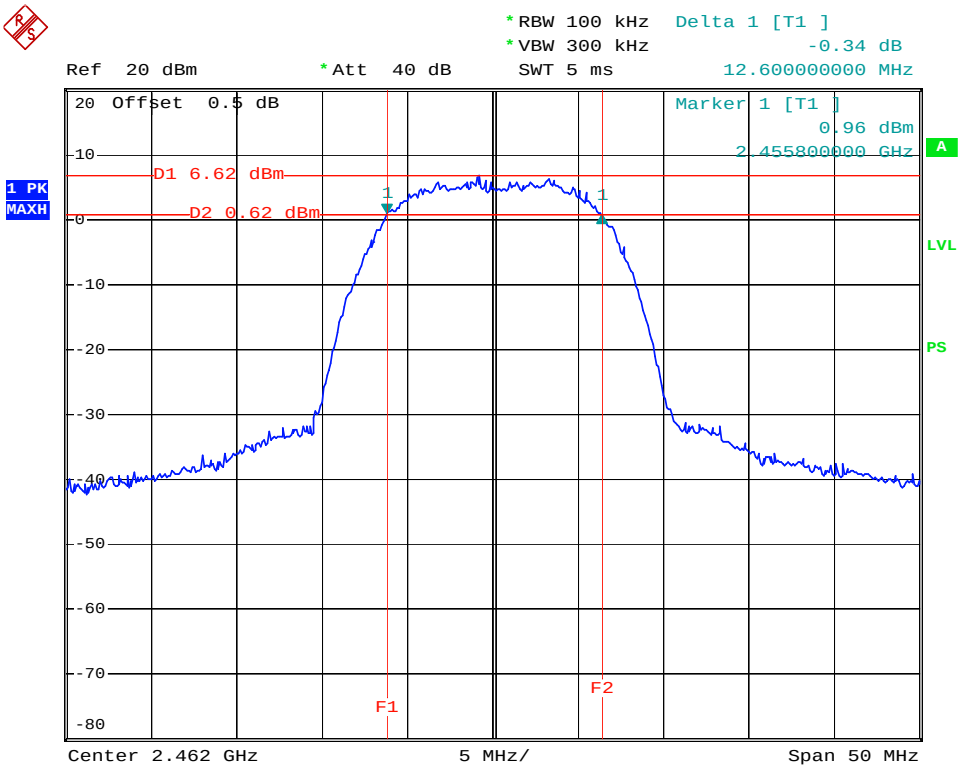
802.11b Middle Channel



802.11b,middle channel,6dB bandwidth

Date: 30.DEC.2008 21:52:11

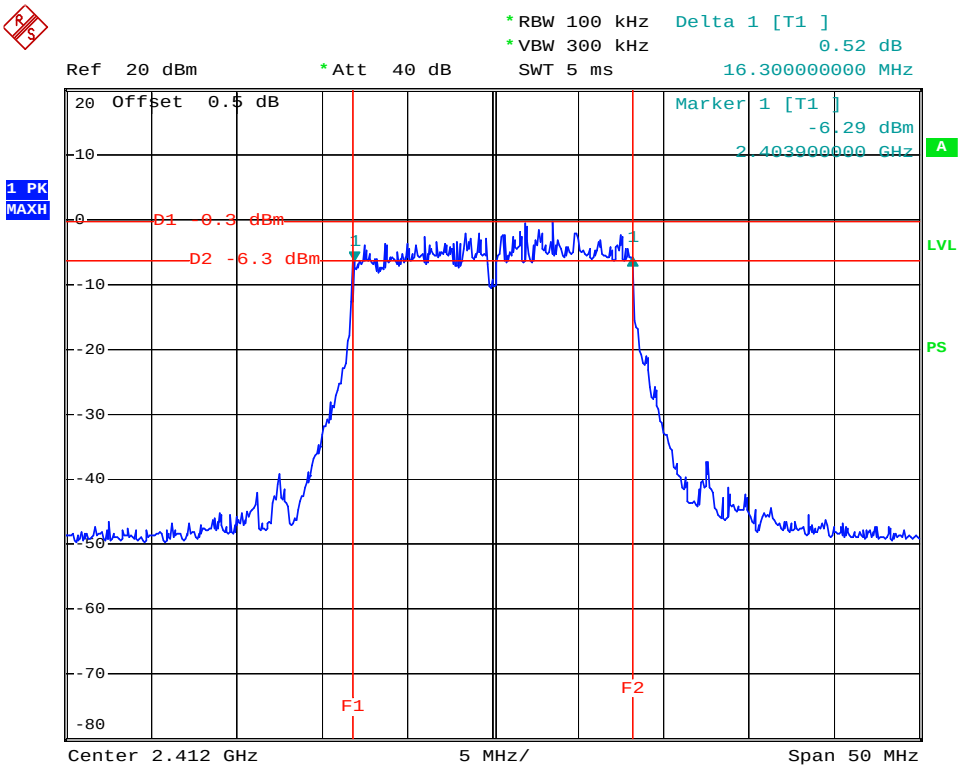
802.11b High Channel



802.11b,high channel,6dB bandwidth

Date: 30.DEC.2008 21:58:40

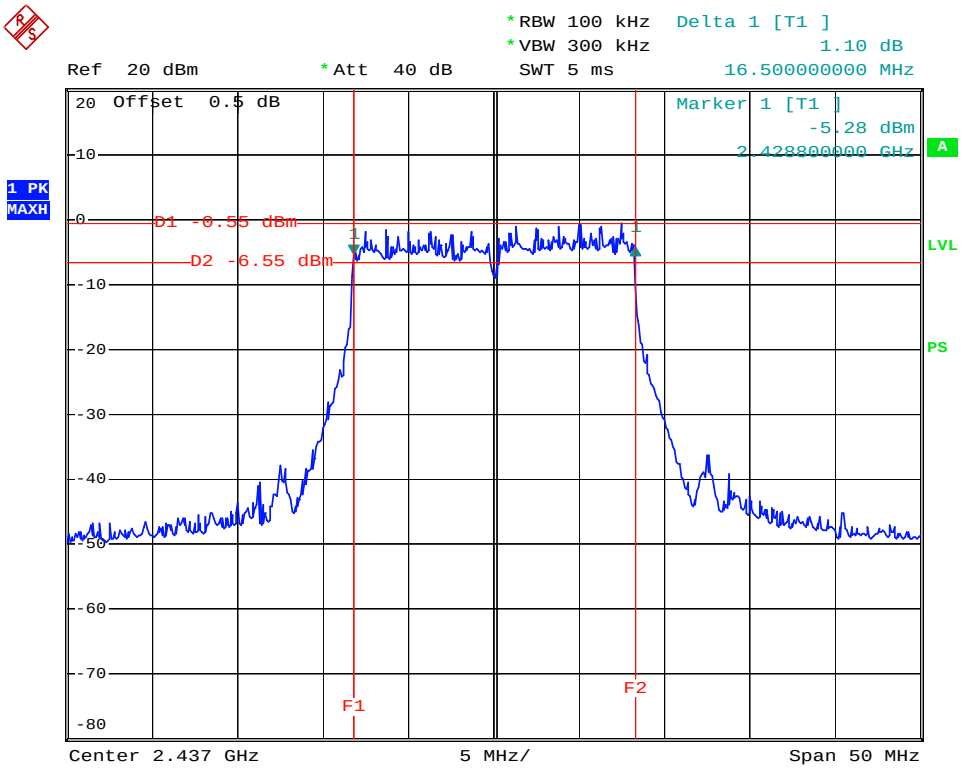
802.11g Low Channel



802.11g,low channel,6dB bandwidth

Date: 30.DEC.2008 22:02:07

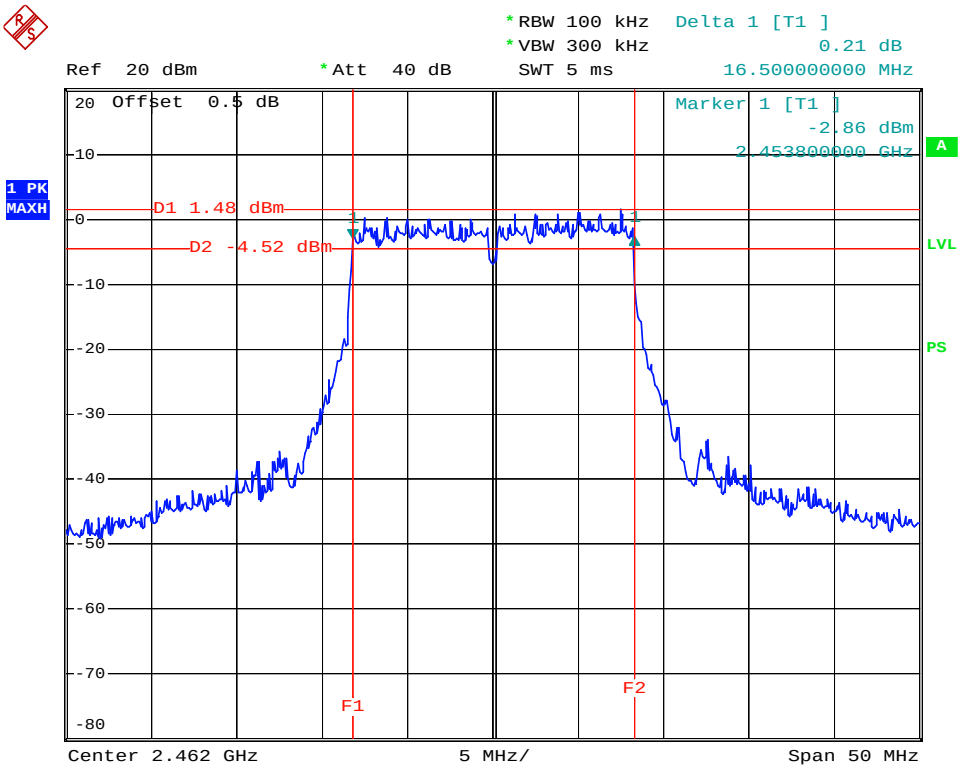
802.11g Middle Channel



802.11g,middle channel,6dB bandwidth

Date: 30.DEC.2008 22:05:04

802.11g High Channel



802.11g,high channel,6dB bandwidth

Date: 30.DEC.2008 22:07:21

§15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to §15.247(b) (3), for systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

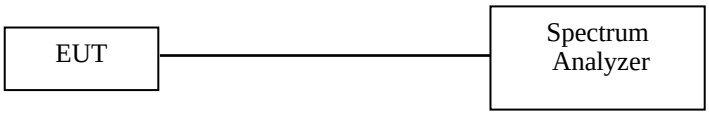
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06

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

The testing was performed by Chris Peng on 2008-12-30.

Test Mode: Transmitting

Test Result: Compliance.

Please refer to the following tables and plots.

802.11b Mode:

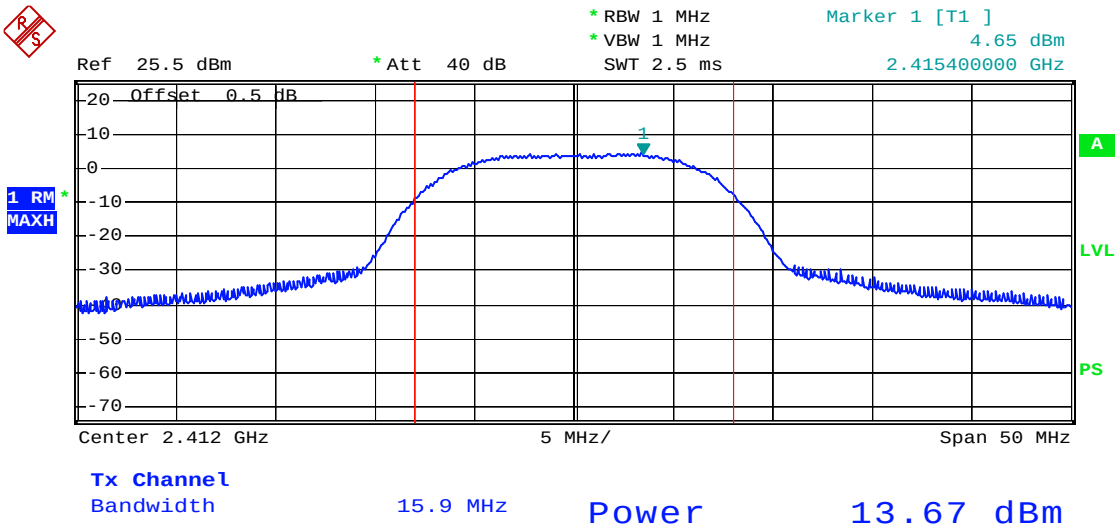
Channel	Channel Frequency (MHz)	Data Rate (Mbps)	Power Output (dBm)	Limit (dBm)
1	2412	1	13.67	30
6	2437	1	15.38	30
11	2462	1	17.53	30

802.11g Mode:

Channel	Channel Frequency (MHz)	Data Rate (Mbps)	Power Output (dBm)	Limit (dBm)
1	2412	6	11.68	30
6	2437	6	12.00	30
11	2462	6	14.08	30

802.11b Mode:

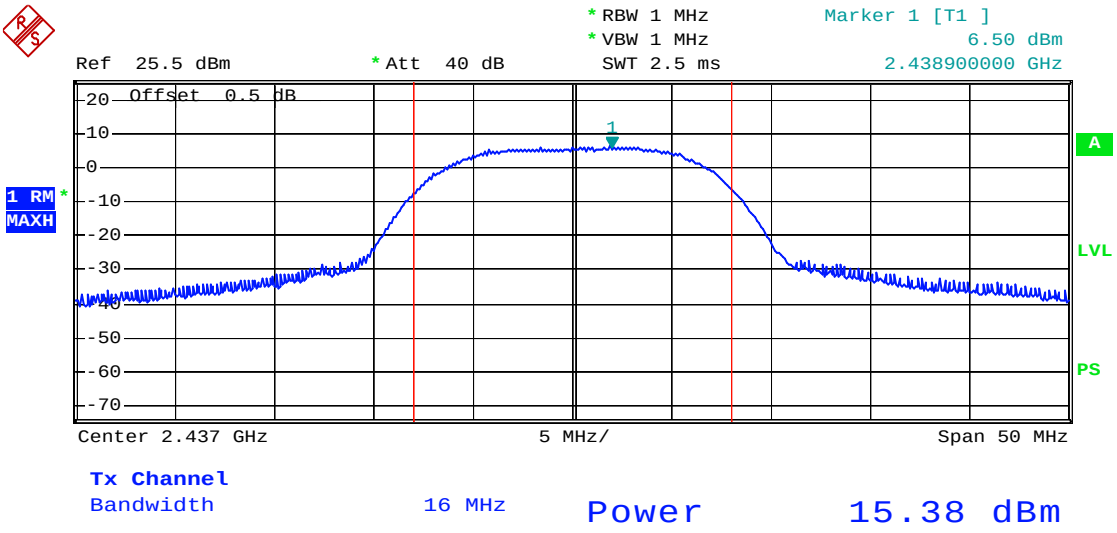
802.11b Low Channel



802.11b,low channel, output power

Date: 30.DEC.2008 22:52:36

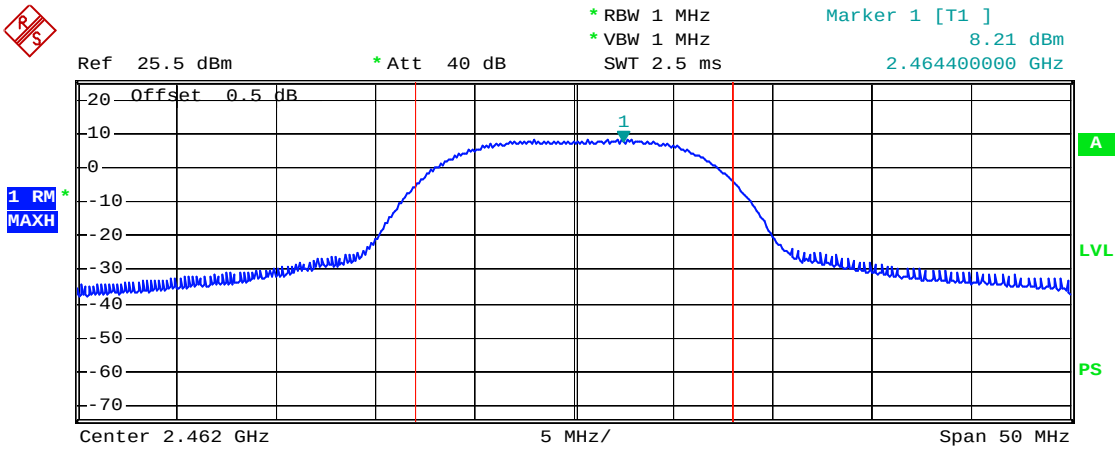
802.11b Middle Channel



802.11b,middle channel, output power

Date: 30.DEC.2008 22:58:57

802.11b High Channel



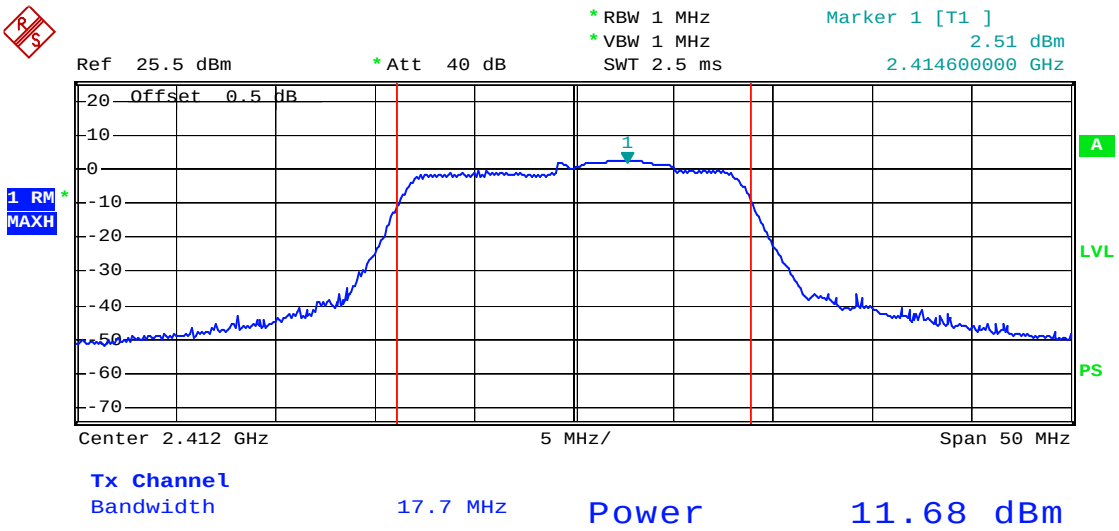
Tx Channel
Bandwidth 16 MHz Power 17.53 dBm

802.11b,high channel, output power

Date: 30.DEC.2008 23:15:04

802.11g Mode:

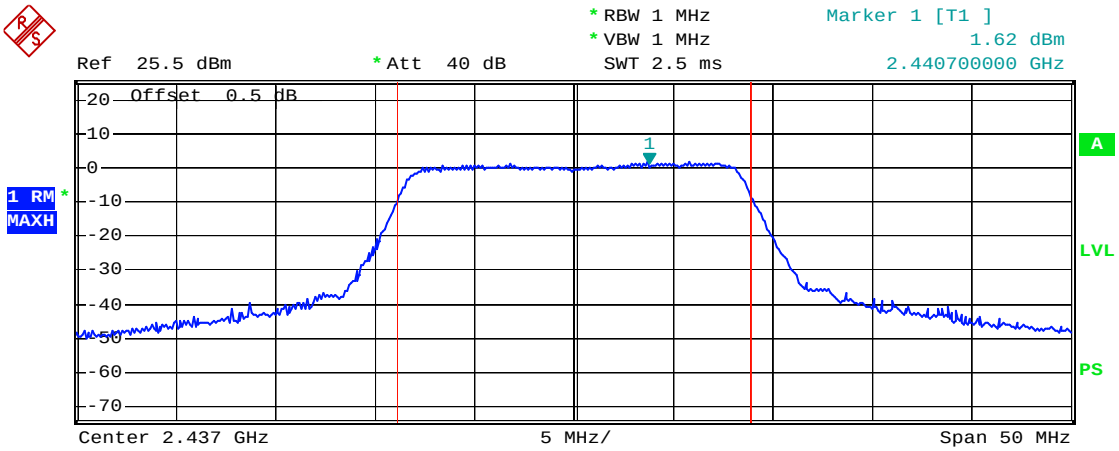
802.11g Low Channel



802.11g,low channel, output power

Date: 30.DEC.2008 23:46:00

802.11g Middle Channel

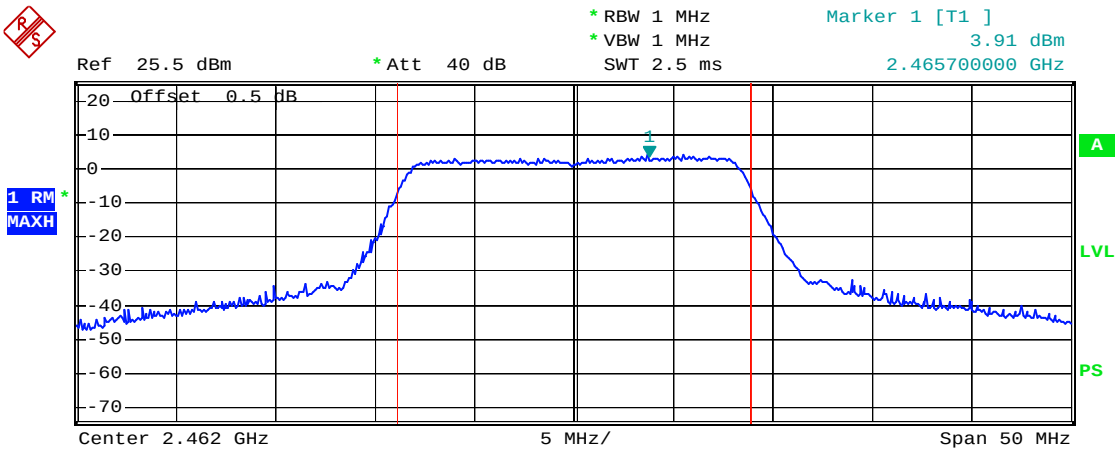


Tx Channel
Bandwidth 17.8 MHz Power 12.00 dBm

802.11g,middle channel, output power

Date: 30.DEC.2008 23:54:02

802.11g High Channel



Tx Channel
Bandwidth 17.7 MHz Power 14.08 dBm

802.11g,high channel, output power

Date: 30.DEC.2008 23:59:36

§15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

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	2008-11-07	2009-11-06

*** 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 its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
   Note: For Rdstricted Band
   RBW=100 kHz
   VBW=300 kHz
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:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

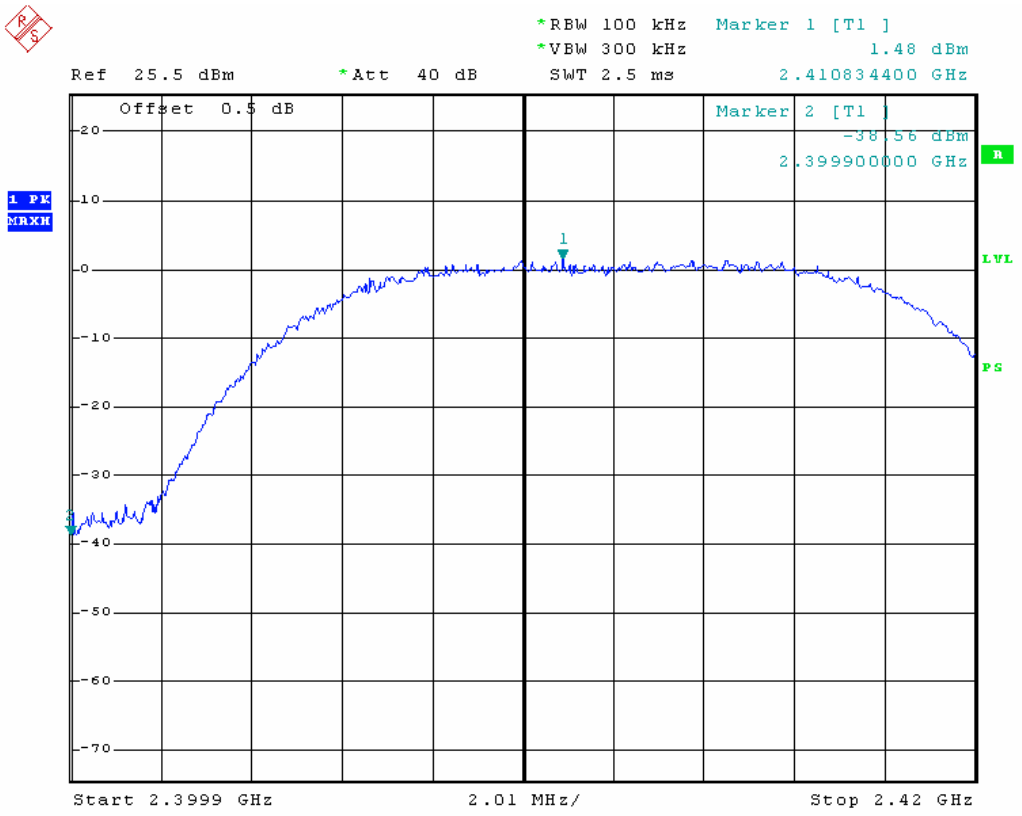
The testing was performed by Chris Peng on 2008-12-31.

Test Result: Compliance.

Frequency (MHz)	Data Rate (Mbps)	Delta Value (dBc)	Limit (dBc)	Ref Plot	Result
802.11b					
2399.9	1	40.04	20	PLOT1	Pass
2483.6	1	44.81	20	PLOT2	Pass
802.11g					
2399.9	6	42.51	20	PLOT3	Pass
2483.6	6	44.26	20	PLOT4	Pass

Please refer to following plots.

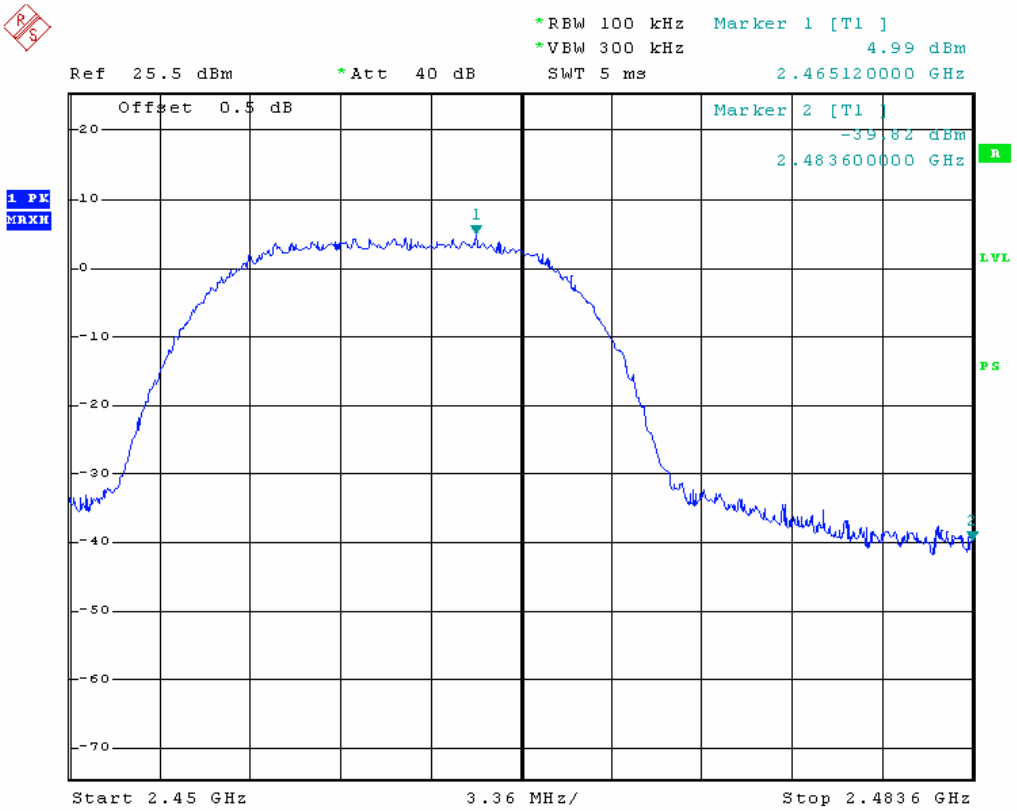
Plot 1:



802.11b out of bandedge, left

Date: 31.DEC.2008 22:23:29

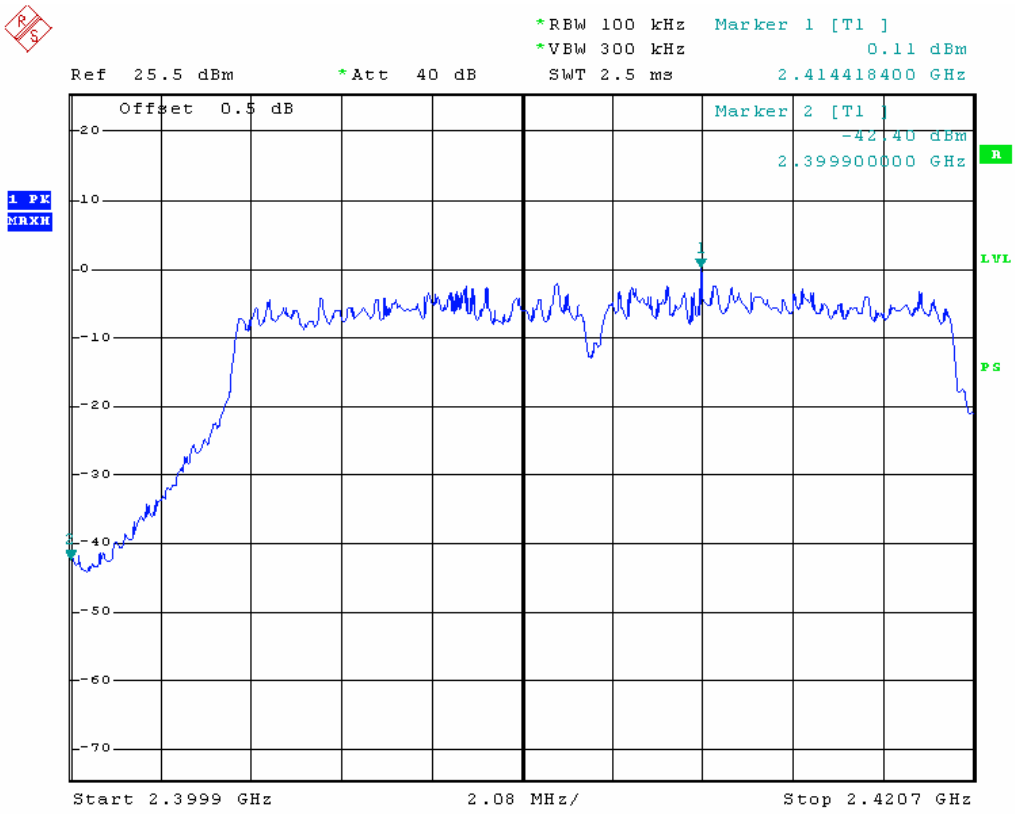
Plot 2:



802.11b out of bandedge, right

Date: 31.DEC.2008 22:07:53

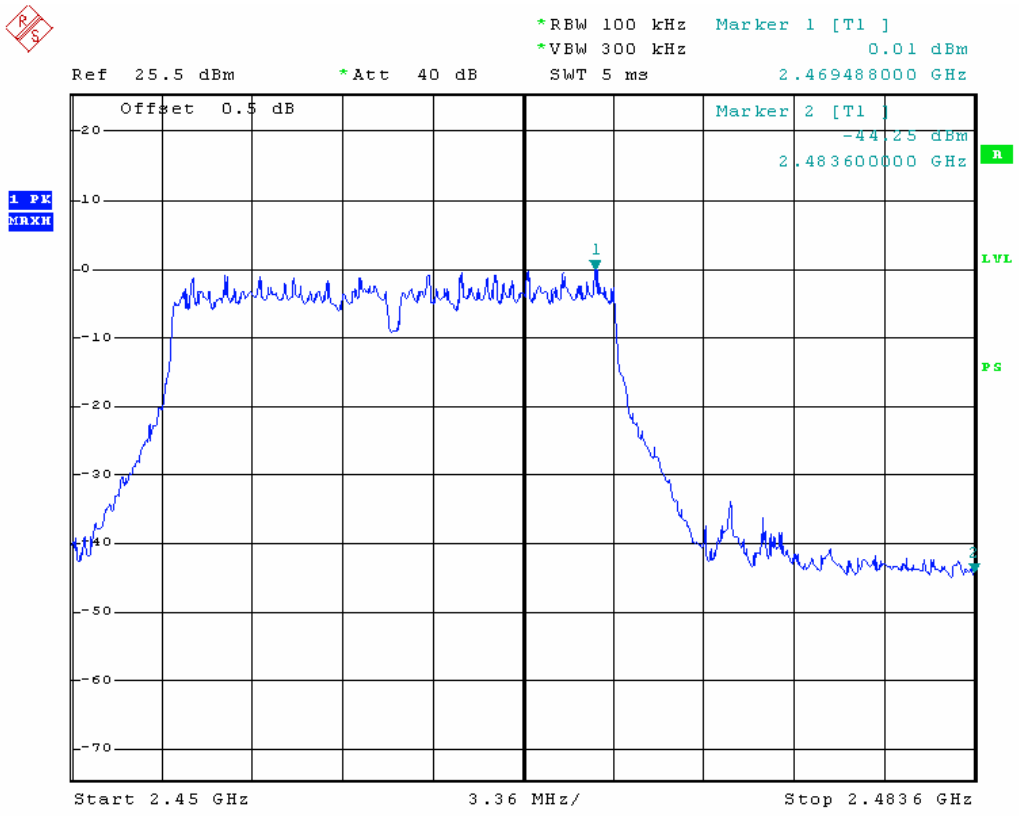
Plot 3:



802.11g out of bandedge, left

Date: 31.DEC.2008 21:43:32

Plot 4:



802.11g out of bandedge, right

Date: 31.DEC.2008 22:04:36

Restricted Bands

Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/209		
Frequency (MHz)	S.A. Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Out of left side band (802.11b mode)											
2389.60	65.86	PK	176	1.5	H	30.90	7.90	33.90	70.76	74	3.24
2383.30	63.51	PK	98	1.0	V	30.30	7.90	33.90	67.81	74	6.19
2389.60	37.81	AV	176	1.5	H	30.90	7.90	33.90	42.71	54	11.29
2383.30	33.58	AV	98	1.0	V	30.30	7.90	33.90	37.88	54	16.12
Out of left right band (802.11b mode)											
2485.40	65.25	PK	134	1.5	H	31.30	8.05	33.90	70.70	74	3.30
2485.80	65.70	PK	62	1.0	V	30.50	8.05	33.90	70.35	74	3.65
2485.40	39.04	AV	134	1.5	H	31.30	8.05	33.90	44.49	54	9.51
2485.80	39.11	AV	62	1.0	V	30.50	8.05	33.90	43.76	54	10.24
Out of left side band (802.11g mode)											
2389.6	33.35	AV	360	1.5	H	30.90	7.90	33.90	38.25	54	15.75
2389.50	32.58	AV	6	1.0	V	30.30	7.90	33.90	36.88	54	17.12
2389.60	49.67	PK	360	1.5	H	30.90	7.90	33.90	54.57	74	19.43
2389.50	48.01	PK	6	1.0	V	30.30	7.90	33.90	52.31	74	21.69
Out of right side band (802.11g mode)											
2484.50	53.64	PK	3	1.0	V	30.50	8.05	33.90	58.29	74	15.71
2484.70	56.98	PK	132	1.5	H	31.30	8.05	33.90	62.43	74	11.57
2484.70	33.28	AV	132	1.5	H	31.30	8.05	33.90	38.73	54	15.27
2484.50	33.18	AV	3	1.0	V	30.50	8.05	33.90	37.83	54	16.17

§15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06

*** Statement of Traceability:** Bay Area Compliance Lab 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 was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to 1.5MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (DTS)
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

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

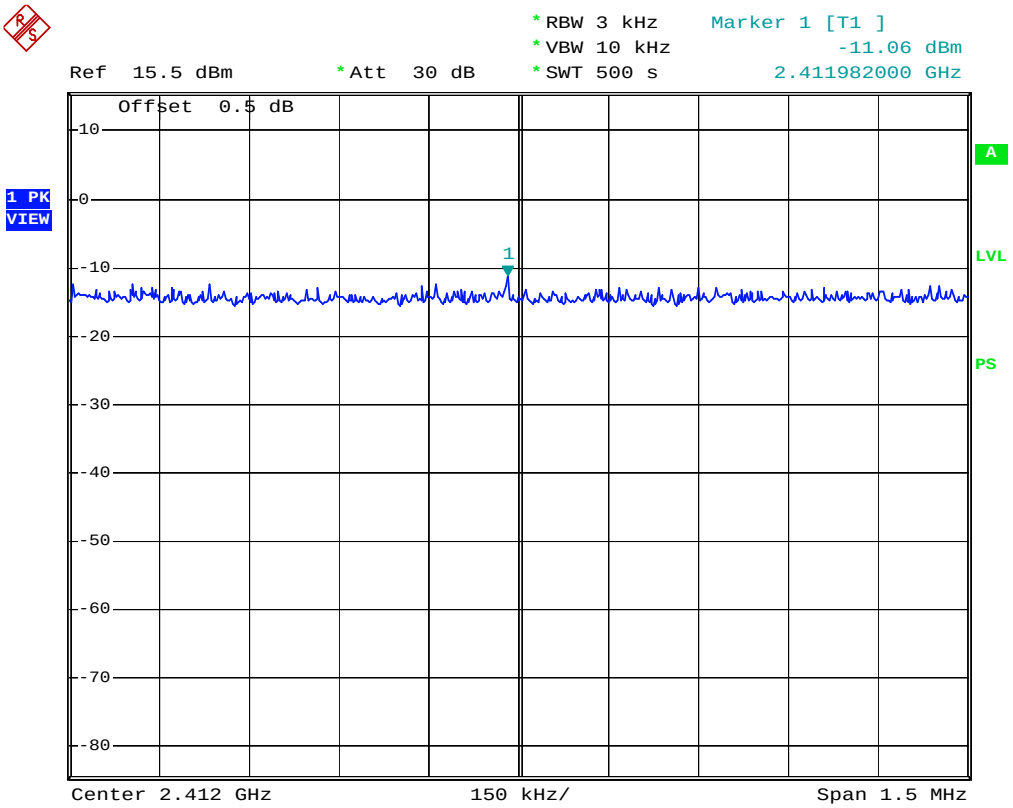
The testing was performed by Chris Peng on 2009-01-08

Test Mode: Transmitting

Test Result: Compliance.

Channel No.	Frequency (MHz)	Data Rate (Mbps)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b Mode					
1	2412	1	-13.00	8	Compliance
6	2437	1	-10.65	8	Compliance
11	2462	1	-10.10	8	Compliance
802.11g Mode					
1	2412	6	-16.64	8	Compliance
6	2437	6	-16.55	8	Compliance
11	2462	6	-16.05	8	Compliance

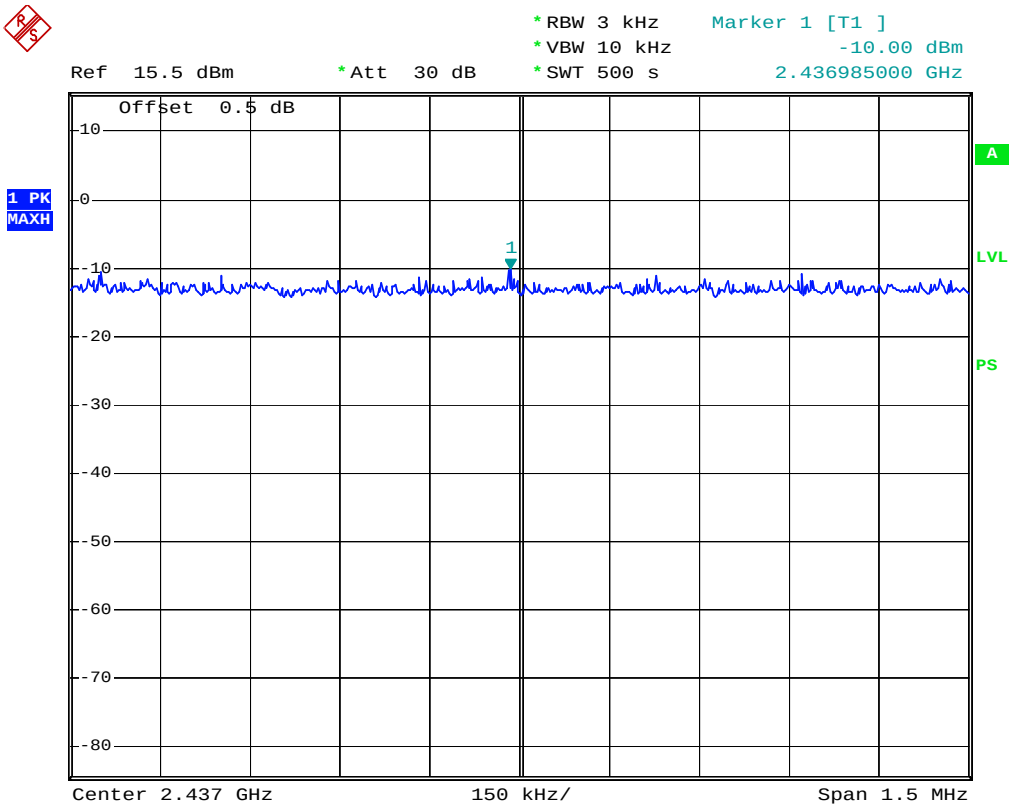
802.11b Low Channel



802.11b(Low Channel Power Density)

Date: 8.JAN.2009 18:48:33

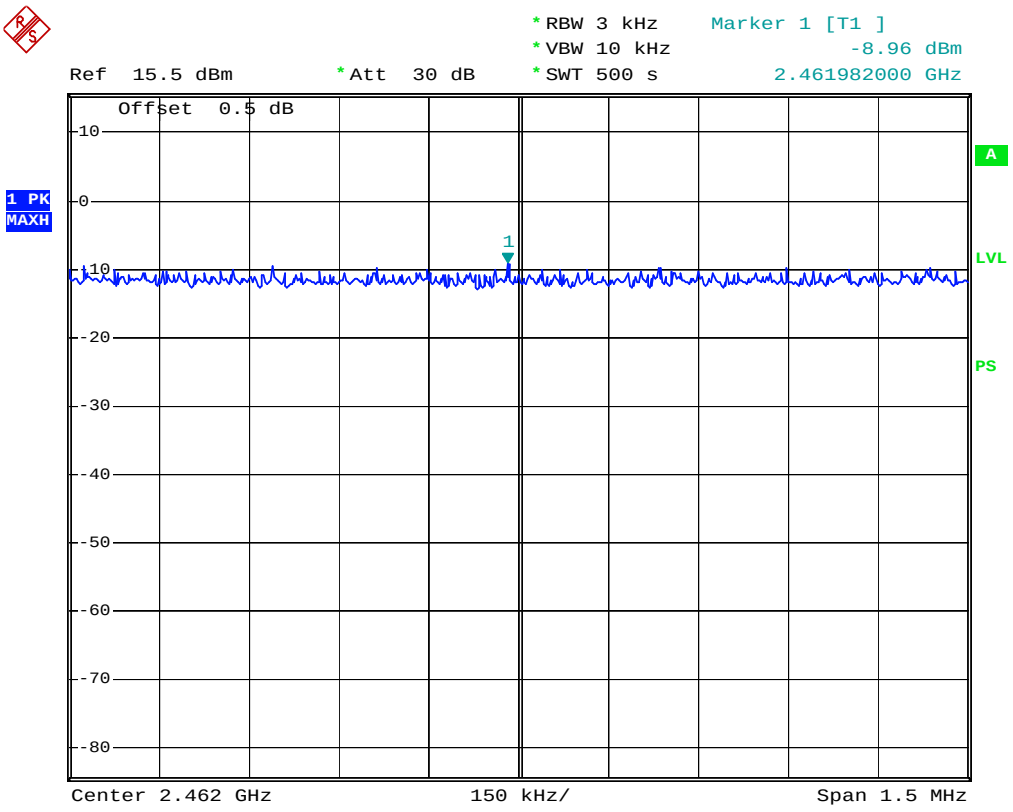
802.11b Middle Channel



802.11b(Middle Channel Power Density)

Date: 8.JAN.2009 19:08:18

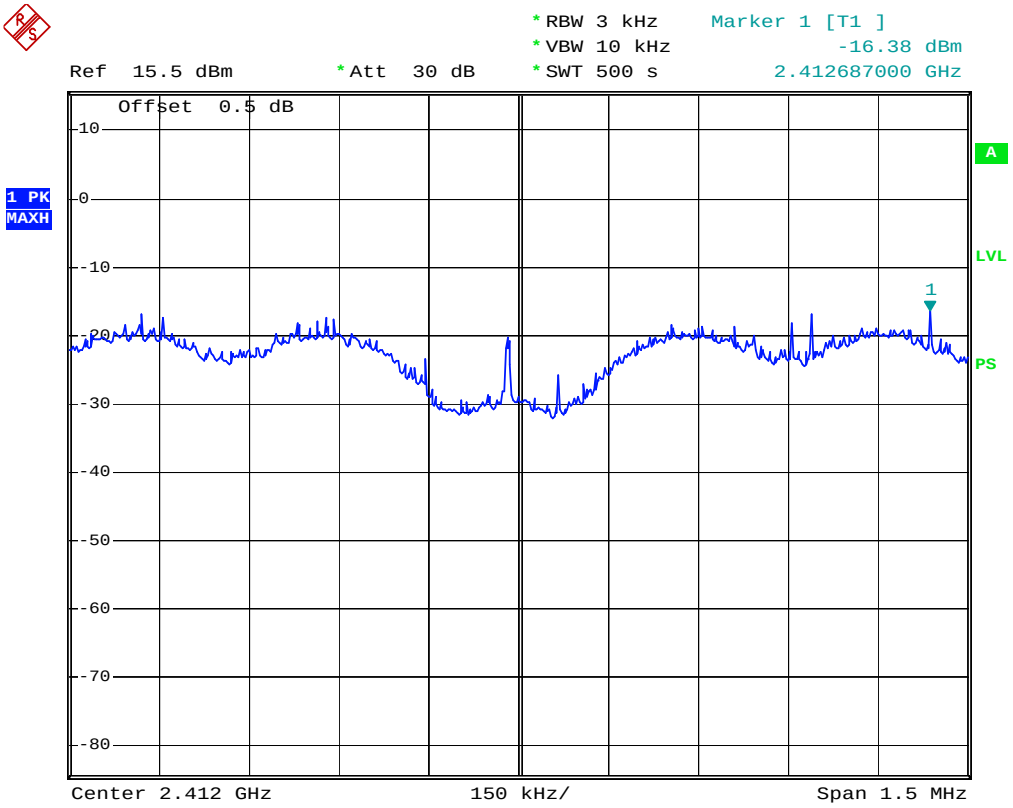
802.11b High Channel



802.11b(High Channel Power Density)

Date: 8.JAN.2009 19:26:40

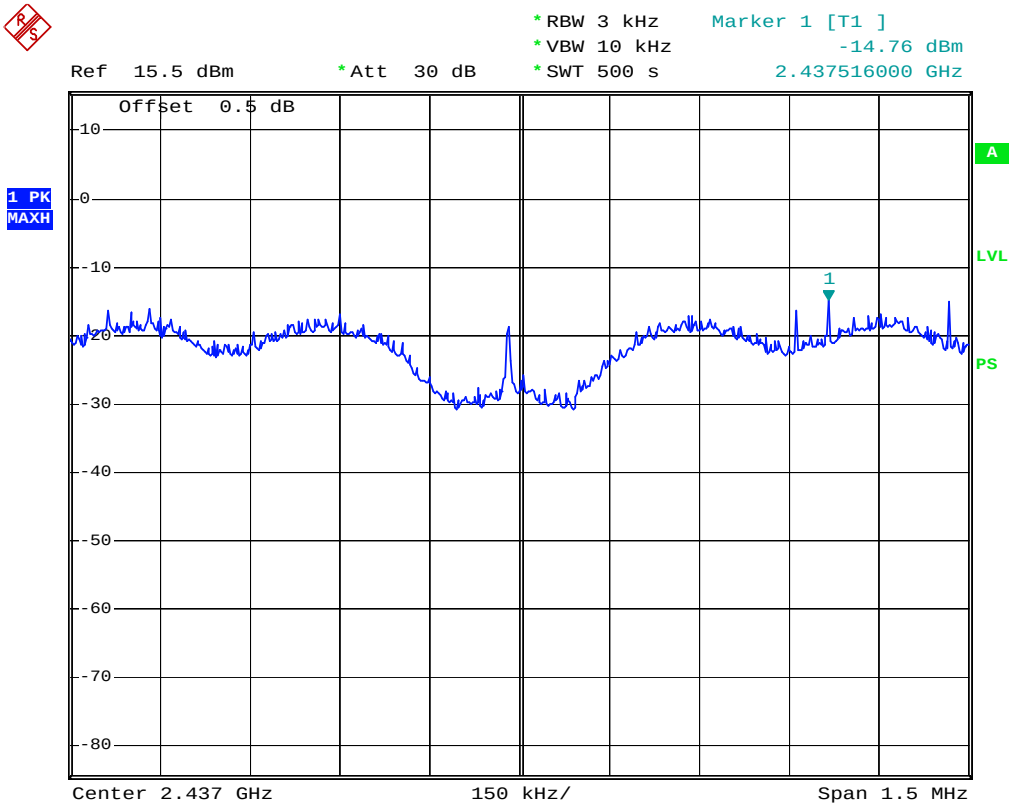
802.11g Low Channel



802.11g(low Channel Power Density)

Date: 8.JAN.2009 21:26:45

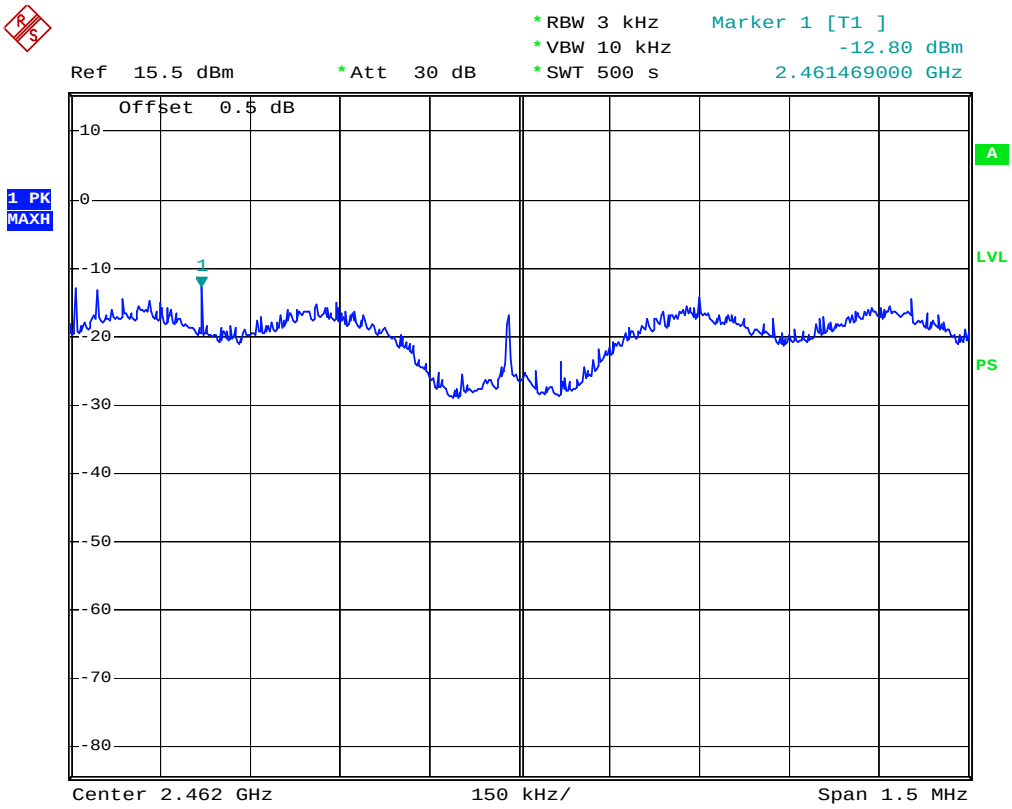
802.11g Middle Channel



802.11g(middle Channel Power Density)

Date: 8.JAN.2009 21:01:29

802.11g High Channel



802.11g(high Channel Power Density)

Date: 8.JAN.2009 21:46:48

PRODUCT SIMILARITY DECLARATION LETTER

NEO-TELECOM

Company Address: 7TH FLOOR, 674-24, ANYANG DONG, MANAN GU, ANYANG CITY, KYUNGGI DO, KOREA
Tel: 82-31-383-4262
Fax: 82-31-448-4264

Product Similarity Declaration

To Whom It May Concern,

We, NEO TELECOM CORPORATION, hereby declare that our WIFI INTERNET RADIO, Model Number: IR1000 is electrically identical with the Model Number: IR2000 .the difference between them is AUX INPUT and REMOTE CONTROLLA functions.

Please contact me if you have any question.

For and on behalf of
Neo Telecom Corporation

Signature: K. B. Roh

Authorized Signature(s)

Print Name: K.B. Roh

Title: CEO

Date: 04 Dec 2008

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