NVLAP LAB CODE 200707-0

FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Shenzhen Hongjiayuan Communication Technology Co., Ltd.

Room 2406, Block A of Electronic Science and Technology Building,
No.2070, Shennan Zhong Road, Futian District,
Shenzhen City, Guangdong Province, China

FCC ID: XUT-N97

Report Type:	**Product Type:**
Original Report	GSM/GPRS Mobile Phone

Test Engineer:	Bruce Zhang
Report Number:	RSZ09112403-WiFi
Report Date:	2010-01-04
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 Hongjiayuan Communication Technology Co., Ltd.*'s product, model number:*N97(FCC ID: XUT-N97)* or the "EUT" as referred to in this report is a *GSM/GPRS Mobile Phone* , which measures approximately: 11.7 cm L x 5.6cm W x 1.9 cm H, rated input voltage: DC 3.7V Li-ion battery or DC 5V adapter.

Adapter Information:
Model: HY-5W0500500X;
Input: 100-240V AC 50/60Hz 0.15A;
Output: 5V DC 500mA

Frequency Range:
Cellular Band: 824-849 MHz (TX), 869-894 MHz (RX)
PCS Band: 1850-1910 MHz (TX), 1930-1990 MHz (RX)
Bluetooth: 2400-2483.5 MHz (TX/RX)
Wi-Fi: 2412-2462 MHz

Modulation Mode: GMSK (GSM/PCS), GFSK (Bluetooth), Wi-Fi: 802.11b/g: CCK, OFDM

Transmitter Output Power:
Cellular Band: 33±2 dBm
PCS Band: 30±2 dBm
Bluetooth: -6~+4 dBm
Wi-Fi: 802.11b:15±1 dBm; 802.11g: 13±1 dBm

All measurement and test data in this report was gathered from production sample serial number: 0911059 (Assigned by BACL, Shenzhen). The EUT was received on 2009-11-24.

Objective

This Type approval report is prepared on behalf of *Shenzhen Hongjiayuan Communication Technology 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)

FCC Part 15.247 with BT portion and FCC Part 22H/24E submissions with FCC ID: XUT-N97.

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

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 rates are determined to be as follows for each mode based upon inverstigation by measuring the average power, peak power and PSD across all date rates bandwidths, and modulations.

EUT Exercise Software

Metaz of WiFi test software was provided by manufacturer.

Equipment Modifications

No modification was made to the unit tested.

Local Support Equipment List and Details

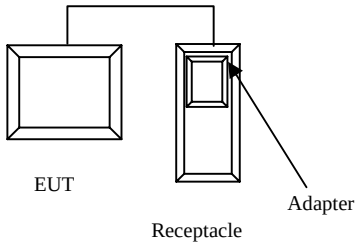
Manufacturer	Description	Model	Serial Number	FCC ID
IBM	Laptop	T40	N/A	DOC

External I/O Cable

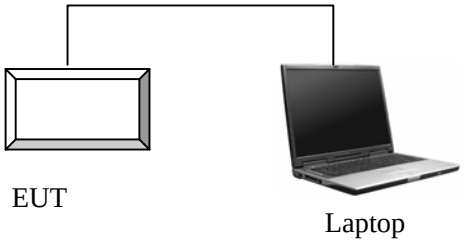
Cable Description	Length (m)	From Port	To
Unshielded Detachable Control Cable	1.0	PC	EUT
Unshielded Detachable Power Line	0.9	Adapter	EUT

Configuration of Test Setup

For conducted emissions:

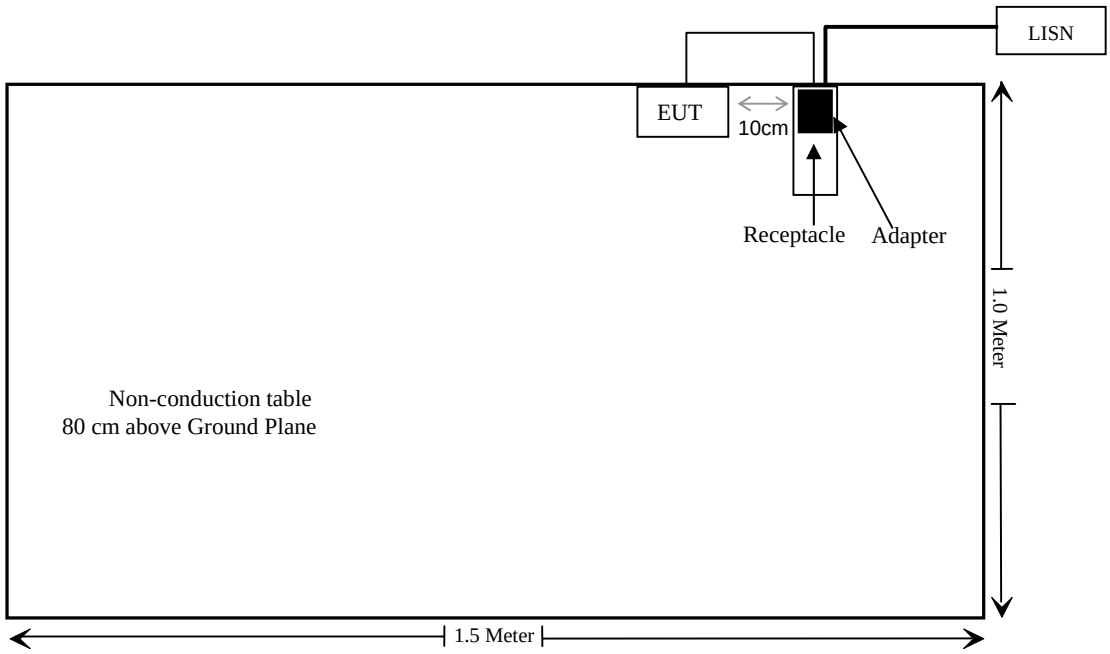


For radiated emissions:

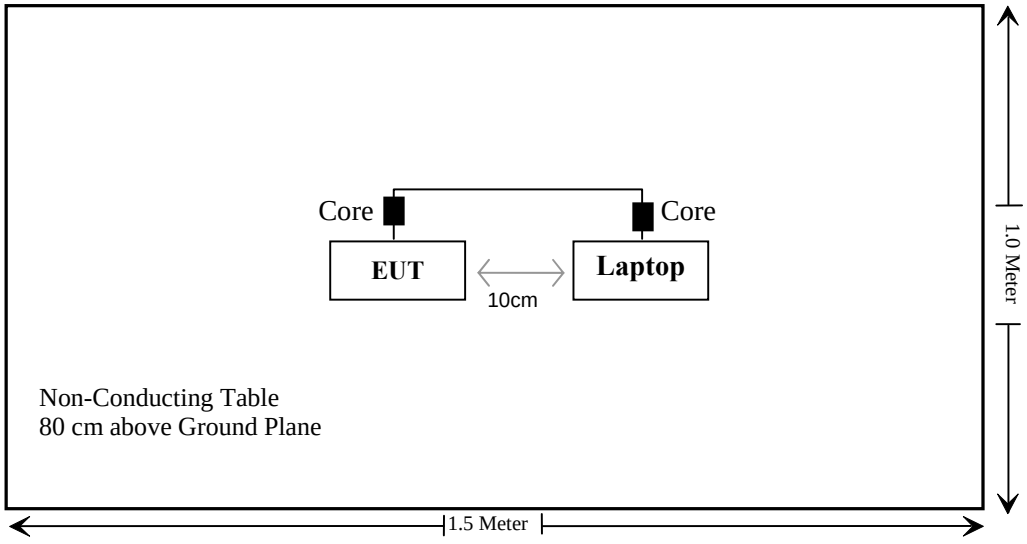


Block Diagram of Test Setup

For conducted emissions:



For radiated emissions:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §2.1093	RF Exposure	Compliant*
§15.203	Antenna Requirement	Compliant
§15.207 (a),	Conducted Emissions	Compliant
§15.205, §15.209, §15.247(d)	Spurious Emissions and Restricted Bands	Compliant
§15.247 (a)(2)	6 dB Bandwidth	Compliant
§15.247(b)(3)	Maximum Peak Output Power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant

Note: * please refer to the SAR report number: R0912115-FCC-SAR

CFR47 §15.247 (i), §1.1307(b)(1) & §2.1093 – RF EXPOSURE

Applicable Standard

§1.1307 and §2.1093.

Test Result

Compliance, please refer to BACL SAR Report: R0912115-FCC-SAR

CFR47 §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:
Antenna must be permanently attached to the unit.
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 3 antennas; one is for Bluetooth, the gain is -1.0 dBi; one is for WiFi, the gain is -0.7 dBi; other is for GSM/PCS; the gain is 1.1 dBi for PCS and 0.7 dBi for GSM which are in accordance to section 15.203.

Result

Compliant

CFR47 §15.207(a) - CONDUCTED EMISSIONS

Applicable Standard

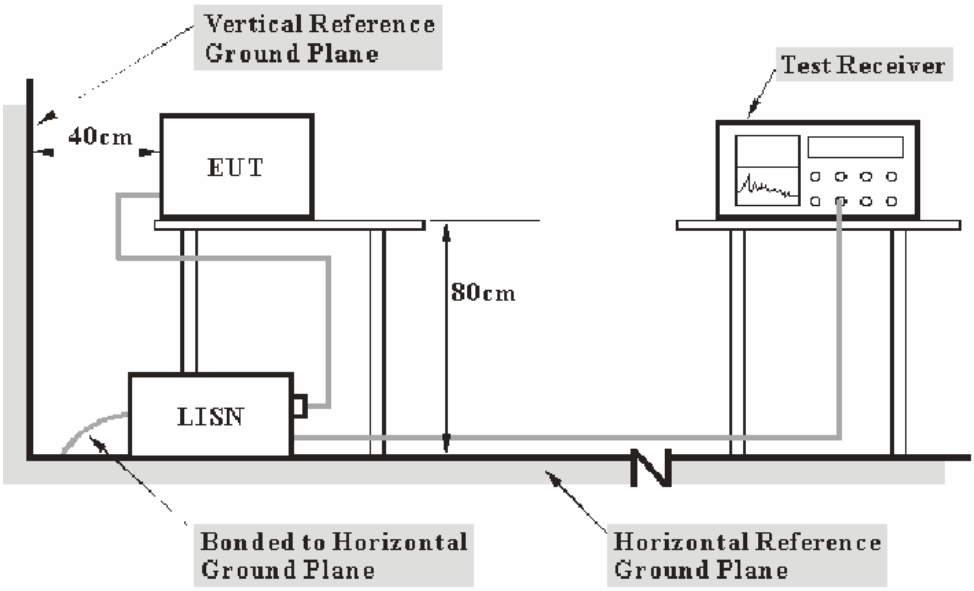
CFR47 §15.207

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is ±2.4 dB.

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

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

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

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:

23.18 dB at **1.490 MHz** in the **Line** conductor mode
24.24 dB at **0.490 MHz** in the **Neutral** conductor mode

Test Data

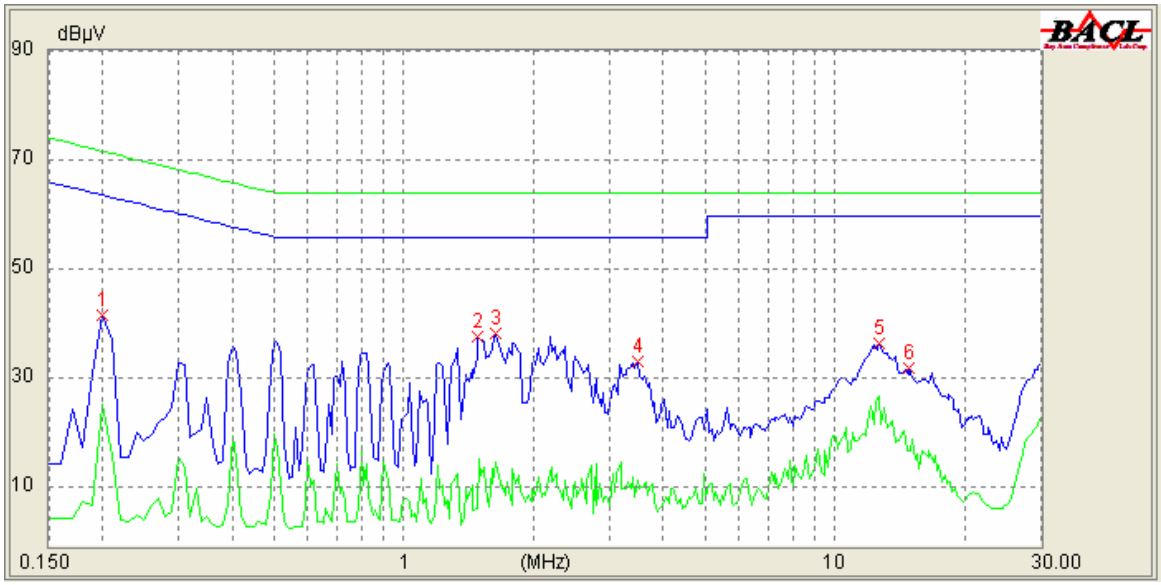
Environmental Conditions

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

** The testing was performed by Bruce Zhang on 2010-01-04.*

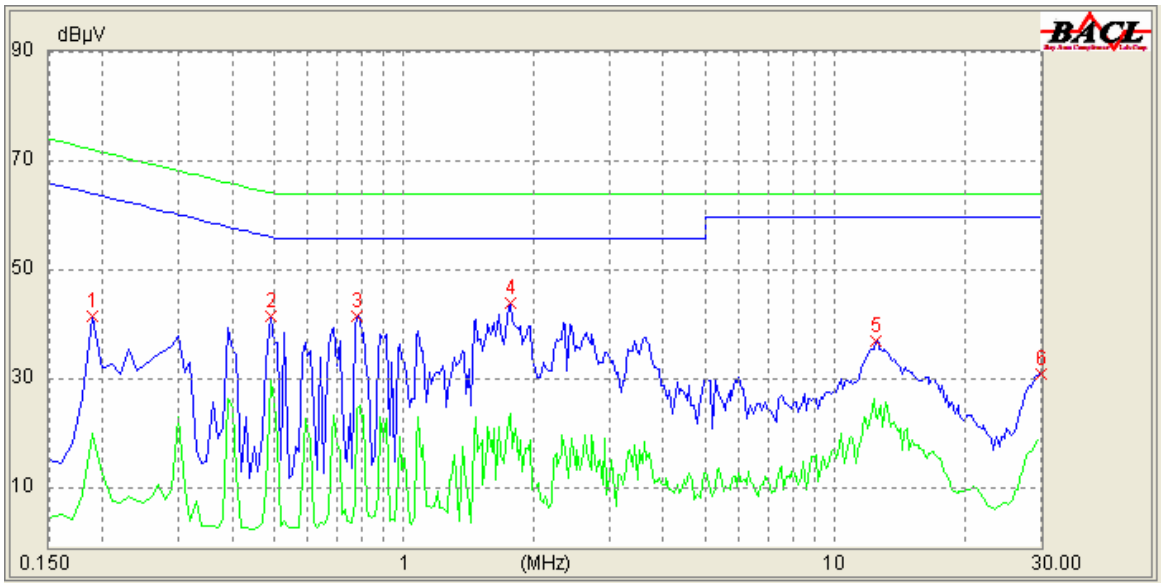
Test Mode: Operating & Charging

Line



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Corrected Factor (dB)	Cord. Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark (PK/AV/QP)
1.490	10.10	32.82	56.00	23.18	QP
12.710	10.30	29.90	60.00	30.10	QP
1.640	10.10	20.82	56.00	35.18	QP
3.500	10.10	17.51	56.00	38.49	QP
14.920	10.30	20.46	60.00	39.54	QP
12.750	10.30	22.11	64.00	41.89	AV
0.200	10.10	19.16	63.69	44.53	QP
0.200	10.10	25.53	71.69	46.16	AV
15.000	10.30	17.23	64.00	46.77	AV
1.500	10.10	15.82	64.00	48.18	AV
1.640	10.10	15.13	64.00	48.87	AV
3.490	10.10	11.89	64.00	52.11	AV

Neutral:



Conducted Emissions			FCC Part 15.247		
Frequency (MHz)	Corrected Factor (dB)	Cord. Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark (PK/AV/QP)
0.490	10.10	31.97	56.21	24.24	QP
30.000	10.30	23.31	48.00	24.69	QP
12.420	10.30	31.49	60.00	28.51	QP
1.770	10.10	24.95	56.00	31.05	QP
0.490	10.10	30.30	64.21	33.91	AV
0.780	10.10	17.57	56.00	38.43	QP
0.780	10.10	25.10	64.00	38.90	AV
1.770	10.10	24.27	64.00	39.73	AV
12.440	10.30	23.72	64.00	40.28	AV
0.190	10.10	22.62	64.13	41.51	QP
29.790	10.30	19.80	64.00	44.20	AV
0.190	10.10	20.62	72.13	51.51	AV

CFR47 §15.205, §15.209 & §15.247(d) - SPURIOUS EMISSIONS AND RESTRICT BANDS

Applicable Standard

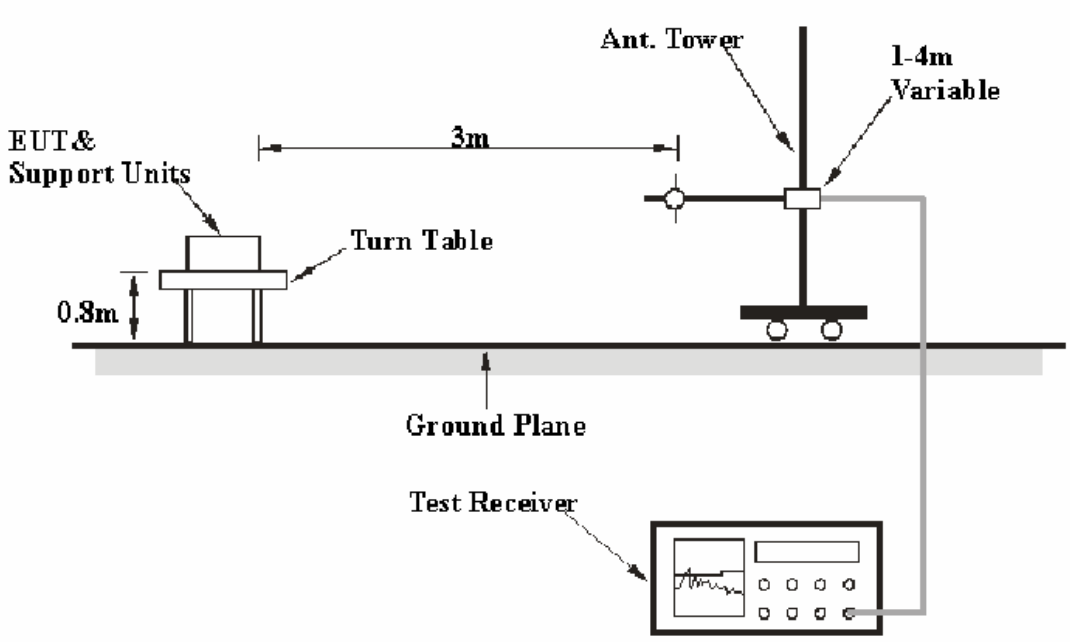
CFR47 §15.205; §15.209; §15.247 (d).

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.

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.

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***	***Detector***
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	2009-11-07	2010-11-06
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	2009-09-25	2010-09-25
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

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 (d), with the worst margin reading of:

Below 1 GHz:

Transmitting (802.11b): 8.4 dB at **47.980000 MHz** in the **Vertical** polarization
Transmitting (802.11g): 6.5 dB at **33.395000 MHz** in the **Horizontal** polarization

Above 1 GHz

Transmitting (802.11b):

9.50 dB at **4824.00 MHz** in the **Horizontal** polarization **(Low Channel)**
9.91 dB at **4874.00 MHz** in the **Horizontal** polarization **(Middle Channel)**
10.91 dB at **4924.00 MHz** in the **Horizontal** polarization **(High Channel)**

Transmitting (802.11g):

10.18 dB at **4824.00 MHz** in the **Horizontal** polarization **(Low Channel)**
10.45 dB at **4874.00 MHz** in the **Horizontal** polarization **(Middle Channel)**
10.33 dB at **4924.00 MHz** in the **Horizontal** polarization **(High Channel)**

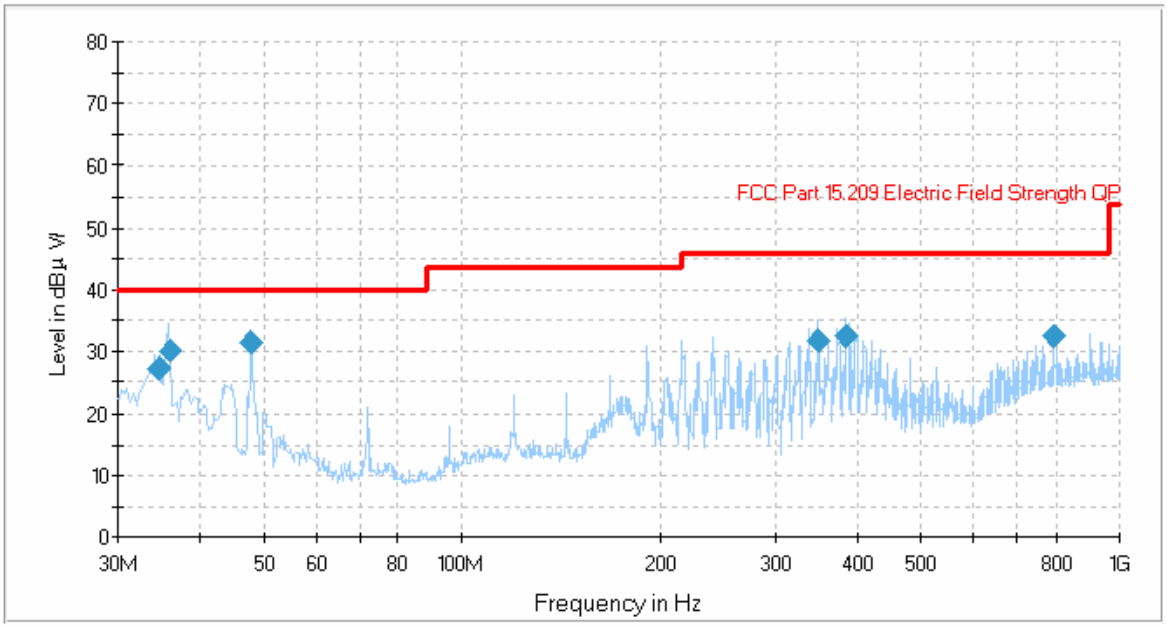
Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

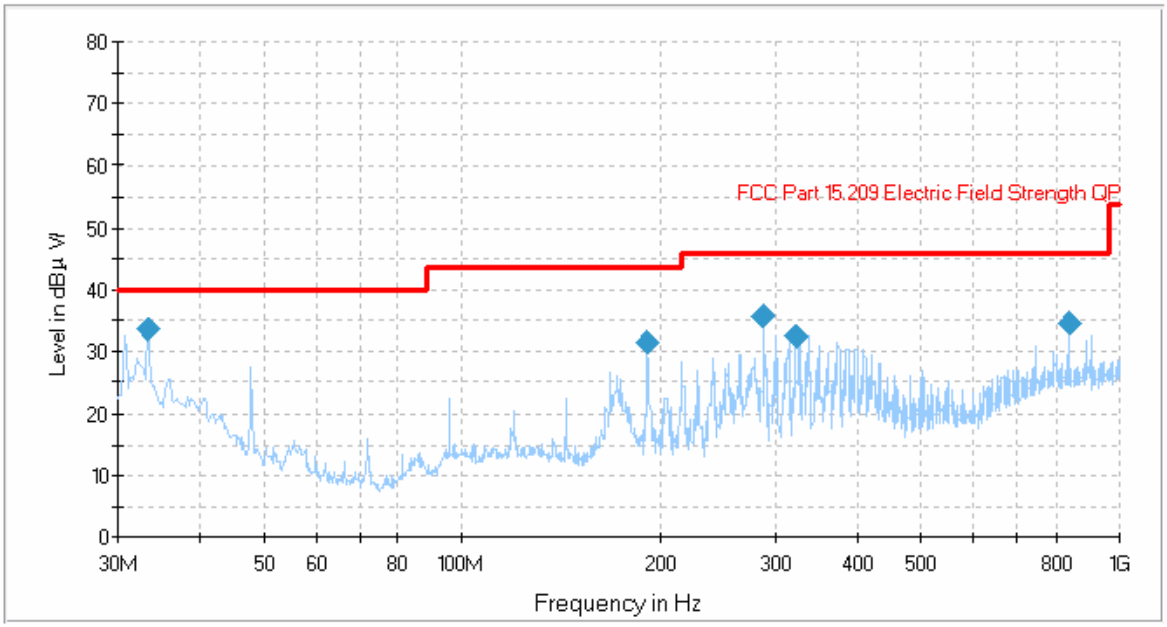
** The testing was performed by Bruce Zhang on 2009-12-11 and 2009-12-21.*

Test Mode: Transmitting (Below 1 GHz 802.11b) (Worst case)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
47.980000	31.6	101.0	V	341.0	-18.0	40.0	8.4
35.969500	30.2	101.0	V	296.0	-10.5	40.0	9.8
34.607500	27.4	215.0	V	228.0	-9.7	40.0	12.6
796.300000	32.6	201.0	V	244.0	-0.5	46.0	13.4
384.476000	32.5	101.0	H	335.0	-12.7	46.0	13.5
348.160000	31.7	201.0	V	224.0	-0.6	46.0	14.3

Test Mode: Transmitting (Below 1 GHz 802.11g) (Worst case)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
33.395000	33.5	128.0	H	135.0	-0.5	40.0	6.5
191.979500	31.3	115.0	H	251.0	-15.5	43.5	12.2
286.322500	35.6	203.0	H	49.0	-0.4	46.0	24.4
836.797500	34.6	303.0	H	338.0	-0.5	46.0	24.4
322.940000	32.6	329.0	H	234.0	-0.6	46.0	24.4

Above 1GHz

Test Mode: *Transmitting (802.11b)*

Indicated		Detector (PK/AV)	Table Angle Degree	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
802.11b Low Channel (2412 MHz)												
4824.00	32.16	AV	150	1.0	H	33.8	9.36	30.82	44.50	54	9.50	harmonic
4824.00	32.11	AV	195	1.0	V	33.5	9.36	30.82	44.15	54	9.85	harmonic
4824.00	47.09	PK	150	1.4	H	33.8	9.36	30.82	59.43	74	14.57	harmonic
4824.00	46.97	PK	195	1.0	V	33.5	9.36	30.82	59.01	74	14.99	harmonic
2389.00	34.03	AV	145	1.2	H	28.5	6.22	31.83	36.92	54	17.08	spurious
2324.70	33.47	AV	215	1.5	V	28.8	6.22	31.83	36.66	54	17.34	spurious
2389.00	50.92	PK	145	1.3	H	28.5	6.22	31.83	53.81	74	20.19	spurious
2324.70	47.58	PK	215	1.5	V	28.8	6.22	31.83	50.77	74	23.23	spurious
802.11b Middle Channel (2437 MHz)												
4874.00	31.75	AV	120	1.5	H	33.8	9.36	30.82	44.09	54	9.91	harmonic
4874.00	31.72	AV	220	1.0	V	33.5	9.36	30.82	43.76	54	10.24	harmonic
4874.00	47.05	PK	120	1.5	H	33.8	9.36	30.82	59.39	74	14.61	harmonic
4874.00	45.74	PK	220	1.0	V	33.5	9.36	30.82	57.78	74	16.22	harmonic
802.11b High Channel (2462 MHz)												
4924.00	30.75	AV	210	1.0	H	33.8	9.36	30.82	43.09	54	10.91	harmonic
4924.00	30.93	AV	170	1.5	V	33.5	9.36	30.82	42.97	54	11.03	harmonic
4924.00	46.29	PK	170	1.5	V	33.5	9.36	30.82	58.33	74	15.67	harmonic
4924.00	45.70	PK	210	1.3	H	33.8	9.36	30.82	58.04	74	15.96	harmonic
2483.50	33.34	AV	145	1.0	H	28.9	5.85	30.58	37.51	54	16.49	spurious
2487.40	32.57	AV	70	1.2	V	29.1	5.85	30.58	36.94	54	17.06	spurious
2483.50	48.47	PK	145	1.0	H	28.9	5.85	30.58	52.64	74	21.36	spurious
2487.40	47.84	PK	70	1.2	V	29.1	5.85	30.58	52.21	74	21.79	spurious

Test Mode: *Transmitting (802.11g)*

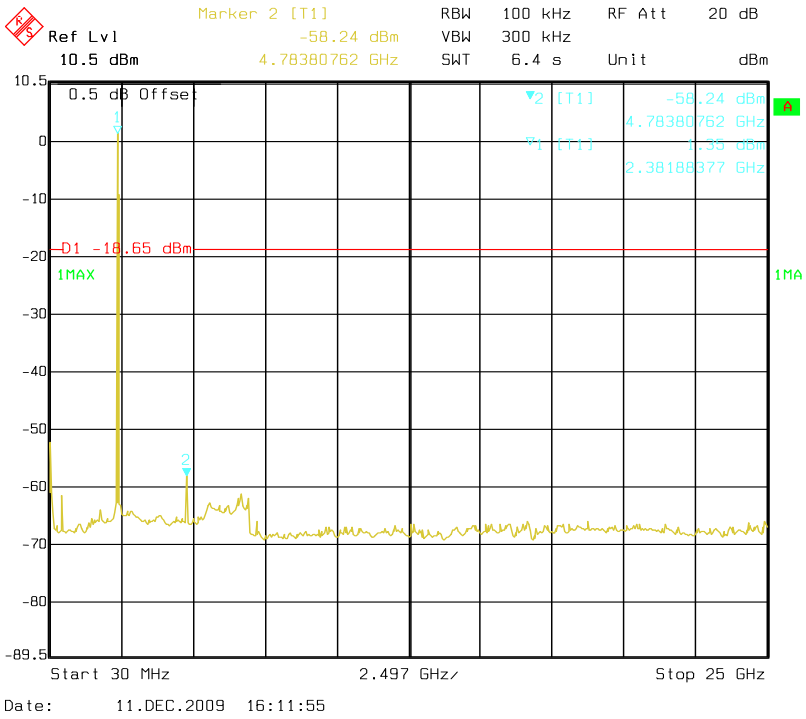
Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209			
Frequency (MHz)	S.A. Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre Amp. (dB)	Cord. Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
802.11b Low Channel (2412 MHz)												
4824.00	31.48	AV	250	1	H	33.8	9.36	30.82	43.82	54	10.18	harmonic
4824.00	31.48	AV	101	1	V	33.5	9.36	30.82	43.52	54	10.48	harmonic
2389.70	59.78	PK	240	1	H	28.5	6.22	31.83	62.67	74	11.33	spurious
4824.00	46.63	PK	250	1	H	33.8	9.36	30.82	58.97	74	15.03	harmonic
2390.00	55.33	PK	75	1	V	28.8	6.22	31.83	58.52	74	15.48	spurious
4824.00	46.46	PK	101	1	V	33.5	9.36	30.82	58.5	74	15.5	harmonic
2390.00	32.76	AV	75	1	V	28.8	6.22	31.83	35.95	54	18.05	spurious
2389.70	32.80	AV	240	1	H	28.5	6.22	31.83	35.69	54	18.31	spurious
802.11b Middle Channel (2437 MHz)												
4874.00	31.21	AV	150	1.0	H	33.8	9.36	30.82	43.55	54	10.45	harmonic
4874.00	31.21	AV	220	1.4	V	33.5	9.36	30.82	43.25	54	10.75	harmonic
4874.00	46.35	PK	150	1.2	H	33.8	9.36	30.82	58.69	74	15.31	harmonic
4874.00	46.33	PK	220	1.4	V	33.5	9.36	30.82	58.37	74	15.63	harmonic
802.11b High Channel (2462 MHz)												
4924.00	31.33	AV	157	1.0	H	33.8	9.36	30.82	43.67	54	10.33	harmonic
4924.00	31.27	AV	260	1.3	V	33.5	9.36	30.82	43.31	54	10.69	harmonic
4924.00	46.72	PK	157	1.1	H	33.8	9.36	30.82	59.06	74	14.94	harmonic
4924.00	46.53	PK	260	1.3	V	33.5	9.36	30.82	58.57	74	15.43	harmonic
2483.90	32.09	AV	130	1.2	V	29.1	5.85	30.58	36.46	54	17.54	spurious
2483.90	49.71	PK	130	1.2	V	29.1	5.85	30.58	54.08	74	19.92	spurious
2483.70	32.13	AV	190	1.6	H	25.3	5.85	30.58	32.7	54	21.30	spurious
2483.90	49.91	PK	190	1.6	H	25.3	5.85	30.58	50.48	74	23.52	spurious

Conducted Spurious Emissions at Antenna Port

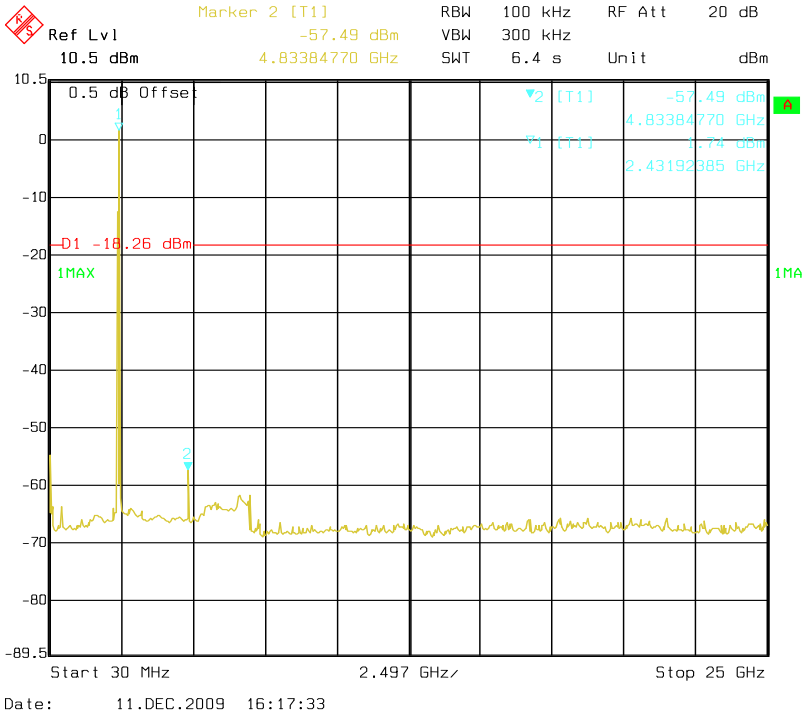
Channel Frequency (MHz)	Data Rate (Mbps)	Delta Value (dBc)	Limit (dBc)	Ref. Plot	Result
802.11b Mode					
2412	11	*	20	Plot 1	Pass
2437	11	*	20	Plot 2	Pass
2462	11	*	20	Plot3	Pass
802.11g Mode					
2412	54	*	20	Plot 4	Pass
2437	54	*	20	Plot 5	Pass
2462	54	*	20	Plot 6	Pass

Please refer to the following plots.

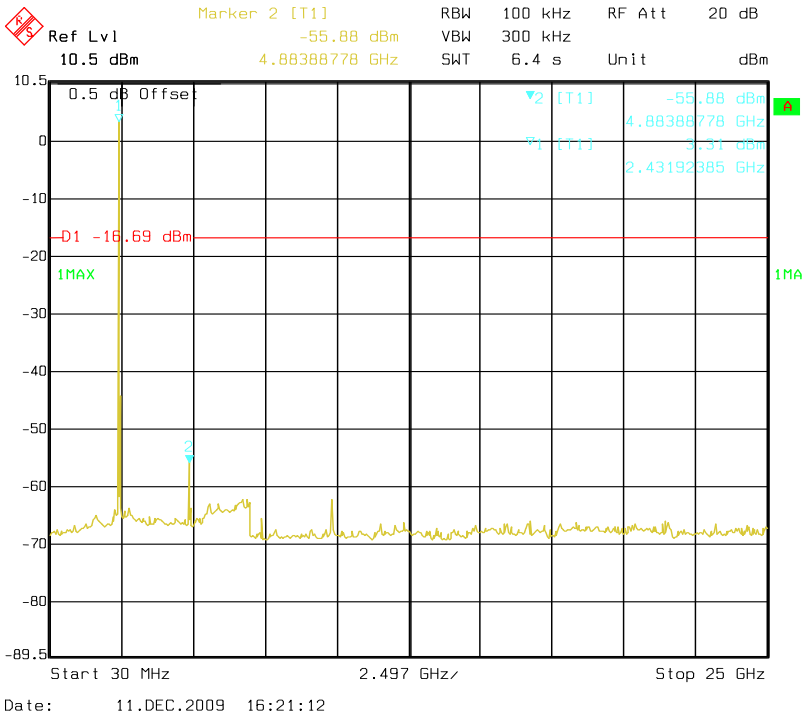
802.11b Low Channel



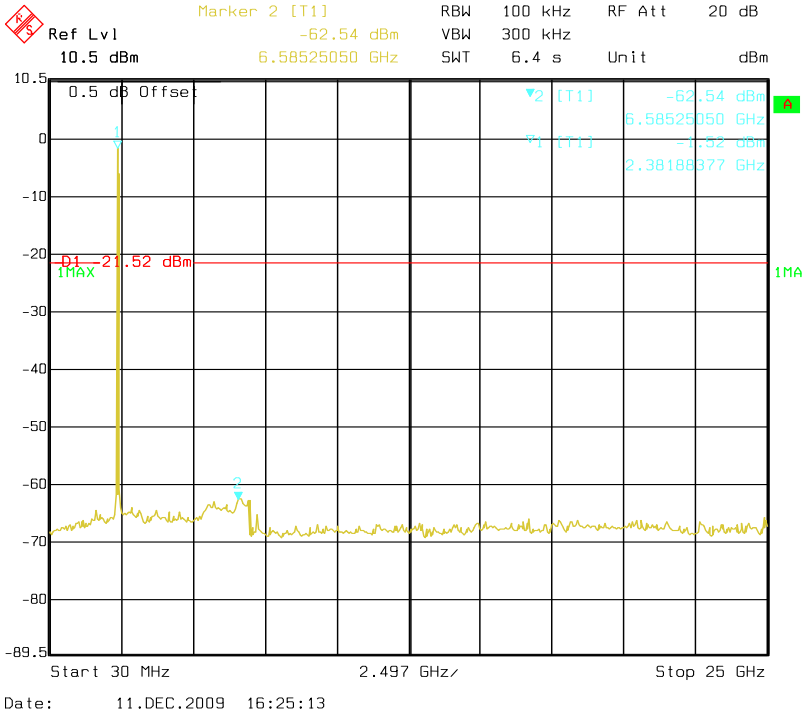
802.11b Middle Channel



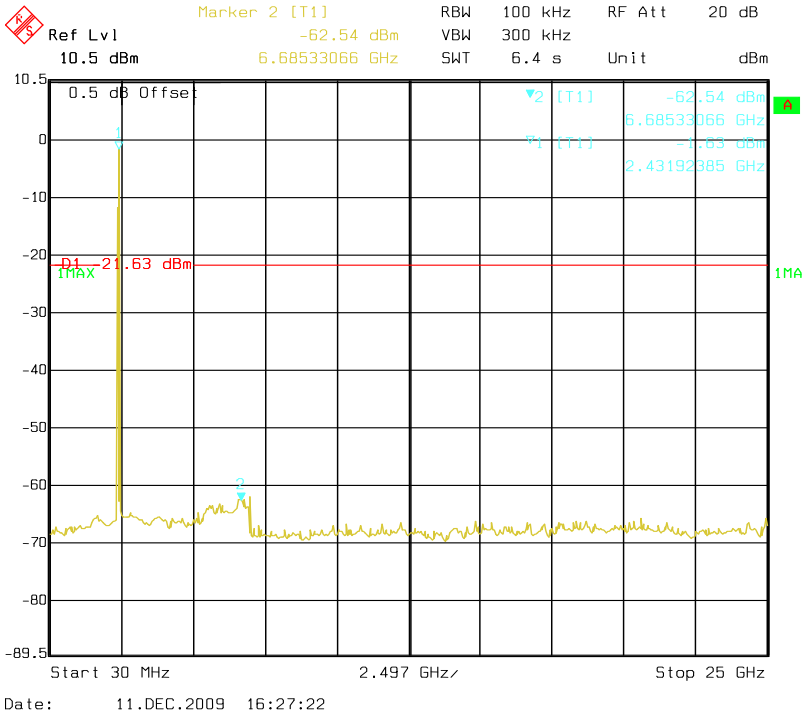
802.11b High Channel



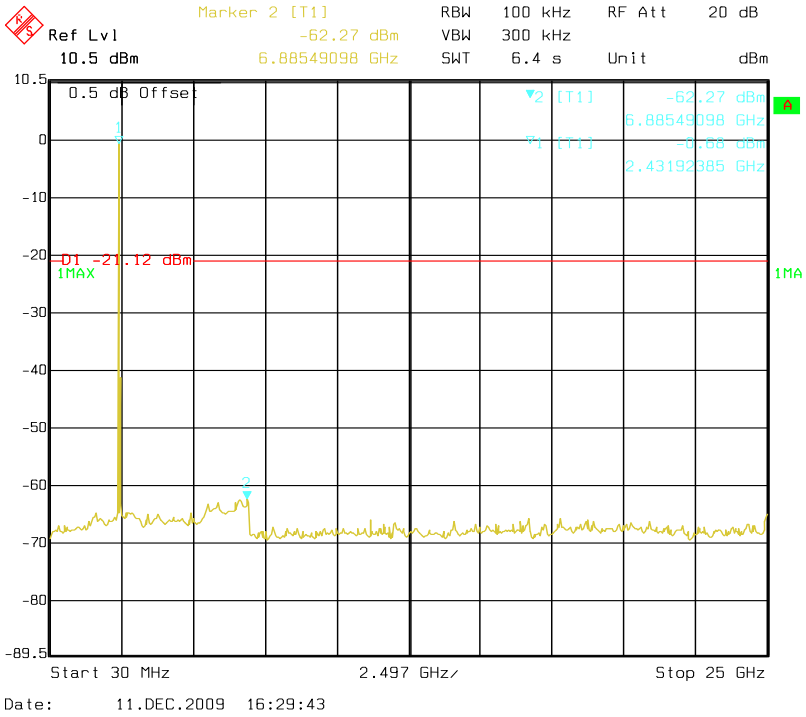
802.11g Low Channel



802.11g Middle Channel



802.11g High Channel



CFR47 §15.247(a)(2) –6 dB 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.

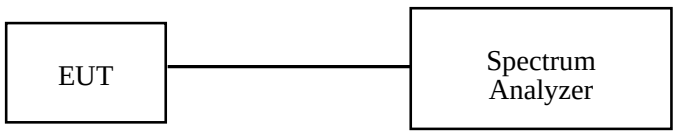
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	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 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

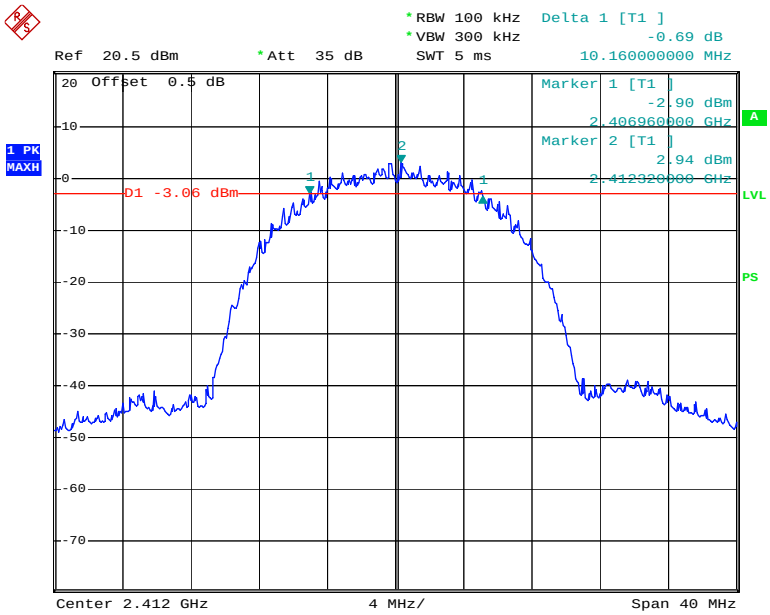
The testing was performed by Bruce Zhang on 2009-12-11.

Test Result: Pass.

Please refer to the following tables and plots.

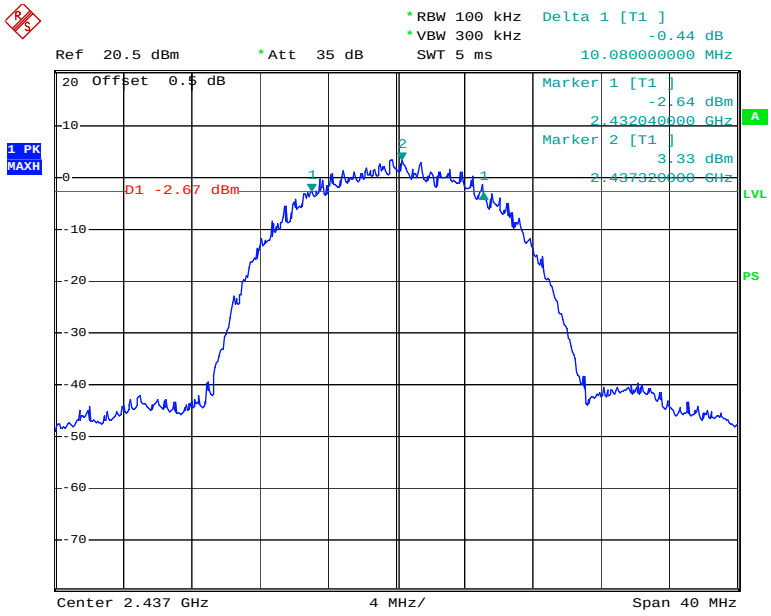
Channel	Channel Frequency (MHz)	Data Rate (Mbps)	Measured 6 dB Bandwidth (MHz)	FCC Part 15.247 Limit (kHz)
802.11b Mode				
Low	2412	11	10.16	> 500
Middle	2437	11	10.08	> 500
High	2462	11	9.92	> 500
802.11g Mode				
Low	2412	54	16.48	> 500
Middle	2437	54	16.48	> 500
High	2462	54	16.48	> 500

802.11b Low Channel



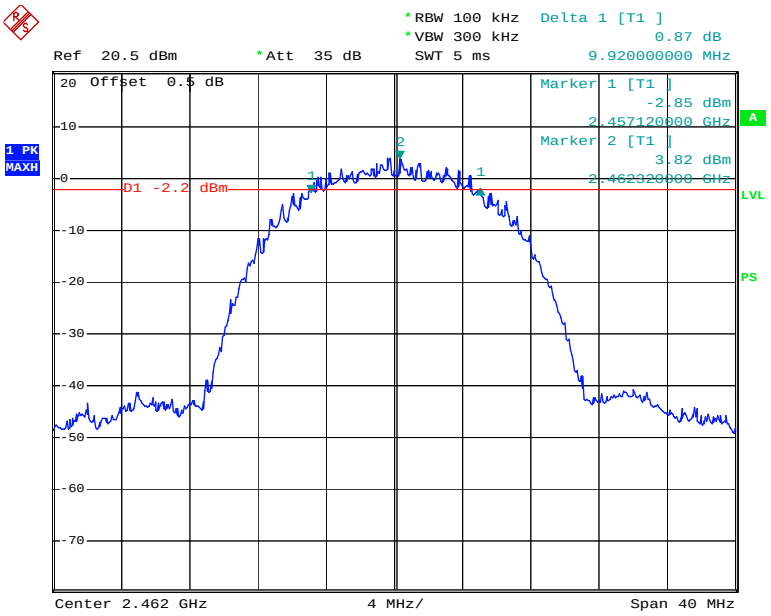
Date: 11.DEC.2009 14:00:25

802.11b Middle Channel



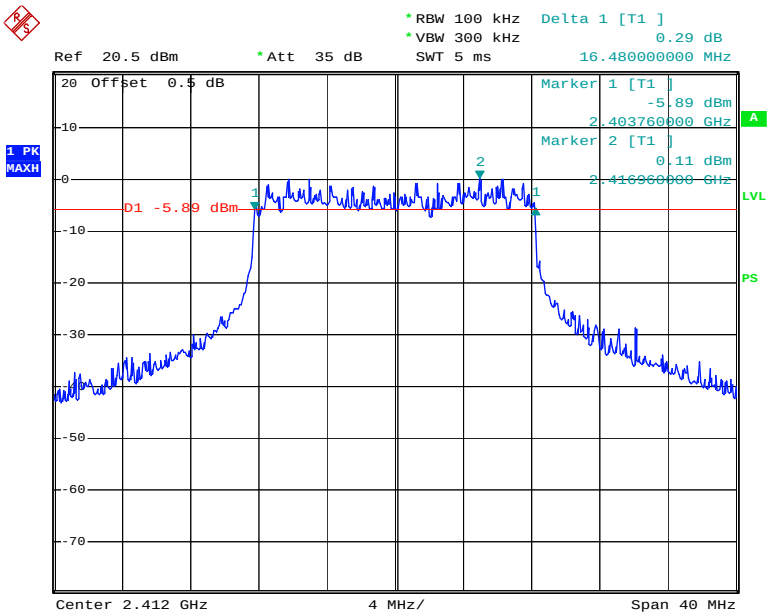
Date: 11.DEC.2009 14:03:20

802.11b High Channel



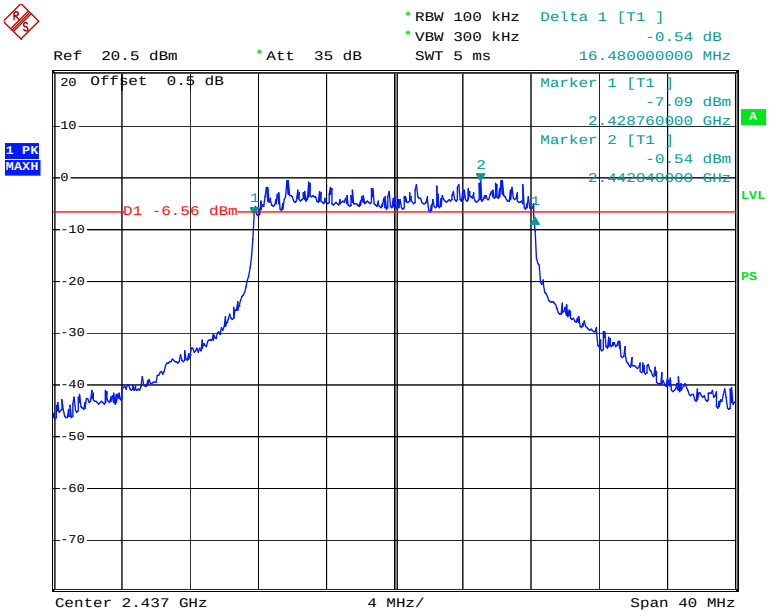
Date: 11.DEC.2009 13:58:57

802.11g Low Channel



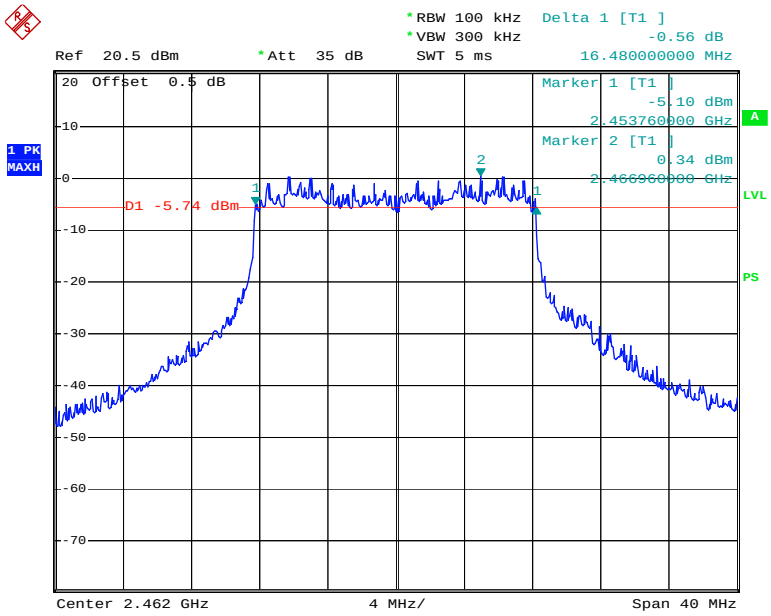
Date: 11.DEC.2009 14:07:21

802.11g Middle Channel



Date: 11.DEC.2009 14:06:00

802.11g High Channel



Date: 11.DEC.2009 14:08:34

CFR47 §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.

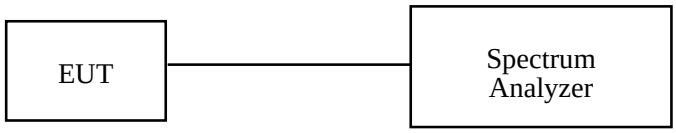
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	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. 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 Bruce Zhang on 2009-12-11.

Test Mode: Transmitting

802.11b Mode:

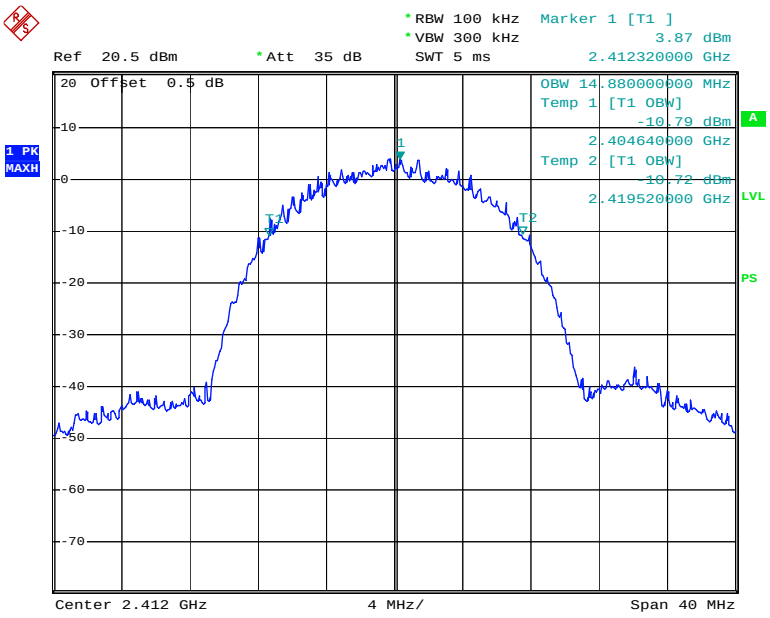
Channel	Channel Frequency (MHz)	Data Rate (Mbps)	Output Power (dBm)	Limit (dBm)
Low	2412	11	14.06	30
Middle	2437	11	14.38	30
High	2462	11	14.73	30

802.11g Mode:

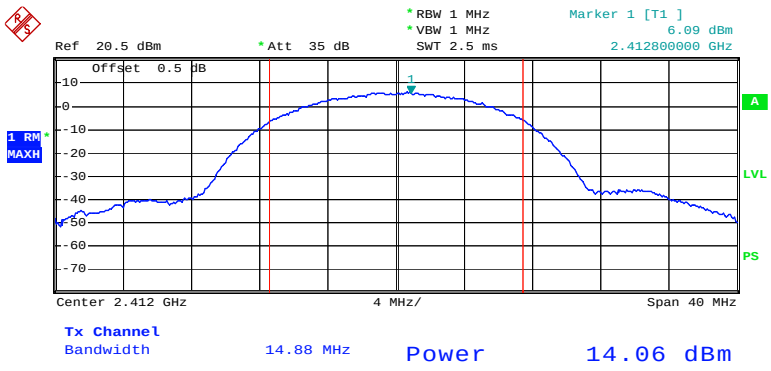
Channel	Channel Frequency (MHz)	Data Rate (Mbps)	Output Power (dBm)	Limit (dBm)
Low	2412	54	12.66	30
Middle	2437	54	12.31	30
High	2462	54	13.15	30

802.11b Mode:

802.11b Low Channel

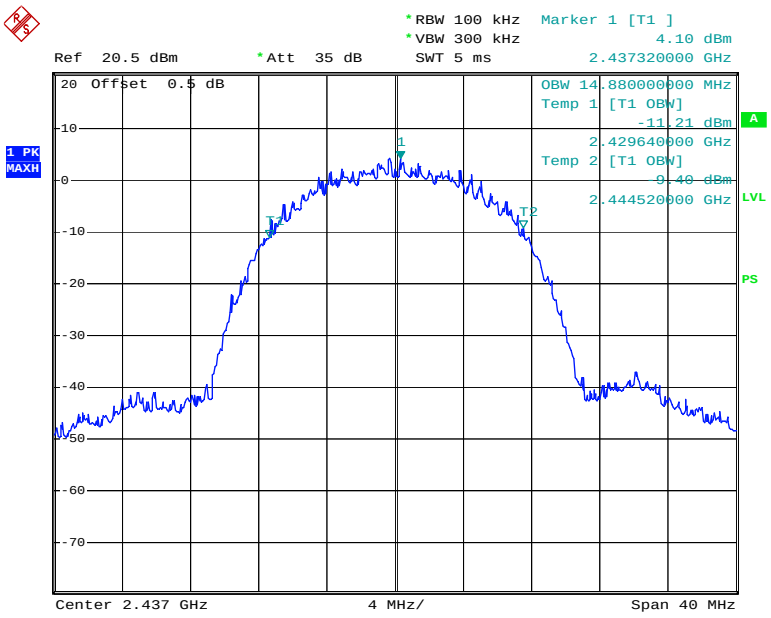


Date: 11.DEC.2009 09:48:27

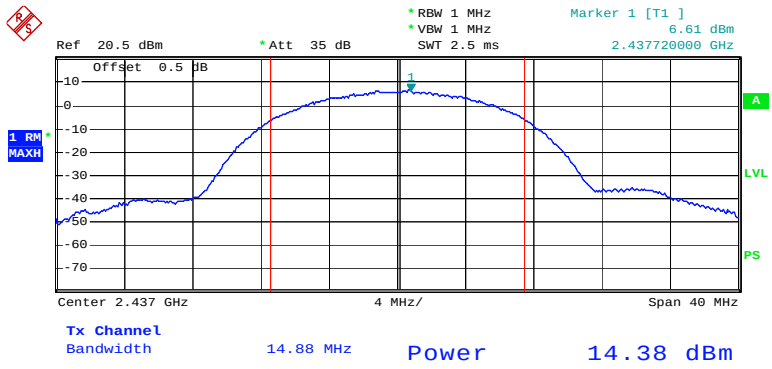


Date: 11.DEC.2009 09:54:56

802.11b Middle Channel

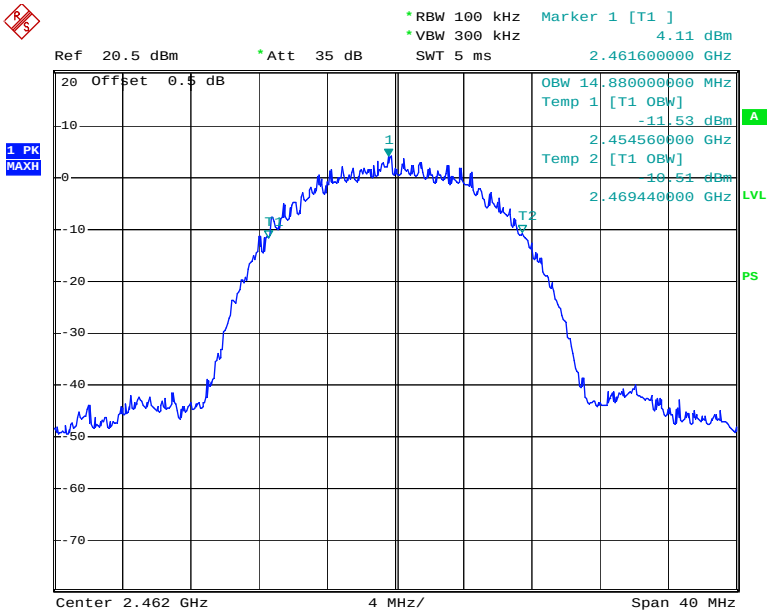


Date: 11.DEC.2009 10:11:33

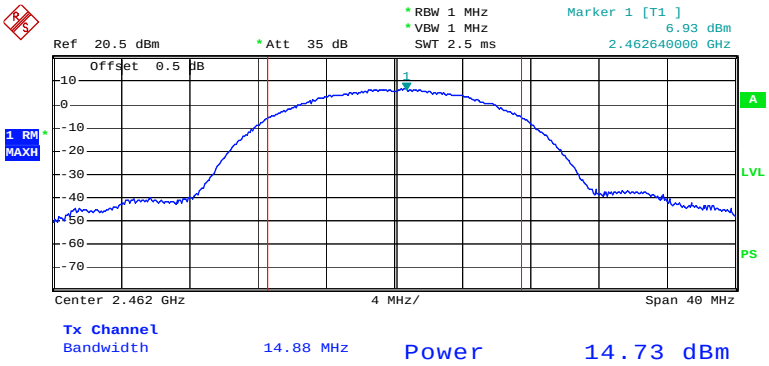


Date: 11.DEC.2009 10:10:43

802.11b High Channel



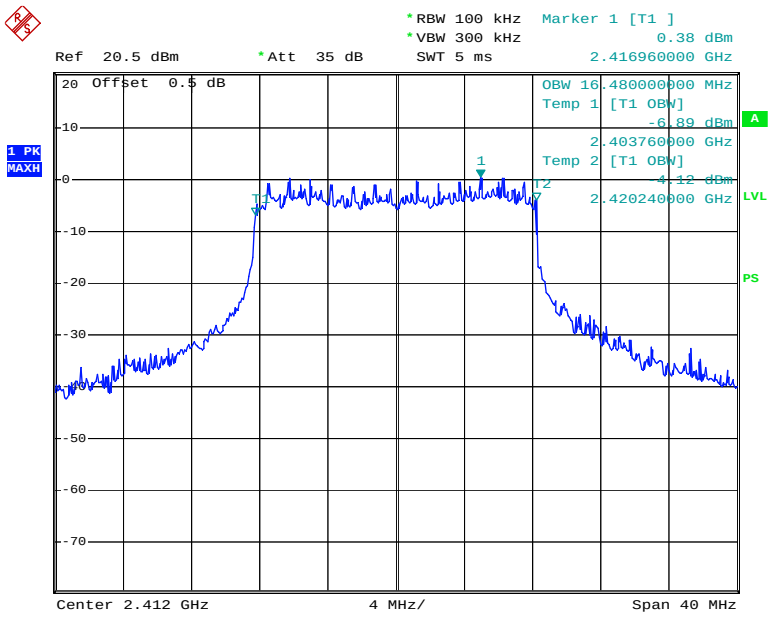
Date: 11.DEC.2009 10:12:16



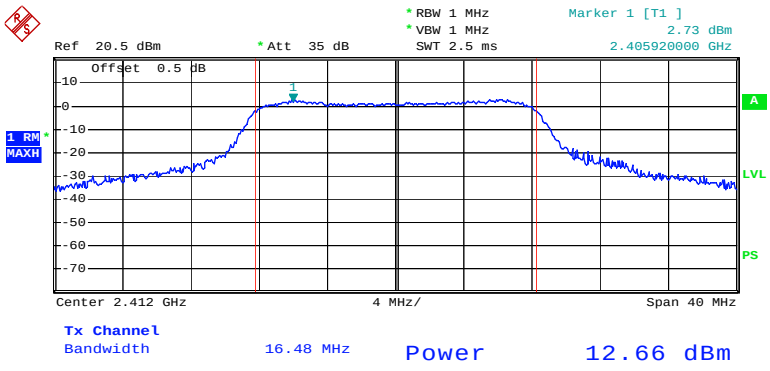
Date: 11.DEC.2009 10:09:37

802.11g Mode:

802.11g Low Channel

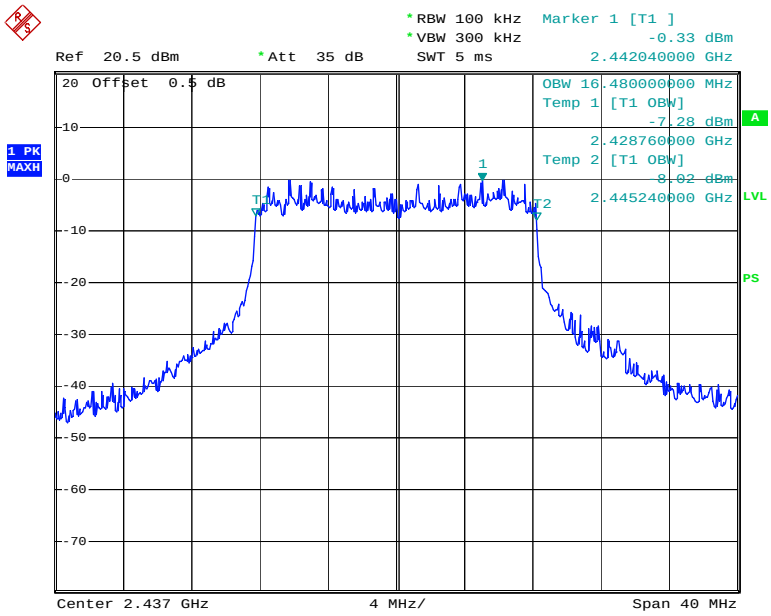


Date: 11.DEC.2009 10:16:14

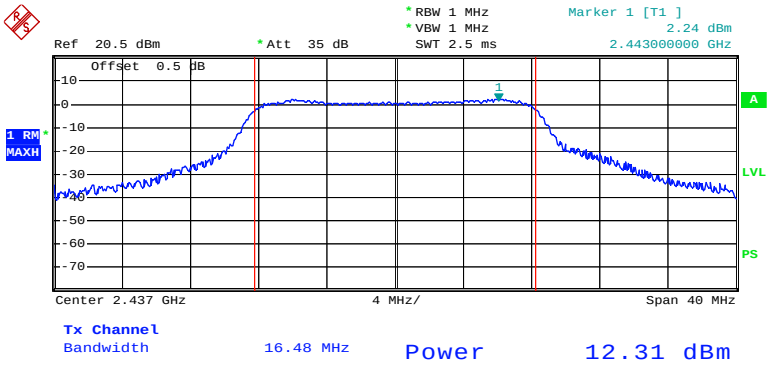


Date: 11.DEC.2009 10:18:22

802.11g Middle Channel

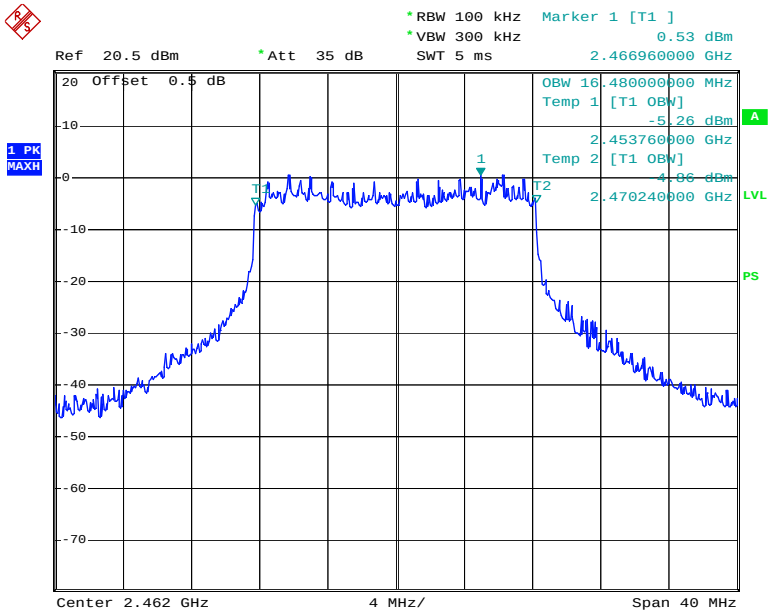


Date: 11.DEC.2009 10:14:49

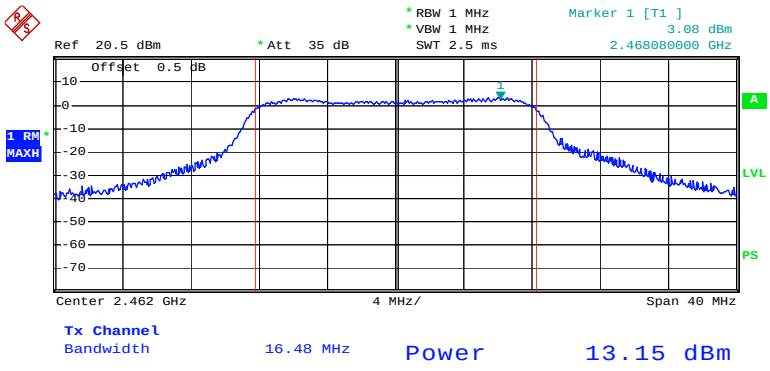


Date: 11.DEC.2009 10:24:02

802.11g High Channel



Date: 11.DEC.2009 10:13:57



Date: 11.DEC.2009 10:28:23

CFR47 §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	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 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 1 MHz and VBW of spectrum analyzer to 1 MHz with a convenient frequency span including 100 kHz bandwidth from band edge.
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

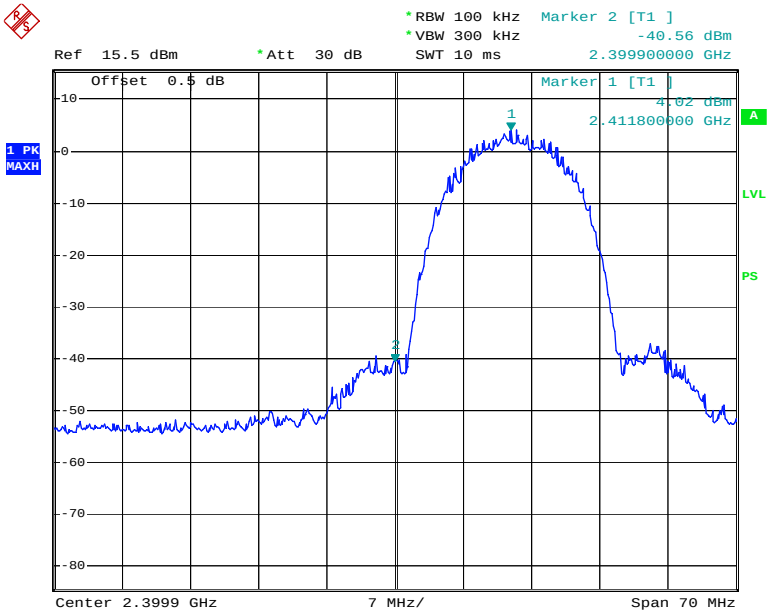
The testing was performed by Bruce Zhang on 2009-12-18.

Test Result: *Compliant.*

Frequency (MHz)	Data Rate (Mbps)	Delta Value (dBc)	Limit (dBc)	Result
802.11b				
2399.900	11	44.58	20	PASS
2483.600	11	54.77	20	PASS
802.11g				
2398.332	54	33.06	20	PASS
2483.600	54	47.36	20	PASS

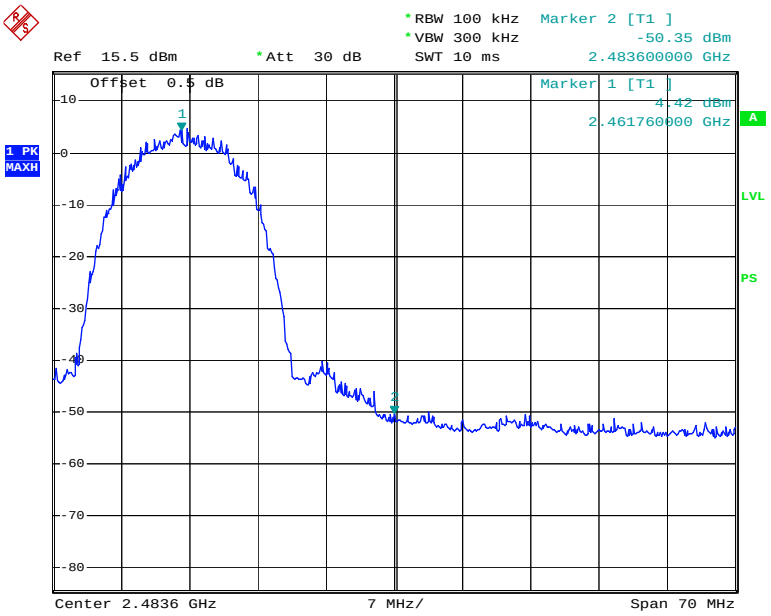
Please refer to following plots.

802.11b: Band Edge, Left Side



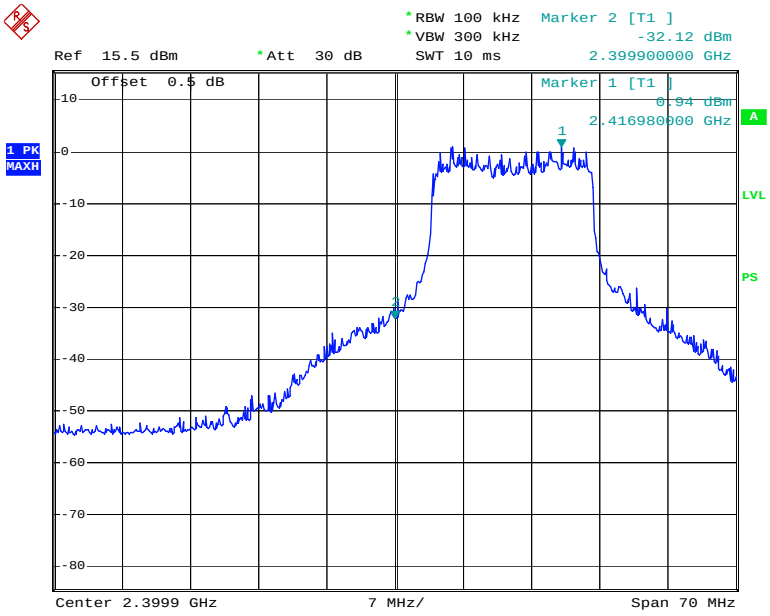
Date: 18.DEC.2009 09:05:52

802.11b: Band Edge, Right Side



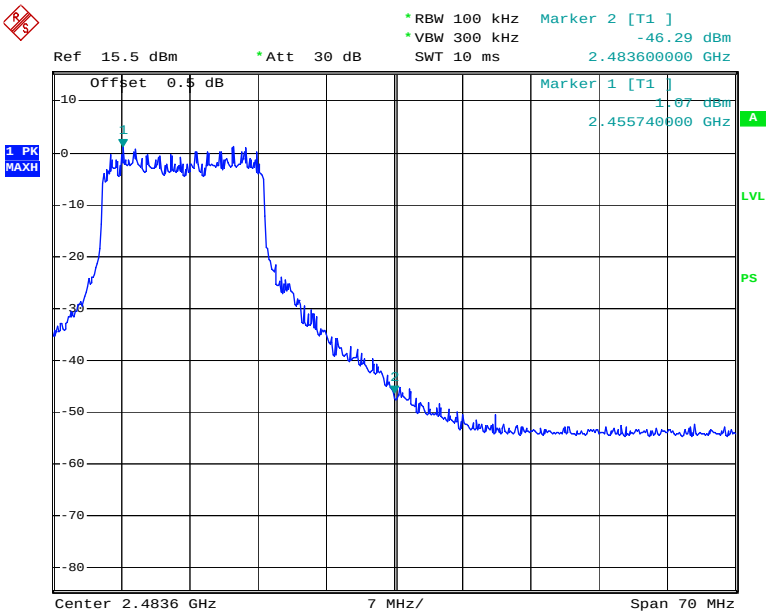
Date: 18.DEC.2009 09:07:48

802.11g: Band Edge, Left Side



Date: 18.DEC.2009 09:11:51

802.11g: Band Edge, Right Side



Date: 18.DEC.2009 09:09:55

CFR47 §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	2009-11-07	2010-11-06

*** 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

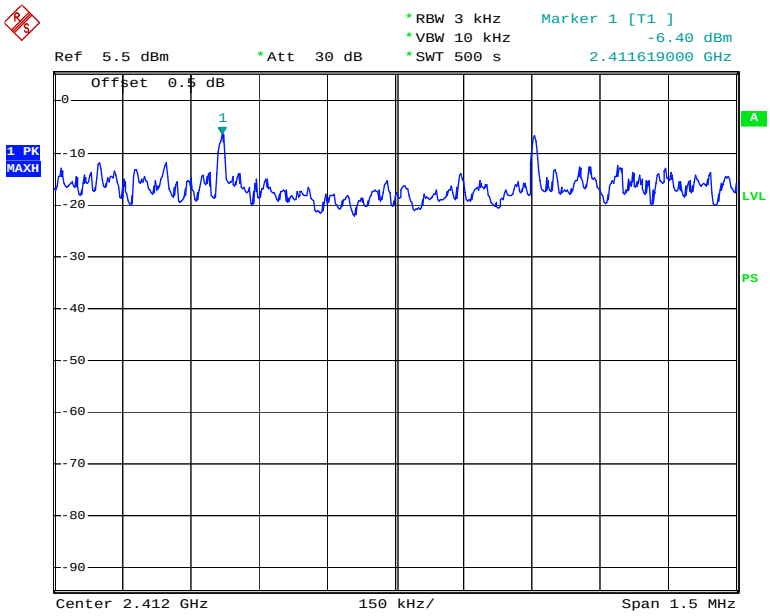
The testing was performed by Bruce Zhang on 2009-12-11.

Test Mode: Transmitting

Test Result: Pass

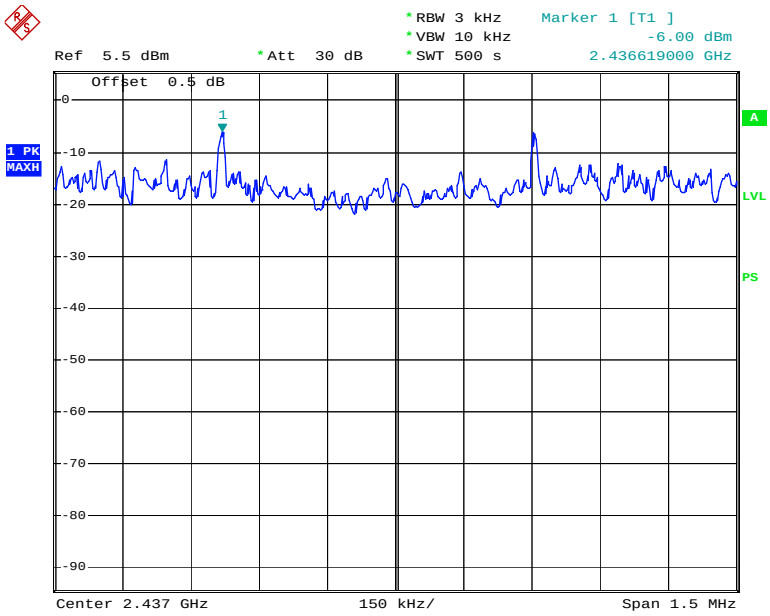
Channel	Frequency (MHz)	Power Spectal Density (dBm/3kHz)	Part 15.247 Limit (dBm/3kHz)	Result
802.11b Mode				
Low	2412	-6.40	8	Pass
Middle	2437	-6.00	8	Pass
High	2462	-5.01	8	Pass
802.11g Mode				
Low	2412	-21.73	8	Pass
Middle	2437	-22.75	8	Pass
High	2462	-21.86	8	Pass

Power Spectral Density, 802.11b Low Channel



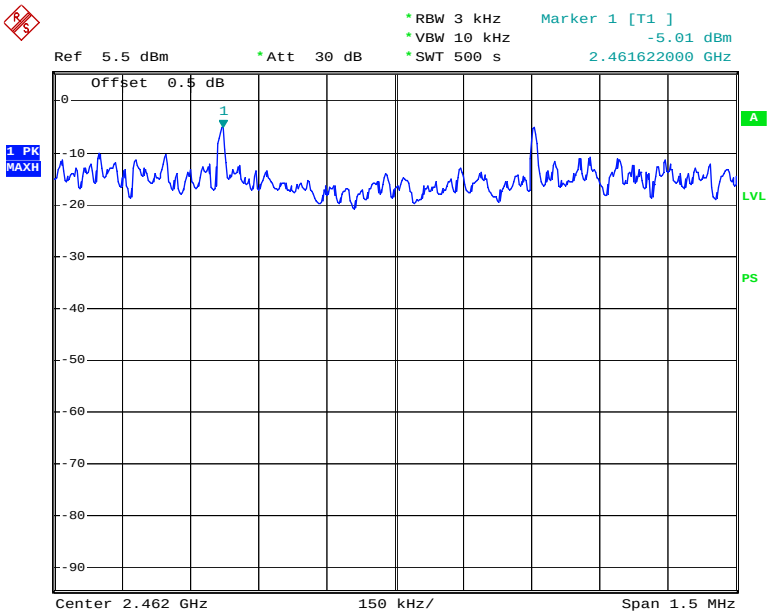
Date: 11.DEC.2009 11:53:11

Power Spectral Density, 802.11b Middle Channel



Date: 11.DEC.2009 13:31:22

Power Spectral Density, 802.11b High Channel



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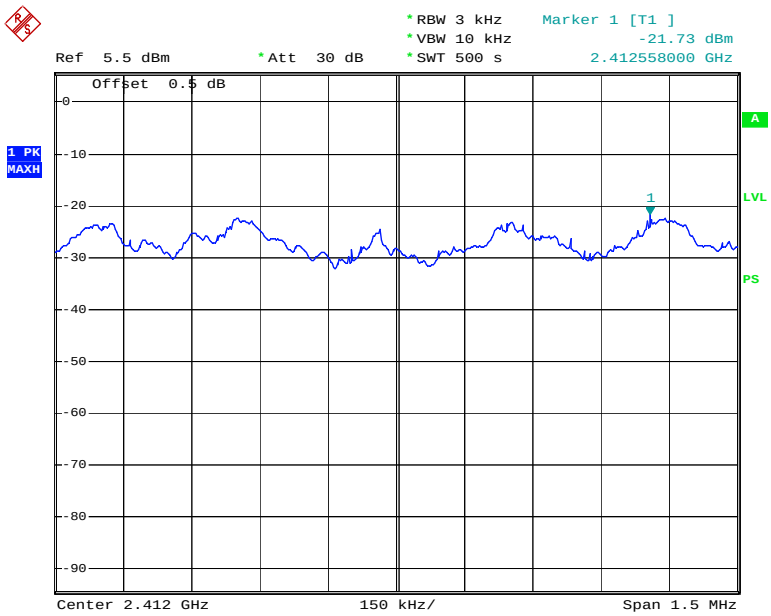
Power Spectral Density, 802.11g Low Channel



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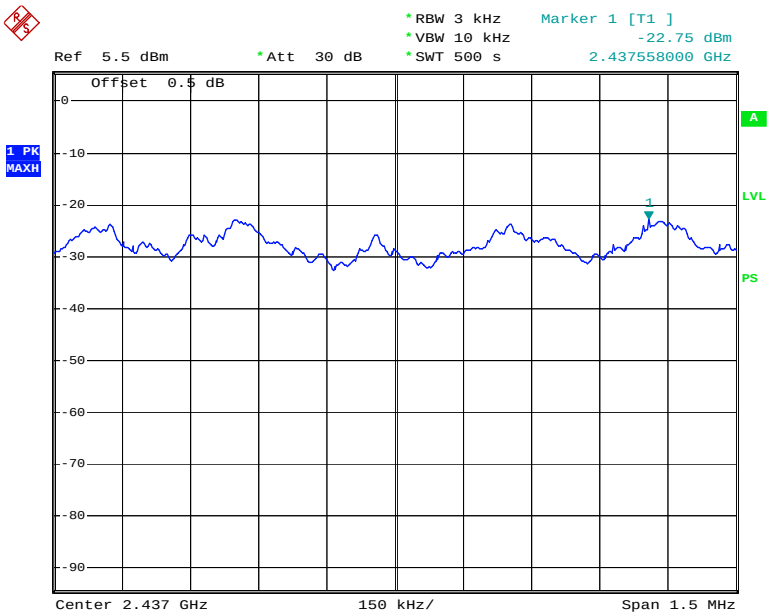
Power Spectral Density, 802.11g Middle Channel



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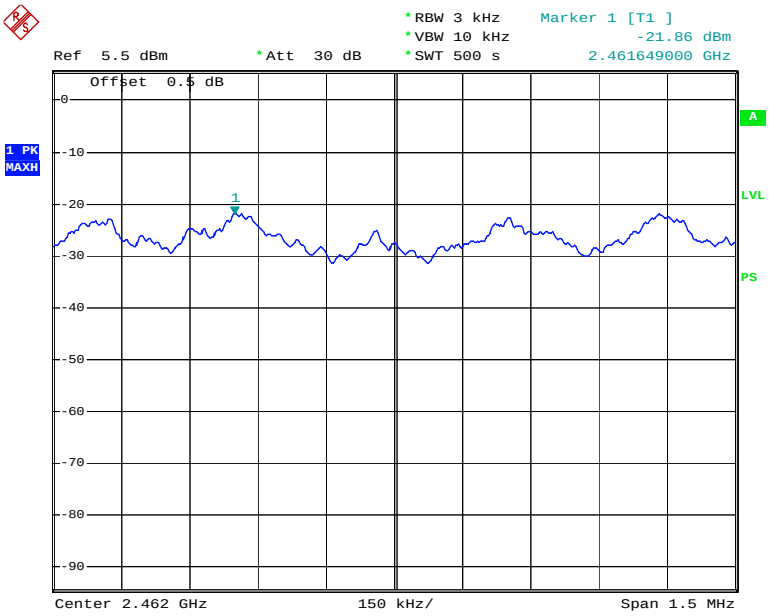
Power Spectral Density, 802.11g High Channel



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