Lab Code: 200707-0

FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

HMM Heidelberger-Medical-Marketing GmbH

Friedrichstr. 89, 69221 Dossenheim, Germany

FCC ID: YF9H80400

Report Type:	Product Type:
Original Report	hFon Smart Phone

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *HMM Heidelberger-Medical-Marketing GmbH*'s product, model number: *H80400 (FCC ID: YF9H80400)* or the "EUT" as referred to in this report is a *hFon smart phone,* which measures approximately: 12.0 cm (L) x 6.0 cm (W) x 1.6 cm (H), rated input voltage: DC 3.7V battery.

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 (Tx/Rx)
ANT: 2403-2480 MHz (Tx/Rx)

Modulation Mode: GMSK (PCS/DCS); GFSK (Bluetooth); Wi-Fi (DSSS/OFDM); GFSK (ANT)

Transmitter Output Power:

Cellular Band: 33 dBm, PCS Band: 30 dBm
Bluetooth: < 4 dBm, 802.11b/g Wi-Fi: ≤10 dBm
2.4 GHz Lower Power Transceiver ANT: 0 dBm

** All measurement and test data in this report was gathered from production sample serial number: 1005063 (Assigned by BACL, Shenzhen). The EUT was received on 2010-05-21.*

Objective

This Type approval report is prepared on behalf of *HMM Heidelberger-Medical-Marketing GmbH* 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 22H & 24E submission with FCC ID: YF9H80400.
FCC Part 15.247 of BT portion submission with FCC ID: YF9H80400.
FCC Part 15.249 submission with FCC ID: YF9H80400.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).

The current scope of accreditations can be found at http://ts.nist.gov/Standards/scopes/2007070.htm

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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.

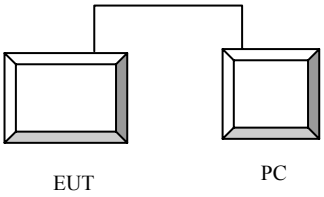
EUT Exercise Software

MP8712.

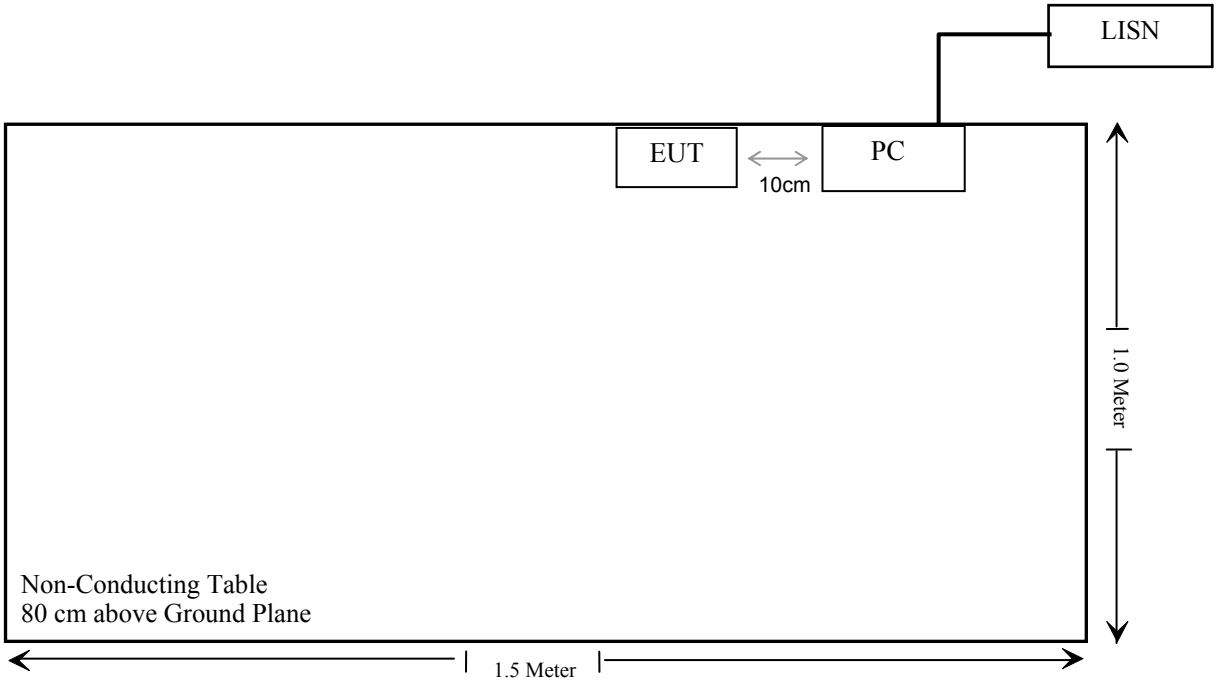
Equipment Modifications

No modification was made to the unit tested.

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions & Restricted Bands	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

FCC §15.247 (i) & §2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §15.247 (i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Table 2 – Summary of SAR Evaluation Requirements for a Cell Phone with Multiple Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	Routine evaluation required	SAR not required: Unlicensed only ○ when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas Licensed & Unlicensed ○ when the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas ○ when SAR to peak location separation ratio of simultaneous transmitting antenna pair is < 0.3 SAR required: Licensed & Unlicensed antenna pairs with SAR to peak location separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply
Unlicensed Transmitters	When there is no simultaneous transmission – ○ output ≤ 60/f: SAR not required ○ output > 60/f: stand-alone SAR required When there is simultaneous transmission – Stand-alone SAR not required when ○ output ≤ 2·P_{Ref} and antenna is ≥ 5.0 cm from other antennas ○ output ≤ P_{Ref} and antenna is ≥ 2.5 cm from other antennas ○ output ≤ P_{Ref} and antenna is < 2.5 cm from other antennas, each with either output power ≤ P_{Ref} or 1-g SAR < 1.2 W/kg Otherwise stand-alone SAR is required When stand-alone SAR is required ○ test SAR on highest output channel for each wireless mode and exposure condition ○ if SAR for highest output channel is > 50% of SAR limit, evaluate all channels according to normal procedures	
Jaw, Mouth and Nose	Flat phantom SAR required ○ when measurement is required in tight regions of SAM and it is not feasible or the results can be questionable due to probe tilt, calibration, positioning and orientation issues ○ position rectangular and clam-shell phones according to flat phantom procedures and conduct SAR measurements for these specific locations	When simultaneous transmission SAR testing is required, contact the FCC Laboratory for interim guidance.

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

Four antennas are available for the EUT, (GSM antenna, Bluetooth antenna, 2.4 GHz Low Power Transceiver antenna and 802.11b/g Wi-Fi antenna),The distance between Wi-Fi antenna and GSM antenna is 9 cm which is more than 5 cm, and the Max output power of Wi-Fi radio is 8.2 mW which is less than 2*Pref (24 mW), according to KDB 648474, stand alone SAR of Wi-Fi radio is not required.

Result

Stand along SAR measurement is exempted.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

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

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

And according to FCC section 15.247 (b), if the transmitting antennas of directional gain greater than 6 dBi 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 Wi-Fi (SMD) antennas soldered on PCB, which complies with the Part 15.203. The maximum antenna gain is 0 dBi. Please see EUT photo for details.

Result: Compliant.

FCC §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

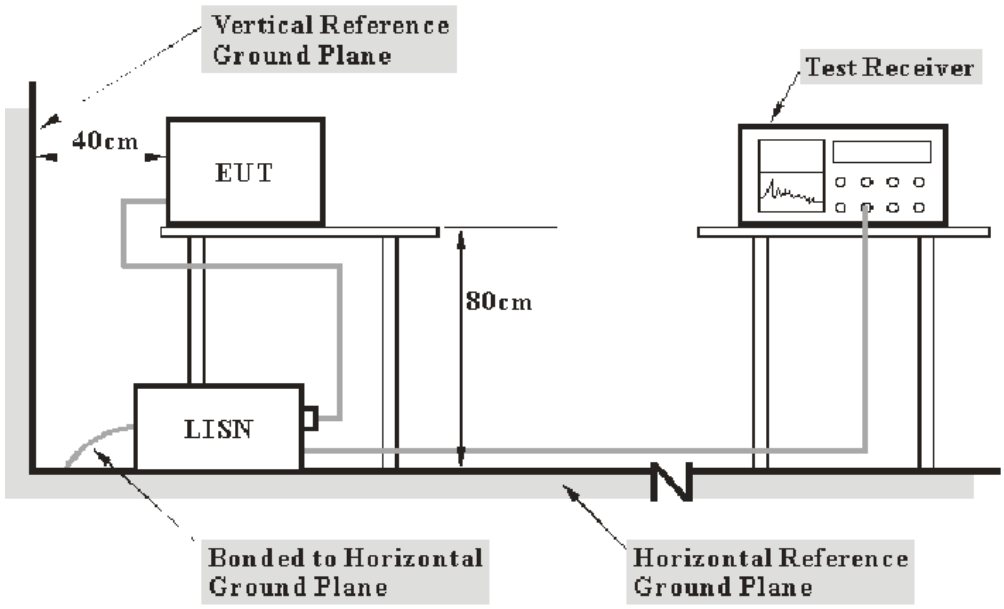
FCC §15.207

Measurement Uncertainty

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

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

EUT Setup



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

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

The spacing between the peripherals was 10 cm.

The PC was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	***IF B/W***
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2010-03-03	2011-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2010-03-09	2011-03-08

*** Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the adapter was connected to the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

9.25 dB at **0.525 MHz** in the **Neutral** conductor mode

Test Data

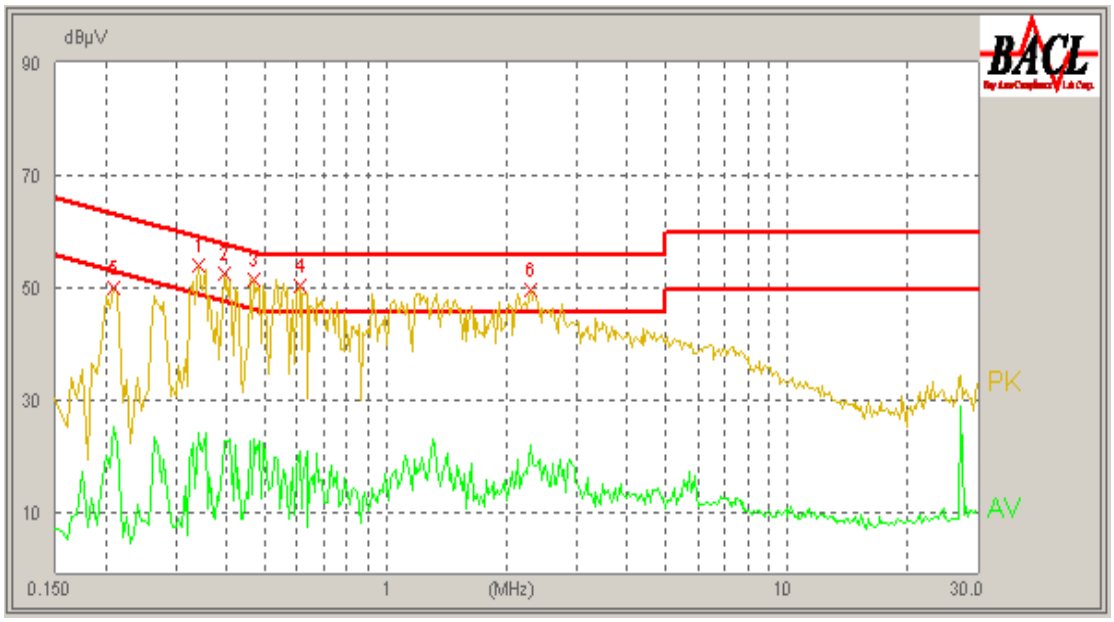
Environmental Conditions

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

The testing was performed by Alvin Huang on 2010-09-18.

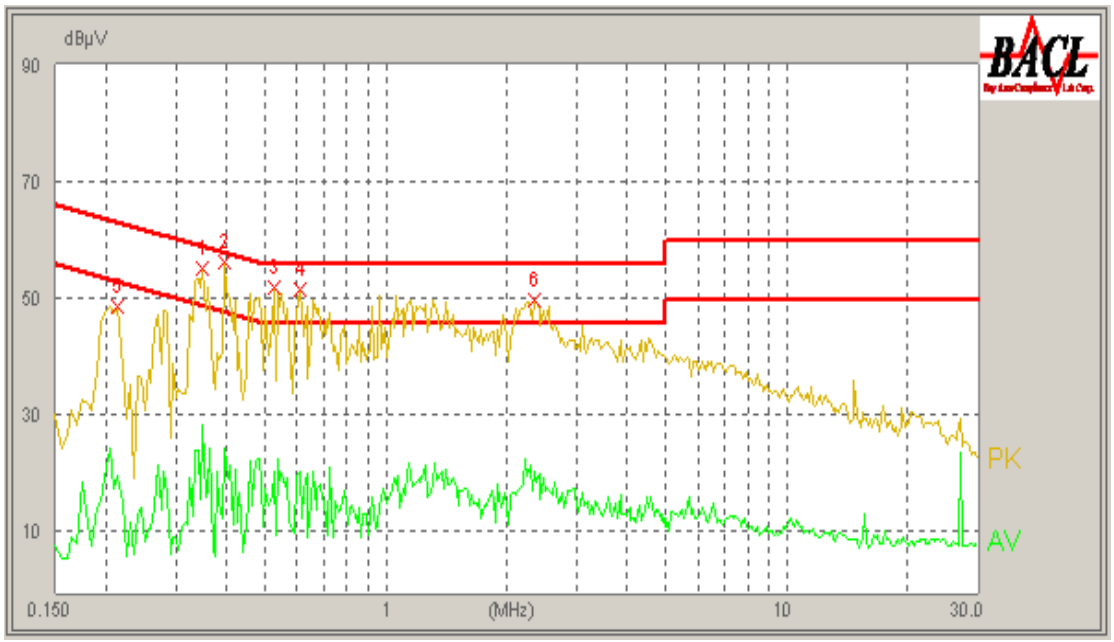
Test Mode: Transmitting & Charging (worse case)

120 V, 60 Hz, Line:



Conducted Emissions			FCC Part 15.247		
Frequency (MHz)	**Corrected Factor (dB)**	**Cord. Result (dBµV)**	**Limit (dBµV)**	**Margin (dB)**	**Remark (PK/QP/Ave.)**
0.395	10.00	49.20	59.00	9.80	QP
2.290	10.20	43.79	56.00	12.21	QP
0.340	10.00	46.73	60.57	13.84	QP
0.470	10.00	42.94	56.86	13.92	QP
0.610	10.20	42.01	56.00	13.99	QP
0.210	10.10	42.76	64.29	21.53	QP
0.470	10.00	23.46	46.86	23.40	Ave.
2.290	10.20	22.41	46.00	23.59	Ave.
0.610	10.20	21.45	46.00	24.55	Ave.
0.395	10.00	23.07	49.00	25.93	Ave.
0.340	10.00	24.50	50.57	26.07	Ave.
0.210	10.10	25.87	54.29	28.42	Ave.

120V, 60 Hz, Neutral:



Conducted Emissions			FCC Part 15.247		
Frequency (MHz)	**Corrected Factor (dB)**	**Cord. Result (dBµV)**	**Limit (dBµV)**	**Margin (dB)**	**Remark (PK/QP/Ave.)**
0.525	10.20	46.75	56.00	9.25	QP
0.395	10.00	44.18	59.00	14.82	QP
2.345	10.20	41.01	56.00	14.99	QP
0.350	10.00	45.27	60.29	15.02	QP
0.610	10.20	40.75	56.00	15.25	QP
0.350	10.00	28.44	50.29	21.85	Ave.
0.395	10.00	24.49	49.00	24.51	Ave.
0.610	10.20	20.86	46.00	25.14	Ave.
2.345	10.20	20.79	46.00	25.21	Ave.
0.525	10.20	20.56	46.00	25.44	Ave.
0.215	10.10	36.73	64.14	27.41	QP
0.215	10.10	20.01	54.14	34.13	Ave.

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

Applicable Standard

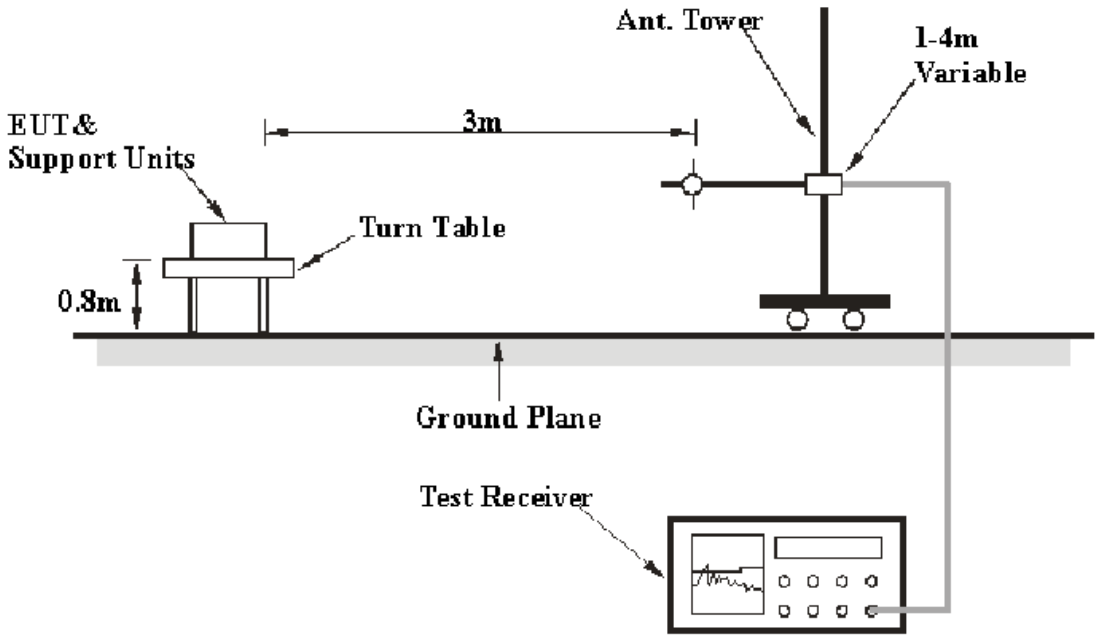
FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ±4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3 meters, 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***
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	2010-08-02	2011-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2010-03-11	2011-03-11
HP	Amplifier	8449B	3008A00277	2009-09-12	2010-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-08

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test.

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 , 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 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, with the worst margin reading of:

30 -1000 MHz:

802.11g (wost case): **7.4 dB** at **698.137000 MHz** in the **Vertical** polarization

Above 1 GHz:

802.11b (Low Channel): **5.45 dB** at **4824 MHz** in the **Vertical** polarization
802.11b (Middle Channel): **5.48 dB** at **4874 MHz** in the **Vertical** polarization
802.11b (High Channel): **7.89 dB** at **4924 MHz** in the **Vertical** polarization

802.11g (Low Channel): **8.66 dB** at **4824 MHz** in the **Horizontal** polarization
802.11g (Middle Channel): **9.18 dB** at **4874 MHz** in the **Horizontal** polarization
802.11g (High Channel): **9.17 dB** at **4924 MHz** in the **Vertical** polarization

Test Data

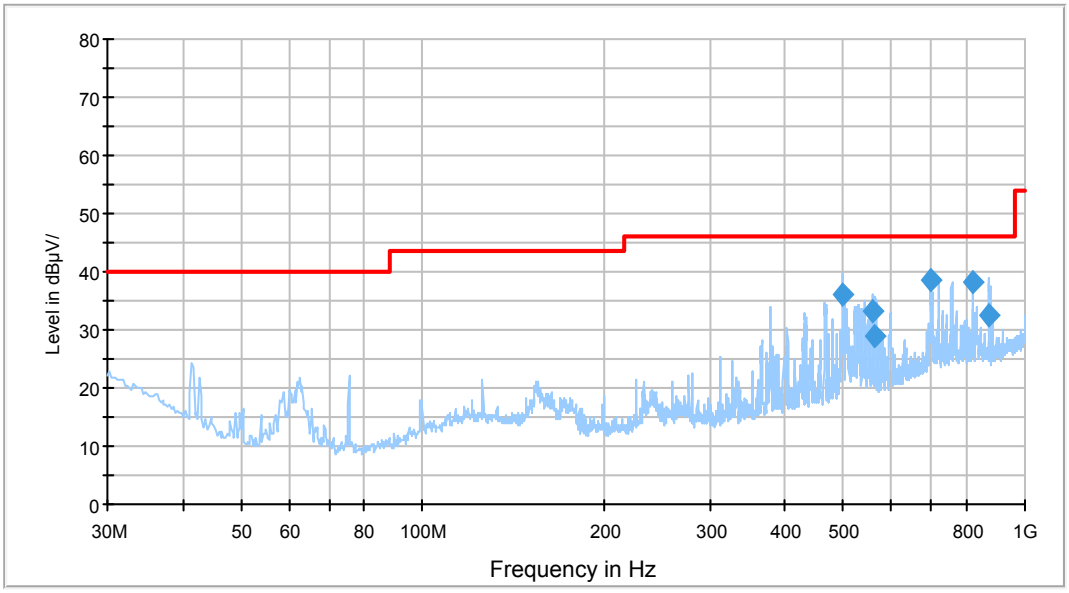
Environmental Conditions

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

The testing was performed by Alvin Huang on 2010-08-23 to 2010-08-29.

30-1000 MHz:

Test Mode: Transmitting (wost case)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
698.137000	38.6	145.0	V	174.0	-3.1	46.0	7.4
819.099750	38.2	104.0	V	162.0	-1.6	46.0	7.8
497.322750	35.9	103.0	V	163.0	-8.4	46.0	10.1
558.347500	33.3	102.0	V	194.0	-7.3	46.0	12.7
873.860250	32.3	245.0	H	342.0	-1.2	46.0	13.7
565.152750	28.8	102.0	V	177.0	-7.2	46.0	17.2

Above 1 GHz:

802.11b Mode:

Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209			
Frequency (MHz)	S.A. Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (2412 MHz)												
4824	39.75	AV	15	1.5	V	31.2	4.3	26.7	48.55	54	5.45	harmonic
4824	38.12	AV	0	1.1	H	31.2	4.3	26.7	46.92	54	7.08	harmonic
4824	52.81	PK	0	1.1	H	31.2	4.3	26.7	61.61	74	12.39	harmonic
4824	51.98	PK	15	1.5	V	31.2	4.3	26.7	60.78	74	13.22	harmonic
Middle Channel (2437 MHz)												
4874	39.72	AV	310	1.6	V	31.2	4.3	26.7	48.52	54	5.48	harmonic
4874	37.15	AV	10	1.2	H	31.2	4.3	26.7	45.95	54	8.05	harmonic
4874	52.13	PK	310	1.6	V	31.2	4.3	26.7	60.93	74	13.07	harmonic
4874	51.53	PK	10	1.2	H	31.2	4.3	26.7	60.33	74	13.67	harmonic
High Channel (2462 MHz)												
4924	36.41	AV	25	1.4	V	31.9	4.4	26.6	46.11	54	7.89	harmonic
4924	36.24	AV	125	1.5	H	31.9	4.4	26.6	45.94	54	8.06	harmonic
4924	50.22	PK	125	1.5	H	31.9	4.4	26.6	59.92	74	14.08	harmonic
4924	49.42	PK	25	1.4	V	31.9	4.4	26.6	59.12	74	14.88	harmonic

Suprious emission in restricted band:

Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209/15.205			
Frequency (MHz)	S.A. Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
2387	46.45	PK	0	1.3	H	27.5	3.0	26.8	50.15	74	23.85	spurious
2387	26.11	AV	0	1.3	H	27.5	3.0	26.8	29.81	54	24.19	spurious
2387	24.77	AV	125	2.4	V	27.5	3.0	26.8	28.47	54	25.53	spurious
2494.1	23.80	AV	305	1.7	H	27.5	3.2	26.8	27.70	54	26.30	spurious
2494.1	23.76	AV	117	1.7	V	27.5	3.2	26.8	27.66	54	26.34	spurious
2387	43.45	PK	125	2.4	V	27.5	3.0	26.8	47.15	74	26.85	spurious
2494.1	42.44	PK	305	1.7	H	27.5	3.2	26.8	46.34	74	27.66	spurious
2494.1	42.15	PK	117	1.7	V	27.5	3.2	26.8	46.05	74	27.95	spurious

802.11g Mode:

Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209			
Frequency (MHz)	S.A. Reading (dBµV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Comment
Low Channel (2412 MHz)												
4824	36.54	AV	14	1.3	H	31.2	4.3	26.7	45.34	54	8.66	harmonic
4824	35.11	AV	142	1.5	V	31.2	4.3	26.7	43.91	54	10.09	harmonic
4824	48.76	PK	14	1.3	H	31.2	4.3	26.7	57.56	74	16.44	harmonic
4824	47.67	PK	142	1.5	V	31.2	4.3	26.7	56.47	74	17.53	harmonic
Middle Channel (2437 MHz)												
4874	36.02	AV	105	1.5	H	31.2	4.3	26.7	44.82	54	9.18	harmonic
4874	36.01	AV	321	1.4	V	31.2	4.3	26.7	44.81	54	9.19	harmonic
4874	48.15	PK	105	1.5	H	31.2	4.3	26.7	56.95	74	17.05	harmonic
4874	47.64	PK	321	1.4	V	31.2	4.3	26.7	56.44	74	17.56	harmonic
High Channel (2462 MHz)												
4924	35.13	AV	0	1.5	V	31.9	4.4	26.6	44.83	54	9.17	harmonic
4924	34.67	AV	0	1.5	H	31.9	4.4	26.6	44.37	54	9.63	harmonic
4924	47.86	PK	0	1.5	H	31.9	4.4	26.6	57.56	74	16.44	harmonic
4924	47.10	PK	0	1.5	V	31.9	4.4	26.6	56.80	74	17.20	harmonic

Suprious emission in restricted band:

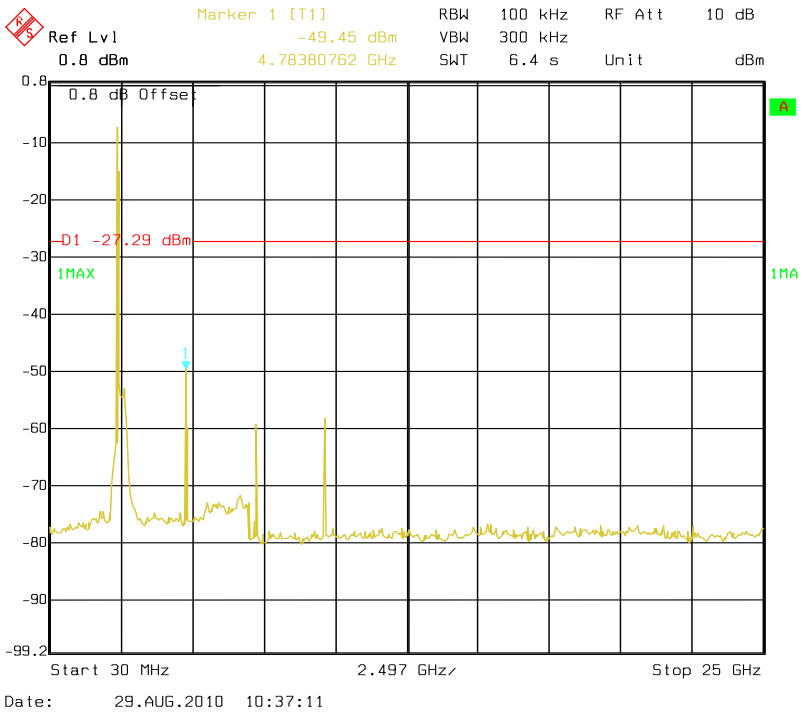
Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209/15.205			
Frequency (MHz)	S.A. Reading (dBµV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Comment
2390	25.11	AV	25	1.8	H	27.5	3.0	26.8	28.81	54	25.19	spurious
2390	44.74	PK	25	1.8	H	27.5	3.0	26.8	48.44	74	25.56	spurious
2390	24.17	AV	125	2.0	V	27.5	3.0	26.8	27.87	54	26.13	spurious
2390	44.12	PK	125	2.0	V	27.5	3.0	26.8	47.82	74	26.18	spurious
2483.5	43.10	PK	32	1.5	H	27.5	3.2	26.8	47.00	74	27.00	spurious
2483.5	22.48	AV	32	1.5	H	27.5	3.2	26.8	26.38	54	27.62	spurious
2483.5	42.44	PK	0	1.7	V	27.5	3.2	26.8	46.34	74	27.66	spurious
2483.5	21.24	AV	0	1.7	V	27.5	3.2	26.8	25.14	54	28.86	spurious

Antenna Port Conducted Spurious Emissions

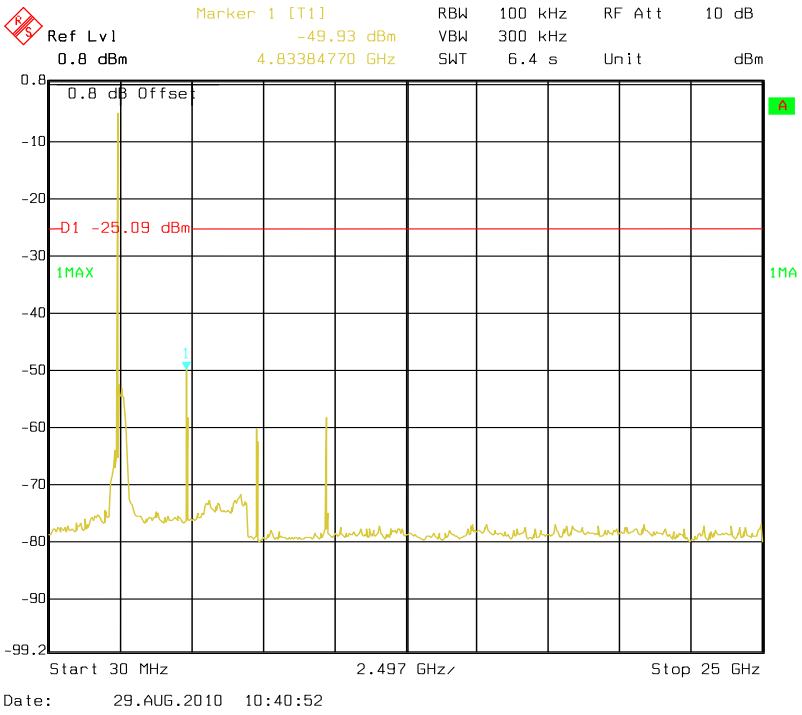
Channel Frequency (MHz)	Delta Value (dBc)	Limit (dBc)	Ref. Plot	Result
802.11g mode				
2412	42.16	20	PLOT1	PASS
2437	44.84	20	PLOT2	PASS
2462	47.87	20	PLOT3	PASS
802.11g mode				
2412	52.51	20	PLOT4	PASS
2437	57.13	20	PLOT5	PASS
2462	59.48	20	PLOT6	PASS

Please refer to the following plots.

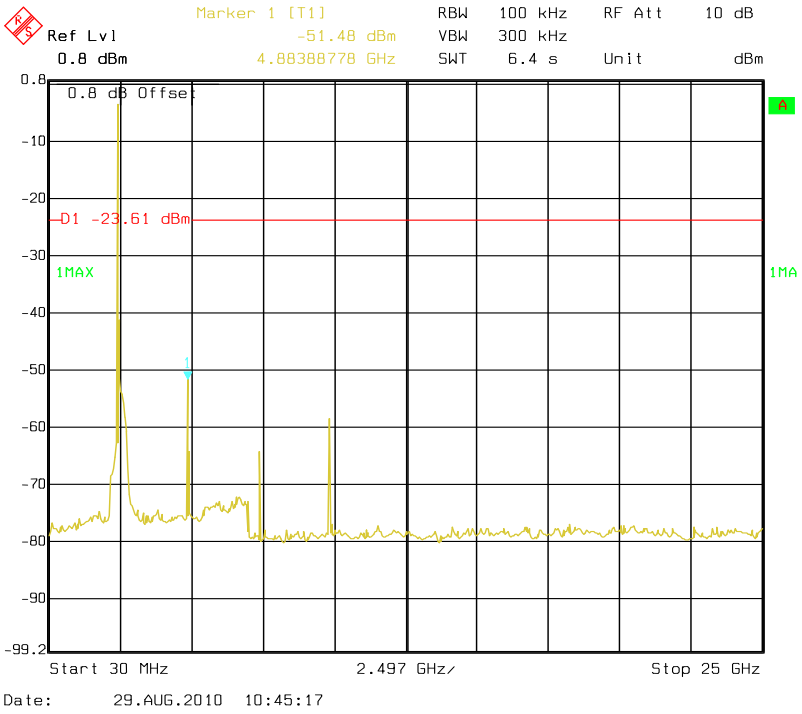
PLOT1- 802.11b Low Channel



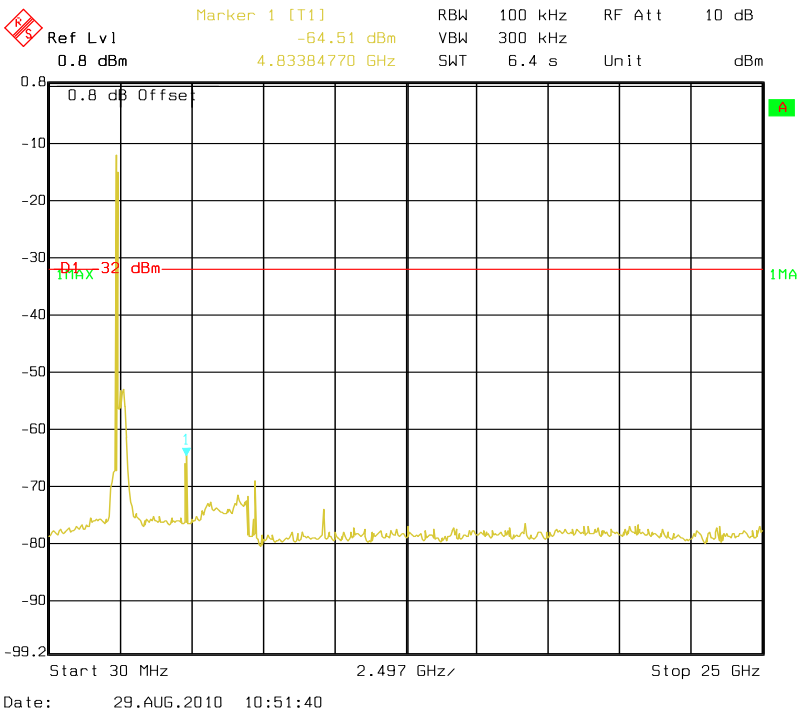
PLOT2- 802.11b Middle Channel



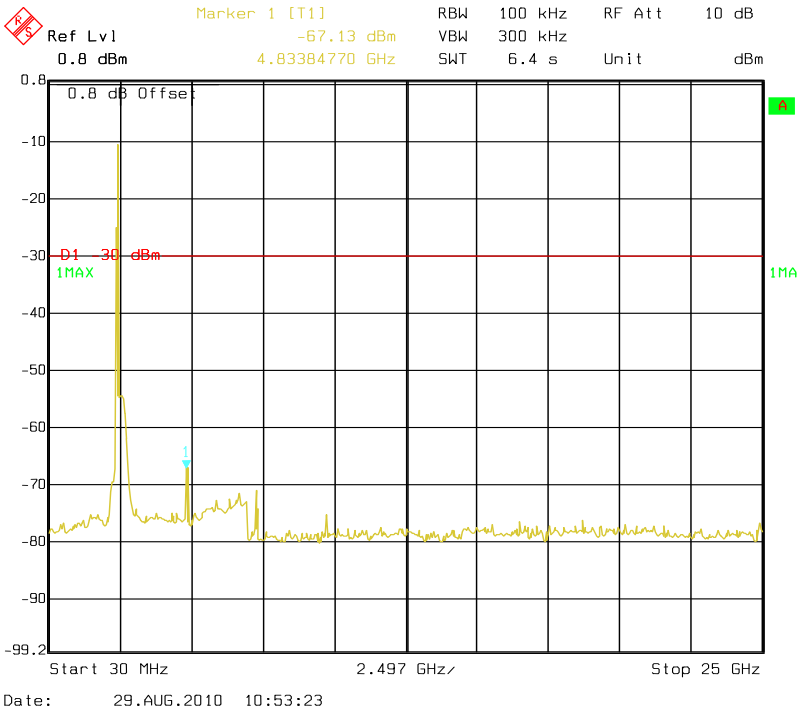
PLOT3- 802.11b High Channel



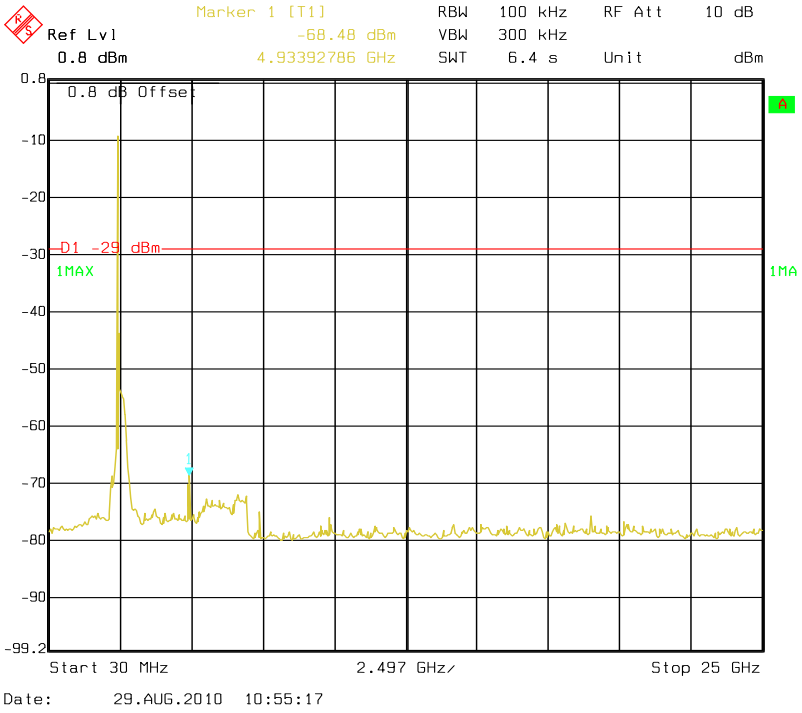
PLOT4- 802.11g Low Channel



PLOT5- 802.11g Middle Channel



PLOT6- 802.11g High Channel



FCC §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.

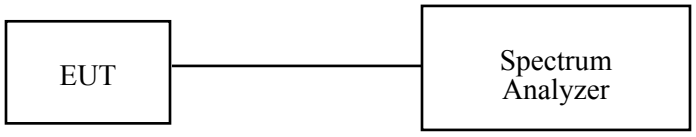
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23

*** 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

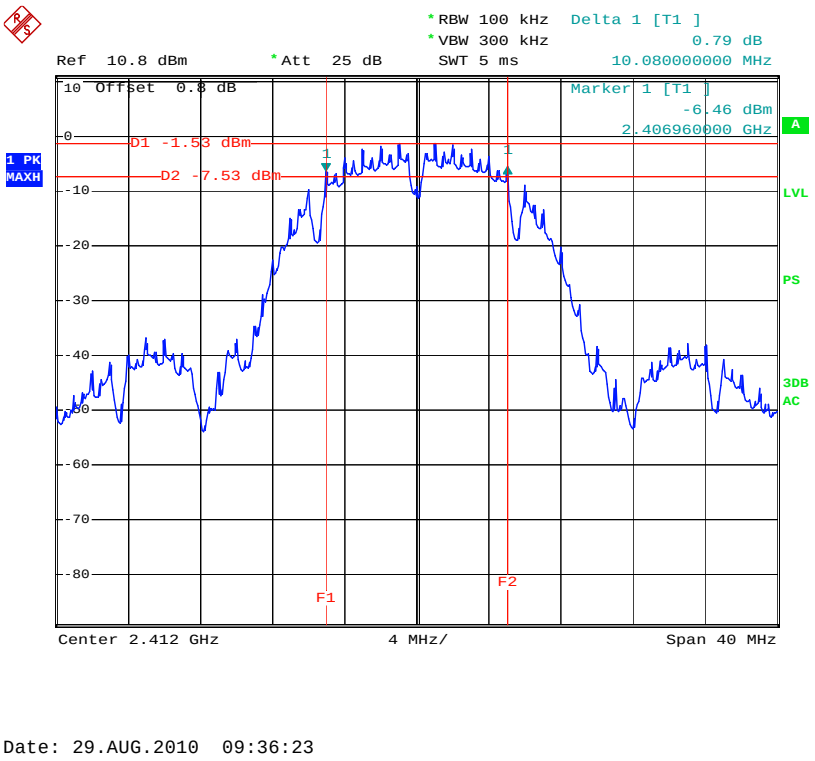
The testing was performed by Alvin Huang on 2010-08-29.

Test Result: Pass.

Please refer to the following tables and plots.

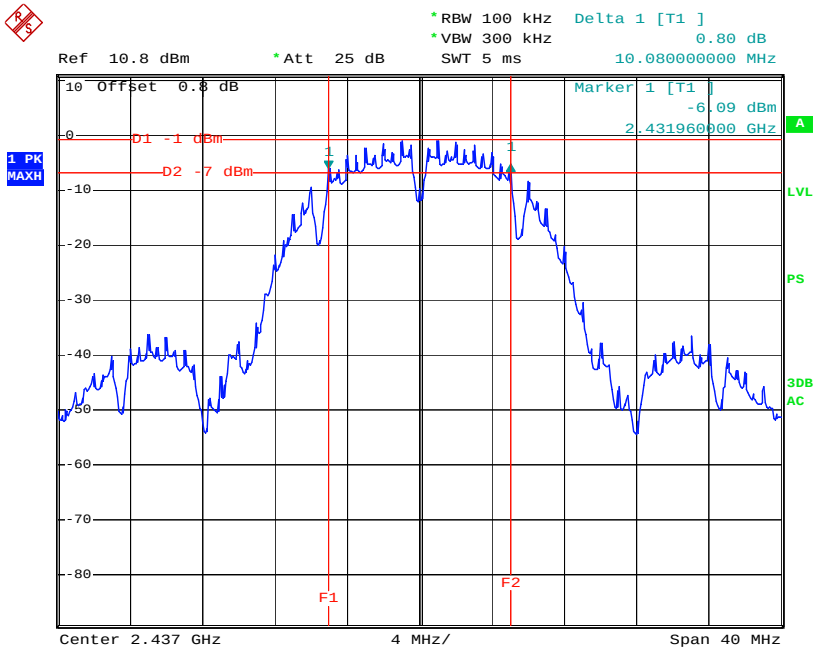
Channel	Channel Frequency (MHz)	Measured 6 dB Bandwidth (MHz)	FCC Part 15.247 Limit (kHz)
802.11b mode			
Low	2412	10.08	> 500
Middle	2437	10.08	> 500
High	2462	10.08	> 500
802.11g mode			
Low	2412	16.48	> 500
Middle	2437	16.40	> 500
High	2462	16.48	> 500

802.11b Low Channel



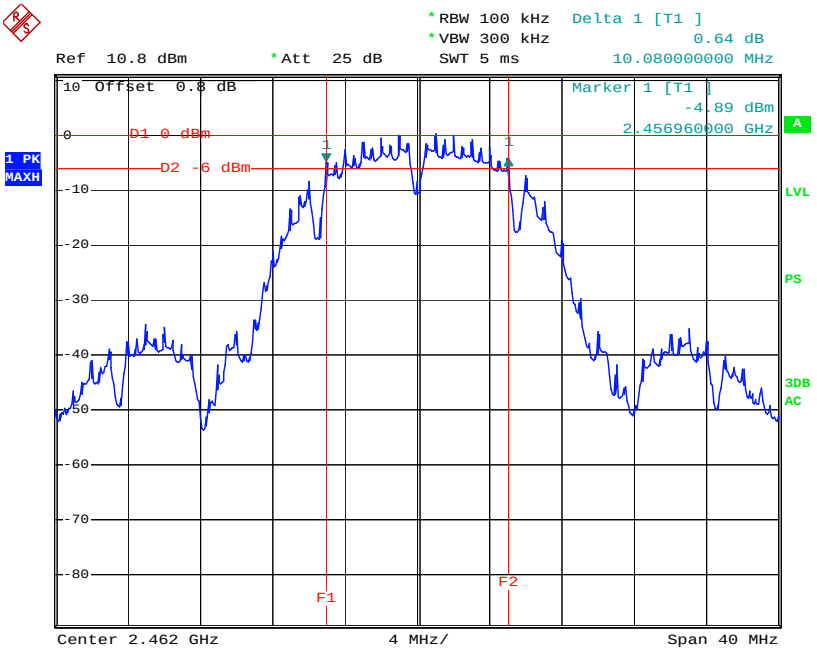
Date: 29.AUG.2010 09:36:23

802.11b Middle Channel



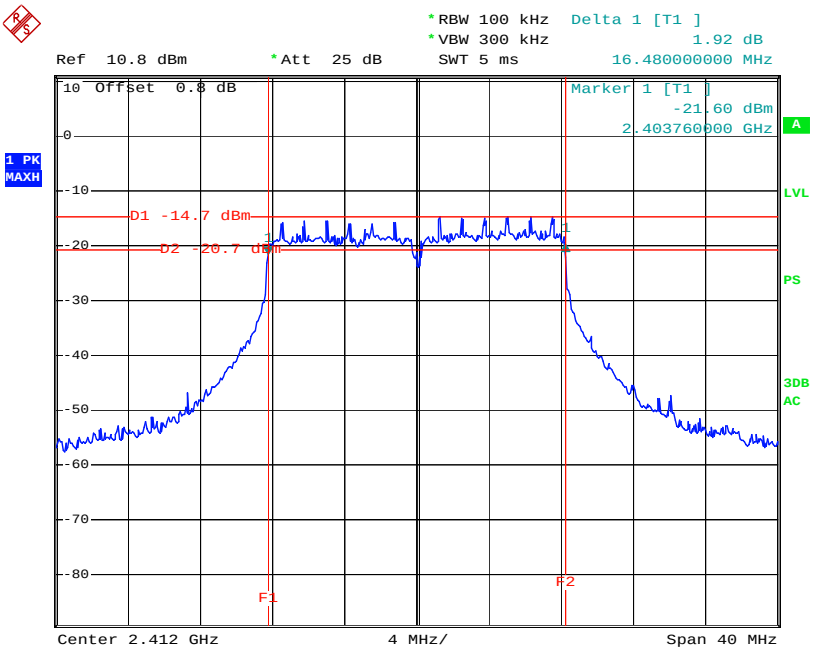
Date: 29.AUG.2010 09:39:39

802.11b High Channel



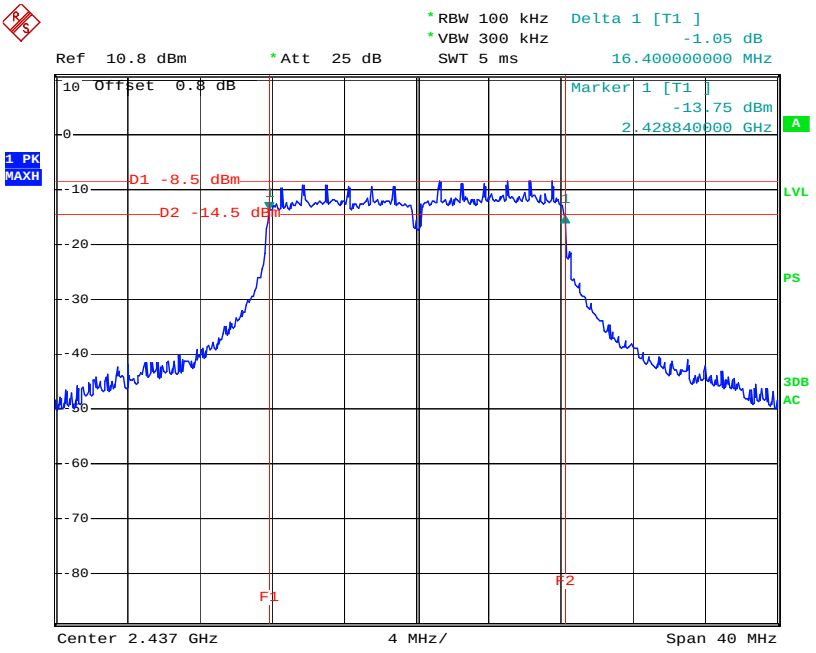
Date: 29.AUG.2010 09:41:19

802.11g Low Channel



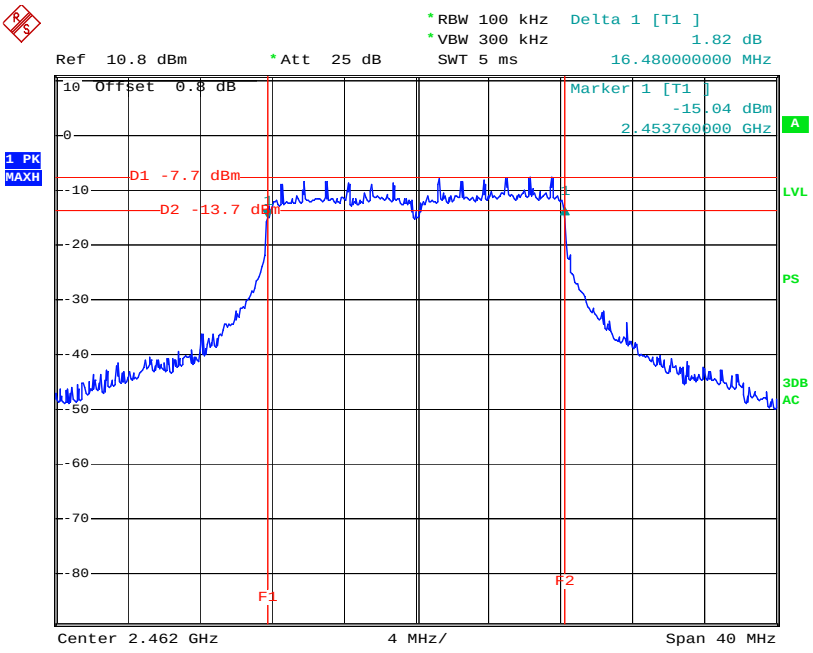
Date: 29.AUG.2010 09:21:58

802.11g Middle Channel



Date: 29.AUG.2010 09:24:42

802.11g High Channel



FCC §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.

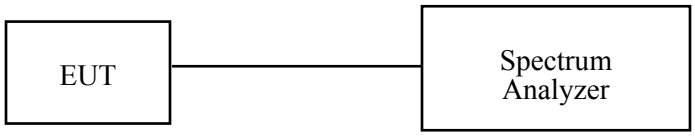
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2009-11-24	2010-11-23

*** 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

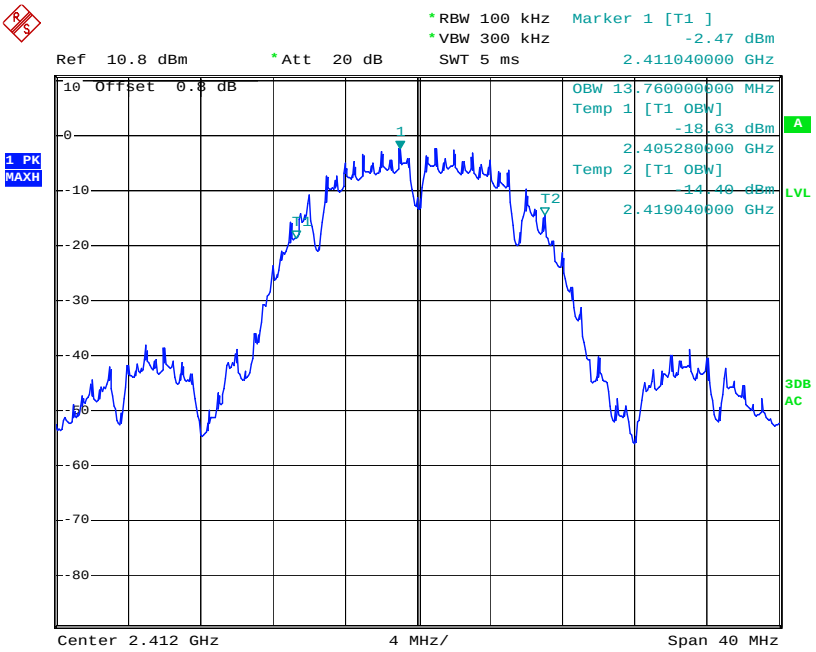
The testing was performed by Alvin Huang on 2010-08-28.

Test Mode: Transmitting

Channel	Frequency (MHz)	Data Rate (Mbps)	Conducted Output Power (dBm)	Limit (dBm)
802.11b mode				
Low	2412	1	7.19	30
Middle	2437	1	7.93	30
High	2462	1	9.14	30
802.11g mode				
Low	2412	6	2.92	30
Middle	2437	6	3.86	30
High	2462	6	4.72	30

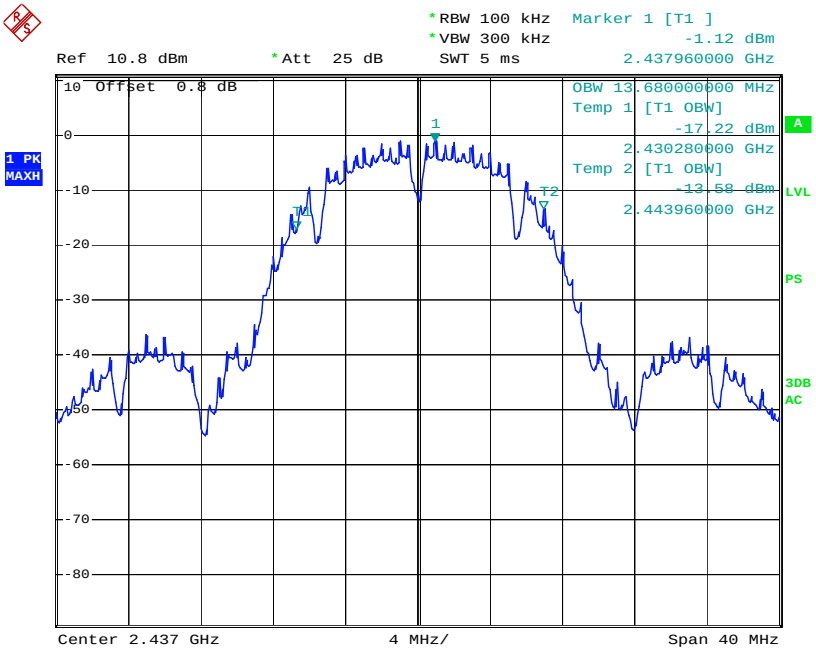
802.11b Mode:

99% Occupied Bandwith, Low Channel



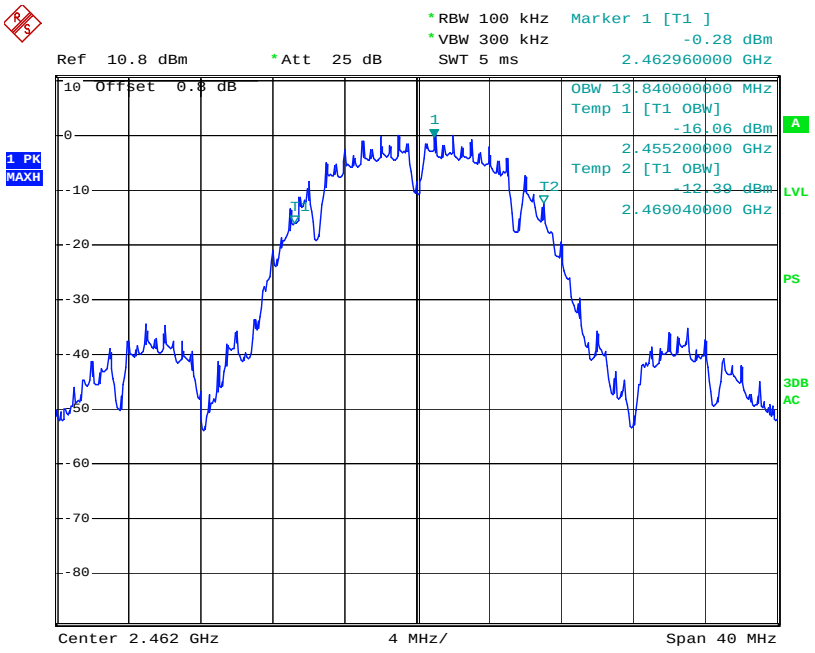
Date: 28.AUG.2010 15:43:59

99% Occupied Bandwith, Middle Channel



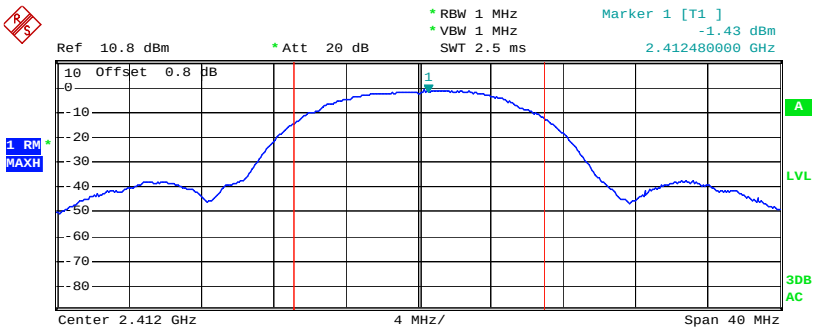
Date: 28.AUG.2010 16:06:47

99% Occupied Bandwith, High Channel



Date: 28.AUG.2010 16:09:04

802.11b RF Output Power, Low Channel

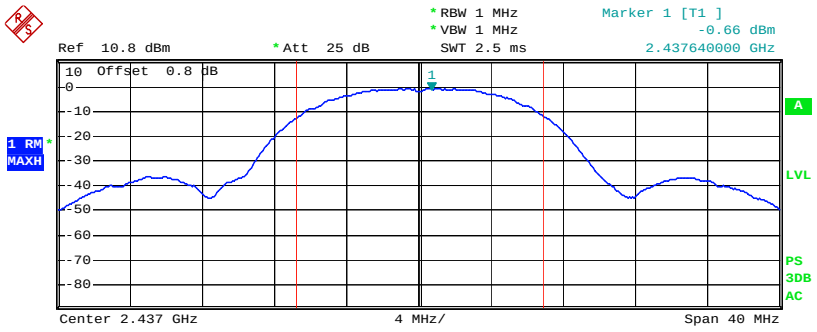


Tx Channel

Bandwidth	13.84 MHz	Power	7.19 dBm

Date: 28.AUG.2010 15:44:52

802.11b RF Output Power, Middle Channel

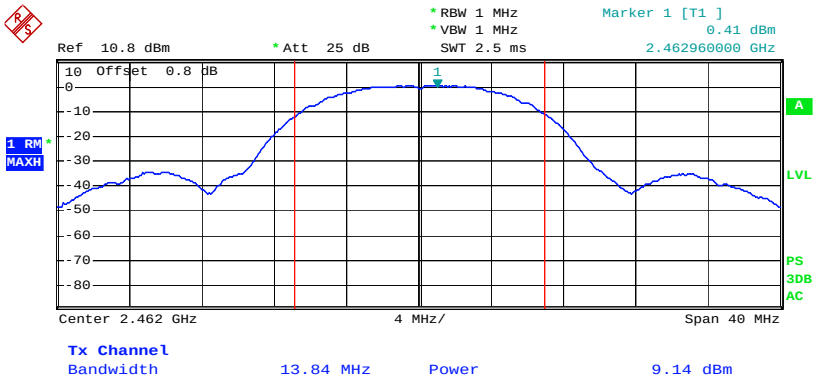


Tx Channel

Bandwidth	13.68 MHz	Power	7.93 dBm

Date: 28.AUG.2010 16:07:25

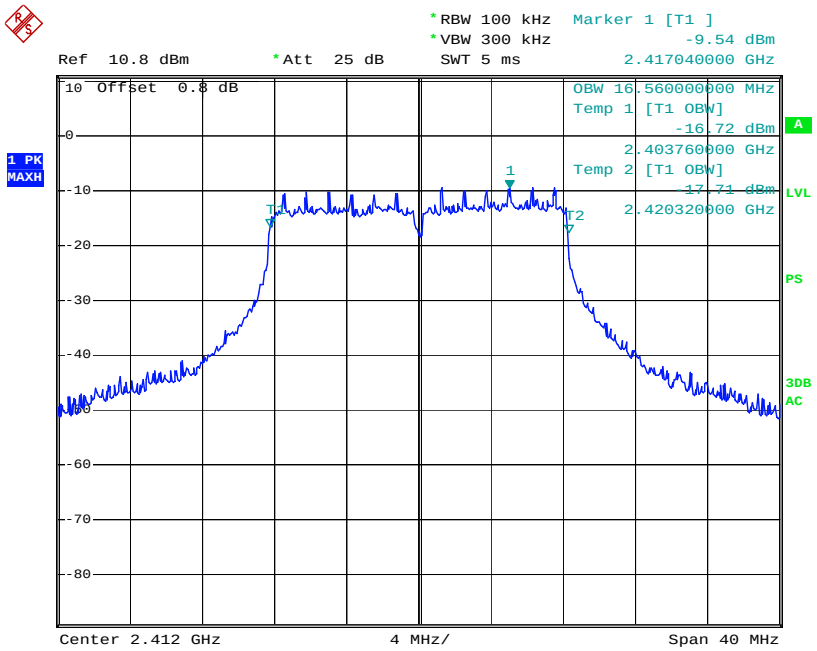
802.11b RF Output Power, High Channel



Date: 28.AUG.2010 16:09:56

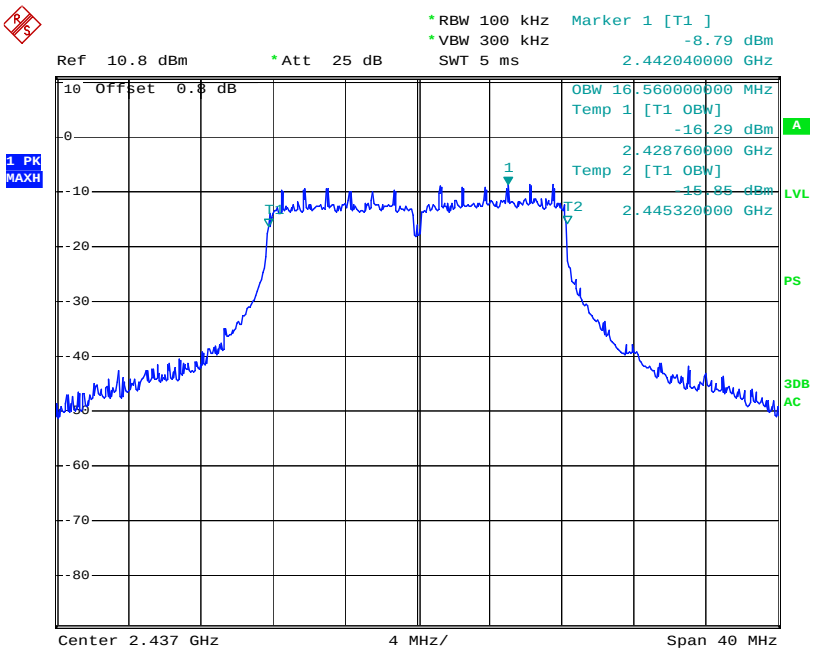
802.11g Mode:

99% Occupied Bandwith, Low Channel



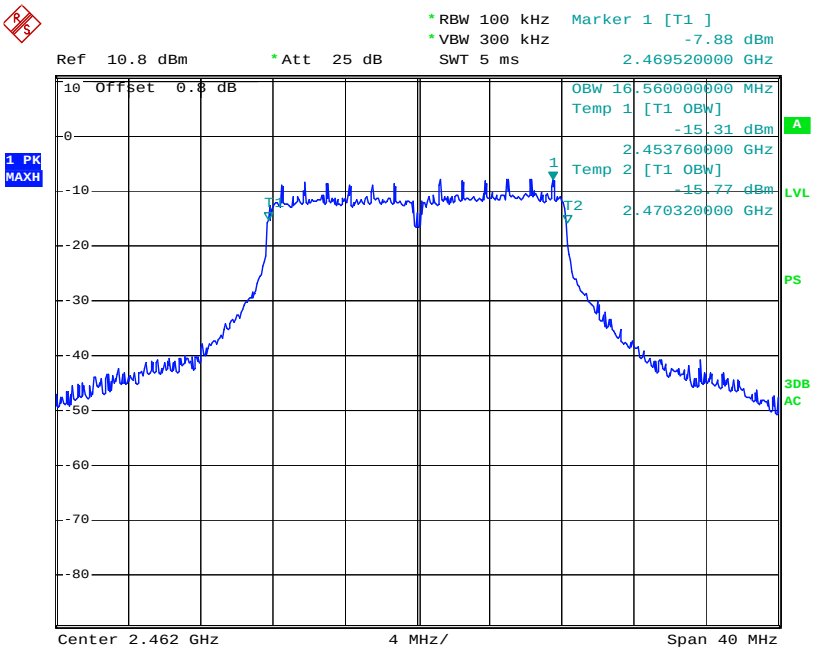
Date: 28.AUG.2010 15:56:18

99% Occupied Bandwith, Middle Channel



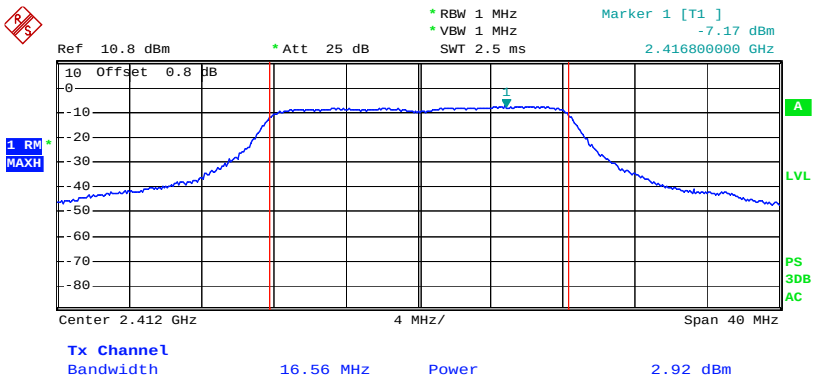
Date: 28.AUG.2010 16:11:19

99% Occupied Bandwith, High Channel



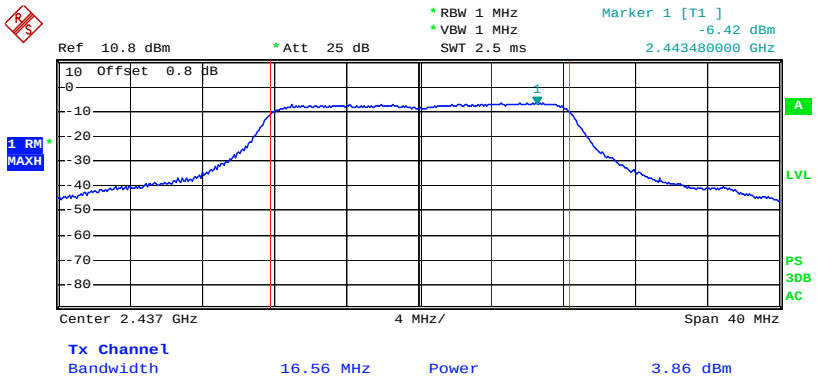
Date: 28.AUG.2010 16:13:57

802.11g RF Output Power, Low Channel



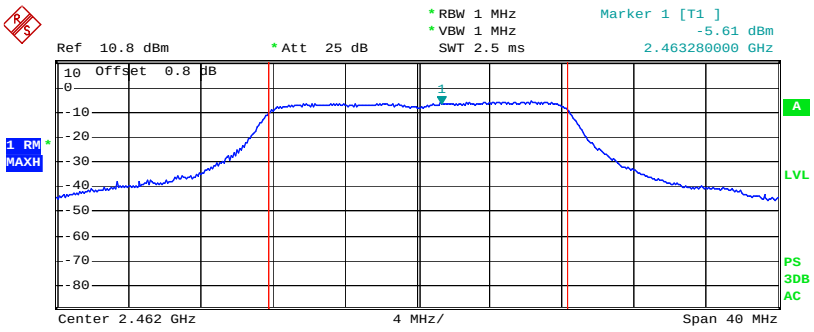
Date: 28.AUG.2010 15:57:35

802.11g RF Output Power, Middle Channel



Date: 28.AUG.2010 16:12:08

802.11g RF Output Power, High Channel



Tx Channel

Bandwidth	16.56 MHz	Power	4.72 dBm

Date: 28.AUG.2010 16:14:37

FCC §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	2009-11-24	2010-11-23

*** 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

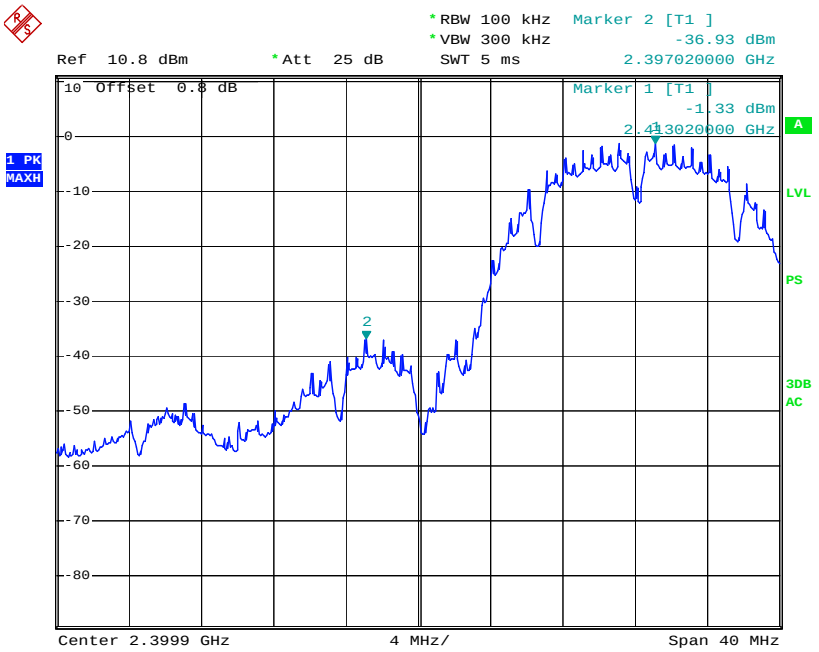
The testing was performed by Alvin Huang on 2010-08-29.

Test Result: *Compliance.*

Frequency (MHz)	Delta Peak to band emission (dBc)	Limit (dBc)
802.11b mode		
2397.02	35.60	20
2487.68	49.23	20
802.11g mode		
2399.58	30.93	20
2483.84	42.26	20

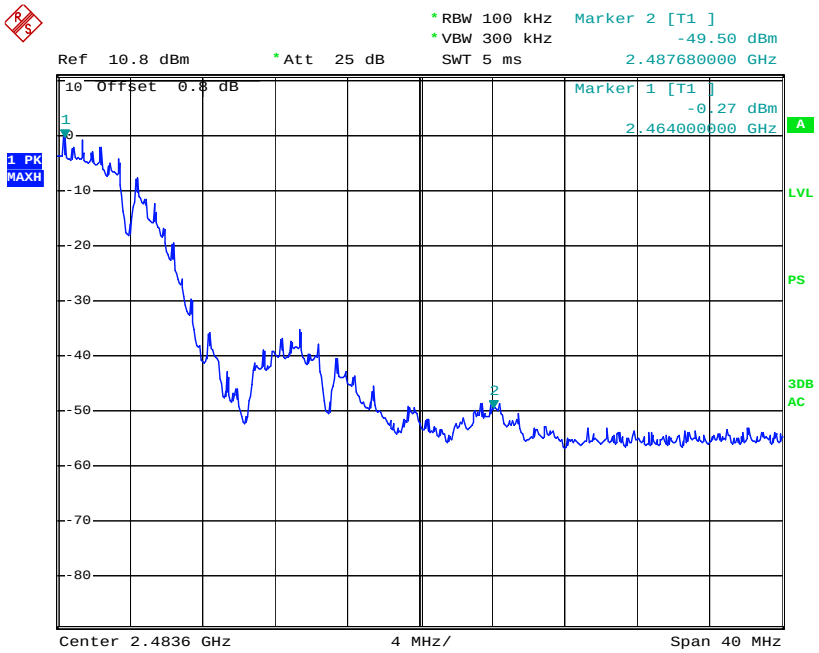
Please refer to following plots.

802.11b: Band Edge, Left Side



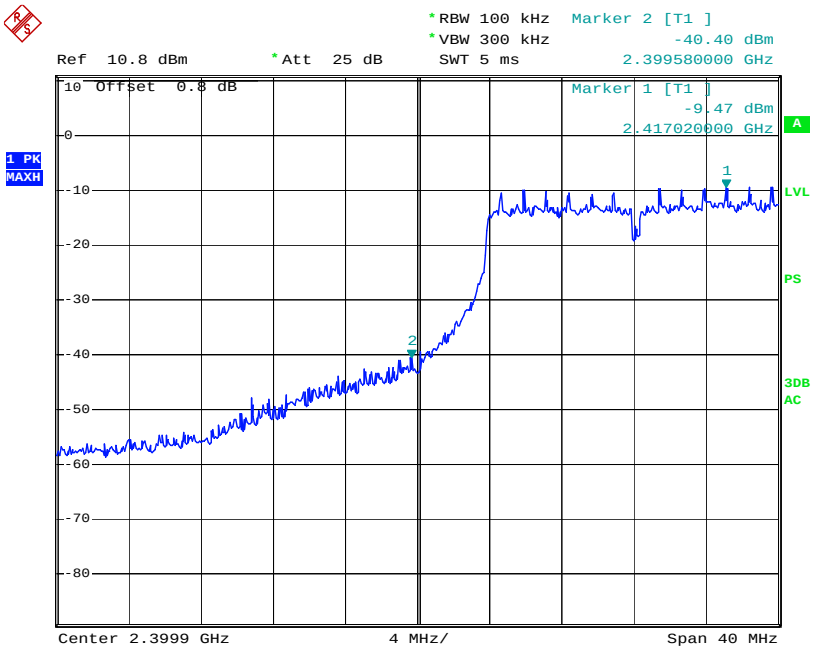
Date: 29.AUG.2010 09:34:09

802.11b: Band Edge, Right Side



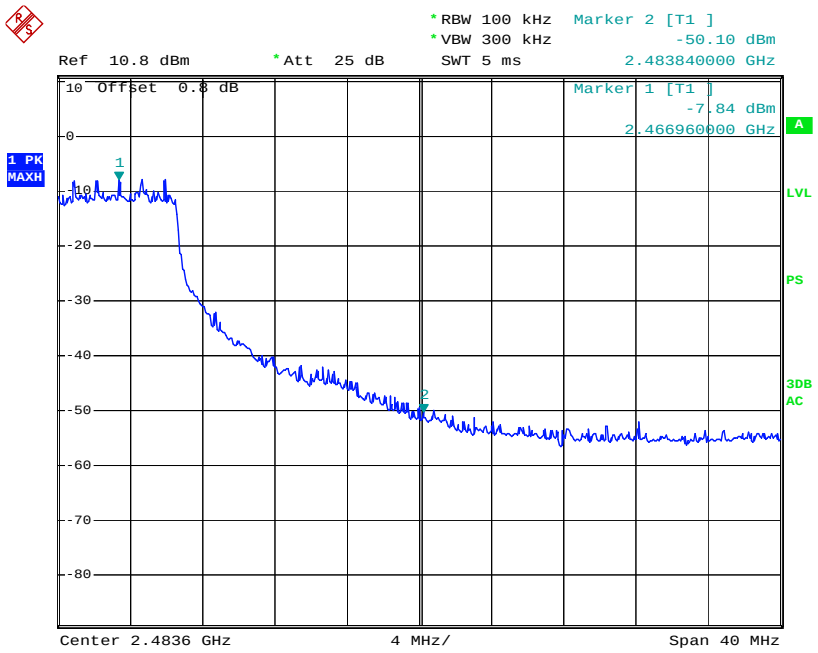
Date: 29.AUG.2010 09:42:09

802.11g: Band Edge, Left Side



Date: 29.AUG.2010 09:32:20

802.11g: Band Edge, Right Side



Date: 29.AUG.2010 09:30:55

FCC §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	2009-11-24	2010-11-23

*** 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

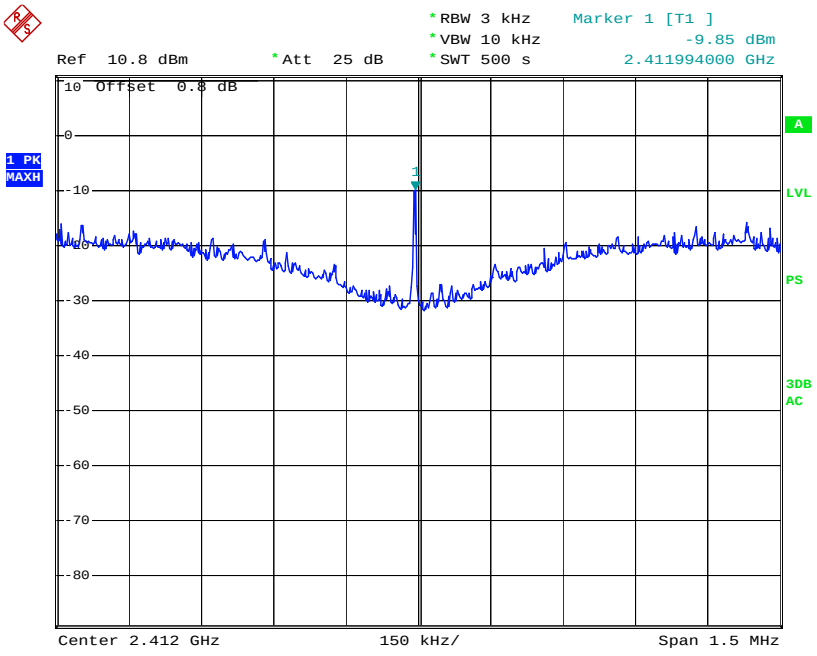
The testing was performed by Alvin Huang on 2010-08-29.

Test Mode: Transmitting

Test Result: Pass

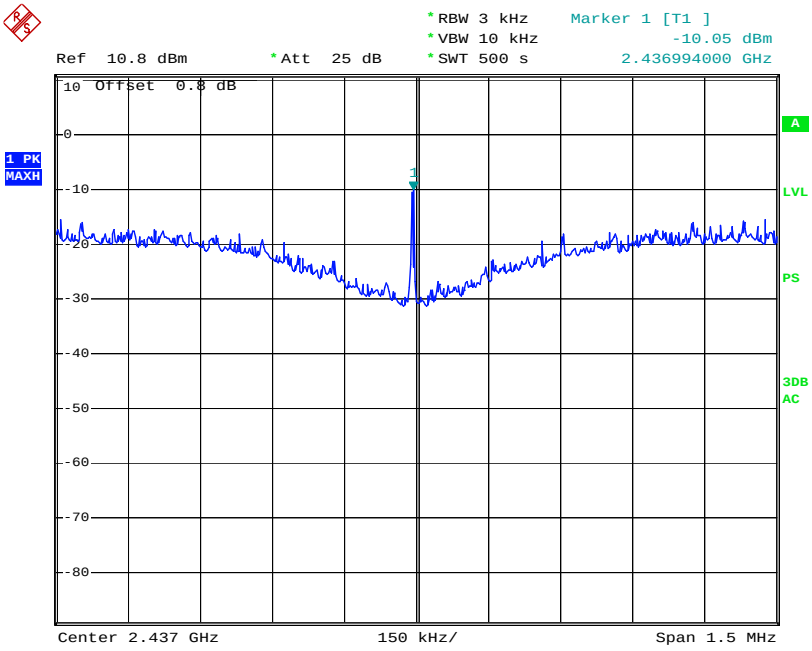
Channel	Frequency (MHz)	Data Rate (Mbps)	PSD (dBm)	Limit (dBm)	Result
802.11b mode					
Low	2412	1	-9.85	8	Pass
Middle	2437	1	-10.05	8	Pass
High	2462	1	-11.52	8	Pass
802.11g mode					
Low	2412	6	-22.79	8	Pass
Middle	2437	6	-20.80	8	Pass
High	2462	6	-19.54	8	Pass

Power Spectral Density, 802.11b Low Channel



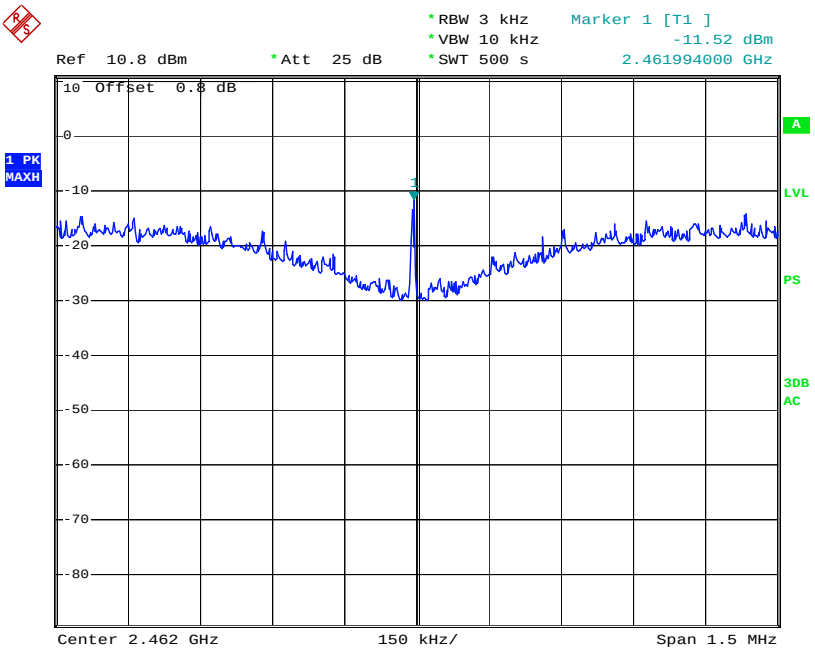
Date: 29.AUG.2010 10:13:31

Power Spectral Density, 802.11b Middle Channel



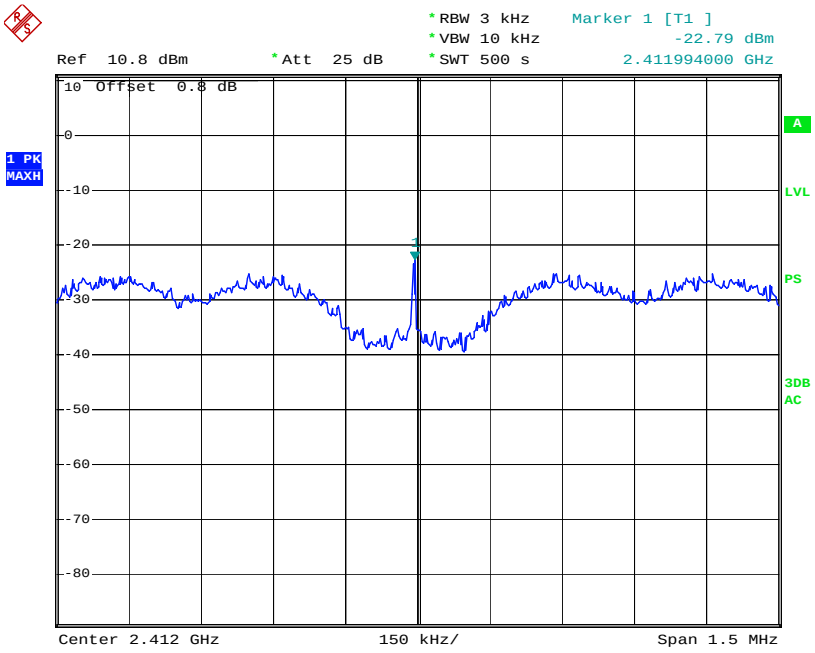
Date: 29.AUG.2010 10:03:28

Power Spectral Density, 802.11b High Channel



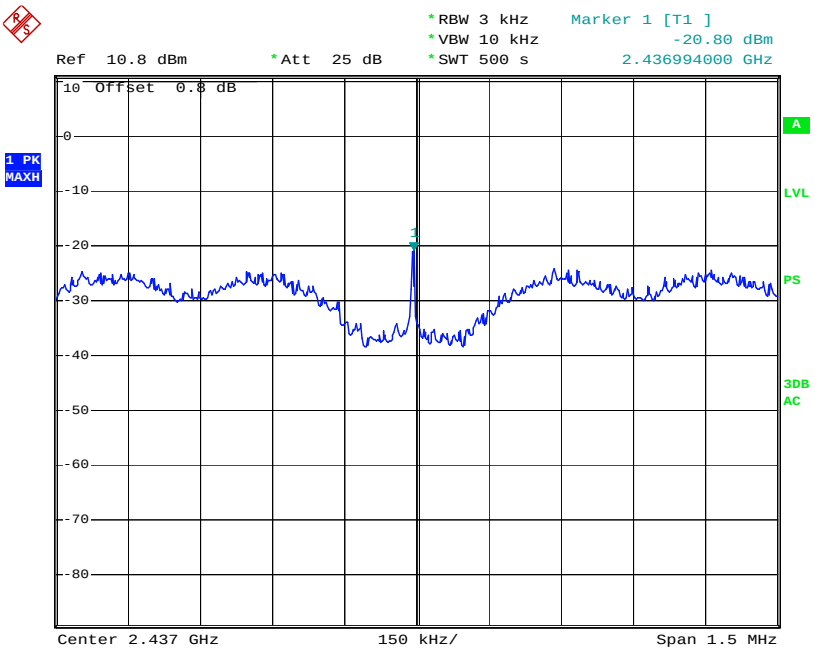
Date: 29.AUG.2010 09:53:24

Power Spectral Density, 802.11g Low Channel



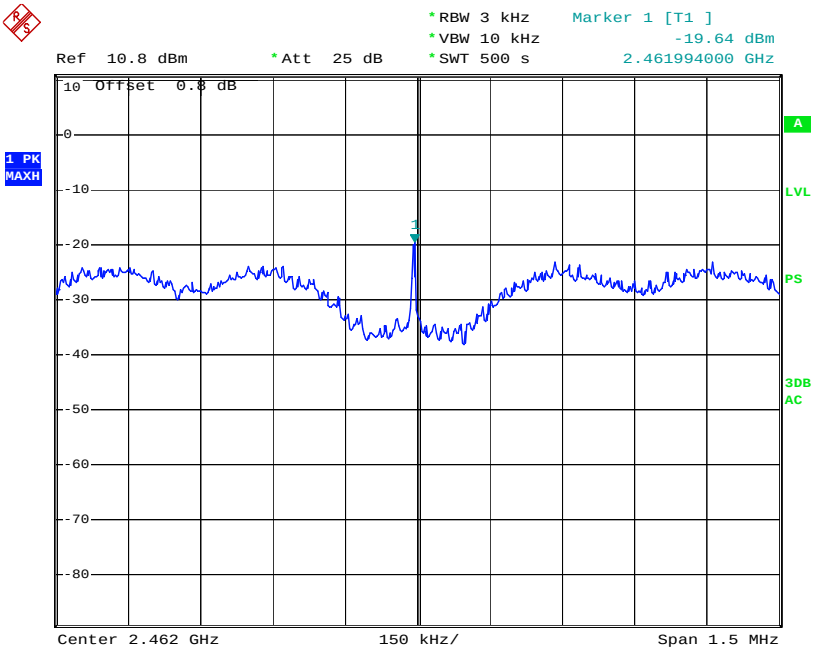
Date: 29.AUG.2010 10:23:37

Power Spectral Density, 802.11g Middle Channel



Date: 29.AUG.2010 10:33:27

Power Spectral Density, 802.11g High Channel



Date: 29.AUG.2010 10:44:20

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