Lab Code: 200707-0

FCC PART 15.247

TEST REPORT

For

Wi2Wi, Inc.

2107 N. 1st Street, Ste. 540, San Jose, CA 95131, USA

FCC ID: U9R-W2SW0011U

Report Type:	Product Name:
Original Report	Wireless 802.11b/g/n Module

Test Engineer:	Walt Kang
Report Number:	RSZ110916001-00
Report Date:	2011-12-19
Reviewed By:	Merry Zhao EMC Engineer
Test Laboratory:	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 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Wi2Wi, Inc's* product, model number: *W2SW0011U (FCC ID: U9R-W2SW0011U)* (the "EUT") in this report is *Wireless 802.11b/g/n*, which was measured approximately: 14.5 mm (L) x 14.5 mm (W) x 2.5 mm (H), rated input voltage: DC 3.3 V.

** All measurement and test data in this report was gathered from production sample serial number: 1109038 (Assigned by BACL, Shenzhen). The EUT was received on 2011-09-16.*

Objective

This Type approval report is prepared on behalf of *Wi2Wi, Inc* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s)

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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 December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

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 an ISO/IEC 17025 accredited laboratory, and is accredited by 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 802.11g and 802.11n-HT20 mode, 11 channels are provided to testing, 802.11n-HT40 7 channels are provided to testing.

Channel NO.	Frequency (MHz)	Channel NO.	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 for 802.11b, 802.11g & 802.11n-HT20 mode were tested with Channel 1, 6 and 11. 802.11n-HT40 mode was tested with channel 3, 6 and 9. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all date rates bandwidths, and modulations.

EUT Exercise Software

Test software: Shortcut to DutApiClient SD

The test was performed under:
802.11b: Data rate: 1 Mbps.
802.11g: Data rate: 6 Mbps.
802.11n-HT20: Data rate: 6Mbps
802.11n-HT40: Data rate: 50 Mbps.

Equipment Modifications

No modification was made to the unit tested.

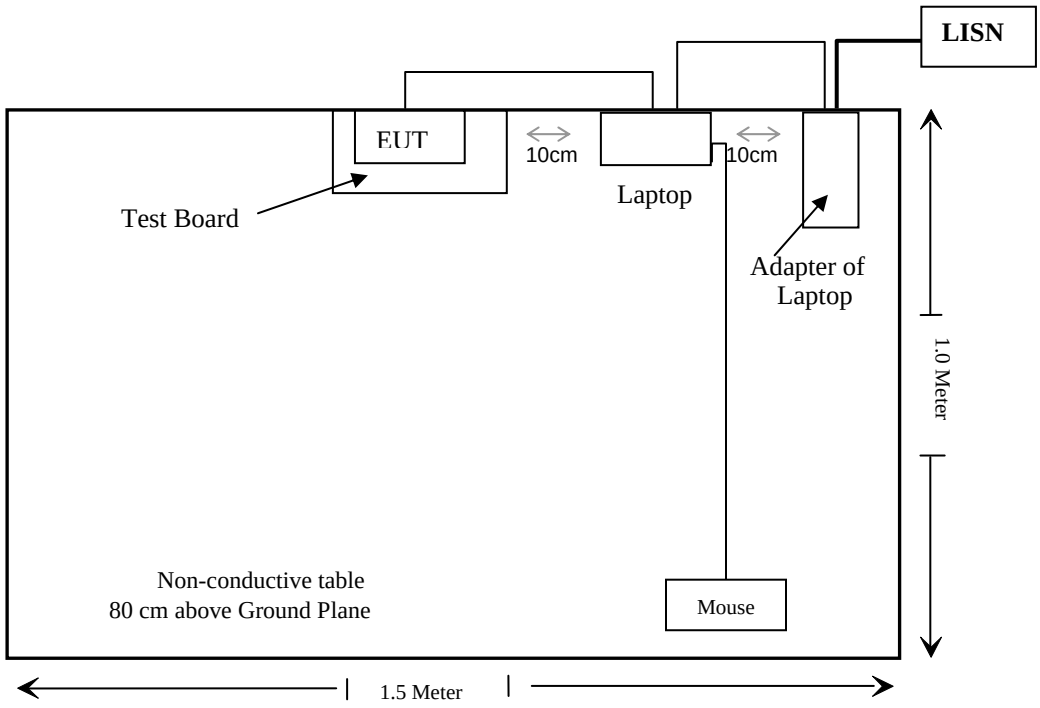
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	Laptop	2371	N/A
Wi2Wi	Test Board	W2CBW001	N/A

External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable USB Cable	1.8	Test Board	Laptop

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §2.1091	Maximum Permissible 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, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

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

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.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) 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 (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

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

MPE Calculation

Predication of MPE limit at a given distance

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

Where: S = power density (in appropriate units, e.g. mW/cm^2);
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.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Mode	**Frequency (MHz)**	**Antenna Gain**		**Conducted Output Power**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
		(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
802.11b	2462	2.0	1.58	15.87	38.64	20	0.0121	1.0
802.11g	2462	2.0	1.58	12.66	18.45	20	0.0058	1.0
802.11n-HT20	2462	2.0	1.58	12.84	19.23	20	0.0060	1.0
802.11n-HT40	2452	2.0	1.58	12.14	16.37	20	0.0051	1.0

Result: The EUT meets FCC MPE limit at 20 cm distance as a mobile device specified in §2.1091. If the device built into a host as a portable usage, the additional RF exposure evaluation may be required as specified by §2.1093.

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 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 one Transmitter/Receiver antenna which is permanent attachment to the EUT chassis as well as non-standard connector. The antenna used for the radiated testing in this filing was an Omni-directional antenna with 2.0 dBi gain. Please see to the EUT photos.

Result: Compliant.

FCC §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

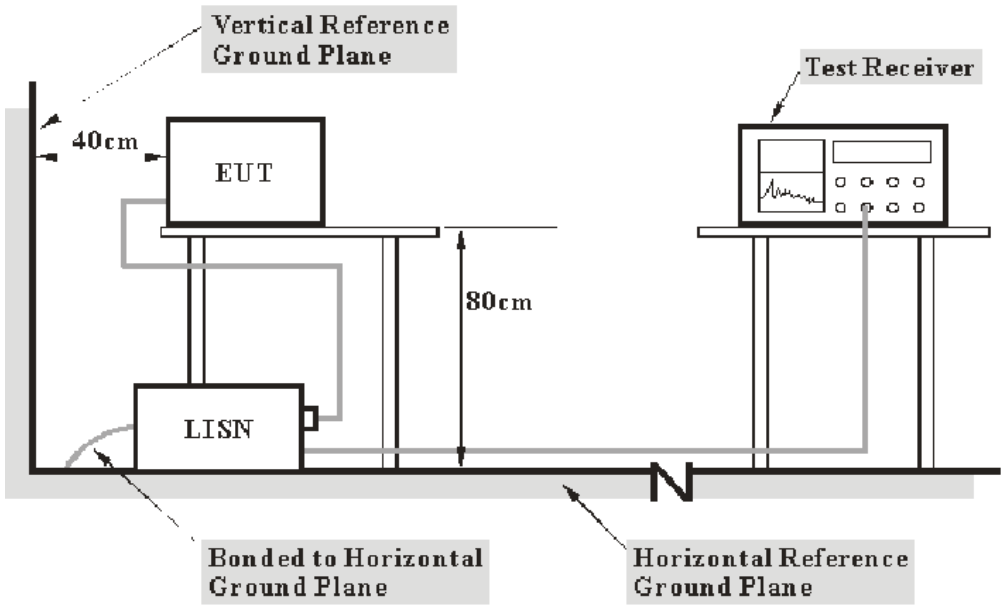
FCC §15.207

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 (k=2, 95% level of confidence).
.

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 C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter of laptop 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	2011-03-03	2012-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-03-09	2012-03-08

*** 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 of laptop 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:

15.24 dB at **0.195 MHz** in the **Neutral** conducted mode

Test Data

Environmental Conditions

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

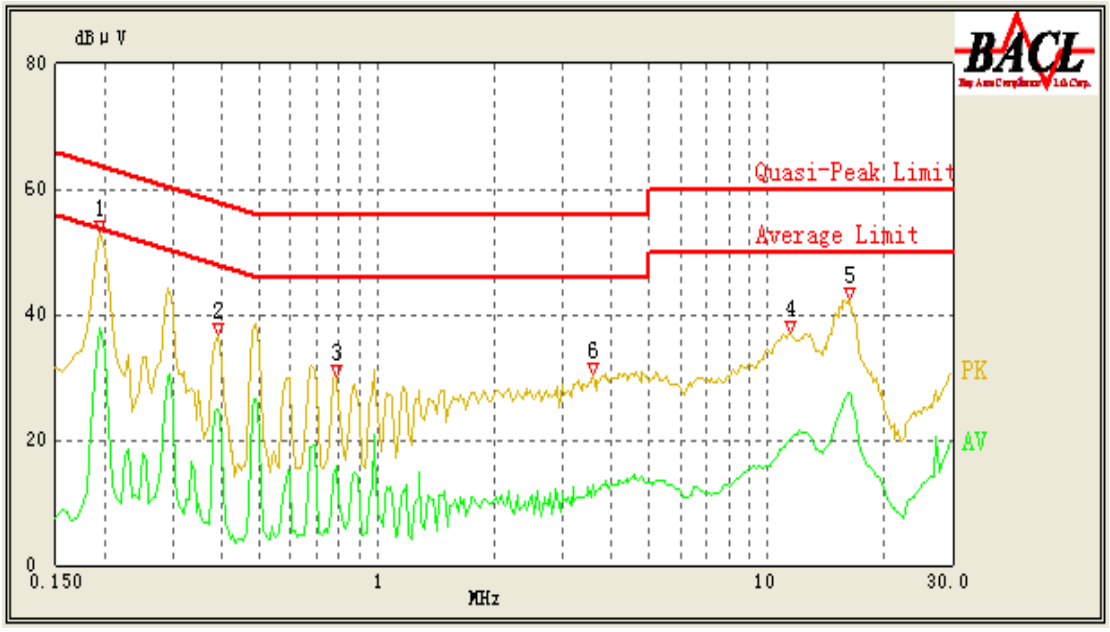
The testing was performed by Walt Kang on 2011-10-18.

Test Mode: Transmitting

AC 120V / 60Hz, Line:

Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	**Corrected Amplitude (dBµV)**	**Corrected Factor (dB)**	**Limit (dBµV)**	**Margin (dB)**	**Detector (PK/QP/Ave)**
0.410	27.88	10.10	48.57	20.69	Ave.
0.510	135.12	10.10	56.00	20.88	QP
0.205	33.49	10.10	54.43	20.94	Ave.
15.985	28.66	10.10	50.00	21.34	Ave.
0.410	36.80	10.10	58.57	21.77	QP
0.300	38.38	10.10	61.71	23.33	QP
15.925	35.85	10.10	60.00	24.15	QP
0.510	20.95	10.10	46.00	25.05	Ave.
0.205	39.26	10.10	64.43	25.17	QP
0.300	24.67	10.10	51.71	27.04	Ave.
12.205	22.95	10.10	50.00	27.05	Ave.
12.345	32.31	10.10	60.00	27.69	QP

AC 120V / 60Hz, Neutral:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	**Corrected Amplitude (dBµV)**	**Corrected Factor (dB)**	**Limit (dBµV)**	**Margin (dB)**	**Detector (PK/QP/Ave)**
0.195	49.47	10.10	64.71	15.24	QP
0.195	37.98	10.10	54.71	16.73	Ave.
16.410	27.04	10.10	50.00	22.96	Ave.
0.390	24.74	10.10	49.14	24.40	Ave.
16.355	33.97	10.10	60.00	26.03	QP
0.390	33.05	10.10	59.14	26.09	QP
11.520	20.06	10.10	50.00	29.94	Ave.
3.580	25.44	10.10	56.00	30.56	QP
0.785	15.42	10.10	46.00	30.58	Ave.
0.785	24.78	10.10	56.00	31.22	QP
11.465	28.64	10.10	60.00	31.36	QP
3.575	12.68	10.10	46.00	33.32	Ave.

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

Applicable Standard

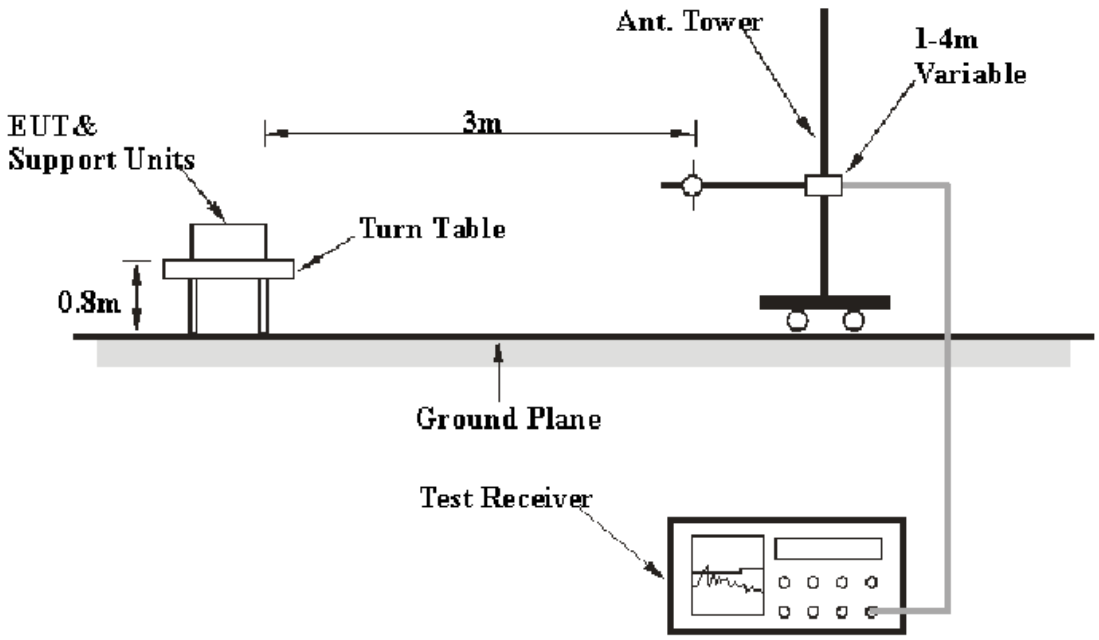
FCC §15.247 (d); §15.209; §15.205;

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(k=2, 95% level of confidence) .

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits.

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

The spacing between the peripherals was 10 cm.

The adapter of laptop 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***	***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	PK

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2011-08-02	2012-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10
Sunol Sciences	Broadband Antenna	At1080	301902	2011-08-25	2012-08-24
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-04	2012-05-03
Electro-Mechanics	Horn Antenna	3116	9510-2270	2011-10-11	2012-10-10
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07

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

Test Procedure

For the radiated emissions test, the adapter of laptop was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz and peak and Average detection modes above 1 GHz.

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:

Below 1GHz: 11.9 dB at **890.752000 MHz** in the **Horizontal** polarization

Test Data

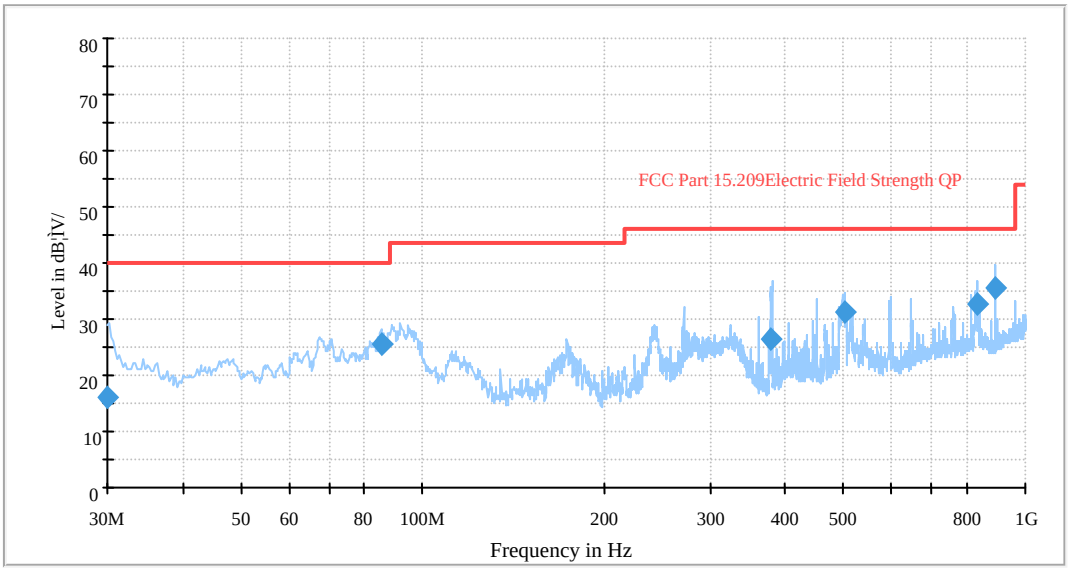
Environmental Conditions

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

The testing was performed by Walt Kang on 2011-11-30 and 2011-12-16.

Test Mode: Transmitting

30-1000 MHz:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
890.752000	35.1	101.0	H	228.0	-1.2	47.0	11.9
829.046000	33.4	102.0	V	7.0	-1.4	47.0	13.6
85.728500	25.8	172.0	V	297.0	-17.8	40.0	14.2
500.339000	32.0	188.0	V	148.0	-8.4	47.0	15.0
379.624250	26.4	102.0	H	327.0	-10.4	47.0	20.6
30.112860	16.2	101.0	V	110.0	-5.5	40.0	23.8

1-25 GHz:

Test Mode: Transmitting (802.11b)

Indicated		Detector (PK/Ave)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.205/15.209			
Frequency (MHz)	S.A. Reading (dBμV)			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	27.27	Ave.	272	1.5	V	35.4	4.3	26.75	40.22	54	13.78	Harmonic
4824	24.76	Ave.	250	1.3	H	36.6	4.3	26.75	38.91	54	15.09	Harmonic
4824	44.14	PK	272	1.5	V	35.4	4.3	26.75	57.09	74	16.91	Harmonic
4824	41.05	PK	250	1.3	H	36.6	4.3	26.75	55.2	74	18.80	Harmonic
2389.6	21.85	Ave.	216	1.0	V	30.6	2.98	26.83	28.6	54	25.40	Spurious
2389.6	20.73	Ave.	230	1.2	H	30.6	2.98	26.83	27.48	54	26.52	Spurious
2389.6	36.71	PK	130	1.4	V	30.6	2.98	26.83	43.46	74	30.54	Spurious
2389.6	34.88	PK	230	1.2	H	30.6	2.98	26.83	41.63	74	32.37	Spurious
Middle Channel (2437 MHz)												
4874	30.96	Ave.	65	1.5	V	35.4	4.36	26.75	43.97	54	10.03	Harmonic
4874	44.25	PK	65	1.5	V	35.4	4.36	26.75	57.26	74	16.74	Harmonic
4874	21.33	Ave.	130	1.5	H	36.6	4.36	26.75	35.54	54	18.46	Harmonic
4874	39.73	PK	130	1.5	H	36.6	4.36	26.75	53.94	74	20.06	Harmonic
1496	18.97	Ave.	95	1.5	V	29.8	2.44	26.83	24.38	54	29.62	Spurious
1496	18.53	Ave.	240	1.5	H	29.7	2.44	26.83	23.84	54	30.16	Spurious
1496	31.75	PK	240	1.5	H	29.7	2.44	26.83	37.06	74	36.94	Spurious
1496	29.26	PK	95	1.5	V	29.8	2.44	26.83	34.67	74	39.33	Spurious
High Channel (2462 MHz)												
4924	27.55	Ave.	196	1.5	V	35.4	4.4	26.75	40.6	54	13.40	Harmonic
4924	24.79	Ave.	130	1.5	H	36.6	4.4	26.75	39.04	54	14.96	Harmonic
4924	41.94	PK	196	1.5	V	35.4	4.4	26.75	54.99	74	19.01	Harmonic
4924	39.52	PK	130	1.5	H	36.6	4.4	26.75	53.77	74	20.23	Harmonic
2487.6	21.24	Ave.	40	1.5	V	30.6	3.11	26.88	28.07	54	25.93	Spurious
2487.6	19.87	Ave.	260	1.6	H	30.6	3.11	26.88	26.7	54	27.30	Spurious
2487.6	35.92	PK	40	1.5	V	30.6	3.11	26.88	42.75	74	31.25	Spurious
2487.6	33.48	PK	260	1.6	H	30.6	3.11	26.88	40.31	74	33.69	Spurious

Test Mode: Transmitting (802.11g)

Indicated		Detector (PK/Ave)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.205/15.209			
Frequency (MHz)	S.A. Reading (dBµV)			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	22.75	Ave.	60	1.8	V	35.4	4.3	26.75	35.7	54	18.30	Harmonic
4824	19.64	Ave.	130	1.5	H	36.6	4.3	26.75	33.79	54	20.21	Harmonic
4824	39.24	PK	60	1.8	V	35.4	4.3	26.75	52.19	74	21.81	Harmonic
4824	37.14	PK	130	1.5	H	36.6	4.3	26.75	51.29	74	22.71	Harmonic
2389.4	19.15	Ave.	250	1.8	H	30.6	2.98	26.83	25.9	54	28.10	Spurious
2389.4	18.75	Ave.	54	1.5	V	30.6	2.98	26.83	25.5	54	28.50	Spurious
2389.4	28.89	PK	54	1.5	V	30.6	2.98	26.83	35.64	74	38.36	Spurious
2389.4	27.43	PK	250	1.8	H	30.6	2.98	26.83	34.18	74	39.82	Spurious
Middle Channel (2437 MHz)												
4874	23.02	Ave.	60	1.8	V	35.4	4.36	26.75	36.03	54	17.97	Harmonic
4874	21.75	Ave.	130	1.5	H	36.6	4.36	26.75	35.96	54	18.04	Harmonic
4874	40.12	PK	60	1.8	V	35.4	4.36	26.75	53.13	74	20.87	Harmonic
4874	37.56	PK	130	1.5	H	36.6	4.36	26.75	51.77	74	22.23	Harmonic
1768.2	20.36	Ave.	90	1	V	29.8	2.44	26.83	25.77	54	28.23	Spurious
1768.2	20.4	Ave.	260	1.5	H	29.7	2.44	26.83	25.71	54	28.29	Spurious
1768.2	26.78	PK	90	1.5	V	29.8	2.44	26.83	32.19	74	41.81	Spurious
1768.2	25.76	PK	260	1.5	H	29.7	2.44	26.83	31.07	74	42.93	Spurious
High Channel (2462 MHz)												
4924	21.77	Ave.	60	1.8	V	35.4	4.4	26.75	34.82	54	19.18	Harmonic
4924	19.20	Ave.	250	1.8	H	36.6	4.4	26.75	33.45	54	20.55	Harmonic
4924	37.90	PK	60	1.8	V	35.4	4.4	26.75	50.95	74	23.05	Harmonic
4924	35.83	PK	250	1.8	H	36.6	4.4	26.75	50.08	74	23.92	Harmonic
2485.8	21.62	Ave.	90	1.5	V	30.6	3.11	26.88	28.45	54	25.55	Spurious
2485.8	19.67	Ave.	220	1.5	H	30.6	3.11	26.88	26.5	54	27.5	Spurious
2485.8	32.33	PK	90	1.5	V	30.6	3.11	26.88	39.16	74	34.84	Spurious
2485.8	28.91	PK	220	1.5	H	30.6	3.11	26.88	35.74	74	38.26	Spurious

Test Mode: Transmitting (802.11n-HT20)

Indicated		Detector (PK/Ave)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.205/15.209			
Frequency (MHz)	S.A. Reading (dBμV)			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	20.50	Ave.	62	1.8	V	35.4	4.3	26.75	33.45	54	20.55	Harmonic
4824	38.40	PK	60	1.8	V	35.4	4.3	26.75	51.35	74	22.65	Harmonic
4824	19.49	Ave.	120	1.5	H	36.6	4.3	26.75	33.64	54	20.36	Harmonic
4824	36.90	PK	120	1.5	H	36.6	4.3	26.75	51.05	74	22.95	Harmonic
2390	22.34	Ave.	160	1.8	H	30.6	2.98	26.83	29.09	54	24.91	Spurious
2390	20.18	Ave.	90	1.5	V	30.6	2.98	26.83	26.93	54	27.07	Spurious
2390	30.18	PK	160	1.8	H	30.6	2.98	26.83	36.93	74	37.07	Spurious
2390	26.37	PK	90	1.5	V	30.6	2.98	26.83	33.12	74	40.88	Spurious
Middle Channel (2437 MHz)												
4874	19.55	Ave.	60	1.8	V	35.4	4.36	26.75	32.56	54	21.44	Harmonic
4874	38.56	PK	60	1.8	V	35.4	4.36	26.75	51.57	74	22.43	Harmonic
4874	19.78	Ave.	130	1.5	H	36.6	4.36	26.75	33.99	54	20.01	Harmonic
4874	36.88	PK	130	1.5	H	36.6	4.36	26.75	51.09	74	22.91	Harmonic
1696	21.72	Ave.	90	1.0	V	29.8	2.44	26.83	27.13	54	26.87	Spurious
1696	21.48	Ave.	260	1.5	H	29.7	2.44	26.83	26.79	54	27.21	Spurious
1696	26.36	PK	260	1.5	H	29.7	2.44	26.83	31.67	74	42.33	Spurious
1696	25.89	PK	90	1.5	V	29.8	2.44	26.83	31.30	74	42.70	Spurious
High Channel (2462 MHz)												
4924	19.43	Ave.	60	1.8	V	35.4	4.4	26.75	32.48	54	21.52	Harmonic
4924	36.41	PK	60	1.8	V	35.4	4.4	26.75	49.46	74	24.54	Harmonic
4924	18.11	Ave.	250	1.8	H	36.7	4.41	26.76	32.46	54	21.54	Harmonic
4924	34.88	PK	250	1.8	H	36.7	4.41	26.76	49.23	74	24.77	Harmonic
2483.6	22.49	Ave.	90	1.5	V	30.6	3.11	26.88	29.32	54	24.68	Spurious
2483.6	20.71	Ave.	220	1.5	H	30.6	3.11	26.88	27.54	54	26.46	Spurious
2483.6	35.64	PK	90	1.5	V	30.6	3.11	26.88	42.47	74	31.53	Spurious
2483.6	32.46	PK	220	1.5	H	30.6	3.11	26.88	39.29	74	34.71	Spurious

Test Mode: Transmitting (802.11n-HT40)

Indicated		Detector (PK/Ave)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.205/15.209			
Frequency (MHz)	S.A. Reading (dBμV)			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 (2422 MHz)												
4844	20.58	Ave.	130	1.5	H	36.6	4.3	26.75	34.73	54	19.27	Harmonic
4844	20.22	Ave.	60	1.8	V	35.4	4.3	26.75	33.17	54	20.83	Harmonic
4844	37.56	PK	130	1.5	H	36.6	4.3	26.75	51.71	74	22.29	Harmonic
4844	36.95	PK	60	1.8	V	35.4	4.3	26.75	49.90	74	24.10	Harmonic
2389.8	20.27	Ave.	260	1.8	H	30.6	2.98	26.83	27.02	54	26.98	Spurious
2389.8	19.82	Ave.	90	1.5	V	30.6	2.98	26.83	26.57	54	27.43	Spurious
2389.8	28.12	PK	260	1.8	H	30.6	2.98	26.83	34.87	74	39.13	Spurious
2389.8	26.78	PK	90	1.5	V	30.6	2.98	26.83	33.53	74	40.47	Spurious
Middle Channel (2437 MHz)												
4874	20.42	Ave.	130	1.5	H	36.6	4.36	26.75	34.63	54	19.37	Harmonic
4874	20.18	Ave.	60	1.8	V	35.4	4.36	26.75	33.19	54	20.81	Harmonic
4874	36.85	PK	130	1.5	H	36.6	4.36	26.75	51.06	74	22.94	Harmonic
4874	36.77	PK	60	1.8	V	35.4	4.36	26.75	49.78	74	24.22	Harmonic
1696.4	24.83	Ave.	90	1.0	V	29.8	2.44	26.83	30.24	54	23.76	Spurious
1696.4	22.21	Ave.	260	1.5	H	29.7	2.44	26.83	27.52	54	26.48	Spurious
1696.4	27.11	PK	90	1.5	V	29.8	2.44	26.83	32.52	74	41.48	Spurious
1696.4	25.4	PK	260	1.5	H	29.7	2.44	26.83	30.71	74	43.29	Spurious
High Channel (2452 MHz)												
2483.6	31.16	Ave.	90	1.5	V	30.6	3.11	26.88	37.99	54	16.01	Spurious
4904	22.75	Ave.	60	1.8	V	35.4	4.4	26.75	35.80	54	18.20	Harmonic
2483.6	28.51	Ave.	220	1.5	H	30.6	3.11	26.88	35.34	54	18.66	Spurious
4904	20.68	Ave.	250	1.8	H	36.6	4.4	26.75	34.93	54	19.07	Harmonic
4904	37.24	PK	250	1.8	H	36.6	4.4	26.75	51.49	74	22.51	Harmonic
4904	37.16	PK	60	1.8	V	35.4	4.4	26.75	50.21	74	23.79	Harmonic
2483.6	35.43	PK	90	1.5	V	30.6	3.11	26.88	42.26	74	31.74	Spurious
2483.6	34.56	PK	220	1.5	H	30.6	3.11	26.88	41.39	74	32.61	Spurious

FCC §2.1051 & §15.247(d) – SPURIOUS EMISSION AT ANTENNA TERMINALS

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.

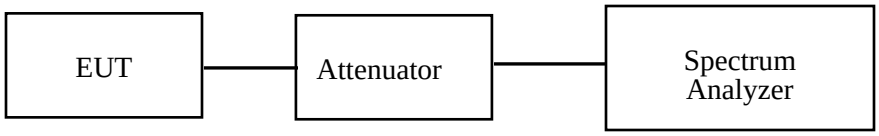
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07

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

Test Procedure

1. 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. Sufficient scans were taken to show any out of band up to 10th harmonic.
4. Repeat above procedures until all measured frequencies were complete.



Test Data

Environmental Conditions

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

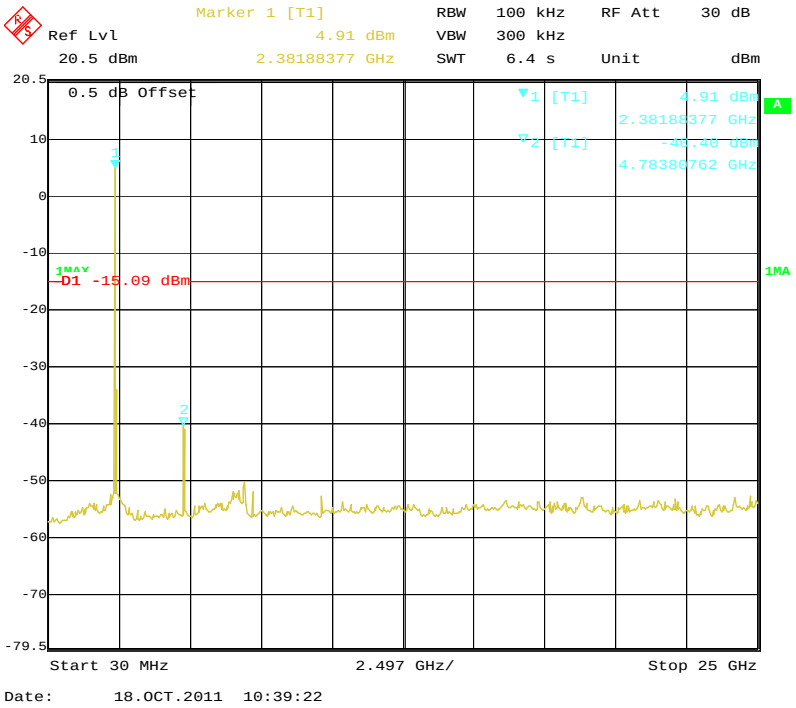
The testing was performed by Walt Kang on 2011-10-18 and 2011-12-16.

Compliance, please refer to the following table and plots

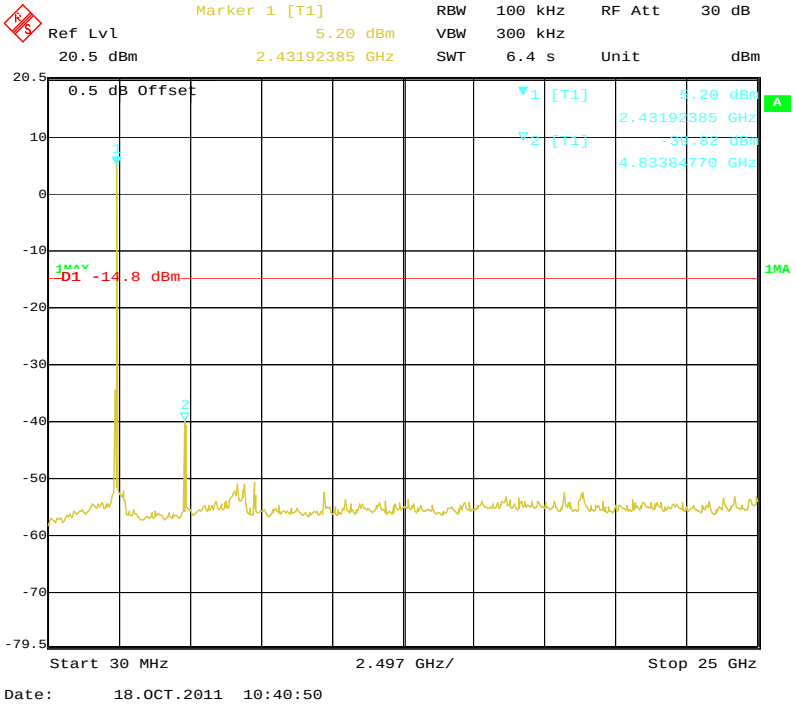
Spurious Emission at Antenna Terminals

Frequency (MHz)	Data Rate (Mbps)	Delta Value (dBc)	Delta Limit (dBc)	Result
802.11b mode				
2412	1	45.31	20	Pass
2437	1	45.02	20	Pass
2462	1	45.76	20	Pass
802.11g mode				
2412	6	44.29	20	Pass
2437	6	43.22	20	Pass
2462	6	44.51	20	Pass
802.11n HT20 mode				
2412	6	39.17	20	Pass
2437	6	39.56	20	Pass
2452	6	41.30	20	Pass
802.11n HT40 mode				
2422	50	42.13	20	Pass
2437	50	40.87	20	Pass
2452	50	40.58	20	Pass

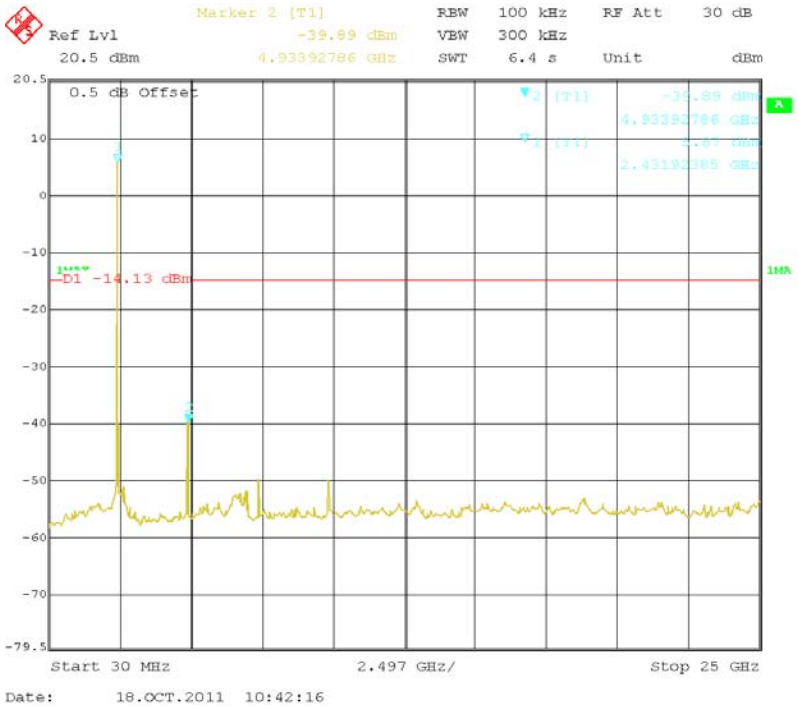
802.11b Low Channel



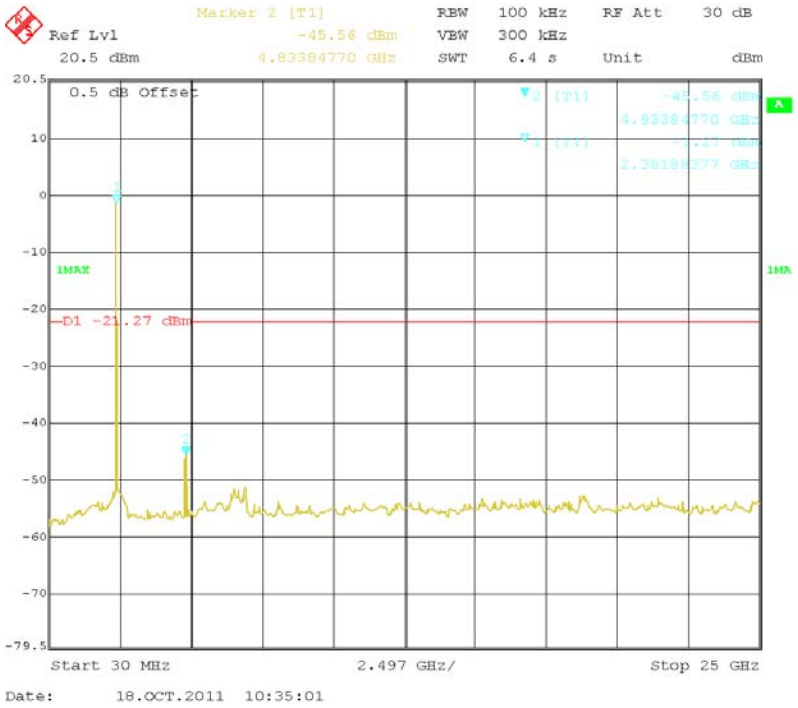
802.11b Middle Channel



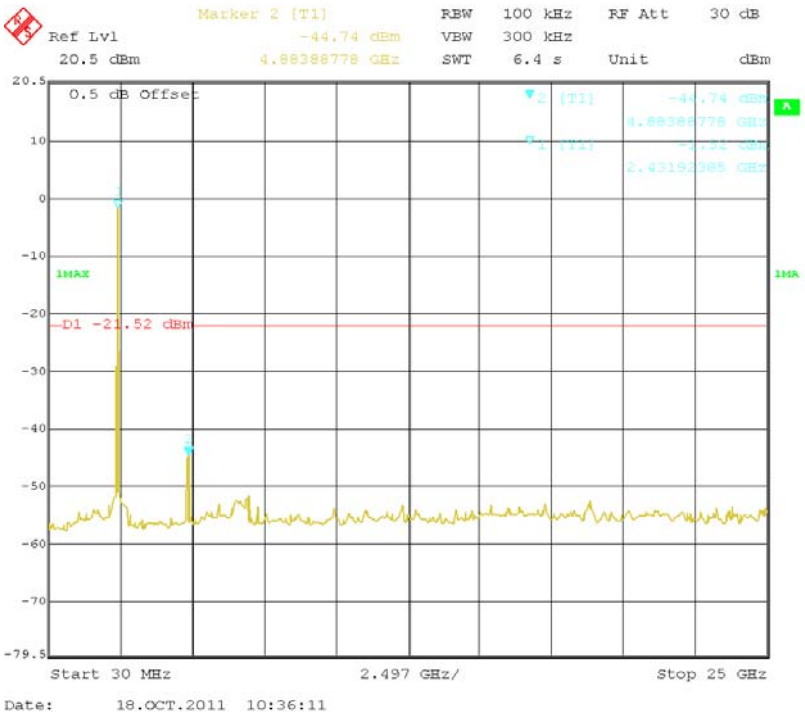
802.11b High Channel



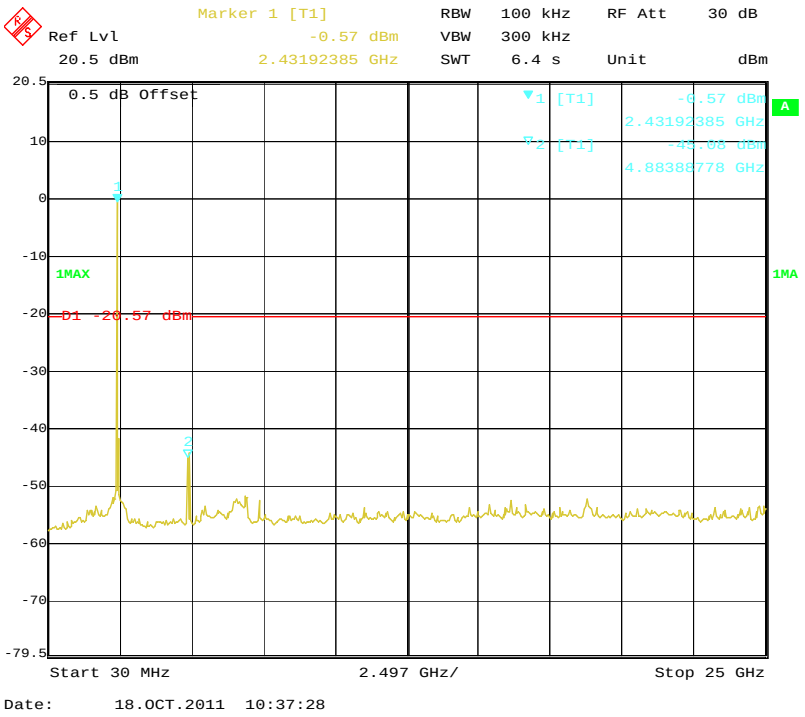
802.11g Low Channel



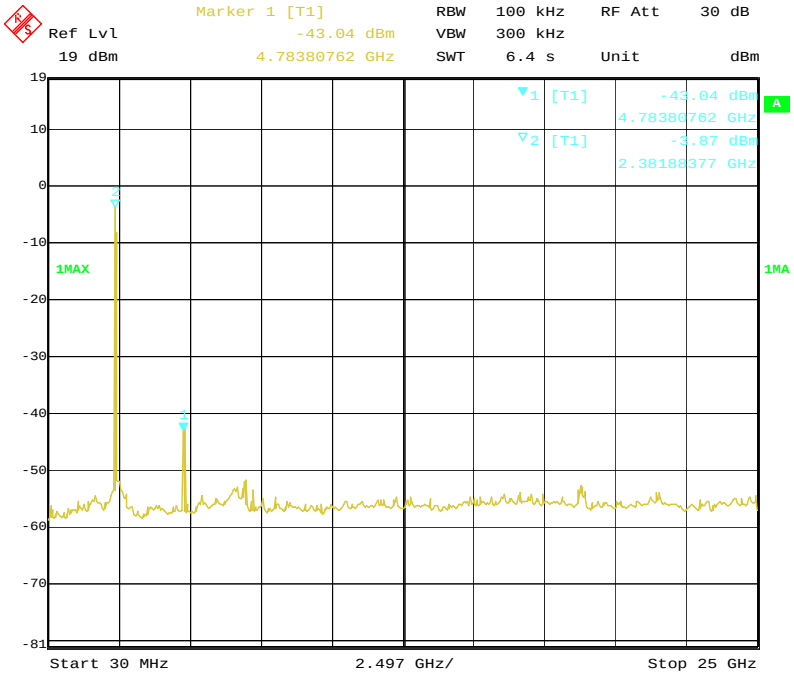
802.11g Middle Channel



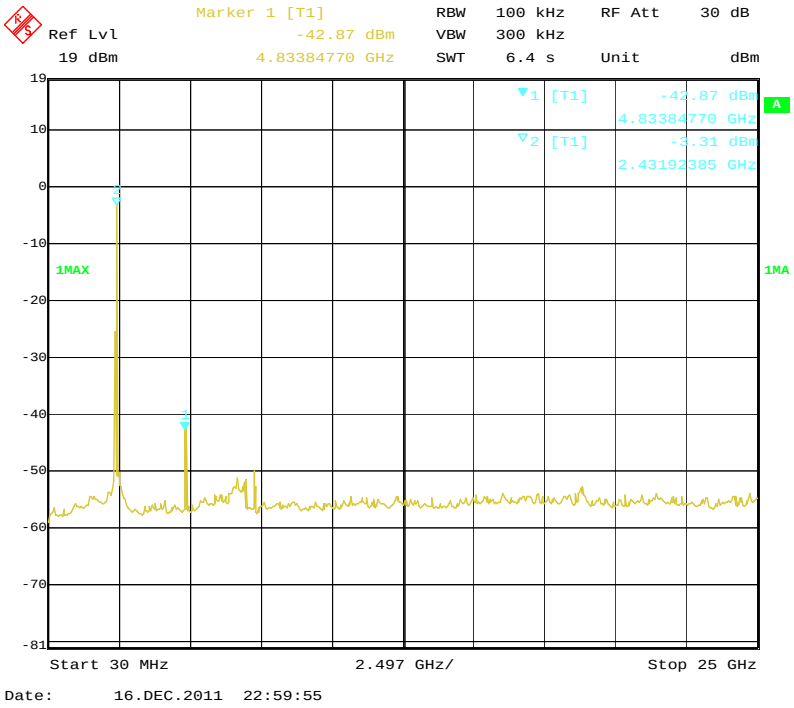
802.11g High Channel



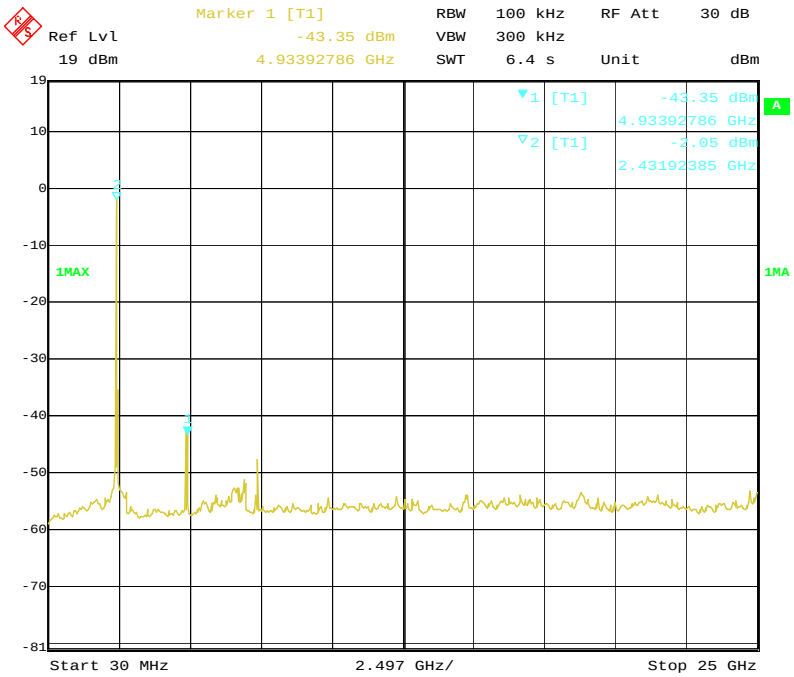
802.11n-HT20 Low Channel



802.11n-HT20 Middle Channel

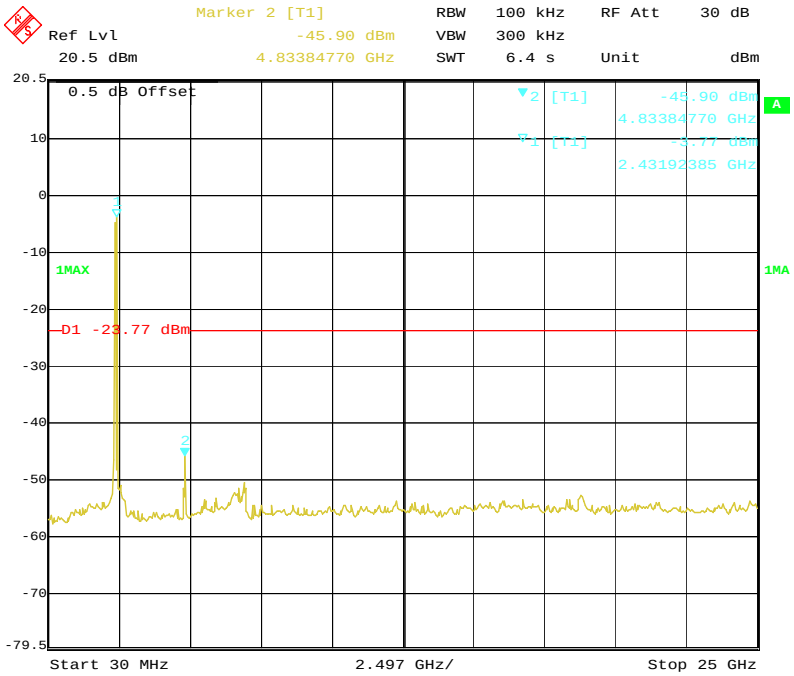


802.11n-HT20 High Channel



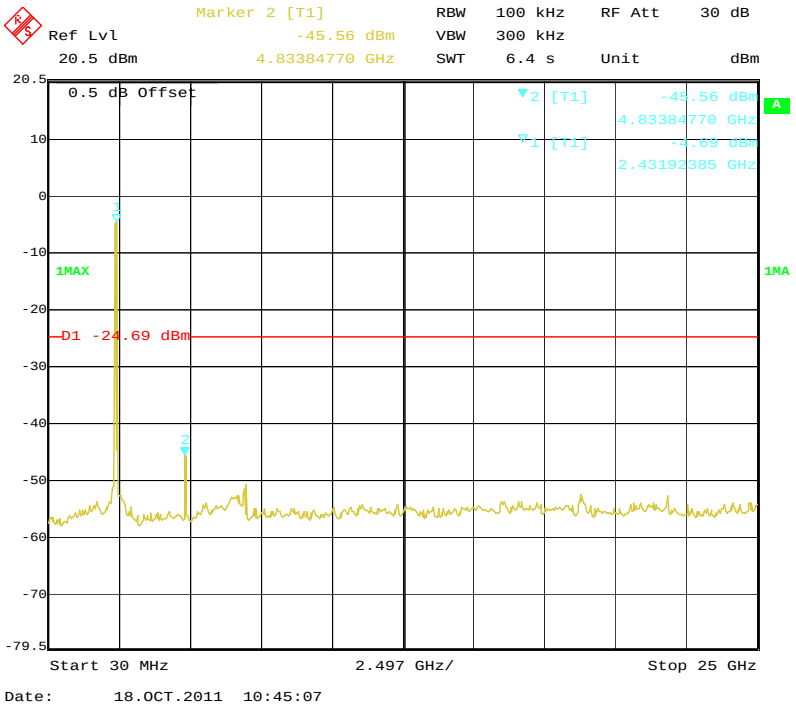
Date: 16.DEC.2011 23:02:08

802.11n-HT40 Low Channel

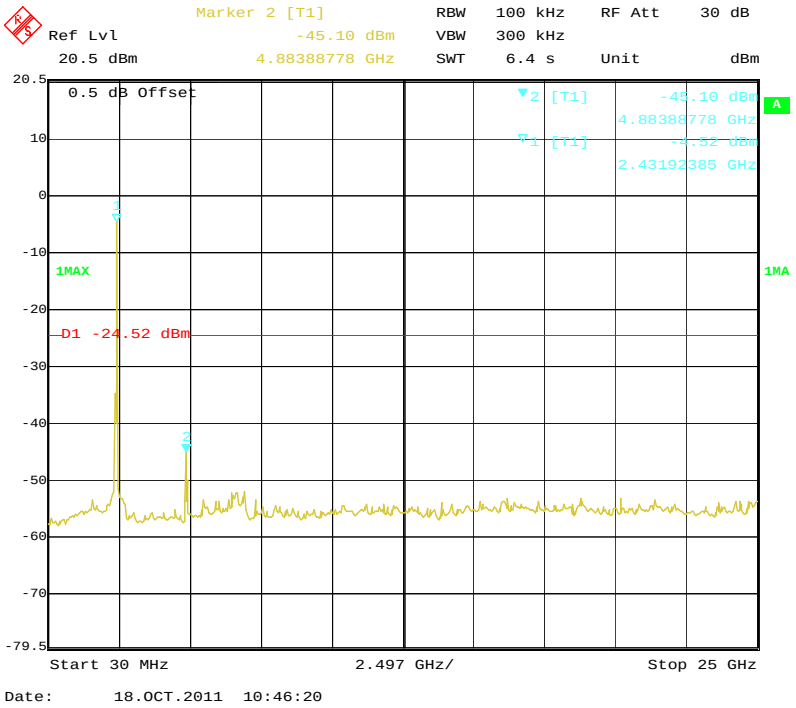


Date: 18.OCT.2011 10:43:57

802.11n-HT40 Middle Channel



802.11n-HT40 High Channel



FCC §15.247(a) (2) – 6 dB EMISSION 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.

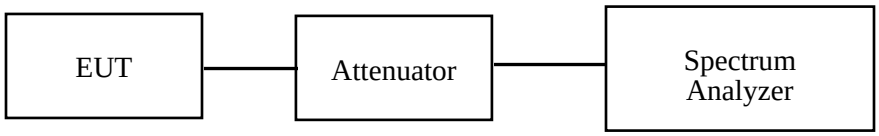
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 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

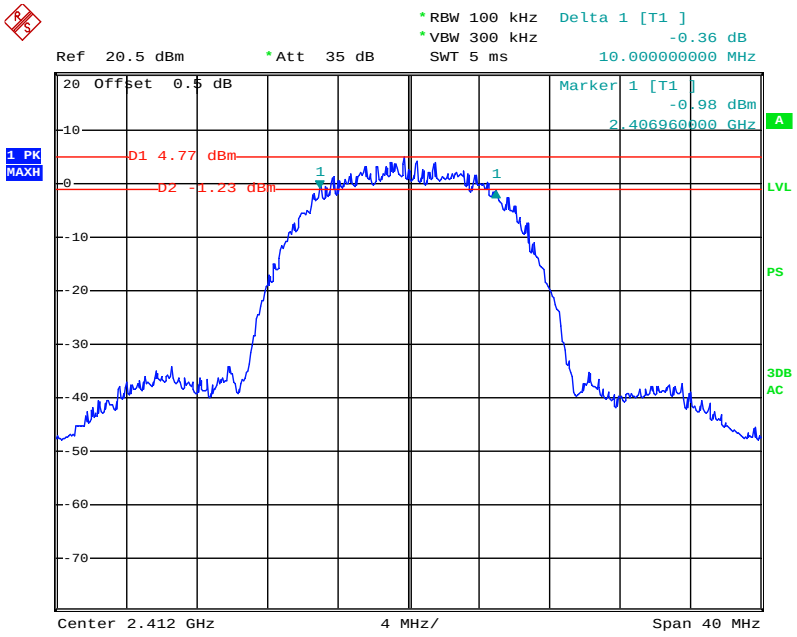
Temperature:	25 °C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

The testing was performed by Walt Kang on 2011-10-16.

Test Result: Compliance, please refer to the following tables and plots.

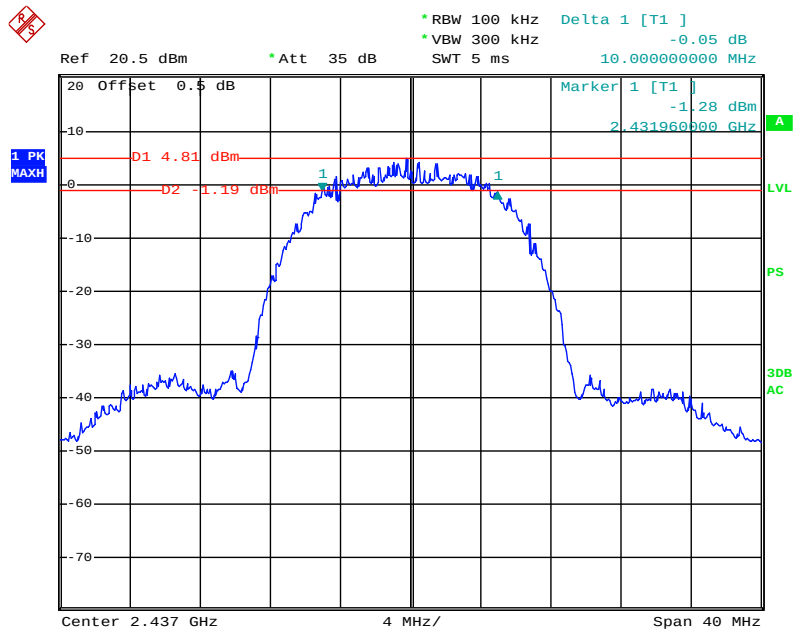
Frequency (MHz)	Data Rate (Mbps)	6 dB Emission Bandwidth (MHz)	Limit (kHz)	Result
802.11b mode				
2412	1	10.00	> 500	Pass
2437	1	10.00	> 500	Pass
2462	1	10.00	> 500	Pass
802.11g mode				
2412	6	16.64	> 500	Pass
2437	6	16.64	> 500	Pass
2462	6	16.64	> 500	Pass
802.11n HT20 mode				
2412	6	17.92	> 500	Pass
2437	6	17.84	> 500	Pass
2462	6	17.92	> 500	Pass
802.11n HT40 mode				
2422	50	36.72	> 500	Pass
2437	50	36.72	> 500	Pass
2452	50	36.72	> 500	Pass

802.11b Low Channel



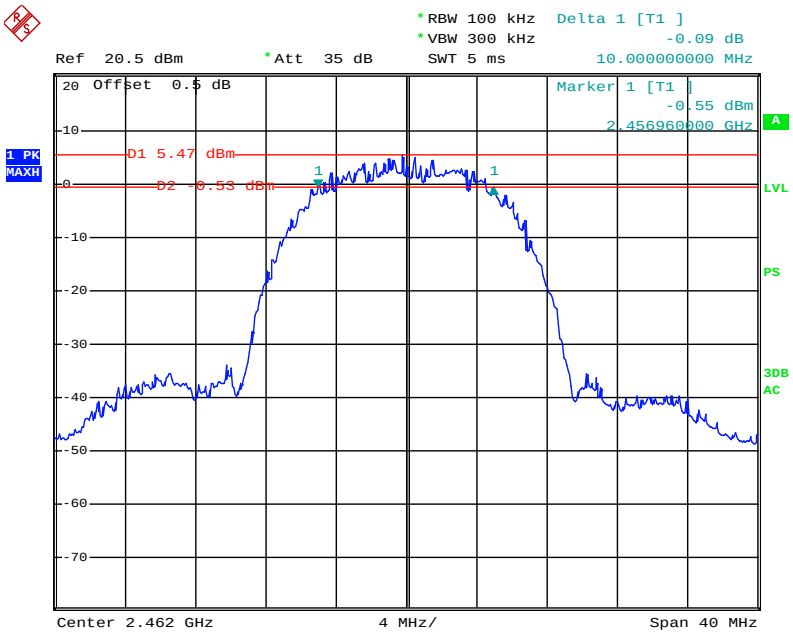
Date: 16.OCT.2011 22:05:54

802.11b Middle Channel



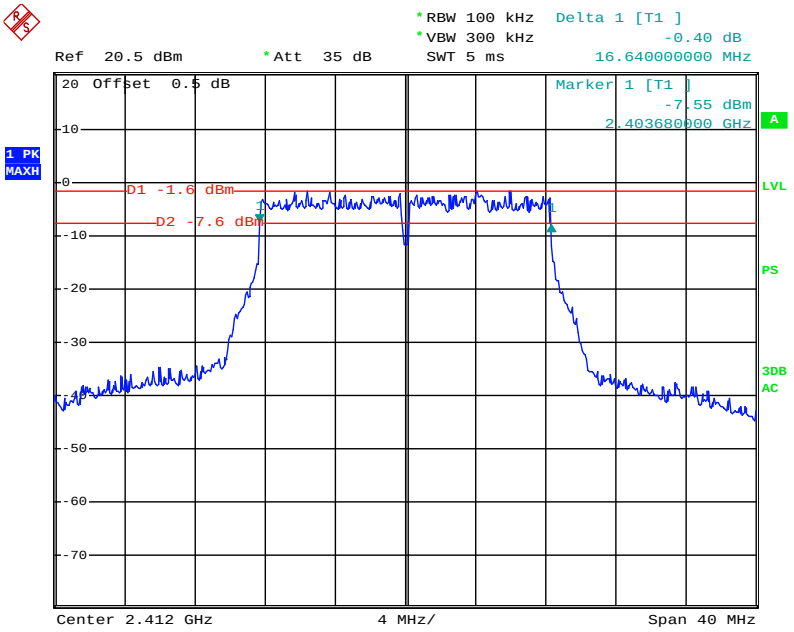
Date: 16.OCT.2011 22:07:32

802.11b High Channel



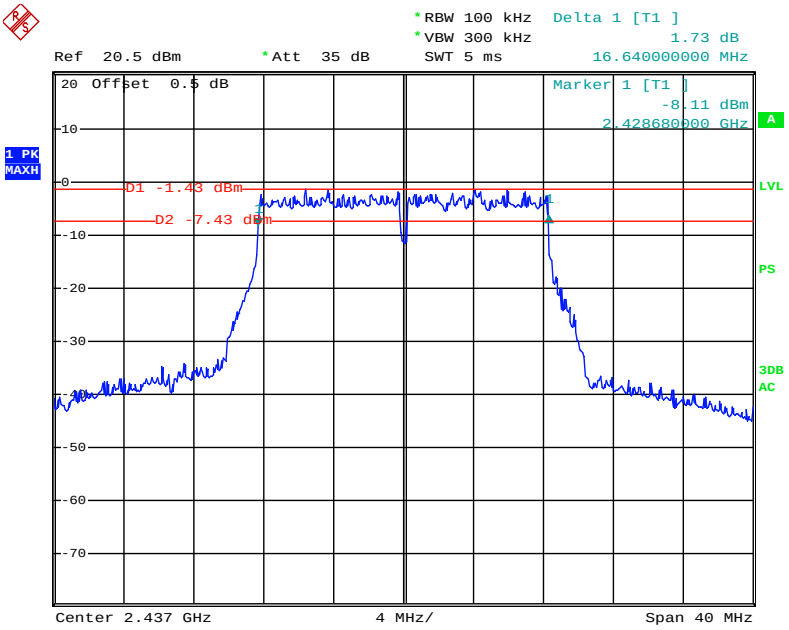
Date: 16.OCT.2011 22:09:20

802.11g Low Channel



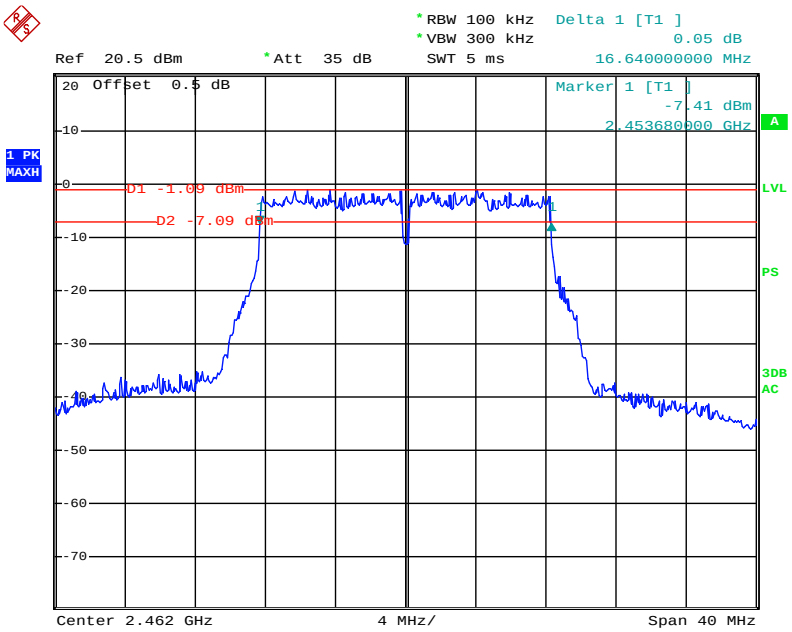
Date: 16.OCT.2011 22:00:36

802.11g Middle Channel



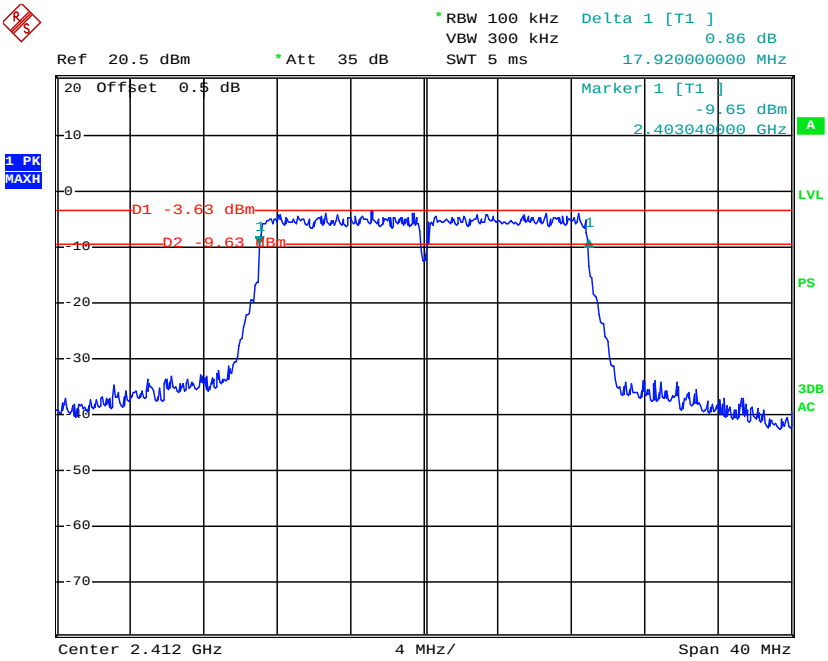
Date: 16.OCT.2011 22:02:10

802.11g High Channel

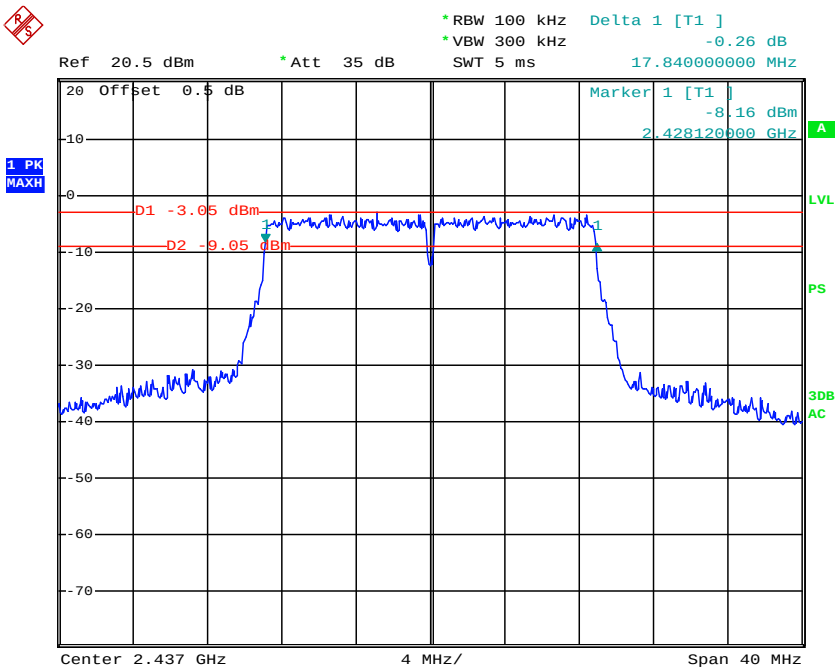


Date: 16.OCT.2011 22:03:41

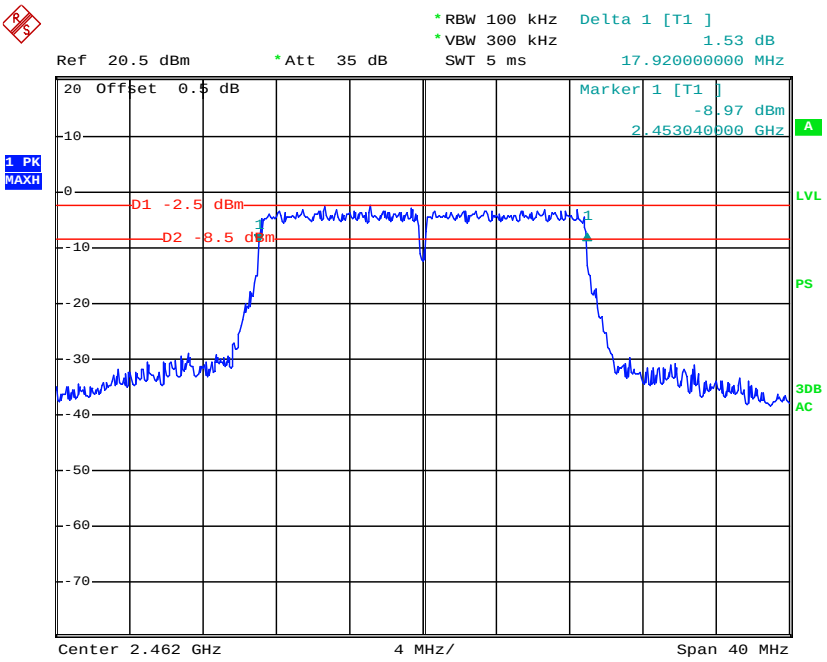
802.11n-HT20 Low Channel



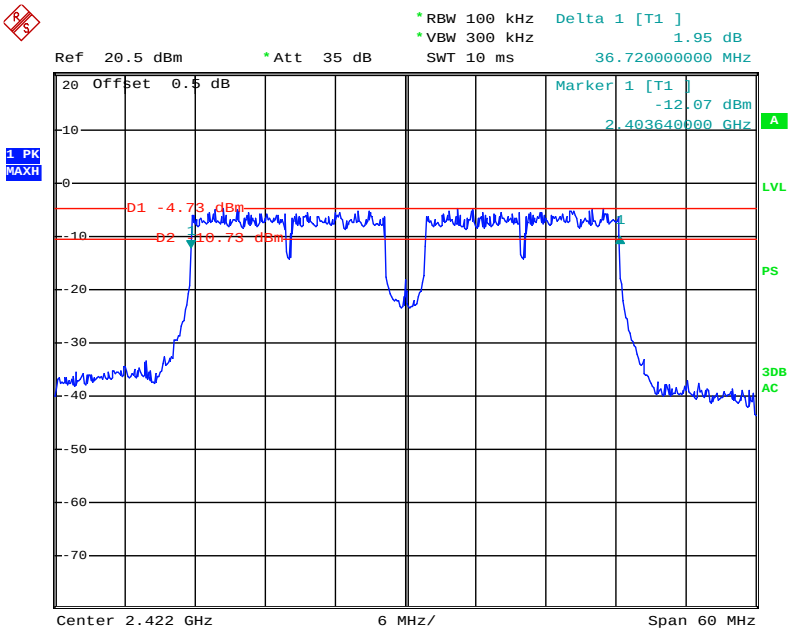
802.11n-HT20 Middle Channel



802.11n-HT20 High Channel

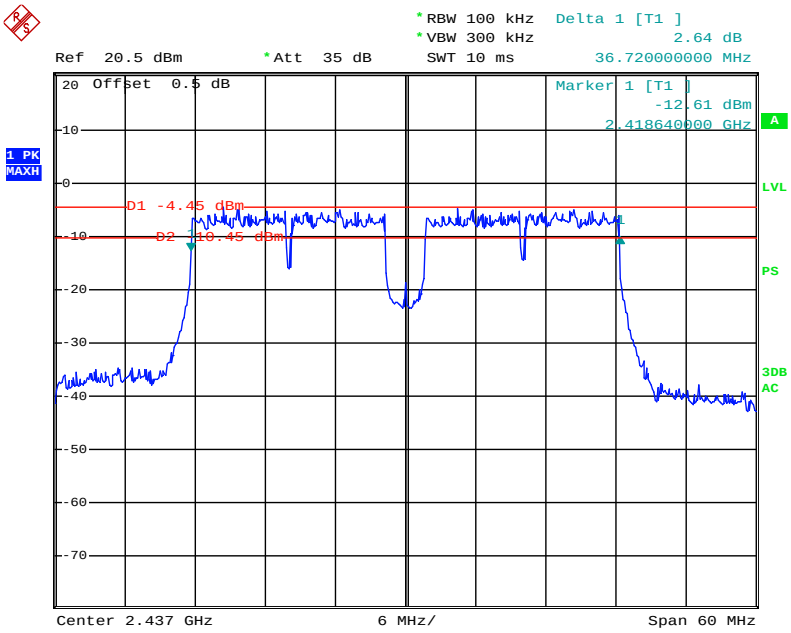


802.11n-HT40 Low Channel



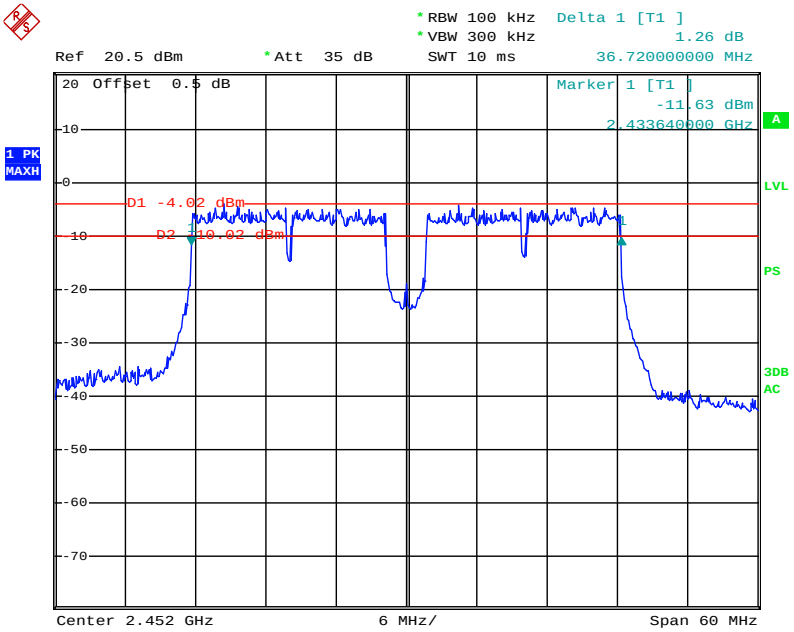
Date: 16.OCT.2011 21:54:29

802.11n-HT40 Middle Channel



Date: 16.OCT.2011 21:57:03

802.11n-HT40 High Channel



Date: 16.OCT.2011 21:58:42

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.

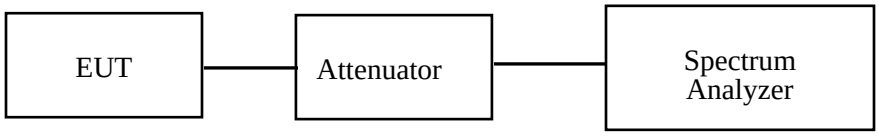
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10

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

Test Procedure

1. 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:	100.0 kPa

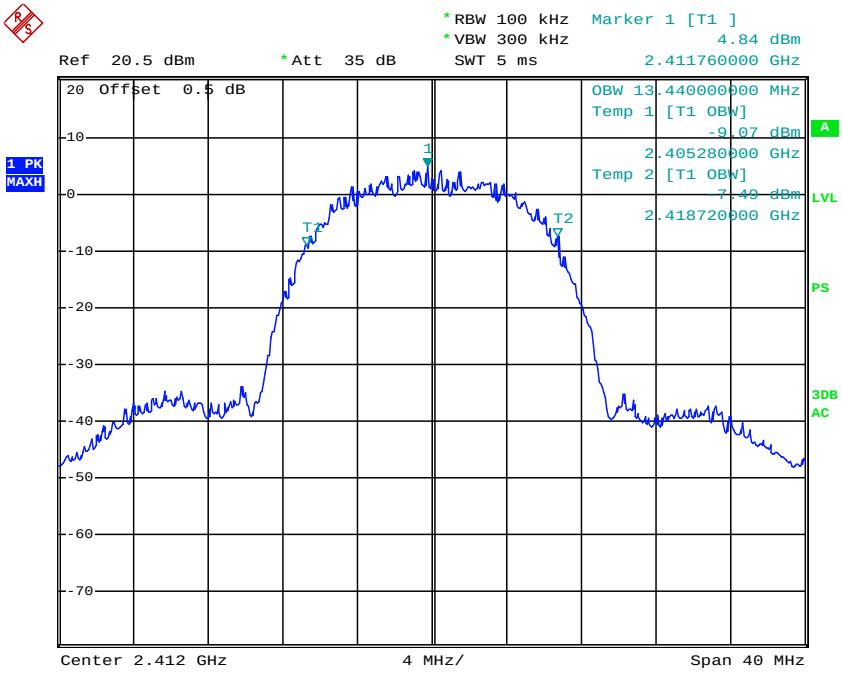
The testing was performed by Walt Kang on 2011-12-17.

Test Mode: Transmitting

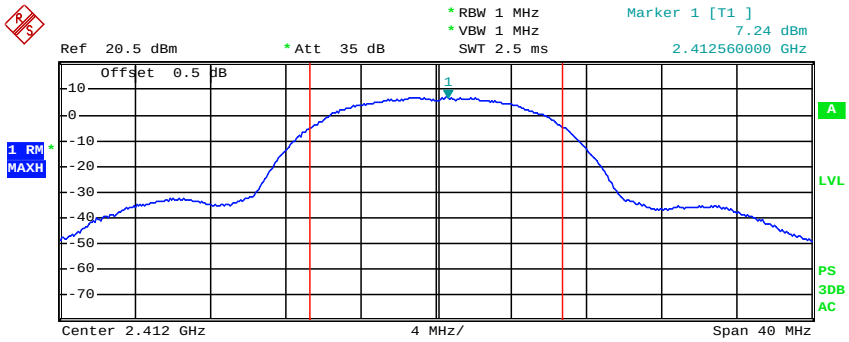
Channel	Frequency (MHz)	Data Rate (Mbps)	Conducted Output Power (dBm)	Limit (dBm)	Result
802.11b mode					
Low	2412	1	15.08	30	Pass
Middle	2437	1	15.22	30	Pass
High	2462	1	15.87	30	Pass
802.11g mode					
Low	2412	6	12.18	30	Pass
Middle	2437	6	12.36	30	Pass
High	2462	6	12.66	30	Pass
802.11n HT20 mode					
Low	2412	6	11.64	30	Pass
Middle	2437	6	12.11	30	Pass
High	2462	6	12.84	30	Pass
802.11n HT40 mode					
Low	2422	50	11.68	30	Pass
Middle	2437	50	11.67	30	Pass
High	2452	50	12.14	30	Pass

802.11b

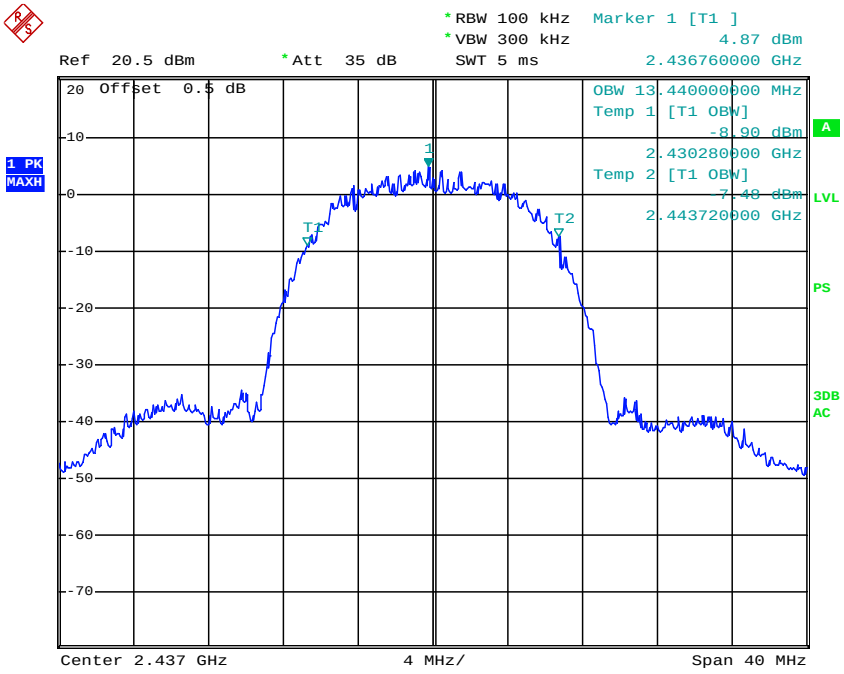
99% Occupied Bandwidth, Low Channel



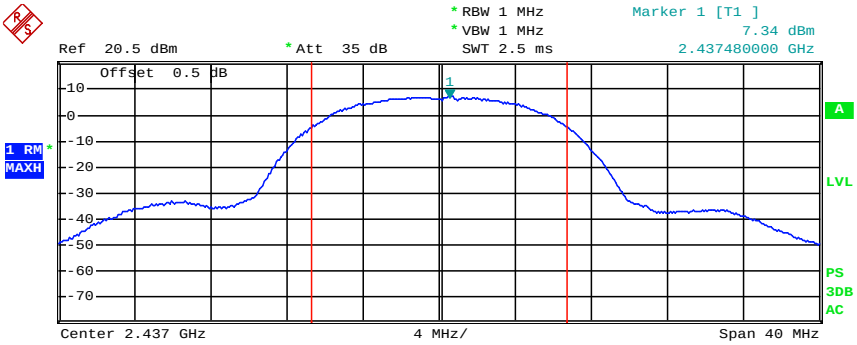
RF Output Power, Low Channel



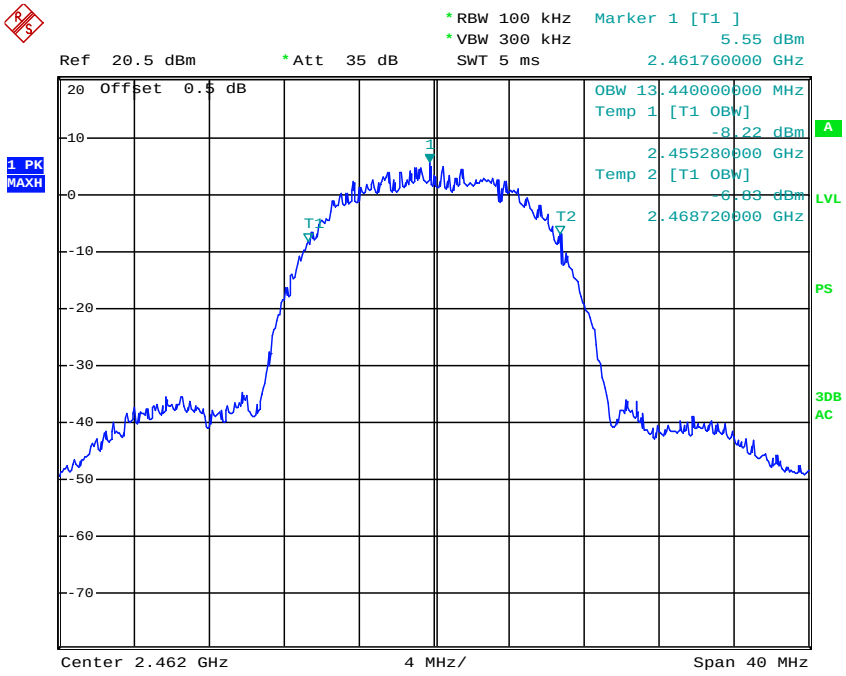
99% Occupied Bandwidth, Middle Channel



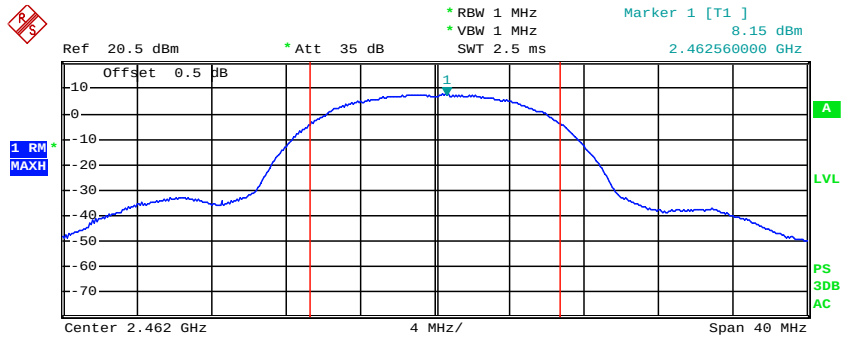
RF Output Power, Middle Channel



99% Occupied Bandwidth, High Channel

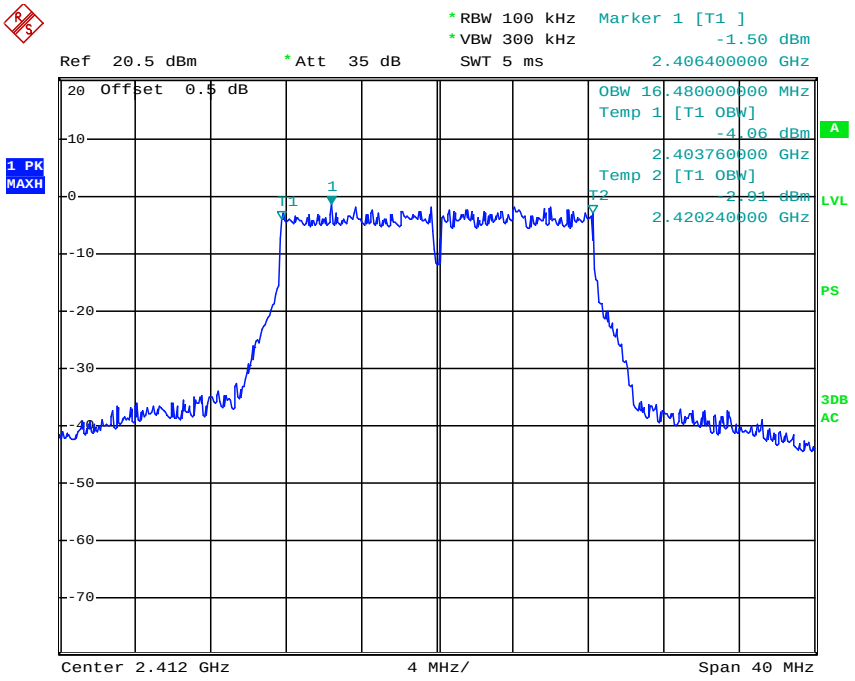


RF Output Power, High Channel

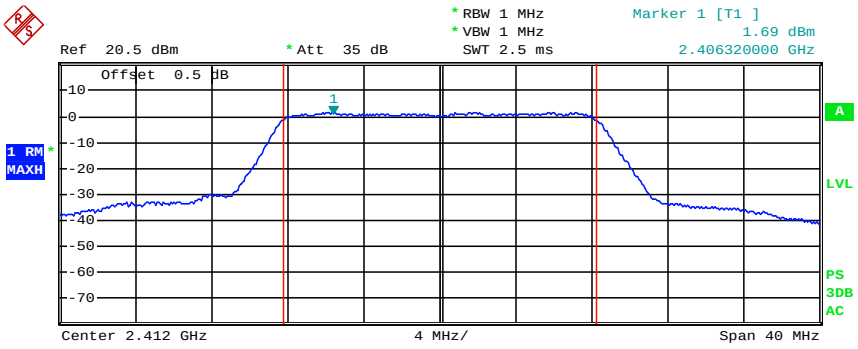


802.11g

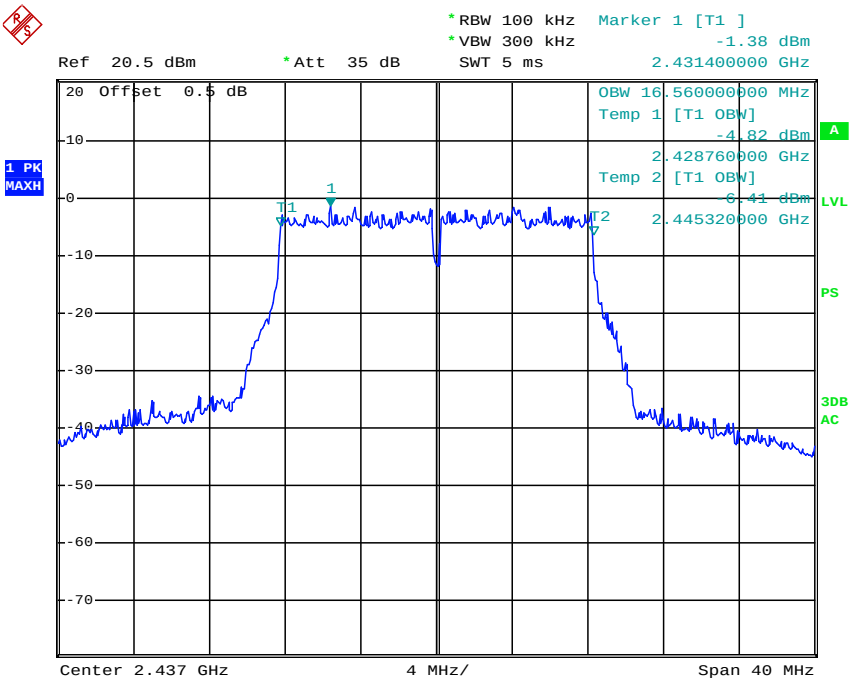
99% Occupied Bandwidth, Low Channel



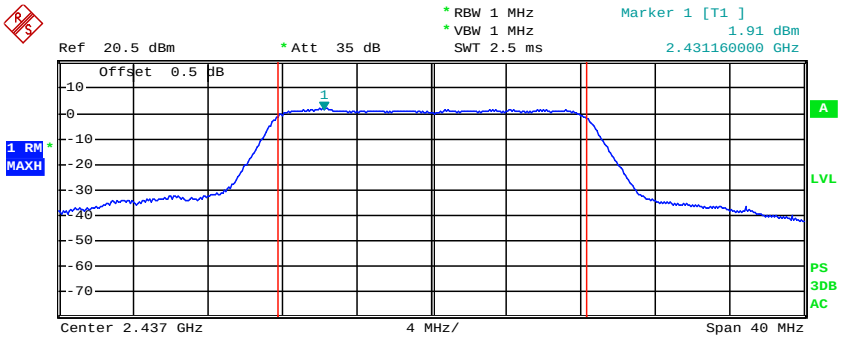
RF Output Power, Low Channel



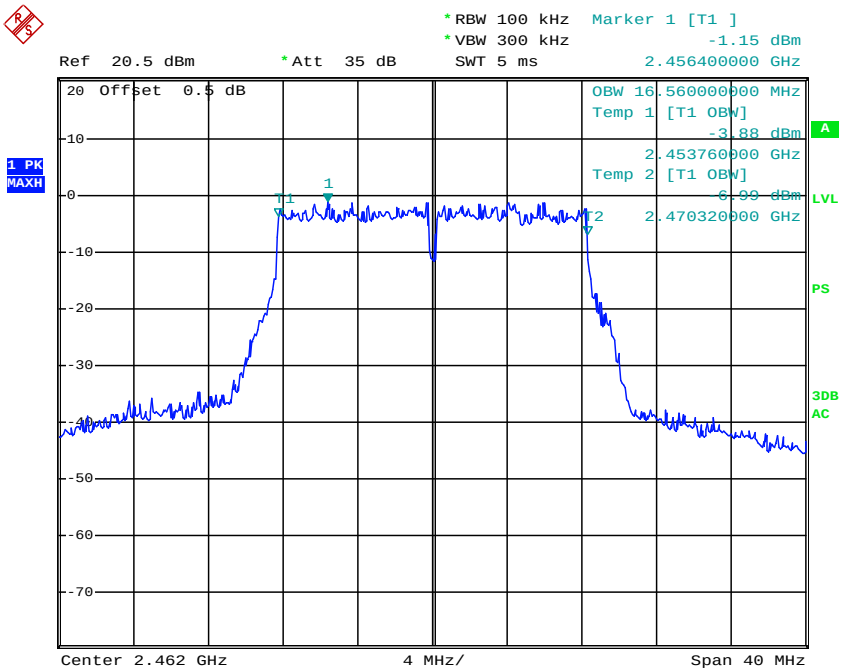
99% Occupied Bandwidth, Middle Channel



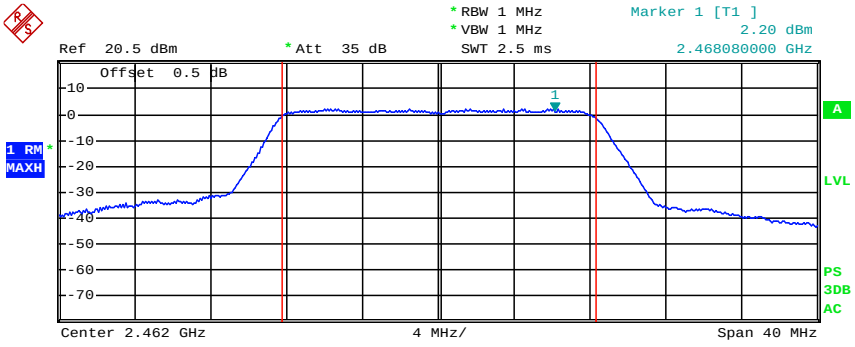
RF Output Power, Middle Channel



99% Occupied Bandwidth, High Channel

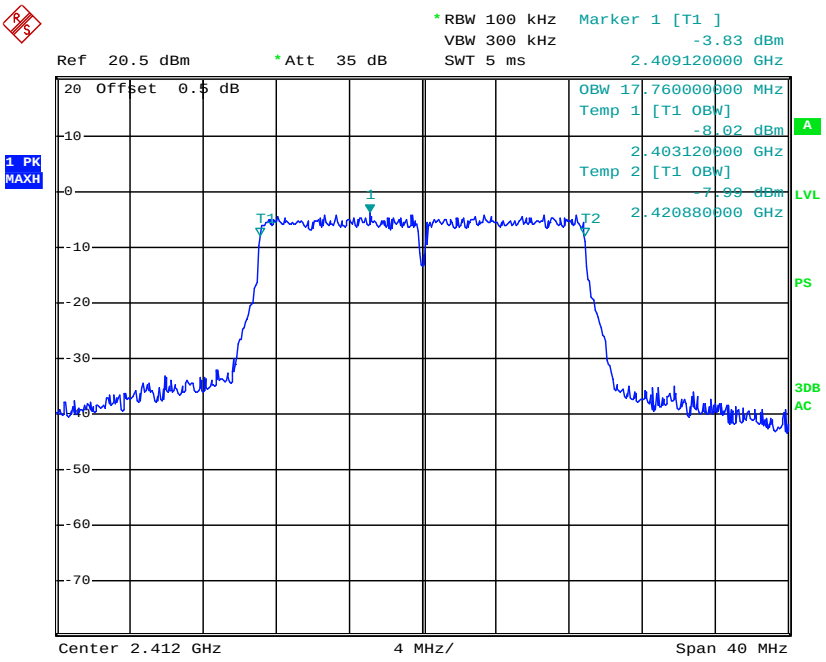


RF Output Power, High Channel

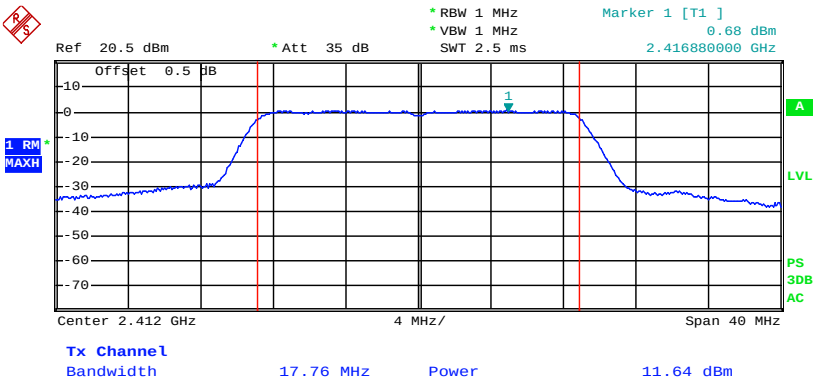


802.11n-HT20

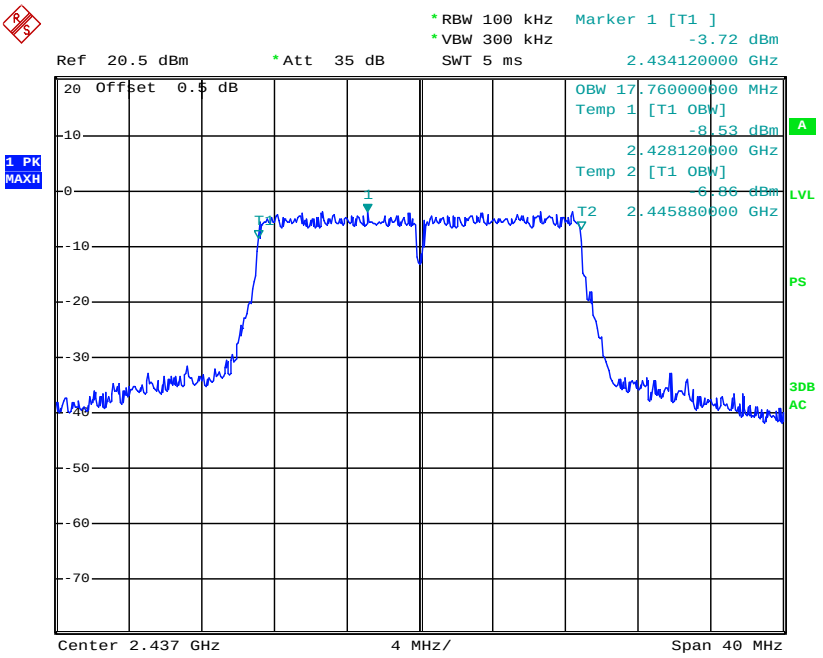
99% Occupied Bandwidth, Low Channel



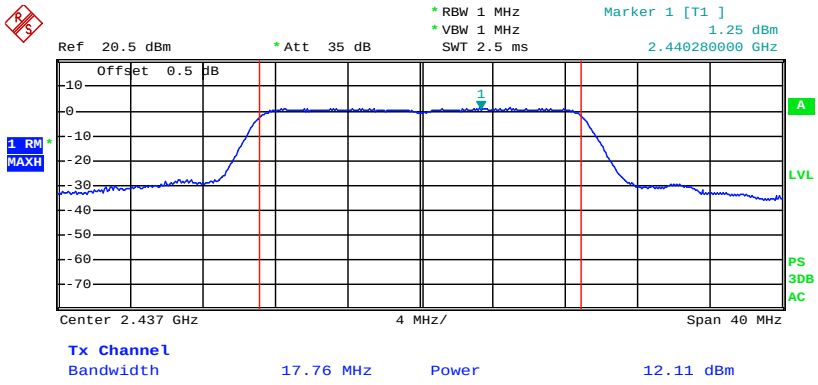
RF Output Power, Low Channel



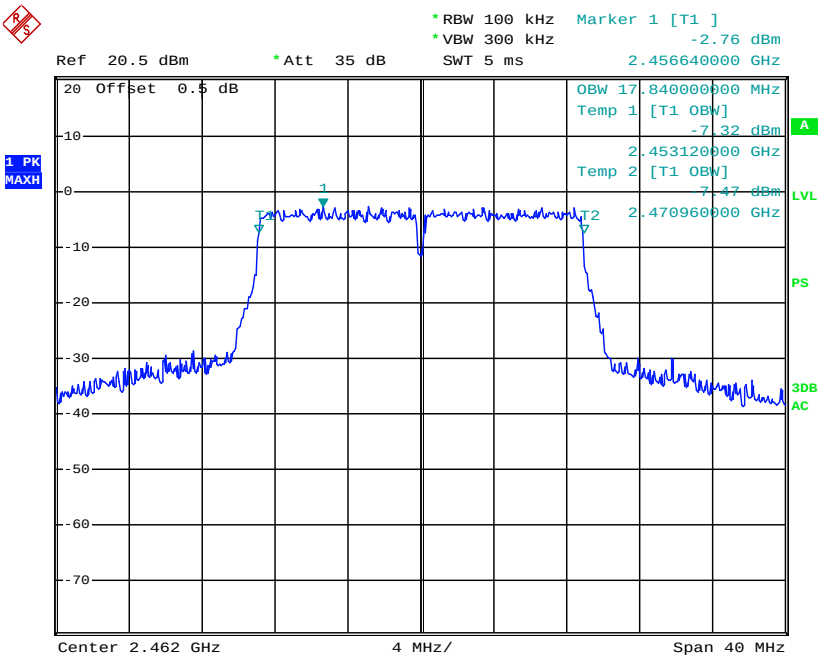
99% Occupied Bandwidth, Middle Channel



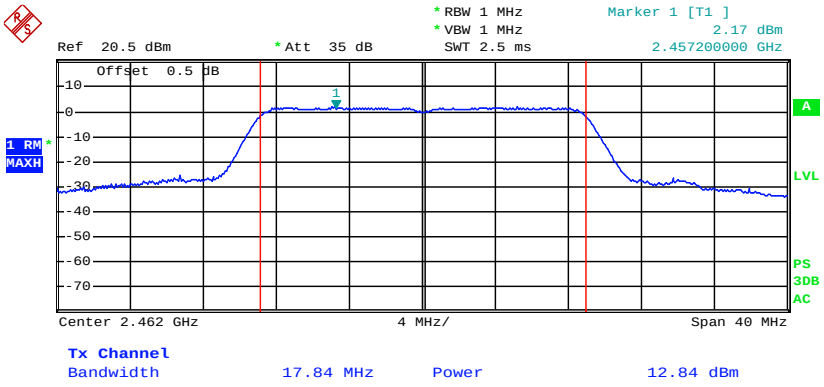
RF Output Power, Middle Channel



99% Occupied Bandwidth, High Channel

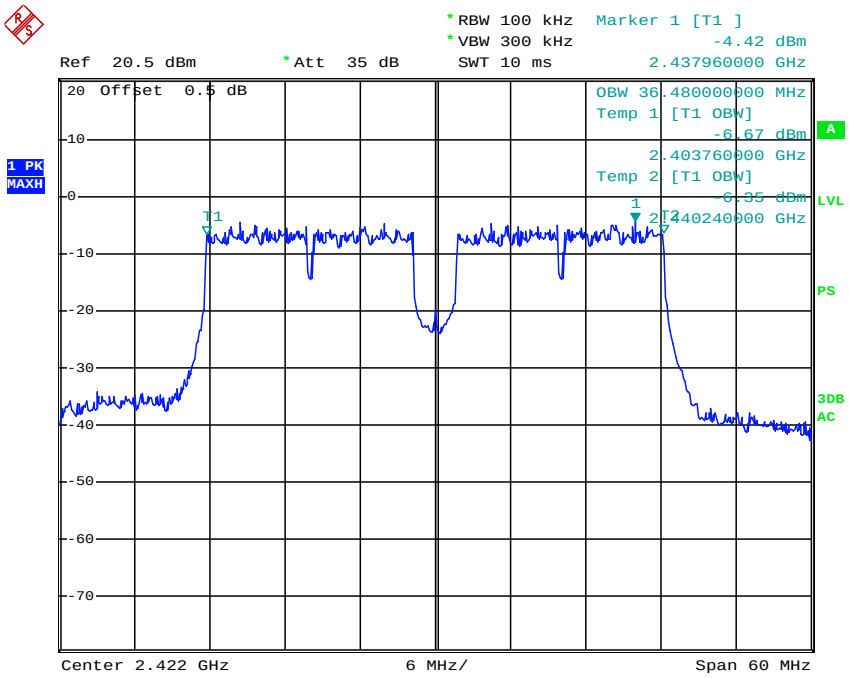


RF Output Power, High Channel

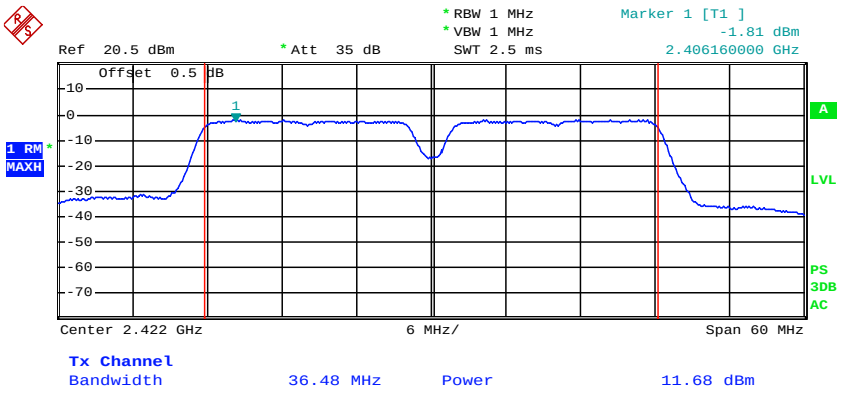


802.11n-HT40

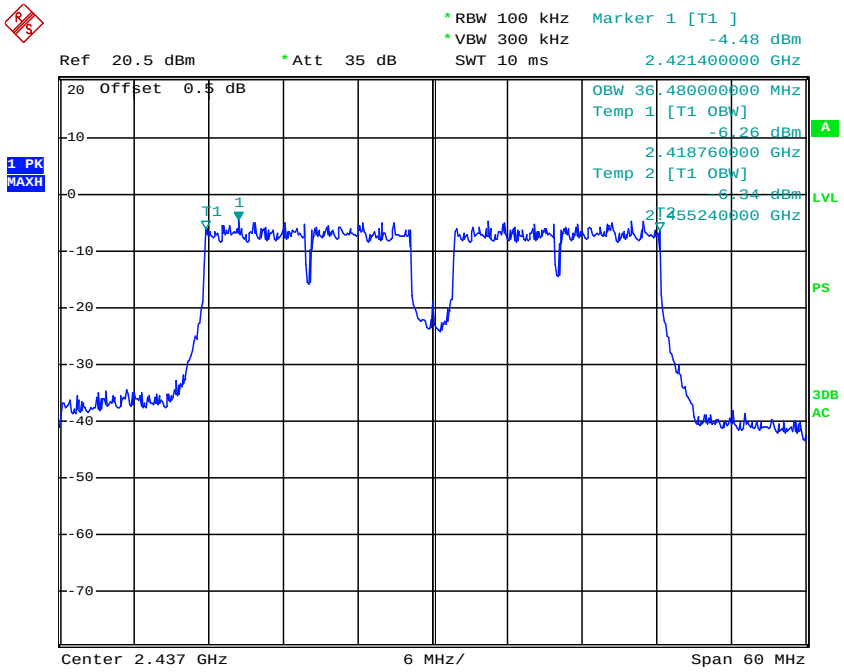
99% Occupied Bandwidth, Low Channel



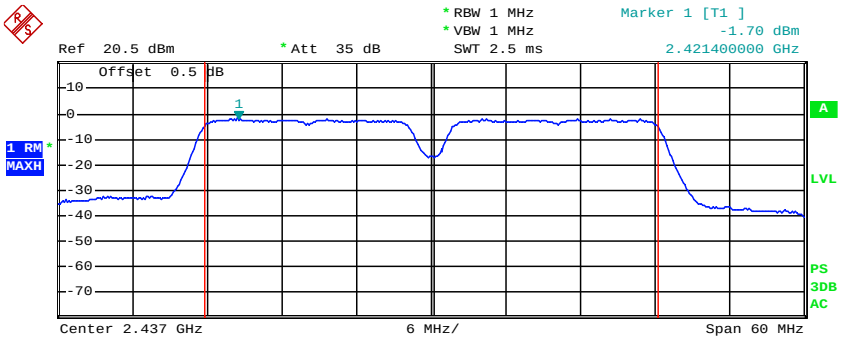
RF Output Power, Low Channel



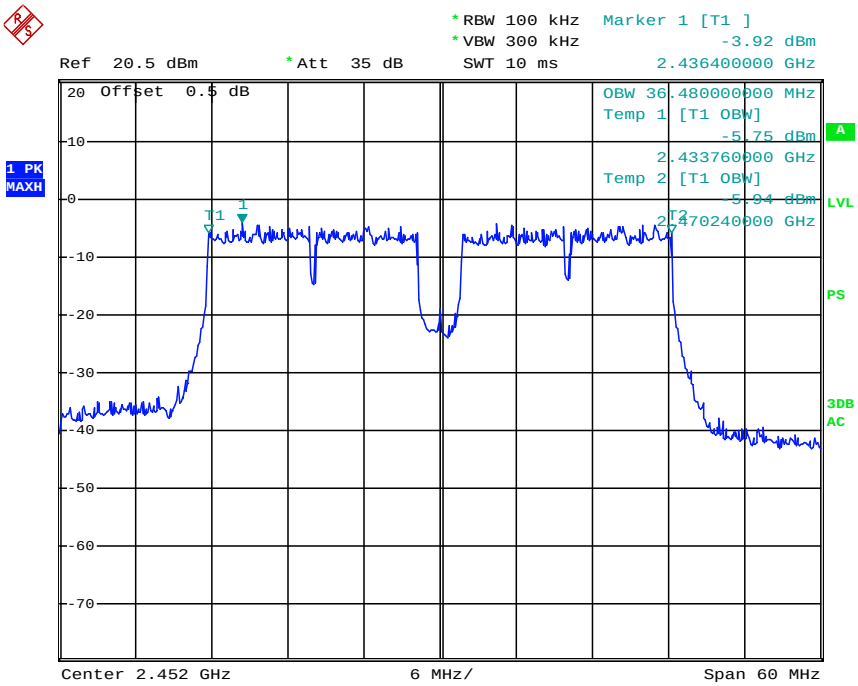
99% Occupied Bandwidth, Middle Channel



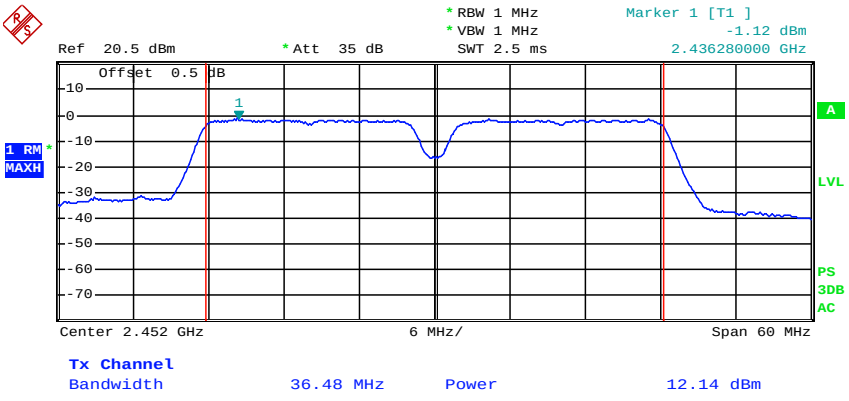
RF Output Power, Middle Channel



99% Occupied Bandwidth, High Channel



RF Output Power, High Channel



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)).

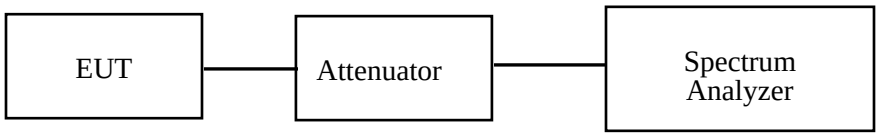
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10

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

Test Procedure

5. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
6. 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.
7. 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.
8. 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.
9. Repeat above procedures until all measured frequencies were complete.



Test Data

Environmental Conditions

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

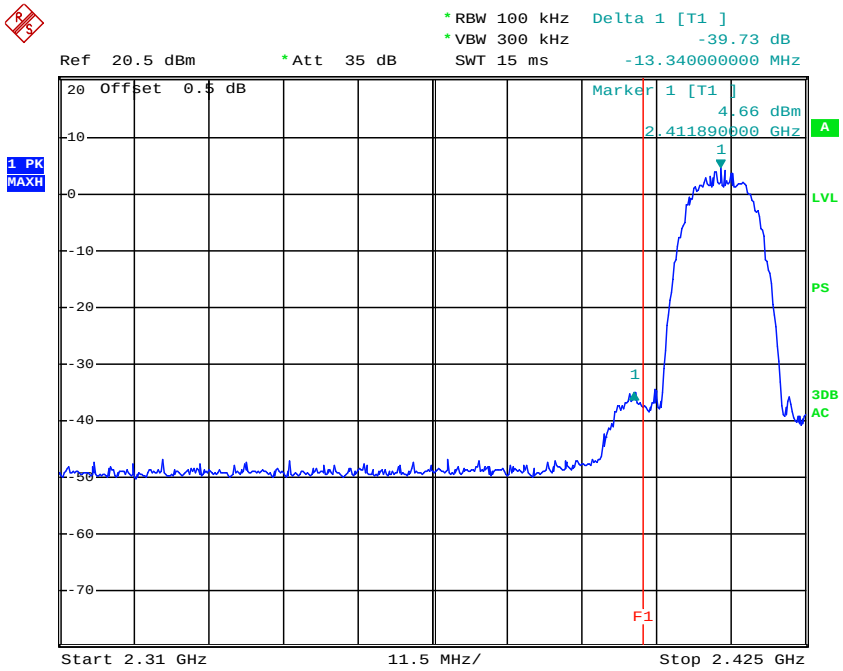
The testing was performed by Walt Kang on 2011-12-17.

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

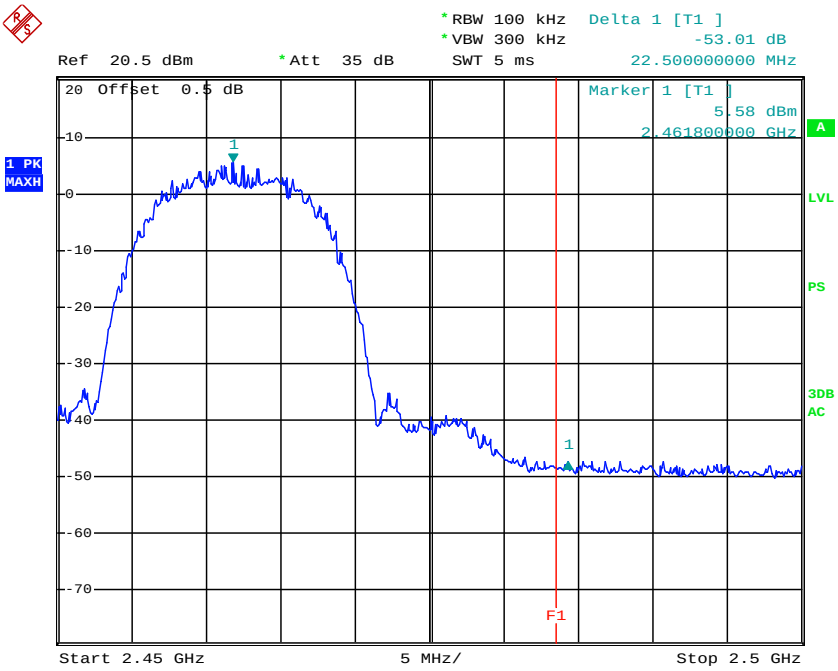
Channel	Frequency (MHz)	Delta Peak (dBc)	Limit (dBc)	Result
802.11b mode				
Low	2398.55	39.73	20	Pass
High	2484.30	53.01	20	Pass
802.11g mode				
Low	2398.09	32.82	20	Pass
High	2483.80	45.41	20	Pass
802.11n HT20 mode				
Low	2398.09	29.80	20	Pass
High	2484.92	35.99	20	Pass
802.11n HT40 mode				
Low	2397.92	29.66	20	Pass
High	2487.96	37.55	20	Pass

802.11b

Band Edge, Left Side,

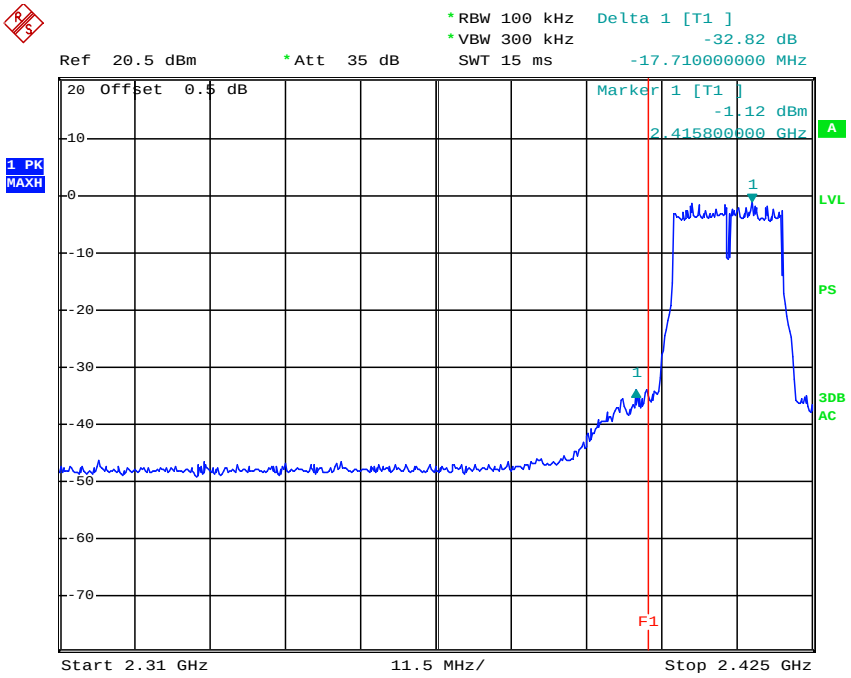


Band Edge, Right Side

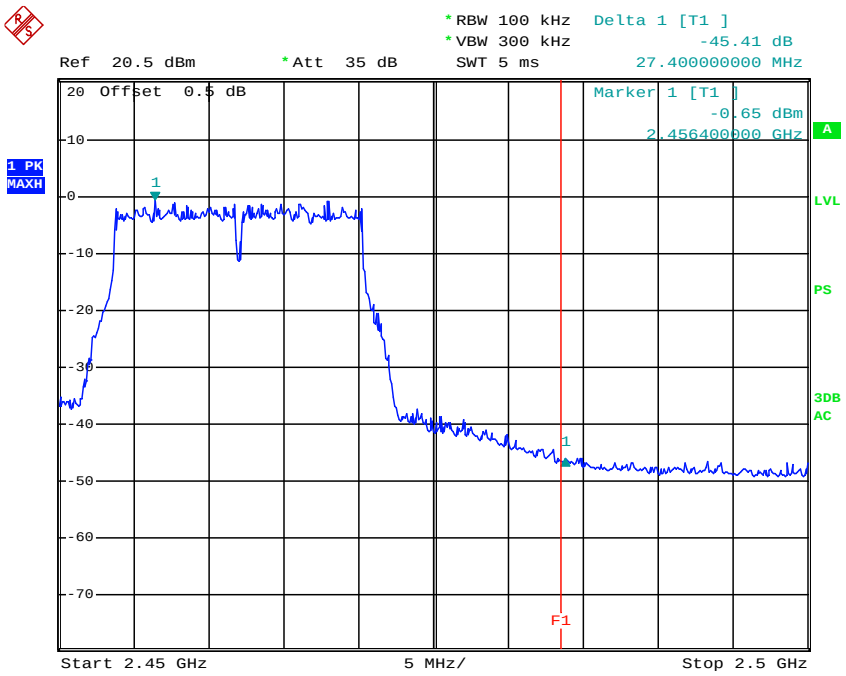


802.11g

Band Edge, Left Side,

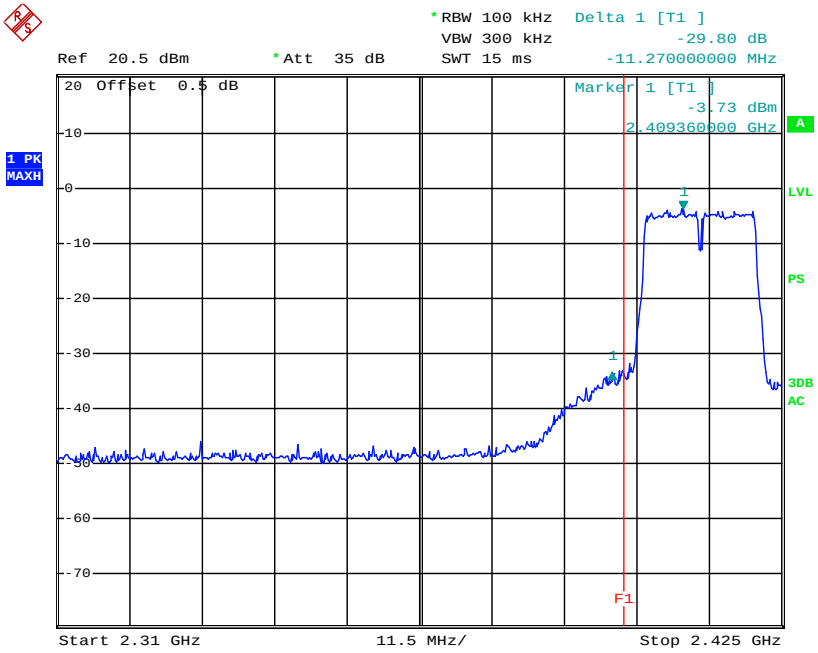


Band Edge, Right Side

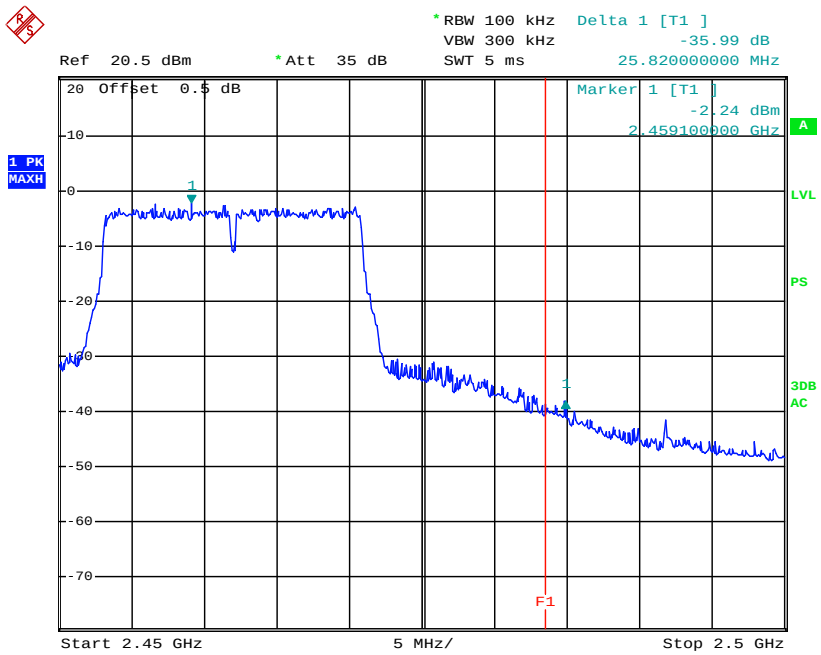


802.11n-HT20

Band Edge, Left Side

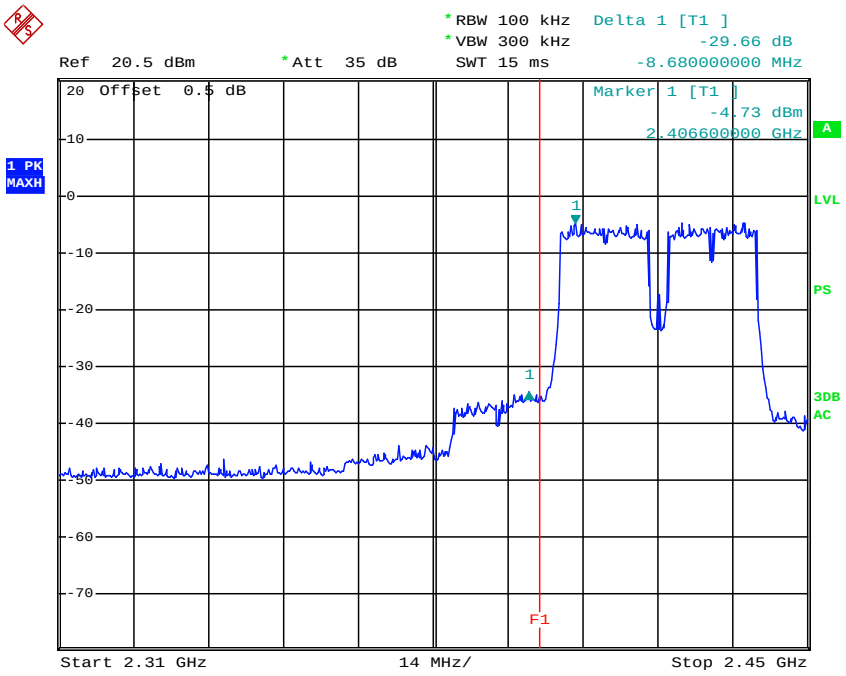


Band Edge, Right Side

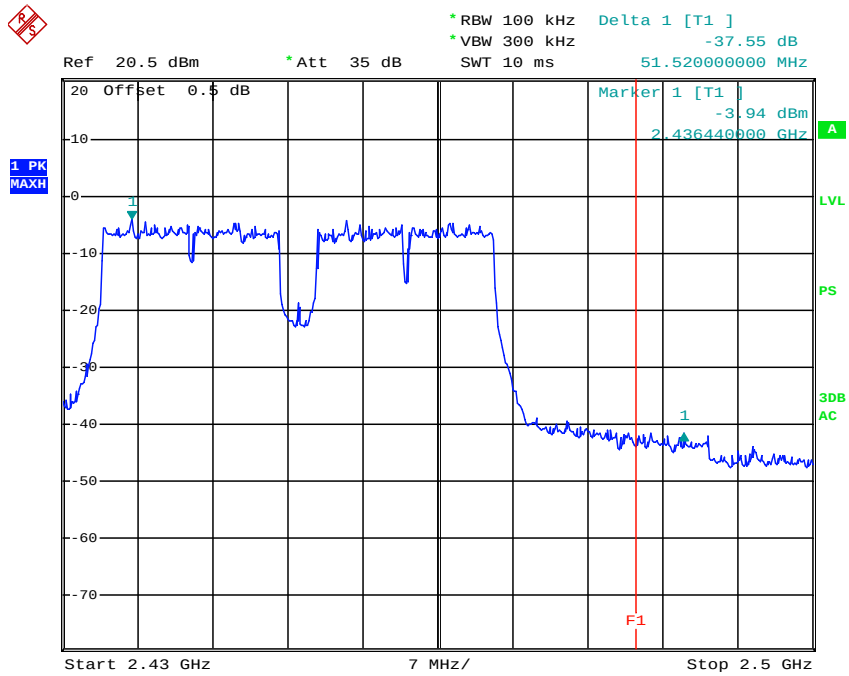


802.11n-HT40

Band Edge, Left Side,



Band Edge, Right Side



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.

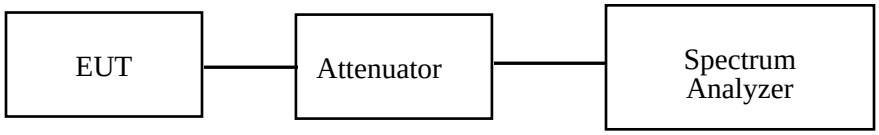
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10

*** 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:	100.0 kPa

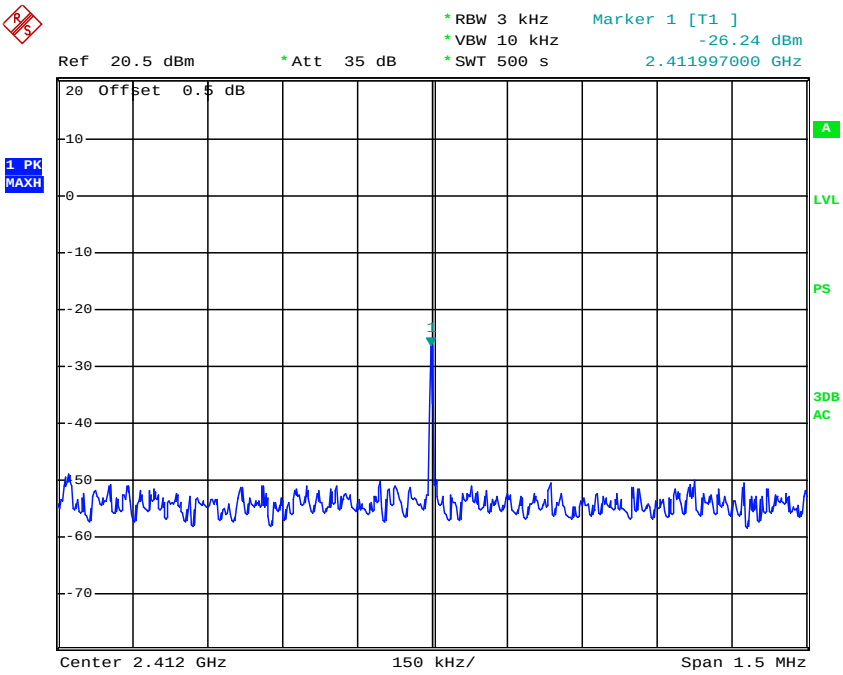
The testing was performed by Walt Kang on 2011-12-17.

Test Mode: Transmitting

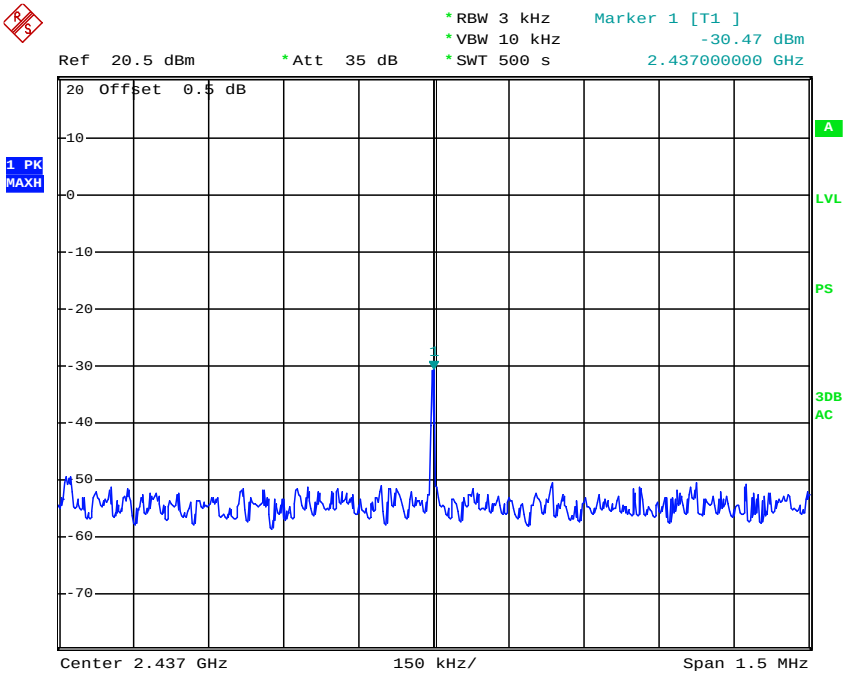
Test Result: Compliance, please refer to the following table and plots.

Channel	Frequency (MHz)	Data Rate (Mbps)	PSD (dBm)	Limit (dBm)	Result
802.11b mode					
Low	2412	1	-26.24	8	Pass
Middle	2437	1	-30.47	8	Pass
High	2462	1	-27.02	8	Pass
802.11g mode					
Low	2412	6	-21.03	8	Pass
Middle	2437	6	-25.49	8	Pass
High	2462	6	-26.09	8	Pass
802.11n HT20 mode					
Low	2412	6	-18.97	8	Pass
Middle	2437	6	-18.52	8	Pass
High	2462	6	-17.76	8	Pass
802.11n HT40 mode					
Low	2422	50	-26.77	8	Pass
Middle	2437	50	-24.24	8	Pass
High	2452	50	-19.72	8	Pass

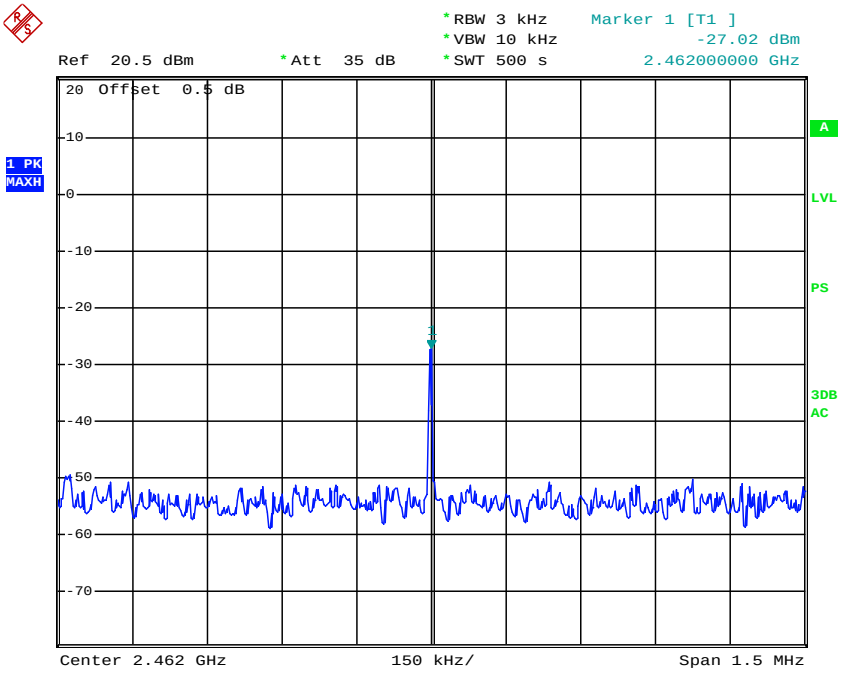
Power Spectral Density, 802.11b Low Channel



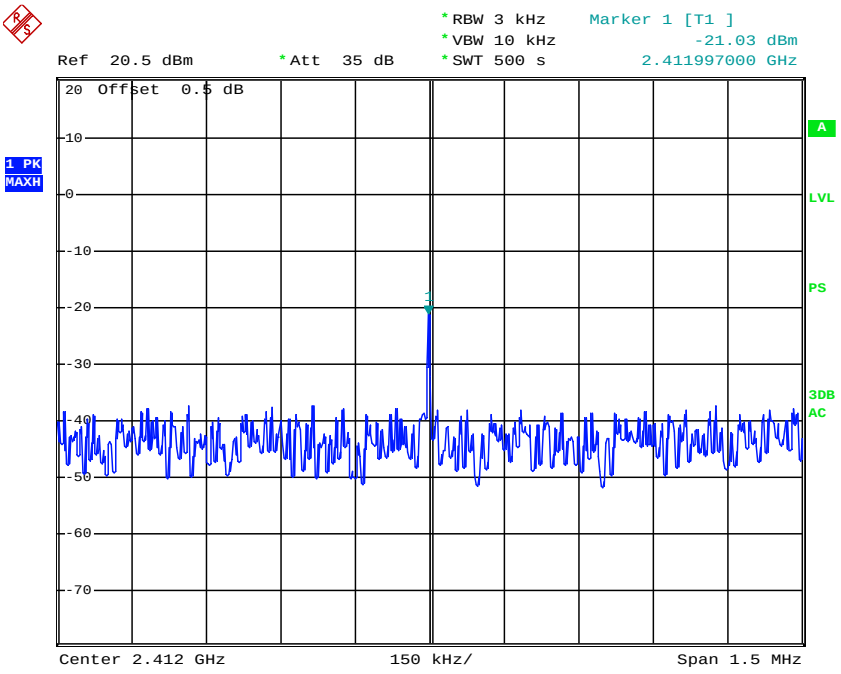
Power Spectral Density, 802.11b Middle Channel



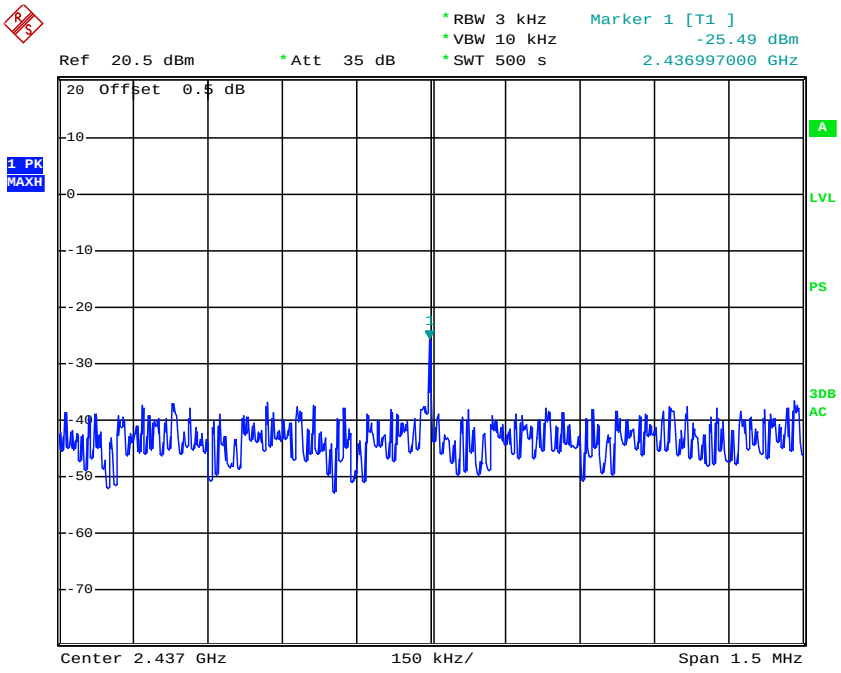
Power Spectral Density, 802.11b High Channel



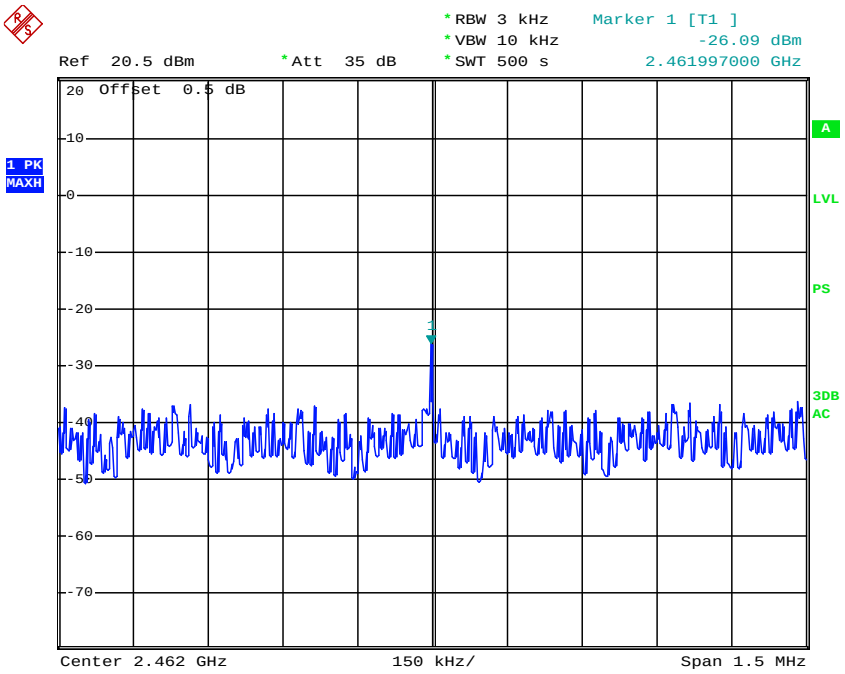
Power Spectral Density, 802.11g Low Channel



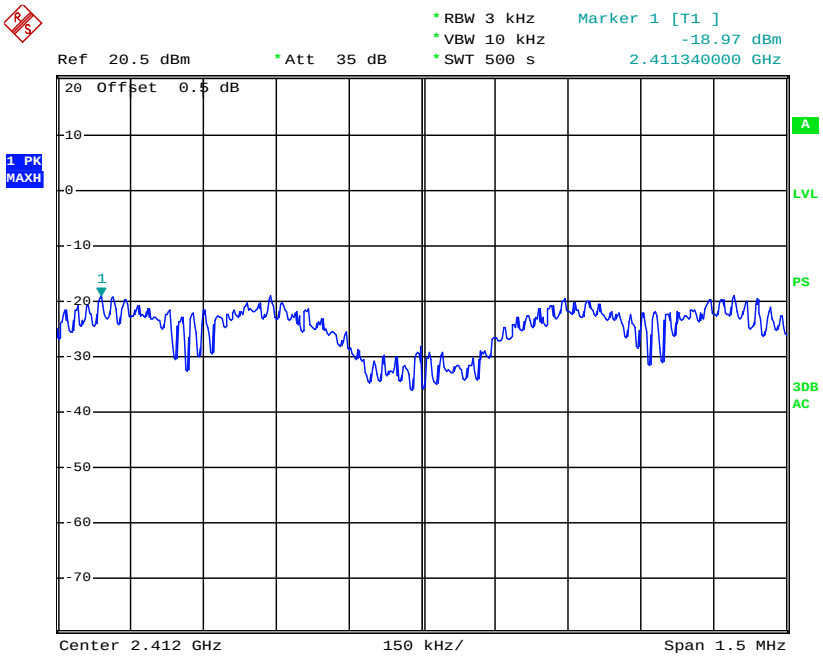
Power Spectral Density, 802.11g Middle Channel



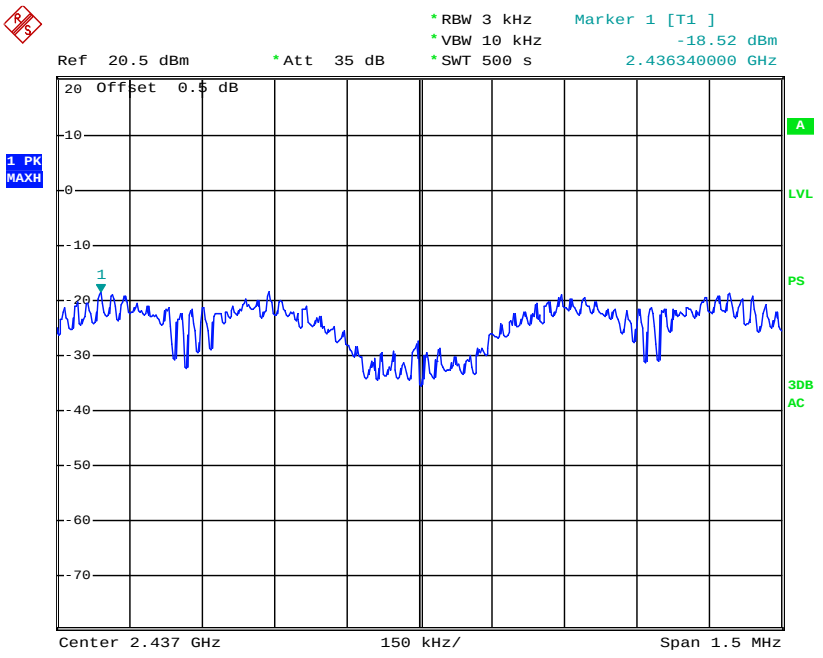
Power Spectral Density, 802.11g High Channel



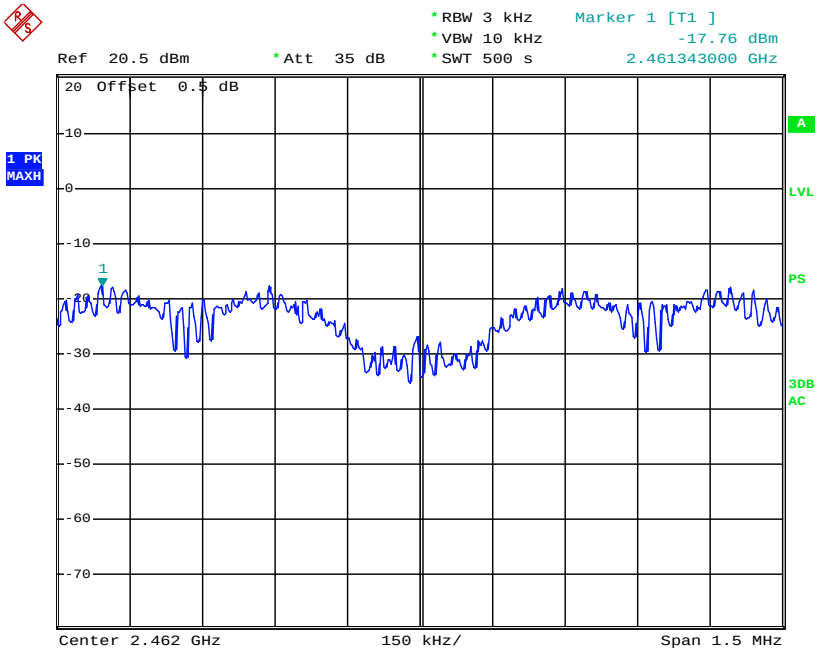
Power Spectral Density, 802.11n-HT20 Low Channel



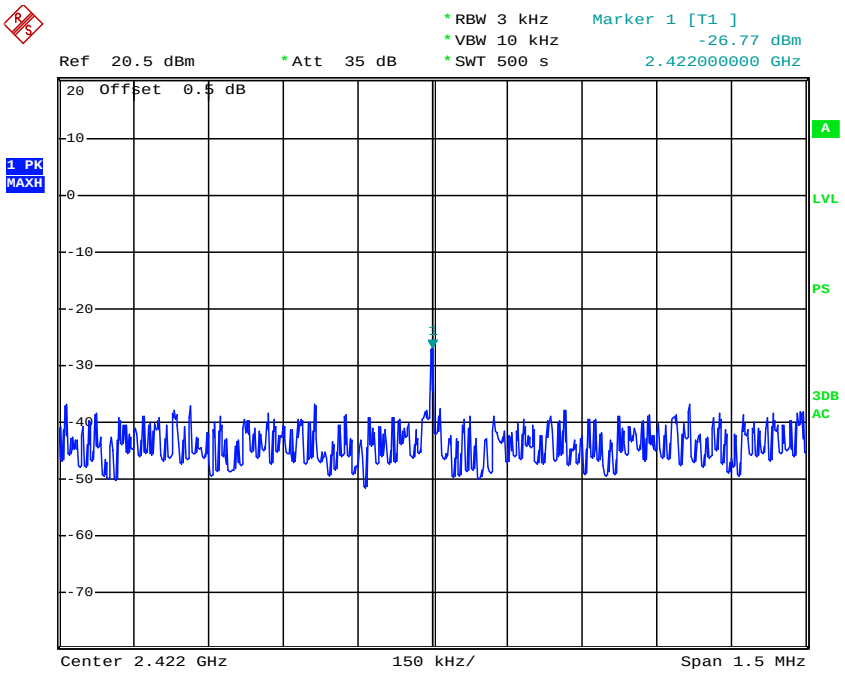
Power Spectral Density, 802.11n-HT20 Middle Channel



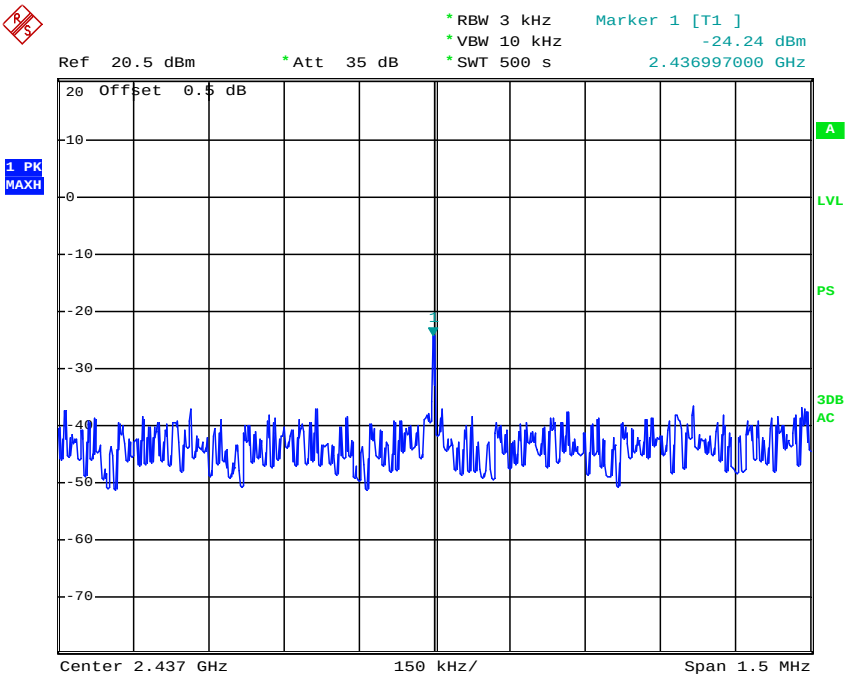
Power Spectral Density, 802.11n-HT20 High Channel



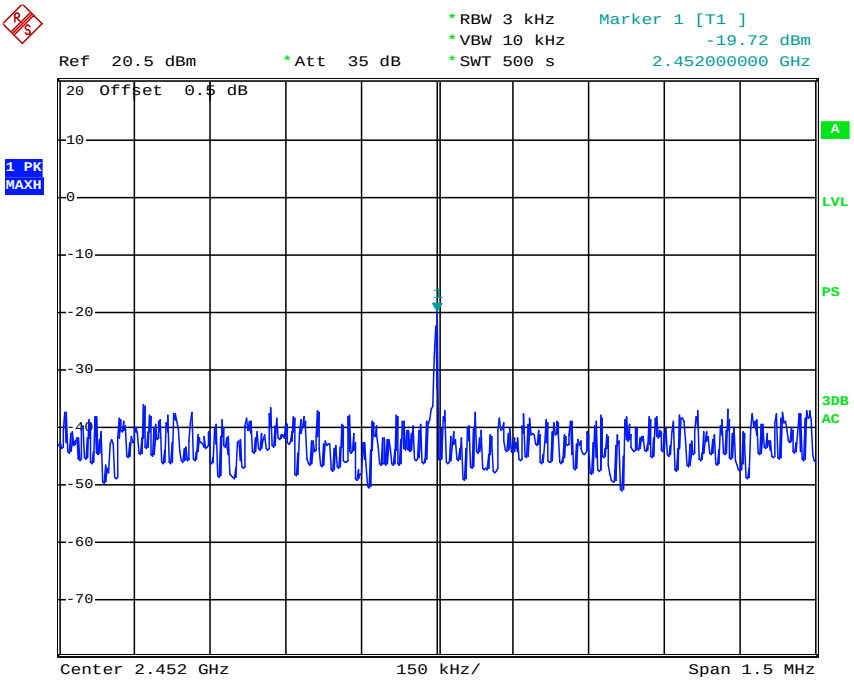
Power Spectral Density, 802.11n-HT40 Low Channel



Power Spectral Density, 802.11n-HT40 Middle Channel



Power Spectral Density, 802.11n-HT40 High Channel



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