LABCODE: 500069-0

FCC PART 15.247

TEST REPORT

For

Shen Zhen Autopro Technology CO., LTD

BLDG H2, Area A, HongFa Technology Industrial Zone, ShiYan Town, BaoAn District, ShenZhen, Guangdong, China

FCC ID: VUDAUTOPRO2013

Report Type:	**Product Type:**
Original Report	Android Box

Test Engineer:	Ares Liu
Report Number:	R2DG130201005-00A
Report Date:	2013-03-25
Reviewed By:	Ivan Cao RF Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The Shen Zhen Autopro Technology CO., LTD's product, model number: MAD11 (FCC ID: VUDAUTOPRO2013) ("EUT") in this report is a *Android Box,* which was measured approximately: 16.4cm (L) x 10.9 cm (W) x2.6cm (H), rated input voltage: DC 12 V from battery.

** All measurement and test data in this report was gathered from production sample serial number: 130201005 (Assigned by BACL, Dongguan). The EUT was received on 2013-02-25.*

Objective

This report is prepared on behalf of *Shen Zhen Autopro Technology CO., LTD* 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 the compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15B JBC submissions with FCC ID: *VUDAUTOPRO2013*.

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. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

The uncertainty of any RF tests which use conducted method measurement is ±3.46 dB, the uncertainty of any radiation on emissions measurement is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB
And the uncertainty will not be taken into consideration for all test data recorded in the report.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) 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 February 02, 2012. 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.: 273710. 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. (Dongguan) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 500069-0).

The current scope of accreditations can be found at http://ts.nist.gov/standards/scopes/5000690.htm

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in testing mode, which was provided by manufacturer. 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	/	/

For 802.11b, 802.11g, and 802.11n20 modes were tested with Channel 1, 6 and 11.
For 802.11n40 mode were 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

The software “MTool 2.0.3” was used for testing, which was provided by manufacturer.

Equipment Modifications

No modification was made to the EUT tested.

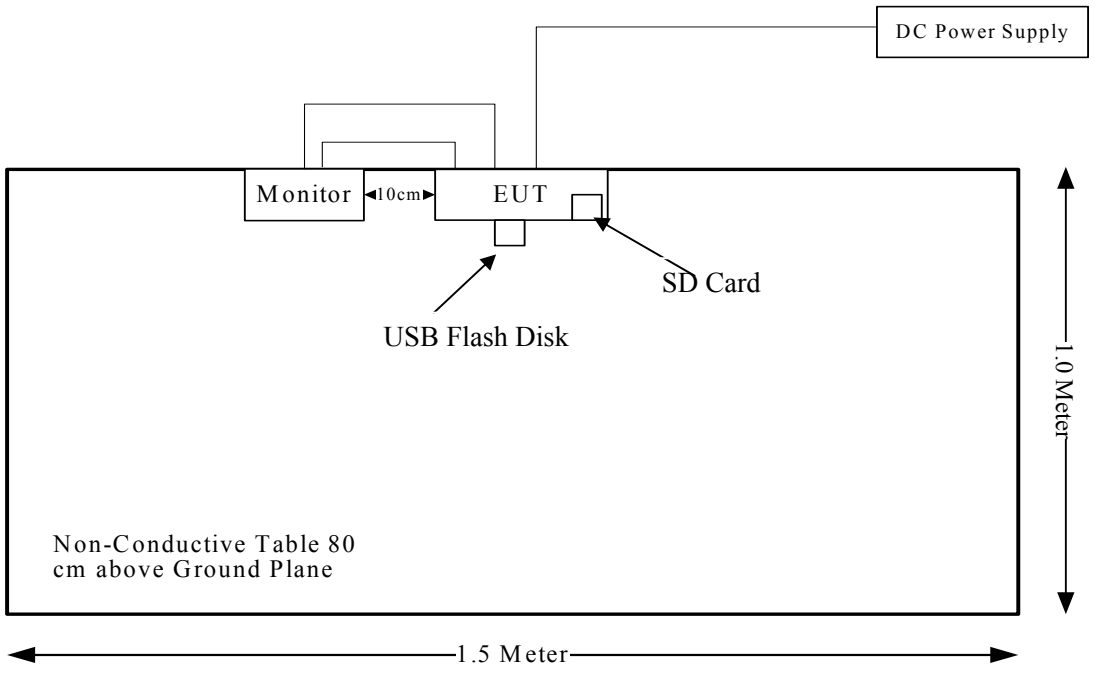
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Monitor	U3011t	CN-OPH5NY-74445-16T-290L
Kinston	USB Flash Disk	Data Traveler 4G	N/A
Kinston	SD Card	UHS-4G	N/A

External Cable

Cable Description	Length (m)	From Port	To
shielded detachable HDMI cable	1.5	EUT	Monitor
Detachable HDMI cable	2.0	EUT	Monitor

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307(b) (1), §2.1091	Maximum Permissible exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Not Applicable*
§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

Not Applicable*: the EUT powered by DC 12V form battery.

FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i)and subpart §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures 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/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

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

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = 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, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Mode	**Frequency (MHz)**	**Antenna Gain**		**Conducted Power**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
		(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
802.11b	2462	-2	0.63	17.43	55.34	20	0.0069	1.0
802.11g	2437	-2	0.63	14.5	28.18	20	0.0035	1.0
802.11n ht20	2412	-2	0.63	13.77	23.82	20	0.0030	1.0
802.11n ht40	2437	-2	0.63	13.43	22.03	20	0.0028	1.0

Result: The device meet FCC MPE at 20 cm distance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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

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

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

Antenna Connector Construction

The EUT has an internal antennas, which was permanently soldered on the PCB, and the maximum gain is -2.0 dBi, please refer to the internal photos.

Result: Compliance.

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 2, then:
- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 2, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

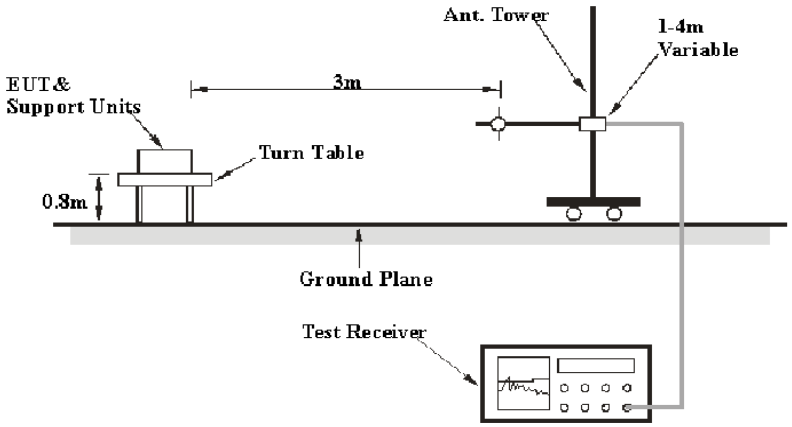
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

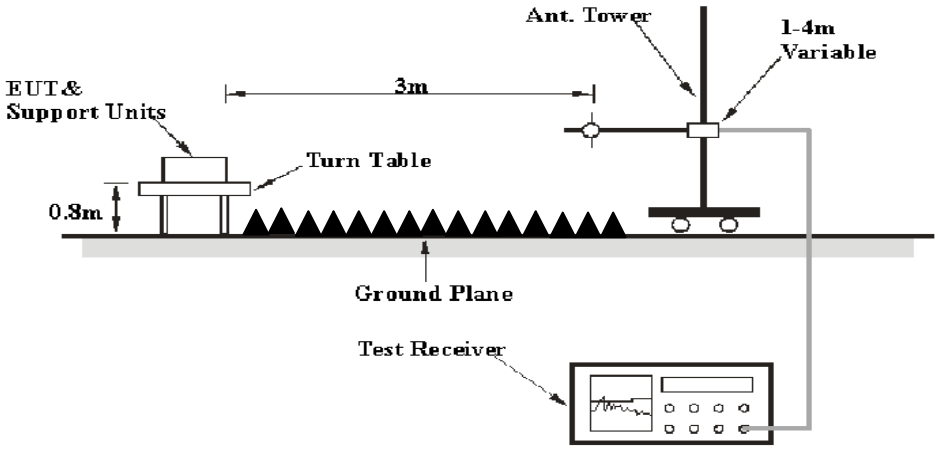
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber 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 EUT was connected to a $12V_{DC}$ battery.

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***
30 MHz – 1000 MHz	120 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	Ave.

Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second 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, peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Loss + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2012-05-14	2013-05-13
Sunol Sciences	Hybrid Antennas	JB3	A060611-1	2012-09-06	2013-09-05
HP	Pre-amplifier	8447E	2434A02181	2012-10-08	2013-10-07
R&S	Spectrum Analyzer	FSEM 30	DE31388	2013-03-15	2014-03-14
ETS-LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2013-09-05
Mini-Circuits	Amplifier	ZVA-213-S+	054201245	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

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

4.32 dB at **4924 MHz** in the **Horizontal** polarization for 802.11b Mode

Test Data

Environmental Conditions

Temperature:	25.1 ° C
Relative Humidity:	61 %
ATM Pressure:	101.4 kPa

The testing was performed by Ares Liu from 2013-03-14 to 2013-03-15.

Mode: Transmitting
802.11b Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2412 MHz									
2412	64.98	AV	H	25.67	3.93	0.00	94.58	N/A	N/A
2412	70.26	PK	H	25.67	3.93	0.00	99.86	N/A	N/A
2412	64.48	AV	V	25.67	3.93	0.00	94.08	N/A	N/A
2412	69.65	PK	V	25.67	3.93	0.00	99.25	N/A	N/A
2390	30.08	PK	H	25.61	3.84	0.00	59.53	74.00	14.47
2390	17.16	AV	H	25.61	3.84	0.00	46.61	54.00	7.39
4824	43.28	PK	H	30.64	4.73	27.26	51.39	74.00	22.61
4824	41.12	AV	H	30.64	4.73	27.26	49.23	54.00	4.77
7236	33.17	PK	H	34.17	6.56	26.36	47.54	74.00	26.46
7236	21.19	AV	H	34.17	6.56	26.36	35.56	54.00	18.44
9648	31.28	PK	H	36.06	8.70	26.06	49.98	74.00	24.02
9648	18.06	AV	H	36.06	8.70	26.06	36.76	54.00	17.24
2814.5	32.89	PK	H	26.72	4.47	27.37	36.71	74.00	37.29
2814.5	19.82	AV	H	26.72	4.47	27.37	23.64	54.00	30.36
402.19	32.41	QP	H	16.80	2.50	21.85	29.86	46.00	16.14
Middle Channel: 2437 MHz									
2437	67.39	AV	H	25.74	3.98	0.00	97.11	N/A	N/A
2437	72.12	PK	H	25.74	3.98	0.00	101.84	N/A	N/A
2437	66.39	AV	V	25.74	3.98	0.00	96.11	N/A	N/A
2437	71.18	PK	V	25.74	3.98	0.00	100.90	N/A	N/A
4874	43.19	PK	H	30.77	4.76	27.26	51.46	74.00	22.54
4874	41.21	AV	H	30.77	4.76	27.26	49.48	54.00	4.52
7311	33.06	PK	H	34.35	6.70	26.51	47.60	74.00	26.40
7311	21.17	AV	H	34.35	6.70	26.51	35.71	54.00	18.29
9748	31.52	PK	H	36.30	8.60	25.68	50.74	74.00	23.26
9748	18.03	AV	H	36.30	8.60	25.68	37.25	54.00	16.75
2814.5	33.01	PK	H	26.72	4.47	27.37	36.83	74.00	37.17
2814.5	19.81	AV	H	26.72	4.47	27.37	23.63	54.00	30.37
6628	32.79	PK	H	32.63	5.57	27.03	43.96	74.00	30.04
6628	19.79	AV	H	32.63	5.57	27.03	30.96	54.00	23.04
403.15	33.81	QP	H	16.83	2.49	21.85	31.28	46.00	14.72
High Channel: 2462 MHz									
2462	68.93	AV	H	25.80	3.93	0.00	98.66	N/A	N/A
2462	73.53	PK	H	25.80	3.93	0.00	103.26	N/A	N/A
2462	68.19	AV	V	25.80	3.93	0.00	97.92	N/A	N/A
2462	72.68	PK	V	25.80	3.93	0.00	102.41	N/A	N/A
2483.5	30.25	PK	H	25.86	3.80	0.00	59.91	74.00	14.09
2483.5	17.59	AV	H	25.86	3.80	0.00	47.25	54.00	6.75
4924	43.67	PK	H	30.90	4.70	27.27	52.00	74.00	22.00
4924	41.35	AV	H	30.90	4.70	27.27	49.68	54.00	4.32
7386	33.25	PK	H	34.53	6.84	26.66	47.96	74.00	26.04
7386	21.44	AV	H	34.53	6.84	26.66	36.15	54.00	17.85
9848	31.7	PK	H	36.54	8.49	25.49	51.24	74.00	22.76
9848	18.05	AV	H	36.54	8.49	25.49	37.59	54.00	16.41
2814.5	32.9	PK	H	26.72	4.47	27.37	36.72	74.00	37.28
2814.5	19.78	AV	H	26.72	4.47	27.37	23.60	54.00	30.40
404.27	32.76	QP	H	16.86	2.49	21.86	30.25	46.00	15.75

802.11g Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2412 MHz									
2412	59.94	AV	H	25.67	3.93	0.00	89.54	N/A	N/A
2412	70.27	PK	H	25.67	3.93	0.00	99.87	N/A	N/A
2412	59.75	AV	V	25.67	3.93	0.00	89.35	N/A	N/A
2412	69.81	PK	V	25.67	3.93	0.00	99.41	N/A	N/A
2390	29.17	PK	H	25.61	3.84	0.00	58.62	74.00	15.38
2390	15.1	AV	H	25.61	3.84	0.00	44.55	54.00	9.45
4824	36.81	PK	V	30.64	4.73	27.26	44.92	74.00	29.08
4824	23.01	AV	V	30.64	4.73	27.26	31.12	54.00	22.88
7236	32.07	PK	V	34.17	6.56	26.36	46.44	74.00	27.56
7236	18.16	AV	V	34.17	6.56	26.36	32.53	54.00	21.47
9648	32.11	PK	V	36.06	8.70	26.06	50.81	74.00	23.19
9648	18.04	AV	V	36.06	8.70	26.06	36.74	54.00	17.26
2814.5	32.74	PK	V	26.72	4.47	27.37	36.56	74.00	37.44
2814.5	19.82	AV	V	26.72	4.47	27.37	23.64	54.00	30.36
402.19	32.41	QP	H	16.80	2.50	21.85	29.86	46.00	16.14
Middle Channel: 2437 MHz									
2437	60.8	AV	H	25.74	3.98	0.00	90.52	N/A	N/A
2437	71.13	PK	H	25.74	3.98	0.00	100.85	N/A	N/A
2437	59.82	AV	V	25.74	3.98	0.00	89.54	N/A	N/A
2437	70.07	PK	V	25.74	3.98	0.00	99.79	N/A	N/A
4874	36.81	PK	V	30.77	4.76	27.26	45.08	74.00	28.92
4874	23.09	AV	V	30.77	4.76	27.26	31.36	54.00	22.64
7311	31.93	PK	V	34.35	6.70	26.51	46.47	74.00	27.53
7311	18.11	AV	V	34.35	6.70	26.51	32.65	54.00	21.35
9748	32.05	PK	V	36.30	8.60	25.68	51.27	74.00	22.73
9748	18.02	AV	V	36.30	8.60	25.68	37.24	54.00	16.76
2814.5	32.67	PK	V	26.72	4.47	27.37	36.49	74.00	37.51
2814.5	19.83	AV	V	26.72	4.47	27.37	23.65	54.00	30.35
6675.4	32.51	PK	V	32.76	5.64	27.15	43.76	74.00	30.24
6675.4	19.79	AV	V	32.76	5.64	27.15	31.04	54.00	22.96
403.15	32.53	QP	H	16.83	2.49	21.85	30.00	46.00	16.00
High Channel: 2462 MHz									
2462	60.91	AV	H	25.80	3.93	0.00	90.64	N/A	N/A
2462	71.56	PK	H	25.80	3.93	0.00	101.29	N/A	N/A
2462	59.98	AV	V	25.80	3.93	0.00	89.71	N/A	N/A
2462	70.49	PK	V	25.80	3.93	0.00	100.22	N/A	N/A
2483.5	29.43	PK	H	25.86	3.80	0.00	59.09	74.00	14.91
2483.5	15.5	AV	H	25.86	3.80	0.00	45.16	54.00	8.84
4924	37.11	PK	H	30.90	4.70	27.27	45.44	74.00	28.56
4924	23.19	AV	H	30.90	4.70	27.27	31.52	54.00	22.48
7386	32.05	PK	H	34.53	6.84	26.66	46.76	74.00	27.24
7386	18.12	AV	H	34.53	6.84	26.66	32.83	54.00	21.17
9848	32.07	PK	H	36.54	8.49	25.49	51.61	74.00	22.39
9848	18.03	AV	H	36.54	8.49	25.49	37.57	54.00	16.43
2814.5	32.81	PK	H	26.72	4.47	27.37	36.63	74.00	37.37
2814.5	19.78	AV	H	26.72	4.47	27.37	23.60	54.00	30.40
404.27	31.97	QP	H	16.86	2.49	21.86	29.46	46.00	16.54

802.11 n20 Mode

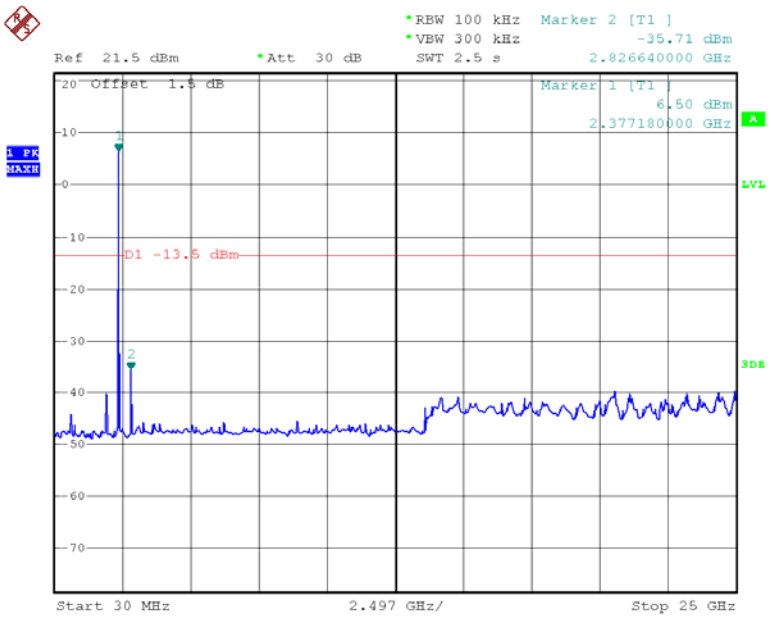
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2412 MHz									
2412	59.76	AV	H	25.67	3.93	0.00	89.36	N/A	N/A
2412	70.27	PK	H	25.67	3.93	0.00	99.87	N/A	N/A
2412	59.37	AV	V	25.67	3.93	0.00	88.97	N/A	N/A
2412	69.54	PK	V	25.67	3.93	0.00	99.14	N/A	N/A
2390	29.42	PK	H	25.61	3.84	0.00	58.87	74.00	15.13
2390	15.33	AV	H	25.61	3.84	0.00	44.78	54.00	9.22
4824	39.27	PK	V	30.64	4.73	27.26	47.38	74.00	26.62
4824	24.61	AV	V	30.64	4.73	27.26	32.72	54.00	21.28
7236	31.26	PK	V	34.17	6.56	26.36	45.63	74.00	28.37
7236	17.83	AV	V	34.17	6.56	26.36	32.20	54.00	21.80
9648	31.89	PK	V	36.06	8.70	26.06	50.59	74.00	23.41
9648	18.04	AV	V	36.06	8.70	26.06	36.74	54.00	17.26
2814.5	33.36	PK	V	26.72	4.47	27.37	37.18	74.00	36.82
2814.5	19.83	AV	V	26.72	4.47	27.37	23.65	54.00	30.35
402.19	31.11	QP	H	16.80	2.50	21.85	28.56	46.00	17.44
Middle Channel: 2437 MHz									
2437	60.17	AV	H	25.74	3.98	0.00	89.89	N/A	N/A
2437	70.84	PK	H	25.74	3.98	0.00	100.56	N/A	N/A
2437	59.78	AV	V	25.74	3.98	0.00	89.50	N/A	N/A
2437	69.89	PK	V	25.74	3.98	0.00	99.61	N/A	N/A
4874	39.17	PK	V	30.77	4.76	27.26	47.44	74.00	26.56
4874	24.88	AV	V	30.77	4.76	27.26	33.15	54.00	20.85
7311	31.29	PK	V	34.35	6.70	26.51	45.83	74.00	28.17
7311	17.81	AV	V	34.35	6.70	26.51	32.35	54.00	21.65
9748	31.83	PK	V	36.30	8.60	25.68	51.05	74.00	22.95
9748	18.04	AV	V	36.30	8.60	25.68	37.26	54.00	16.74
2814.5	33.42	PK	V	26.72	4.47	27.37	37.24	74.00	36.76
2814.5	19.84	AV	V	26.72	4.47	27.37	23.66	54.00	30.34
6675.4	32.94	PK	V	32.76	5.64	27.15	44.19	74.00	29.81
6675.4	19.74	AV	V	32.76	5.64	27.15	30.99	54.00	23.01
403.15	33.25	QP	H	16.83	2.49	21.85	30.72	46.00	15.28
High Channel: 2462 MHz									
2462	60.38	AV	H	25.80	3.93	0.00	90.11	N/A	N/A
2462	71.21	PK	H	25.80	3.93	0.00	100.94	N/A	N/A
2462	59.69	AV	V	25.80	3.93	0.00	89.42	N/A	N/A
2462	70.12	PK	V	25.80	3.93	0.00	99.85	N/A	N/A
2483.5	29.58	PK	H	25.86	3.80	0.00	59.24	74.00	14.76
2483.5	15.43	AV	H	25.86	3.80	0.00	45.09	54.00	8.91
4924	39.53	PK	H	30.90	4.70	27.27	47.86	74.00	26.14
4924	25.11	AV	H	30.90	4.70	27.27	33.44	54.00	20.56
7386	31.46	PK	H	34.53	6.84	26.66	46.17	74.00	27.83
7386	17.8	AV	H	34.53	6.84	26.66	32.51	54.00	21.49
9848	31.85	PK	H	36.54	8.49	25.49	51.39	74.00	22.61
9848	18.05	AV	H	36.54	8.49	25.49	37.59	54.00	16.41
2814.5	33.41	PK	H	26.72	4.47	27.37	37.23	74.00	36.77
2814.5	19.85	AV	H	26.72	4.47	27.37	23.67	54.00	30.33
404.27	31.24	QP	H	16.86	2.49	21.86	28.73	46.00	17.27

802.11 n40 Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2422 MHz									
2422	56.23	AV	H	25.70	3.95	0.00	85.88	N/A	N/A
2422	69.58	PK	H	25.70	3.95	0.00	99.23	N/A	N/A
2422	55.84	AV	V	25.70	3.95	0.00	85.49	N/A	N/A
2422	68.11	PK	V	25.70	3.95	0.00	97.76	N/A	N/A
2390	30.89	PK	H	25.61	3.84	0.00	60.34	74.00	13.66
2390	17.75	AV	H	25.61	3.84	0.00	47.20	54.00	6.80
4844	38.41	PK	V	30.69	4.78	27.26	46.62	74.00	27.38
4844	23.19	AV	V	30.69	4.78	27.26	31.40	54.00	22.60
7266	32.81	PK	V	34.24	6.62	26.42	47.25	74.00	26.75
7266	18.04	AV	V	34.24	6.62	26.42	32.48	54.00	21.52
9688	32.91	PK	V	36.15	8.66	25.91	51.81	74.00	22.19
9688	19.89	AV	V	36.15	8.66	25.91	38.79	54.00	15.21
2814.5	32.66	PK	V	26.72	4.47	27.37	36.48	74.00	37.52
2814.5	19.77	AV	V	26.72	4.47	27.37	23.59	54.00	30.41
402.19	33.64	QP	H	16.80	2.50	21.85	31.09	46.00	14.91
Middle Channel: 2437 MHz									
2437	56.26	AV	H	25.74	3.98	0.00	85.98	N/A	N/A
2437	69.82	PK	H	25.74	3.98	0.00	99.54	N/A	N/A
2437	55.94	AV	V	25.74	3.98	0.00	85.66	N/A	N/A
2437	68.94	PK	V	25.74	3.98	0.00	98.66	N/A	N/A
4874	38.27	PK	V	30.77	4.76	27.26	46.54	74.00	27.46
4874	23.16	AV	V	30.77	4.76	27.26	31.43	54.00	22.57
7311	32.96	PK	V	34.35	6.70	26.51	47.50	74.00	26.50
7311	18.06	AV	V	34.35	6.70	26.51	32.60	54.00	21.40
9748	32.81	PK	V	36.30	8.60	25.68	52.03	74.00	21.97
9748	19.84	AV	V	36.30	8.60	25.68	39.06	54.00	14.94
2814.5	32.69	PK	V	26.72	4.47	27.37	36.51	74.00	37.49
2814.5	19.92	AV	V	26.72	4.47	27.37	23.74	54.00	30.26
6675.4	32.48	PK	V	32.76	5.64	27.15	43.73	74.00	30.27
6675.4	19.76	AV	V	32.76	5.64	27.15	31.01	54.00	22.99
403.15	32.29	QP	H	16.83	2.49	21.85	29.76	46.00	16.24
High Channel: 2452 MHz									
2452	56.65	AV	H	25.78	4.00	0.00	86.42	N/A	N/A
2452	70.18	PK	H	25.78	4.00	0.00	99.95	N/A	N/A
2452	56.17	AV	V	25.78	4.00	0.00	85.94	N/A	N/A
2452	69.02	PK	V	25.78	4.00	0.00	98.79	N/A	N/A
2483.5	31.97	PK	H	25.86	3.80	0.00	61.63	74.00	12.37
2483.5	17.86	AV	H	25.86	3.80	0.00	47.52	54.00	6.48
4904	38.51	PK	V	30.85	4.72	27.27	46.81	74.00	27.19
4904	23.23	AV	V	30.85	4.72	27.27	31.53	54.00	22.47
7356	32.9	PK	V	34.45	6.79	26.60	47.54	74.00	26.46
7356	18.01	AV	V	34.45	6.79	26.60	32.65	54.00	21.35
9808	32.87	PK	V	36.44	8.53	25.48	52.36	74.00	21.64
9808	18.06	AV	V	36.44	8.53	25.48	37.55	54.00	16.45
2814.5	32.66	PK	V	26.72	4.47	27.37	36.48	74.00	37.52
2814.5	19.85	AV	V	26.72	4.47	27.37	23.67	54.00	30.33
404.27	31.75	QP	H	16.86	2.49	21.86	29.24	46.00	16.76

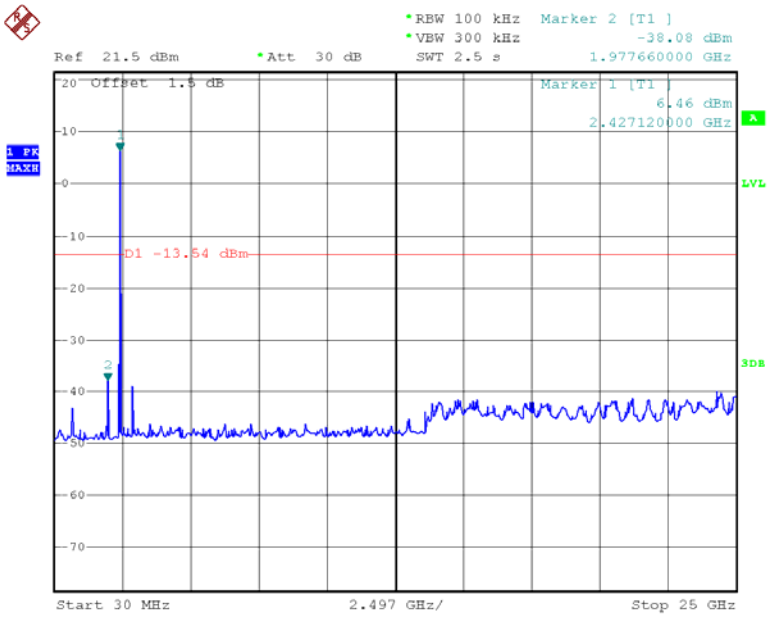
Conducted Spurious Emissions at Antenna Port

802.11b Low Channel



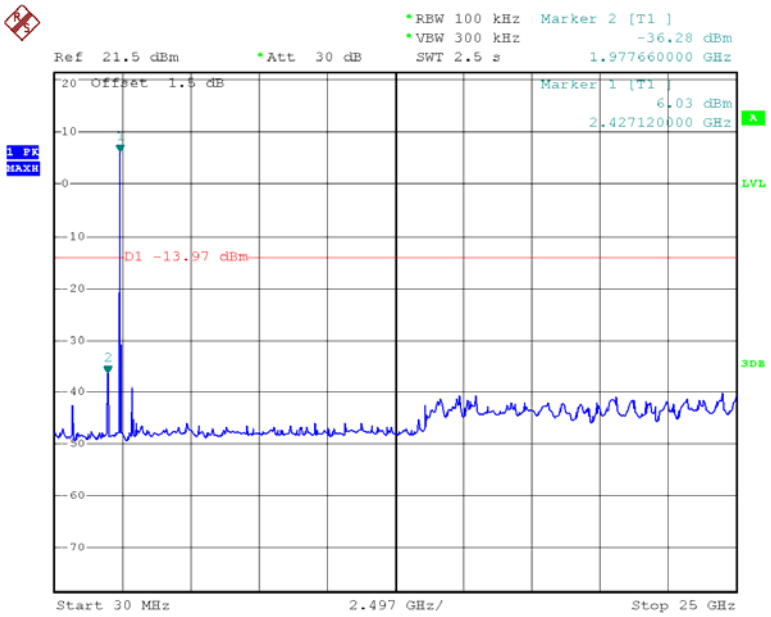
Date: 14.MAR.2013 16:54:01

802.11b Middle Channel



Date: 14.MAR.2013 16:55:57

802.11b High Channel



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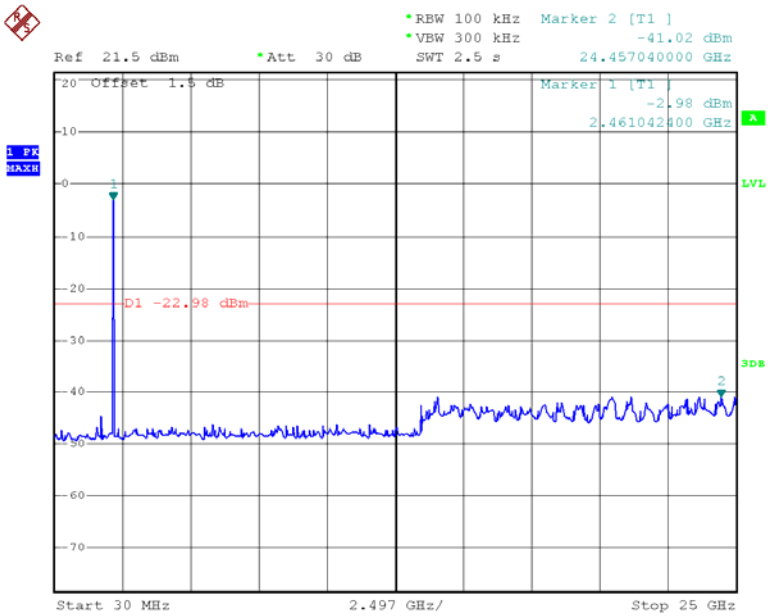
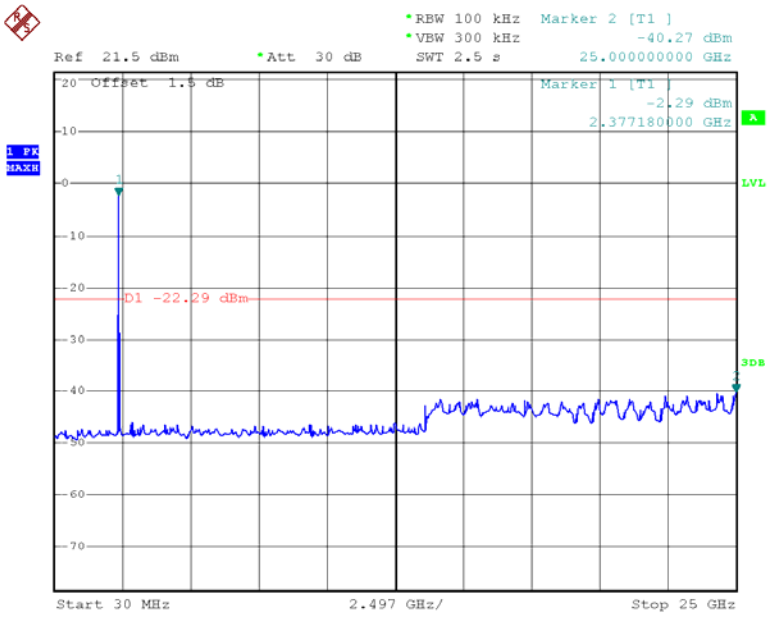
802.11g Low Channel



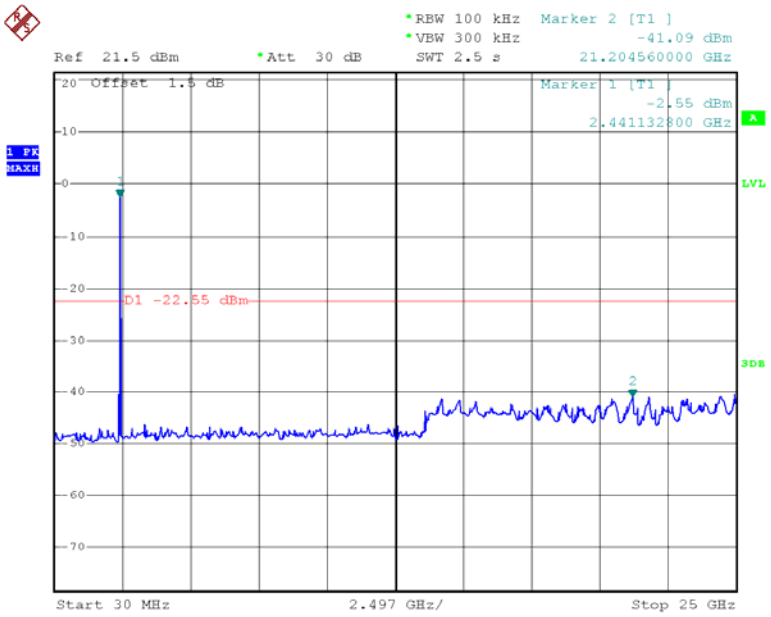
Date: 15.MAR.2013 09:35:38

802.11g Middle Channel



Date: 15.MAR.2013 09:28:20

802.11g High Channel



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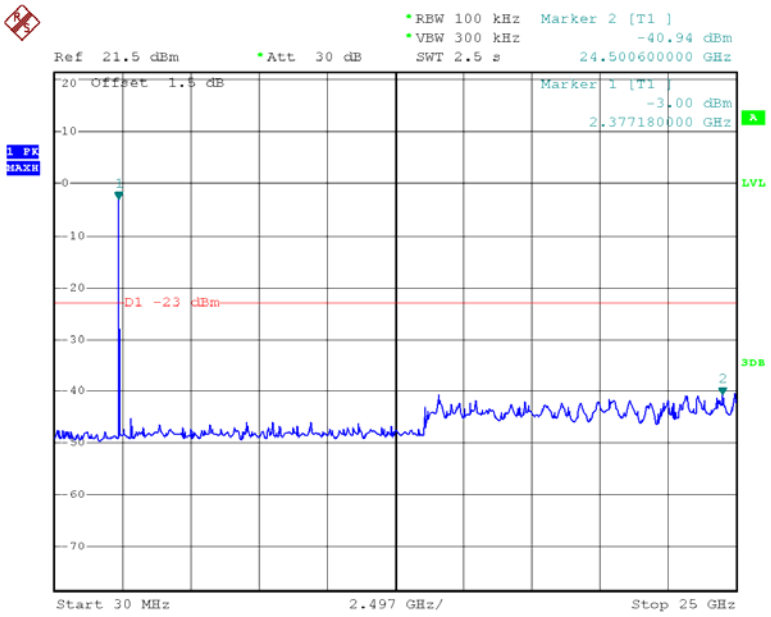
802.11n20 Low Channel



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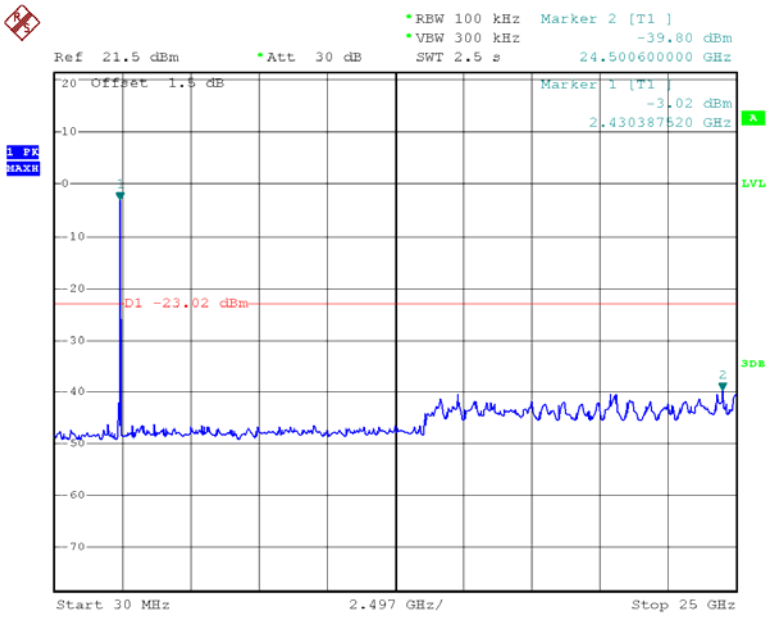
802.11n20 Middle Channel



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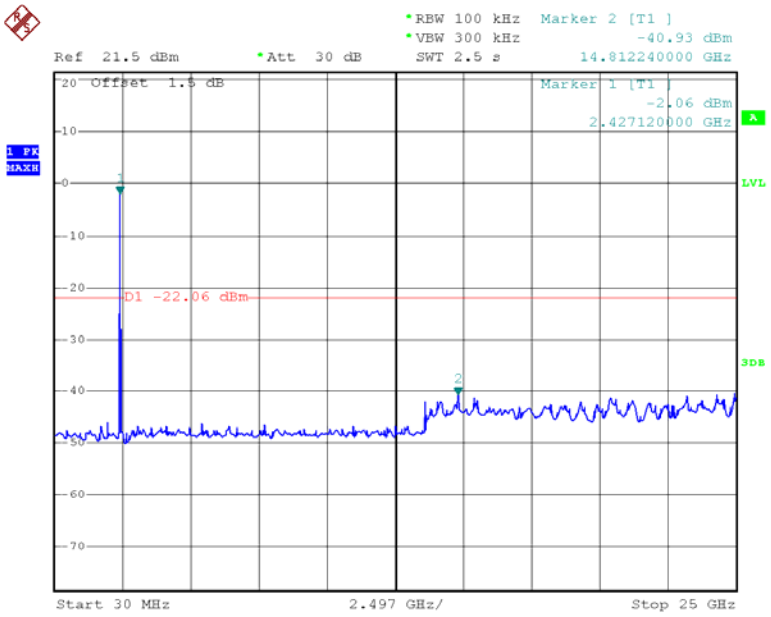
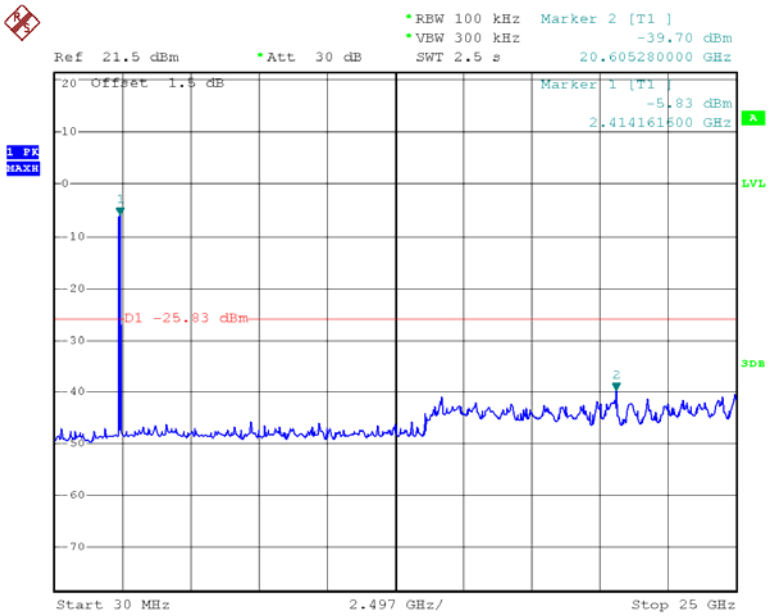
802.11n20 High Channel



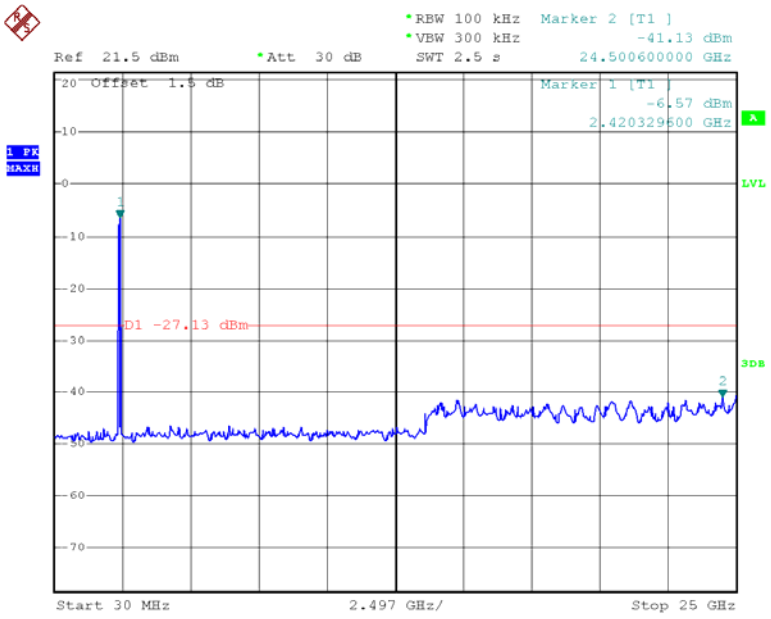
Date: 15.MAR.2013 09:55:57

802.11n40 Low Channel



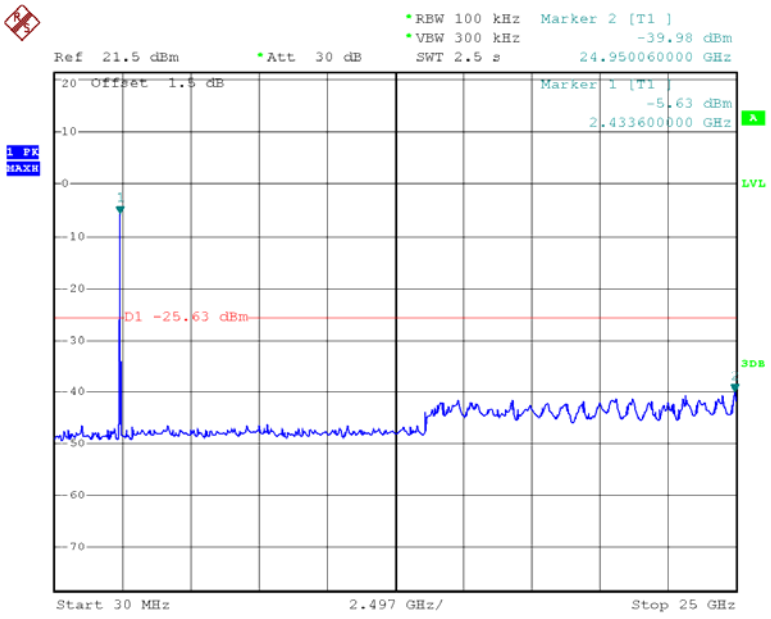
Date: 15.MAR.2013 10:01:03

802.11n40 Middle Channel



Date: 15.MAR.2013 10:16:03

802.11n40 High Channel



Date: 15.MAR.2013 10:18:08

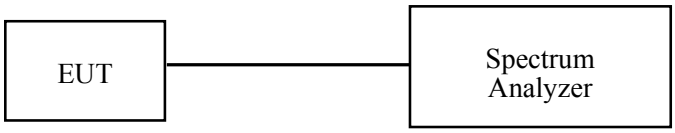
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.3 ~ 28.1° C
Relative Humidity:	43 ~47 %
ATM Pressure:	101.4 ~101.6 kPa

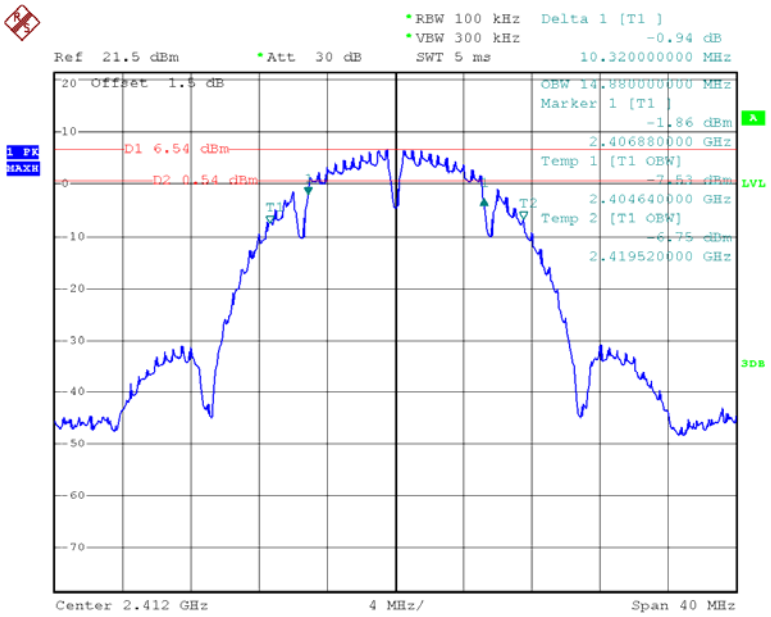
The testing was performed by Ares Liu from 2013-03-14 to 2013-03-15.

Test Result: Pass.

Please refer to the following tables and plots.

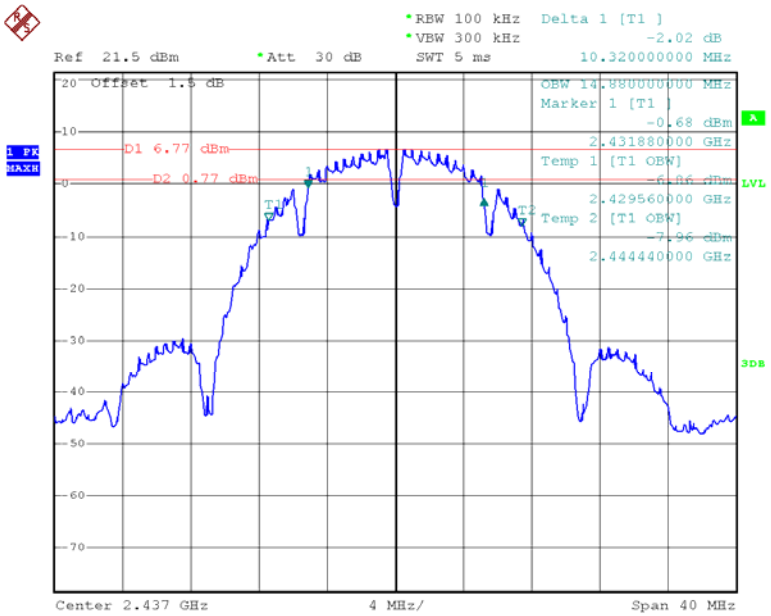
Channel	Frequency	6 dB Bandwidth	Limit
	(MHz)	(MHz)	(kHz)
802.11b mode			
Low	2412	10.32	>500
Middle	2437	10.32	>500
High	2462	10.32	>500
802.11g mode			
Low	2412	16.80	>500
Middle	2437	16.80	>500
High	2462	16.80	>500
802.11n20 mode			
Low	2412	17.92	>500
Middle	2437	17.92	>500
High	2462	17.92	>500
802.11n40 mode			
Low	2422	36.80	>500
Middle	2437	36.80	>500
High	2452	36.80	>500

802.11b Low Channel



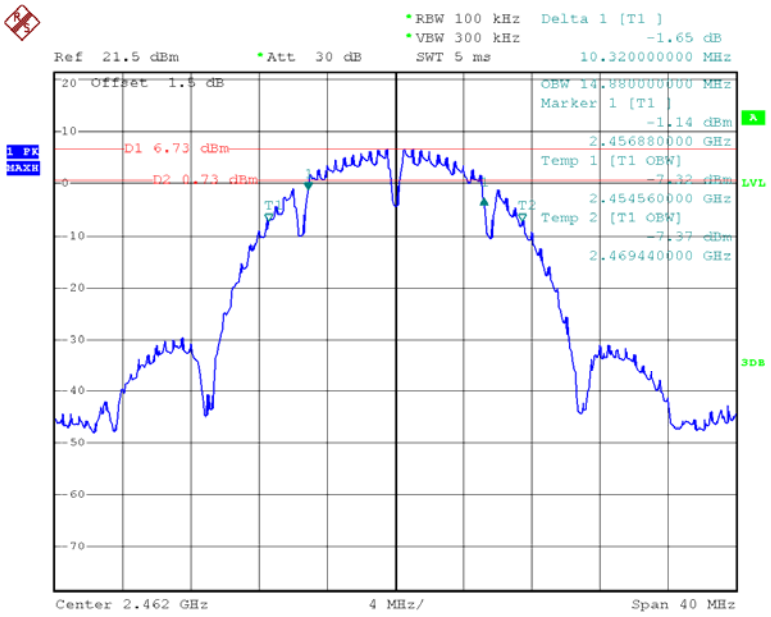
Date: 14.MAR.2013 16:46:37

802.11b Middle Channel



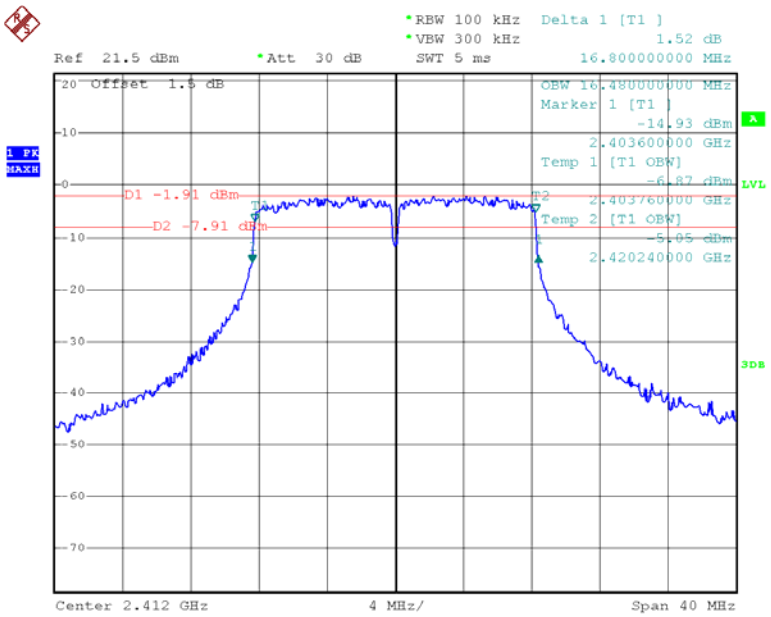
Date: 14.MAR.2013 16:43:42

802.11b High Channel



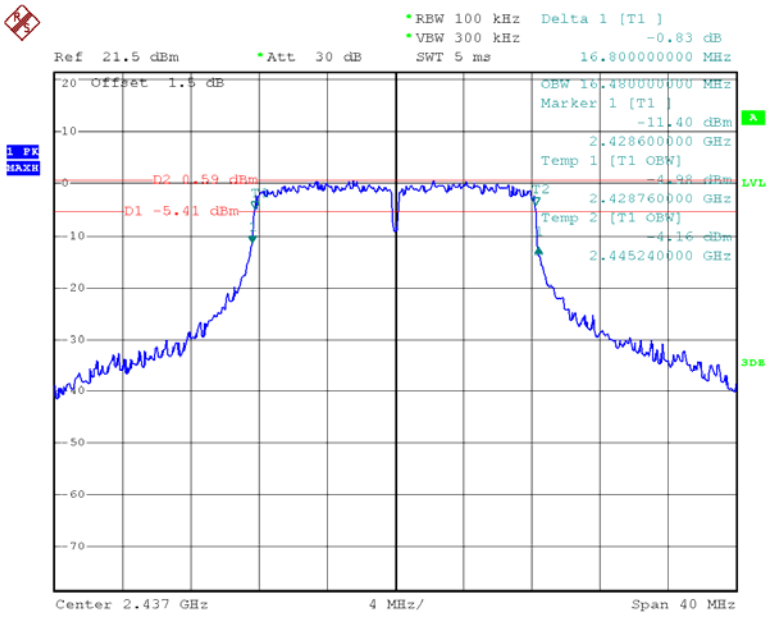
Date: 14.MAR.2013 16:57:11

802.11g Low Channel



Date: 15.MAR.2013 09:25:37

802.11g Middle Channel



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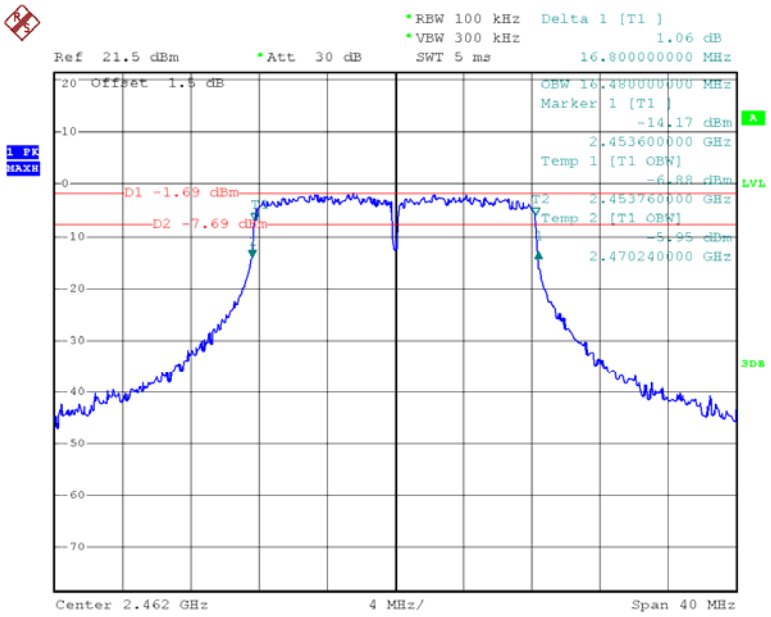
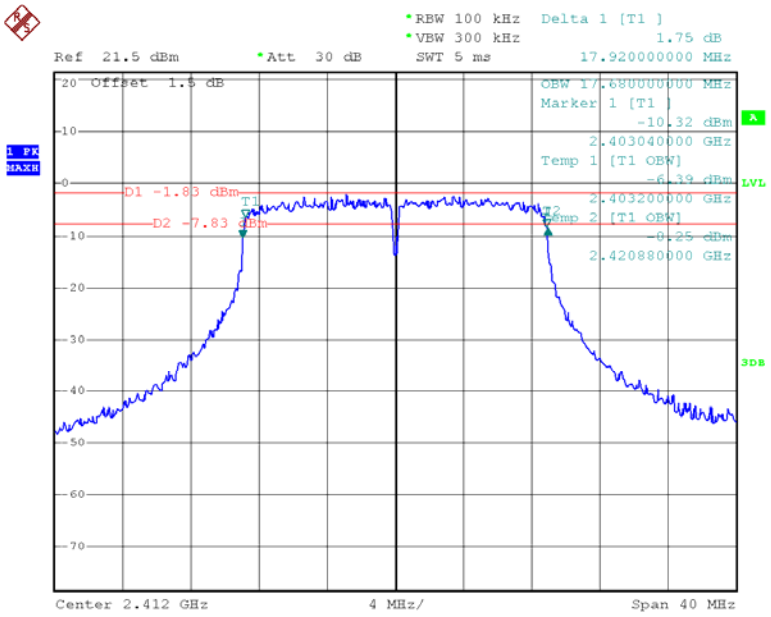
802.11g High Channel



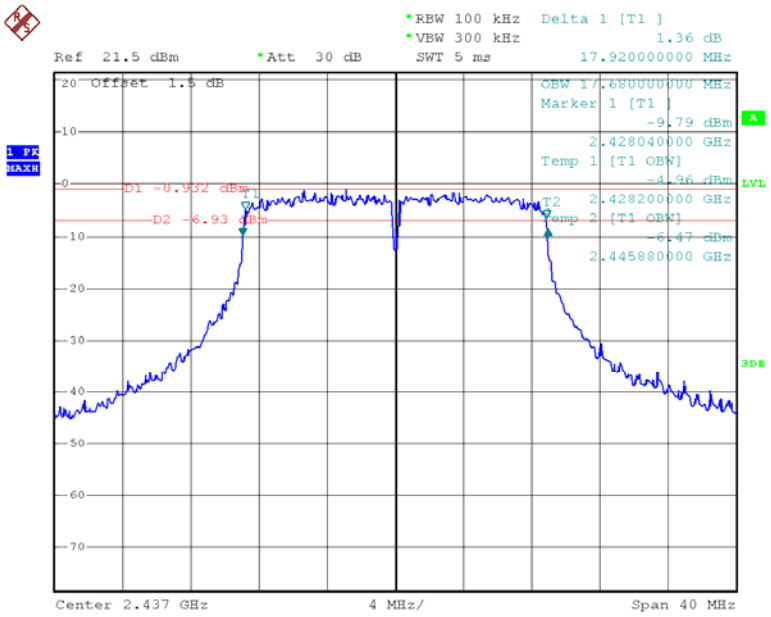
Date: 15.MAR.2013 09:33:45

802.11n20 Low Channel



Date: 15.MAR.2013 09:43:10

802.11n20 Middle Channel



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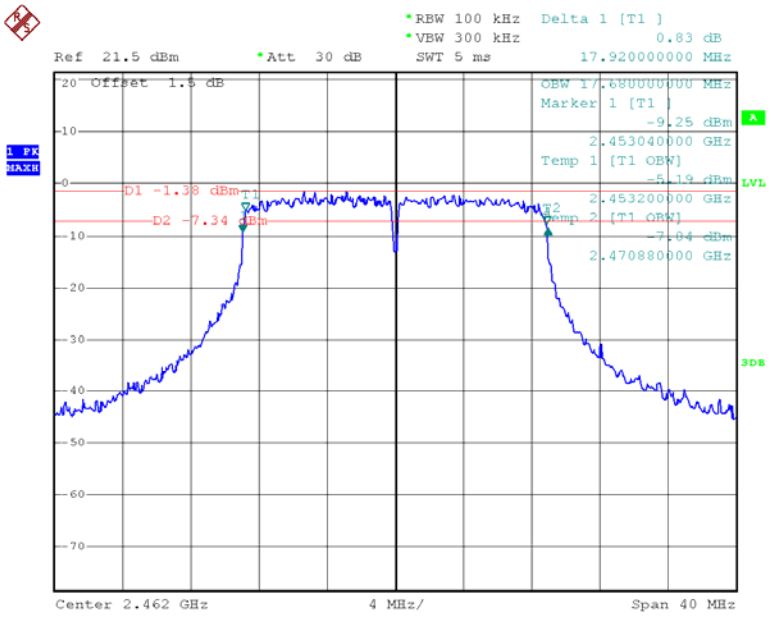
802.11n20 High Channel



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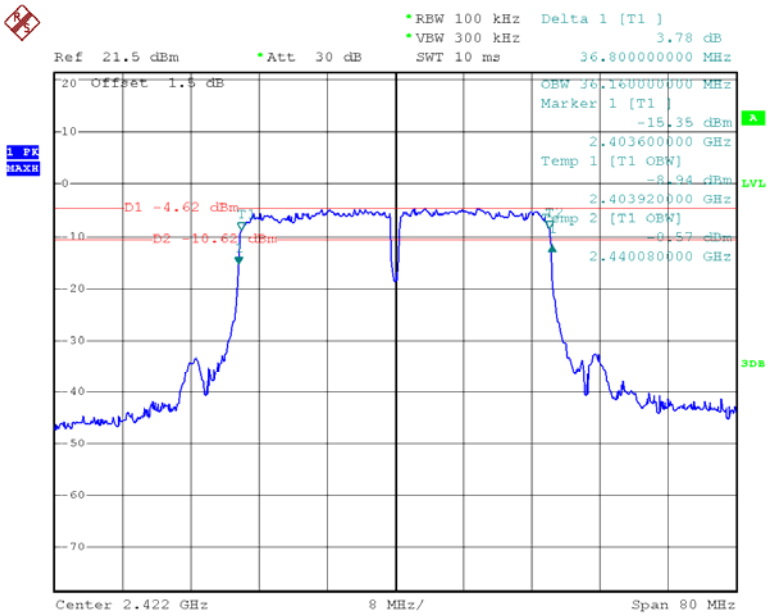
802.11n40 Low Channel



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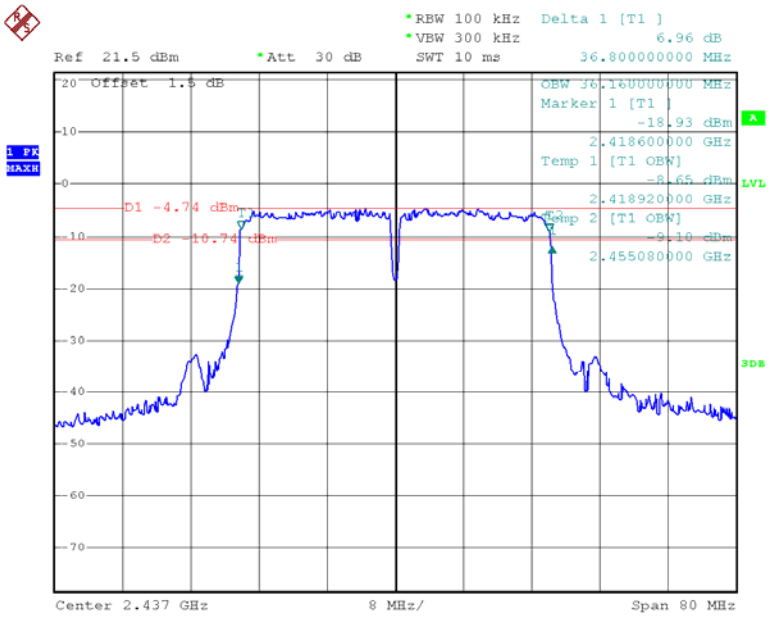
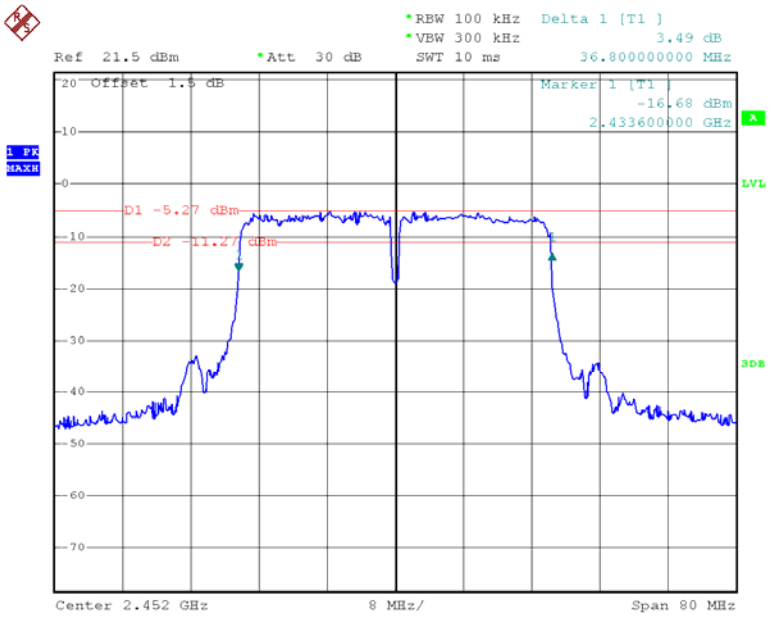
802.11n40 Middle Channel



Date: 15.MAR.2013 10:14:04

802.11n40 High Channel



Date: 15.MAR.2013 10:17:23

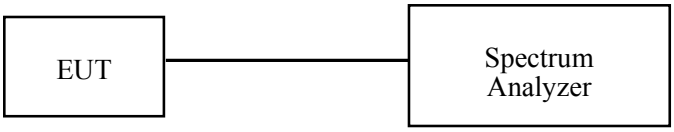
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to FCC §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 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.8° C
Relative Humidity:	57 %
ATM Pressure:	100.8 kPa

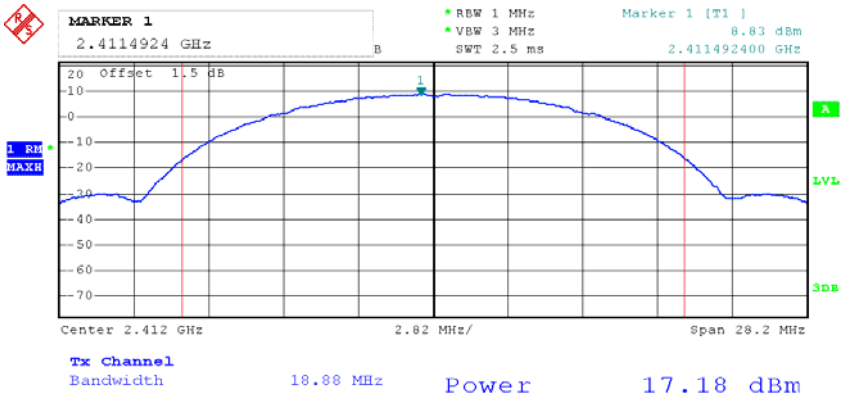
The testing was performed by Ares Liu on 2013-03-21.

Test Mode: Transmitting

Channel	Frequency	Conducted Output Power	Limit	Result
	(MHz)	(dBm)	(dBm)	
802.11b mode				
Low	2412	17.18	30	PASS
Middle	2437	17.31	30	PASS
High	2462	17.43	30	PASS
802.11g mode				
Low	2412	14.41	30	PASS
Middle	2437	14.50	30	PASS
High	2462	14.48	30	PASS
802.11n20 mode				
Low	2412	13.77	30	PASS
Middle	2437	13.76	30	PASS
High	2462	13.47	30	PASS
802.11n40 mode				
Low	2422	13.27	30	PASS
Middle	2437	13.43	30	PASS
High	2452	13.21	30	PASS

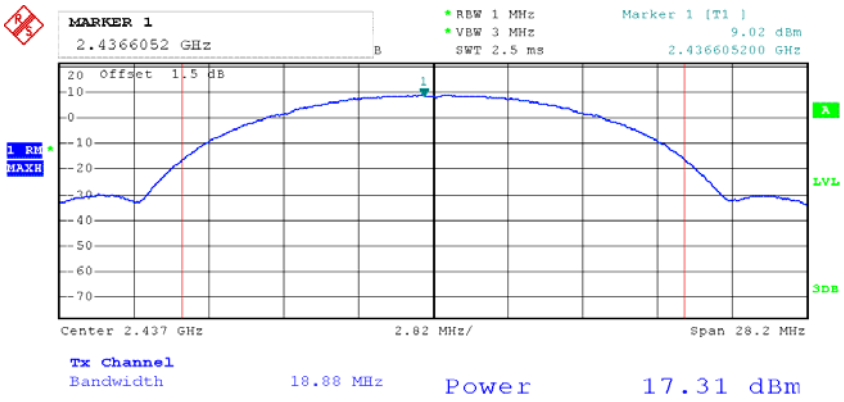
Please refer to the following plots

802.11b RF Output Power, Low Channel



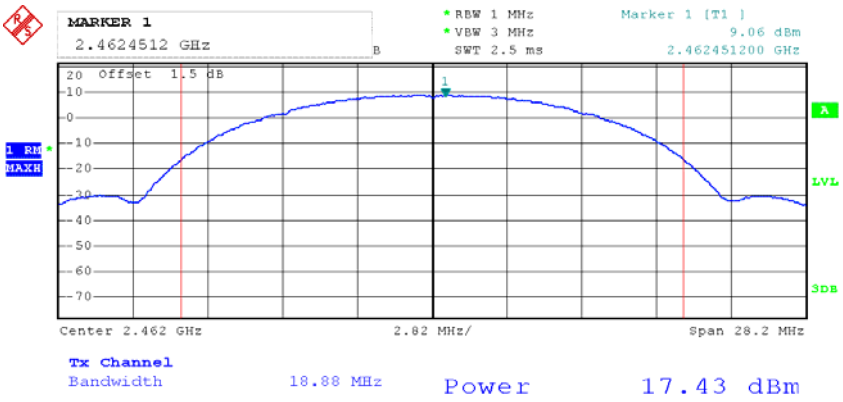
Date: 21.MAR.2013 10:32:00

802.11b RF Output Power, Middle Channel



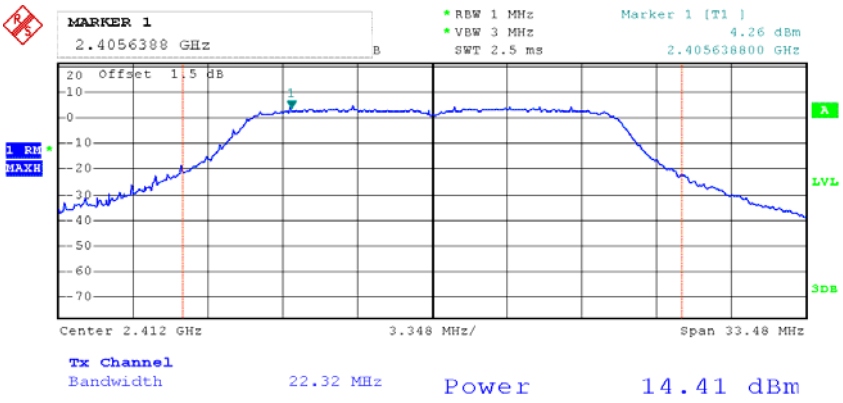
Date: 21.MAR.2013 10:33:14

802.11b RF Output Power, High Channel



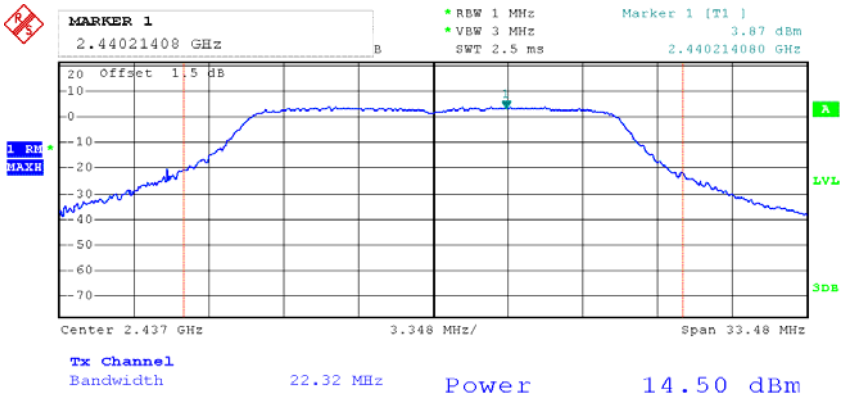
Date: 21.MAR.2013 10:33:58

802.11g RF Output Power, Low Channel



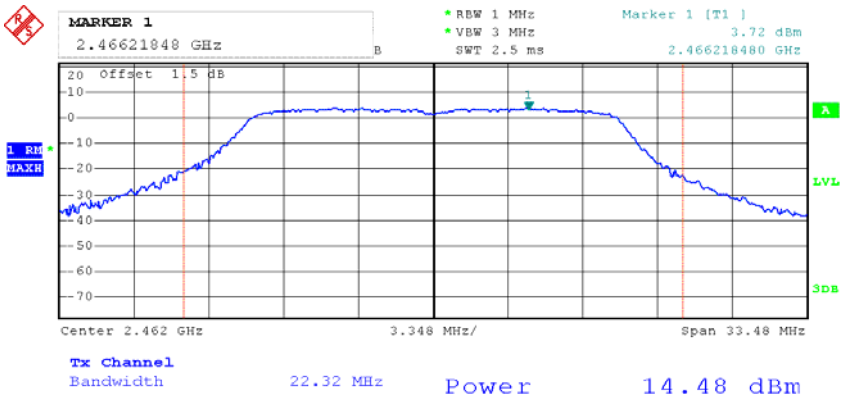
Date: 21.MAR.2013 10:39:23

802.11g RF Output Power, Middle Channel



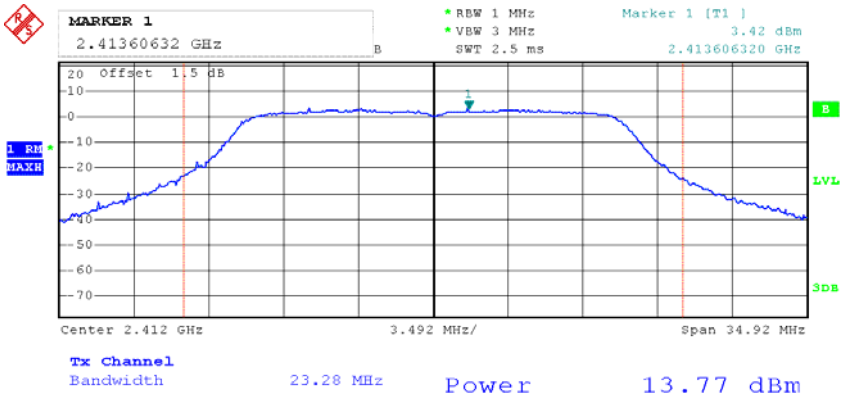
Date: 21.MAR.2013 10:39:52

802.11g RF Output Power, High Channel



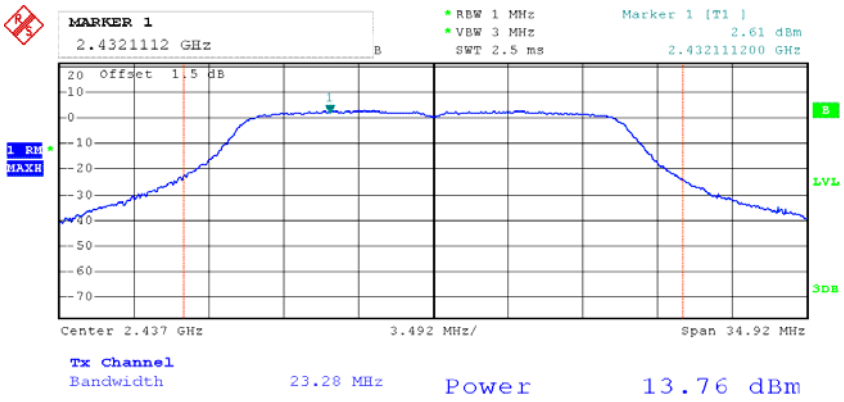
Date: 21.MAR.2013 10:40:15

802.11n20 RF Output Power, Low Channel



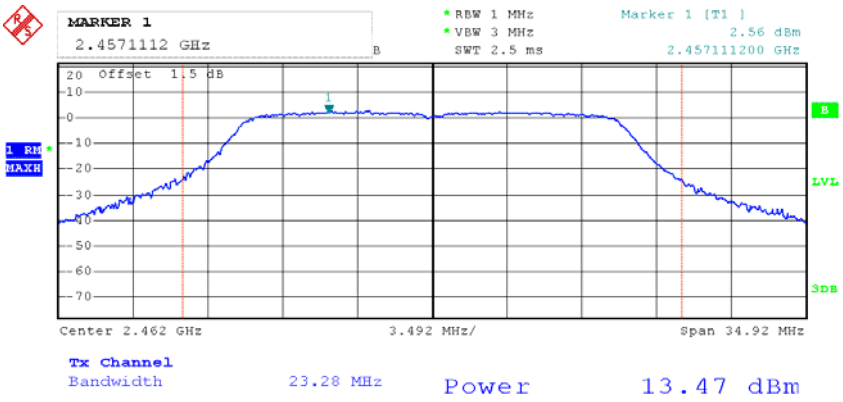
Date: 21.MAR.2013 12:43:21

802.11n20 RF Output Power, Middle Channel



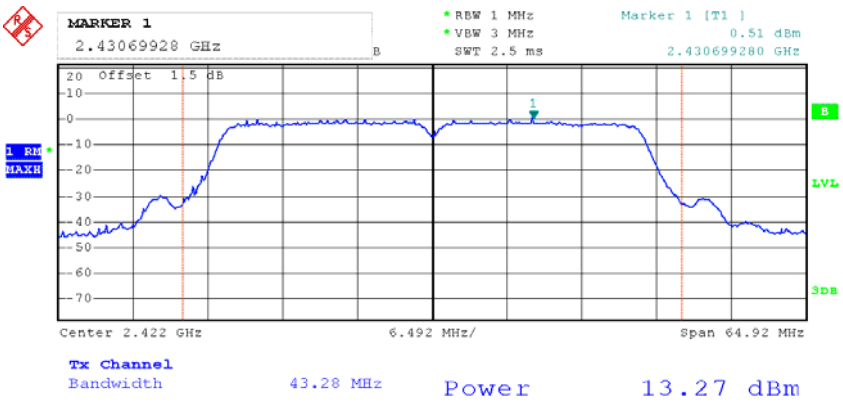
Date: 21.MAR.2013 12:42:49

802.11n20 RF Output Power, High Channel



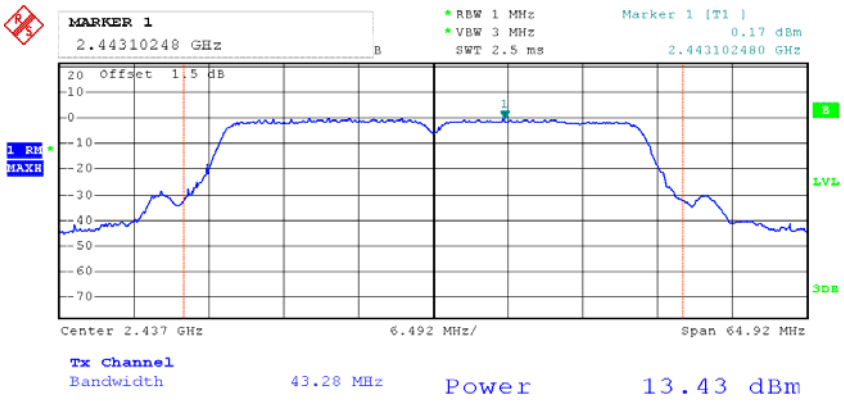
Date: 21.MAR.2013 12:43:47

802.11n40 RF Output Power, Low Channel



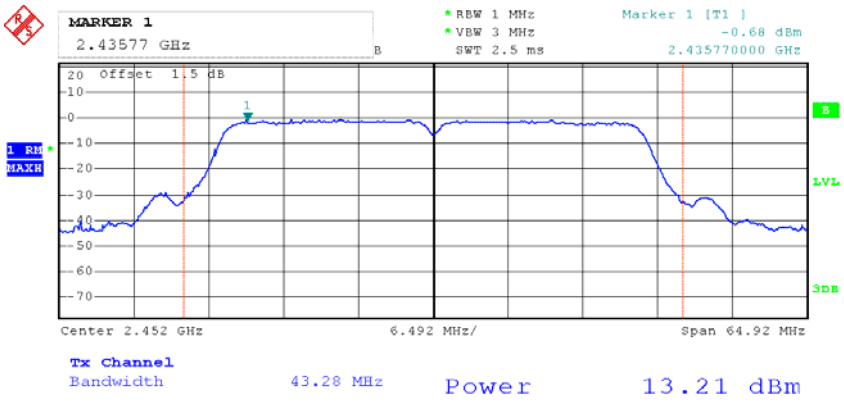
Date: 21.MAR.2013 12:48:17

802.11n40 RF Output Power, Middle Channel



Date: 21.MAR.2013 12:48:46

802.11n40 RF Output Power, High Channel



Date: 21.MAR.2013 12:49:35

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 Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

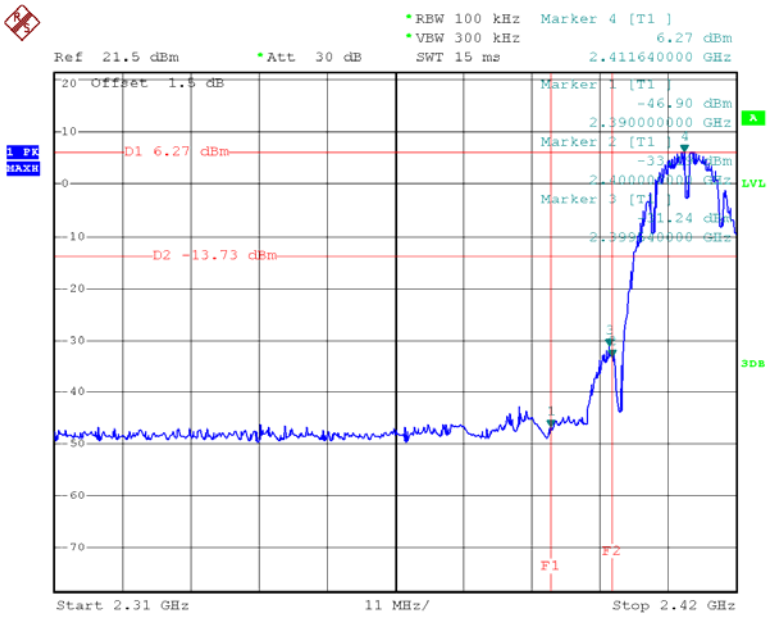
Temperature:	27.3 ~ 28.1° C
Relative Humidity:	43 ~47 %
ATM Pressure:	101.4 ~ 101.6 kPa

The testing was performed by Ares Liu from 2013-03-14 to 2013-03-15.

Test Result: *Compliance*

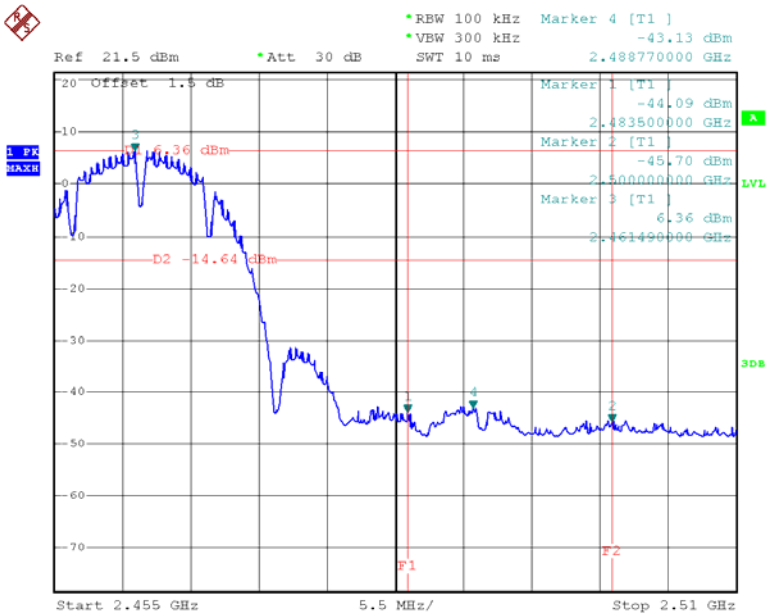
Please refer to following plots.

802.11b: Band Edge, Left Side



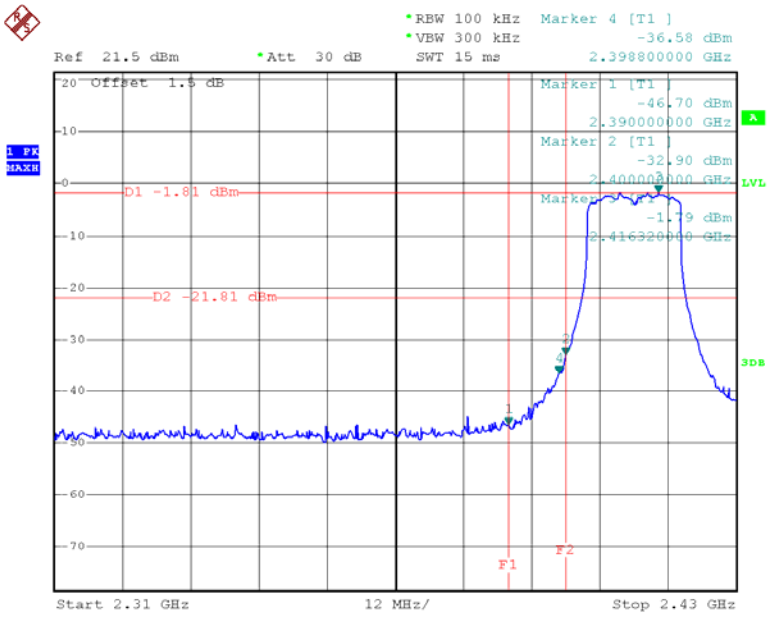
Date: 14.MAR.2013 16:55:12

802.11b: Band Edge, Right Side



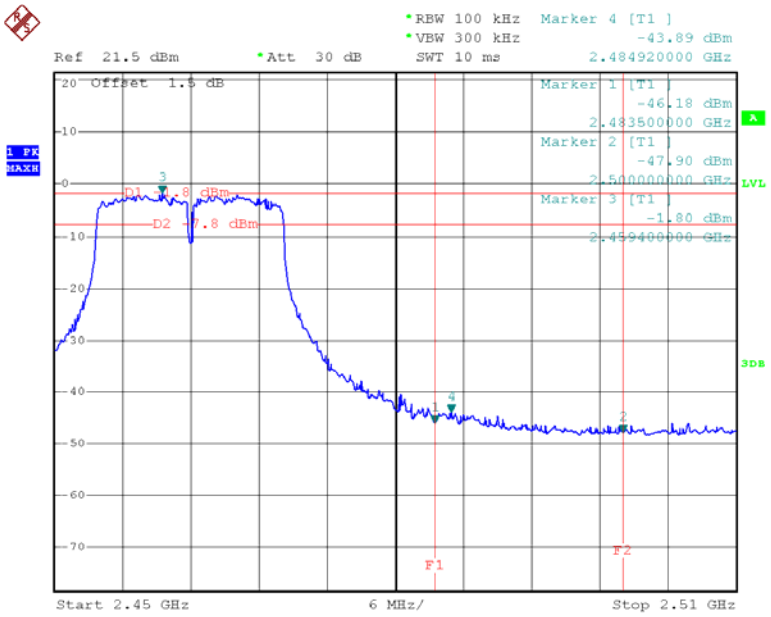
Date: 14.MAR.2013 17:00:29

802.11g: Band Edge, Left Side



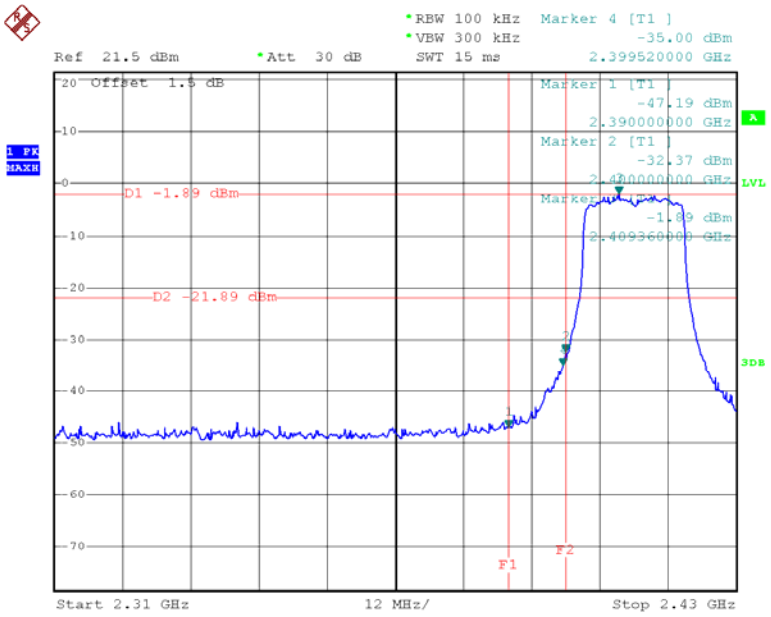
Date: 15.MAR.2013 09:29:13

802.11g: Band Edge, Right Side



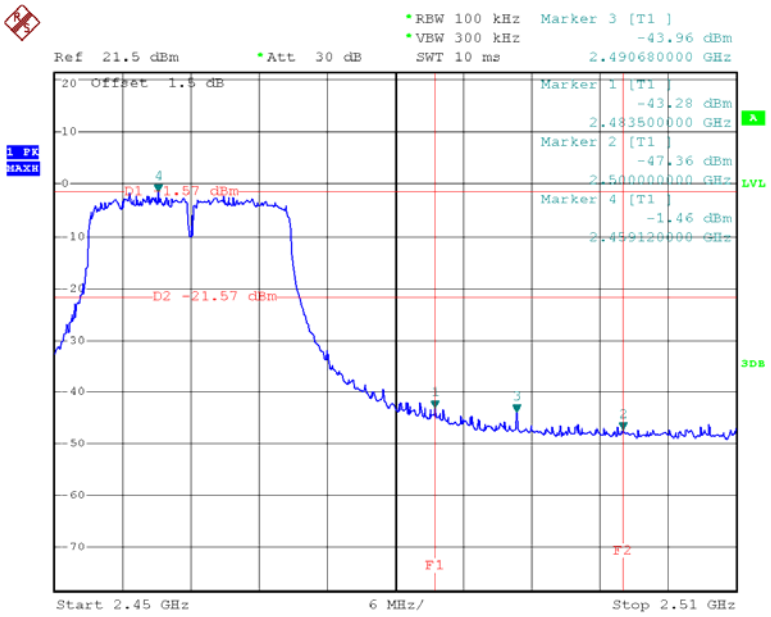
Date: 15.MAR.2013 09:39:30

802.11n20 Band Edge, Left Side



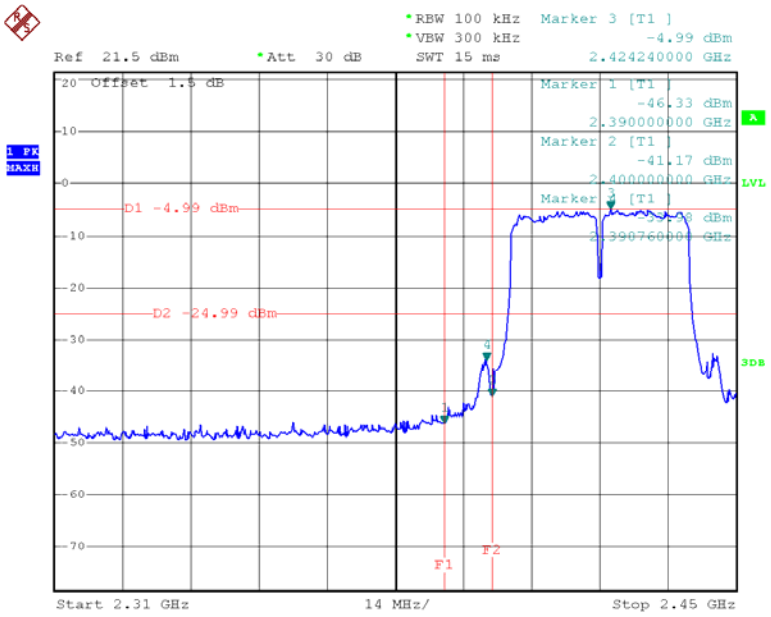
Date: 15.MAR.2013 09:46:22

802.11n20 Band Edge, Right Side



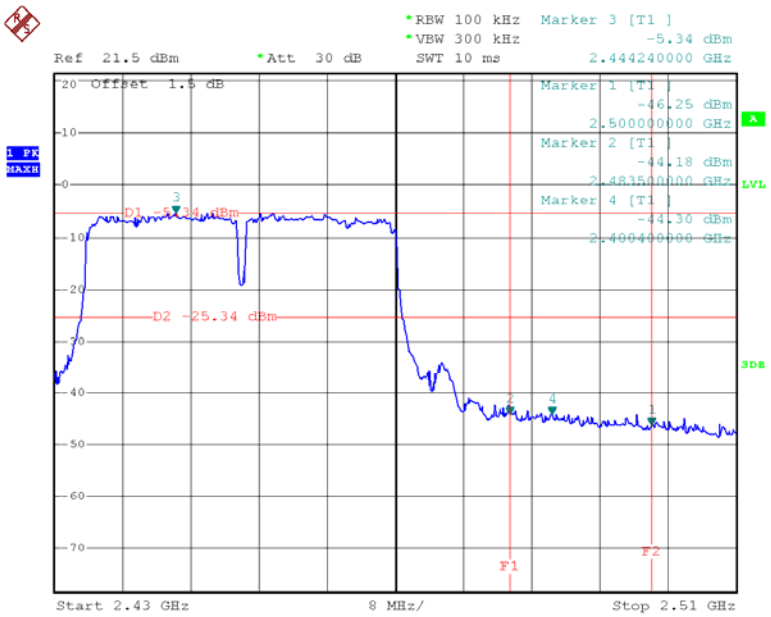
Date: 15.MAR.2013 09:57:08

802.11n40 Band Edge, Left Side



Date: 15.MAR.2013 10:02:25

802.11n40 Band Edge, Right Side



Date: 15.MAR.2013 10:19:36

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 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. According to KDB 558074 D01 DTS Meas Guidance v02, set the RBW = 3 kHz, VBW = 30 kHz, Set the span to 1.5 times the DTS channel bandwidth.
4. Use the peak marker function to determine the maximum power level in any 3 kHz band segment within the fundamental EBW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	27.8° C
Relative Humidity:	60 %
ATM Pressure:	100.5kPa

The testing was performed by Ares Liu from 2013-03-14 to 2013-03-15.

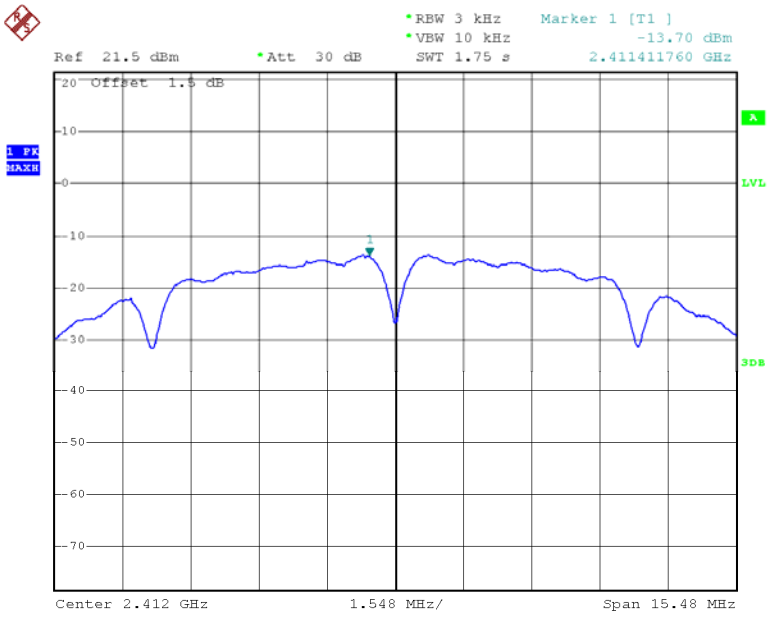
Test Mode: Transmitting

Test Result: Pass

Channel	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b mode			
Low	-13.70	8	PASS
Middle	-13.29	8	PASS
High	-13.84	8	PASS
802.11g mode			
Low	-15.87	8	PASS
Middle	-15.83	8	PASS
High	-16.24	8	PASS
chain 0: 802.11n20 mode			
Low	-16.61	8	PASS
Middle	-16.88	8	PASS
High	-16.69	8	PASS
802.11n40 mode			
Low	-18.07	8	PASS
Middle	-19.50	8	PASS
High	-18.24	8	PASS

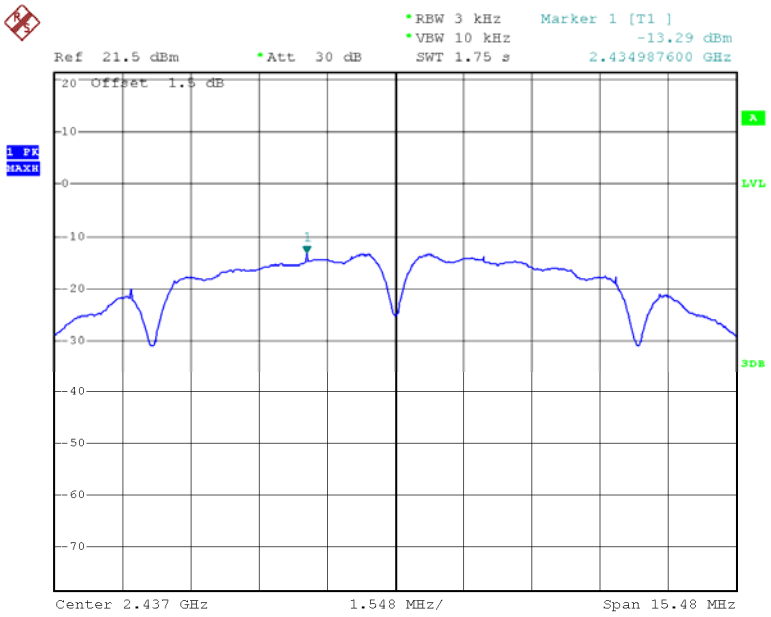
Please refer to the following plots

Power Spectral Density, 802.11b Low Channel



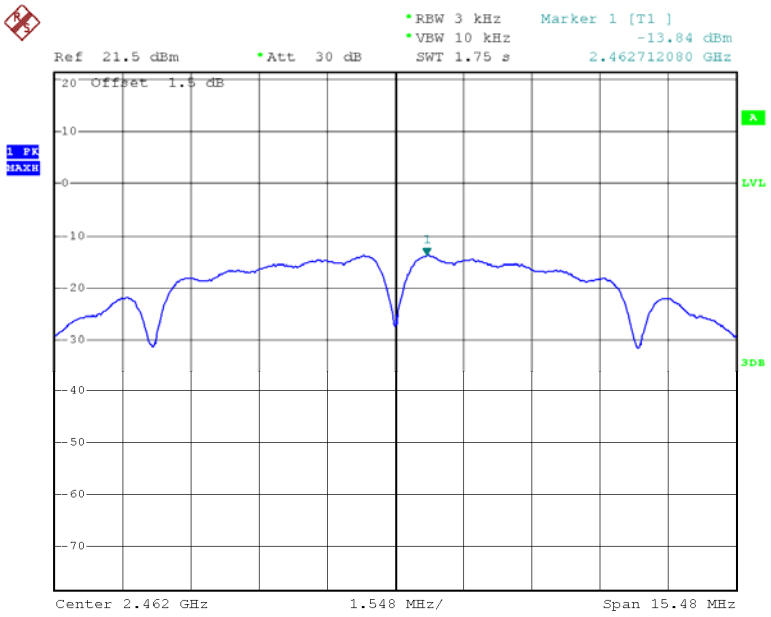
Date: 14.MAR.2013 16:39:39

Power Spectral Density, 802.11b Middle Channel



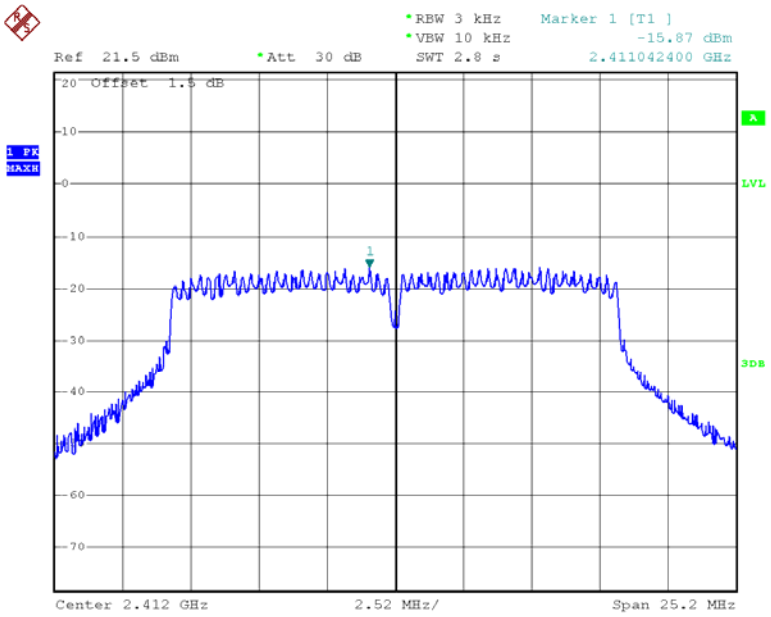
Date: 14.MAR.2013 16:44:14

Power Spectral Density, 802.11b High Channel



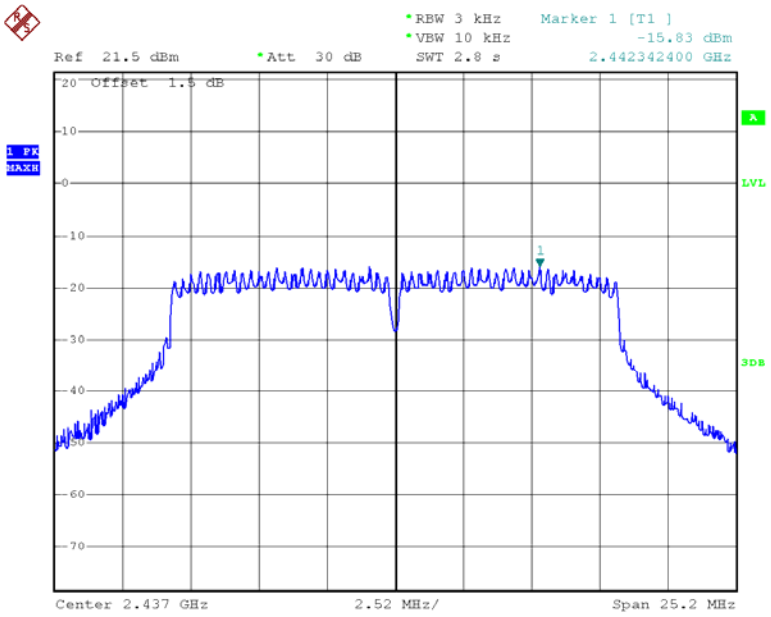
Date: 14.MAR.2013 16:58:13

Power Spectral Density, 802.11g Low Channel



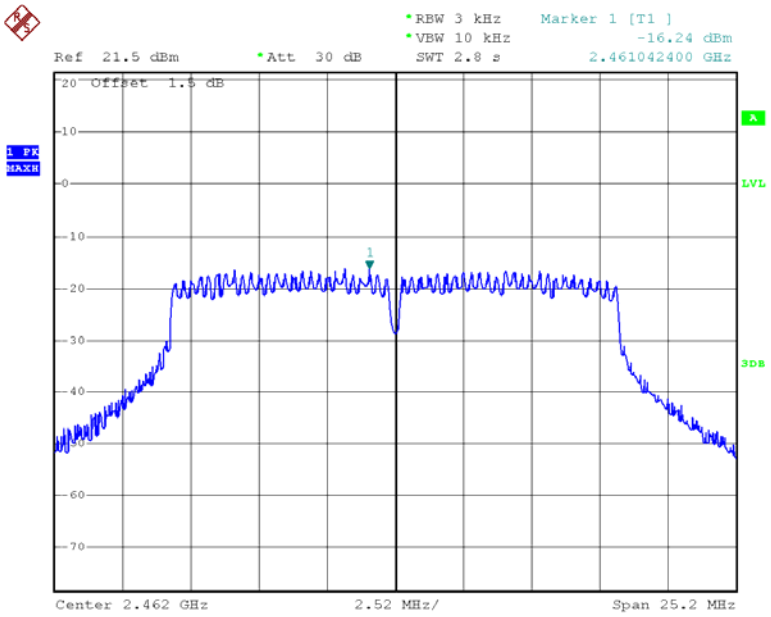
Date: 15.MAR.2013 09:27:38

Power Spectral Density, 802.11g Middle Channel



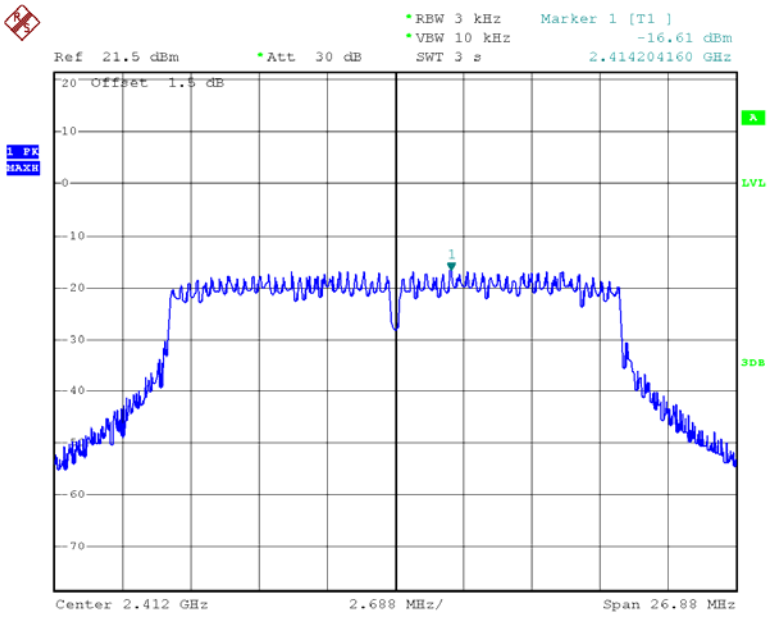
Date: 15.MAR.2013 09:31:52

Power Spectral Density, 802.11g High Channel



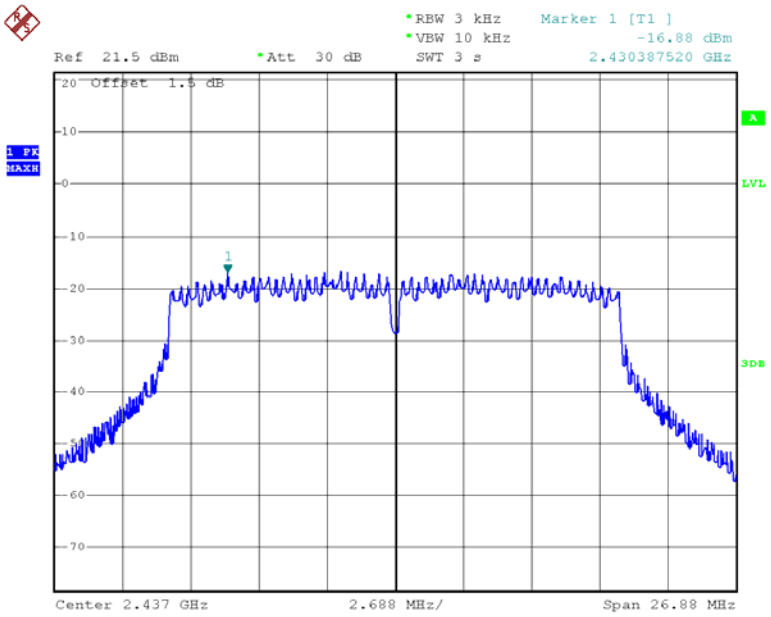
Date: 15.MAR.2013 09:35:01

Power Spectral Density, 802.11n20 Low Channel



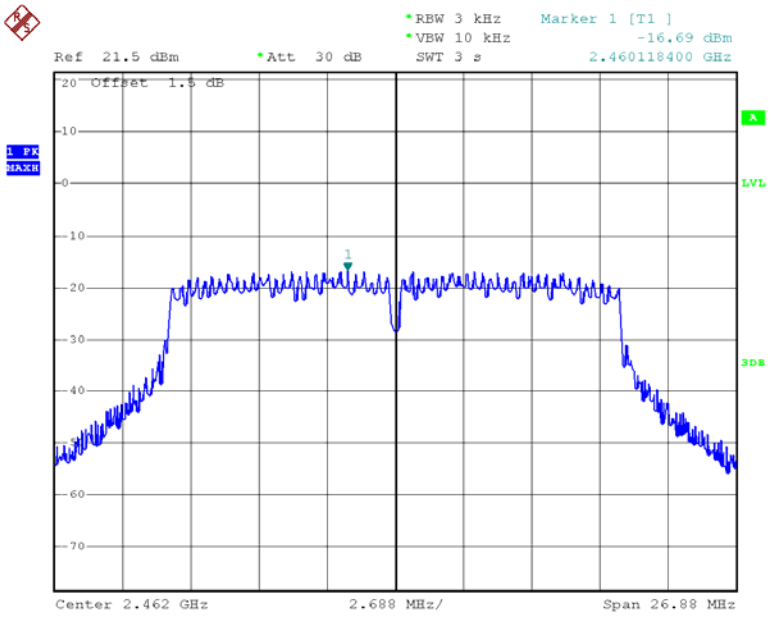
Date: 15.MAR.2013 09:44:39

Power Spectral Density, 802.11n20 Middle Channel



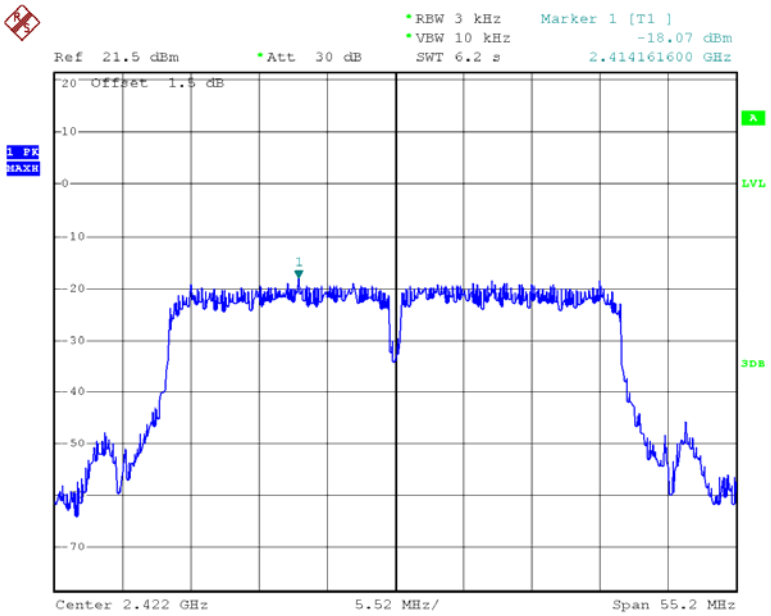
Date: 15.MAR.2013 09:49:26

Power Spectral Density, 802.11n20 High Channel



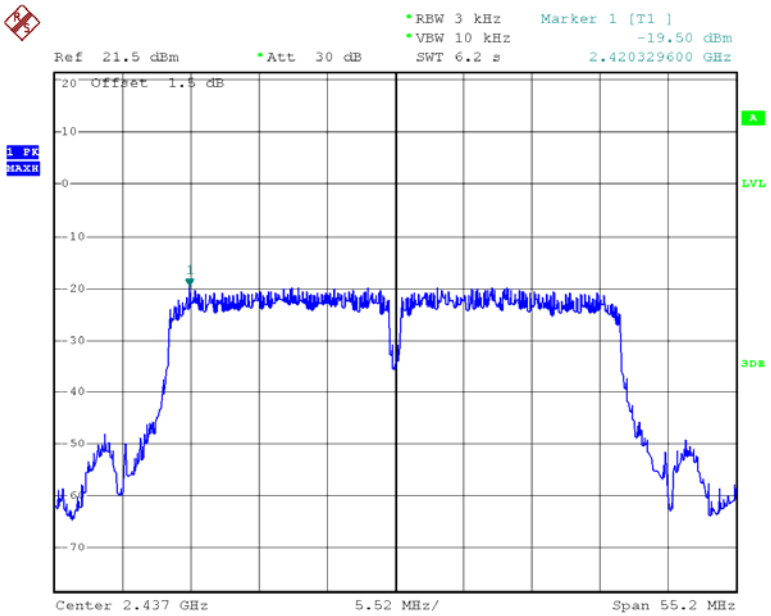
Date: 15.MAR.2013 09:55:24

Power Spectral Density, 802.11n40 Low Channel



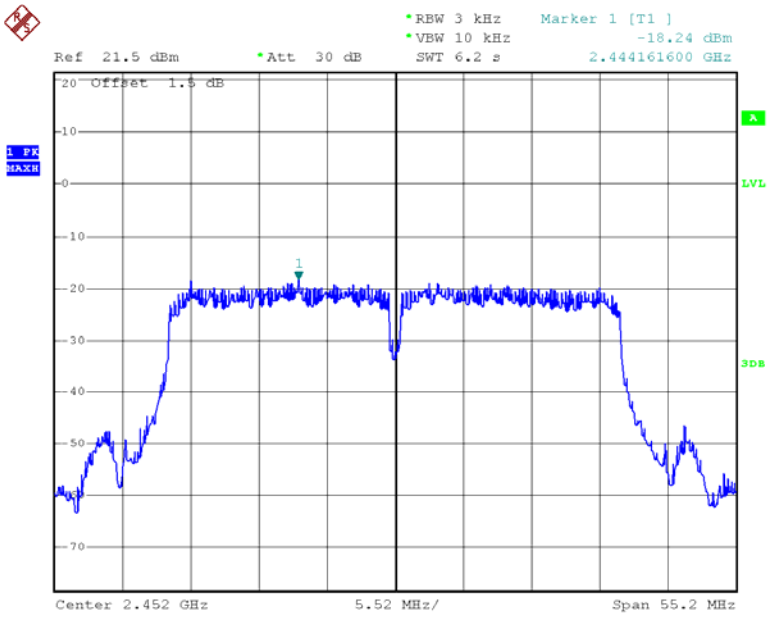
Date: 15.MAR.2013 10:00:30

Power Spectral Density, 802.11n40 Middle Channel



Date: 15.MAR.2013 10:15:27

Power Spectral Density, 802.11n40 High Channel



Date: 15.MAR.2013 10:20:16

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