FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Active Development Co., Ltd.

No. 3, Alley 15, Lane 133, Jungyang Rd. Shindian Dist., New Taipei City 231, Taiwan

FCC ID: 2AABAADC000066

Report Type:	**Product Type:**
Original Report	Activemedia Smart Box 66

Test Engineer:	Candy Li
Report Number:	RSZ130515012-00A
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Reviewed By:	Sula Huang RF 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

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Active Development Co., Ltd.'s* product, model number: *iMP-66 (FCC ID: 2AABAADC000066)* or the "EUT" as referred to in this report was a *Activemedia Smart box 66,* which was measured approximately: 9.2 cm (L) x 3.2 cm (W) x 1.0 cm (H), rated with input voltage: DC 5V adapter.

Adapter Information:
Model: TPA-010510UU
Input: AC 100-240V, 50/60Hz, 0.3A
Output: DC 5V, 1000mA

** All measurement and test data in this report was gathered from production sample serial number: 1305079 (Assigned by BACL, Shenzhen). The EUT was received on 2013-05-15.*

Objective

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

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

Related Submittal(s)/Grant(s)

No related submittal(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 at 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.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For 802.11b, 802.11g mode and 802.11n-HT20 mode, 11 channels are provided to testing:

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

EUT Exercise Software

Run CMD.exe and input relative command which provided by applicant.

The test was performed under:
802.11b: Data rate: 1 Mbps.
802.11g: Data rate: 6 Mbps.
802.11n-HT20: Data rate: 6.5 Mbps.

Equipment Modifications

No modification was made to the unit tested.

Support Equipment List and Details

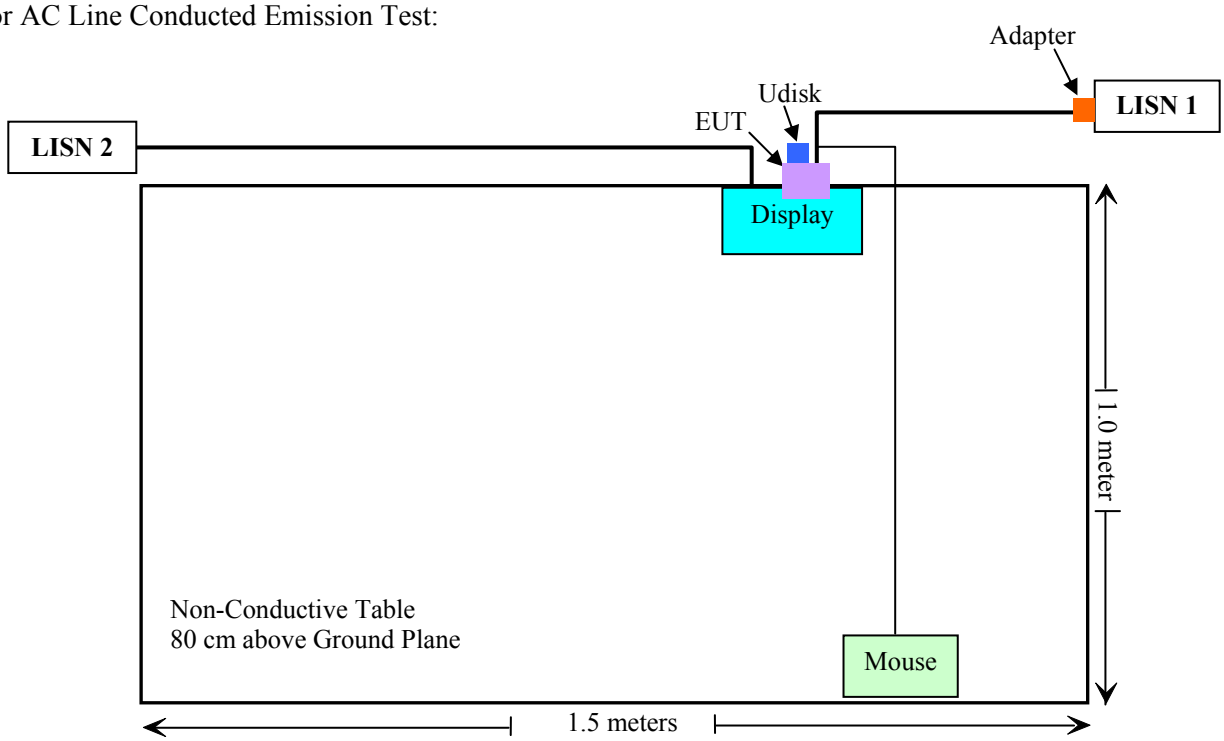
Manufacturer	Description	Model	Serial Number
PHILIPS	Display	PM5418	LO670816
Kingston	Udisk	4 GB	/
DELL	PC	VOSTRO 220S	127BP2X
DELL	Keyboard	L100	CNORH656658907BL05DC
DELL	Mouse	MOC5UO	G1900NKD
DELL	LCD Monitor	E178WFPC	CN-OWY564-64180-7C4-2SQH

External I/O Cable

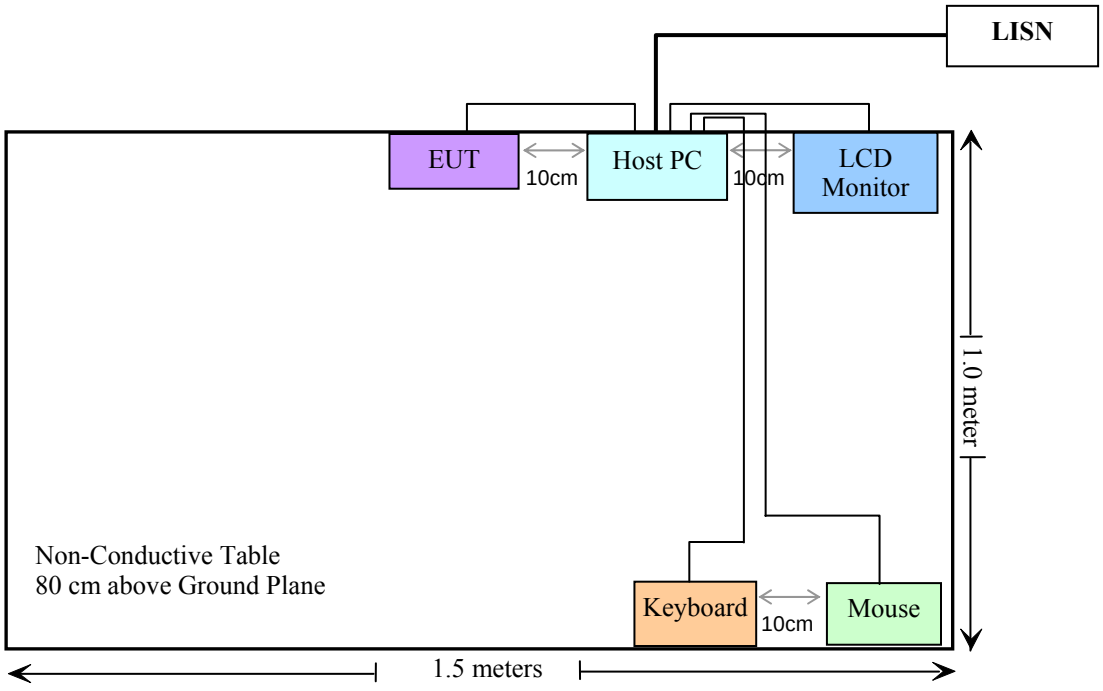
Cable Description	Length (m)	From	To
Shielding Detachable USB Cable	1.5	EUT	Mouse
Shielding Detachable USB Cable	1.0	EUT	Adapter
Shielded Detachable USB Cable	1.5	Host PC	Mouse
Shielded Detachable K/B Cable	1.5	Host PC	Keyboard
Shielded Detachable VGA Cable	1.5	Host PC	LCD Monitor
Shielded Detachable USB Cable	1.0	EUT	Host PC

Block Diagram of Test Setup

For AC Line Conducted Emission Test:



For spurious Emissions Test:



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/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

$$S = \frac{PG}{4\pi R^2}$$

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, 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	0	1.0	17.99	62.95	20	0.0125	1.0
802.11g	2462	0	1.0	17.74	59.43	20	0.0118	1.0
802.11n-HT20	2462	0	1.0	16.38	43.45	20	0.0086	1.0

Result: The device meets FCC MPE at 20 cm distance.

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 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has an integrated antenna arrangement, which was permanently attached and the gain was 0 dBi, fulfill the requirement of this section. Please refer to the internal photos.

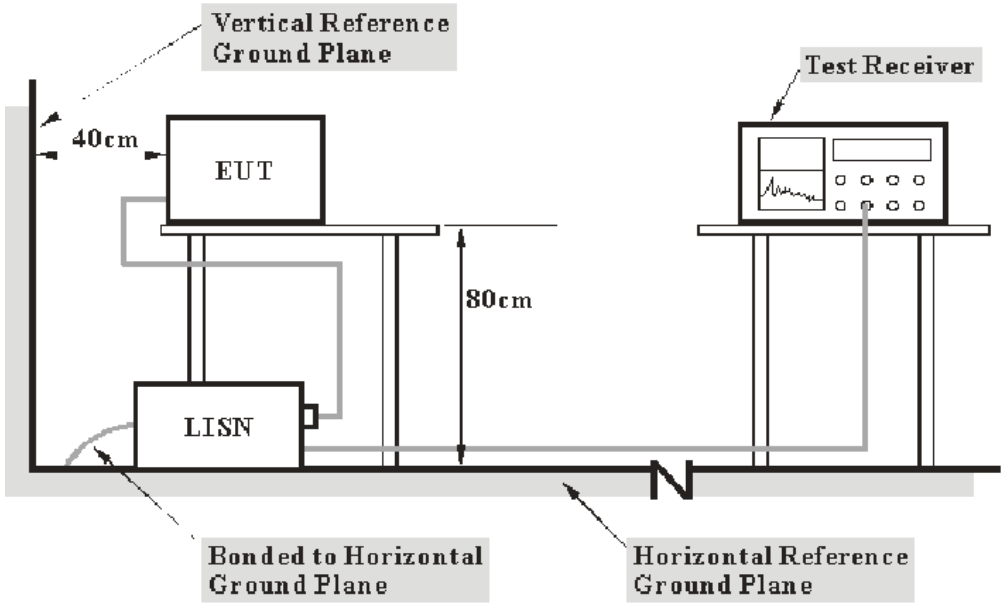
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

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 relevant peripherals was 10 cm.

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

EMI Test Receiver Setup

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

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

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

Test Procedure

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

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-08
Rohde & Schwarz	1st LISN	ESH2-Z5	892107/021	2012-08-22	2013-08-22
COM-POWER	2nd LISN	LI-200	12208	NCR	NCR
BACL	CE Test software	BACL-CE	V1.0	-	-

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to 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 Part 15.207, with the worst margin reading of:

1.1 dB at **0.491640 MHz** in the **Neutral** conducted mode

Test Data

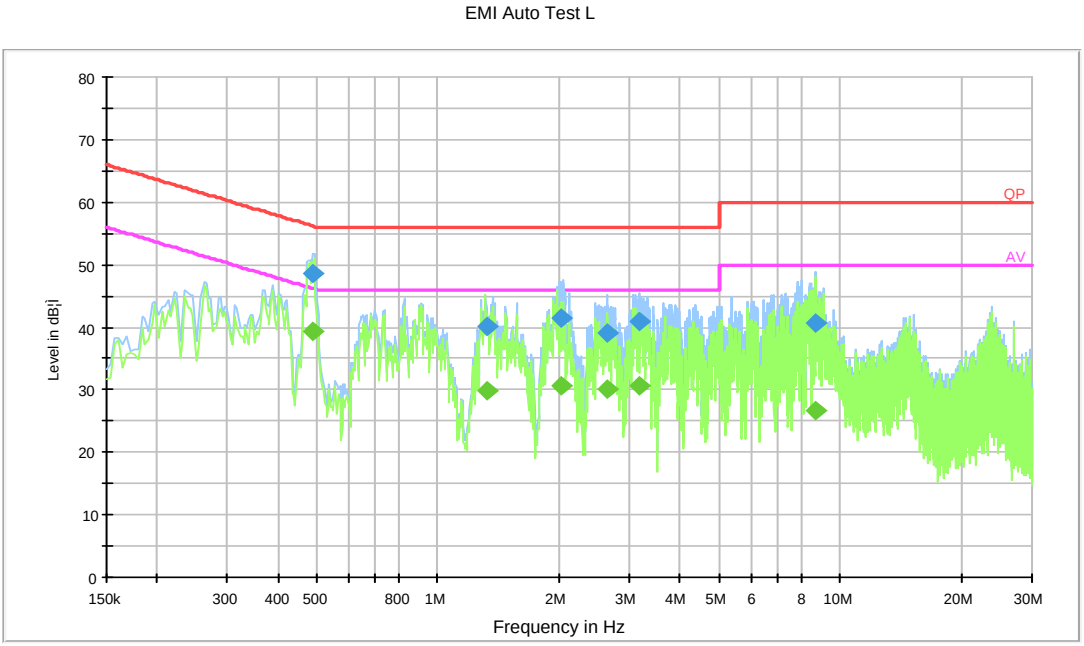
Environmental Conditions

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

The testing was performed by Tiger Ye on 2013-05-15.

Test mode: Transmitting

AC 120V/60Hz, Line:



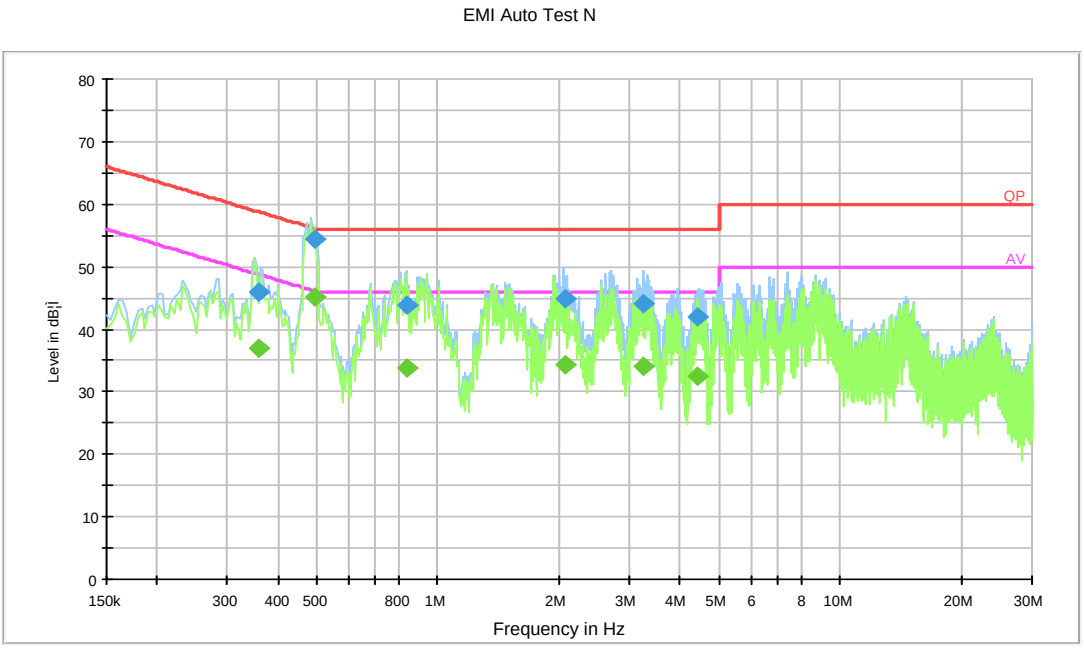
Quasi-peak detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/ QP/Ave)
0.491351	48.6	0.5	56.1	7.5	QP
2.036912	41.4	0.5	56.0	14.6	QP
3.172380	40.9	0.5	56.0	15.2	QP
1.329073	40.0	0.5	56.0	16.0	QP
2.628996	39.1	0.5	56.0	16.9	QP
8.661641	40.6	0.7	60.0	19.4	QP

Average detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/ QP/Ave)
0.491351	39.2	0.5	46.1	6.9	Ave.
2.036912	30.6	0.5	46.0	15.4	Ave.
3.172380	30.5	0.5	46.0	15.5	Ave.
2.628996	30.1	0.5	46.0	15.9	Ave.
1.329073	29.9	0.5	46.0	16.1	Ave.
8.661641	26.6	0.7	50.0	23.4	Ave.

AC 120V/60Hz, Neutral:



Quasi-peak detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/ QP/Ave)
0.491640	54.4	0.5	56.1	1.7	QP
2.065778	44.8	0.5	56.0	11.2	QP
3.261142	44.2	0.5	56.0	11.8	QP
0.835718	43.8	0.5	56.0	12.2	QP
0.359622	46.0	0.4	58.7	12.7	QP
4.426401	42.1	0.5	56.0	13.9	QP

Average detection mode

Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/ QP/Ave)
0.491640	45.1	0.5	46.1	1.1	Ave.
2.065778	34.4	0.5	46.0	11.6	Ave.
0.359622	36.9	0.4	48.7	11.9	Ave.
3.261142	34.0	0.5	46.0	12.0	Ave.
0.835718	33.9	0.5	46.0	12.1	Ave.
4.426401	32.4	0.5	46.0	13.6	Ave.

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

Applicable Standard

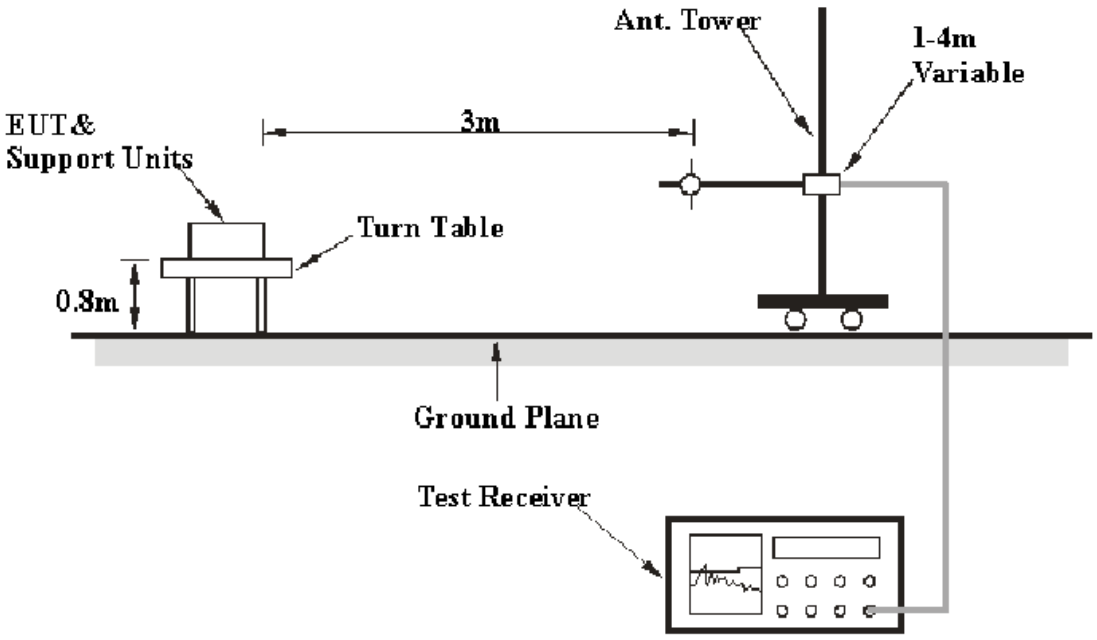
FCC §15.247 (d); §15.209; §15.205;

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 CISPR 16-4-4, 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), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

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.

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	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2012-11-24	2013-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
Mini-Circuits	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13

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

Test Procedure

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz and peak and Average detection modes for frequencies 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 7dB means the emission is 7dB 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:

3.83 dB at **4924.0 MHz** in the **Vertical** polarization for 802.11b mode

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54 %
ATM Pressure:	101.0kPa

The testing was performed by Candy Li on 2013-05-16.

Test Mode: Transmitting

30 MHz - 25 GHz

802.11b mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412.0	90.48	PK	35	1.3	H	6.13	96.61	/	/
2412.0	85.49	Ave.	35	1.3	H	6.13	91.62	/	/
2412.0	93.98	PK	154	1.4	V	6.13	100.11	/	/
2412.0	88.37	Ave.	154	1.4	V	6.13	94.50	/	/
4824.0	37.10	Ave.	10	1.5	V	12.40	49.50	54	4.50
337.73	51.96	QP	78	1.1	H	-13.5	38.46	46	7.54
9648.0	17.24	Ave.	29	1.1	H	19.29	36.53	54	17.47
4824.0	41.76	PK	10	1.5	V	12.40	54.16	74	19.84
2335.9	28.55	Ave.	263	1.4	V	5.48	34.03	54	19.97
7236.0	17.28	Ave.	297	1.4	H	16.62	33.90	54	20.10
2485.2	23.61	Ave.	311	1.2	H	7.21	30.82	54	23.18
9648.0	31.51	PK	29	1.1	H	19.29	50.80	74	23.20
2314.5	24.09	Ave.	95	1.3	V	5.48	29.57	54	24.43
7236.0	32.63	PK	297	1.4	H	16.62	49.25	74	24.75
2335.9	41.14	PK	263	1.4	V	5.48	46.62	74	27.38
2314.5	39.07	PK	95	1.3	V	5.48	44.55	74	29.45
2485.2	36.53	PK	311	1.2	H	7.21	43.74	74	30.26
Middle Channel (2437 MHz)									
2437.0	89.92	PK	81	1.1	H	7.21	97.13	/	/
2437.0	85.76	Ave.	81	1.1	H	7.21	92.97	/	/
2437.0	93.94	PK	115	1.3	V	7.21	101.15	/	/
2437.0	88.65	Ave.	115	1.3	V	7.21	95.86	/	/
4874.0	37.59	Ave.	181	1.1	V	12.46	50.05	54	3.95
337.73	51.21	QP	180	1.4	H	-13.5	37.71	46	8.29
9748.0	18.28	Ave.	164	1.3	H	19.40	37.68	54	16.32
7311.0	18.19	Ave.	311	1.2	V	16.49	34.68	54	19.32
2379.8	27.09	Ave.	240	1.4	H	6.13	33.22	54	20.78
4874.0	40.74	PK	181	1.1	V	12.46	53.20	74	20.80
9748.0	32.19	PK	164	1.3	H	19.40	51.59	74	22.41
2485.7	23.42	Ave.	290	1.0	H	7.21	30.63	54	23.37
2484.8	23.13	Ave.	149	1.1	V	7.21	30.34	54	23.66
7311.0	33.77	PK	311	1.2	V	16.49	50.26	74	23.74
2379.8	39.87	PK	240	1.4	H	6.13	46.00	74	28.00
2484.8	37.14	PK	149	1.1	V	7.21	44.35	74	29.65
2485.7	37.03	PK	290	1.0	H	7.21	44.24	74	29.76

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462.0	90.15	PK	159	1.3	H	7.21	97.36	/	/
2462.0	85.74	Ave.	159	1.3	H	7.21	92.95	/	/
2462.0	93.98	PK	62	1.1	V	7.21	101.19	/	/
2462.0	89.09	Ave.	62	1.1	V	7.21	96.30	/	/
4924.0	37.67	Ave.	122	1.2	V	12.50	50.17	54	3.83
337.73	51.87	QP	271	1.3	H	-13.5	38.37	46	7.63
9848.0	17.72	Ave.	231	1.2	V	19.39	37.11	54	16.89
7386.0	21.09	Ave.	188	1.2	H	15.91	37.00	54	17.00
2486.6	28.87	Ave.	23	1.4	V	7.21	36.08	54	17.92
4924.0	41.61	PK	122	1.2	V	12.50	54.11	74	19.89
9848.0	31.76	PK	231	1.2	V	19.39	51.15	74	22.85
2494.7	22.91	Ave.	115	1.3	V	7.21	30.12	54	23.88
7386.0	33.05	PK	188	1.2	H	15.91	48.96	74	25.04
2313.1	21.98	Ave.	223	1.1	V	5.48	27.46	54	26.54
2486.6	39.74	PK	23	1.4	V	7.21	46.95	74	27.05
2494.7	38.56	PK	115	1.3	V	7.21	45.77	74	28.23
2313.1	36.99	PK	223	1.1	V	5.48	42.47	74	31.53

802.11g mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412.0	86.27	PK	350	1.0	H	6.13	92.40	/	/
2412.0	74.46	Ave.	350	1.0	H	6.13	80.59	/	/
2412.0	91.37	PK	78	1.3	V	6.13	97.50	/	/
2412.0	80.06	Ave.	78	1.3	V	6.13	86.19	/	/
337.73	52.27	QP	82	1.4	H	-13.5	38.77	46	7.23
9648.0	19.61	Ave.	175	1.1	H	19.29	38.90	54	15.10
7236.0	19.27	Ave.	13	1.2	V	16.62	35.89	54	18.11
4824.0	21.31	Ave.	114	1.2	V	12.40	33.71	54	20.29
2371.9	25.66	Ave.	247	1.3	H	6.13	31.79	54	22.21
2332.3	26.26	Ave.	122	1.5	V	5.48	31.74	54	22.26
9648.0	31.16	PK	175	1.1	H	19.29	50.45	74	23.55
2489.2	22.98	Ave.	12	1.3	V	7.21	30.19	54	23.81
7236.0	32.66	PK	13	1.2	V	16.62	49.28	74	24.72
2371.9	42.46	PK	247	1.3	H	6.13	48.59	74	25.41
4824.0	35.42	PK	114	1.2	V	12.40	47.82	74	26.18
2332.3	38.78	PK	122	1.5	V	5.48	44.26	74	29.74
2489.2	35.55	PK	12	1.3	V	7.21	42.76	74	31.24
Middle Channel (2437 MHz)									
2437.0	86.34	PK	16	1.2	H	7.21	93.55	/	/
2437.0	74.62	Ave.	16	1.2	H	7.21	81.83	/	/
2437.0	89.39	PK	301	1.0	V	7.21	96.60	/	/
2437.0	76.91	Ave.	301	1.0	V	7.21	84.12	/	/
337.73	51.67	QP	242	1.3	H	-13.5	38.17	46	7.83
9748.0	18.58	Ave.	140	1.0	H	19.40	37.98	54	16.02
7311.0	20.44	Ave.	35	1.3	V	16.49	36.93	54	17.07
2329.2	28.18	Ave.	339	1.2	H	5.48	33.66	54	20.34
4874.0	20.89	Ave.	71	1.0	H	12.46	33.35	54	20.65
9748.0	31.66	PK	140	1.0	H	19.40	51.06	74	22.94
2491.4	23.83	Ave.	169	1.4	H	7.21	31.04	54	22.96
2321.1	23.62	Ave.	137	1.4	V	5.48	29.10	54	24.90
7311.0	32.46	PK	35	1.3	V	16.49	48.95	74	25.05
2329.2	42.22	PK	339	1.2	H	5.48	47.70	74	26.30
4874.0	34.75	PK	71	1.0	H	12.46	47.21	74	26.79
2491.4	37.97	PK	169	1.4	H	7.21	45.18	74	28.82
2321.1	38.71	PK	137	1.4	V	5.48	44.19	74	29.81

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462.0	86.29	PK	233	1.4	H	7.21	93.50	/	/
2462.0	74.39	Ave.	233	1.4	H	7.21	81.60	/	/
2462.0	90.52	PK	42	1.2	V	7.21	97.73	/	/
2462.0	77.36	Ave.	42	1.2	V	7.21	84.57	/	/
337.73	51.62	QP	104	1.2	H	-13.5	38.12	46	7.88
9848.0	19.72	Ave.	343	1.4	H	19.39	39.11	54	14.89
7386.0	20.67	Ave.	119	1.3	V	15.91	36.58	54	17.42
2491.2	27.11	Ave.	62	1.2	H	7.21	34.32	54	19.68
4924.0	21.75	Ave.	197	1.1	H	12.50	34.25	54	19.75
9848.0	31.97	PK	343	1.4	H	19.39	51.36	74	22.64
2488.8	23.94	Ave.	136	1.3	V	7.21	31.15	54	22.85
2384.9	23.09	Ave.	179	1.4	H	6.13	29.22	54	24.78
7386.0	33.19	PK	119	1.3	V	15.91	49.10	74	24.90
4924.0	36.20	PK	197	1.1	H	12.50	48.70	74	25.30
2491.2	40.40	PK	62	1.2	H	7.21	47.61	74	26.39
2488.8	39.68	PK	136	1.3	V	7.21	46.89	74	27.11
2384.9	37.57	PK	179	1.4	H	6.13	43.70	74	30.30

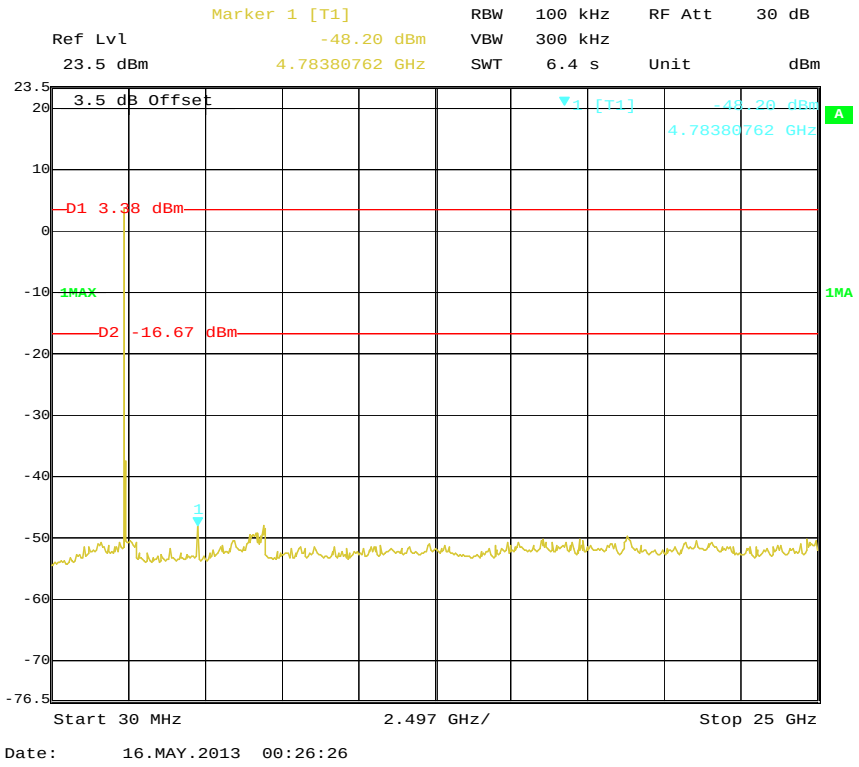
802.11n-HT20 mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412.0	88.17	PK	128	1.5	H	6.13	94.30	/	/
2412.0	75.57	Ave.	128	1.5	H	6.13	81.70	/	/
2412.0	88.99	PK	207	1.3	V	6.13	95.12	/	/
2412.0	77.06	Ave.	207	1.3	V	6.13	83.19	/	/
337.73	51.89	QP	301	1.3	H	-13.5	38.39	46	7.61
4824.0	27.25	Ave.	230	1.3	V	12.40	39.65	54	14.35
9648.0	18.07	Ave.	274	1.4	V	19.29	37.36	54	16.64
7236.0	19.51	Ave.	292	1.2	V	16.62	36.13	54	17.87
9648.0	32.38	PK	274	1.4	V	19.29	51.67	74	22.33
2365.5	25.47	Ave.	129	1.3	V	6.13	31.60	54	22.40
7236.0	33.01	PK	292	1.2	V	16.62	49.63	74	24.37
2371.2	22.97	Ave.	340	1.1	V	6.13	29.10	54	24.90
2487.7	21.70	Ave.	323	1.1	H	7.21	28.91	54	25.09
4824.0	35.96	PK	230	1.3	V	12.40	48.36	74	25.64
2487.7	40.71	PK	323	1.1	H	7.21	47.92	74	26.08
2371.2	41.65	PK	340	1.1	V	6.13	47.78	74	26.22
2365.5	40.19	PK	129	1.3	V	6.13	46.32	74	27.68
Middle Channel (2437 MHz)									
2437.0	87.55	PK	195	1.2	H	7.21	94.76	/	/
2437.0	76.17	Ave.	195	1.2	H	7.21	83.38	/	/
2437.0	88.81	PK	334	1.0	V	7.21	96.02	/	/
2437.0	77.02	Ave.	334	1.0	V	7.21	84.23	/	/
337.73	51.82	QP	269	1.2	H	-13.5	38.32	46	7.68
4874.0	25.71	Ave.	170	1.2	V	12.46	38.17	54	15.83
9748.0	18.54	Ave.	91	1.1	H	19.40	37.94	54	16.06
7311.0	19.47	Ave.	129	1.3	V	16.49	35.96	54	18.04
2327.9	26.72	Ave.	42	1.3	H	5.48	32.20	54	21.80
9748.0	30.89	PK	91	1.1	H	19.40	50.29	74	23.71
2356.3	23.11	Ave.	57	1.4	V	6.13	29.24	54	24.76
7311.0	32.47	PK	129	1.3	V	16.49	48.96	74	25.04
2492.2	21.65	Ave.	282	1.2	H	7.21	28.86	54	25.14
2492.2	40.85	PK	282	1.2	H	7.21	48.06	74	25.94
2356.3	41.89	PK	57	1.4	V	6.13	48.02	74	25.98
4874.0	35.56	PK	170	1.2	V	12.46	48.02	74	25.98
2327.9	41.30	PK	42	1.3	H	5.48	46.78	74	27.22

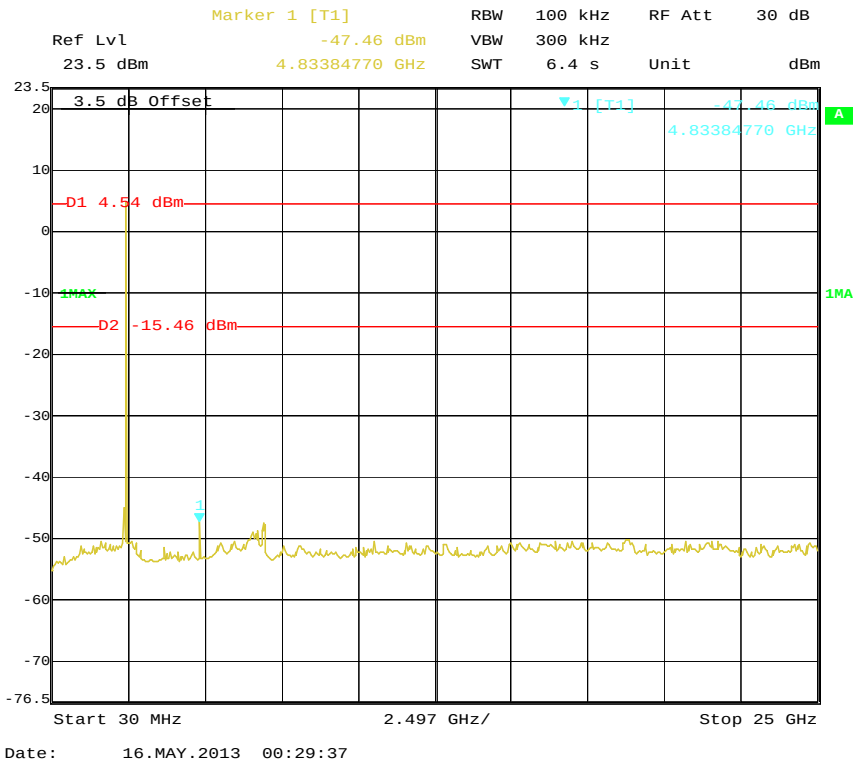
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462.0	87.65	PK	160	1.1	H	7.21	94.86	/	/
2462.0	74.14	Ave.	160	1.1	H	7.21	81.35	/	/
2462.0	89.07	PK	3	1.2	V	7.21	96.28	/	/
2462.0	76.64	Ave.	3	1.2	V	7.21	83.85	/	/
337.73	51.75	QP	65	1.1	H	-13.5	38.25	46	7.75
4924.0	27.19	Ave.	205	1.1	H	12.50	39.69	54	14.31
9848.0	19.17	Ave.	184	1.0	H	19.39	38.56	54	15.44
7386.0	19.10	Ave.	100	1.3	V	15.91	35.01	54	18.99
2368.5	26.08	Ave.	180	1.2	V	6.13	32.21	54	21.79
2497.3	23.85	Ave.	346	1.4	H	7.21	31.06	54	22.94
9848.0	31.00	PK	184	1.0	H	19.39	50.39	74	23.61
4924.0	37.59	PK	205	1.1	H	12.50	50.09	74	23.91
7386.0	33.03	PK	100	1.3	V	15.91	48.94	74	25.06
2497.3	40.35	PK	346	1.4	H	7.21	47.56	74	26.44
2368.5	41.10	PK	180	1.2	V	6.13	47.23	74	26.77
2492.8	19.59	Ave.	63	1.3	H	7.21	26.80	54	27.20
2492.8	39.35	PK	63	1.3	H	7.21	46.56	74	27.44

Antenna Port Conducted Spurious Emissions:

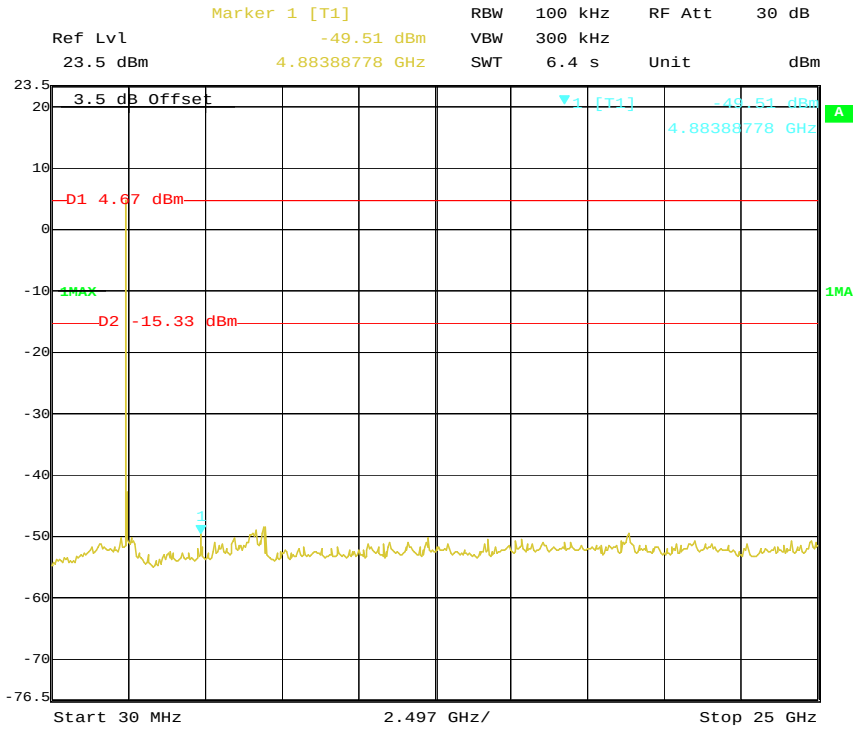
802.11b Low Channel



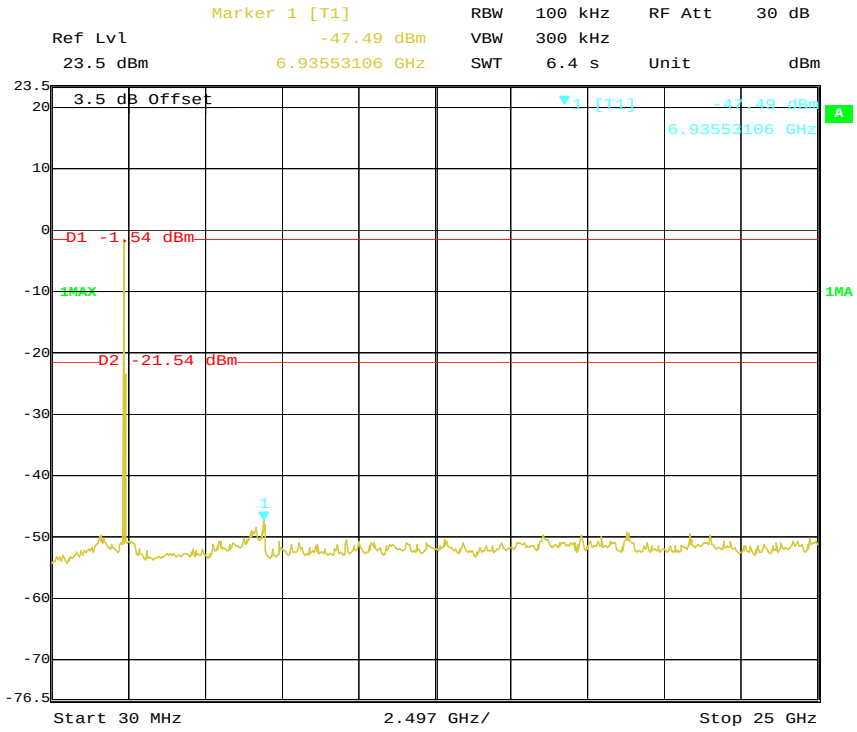
802.11b Middle Channel



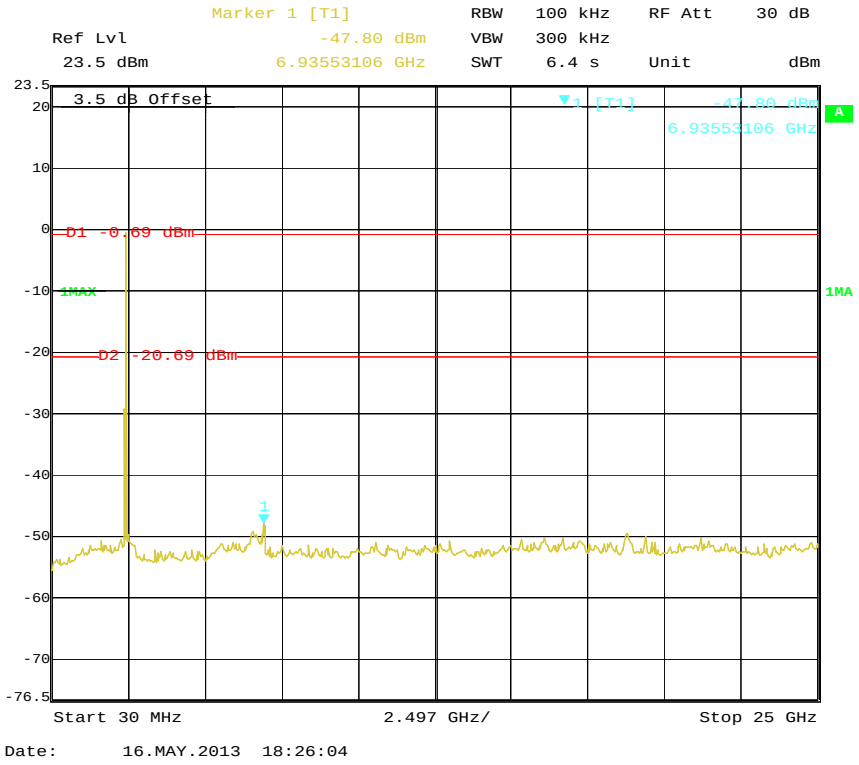
802.11b High Channel



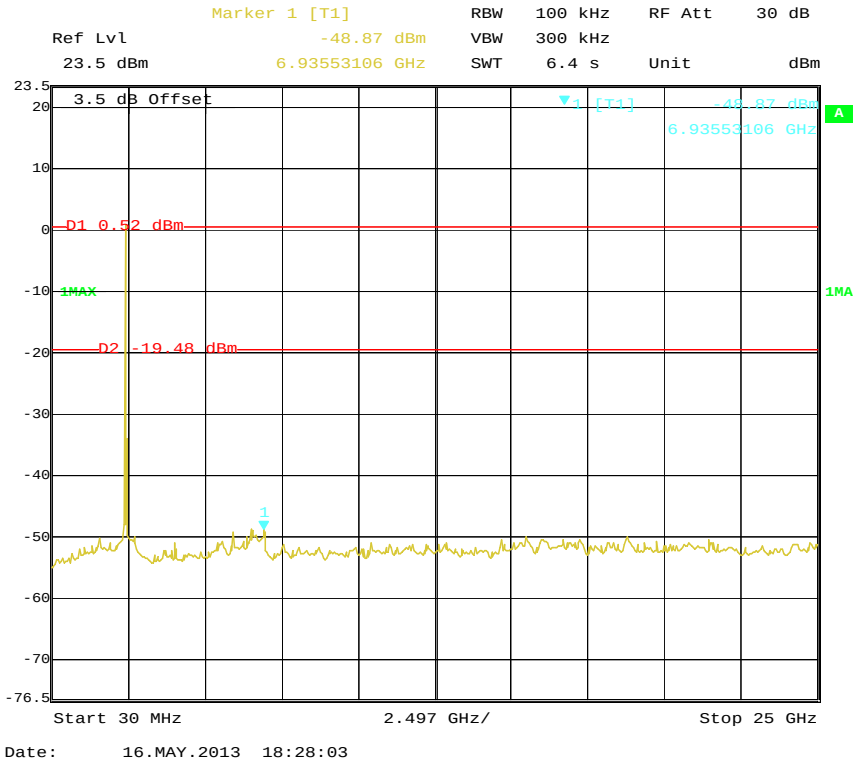
802.11g Low Channel



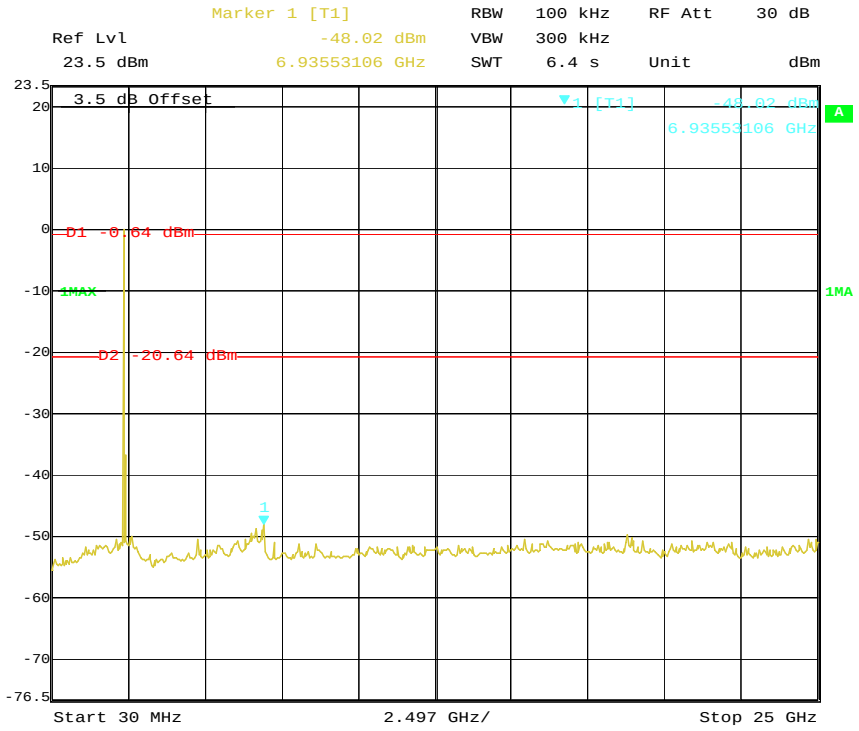
802.11g Middle Channel



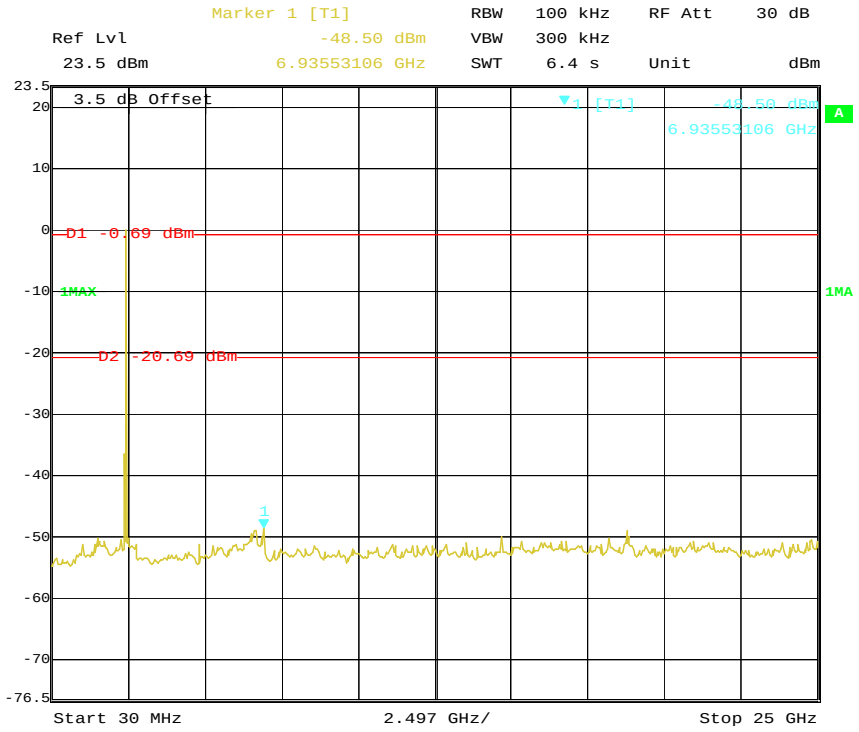
802.11g High Channel



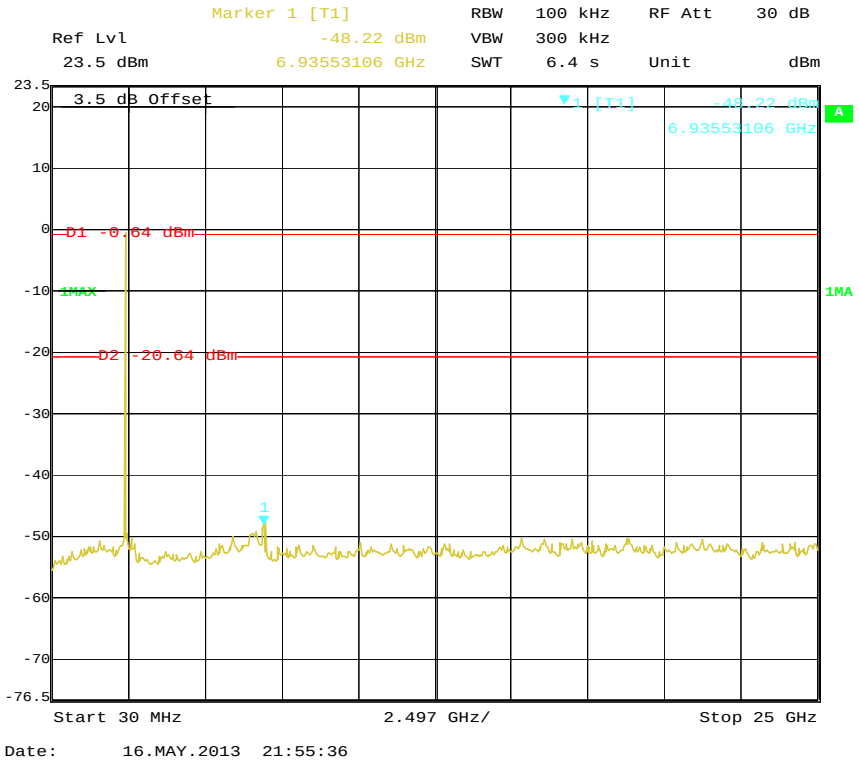
802.11n-HT20 Low Channel



802.11n-HT20 Middle Channel



802.11n-HT20 High Channel



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

Applicable Standard

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

Test Equipment List and Details

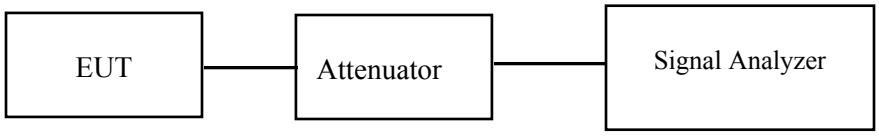
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v02

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 Candy Li on 2013-05-15.

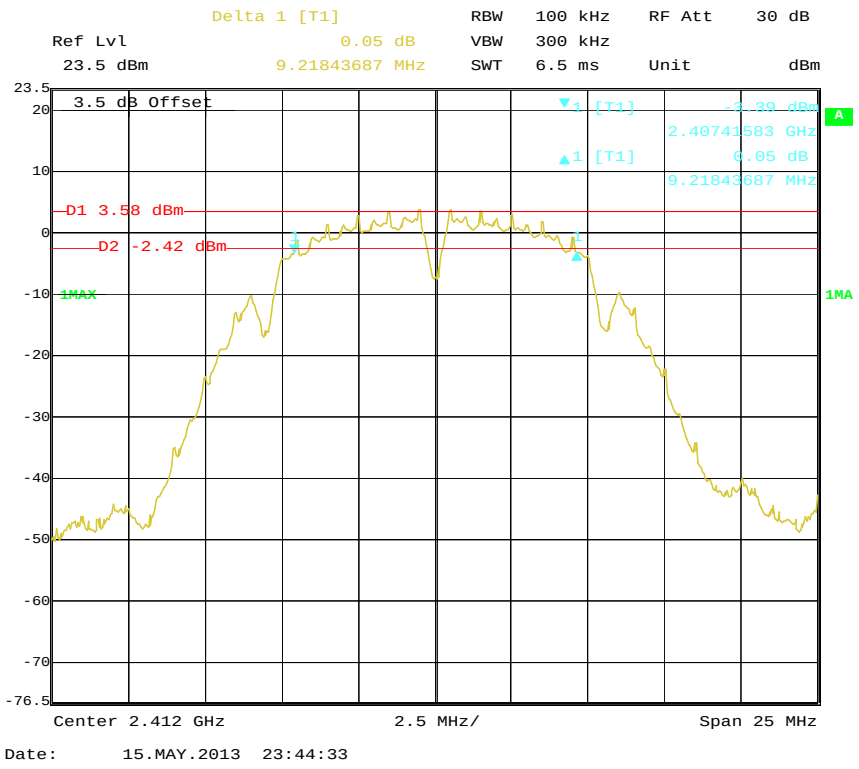
Test Mode: Transmitting

Test Result: Pass.

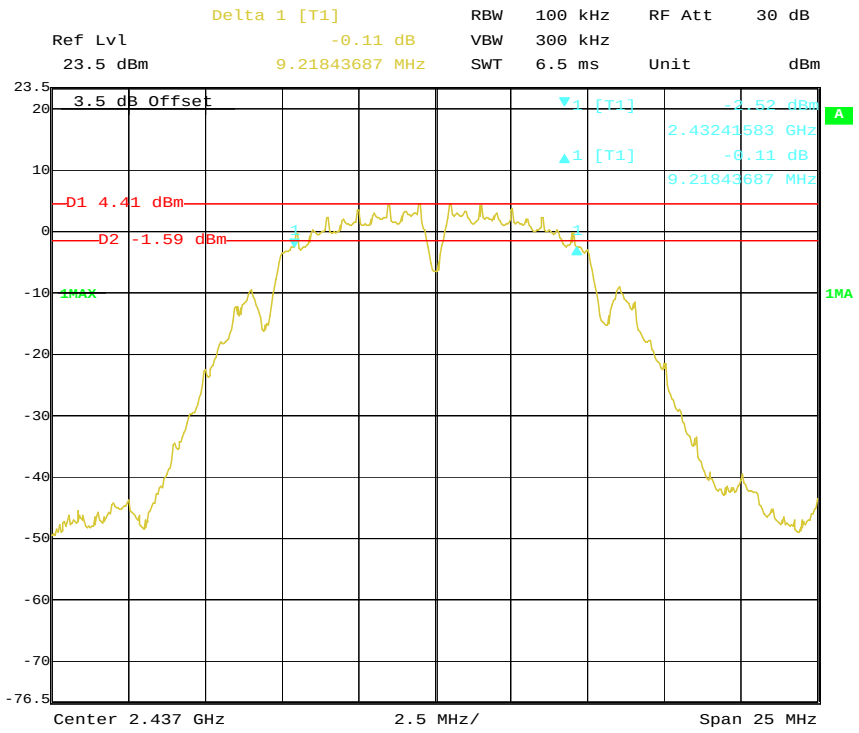
Please refer to the following tables and plots.

Channel	Frequency (MHz)	Data Rate (Mbps)	6 dB Emission Bandwidth (MHz)	Limit (kHz)	Result
802.11b mode					
Low	2412	1	9.22	≥500	Pass
Middle	2437	1	9.22	≥500	Pass
High	2462	1	9.22	≥500	Pass
802.11g mode					
Low	2412	6	16.63	≥500	Pass
Middle	2437	6	16.63	≥500	Pass
High	2462	6	16.63	≥500	Pass
802.11n-HT20 mode					
Low	2412	6.5	17.86	≥500	Pass
Middle	2437	6.5	17.86	≥500	Pass
High	2462	6.5	17.86	≥500	Pass

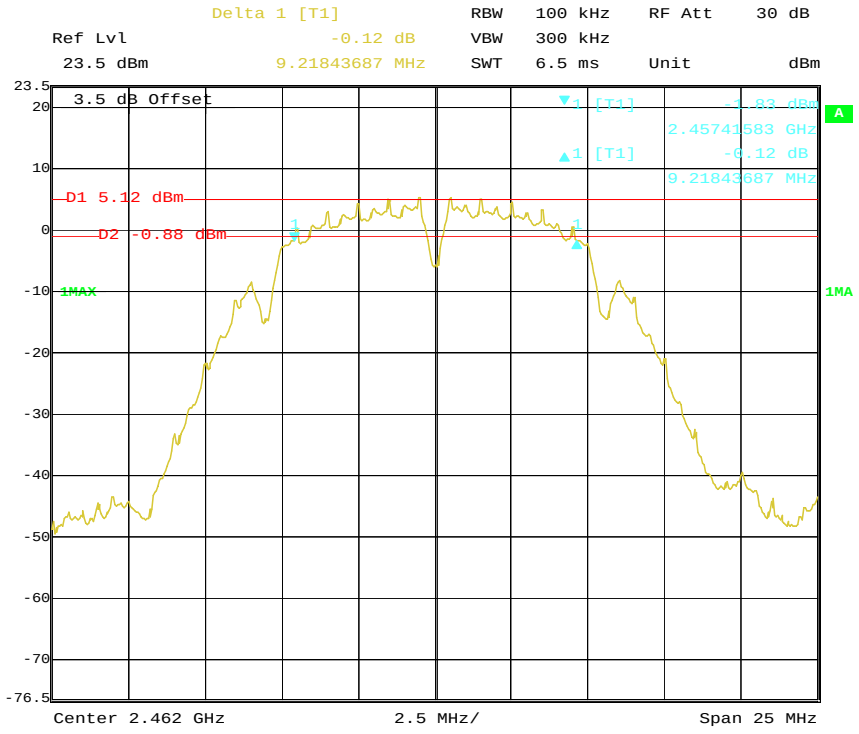
802.11b Low Channel



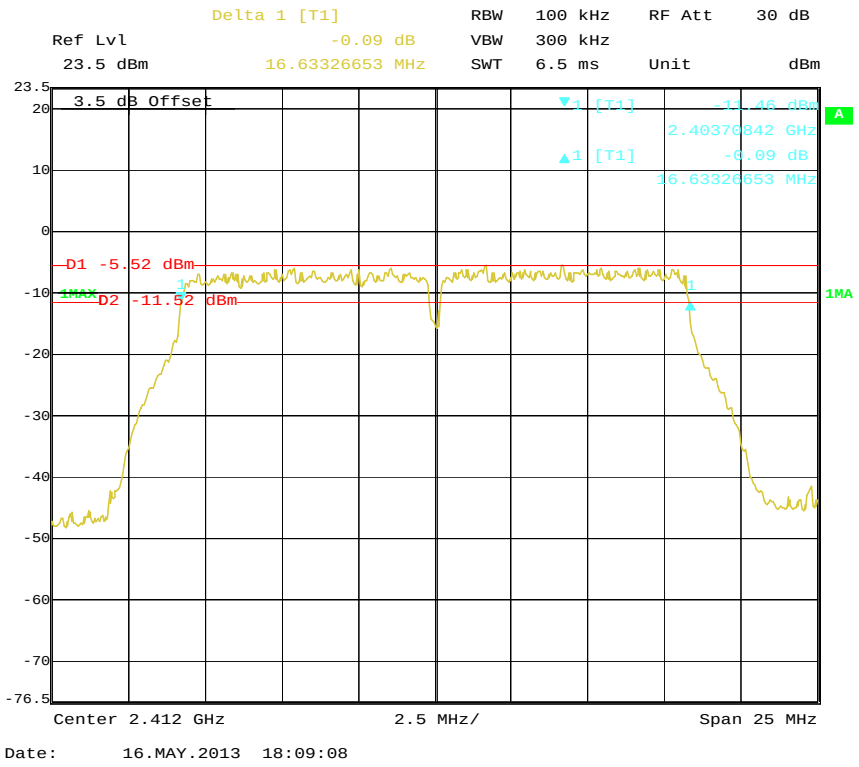
802.11b Middle Channel



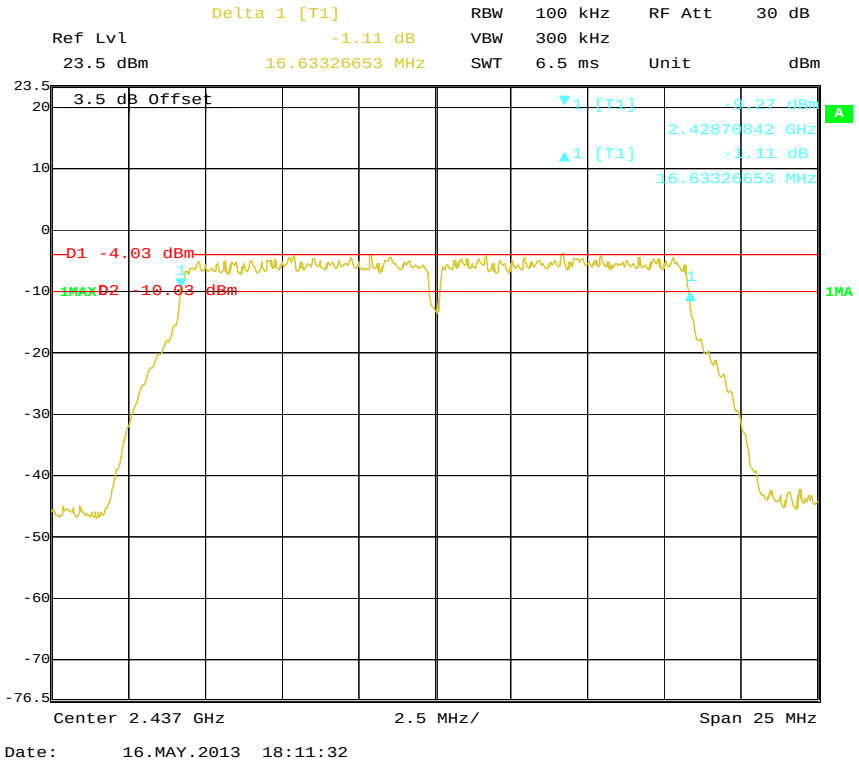
802.11b High Channel



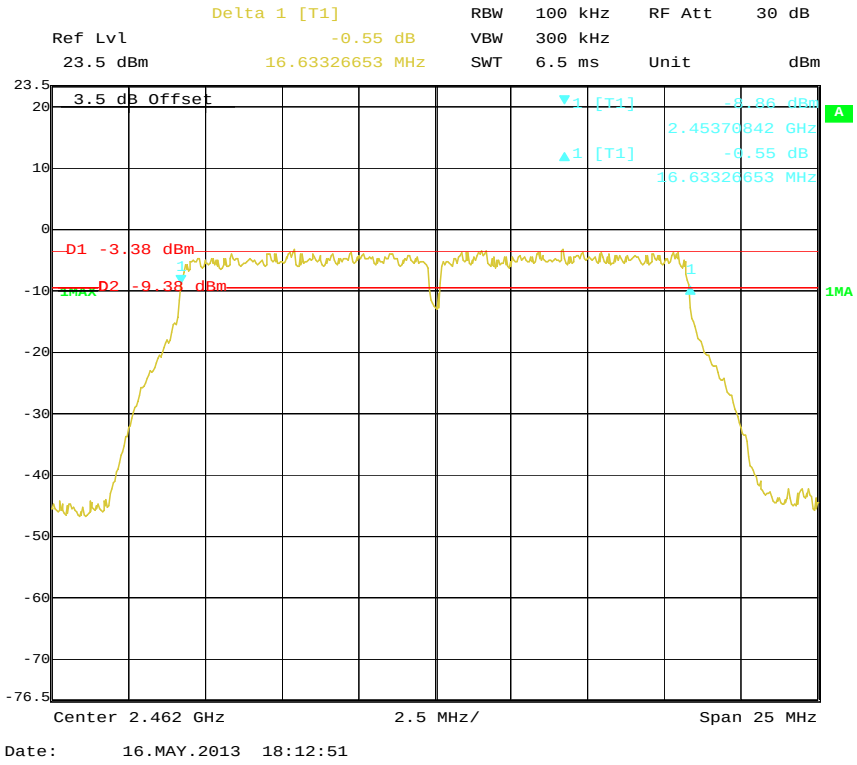
802.11g Low Channel



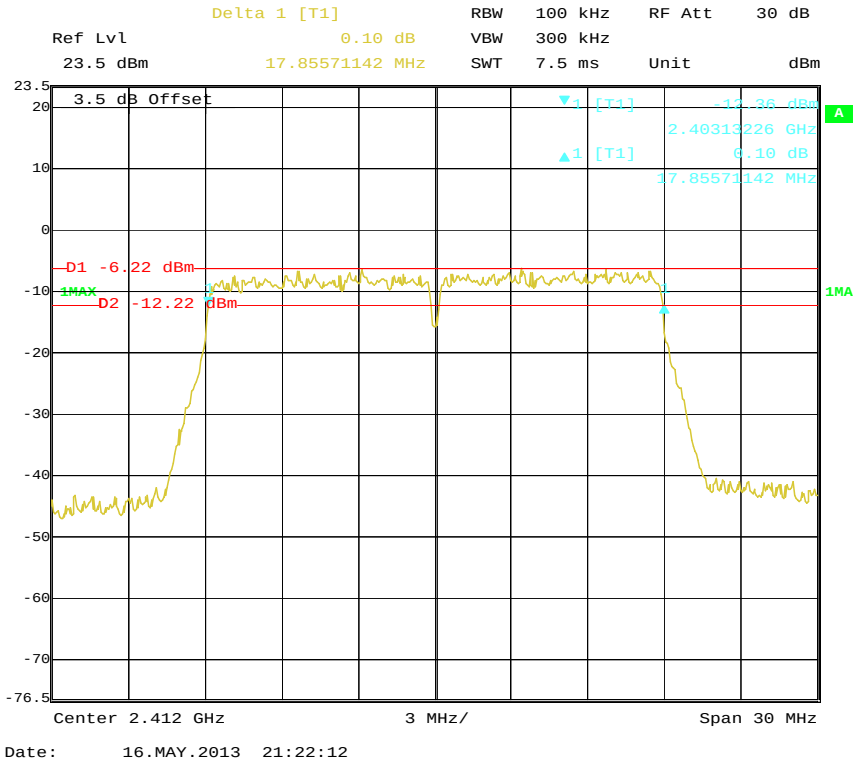
802.11g Middle Channel



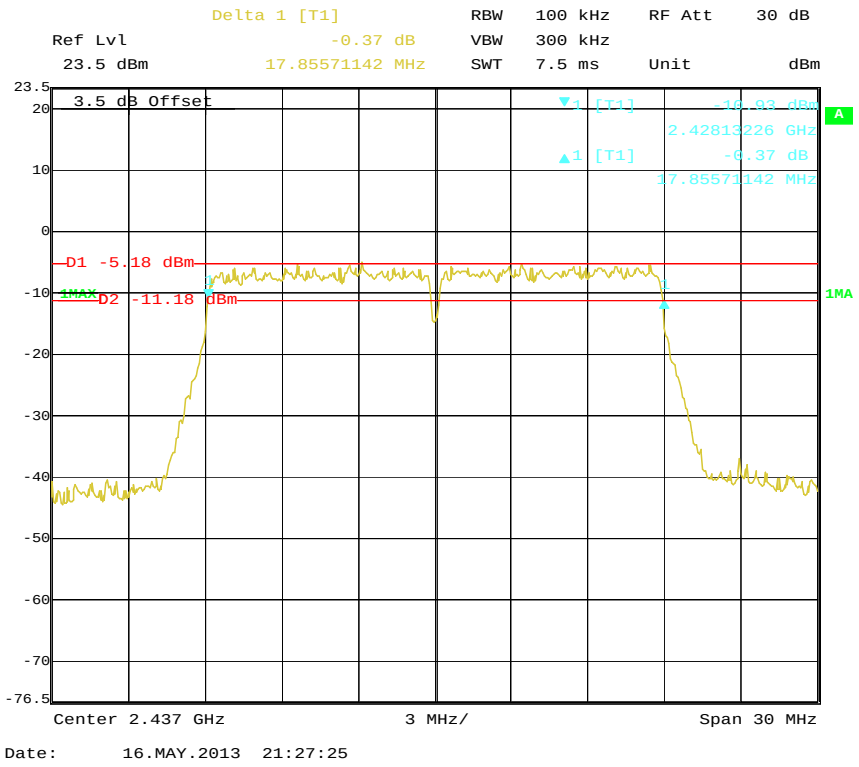
802.11g High Channel



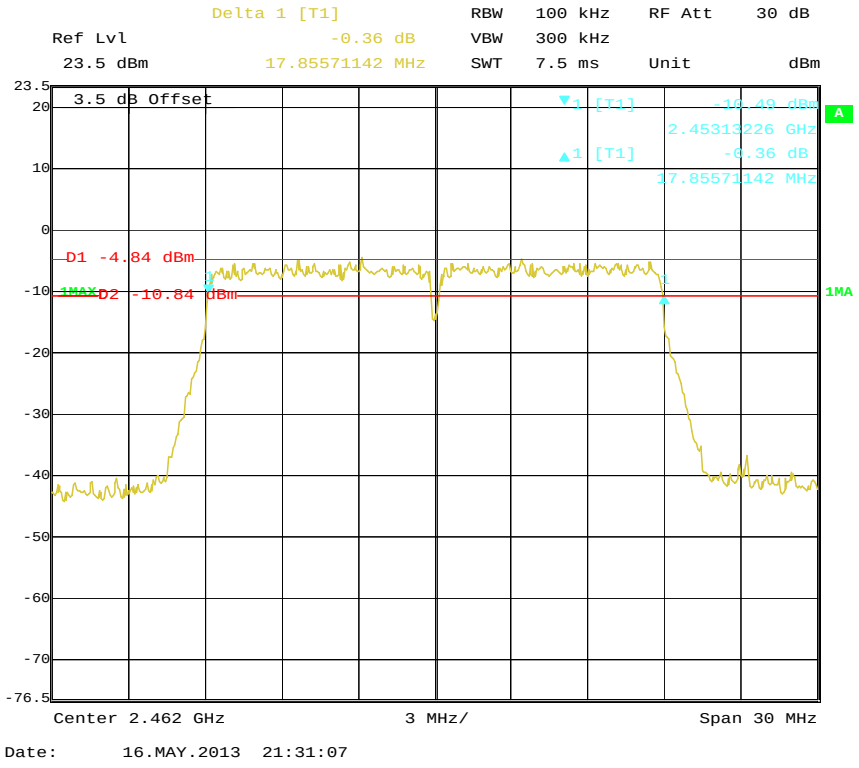
802.11n-HT20 Low Channel



802.11n-HT20 Middle Channel



802.11n-HT20 High Channel



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

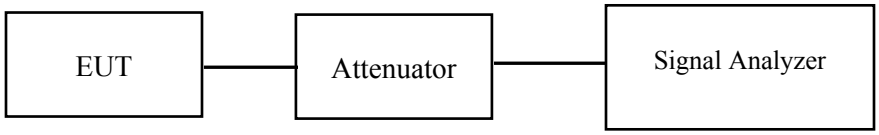
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v02

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

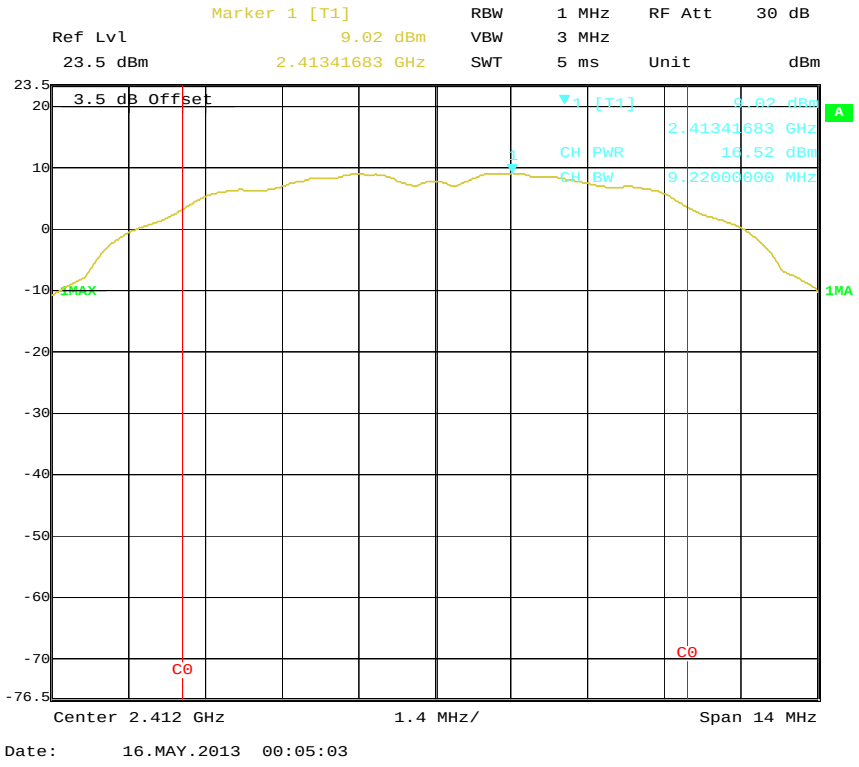
Temperature:	25 °C
Relative Humidity:	54 %
ATM Pressure:	101.0kPa

The testing was performed by Candy Li on 2013-05-16.

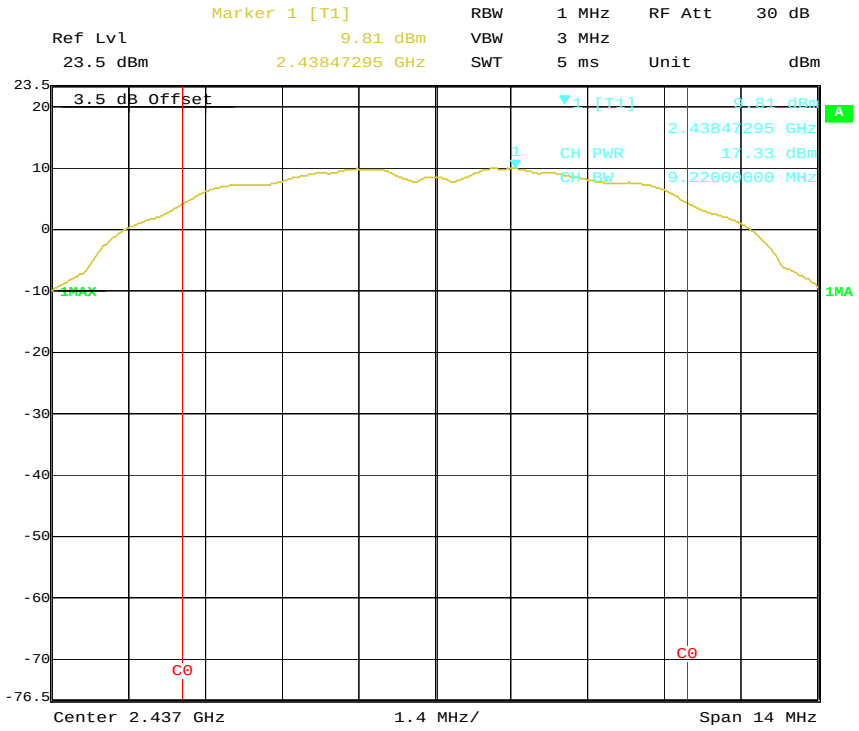
Test Mode: Transmitting

Channel	Frequency (MHz)	Data Rate (Mbps)	Conducted Output Power (dBm)	Limit (dBm)	Result
802.11b mode					
Low	2412	1	16.52	30	Pass
Middle	2437	1	17.33	30	Pass
High	2462	1	17.99	30	Pass
802.11g mode					
Low	2412	6	16.07	30	Pass
Middle	2437	6	17.01	30	Pass
High	2462	6	17.74	30	Pass
802.11n-HT20 mode					
Low	2412	6.5	14.78	30	Pass
Middle	2437	6.5	16.14	30	Pass
High	2462	6.5	16.38	30	Pass

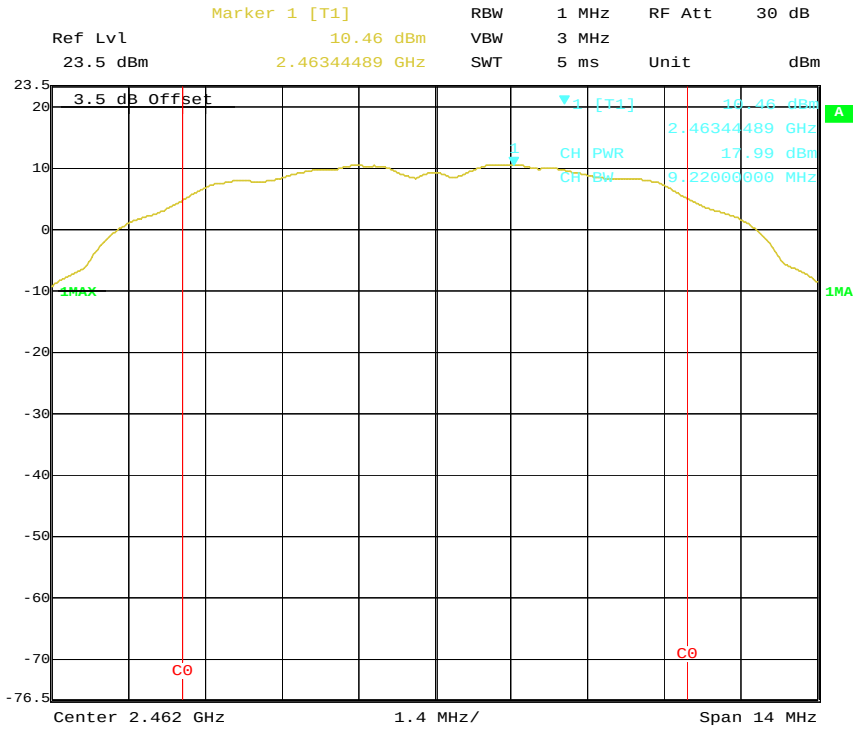
802.11b RF Output Power, Low Channel



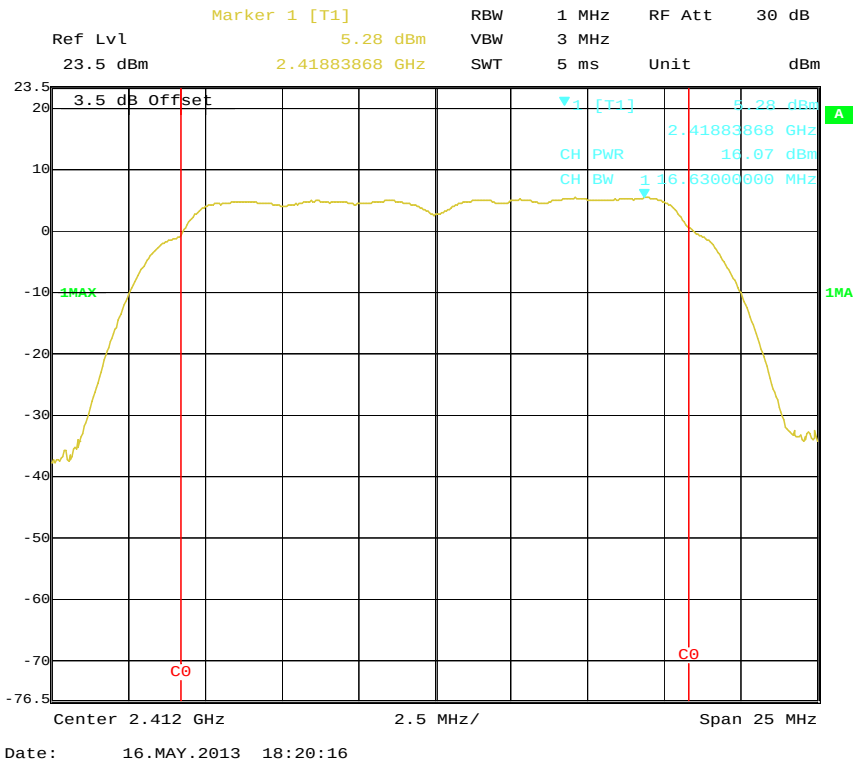
802.11b RF Output Power, Middle Channel



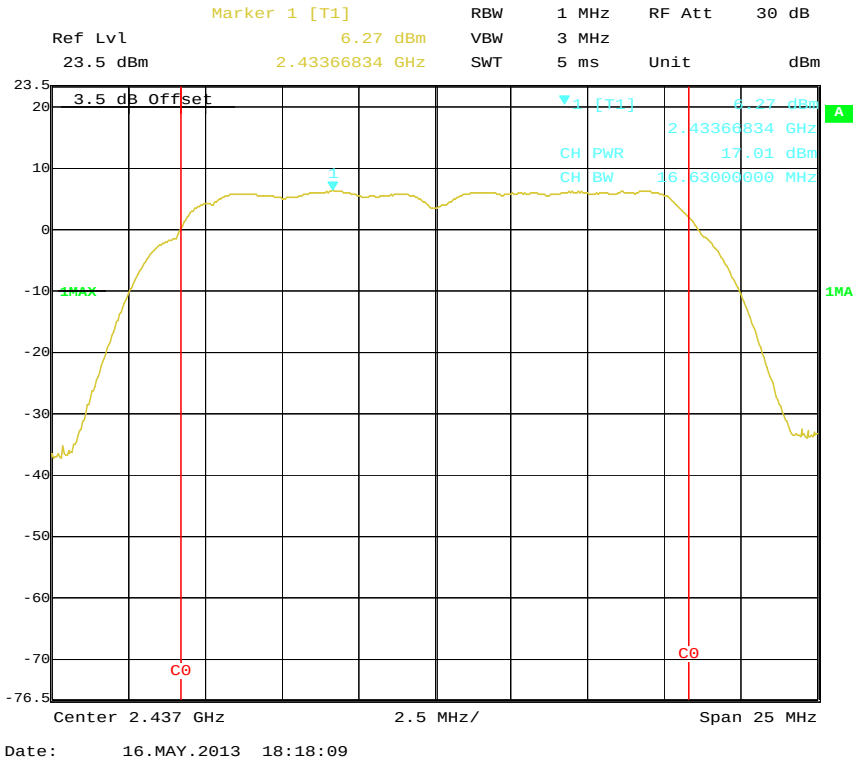
802.11b RF Output Power, High Channel



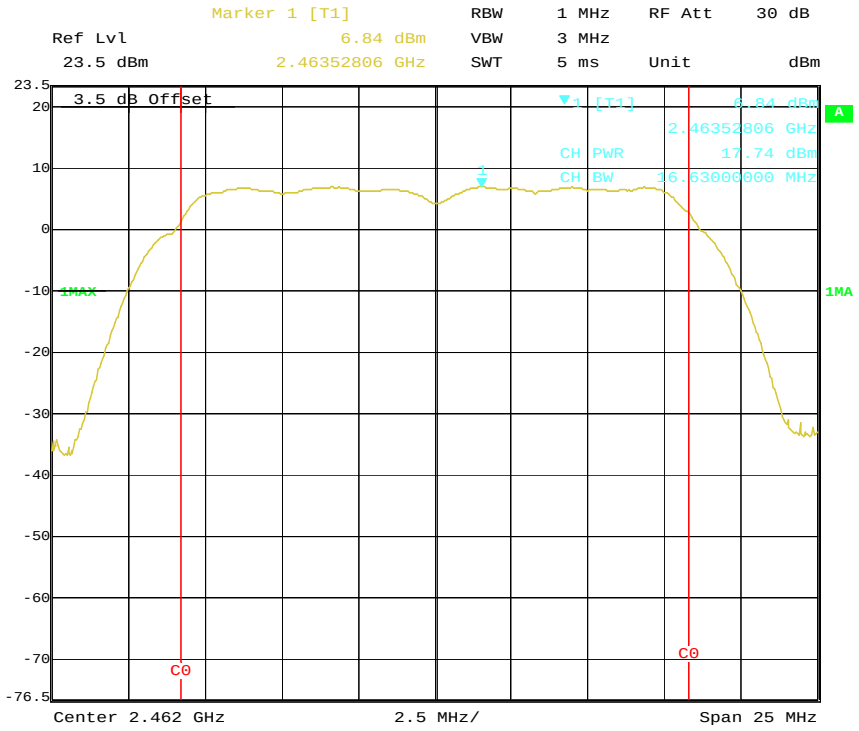
802.11g RF Output Power, Low Channel



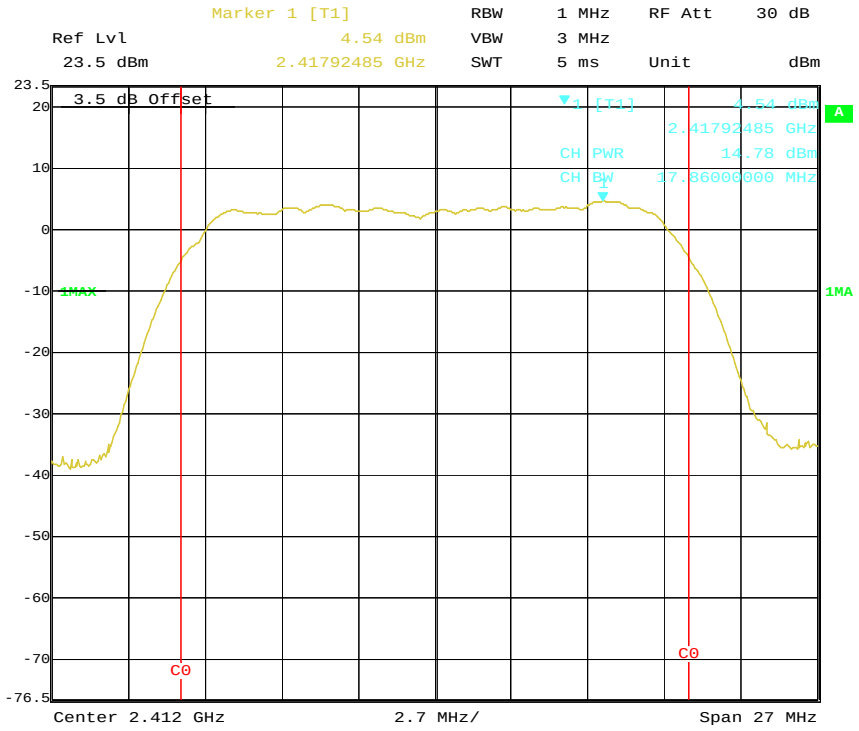
802.11g RF Output Power, Middle Channel



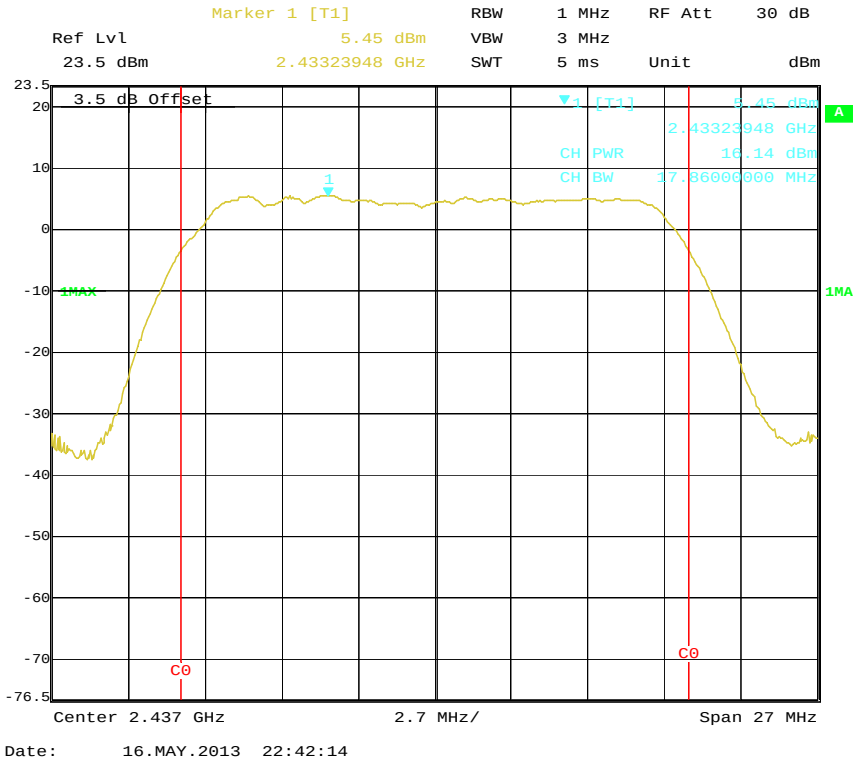
802.11g RF Output Power, High Channel



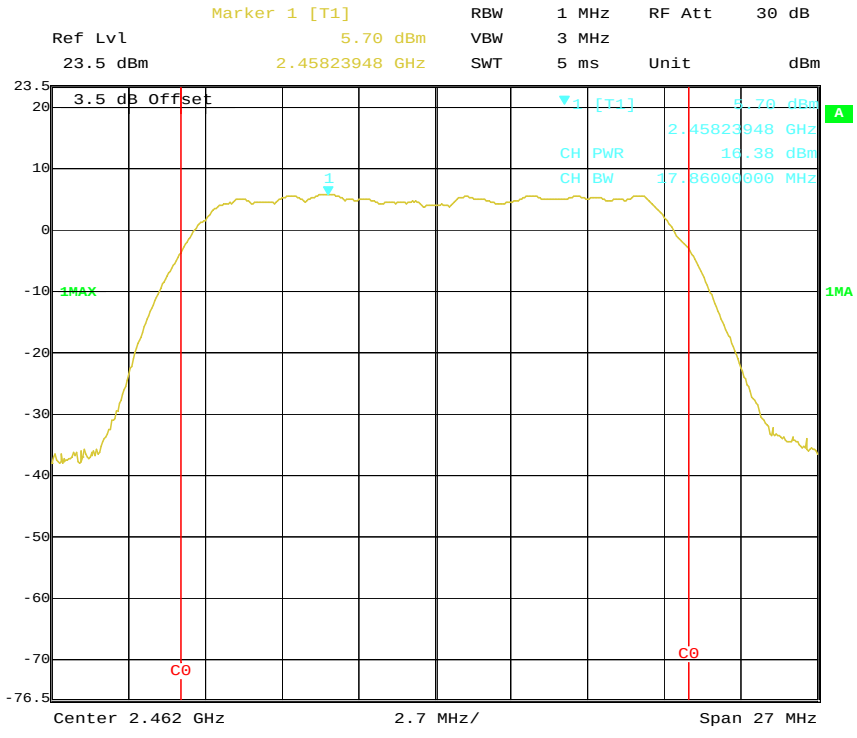
802.11n-HT20 RF Output Power, Low Channel



802.11n-HT20 RF Output Power, Middle Channel



802.11n-HT20 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

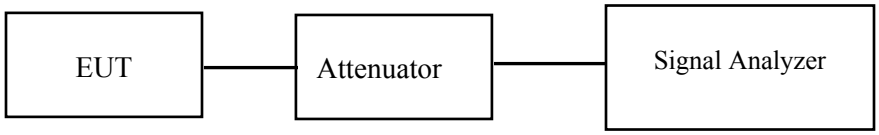
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v02

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 Data

Environmental Conditions

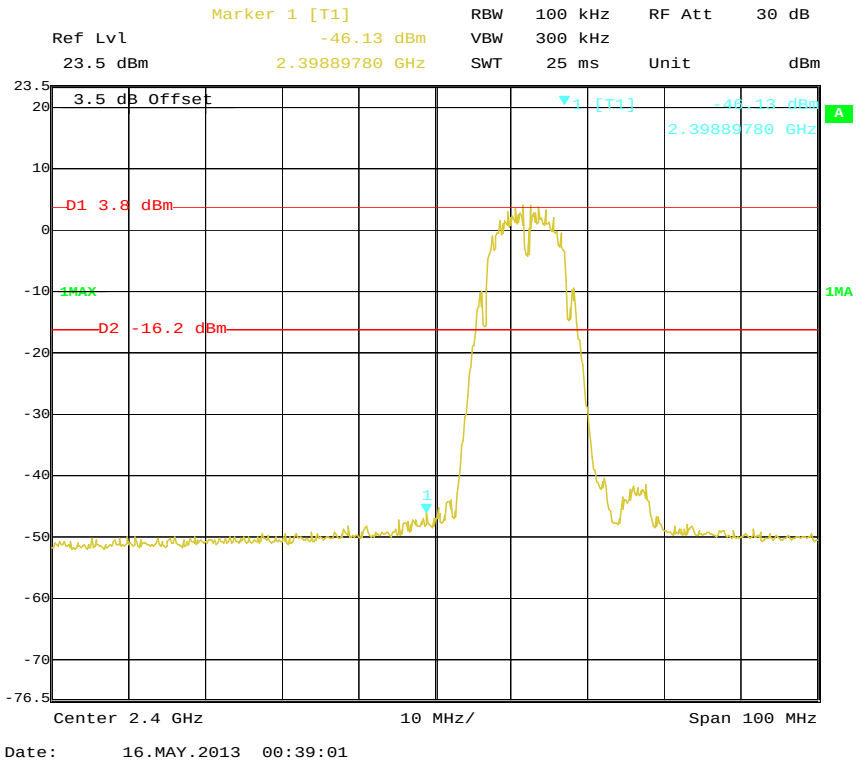
Temperature:	24 °C
Relative Humidity:	56 %
ATM Pressure:	101.0kPa

The testing was performed by Candy Li on 2013-05-16.

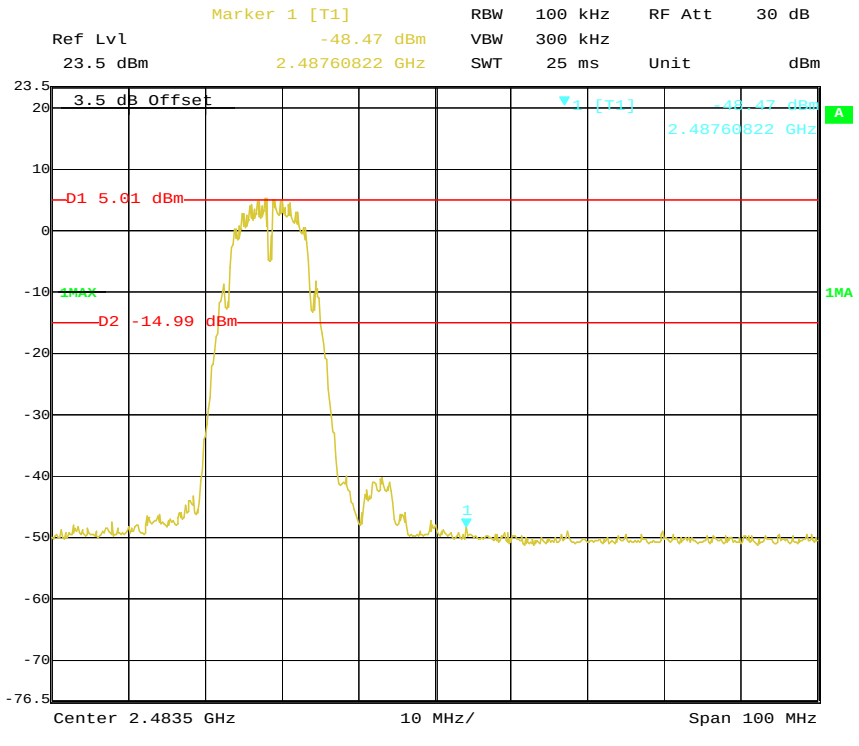
Test Mode: Transmitting

Test Result: *Compliance. Please refer to following plots.*

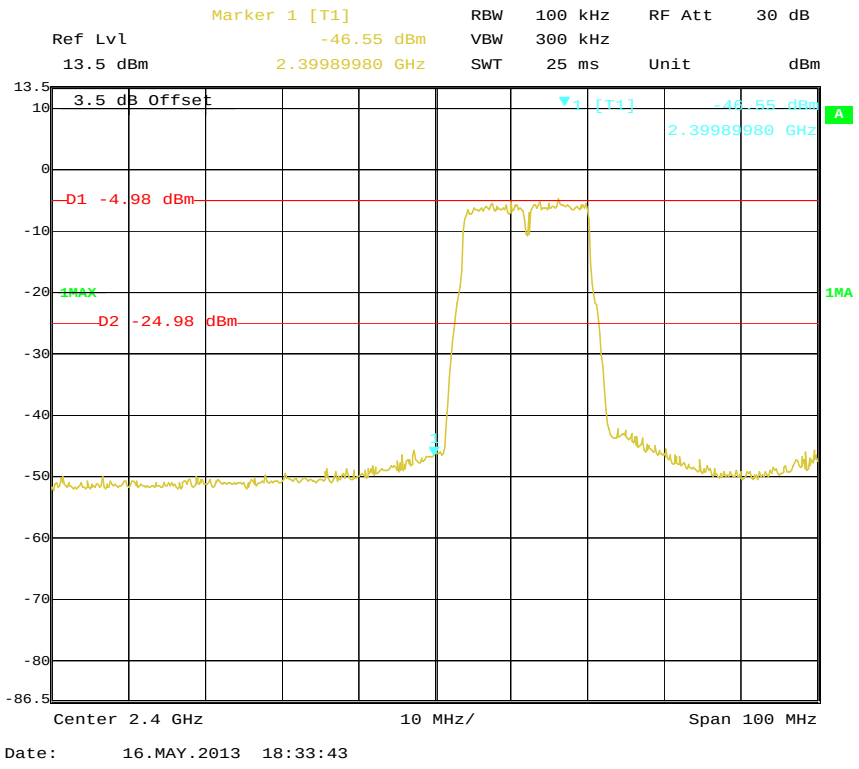
802.11b Band Edge, Left Side



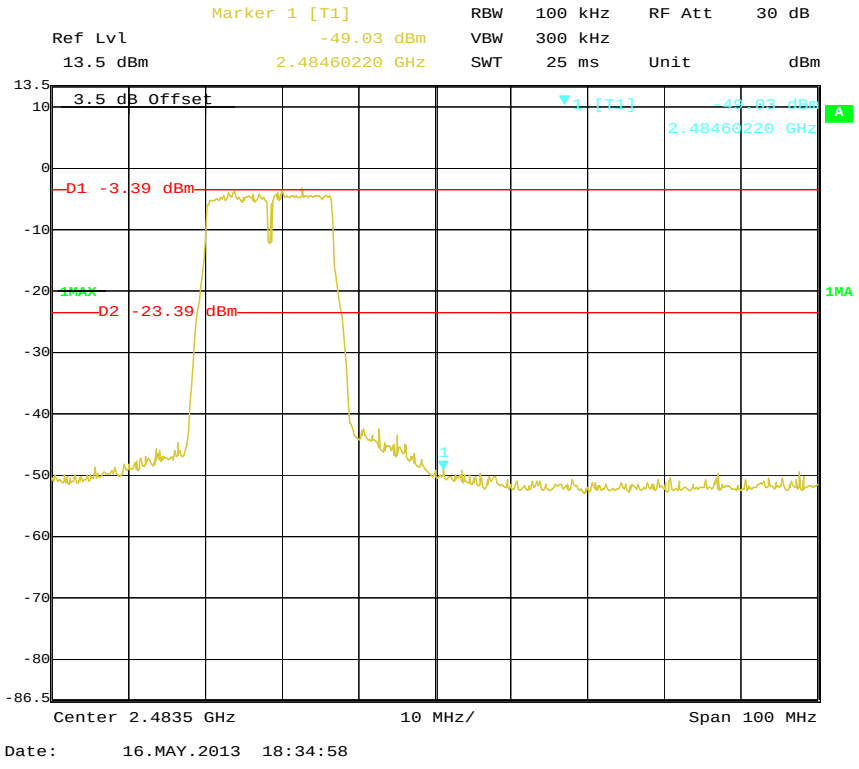
802.11b Band Edge, Right Side



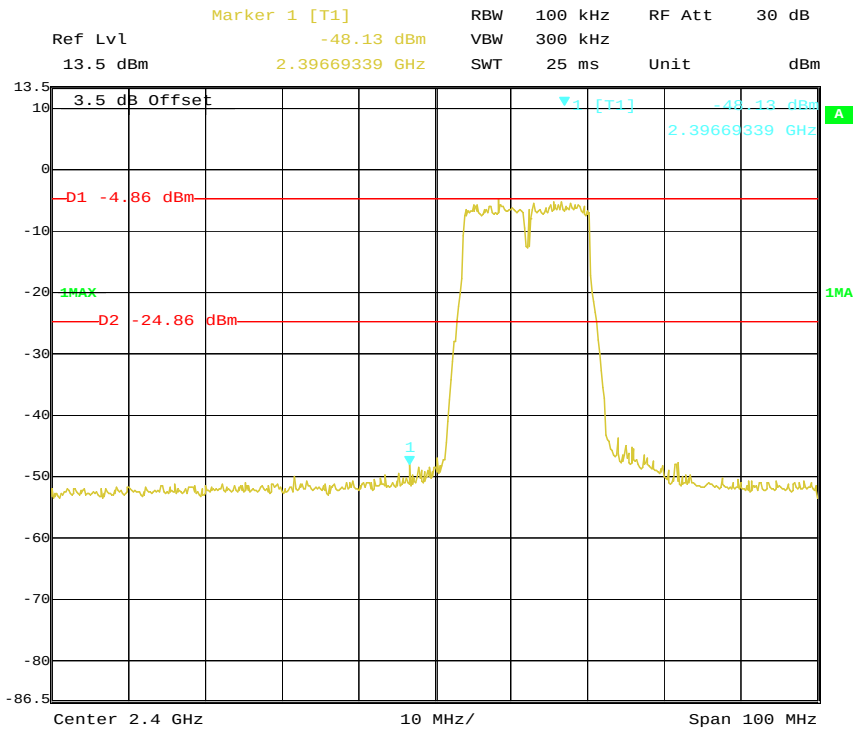
802.11g Band Edge, Left Side



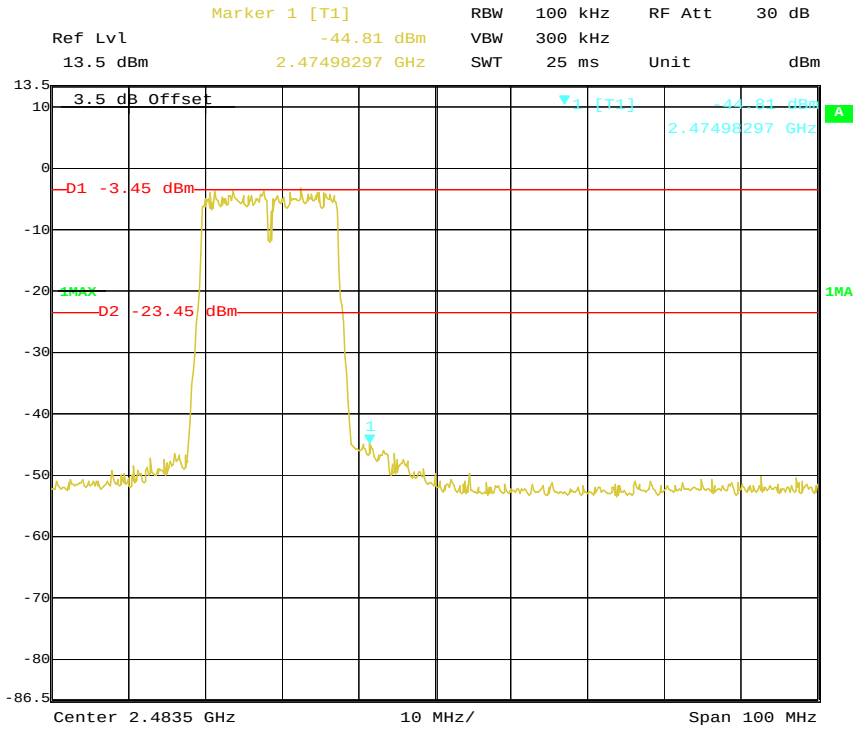
802.11g Band Edge, Right Side



802.11n-HT20 Band Edge, Left Side



802.11n-HT20 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

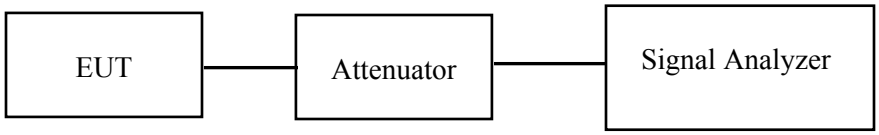
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

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

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v02 Clause 9.1 Option 1

1. Set analy center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measurement value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	56 %
ATM Pressure:	101.0kPa

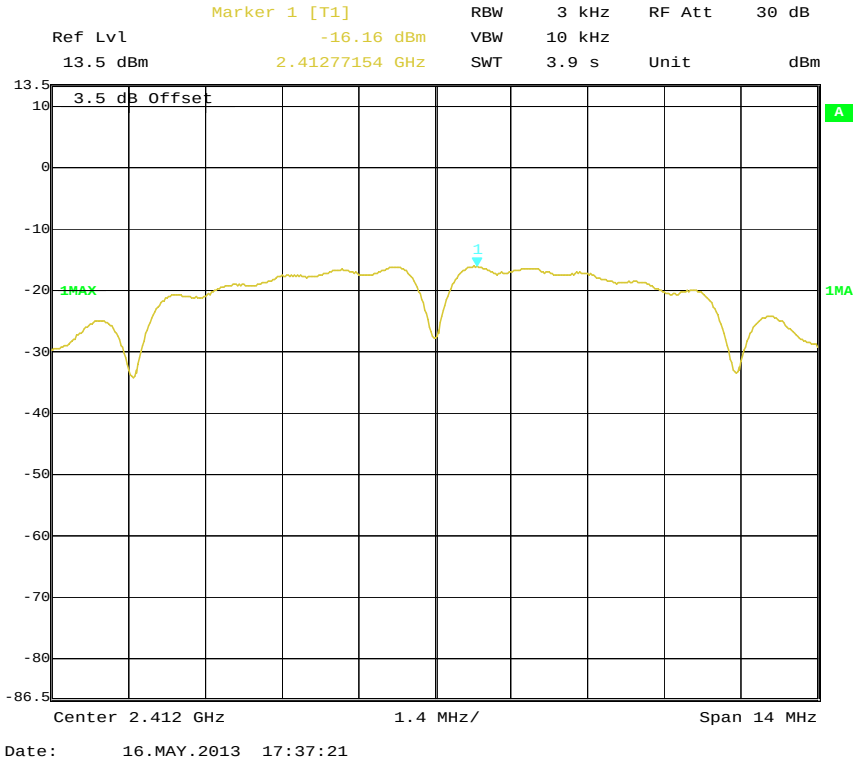
The testing was performed by Candy Li on 2013-05-16.

Test Mode: Transmitting

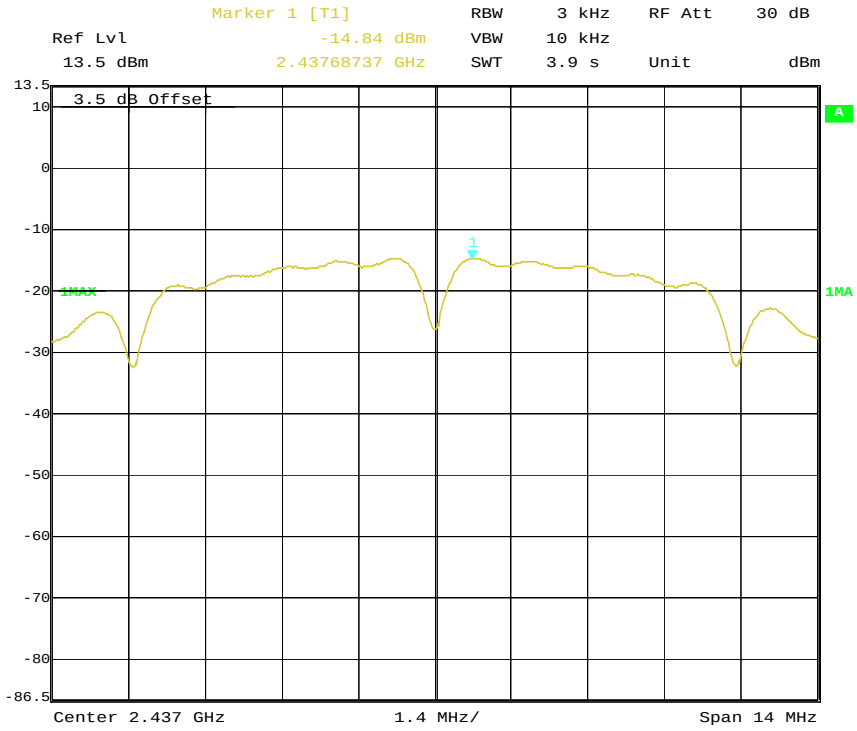
Test Result: Pass

Channel	Frequency (MHz)	Data Rate (Mbps)	Power spectral density (dBm/3 kHz)	Limit (dBm/3 kHz)
802.11b mode				
Low	2412	1	-16.16	8
Middle	2437	1	-14.84	8
High	2462	1	-14.10	8
802.11g mode				
Low	2412	6	-19.72	8
Middle	2437	6	-18.47	8
High	2462	6	-17.19	8
802.11n-HT20 mode				
Low	2412	6.5	-23.71	8
Middle	2437	6.5	-22.72	8
High	2462	6.5	-22.20	8

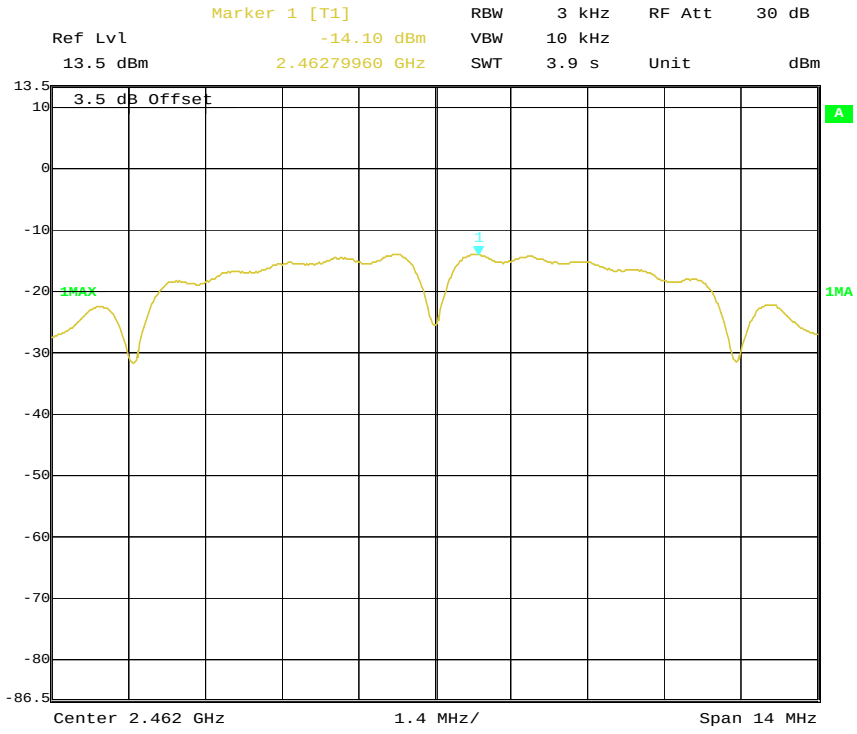
Power Spectral Density, 802.11b Low Channel



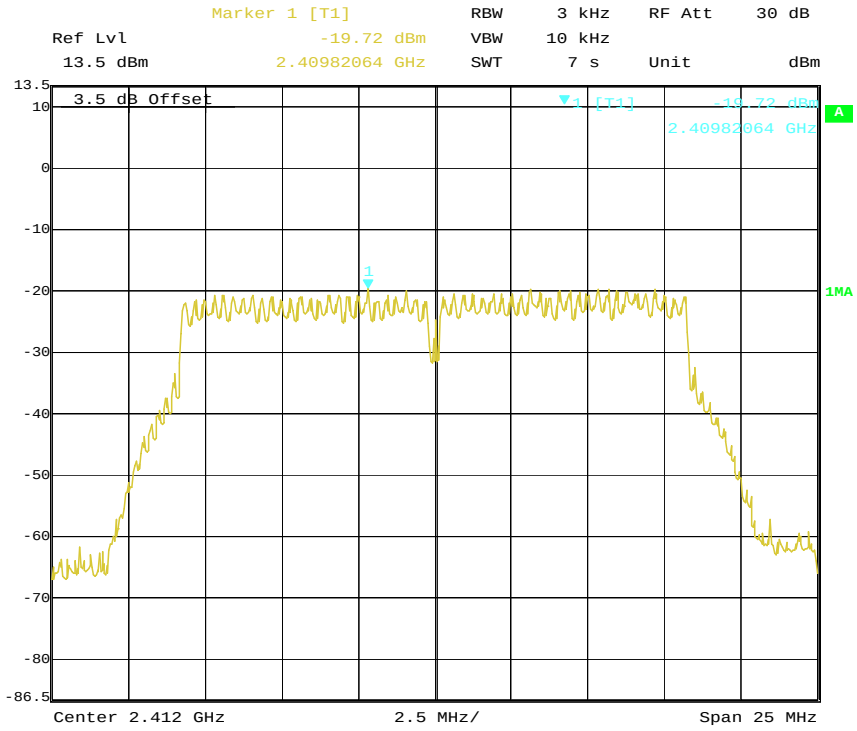
Power Spectral Density, 802.11b Middle Channel



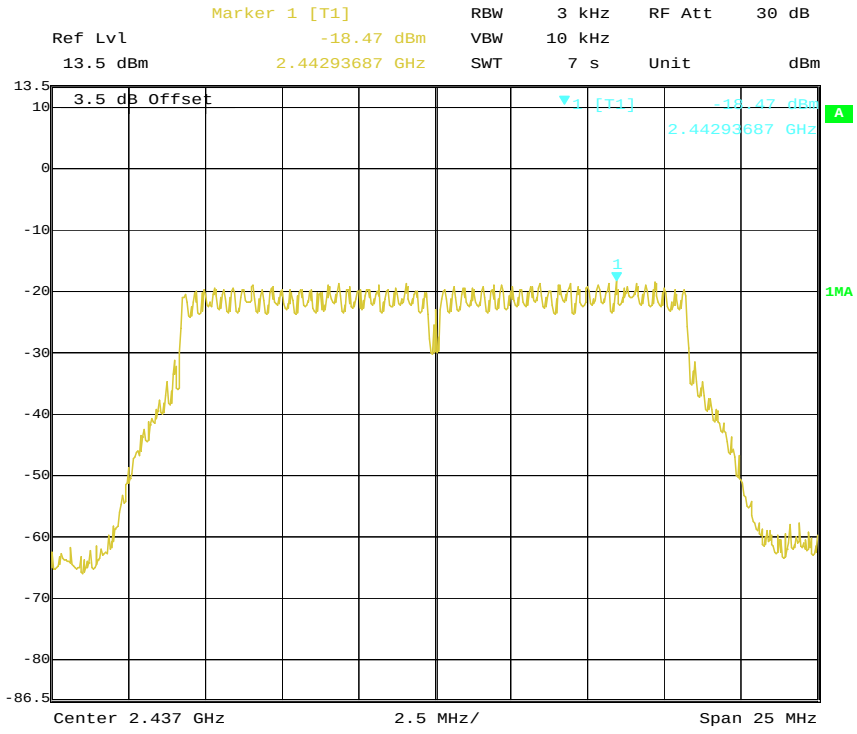
Power Spectral Density, 802.11b High Channel



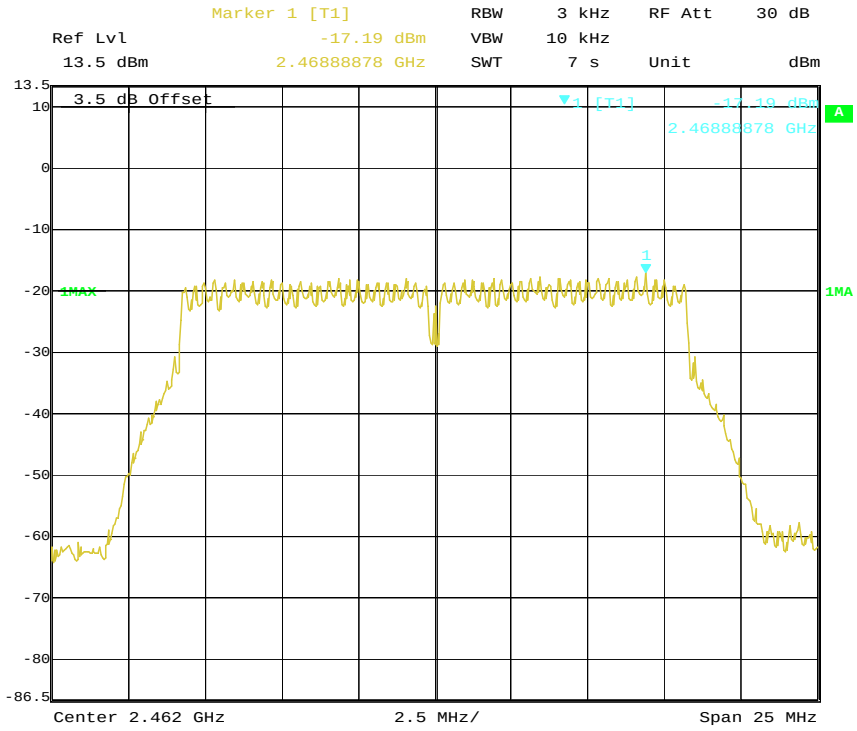
Power Spectral Density, 802.11g Low Channel



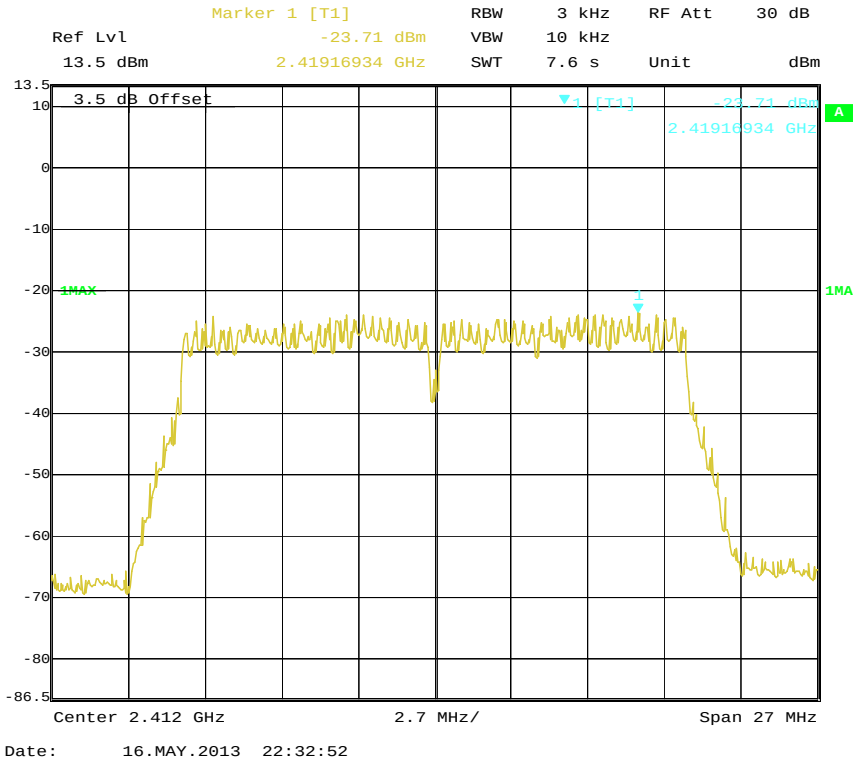
Power Spectral Density, 802.11g Middle Channel



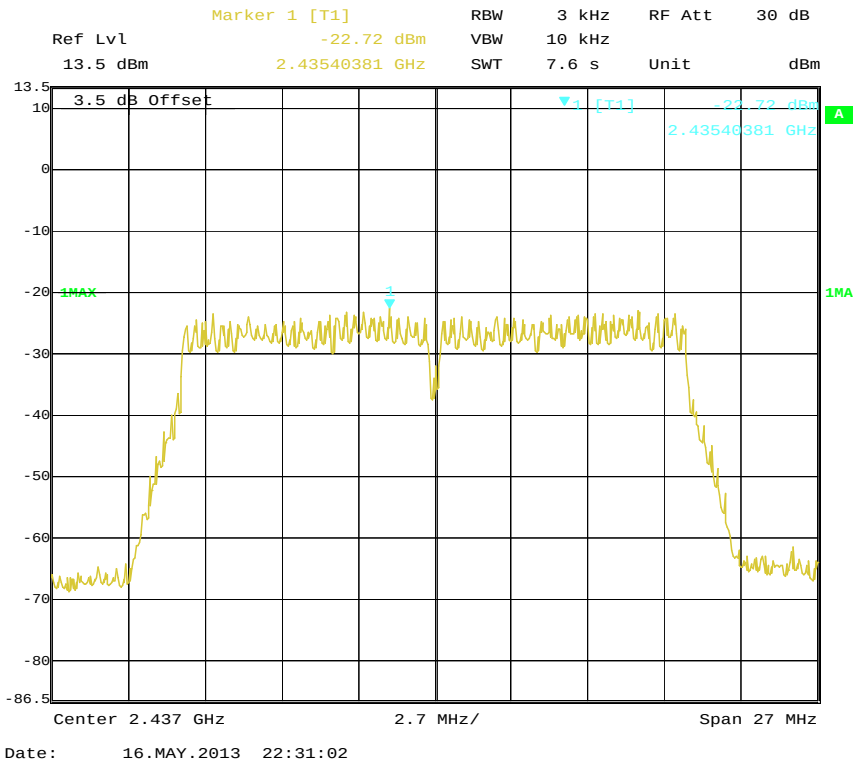
Power Spectral Density, 802.11g High Channel



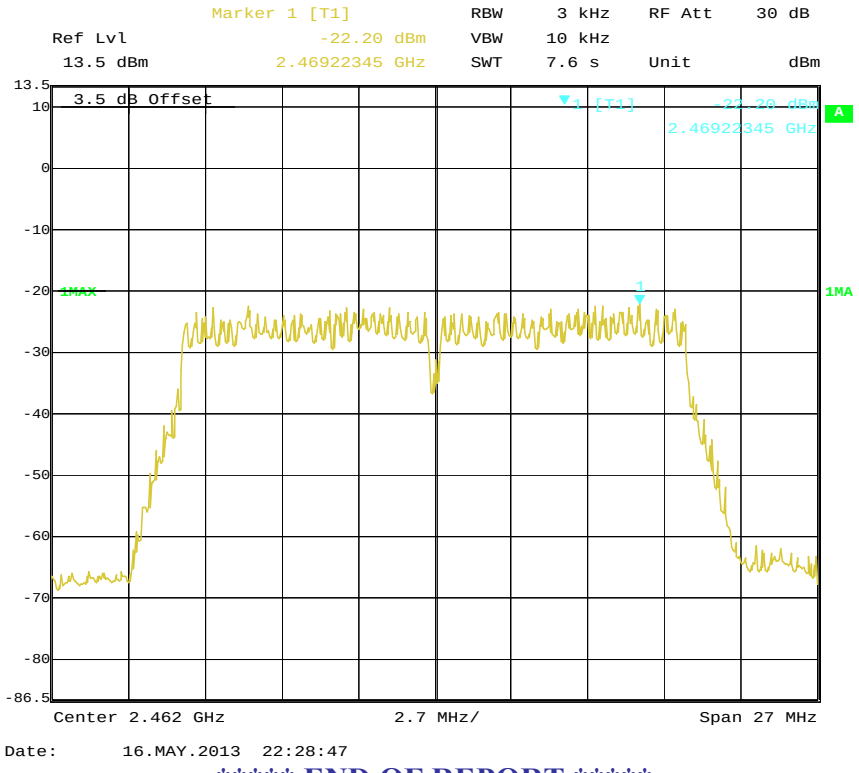
Power Spectral Density, 802.11n-HT20 Low Channel



Power Spectral Density, 802.11n-HT20 Middle Channel



Power Spectral Density, 802.11n-HT20 High Channel



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