LABCODE: 500069-0

FCC PART 15.247

TEST REPORT

For

Galaxy Microsystems Ltd.

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FCC ID: Y3GGALAPAD7G2

Report Type:	**Product Type:**
Original Report	Galapad 7

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Report Number:	R2DG130508007-00A
Report Date:	2013-07-31
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Galaxy Microsystems Ltd.*'s product, model number: *Galapad7(G2) (FCC ID: Y3GGALAPAD7G2)* (the "EUT") in this report was a *Galapad 7,* which was measured approximately: 19.5 cm (L) x 12.5 cm (W) x 1.0 cm (H), rated input voltage: DC 3.8 V from lithium battery or DC 5V from adapter.

Adapter information: GALAPAD
Model: LFS0502000D-A8S
Input: AC 100-240V, 50/60Hz, 500mA max
Output: DC 5V, 2.0A

** All measurement and test data in this report was gathered from production sample serial number: 130508007 (Assigned by BACL.Dongguan). The EUT was received on 2013-05-09.*

Objective

This report is prepared on behalf of *Galaxy Microsystems 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 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 JBP submissions with FCC ID: *Y3GGALAPAD7G2.*
FCC Part 15C DSS submissions with FCC ID: *Y3GGALAPAD7G2* for Bluetooth.

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.

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).

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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. For 2.4G band, 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.

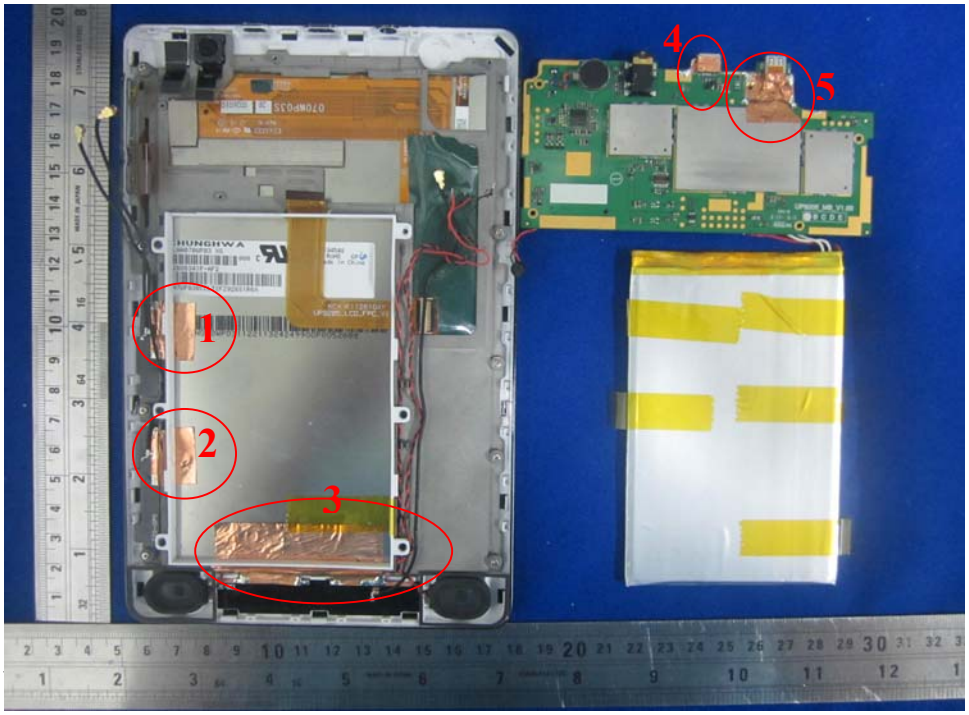
The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all date rates bandwidths, and modulations.

EUT Exercise Software

The software “adb.exe” was used, which was provided by the manufacturer.

Equipment Modifications

1. As shown on below, paste the copper on the position of the point 1, 2, 3, 4, 5.



2. Add an cord on the USB cable.

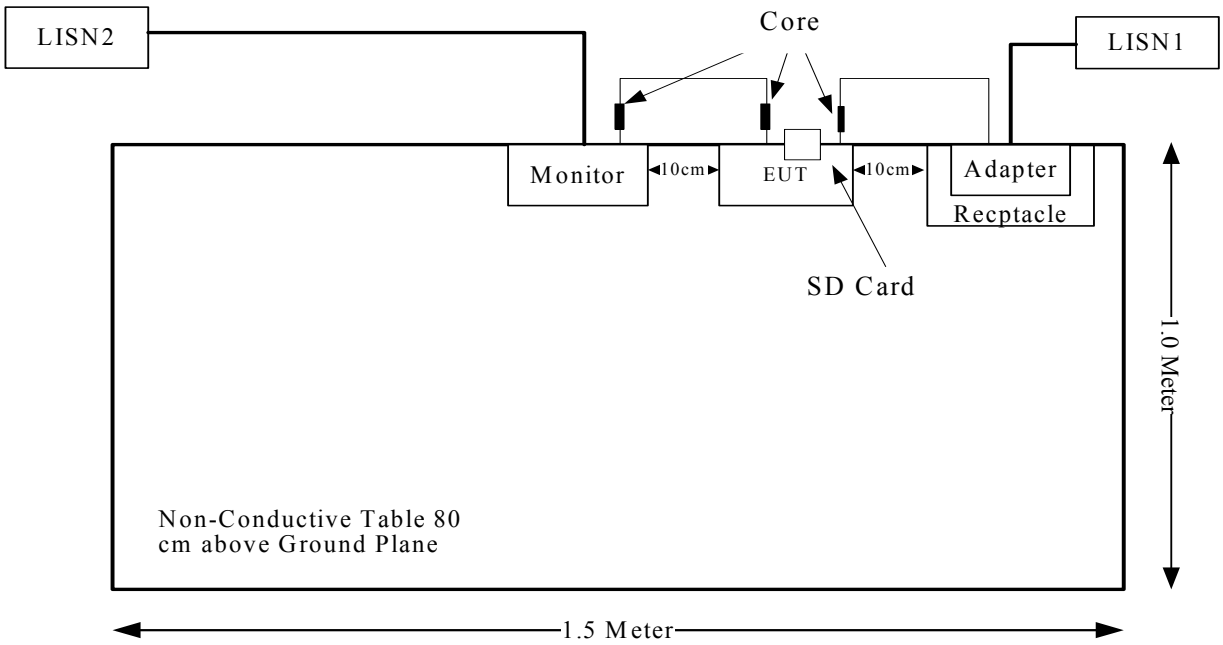
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Monitor	U3011t	CN-OPH5NY-74445-16T-290L
Kinston	Micro SD Card	4G	N/A

External Cable

Cable Description	Length (m)	From Port	To
Shielded Detachable HDMI Cable	1.5	LCD Monitor	EUT
Shielded Detachable USB Cable	1.0	Adapter	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line 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) & §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: R1DG130508007-20

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 PIFA antenna, which was permanently attached to the EUT, and the maximum gain is 1.6dBi, please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

Measurement Uncertainty

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

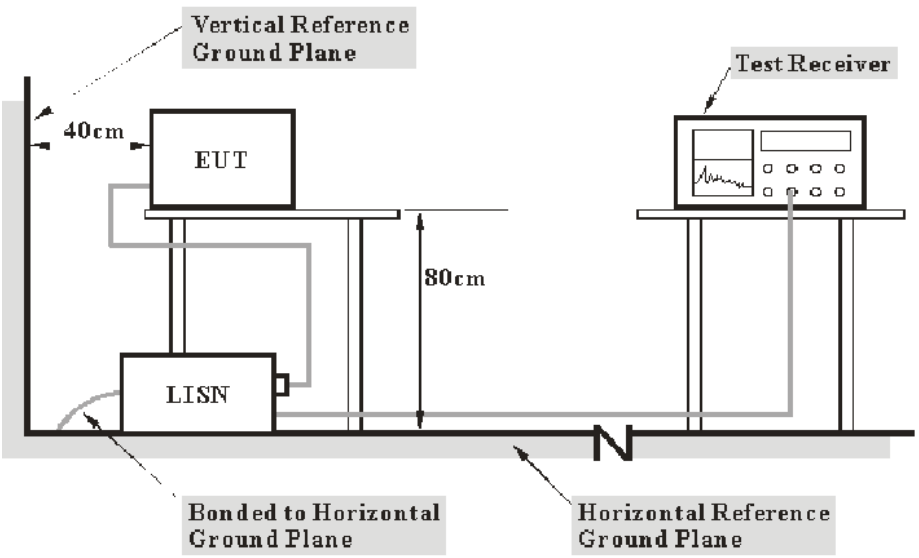
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, 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 conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

EUT Setup



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

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

The spacing between the peripherals was 10 cm.

The 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 outlet of the first LISN and the other support equipments were connected to the outlet of the second 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.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$
$C_f = A_C + VDF$

Herein,
V_C (cord. Reading): corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN
C_f: Correction Factor

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

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI TEST RECIEVER	ESCS 30	830245/006	2013-1-10	2014-1-9
R&S	L.I.S.N	ESH3-Z5	843331/015	2012-9-17	2013-9-16
R&S	L.I.S.N	ESH3-Z5	100113	2012-11-29	2013-11-28
BACL	Test Software	BACL-EMC	V1.0-2010	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 Part 15.207, with the worst margin reading of:

7.58dB at **0.560 MHz** in the **Line** conducted mode

Test Data

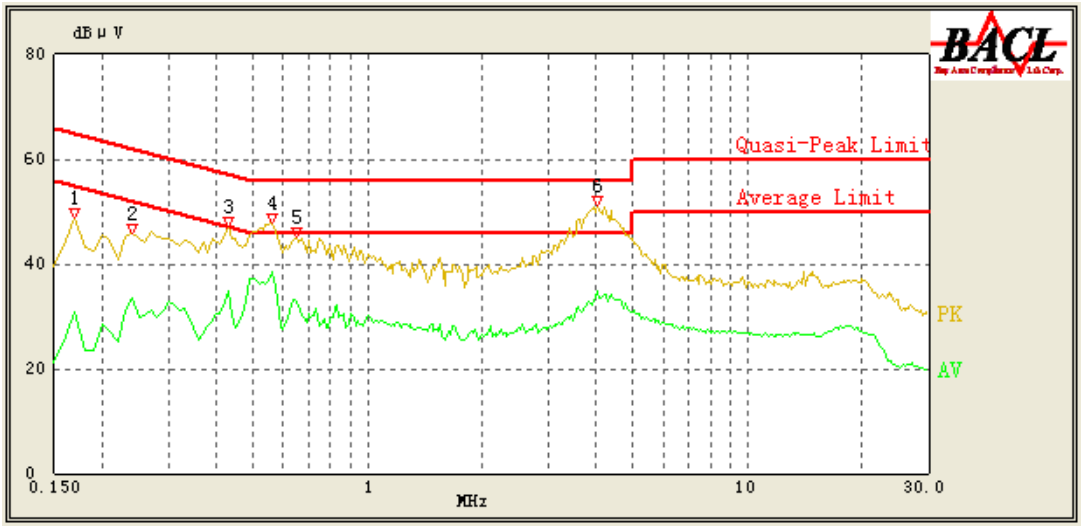
Environmental Conditions

Temperature:	28.3 °C
Relative Humidity:	61 %
ATM Pressure:	100.2 kPa

The testing was performed by Leon Chen on 2013-07-15.

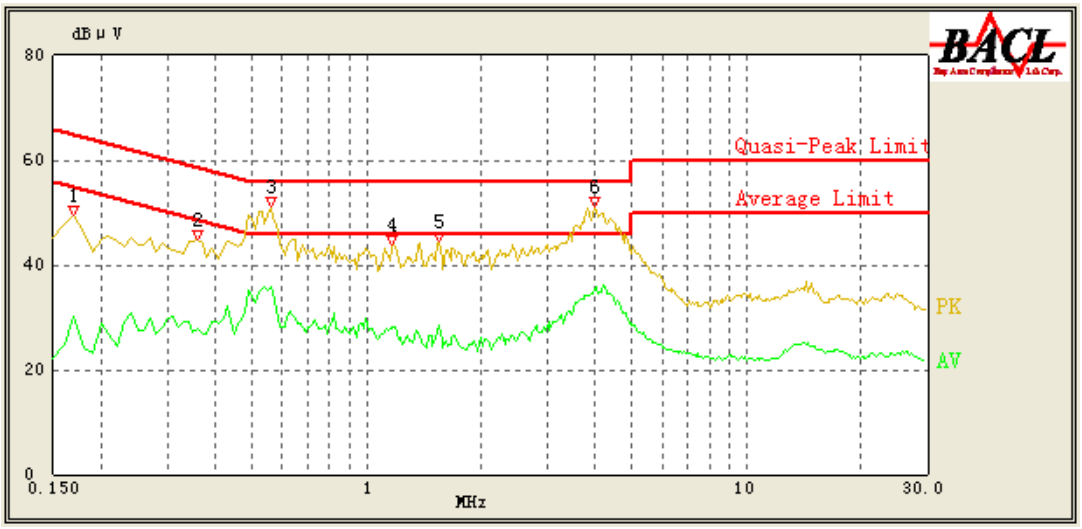
Test Mode: Transmitting

120 V, 60 Hz, Line:



Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.170	44.27	0.45	64.96	20.69	QP
0.170	30.84	0.45	54.96	24.12	AV
0.240	42.03	0.39	62.10	20.07	QP
0.240	33.59	0.39	52.10	18.51	AV
0.430	41.21	0.32	57.25	16.04	QP
0.430	34.70	0.32	47.25	12.55	AV
0.560	44.94	0.31	56.00	11.06	QP
0.560	38.42	0.31	46.00	7.58	AV
0.650	40.76	0.31	56.00	15.24	QP
0.650	32.94	0.31	46.00	13.06	AV
4.020	45.75	0.43	56.00	10.25	QP
4.020	34.73	0.43	46.00	11.27	AV

120 V, 60 Hz, Neutral:



Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.170	45.05	0.26	64.96	19.91	QP
0.170	30.15	0.26	54.96	24.81	AV
0.360	40.66	0.22	58.73	18.07	QP
0.360	27.71	0.22	48.73	21.02	AV
0.560	48.38	0.21	56.00	7.62	QP
0.560	35.77	0.21	46.00	10.23	AV
1.170	37.97	0.24	56.00	18.03	QP
1.170	27.78	0.24	46.00	18.22	AV
1.550	40.27	0.25	56.00	15.73	QP
1.550	28.58	0.25	46.00	17.42	AV
4.000	44.33	0.35	56.00	11.67	QP
3.980	35.51	0.35	46.00	10.49	AV

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.

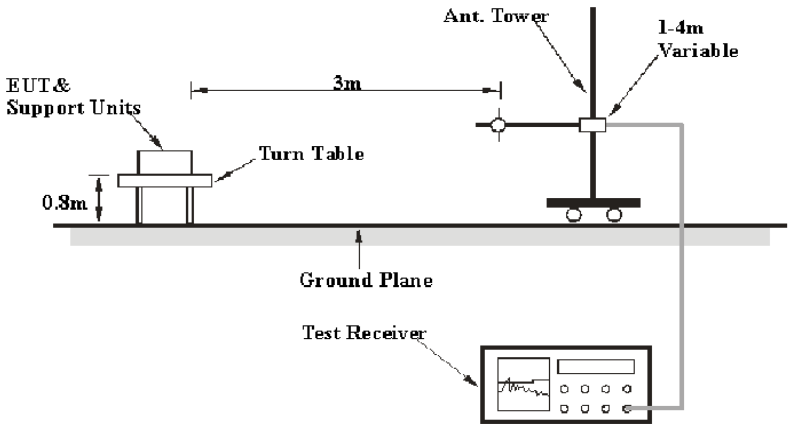
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

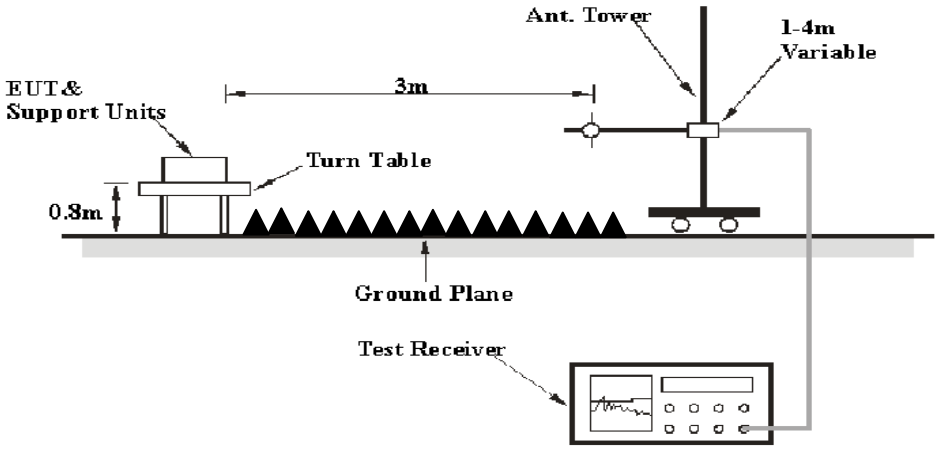
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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 C63.4-2003. The specification used was the FCC 15.209, and FCC 15.247 limits.

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

The spacing between the peripherals was 10 cm.

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

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

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

Test Procedure

For the radiated emissions 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
R&S	EMI TEST RECEIVER	ESCI	100224	2013-5-6	2014-5-5
Sunol Sciences	Antenna	JB3	A060611-1	2012-9-6	2015-9-5
HP	HP AMPLIFIER	8447E	2434A02181	N/A	N/A
R&S	Spectrum analyzer	FSEM 30	849016/001	2012-9-4	2013-9-3
ETS LINDGREN	horn antenna	3115	000 527 35	2012-9-6	2015-9-5
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	N/A	N/A
R&S	Spectrum analyzer	FSP 38	100478	2012-9-16	2013-9-15

*** 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:

8.92 dB at **2483.5 MHz** in the **Horizontal** polarization for 802.11g Mode

Test Data

Environmental Conditions

Temperature:	22.6~22.8° C
Relative Humidity:	67~68 %
ATM Pressure:	99.8~99.9kPa

The testing was performed by Leon Chen from 2013-05-10 to 2013-07-01.

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	76.08	PK	H	25.67	3.93	0.00	105.68	N/A	N/A
2412	71.4	AV	H	25.67	3.93	0.00	101.00	N/A	N/A
2412	70.25	PK	V	25.67	3.93	0.00	99.85	N/A	N/A
2412	65.43	AV	V	25.67	3.93	0.00	95.03	N/A	N/A
2390	25.63	PK	H	25.61	3.84	0.00	55.08	74.00	18.92
2390	13.61	AV	H	25.61	3.84	0.00	43.06	54.00	10.94
4824	41.57	PK	H	30.64	4.73	27.26	49.68	74.00	24.32
4824	36.23	AV	H	30.64	4.73	27.26	44.34	54.00	9.66
7236	33.14	PK	H	34.17	6.56	26.36	47.51	74.00	26.49
7236	20.57	AV	H	34.17	6.56	26.36	34.94	54.00	19.06
9648	33.28	PK	H	36.06	8.70	26.06	51.98	74.00	22.02
9648	19.81	AV	H	36.06	8.70	26.06	38.51	54.00	15.49
3298	34.45	PK	H	28.15	4.60	27.40	39.80	74.00	34.20
3298	20.98	AV	H	28.15	4.60	27.40	26.33	54.00	27.67
219.35	32.84	QP	H	11.55	1.79	21.47	24.71	46.00	21.29
Middle Channel: 2437 MHz									
2437	76.81	PK	H	25.74	3.98	0.00	106.53	N/A	N/A
2437	72.45	AV	H	25.74	3.98	0.00	102.17	N/A	N/A
2437	70.85	PK	V	25.74	3.98	0.00	100.57	N/A	N/A
2437	66.46	AV	V	25.74	3.98	0.00	96.18	N/A	N/A
4874	41.56	PK	H	30.77	4.76	27.26	49.83	74.00	24.17
4874	36.47	AV	H	30.77	4.76	27.26	44.74	54.00	9.26
7311	33.4	PK	H	34.35	6.70	26.51	47.94	74.00	26.06
7311	20.68	AV	H	34.35	6.70	26.51	35.22	54.00	18.78
9748	33.26	PK	H	36.30	8.60	25.68	52.48	74.00	21.52
9748	19.78	AV	H	36.30	8.60	25.68	39.00	54.00	15.00
1927	34.4	PK	H	24.45	3.45	27.09	35.21	74.00	38.79
1927	20.9	AV	H	24.45	3.45	27.09	21.71	54.00	32.29
3298	34.46	PK	H	28.15	4.60	27.40	39.81	74.00	34.19
3298	21.03	AV	H	28.15	4.60	27.40	26.38	54.00	27.62
218.75	31.65	QP	H	11.52	1.79	21.47	23.49	46.00	22.51
High Channel: 2462 MHz									
2462	77.27	PK	H	25.80	3.93	0.00	107.00	N/A	N/A
2462	72.67	AV	H	25.80	3.93	0.00	102.40	N/A	N/A
2462	71.23	PK	V	25.80	3.93	0.00	100.96	N/A	N/A
2462	66.82	AV	V	25.80	3.93	0.00	96.55	N/A	N/A
2483.5	27.57	PK	H	25.86	3.80	0.00	57.23	74.00	16.77
2483.5	15.19	AV	H	25.86	3.80	0.00	44.85	54.00	9.15
4924	41.77	PK	H	30.90	4.70	27.27	50.10	74.00	23.90
4924	36.54	AV	H	30.90	4.70	27.27	44.87	54.00	9.13
7386	33.43	PK	H	34.53	6.84	26.66	48.14	74.00	25.86
7386	20.69	AV	H	34.53	6.84	26.66	35.40	54.00	18.60
9848	33.55	PK	H	36.54	8.49	25.49	53.09	74.00	20.91
9848	19.97	AV	H	36.54	8.49	25.49	39.51	54.00	14.49
3298	34.62	PK	H	28.15	4.60	27.40	39.97	74.00	34.03
3298	21.13	AV	H	28.15	4.60	27.40	26.48	54.00	27.52
220.42	31.86	QP	H	11.59	1.80	21.47	23.78	46.00	22.22

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	75.53	PK	H	25.67	3.93	0.00	105.13	N/A	N/A
2412	64.15	AV	H	25.67	3.93	0.00	93.75	N/A	N/A
2412	69.83	PK	V	25.67	3.93	0.00	99.43	N/A	N/A
2412	58.45	AV	V	25.67	3.93	0.00	88.05	N/A	N/A
2390	28.53	PK	H	25.61	3.84	0.00	57.98	74.00	16.02
2390	14.44	AV	H	25.61	3.84	0.00	43.89	54.00	10.11
4824	40.12	PK	H	30.64	4.73	27.26	48.23	74.00	25.77
4824	24.21	AV	H	30.64	4.73	27.26	32.32	54.00	21.68
7236	33.02	PK	H	34.17	6.56	26.36	47.39	74.00	26.61
7236	20.23	AV	H	34.17	6.56	26.36	34.60	54.00	19.40
9648	32.87	PK	H	36.06	8.70	26.06	51.57	74.00	22.43
9648	19.78	AV	H	36.06	8.70	26.06	38.48	54.00	15.52
3298	34.05	PK	H	28.15	4.60	27.40	39.40	74.00	34.60
3298	20.39	AV	H	28.15	4.60	27.40	25.74	54.00	28.26
219.35	32.35	QP	H	11.55	1.79	21.47	24.22	46.00	21.78
Middle Channel: 2437 MHz									
2437	76.44	PK	H	25.74	3.98	0.00	106.16	N/A	N/A
2437	64.72	AV	H	25.74	3.98	0.00	94.44	N/A	N/A
2437	70.32	PK	V	25.74	3.98	0.00	100.04	N/A	N/A
2437	58.78	AV	V	25.74	3.98	0.00	88.50	N/A	N/A
4874	40.29	PK	H	30.77	4.76	27.26	48.56	74.00	25.44
4874	24.31	AV	H	30.77	4.76	27.26	32.58	54.00	21.42
7311	32.95	PK	H	34.35	6.70	26.51	47.49	74.00	26.51
7311	20.24	AV	H	34.35	6.70	26.51	34.78	54.00	19.22
9748	32.72	PK	H	36.30	8.60	25.68	51.94	74.00	22.06
9748	19.78	AV	H	36.30	8.60	25.68	39.00	54.00	15.00
1927	34.02	PK	H	24.45	3.45	27.09	34.83	74.00	39.17
1927	20.45	AV	H	24.45	3.45	27.09	21.26	54.00	32.74
3298	33.16	PK	H	28.15	4.60	27.40	38.51	74.00	35.49
3298	20.34	AV	H	28.15	4.60	27.40	25.69	54.00	28.31
218.75	31.76	QP	H	11.52	1.79	21.47	23.60	46.00	22.4
High Channel: 2462 MHz									
2462	76.72	PK	H	25.80	3.93	0.00	106.45	N/A	N/A
2462	64.93	AV	H	25.80	3.93	0.00	94.66	N/A	N/A
2462	70.63	PK	V	25.80	3.93	0.00	100.36	N/A	N/A
2462	58.97	AV	V	25.80	3.93	0.00	88.70	N/A	N/A
2483.5	29.31	PK	H	25.86	3.80	0.00	58.97	74.00	15.03
2483.5	15.42	AV	H	25.86	3.80	0.00	45.08	54.00	8.92
4924	40.33	PK	H	30.90	4.70	27.27	48.66	74.00	25.34
4924	24.41	AV	H	30.90	4.70	27.27	32.74	54.00	21.26
7386	33.23	PK	H	34.53	6.84	26.66	47.94	74.00	26.06
7386	20.52	AV	H	34.53	6.84	26.66	35.23	54.00	18.77
9848	32.97	PK	H	36.54	8.49	25.49	52.51	74.00	21.49
9848	19.89	AV	H	36.54	8.49	25.49	39.43	54.00	14.57
3298	34.13	PK	H	28.15	4.60	27.40	39.48	74.00	34.52
3298	20.62	AV	H	28.15	4.60	27.40	25.97	54.00	28.03
220.42	31.24	QP	H	11.59	1.80	21.47	23.16	46.00	22.84

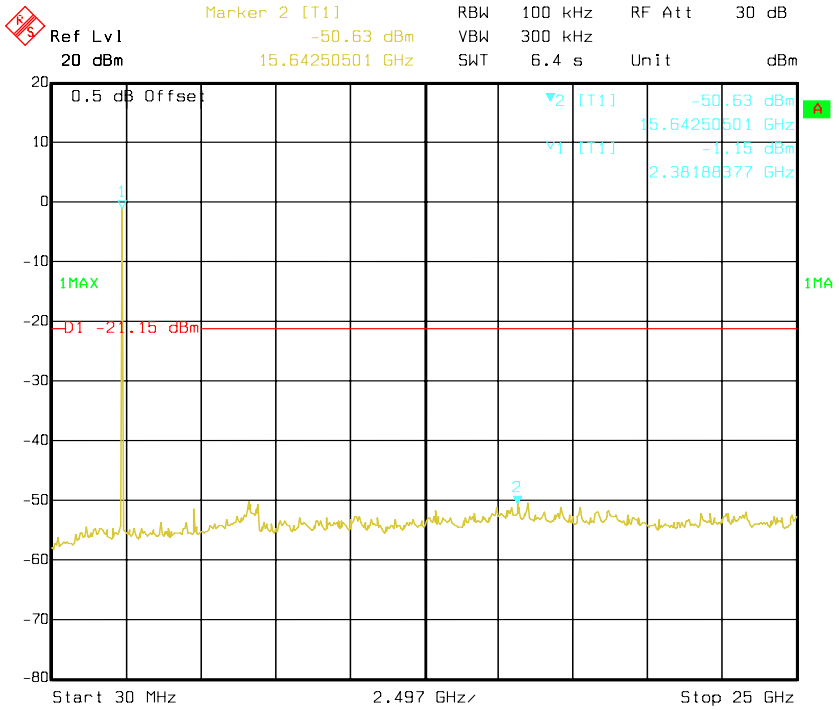
802.11 n20 Mode

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	76.92	PK	H	25.67	3.93	0.00	106.52	N/A	N/A
2412	65.91	AV	H	25.67	3.93	0.00	95.51	N/A	N/A
2412	69.89	PK	V	25.67	3.93	0.00	99.49	N/A	N/A
2412	58.47	AV	V	25.67	3.93	0.00	88.07	N/A	N/A
2390	30.95	PK	H	25.61	3.84	0.00	60.4	74.00	13.6
2390	14.03	AV	H	25.61	3.84	0.00	43.48	54.00	10.52
4824	40.26	PK	H	30.64	4.73	27.26	48.37	74.00	25.63
4824	26.02	AV	H	30.64	4.73	27.26	34.13	54.00	19.87
7236	34.69	PK	H	34.17	6.56	26.36	49.06	74.00	24.94
7236	21.26	AV	H	34.17	6.56	26.36	35.63	54.00	18.37
9648	31.25	PK	H	36.06	8.7	26.06	49.95	74.00	24.05
9648	20.17	AV	H	36.06	8.7	26.06	38.87	54.00	15.13
3298	34.12	PK	H	28.15	4.6	27.4	39.47	74.00	34.53
3298	19.64	AV	H	28.15	4.6	27.4	24.99	54.00	29.01
219.35	32.01	QP	H	11.55	1.79	21.47	23.88	46.00	22.12
Middle Channel: 2437 MHz									
2437	75.24	PK	H	25.74	3.98	0.00	104.96	N/A	N/A
2437	64.06	AV	H	25.74	3.98	0.00	93.78	N/A	N/A
2437	68.24	PK	V	25.74	3.98	0.00	97.96	N/A	N/A
2437	54.93	AV	V	25.74	3.98	0.00	84.65	N/A	N/A
4874	41.06	PK	H	30.77	4.76	27.26	49.33	74.00	24.5
4874	23.58	AV	H	30.77	4.76	27.26	31.85	54.00	21.58
7311	33.26	PK	H	34.35	6.7	26.51	47.8	74.00	26.44
7311	21.05	AV	H	34.35	6.7	26.51	35.59	54.00	19.13
9748	33.09	PK	H	36.3	8.6	25.68	52.31	74.00	22.19
9748	20.17	AV	H	36.3	8.6	25.68	39.39	54.00	15.4
1927	33.26	PK	H	24.45	3.45	27.09	34.07	74.00	39.38
1927	21.54	AV	H	24.45	3.45	27.09	22.35	54.00	32.81
3298	32.15	PK	H	28.15	4.6	27.4	37.5	74.00	34.98
3298	19.29	AV	H	28.15	4.6	27.4	24.64	54.00	28.23
218.75	29.47	QP	H	11.52	1.79	21.47	21.31	46.00	20.72
High Channel: 2462 MHz									
2462	76.23	PK	H	25.8	3.93	0.00	105.96	N/A	N/A
2462	66.84	AV	H	25.8	3.93	0.00	96.57	N/A	N/A
2462	70.16	PK	V	25.8	3.93	0.00	99.89	N/A	N/A
2462	61.03	AV	V	25.8	3.93	0.00	90.76	N/A	N/A
2483.5	31.25	PK	H	25.86	3.8	0.00	60.91	74.00	12.09
2483.5	16.66	AV	H	25.86	3.8	0.00	46.32	54.00	9.98
4924	40.95	PK	H	30.9	4.7	27.27	49.28	74.00	24.31
4924	25.16	AV	H	30.9	4.7	27.27	33.49	54.00	21.36
7386	34.02	PK	H	34.53	6.84	26.66	48.73	74.00	26.2
7386	20.95	AV	H	34.53	6.84	26.66	35.66	54.00	18.95
9848	31.58	PK	H	36.54	8.49	25.49	51.12	74.00	21.69
9848	20.06	AV	H	36.54	8.49	25.49	39.6	54.00	14.84
3298	33.25	PK	H	28.15	4.6	27.4	38.6	74.00	34.7
3298	21.06	AV	H	28.15	4.6	27.4	26.41	54.00	28.05
220.42	31.02	QP	H	11.59	1.8	21.47	22.94	46.00	19.72

*Within measurement uncertainty!

Conducted Spurious Emissions at Antenna Port

802.11b Low Channel



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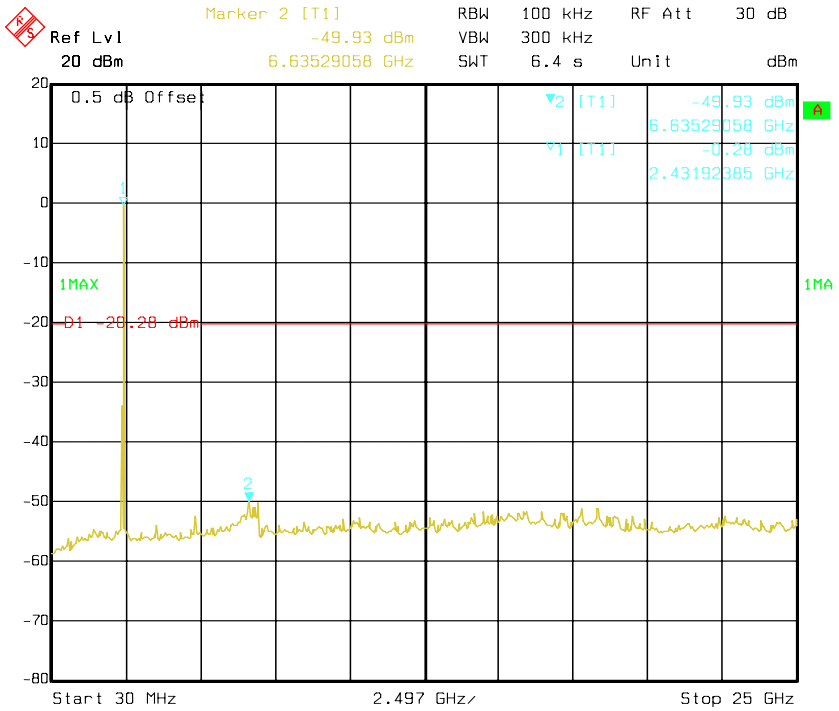
802.11b Middle Channel



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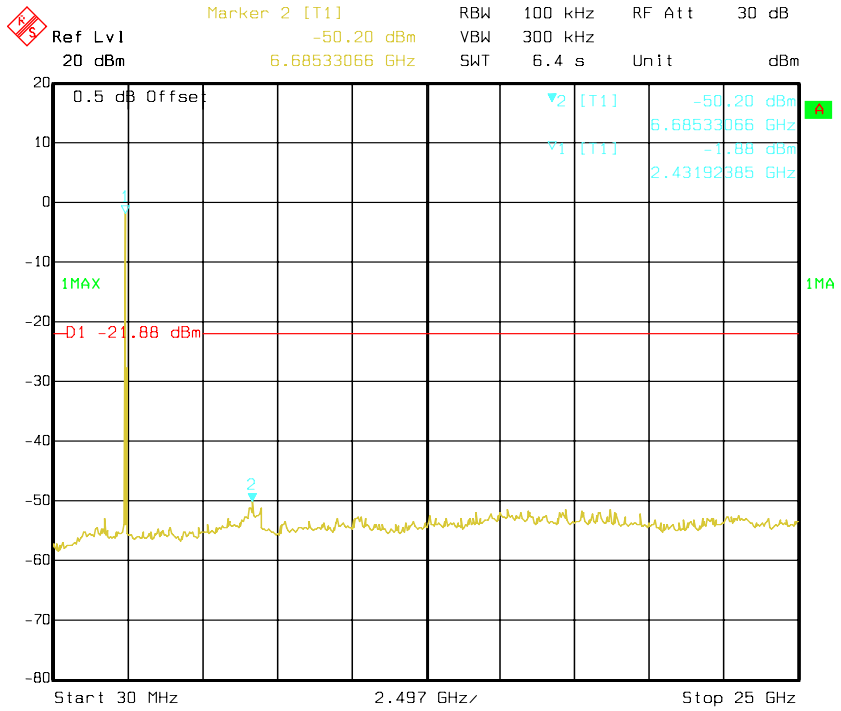
802.11b High Channel



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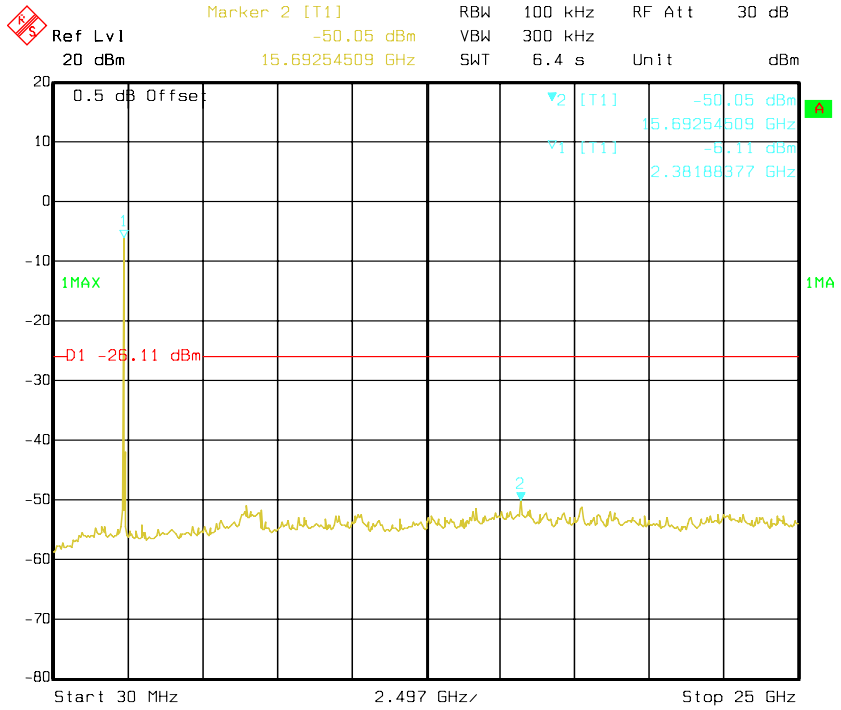
802.11g Low Channel



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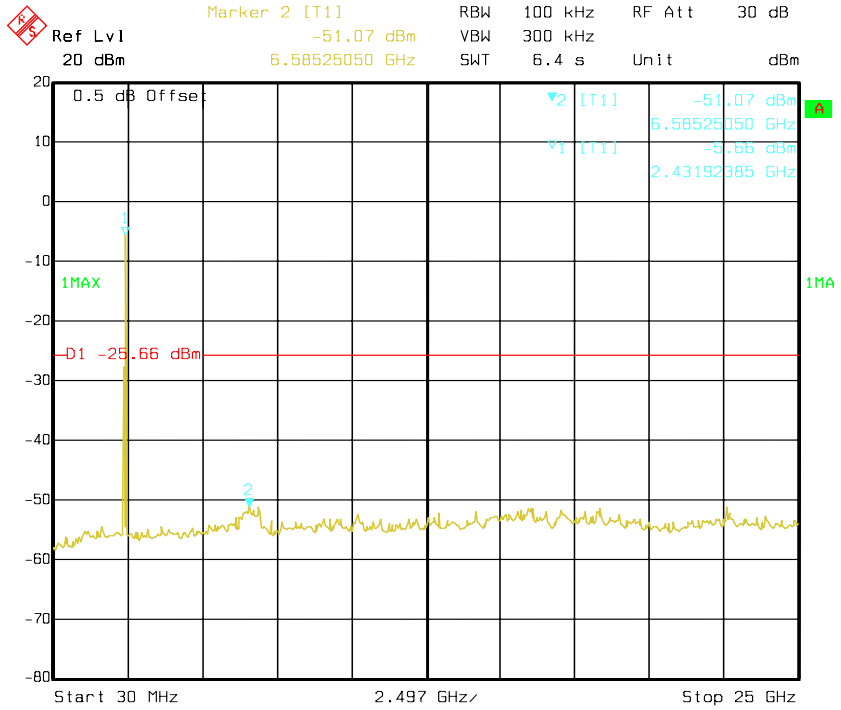
802.11g Middle Channel



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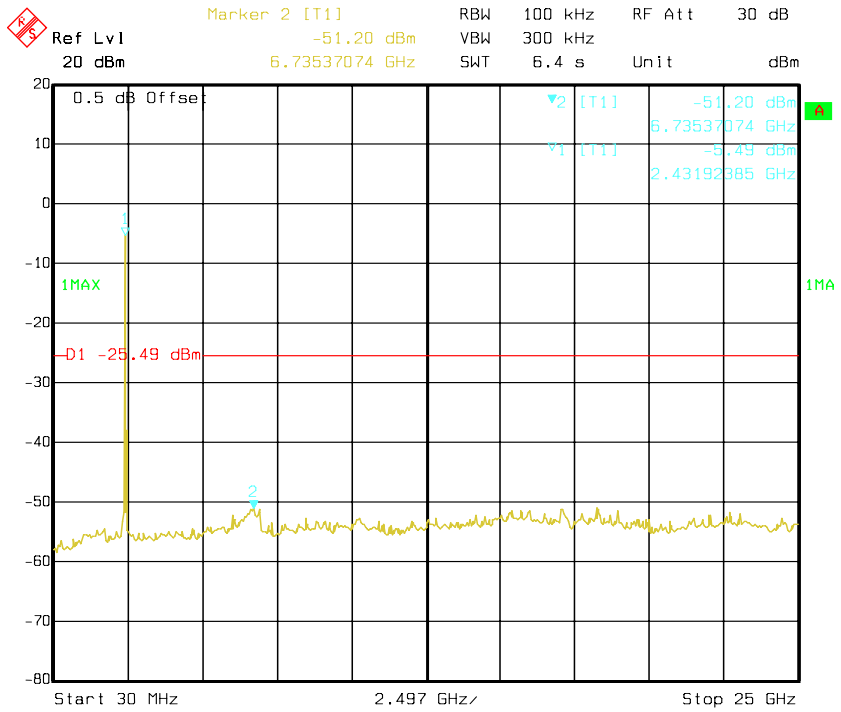
802.11g High Channel



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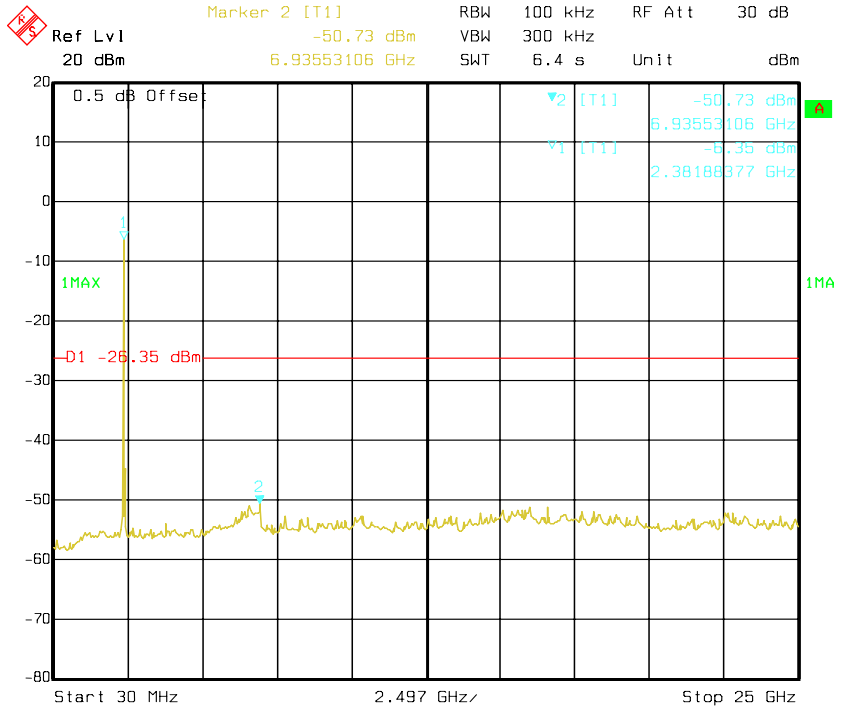
802.11n20 Low Channel



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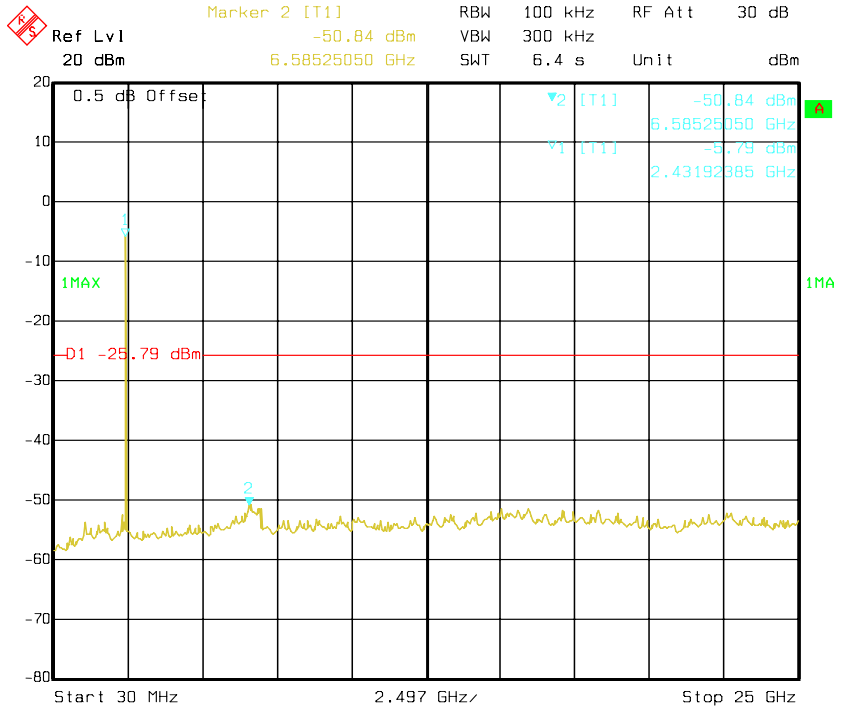
802.11n20 Middle Channel



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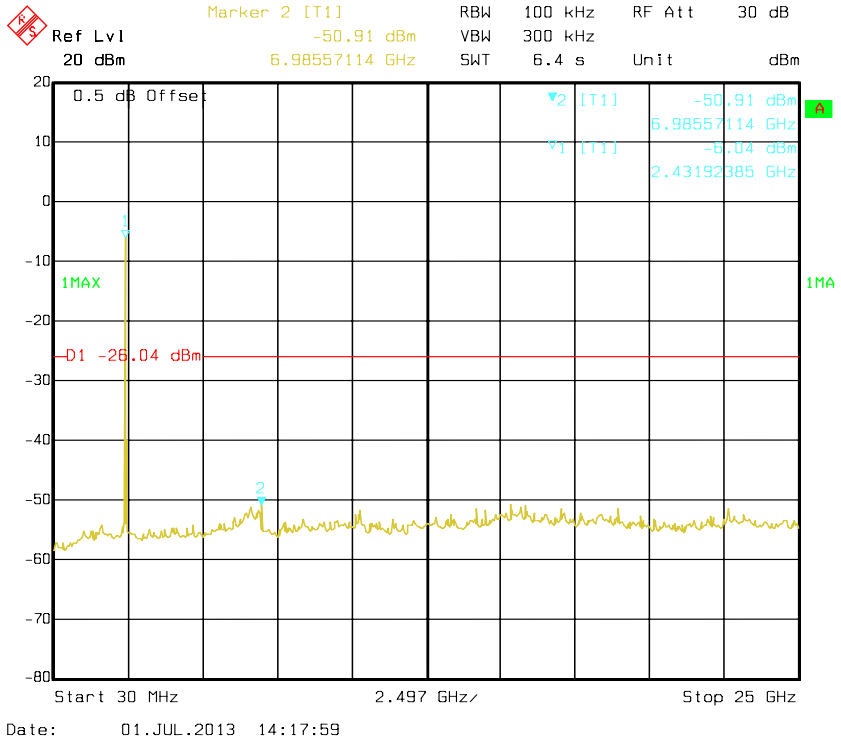
802.11n20 High Channel



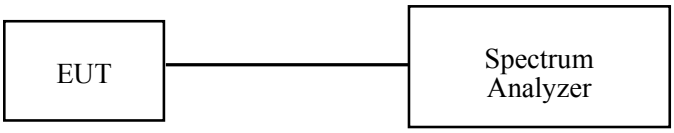
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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
R&S	Spectrum analyzer	FSP 38	100478	2012-9-16	2013-9-15

*** 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:	24.3~29.7° C
Relative Humidity:	56~70 %
ATM Pressure:	99.5~100.5kPa

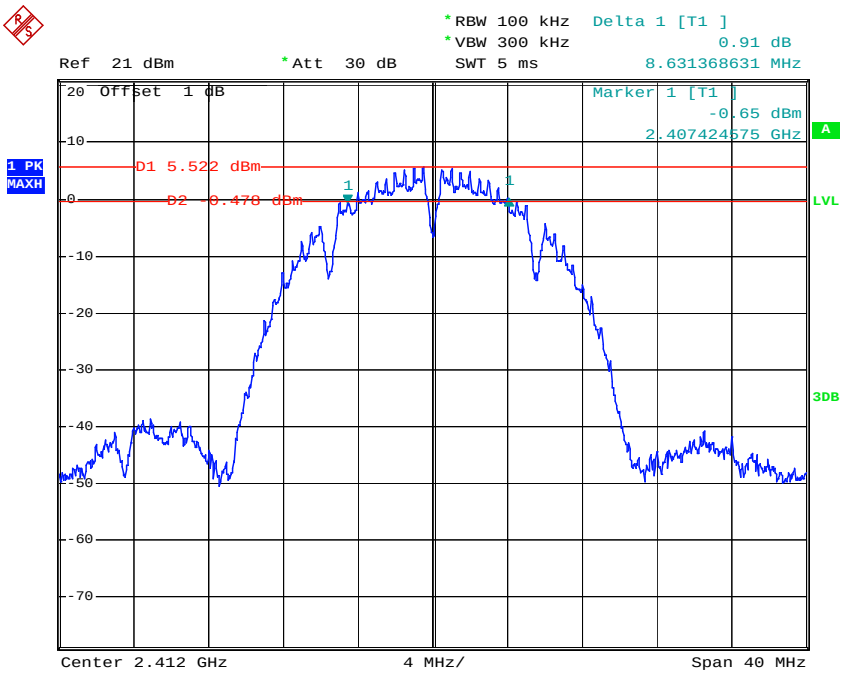
The testing was performed by Leon Chen from 2013-05-10 to 2013-08-02.

Test Result: Pass.

Please refer to the following tables and plots.

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limit (kHz)
802.11b mode			
Low	2412	8.63	>500
Middle	2437	9.59	>500
High	2462	9.63	>500
802.11g mode			
Low	2412	15.46	>500
Middle	2437	15.06	>500
High	2462	15.10	>500
802.11n20 mode			
Low	2412	16.56	>500
Middle	2437	16.40	>500
High	2462	16.72	>500

802.11b Low Channel



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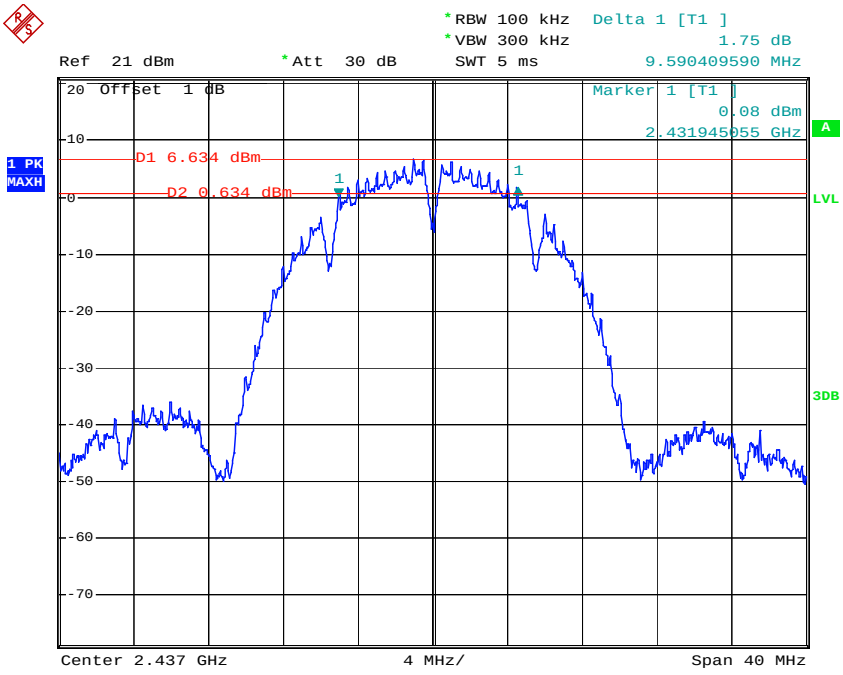
802.11b Middle Channel



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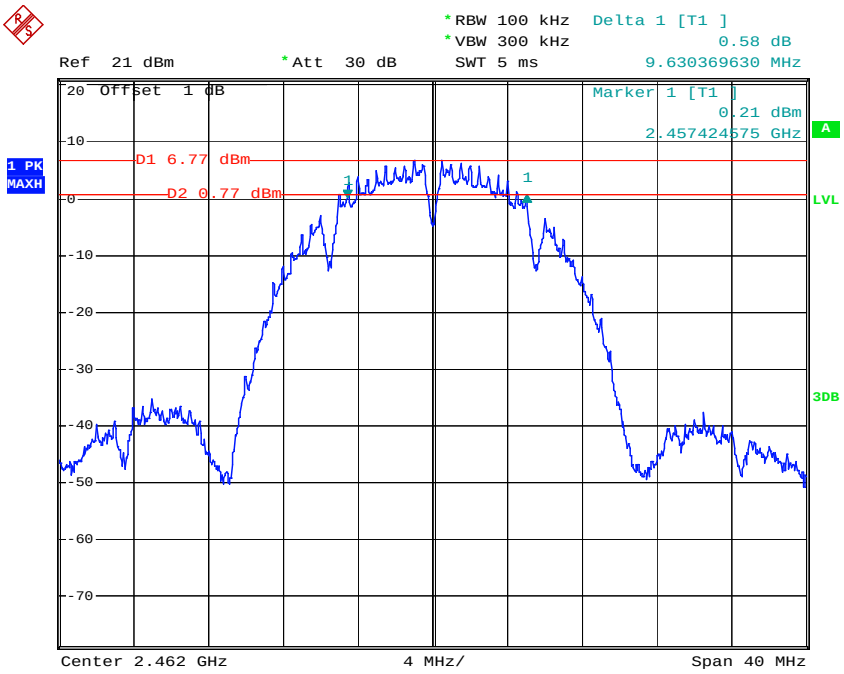
802.11b High Channel



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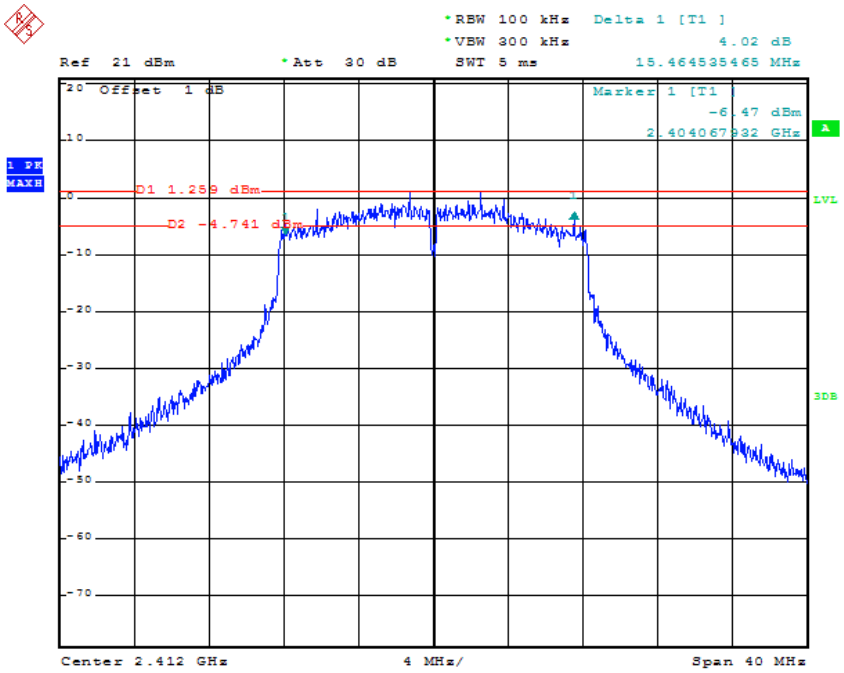
802.11g Low Channel



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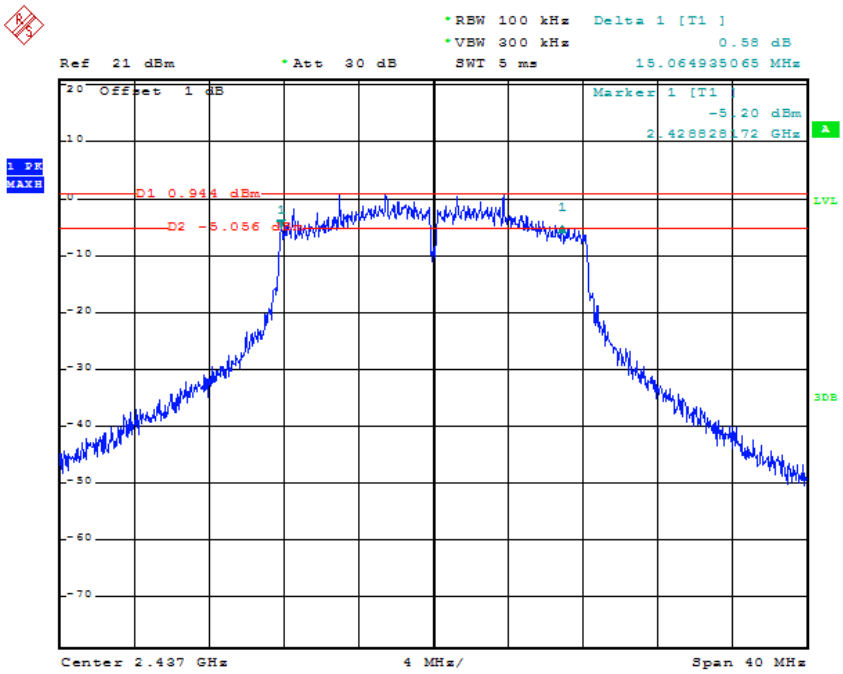
802.11g Middle Channel



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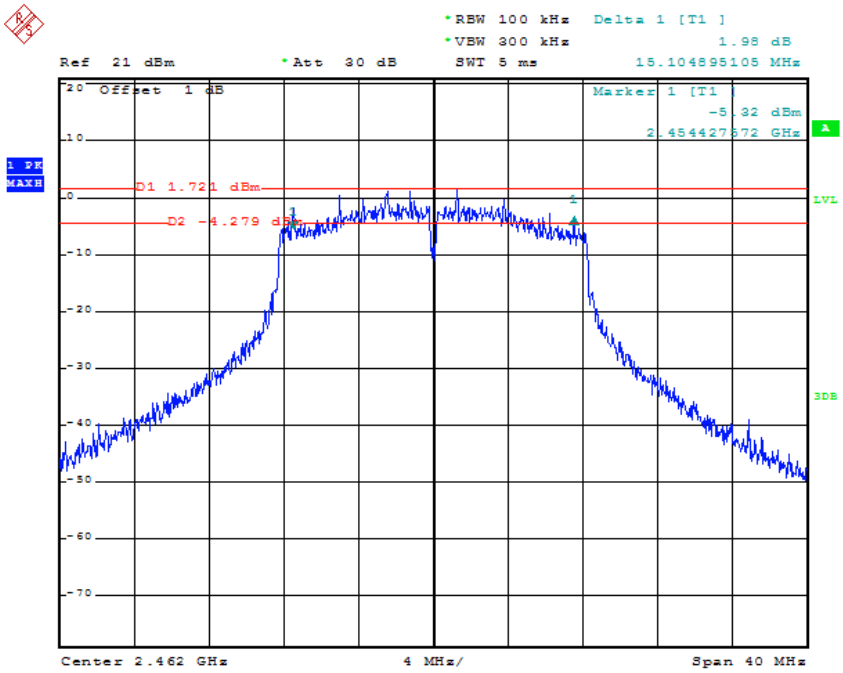
802.11g High Channel



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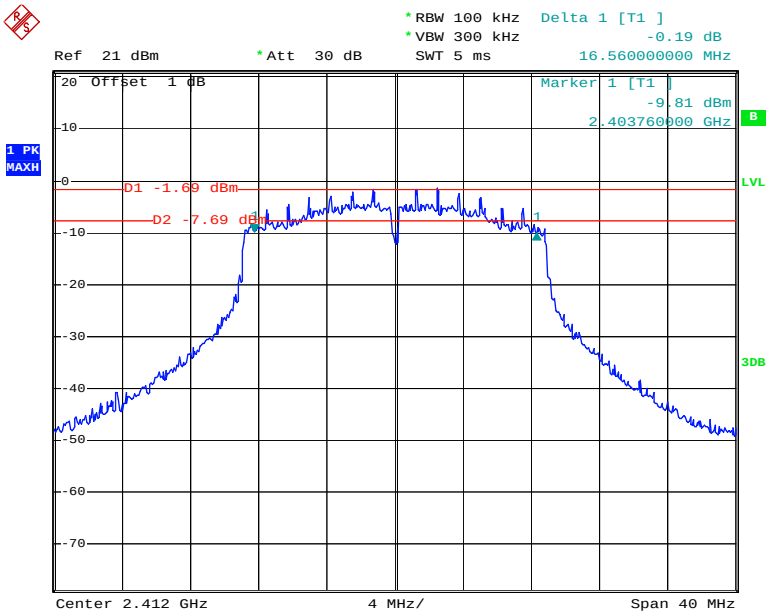
802.11n20 Low Channel



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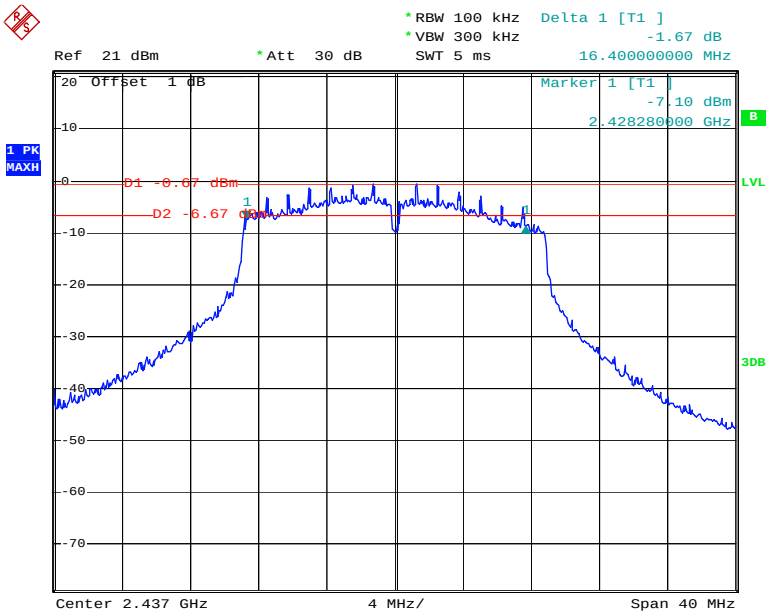
802.11n20 Middle Channel



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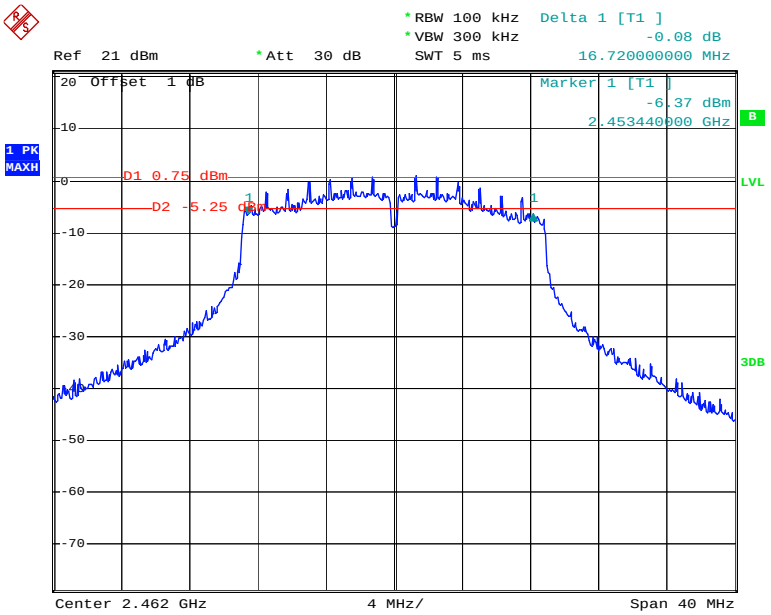
802.11n20 High Channel



Date: 2.AUG.2013 14:56:34

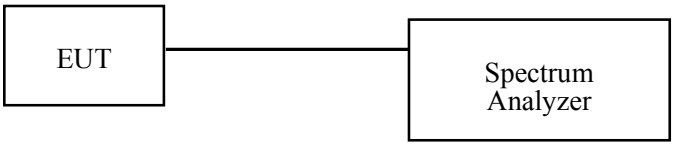
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

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.



4. According to KDB 558074 D01 DTS Meas Guidance v02, Section 8.2.1 Option 1:
   4.1 Set the analyzer span to a minimum of 1.5 times the EBW.
   4.2 Set the RBW = 1 MHz.
   4.3 Set the VBW = 3 MHz.
   4.4 Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW
   4.5 Sweep time = auto couple.
   4.6 Detector = power averaging (RMS) or sample detector when RMS not available.
   4.7 Employ trace averaging in power averaging (RMS) mode over a minimum of 100 traces.
   4.8 Use the spectrum analyzer's band power measurement function with band limits set equal to the EBW band edges.

   Note：EBW means 26dB bandwidth.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum analyzer	FSP 38	100478	2012-9-16	2013-9-15

*** 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:	24.3~29.7°C
Relative Humidity:	62~70 %
ATM Pressure:	99.5~100.5kPa

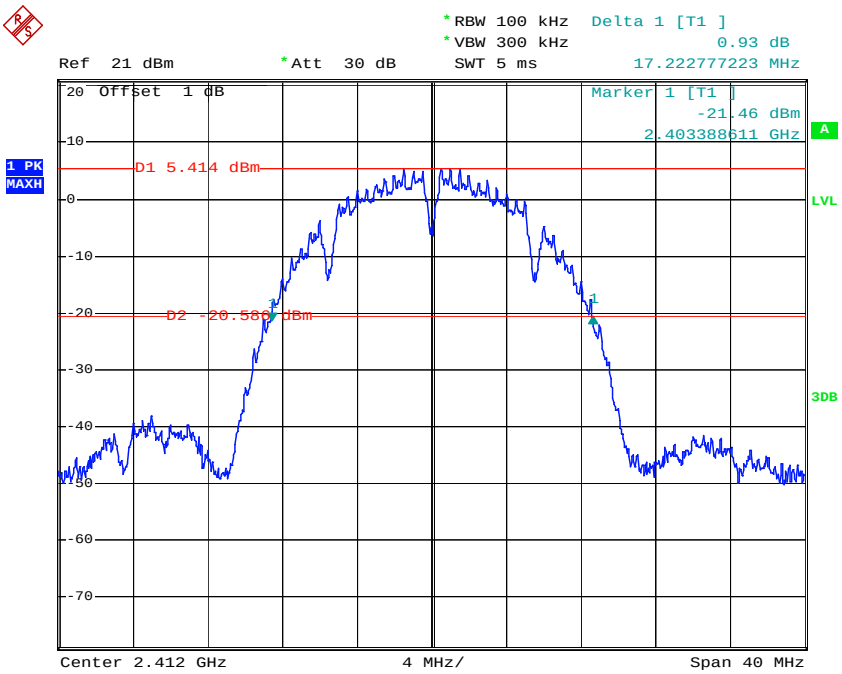
The testing was performed by Leon Chen from 2013-05-10 to 2013-07-15.

Test Mode: Transmitting

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Result
802.11b mode				
Low	2412	14.86	30	PASS
Middle	2437	14.84	30	PASS
High	2462	14.98	30	PASS
802.11g mode				
Low	2412	14.56	30	PASS
Middle	2437	14.69	30	PASS
High	2462	14.54	30	PASS
802.11n20 mode				
Low	2412	14.27	30	PASS
Middle	2437	14.14	30	PASS
High	2462	14.45	30	PASS

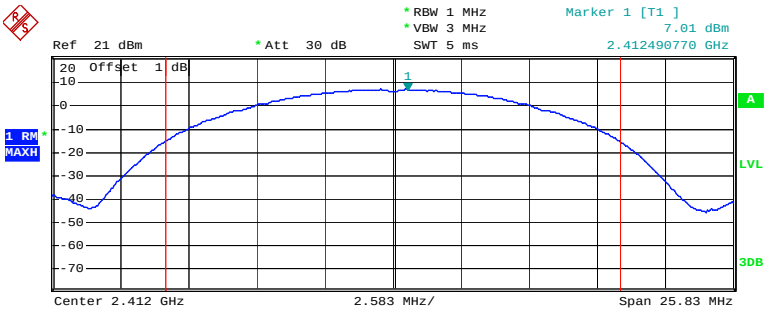
Please refer to the following plots

802.11b 26dB, Low Channel



Date: 10.MAY.2013 16:18:10

802.11b RF Output Power, Low Channel

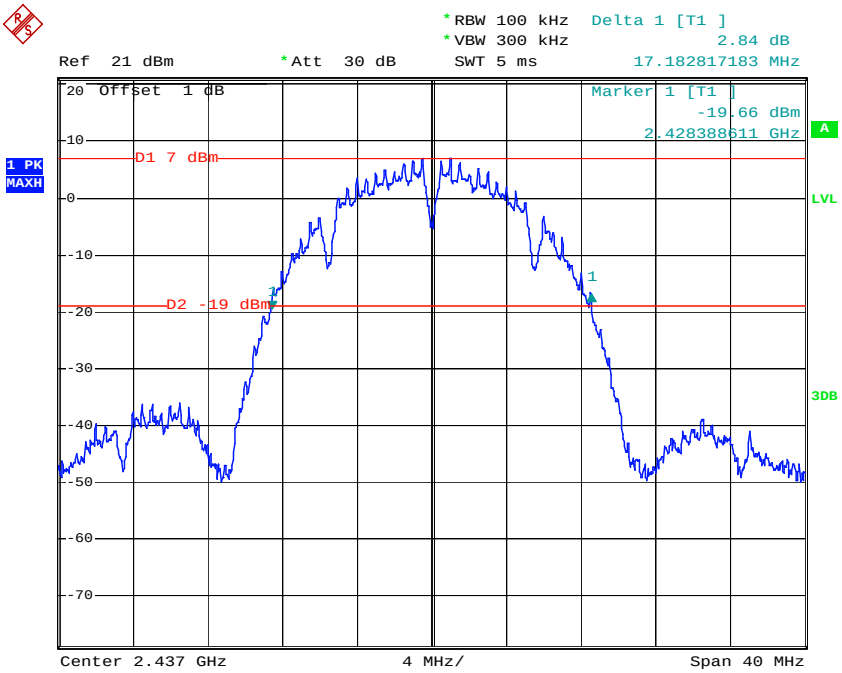


Tx Channel

Bandwidth	17.22 MHz	Power	14.86 dBm

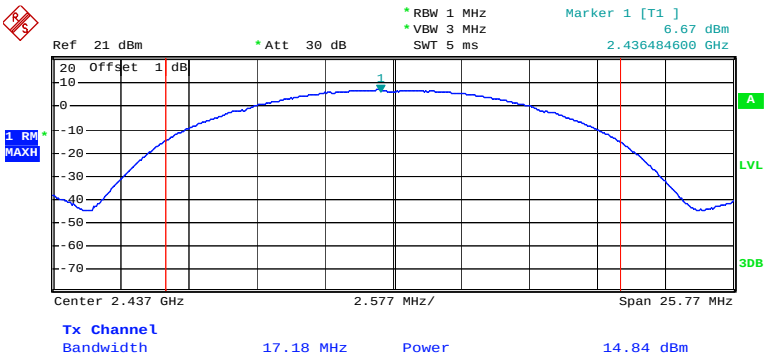
Date: 15.JUL.2013 14:18:01

802.11b 26dB, Middle Channel



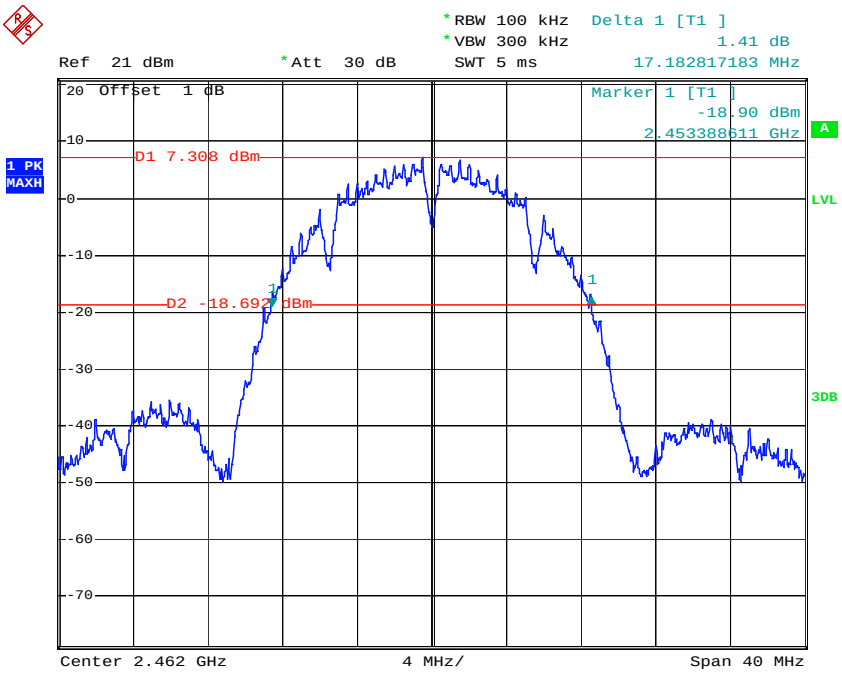
Date: 10.MAY.2013 17:05:51

802.11b RF Output Power, Middle Channel



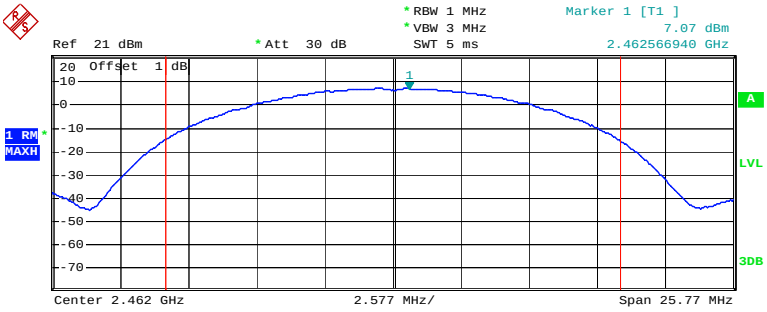
Date: 15.JUL.2013 14:16:33

802.11b 26dB, High Channel



Date: 10.MAY.2013 17:09:40

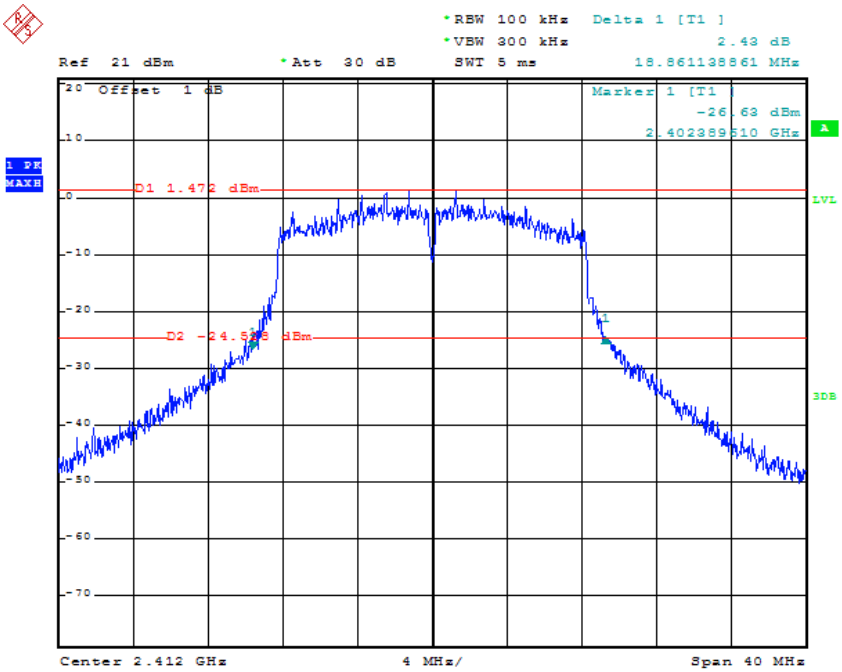
802.11b RF Output Power, High Channel



Tx Channel
Bandwidth 17.18 MHz Power 14.98 dBm

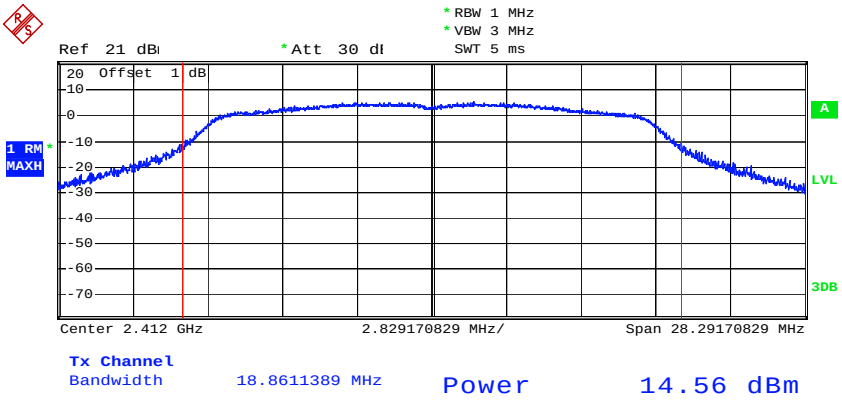
Date: 15.JUL.2013 14:17:20

802.11g 26dB, Low Channel



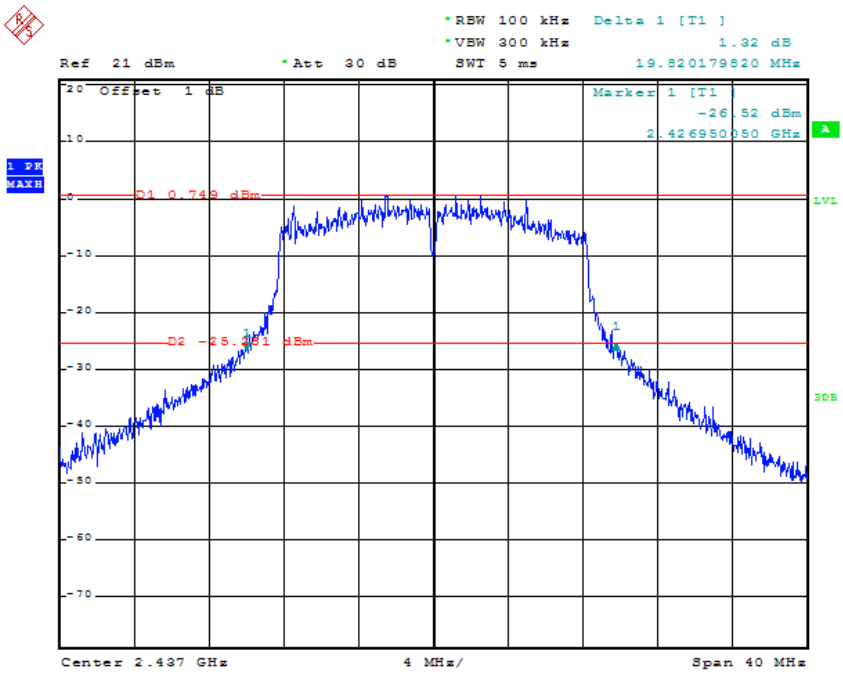
Date: 10.MAY.2013 17:35:08

802.11g RF Output Power, Low Channel



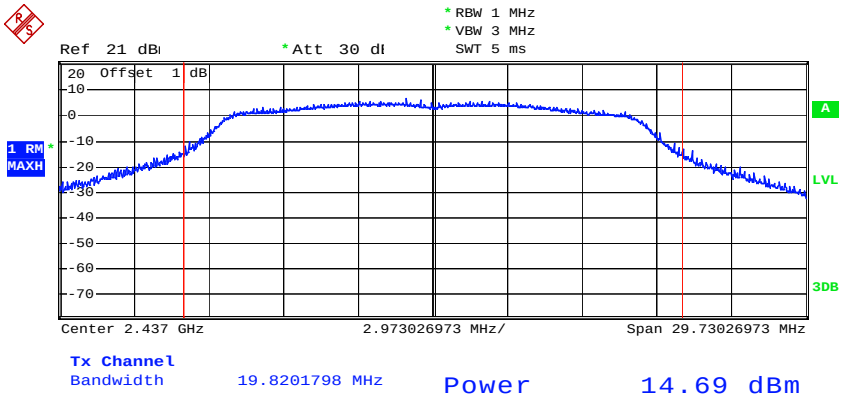
Date: 10.MAY.2013 17:35:25

802.11g 26dB, Middle Channel



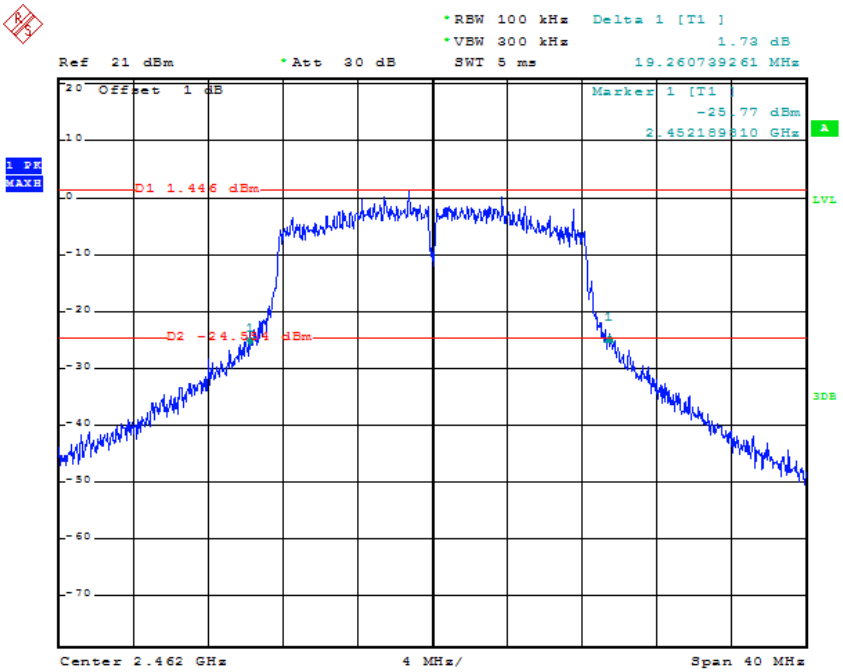
Date: 10.MAY.2013 17:42:29

802.11g RF Output Power, Middle Channel



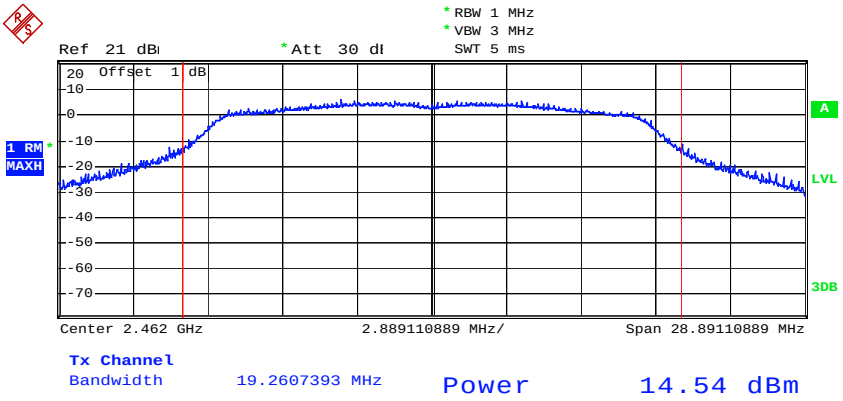
Date: 10.MAY.2013 17:42:46

802.11g RF 26dB, High Channel



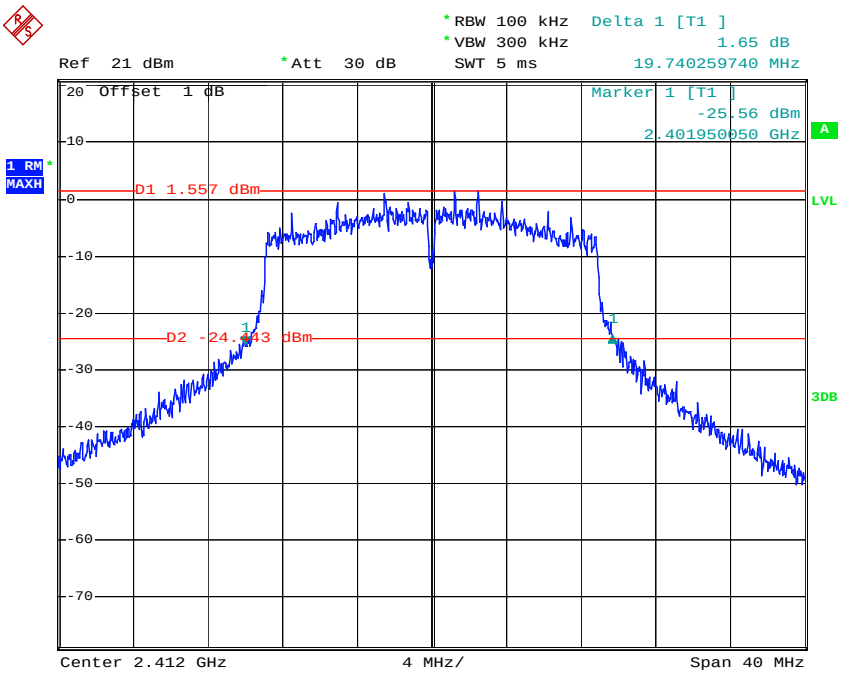
Date: 10.MAY.2013 17:45:11

802.11g RF Output Power, High Channel



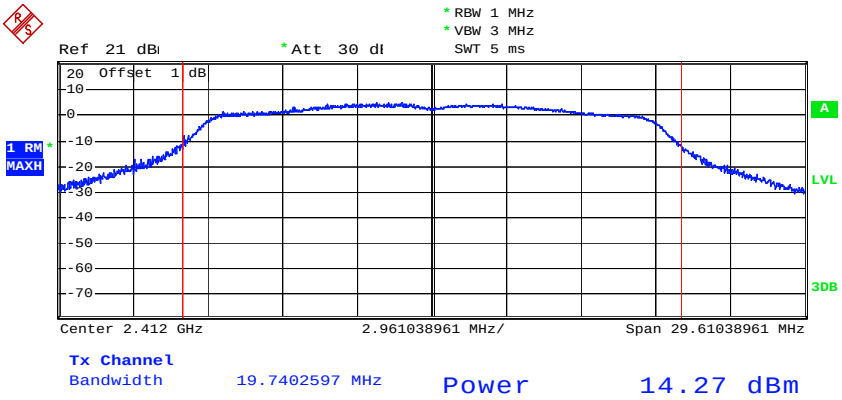
Date: 10.MAY.2013 17:45:28

802.11n20 26dB, Low Channel



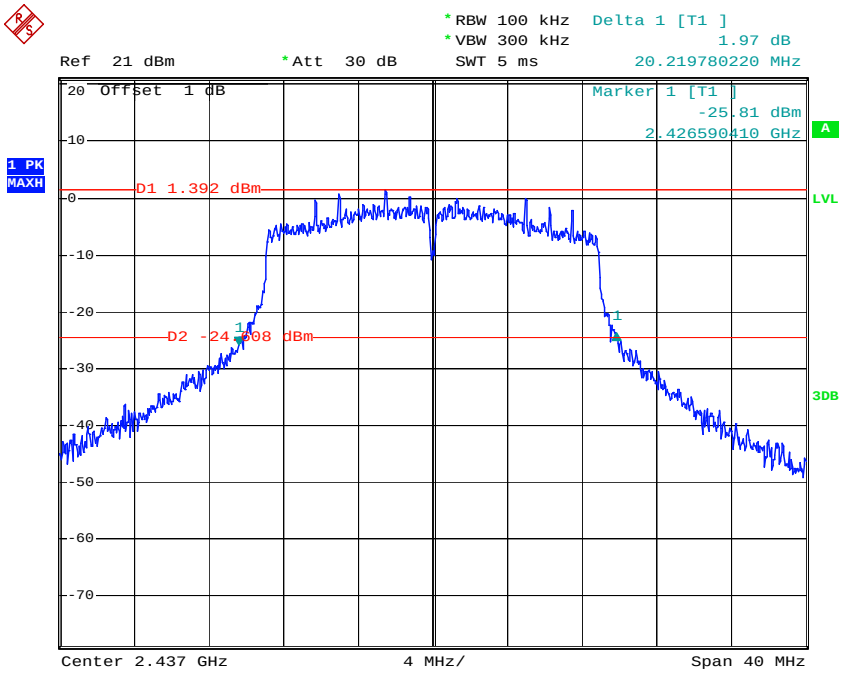
Date: 10.MAY.2013 17:48:13

802.11n20 RF Output Power, Low Channel



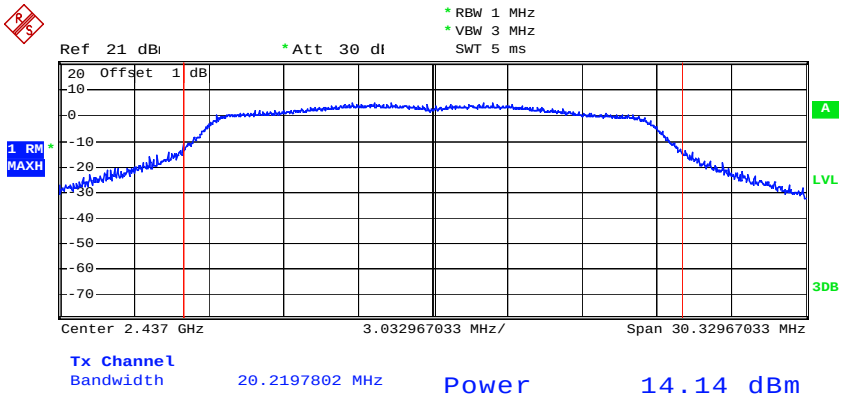
Date: 10.MAY.2013 17:48:30

802.11n20 26dB, Middle Channel



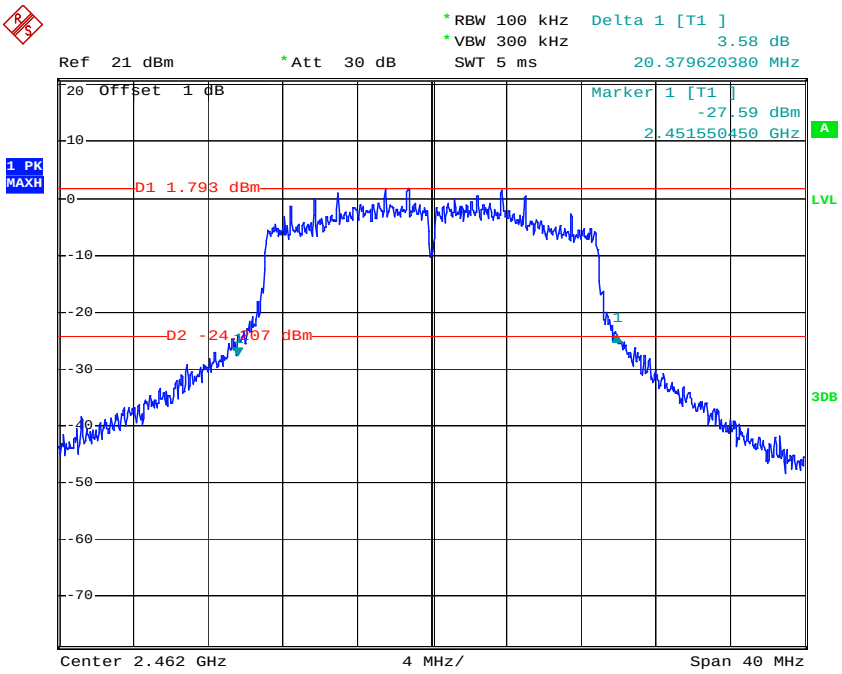
Date: 12.MAY.2013 16:18:51

802.11n20 RF Output Power, Middle Channel



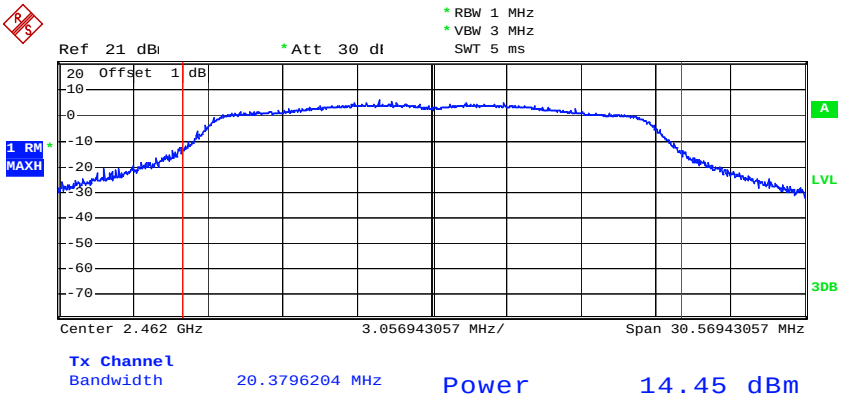
Date: 12.MAY.2013 16:19:08

802.11n20 26dB, High Channel



Date: 12.MAY.2013 16:21:34

802.11n20 RF Output Power, High Channel



Date: 12.MAY.2013 16:21:50

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
R&S	Spectrum analyzer	FSP 38	100478	2012-9-16	2013-9-15

*** 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

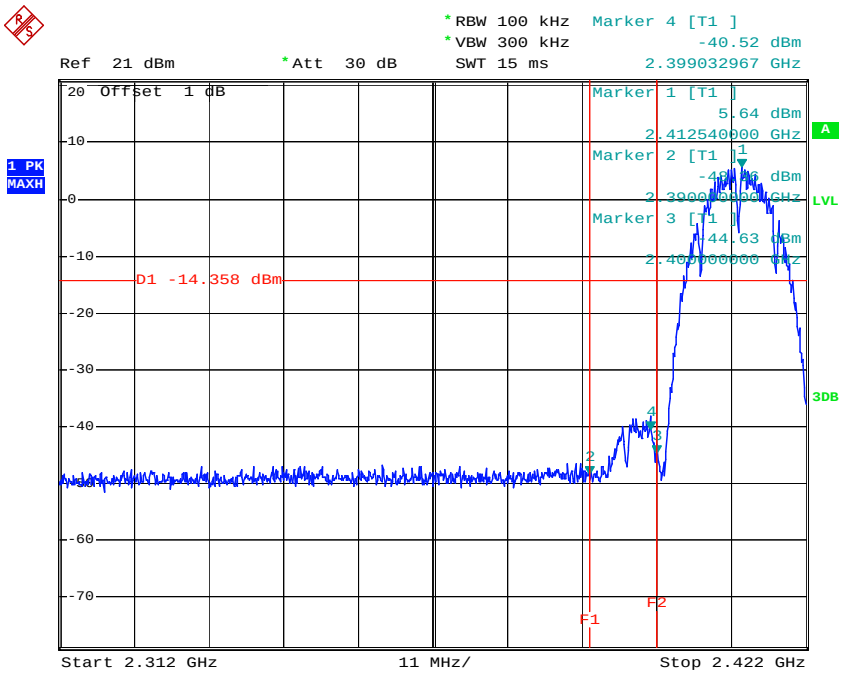
Environmental Conditions

Temperature:	24.3~29.7°C
Relative Humidity:	56~70 %
ATM Pressure:	99.5~100.5kPa

The testing was performed by Leon Chen from 2013-05-10 to 2013-08-02.

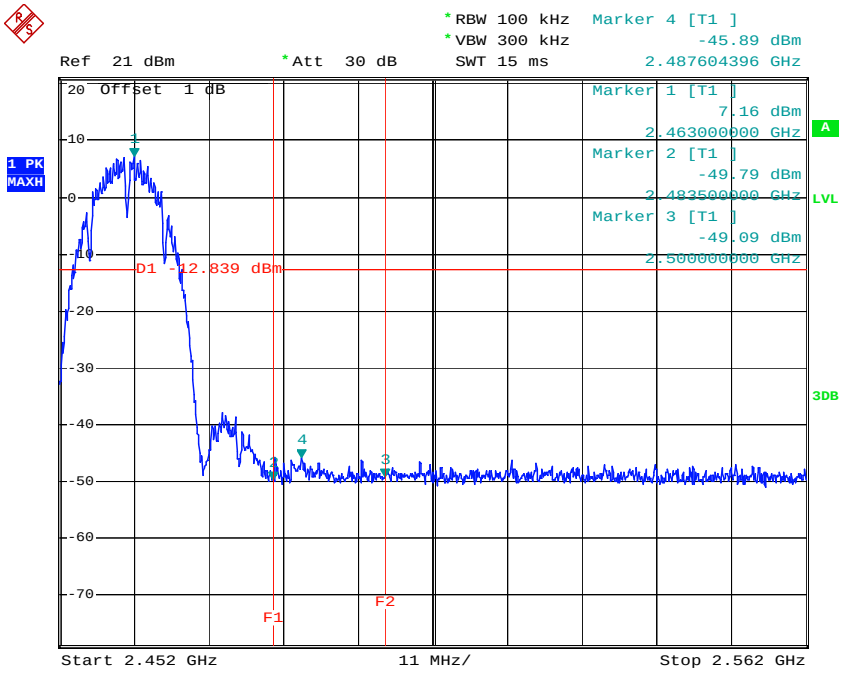
Test Result: *Compliance*
Please refer to following table and plots.

802.11b: Band Edge, Left Side



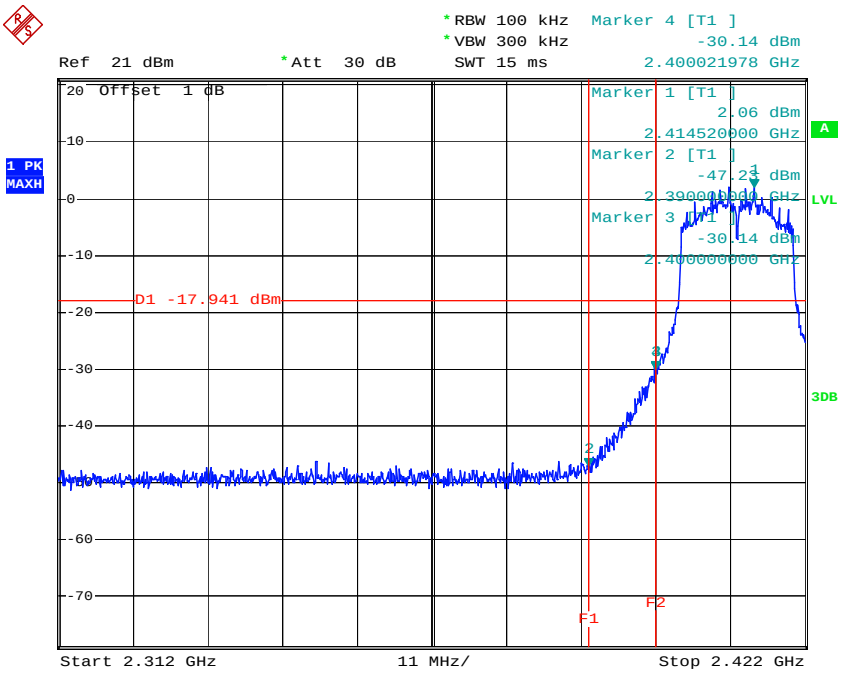
Date: 10.MAY.2013 16:18:56

802.11b: Band Edge, Right Side



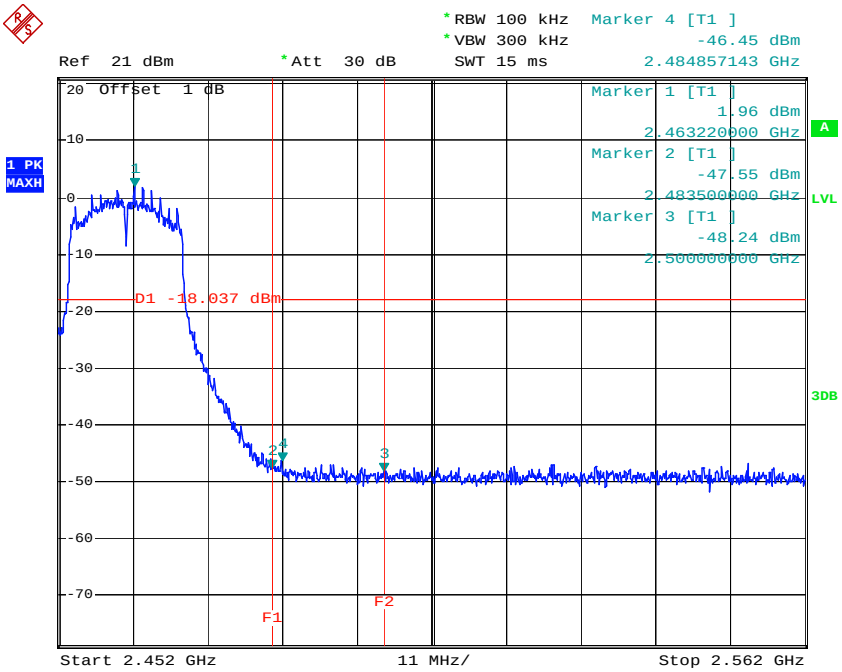
Date: 10.MAY.2013 17:10:26

802.11g: Band Edge, Left Side



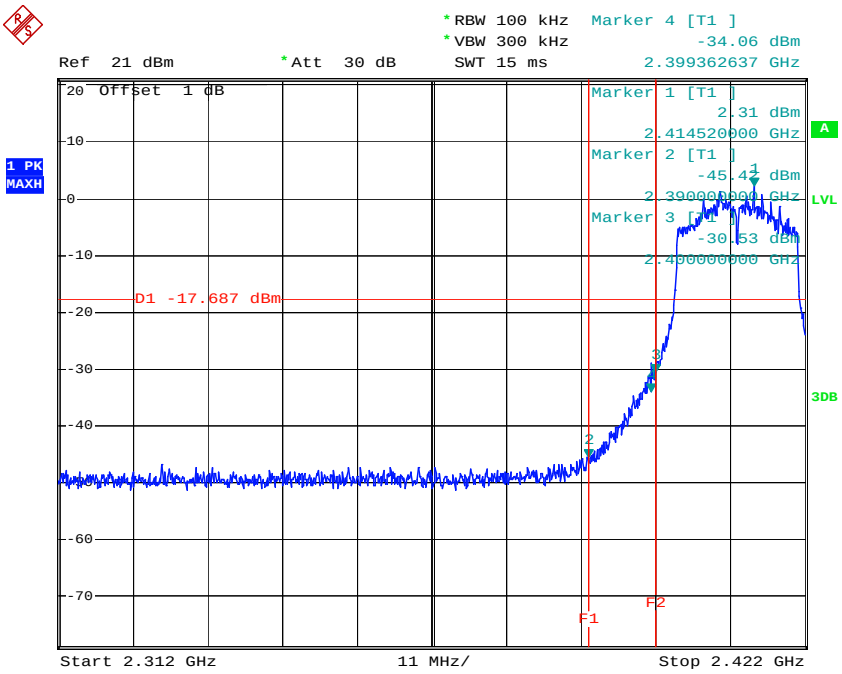
Date: 10.MAY.2013 17:35:55

802.11g: Band Edge, Right Side



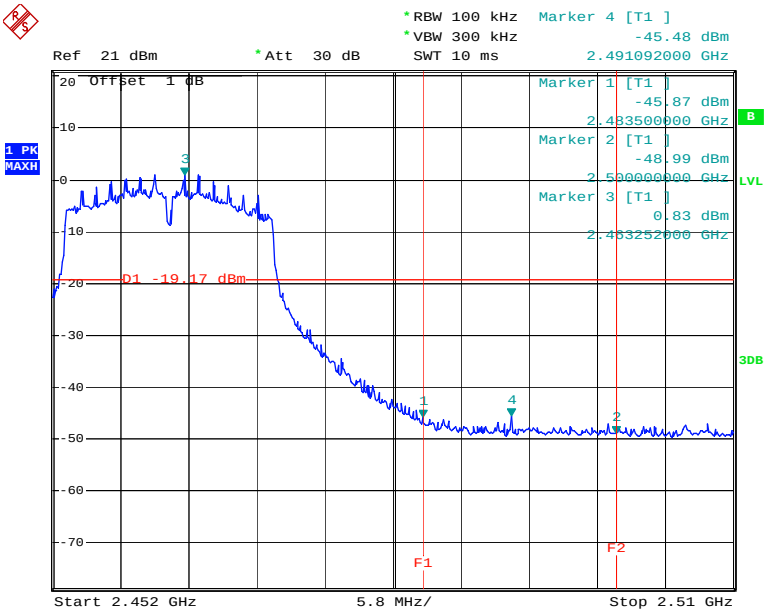
Date: 10.MAY.2013 17:45:58

802.11n20 Band Edge, Left Side



Date: 10.MAY.2013 17:49:00

802.11n20 Band Edge, Right Side



Date: 2.AUG.2013 14:58:51

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
R&S	Spectrum analyzer	FSP 38	100478	2012-9-16	2013-9-15

*** 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:	26~28.5° C
Relative Humidity:	64~70 %
ATM Pressure:	99.5~100.1kPa

The testing was performed by Leon Chen from 2013-06-13 to 2013-06-27.

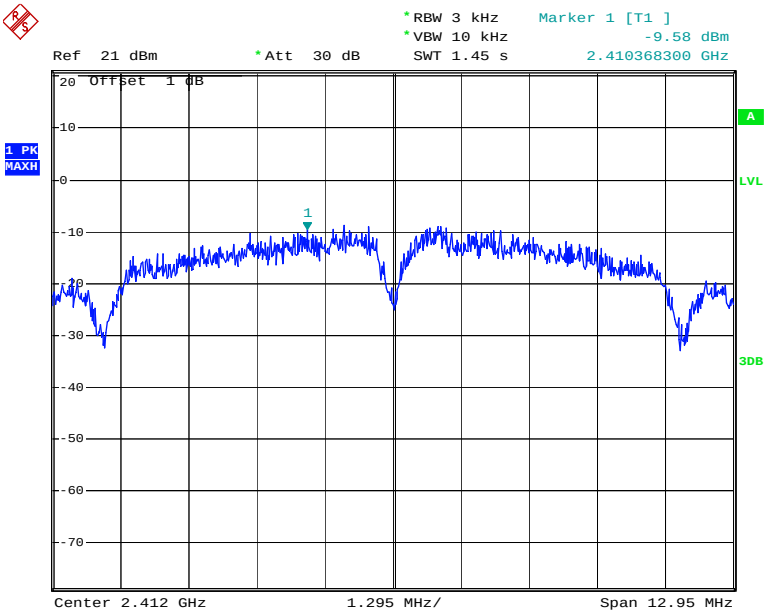
Test Mode: Transmitting

Test Result: Pass

Channel	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b mode			
Low	-9.58	8	PASS
Middle	-8.14	8	PASS
High	-8.57	8	PASS
802.11g mode			
Low	-11.28	8	PASS
Middle	-11.71	8	PASS
High	-11.65	8	PASS
802.11n20 mode			
Low	-12.54	8	PASS
Middle	-11.11	8	PASS
High	-11.77	8	PASS

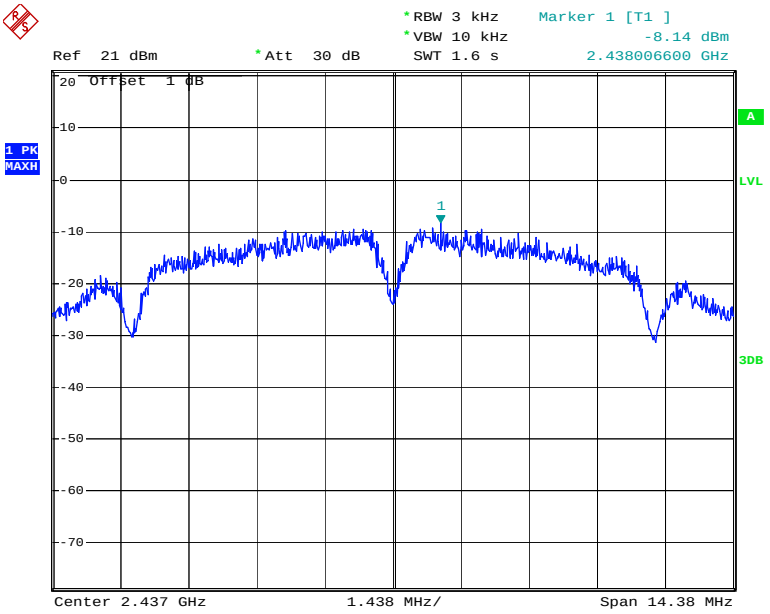
Please refer to the following plots

Power Spectral Density, 802.11b Low Channel



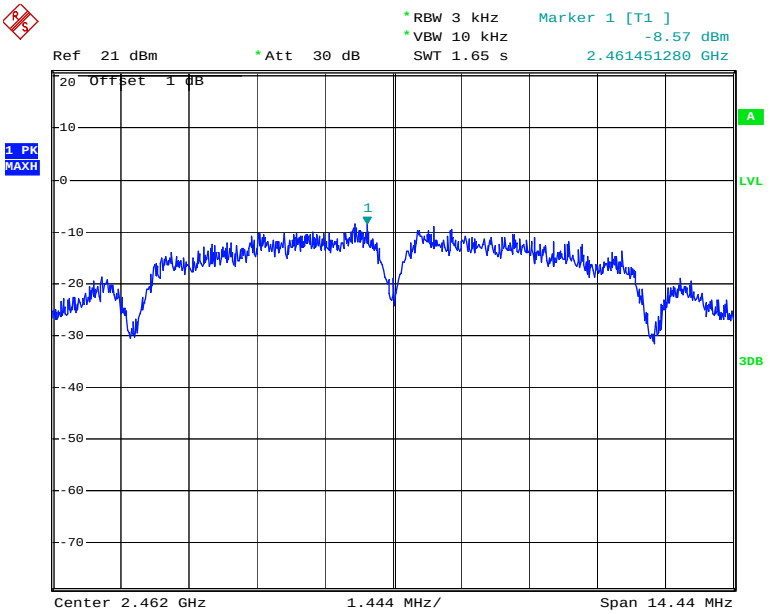
Date: 15.JUL.2013 14:12:37

Power Spectral Density, 802.11b Middle Channel



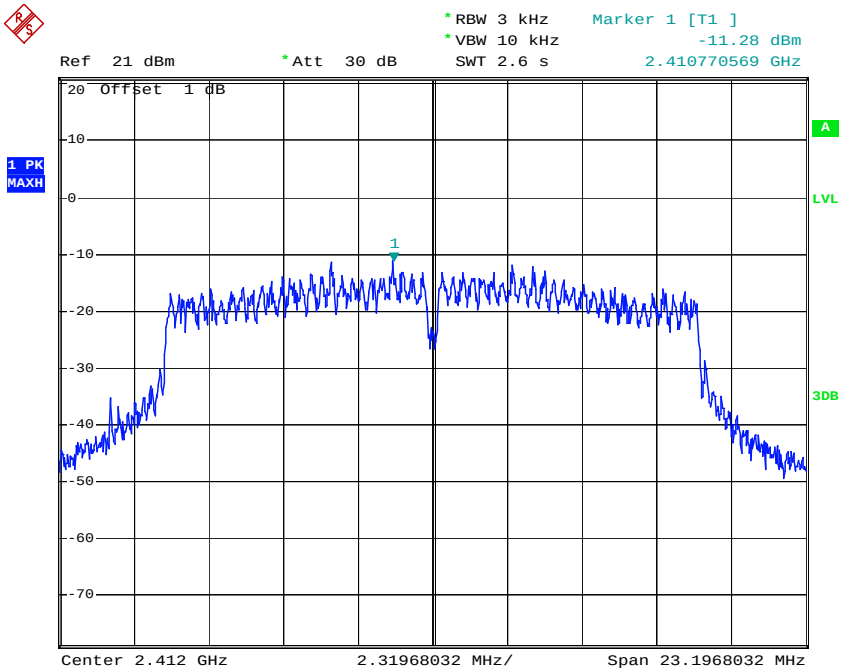
Date: 15.JUL.2013 14:12:07

Power Spectral Density, 802.11b High Channel



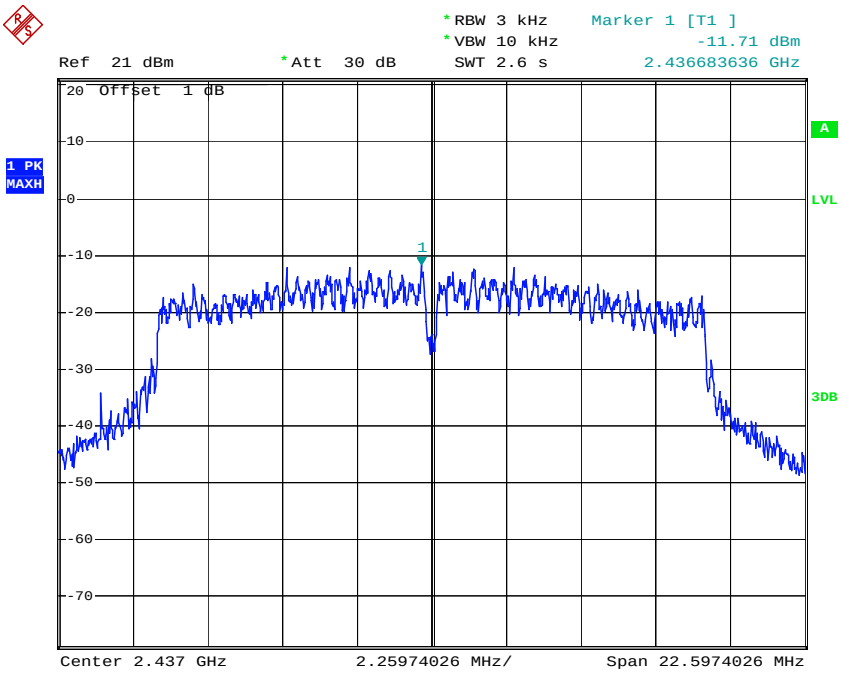
Date: 15.JUL.2013 14:13:25

Power Spectral Density, 802.11g Low Channel



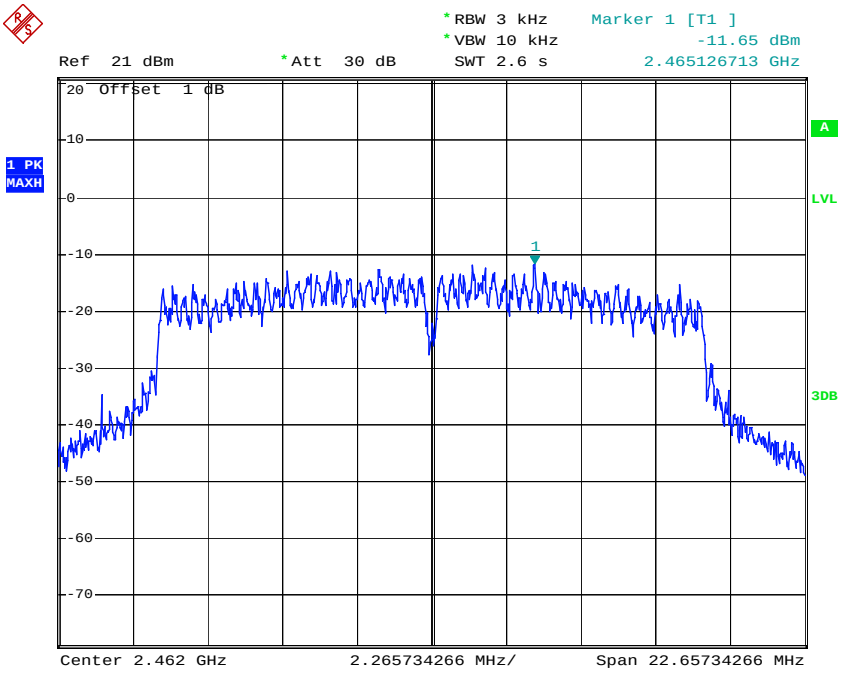
Date: 10.MAY.2013 17:35:34

Power Spectral Density, 802.11g Middle Channel



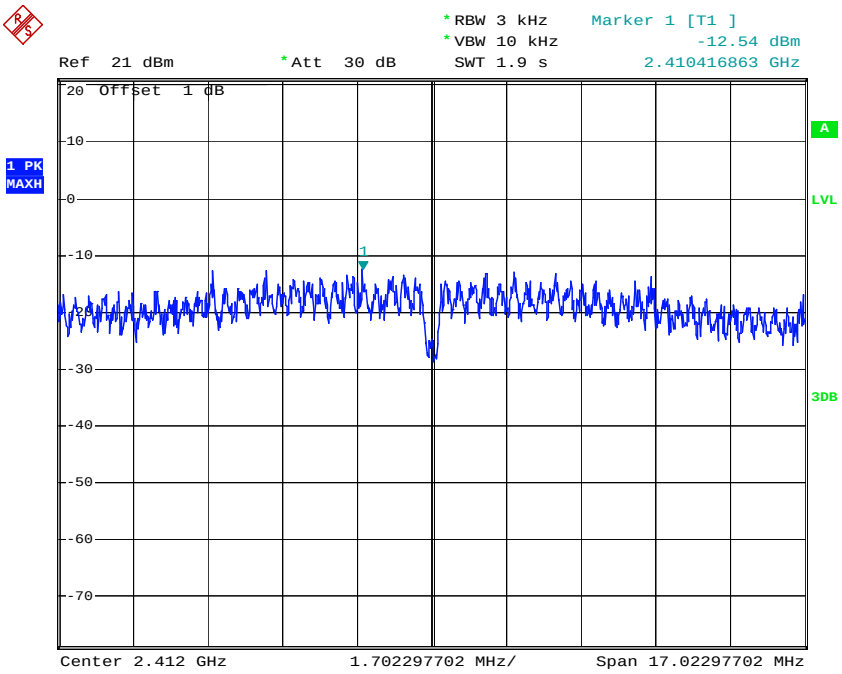
Date: 10.MAY.2013 17:42:56

Power Spectral Density, 802.11g High Channel



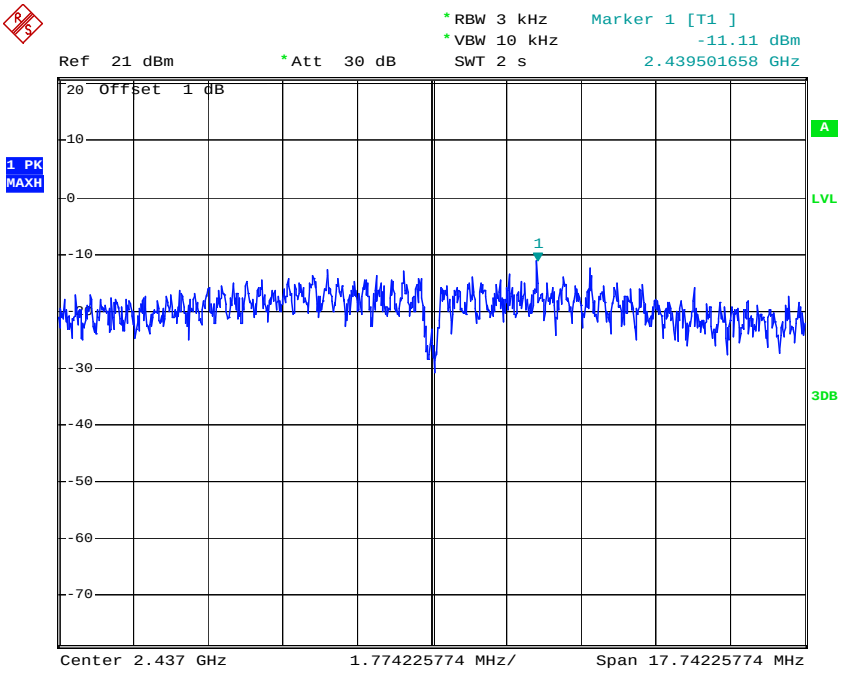
Date: 10.MAY.2013 17:45:37

Power Spectral Density, 802.11n20 Low Channel



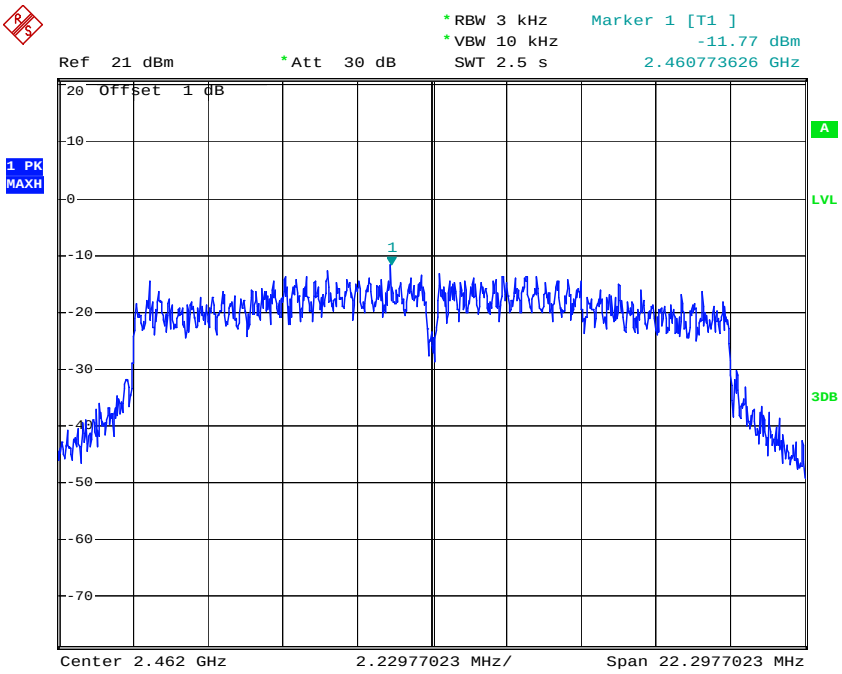
Date: 10.MAY.2013 17:48:38

Power Spectral Density, 802.11n20 Middle Channel



Date: 12.MAY.2013 16:19:17

Power Spectral Density, 802.11n20 High Channel



Date: 12.MAY.2013 16:21:59

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