

FCC PART 15.247

TEST REPORT

For

**ShenZhen Hipad Telecommunication Technology Co.,  
LTD.**

Rm 502, Unit 3, Bldg. C, Kexing Science Park, Keyuan Rd., NanShan Dist., Shenzhen, China

**FCC ID: 2ABOU7705**

<b>Report Type:</b> Original Report	<b>Product Type:</b> mobile phone
<b>Test Engineer:</b> Allen Qiao <i>Allen Qiao</i>	
<b>Report Number:</b> R2DG131230001-00B	
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<b>Reviewed By:</b> Ivan Cao RF Leader <i>Ivan Cao</i>	
<b>Test Laboratory:</b> Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 <a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a>	

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *ShenZhen Hipad Telecommunication Technology Co., LTD.*'s product, model number: *AHS7705CA* (FCC ID: *2ABOU7705*) (the "EUT") in this report was a *mobile phone*, which was measured approximately: 11.5 cm (L) x 6.5 cm (W) x 1.3 cm (H), rated input voltage: DC 3.7 V from lithium battery or DC 5V from adapter.

Adapter information: SPPS  
Model: SA/12PA/05FUS050200  
Input: AC 100-240V, 50/60Hz, 0.5A  
Output: DC 5.0V, 2A

*\* All measurement and test data in this report was gathered from production sample serial number: 131230001 (Assigned by BACL.Dongguan). The EUT was received on 2013-12-30*

### Objective

This report is prepared on behalf of *ShenZhen Hipad Telecommunication Technology Co., LTD.* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communications Commission's 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: *2ABOU7705*  
FCC Part15C DSS submissions with FCC ID: *2ABOU7705 for Bluetooth BDR, EDR mode.*  
FCC Part 22H & 24E PCB submissions with FCC ID: *2ABOU7705.*

### 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).

**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 Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Dongguan) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 500069-0).



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

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in an engineering 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 and 802.11g 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 data rates bandwidths, and modulations.

### EUT Exercise Software

The engineering mode was a build in software entered with engineering code, which was provided by manufacturer, and the test configured as following table:

Test Mode	Test Software Version	engineering mode		
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level Setting	9	9	10
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	6	6	7
802.11n20	Test Frequency	2412MHz	2437MHz	2462MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	5	5	6

### Equipment Modifications

No modification was made to the EUT.

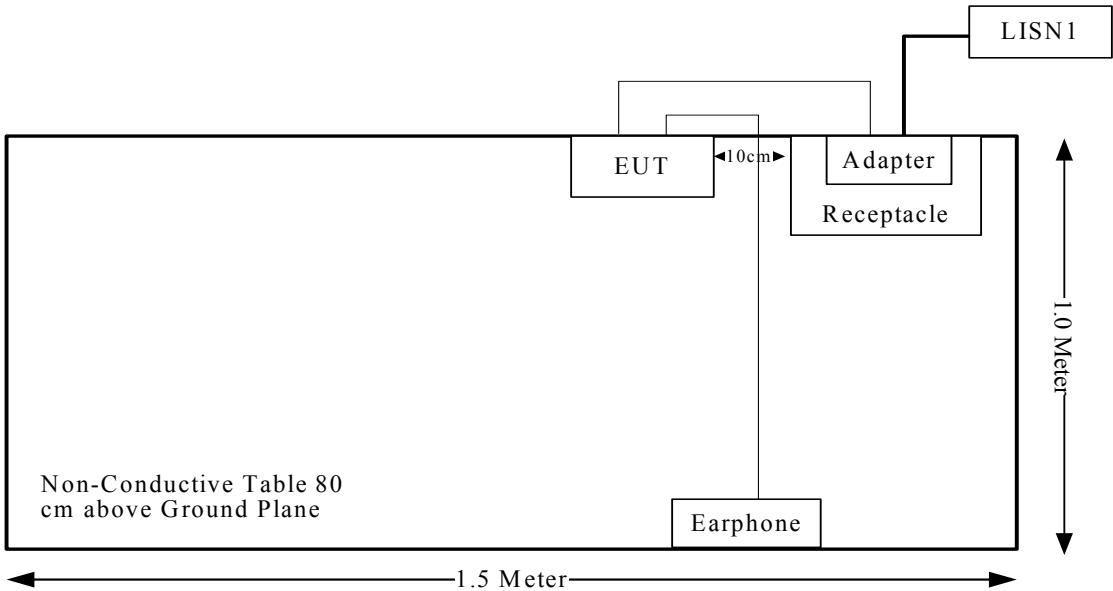
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
N/A	Earphone	N/A	N/A

External I/O Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
DC Power Cable	yes	yes	0.7	Adapter	EUT
Earphone Cable	no	no	1.0	EUT	Earphone

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



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## **FCC §15.247 (i) & §1.1310 & §2.1093- RF EXPOSURE**

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### **Applicable Standard**

According to §15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

### **Test Result**

Compliance, please refer to the SAR report: R1DG131230001-20.

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## **FCC §15.203 - ANTENNA REQUIREMENT**

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### **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 antenna, which was Conformance with this requirement, and the maximum gain is 1dBi, 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  $U_{cisp}$  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  $U_{cisp}$  of Table 1, then:

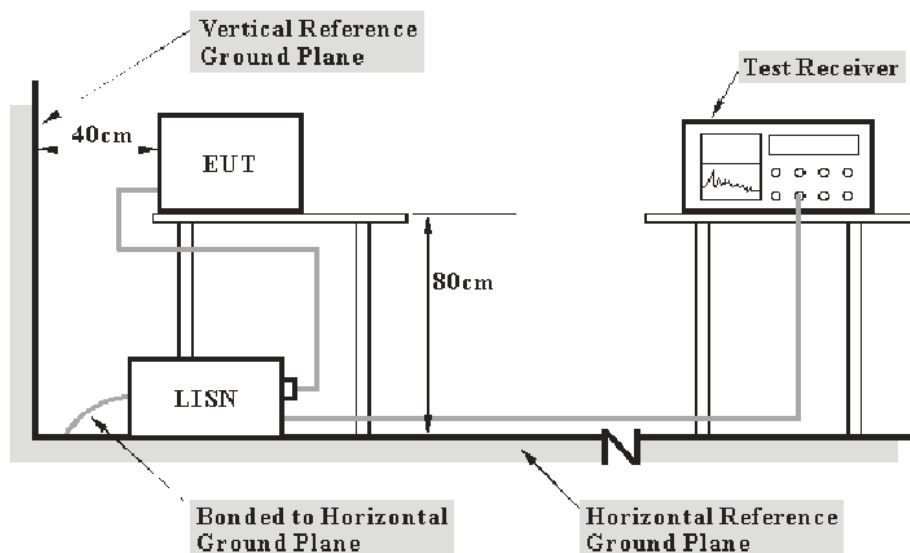
- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit.

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  $U_{cisp}$

Measurement	$U_{cisp}$
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 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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI TEST RECEIVER	ESCS 30	830245/006	2013-11-20	2014-11-19
R&S	Two-line V-network	ENV216	3560.6550.12	2013-2-18	2014-2-17
R&S	L.I.S.N	ESH3-Z5	100113	N/A	N/A
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:

**16.76 dB at 0.360 MHz** in the **Line** conducted mode

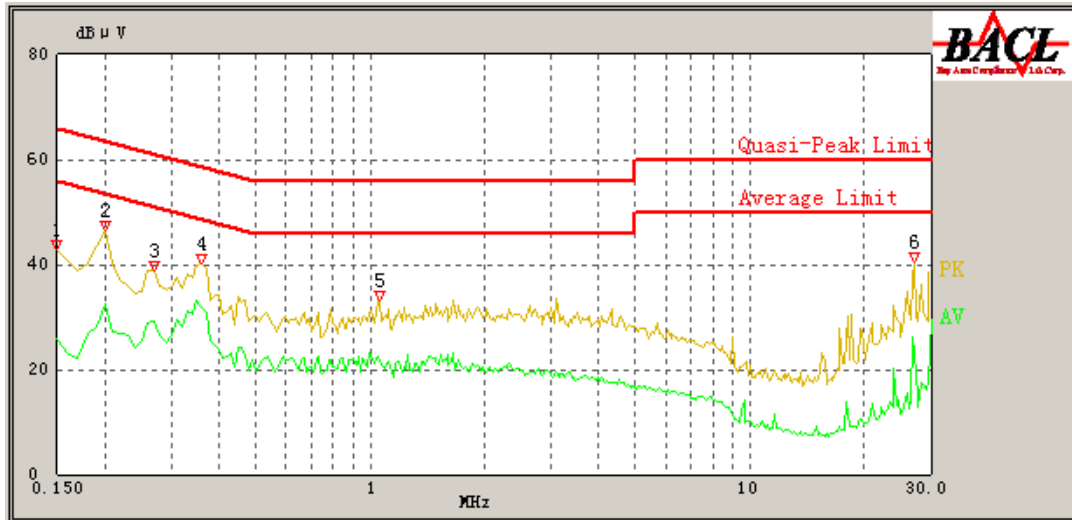
**Test Data****Environmental Conditions**

Temperature:	20.8 °C
Relative Humidity:	37 %
ATM Pressure:	102 kPa

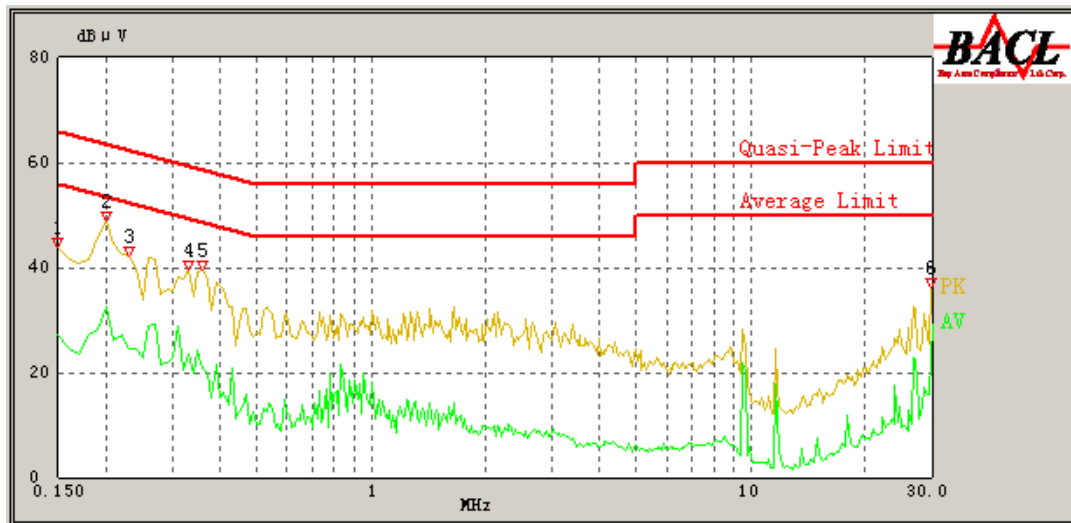
*The testing was performed by Allen Qiao on 2014-01-21.*

Test Mode: Transmitting

120 V, 60 Hz, Line:



Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.150	39.55	0.16	66.00	26.45	QP
0.150	25.83	0.16	56.00	30.17	AV
0.200	42.80	0.14	63.61	20.81	QP
0.200	32.65	0.14	53.61	20.96	AV
0.270	36.94	0.15	61.12	24.18	QP
0.270	29.10	0.15	51.12	22.02	AV
0.360	37.35	0.17	58.73	21.38	QP
0.360	31.97	0.17	48.73	16.76	AV
1.060	27.20	0.20	56.00	28.80	QP
1.060	21.69	0.20	46.00	24.31	AV
27.150	33.96	2.71	60.00	26.04	QP
27.150	23.15	2.71	50.00	26.85	AV

**120 V, 60 Hz, Neutral:**

## 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  $U_{cisp}$  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  $U_{cisp}$  of Table 2, then:

- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , 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

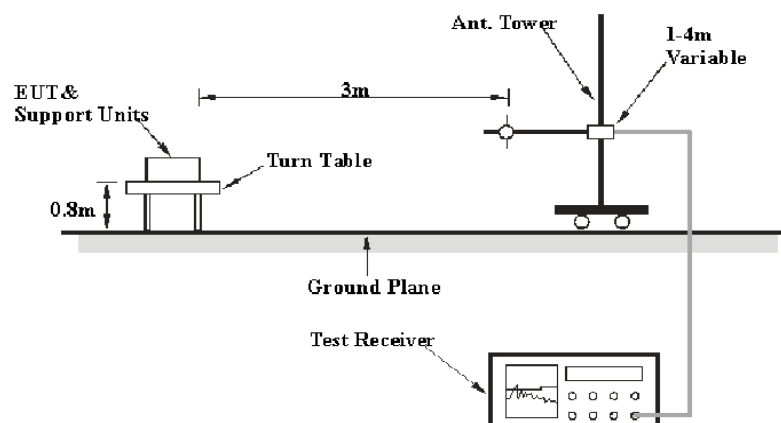
6G~18GHz: 5.23 dB

Table 2 – Values of  $U_{cisp}$

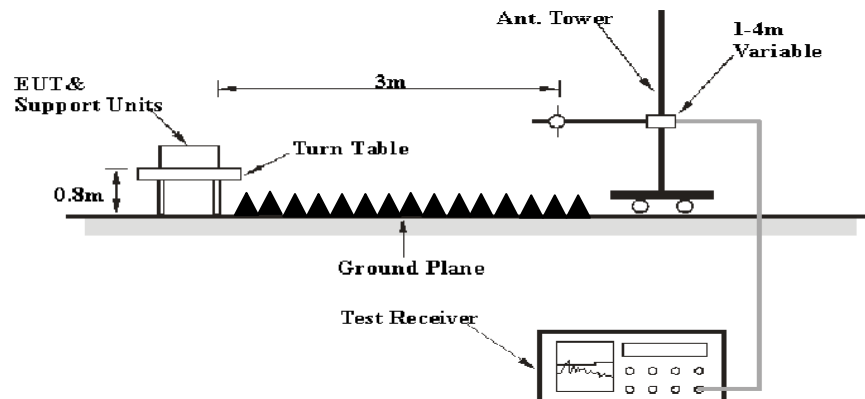
Measurement	$U_{cisp}$
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

### 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**

During the radiated emission test, the adapter was connected to the AC floor outlet.

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, 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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## 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	2011-9-6	2014-9-5
HP	AMPLIFIER	8447E	2434A02181	2013-9-6	2014-9-5
R&S	Spectrum analyzer	FSEM	DE31388	2013-5-7	2014-5-6
ETS-Lindgren	horn antenna	3115	000 527 35	2012-9-6	2015-9-5
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2013-4-6	2014-4-5
R&S	Spectrum Analyzer	FSP 38	100478	2013-6-16	2014-6-15
Ducommun Technologies	horn antenna	ARH-4223-02	1007726-01 1304	2013-6-16	2014-6-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2013-4-6	2014-4-5

\* **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:

**3.01 dB at 41.58 MHz in the Horizontal polarization for 802.11n20 Mode**

## Test Data

### Environmental Conditions

Temperature:	20.5 °C
Relative Humidity:	54 %
ATM Pressure:	101 kPa

The testing was performed by Allen Qiao on 2014-01-08.  
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	71.67	PK	H	25.67	4.42	0.00	101.76	N/A	N/A
2412	66.52	AV	H	25.67	4.42	0.00	96.61	N/A	N/A
2412	63.72	PK	V	25.67	4.42	0.00	93.81	N/A	N/A
2412	58.87	AV	V	25.67	4.42	0.00	88.96	N/A	N/A
2390	28.05	PK	H	25.61	4.39	0.00	58.05	74.00	15.95
2390	14.32	AV	H	25.61	4.39	0.00	44.32	54.00	9.68
4824	34.27	PK	H	30.64	6.03	27.26	43.68	74.00	30.32
4824	22.42	AV	H	30.64	6.03	27.26	31.83	54.00	22.17
7236	32.87	PK	V	34.17	7.47	26.36	48.15	74.00	25.85
7236	18.16	AV	V	34.17	7.47	26.36	33.44	54.00	20.56
9648	32.23	PK	V	36.06	8.81	26.06	51.04	74.00	22.96
9648	18.18	AV	V	36.06	8.81	26.06	36.99	54.00	17.01
1329.82	34.3	PK	H	23.16	2.98	27.18	33.26	74.00	40.74
1329.82	20.89	AV	H	23.16	2.98	27.18	19.85	54.00	34.15
41.64	44.1	QP	V	13.23	0.83	21.42	36.74	40.00	3.26*
Middle Channel: 2437 MHz									
2437	70.56	PK	H	25.74	4.41	0.00	100.70	N/A	N/A
2437	65.51	AV	H	25.74	4.41	0.00	95.65	N/A	N/A
2437	65.68	PK	V	25.74	4.41	0.00	95.82	N/A	N/A
2437	60.63	AV	V	25.74	4.41	0.00	90.77	N/A	N/A
4874	33.36	PK	H	30.77	6.09	27.26	42.96	74.00	31.04
4874	21.23	AV	H	30.77	6.09	27.26	30.83	54.00	23.17
7311	32.04	PK	V	34.35	7.51	26.51	47.39	74.00	26.61
7311	18.13	AV	V	34.35	7.51	26.51	33.48	54.00	20.52
9748	32.25	PK	V	36.30	8.83	25.68	51.70	74.00	22.30
9748	18.16	AV	V	36.30	8.83	25.68	37.61	54.00	16.39
1356.35	34.64	PK	H	23.23	3.04	27.16	33.75	74.00	40.25
1356.35	21.21	AV	H	23.23	3.04	27.16	20.32	54.00	33.68
1349.93	35.44	PK	H	23.21	3.03	27.17	34.51	74.00	39.49
1349.93	21.26	AV	H	23.21	3.03	27.17	20.33	54.00	33.67
41.73	43.7	QP	V	13.17	0.83	21.42	36.28	40.00	3.72*
High Channel: 2462 MHz									
2462	71.18	PK	H	25.80	4.43	0.00	101.41	N/A	N/A
2462	65.91	AV	H	25.80	4.43	0.00	96.14	N/A	N/A
2462	61.11	PK	V	25.80	4.43	0.00	91.34	N/A	N/A
2462	55.93	AV	V	25.80	4.43	0.00	86.16	N/A	N/A
2483.5	28.32	PK	H	25.86	4.49	0.00	58.67	74.00	15.33
2483.5	14.01	AV	H	25.86	4.49	0.00	44.36	54.00	9.64
4924	33.28	PK	H	30.90	5.97	27.27	42.88	74.00	31.12
4924	21.26	AV	H	30.90	5.97	27.27	30.86	54.00	23.14
7386	32.35	PK	V	34.53	7.55	26.66	47.77	74.00	26.23
7386	17.99	AV	V	34.53	7.55	26.66	33.41	54.00	20.59
9848	32.34	PK	V	36.54	8.85	25.49	52.24	74.00	21.76
9848	18.37	AV	V	36.54	8.85	25.49	38.27	54.00	15.73
1362.38	21.31	PK	H	23.24	3.04	27.16	20.43	74.00	53.57
1362.38	35.22	AV	H	23.24	3.04	27.16	34.34	54.00	19.66
41.58	43.6	QP	V	13.28	0.83	21.42	36.29	40.00	3.71*

\*Within measurement uncertainty!

## 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	70.81	PK	H	25.67	4.42	0.00	100.90	N/A	N/A
2412	54.27	AV	H	25.67	4.42	0.00	84.36	N/A	N/A
2412	62.89	PK	V	25.67	4.42	0.00	92.98	N/A	N/A
2412	47.39	AV	V	25.67	4.42	0.00	77.48	N/A	N/A
2390	28.04	PK	H	25.61	4.39	0.00	58.04	74.00	15.96
2390	14.59	AV	H	25.61	4.39	0.00	44.59	54.00	9.41
4824	32.93	PK	H	30.64	6.03	27.26	42.34	74.00	31.66
4824	18.44	AV	H	30.64	6.03	27.26	27.85	54.00	26.15
7236	32.62	PK	V	34.17	7.47	26.36	47.90	74.00	26.10
7236	18.23	AV	V	34.17	7.47	26.36	33.51	54.00	20.49
9648	32.52	PK	V	36.06	8.81	26.06	51.33	74.00	22.67
9648	18.25	AV	V	36.06	8.81	26.06	37.06	54.00	16.94
1329.82	34.47	PK	H	23.16	2.98	27.18	33.43	74.00	40.57
1329.82	20.63	AV	H	23.16	2.98	27.18	19.59	54.00	34.41
41.64	43.4	QP	V	13.23	0.83	21.42	36.04	40.00	3.96*
Middle Channel: 2437 MHz									
2437	69.98	PK	H	25.74	4.41	0.00	100.12	N/A	N/A
2437	53.39	AV	H	25.74	4.41	0.00	83.53	N/A	N/A
2437	63.85	PK	V	25.74	4.41	0.00	93.99	N/A	N/A
2437	48.41	AV	V	25.74	4.41	0.00	78.55	N/A	N/A
4874	31.52	PK	H	30.77	6.09	27.26	41.12	74.00	32.88
4874	18.08	AV	H	30.77	6.09	27.26	27.68	54.00	26.32
7311	32.02	PK	V	34.35	7.51	26.51	47.37	74.00	26.63
7311	18.13	AV	V	34.35	7.51	26.51	33.48	54.00	20.52
9748	32.26	PK	V	36.30	8.83	25.68	51.71	74.00	22.29
9748	18.11	AV	V	36.30	8.83	25.68	37.56	54.00	16.44
1356.35	34.56	PK	H	23.23	3.04	27.16	33.67	74.00	40.33
1356.35	21.18	AV	H	23.23	3.04	27.16	20.29	54.00	33.71
1349.93	42.29	PK	H	23.21	3.03	27.17	41.36	74.00	32.64
1349.93	25.17	AV	H	23.21	3.03	27.17	24.24	54.00	29.76
41.73	43.6	QP	V	13.17	0.83	21.42	36.18	40.00	3.82*
High Channel: 2462 MHz									
2462	70.39	PK	H	25.80	4.43	0.00	100.62	N/A	N/A
2462	53.35	AV	H	25.80	4.43	0.00	83.58	N/A	N/A
2462	65.82	PK	V	25.80	4.43	0.00	96.05	N/A	N/A
2462	50.28	AV	V	25.80	4.43	0.00	80.51	N/A	N/A
2483.5	28.67	PK	H	25.86	4.49	0.00	59.02	74.00	14.98
2483.5	14.72	AV	H	25.86	4.49	0.00	45.07	54.00	8.93
4924	32.33	PK	H	30.90	5.97	27.27	41.93	74.00	32.07
4924	17.93	AV	H	30.90	5.97	27.27	27.53	54.00	26.47
7386	31.57	PK	V	34.53	7.55	26.66	46.99	74.00	27.01
7386	18.16	AV	V	34.53	7.55	26.66	33.58	54.00	20.42
9848	32.12	PK	V	36.54	8.85	25.49	52.02	74.00	21.98
9848	18.28	AV	V	36.54	8.85	25.49	38.18	54.00	15.82
1362.38	34.75	PK	H	23.24	3.04	27.16	33.87	74.00	40.13
1362.38	21.23	AV	H	23.24	3.04	27.16	20.35	54.00	33.65
41.58	43.9	QP	V	13.28	0.83	21.42	36.59	40.00	3.41*

\*Within measurement uncertainty!

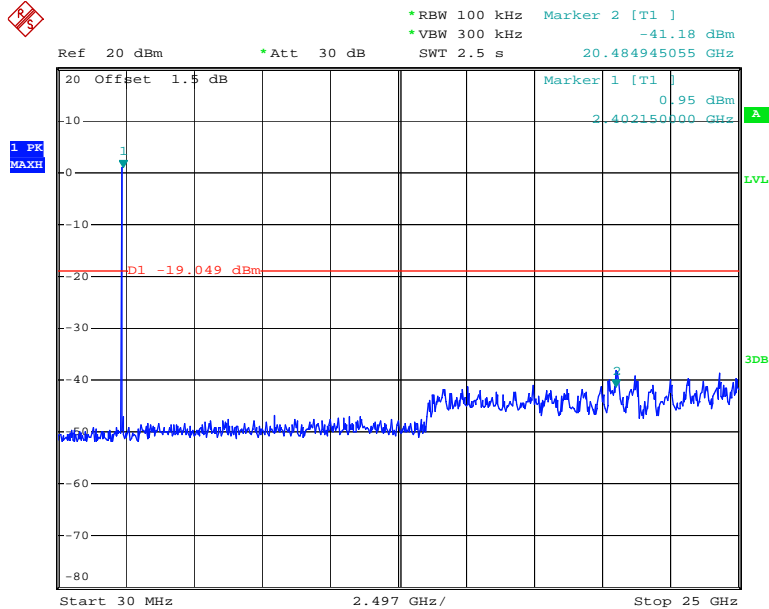
## 802.11 n20 Mode

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/m)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2412 MHz									
2412	69.15	PK	H	25.67	4.42	0.00	99.24	N/A	N/A
2412	52.49	AV	H	25.67	4.42	0.00	82.58	N/A	N/A
2412	61.39	PK	V	25.67	4.42	0.00	91.48	N/A	N/A
2412	45.55	AV	V	25.67	4.42	0.00	75.64	N/A	N/A
2390	28.29	PK	H	25.61	4.39	0.00	58.29	74.00	15.71
2390	14.57	AV	H	25.61	4.39	0.00	44.57	54.00	9.43
4824	31.26	PK	H	30.64	6.03	27.26	40.67	74.00	33.33
4824	17.86	AV	H	30.64	6.03	27.26	27.27	54.00	26.73
7236	31.56	PK	V	34.17	7.47	26.36	46.84	74.00	27.16
7236	18.22	AV	V	34.17	7.47	26.36	33.50	54.00	20.50
9648	31.64	PK	V	36.06	8.81	26.06	50.45	74.00	23.55
9648	18.19	AV	V	36.06	8.81	26.06	37.00	54.00	17.00
1329.82	34.13	PK	H	23.16	2.98	27.18	33.09	74.00	40.91
1329.82	20.89	AV	H	23.16	2.98	27.18	19.85	54.00	34.15
41.64	43.9	QP	V	13.23	0.83	21.42	36.54	40.00	3.46*
Middle Channel: 2437 MHz									
2437	67.91	PK	H	25.74	4.41	0.00	98.05	N/A	N/A
2437	51.21	AV	H	25.74	4.41	0.00	81.35	N/A	N/A
2437	62.79	PK	V	25.74	4.41	0.00	92.93	N/A	N/A
2437	47.13	AV	V	25.74	4.41	0.00	77.27	N/A	N/A
4874	30.91	PK	H	30.77	6.09	27.26	40.51	74.00	33.49
4874	17.75	AV	H	30.77	6.09	27.26	27.35	54.00	26.65
7311	31.96	PK	V	34.35	7.51	26.51	47.31	74.00	26.69
7311	18.16	AV	V	34.35	7.51	26.51	33.51	54.00	20.49
9748	32.31	PK	V	36.30	8.83	25.68	51.76	74.00	22.24
9748	18.17	AV	V	36.30	8.83	25.68	37.62	54.00	16.38
1356.35	34.71	PK	H	23.23	3.04	27.16	33.82	74.00	40.18
1356.35	21.23	AV	H	23.23	3.04	27.16	20.34	54.00	33.66
1349.93	42.21	PK	H	23.21	3.03	27.17	41.28	74.00	32.72
1349.93	25.03	AV	H	23.21	3.03	27.17	24.10	54.00	29.90
41.73	43.6	QP	V	13.17	0.83	21.42	36.18	40.00	3.82*
High Channel: 2462 MHz									
2462	68.88	PK	H	25.80	4.43	0.00	99.11	N/A	N/A
2462	52.27	AV	H	25.80	4.43	0.00	82.50	N/A	N/A
2462	61.25	PK	V	25.80	4.43	0.00	91.48	N/A	N/A
2462	45.43	AV	V	25.80	4.43	0.00	75.66	N/A	N/A
2483.5	27.83	PK	H	25.86	4.49	0.00	58.18	74.00	15.82
2483.5	14.29	AV	H	25.86	4.49	0.00	44.64	54.00	9.36
4924	31.88	PK	H	30.90	5.97	27.27	41.48	74.00	32.52
4924	17.83	AV	H	30.90	5.97	27.27	27.43	54.00	26.57
7386	31.69	PK	V	34.53	7.55	26.66	47.11	74.00	26.89
7386	18.01	AV	V	34.53	7.55	26.66	33.43	54.00	20.57
9848	32.81	PK	V	36.54	8.85	25.49	52.71	74.00	21.29
9848	18.29	AV	V	36.54	8.85	25.49	38.19	54.00	15.81
1362.38	35.78	PK	H	23.24	3.04	27.16	34.90	74.00	39.10
1362.38	21.28	AV	H	23.24	3.04	27.16	20.40	54.00	33.60
41.58	44.3	OP	V	13.28	0.83	21.42	36.99	40.00	3.01*

\*Within measurement uncertainty!

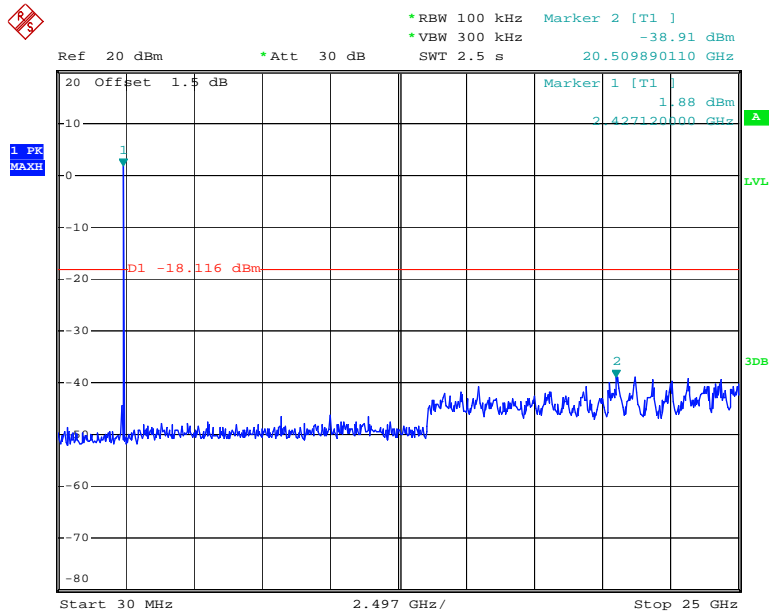
## Conducted Spurious Emissions at Antenna Port

### 802.11b Low Channel



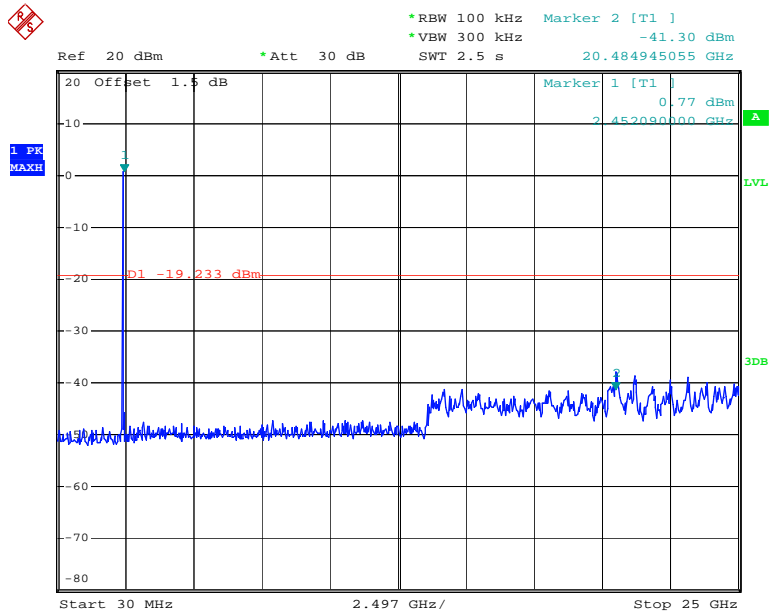
Date: 8.JAN.2014 11:44:18

### 802.11b Middle Channel



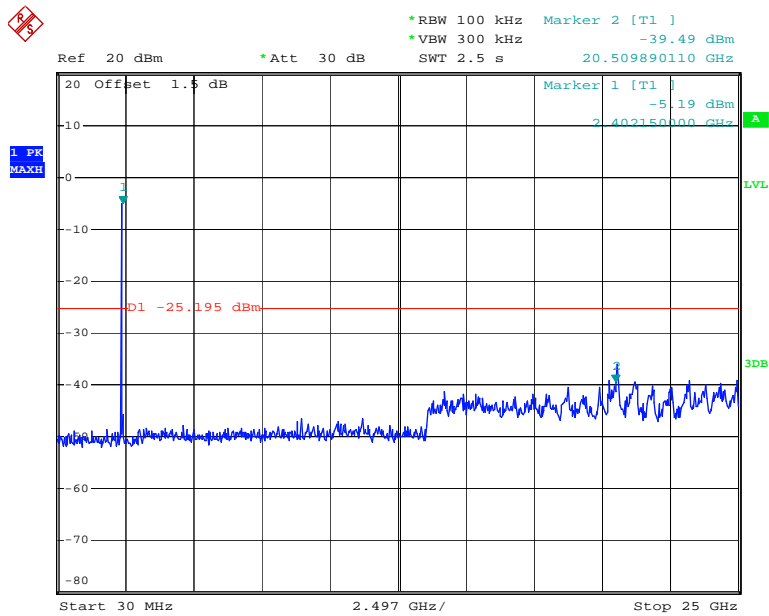
Date: 8.JAN.2014 11:49:52

### 802.11b High Channel



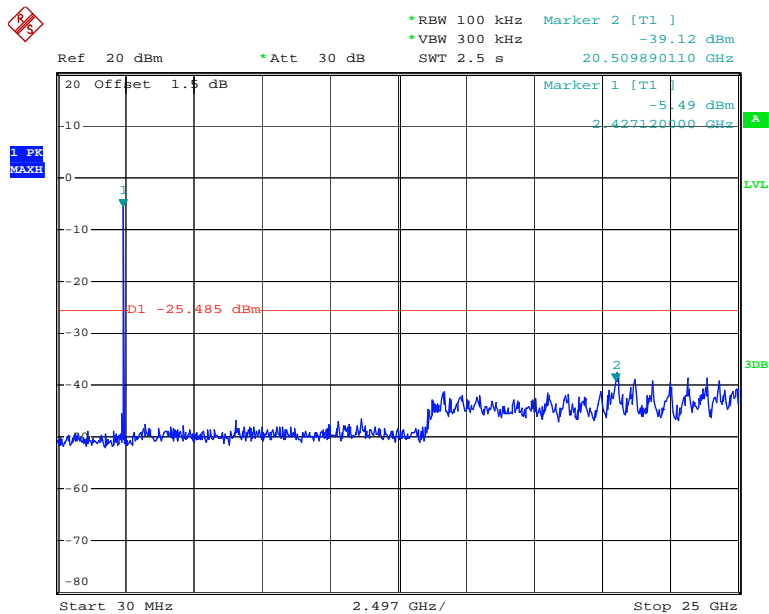
Date: 8.JAN.2014 13:04:59

### 802.11g Low Channel



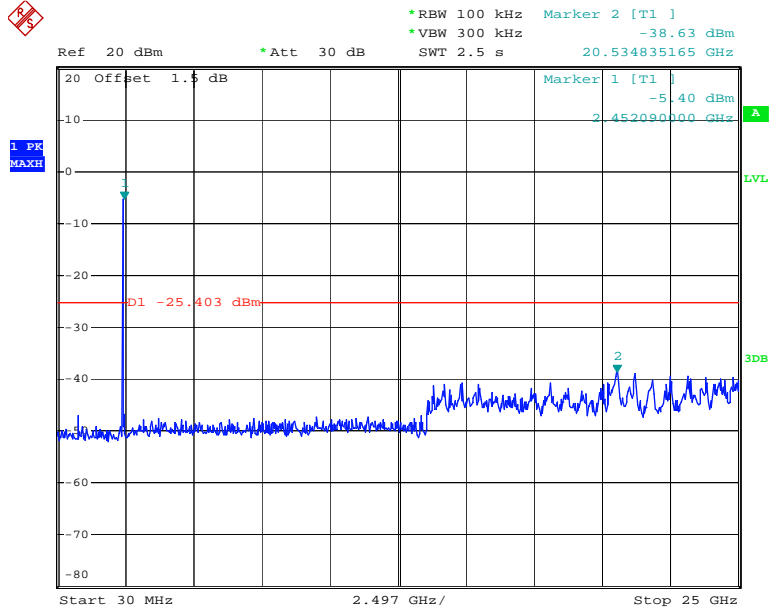
Date: 8.JAN.2014 13:07:07

### 802.11g Middle Channel



Date: 8.JAN.2014 13:10:47

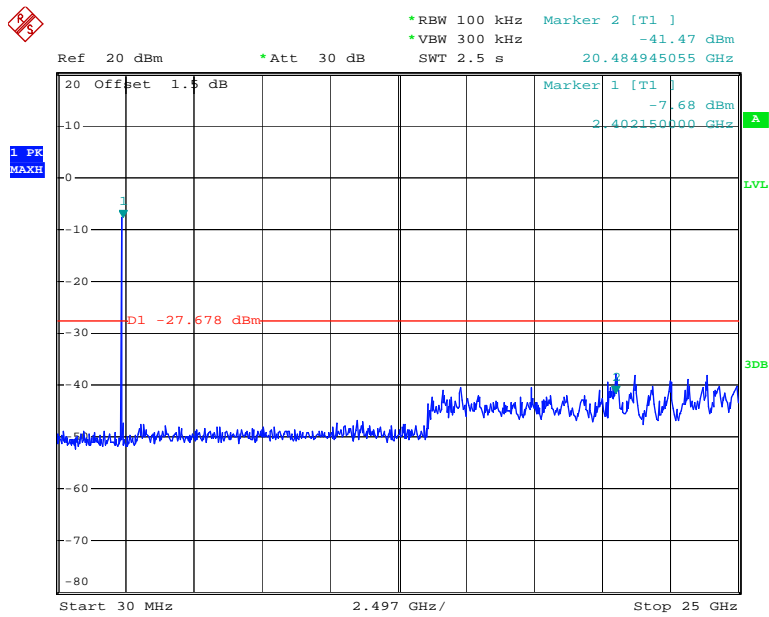
### 802.11g High Channel



Date: 8.JAN.2014 13:08:57

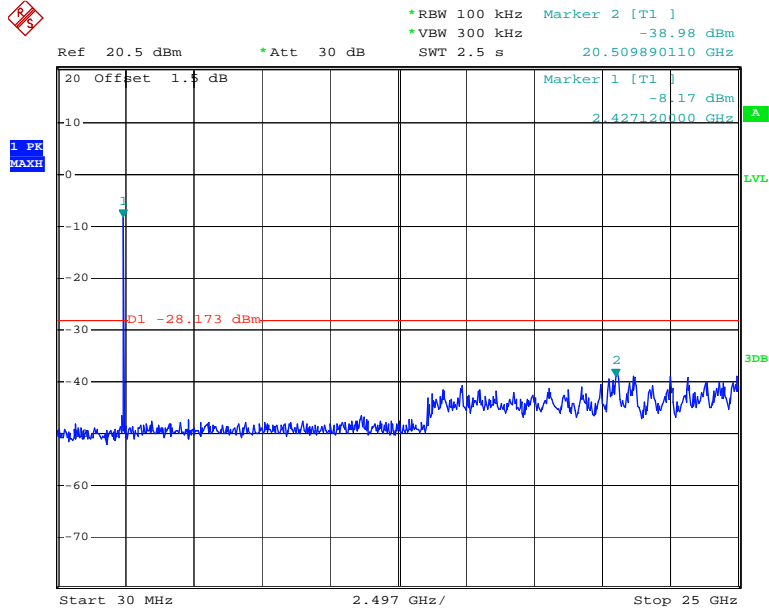


### 802.11n20 Low Channel



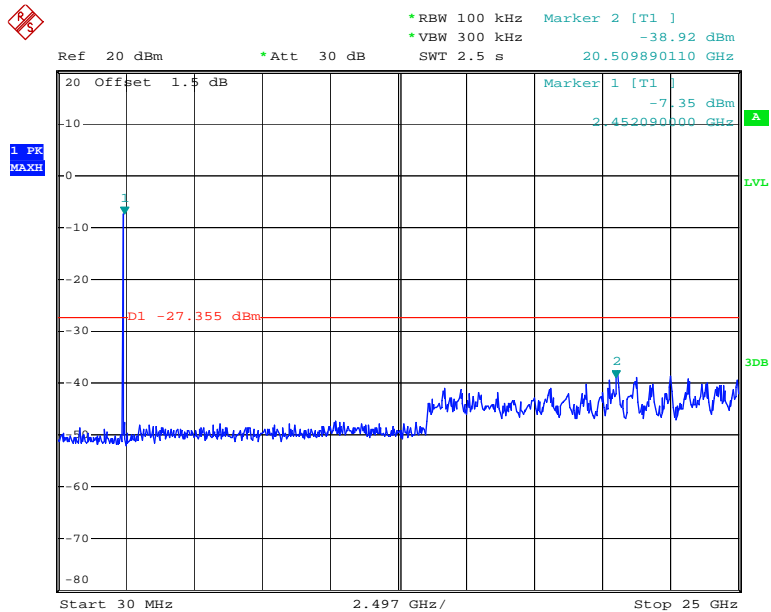
Date: 8.JAN.2014 11:37:41

### 802.11n20 Middle Channel



Date: 8.JAN.2014 11:36:03

802.11n20 High Channel



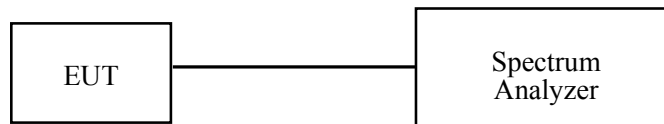
Date: 8.JAN.2014 11:40:09

**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	2013-6-16	2014-6-15

\* **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:	23.3 °C
Relative Humidity:	51 %
ATM Pressure:	101 kPa

\* The testing was performed by Allen Qiao on 2014-01-08

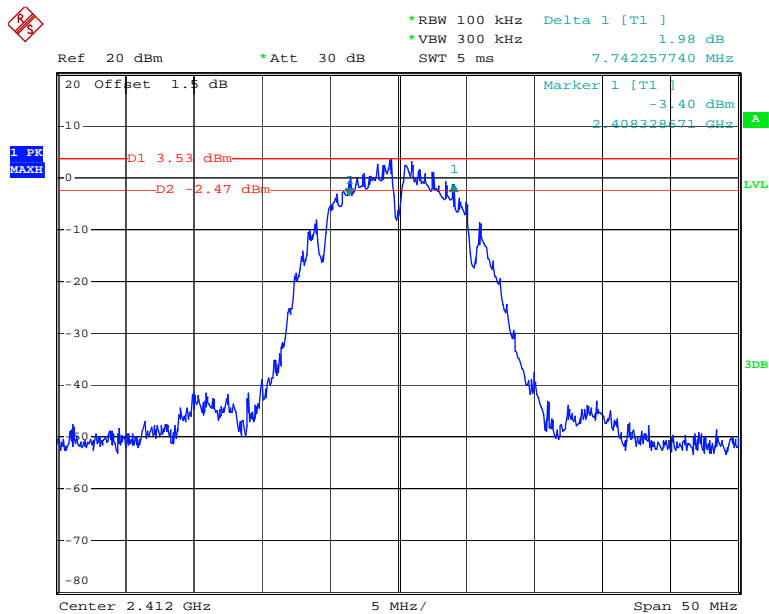
**Test Result:** Pass.

Please refer to the following tables and plots.

Test Mode: Transmitting

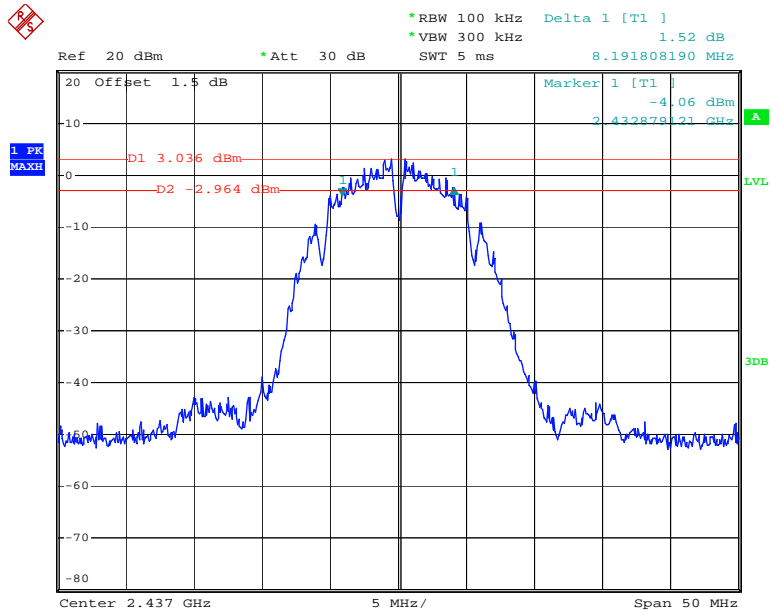
Test Mode	Channel	Frequency	6 dB Bandwidth	Limit
		(MHz)	(MHz)	(kHz)
802.11b	Low	2412	7.74	>500
	Middle	2437	8.19	>500
	High	2462	7.64	>500
802.11g	Low	2412	14.54	>500
	Middle	2437	14.89	>500
	High	2462	14.79	>500
802.11n20	Low	2412	15.18	>500
	Middle	2437	14.54	>500
	High	2462	15.18	>500

## 802.11b Low Channel



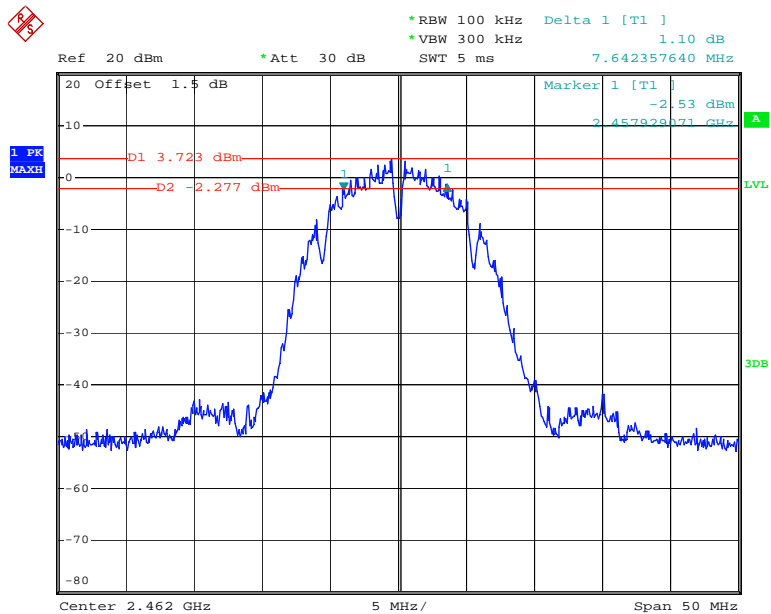
Date: 8.JAN.2014 11:43:35

### 802.11b Middle Channel



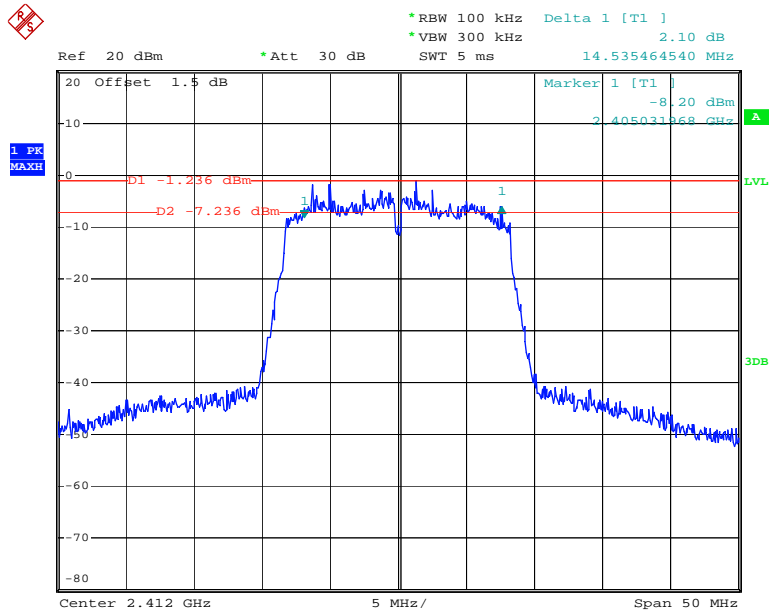
Date: 8.JAN.2014 11:49:05

### 802.11b High Channel



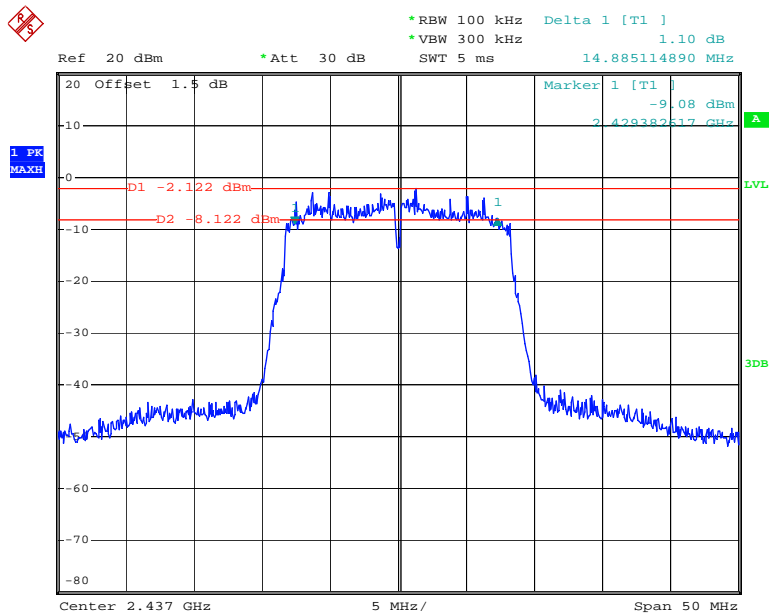
Date: 8.JAN.2014 13:04:13

### 802.11g Low Channel



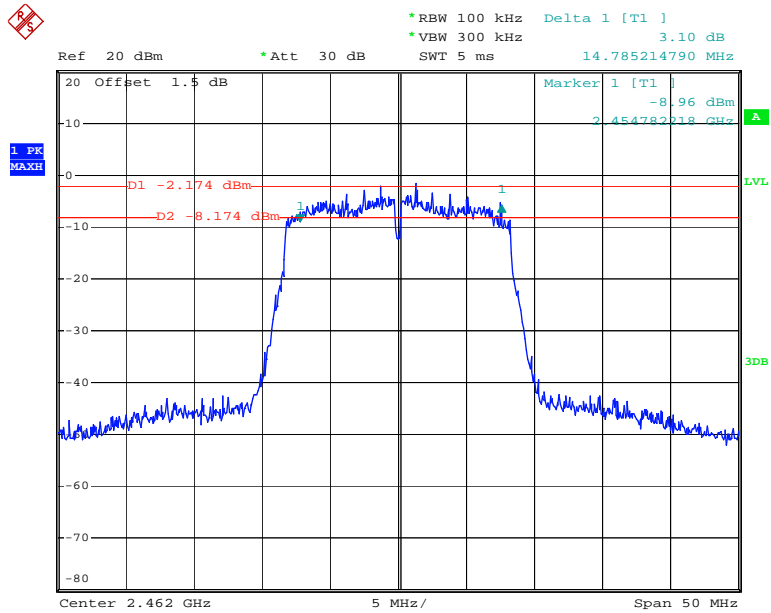
Date: 8.JAN.2014 13:06:16

### 802.11g Middle Channel



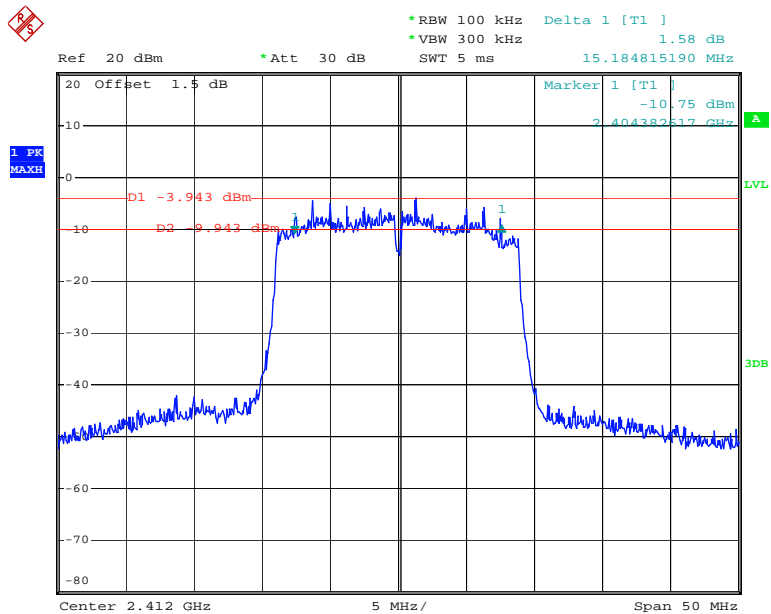
Date: 8.JAN.2014 13:09:50

### 802.11g High Channel



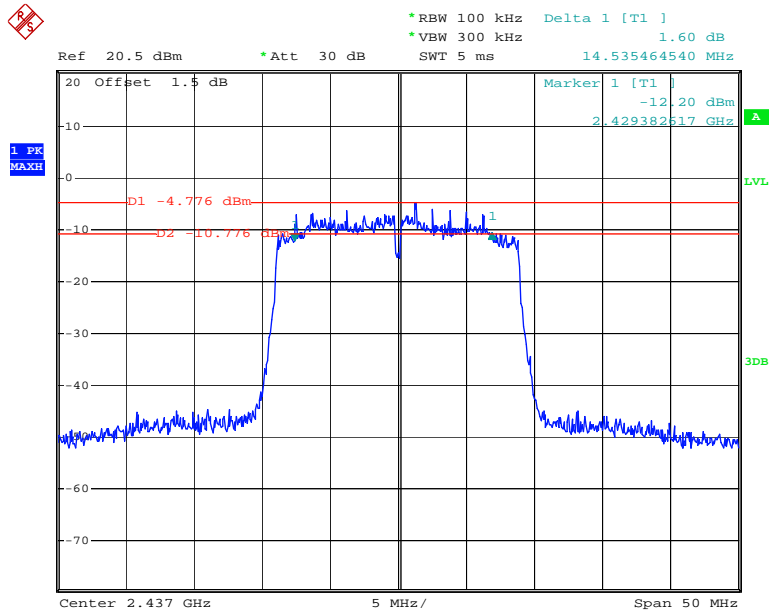
Date: 8.JAN.2014 13:08:05

### 802.11n20 Low Channel



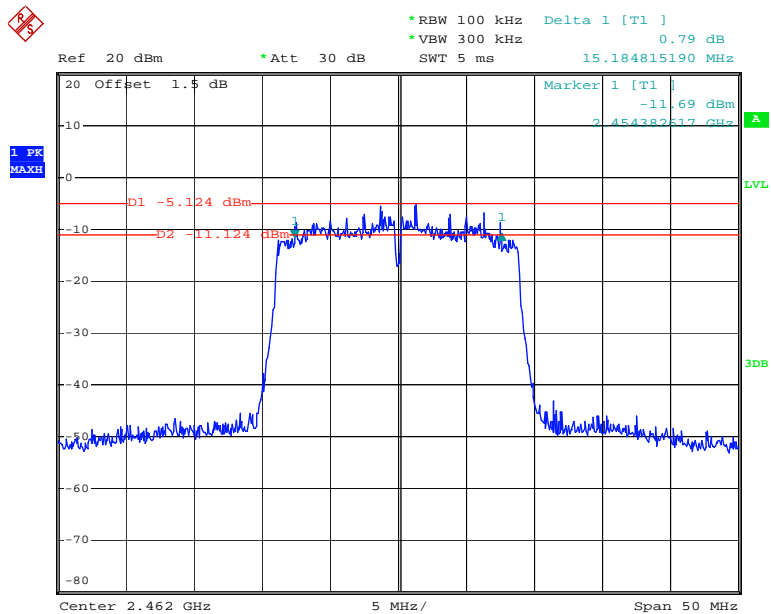
Date: 8.JAN.2014 11:36:43

### 802.11n20 Middle Channel



Date: 8.JAN.2014 11:35:09

### 802.11n20 High Channel



Date: 8.JAN.2014 11:38:49



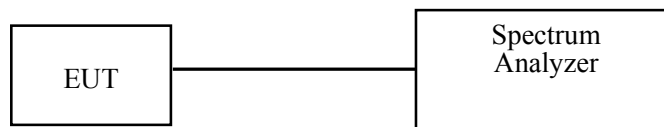
## FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

### 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. According to KDB 558074 D01 DTS Meas Guidance v03r01, 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 a spectrum Analyzer.
3. Add a correction factor to the display.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum analyzer	FSP 38	100478	2013-6-16	2014-6-15

\* **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**

<b>Temperature:</b>	23.3 °C
<b>Relative Humidity:</b>	51 %
<b>ATM Pressure:</b>	101 kPa

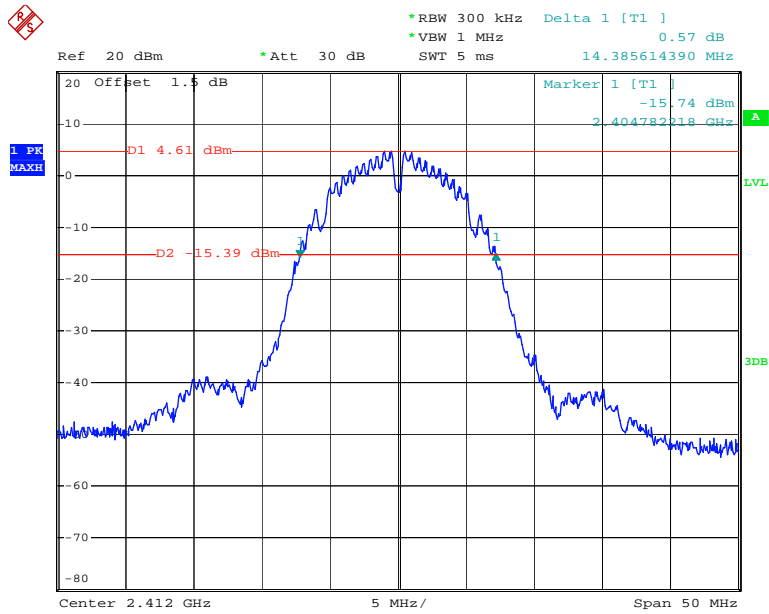
*\* The testing was performed by Allen Qiao on 2014-01-08*

*Test Mode: Transmitting*

Test Mode	Channel	Frequency	Conducted Output Power	Limit	Result
		(MHz)	(dBm)	(dBm)	
802.11b	Low	2412	14.90	30	PASS
	Middle	2437	14.57	30	PASS
	High	2462	14.56	30	PASS
802.11g	Low	2412	12.90	30	PASS
	Middle	2437	12.77	30	PASS
	High	2462	12.83	30	PASS
802.11n20	Low	2412	10.66	30	PASS
	Middle	2437	10.16	30	PASS
	High	2462	10.53	30	PASS

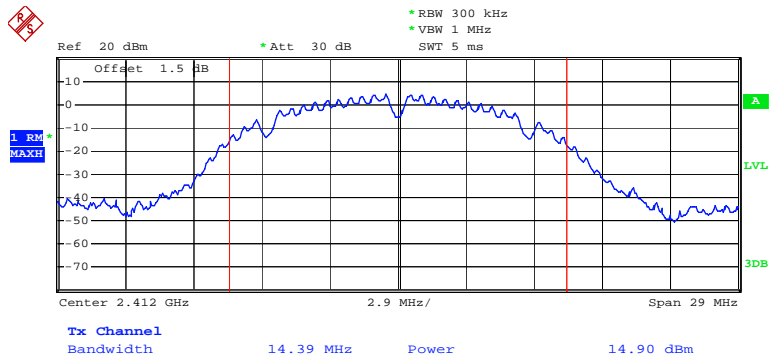
Please refer to the following plots

### 802.11b 20dB OBW, Low Channel



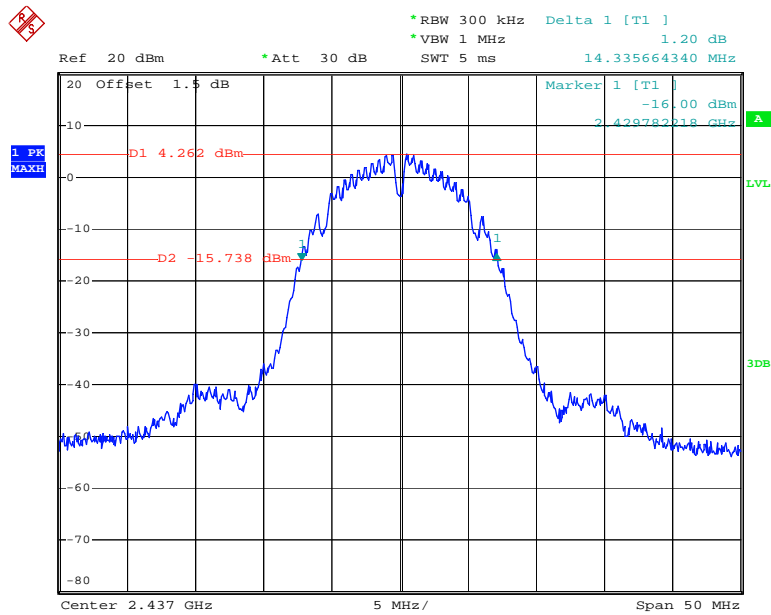
Date: 8.JAN.2014 11:43:49

### 802.11b RF Output Power, Low Channel



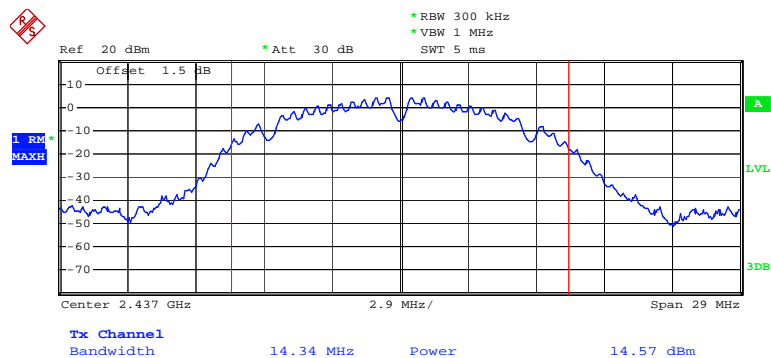
Date: 8.JAN.2014 11:43:57

## 802.11b 20dB OBW, Middle Channel



Date: 8.JAN.2014 11:49:19

## 802.11b RF Output Power, Middle Channel



Date: 8.JAN.2014 11:49:30

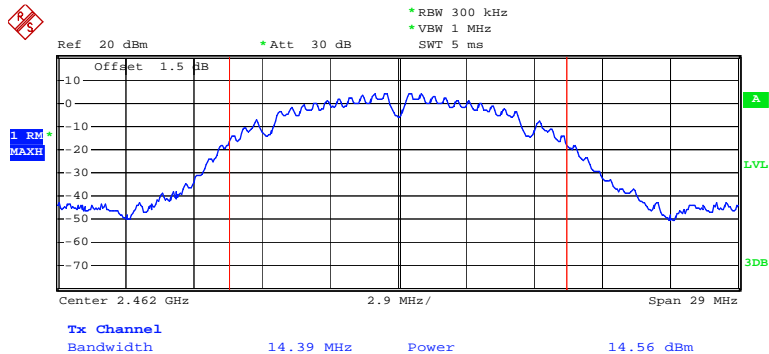
\*RBW 300 kHz Delta 1 [T1] 0.86 dB  
 \*VBW 1 MHz  
 Ref 20 dBm \*Att 30 dB 14.385614390 MHz  
 SWT 5 ms

20 Offset 1.5 dB  
 Marker 1 [T1] -16.61 dBm  
 2.454782218 GHz

1 PK MAXH  
 D1 4.062 dBm  
 D2 -15.938 dBm

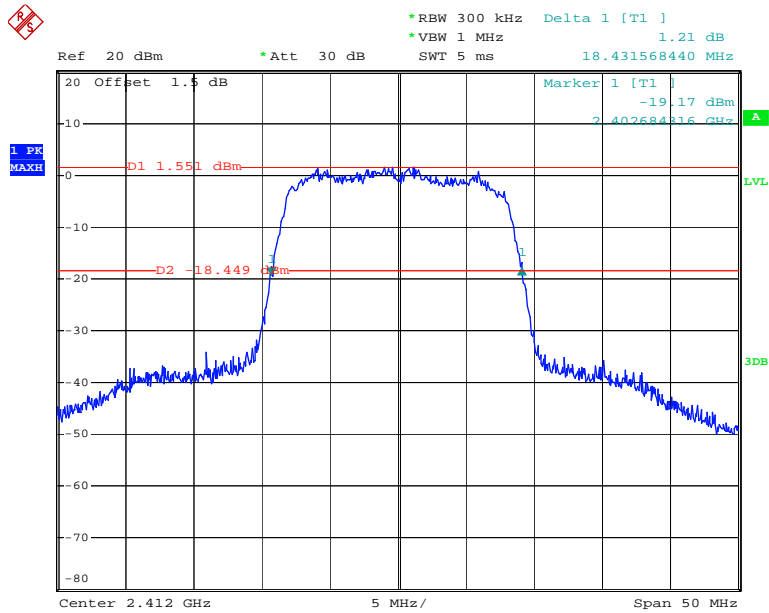
Center 2.462 GHz  
 5 MHz/  
 Span 50 MHz

### 802.11b RF Output Power, High Channel



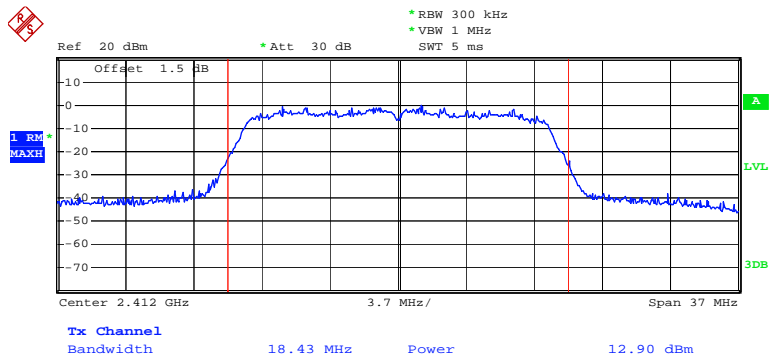
Page 37 of 53

### 802.11g 20dB OBW, Low Channel



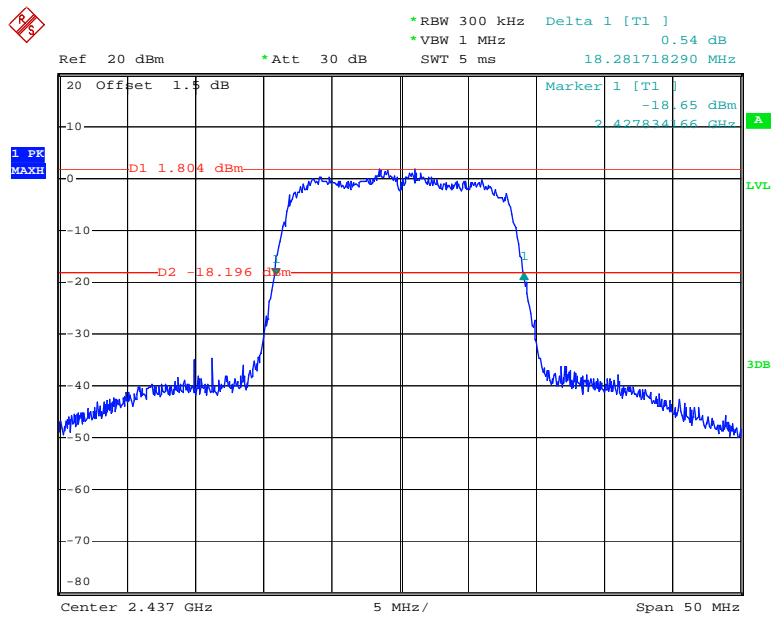
Date: 8.JAN.2014 13:06:30

### 802.11g RF Output Power, Low Channel



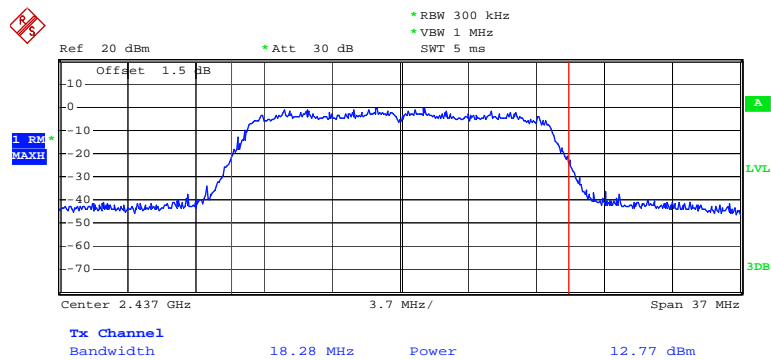
Date: 8.JAN.2014 13:06:43

### 802.11g 20dB OBW, Middle Channel



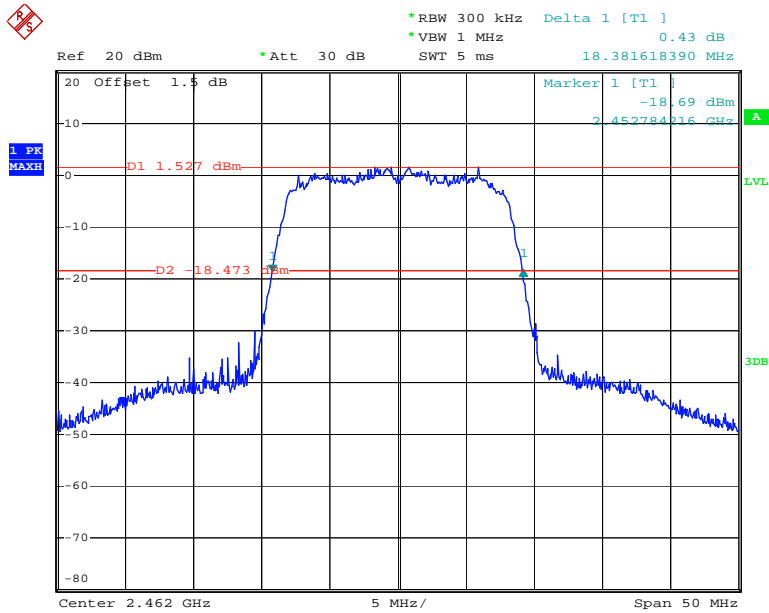
Date: 8.JAN.2014 13:10:04

### 802.11g RF Output Power, Middle Channel



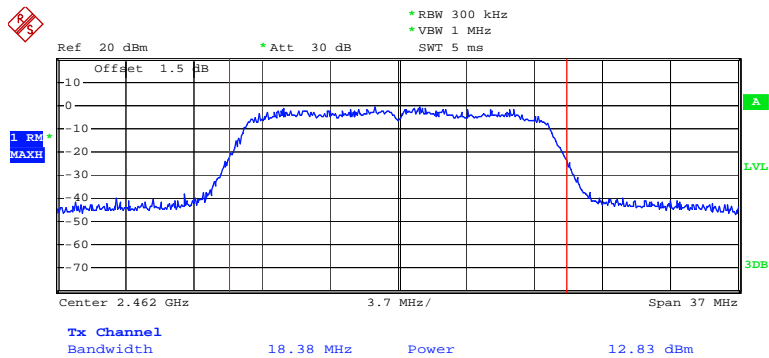
Date: 8.JAN.2014 13:10:22

### 802.11g RF 20dB OBW, High Channel



Date: 8.JAN.2014 13:08:18

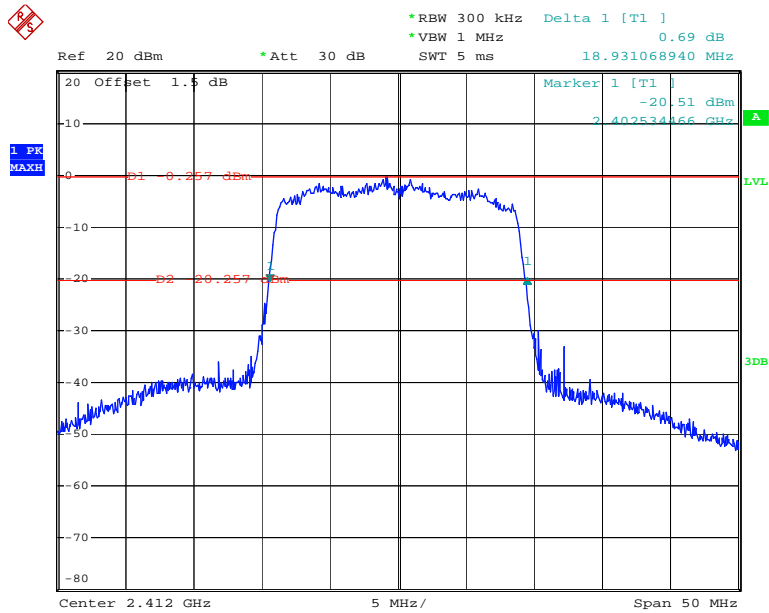
### 802.11g RF Output Power, High Channel



Date: 8.JAN.2014 13:08:33

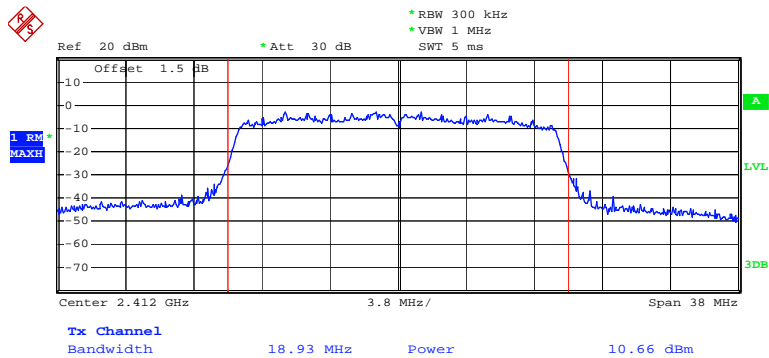


### 802.11n20 20dB OBW, Low Channel



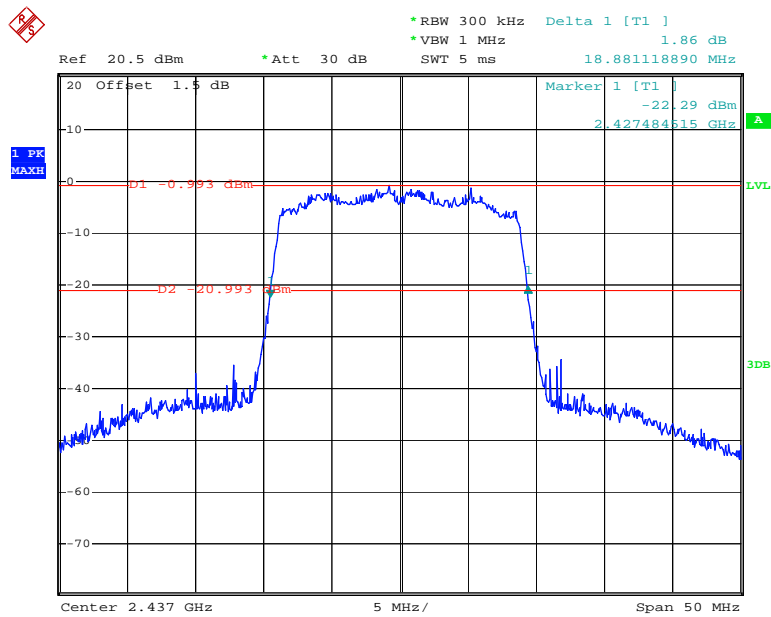
Date: 8.JAN.2014 11:36:57

### 802.11n20 RF Output Power, Low Channel



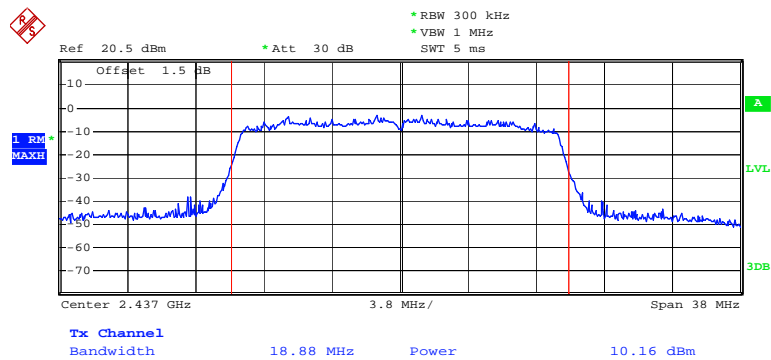
Date: 8.JAN.2014 11:37:16

### 802.11n20 20dB OBW, Middle Channel



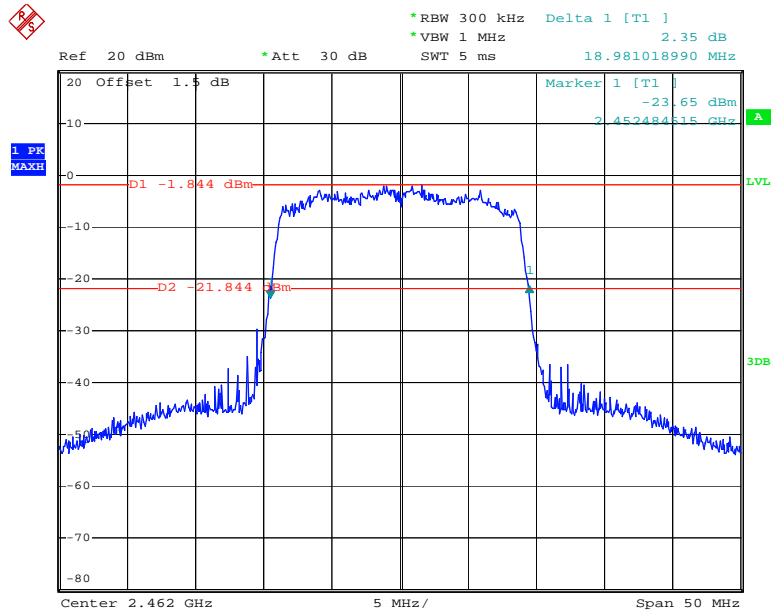
Date: 8.JAN.2014 11:35:23

### 802.11n20 RF Output Power, Middle Channel



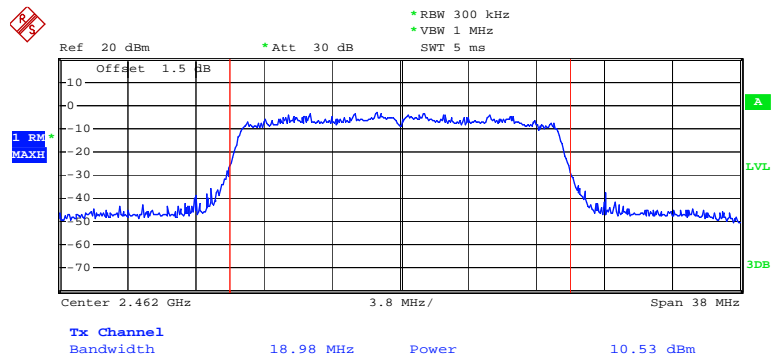
Date: 8.JAN.2014 11:35:39

### 802.11n20 RF 20dB OBW, High Channel



Date: 8.JAN.2014 11:39:03

### 802.11n20 RF Output Power, High Channel



Date: 8.JAN.2014 11:39:44

## **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	2013-6-16	2014-6-15

\* **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**

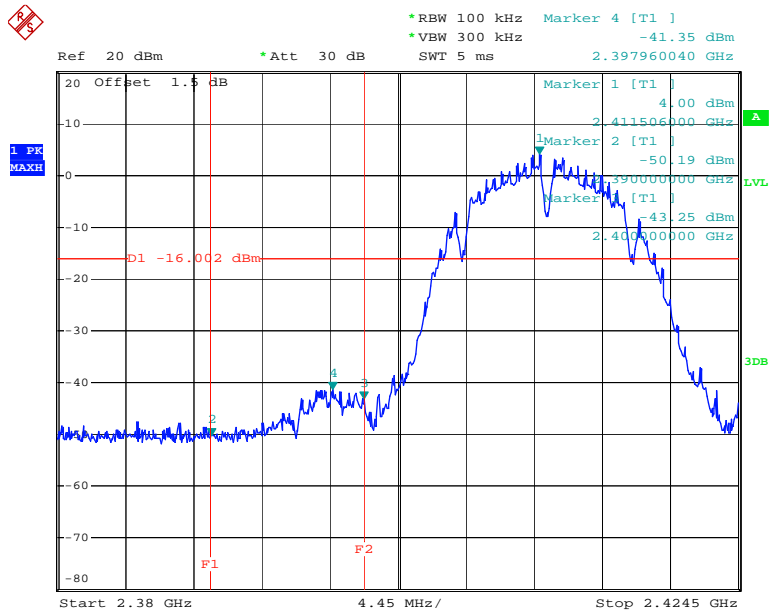
Temperature:	23.3 °C
Relative Humidity:	51 %
ATM Pressure:	101 kPa

\* The testing was performed by Allen Qiao on 2014-01-08

#### **Test Result: Compliance**

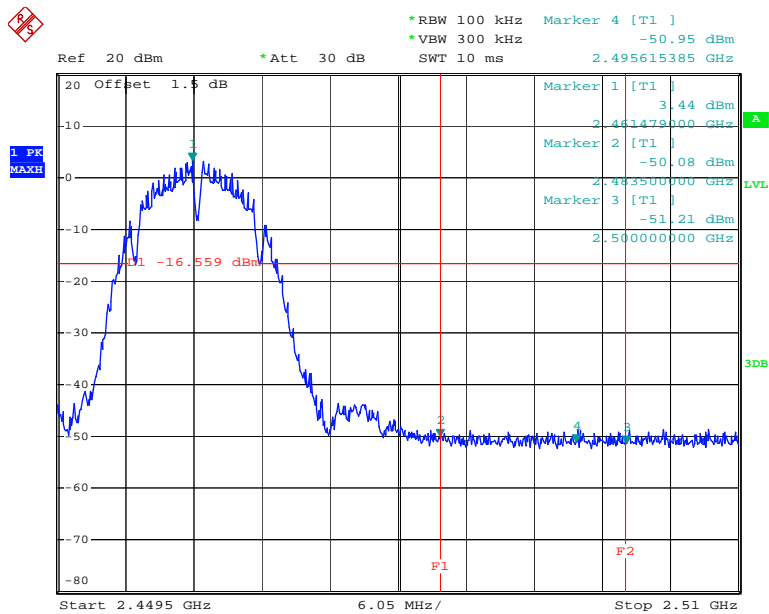
Please refer to following table and plots.

### 802.11b: Band Edge, Left Side



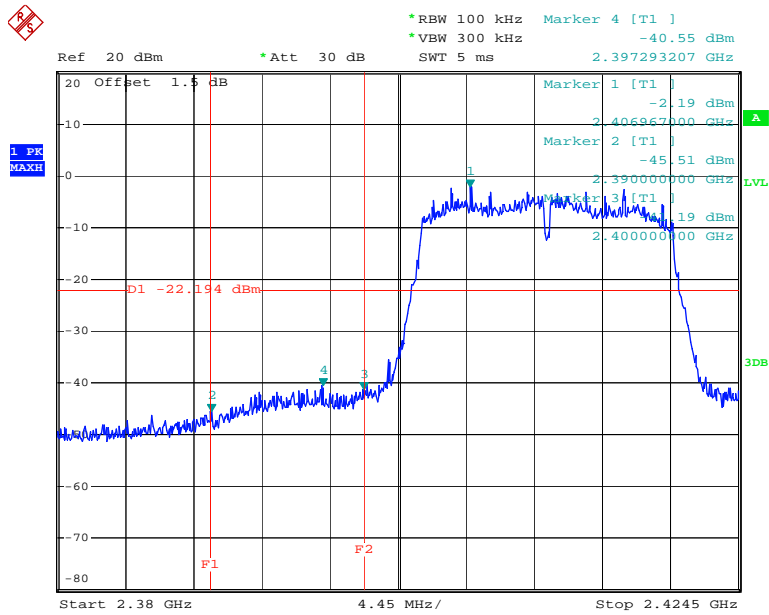
Date: 8.JAN.2014 11:44:30

### 802.11b: Band Edge, Right Side



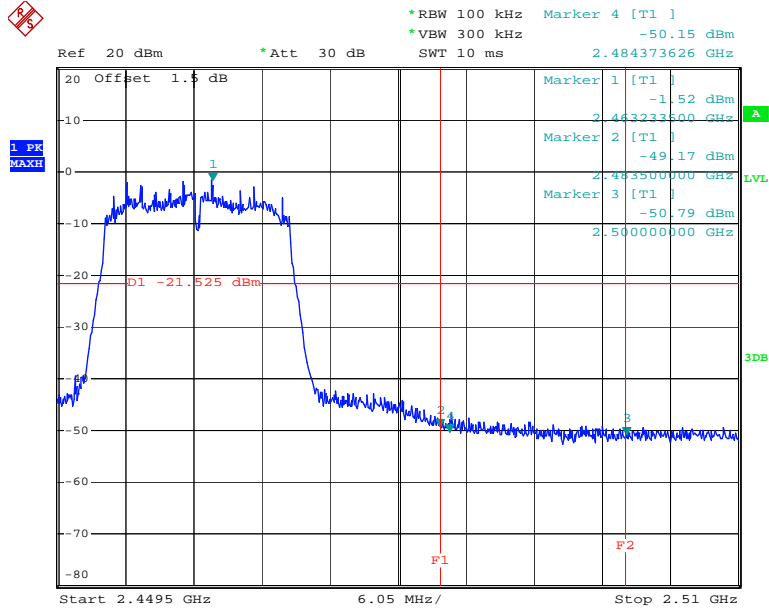
Date: 8.JAN.2014 13:05:11

### 802.11g: Band Edge, Left Side



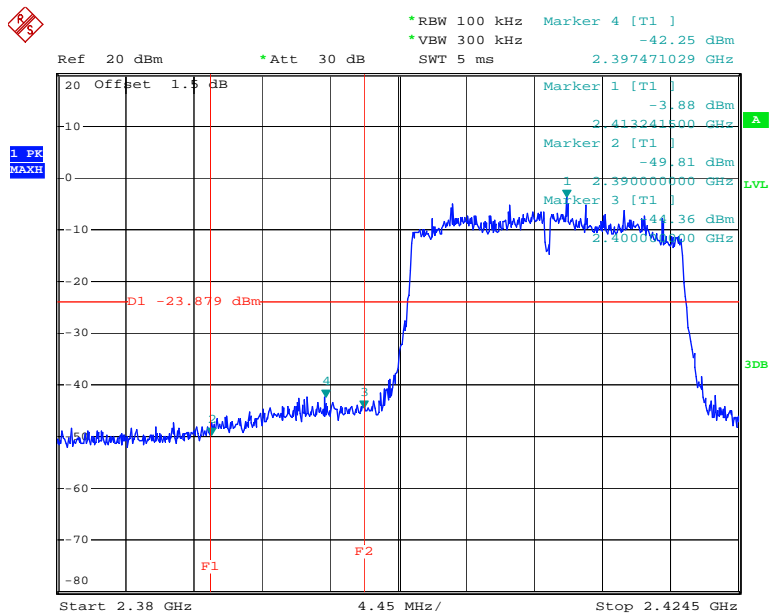
Date: 8.JAN.2014 13:07:19

### 802.11g: Band Edge, Right Side



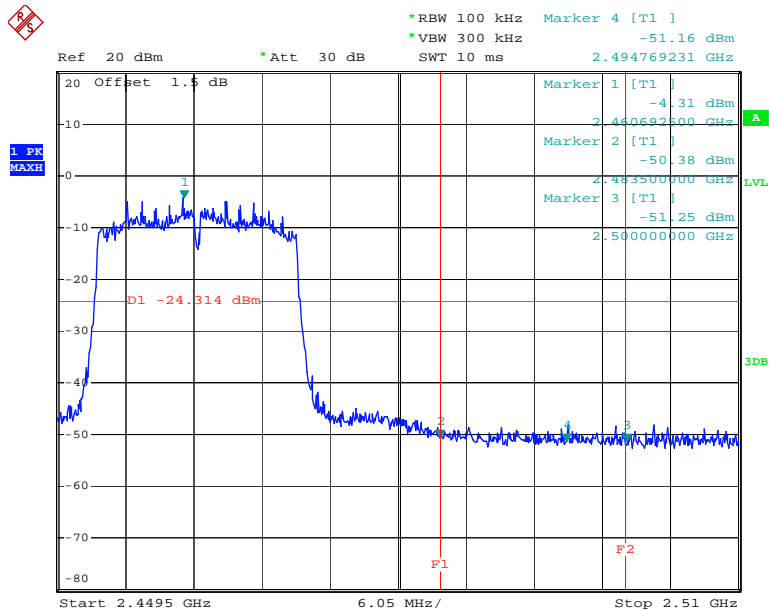
Date: 8.JAN.2014 13:09:09

## 802.11n20 Band Edge, Left Side



Date: 8.JAN.2014 11:37:53

## 802.11n20 Band Edge, Right Side



Date: 8.JAN.2014 11:40:21

## 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. Set the RBW = 3 kHz, VBW = 10 kHz, Set the span to 1.5 times the DTS bandwidth.
4. Use the peak marker function to determine the maximum amplitude level.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum analyzer	FSP 38	100478	2013-6-16	2014-6-15

\* **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:	23.3 °C
Relative Humidity:	51 %
ATM Pressure:	101 kPa

\* The testing was performed by Allen Qiao on 2014-01-08

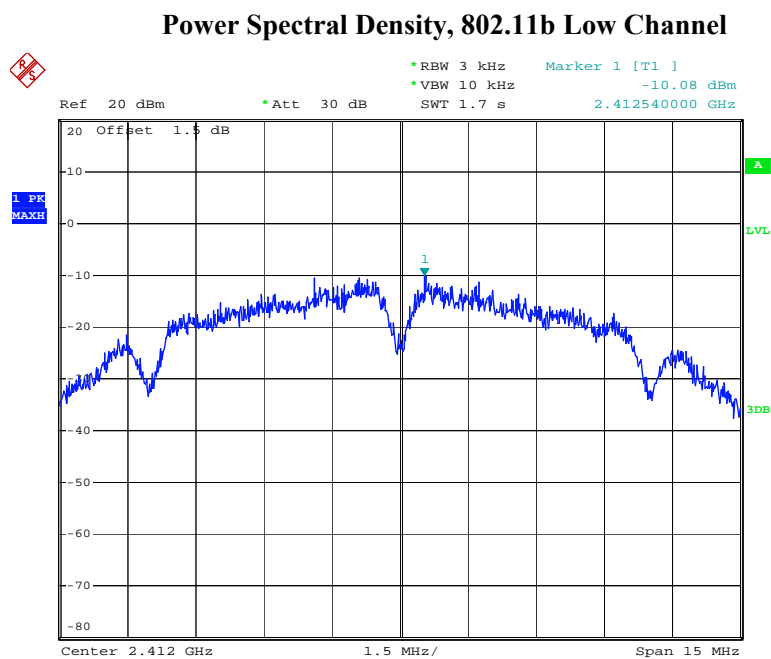


Test Mode: Transmitting

Test Result: Pass

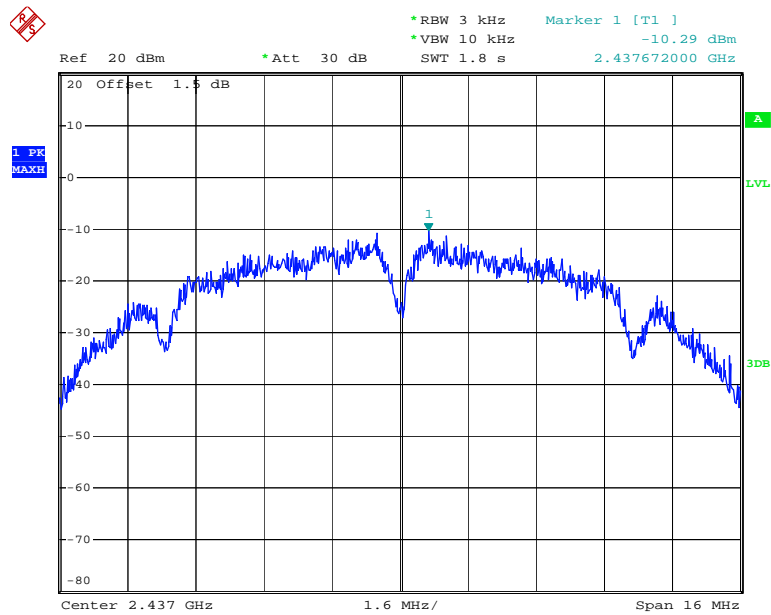
Test Mode	Channel	PSD	Limit	Result
		(dBm/3kHz)	(dBm/3kHz)	
802.11b	Low	-10.08	8	PASS
	Middle	-10.29	8	PASS
	High	-10.82	8	PASS
802.11g	Low	-16.21	8	PASS
	Middle	-16.33	8	PASS
	High	-16.22	8	PASS
802.11n20	Low	-19.59	8	PASS
	Middle	-19.31	8	PASS
	High	-19.13	8	PASS

Please refer to the following plots



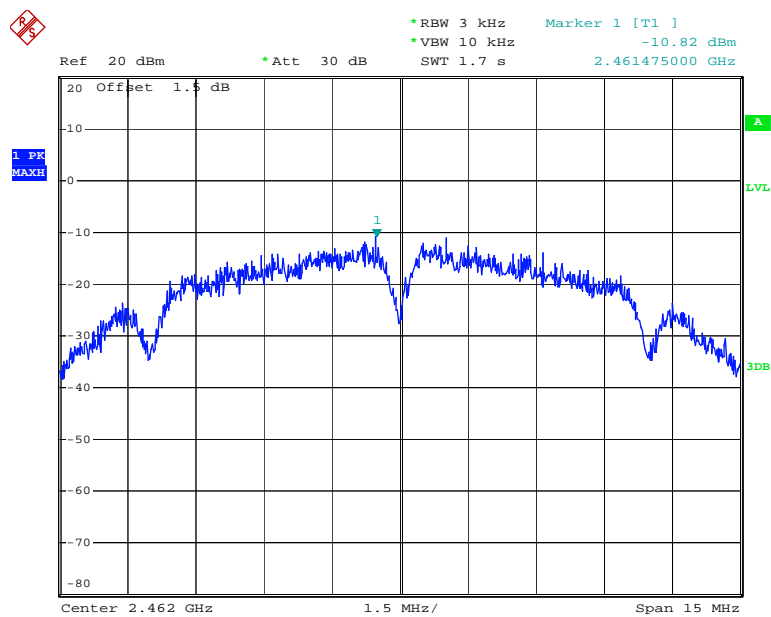
Date: 8.JAN.2014 13:13:12

### Power Spectral Density, 802.11b Middle Channel



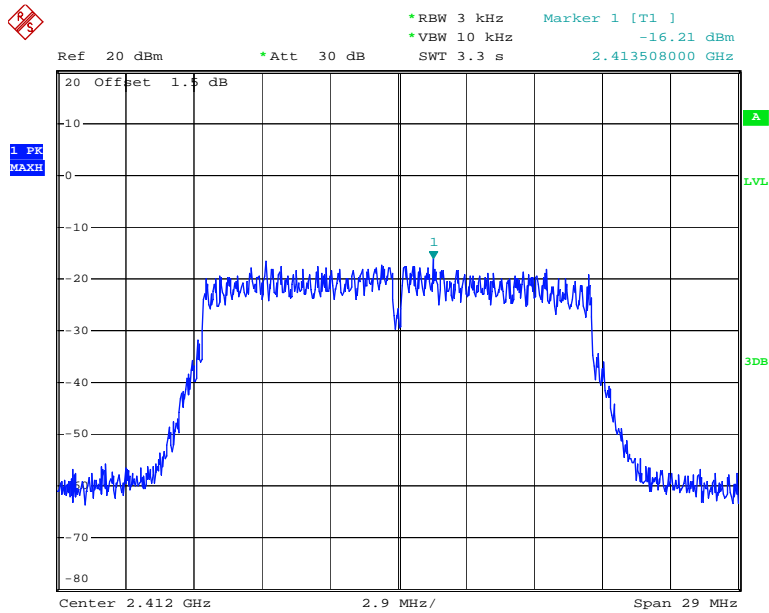
Date: 8.JAN.2014 11:49:39

### Power Spectral Density, 802.11b High Channel



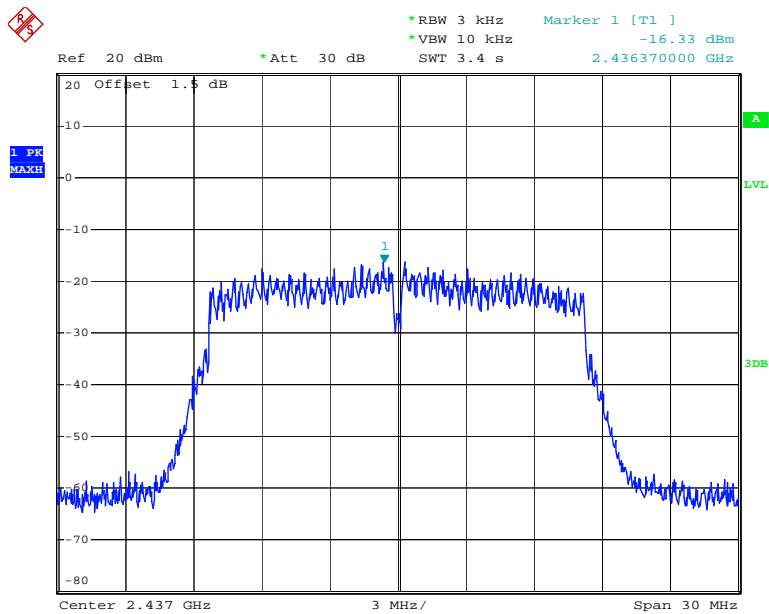
Date: 8.JAN.2014 13:04:46

### Power Spectral Density, 802.11g Low Channel



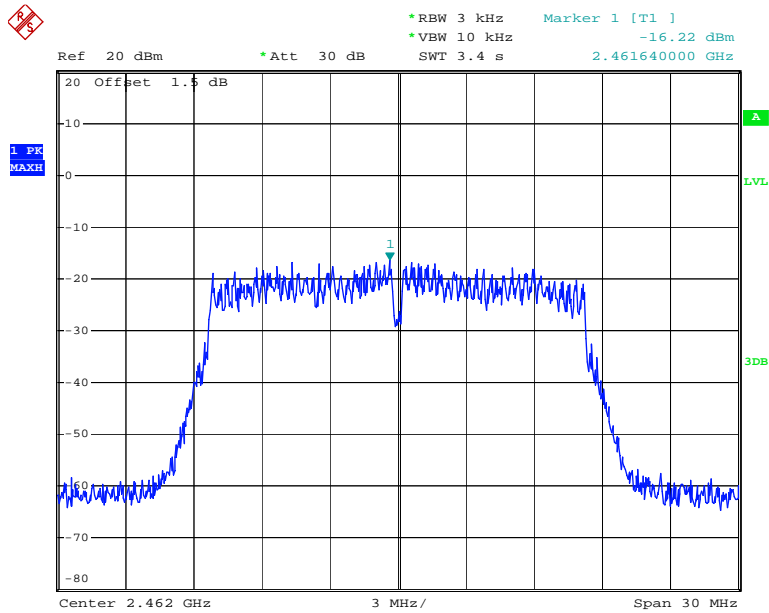
Date: 8.JAN.2014 13:06:55

### Power Spectral Density, 802.11g Middle Channel



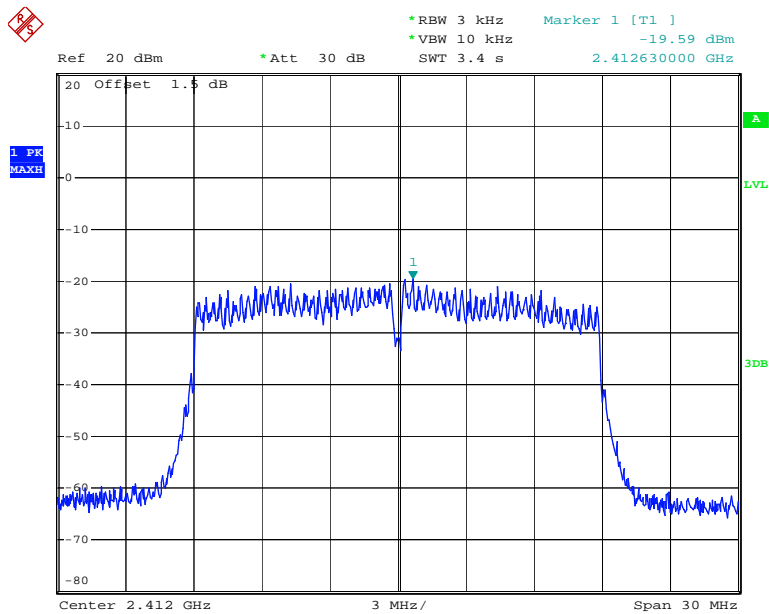
Date: 8.JAN.2014 13:10:34

### Power Spectral Density, 802.11g High Channel



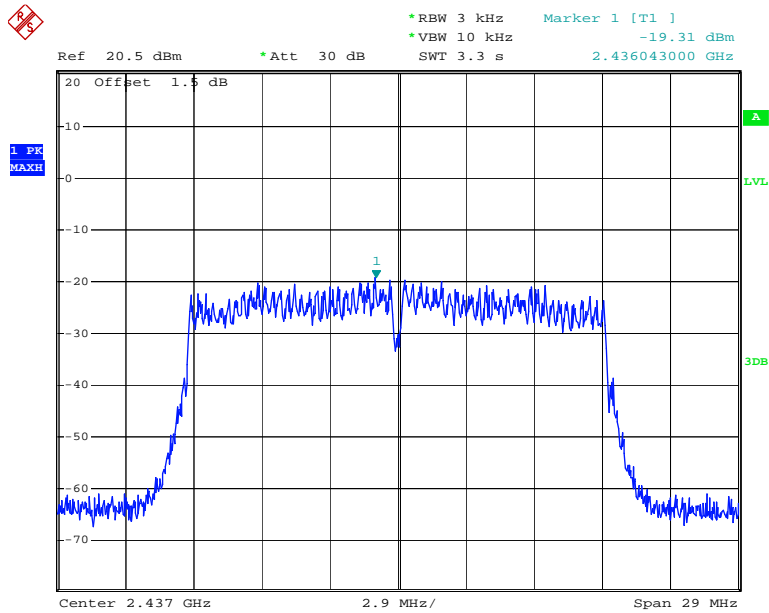
Date: 8.JAN.2014 13:20:28

### Power Spectral Density, 802.11n20 Low Channel



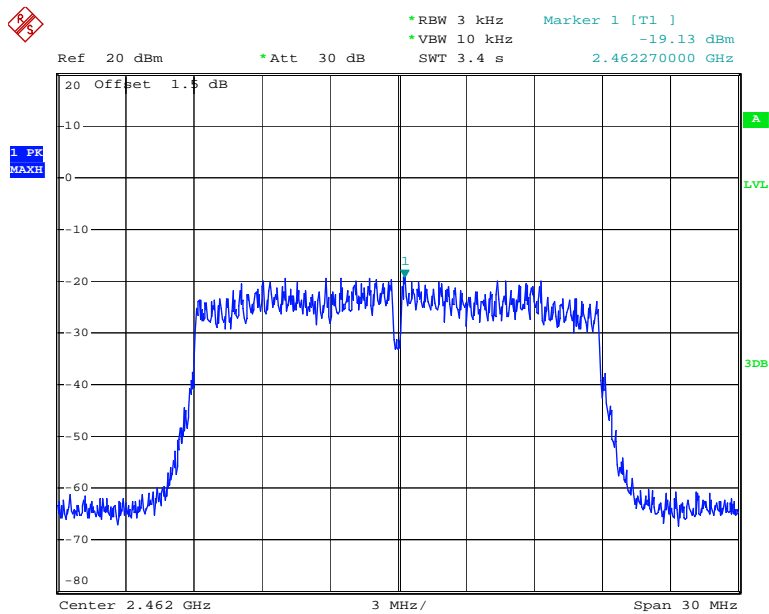
Date: 8.JAN.2014 13:23:13

### Power Spectral Density, 802.11n20 Middle Channel



Date: 8.JAN.2014 11:35:50

### Power Spectral Density, 802.11n20 High Channel



Date: 8.JAN.2014 11:39:56

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