

# FCC PART 15.247

## TEST REPORT

For

### Suga Electronics Limited

22/F., TowerB, Billion Centre, 1 Wang Kwong Road, Kowloon Bay, Kowloon, Hong Kong

**FCC ID: VZFSWP23MA2**

<b>Report Type:</b> Original Report	<b>Product Type:</b> 802.11 b/g/n Module
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<b>Report Number:</b> RSZ130703001-00	
<b>Report Date:</b> 2013-07-18	
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**Note:** This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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## GENERAL INFORMATION

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

The *Suga Electronics Limited*'s product, model number: *SWP23MA-2 (FCC ID: VZFSWP23MA2)* (the "EUT") in this report was a 802.11 b/g/n module, names as *Wifi module 802.11 b/g/n with AP (Access Point) / Router function* by applicant, which was measured approximately: 5.0 cm (L) x 4.8 cm (W) x 1.9 cm (H), rated with input voltage: DC 3.3V (Typical).

*\* All measurement and test data in this report was gathered from production sample serial number: ccYXddddddd (Assigned by applicant). The EUT supplied by the applicant was received on 2013-07-03.*

### Objective

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

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

### Related Submittal(s)/Grant(s)

No related submitted(s).

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

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

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

EUT was tested with Channel 1, 6 and 11.

For 802.11n-HT40 mode, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2422	6	2447
2	2427	7	2452
3	2432	/	/
4	2437	/	/
5	2442	/	/

EUT was tested with Channel 1, 4 and 7.

### EUT Exercise Software

Test software and test requirement was provided by applicant:

1. WinPcap-4-0-2
2. RT3352QA

The test was performed under:

ANT0:

Low channel

802.11b: Data rate: 1 Mbps. Power level: 09

802.11g: Data rate: 6 Mbps. Power level: 09

802.11n-HT20: Data rate: 6.5 Mbps. Power level: 09

802.11n-HT40: Data rate: 6.5 Mbps. Power level: 09

Middle channel

802.11b: Data rate: 1 Mbps. Power level: 0A

802.11g: Data rate: 6 Mbps. Power level: 0A

802.11n-HT20: Data rate: 6.5 Mbps. Power level: 0A

802.11n-HT40: Data rate: 6.5 Mbps. Power level: 0A

High channel

802.11b: Data rate: 1 Mbps. Power level: 0C

802.11g: Data rate: 6 Mbps. Power level: 0C

802.11n-HT20: Data rate: 6.5 Mbps. Power level: 0C

802.11n-HT40: Data rate: 6.5 Mbps. Power level: 0C

ANT1:

Low channel

802.11b: Data rate: 1 Mbps. Power level: 09

802.11g: Data rate: 6 Mbps. Power level: 09

802.11n-HT20: Data rate: 6.5 Mbps. Power level: 09

802.11n-HT40: Data rate: 6.5 Mbps. Power level: 09

Middle channel

802.11b: Data rate: 1 Mbps. Power level: 09

802.11g: Data rate: 6 Mbps. Power level: 09

802.11n-HT20: Data rate: 6.5 Mbps. Power level: 09

802.11n-HT40: Data rate: 6.5 Mbps. Power level: 09

High channel

802.11b: Data rate: 1 Mbps. Power level: 0B

802.11g: Data rate: 6 Mbps. Power level: 0B

802.11n-HT20: Data rate: 6.5 Mbps. Power level: 0B

802.11n-HT40: Data rate: 6.5 Mbps. Power level: 0B

### Equipment Modifications

No modification was made to the EUT tested.

**Support Equipment List and Details**

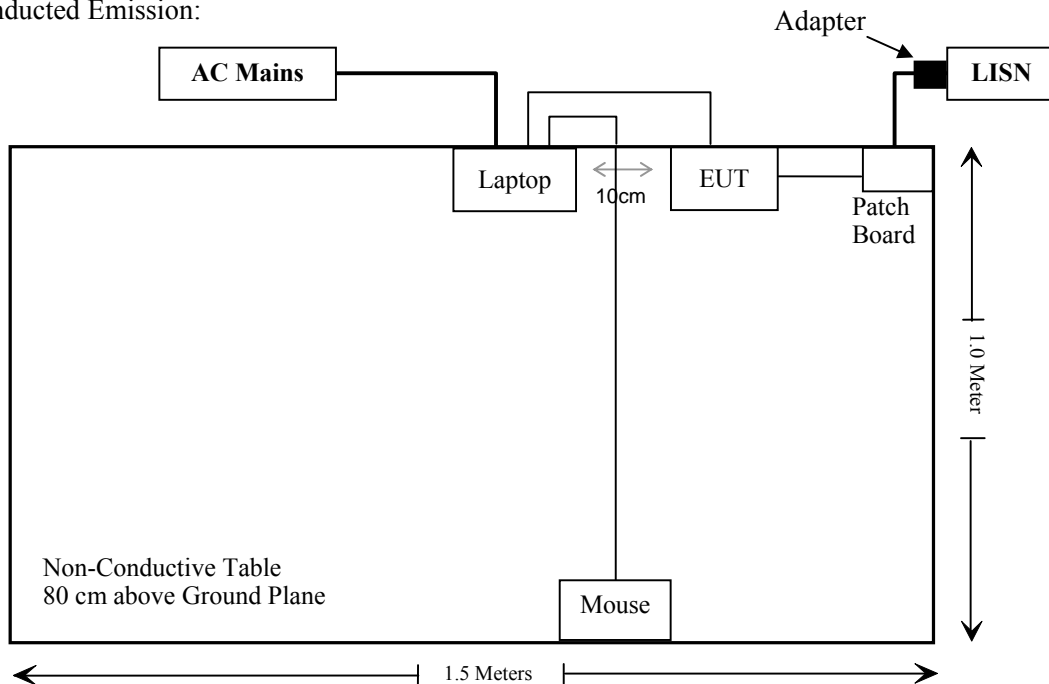
Manufacturer	Description	Model	Serial Number
DELL	Laptop	D610	/
DELL	Mouse	MOC5UO	G1900NKD
TP-LINK	Adapter	T090085-2A1	/

**External I/O Cable**

Cable Description	Length (m)	From Port	To
Unshielded Detachable RJ45 Cable	2.1	EUT	Laptop
Unshielded Detachable DC Power Cable	1.5	EUT	Adapter
Unshielded Undetachable Mouse Cable	1.5	Laptop	Mouse
Unshielded Detachable DC Power Cable	2.0	Patch Board	Adapter

**Block Diagram of Test Setup**

For Conducted Emission:



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§15.247 (i), §1.1307 (b)(1), §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a),	Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance



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

**Applicable Standard**

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (Minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

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

**Calculated Formulary:**

Predication of MPE limit at a given distance

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

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

**Calculated Data, worst case as below:**

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(mW)			
<b>Limits for General Population/Uncontrolled Exposure</b>								
802.11b	2412	2.0	1.58	17.76	59.70	20	0.0188	1.0
802.11g	2412	2.0	1.58	19.67	92.68	20	0.0291	1.0
802.11n-HT20	2412	2.0	1.58	22.10	162.18	20	0.0510	1.0
802.11n-HT40	2452	2.0	1.58	22.29	169.43	20	0.0533	1.0

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

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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.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Antenna Connector Construction**

This product used two 2.4 GHz TX/RX antennas which were connected to the mainboard with I-PEX socket, and the maximum gain is 2.0 dBi, which fulfill the requirement of this section, and please refer to the internal photos.

**Result:** Compliance.

## FCC §15.207 (a) - CONDUCTED EMISSIONS

### Applicable Standard

FCC§15.207

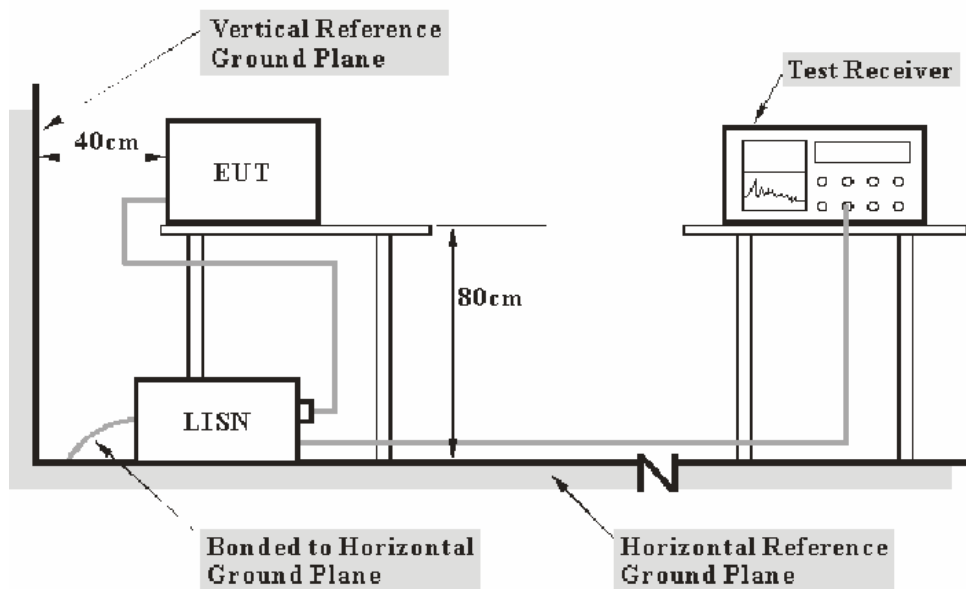
### Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements may be receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expanded combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

### EUT Setup



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

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The 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 first LISN.

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

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

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2013-06-17	2014-06-17
Rohde & Schwarz	1st LISN	ENV216	3560.6650.12-101613-Yb	2013-05-07	2014-05-07
Rohde & Schwarz	2nd LISN	ESH2-Z5	892107/021	2012-08-22	2013-08-22
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2012-08-09	2013-08-09

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

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

**1.7 dB at 0.266000 MHz in the Neutral conductor mode**

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(L_m)} \leq L_{lim} + U_{cispr}$$

in our lab.,  $U_{(L_m)}$  is less than  $U_{cispr}$ , if  $L_m$  is less than  $L_{lim}$ , it implies that the EUT complies with the limit.

## Test Data

### Environmental Conditions

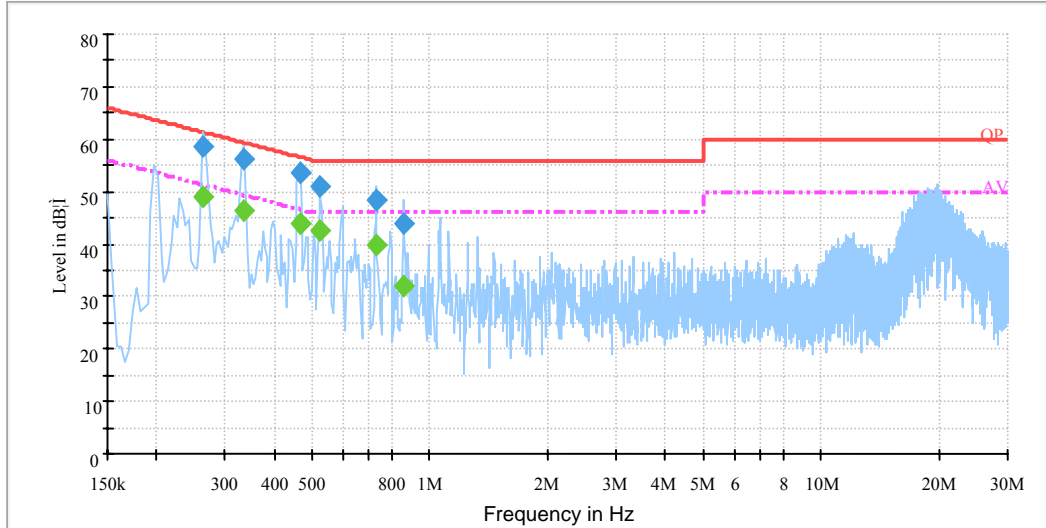
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

*The testing was performed by Candy Li on 2013-07-08.*

*Test Mode: Transmitting*

**AC 120 V, 60 Hz, Line:**

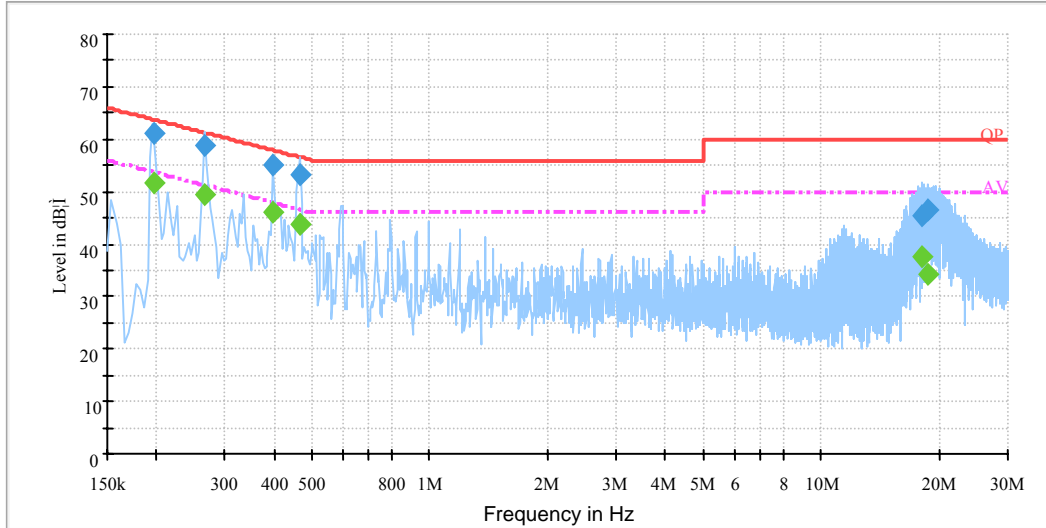
EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave.)
0.262000	49.1	19.5	51.4	2.2*	Ave.
0.334000	57.1	19.5	59.4	2.3*	QP
0.334000	46.9	19.5	49.4	2.4*	Ave.
0.466000	44.2	19.5	46.6	2.4*	Ave.
0.262000	58.6	19.5	61.4	2.8*	QP
0.526000	43.2	19.5	46.0	2.8*	Ave.
0.466000	53.7	19.5	56.6	2.9*	QP
0.526000	51.1	19.5	56.0	4.9	QP
0.730000	39.9	19.5	46.0	6.1	Ave.
0.730000	48.5	19.5	56.0	7.5	QP
0.858000	43.7	19.5	56.0	12.3	QP
0.858000	32.1	19.5	46.0	13.9	Ave.

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

EMI Auto Test N



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave.)
0.266000	49.5	19.5	51.2	1.7*	Ave.
0.198000	51.9	19.5	53.7	1.8*	Ave.
0.398000	46.1	19.5	47.9	1.8*	Ave.
0.198000	61.8	19.5	63.7	1.9*	QP
0.466000	44.2	19.5	46.6	2.4*	Ave.
0.266000	58.7	19.5	61.2	2.6*	QP
0.398000	55.0	19.5	57.9	2.9*	QP
0.466000	53.3	19.5	56.6	3.3	QP
18.166000	37.4	20.1	50.0	12.6	Ave.
18.742000	46.5	20.1	60.0	13.5	QP
18.166000	45.3	20.1	60.0	14.7	QP
18.742000	34.4	20.1	50.0	15.6	Ave.

**Note:**

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Correction Factor = LISN/ISN VDF (Voltage Division Factor) + Cable Loss  
The corrected factor has been input into the transducer of the test software.
- 3) Margin = Limit – Corrected Amplitude
- 4) \* Within measurement uncertainty!

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

**Applicable Standard**

FCC §15.247 (d); §15.209; §15.205;

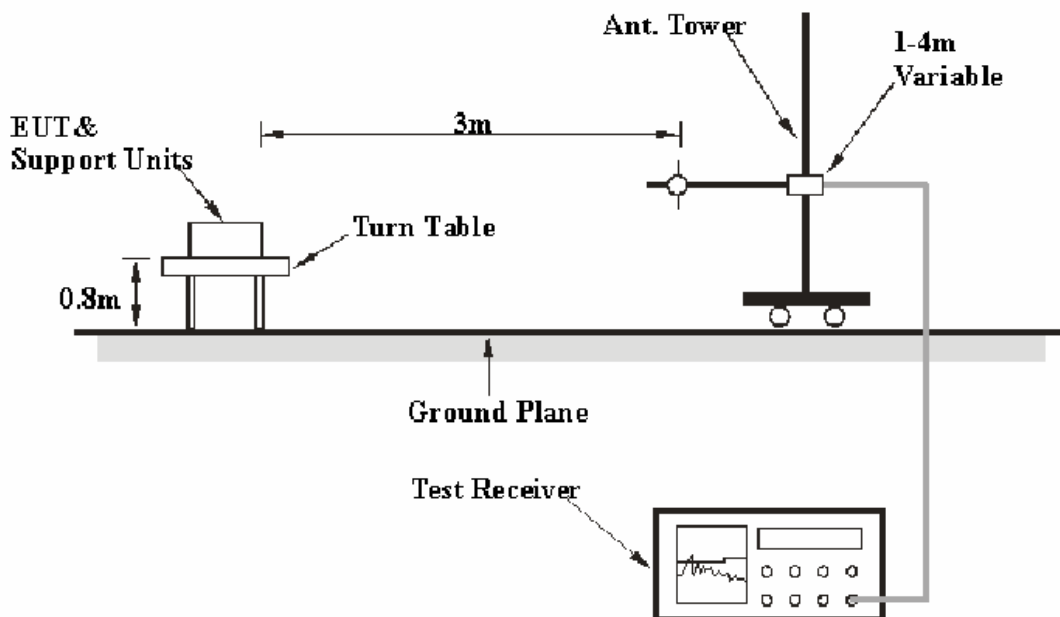
**Measurement Uncertainty**

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report

Frequency	Polarity	Measurement uncertainty
30MHz~200MHz	Horizontal	4.62 dB (k=2, 95% level of confidence)
	Vertical	4.54 dB (k=2, 95% level of confidence)
200MHz~1GHz	Horizontal	4.84 dB (k=2, 95% level of confidence)
	Vertical	5.91 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	Horizontal / Vertical	4.68 dB (k=2, 95% level of confidence)
Above 6 GHz	Horizontal / Vertical	4.92 dB (k=2, 95% level of confidence)

**EUT Setup**





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

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

The 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
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	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 AC floor outlet.

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

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

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2012-08-09	2013-08-09
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-05-09	2014-05-09
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
SUPER ULTRA	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13

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

## Corrected Amplitude & Margin Calculation

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

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

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 Results Summary

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

**0.33 dB at 2389.4 MHz** in the **Horizontal** polarization for mode 802.11b

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(L_m)} \leq L_{lim} + U_{cispr}$$

in our lab.,  $U_{(L_m)}$  is less than  $+ U_{cispr}$ , if  $L_m$  is less than  $L_{lim}$ , it implies that the EUT complies with the limit.

## Test Data

### Environmental Conditions

<b>Temperature:</b>	24~25 °C
<b>Relative Humidity:</b>	50~55 %
<b>ATM Pressure:</b>	100.0~101.0 kPa

*The testing was performed by Candy Li on 2013-07-05 and 2013-07-06.*

*Test Mode: Transmitting*

Note: For 802.11b/g, test with two antenna port transmit separately, for 802.11n-HT20, 802.11n-HT40, test with two antenna ports transmit simultaneously, and the worst case as below:

**30 MHz-25 GHz**

**802.11b mode:**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/15.205/15.209		
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)	Comment
Low Channel (2412 MHz)										
2412	103.87	PK	25	1.5	H	6.13	110.00	/	/	Fund.
2412	97.93	Ave.	25	1.5	H	6.13	104.06	/	/	Fund.
2412	95.29	PK	141	1.3	V	6.13	101.42	/	/	Fund.
2412	89.84	Ave.	141	1.3	V	6.13	95.97	/	/	Fund.
2389.8	47.06	Ave.	52	2.1	H	6.13	53.19	54	0.81*	Spurious
2387.6	46.84	Ave.	80	1.4	H	6.13	52.97	54	1.03*	Spurious
2493.3	45.02	Ave.	221	2.2	H	7.21	52.23	54	1.77*	Spurious
375.05	56.23	QP	44	1.5	H	-13.10	43.13	46	2.87*	Spurious
2389.8	62.17	PK	52	2.1	H	6.13	68.30	74	5.70	Spurious
2387.6	61.89	PK	80	1.4	H	6.13	68.02	74	5.98	Spurious
2493.3	58.78	PK	221	2.2	H	7.21	65.99	74	8.01	Spurious
7236	19.48	Ave.	211	1.1	H	16.62	36.10	54	17.90	Harmonic
7236	39.11	PK	211	1.1	H	16.62	55.73	74	18.27	Harmonic
4824	19.10	Ave.	182	1.9	H	12.40	31.50	54	22.50	Harmonic
4824	38.74	PK	182	1.9	H	12.40	51.14	74	22.86	Harmonic
3216.1	49.20	Ave.	343	1.4	H	9.39	58.59	84.06	25.47	Spurious
3216.1	51.10	PK	343	1.4	H	9.39	60.49	90.00	29.51	Spurious
Middle Channel (2437 MHz)										
2437	104.13	PK	122	1.5	H	6.13	110.26	/	/	Fund.
2437	98.11	Ave.	122	1.5	H	6.13	104.24	/	/	Fund.
2437	95.78	PK	254	1.1	V	6.13	101.91	/	/	Fund.
2437	89.62	Ave.	254	1.1	V	6.13	95.75	/	/	Fund.
2389.4	47.54	Ave.	331	2.1	H	6.13	53.67	54	0.33*	Spurious
2385.7	46.92	Ave.	215	1.5	H	6.13	53.05	54	0.95*	Spurious
2489.1	44.86	Ave.	54	1.9	H	7.21	52.07	54	1.93*	Spurious
375.05	55.82	QP	185	1.9	H	-13.10	42.72	46	3.28*	Spurious
2389.4	62.58	PK	331	2.1	H	6.13	68.71	74	5.29	Spurious
2385.7	61.86	PK	215	1.5	H	6.13	67.99	74	6.01	Spurious
2489.1	58.55	PK	54	1.9	H	7.21	65.76	74	8.24	Spurious
7311	19.23	Ave.	104	1.8	H	16.49	35.72	54	18.28	Harmonic
7311	39.05	PK	104	1.8	H	16.49	55.54	74	18.46	Harmonic
4874	19.66	Ave.	310	1.9	H	12.46	32.12	54	21.88	Harmonic
4874	39.30	PK	310	1.9	H	12.46	51.76	74	22.24	Harmonic
3249.3	46.05	Ave.	143	1.5	H	9.39	55.44	84.24	28.80	Spurious
3249.3	49.91	PK	143	1.5	H	9.39	59.30	90.26	30.96	Spurious

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/15.205/15.209		
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)	Comment
High Channel (2462 MHz)										
2462	103.55	PK	305	1.6	H	7.21	110.76	/	/	Fund.
2462	97.73	Ave.	305	1.6	H	7.21	104.94	/	/	Fund.
2462	95.16	PK	266	1.4	V	7.21	102.37	/	/	Fund.
2462	89.61	Ave.	266	1.4	V	7.21	96.82	/	/	Fund.
2388.6	46.99	Ave.	107	1.9	H	6.13	53.12	54	0.88*	Spurious
2386.7	46.73	Ave.	109	2.2	H	6.13	52.86	54	1.14*	Spurious
2484.5	45.24	Ave.	218	1.5	H	7.21	52.45	54	1.55*	Spurious
375.05	56.19	QP	118	2.1	H	-13.10	43.09	46	2.91*	Spurious
2386.7	61.85	PK	109	2.2	H	6.13	67.98	74	6.02	Spurious
2388.6	61.64	PK	107	1.9	H	6.13	67.77	74	6.23	Spurious
2484.5	58.88	PK	218	1.5	H	7.21	66.09	74	7.91	Spurious
7386	18.84	Ave.	92	1.1	H	15.91	34.75	54	19.25	Harmonic
7386	38.23	PK	92	1.1	H	15.91	54.14	74	19.86	Harmonic
4924	19.25	Ave.	328	1.9	H	12.50	31.75	54	22.25	Harmonic
4924	39.22	PK	328	1.9	H	12.50	51.72	74	22.28	Harmonic
3282.7	45.13	Ave.	164	1.6	H	9.52	54.65	84.94	30.29	Spurious
3282.7	48.12	PK	164	1.6	H	9.52	57.64	90.76	33.12	Spurious

**802.11g mode:**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/15.205/15.209		
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)	Comment
Low Channel (2412 MHz)										
2412	104.32	PK	153	1.1	H	6.13	110.45	/	/	Fund.
2412	85.50	Ave.	153	1.1	H	6.13	91.63	/	/	Fund.
2412	93.28	PK	290	1.5	V	6.13	99.41	/	/	Fund.
2412	76.34	Ave.	290	1.5	V	6.13	82.47	/	/	Fund.
2389.5	45.43	Ave.	261	1.4	H	6.13	51.56	54	2.44*	Spurious
2388.1	45.11	Ave.	123	2.1	H	6.13	51.24	54	2.76*	Spurious
375.05	56.02	QP	119	1.6	H	-13.10	42.92	46	3.08*	Spurious
2496.3	43.08	Ave.	245	1.8	H	7.21	50.29	54	3.71*	Spurious
2389.5	61.66	PK	261	1.4	H	6.13	67.79	74	6.21	Spurious
2388.1	61.09	PK	123	2.1	H	6.13	67.22	74	6.78	Spurious
2496.3	58.29	PK	245	1.8	H	7.21	65.50	74	8.50	Spurious
3216.1	49.44	Ave.	313	1.8	H	9.39	58.83	71.63	12.80	Spurious
7236	19.46	Ave.	249	1.9	H	16.62	36.08	54	17.92	Harmonic
7236	39.45	PK	249	1.9	H	16.62	56.07	74	17.93	Harmonic
4824	18.95	Ave.	171	2.0	H	12.40	31.35	54	22.65	Harmonic
4824	37.79	PK	171	2.0	H	12.40	50.19	74	23.81	Harmonic
3216.1	51.77	PK	313	1.8	H	9.39	61.16	90.45	29.29	Spurious
Middle Channel (2437 MHz)										
2437	104.28	PK	179	1.1	H	6.13	110.41	/	/	Fund.
2437	85.49	Ave.	179	1.1	H	6.13	91.62	/	/	Fund.
2437	94.66	PK	185	1.6	V	6.13	100.79	/	/	Fund.
2437	77.67	Ave.	185	1.6	V	6.13	83.80	/	/	Fund.
2384.4	46.01	Ave.	314	1.8	H	6.13	52.14	54	1.86*	Spurious
2388.2	45.67	Ave.	136	1.7	H	6.13	51.80	54	2.20*	Spurious
375.05	56.16	QP	105	1.6	H	-13.10	43.06	46	2.94*	Spurious
2489.5	43.14	Ave.	179	1.1	H	7.21	50.35	54	3.65*	Spurious
2384.4	61.92	PK	314	1.8	H	6.13	68.05	74	5.95	Spurious
2388.2	61.32	PK	136	1.7	H	6.13	67.45	74	6.55	Spurious
2489.5	58.56	PK	179	1.1	H	7.21	65.77	74	8.23	Spurious
3249.3	46.02	Ave.	83	1.2	H	9.39	55.41	71.62	16.21	Spurious
7311	18.25	Ave.	258	1.3	H	16.49	34.74	54	19.26	Harmonic
7311	38.17	PK	258	1.3	H	16.49	54.66	74	19.34	Harmonic
4874	39.24	PK	290	2.1	H	12.46	51.70	74	22.30	Harmonic
4874	19.09	Ave.	290	2.1	H	12.46	31.55	54	22.45	Harmonic
3249.3	49.50	PK	83	1.2	H	9.39	58.89	90.41	31.52	Spurious

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/15.205/15.209		
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)	Comment
High Channel (2462 MHz)										
2462	104.14	PK	139	1.5	H	7.21	111.35	/	/	Fund.
2462	85.38	Ave.	139	1.5	H	7.21	92.59	/	/	Fund.
2462	93.75	PK	184	1.1	V	7.21	100.96	/	/	Fund.
2462	76.69	Ave.	184	1.1	V	7.21	83.90	/	/	Fund.
2365.5	45.77	Ave.	196	1.0	H	6.13	51.90	54	2.10*	Spurious
2384.1	45.19	Ave.	277	1.0	H	6.13	51.32	54	2.68*	Spurious
375.05	56.26	QP	306	1.4	H	-13.10	43.16	46	2.84*	Spurious
2488.2	43.02	Ave.	207	1.9	H	7.21	50.23	54	3.77*	Spurious
2365.5	61.12	PK	196	1.0	H	6.13	67.25	74	6.75	Spurious
2384.1	60.53	PK	277	1.0	H	6.13	66.66	74	7.34	Spurious
2488.2	58.34	PK	207	1.9	H	7.21	65.55	74	8.45	Spurious
3282.7	44.10	Ave.	281	1.5	H	9.52	53.62	72.59	18.97	Spurious
7386	18.96	Ave.	155	1.9	H	15.91	34.87	54	19.13	Harmonic
7386	38.35	PK	155	1.9	H	15.91	54.26	74	19.74	Harmonic
4924	19.69	Ave.	211	2.2	H	12.50	32.19	54	21.81	Harmonic
4924	39.47	PK	211	2.2	H	12.50	51.97	74	22.03	Harmonic
3282.7	47.42	PK	281	1.5	H	9.52	56.94	91.35	34.41	Spurious

**802.11n-HT20 mode:**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/15.205/15.209		
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)	Comment
Low Channel (2412 MHz)										
2412	104.27	PK	314	1.2	H	6.13	110.40	/	/	Fund.
2412	85.34	Ave.	314	1.2	H	6.13	91.47	/	/	Fund.
2412	95.65	PK	210	1.1	V	6.13	101.78	/	/	Fund.
2412	78.30	Ave.	210	1.1	V	6.13	84.43	/	/	Fund.
375.05	56.07	QP	267	1.5	H	-13.10	42.97	46	3.03*	Spurious
2389.8	63.42	PK	180	1.0	H	6.13	69.55	74	4.45*	Spurious
2389.8	43.28	Ave.	180	1.0	H	6.13	49.41	54	4.59*	Spurious
2381.5	43.01	Ave.	216	1.2	H	6.13	49.14	54	4.86	Spurious
2381.5	62.17	PK	216	1.2	H	6.13	68.30	74	5.70	Spurious
2497.8	39.47	Ave.	120	1.5	H	7.21	46.68	54	7.32	Spurious
2497.8	58.56	PK	120	1.5	H	7.21	65.77	74	8.23	Spurious
3216.1	49.29	Ave.	332	1.5	H	9.39	58.68	71.47	12.79	Spurious
7236	39.41	PK	337	1.3	H	16.62	56.03	74	17.97	Harmonic
7236	19.28	Ave.	337	1.3	H	16.62	35.90	54	18.10	Harmonic
4824	18.62	Ave.	292	1.9	H	12.40	31.02	54	22.98	Harmonic
4824	37.29	PK	292	1.9	H	12.40	49.69	74	24.31	Harmonic
3216.1	51.36	PK	332	1.5	H	9.39	60.75	90.40	29.65	Spurious
Middle Channel (2437 MHz)										
2437	104.83	PK	139	1.4	H	6.13	110.96	/	/	Fund.
2437	85.51	Ave.	139	1.4	H	6.13	91.64	/	/	Fund.
2437	95.47	PK	37	1.2	V	6.13	101.60	/	/	Fund.
2437	78.16	Ave.	37	1.2	V	6.13	84.29	/	/	Fund.
375.05	56.13	QP	175	1.4	H	-13.10	43.03	46	2.97*	Spurious
2388.7	42.48	Ave.	148	1.8	H	6.13	48.61	54	5.39	Spurious
2386.6	41.95	Ave.	329	1.7	H	6.13	48.08	54	5.92	Spurious
2388.7	61.12	PK	148	1.8	H	6.13	67.25	74	6.75	Spurious
2495.3	39.67	Ave.	179	2.1	H	7.21	46.88	54	7.12	Spurious
2386.6	60.74	PK	329	1.7	H	6.13	66.87	74	7.13	Spurious
2495.3	58.73	PK	179	2.1	H	7.21	65.94	74	8.06	Spurious
3249.3	45.49	Ave.	338	1.5	H	9.39	54.88	71.64	16.76	Spurious
7311	18.88	Ave.	158	1.5	H	16.49	35.37	54	18.63	Harmonic
7311	38.74	PK	158	1.5	H	16.49	55.23	74	18.77	Harmonic
4874	18.73	Ave.	292	1.5	H	12.46	31.19	54	22.81	Harmonic
4874	38.48	PK	292	1.5	H	12.46	50.94	74	23.06	Harmonic
3249.3	48.86	PK	338	1.5	H	9.39	58.25	90.96	32.71	Spurious

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/15.205/15.209		
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)	Comment
High Channel (2462 MHz)										
2462	105.12	PK	39	1.3	H	7.21	112.33	/	/	Fund.
2462	85.63	Ave.	39	1.3	H	7.21	92.84	/	/	Fund.
2462	95.73	PK	177	1.2	V	7.21	102.94	/	/	Fund.
2462	78.44	Ave.	177	1.2	V	7.21	85.65	/	/	Fund.
375.05	56.04	QP	227	1.2	H	-13.10	42.94	46	3.06*	Spurious
2389.6	43.09	Ave.	271	2.0	H	6.13	49.22	54	4.78	Spurious
2378.4	42.81	Ave.	248	1.8	H	6.13	48.94	54	5.06	Spurious
2389.6	62.58	PK	271	2.0	H	6.13	68.71	74	5.29	Spurious
2378.4	61.45	PK	248	1.8	H	6.13	67.58	74	6.42	Spurious
2492.1	39.11	Ave.	95	1.5	H	7.21	46.32	54	7.68	Spurious
2492.1	57.96	PK	95	1.5	H	7.21	65.17	74	8.83	Spurious
3282.7	44.15	Ave.	45	1.5	H	9.52	53.67	72.84	19.17	Spurious
7386	18.80	Ave.	13	1.9	H	15.91	34.71	54	19.29	Harmonic
7386	38.13	PK	13	1.9	H	15.91	54.04	74	19.96	Harmonic
4924	40.44	PK	173	1.9	H	12.50	52.94	74	21.06	Harmonic
4924	19.18	Ave.	173	1.9	H	12.50	31.68	54	22.32	Harmonic
3282.7	46.98	PK	45	1.5	H	9.52	56.50	92.33	35.83	Spurious



**802.11n-HT40 mode:**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/15.205/15.209		
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)	Comment
Low Channel (2422 MHz)										
2422	101.94	PK	348	1.5	H	6.13	108.07	/	/	Fund.
2422	78.44	Ave.	348	1.5	H	6.13	84.57	/	/	Fund.
2422	91.97	PK	55	1.9	V	6.13	98.10	/	/	Fund.
2422	70.74	Ave.	55	1.9	V	6.13	76.87	/	/	Fund.
375.05	56.20	QP	350	1.3	H	-13.10	43.10	46	2.90*	Spurious
2387.9	64.59	PK	345	1.3	H	6.13	70.72	74	3.28*	Spurious
2387.9	44.44	Ave.	345	1.3	H	6.13	50.57	54	3.43*	Spurious
2383.4	43.95	Ave.	84	1.8	H	6.13	50.08	54	3.92*	Spurious
2383.4	63.68	PK	84	1.8	H	6.13	69.81	74	4.19*	Spurious
2487.4	42.34	Ave.	2	2.2	H	7.21	49.55	54	4.45*	Spurious
3230.4	48.61	Ave.	182	1.1	H	9.39	58.00	64.57	6.57	Spurious
2487.4	58.59	PK	2	2.2	H	7.21	65.80	74	8.20	Spurious
7266	19.42	Ave.	297	1.2	H	16.62	36.04	54	17.96	Harmonic
7266	39.38	PK	297	1.2	H	16.62	56.00	74	18.00	Harmonic
4844	18.65	Ave.	341	1.9	H	12.40	31.05	54	22.95	Harmonic
4844	37.69	PK	341	1.9	H	12.40	50.09	74	23.91	Harmonic
3230.4	50.84	PK	182	1.1	H	9.39	60.23	88.07	27.84	Spurious
Middle Channel (2437 MHz)										
2437	102.16	PK	337	1.4	H	6.13	108.29	/	/	Fund.
2437	78.51	Ave.	337	1.4	H	6.13	84.64	/	/	Fund.
2437	91.52	PK	98	2.1	V	6.13	97.65	/	/	Fund.
2437	70.20	Ave.	98	2.1	V	6.13	76.33	/	/	Fund.
375.05	56.05	QP	24	1.7	H	-13.10	42.95	46	3.05*	Spurious
2388.7	44.24	Ave.	54	1.6	H	6.13	50.37	54	3.63*	Spurious
2388.7	64.15	PK	54	1.6	H	6.13	70.28	74	3.72*	Spurious
2374.9	63.74	PK	20	2.1	H	6.13	69.87	74	4.13*	Spurious
2374.9	43.38	Ave.	20	2.1	H	6.13	49.51	54	4.49*	Spurious
2488.5	42.12	Ave.	329	2.2	H	7.21	49.33	54	4.67*	Spurious
2488.5	58.50	PK	329	2.2	H	7.21	65.71	74	8.29	Spurious
3249.5	44.92	Ave.	276	1.8	H	9.39	54.31	64.64	10.33	Spurious
7311	38.71	PK	165	1.1	H	16.49	55.20	74	18.80	Harmonic
7311	18.44	Ave.	165	1.1	H	16.49	34.93	54	19.07	Harmonic
4874	18.97	Ave.	245	1.8	H	12.46	31.43	54	22.57	Harmonic
4874	38.46	PK	245	1.8	H	12.46	50.92	74	23.08	Harmonic
3249.5	49.34	PK	276	1.8	H	9.39	58.73	88.29	29.56	Spurious

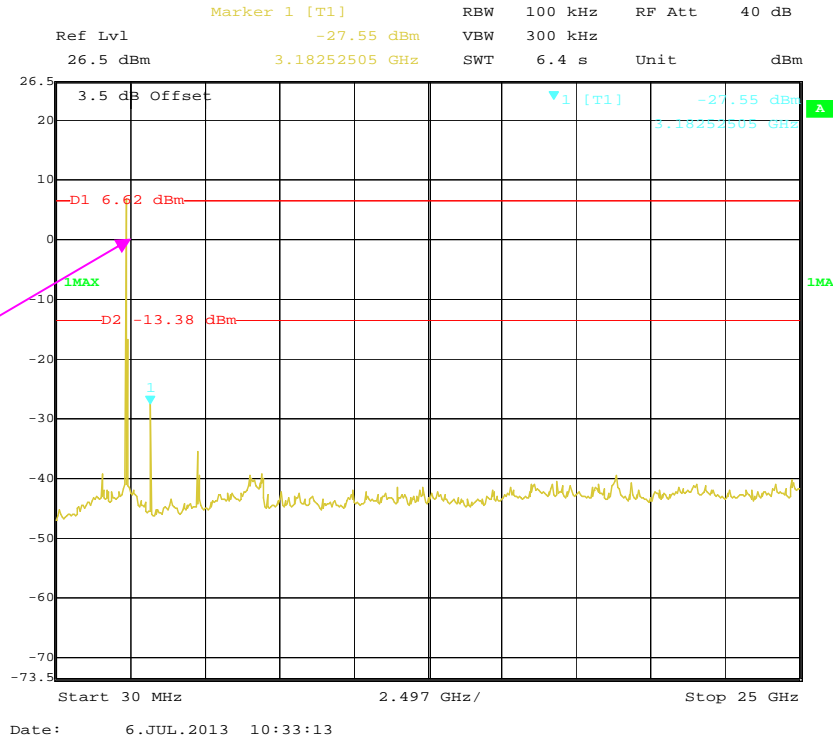
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/15.205/15.209		
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)	Comment
High Channel (2452 MHz)										
2452	102.23	PK	70	1.8	H	7.21	109.44	/	/	Fund.
2452	78.76	Ave.	70	1.8	H	7.21	85.97	/	/	Fund.
2452	91.68	PK	65	1.4	V	7.21	98.89	/	/	Fund.
2452	69.89	Ave.	65	1.4	V	7.21	77.10	/	/	Fund.
375.05	56.08	QP	25	1.9	H	-13.10	42.98	46	3.02*	Spurious
2387.9	63.98	PK	214	1.5	H	6.13	70.11	74	3.89*	Spurious
2389.4	43.93	Ave.	175	1.1	H	6.13	50.06	54	3.94*	Spurious
2389.4	63.90	PK	175	1.1	H	6.13	70.03	74	3.97*	Spurious
2491.6	42.44	Ave.	245	1.2	H	7.21	49.65	54	4.35*	Spurious
2387.9	42.89	Ave.	214	1.5	H	6.13	49.02	54	4.98	Spurious
2491.6	58.96	PK	245	1.2	H	7.21	66.17	74	7.83	Spurious
3270.5	44.24	Ave.	178	1.5	H	9.52	53.76	65.97	12.21	Spurious
7356	38.01	PK	282	1.4	H	15.91	53.92	74	20.08	Harmonic
7356	17.99	Ave.	282	1.4	H	15.91	33.90	54	20.10	Harmonic
4904	39.82	PK	249	1.8	H	12.46	52.28	74	21.72	Harmonic
4904	18.64	Ave.	249	1.8	H	12.46	31.10	54	22.90	Harmonic
3270.5	47.26	PK	178	1.5	H	9.52	56.78	89.44	32.66	Spurious

**Note:**

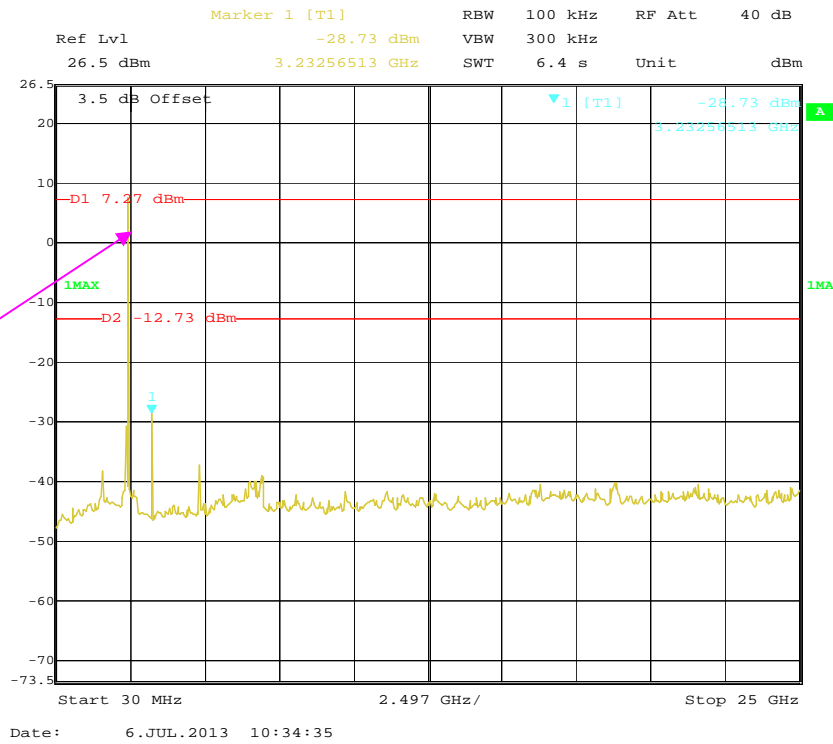
Corrected Amplitude = Corrected Factor + Reading  
 Corrected Factor=Antenna factor (RX) + Cable loss – Amplifier Factor  
 Margin = Limit - Corrected Amplitude

**Conducted Spurious Emissions at Antenna Port:**

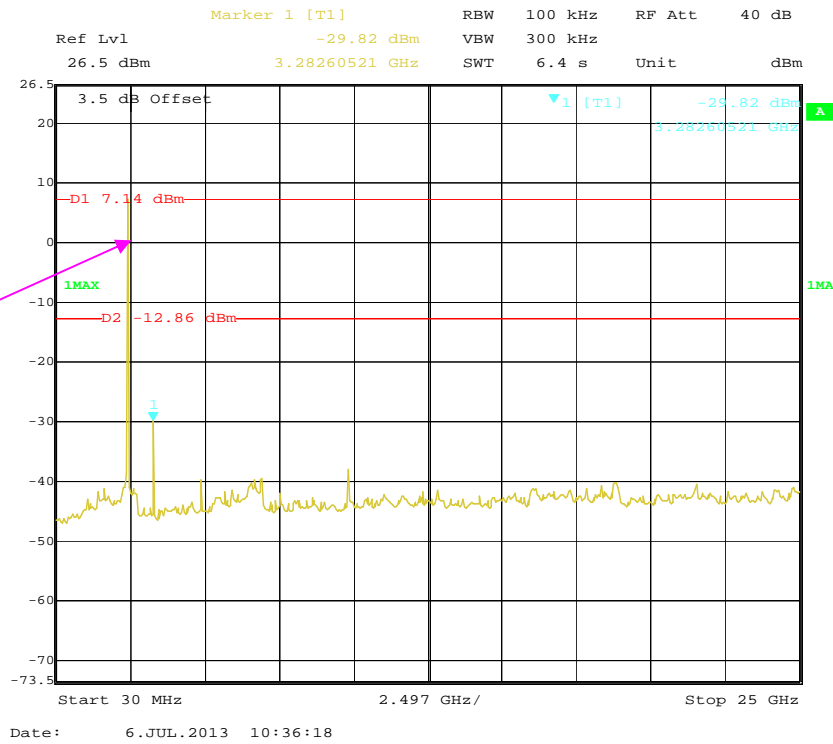
**802.11b Low Channel, Antenna 0**



**802.11b Middle Channel, Antenna 0**

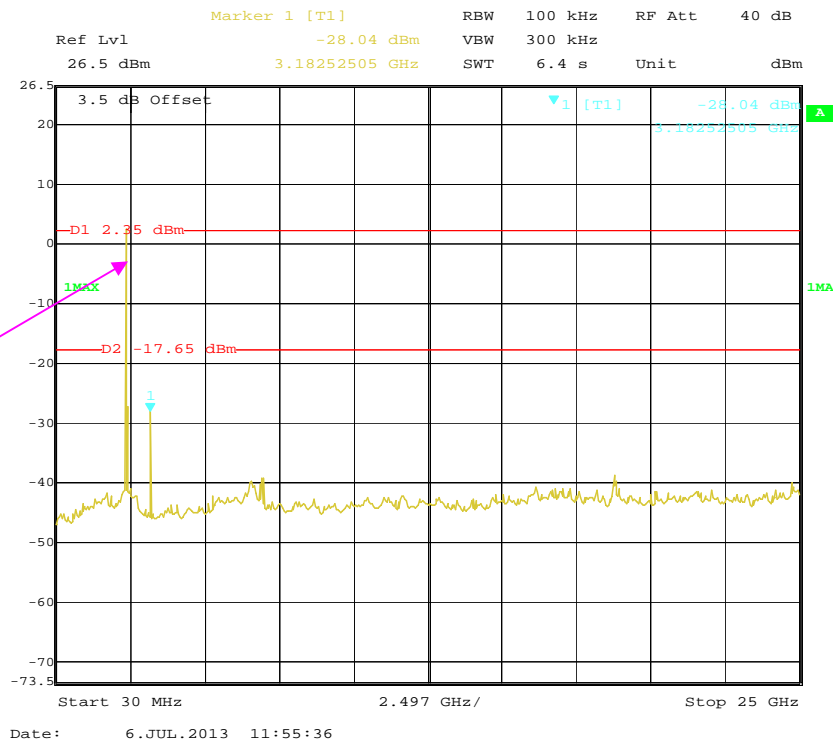


### 802.11b High Channel, Antenna 0



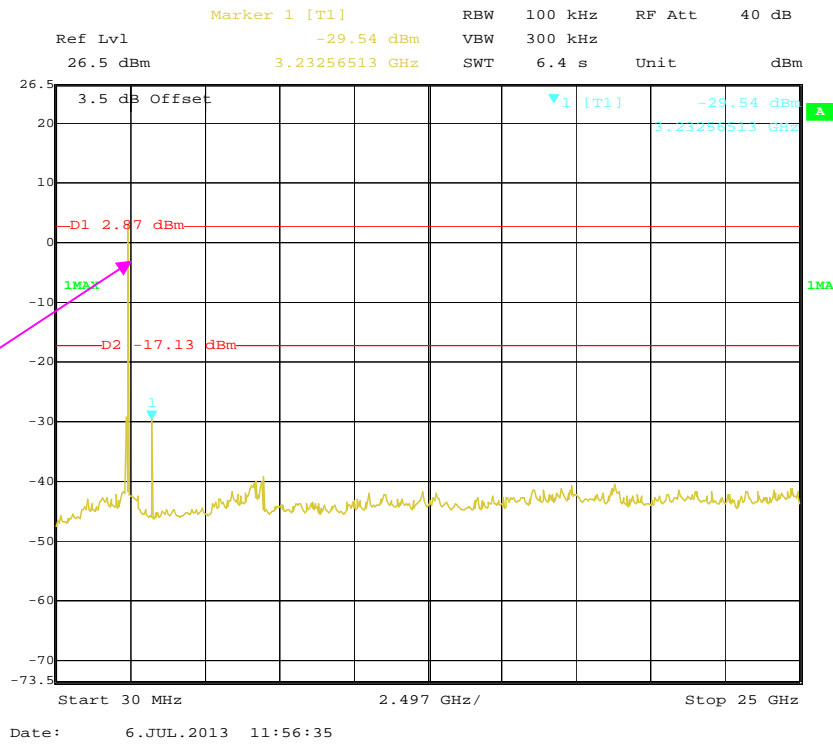
Fundamental

### 802.11g Low Channel, Antenna 0



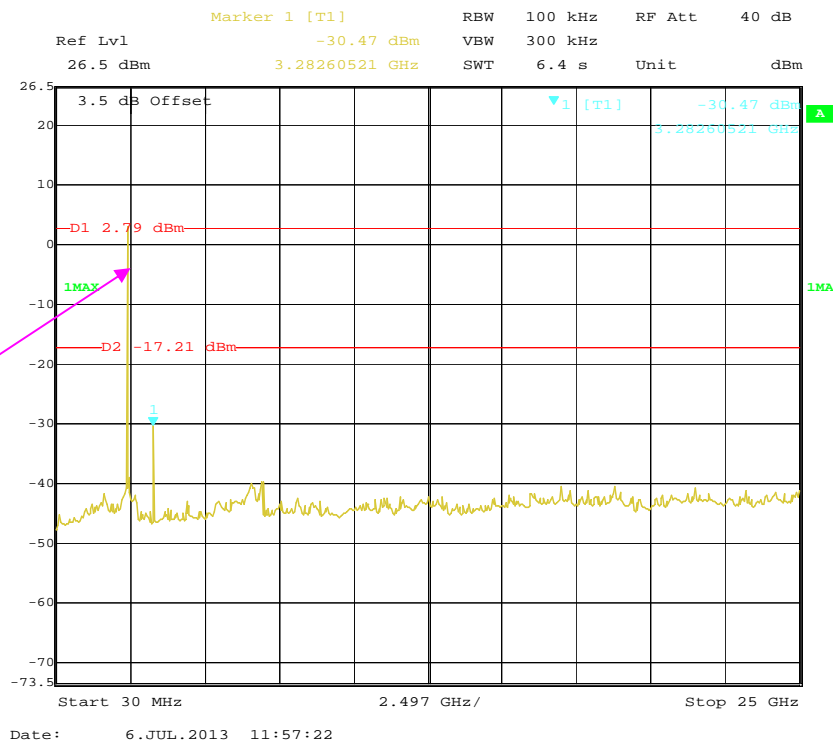
Fundamental

### 802.11g Middle Channel, Antenna 0



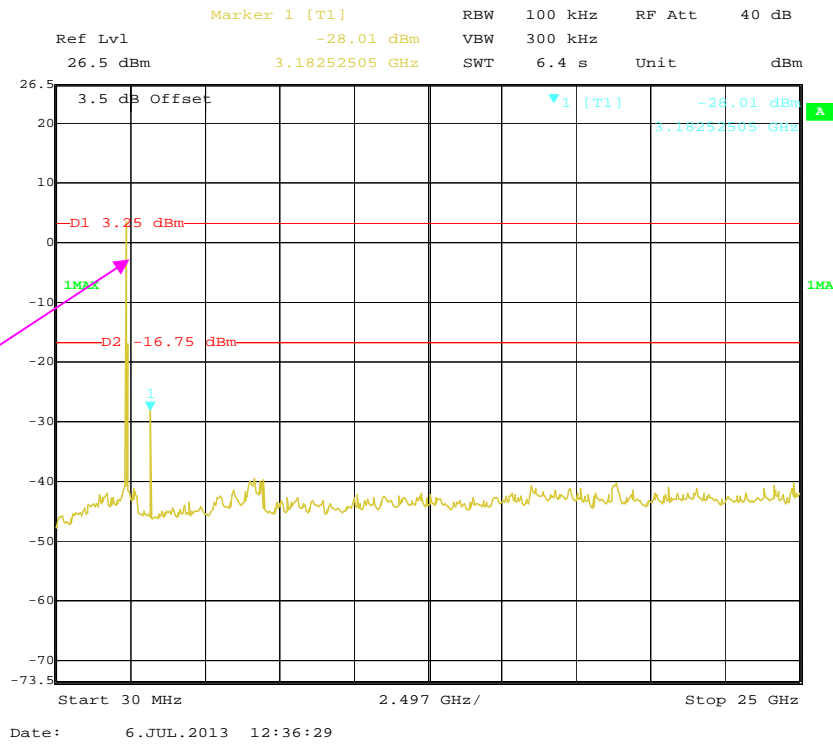
Fundamental

### 802.11g High Channel, Antenna 0



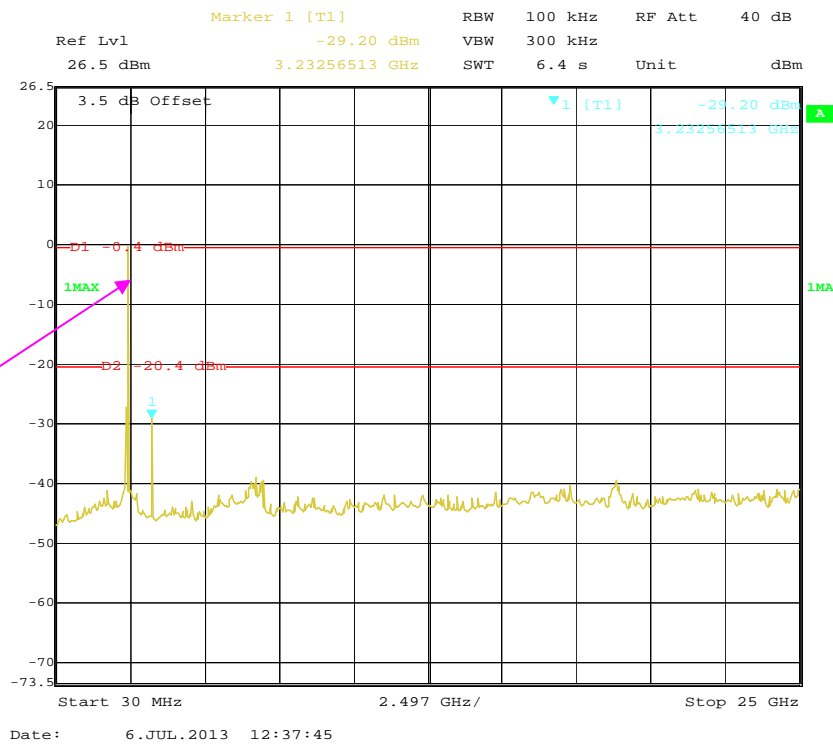
Fundamental

### 802.11n-HT20 Low Channel, Antenna 0



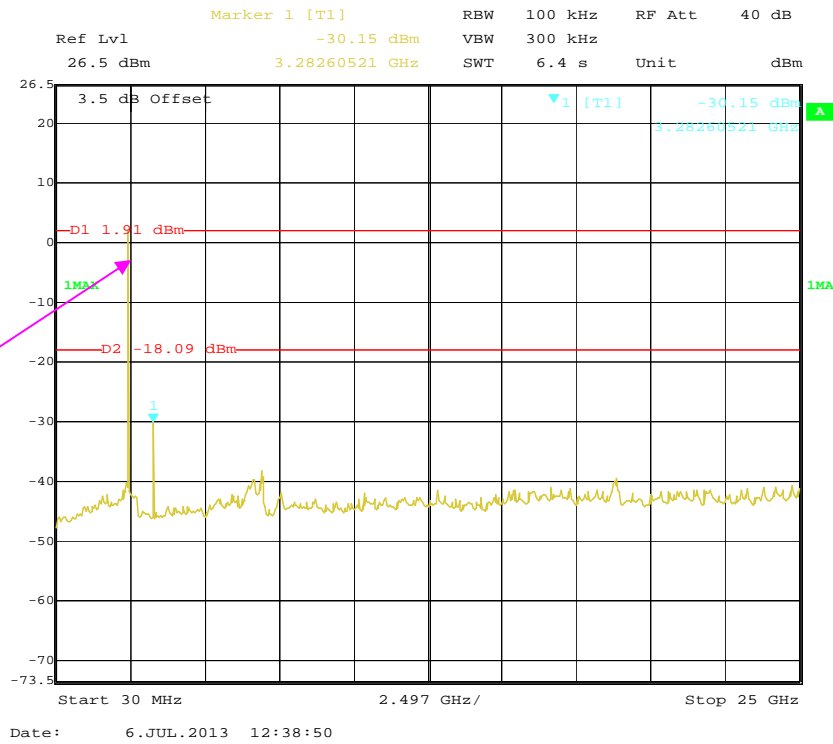
Fundamental

### 802.11n-HT20 Middle Channel, Antenna 0



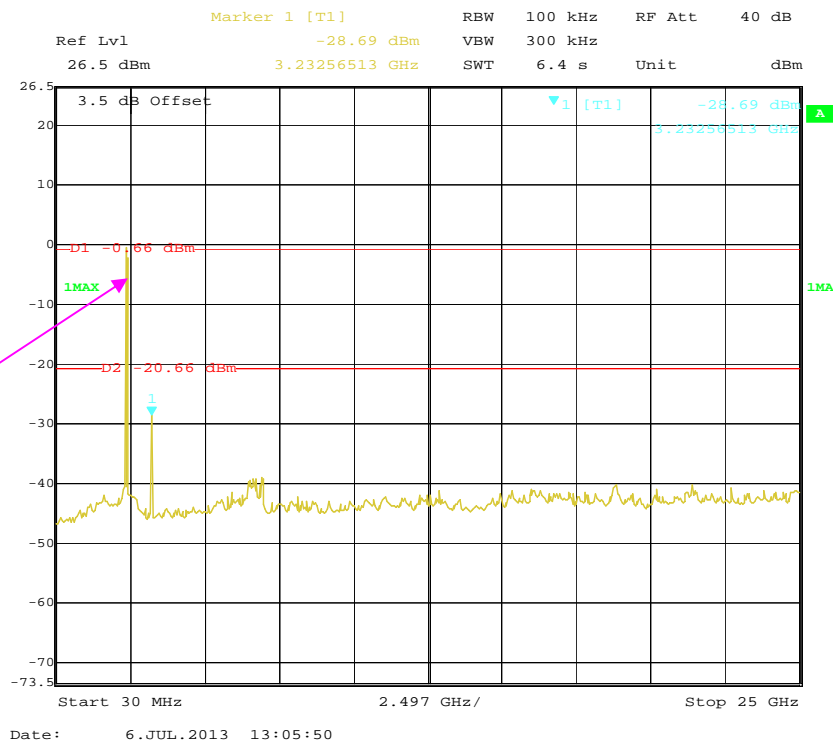
Fundamental

802.11n-HT20 High Channel, Antenna 0



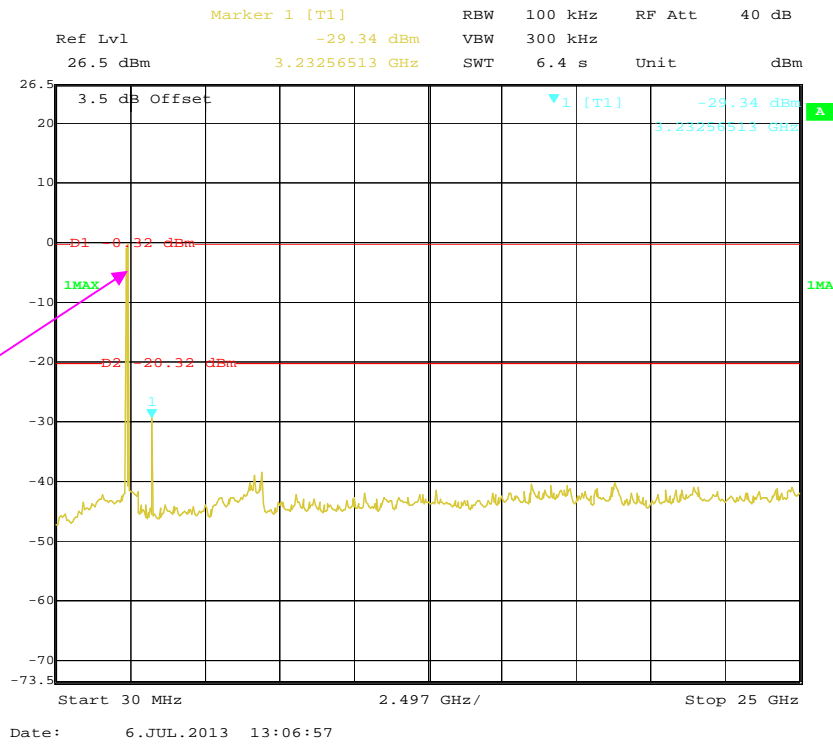
Fundamental

802.11n-HT40 Low Channel, Antenna 0



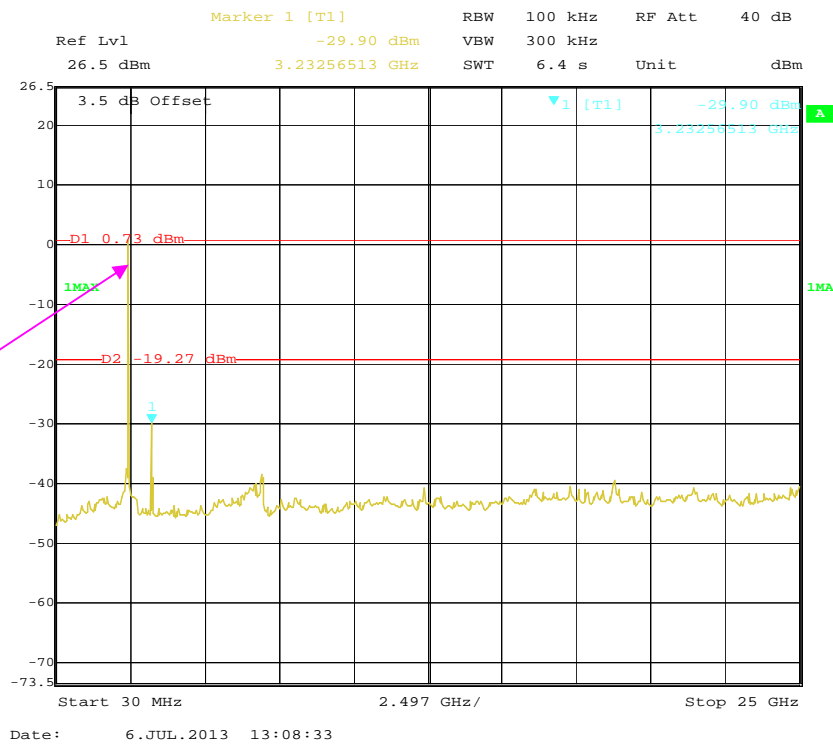
Fundamental

**802.11n-HT40 Middle Channel, Antenna 0**



Fundamental

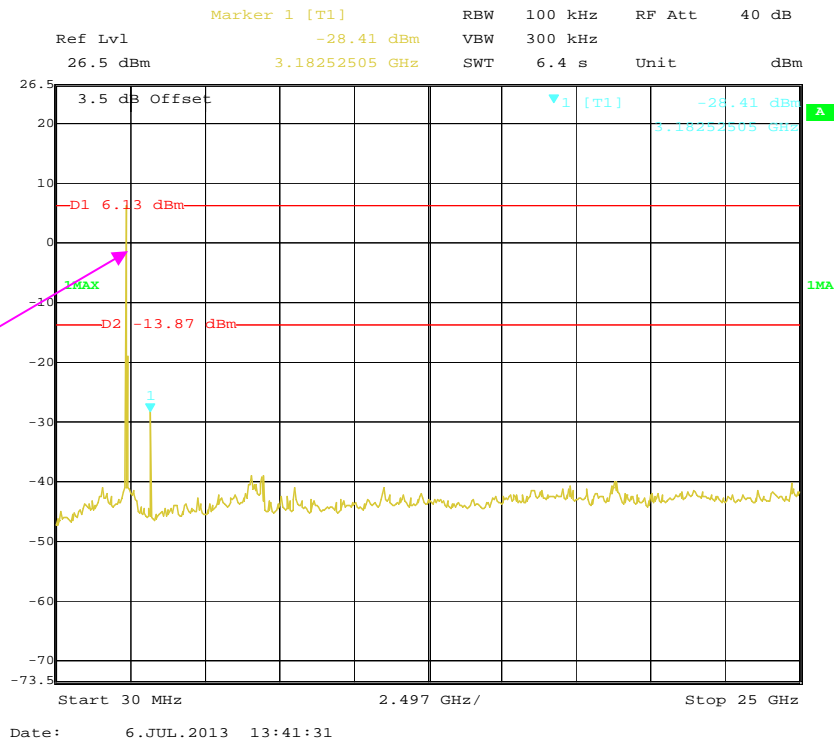
**802.11n-HT40 High Channel, Antenna 0**



Fundamental

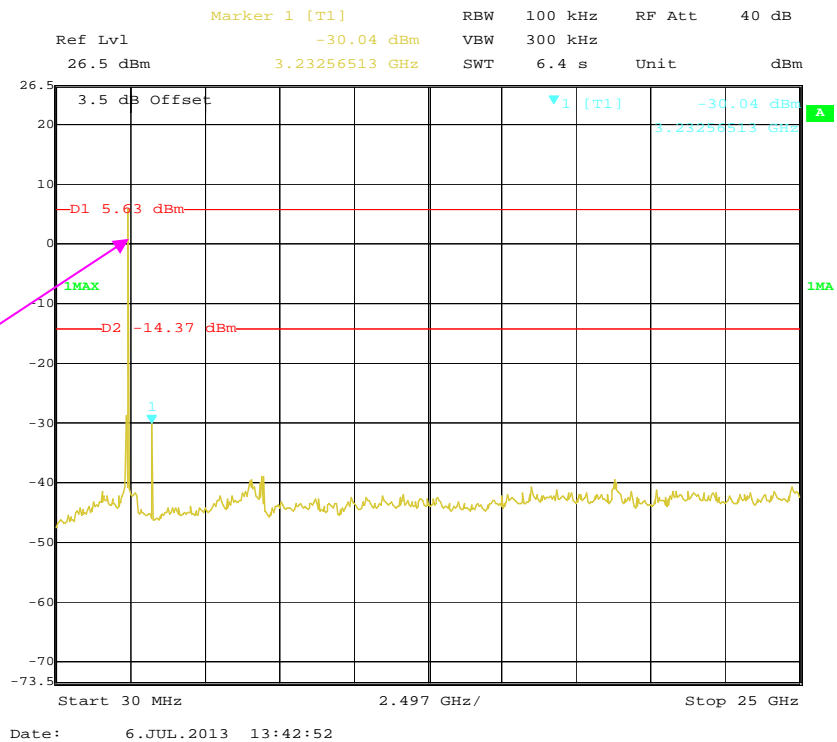


### 802.11b Low Channel, Antenna 1



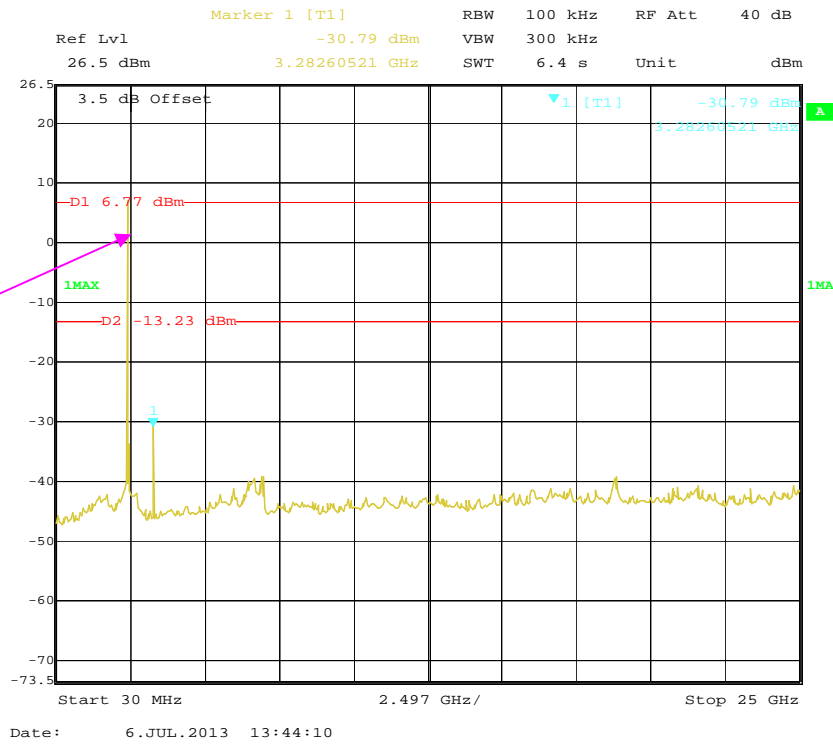
Fundamental

### 802.11b Middle Channel, Antenna 1



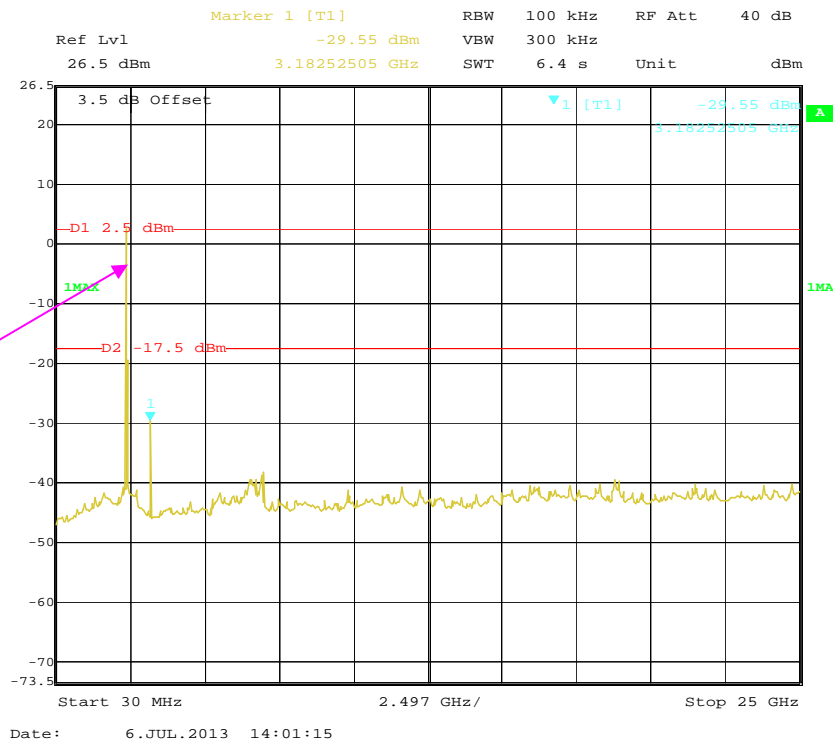
Fundamental

### 802.11b High Channel, Antenna 1



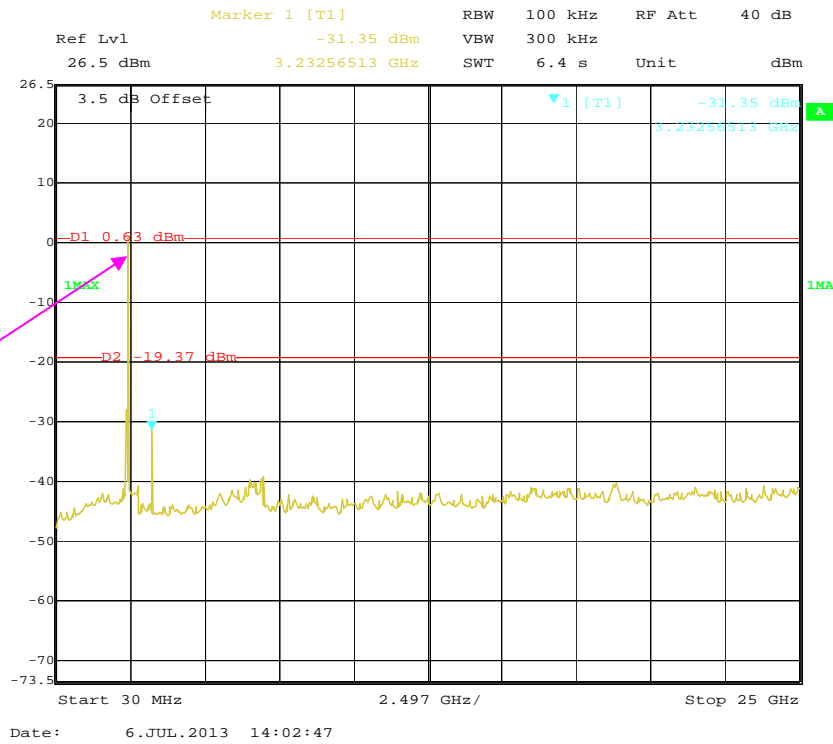
Fundamental

### 802.11g Low Channel, Antenna 1



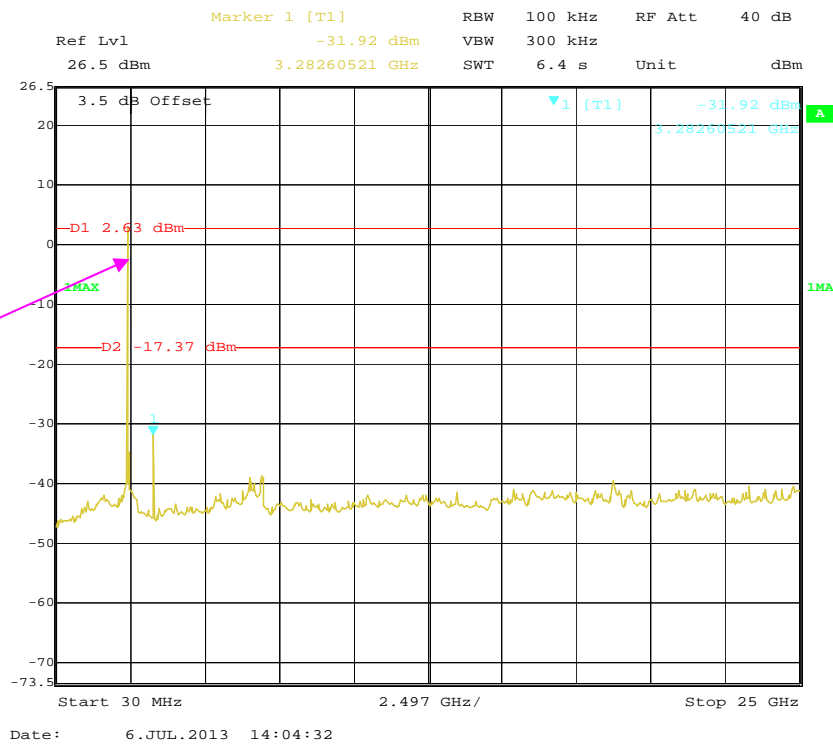
Fundamental

### 802.11g Middle Channel, Antenna 1



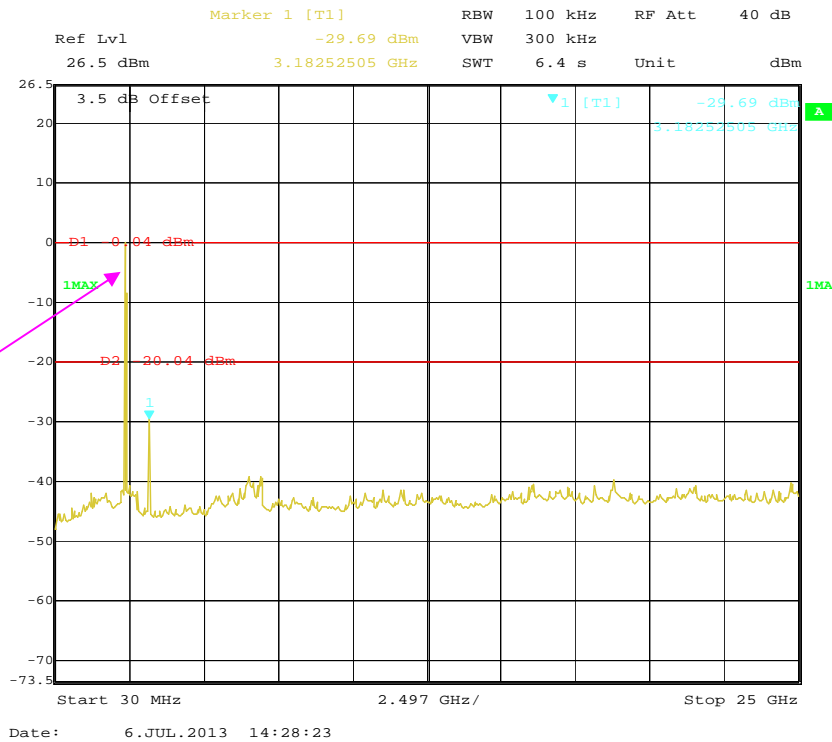
Fundamental

### 802.11g High Channel, Antenna 1



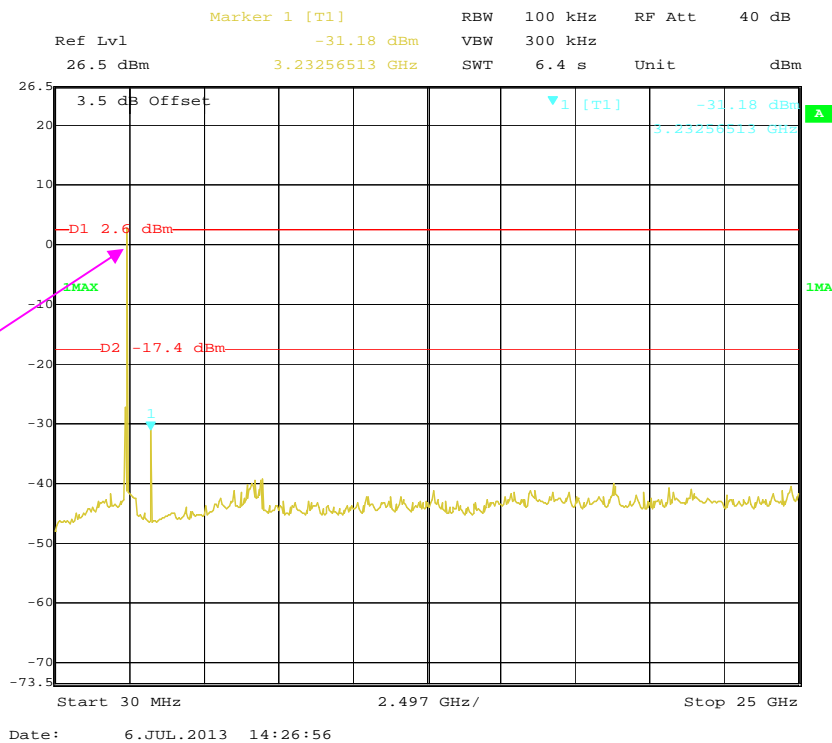
Fundamental

### 802.11n-HT20 Low Channel, Antenna 1



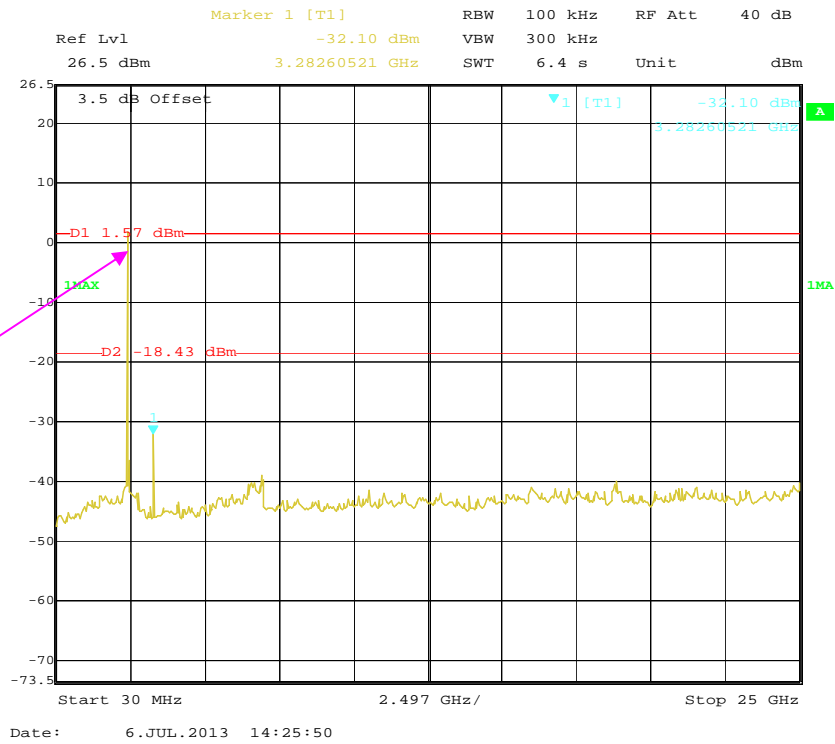
Fundamental

### 802.11n-HT20 Middle Channel, Antenna 1



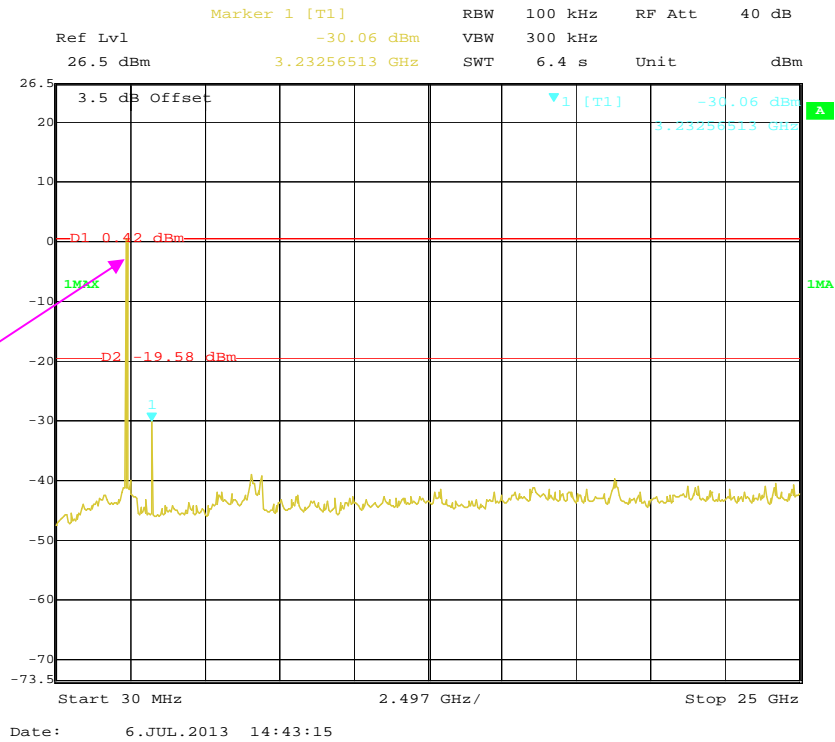
Fundamental

### 802.11n-HT20 High Channel, Antenna 1



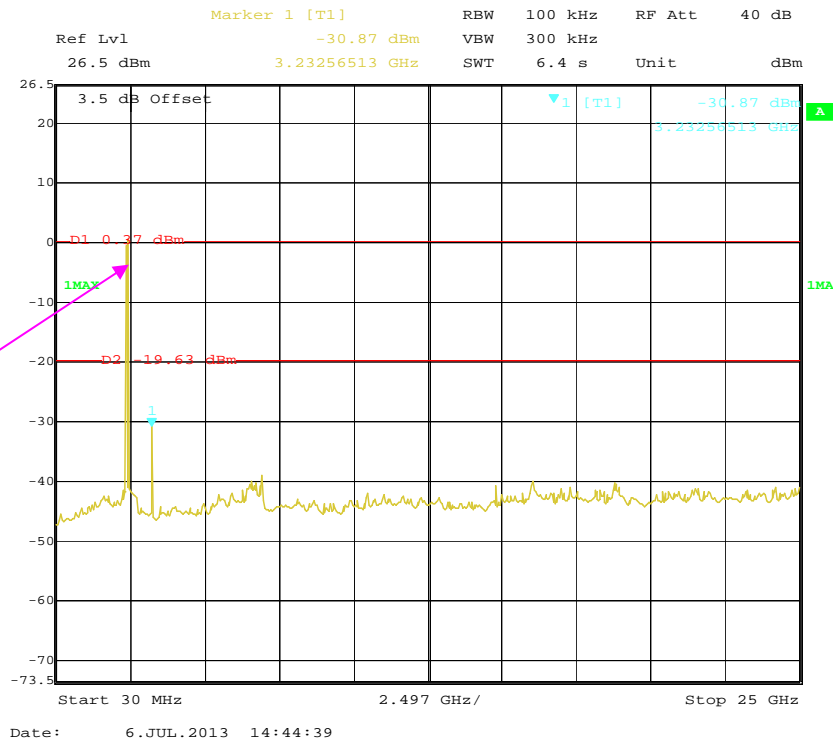
Fundamental

### 802.11n-HT40 Low Channel, Antenna 1

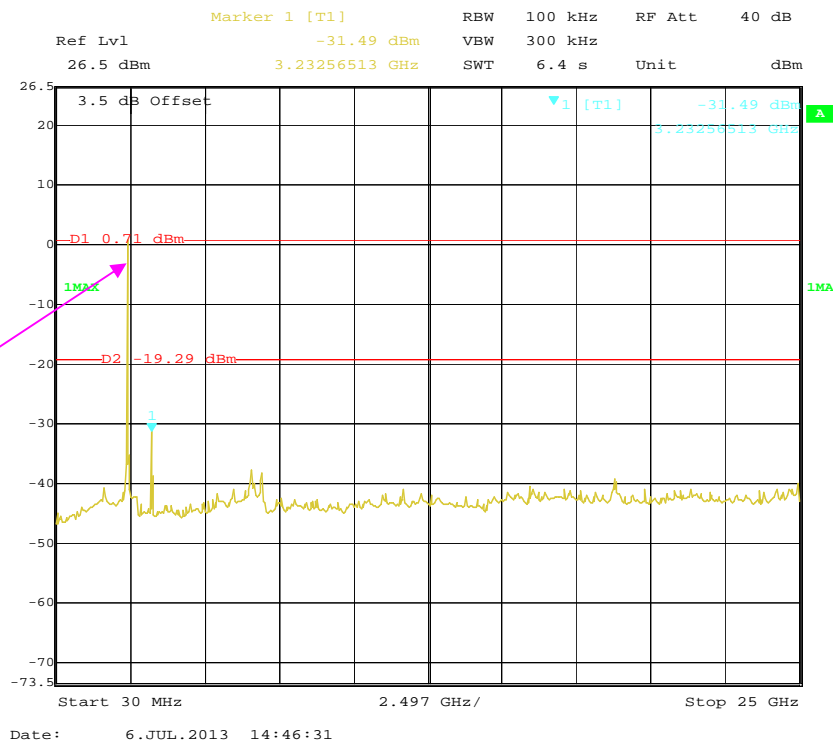


Fundamental

**802.11n-HT40 Middle Channel, Antenna 1**



**802.11n-HT40 High Channel, Antenna 1**



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

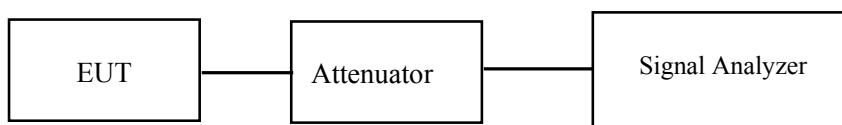
### Applicable Standard

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

### Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v02

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



### Test Equipment List and Details

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

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

### Test Data

#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

*The testing was performed by Candy Li on 2013-07-06.*

*Test Mode: Transmitting*

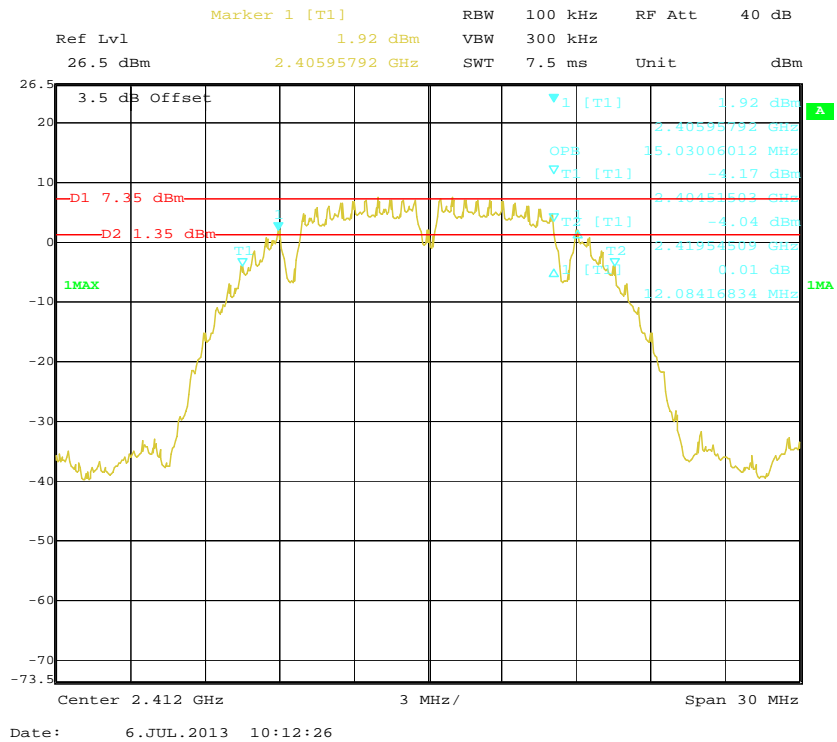
**Test Result:** Pass.

Please refer to the following tables and plots.

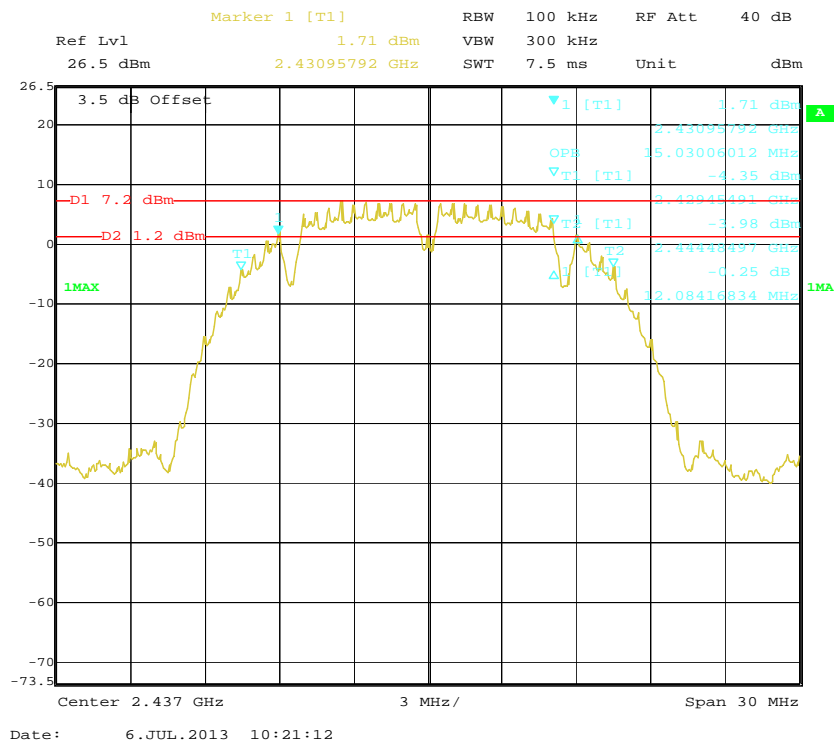
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)		Limit (kHz)	Result
		Antenna 0	Antenna 1		
<b>802.11b mode</b>					
Low	2412	12.08	12.08	≥500	Pass
Middle	2437	12.08	12.08	≥500	Pass
High	2462	12.08	12.08	≥500	Pass
<b>802.11g mode</b>					
Low	2412	16.29	16.35	≥500	Pass
Middle	2437	16.29	16.35	≥500	Pass
High	2462	16.29	16.35	≥500	Pass
<b>802.11n-HT20 mode</b>					
Low	2412	16.89	16.68	≥500	Pass
Middle	2437	16.89	16.68	≥500	Pass
High	2462	16.89	16.68	≥500	Pass
<b>802.11n-HT40 mode</b>					
Low	2422	35.23	35.23	≥500	Pass
Middle	2437	35.23	35.23	≥500	Pass
High	2452	35.23	35.23	≥500	Pass



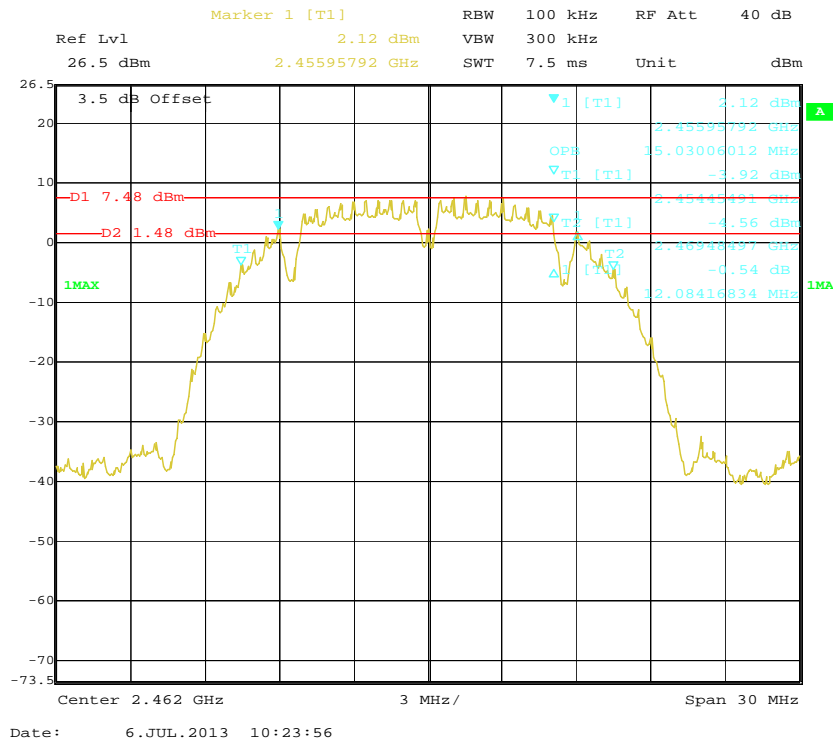
**802.11b Low Channel, Antenna 0**



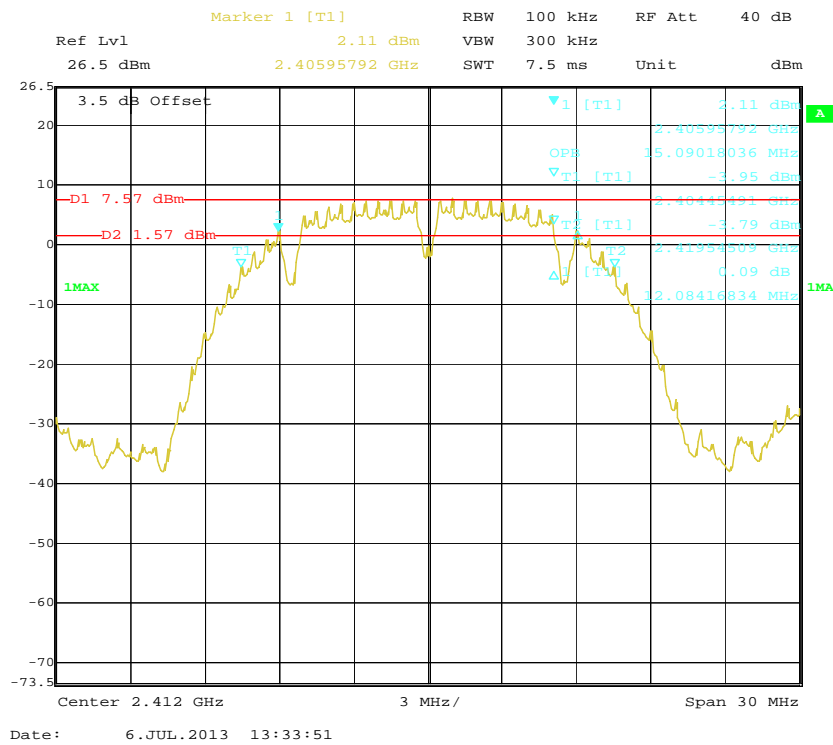
**802.11b Middle Channel, Antenna 0**



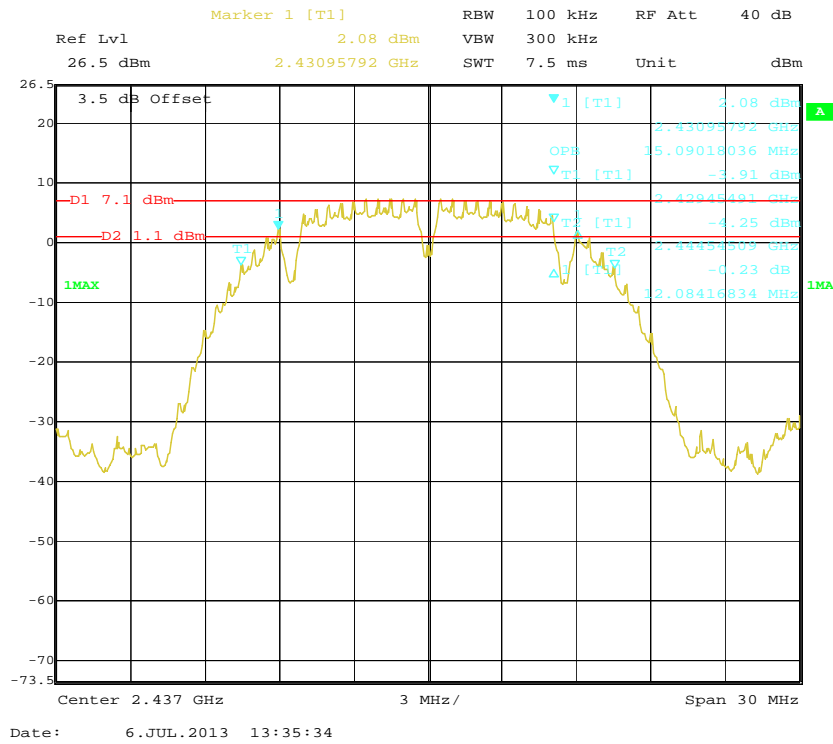
### 802.11b High Channel, Antenna 0



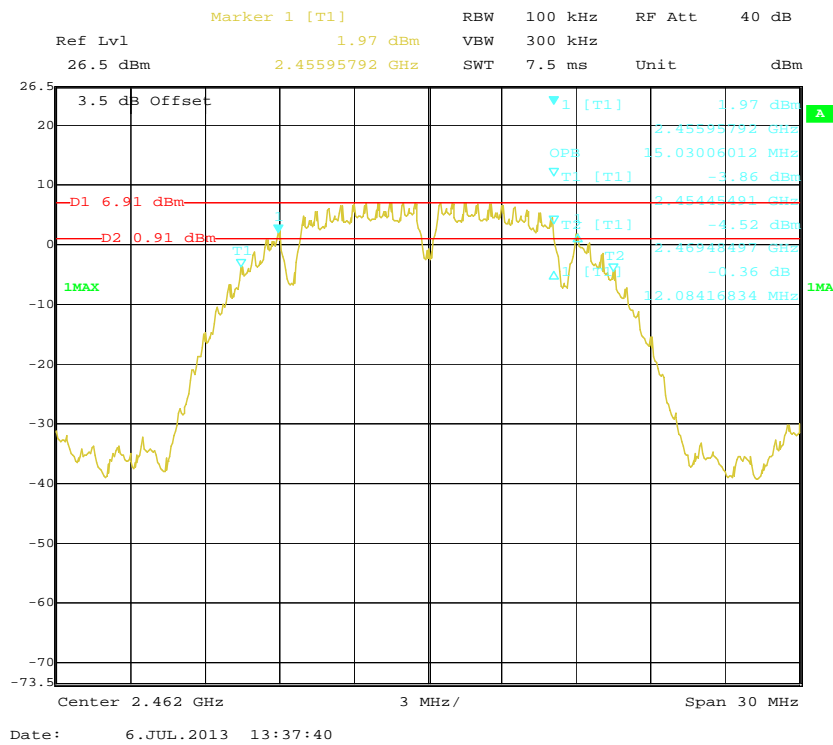
### 802.11b Low Channel, Antenna 1



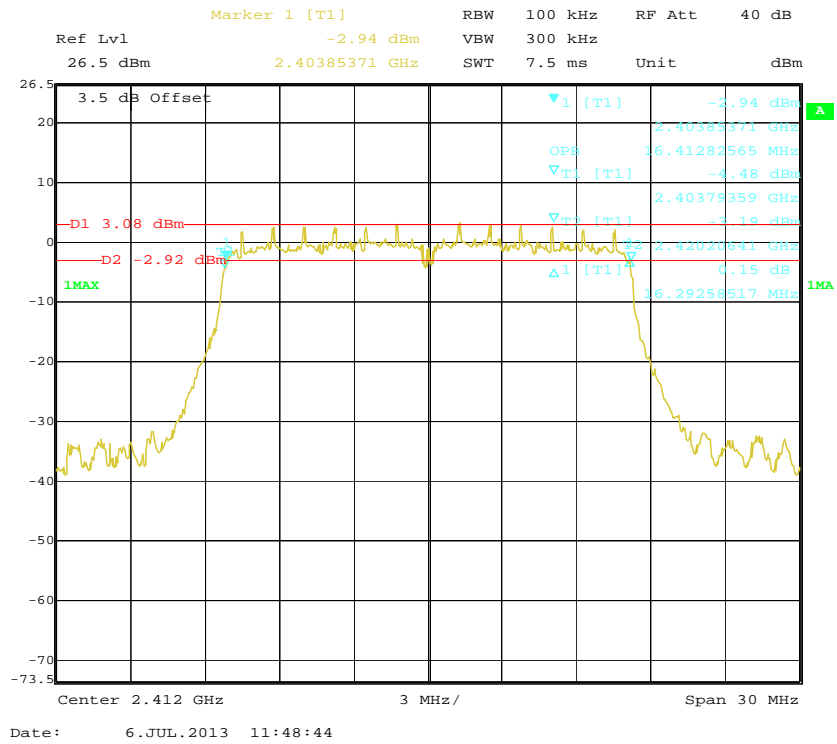
### 802.11b Middle Channel, Antenna 1



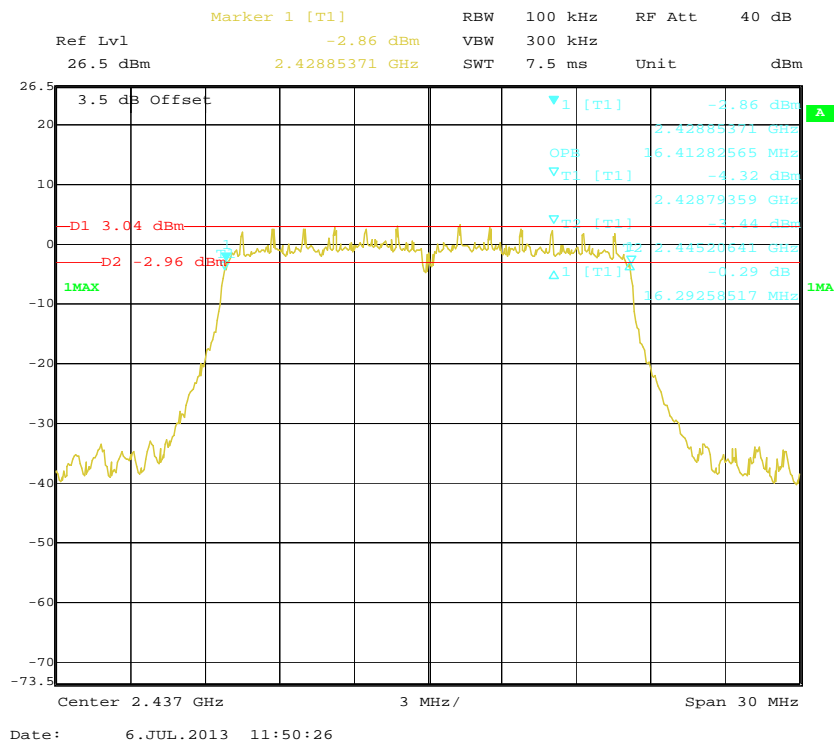
### 802.11b High Channel, Antenna 1



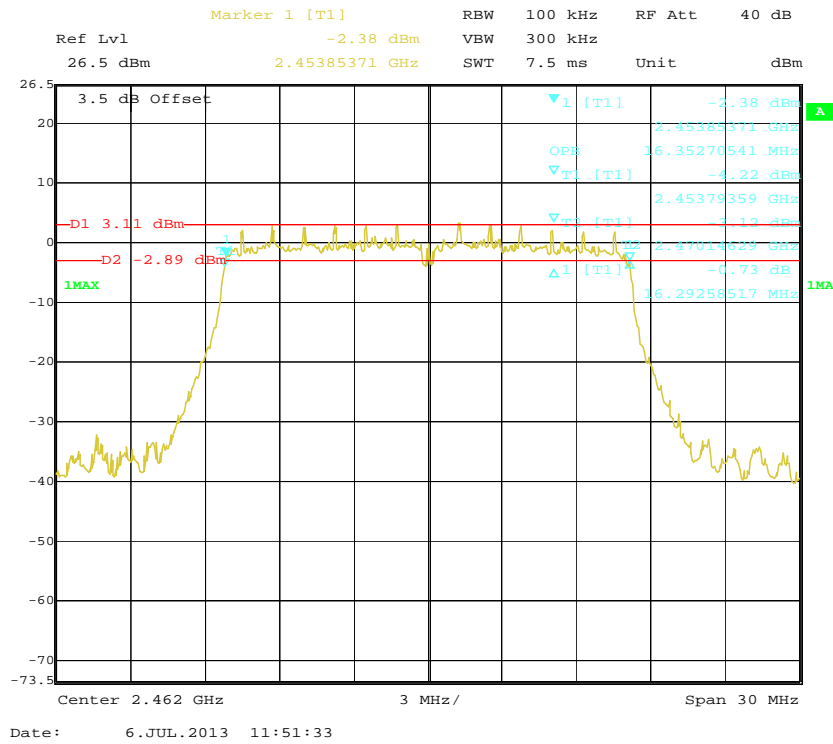
### 802.11g Low Channel, Antenna 0



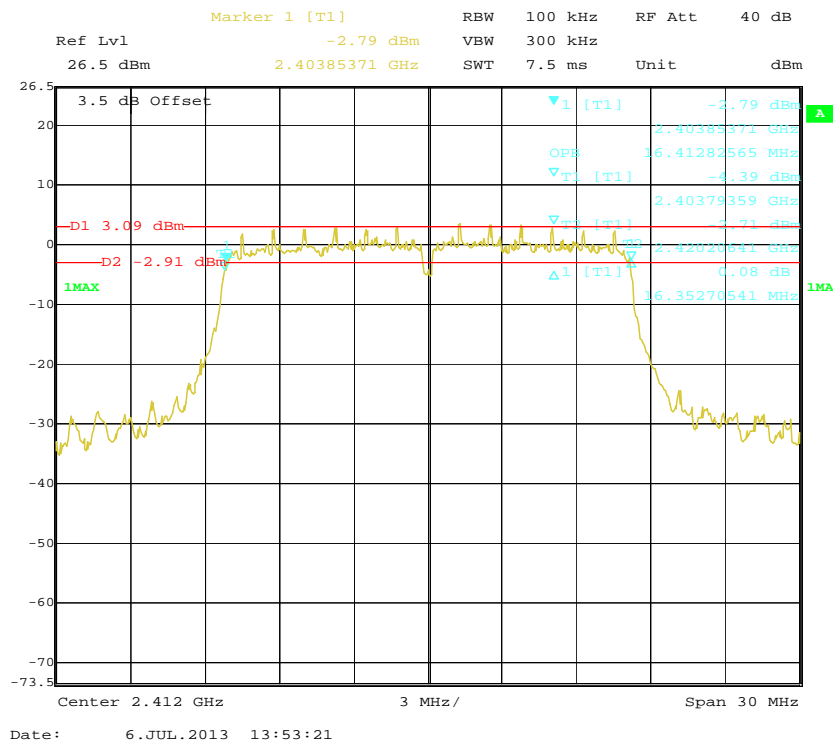
### 802.11g Middle Channel, Antenna 0



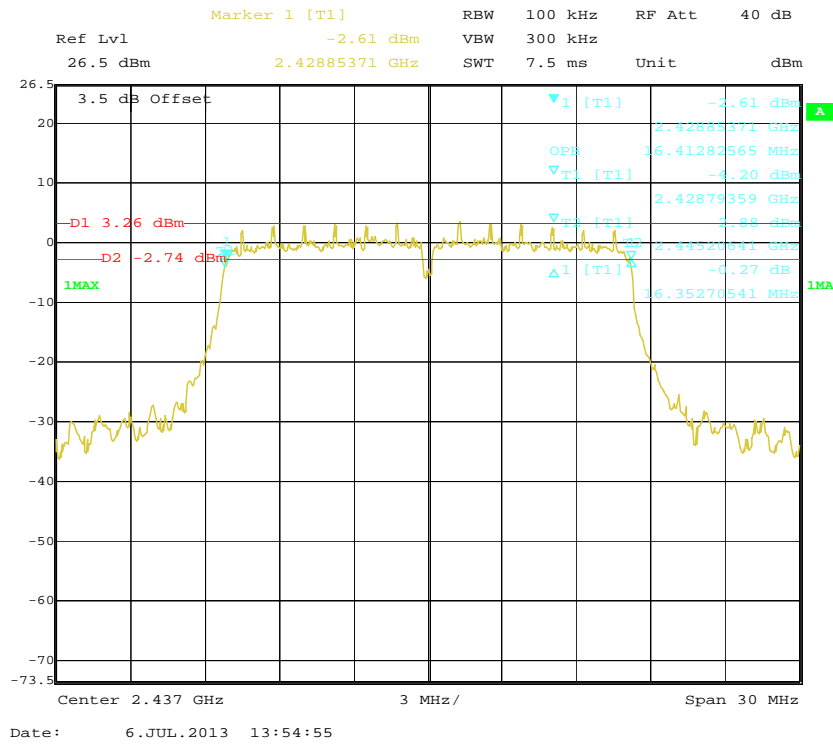
### 802.11g High Channel, Antenna 0



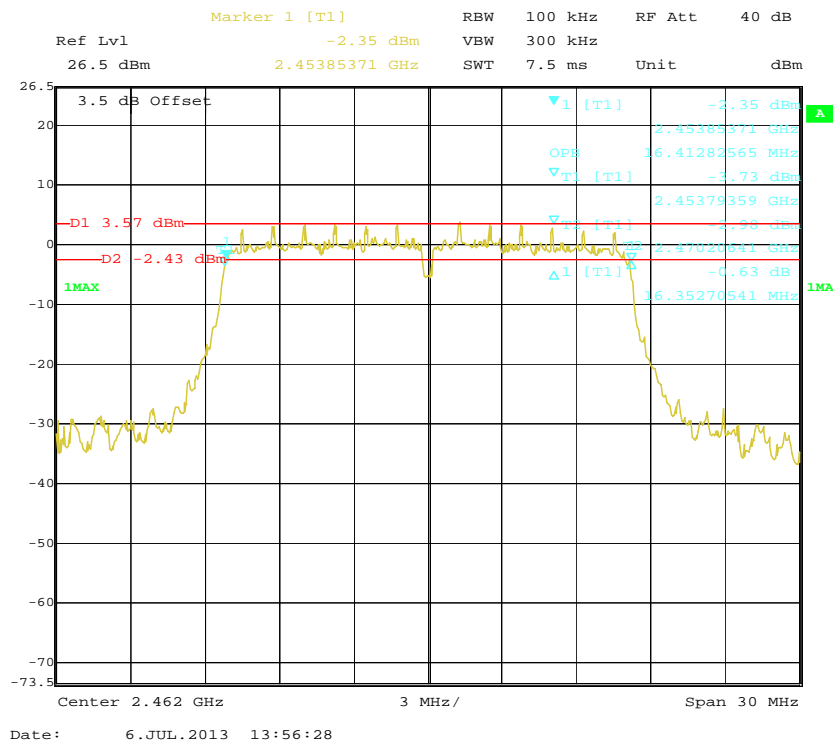
### 802.11g Low Channel, Antenna 1



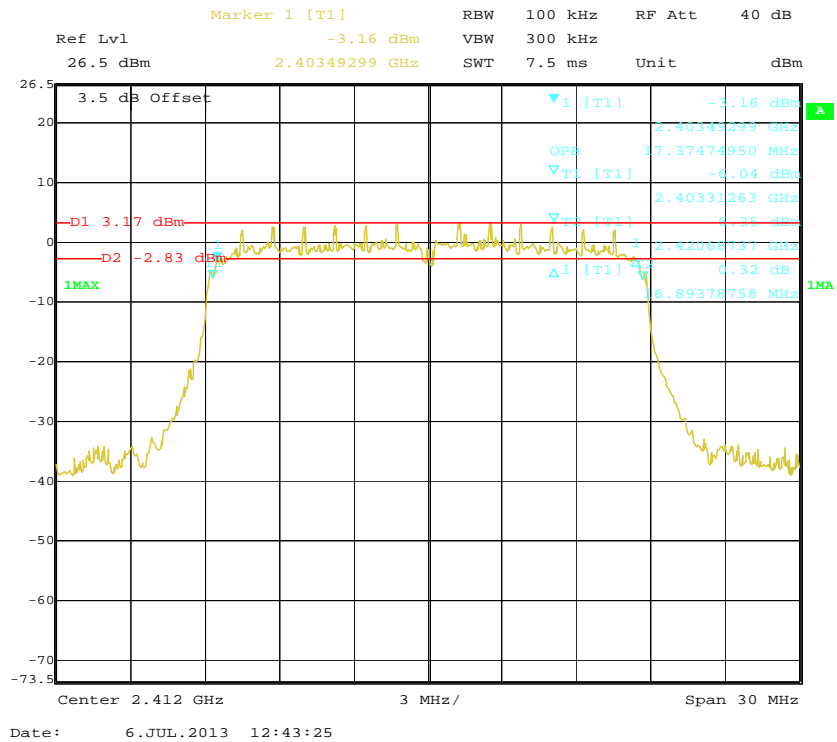
### 802.11g Middle Channel, Antenna 1



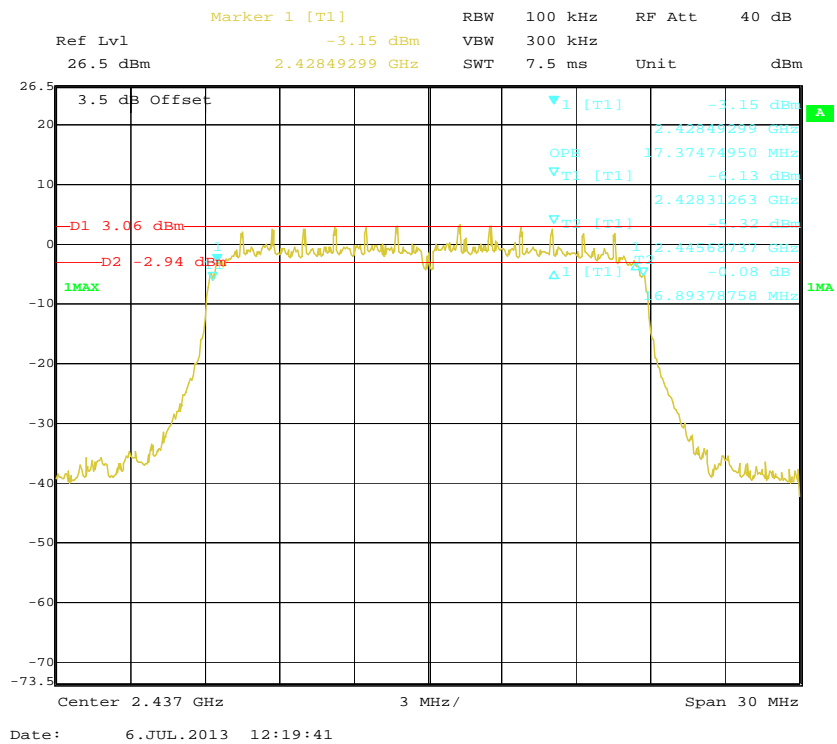
### 802.11g High Channel, Antenna 1



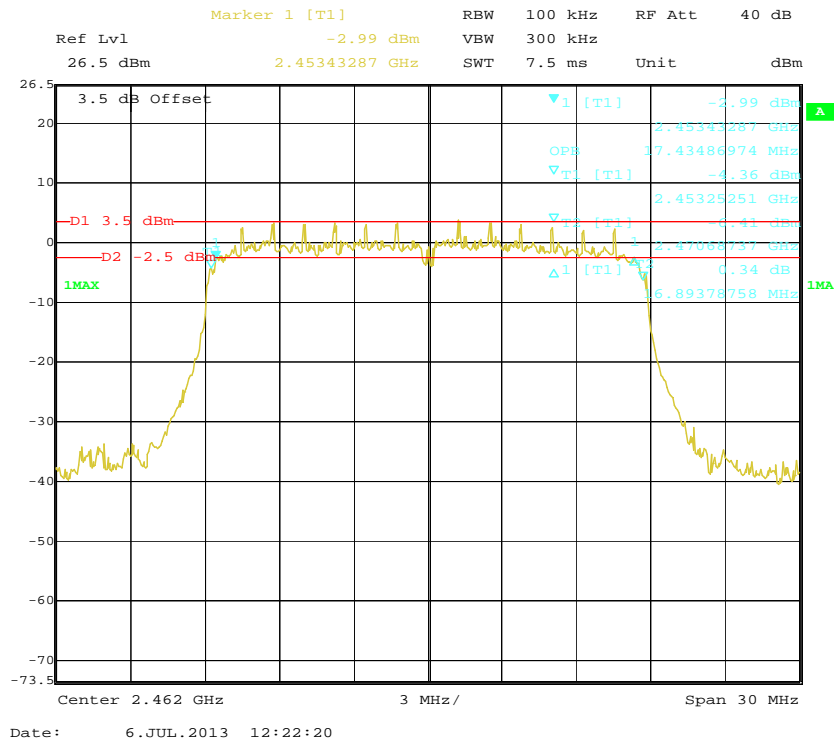
802.11n-HT20 Low Channel, Antenna 0



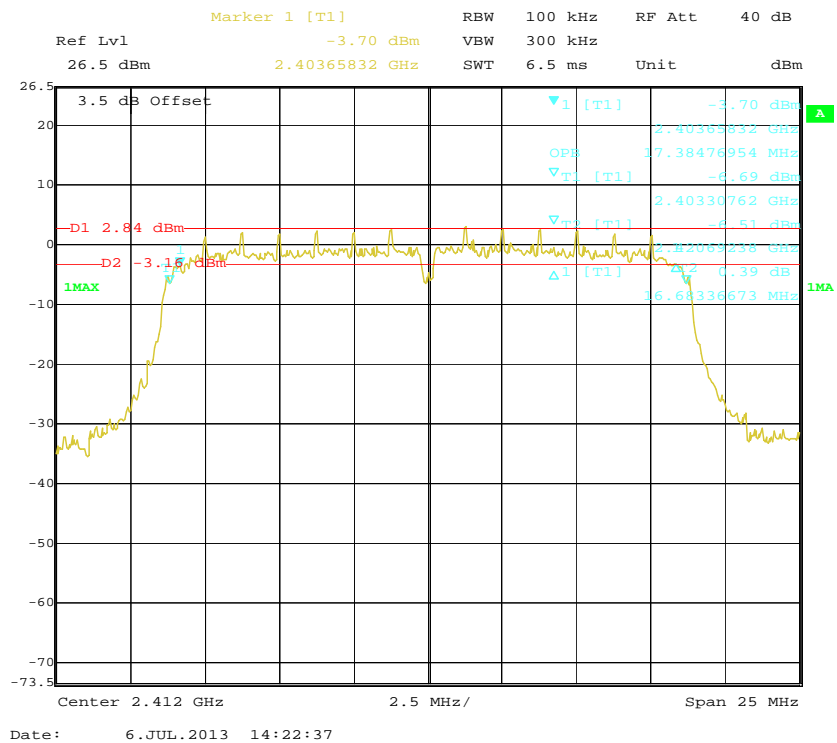
802.11n-HT20 Middle Channel, Antenna 0



### 802.11n-HT20 High Channel, Antenna 0

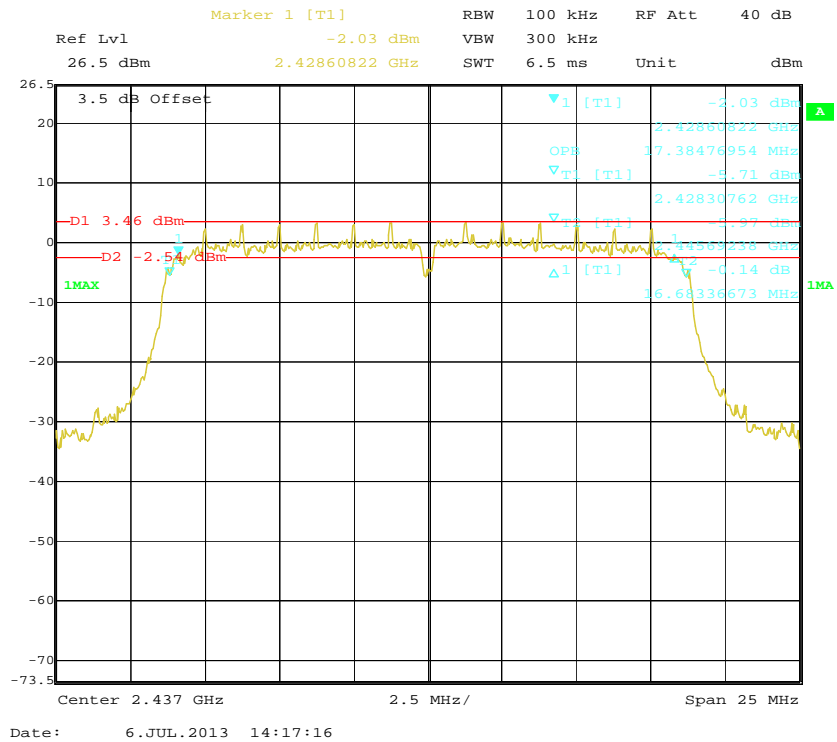


### 802.11n-HT20 Low Channel, Antenna 1

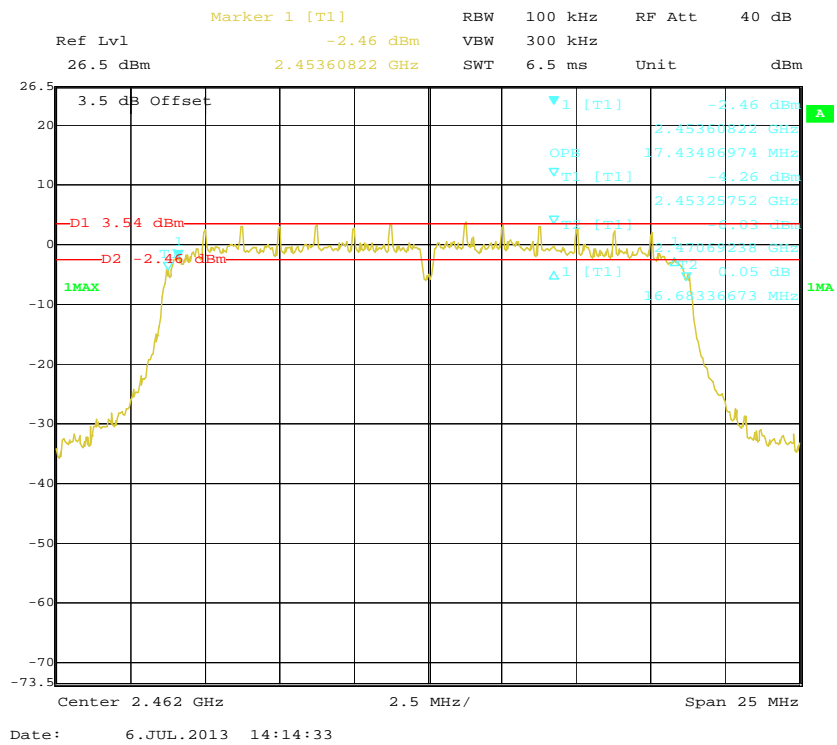




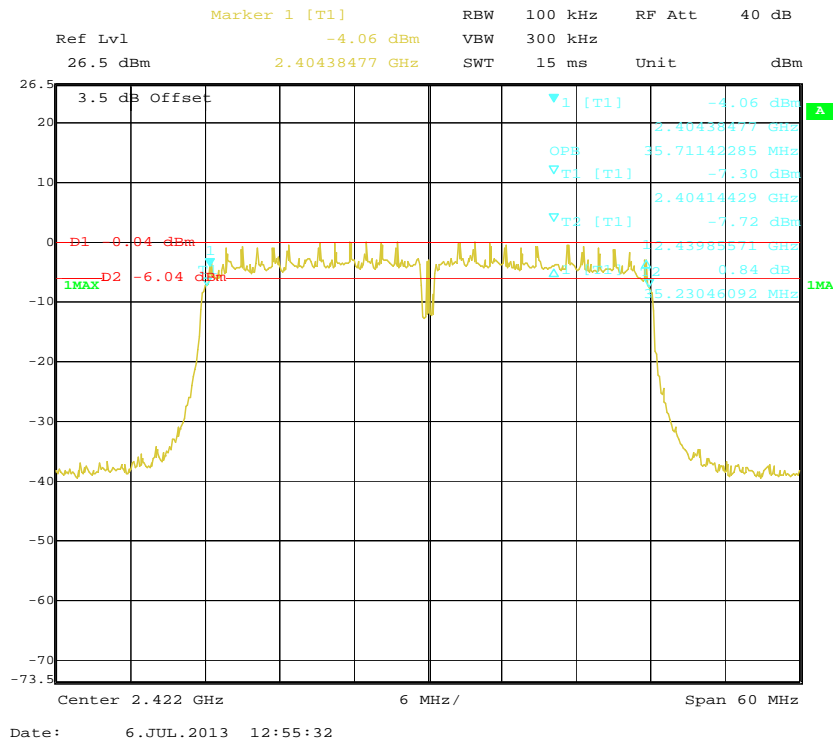
**802.11n-HT20 Middle Channel, Antenna 1**



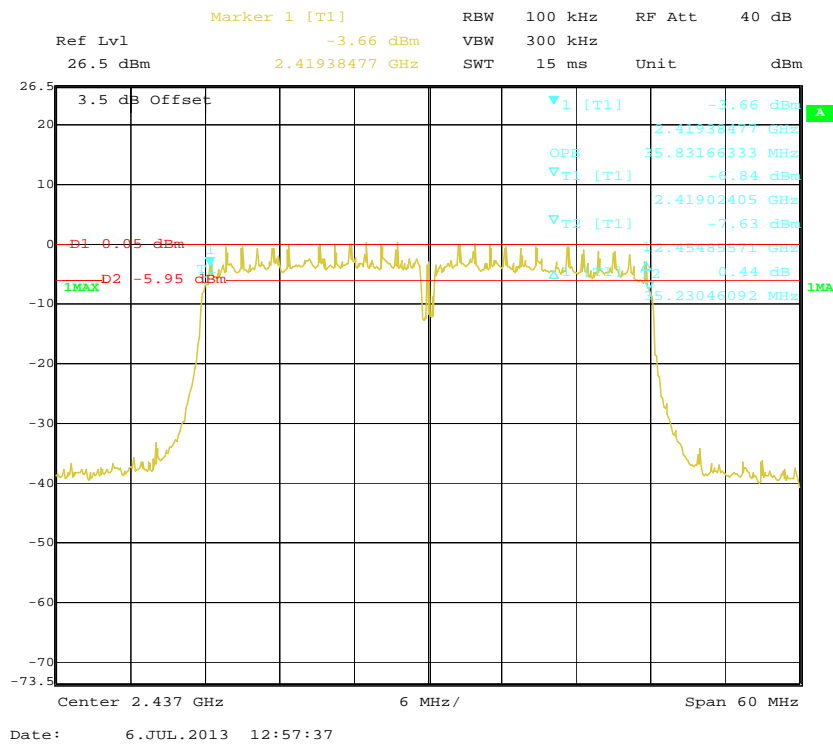
**802.11n-HT20 High Channel, Antenna 1**



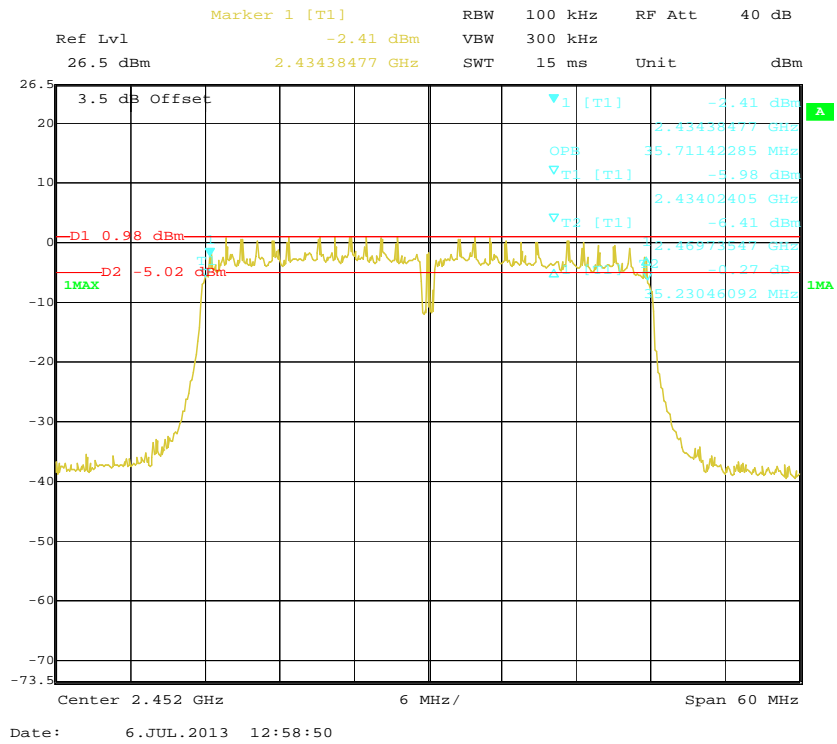
**802.11n-HT40 Low Channel, Antenna 0**



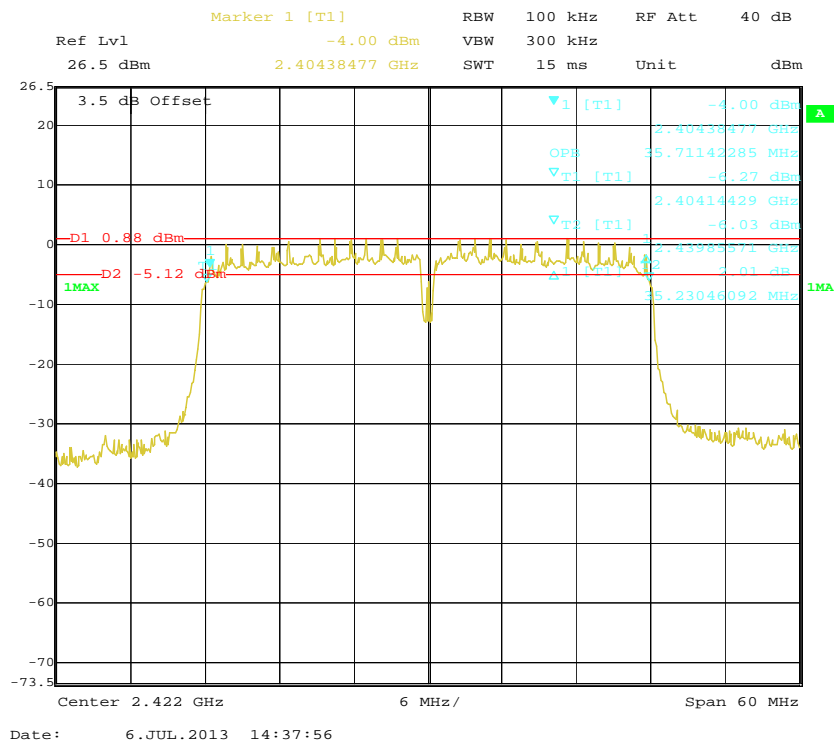
**802.11n-HT40 Middle Channel, Antenna 0**



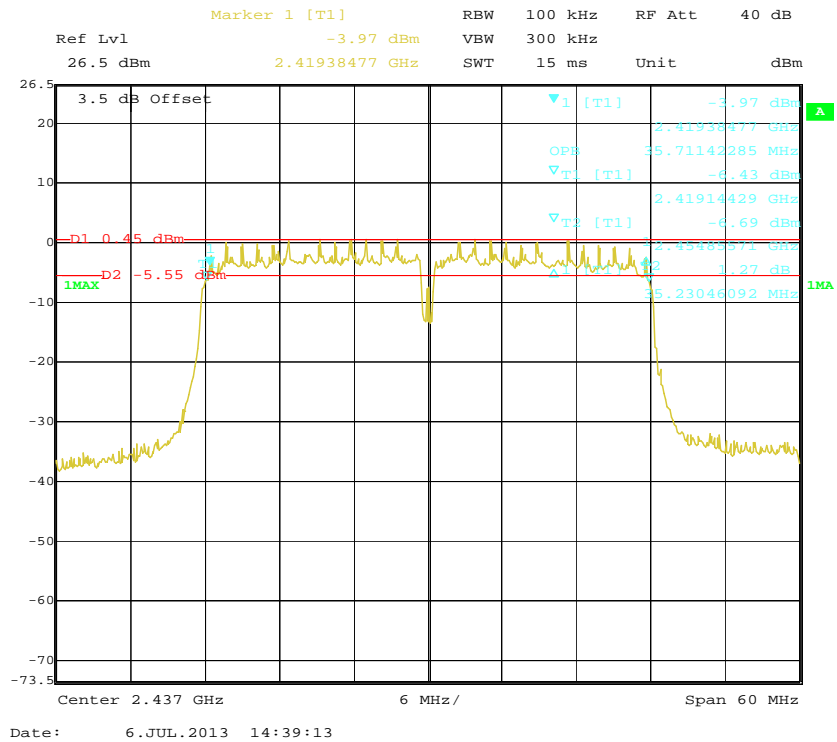
### 802.11n-HT40 High Channel, Antenna 0



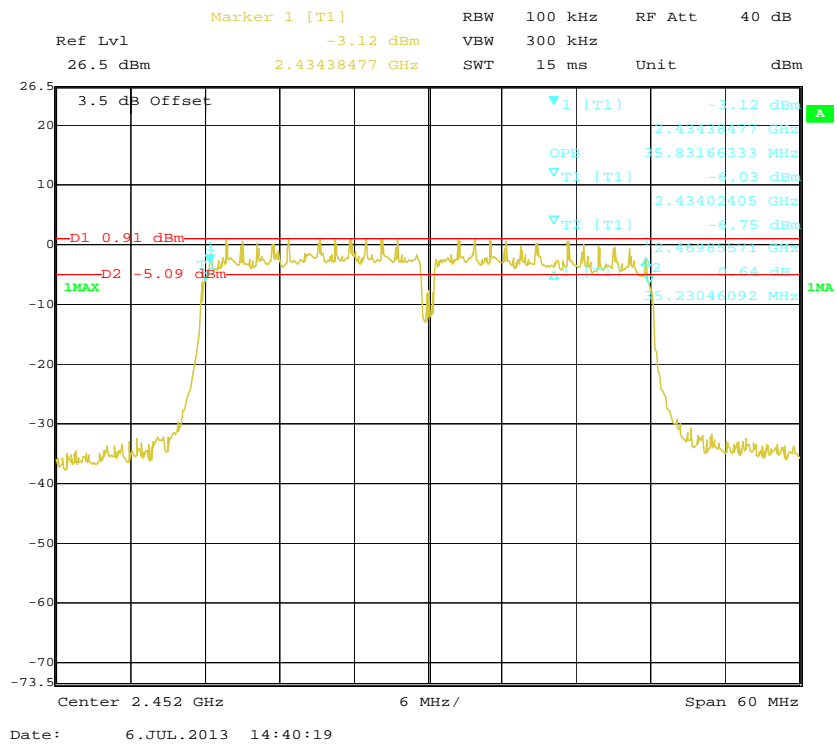
### 802.11n-HT40 Low Channel, Antenna 1



### 802.11n-HT40 Middle Channel, Antenna 1



### 802.11n-HT40 High Channel, Antenna 1



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

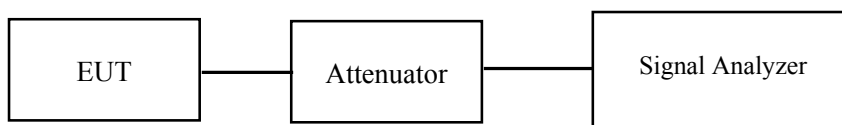
### Applicable Standard

According to §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

### Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v02

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. Add a correction factor to the display.



### Test Equipment List and Details

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

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

### Test Data

#### Environmental Conditions

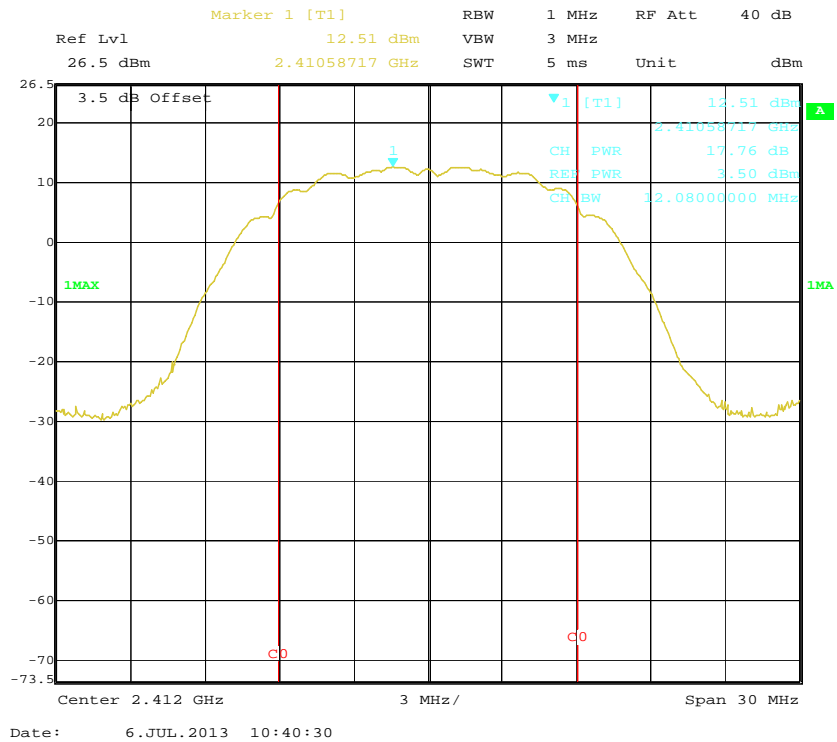
Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

*The testing was performed by Candy Li on 2013-07-06.*

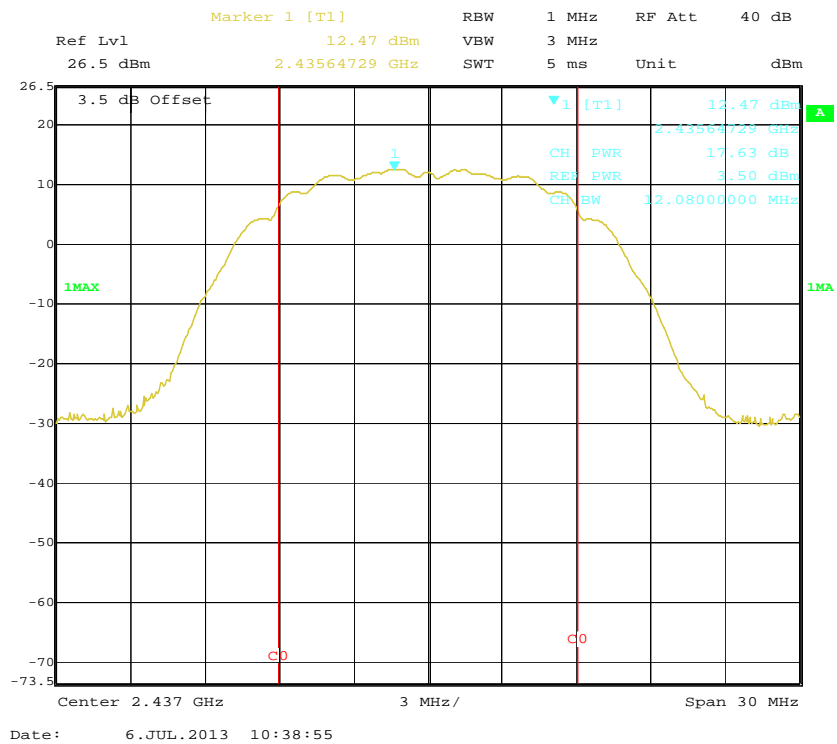
Test Mode: Transmitting

Channel	Frequency (MHz)	Conducted Peak Output Power (dBm)			Limit (dBm)
		Antenna 0	Antenna 1	Antenna 0 +Antenna 1	
802.11b mode					
Low	2412	17.76	17.60	\	30
Middle	2437	17.63	17.76	\	30
High	2462	17.62	17.33	\	30
802.11g mode					
Low	2412	19.52	19.67	\	30
Middle	2437	18.85	19.22	\	30
High	2462	19.05	18.86	\	30
802.11n-HT20 mode					
Low	2412	19.10	19.08	22.10	30
Middle	2437	18.90	19.01	21.97	30
High	2462	18.83	19.10	21.98	30
802.11n-HT40 mode					
Low	2422	18.88	19.46	22.19	30
Middle	2437	18.69	19.20	21.96	30
High	2452	19.17	19.38	22.29	30

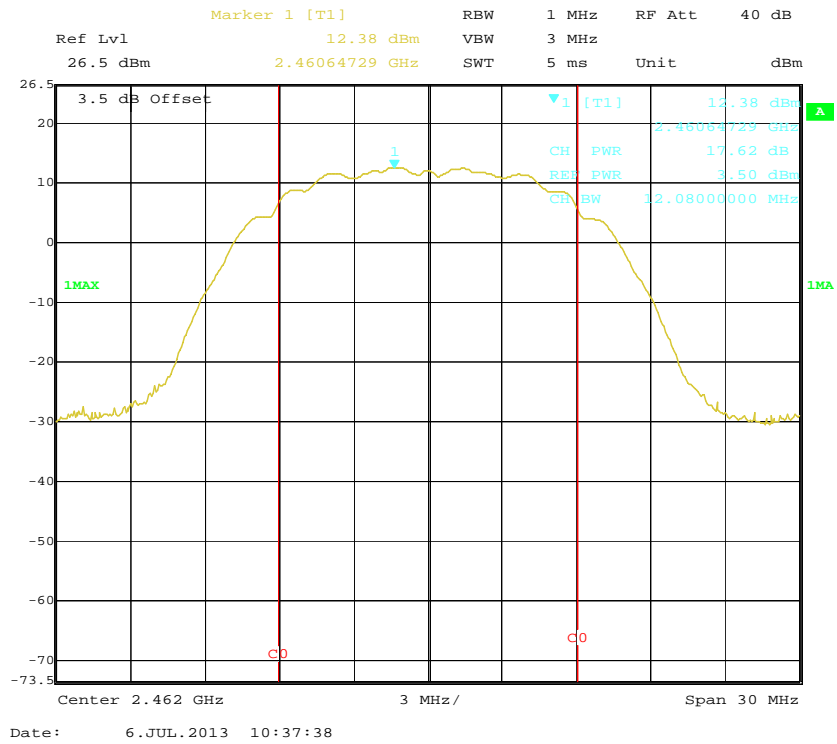
**802.11b RF Output Power, Low Channel, Antenna 0**



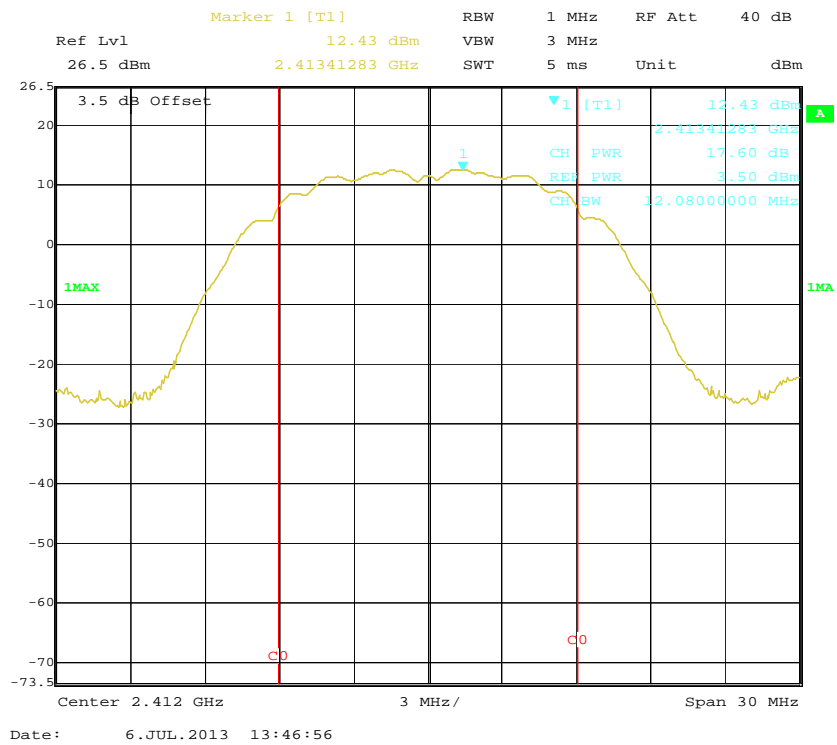
**802.11b RF Output Power, Middle Channel, Antenna 0**



### 802.11b RF Output Power, High Channel, Antenna 0

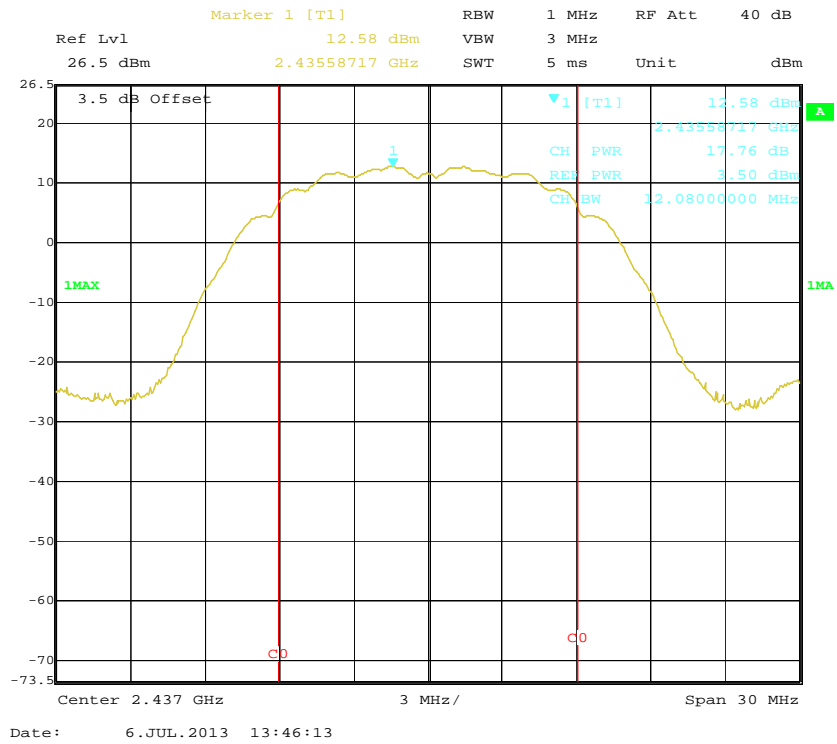


### 802.11b RF Output Power, Low Channel, Antenna 1

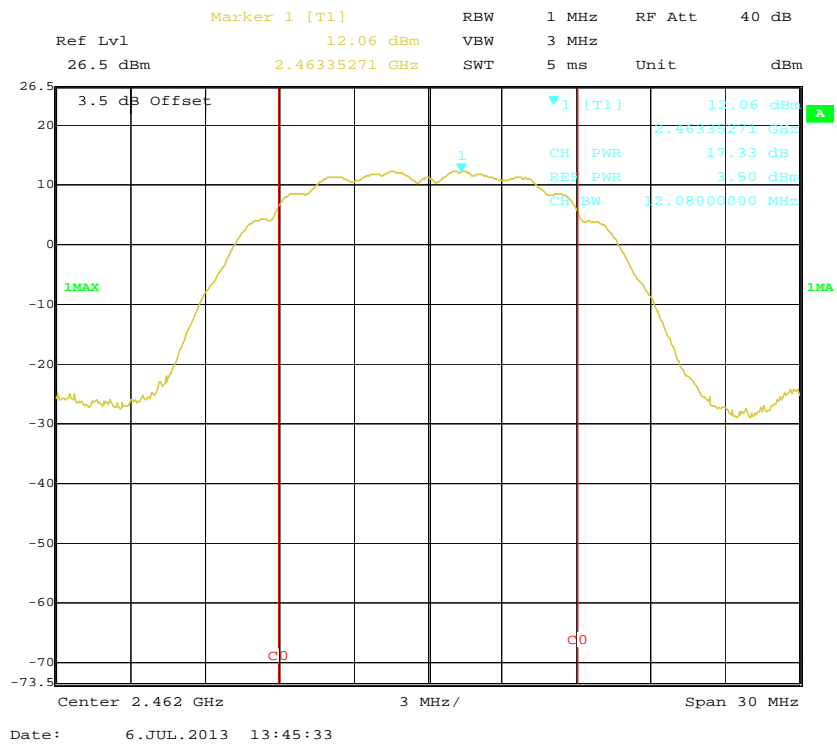




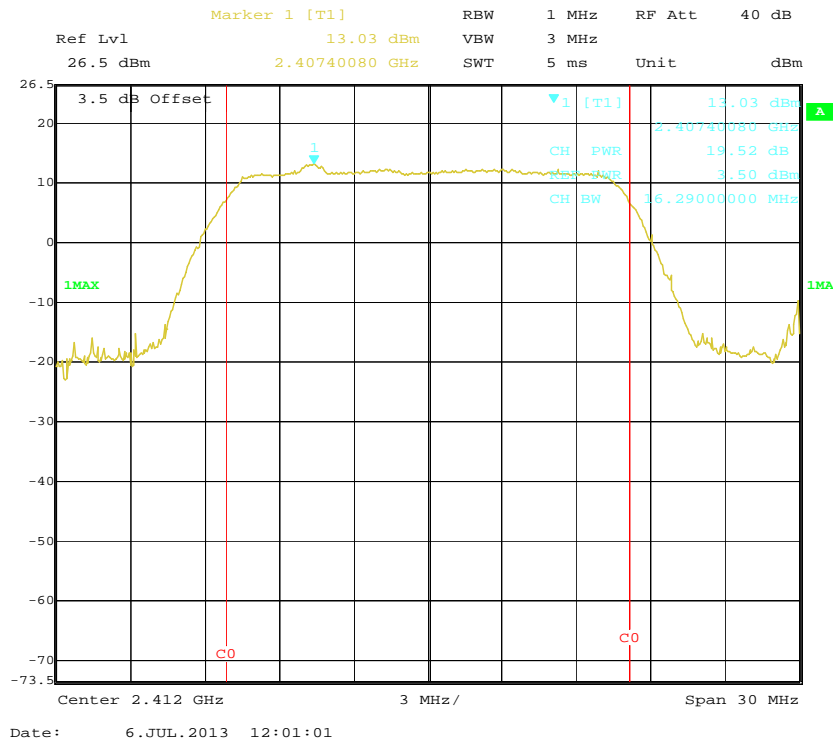
### 802.11b RF Output Power, Middle Channel, Antenna 1



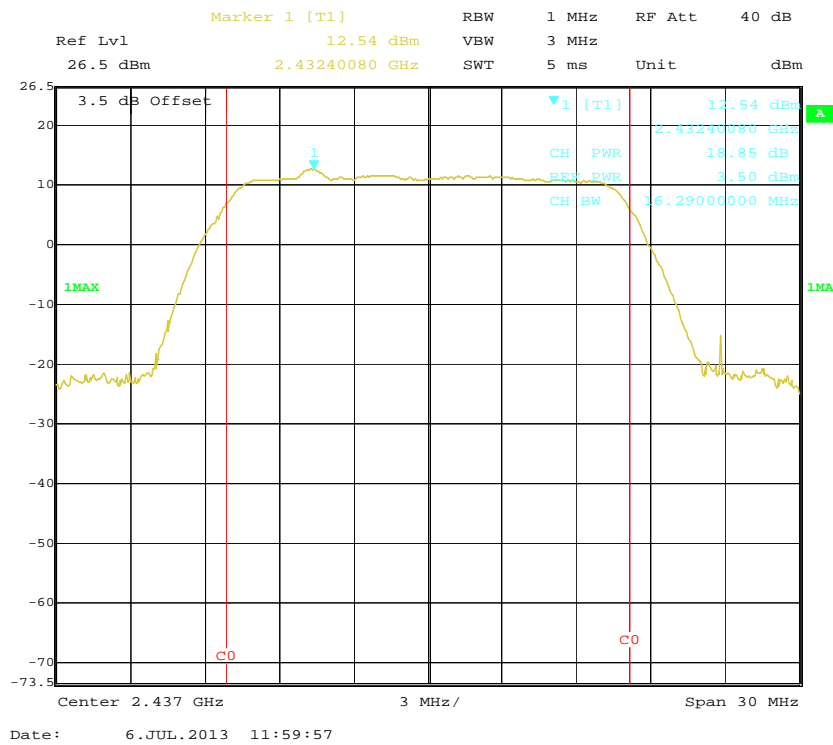
### 802.11b RF Output Power, High Channel, Antenna 1



**802.11g RF Output Power, Low Channel, Antenna 0**

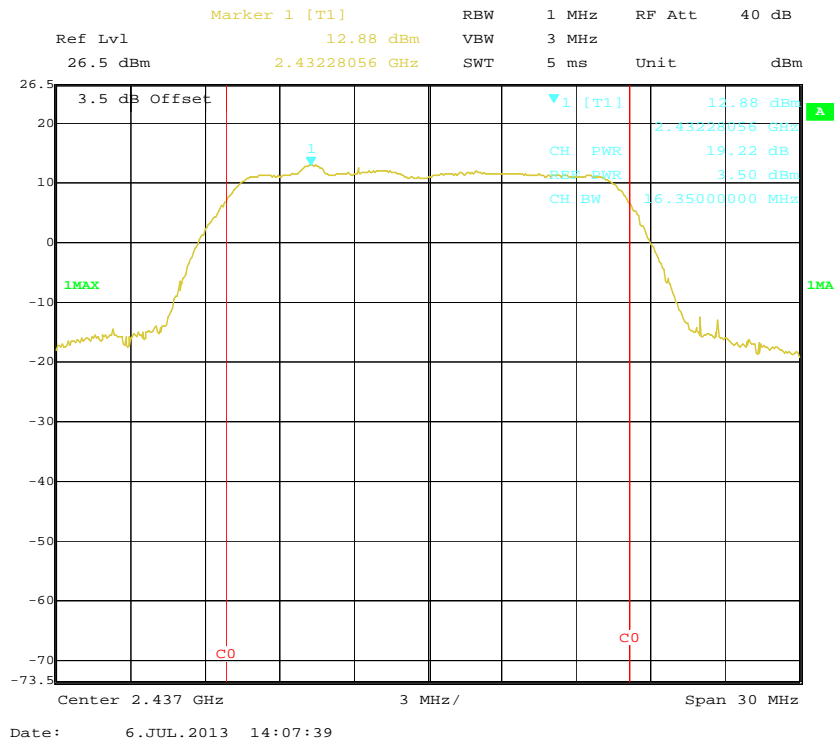


**802.11g RF Output Power, Middle Channel, Antenna 0**

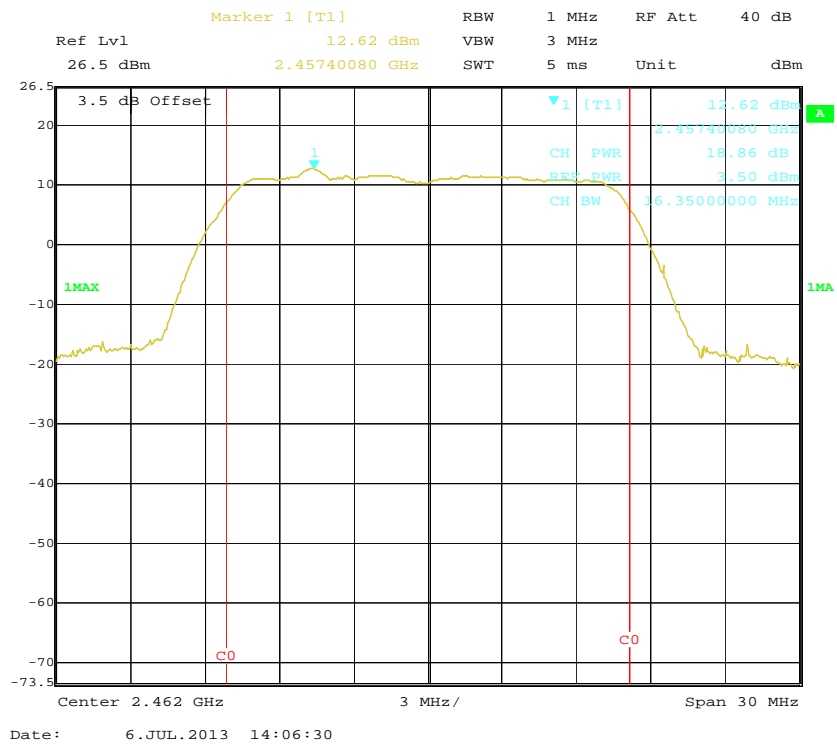




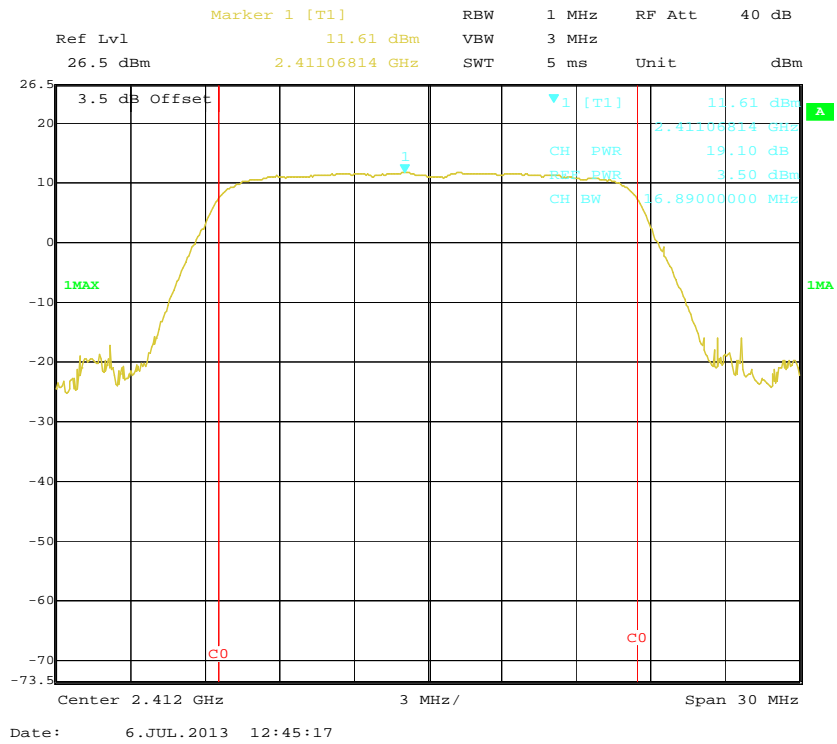
### 802.11g RF Output Power, Middle Channel, Antenna 1



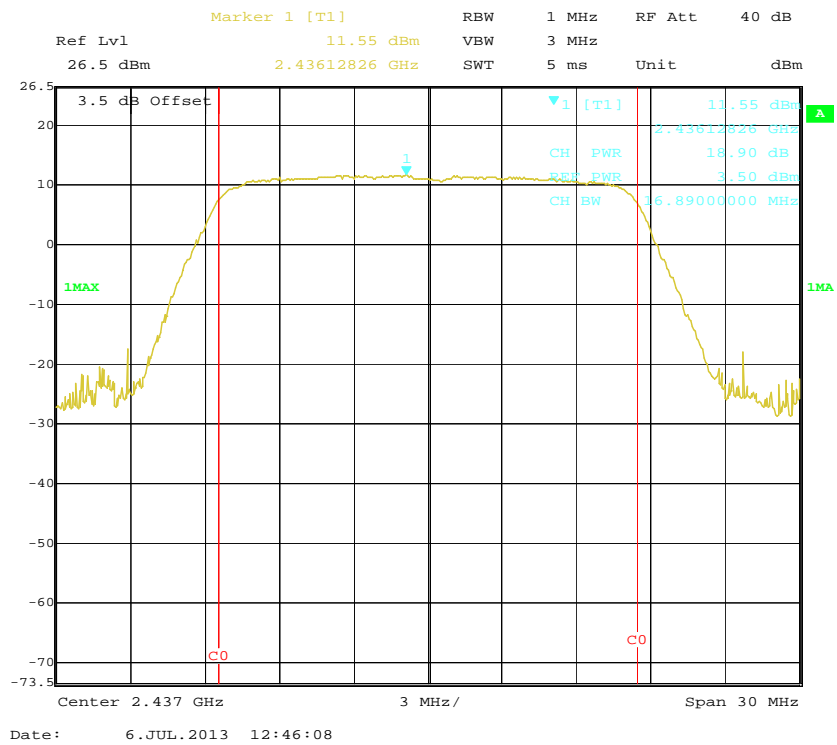
### 802.11g RF Output Power, High Channel, Antenna 1



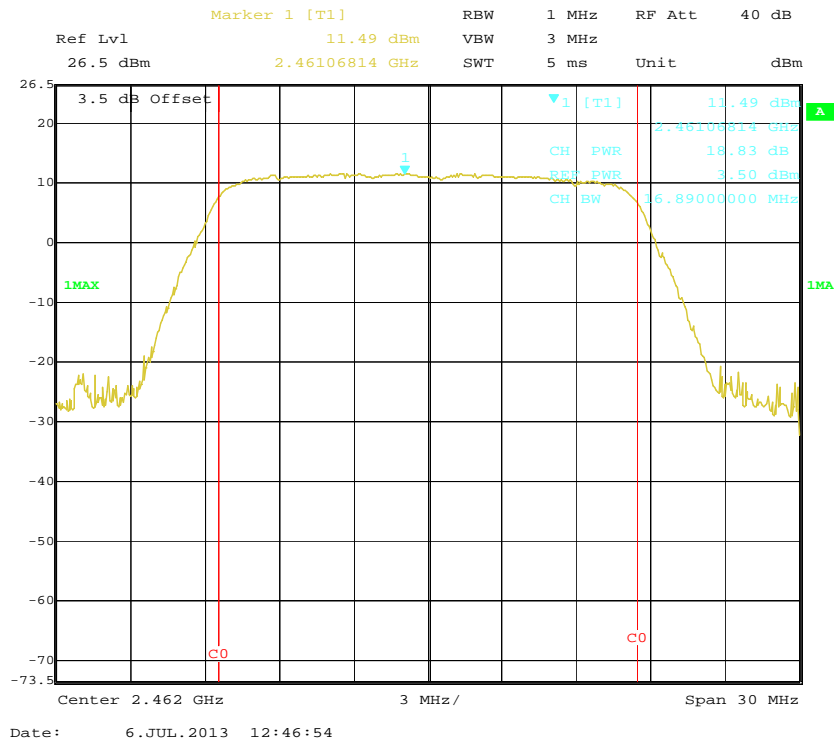
**802.11n-HT20 RF Output Power, Low Channel, Antenna 0**



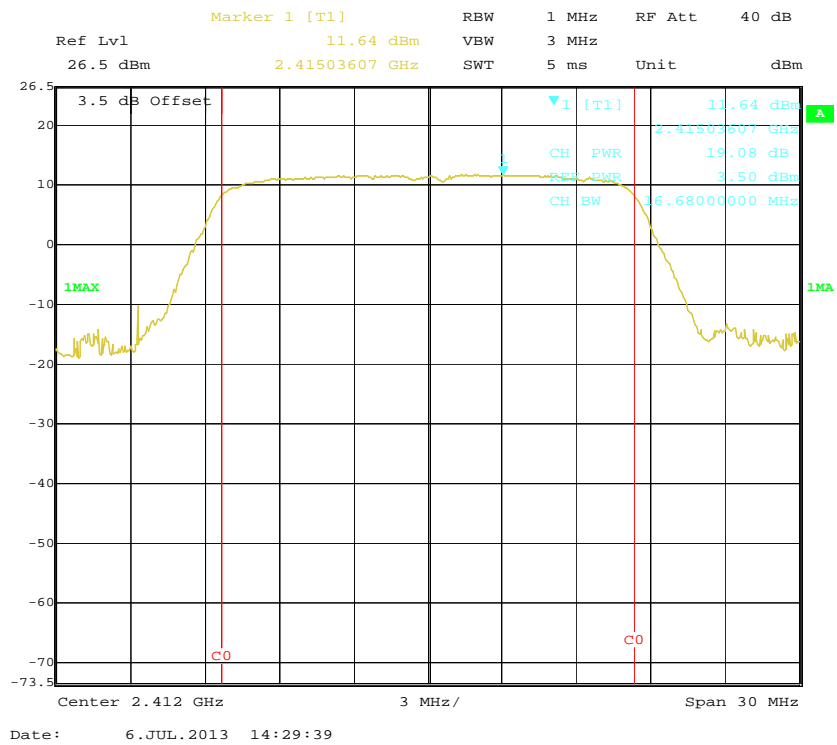
**802.11n-HT20 RF Output Power, Middle Channel, Antenna 0**



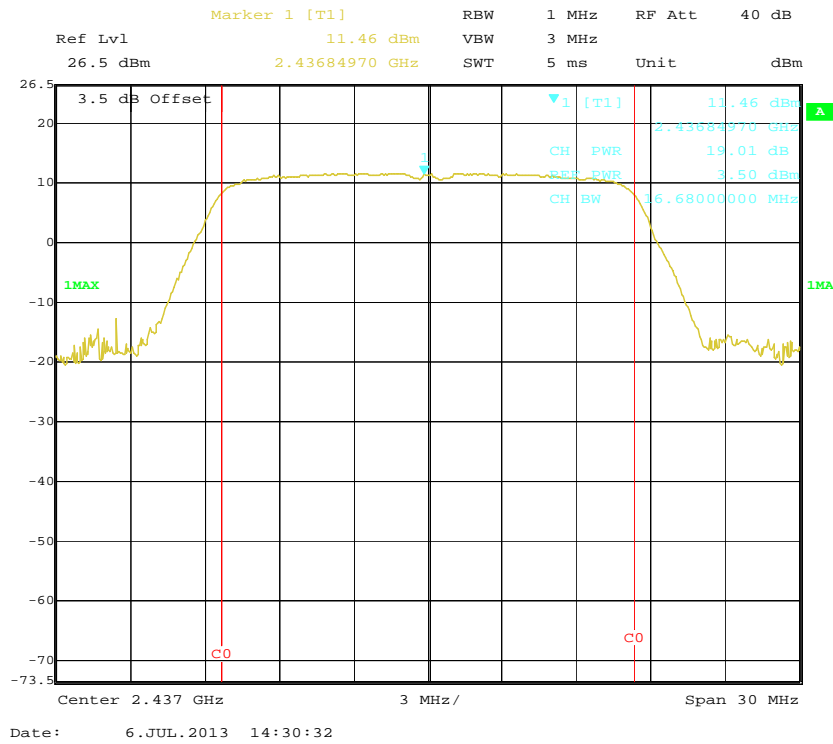
**802.11n-HT20 RF Output Power, High Channel, Antenna 0**



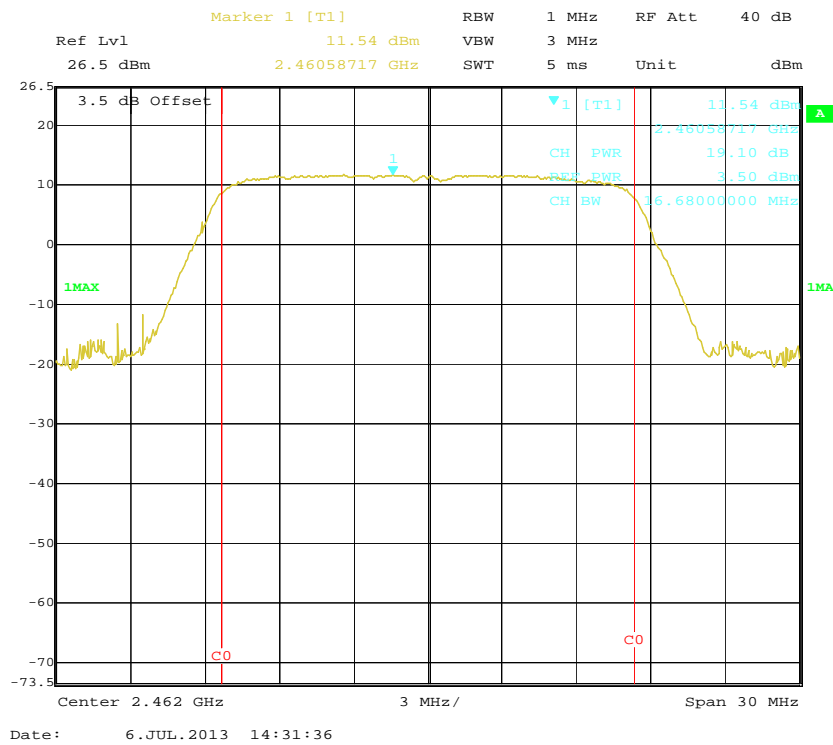
**802.11n-HT20 RF Output Power, Low Channel, Antenna 1**



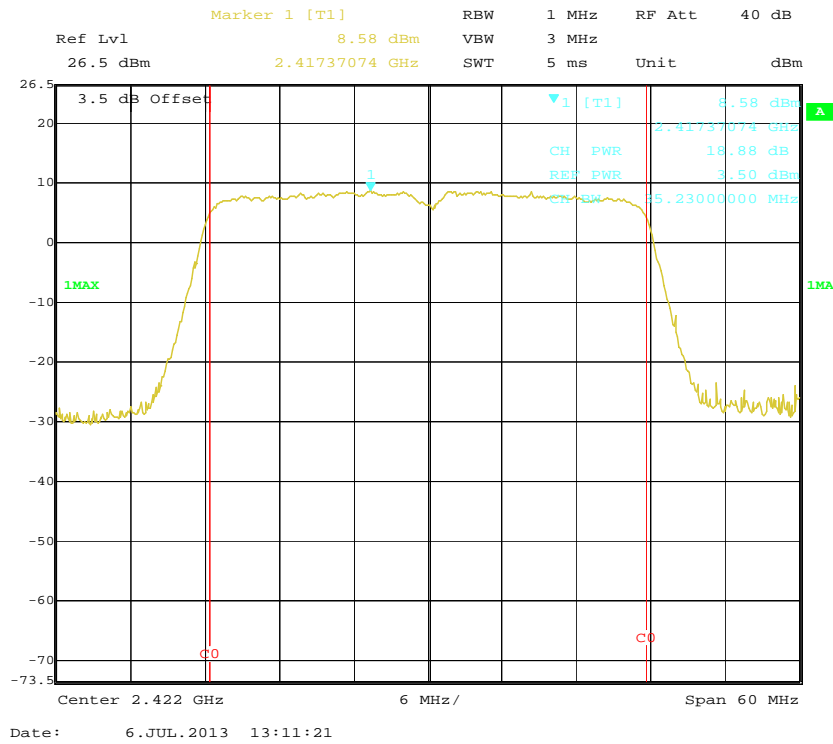
**802.11n-HT20 RF Output Power, Middle Channel, Antenna 1**



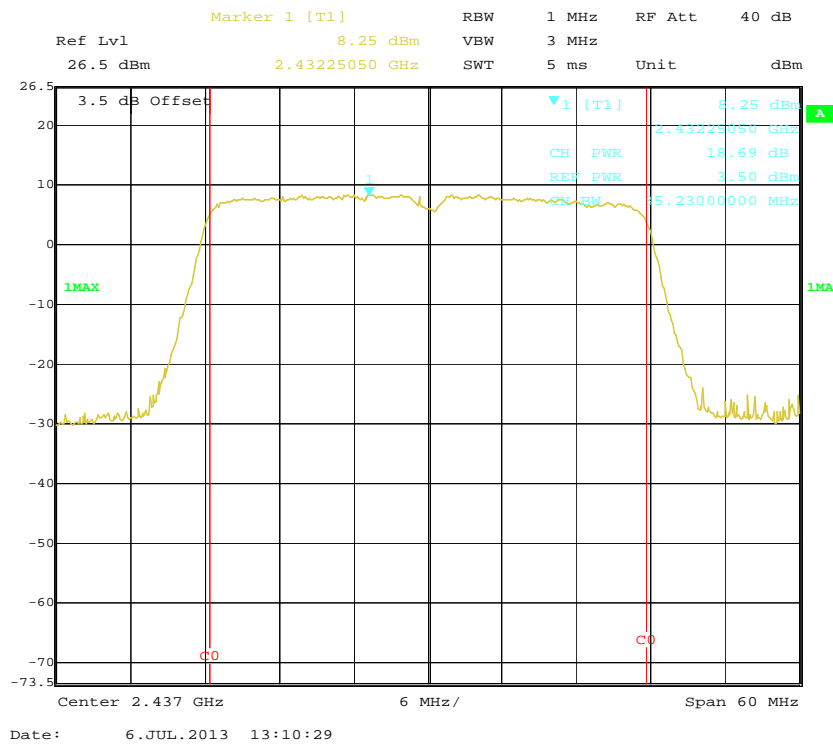
**802.11n-HT20 RF Output Power, High Channel, Antenna 1**



**802.11n-HT40 RF Output Power, Low Channel, Antenna 0**

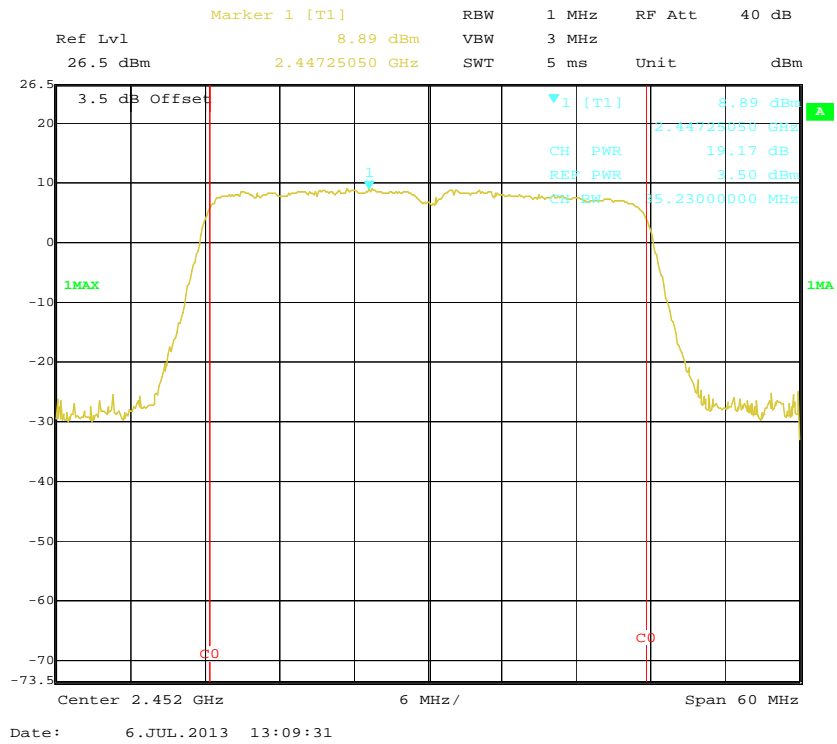


**802.11n-HT40 RF Output Power, Middle Channel, Antenna 0**

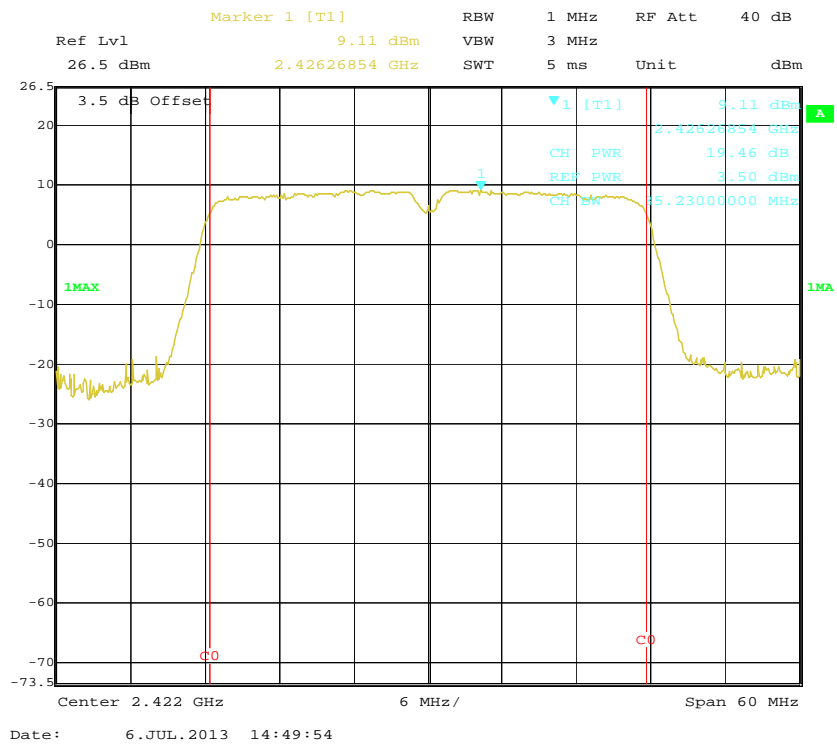




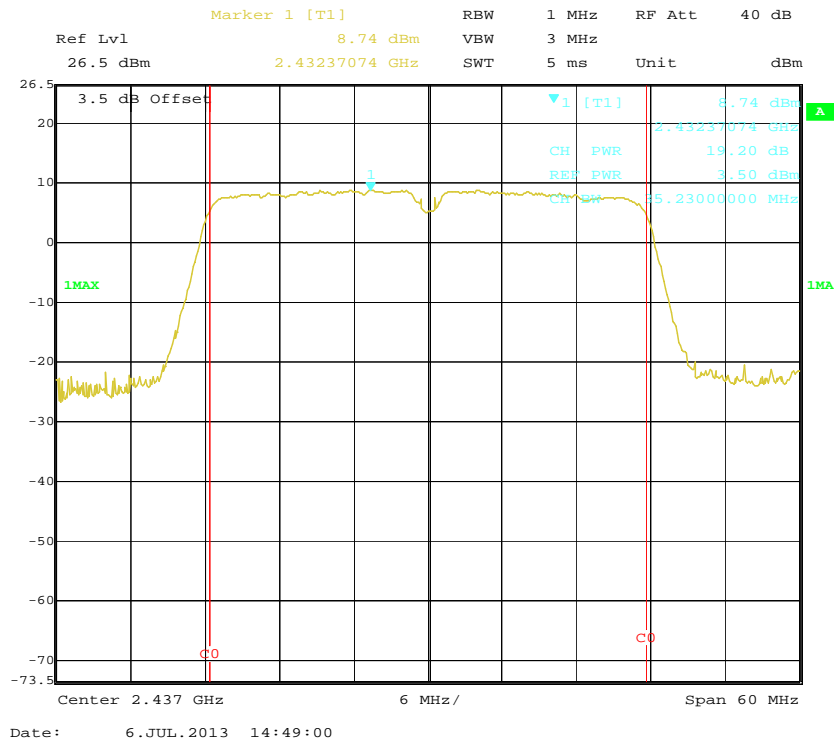
**802.11n-HT40 RF Output Power, High Channel, Antenna 0**



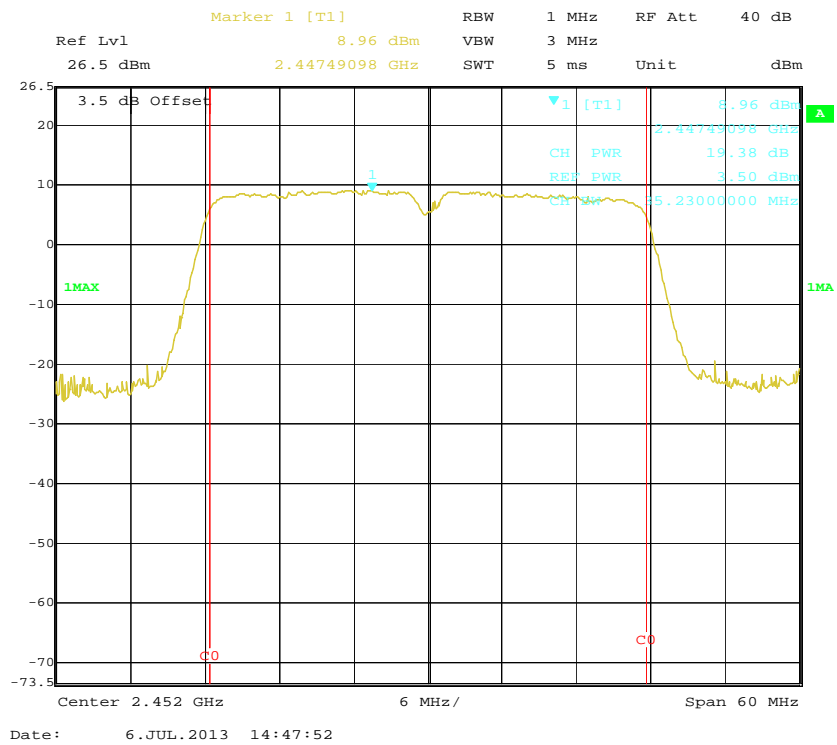
**802.11n-HT40 RF Output Power, Low Channel, Antenna 1**



**802.11n-HT40 RF Output Power, Middle Channel, Antenna 1**



**802.11n-HT40 RF Output Power, High Channel, Antenna 1**



## **FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE**

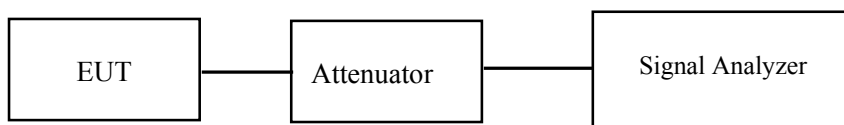
### **Applicable Standard**

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**

According to KDB 558074 D01 DTS Meas Guidance v02

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



### **Test Equipment List and Details**

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

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

**Test Data**

**Environmental Conditions**

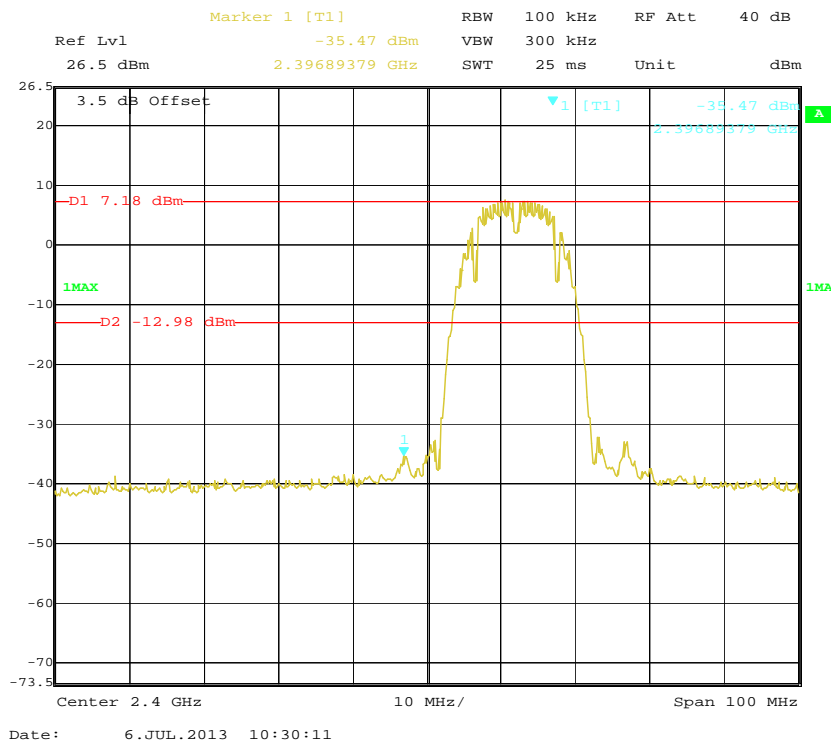
<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	55 %
<b>ATM Pressure:</b>	100.0 kPa

The testing was performed by Candy Li on 2013-07-06.

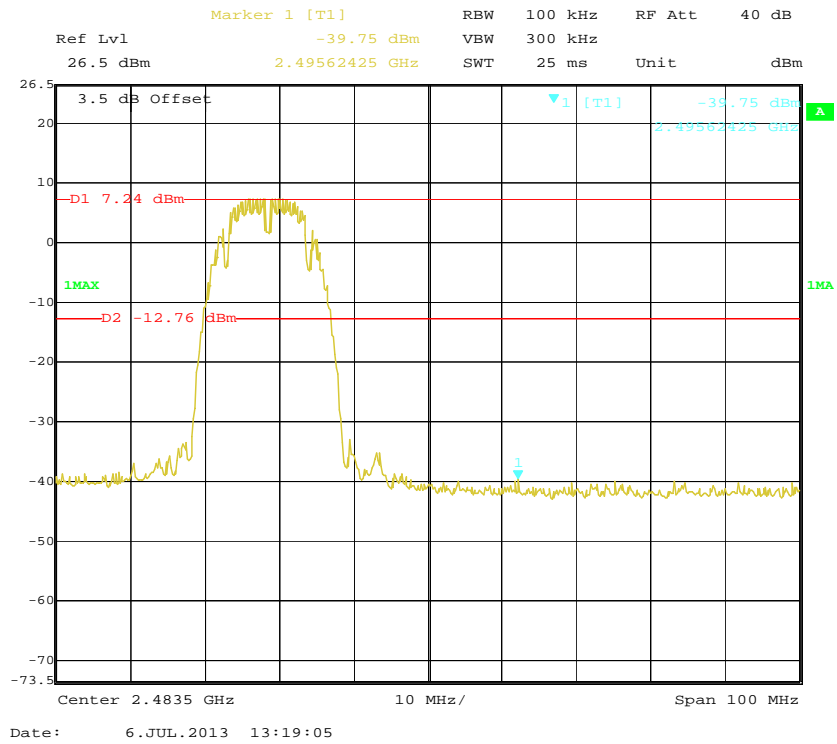
Test Mode: Transmitting

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

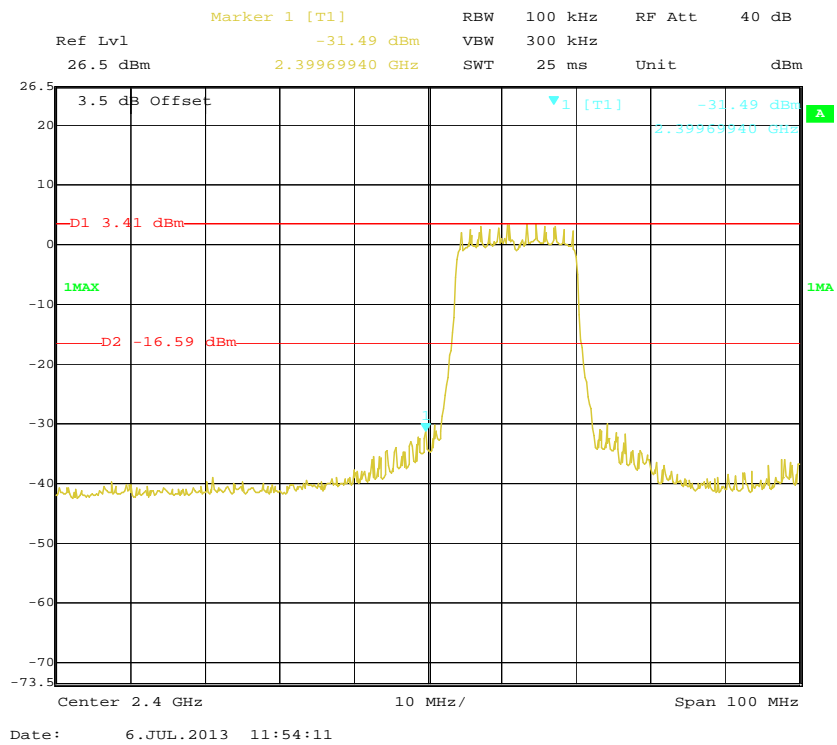
**802.11b: Band Edge, Left Side, Antenna 0**



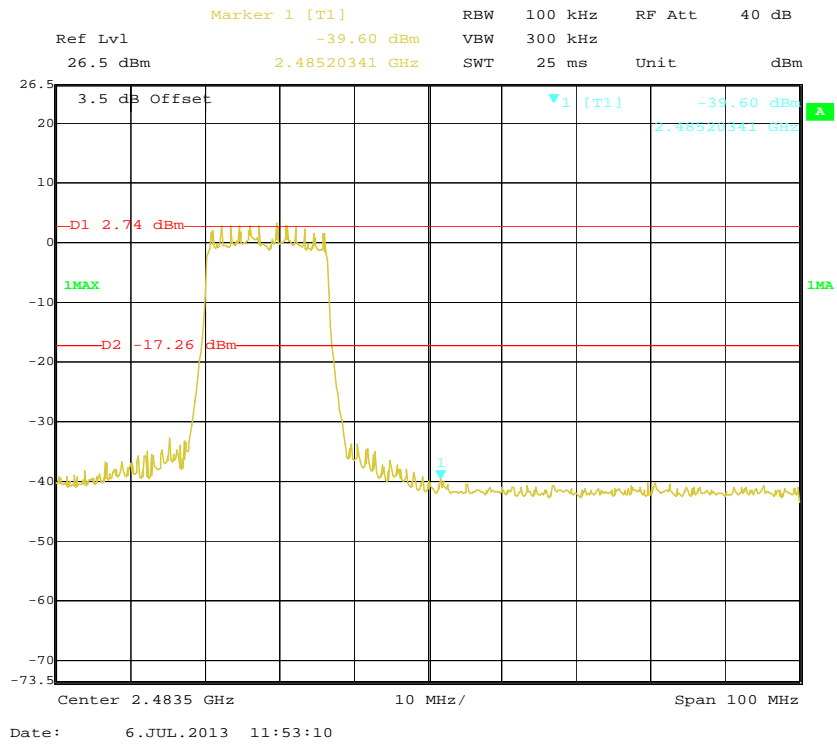
**802.11b: Band Edge, Right Side, Antenna 0**



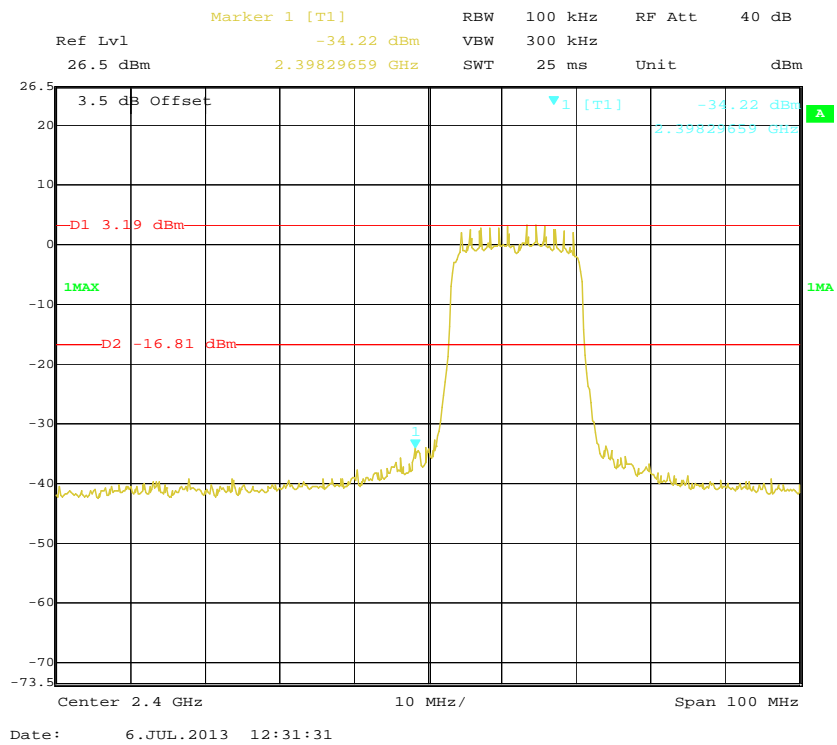
**802.11g: Band Edge, Left Side, Antenna 0**



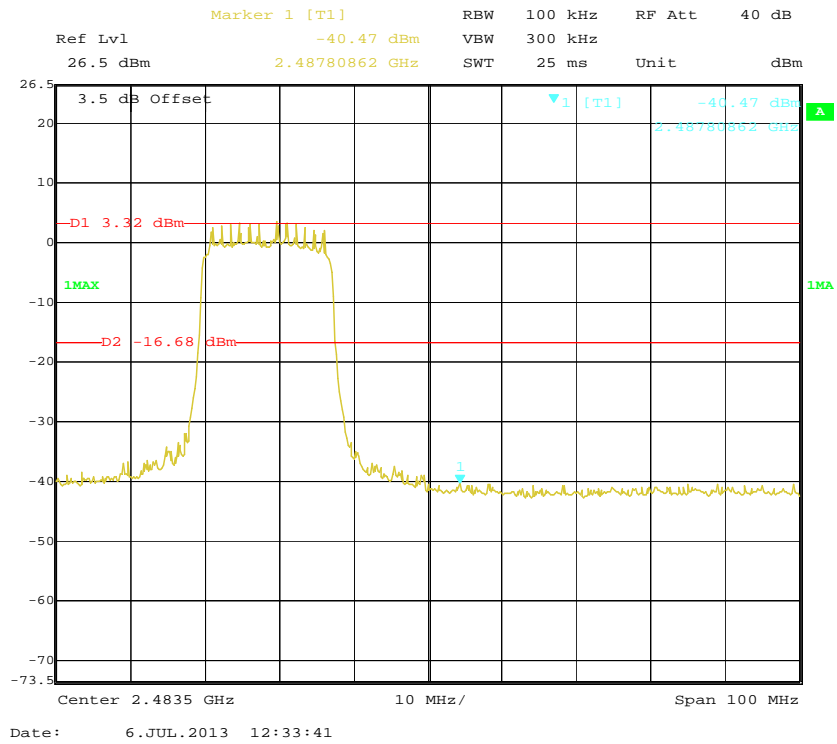
**802.11g: Band Edge, Right Side, Antenna 0**



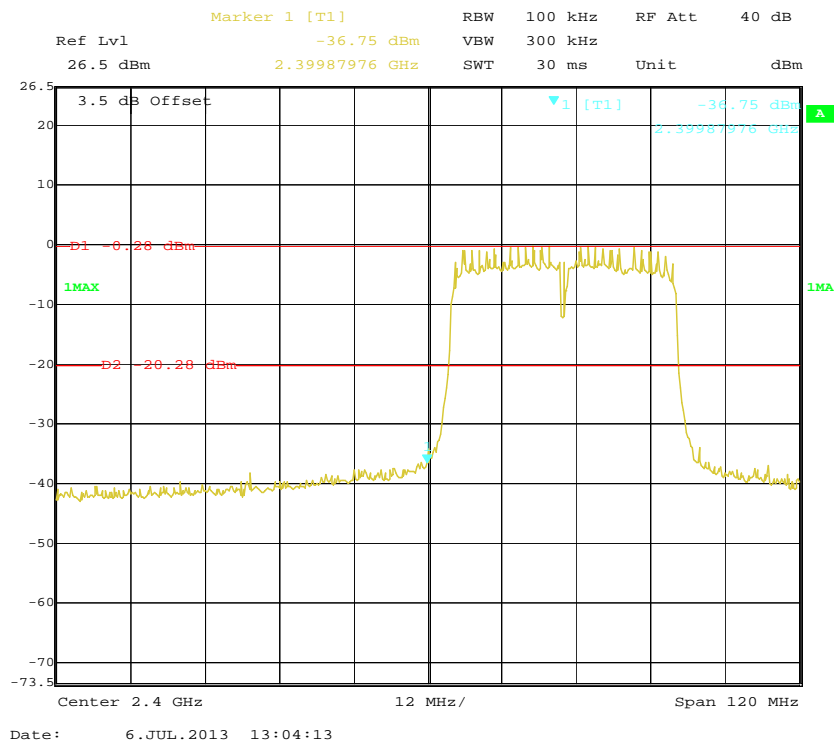
**802.11n-HT20: Band Edge, Left Side, Antenna 0**



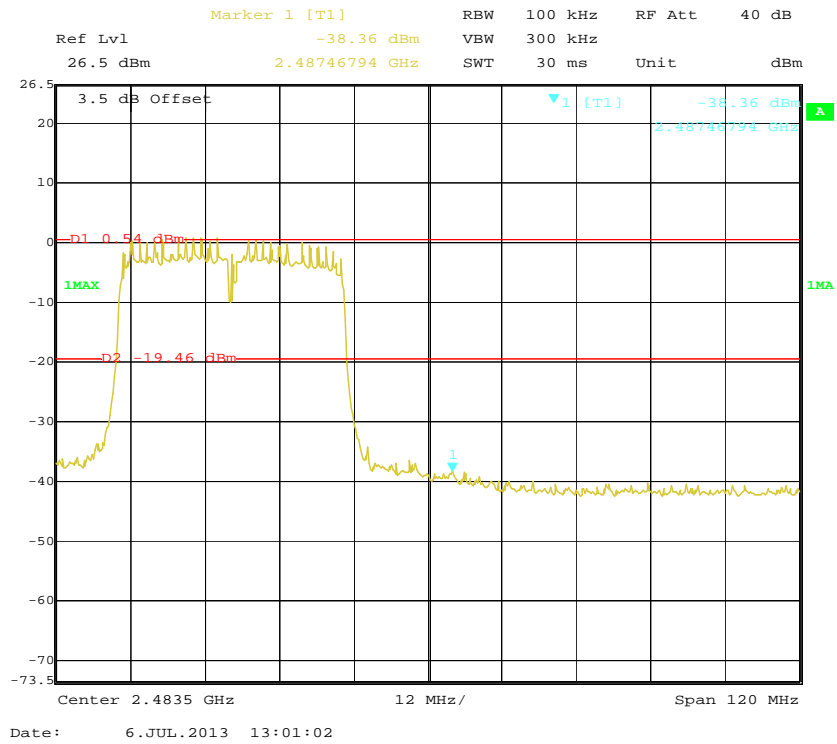
**802.11n-HT20: Band Edge, Right Side, Antenna 0**



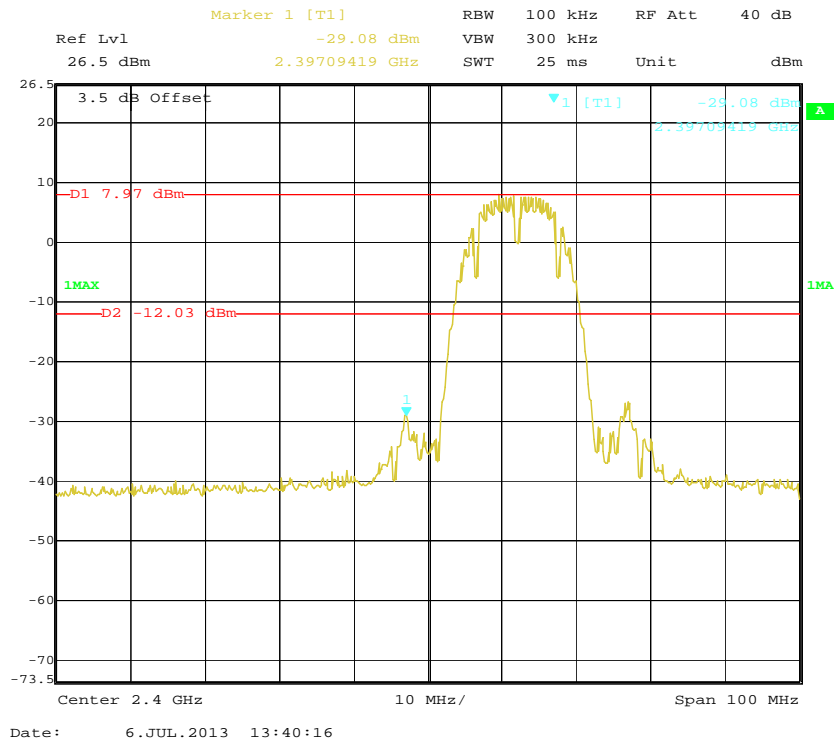
**802.11n-HT40: Band Edge, Left Side, Antenna 0**



**802.11n-HT40: Band Edge, Right Side, Antenna 0**

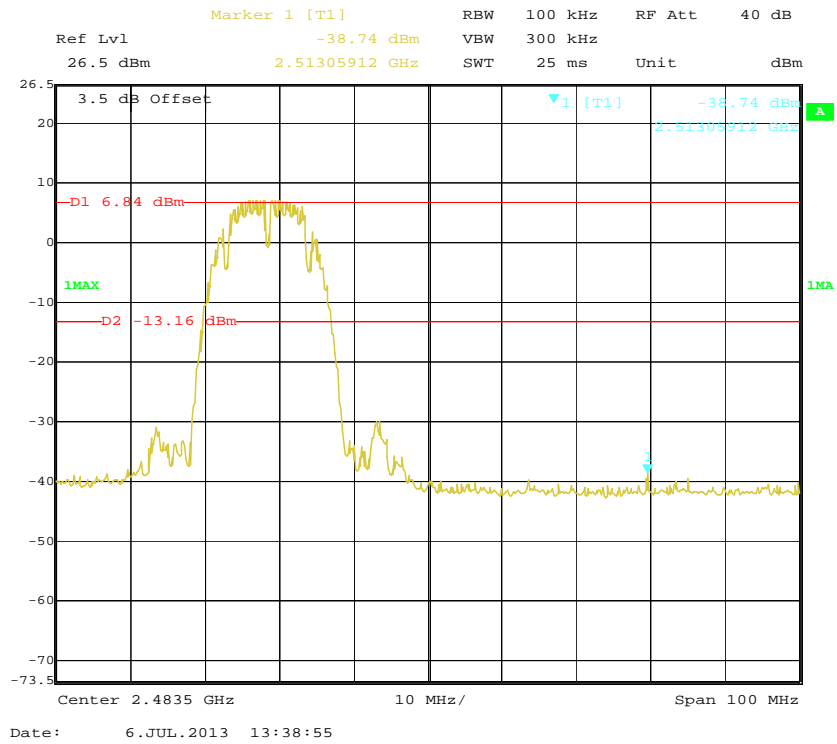


**802.11b: Band Edge, Left Side, Antenna 1**

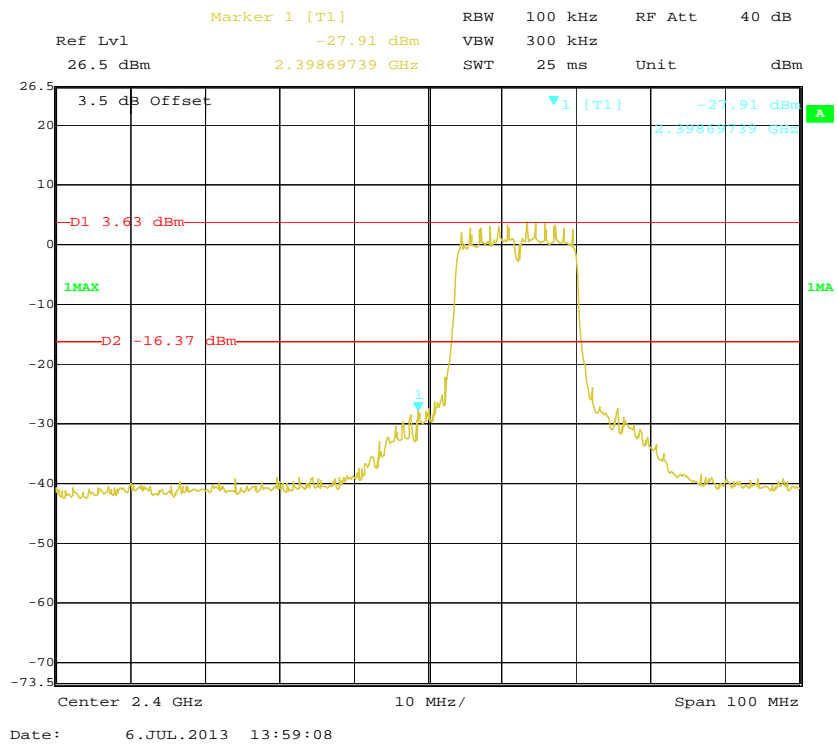




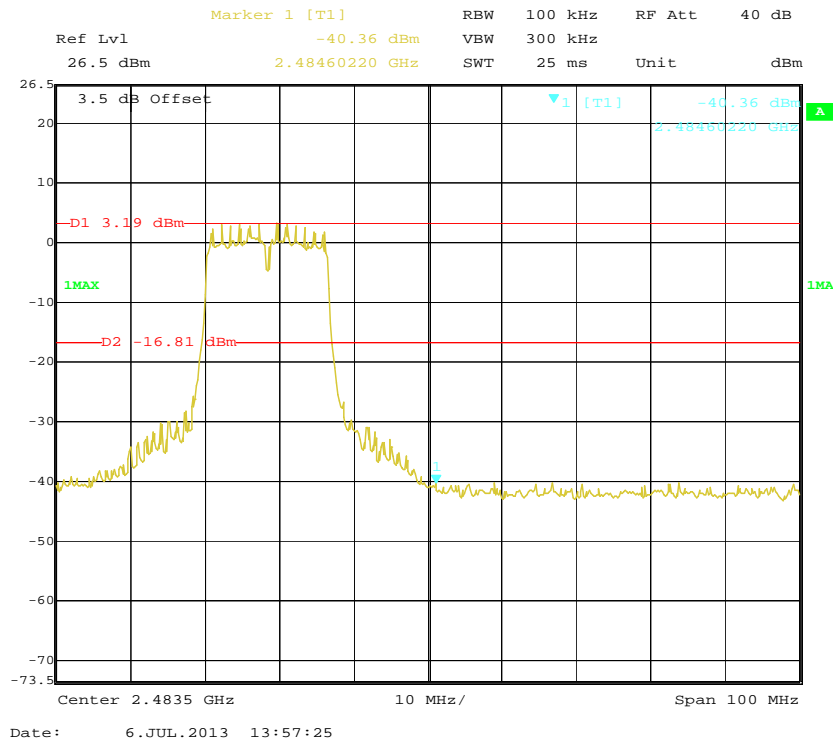
**802.11b: Band Edge, Right Side, Antenna 1**



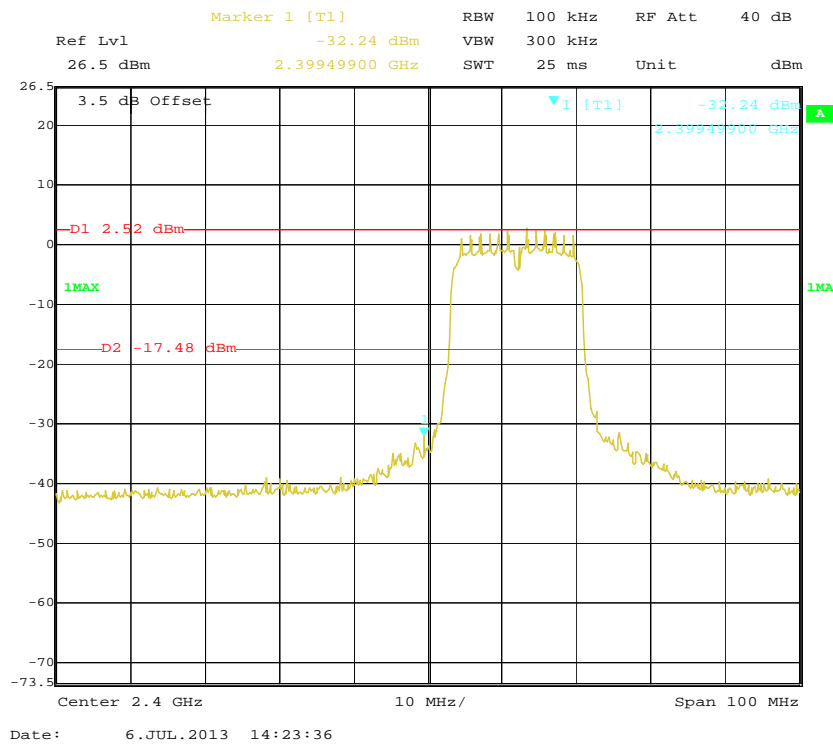
**802.11g: Band Edge, Left Side, Antenna 1**



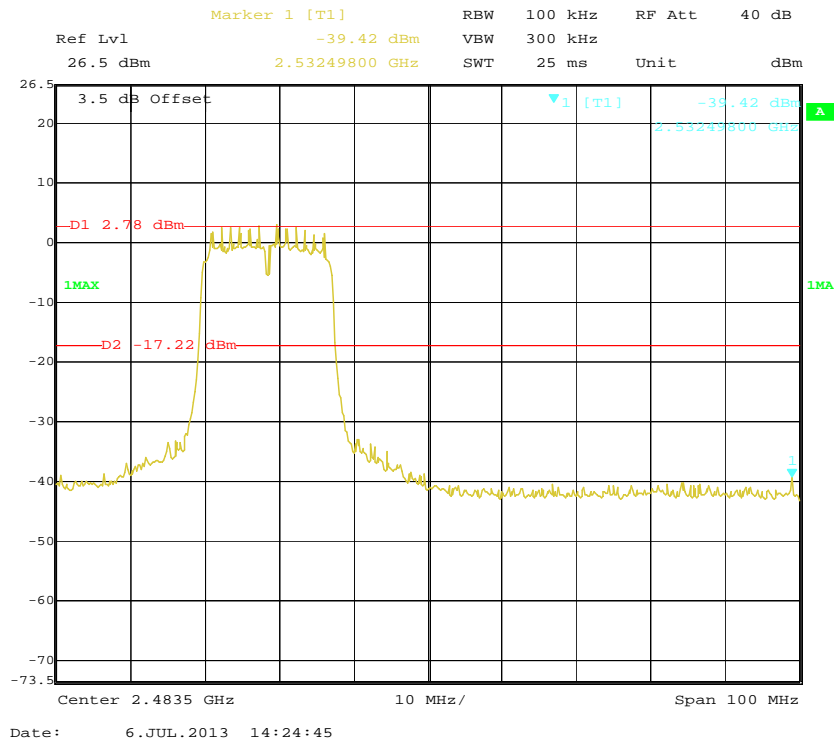
**802.11g: Band Edge, Right Side, Antenna 1**



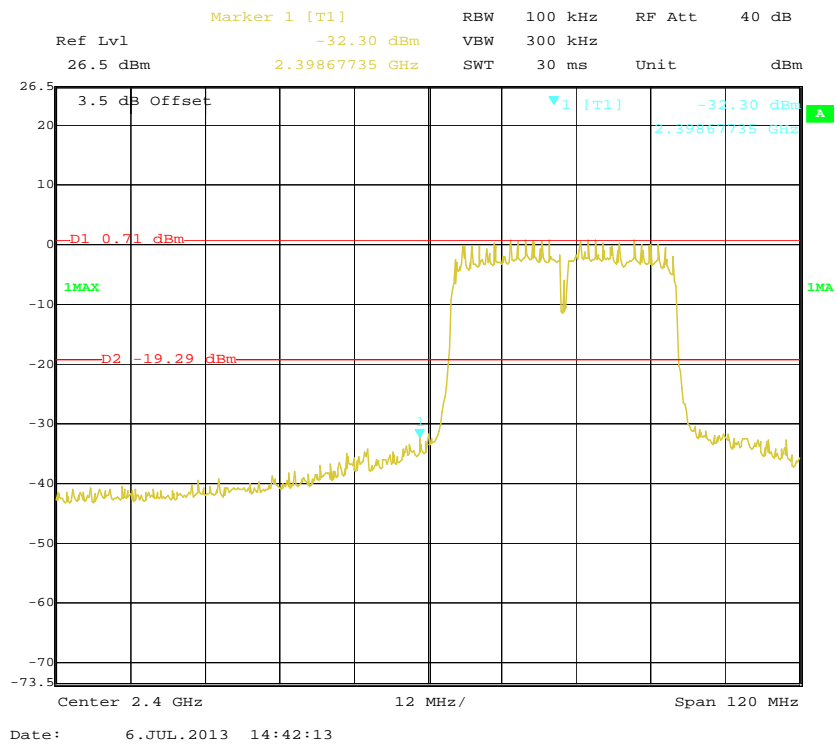
**802.11n-HT20: Band Edge, Left Side, Antenna 1**



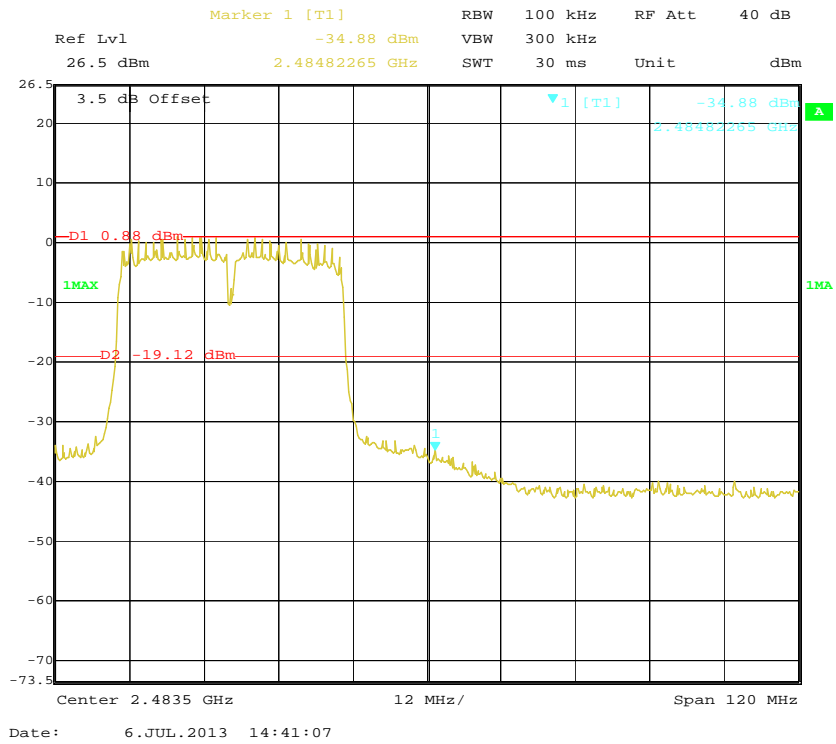
**802.11n-HT20: Band Edge, Right Side, Antenna 1**



**802.11n-HT40: Band Edge, Left Side, Antenna 1**



### 802.11n-HT40: Band Edge, Right Side, Antenna 1



## 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 (KDB558074 D01 DTS Meas Guidance v03r01 sub-clause 10.2)

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW to:  $3\text{kHz} \leq \text{RBW} \leq 100\text{ kHz}$ .
3. Set the VBW  $\geq 3 \times \text{RBW}$ .
4. Set the span to 1.5 times the DTS bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### Test Equipment List and Details

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

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

### Test Data

#### Environmental Conditions

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

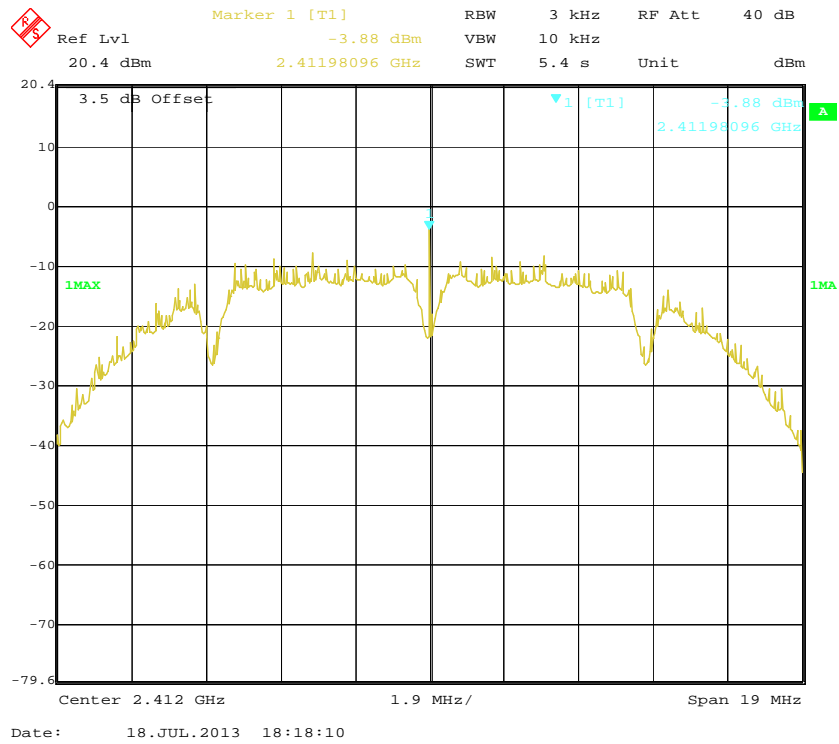
*The testing was performed by Candy Li on 2013-07-18.*

Test Mode: Transmitting

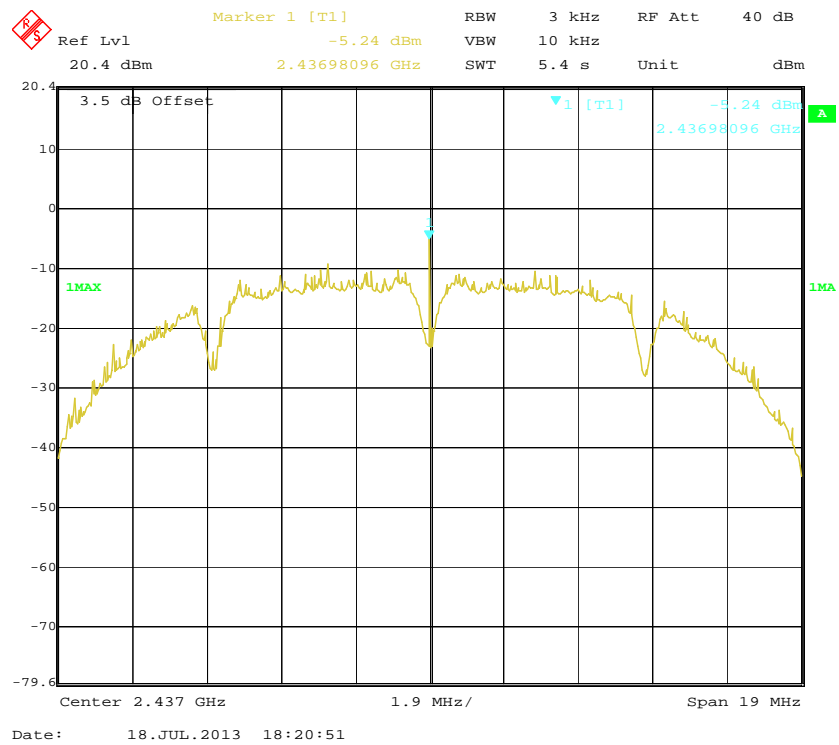
Test Result: Pass

Channel	Frequency (MHz)	PSD(dBm/3kHz)			Limit (dBm/3kHz)
		Antenna 0	Antenna 1	Antenna 0 +Antenna 1	
802.11b mode					
Low	2412	-3.88	-4.55	\	≤8
Middle	2437	-5.24	-5.33	\	≤8
High	2462	-4.34	-4.69	\	≤8
802.11g mode					
Low	2412	-5.67	-5.91	\	≤8
Middle	2437	-6.18	-6.34	\	≤8
High	2462	-5.34	-5.23	\	≤8
802.11n-HT20 mode					
Low	2412	-5.61	-6.01	-2.80	≤8
Middle	2437	-5.92	-6.15	-3.02	≤8
High	2462	-5.56	-5.47	-2.50	≤8
802.11n-HT40 mode					
Low	2422	-5.04	-5.42	-2.22	≤8
Middle	2437	-6.16	-6.09	-3.11	≤8
High	2452	-4.65	-4.60	-1.61	≤8

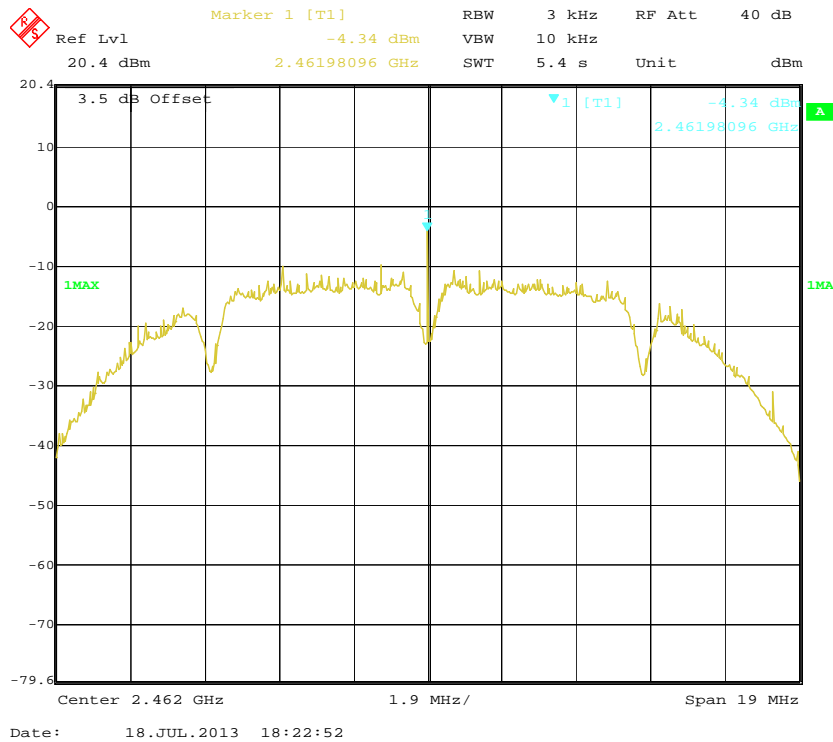
### Power Spectral Density, 802.11b Low Channel, Antenna 0



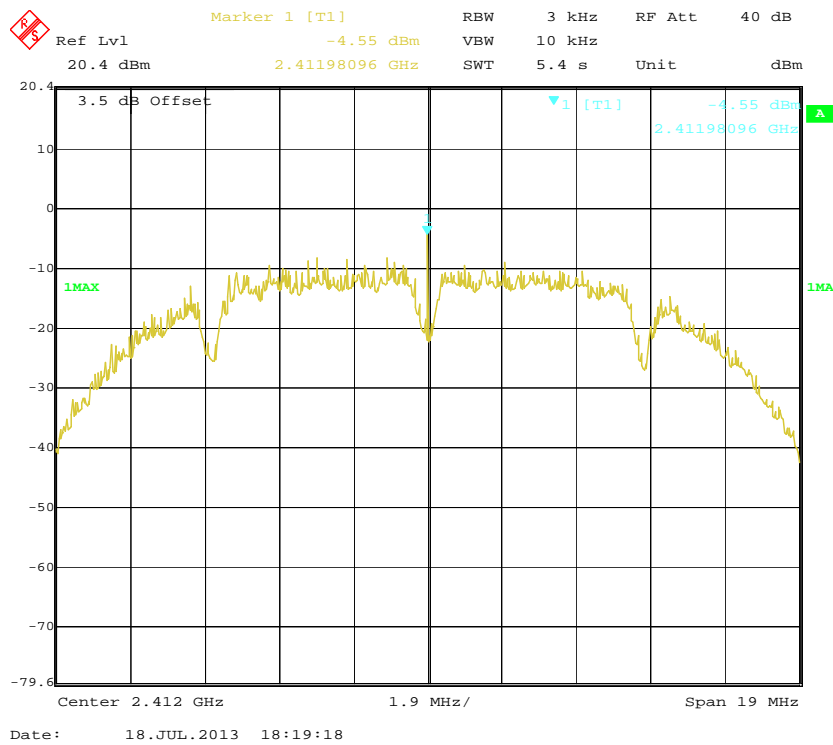
### Power Spectral Density, 802.11b Middle Channel, Antenna 0



### Power Spectral Density, 802.11b High Channel, Antenna 0

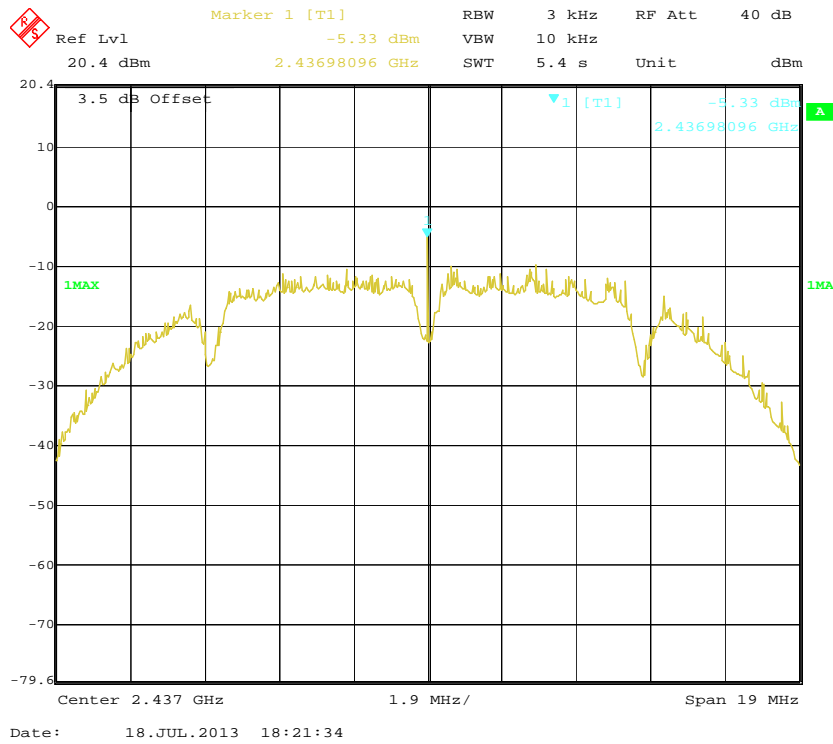


### Power Spectral Density, 802.11b Low Channel, Antenna 1

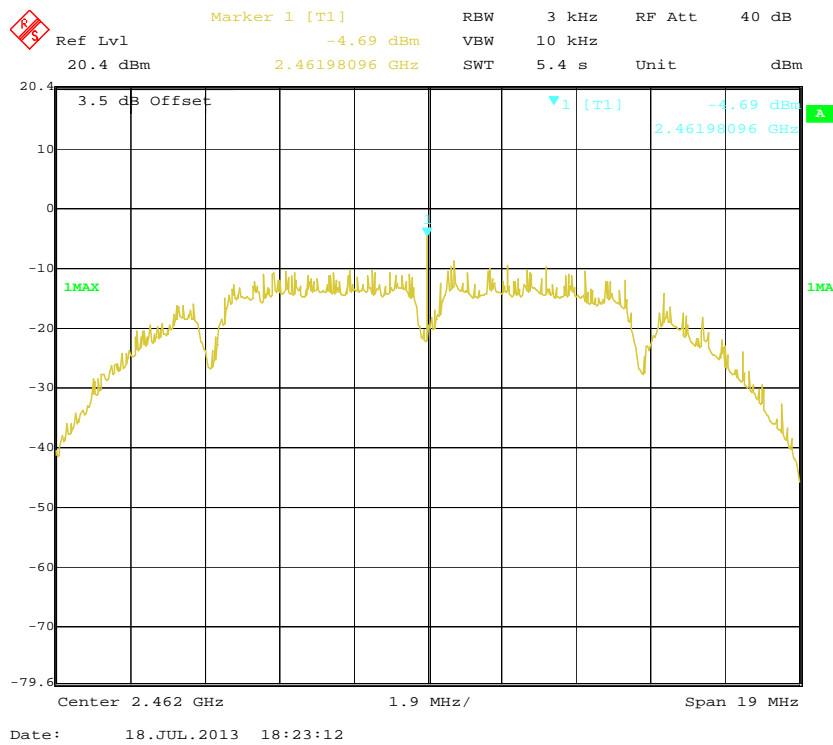




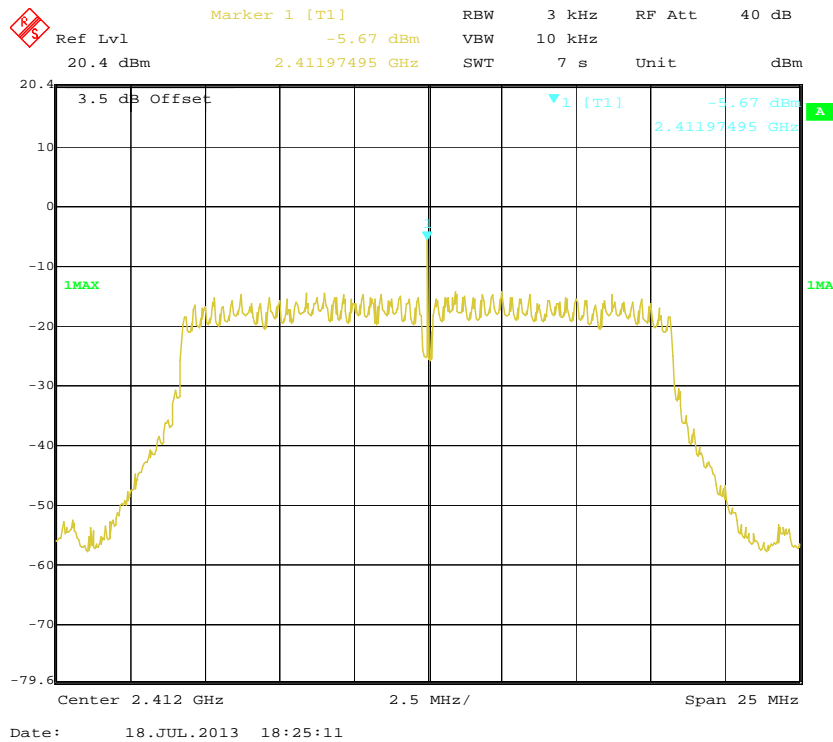
**Power Spectral Density, 802.11b Middle Channel, Antenna 1**



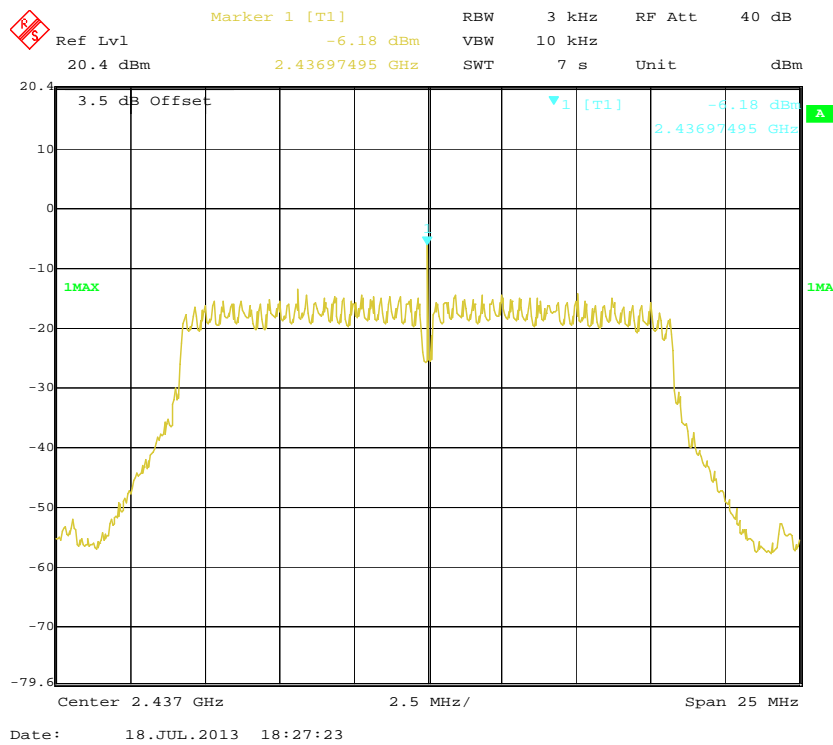
**Power Spectral Density, 802.11b High Channel, Antenna 1**



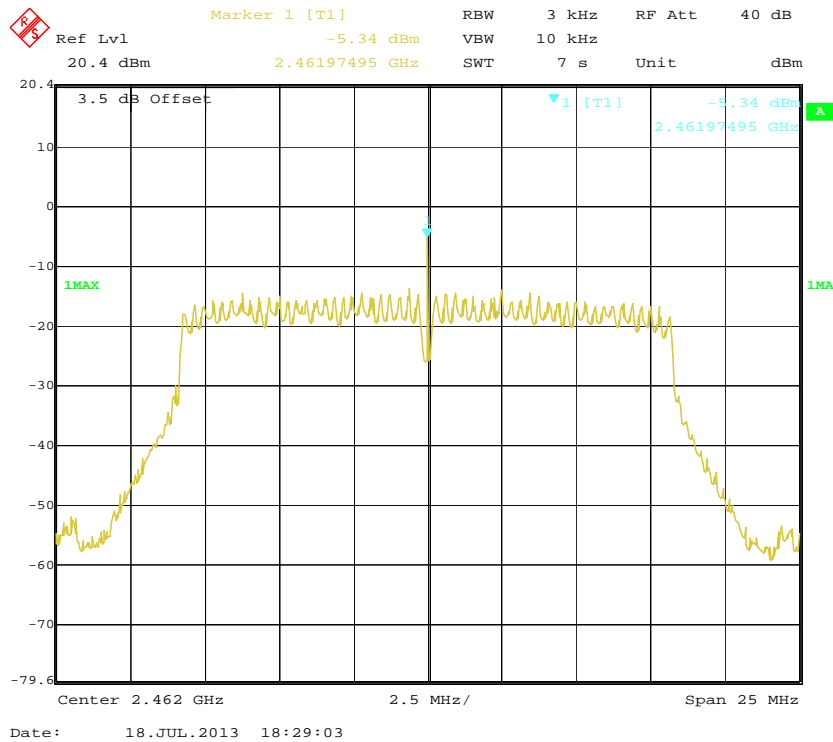
### Power Spectral Density, 802.11g Low Channel, Antenna 0



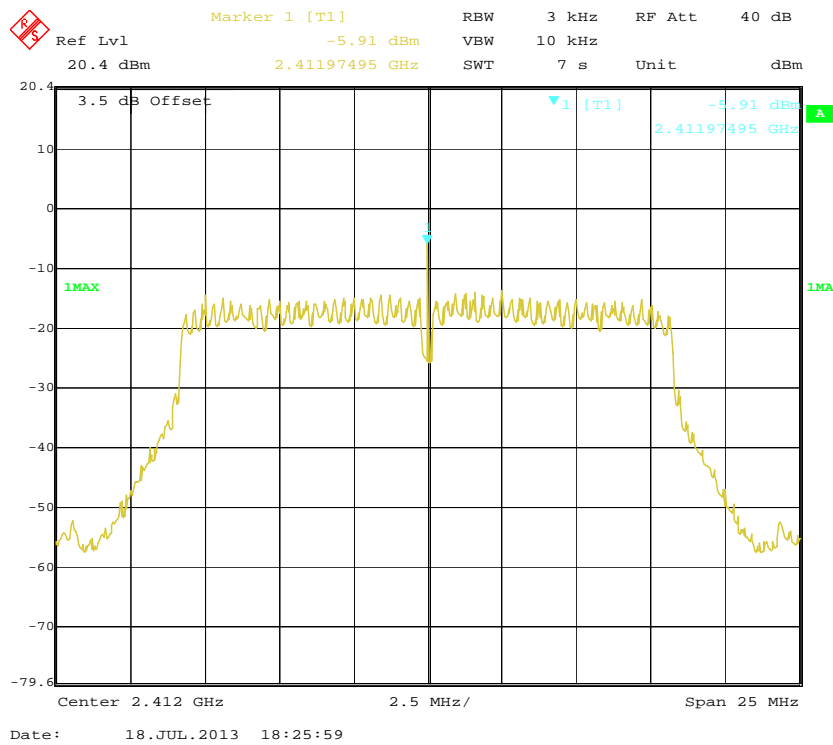
### Power Spectral Density, 802.11g Middle Channel, Antenna 0



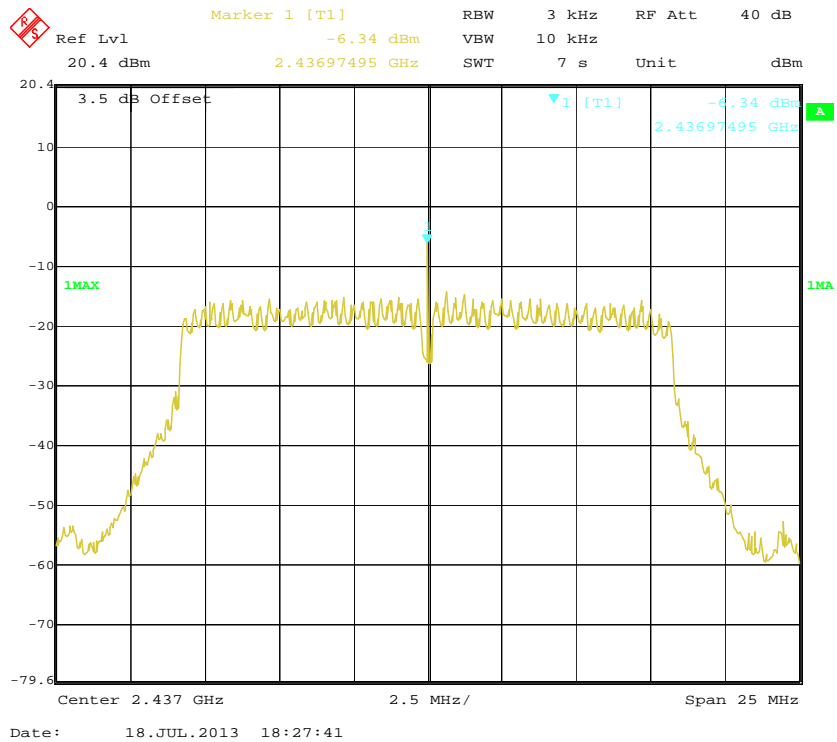
### Power Spectral Density, 802.11g High Channel, Antenna 0



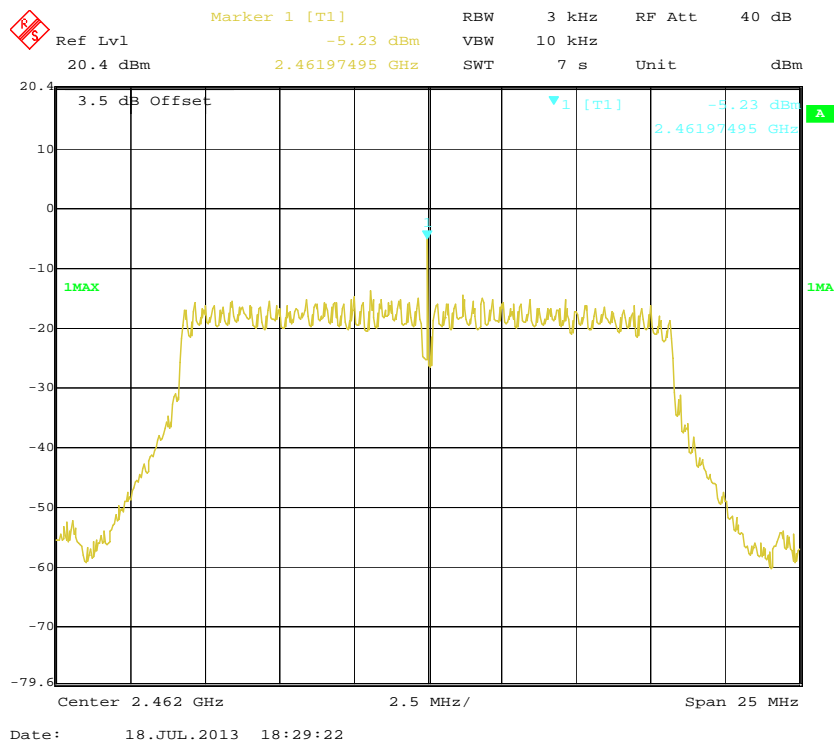
### Power Spectral Density, 802.11g Low Channel, Antenna 1



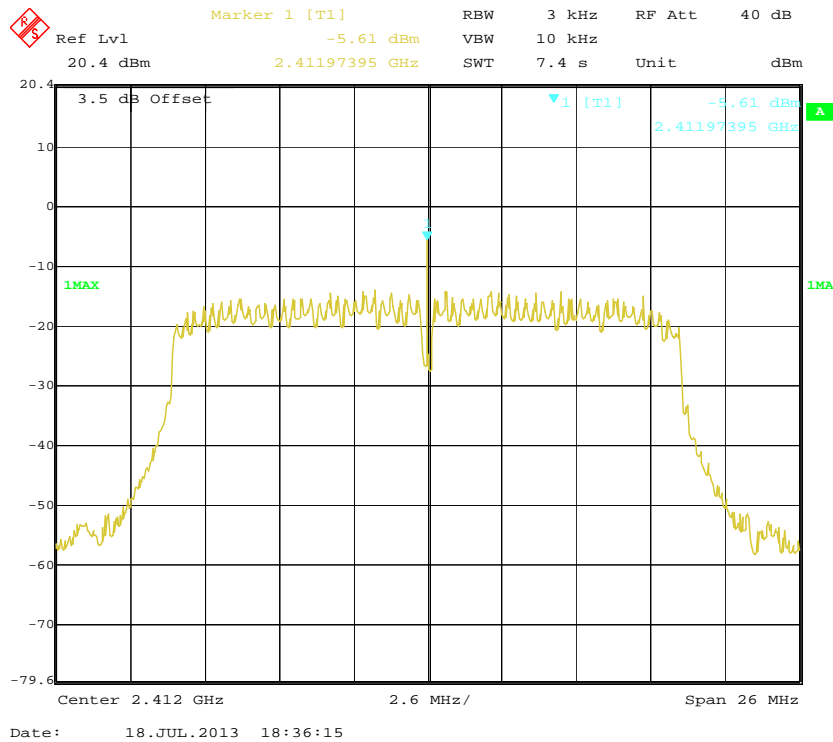
### Power Spectral Density, 802.11g Middle Channel, Antenna 1



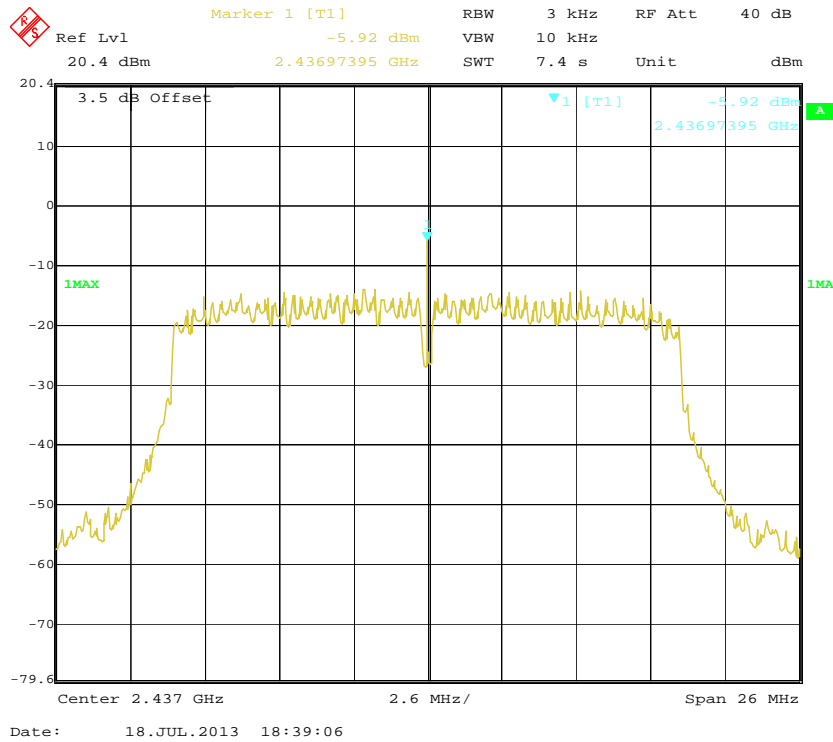
### Power Spectral Density, 802.11g High Channel, Antenna 1



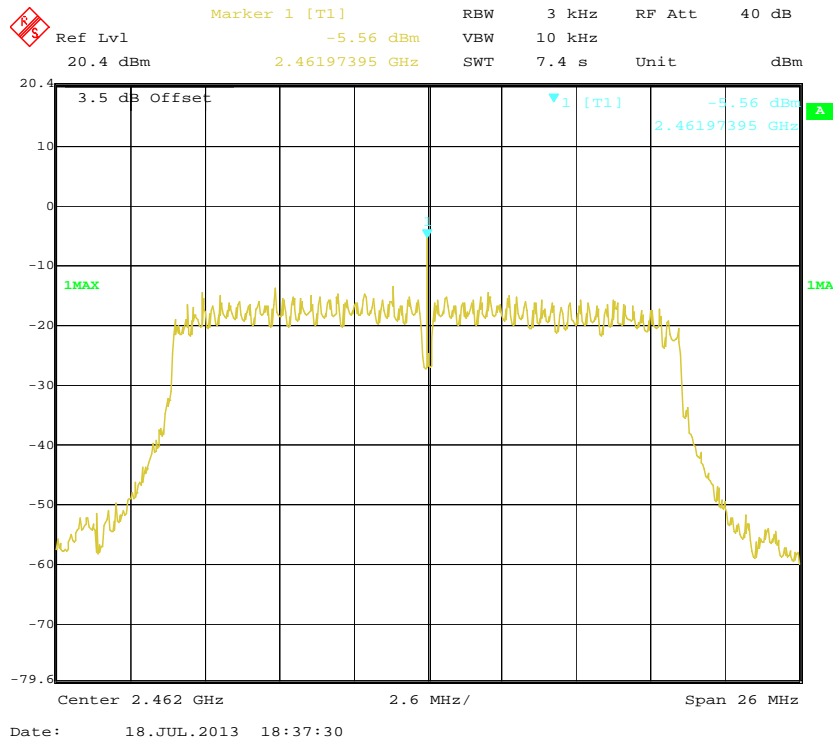
### Power Spectral Density, 802.11n-HT20 Low Channel, Antenna 0



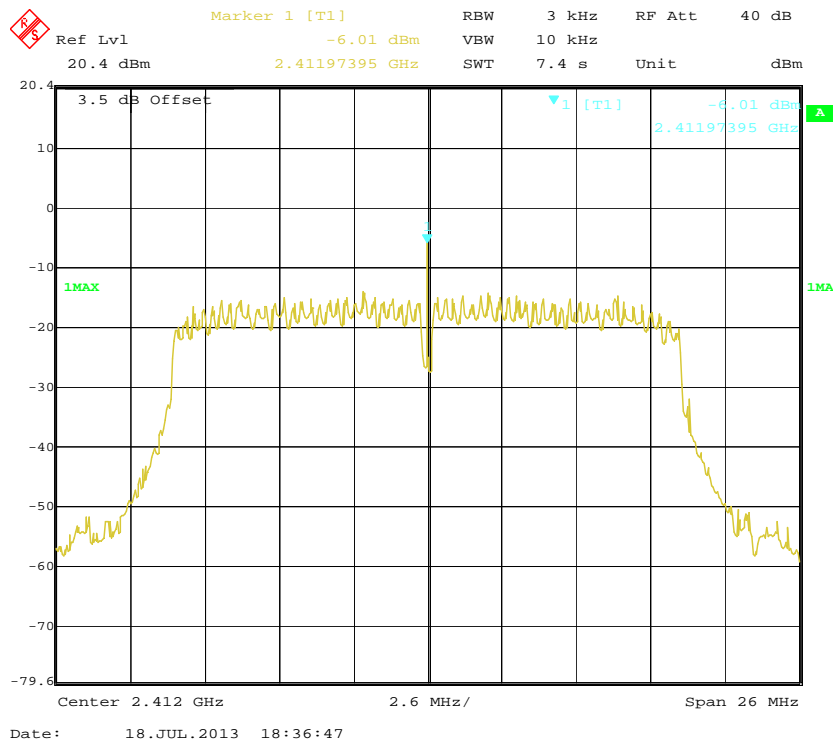
### Power Spectral Density, 802.11n-HT20 Middle Channel, Antenna 0



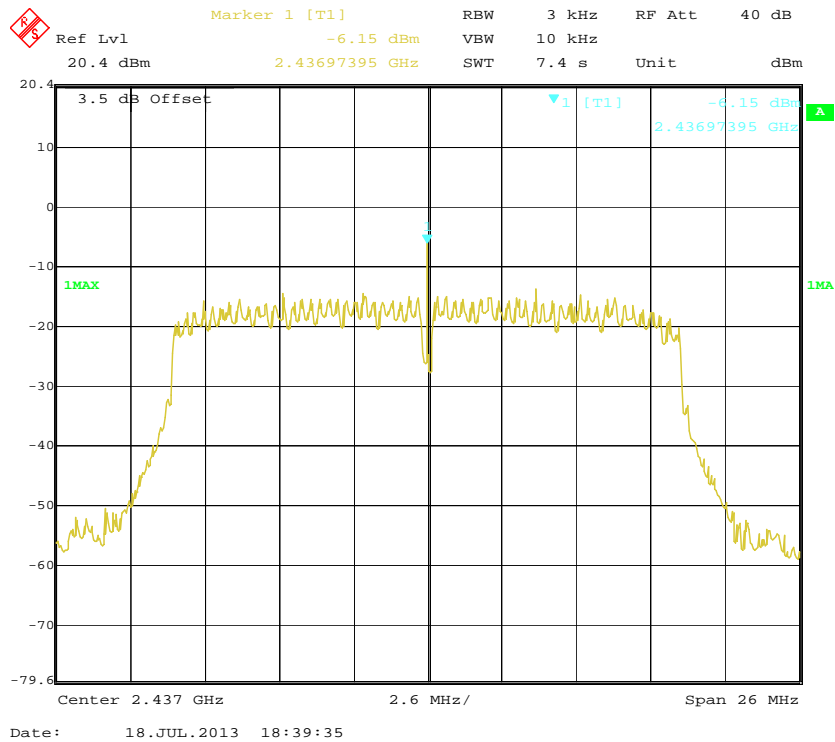
### Power Spectral Density, 802.11n-HT20 High Channel, Antenna 0



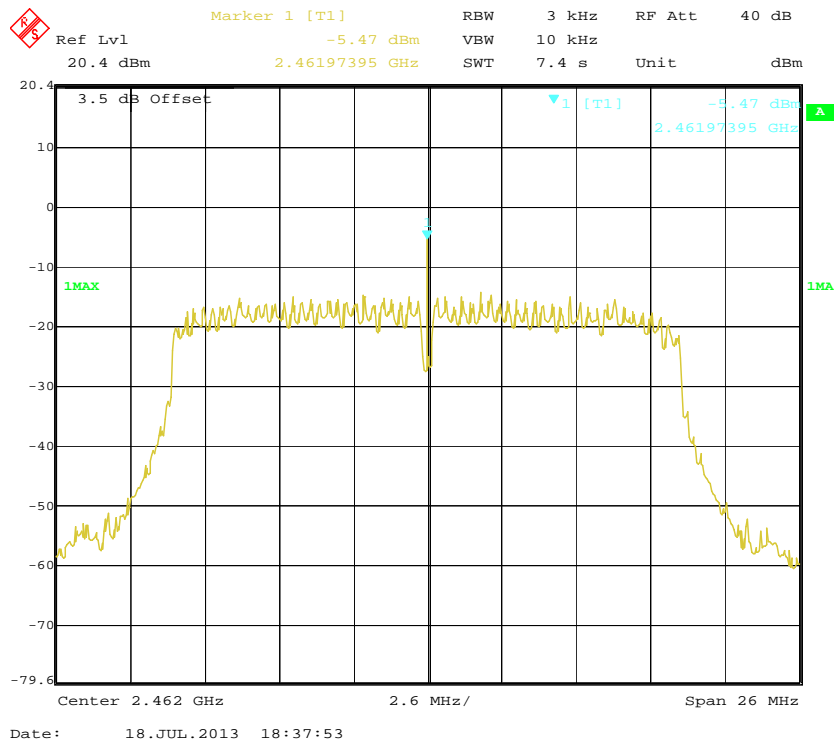
### Power Spectral Density, 802.11n-HT20 Low Channel, Antenna 1



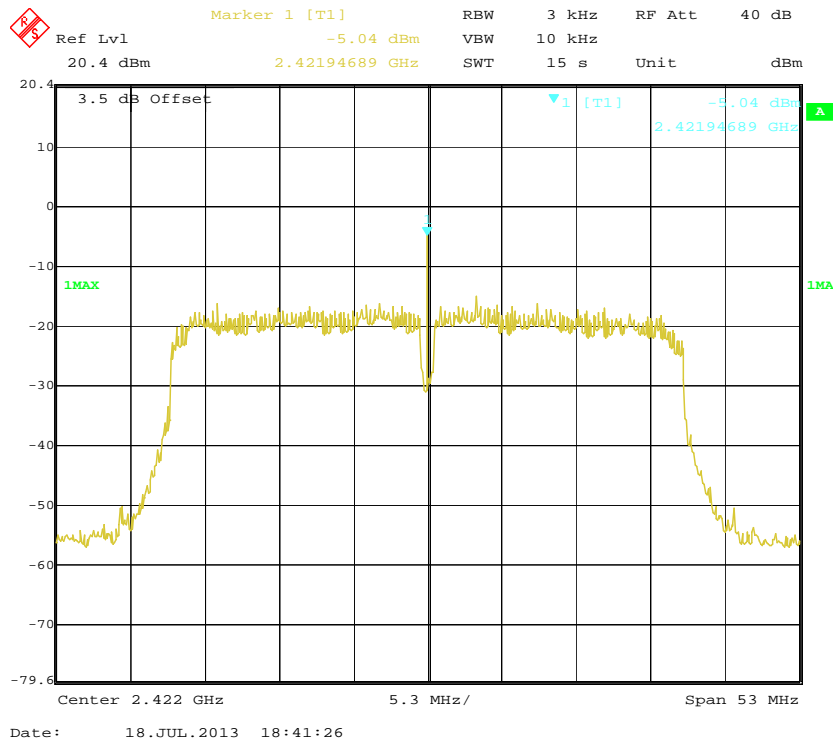
### Power Spectral Density, 802.11n-HT20 Middle Channel, Antenna 1



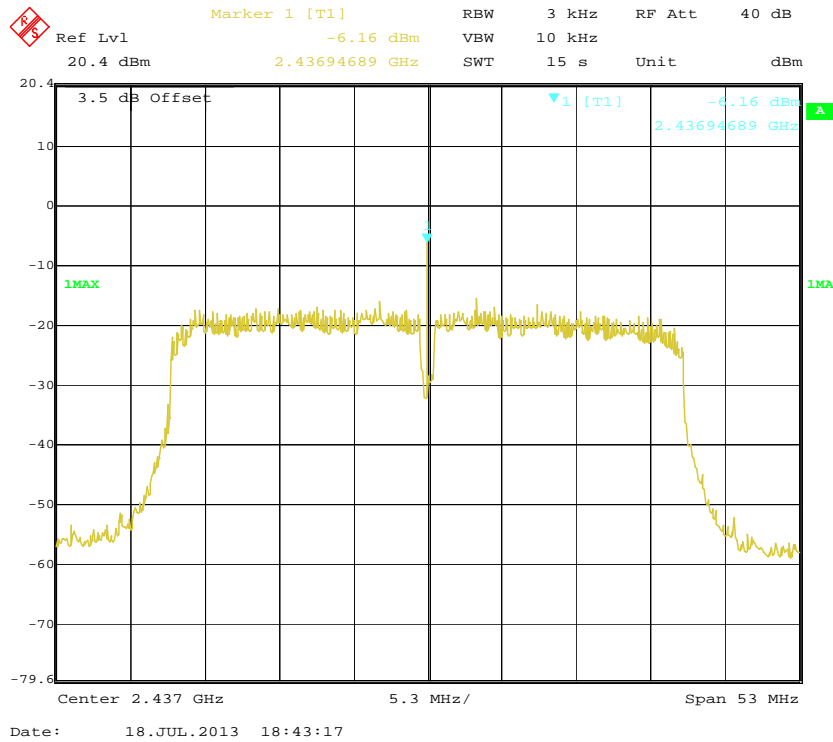
### Power Spectral Density, 802.11n-HT20 High Channel, Antenna 1



**Power Spectral Density, 802.11n-HT40 Low Channel, Antenna 0**

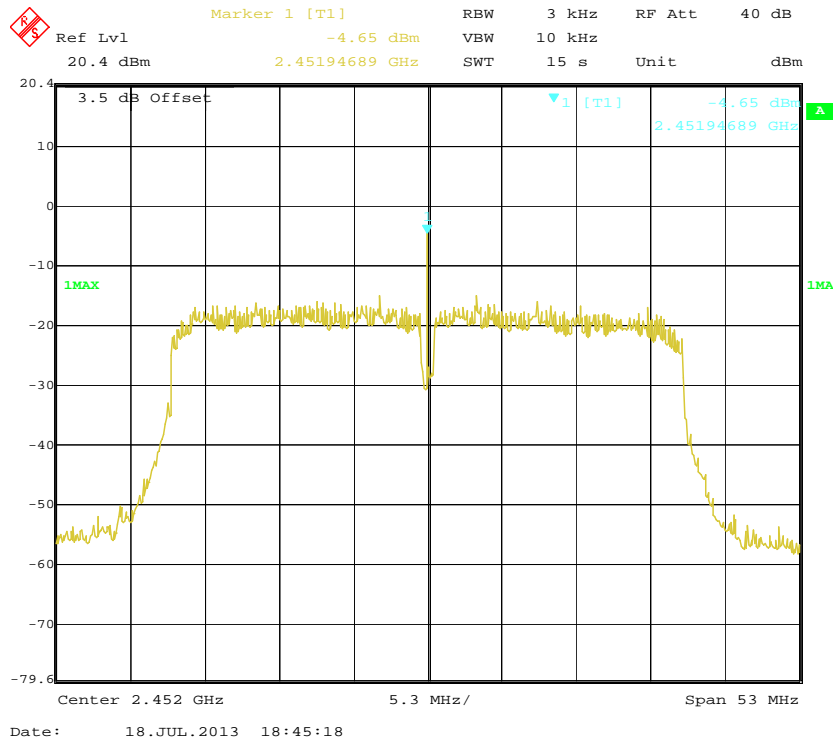


**Power Spectral Density, 802.11n-HT40 Middle Channel, Antenna 0**

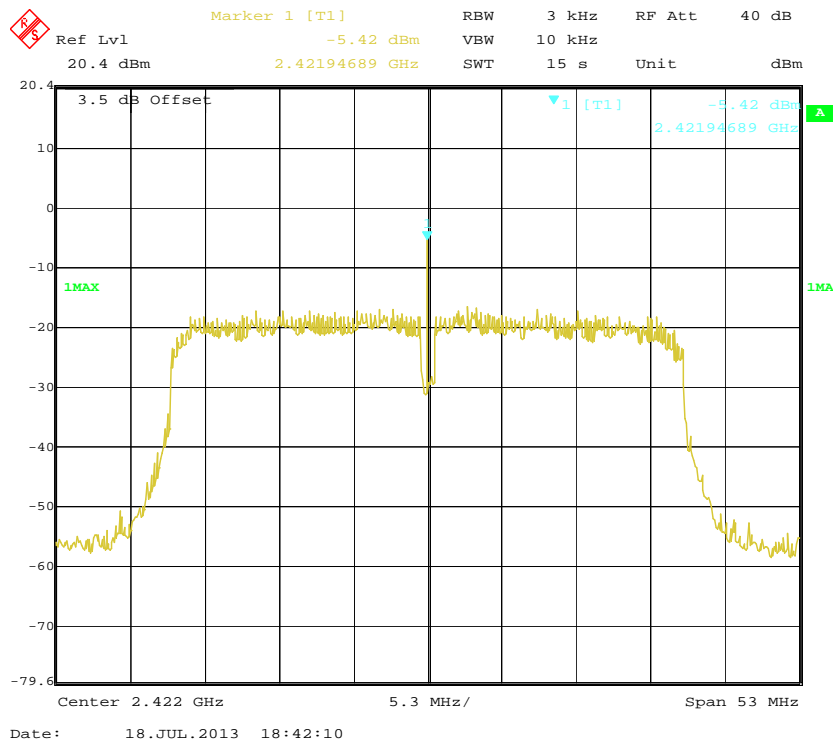




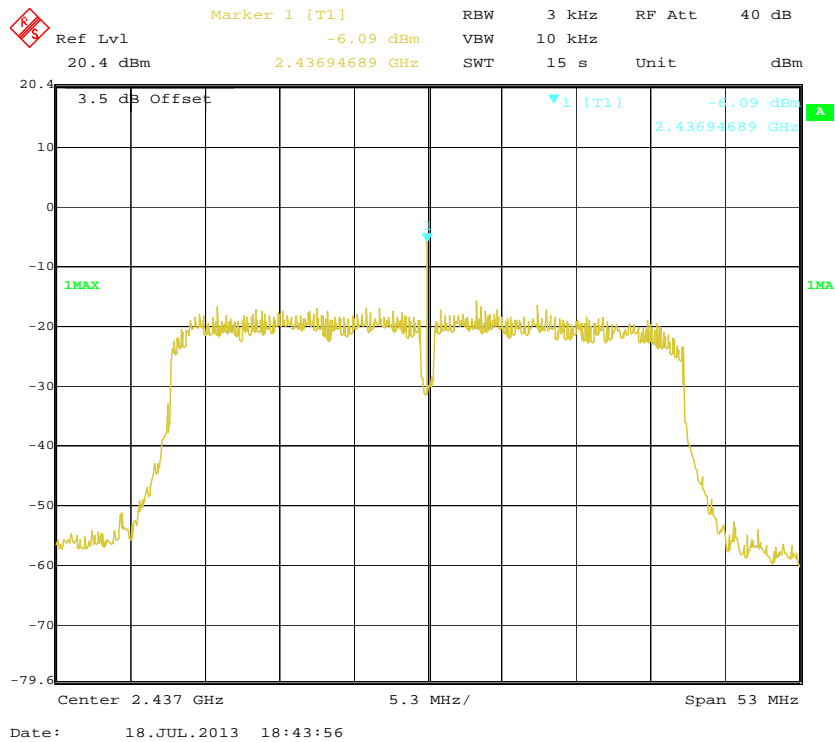
**Power Spectral Density, 802.11n-HT40 High Channel, Antenna 0**



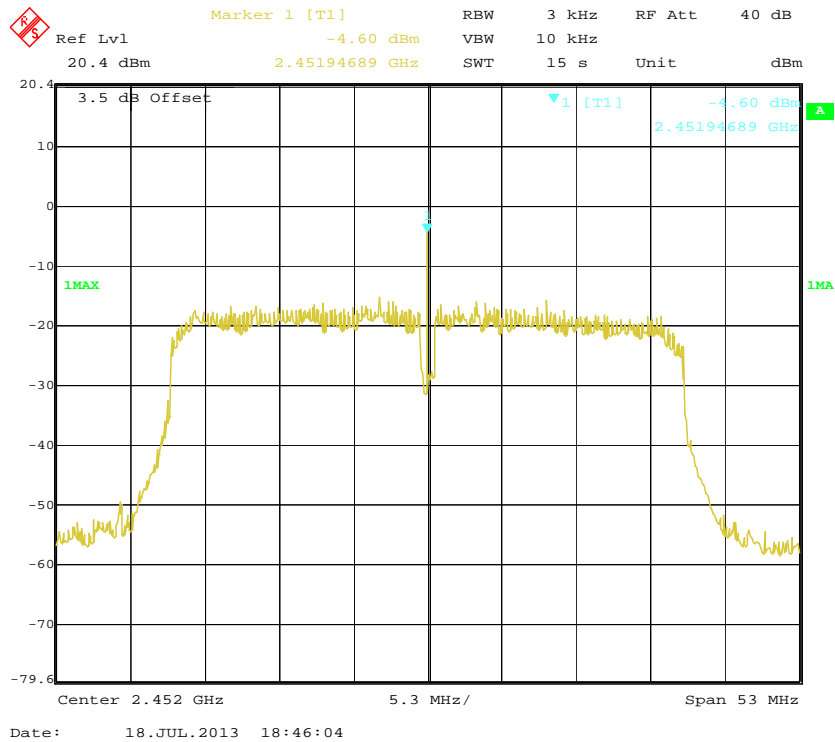
**Power Spectral Density, 802.11n-HT40 Low Channel, Antenna 1**



**Power Spectral Density, 802.11n-HT40 Middle Channel, Antenna 1**



**Power Spectral Density, 802.11n-HT40 High Channel, Antenna 1**



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