

FCC PART 15.247

TEST REPORT

For

**SHUOYING INDUSTRIAL(SHENZHEN)CO.,LTD.**

NO.1 Shuoying Rd., Hebei Industry Area, Dalang, Longhua Town, Baoan, Shenzhen, China

**FCC ID: XJN-PA0906X**

|                                                                                                                                                                                                                                                                                 |                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>Report Type:</b><br>Original Report                                                                                                                                                                                                                                          | <b>Product Type:</b><br>Mobile Internet Devices |
| <b>Test Engineer:</b> Ares Liu <i>Ares Liu</i>                                                                                                                                                                                                                                  |                                                 |
| <b>Report Number:</b> R2DG130628021-00A                                                                                                                                                                                                                                         |                                                 |
| <b>Report Date:</b> 2013-08-07                                                                                                                                                                                                                                                  |                                                 |
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## GENERAL INFORMATION

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

The *SHUOYING INDUSTRIAL(SHENZHEN)CO.,LTD.*'s product, model number: *PA0906 (FCC ID: XJN-PA0906X)* (the "EUT") in this report was a *Mobile Internet Devices*, which was measured approximately: 24.0 cm (L) x 14.7 cm (W) x 1.0 cm (H), rated input voltage: DC 3.7 V from lithium battery or DC 5V from adapter.

Adapter information: TEKA  
Model: TEKA018-0502500UK  
Input: AC 100-240V, 50/60Hz, 0.5A max  
Output: DC 5V, 2.5A

*\* All measurement and test data in this report was gathered from production sample serial number: 130628021 (Assigned by BACL.Dongguan). The EUT was received on 2013-07-01.*

### Objective

This report is prepared on behalf of *SHUOYING INDUSTRIAL(SHENZHEN)CO.,LTD.* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communications Commission 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: *XJN-PA0906X*

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

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

**Test Facility**

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

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal 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 testing mode, which was provided by manufacturer. For 2.4G band, 11 channels are provided to testing:

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

For 802.11b, 802.11g, and 802.11n20 modes were tested with Channel 1, 6 and 11.  
For 802.11n40 mode were tested with Channel 3, 6 and 9.

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

### EUT Exercise Software

“Cmd.exe” was used in the test, which the commands were provided by the manufacturer.

### Equipment Modifications

No modification was made to the EUT tested.

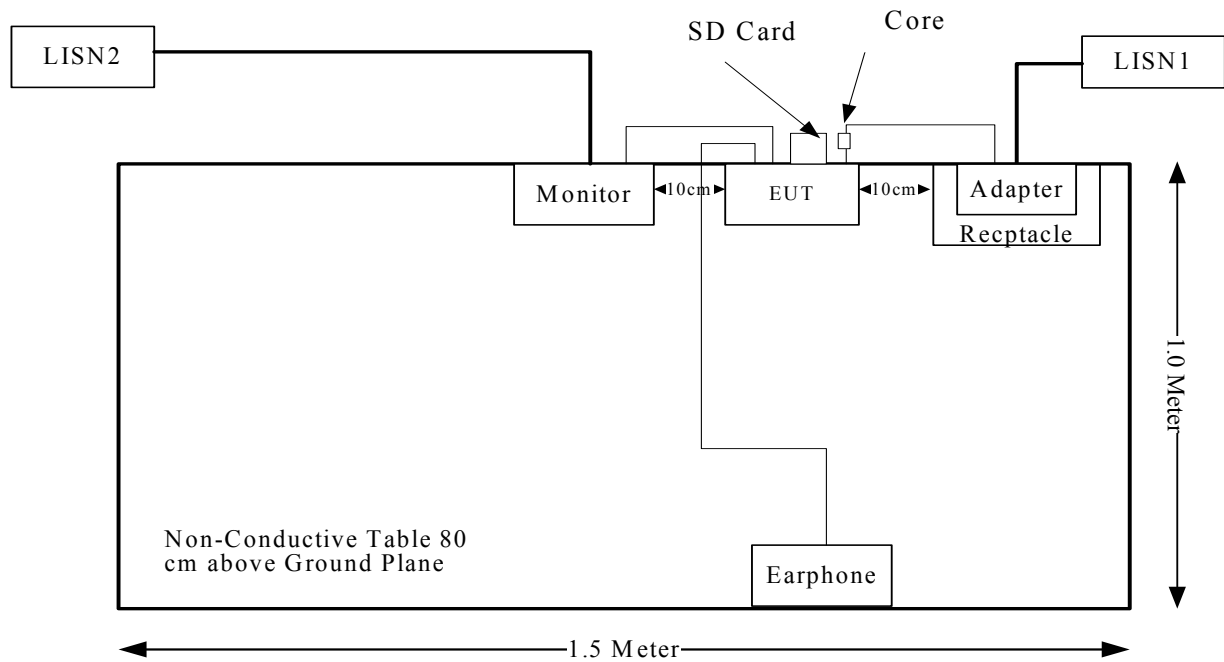
### Support Equipment List and Details

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

### External Cable

| Cable Description              | Length (m) | From Port   | To  |
|--------------------------------|------------|-------------|-----|
| Shielded Detachable HDMI Cable | 1.5        | LCD Monitor | EUT |

## 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.

According to KDB 447498 D01 Mobile Portable RF Exposure V05 Appendix A, SAR can be exempted if the output power is less than the SAR exclusion threshold:

For  $f=2450\text{MHz}$ , the output power is less 10mW at distance of 5mm.

### **Measurement Result**

Peak conducted output power= 9.61 dBm

Antenna gain =1 dBi

SAR exclusion threshold 10 mW (10dBm) > 9.61 dBm

**So the SAR evaluation is not necessary.**

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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 permanently attached to the EUT, 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:

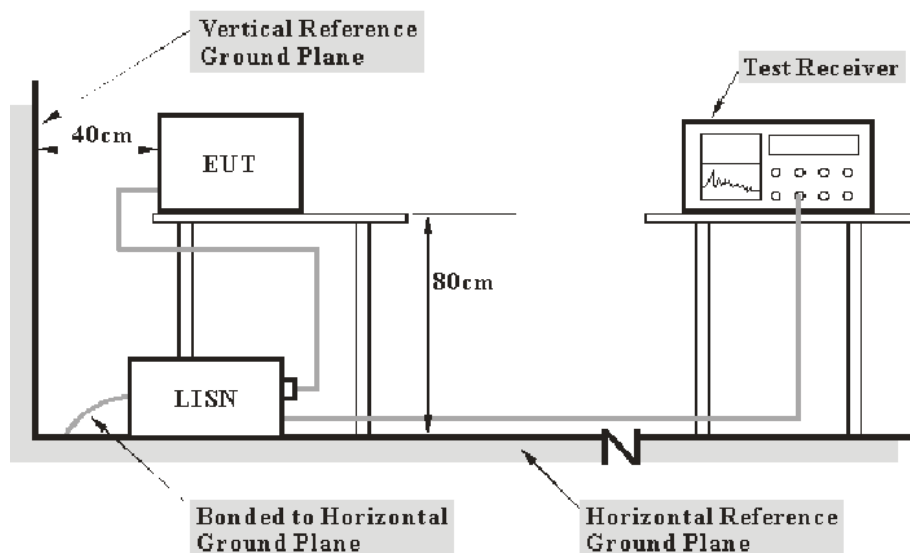
- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cisp})$ , exceeds the disturbance limit.

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

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

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

### Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

$V_C$  (cord. Reading): corrected voltage amplitude

$V_R$ : reading voltage amplitude

$A_C$ : attenuation caused by cable loss

VDF: voltage division factor of AMN

$C_f$ : Correction Factor

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

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

**Test Equipment List and Details**

| Manufacturer | Description       | Model    | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------|----------|---------------|------------------|----------------------|
| R&S          | EMI TEST RECIEVER | ESCS 30  | 830245/006    | 2013-1-10        | 2014-1-9             |
| R&S          | L.I.S.N           | ESH3-Z5  | 843331/015    | 2012-9-17        | 2013-9-16            |
| R&S          | L.I.S.N           | ESH3-Z5  | 100113        | 2012-11-29       | 2013-11-28           |
| BACL         | Test Software     | BACL-EMC | V1.0-2010     | N/A              | N/A                  |

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

**Test Results Summary**

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

**10.16 dB at 0.170 MHz** in the **Line** conducted mode

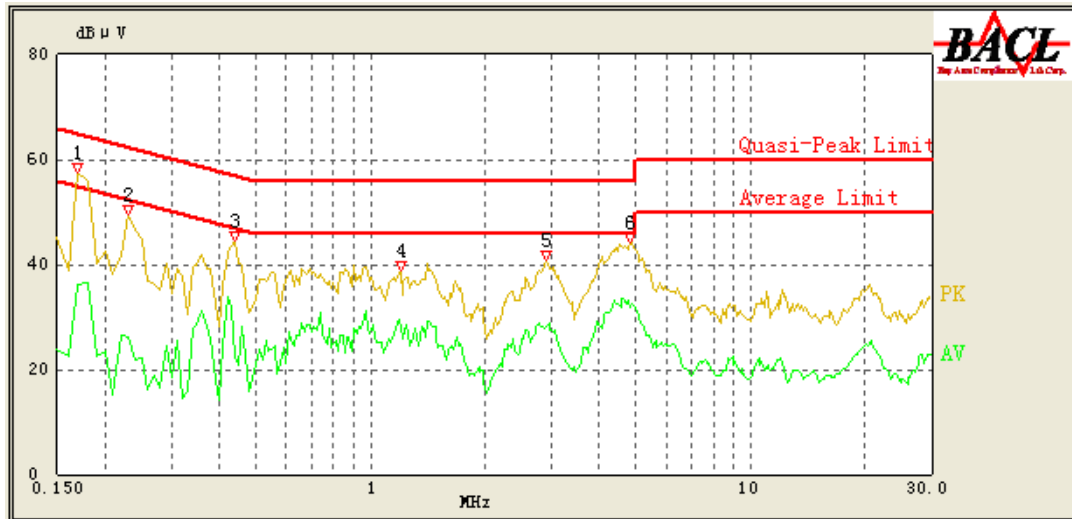
**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 27.6 °C   |
| <b>Relative Humidity:</b> | 57 %      |
| <b>ATM Pressure:</b>      | 100.1 kPa |

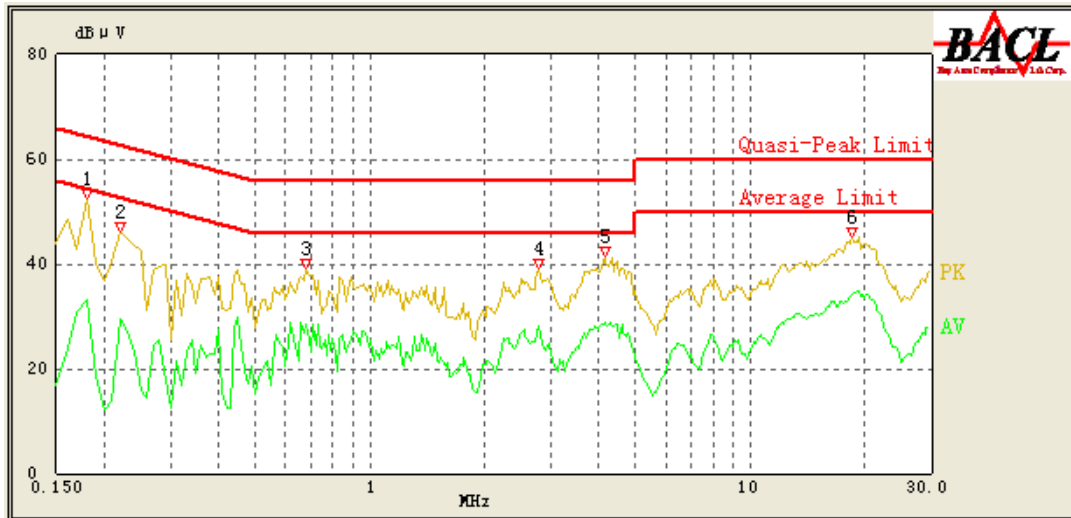
*The testing was performed by Ares Liu on 2013-08-05.*

Test Mode: Transmitting

120 V, 60 Hz, Line:



| Frequency (MHz) | Cord. Reading (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/AV/QP) |
|-----------------|----------------------|------------------------|--------------|-------------|---------------------|
| 0.170           | 54.80                | 0.45                   | 64.96        | 10.16       | QP                  |
| 0.170           | 36.31                | 0.45                   | 54.96        | 18.65       | AV                  |
| 0.230           | 43.44                | 0.40                   | 62.45        | 19.01       | QP                  |
| 0.230           | 26.20                | 0.40                   | 52.45        | 26.25       | AV                  |
| 0.440           | 40.86                | 0.32                   | 57.06        | 16.20       | QP                  |
| 0.440           | 22.47                | 0.32                   | 47.06        | 24.59       | AV                  |
| 1.200           | 33.74                | 0.33                   | 56.00        | 22.26       | QP                  |
| 1.190           | 29.42                | 0.33                   | 46.00        | 16.58       | AV                  |
| 2.910           | 32.31                | 0.39                   | 56.00        | 23.69       | QP                  |
| 2.880           | 27.94                | 0.39                   | 46.00        | 18.06       | AV                  |
| 4.800           | 37.66                | 0.46                   | 56.00        | 18.34       | QP                  |
| 4.790           | 33.17                | 0.46                   | 46.00        | 12.83       | AV                  |

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

| Frequency (MHz) | Cord. Reading (dBμV) | Correction Factor (dB) | Limit (dBμV) | Margin (dB) | Detector (PK/AV/QP) |
|-----------------|----------------------|------------------------|--------------|-------------|---------------------|
| 0.180           | 51.39                | 0.25                   | 64.49        | 13.10       | QP                  |
| 0.180           | 33.19                | 0.25                   | 54.49        | 21.30       | AV                  |
| 0.220           | 44.84                | 0.25                   | 62.82        | 17.98       | QP                  |
| 0.220           | 29.58                | 0.25                   | 52.82        | 23.24       | AV                  |
| 0.680           | 33.95                | 0.22                   | 56.00        | 22.05       | QP                  |
| 0.680           | 28.49                | 0.22                   | 46.00        | 17.51       | AV                  |
| 2.780           | 32.94                | 0.30                   | 56.00        | 23.06       | QP                  |
| 2.780           | 28.27                | 0.30                   | 46.00        | 17.73       | AV                  |
| 4.160           | 34.63                | 0.36                   | 56.00        | 21.37       | QP                  |
| 4.140           | 28.83                | 0.36                   | 46.00        | 17.17       | AV                  |
| 18.480          | 38.09                | 1.37                   | 60.00        | 21.91       | QP                  |
| 18.610          | 34.15                | 1.38                   | 50.00        | 15.85       | AV                  |

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

### Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

### Measurement Uncertainty

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

If  $U_{lab}$  is less than or equal to  $U_{cisp}$  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

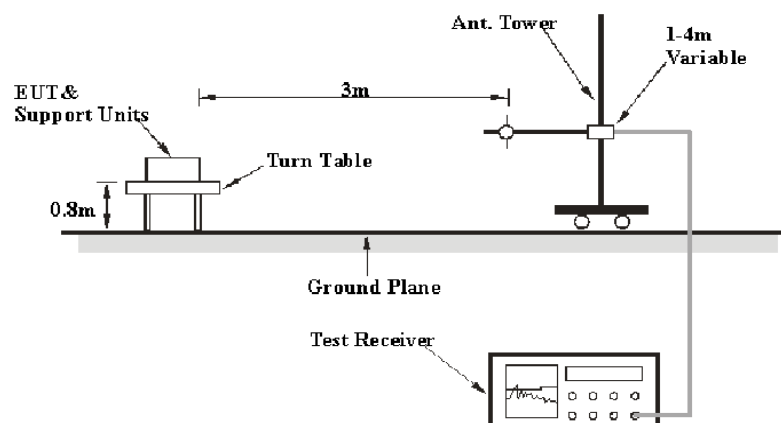
6G~18GHz: 5.23 dB

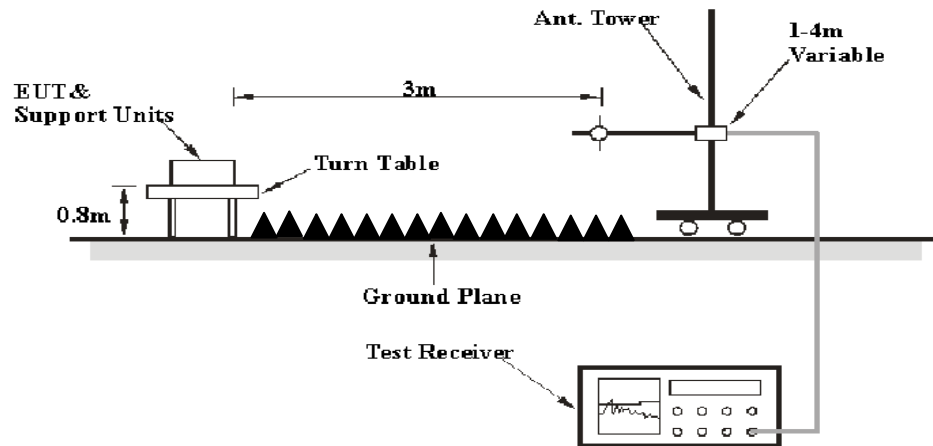
Table 2 – Values of  $U_{cisp}$

| 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**

For the radiated emissions test, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

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

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

## Corrected Amplitude & Margin Calculation

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

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

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     | 2012-9-6         | 2015-9-5             |
| HP             | HP AMPLIFIER      | 8447E      | 2434A02181    | N/A              | N/A                  |
| R&S            | Spectrum analyzer | FSEM 30    | 849016/001    | 2012-9-4         | 2013-9-3             |
| ETS LINDGREN   | horn antenna      | 3115       | 000 527 35    | 2012-9-6         | 2015-9-5             |
| Mini-Circuit   | Amplifier         | ZVA-213-S+ | 54201245      | N/A              | N/A                  |
| R&S            | Spectrum analyzer | FSP 38     | 100478        | 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 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:

**3.27 dB at 34.85 MHz in the Vertical polarization for 802.11b Mode**

## Test Data

### Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 26.7 °C  |
| Relative Humidity: | 61 %     |
| ATM Pressure:      | 99.8 kPa |

*The testing was performed by Ares Liu on 2013-07-01.*

Mode: Transmitting  
802.11b Mode

| Frequency<br>(MHz)       | Receiver          |                        | Rx Antenna     |                | Cable<br>loss<br>(dB) | Amplifier<br>Gain<br>(dB) | Corrected<br>Amplitude<br>(dBμV/m) | FCC 15.247        |                |
|--------------------------|-------------------|------------------------|----------------|----------------|-----------------------|---------------------------|------------------------------------|-------------------|----------------|
|                          | Reading<br>(dBμV) | Detector<br>(PK/QP/AV) | Polar<br>(H/V) | Factor<br>(dB) |                       |                           |                                    | Limit<br>(dBμV/m) | Margin<br>(dB) |
| Low Channel: 2412 MHz    |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2412                     | 69.09             | PK                     | H              | 25.67          | 3.93                  | 0.00                      | 98.69                              | N/A               | N/A            |
| 2412                     | 64.71             | AV                     | H              | 25.67          | 3.93                  | 0.00                      | 94.31                              | N/A               | N/A            |
| 2412                     | 73.26             | PK                     | V              | 25.67          | 3.93                  | 0.00                      | 102.86                             | N/A               | N/A            |
| 2412                     | 68.79             | AV                     | V              | 25.67          | 3.93                  | 0.00                      | 98.39                              | N/A               | N/A            |
| 2390                     | 28.15             | PK                     | V              | 25.61          | 3.84                  | 0.00                      | 57.60                              | 74.00             | 16.40          |
| 2390                     | 14.31             | AV                     | V              | 25.61          | 3.84                  | 0.00                      | 43.76                              | 54.00             | 10.24          |
| 4824                     | 41.96             | PK                     | V              | 30.64          | 4.73                  | 27.26                     | 50.07                              | 74.00             | 23.93          |
| 4824                     | 37.92             | AV                     | V              | 30.64          | 4.73                  | 27.26                     | 46.03                              | 54.00             | 7.97           |
| 7236                     | 31.14             | PK                     | V              | 34.17          | 6.56                  | 26.36                     | 45.51                              | 74.00             | 28.49          |
| 7236                     | 18.57             | AV                     | V              | 34.17          | 6.56                  | 26.36                     | 32.94                              | 54.00             | 21.06          |
| 9648                     | 33.28             | PK                     | V              | 36.06          | 8.70                  | 26.06                     | 51.98                              | 74.00             | 22.02          |
| 9648                     | 19.81             | AV                     | V              | 36.06          | 8.70                  | 26.06                     | 38.51                              | 54.00             | 15.49          |
| 3265                     | 34.45             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 40.14                              | 74.00             | 33.86          |
| 3265                     | 20.98             | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 26.67                              | 54.00             | 27.33          |
| 34.85                    | 38.9              | QP                     | V              | 18.46          | 0.79                  | 21.42                     | 36.73                              | 40.00             | 3.27*          |
| Middle Channel: 2437 MHz |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2437                     | 69.25             | PK                     | H              | 25.74          | 3.98                  | 0.00                      | 98.97                              | N/A               | N/A            |
| 2437                     | 64.6              | AV                     | H              | 25.74          | 3.98                  | 0.00                      | 94.32                              | N/A               | N/A            |
| 2437                     | 73.3              | PK                     | V              | 25.74          | 3.98                  | 0.00                      | 103.02                             | N/A               | N/A            |
| 2437                     | 68.85             | AV                     | V              | 25.74          | 3.98                  | 0.00                      | 98.57                              | N/A               | N/A            |
| 4874                     | 42.02             | PK                     | V              | 30.77          | 4.76                  | 27.26                     | 50.29                              | 74.00             | 23.71          |
| 4874                     | 38.05             | AV                     | V              | 30.77          | 4.76                  | 27.26                     | 46.32                              | 54.00             | 7.68           |
| 7311                     | 31.19             | PK                     | V              | 34.35          | 6.70                  | 26.51                     | 45.73                              | 74.00             | 28.27          |
| 7311                     | 18.69             | AV                     | V              | 34.35          | 6.70                  | 26.51                     | 33.23                              | 54.00             | 20.77          |
| 9748                     | 33.26             | PK                     | V              | 36.30          | 8.60                  | 25.68                     | 52.48                              | 74.00             | 21.52          |
| 9748                     | 19.78             | AV                     | V              | 36.30          | 8.60                  | 25.68                     | 39.00                              | 54.00             | 15.00          |
| 1623                     | 34.4              | PK                     | V              | 23.85          | 3.18                  | 26.91                     | 34.52                              | 74.00             | 39.48          |
| 1623                     | 20.9              | AV                     | V              | 23.85          | 3.18                  | 26.91                     | 21.02                              | 54.00             | 32.98          |
| 3265                     | 34.46             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 40.15                              | 74.00             | 33.85          |
| 3265                     | 21.03             | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 26.72                              | 54.00             | 27.28          |
| 34.82                    | 38.7              | QP                     | V              | 18.48          | 0.79                  | 21.42                     | 36.55                              | 40.00             | 3.45*          |
| High Channel: 2462 MHz   |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2462                     | 69.08             | PK                     | H              | 25.80          | 3.93                  | 0.00                      | 98.81                              | N/A               | N/A            |
| 2462                     | 64.54             | AV                     | H              | 25.80          | 3.93                  | 0.00                      | 94.27                              | N/A               | N/A            |
| 2462                     | 73.25             | PK                     | V              | 25.80          | 3.93                  | 0.00                      | 102.98                             | N/A               | N/A            |
| 2462                     | 68.71             | AV                     | V              | 25.80          | 3.93                  | 0.00                      | 98.44                              | N/A               | N/A            |
| 2483.5                   | 28.34             | PK                     | V              | 25.86          | 3.80                  | 0.00                      | 58.00                              | 74.00             | 16.00          |
| 2483.5                   | 14.83             | AV                     | V              | 25.86          | 3.80                  | 0.00                      | 44.49                              | 54.00             | 9.51           |
| 4924                     | 42.04             | PK                     | V              | 30.90          | 4.70                  | 27.27                     | 50.37                              | 74.00             | 23.63          |
| 4924                     | 38.11             | AV                     | V              | 30.90          | 4.70                  | 27.27                     | 46.44                              | 54.00             | 7.56           |
| 7386                     | 31.3              | PK                     | V              | 34.53          | 6.84                  | 26.66                     | 46.01                              | 74.00             | 27.99          |
| 7386                     | 18.66             | AV                     | V              | 34.53          | 6.84                  | 26.66                     | 33.37                              | 54.00             | 20.63          |
| 9848                     | 33.55             | PK                     | V              | 36.54          | 8.49                  | 25.49                     | 53.09                              | 74.00             | 20.91          |
| 9848                     | 19.97             | AV                     | V              | 36.54          | 8.49                  | 25.49                     | 39.51                              | 54.00             | 14.49          |
| 3265                     | 34.62             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 40.31                              | 74.00             | 33.69          |
| 3265                     | 21.13             | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 26.82                              | 54.00             | 27.18          |
| 34.88                    | 38.8              | QP                     | V              | 18.43          | 0.79                  | 21.42                     | 36.60                              | 40.00             | 3.40*          |

\*Within measurement uncertainty!

## 802.11g Mode

| Frequency<br>(MHz)       | Receiver          |                        | Rx Antenna     |                | Cable<br>loss<br>(dB) | Amplifier<br>Gain<br>(dB) | Corrected<br>Amplitude<br>(dBμV/m) | FCC 15.247        |                |
|--------------------------|-------------------|------------------------|----------------|----------------|-----------------------|---------------------------|------------------------------------|-------------------|----------------|
|                          | Reading<br>(dBμV) | Detector<br>(PK/QP/AV) | Polar<br>(H/V) | Factor<br>(dB) |                       |                           |                                    | Limit<br>(dBμV/m) | Margin<br>(dB) |
| Low Channel: 2412 MHz    |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2412                     | 68.38             | PK                     | H              | 25.67          | 3.93                  | 0.00                      | 97.98                              | N/A               | N/A            |
| 2412                     | 57.97             | AV                     | H              | 25.67          | 3.93                  | 0.00                      | 87.57                              | N/A               | N/A            |
| 2412                     | 72.74             | PK                     | V              | 25.67          | 3.93                  | 0.00                      | 102.34                             | N/A               | N/A            |
| 2412                     | 62.24             | AV                     | V              | 25.67          | 3.93                  | 0.00                      | 91.84                              | N/A               | N/A            |
| 2390                     | 28.23             | PK                     | V              | 25.61          | 3.84                  | 0.00                      | 57.68                              | 74.00             | 16.32          |
| 2390                     | 14.29             | AV                     | V              | 25.61          | 3.84                  | 0.00                      | 43.74                              | 54.00             | 10.26          |
| 4824                     | 40.96             | PK                     | V              | 30.64          | 4.73                  | 27.26                     | 49.07                              | 74.00             | 24.93          |
| 4824                     | 28.13             | AV                     | V              | 30.64          | 4.73                  | 27.26                     | 36.24                              | 54.00             | 17.76          |
| 7236                     | 31.42             | PK                     | V              | 34.17          | 6.56                  | 26.36                     | 45.79                              | 74.00             | 28.21          |
| 7236                     | 18.35             | AV                     | V              | 34.17          | 6.56                  | 26.36                     | 32.72                              | 54.00             | 21.28          |
| 9648                     | 32.87             | PK                     | V              | 36.06          | 8.70                  | 26.06                     | 51.57                              | 74.00             | 22.43          |
| 9648                     | 19.78             | AV                     | V              | 36.06          | 8.70                  | 26.06                     | 38.48                              | 54.00             | 15.52          |
| 3265                     | 34.05             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 39.74                              | 74.00             | 34.26          |
| 3265                     | 20.39             | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 26.08                              | 54.00             | 27.92          |
| 34.85                    | 38.8              | QP                     | V              | 18.46          | 0.79                  | 21.42                     | 36.63                              | 40.00             | 3.37*          |
| Middle Channel: 2437 MHz |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2437                     | 68.35             | PK                     | H              | 25.74          | 3.98                  | 0.00                      | 98.07                              | N/A               | N/A            |
| 2437                     | 57.99             | AV                     | H              | 25.74          | 3.98                  | 0.00                      | 87.71                              | N/A               | N/A            |
| 2437                     | 72.79             | PK                     | V              | 25.74          | 3.98                  | 0.00                      | 102.51                             | N/A               | N/A            |
| 2437                     | 62.41             | AV                     | V              | 25.74          | 3.98                  | 0.00                      | 92.13                              | N/A               | N/A            |
| 4874                     | 41.11             | PK                     | V              | 30.77          | 4.76                  | 27.26                     | 49.38                              | 74.00             | 24.62          |
| 4874                     | 28.22             | AV                     | V              | 30.77          | 4.76                  | 27.26                     | 36.49                              | 54.00             | 17.51          |
| 7311                     | 31.45             | PK                     | V              | 34.35          | 6.70                  | 26.51                     | 45.99                              | 74.00             | 28.01          |
| 7311                     | 18.45             | AV                     | V              | 34.35          | 6.70                  | 26.51                     | 32.99                              | 54.00             | 21.01          |
| 9748                     | 32.72             | PK                     | V              | 36.30          | 8.60                  | 25.68                     | 51.94                              | 74.00             | 22.06          |
| 9748                     | 19.78             | AV                     | V              | 36.30          | 8.60                  | 25.68                     | 39.00                              | 54.00             | 15.00          |
| 1623                     | 34.02             | PK                     | V              | 23.85          | 3.18                  | 26.91                     | 34.14                              | 74.00             | 39.86          |
| 1623                     | 20.45             | AV                     | V              | 23.85          | 3.18                  | 26.91                     | 20.57                              | 54.00             | 33.43          |
| 3265                     | 33.16             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 38.85                              | 74.00             | 35.15          |
| 3265                     | 20.34             | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 26.03                              | 54.00             | 27.97          |
| 34.84                    | 38.9              | QP                     | V              | 18.46          | 0.79                  | 21.42                     | 36.73                              | 40.00             | 3.27*          |
| High Channel: 2462 MHz   |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2462                     | 68.39             | PK                     | H              | 25.80          | 3.93                  | 0.00                      | 98.12                              | N/A               | N/A            |
| 2462                     | 57.11             | AV                     | H              | 25.80          | 3.93                  | 0.00                      | 86.84                              | N/A               | N/A            |
| 2462                     | 72.85             | PK                     | V              | 25.80          | 3.93                  | 0.00                      | 102.58                             | N/A               | N/A            |
| 2462                     | 62.43             | AV                     | V              | 25.80          | 3.93                  | 0.00                      | 92.16                              | N/A               | N/A            |
| 2483.5                   | 27.57             | PK                     | V              | 25.86          | 3.80                  | 0.00                      | 57.23                              | 74.00             | 16.77          |
| 2483.5                   | 14.23             | AV                     | V              | 25.86          | 3.80                  | 0.00                      | 43.89                              | 54.00             | 10.11          |
| 4924                     | 41.1              | PK                     | V              | 30.90          | 4.70                  | 27.27                     | 49.43                              | 74.00             | 24.57          |
| 4924                     | 28.29             | AV                     | V              | 30.90          | 4.70                  | 27.27                     | 36.62                              | 54.00             | 17.38          |
| 7386                     | 31.55             | PK                     | V              | 34.53          | 6.84                  | 26.66                     | 46.26                              | 74.00             | 27.74          |
| 7386                     | 18.48             | AV                     | V              | 34.53          | 6.84                  | 26.66                     | 33.19                              | 54.00             | 20.81          |
| 9848                     | 32.97             | PK                     | V              | 36.54          | 8.49                  | 25.49                     | 52.51                              | 74.00             | 21.49          |
| 9848                     | 19.89             | AV                     | V              | 36.54          | 8.49                  | 25.49                     | 39.43                              | 54.00             | 14.57          |
| 3265                     | 34.13             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 39.82                              | 74.00             | 34.18          |
| 3265                     | 20.62             | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 26.31                              | 54.00             | 27.69          |
| 34.86                    | 38.7              | QP                     | V              | 18.45          | 0.79                  | 21.42                     | 36.52                              | 40.00             | 3.48*          |

\*Within measurement uncertainty!

## 802.11 n20 Mode

| Frequency<br>(MHz)       | Receiver          |                        | Rx Antenna     |                | Cable<br>loss<br>(dB) | Amplifier<br>Gain<br>(dB) | Corrected<br>Amplitude<br>(dBμV/m) | FCC 15.247        |                |
|--------------------------|-------------------|------------------------|----------------|----------------|-----------------------|---------------------------|------------------------------------|-------------------|----------------|
|                          | Reading<br>(dBμV) | Detector<br>(PK/QP/AV) | Polar<br>(H/V) | Factor<br>(dB) |                       |                           |                                    | Limit<br>(dBμV/m) | Margin<br>(dB) |
| Low Channel: 2412 MHz    |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2412                     | 68.11             | PK                     | H              | 25.67          | 3.93                  | 0.00                      | 97.71                              | N/A               | N/A            |
| 2412                     | 57.96             | AV                     | H              | 25.67          | 3.93                  | 0.00                      | 87.56                              | N/A               | N/A            |
| 2412                     | 72.63             | PK                     | V              | 25.67          | 3.93                  | 0.00                      | 102.23                             | N/A               | N/A            |
| 2412                     | 62.29             | AV                     | V              | 25.67          | 3.93                  | 0.00                      | 91.89                              | N/A               | N/A            |
| 2390                     | 28.58             | PK                     | V              | 25.61          | 3.84                  | 0.00                      | 58.03                              | 74.00             | 15.97          |
| 2390                     | 14.58             | AV                     | V              | 25.61          | 3.84                  | 0.00                      | 44.03                              | 54.00             | 9.97           |
| 4824                     | 41.11             | PK                     | V              | 30.64          | 4.73                  | 27.26                     | 49.22                              | 74.00             | 24.78          |
| 4824                     | 28.14             | AV                     | V              | 30.64          | 4.73                  | 27.26                     | 36.25                              | 54.00             | 17.75          |
| 7236                     | 31.42             | PK                     | V              | 34.17          | 6.56                  | 26.36                     | 45.79                              | 74.00             | 28.21          |
| 7236                     | 18.41             | AV                     | V              | 34.17          | 6.56                  | 26.36                     | 32.78                              | 54.00             | 21.22          |
| 9648                     | 32.67             | PK                     | V              | 36.06          | 8.70                  | 26.06                     | 51.37                              | 74.00             | 22.63          |
| 9648                     | 19.33             | AV                     | V              | 36.06          | 8.70                  | 26.06                     | 38.03                              | 54.00             | 15.97          |
| 3265                     | 33.77             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 39.46                              | 74.00             | 34.54          |
| 3265                     | 20.47             | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 26.16                              | 54.00             | 27.84          |
| 34.85                    | 38.9              | QP                     | V              | 18.46          | 0.79                  | 21.42                     | 36.73                              | 40.00             | 3.27*          |
| Middle Channel: 2437 MHz |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2437                     | 68.25             | PK                     | H              | 25.74          | 3.98                  | 0.00                      | 97.97                              | N/A               | N/A            |
| 2437                     | 57.9              | AV                     | H              | 25.74          | 3.98                  | 0.00                      | 87.62                              | N/A               | N/A            |
| 2437                     | 72.54             | PK                     | V              | 25.74          | 3.98                  | 0.00                      | 102.26                             | N/A               | N/A            |
| 2437                     | 62.23             | AV                     | V              | 25.74          | 3.98                  | 0.00                      | 91.95                              | N/A               | N/A            |
| 4874                     | 41.25             | PK                     | V              | 30.77          | 4.76                  | 27.26                     | 49.52                              | 74.00             | 24.48          |
| 4874                     | 28.31             | AV                     | V              | 30.77          | 4.76                  | 27.26                     | 36.58                              | 54.00             | 17.42          |
| 7311                     | 31.45             | PK                     | V              | 34.35          | 6.70                  | 26.51                     | 45.99                              | 74.00             | 28.01          |
| 7311                     | 18.52             | AV                     | V              | 34.35          | 6.70                  | 26.51                     | 33.06                              | 54.00             | 20.94          |
| 9748                     | 32.59             | PK                     | V              | 36.30          | 8.60                  | 25.68                     | 51.81                              | 74.00             | 22.19          |
| 9748                     | 19.38             | AV                     | V              | 36.30          | 8.60                  | 25.68                     | 38.60                              | 54.00             | 15.40          |
| 1623                     | 33.81             | PK                     | V              | 23.85          | 3.18                  | 26.91                     | 33.93                              | 74.00             | 40.07          |
| 1623                     | 20.38             | AV                     | V              | 23.85          | 3.18                  | 26.91                     | 20.50                              | 54.00             | 33.50          |
| 3265                     | 33.67             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 39.36                              | 74.00             | 34.64          |
| 3265                     | 20.42             | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 26.11                              | 54.00             | 27.89          |
| 34.85                    | 38.7              | QP                     | V              | 18.46          | 0.79                  | 21.42                     | 36.53                              | 40.00             | 3.47*          |
| High Channel: 2462 MHz   |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2462                     | 68.36             | PK                     | H              | 25.80          | 3.93                  | 0.00                      | 98.09                              | N/A               | N/A            |
| 2462                     | 58.11             | AV                     | H              | 25.80          | 3.93                  | 0.00                      | 87.84                              | N/A               | N/A            |
| 2462                     | 72.69             | PK                     | V              | 25.80          | 3.93                  | 0.00                      | 102.42                             | N/A               | N/A            |
| 2462                     | 62.37             | AV                     | V              | 25.80          | 3.93                  | 0.00                      | 92.10                              | N/A               | N/A            |
| 2483.5                   | 27.35             | PK                     | V              | 25.86          | 3.80                  | 0.00                      | 57.01                              | 74.00             | 16.99          |
| 2483.5                   | 14.15             | AV                     | V              | 25.86          | 3.80                  | 0.00                      | 43.81                              | 54.00             | 10.19          |
| 4924                     | 41.2              | PK                     | V              | 30.90          | 4.70                  | 27.27                     | 49.53                              | 74.00             | 24.47          |
| 4924                     | 28.16             | AV                     | V              | 30.90          | 4.70                  | 27.27                     | 36.49                              | 54.00             | 17.51          |
| 7386                     | 31.51             | PK                     | V              | 34.53          | 6.84                  | 26.66                     | 46.22                              | 74.00             | 27.78          |
| 7386                     | 18.56             | AV                     | V              | 34.53          | 6.84                  | 26.66                     | 33.27                              | 54.00             | 20.73          |
| 9848                     | 32.77             | PK                     | V              | 36.54          | 8.49                  | 25.49                     | 52.31                              | 74.00             | 21.69          |
| 9848                     | 19.62             | AV                     | V              | 36.54          | 8.49                  | 25.49                     | 39.16                              | 54.00             | 14.84          |
| 3265                     | 33.95             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 39.64                              | 74.00             | 34.36          |
| 3265                     | 20.6              | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 26.29                              | 54.00             | 27.71          |
| 34.86                    | 38.8              | QP                     | V              | 18.45          | 0.79                  | 21.42                     | 36.62                              | 40.00             | 3.38*          |

\*Within measurement uncertainty!

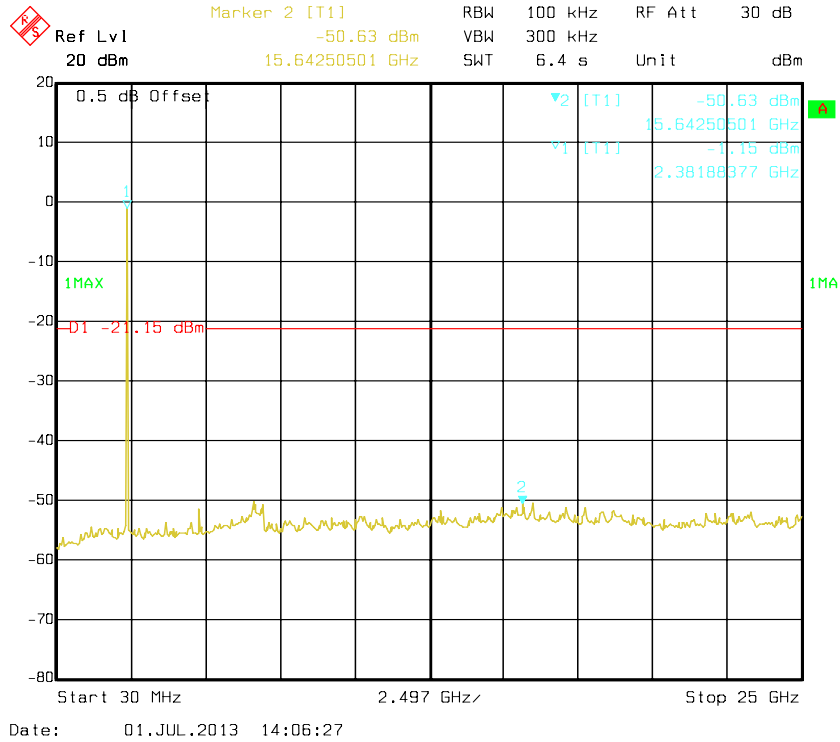
## 802.11 n40 Mode

| Frequency<br>(MHz)       | Receiver          |                        | Rx Antenna     |                | Cable<br>loss<br>(dB) | Amplifier<br>Gain<br>(dB) | Corrected<br>Amplitude<br>(dBμV/m) | FCC 15.247        |                |
|--------------------------|-------------------|------------------------|----------------|----------------|-----------------------|---------------------------|------------------------------------|-------------------|----------------|
|                          | Reading<br>(dBμV) | Detector<br>(PK/QP/AV) | Polar<br>(H/V) | Factor<br>(dB) |                       |                           |                                    | Limit<br>(dBμV/m) | Margin<br>(dB) |
| Low Channel: 2422 MHz    |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2422                     | 68.35             | PK                     | H              | 25.70          | 3.95                  | 0.00                      | 98.00                              | N/A               | N/A            |
| 2422                     | 58.07             | AV                     | H              | 25.70          | 3.95                  | 0.00                      | 87.72                              | N/A               | N/A            |
| 2422                     | 72.63             | PK                     | V              | 25.70          | 3.95                  | 0.00                      | 102.28                             | N/A               | N/A            |
| 2422                     | 62.26             | AV                     | V              | 25.70          | 3.95                  | 0.00                      | 91.91                              | N/A               | N/A            |
| 2390                     | 28.42             | PK                     | V              | 25.61          | 3.84                  | 0.00                      | 57.87                              | 74.00             | 16.13          |
| 2390                     | 14.67             | AV                     | V              | 25.61          | 3.84                  | 0.00                      | 44.12                              | 54.00             | 9.88           |
| 4844                     | 41.23             | PK                     | V              | 30.69          | 4.78                  | 27.26                     | 49.44                              | 74.00             | 24.56          |
| 4844                     | 28.17             | AV                     | V              | 30.69          | 4.78                  | 27.26                     | 36.38                              | 54.00             | 17.62          |
| 7266                     | 31.43             | PK                     | V              | 34.24          | 6.62                  | 26.42                     | 45.87                              | 74.00             | 28.13          |
| 7266                     | 18.51             | AV                     | V              | 34.24          | 6.62                  | 26.42                     | 32.95                              | 54.00             | 21.05          |
| 9688                     | 32.84             | PK                     | V              | 36.15          | 8.66                  | 25.91                     | 51.74                              | 74.00             | 22.26          |
| 9688                     | 19.41             | AV                     | V              | 36.15          | 8.66                  | 25.91                     | 38.31                              | 54.00             | 15.69          |
| 3265                     | 34.25             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 39.94                              | 74.00             | 34.06          |
| 3265                     | 20.46             | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 26.15                              | 54.00             | 27.85          |
| 34.87                    | 38.8              | QP                     | V              | 18.44          | 0.79                  | 21.42                     | 36.61                              | 40.00             | 3.39*          |
| Middle Channel: 2437 MHz |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2437                     | 68.15             | PK                     | H              | 25.74          | 3.98                  | 0.00                      | 97.87                              | N/A               | N/A            |
| 2437                     | 57.94             | AV                     | H              | 25.74          | 3.98                  | 0.00                      | 87.66                              | N/A               | N/A            |
| 2437                     | 72.5              | PK                     | V              | 25.74          | 3.98                  | 0.00                      | 102.22                             | N/A               | N/A            |
| 2437                     | 62.21             | AV                     | V              | 25.74          | 3.98                  | 0.00                      | 91.93                              | N/A               | N/A            |
| 4874                     | 41.3              | PK                     | V              | 30.77          | 4.76                  | 27.26                     | 49.57                              | 74.00             | 24.43          |
| 4874                     | 28.19             | AV                     | V              | 30.77          | 4.76                  | 27.26                     | 36.46                              | 54.00             | 17.54          |
| 7311                     | 31.46             | PK                     | V              | 34.35          | 6.70                  | 26.51                     | 46.00                              | 74.00             | 28.00          |
| 7311                     | 18.59             | AV                     | V              | 34.35          | 6.70                  | 26.51                     | 33.13                              | 54.00             | 20.87          |
| 9748                     | 32.96             | PK                     | V              | 36.30          | 8.60                  | 25.68                     | 52.18                              | 74.00             | 21.82          |
| 9748                     | 19.64             | AV                     | V              | 36.30          | 8.60                  | 25.68                     | 38.86                              | 54.00             | 15.14          |
| 1623                     | 33.65             | PK                     | V              | 23.85          | 3.18                  | 26.91                     | 33.77                              | 74.00             | 40.23          |
| 1623                     | 20.42             | AV                     | V              | 23.85          | 3.18                  | 26.91                     | 20.54                              | 54.00             | 33.46          |
| 3265                     | 34.26             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 39.95                              | 74.00             | 34.05          |
| 3265                     | 21.43             | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 27.12                              | 54.00             | 26.88          |
| 34.88                    | 38.9              | QP                     | V              | 18.43          | 0.79                  | 21.42                     | 36.70                              | 40.00             | 3.30*          |
| High Channel: 2452 MHz   |                   |                        |                |                |                       |                           |                                    |                   |                |
| 2452                     | 68.27             | PK                     | H              | 25.78          | 4.00                  | 0.00                      | 98.04                              | N/A               | N/A            |
| 2452                     | 58.08             | AV                     | H              | 25.78          | 4.00                  | 0.00                      | 87.85                              | N/A               | N/A            |
| 2452                     | 72.52             | PK                     | V              | 25.78          | 4.00                  | 0.00                      | 102.29                             | N/A               | N/A            |
| 2452                     | 62.29             | AV                     | V              | 25.78          | 4.00                  | 0.00                      | 92.06                              | N/A               | N/A            |
| 2483.5                   | 27.66             | PK                     | V              | 25.86          | 3.80                  | 0.00                      | 57.32                              | 74.00             | 16.68          |
| 2483.5                   | 14.47             | AV                     | V              | 25.86          | 3.80                  | 0.00                      | 44.13                              | 54.00             | 9.87           |
| 4904                     | 41.14             | PK                     | V              | 30.85          | 4.72                  | 27.27                     | 49.44                              | 74.00             | 24.56          |
| 4904                     | 28.32             | AV                     | V              | 30.85          | 4.72                  | 27.27                     | 36.62                              | 54.00             | 17.38          |
| 7356                     | 31.48             | PK                     | V              | 34.45          | 6.79                  | 26.60                     | 46.12                              | 74.00             | 27.88          |
| 7356                     | 18.53             | AV                     | V              | 34.45          | 6.79                  | 26.60                     | 33.17                              | 54.00             | 20.83          |
| 9808                     | 33.51             | PK                     | V              | 36.44          | 8.53                  | 25.48                     | 53.00                              | 74.00             | 21.00          |
| 9808                     | 20.45             | AV                     | V              | 36.44          | 8.53                  | 25.48                     | 39.94                              | 54.00             | 14.06          |
| 3265                     | 33.87             | PK                     | V              | 28.05          | 5.07                  | 27.43                     | 39.56                              | 74.00             | 34.44          |
| 3265                     | 20.42             | AV                     | V              | 28.05          | 5.07                  | 27.43                     | 26.11                              | 54.00             | 27.89          |
| 34.84                    | 38.7              | QP                     | V              | 18.46          | 0.79                  | 21.42                     | 36.53                              | 40.00             | 3.47*          |

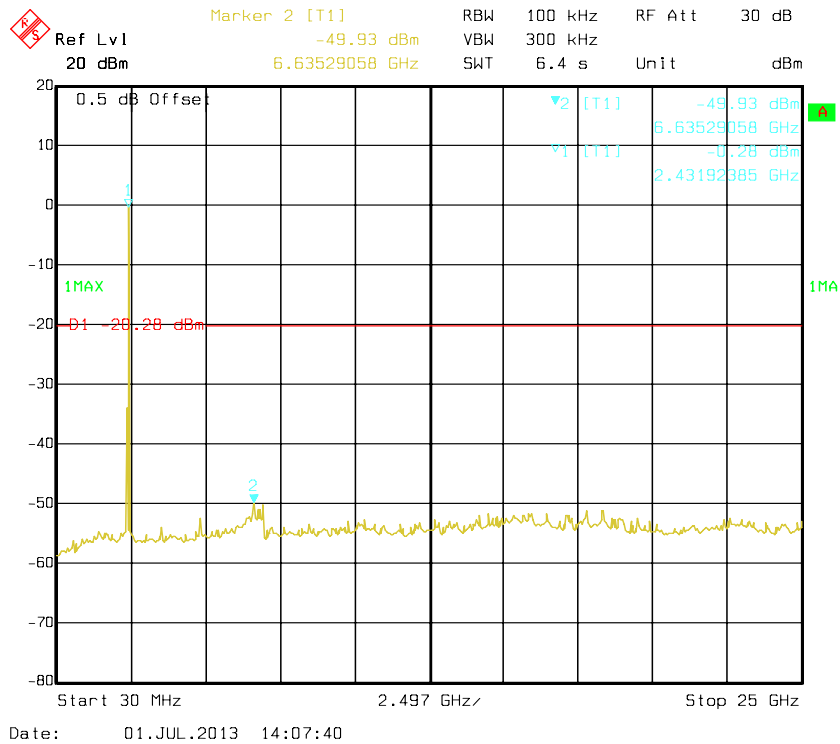
\*Within measurement uncertainty!

# Conducted Spurious Emissions at Antenna Port

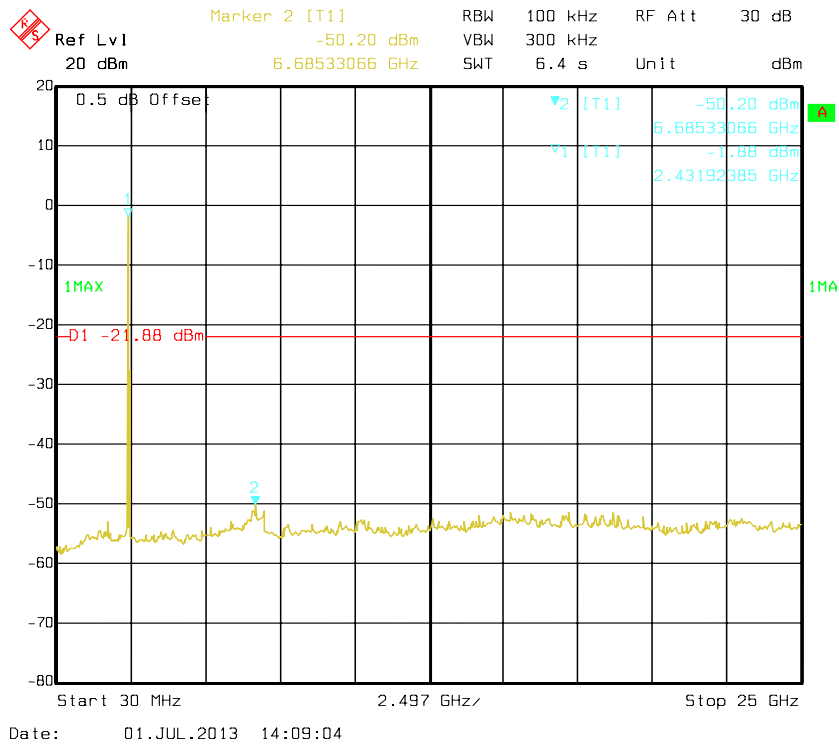
## 802.11b Low Channel



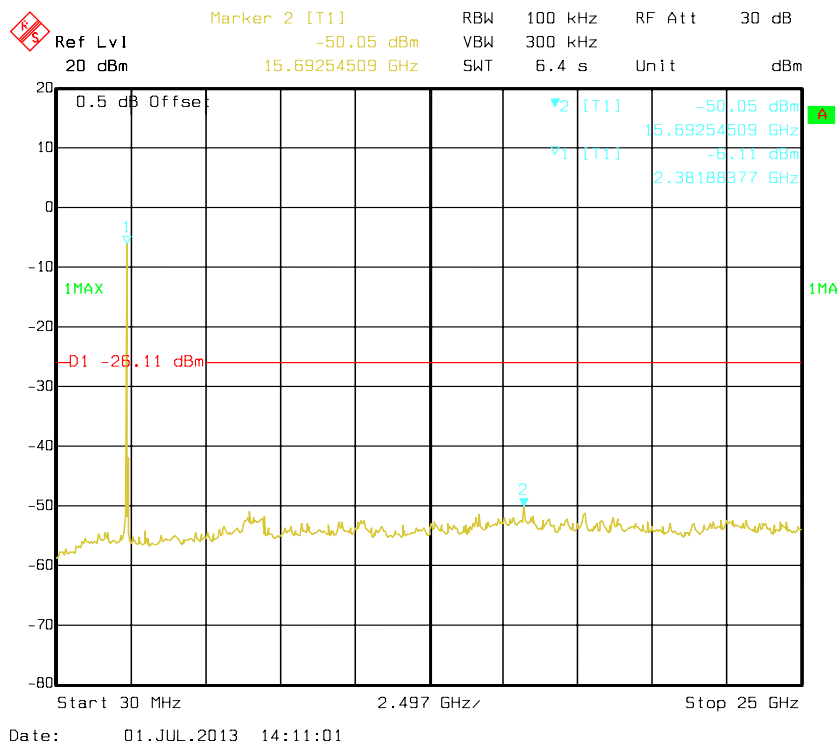
## 802.11b Middle Channel



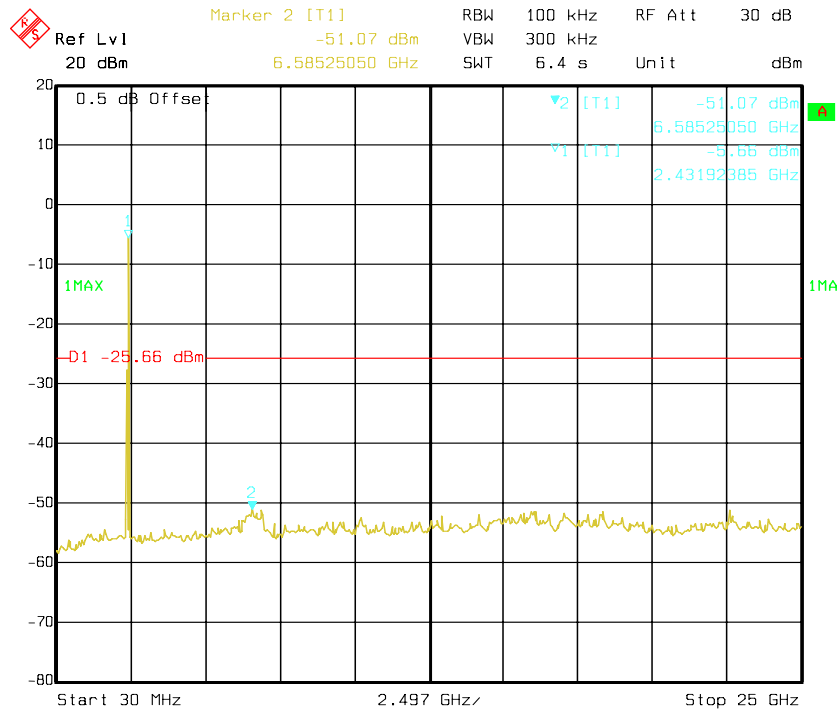
### 802.11b High Channel



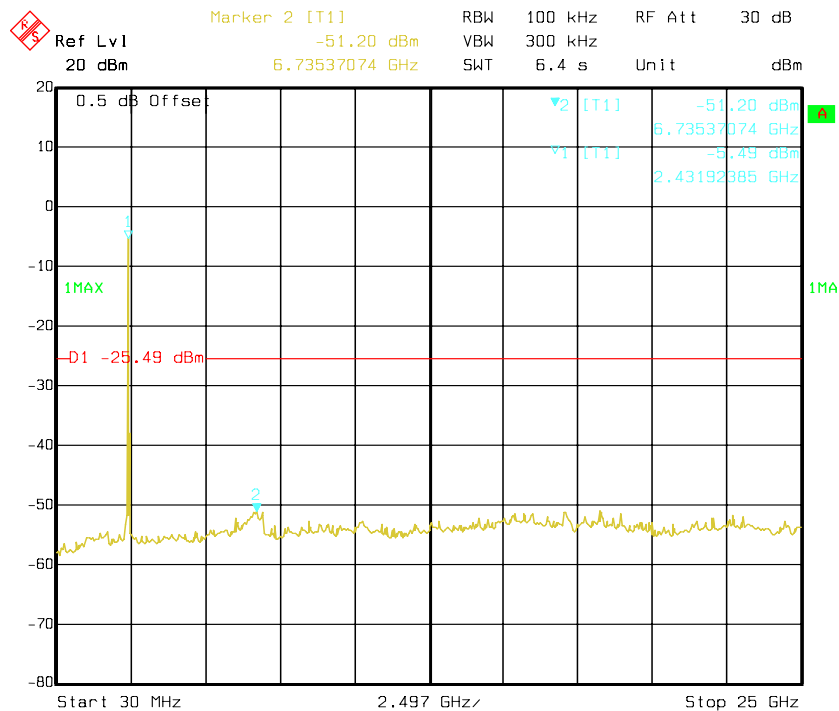
### 802.11g Low Channel



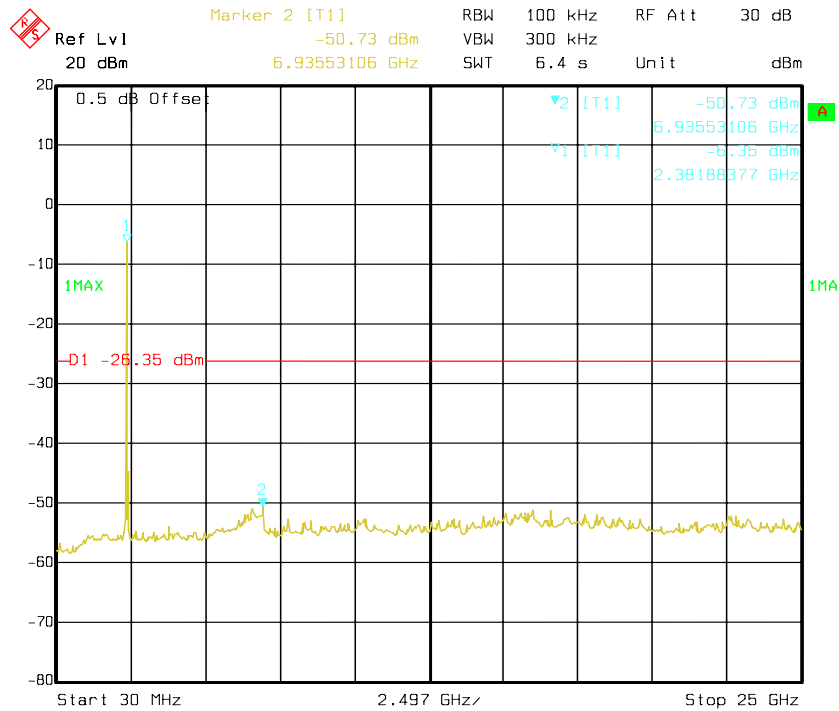
### 802.11g Middle Channel



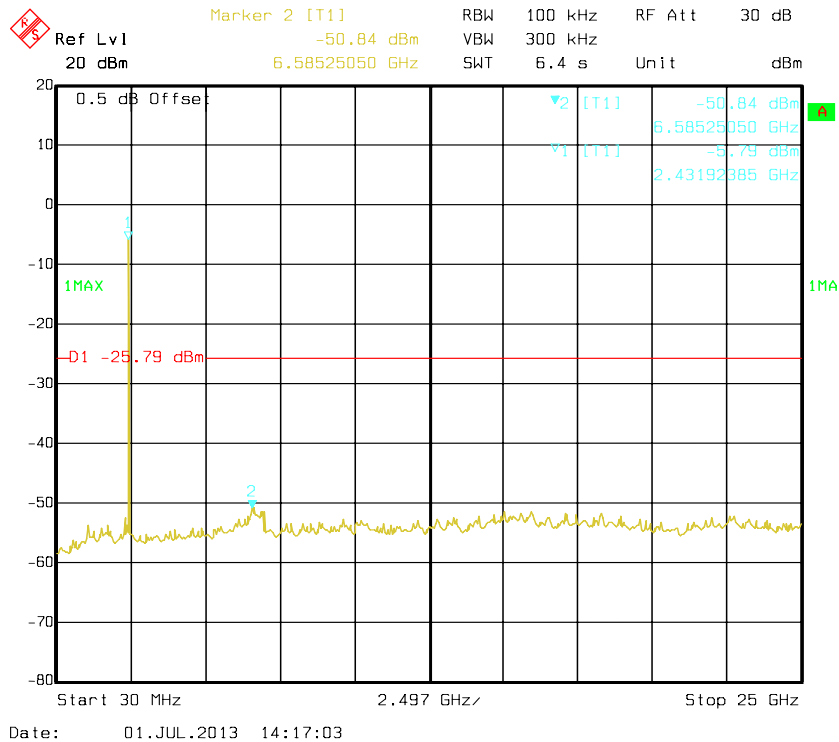
### 802.11g High Channel



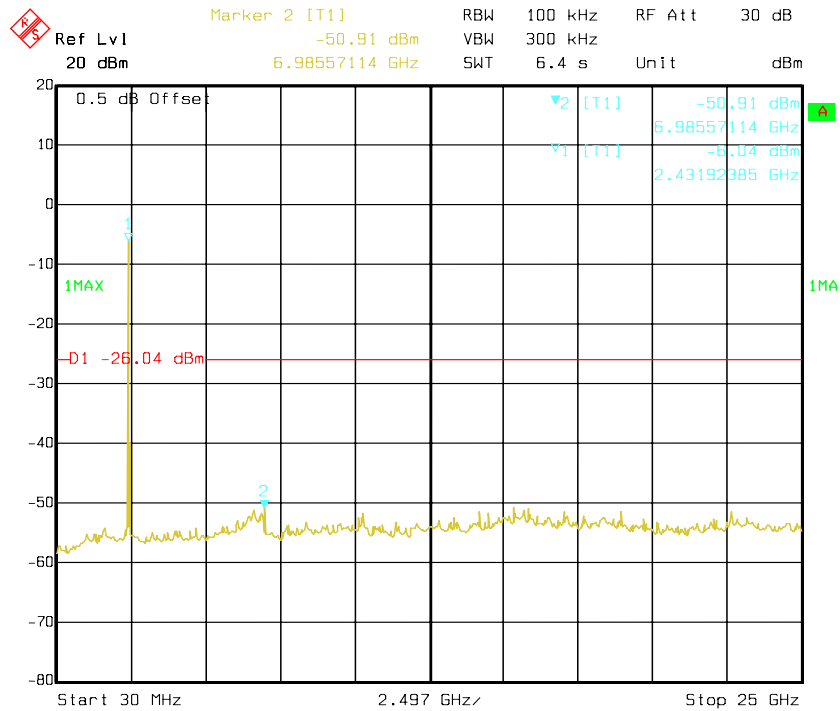
### 802.11n20 Low Channel



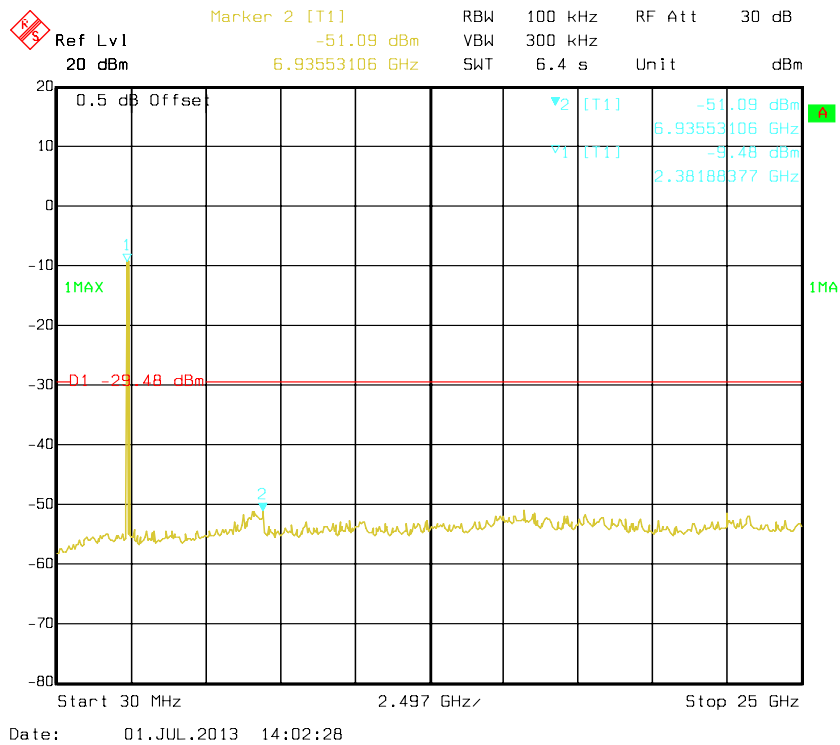
### 802.11n20 Middle Channel



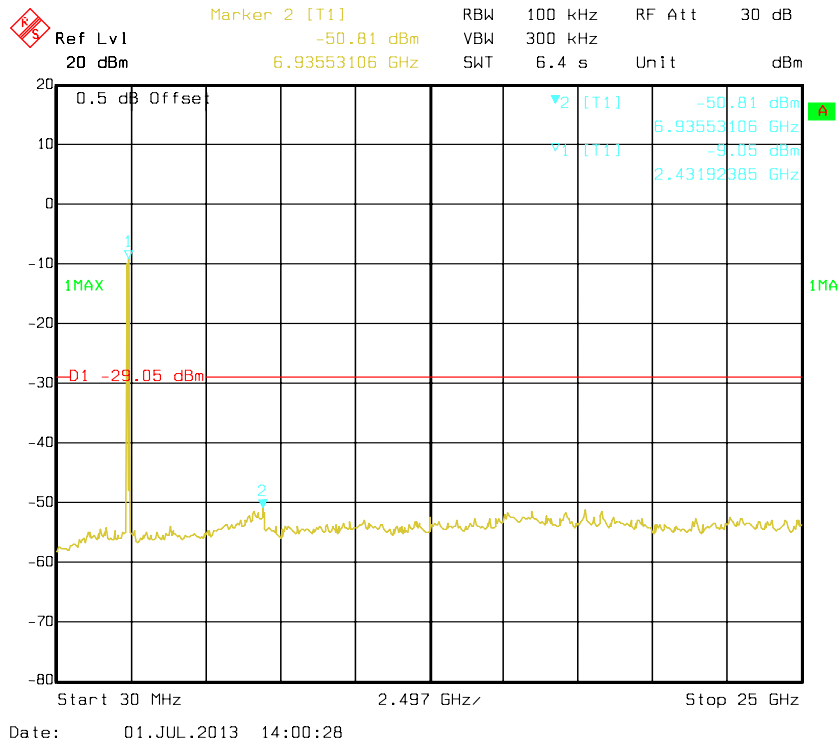
### 802.11n20 High Channel



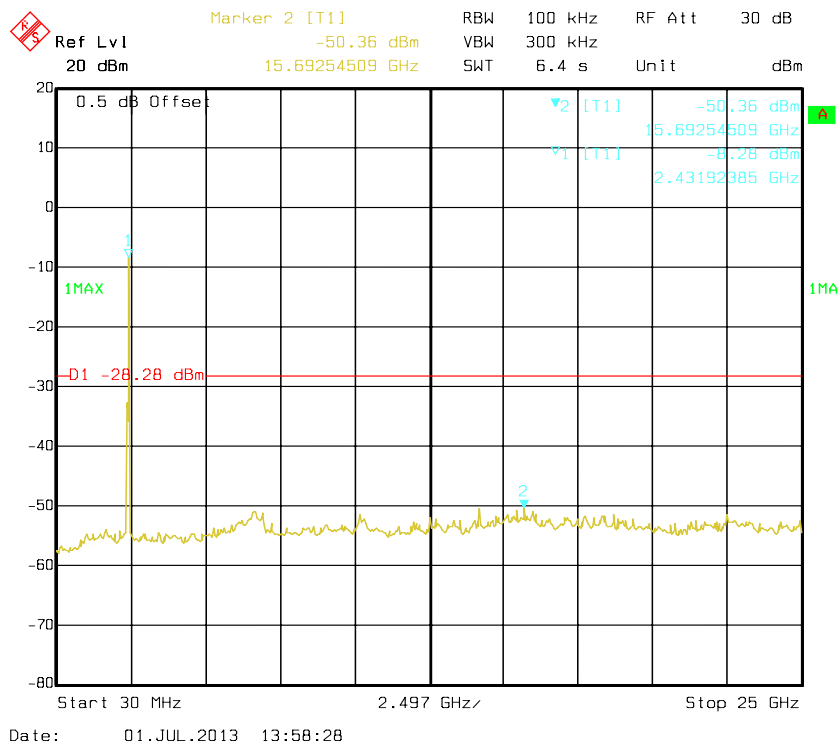
### 802.11n40 Low Channel



### 802.11n40 Middle Channel



### 802.11n40 High Channel



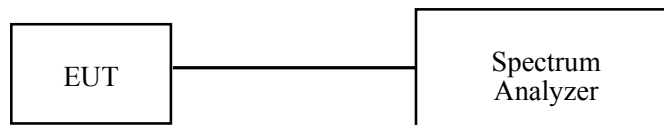
## FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

### Applicable Standard

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

### Test Procedure

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



### Test Equipment List and Details

| Manufacturer | Description       | Model  | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------|--------|---------------|------------------|----------------------|
| R&S          | Spectrum analyzer | FSP 38 | 100478        | 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:       | 27.9 °C  |
| Relative Humidity: | 69 %     |
| ATM Pressure:      | 99.8 kPa |

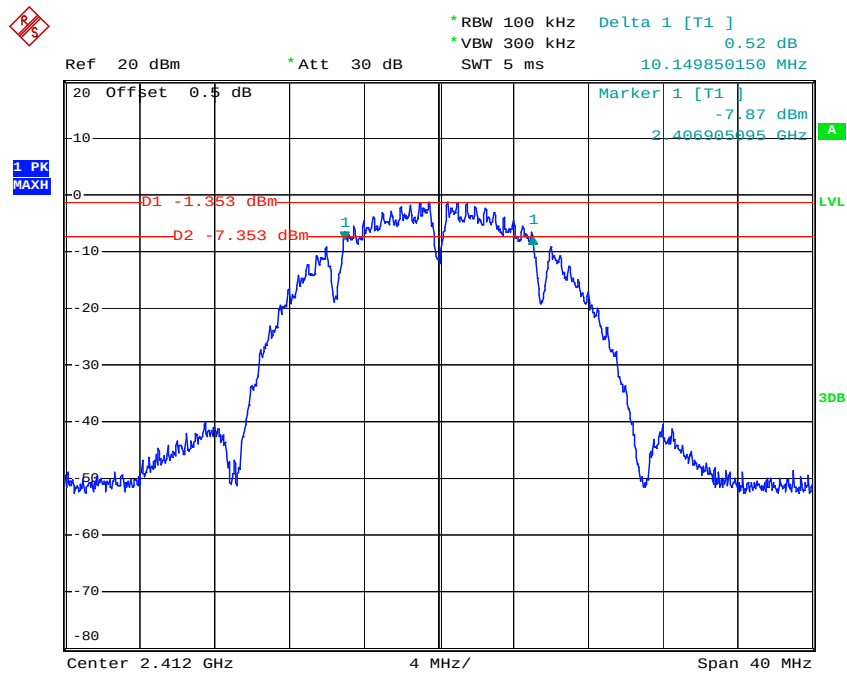
The testing was performed by Ares Liu on 2013-07-01.

**Test Result:** Pass.

Please refer to the following tables and plots.

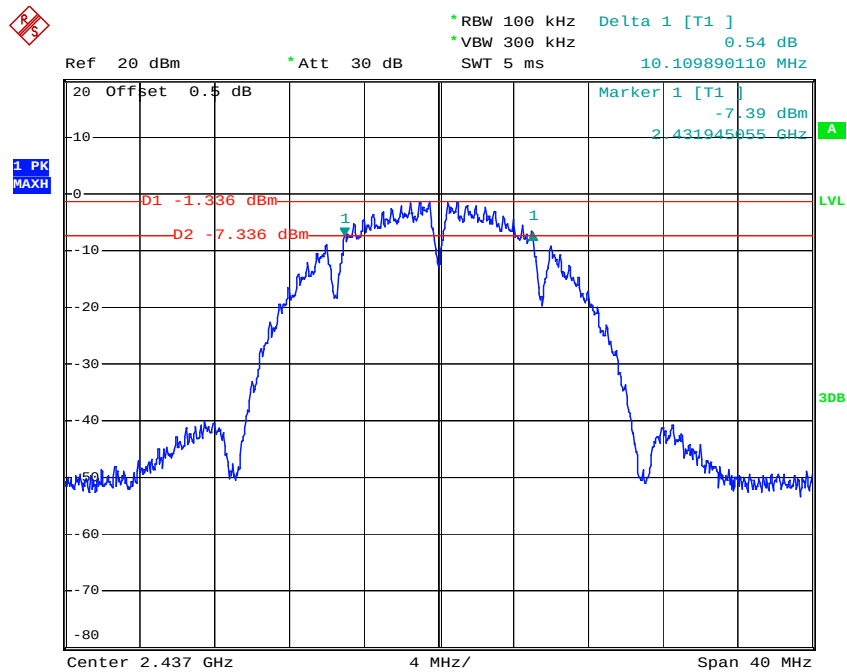
| Channel        | Frequency | 6 dB Bandwidth | Limit |
|----------------|-----------|----------------|-------|
|                | (MHz)     | (MHz)          | (kHz) |
| 802.11b mode   |           |                |       |
| Low            | 2412      | 10.15          | >500  |
| Middle         | 2437      | 10.11          | >500  |
| High           | 2462      | 10.15          | >500  |
| 802.11g mode   |           |                |       |
| Low            | 2412      | 16.62          | >500  |
| Middle         | 2437      | 16.58          | >500  |
| High           | 2462      | 16.62          | >500  |
| 802.11n20 mode |           |                |       |
| Low            | 2412      | 17.86          | >500  |
| Middle         | 2437      | 17.90          | >500  |
| High           | 2462      | 17.90          | >500  |
| 802.11n40 mode |           |                |       |
| Low            | 2422      | 37.72          | >500  |
| Middle         | 2437      | 37.80          | >500  |
| High           | 2452      | 37.72          | >500  |

### 802.11b Low Channel



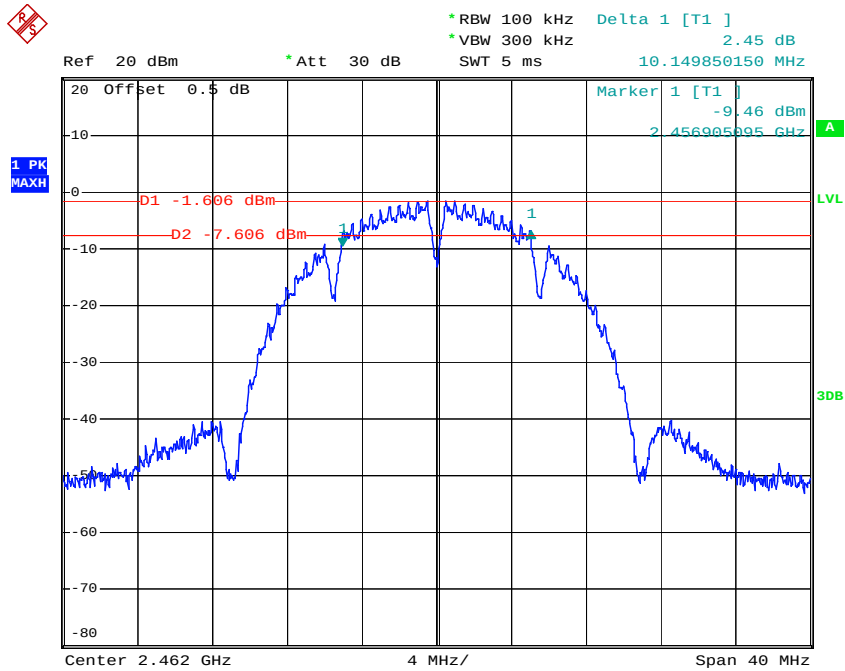
Date: 1.JUL.2013 11:18:01

### 802.11b Middle Channel



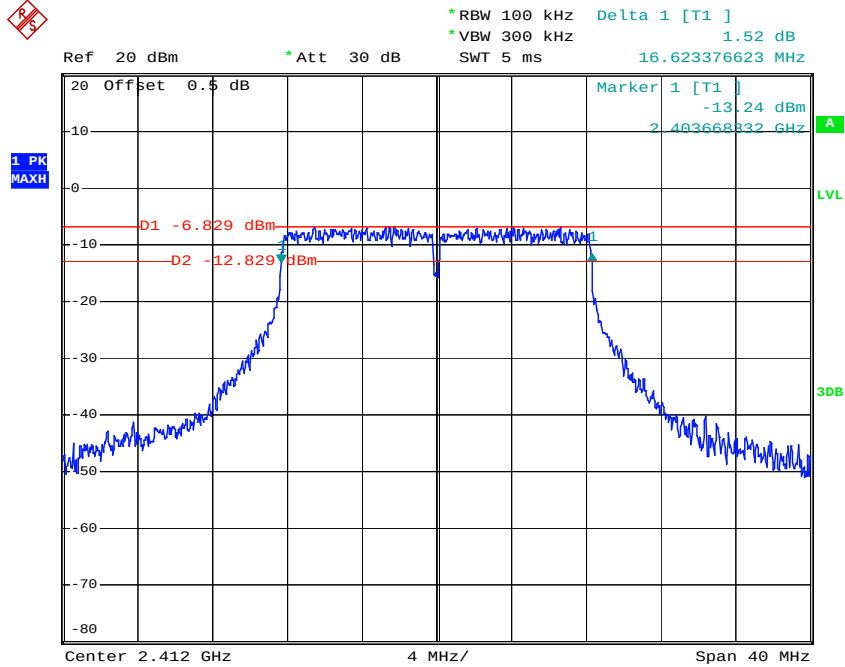
Date: 1.JUL.2013 11:21:16

### 802.11b High Channel



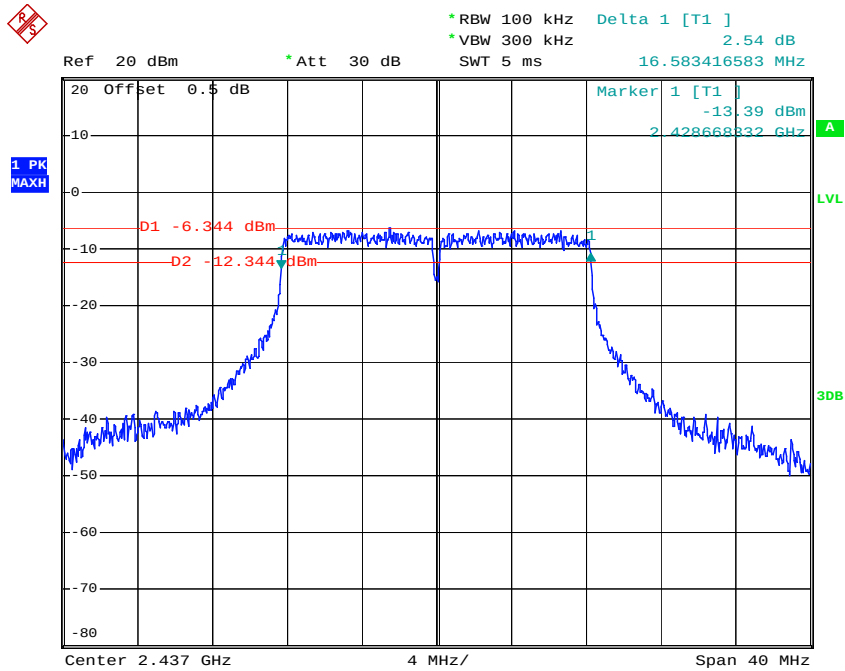
Date: 1.JUL.2013 11:24:01

### 802.11g Low Channel



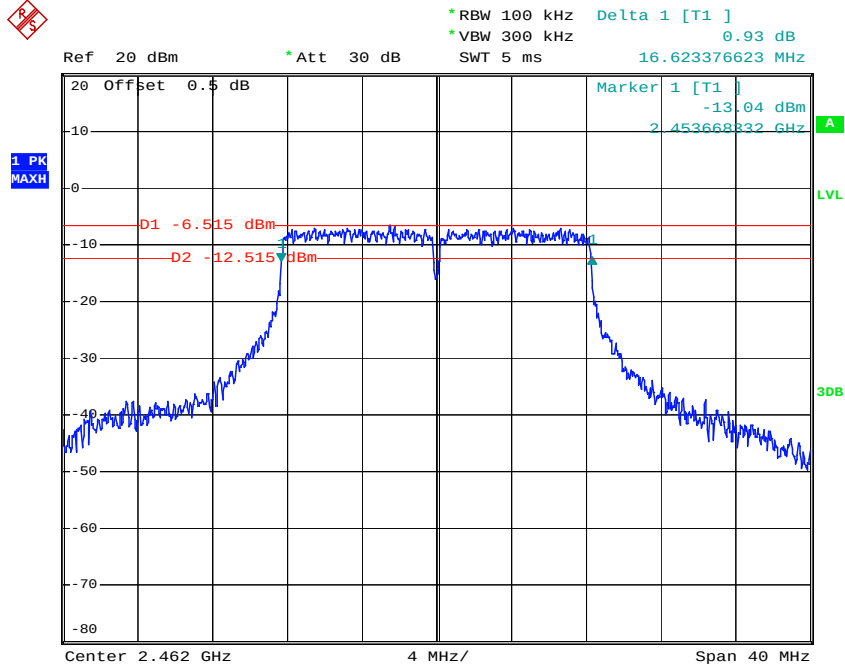
Date: 1.JUL.2013 11:34:54

### 802.11g Middle Channel



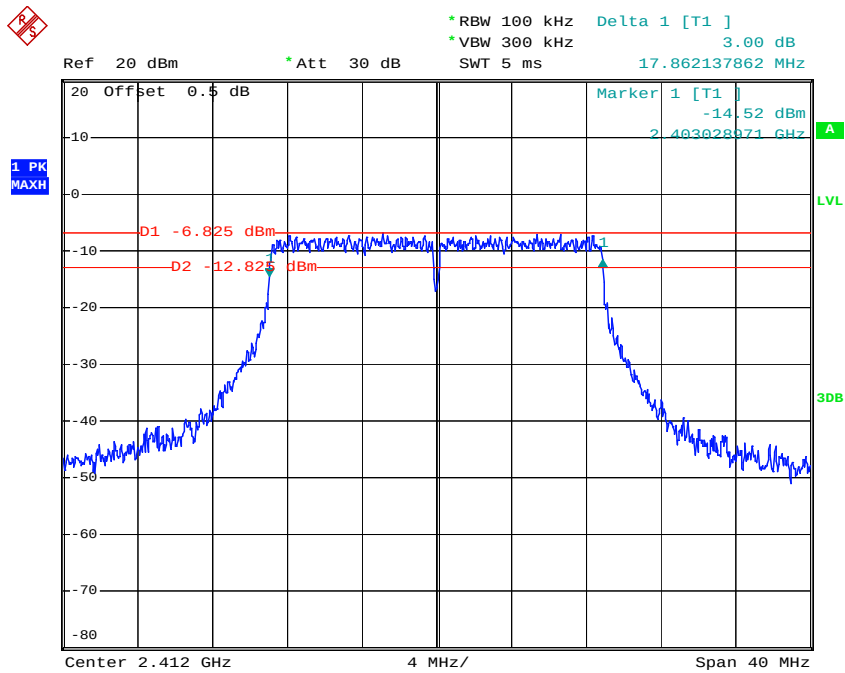
Date: 1.JUL.2013 11:37:31

### 802.11g High Channel



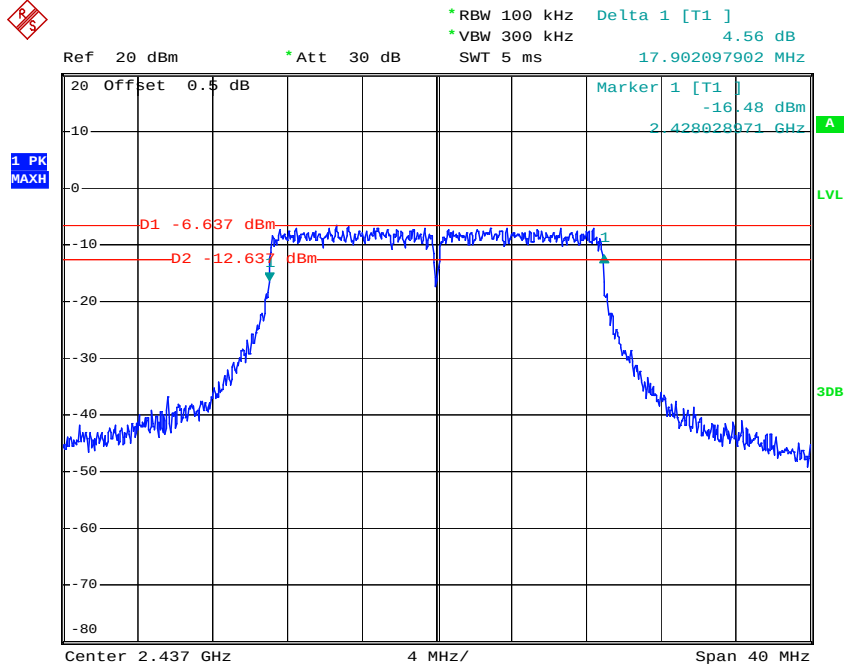
Date: 1.JUL.2013 11:40:28

### 802.11n20 Low Channel



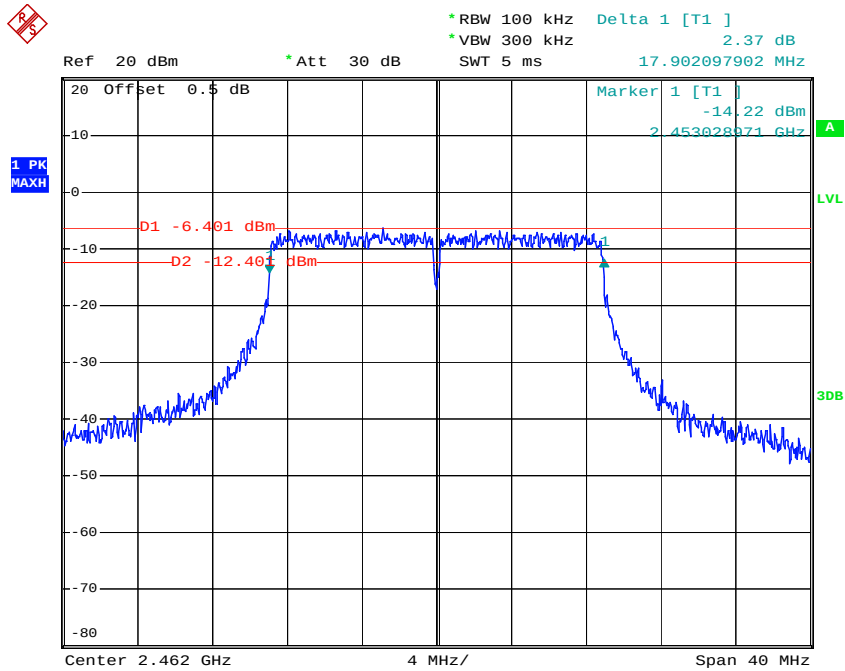
Date: 1.JUL.2013 13:30:25

### 802.11n20 Middle Channel



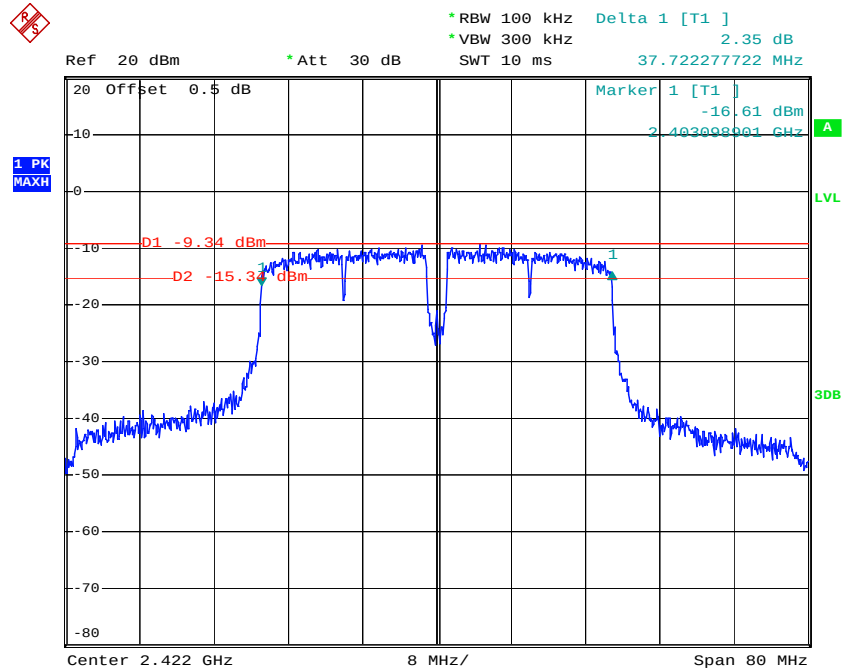
Date: 1.JUL.2013 13:32:03

### 802.11n20 High Channel



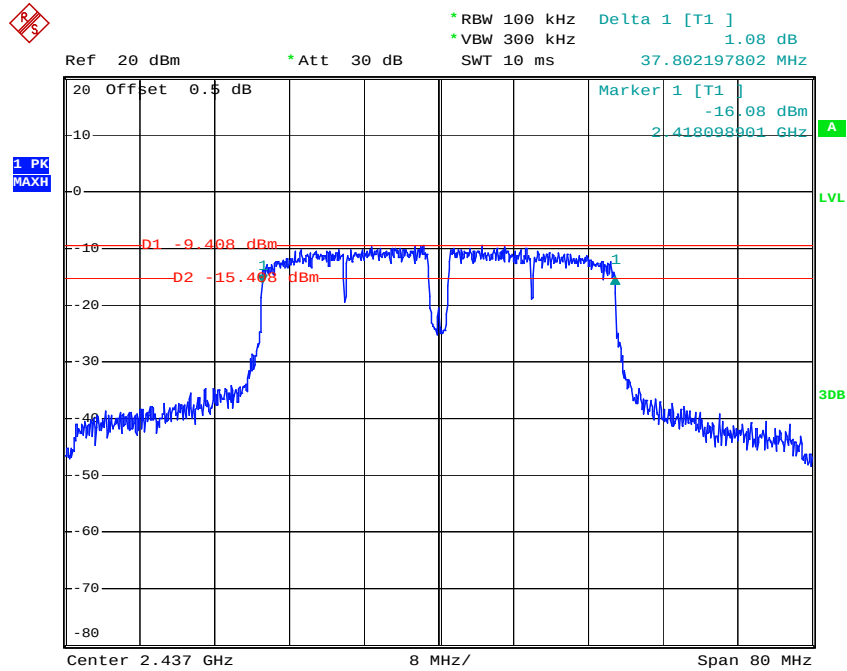
Date: 1.JUL.2013 13:34:59

### 802.11n40 Low Channel



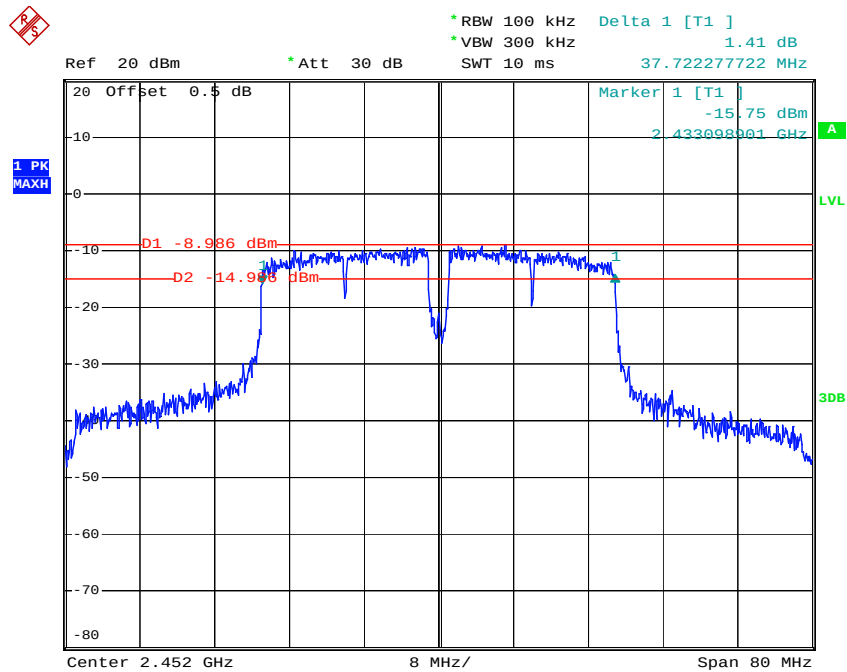
Date: 1.JUL.2013 13:40:12

### 802.11n40 Middle Channel



Date: 1.JUL.2013 13:41:58

### 802.11n40 High Channel



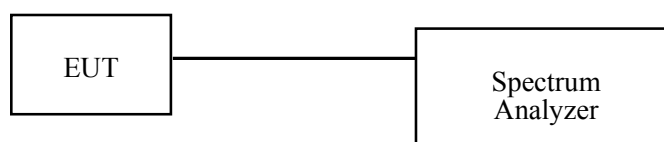
Date: 1.JUL.2013 13:44:30

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

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

**Test Procedure**

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



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

Note: EBW means 26dB bandwidth.

**Test Equipment List and Details**

| Manufacturer | Description       | Model  | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------|--------|---------------|------------------|----------------------|
| R&S          | Spectrum analyzer | FSP 38 | 100478        | 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>       | 27.9 °C  |
| <b>Relative Humidity:</b> | 69 %     |
| <b>ATM Pressure:</b>      | 99.8 kPa |

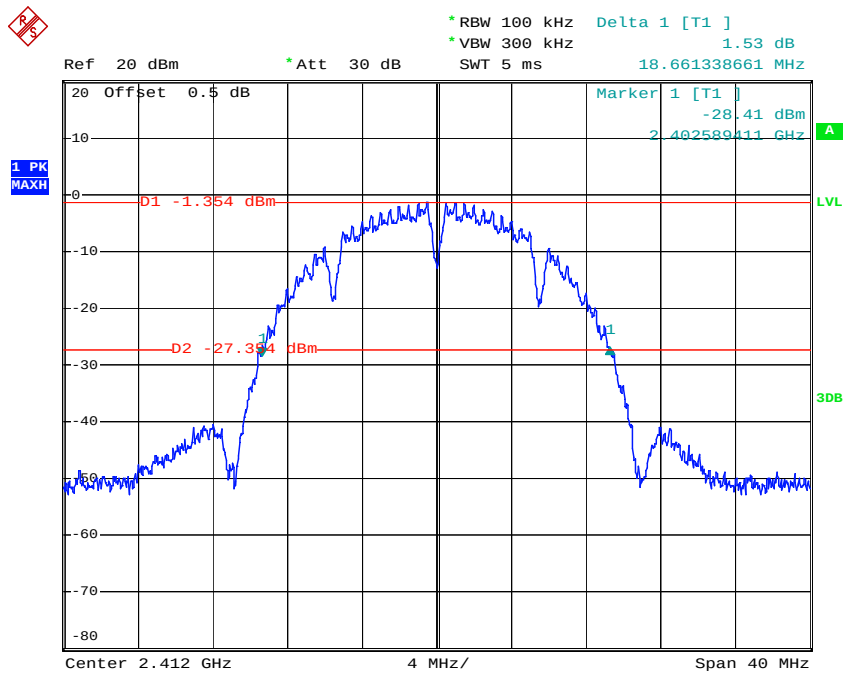
The testing was performed by Ares Liu on 2013-07-01.

Test Mode: Transmitting

| Channel        | Frequency | Conducted Output Power | Limit | Result |
|----------------|-----------|------------------------|-------|--------|
|                | (MHz)     | (dBm)                  | (dBm) |        |
| 802.11b mode   |           |                        |       |        |
| Low            | 2412 MHz  | 9.27                   | 30    | PASS   |
| Middle         | 2437 MHz  | 9.38                   | 30    | PASS   |
| High           | 2462 MHz  | 9.12                   | 30    | PASS   |
| 802.11g mode   |           |                        |       |        |
| Low            | 2412 MHz  | 9.60                   | 30    | PASS   |
| Middle         | 2437 MHz  | 9.49                   | 30    | PASS   |
| High           | 2462 MHz  | 9.26                   | 30    | PASS   |
| 802.11n20 mode |           |                        |       |        |
| Low            | 2412 MHz  | 9.45                   | 30    | PASS   |
| Middle         | 2437 MHz  | 9.50                   | 30    | PASS   |
| High           | 2462 MHz  | 9.61                   | 30    | PASS   |
| 802.11n40 mode |           |                        |       |        |
| Low            | 2422 MHz  | 9.17                   | 30    | PASS   |
| Middle         | 2437 MHz  | 9.30                   | 30    | PASS   |
| High           | 2452 MHz  | 9.58                   | 30    | PASS   |

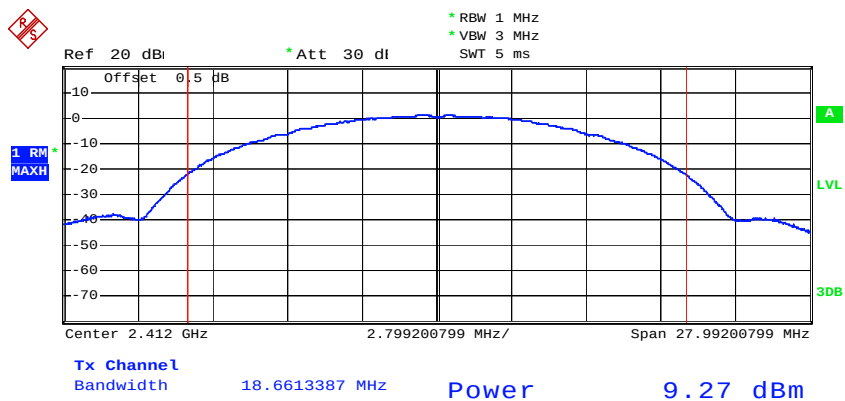
Please refer to the following plots

### 802.11b 26dB, Low Channel



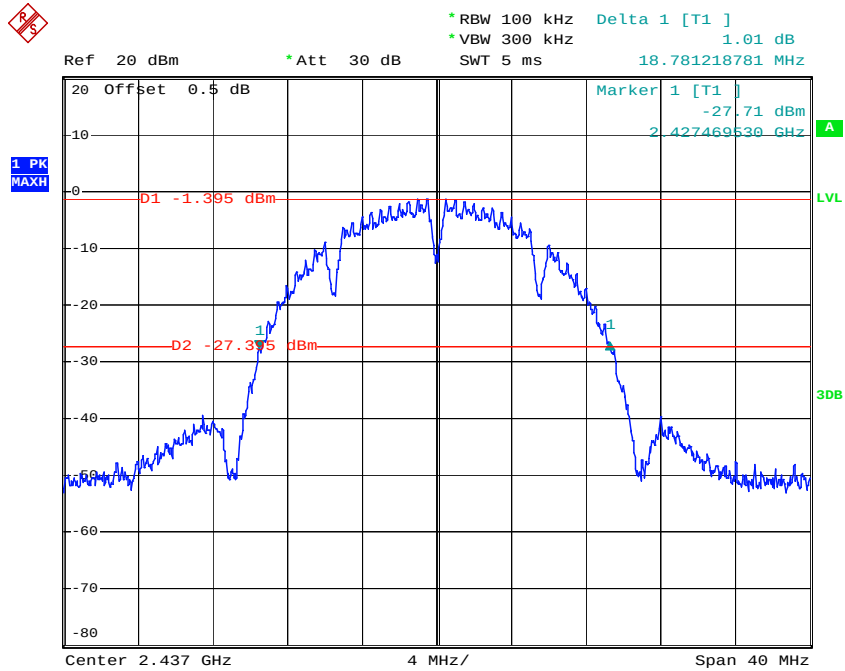
Date: 1.JUL.2013 11:18:12

### 802.11b RF Output Power, Low Channel



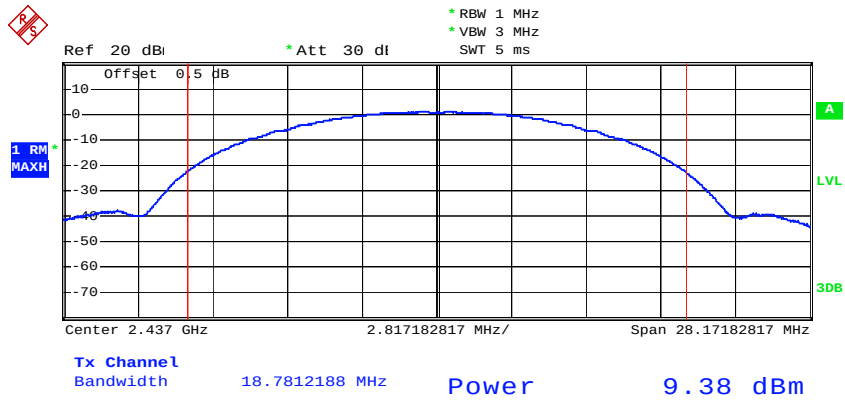
Date: 1.JUL.2013 11:18:26

### 802.11b 26dB, Middle Channel



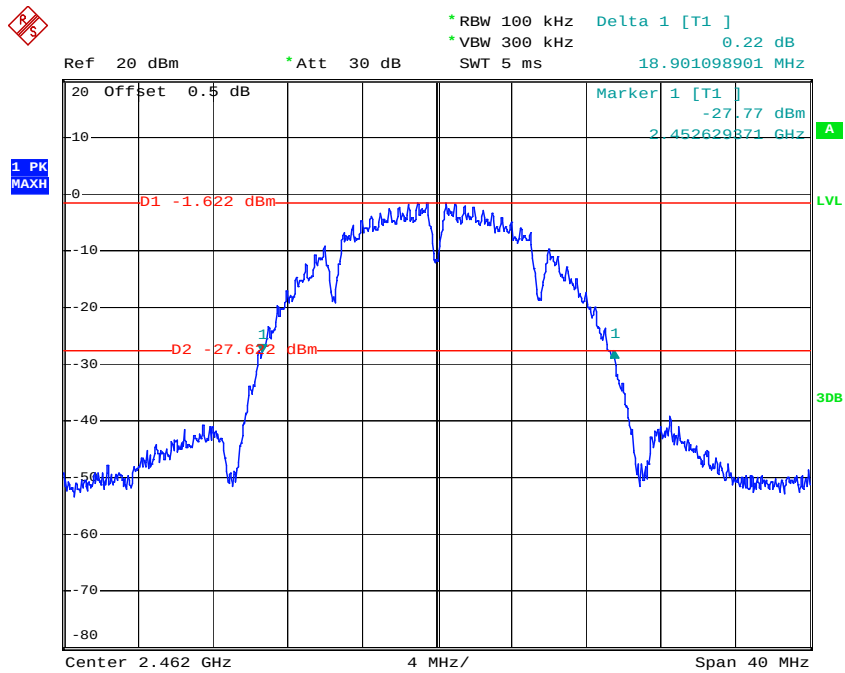
Date: 1.JUL.2013 11:21:28

### 802.11b RF Output Power, Middle Channel



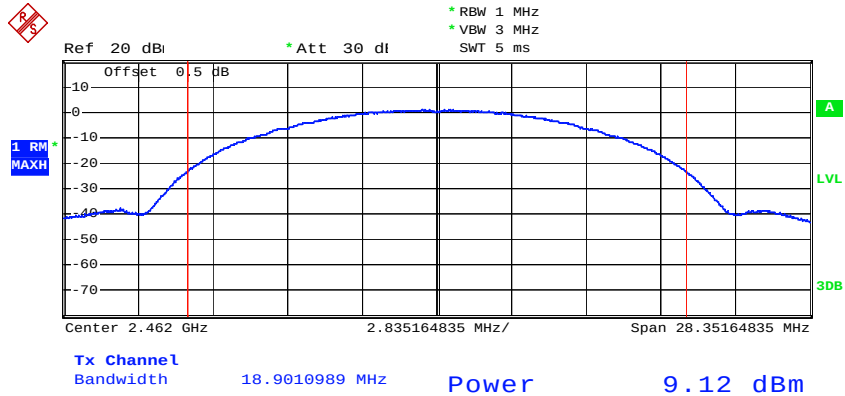
Date: 1.JUL.2013 11:21:42

### 802.11b 26dB, High Channel



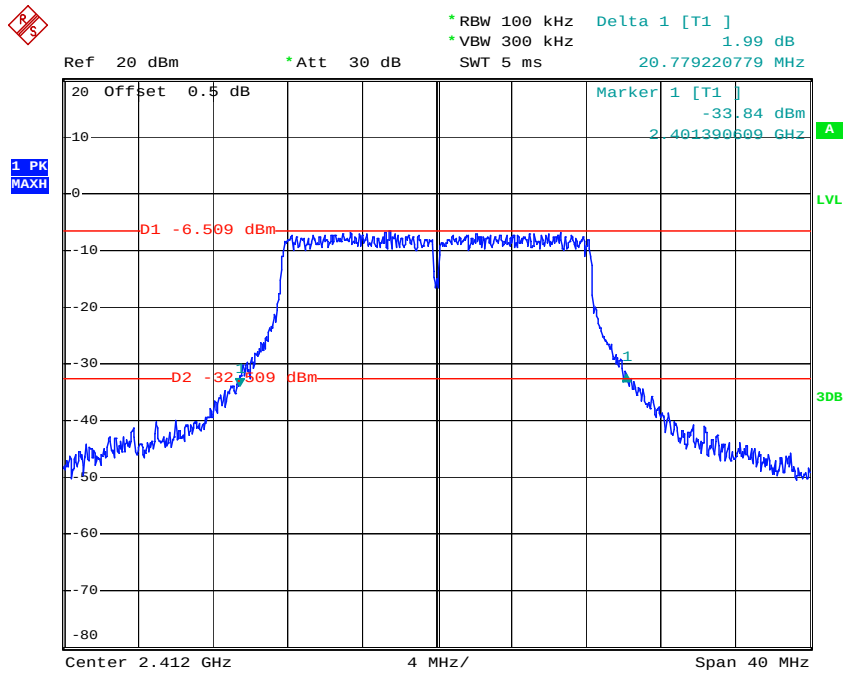
Date: 1.JUL.2013 11:24:12

### 802.11b RF Output Power, High Channel



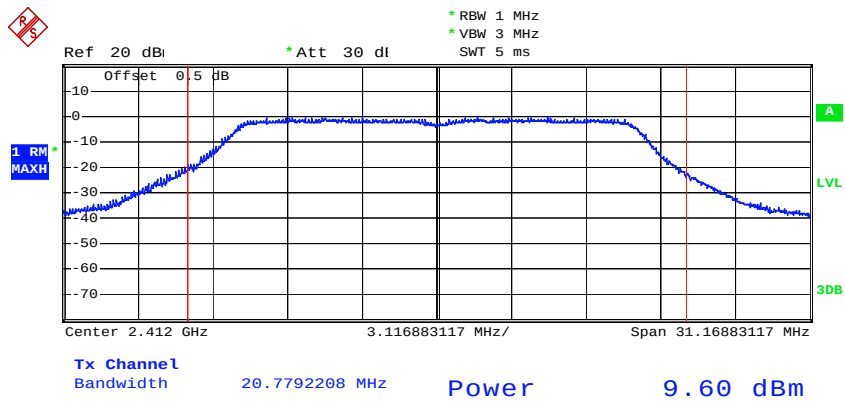
Date: 1.JUL.2013 11:24:26

### 802.11g 26dB, Low Channel



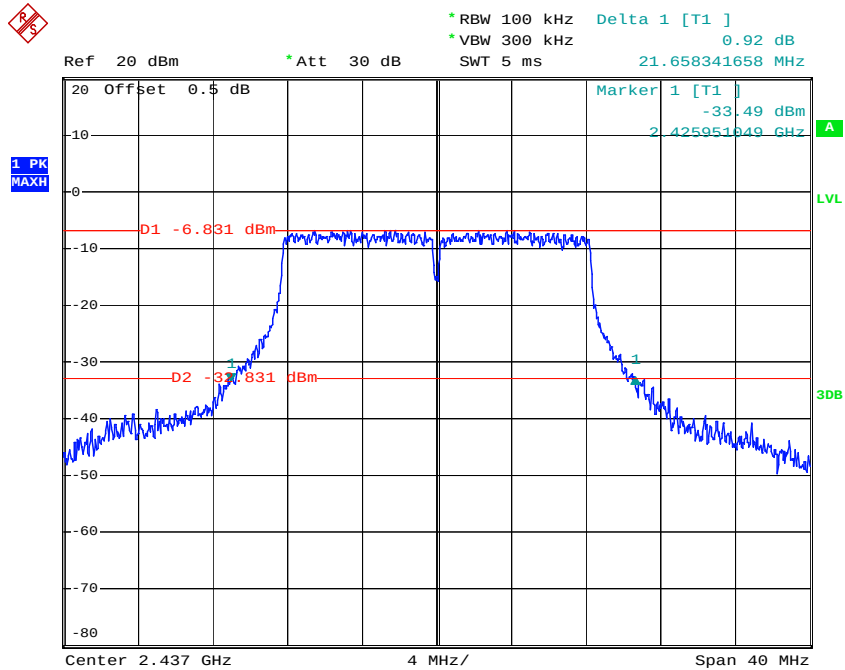
Date: 1.JUL.2013 11:35:05

### 802.11g RF Output Power, Low Channel



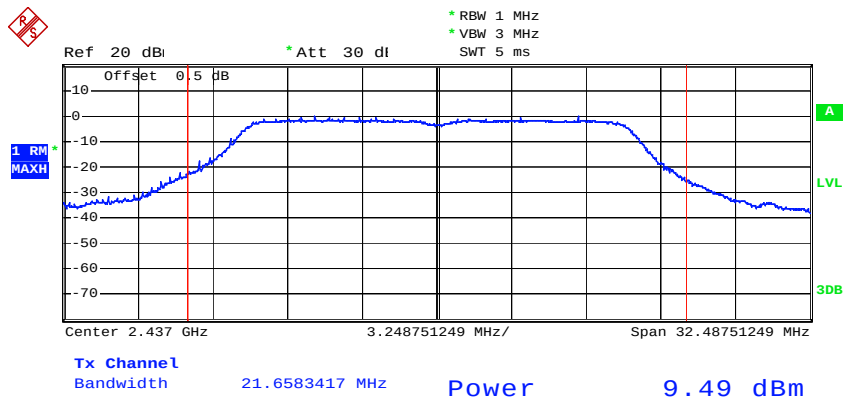
Date: 1.JUL.2013 11:35:19

### 802.11g 26dB, Middle Channel



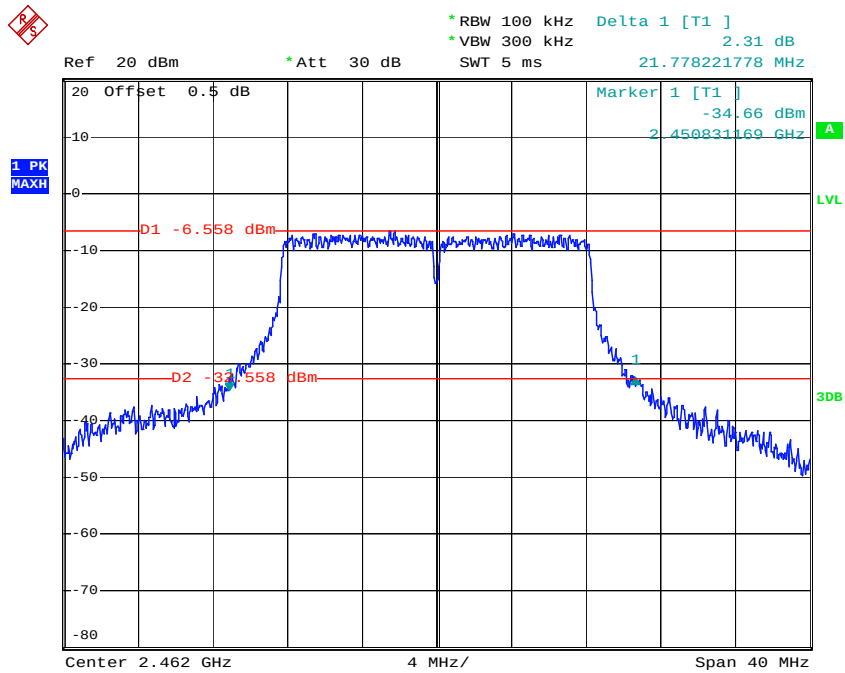
Date: 1.JUL.2013 11:37:42

### 802.11g RF Output Power, Middle Channel



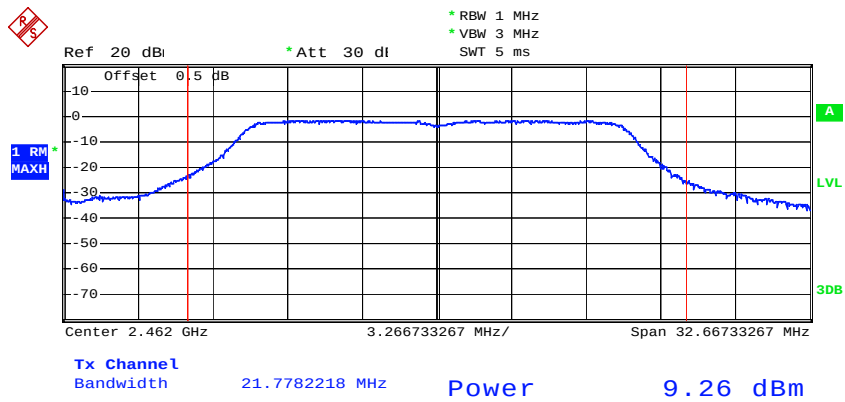
Date: 1.JUL.2013 11:37:56

### 802.11g RF 26dB, High Channel



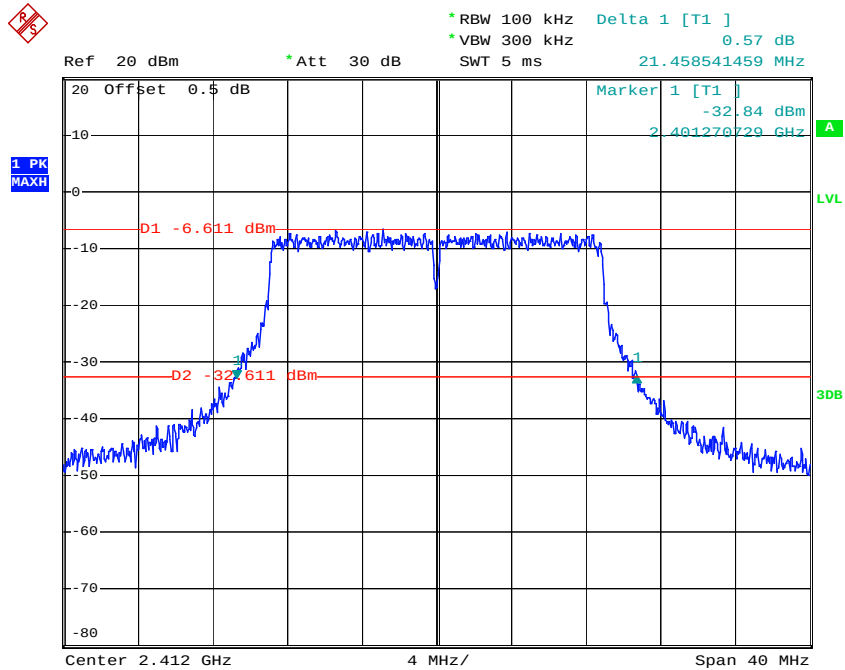
Date: 1.JUL.2013 11:40:39

### 802.11g RF Output Power, High Channel



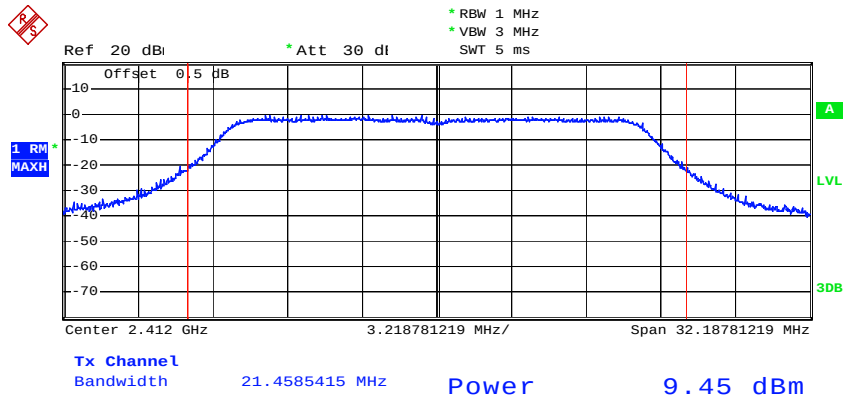
Date: 1.JUL.2013 11:40:53

### 802.11n20 26dB, Low Channel



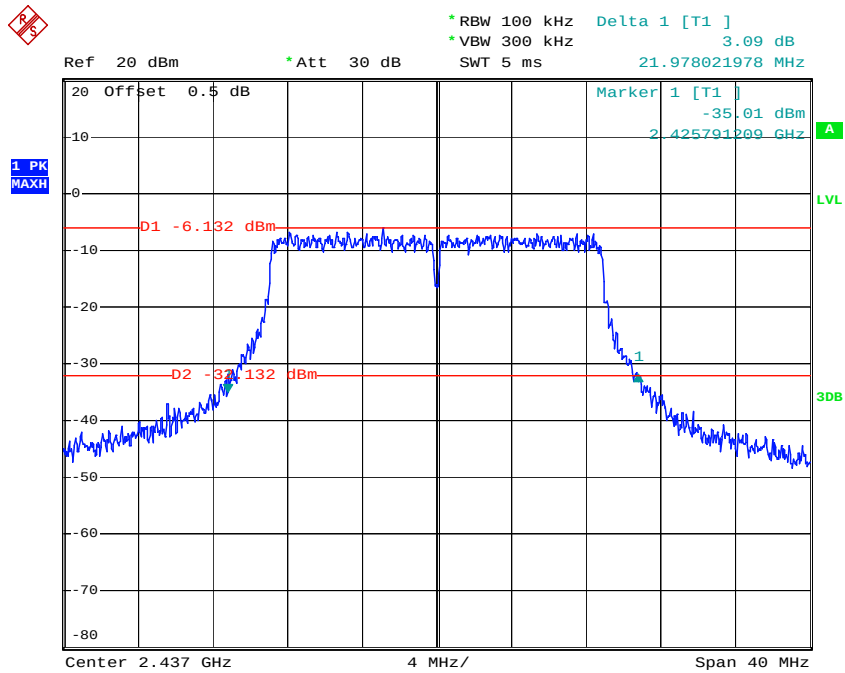
Date: 1.JUL.2013 13:30:38

### 802.11n20 RF Output Power, Low Channel



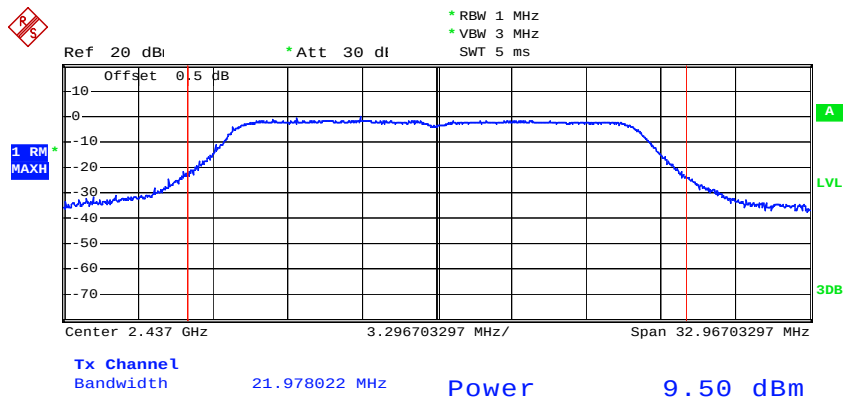
Date: 1.JUL.2013 13:30:52

### 802.11n20 26dB, Middle Channel



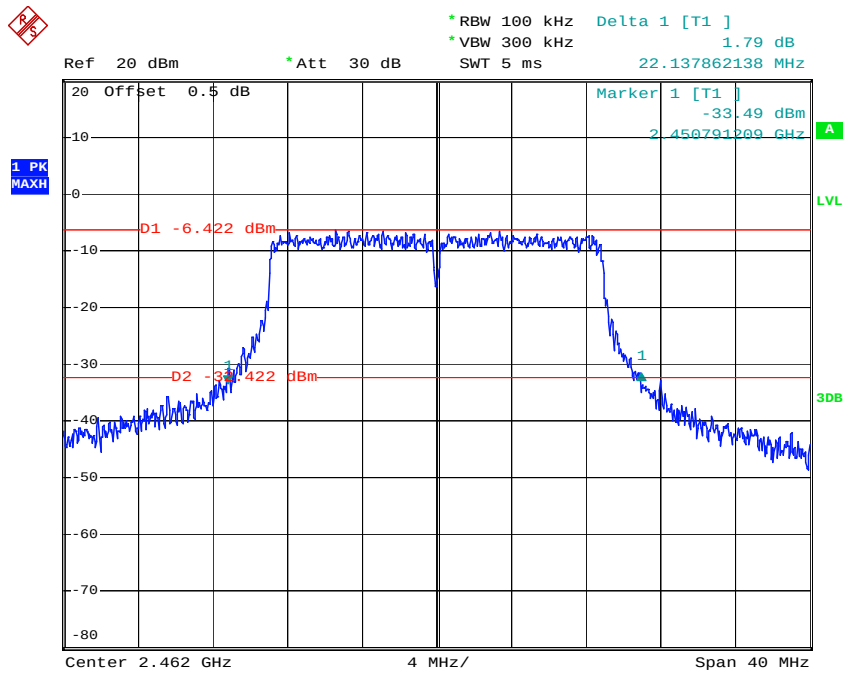
Date: 1.JUL.2013 13:32:15

### 802.11n20 RF Output Power, Middle Channel



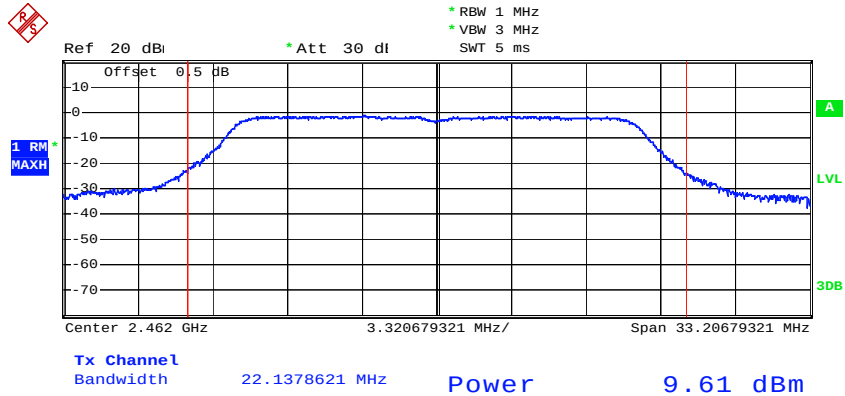
Date: 1.JUL.2013 13:32:29

### 802.11n20 26dB, High Channel



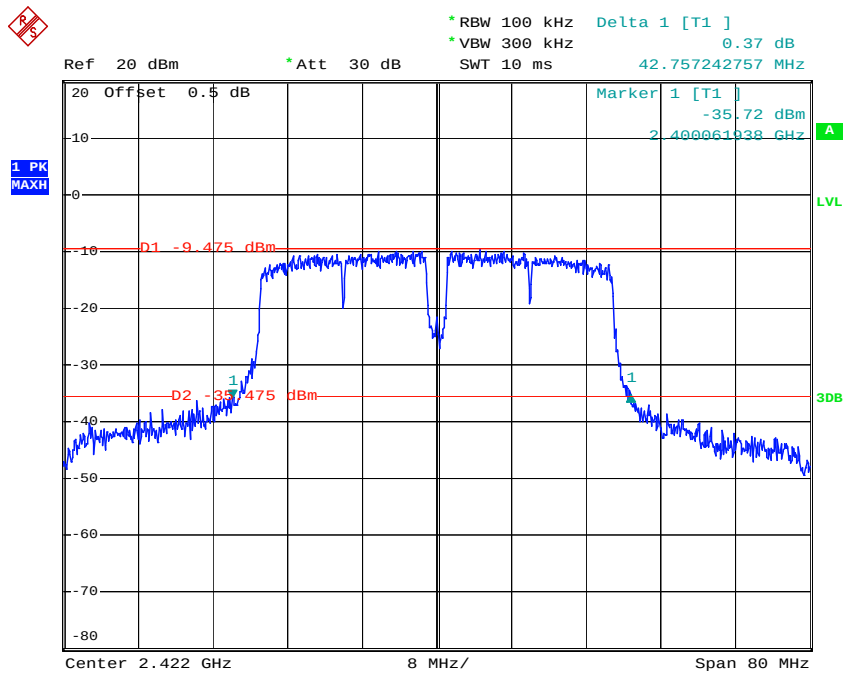
Date: 1.JUL.2013 13:35:11

### 802.11n20 RF Output Power, High Channel



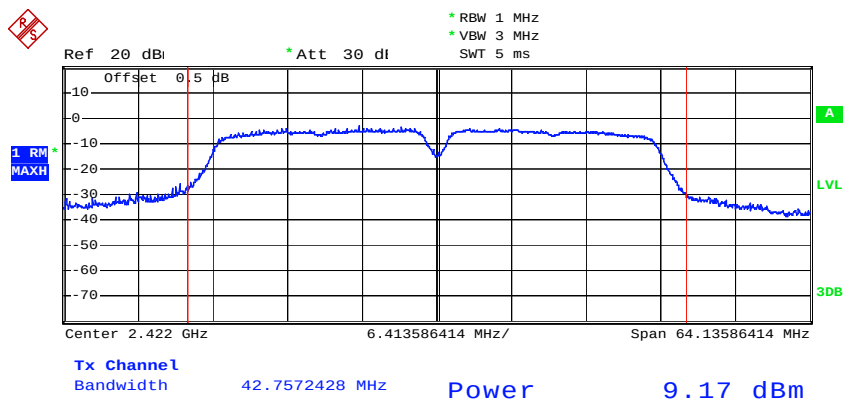
Date: 1.JUL.2013 13:35:25

### 802.11n40 26dB, Low Channel



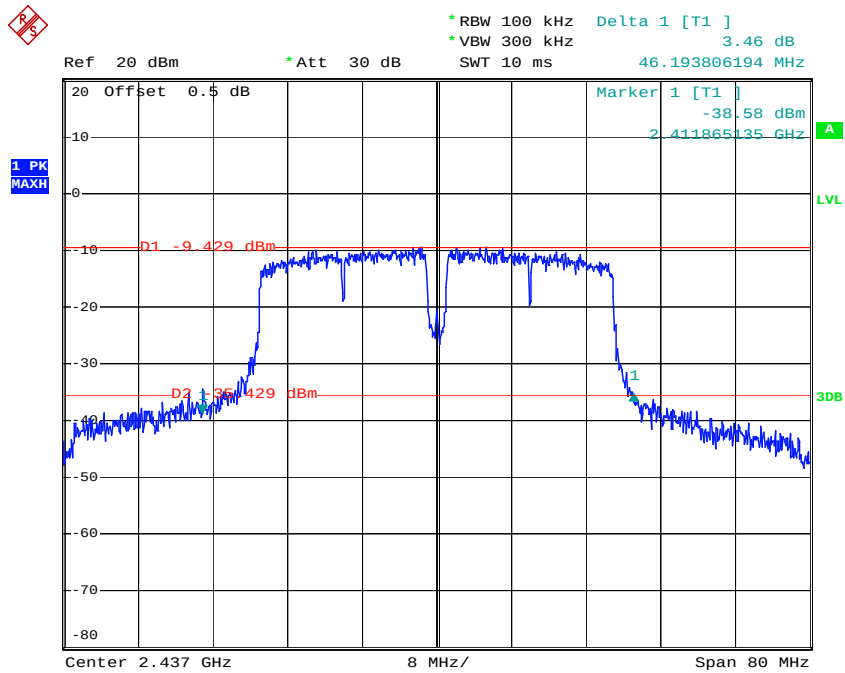
Date: 1.JUL.2013 13:40:23

### 802.11n40 RF Output Power, Low Channel



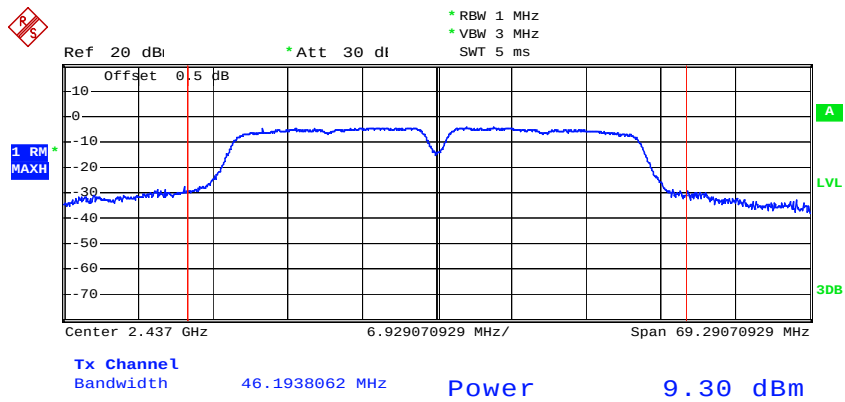
Date: 1.JUL.2013 13:40:37

### 802.11n40 26dB, Middle Channel



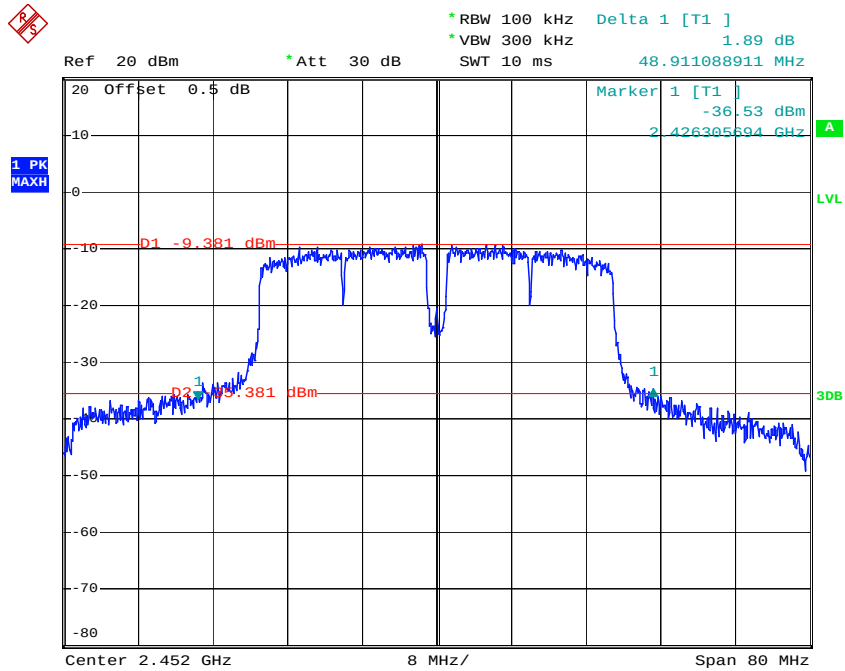
Date: 1.JUL.2013 13:42:09

### 802.11n40 RF Output Power, Middle Channel



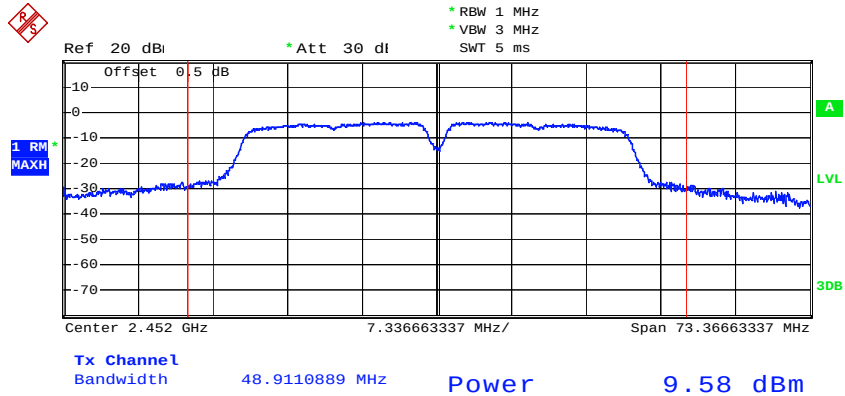
Date: 1.JUL.2013 13:42:23

### 802.11n40 26dB, High Channel



Date: 1.JUL.2013 13:44:41

### 802.11n40 RF Output Power, High Channel



Date: 1.JUL.2013 13:44:55

## **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**

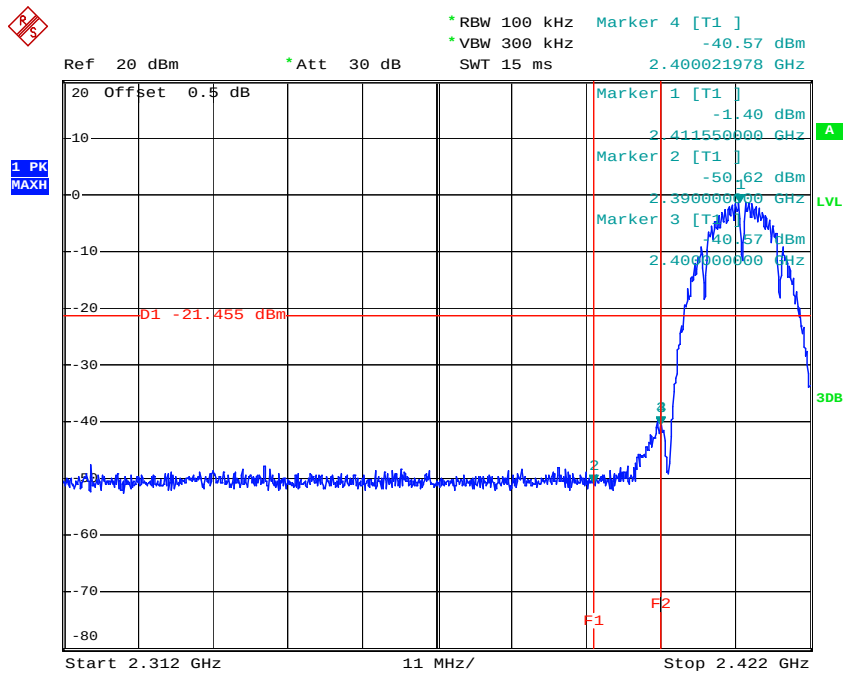
|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 27.9 °C  |
| <b>Relative Humidity:</b> | 69 %     |
| <b>ATM Pressure:</b>      | 99.8 kPa |

*The testing was performed by Ares Liu on 2013-07-01.*

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

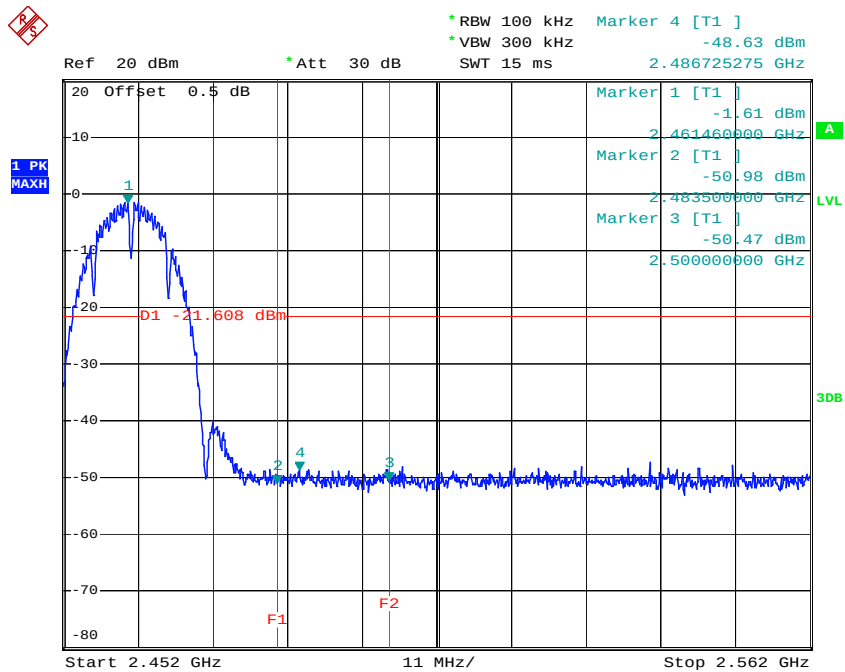
Please refer to following table and plots.

### 802.11b: Band Edge, Left Side



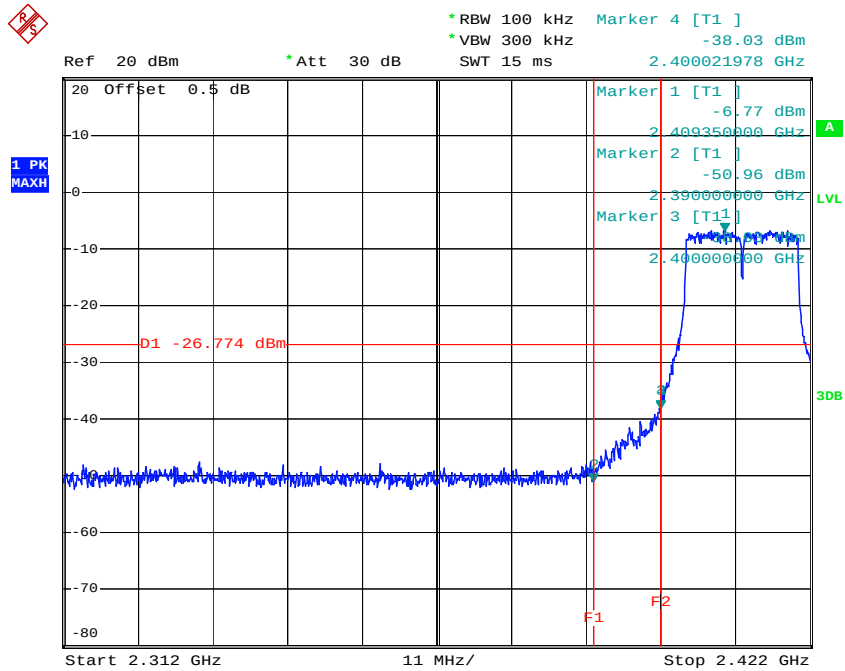
Date: 1. JUL. 2013 11:18:51

### 802.11b: Band Edge, Right Side



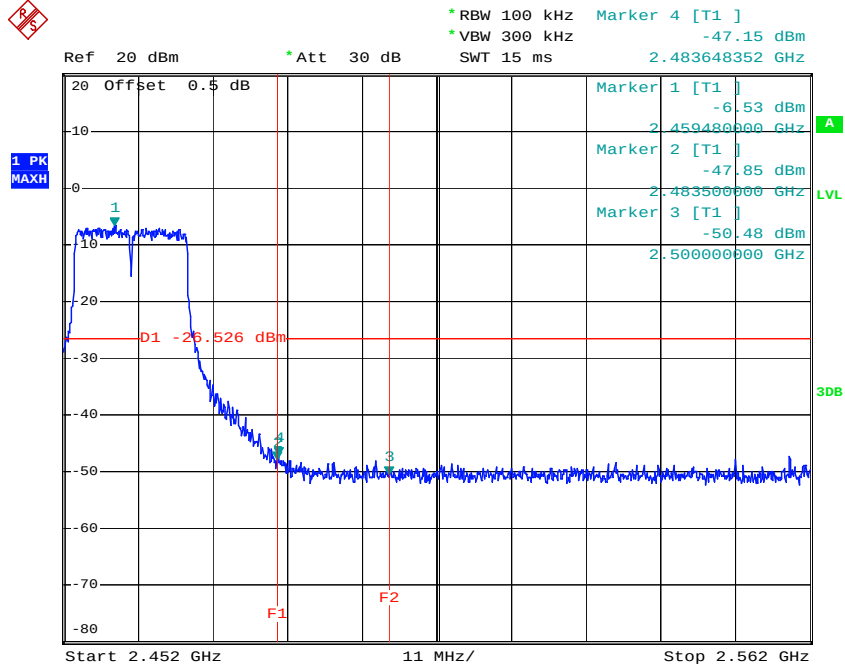
Date: 1. JUL. 2013 11:24:50

### 802.11g: Band Edge, Left Side



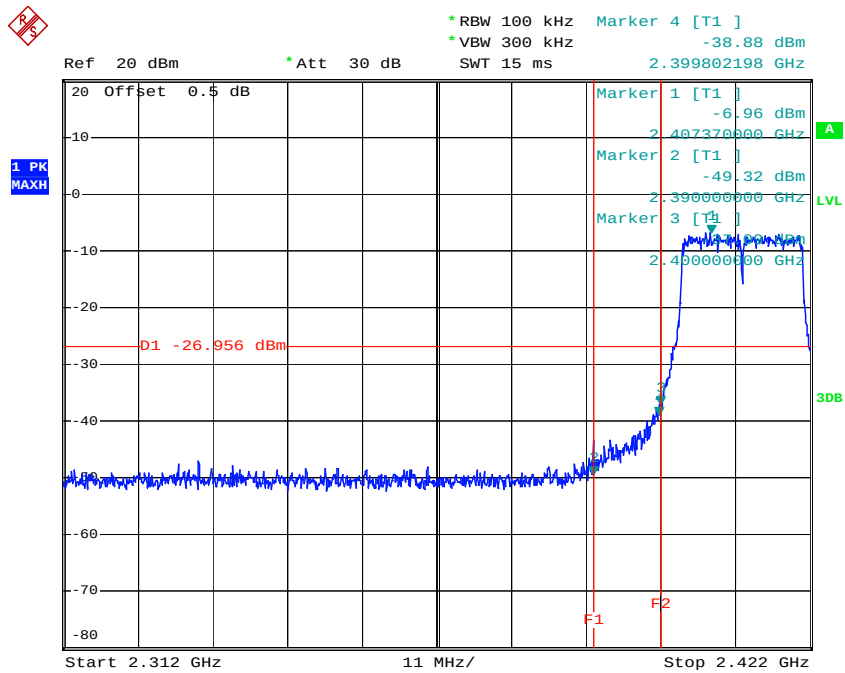
Date: 1.JUL.2013 11:35:46

### 802.11g: Band Edge, Right Side



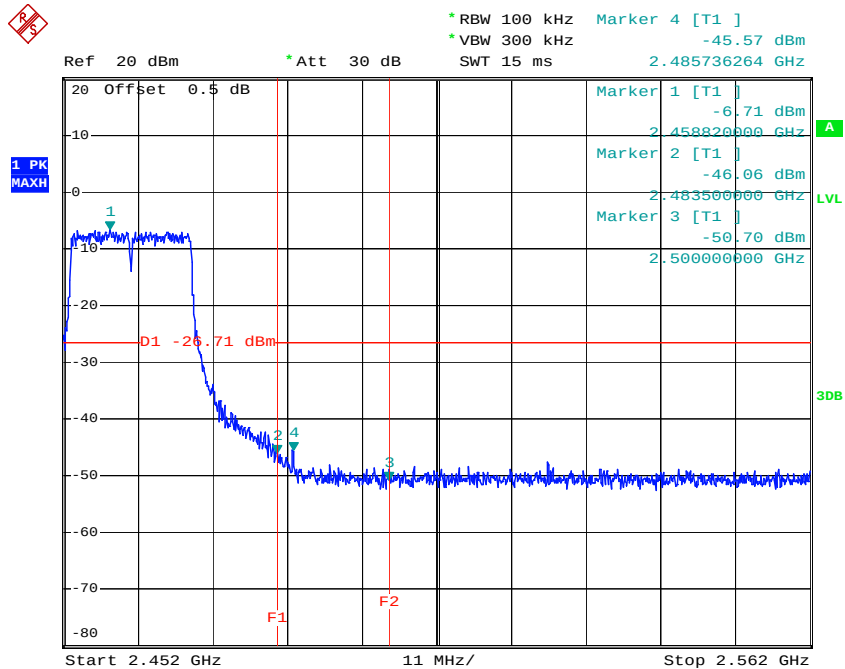
Date: 1.JUL.2013 11:41:20

### 802.11n20 Band Edge, Left Side



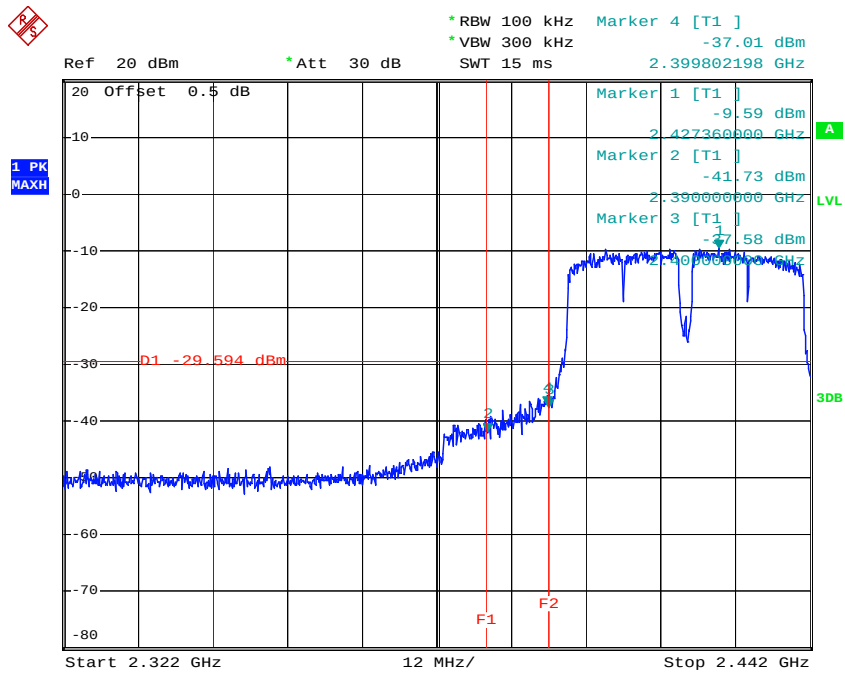
Date: 1.JUL.2013 13:31:20

### 802.11n20 Band Edge, Right Side



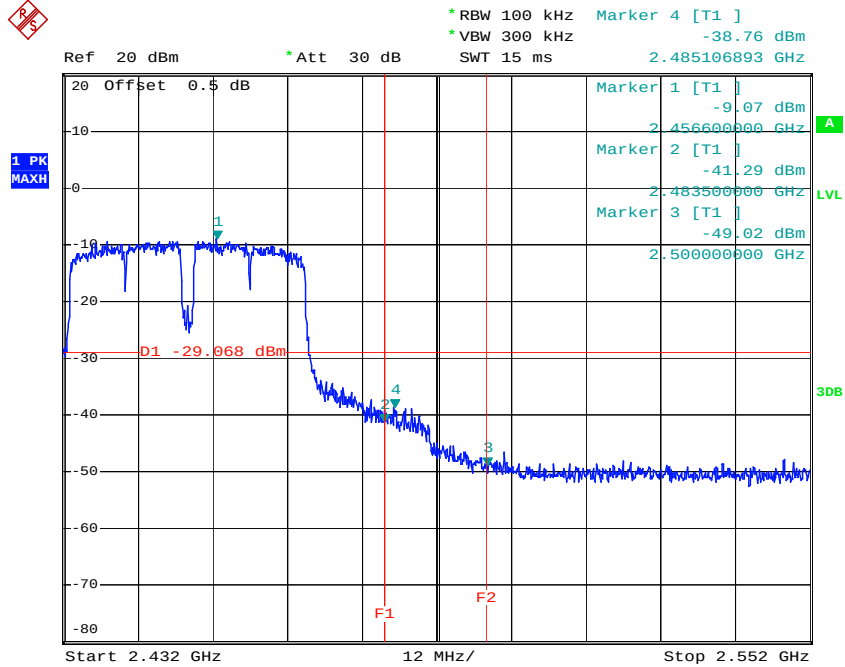
Date: 1.JUL.2013 13:35:53

### 802.11n40 Band Edge, Left Side



Date: 1.JUL.2013 13:41:15

### 802.11n40 Band Edge, Right Side



Date: 1.JUL.2013 13:45:34

## FCC §15.247(e) - POWER SPECTRAL DENSITY

### Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. According to KDB 558074 D01 DTS Meas Guidance v02, set the RBW = 3 kHz, VBW = 30 kHz, Set the span to 1.5 times the DTS channel bandwidth.
4. Use the peak marker function to determine the maximum power level in any 3 kHz band segment within the fundamental EBW.

### Test Equipment List and Details

| Manufacturer | Description       | Model  | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------|--------|---------------|------------------|----------------------|
| R&S          | Spectrum analyzer | FSP 38 | 100478        | 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:       | 27.9 °C  |
| Relative Humidity: | 69 %     |
| ATM Pressure:      | 99.8 kPa |

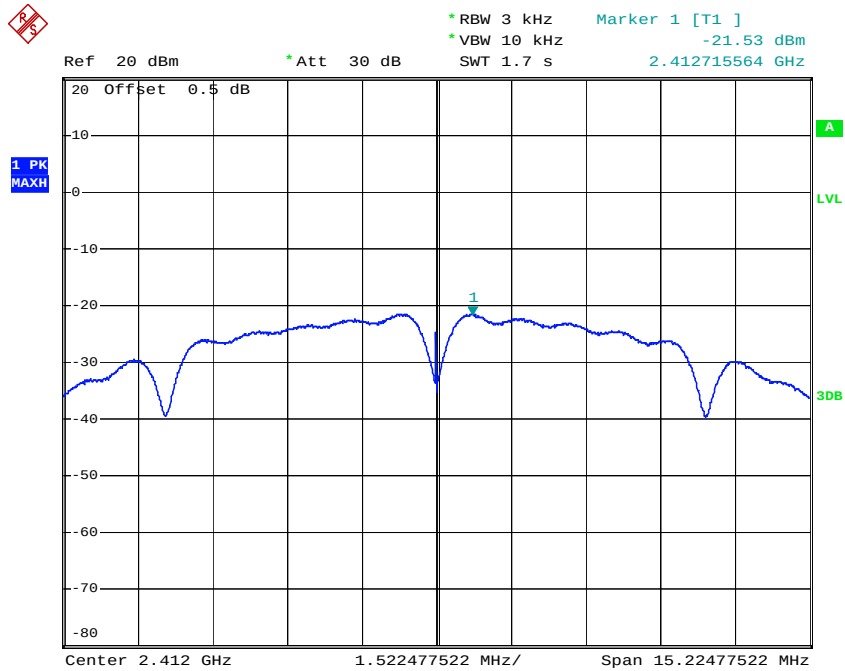
*The testing was performed by Ares Liu on 2013-07-01.*

*Test Mode: Transmitting***Test Result:** Pass

| Channel        | PSD        | Limit      | Result |
|----------------|------------|------------|--------|
|                | (dBm/3kHz) | (dBm/3kHz) |        |
| 802.11b mode   |            |            |        |
| Low            | -21.53     | 8          | PASS   |
| Middle         | -21.52     | 8          | PASS   |
| High           | -21.76     | 8          | PASS   |
| 802.11g mode   |            |            |        |
| Low            | -21.05     | 8          | PASS   |
| Middle         | -20.70     | 8          | PASS   |
| High           | -21.16     | 8          | PASS   |
| 802.11n20 mode |            |            |        |
| Low            | -20.95     | 8          | PASS   |
| Middle         | -19.97     | 8          | PASS   |
| High           | -20.56     | 8          | PASS   |
| 802.11n40 mode |            |            |        |
| Low            | -24.06     | 8          | PASS   |
| Middle         | -22.95     | 8          | PASS   |
| High           | -22.48     | 8          | PASS   |

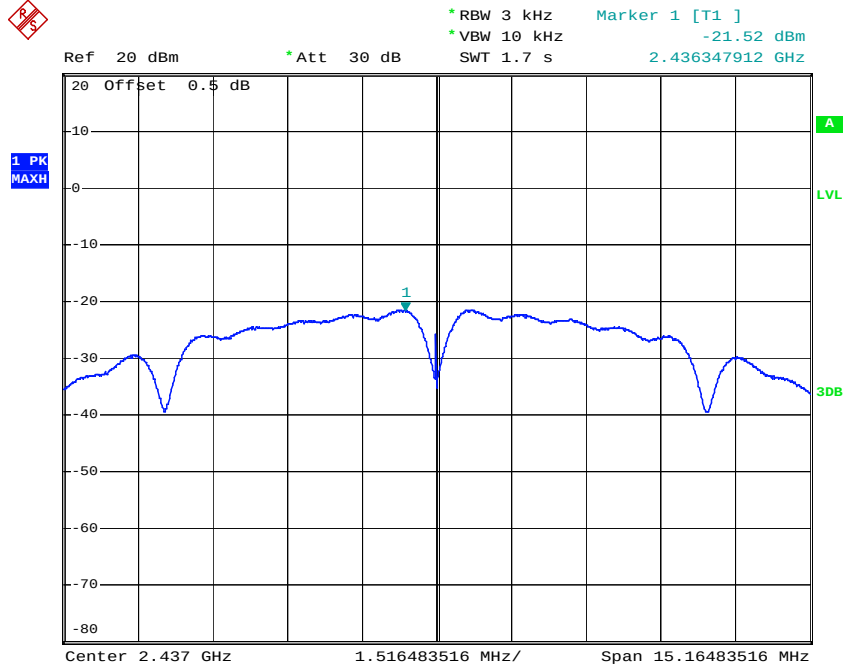
Please refer to the following plots

### Power Spectral Density, 802.11b Low Channel



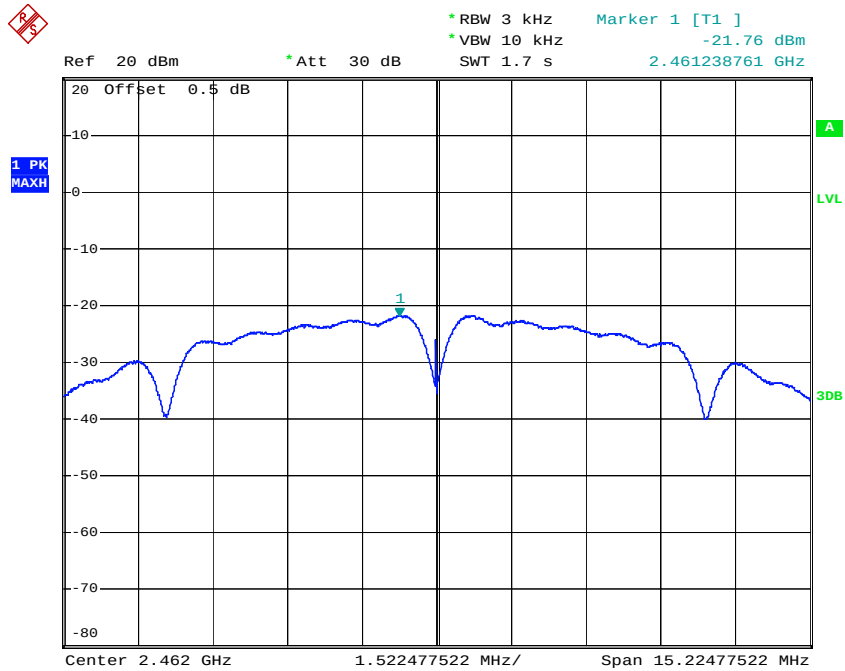
Date: 1.JUL.2013 11:18:33

### Power Spectral Density, 802.11b Middle Channel



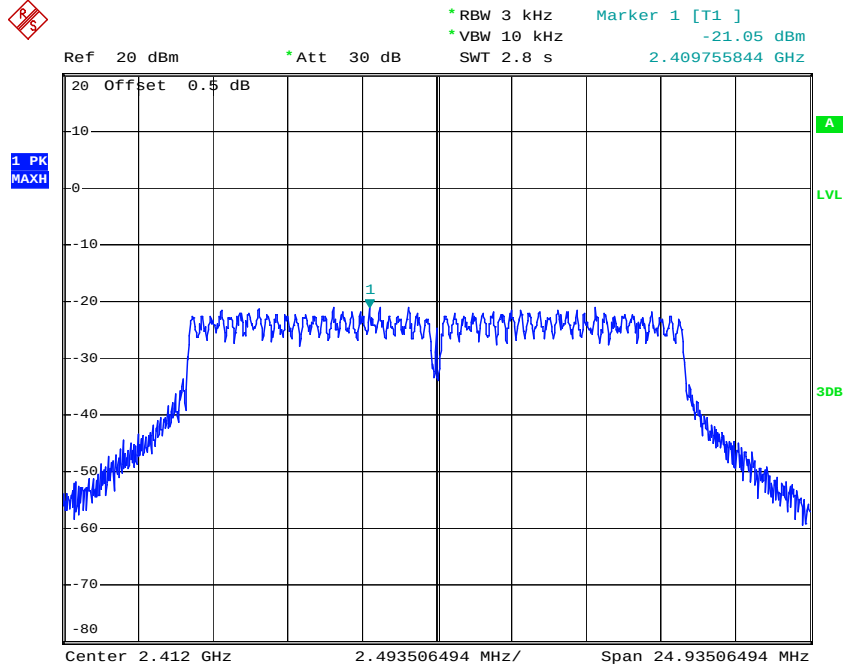
Date: 1.JUL.2013 11:21:49

### Power Spectral Density, 802.11b High Channel



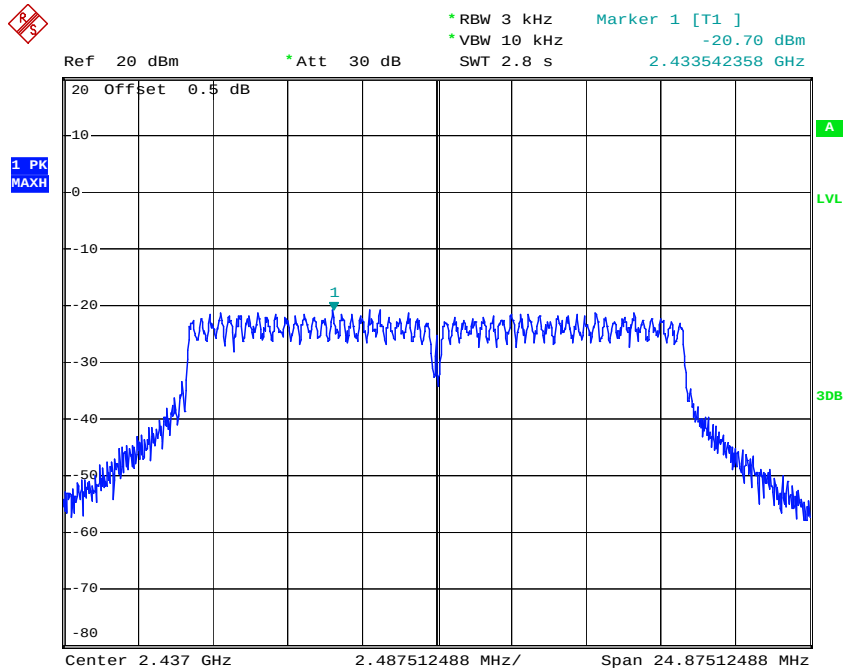
Date: 1.JUL.2013 11:24:33

### Power Spectral Density, 802.11g Low Channel



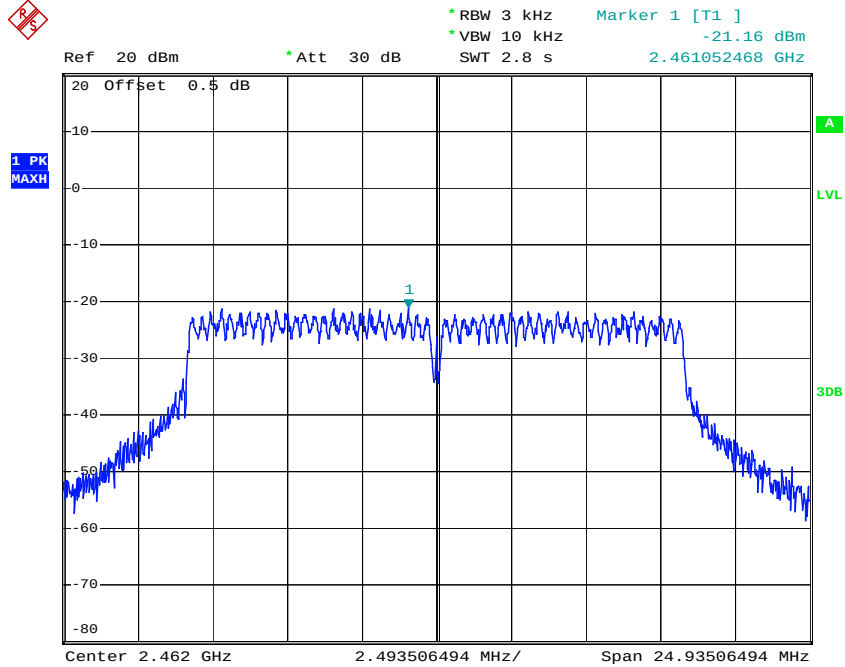
Date: 1.JUL.2013 11:35:29

### Power Spectral Density, 802.11g Middle Channel



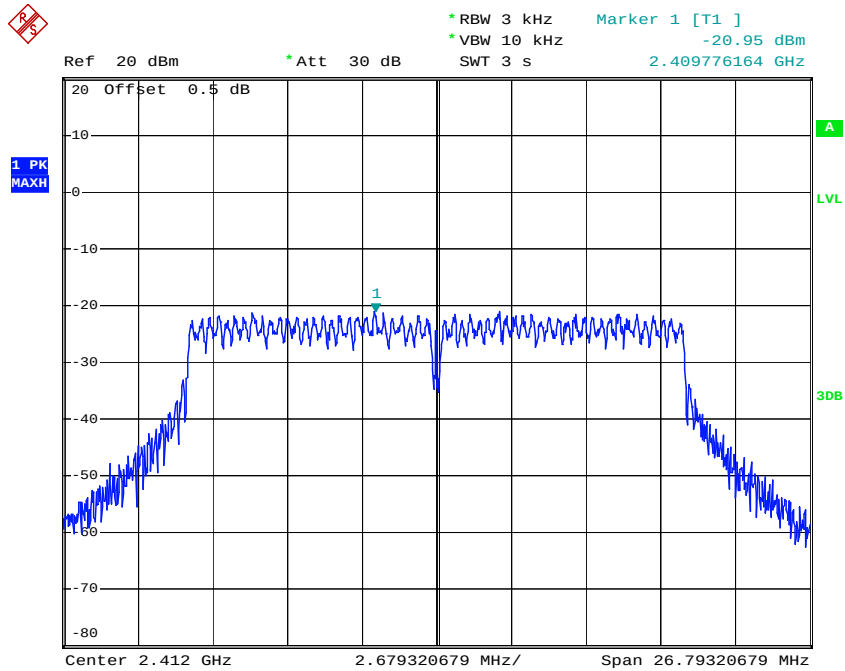
Date: 1.JUL.2013 11:38:06

### Power Spectral Density, 802.11g High Channel



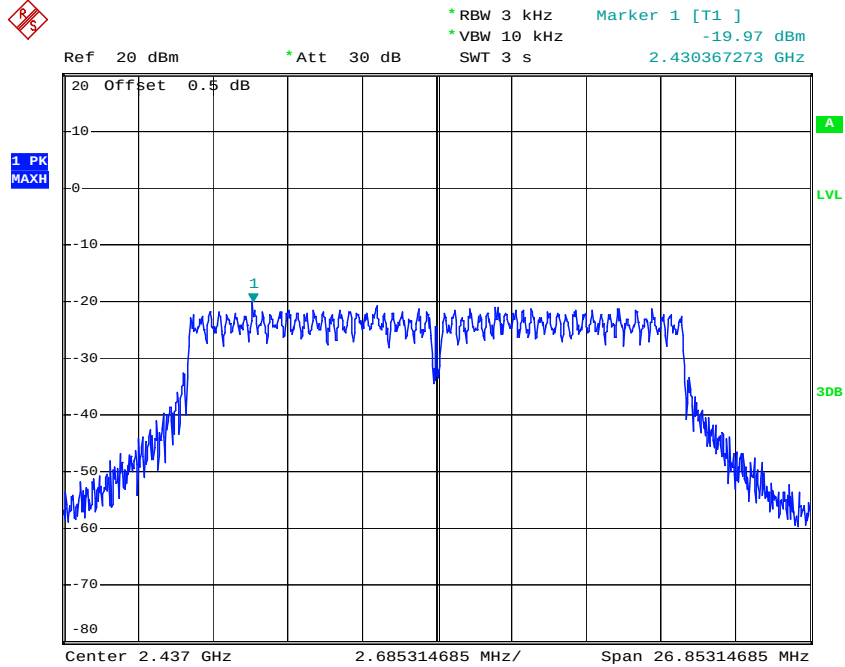
Date: 1.JUL.2013 11:41:03

### Power Spectral Density, 802.11n20 Low Channel



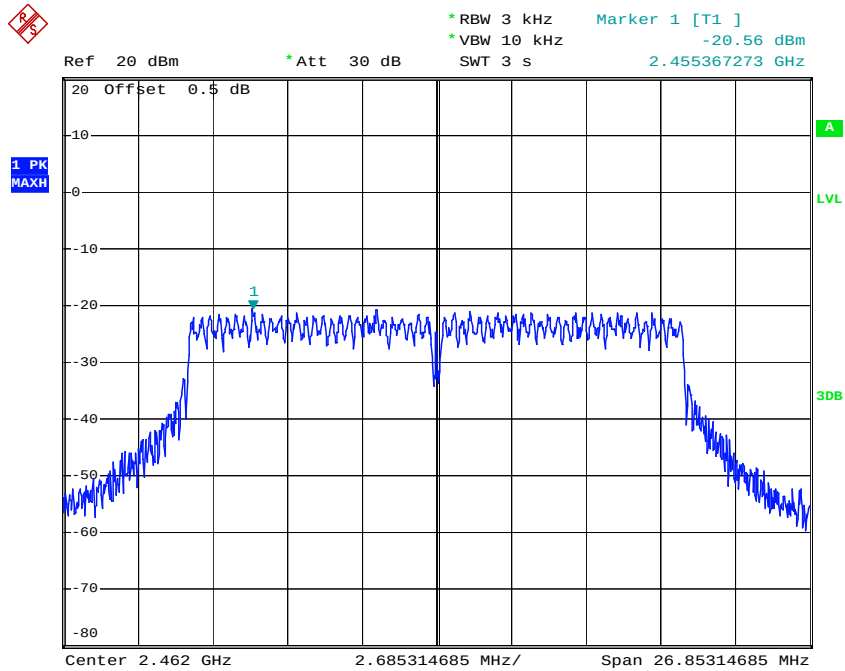
Date: 1.JUL.2013 13:31:02

### Power Spectral Density, 802.11n20 Middle Channel



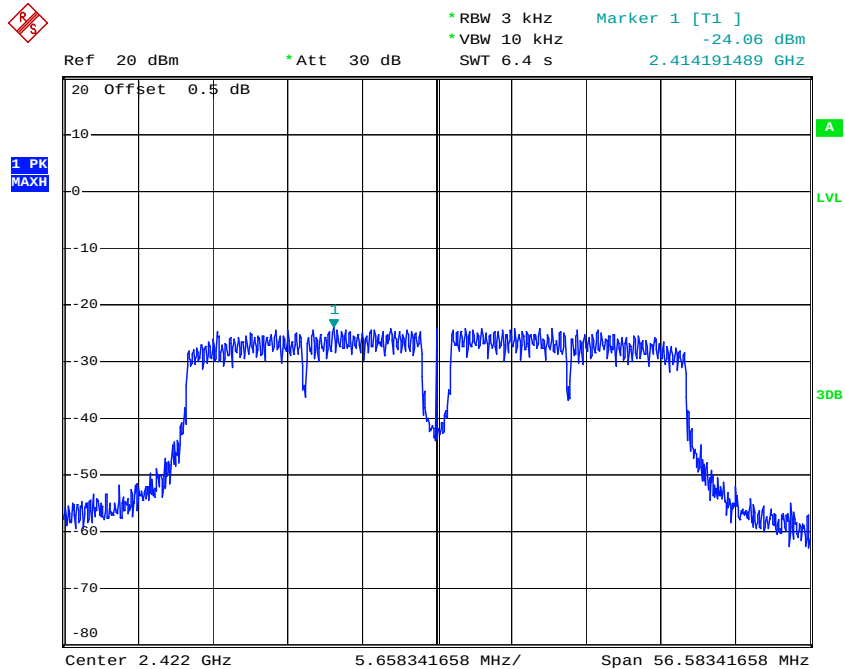
Date: 1.JUL.2013 13:32:39

### Power Spectral Density, 802.11n20 High Channel



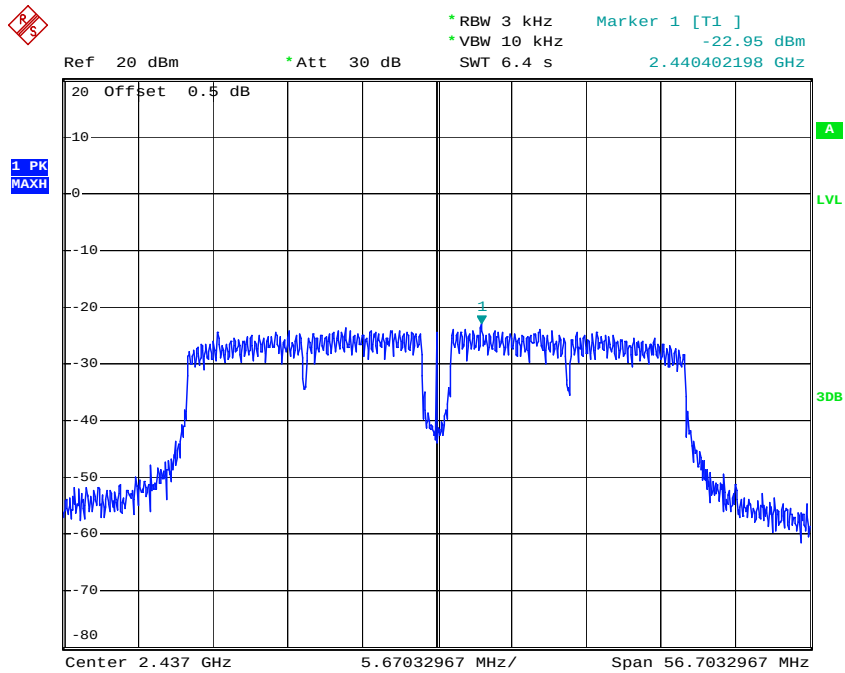
Date: 1.JUL.2013 13:35:35

### Power Spectral Density, 802.11n40 Low Channel



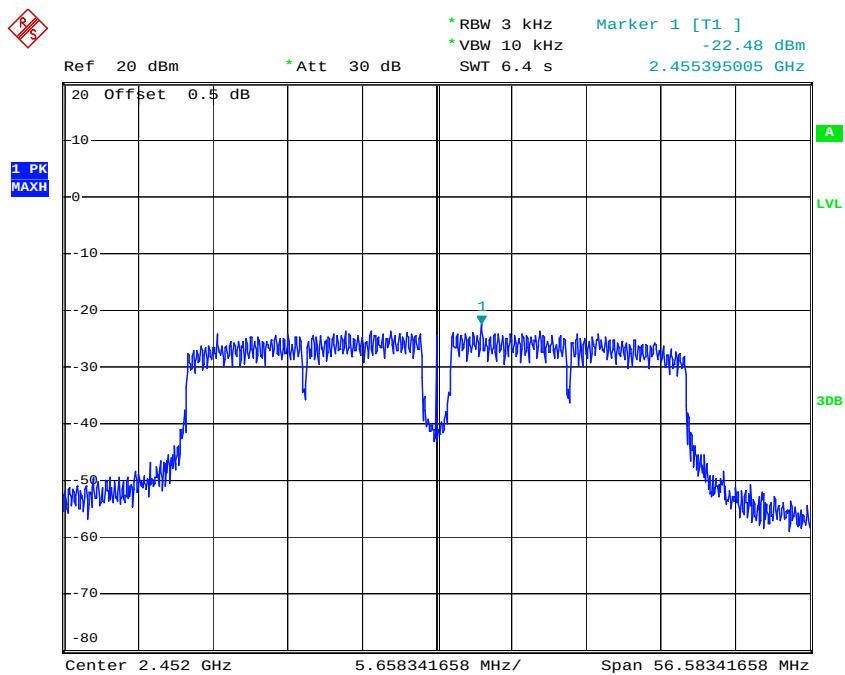
Date: 1.JUL.2013 13:40:58

### Power Spectral Density, 802.11n40 Middle Channel



Date: 1. JUL. 2013 13:42:44

### Power Spectral Density, 802.11n40 High Channel



Date: 1. JUL. 2013 13:45:16

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