



## FCC PART 15.407





# TEST AND MEASUREMENT REPORT

For

## Sensity Systems, Inc.

480 Oakmead Parkway,  
Sunnyvale, CA 94085, USA

**FCC: SXNLSNM-0001-A**

|  |  |
|--|--|
| <b>Report Type:</b><br>Original Report   | <b>Product Type:</b><br>Light Sensory Module |
| <b>Test Engineer:</b> <u>Lionel Lara</u>                |  |
| <b>Report Number:</b> <u>R1304307-407</u>  |  |
| <b>Report Date:</b> <u>2013-09-24</u>  |  |
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**DOCUMENT REVISION HISTORY**

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|------------------------|----------------------|--------------------------------|-------------------------|
| 0                      | R1304307-407         | Original Report                | 2013-09-24              |

## 1 General Description

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

This test and measurement report was prepared on behalf of *Sensity Systems, Inc.*, and their product model: *LSNM-0001-A* with *FCC ID: SXNLSNM-0001-A* or the “EUT” as referred to in this report. The EUT is a light sensory module operating in the 2.4, 5.2, 5.3 and 5.6 GHz bands.

### 1.2 Mechanical Description of EUT

The EUT measures approximately 15 cm (L) x 15 cm (W) x 12 cm (H) and weighs 620g.

*The test data gathered are from typical production sample, serial number: 0102713A0000C250 provided by the manufacturer.*

### 1.3 Objective

This report is prepared on behalf of *Sensity Systems, Inc.*, in accordance with FCC CFR47 §15.407.

The objective is to determine compliance with FCC rules for Antenna Requirements, AC Line Conducted Emissions, Occupied Bandwidth, Maximum Peak Output Power, Power Spectral Density, Radiated and Conducted Spurious Emissions, and Band Edge.

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

N/A

### 1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz and FCC KDB 789033 D01 General UNII Test Procedures v01r03: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E

### 1.6 Measurement Uncertainty

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

Based on CISPR16-4-2:2007, The Treatment of Uncertainty in EMC Measurements, the values ranging from  $\pm 2.0$  dB for Conducted Emissions tests and  $\pm 4.0$  dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## 1.7 Test Facility

Bay Area Compliance Laboratories Corp. (BACL) is:

1- An independent Commercial Test Laboratory accredited to **ISO 17025:2005** by **A2LA**, in the fields of: Electromagnetic Compatibility & Telecommunications covering Emissions, Immunity, Radio, RF Exposure, Safety and Telecom. This includes NEBS (Network Equipment Building System), Wireless RF, Telecommunications Terminal Equipment (TTE); Network Equipment; Information Technology Equipment (ITE); Medical Electrical Equipment; Industrial, Commercial, and Medical Test Equipment; Professional Audio and Video Equipment; Electronic (Digital) Products; Industrial and Scientific Instruments; Cabled Distribution Systems and Energy Efficiency Lighting.

2- An ENERGY STAR Recognized Laboratory, for the LM80 Testing, a wide variety of Luminaires and Computers.

3- A NIST Designated Phase-I and Phase-II CAB including: ACMA (Australian Communication and Media Authority), BSMI (Bureau of Standards, Metrology and Inspection of Taiwan), IDA (Infocomm Development Authority of Singapore), IC (Industry Canada), Korea (Ministry of Communications Radio Research Laboratory), NCC (Formerly DGT; Directorate General of Telecommunication of Chinese Taipei) OFTA (Office of the Telecommunications Authority of Hong Kong), Vietnam, VCCI - Voluntary Control Council for Interference of Japan and a designated EU CAB (Conformity Assessment Body) (Notified Body) for the EMC and R&TTE Directives.

4 - A Product Certification Body accredited to **ISO Guide 65:1996** by **A2LA** to certify:

1- Unlicensed, Licensed radio frequency devices and Telephone Terminal Equipment for the FCC. Scope A1, A2, A3, A4, B1, B2, B3, B4 & C.

2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.

3. Radio Communication Equipment for Singapore.

4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.

5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).

6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (including GU24s), Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). 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 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz, as well as ANSI C63.4-2009, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

<http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionId=8430d44f1f47cf2996124343c704b367816b>



## 2 EUT Test Configuration

### 2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2009 FCC KDB 789033 D01 General UNII Test Procedures v01r03

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

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

### 2.2 EUT Exercise Software

The test utility used was TeraTerm and was verified by Lionel Lara to comply with the standard requirements being tested against.

### 2.3 Equipment Modifications

No modifications were made to the EUT.

### 2.4 Special Accessories

There were no special accessories were required, included, or intended for use with EUT during these tests.

### 2.5 Local Support Equipment

| Manufacturer | Description | Model          | Serial Number |
|--------------|-------------|----------------|---------------|
| DELL         | Laptop      | Latitude E5420 | -             |

### 2.6 EUT Internal Configuration Details

| Manufacturer    | Description  | Model     | Serial Number  |
|-----------------|--------------|-----------|----------------|
| Sensity Systems | Main Board   | U-Node V2 | 40313260134    |
| Sensity Systems | Power Board  | PMAC V2   | 40313260176    |
| Sensity Systems | Sensor Board | D055      | 6MT064462-0089 |

## 2.7 Interface Ports and Cables

| Cable Description | Length (m) | To           | From            |
|-------------------|------------|--------------|-----------------|
| RF Cable          | <1.0       | PSA          | EUT             |
| USB cable         | <1.0       | Laptop       | Interface Board |
| RJ 45 Cable       | <1.0       | Power Supply | EUT             |

## 2.8 Power Supply List and Details

| Manufacturer | Description     | Model | Part Number |
|--------------|-----------------|-------|-------------|
| BK Precision | DC Power Supply | 1621A | D185052265  |

*Note: EUT is AC powered only. A DC power supply was used for testing purposes only.*

### 3 Summary of Test Results

| FCC Rules                 | Description of Test                     | Result    |
|---------------------------|---|-----------|
| FCC §15.407(f), §2.1091   | RF Exposure                             | Compliant |
| FCC §15.203               | Antenna Requirement                     | Compliant |
| FCC §15.207               | AC Power Line Conducted Emissions       | Compliant |
| FCC §15.209(a), 15.407(b) | Spurious Radiated Emissions             | Compliant |
| FCC §15.407(a)            | 26 dB and 99% Emission Bandwidth        | Compliant |
| FCC §407(a)(1)            | Peak Output Power Measurement           | Compliant |
| FCC §2.1051, §15.407(b)   | Out of Band Emissions                   | Compliant |
| FCC §15.407(a)(1)         | Power Spectral Density                  | Compliant |
| FCC §15.407(a)(6)         | Peak Excursion Ratio                    | Compliant |
| FCC §2.1051, §15.407(b)   | Spurious Emissions at Antenna Terminals | Compliant |
| FCC §15.407(h)            | DFS                                     | Note 1    |

- **Note 1:** please refer to the DFS report, Report number: R1304301-FCC client DFS

## 4 FCC §2.1091 & §15.407(f) - RF Exposure

### 4.1 Applicable Standard

According to FCC §15.407(f) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

#### Limits for General Population/Uncontrolled Exposure

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

f = frequency in MHz

\* = Plane-wave equivalent power density

### 4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

### 4.3 MPE Results

W52 Band:

|  |       |
|--|-------|
| Maximum peak output power at antenna input terminal (dBm):                         | 14.68 |
| Maximum peak output power at antenna input terminal (mW):                          | 29.38 |
| Prediction distance (cm):  | 20    |
| Prediction frequency (MHz):  | 5180  |
| Maximum Antenna Gain, typical (dBi):   | 2.9   |
| Maximum Antenna Gain (numeric):  | 1.950 |
| Power density of prediction frequency at 20.0 cm (mW/cm <sup>2</sup> ):            | 0.011 |
| MPE limit for uncontrolled exposure at prediction frequency (mW/cm <sup>2</sup> ): | 1.0   |

## W53 Band:

|   |              |
|---|--------------|
| <u>Maximum peak output power at antenna input terminal (dBm):</u>                       | <u>16.20</u> |
| <u>Maximum peak output power at antenna input terminal (mW):</u>                        | <u>41.69</u> |
| <u>Prediction distance (cm):</u>  | <u>20</u>    |
| <u>Prediction frequency (MHz):</u>  | <u>5280</u>  |
| <u>Maximum Antenna Gain, typical (dBi):</u>   | <u>2.9</u>   |
| <u>Maximum Antenna Gain (numeric):</u>  | <u>1.950</u> |
| <u>Power density of prediction frequency at 20.0 cm (mW/cm<sup>2</sup>):</u>            | <u>0.016</u> |
| <u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u> | <u>1.0</u>   |

## W56 Band:

|   |              |
|---|--------------|
| <u>Maximum peak output power at antenna input terminal (dBm):</u>                       | <u>15.45</u> |
| <u>Maximum peak output power at antenna input terminal (mW):</u>                        | <u>35.08</u> |
| <u>Prediction distance (cm):</u>  | <u>20</u>    |
| <u>Prediction frequency (MHz):</u>  | <u>5500</u>  |
| <u>Maximum Antenna Gain, typical (dBi):</u>   | <u>2.9</u>   |
| <u>Maximum Antenna Gain (numeric):</u>  | <u>1.950</u> |
| <u>Power density of prediction frequency at 20.0 cm (mW/cm<sup>2</sup>):</u>            | <u>0.014</u> |
| <u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u> | <u>1.0</u>   |

The device meets FCC MPE requirement for uncontrolled exposure environment at 20 cm distance.

## **5 FCC §15.203 – Antenna Requirements**

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### **5.1 Applicable Standard**

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §15.247 (b)(4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **5.2 Antenna List**

The antenna used by the EUT will be a -3.7 dBi gain chip antenna, and a 2.9 dBi gain dipole antenna which contains an N-type connector; therefore, the antennas comply with the antenna requirement.

## 6 FCC §15.207 - AC Power Line Conducted Emissions

### 6.1 Applicable Standards

As per FCC §15.207 Conducted limits:

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

| Frequency of Emission<br>(MHz) | Conducted Limit (dBuV) |                 |
|--------------------------------|------------------------|-----------------|
|                                | Quasi-peak             | Average         |
| 0.15-0.5                       | 66 to 56 Note 1        | 56 to 46 Note 1 |
| 0.5-5                          | 56                     | 46              |
| 5-30                           | 60                     | 50              |

*Note 1 Decreases with the logarithm of the frequency.*

### 6.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.4-2009 measurement procedure. The specification used was FCC §15.207 limits.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The AC/DC power adapter of the test support board was connected with LISN-1 which provided 120 V / 60 Hz AC power.

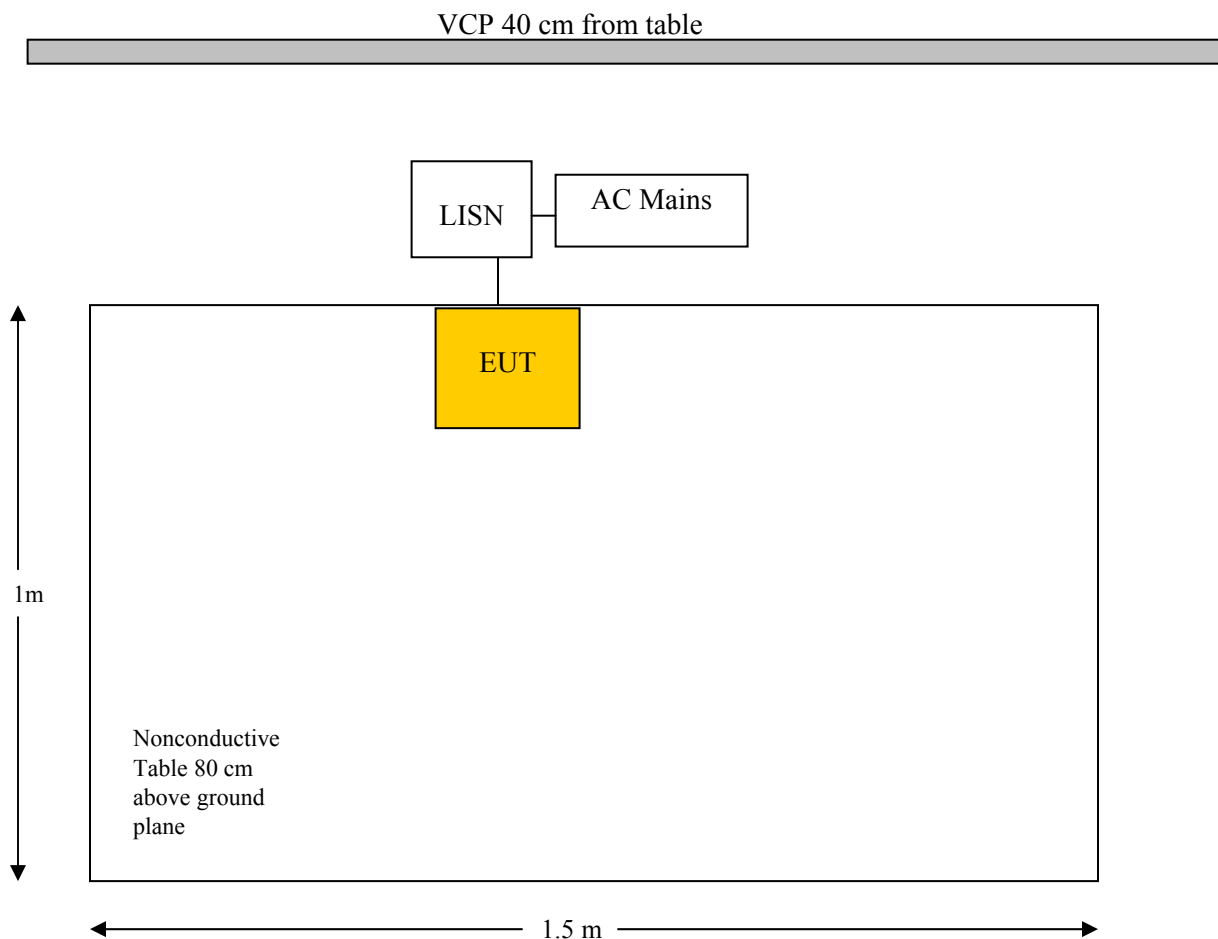
### 6.3 Test Procedure

During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1.

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

All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a "QP." Average readings are distinguished with an "Ave".

## 6.4 Test Setup Block Diagram



## 6.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL), the Attenuator Factor (Atten) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = A_i + CL + \text{Atten}$$

For example, a corrected amplitude of 46.2 dBuV = Indicated Reading (32.5 dBuV) + Cable Loss (3.7 dB) + Attenuator (10 dB)

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

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



## 6.6 Test Equipment List and Details

| Manufacturer      | Description       | Model No.           | Serial No. | Calibration Date | Calibration Interval |
|-------------------|-------------------|---------------------|------------|------------------|----------------------|
| Rohde & Schwarz   | EMI Test Receiver | ESCI 1166.5950K03   | 100044     | 2013-04-23       | 1 year               |
| Solar Electronics | LISN              | 9252-R-24-BNC       | 511205     | 2013-06-25       | 1 year               |
| TTE               | Filter, High Pass | H9962-150K-50-21378 | K7133      | 2013-05-30       | 1 year               |

**Statement of Traceability:** *BACL Corp. attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.*

## 6.7 Test Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 20 °C     |
| Relative Humidity: | 58 %      |
| ATM Pressure:      | 101.3 kPa |

*The testing was performed by Lionel Lara on 2013-08-05 in 5 m chamber 3.*

## 6.8 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC standard's conducted emissions limits, with the margin reading of:

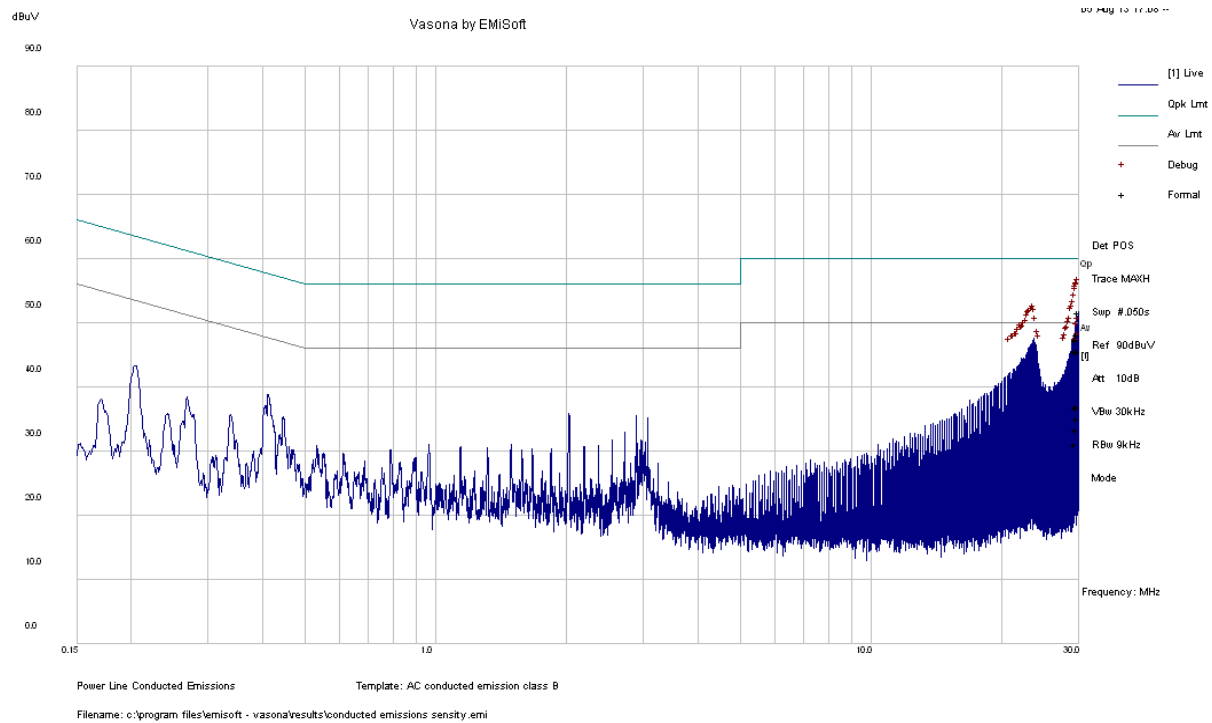
Transmitting Mode: Worst case with 5 GHz operating

| Connection: 120 V/60 Hz, AC |                 |                          |             |
|-----------------------------|-----------------|--------------------------|-------------|
| Margin (dB)                 | Frequency (MHz) | Conductor (Line/Neutral) | Range (MHz) |
| -4.42                       | 30              | Line                     | 0.15-30     |

6.9 Conducted Emissions Test Plots and Data

Worst case in the 5 GHz Band:

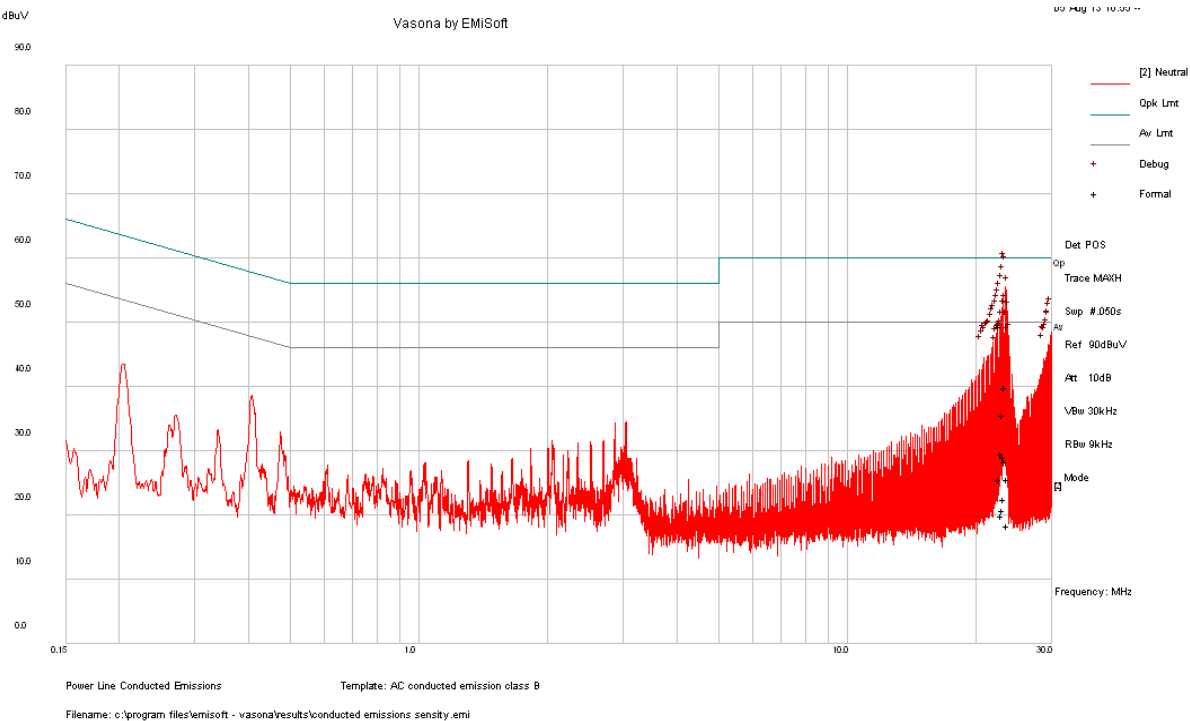
120 V, 60 Hz – Line



| Frequency (MHz) | Corrected Amplitude (dBμV) | Conductor (Line/Neutral) | Limit (dBμV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 30              | 51.64                      | Line                     | 60           | -8.36       | QP                 |
| 29.81947        | 48.18                      | Line                     | 60           | -11.82      | QP                 |
| 29.65668        | 47.48                      | Line                     | 60           | -12.52      | QP                 |
| 29.62874        | 47.42                      | Line                     | 60           | -12.58      | QP                 |
| 29.819          | 45.67                      | Line                     | 60           | -14.33      | QP                 |
| 29.46753        | 45.59                      | Line                     | 60           | -14.41      | QP                 |

| Frequency (MHz) | Corrected Amplitude (dBμV) | Conductor (Line/Neutral) | Limit (dBμV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 30              | 45.58                      | Line                     | 50           | -4.42       | Ave.               |
| 29.81947        | 37.03                      | Line                     | 50           | -12.97      | Ave.               |
| 29.62874        | 36.8                       | Line                     | 50           | -13.2       | Ave.               |
| 29.819          | 35.05                      | Line                     | 50           | -14.95      | Ave.               |
| 29.65668        | 33.35                      | Line                     | 50           | -16.65      | Ave.               |
| 29.46753        | 31.05                      | Line                     | 50           | -18.95      | Ave.               |

120 V, 60 Hz – Neutral



| Frequency (MHz) | Corrected Amplitude (dBμV) | Conductor (Line/Neutral) | Limit (dBμV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 22.74068        | 49.46                      | Neutral                  | 60           | -10.54      | QP                 |
| 23.10272        | 35.56                      | Neutral                  | 60           | -24.44      | QP                 |
| 22.95061        | 29.52                      | Neutral                  | 60           | -30.48      | QP                 |
| 23.26646        | 29.14                      | Neutral                  | 60           | -30.86      | QP                 |
| 23.44692        | 28.36                      | Neutral                  | 60           | -31.64      | QP                 |
| 23.61721        | 25.68                      | Neutral                  | 60           | -34.32      | QP                 |

| Frequency (MHz) | Corrected Amplitude (dBμV) | Conductor (Line/Neutral) | Limit (dBμV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 23.44692        | 39.86                      | Neutral                  | 50           | -10.14      | Ave.               |
| 22.74068        | 25.54                      | Neutral                  | 50           | -24.46      | Ave.               |
| 23.26646        | 22.57                      | Neutral                  | 50           | -27.43      | Ave.               |
| 23.10272        | 20.85                      | Neutral                  | 50           | -29.15      | Ave.               |
| 22.95061        | 20                         | Neutral                  | 50           | -30         | Ave.               |
| 23.61721        | 18.39                      | Neutral                  | 50           | -31.61      | Ave.               |

## 7 FCC §15.209, §15.407(b) - Spurious Radiated Emissions

### 7.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

| Frequency (MHz) | Field Strength (micro volts/meter) | Measurement Distance (meters) |
|-----------------|------------------------------------|-------------------------------|
| 0.009 - 0.490   | 2400/F(kHz)                        | 300                           |
| 0.490 - 1.705   | 24000/F(kHz)                       | 30                            |
| 1.705 - 30.0    | 30                                 | 30                            |
| 30 - 88         | 100 Note 1                         | 3                             |
| 88 - 216        | 150 Note 1                         | 3                             |
| 216 - 960       | 200 Note 1                         | 3                             |
| Above 960       | 500                                | 3                             |

Note 1: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                 | MHz                   | MHz             | GHz           |
|---------------------|-----------------------|-----------------|---------------|
| 0.090 – 0.110       | 16.42 – 16.423        | 960 – 1240      | 4.5 – 5.15    |
| 0.495 – 0.505       | 16.69475 – 16.69525   | 1300 – 1427     | 5.35 – 5.46   |
| 2.1735 – 2.1905     | 25.5 – 25.67          | 1435 – 1626.5   | 7.25 – 7.75   |
| 4.125 – 4.128       | 37.5 – 38.25          | 1645.5 – 1646.5 | 8.025 – 8.5   |
| 4.17725 – 4.17775   | 73 – 74.6             | 1660 – 1710     | 9.0 – 9.2     |
| 4.20725 – 4.20775   | 74.8 – 75.2           | 1718.8 – 1722.2 | 9.3 – 9.5     |
| 6.215 – 6.218       | 108 – 121.94          | 2200 – 2300     | 10.6 – 12.7   |
| 6.26775 – 6.26825   | 123 – 138             | 2310 – 2390     | 13.25 – 13.4  |
| 6.31175 – 6.31225   | 149.9 – 150.05        | 2483.5 – 2500   | 14.47 – 14.5  |
| 8.291 – 8.294       | 156.52475 – 156.52525 | 2690 – 2900     | 15.35 – 16.2  |
| 8.362 – 8.366       | 156.7 – 156.9         | 3260 – 3267     | 17.7 – 21.4   |
| 8.37625 – 8.38675   | 162.0125 – 167.17     | 3.332 – 3.339   | 22.01 – 23.12 |
| 8.41425 – 8.41475   | 167.72 – 173.2        | 3.3458 – 3.358  | 23.6 – 24.0   |
| 12.29 – 12.293      | 240 – 285             | 3.600 – 4.400   | 31.2 – 31.8   |
| 12.51975 – 12.52025 | 322 – 335.4           |                 | 36.43 – 36.5  |
| 12.57675 – 12.57725 | 399.9 – 410           |                 | Above 38.6    |
| 13.36 – 13.41       | 608 – 614             |                 |               |

As per FCC §15.407(b)(1)

(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

## 7.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.4-2009. The specification used was the FCC 15C/15E and IC RSS-210/RSS-Gen limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

## 7.3 Test Procedure

The measurements are base on FCC KDB 789033 D01 General UNII Test Procedures v01r03: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E section H: Unwanted emissions measurement, As well as ANSI C63.4: 2009 as described below:

For the radiated emissions test, the EUT host, and all support equipment power cords was connected to the AC floor outlet.

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

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000 MHz:

- (1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
- (2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

## 7.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL), the Attenuator Factor (Atten) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + CL + Atten$$

For example, a corrected amplitude of 46.2 dBuV = Indicated Reading (32.5 dBuV) + Cable Loss (3.7 dB) + Attenuator (10 dB)

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

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

## 7.5 Test Equipment List and Details

| Manufacturer       | Description         | Model             | Serial Number | Calibration Date | Calibration Cycle |
|--------------------|---------------------|-------------------|---------------|------------------|-------------------|
| Agilent            | Spectrum Analyzer   | E4446A            | US44300386    | 2012-09-29       | 1 year            |
| Sunol Science Corp | System Controller   | SC99V             | 122303-1      | N/R              | N/R               |
| Sunol Science Corp | Combination Antenna | JB3               | A020106-3     | 2012-06-18       | 1 Year            |
| Hewlett Packard    | Pre-amplifier       | 8447D             | 2944A06639    | 2013-06-09       | 1 Year            |
| Mini-Circuits      | Pre Amplifier       | ZVA-183-S         | 570400946     | 2013-05-09       | 1 Year            |
| EMCO               | Horn antenna        | 3115              | 9511-4627     | 2012-10-17       | 1 Year            |
| Rohde & Schwarz    | EMI Test Receiver   | ESCI 1166.5950K03 | 100337        | 2013-03-28       | 1 year            |

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

## 7.6 Test Environmental Conditions

|                    |                 |
|--------------------|-----------------|
| Temperature:       | 18-22 °C        |
| Relative Humidity: | 45-48 %         |
| ATM Pressure:      | 101.1-101.4 kPa |

The testing was performed by Lionel Lara on 2013-05-14 to 2013-05-21 at 5m meter 3.

## 7.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Part 15.205, 15.209 and 15.407 radiated emissions limits, and had the worst margin of:

5150-5250 MHz

| Mode: Transmitting |                 |                                    |                     |
|--------------------|-----------------|------------------------------------|---------------------|
| Margin (dB)        | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range, Mode (MHz)   |
| -0.89              | 349.6863        | Horizontal                         | 30 to 1000, 802.11a |
| -1.93              | 10360           | Horizontal                         | 1 to 40000, 802.11a |

5250-5350 MHz

| Mode: Transmitting |                 |                                    |                     |
|--------------------|-----------------|------------------------------------|---------------------|
| Margin (dB)        | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz)         |
| -6.45              | 137.3993        | Vertical                           | 30 to 1000, 802.11a |
| -3.92              | 10520           | Horizontal                         | 1 to 40000, 802.11a |

5470-5725 MHz

| Mode: Transmitting |                 |                                    |                     |
|--------------------|-----------------|------------------------------------|---------------------|
| Margin (dB)        | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz)         |
| -8.39              | 130.494         | Vertical                           | 30 to 1000, 802.11a |
| -1.65              | 17010           | Horizontal                         | 1 to 40000, 802.11a |

*Note: The higher power setting (chip antenna settings) was used for all radiated emissions testing.*

## 7.8 Radiated Emissions Test Result Data

### 1) Radiated Emission at 3 meters, 5150-5250 MHz Band, termination method was used.

30 MHz–1 GHz:

802.11a mode

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|---------|
| 349.6863        | 45.11                              | 100                 | H                      | 206                         | 46                   | -0.89       | QP      |
| 549.6785        | 41.23                              | 112                 | V                      | 339                         | 46                   | -4.77       | QP      |
| 134.7133        | 28.42                              | 116                 | V                      | 206                         | 43.5                 | -15.08      | QP      |
| 399.9098        | 24.04                              | 301                 | H                      | 185                         | 46                   | -21.96      | QP      |

802.11n-HT40 mode

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|---------|
| 349.6892        | 45.08                              | 100                 | H                      | 204                         | 46                   | -0.92       | QP      |
| 549.6844        | 41.2                               | 110                 | V                      | 334                         | 46                   | -4.8        | QP      |
| 134.7376        | 28.44                              | 115                 | V                      | 201                         | 43.5                 | -15.06      | QP      |
| 399.9109        | 24.12                              | 289                 | H                      | 185                         | 46                   | -21.88      | QP      |

Note: 1) All 30 MHz–1 GHz spurious are digital, other emissions are on the noise floor level. The worst case result was reported.

2) 802.11a/802.11n-HT20 is the same modulation, therefore only the worst case of the two was tested.



**1 - 40 GHz:****802.11a Mode, Low Channel**

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|--|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|  |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 5180 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 10360                                      | 46.34                     | 206                               | 144            | V                 | 38.33            | 6.14                  | 26.98                | 63.83                        | 74                | -10.17         | Peak     |
| 10360                                      | 48.13                     | 129                               | 133            | H                 | 38.33            | 6.14                  | 26.98                | 65.62                        | 74                | -8.38          | Peak     |
| 10360                                      | 32.97                     | 206                               | 144            | V                 | 38.33            | 6.14                  | 26.98                | 50.46                        | 54                | -3.54          | Ave      |
| 10360                                      | 34.58                     | 129                               | 133            | H                 | 38.33            | 6.14                  | 26.98                | 52.07                        | 54                | -1.93          | Ave      |
| 15540                                      | 35.19                     | 153                               | 127            | V                 | 38.43            | 7.47                  | 25.92                | 55.17                        | 74                | -18.83         | Peak     |
| 15540                                      | 38.75                     | 176                               | 100            | H                 | 38.43            | 7.47                  | 25.92                | 58.73                        | 74                | -15.27         | Peak     |
| 15540                                      | 19.74                     | 153                               | 127            | V                 | 38.43            | 7.47                  | 25.92                | 39.72                        | 54                | -14.28         | Ave      |
| 15540                                      | 22.99                     | 176                               | 100            | H                 | 38.43            | 7.47                  | 25.92                | 42.97                        | 54                | -11.03         | Ave      |
| 20720                                      | 31.91                     | 0                                 | 100            | V                 | 34.4             | 9.36                  | 29                   | 46.67                        | 74                | -27.33         | Peak     |
| 20720                                      | 31.91                     | 0                                 | 100            | H                 | 34.4             | 9.36                  | 29                   | 46.67                        | 74                | -27.33         | Peak     |
| 20720                                      | 17.19                     | 0                                 | 100            | V                 | 34.4             | 9.36                  | 29                   | 31.95                        | 54                | -22.05         | Ave      |
| 20720                                      | 17.19                     | 0                                 | 100            | H                 | 34.4             | 9.36                  | 29                   | 31.95                        | 54                | -22.05         | Ave      |

**802.11a Mode, Middle Channel**

| Frequency<br>(MHz)                            | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|---|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|   |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Middle Channel 5200 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 10400   | 45.41                     | 204                               | 144            | V                 | 38.33            | 6.14                  | 26.97                | 62.91                        | 74                | -11.09         | Peak     |
| 10400   | 46.96                     | 130                               | 133            | H                 | 38.33            | 6.14                  | 26.97                | 64.46                        | 74                | -9.54          | Peak     |
| 10400   | 31.8                      | 204                               | 144            | V                 | 38.33            | 6.14                  | 26.97                | 49.3                         | 54                | -4.7           | Ave      |
| 10400   | 33.23                     | 130                               | 133            | H                 | 38.33            | 6.14                  | 26.97                | 50.73                        | 54                | -3.27          | Ave      |
| 15600   | 34.67                     | 170                               | 116            | V                 | 38.33            | 7.47                  | 25.92                | 54.55                        | 74                | -19.45         | Peak     |
| 15600   | 39.59                     | 179                               | 100            | H                 | 38.33            | 7.47                  | 25.92                | 59.47                        | 74                | -14.53         | Peak     |
| 15600   | 19.87                     | 170                               | 116            | V                 | 38.33            | 7.47                  | 25.92                | 39.75                        | 54                | -14.25         | Ave      |
| 15600   | 24.03                     | 179                               | 100            | H                 | 38.33            | 7.47                  | 25.92                | 43.91                        | 54                | -10.09         | Ave      |
| 20800   | 31.87                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 28.9                 | 46.93                        | 74                | -27.07         | Peak     |
| 20800   | 31.87                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 28.9                 | 46.93                        | 74                | -27.07         | Peak     |
| 20800   | 17.17                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 28.9                 | 32.23                        | 54                | -21.77         | Ave      |
| 20800   | 17.17                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 28.9                 | 32.23                        | 54                | -21.77         | Ave      |

## 802.11a Mode, High Channel

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|---|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|   |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 5240 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 10480                                       | 44.75                     | 206                               | 100            | V                 | 38.34            | 6.14                  | 26.93                | 62.3                         | 74                | -11.7          | Peak     |
| 10480                                       | 44.84                     | 129                               | 131            | H                 | 38.34            | 6.14                  | 26.93                | 62.39                        | 74                | -11.61         | Peak     |
| 10480                                       | 30.81                     | 206                               | 100            | V                 | 38.34            | 6.14                  | 26.93                | 48.36                        | 54                | -5.64          | Ave      |
| 10480                                       | 31.44                     | 129                               | 131            | H                 | 38.34            | 6.14                  | 26.93                | 48.99                        | 54                | -5.01          | Ave      |
| 15720                                       | 37.86                     | 158                               | 114            | V                 | 38.19            | 7.47                  | 25.97                | 57.55                        | 74                | -16.45         | Peak     |
| 15720                                       | 42.82                     | 179                               | 100            | H                 | 38.19            | 7.47                  | 25.97                | 62.51                        | 74                | -11.49         | Peak     |
| 15720                                       | 22.49                     | 158                               | 114            | V                 | 38.19            | 7.47                  | 25.97                | 42.18                        | 54                | -11.82         | Ave      |
| 15720                                       | 27.2                      | 179                               | 100            | H                 | 38.19            | 7.47                  | 25.97                | 46.89                        | 54                | -7.11          | Ave      |
| 20960                                       | 32.62                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 29                   | 47.58                        | 74                | -26.42         | Peak     |
| 20960                                       | 32.62                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 29                   | 47.58                        | 74                | -26.42         | Peak     |
| 20960                                       | 17.55                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 29                   | 32.51                        | 54                | -21.49         | Ave      |
| 20960                                       | 17.55                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 29                   | 32.51                        | 54                | -21.49         | Ave      |

## 802.11n-HT40 Mode, Low Channel

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|--|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|  |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 5190 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 10380                                      | 41.22                     | 210                               | 129            | V                 | 38.33            | 6.14                  | 26.97                | 58.72                        | 74                | -15.28         | Peak     |
| 10380                                      | 43.87                     | 131                               | 136            | H                 | 38.33            | 6.14                  | 26.97                | 61.37                        | 74                | -12.63         | Peak     |
| 10380                                      | 27.49                     | 210                               | 129            | V                 | 38.33            | 6.14                  | 26.97                | 44.99                        | 54                | -9.01          | Ave      |
| 10380                                      | 30.69                     | 131                               | 136            | H                 | 38.33            | 6.14                  | 26.97                | 48.19                        | 54                | -5.81          | Ave      |
| 15570                                      | 33.86                     | 177                               | 100            | V                 | 38.33            | 7.47                  | 25.92                | 53.74                        | 74                | -20.26         | Peak     |
| 15570                                      | 38.36                     | 178                               | 100            | H                 | 38.33            | 7.47                  | 25.92                | 58.24                        | 74                | -15.76         | Peak     |
| 15570                                      | 18.81                     | 177                               | 100            | V                 | 38.33            | 7.47                  | 25.92                | 38.69                        | 54                | -15.31         | Ave      |
| 15570                                      | 21.58                     | 178                               | 100            | H                 | 38.33            | 7.47                  | 25.92                | 41.46                        | 54                | -12.54         | Ave      |
| 20760                                      | 31.74                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 28.9                 | 46.8                         | 74                | -27.2          | Peak     |
| 20760                                      | 31.74                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 28.9                 | 46.8                         | 74                | -27.2          | Peak     |
| 20760                                      | 17.16                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 28.9                 | 32.22                        | 54                | -21.78         | Ave      |
| 20760                                      | 17.16                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 28.9                 | 32.22                        | 54                | -21.78         | Ave      |

## 802.11n-HT40 Mode, High Channel

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|---|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|   |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 5230 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 10460                                       | 41.3                      | 204                               | 143            | V                 | 38.34            | 6.14                  | 26.93                | 58.85                        | 74                | -15.15         | Peak     |
| 10460                                       | 42.53                     | 132                               | 131            | H                 | 38.34            | 6.14                  | 26.93                | 60.08                        | 74                | -13.92         | Peak     |
| 10460                                       | 28.37                     | 204                               | 143            | V                 | 38.34            | 6.14                  | 26.93                | 45.92                        | 54                | -8.08          | Ave      |
| 10460                                       | 29.19                     | 132                               | 131            | H                 | 38.34            | 6.14                  | 26.93                | 46.74                        | 54                | -7.26          | Ave      |
| 15690                                       | 35.56                     | 160                               | 100            | V                 | 38.19            | 7.47                  | 25.97                | 55.25                        | 74                | -18.75         | Peak     |
| 15690                                       | 40.28                     | 176                               | 100            | H                 | 38.19            | 7.47                  | 25.97                | 59.97                        | 74                | -14.03         | Peak     |
| 15690                                       | 20.28                     | 160                               | 100            | V                 | 38.19            | 7.47                  | 25.97                | 39.97                        | 54                | -14.03         | Ave      |
| 15690                                       | 23.86                     | 176                               | 100            | H                 | 38.19            | 7.47                  | 25.97                | 43.55                        | 54                | -10.45         | Ave      |
| 20920                                       | 32.11                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 29                   | 47.07                        | 74                | -26.93         | Peak     |
| 20920                                       | 32.11                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 29                   | 47.07                        | 74                | -26.93         | Peak     |
| 20920                                       | 17.32                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 29                   | 32.28                        | 54                | -21.72         | Ave      |
| 20920                                       | 17.32                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 29                   | 32.28                        | 54                | -21.72         | Ave      |

Note: 802.11a/802.11n-HT20 is the same modulation, therefore only the worst case of the two was tested.

**2) Radiated Emission at 3 meters, 5250-5350 MHz Band, termination method was used.****30 MHz – 1 GHz****802.11a Mode**

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|---------|
| 137.3993        | 37.05                              | 120                 | V                      | 175                         | 43.5                 | -6.45       | QP      |
| 549.307         | 37.76                              | 100                 | V                      | 107                         | 46                   | -8.24       | QP      |
| 349.678         | 38.81                              | 104                 | H                      | 175                         | 46                   | -7.19       | QP      |
| 499.4328        | 27.84                              | 203                 | V                      | 131                         | 46                   | -18.16      | QP      |

**802.11n-HT40 Mode**

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|---------|
| 138.117         | 29.98                              | 121                 | V                      | 174                         | 43.5                 | -13.52      | QP      |
| 549.4583        | 37.75                              | 98                  | V                      | 108                         | 46                   | -8.25       | QP      |
| 349.6298        | 32.25                              | 102                 | H                      | 173                         | 46                   | -13.75      | QP      |
| 499.1295        | 23.7                               | 202                 | V                      | 131                         | 46                   | -22.3       | QP      |

Note: 1) All 30 MHz–1 GHz spurious are digital, other emissions are on the noise floor level. The worst case result was reported.  
 2) 802.11a/802.11n-HT20 is the same modulation, therefore only the worst case of the two was tested.

**1 - 40 GHz:****802.11a Mode, Low Channel**

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|--|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|  |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 5260 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 10520                                      | 43.61                     | 159                               | 161            | V                 | 38.34            | 7                     | 26.9                 | 62.05                        | 74                | -11.95         | Peak     |
| 10520                                      | 44.17                     | 215                               | 129            | H                 | 38.34            | 7                     | 26.9                 | 62.61                        | 74                | -11.39         | Peak     |
| 10520                                      | 30.27                     | 159                               | 161            | V                 | 38.34            | 7                     | 26.9                 | 48.71                        | 54                | -5.29          | Ave      |
| 10520                                      | 31.64                     | 215                               | 129            | H                 | 38.34            | 7                     | 26.9                 | 50.08                        | 54                | -3.92          | Ave      |
| 15780                                      | 38.37                     | 157                               | 100            | V                 | 37.93            | 8.35                  | 26.01                | 58.64                        | 74                | -15.36         | Peak     |
| 15780                                      | 44.21                     | 181                               | 100            | H                 | 37.93            | 8.35                  | 26.01                | 64.48                        | 74                | -9.52          | Peak     |
| 15780                                      | 23.19                     | 157                               | 100            | V                 | 37.93            | 8.35                  | 26.01                | 43.46                        | 54                | -10.54         | Ave      |
| 15780                                      | 28.3                      | 181                               | 100            | H                 | 37.93            | 8.35                  | 26.01                | 48.57                        | 54                | -5.43          | Ave      |
| 21040                                      | 32.35                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 29                   | 47.31                        | 74                | -26.69         | Peak     |
| 21040                                      | 32.35                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 29                   | 47.31                        | 74                | -26.69         | Peak     |
| 21040                                      | 17.36                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 29                   | 32.32                        | 54                | -21.68         | Ave      |
| 21040                                      | 17.36                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 29                   | 32.32                        | 54                | -21.68         | Ave      |

**802.11a Mode, Middle Channel**

| Frequency<br>(MHz)                            | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|---|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|   |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Middle Channel 5280 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 10560   | 45.16                     | 157                               | 100            | V                 | 38.42            | 7.05                  | 26.98                | 63.65                        | 74                | -10.35         | Peak     |
| 10560   | 42.19                     | 129                               | 100            | H                 | 38.42            | 7.05                  | 26.98                | 60.68                        | 74                | -13.32         | Peak     |
| 10560   | 31.24                     | 157                               | 100            | V                 | 38.42            | 7.05                  | 26.98                | 49.73                        | 54                | -4.27          | Ave      |
| 10560   | 28.16                     | 129                               | 100            | H                 | 38.42            | 7.05                  | 26.98                | 46.65                        | 54                | -7.35          | Ave      |
| 15840   | 38.81                     | 162                               | 100            | V                 | 37.93            | 8.44                  | 26.04                | 59.14                        | 74                | -14.86         | Peak     |
| 15840   | 43.61                     | 178                               | 100            | H                 | 37.93            | 8.44                  | 26.04                | 63.94                        | 74                | -10.06         | Peak     |
| 15840   | 22.6                      | 162                               | 100            | V                 | 37.93            | 8.44                  | 26.04                | 42.93                        | 54                | -11.07         | Ave      |
| 15840   | 27.3                      | 178                               | 100            | H                 | 37.93            | 8.44                  | 26.04                | 47.63                        | 54                | -6.37          | Ave      |
| 21120   | 32.24                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 29                   | 47.2                         | 74                | -26.8          | Peak     |
| 21120   | 32.24                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 29                   | 47.2                         | 74                | -26.8          | Peak     |
| 21120   | 17.41                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 29                   | 32.37                        | 54                | -21.63         | Ave      |
| 21120   | 17.41                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 29                   | 32.37                        | 54                | -21.63         | Ave      |

## 802.11a Mode, High Channel

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|---|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|   |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 5320 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 10640                                       | 44.72                     | 160                               | 100            | V                 | 38.42            | 7.07                  | 26.92                | 63.29                        | 74                | -10.71         | Peak     |
| 10640                                       | 40.86                     | 129                               | 128            | H                 | 38.42            | 7.07                  | 26.92                | 59.43                        | 74                | -14.57         | Peak     |
| 10640                                       | 31.03                     | 160                               | 100            | V                 | 38.42            | 7.07                  | 26.92                | 49.6                         | 54                | -4.4           | Ave      |
| 10640                                       | 27.05                     | 129                               | 128            | H                 | 38.42            | 7.07                  | 26.92                | 45.62                        | 54                | -8.38          | Ave      |
| 15960                                       | 39.41                     | 204                               | 100            | V                 | 37.87            | 8.39                  | 26.05                | 59.62                        | 74                | -14.38         | Peak     |
| 15960                                       | 43.97                     | 182                               | 100            | H                 | 37.87            | 8.39                  | 26.05                | 64.18                        | 74                | -9.82          | Peak     |
| 15960                                       | 24.46                     | 204                               | 100            | V                 | 37.87            | 8.39                  | 26.05                | 44.67                        | 54                | -9.33          | Ave      |
| 15960                                       | 28.08                     | 182                               | 100            | H                 | 37.87            | 8.39                  | 26.05                | 48.29                        | 54                | -5.71          | Ave      |
| 21280                                       | 33.17                     | 0                                 | 100            | V                 | 34.6             | 9.4                   | 29                   | 48.17                        | 74                | -25.83         | Peak     |
| 21280                                       | 33.17                     | 0                                 | 100            | H                 | 34.6             | 9.4                   | 29                   | 48.17                        | 74                | -25.83         | Peak     |
| 21280                                       | 18.07                     | 0                                 | 100            | V                 | 34.6             | 9.4                   | 29                   | 33.07                        | 54                | -20.93         | Ave      |
| 21280                                       | 18.07                     | 0                                 | 100            | H                 | 34.6             | 9.4                   | 29                   | 33.07                        | 54                | -20.93         | Ave      |

## 802.11n-HT40 Mode, Low Channel

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|--|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|  |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 5270 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 10540                                      | 41.18                     | 158                               | 155            | V                 | 38.34            | 7                     | 26.9                 | 59.62                        | 74                | -14.38         | Peak     |
| 10540                                      | 41.39                     | 214                               | 160            | H                 | 38.34            | 7                     | 26.9                 | 59.83                        | 74                | -14.17         | Peak     |
| 10540                                      | 28.14                     | 158                               | 155            | V                 | 38.34            | 7                     | 26.9                 | 46.58                        | 54                | -7.42          | Ave      |
| 10540                                      | 27.8                      | 214                               | 160            | H                 | 38.34            | 7                     | 26.9                 | 46.24                        | 54                | -7.76          | Ave      |
| 15810                                      | 36.84                     | 157                               | 100            | V                 | 37.93            | 8.35                  | 26.01                | 57.11                        | 74                | -16.89         | Peak     |
| 15810                                      | 42.62                     | 180                               | 100            | H                 | 37.93            | 8.35                  | 26.01                | 62.89                        | 74                | -11.11         | Peak     |
| 15810                                      | 21.37                     | 157                               | 100            | V                 | 37.93            | 8.35                  | 26.01                | 41.64                        | 54                | -12.36         | Ave      |
| 15810                                      | 26.18                     | 180                               | 100            | H                 | 37.93            | 8.35                  | 26.01                | 46.45                        | 54                | -7.55          | Ave      |
| 21080                                      | 32.06                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 29                   | 47.02                        | 74                | -26.98         | Peak     |
| 21080                                      | 32.06                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 29                   | 47.02                        | 74                | -26.98         | Peak     |
| 21080                                      | 17.19                     | 0                                 | 100            | V                 | 34.6             | 9.36                  | 29                   | 32.15                        | 54                | -21.85         | Ave      |
| 21080                                      | 17.19                     | 0                                 | 100            | H                 | 34.6             | 9.36                  | 29                   | 32.15                        | 54                | -21.85         | Ave      |

## 802.11n-HT40 Mode, High Channel

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|---|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|   |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 5310 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 10620                                       | 38.78                     | 156                               | 160            | V                 | 38.42            | 7.07                  | 26.92                | 57.35                        | 74                | -16.65         | Peak     |
| 10620                                       | 39.24                     | 209                               | 100            | H                 | 38.42            | 7.07                  | 26.92                | 57.81                        | 74                | -16.19         | Peak     |
| 10620                                       | 25.33                     | 156                               | 160            | V                 | 38.42            | 7.07                  | 26.92                | 43.9                         | 54                | -10.1          | Ave      |
| 10620                                       | 25.69                     | 209                               | 100            | H                 | 38.42            | 7.07                  | 26.92                | 44.26                        | 54                | -9.74          | Ave      |
| 15930                                       | 39.16                     | 185                               | 100            | V                 | 37.87            | 8.39                  | 26.05                | 59.37                        | 74                | -14.63         | Peak     |
| 15930                                       | 43.84                     | 183                               | 100            | H                 | 37.87            | 8.39                  | 26.05                | 64.05                        | 74                | -9.95          | Peak     |
| 15930                                       | 22.61                     | 185                               | 100            | V                 | 37.87            | 8.39                  | 26.05                | 42.82                        | 54                | -11.18         | Ave      |
| 15930                                       | 27.48                     | 183                               | 100            | H                 | 37.87            | 8.39                  | 26.05                | 47.69                        | 54                | -6.31          | Ave      |
| 21240                                       | 32.82                     | 0                                 | 100            | V                 | 34.6             | 9.4                   | 29                   | 47.82                        | 74                | -26.18         | Peak     |
| 21240                                       | 32.82                     | 0                                 | 100            | H                 | 34.6             | 9.4                   | 29                   | 47.82                        | 74                | -26.18         | Peak     |
| 21240                                       | 18.09                     | 0                                 | 100            | V                 | 34.6             | 9.4                   | 29                   | 33.09                        | 54                | -20.91         | Ave      |
| 21240                                       | 18.09                     | 0                                 | 100            | H                 | 34.6             | 9.4                   | 29                   | 33.09                        | 54                | -20.91         | Ave      |

Note: 802.11a/802.11n-HT20 is the same modulation, therefore only the worst case of the two was tested.

**3) Radiated Emission at 3 meters, 5470-5725 MHz Band, termination method was used****30 MHz – 1 GHz****802.11a Mode**

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|---------|
| 130.494         | 35.11                              | 118                 | V                      | 189                         | 43.5                 | -8.39       | QP      |
| 550.028         | 36.94                              | 100                 | V                      | 211                         | 46                   | -9.06       | QP      |
| 500.395         | 23.3                               | 111                 | V                      | 222                         | 46                   | -22.7       | QP      |
| 350.0093        | 26.78                              | 247                 | H                      | 180                         | 46                   | -19.22      | QP      |

**802.11n-HT40 Mode**

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|---------|
| 138.139         | 28.05                              | 121                 | V                      | 190                         | 43.5                 | -15.45      | QP      |
| 549.511         | 37.36                              | 99                  | V                      | 212                         | 46                   | -8.64       | QP      |
| 499.8538        | 28.57                              | 108                 | V                      | 246                         | 46                   | -17.43      | QP      |
| 349.8328        | 27.11                              | 245                 | H                      | 182                         | 46                   | -18.89      | QP      |

Note: 1) All 30 MHz–1 GHz spurious are digital, other emissions are on the noise floor level. The worst case result was reported.  
 2) 802.11a/802.11n-HT20 is the same modulation, therefore only the worst case of the two was tested.



**1 - 40 GHz:**

## 802.11a Mode, Low Channel

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|--|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|  |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 5500 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 11000                                      | 38.18                     | 189                               | 100            | V                 | 38.38            | 7.36                  | 26.92                | 57                           | 74                | -17            | Peak     |
| 11000                                      | 41.92                     | 232                               | 136            | H                 | 38.38            | 7.36                  | 26.92                | 60.74                        | 74                | -13.26         | Peak     |
| 11000                                      | 24.92                     | 189                               | 100            | V                 | 38.38            | 7.36                  | 26.92                | 43.74                        | 54                | -10.26         | Ave      |
| 11000                                      | 28.45                     | 232                               | 136            | H                 | 38.38            | 7.36                  | 26.92                | 47.27                        | 54                | -6.73          | Ave      |
| 16500                                      | 37.88                     | 150                               | 100            | V                 | 38.67            | 8.5                   | 26.1                 | 58.95                        | 74                | -15.05         | Peak     |
| 16500                                      | 42.91                     | 258                               | 100            | H                 | 38.67            | 8.5                   | 26.1                 | 63.98                        | 74                | -10.02         | Peak     |
| 16500                                      | 22.13                     | 150                               | 100            | V                 | 38.67            | 8.5                   | 26.1                 | 43.2                         | 54                | -10.8          | Ave      |
| 16500                                      | 25.55                     | 258                               | 100            | H                 | 38.67            | 8.5                   | 26.1                 | 46.62                        | 54                | -7.38          | Ave      |
| 22000                                      | 31.41                     | 0                                 | 100            | V                 | 34.9             | 9.55                  | 29.1                 | 46.76                        | 74                | -27.24         | Peak     |
| 22000                                      | 31.41                     | 0                                 | 100            | H                 | 34.9             | 9.55                  | 29.1                 | 46.76                        | 74                | -27.24         | Peak     |
| 22000                                      | 16.83                     | 0                                 | 100            | V                 | 34.9             | 9.55                  | 29.1                 | 32.18                        | 54                | -21.82         | Ave      |
| 22000                                      | 16.83                     | 0                                 | 100            | H                 | 34.9             | 9.55                  | 29.1                 | 32.18                        | 54                | -21.82         | Ave      |

## 802.11a Mode, Middle Channel

| Frequency<br>(MHz)                            | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|---|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|   |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Middle Channel 5580 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 11160   | 43.62                     | 157                               | 105            | V                 | 38.7             | 7.52                  | 26.94                | 62.9                         | 74                | -11.1          | Peak     |
| 11160   | 43.79                     | 37                                | 120            | H                 | 38.7             | 7.52                  | 26.94                | 63.07                        | 74                | -10.93         | Peak     |
| 11160   | 30.59                     | 157                               | 105            | V                 | 38.7             | 7.52                  | 26.94                | 49.87                        | 54                | -4.13          | Ave      |
| 11160   | 31                        | 37                                | 120            | H                 | 38.7             | 7.52                  | 26.94                | 50.28                        | 54                | -3.72          | Ave      |
| 16740   | 39.41                     | 156                               | 100            | V                 | 39.84            | 8.63                  | 26.12                | 61.76                        | 74                | -12.24         | Peak     |
| 16740   | 43.19                     | 255                               | 110            | H                 | 39.84            | 8.63                  | 26.12                | 65.54                        | 74                | -8.46          | Peak     |
| 16740   | 23.1                      | 156                               | 100            | V                 | 39.84            | 8.63                  | 26.12                | 45.45                        | 54                | -8.55          | Ave      |
| 16740   | 26.87                     | 255                               | 110            | H                 | 39.84            | 8.63                  | 26.12                | 49.22                        | 54                | -4.78          | Ave      |
| 22320   | 32.16                     | 0                                 | 100            | V                 | 34.9             | 9.6                   | 29.1                 | 47.56                        | 74                | -26.44         | Peak     |
| 22320   | 32.16                     | 0                                 | 100            | H                 | 34.9             | 9.6                   | 29.1                 | 47.56                        | 74                | -26.44         | Peak     |
| 22320   | 17.03                     | 0                                 | 100            | V                 | 34.9             | 9.6                   | 29.1                 | 32.43                        | 54                | -21.57         | Ave      |
| 22320   | 17.03                     | 0                                 | 100            | H                 | 34.9             | 9.6                   | 29.1                 | 32.43                        | 54                | -21.57         | Ave      |

## 802.11a Mode, High Channel

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|---|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|   |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 5700 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 11400                                       | 42.47                     | 150                               | 126            | V                 | 38.88            | 7.57                  | 27                   | 61.92                        | 74                | -12.08         | Peak     |
| 11400                                       | 45.59                     | 237                               | 146            | H                 | 38.88            | 7.57                  | 27                   | 65.04                        | 74                | -8.96          | Peak     |
| 11400                                       | 29.84                     | 150                               | 126            | V                 | 38.88            | 7.57                  | 27                   | 49.29                        | 54                | -4.71          | Ave      |
| 11400                                       | 32.57                     | 237                               | 146            | H                 | 38.88            | 7.57                  | 27                   | 52.02                        | 54                | -1.98          | Ave      |
| 17100                                       | 39.58                     | 149                               | 100            | V                 | 42.64            | 8.66                  | 26.03                | 64.85                        | 74                | -9.15          | Peak     |
| 17100                                       | 40.59                     | 248                               | 110            | H                 | 42.64            | 8.66                  | 26.03                | 65.86                        | 74                | -8.14          | Peak     |
| 17100                                       | 22.82                     | 149                               | 100            | V                 | 42.64            | 8.66                  | 26.03                | 48.09                        | 54                | -5.91          | Ave      |
| 17100                                       | 23.69                     | 248                               | 110            | H                 | 42.64            | 8.66                  | 26.03                | 48.96                        | 54                | -5.04          | Ave      |
| 22800                                       | 31.98                     | 0                                 | 100            | V                 | 35.4             | 9.74                  | 28.9                 | 48.22                        | 74                | -25.78         | Peak     |
| 22800                                       | 31.98                     | 0                                 | 100            | H                 | 35.4             | 9.74                  | 28.9                 | 48.22                        | 74                | -25.78         | Peak     |
| 22800                                       | 17.29                     | 0                                 | 100            | V                 | 35.4             | 9.74                  | 28.9                 | 33.53                        | 54                | -20.47         | Ave      |
| 22800                                       | 17.29                     | 0                                 | 100            | H                 | 35.4             | 9.74                  | 28.9                 | 33.53                        | 54                | -20.47         | Ave      |

## 802.11n-HT40 Mode, Low Channel

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|--|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|  |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 5510 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 11020                                      | 38.59                     | 156                               | 140            | V                 | 38.38            | 7.36                  | 26.92                | 57.41                        | 74                | -16.59         | Peak     |
| 11020                                      | 41.63                     | 163                               | 128            | H                 | 38.38            | 7.36                  | 26.92                | 60.45                        | 74                | -13.55         | Peak     |
| 11020                                      | 21.39                     | 156                               | 140            | V                 | 38.38            | 7.36                  | 26.92                | 40.21                        | 54                | -13.79         | Ave      |
| 11020                                      | 23.53                     | 163                               | 128            | H                 | 38.38            | 7.36                  | 26.92                | 42.35                        | 54                | -11.65         | Ave      |
| 16530                                      | 36.86                     | 202                               | 100            | V                 | 38.67            | 8.5                   | 26.1                 | 57.93                        | 74                | -16.07         | Peak     |
| 16530                                      | 42.84                     | 238                               | 100            | H                 | 38.67            | 8.5                   | 26.1                 | 63.91                        | 74                | -10.09         | Peak     |
| 16530                                      | 20.69                     | 202                               | 100            | V                 | 38.67            | 8.5                   | 26.1                 | 41.76                        | 54                | -12.24         | Ave      |
| 16530                                      | 24.88                     | 238                               | 100            | H                 | 38.67            | 8.5                   | 26.1                 | 45.95                        | 54                | -8.05          | Ave      |
| 22040                                      | 30.99                     | 0                                 | 100            | V                 | 34.9             | 9.55                  | 29.1                 | 46.34                        | 74                | -27.66         | Peak     |
| 22040                                      | 30.99                     | 0                                 | 100            | H                 | 34.9             | 9.55                  | 29.1                 | 46.34                        | 74                | -27.66         | Peak     |
| 22040                                      | 16.47                     | 0                                 | 100            | V                 | 34.9             | 9.55                  | 29.1                 | 31.82                        | 54                | -22.18         | Ave      |
| 22040                                      | 16.47                     | 0                                 | 100            | H                 | 34.9             | 9.55                  | 29.1                 | 31.82                        | 54                | -22.18         | Ave      |

## 802.11n-HT40 Mode, Middle Channel

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|--|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|  |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 5550 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 11050                                      | 39.21                     | 156                               | 144            | V                 | 38.7             | 7.52                  | 26.94                | 58.49                        | 74                | -15.51         | Peak     |
| 11050                                      | 44.66                     | 163                               | 141            | H                 | 38.7             | 7.52                  | 26.94                | 63.94                        | 74                | -10.06         | Peak     |
| 11050                                      | 22.85                     | 156                               | 144            | V                 | 38.7             | 7.52                  | 26.94                | 42.13                        | 54                | -11.87         | Ave      |
| 11050                                      | 27.99                     | 163                               | 141            | H                 | 38.7             | 7.52                  | 26.94                | 47.27                        | 54                | -6.73          | Ave      |
| 16550                                      | 37.97                     | 215                               | 100            | V                 | 39.84            | 8.63                  | 26.12                | 60.32                        | 74                | -13.68         | Peak     |
| 16550                                      | 42.39                     | 237                               | 100            | H                 | 39.84            | 8.63                  | 26.12                | 64.74                        | 74                | -9.26          | Peak     |
| 16550                                      | 20.81                     | 215                               | 100            | V                 | 39.84            | 8.63                  | 26.12                | 43.16                        | 54                | -10.84         | Ave      |
| 16550                                      | 24.84                     | 237                               | 100            | H                 | 39.84            | 8.63                  | 26.12                | 47.19                        | 54                | -6.81          | Ave      |
| 22050                                      | 32.08                     | 0                                 | 100            | V                 | 35               | 9.6                   | 29.1                 | 47.58                        | 74                | -26.42         | Peak     |
| 22050                                      | 32.08                     | 0                                 | 100            | H                 | 35               | 9.6                   | 29.1                 | 47.58                        | 74                | -26.42         | Peak     |
| 22050                                      | 17.17                     | 0                                 | 100            | V                 | 35               | 9.6                   | 29.1                 | 32.67                        | 54                | -21.33         | Ave      |
| 22050                                      | 17.17                     | 0                                 | 100            | H                 | 35               | 9.6                   | 29.1                 | 32.67                        | 54                | -21.33         | Ave      |

## 802.11n-HT40 Mode, High Channel

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC               |                | Comments |
|---|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|   |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 5670 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 11340                                       | 41.18                     | 151                               | 100            | V                 | 38.88            | 7.57                  | 27                   | 60.63                        | 74                | -13.37         | Peak     |
| 11340                                       | 46.82                     | 228                               | 149            | H                 | 38.88            | 7.57                  | 27                   | 66.27                        | 74                | -7.73          | Peak     |
| 11340                                       | 26.6                      | 151                               | 100            | V                 | 38.88            | 7.57                  | 27                   | 46.05                        | 54                | -7.95          | Ave      |
| 11340                                       | 32.14                     | 228                               | 149            | H                 | 38.88            | 7.57                  | 27                   | 51.59                        | 54                | -2.41          | Ave      |
| 17010                                       | 37.65                     | 131                               | 100            | V                 | 41.83            | 8.61                  | 26.03                | 62.06                        | 74                | -11.94         | Peak     |
| 17010                                       | 44.71                     | 234                               | 100            | H                 | 41.83            | 8.61                  | 26.03                | 69.12                        | 74                | -4.88          | Peak     |
| 17010                                       | 21.88                     | 131                               | 100            | V                 | 41.83            | 8.61                  | 26.03                | 46.29                        | 54                | -7.71          | Ave      |
| 17010                                       | 27.89                     | 23                                | 100            | H                 | 41.83            | 8.66                  | 26.03                | 52.35                        | 54                | -1.65          | Ave      |
| 22680                                       | 32.1                      | 0                                 | 100            | V                 | 35.4             | 9.74                  | 28.9                 | 48.34                        | 74                | -25.66         | Peak     |
| 22680                                       | 32.1                      | 0                                 | 100            | H                 | 35.4             | 9.74                  | 28.9                 | 48.34                        | 74                | -25.66         | Peak     |
| 22680                                       | 17.06                     | 0                                 | 100            | V                 | 35.4             | 9.74                  | 28.9                 | 33.3                         | 54                | -20.7          | Ave      |
| 22680                                       | 17.06                     | 0                                 | 100            | H                 | 35.4             | 9.74                  | 28.9                 | 33.3                         | 54                | -20.7          | Ave      |

Note: 802.11a/802.11n-HT20 is the same modulation, therefore only the worst case of the two was tested.

## 8 FCC §15.407(a) – 26 dB & 99% Emission Bandwidth

### 8.1 Applicable Standard

FCC §15.407(a)

### 8.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D01 General UNII Test Procedures v01r03: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section C: Emission bandwidth and section D: 99 Percent Occupied Bandwidth

### 8.3 Test Equipment List and Details

| Manufacturer | Description       | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4446A    | US44300386 | 2012-09-29       | 1 year               |

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 8.4 Test Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 21 °C     |
| Relative Humidity: | 51 %      |
| ATM Pressure:      | 101.3 kPa |

The testing was performed by Lionel Lara on 2013-05-07 in the RF site.

## 8.5 Test Results

### 5150-5250 MHz Band

#### 802.11a mode

| Channel | Frequency (MHz) | 26 dB Emission Bandwidth (MHz) | 99% Emission Bandwidth (MHz) | Results   |
|---------|-----------------|--------------------------------|------------------------------|-----------|
| Low     | 5180            | 19.097                         | 16.4574                      | Compliant |
| Middle  | 5200            | 19.633                         | 16.4423                      | Compliant |
| High    | 5240            | 18.834                         | 16.4454                      | Compliant |

#### 802.11n-HT20 mode

| Channel | Frequency (MHz) | 26 dB Emission Bandwidth (MHz) | 99% Emission Bandwidth (MHz) | Results   |
|---------|-----------------|--------------------------------|------------------------------|-----------|
| Low     | 5180            | 20.327                         | 17.6982                      | Compliant |
| Middle  | 5200            | 19.975                         | 17.7053                      | Compliant |
| High    | 5240            | 19.957                         | 17.7087                      | Compliant |

#### 802.11n-HT40 mode

| Channel | Frequency (MHz) | 26 dB Emission Bandwidth (MHz) | 99% Emission Bandwidth (MHz) | Results   |
|---------|-----------------|--------------------------------|------------------------------|-----------|
| Low     | 5190            | 38.696                         | 36.2337                      | Compliant |
| High    | 5230            | 39.106                         | 36.2670                      | Compliant |

### 5250-5350 MHz Band

#### 802.11a mode

| Channel | Frequency (MHz) | 26 dB Emission Bandwidth (MHz) | 99% Emission Bandwidth (MHz) | Results   |
|---------|-----------------|--------------------------------|------------------------------|-----------|
| Low     | 5260            | 19.221                         | 16.4618                      | Compliant |
| Middle  | 5280            | 19.444                         | 16.4450                      | Compliant |
| High    | 5320            | 19.638                         | 16.4672                      | Compliant |

## 802.11n-HT20 mode

| Channel | Frequency (MHz) | 26 dB Emission Bandwidth (MHz) | 99% Emission Bandwidth (MHz) | Results   |
|---------|-----------------|--------------------------------|------------------------------|-----------|
| Low     | 5260            | 19.896                         | 17.7017                      | Compliant |
| Middle  | 5280            | 20.028                         | 17.6862                      | Compliant |
| High    | 5320            | 20.148                         | 17.6787                      | Compliant |

## 802.11n-HT40 mode

| Channel | Frequency (MHz) | 26 dB Emission Bandwidth (MHz) | 99% Emission Bandwidth (MHz) | Results   |
|---------|-----------------|--------------------------------|------------------------------|-----------|
| Low     | 5270            | 39.357                         | 36.2795                      | Compliant |
| High    | 5310            | 38.581                         | 36.2617                      | Compliant |

## 5470-5725 MHz Band

## 802.11a mode

| Channel | Frequency (MHz) | 26 dB Emission Bandwidth (MHz) | 99% Emission Bandwidth (MHz) | Results   |
|---------|-----------------|--------------------------------|------------------------------|-----------|
| Low     | 5500            | 20.245                         | 16.4740                      | Compliant |
| Middle  | 5580            | 19.656                         | 16.4711                      | Compliant |
| High    | 5700            | 20.057                         | 16.4802                      | Compliant |

## 802.11n-HT20 mode

| Channel | Frequency (MHz) | 26 dB Emission Bandwidth (MHz) | 99% Emission Bandwidth (MHz) | Results   |
|---------|-----------------|--------------------------------|------------------------------|-----------|
| Low     | 5500            | 19.952                         | 17.6797                      | Compliant |
| Middle  | 5580            | 20.118                         | 17.7173                      | Compliant |
| High    | 5700            | 20.596                         | 17.7127                      | Compliant |

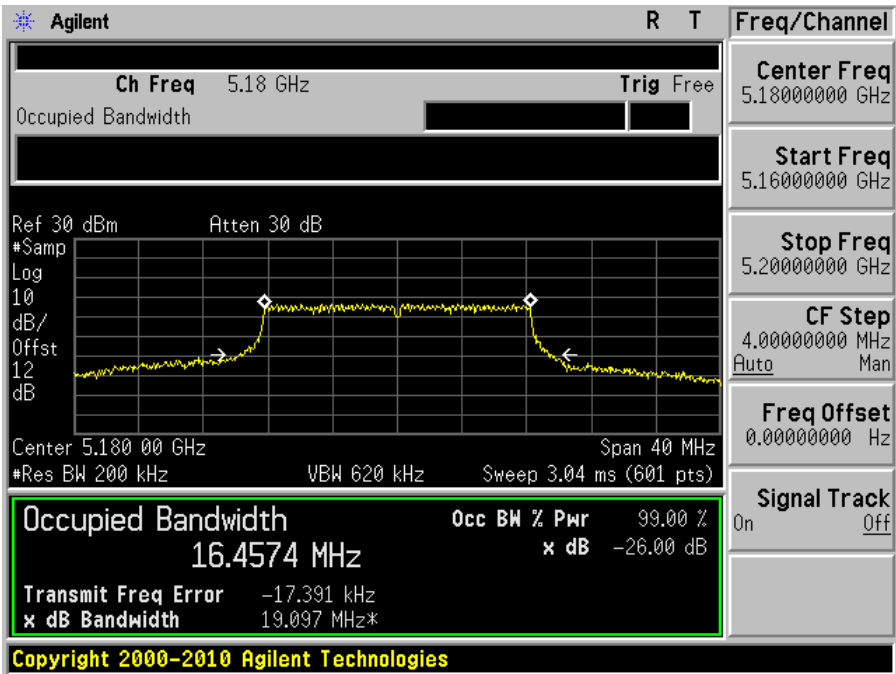
## 802.11n-HT40 mode

| Channel | Frequency (MHz) | 26 dB Emission Bandwidth (MHz) | 99% Emission Bandwidth (MHz) | Results   |
|---------|-----------------|--------------------------------|------------------------------|-----------|
| Low     | 5510            | 39.399                         | 36.2844                      | Compliant |
| Middle  | 5550            | 39.344                         | 36.2820                      | Compliant |
| High    | 5670            | 39.159                         | 36.2979                      | Compliant |

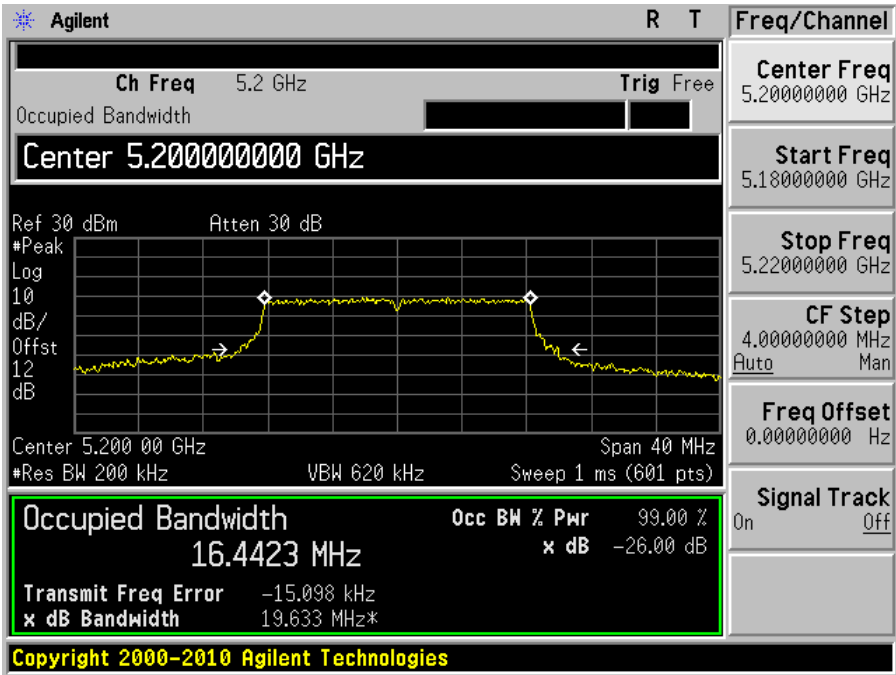
Note: The higher power setting (chip antenna settings) was used for all occupied bandwidth testing.

5150-5250 MHz Band

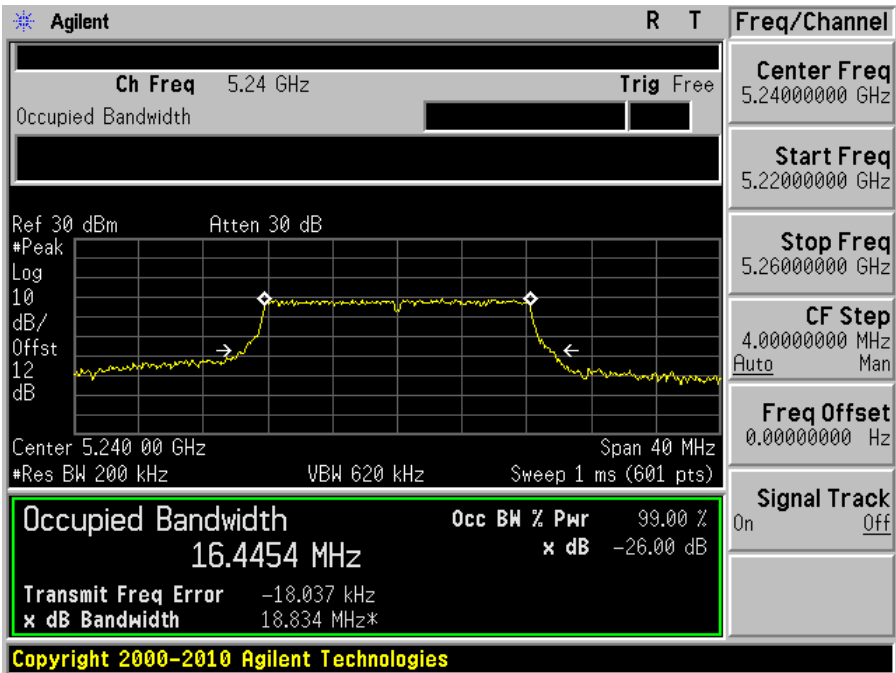
802.11a mode, 5180 MHz



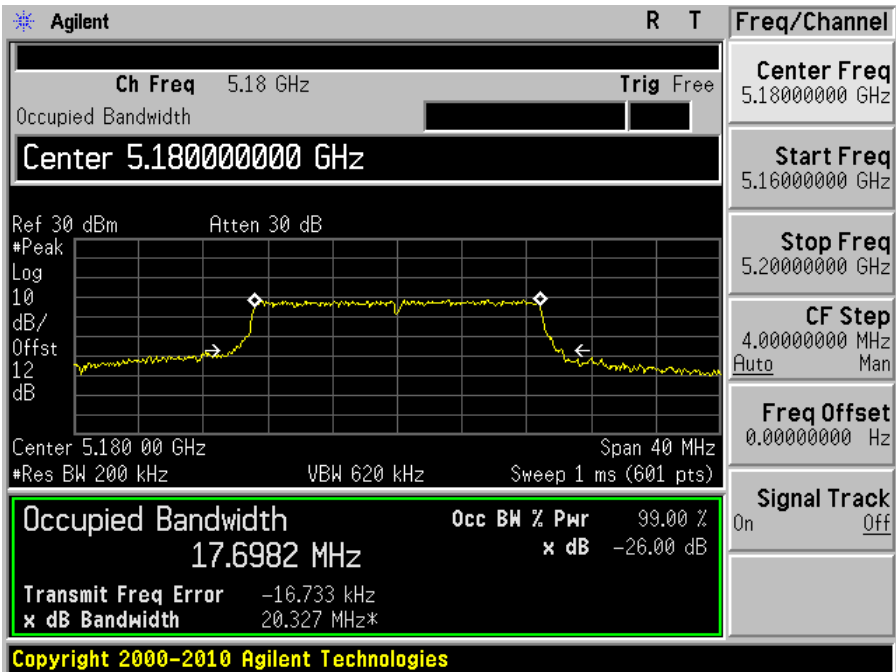
802.11a mode, 5200 MHz



802.11a mode, 5240 MHz

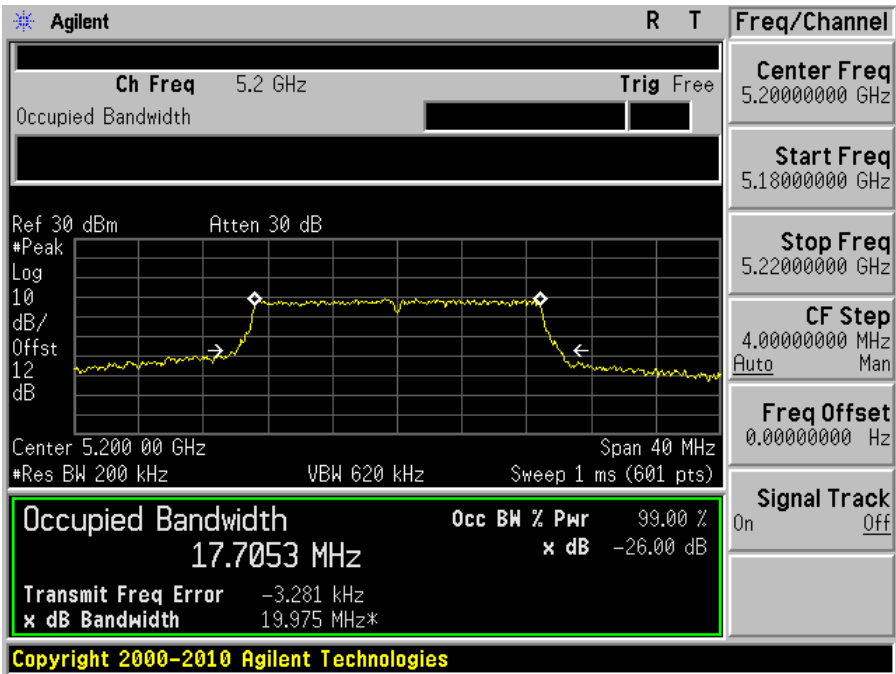


802.11n-HT20 mode, 5180 MHz

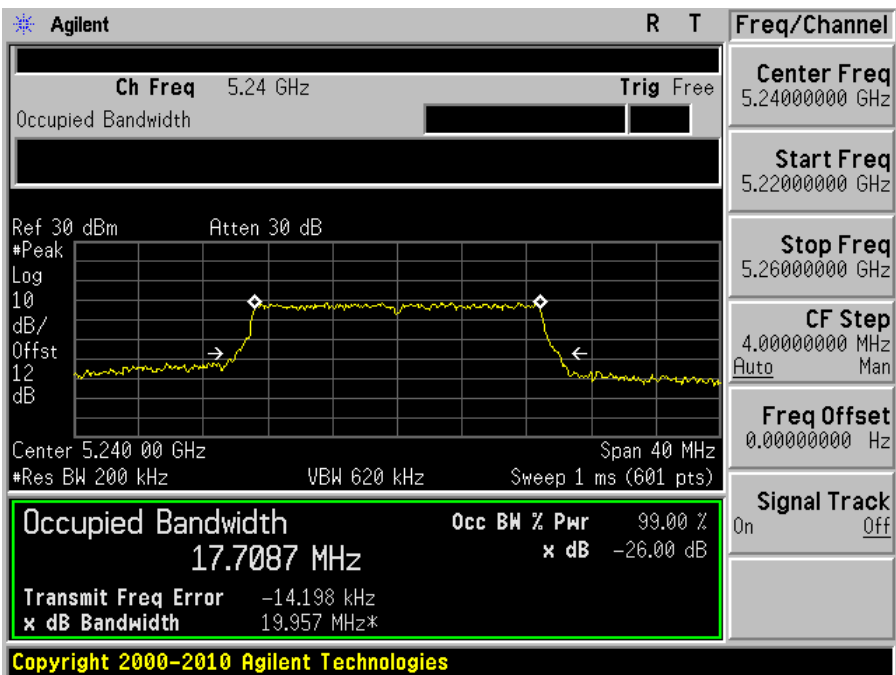




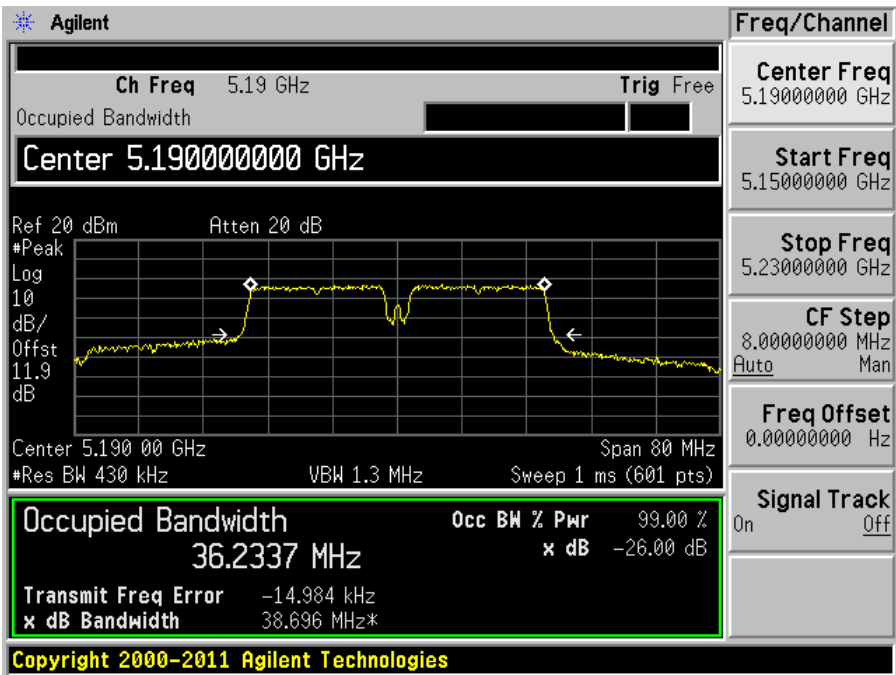
802.11n-HT20 mode, 5200 MHz



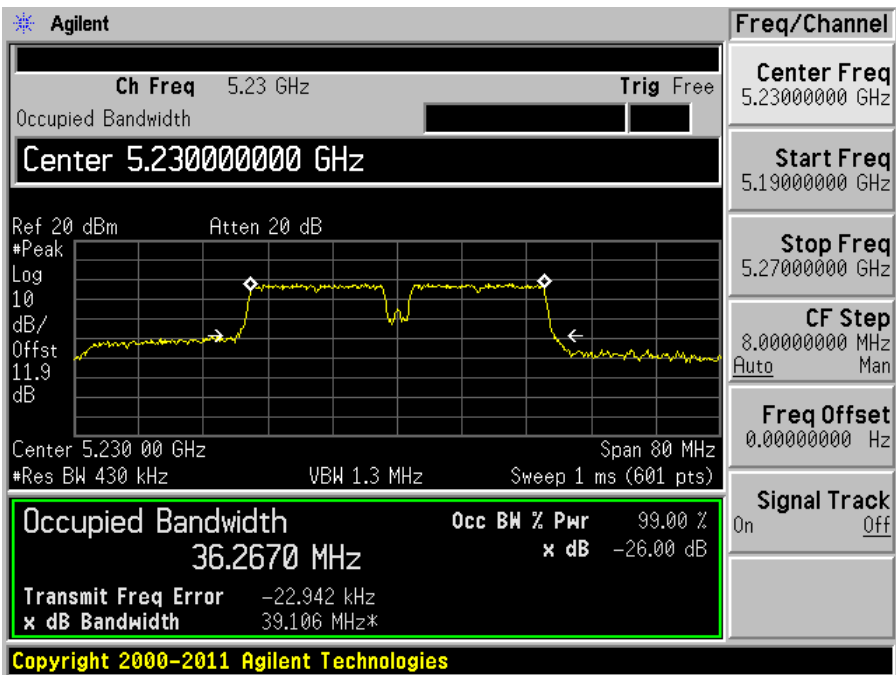
802.11n-HT20 mode, 5240 MHz



802.11n-HT40 mode, 5190 MHz

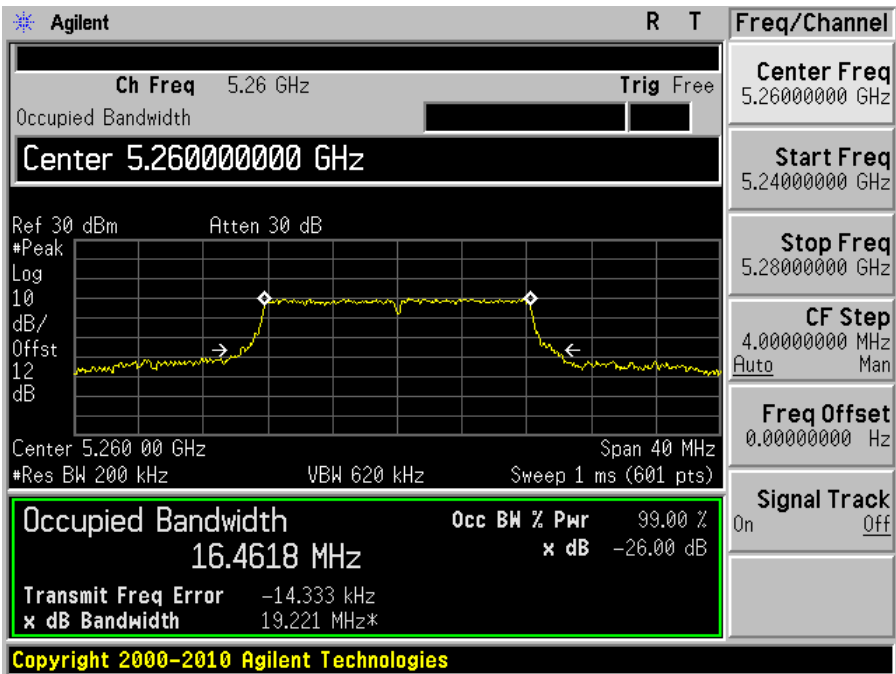


802.11n-HT40 mode, 5230 MHz

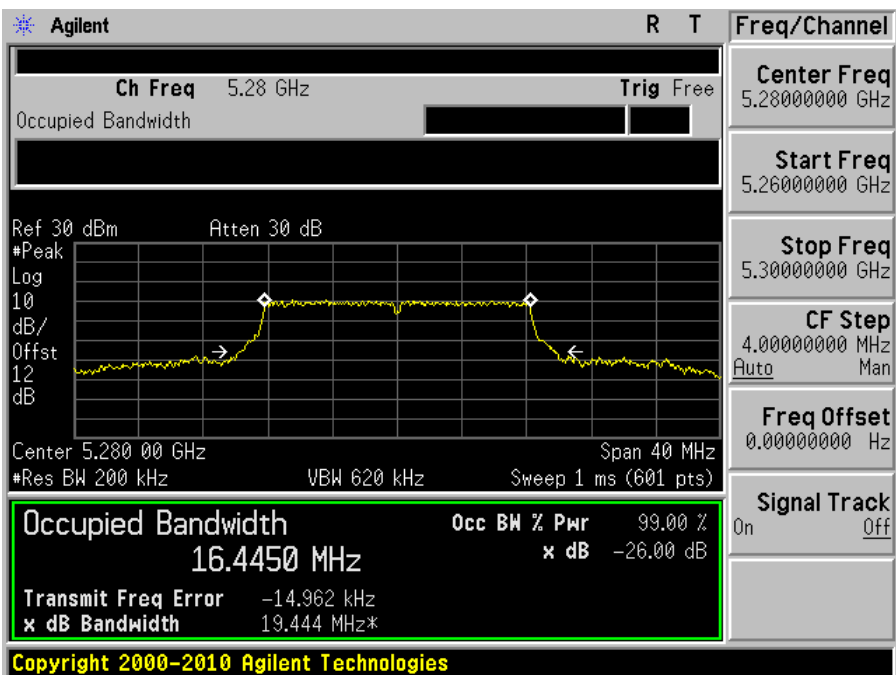


5250-5350 MHz Band

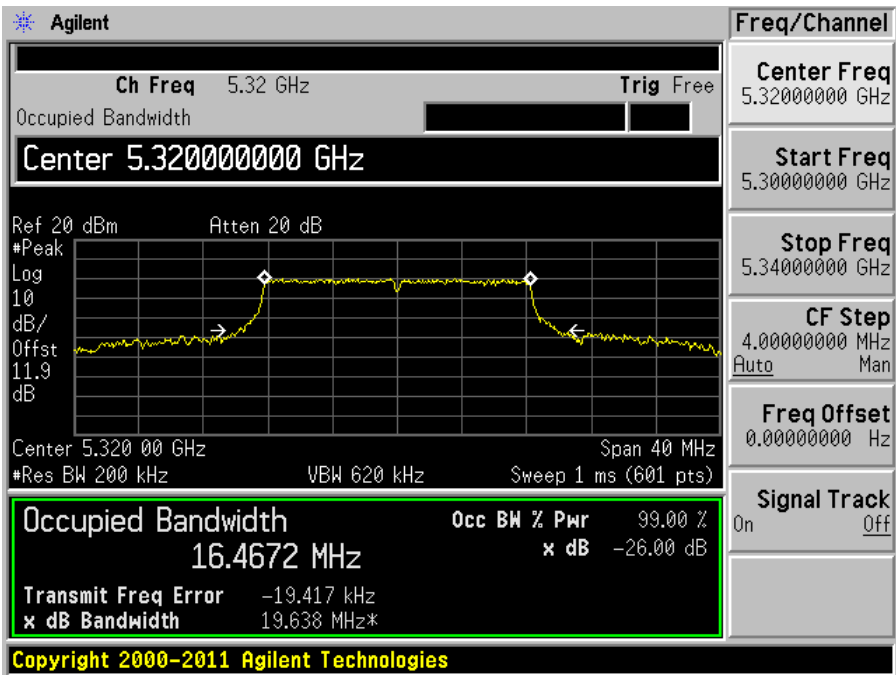
802.11a mode, 5260 MHz



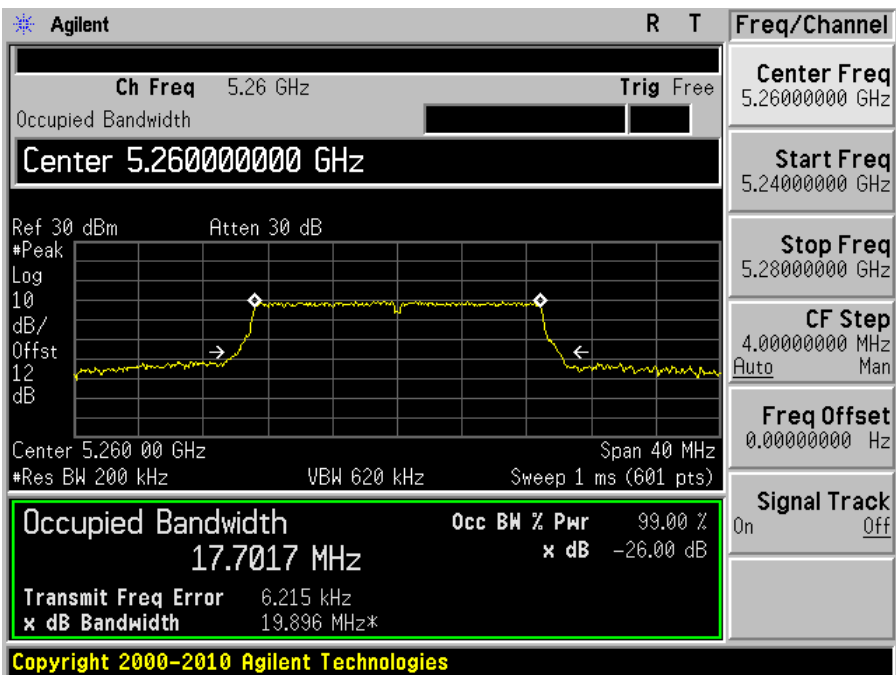
802.11a mode, 5280 MHz



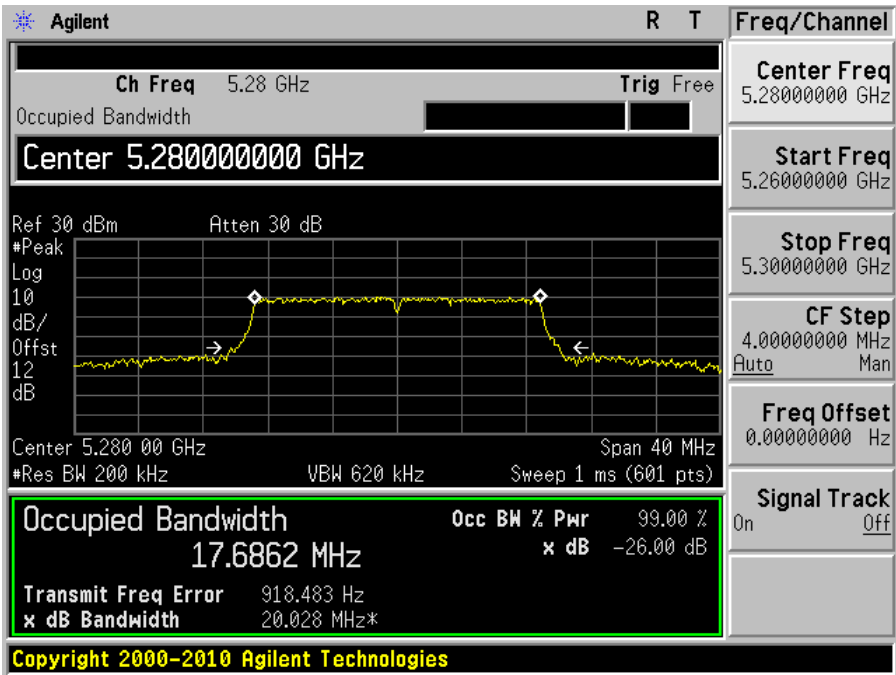
802.11a mode, 5320 MHz



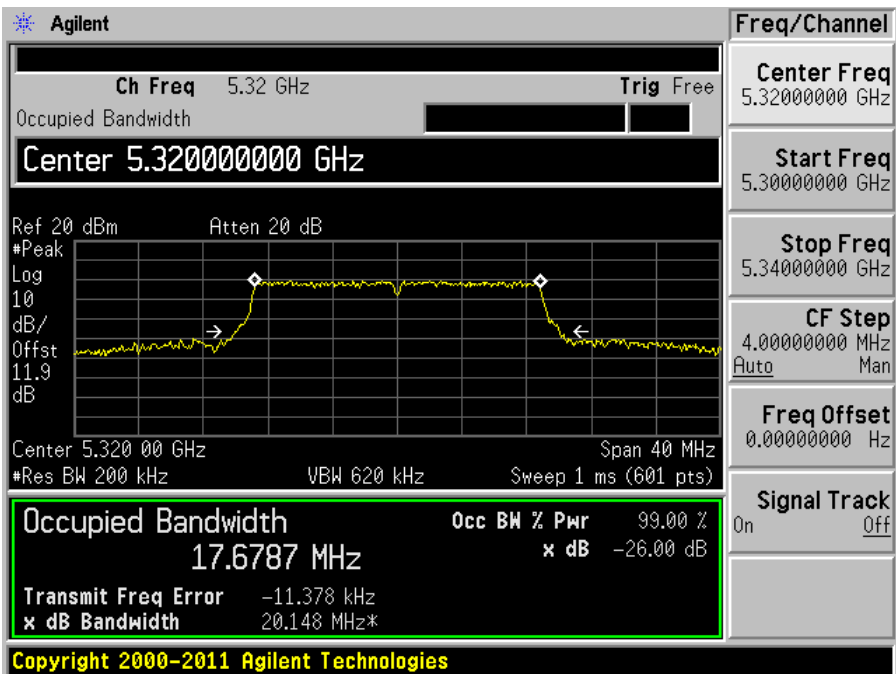
802.11n-HT20 mode, 5260 MHz



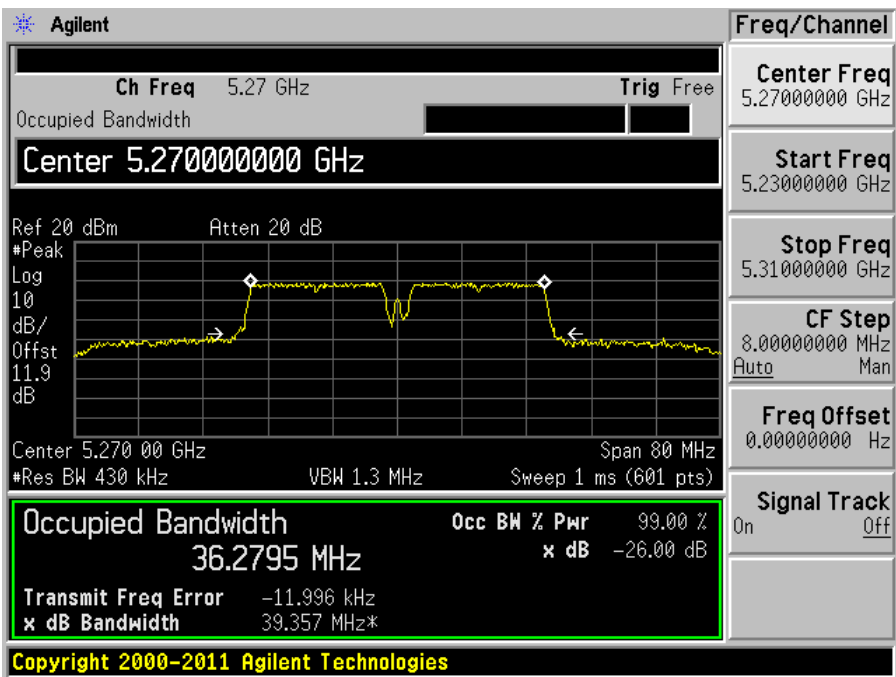
802.11n-HT20 mode, 5280 MHz



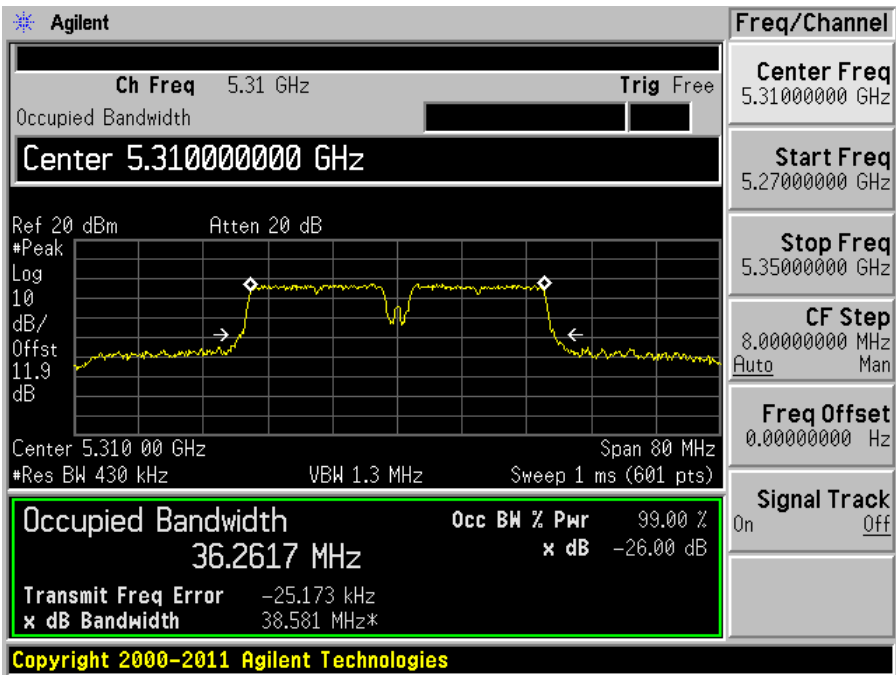
802.11n-HT20 mode, 5320 MHz



802.11n-HT40 mode, 5270 MHz

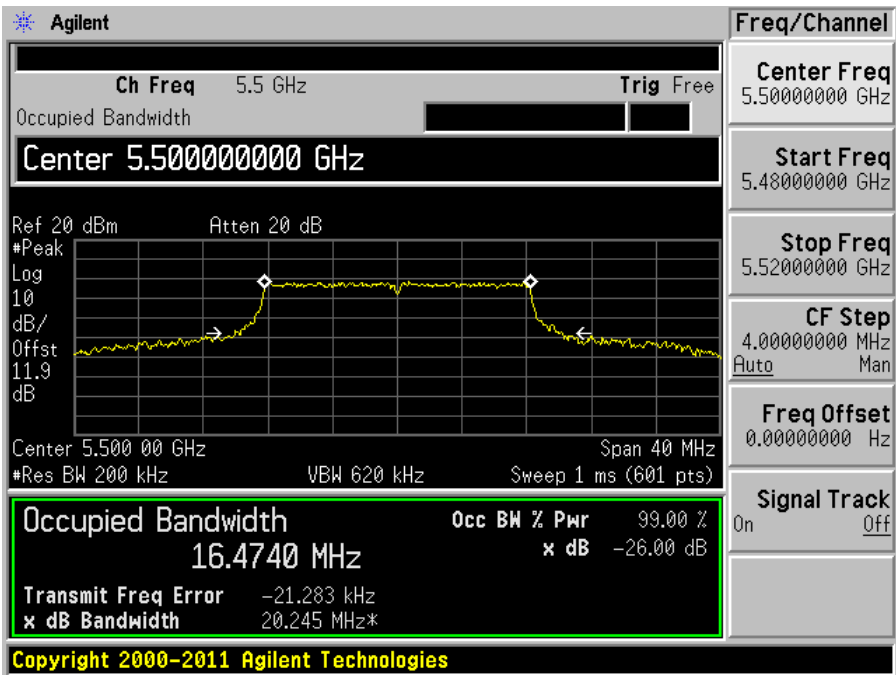


802.11n-HT40 mode, 5310 MHz

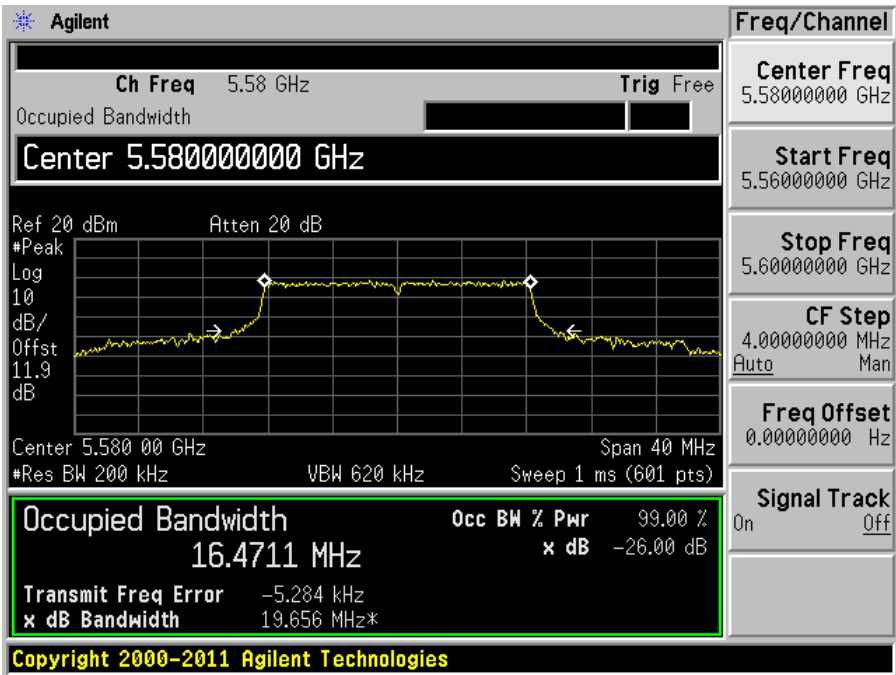


5470-5725 MHz Band

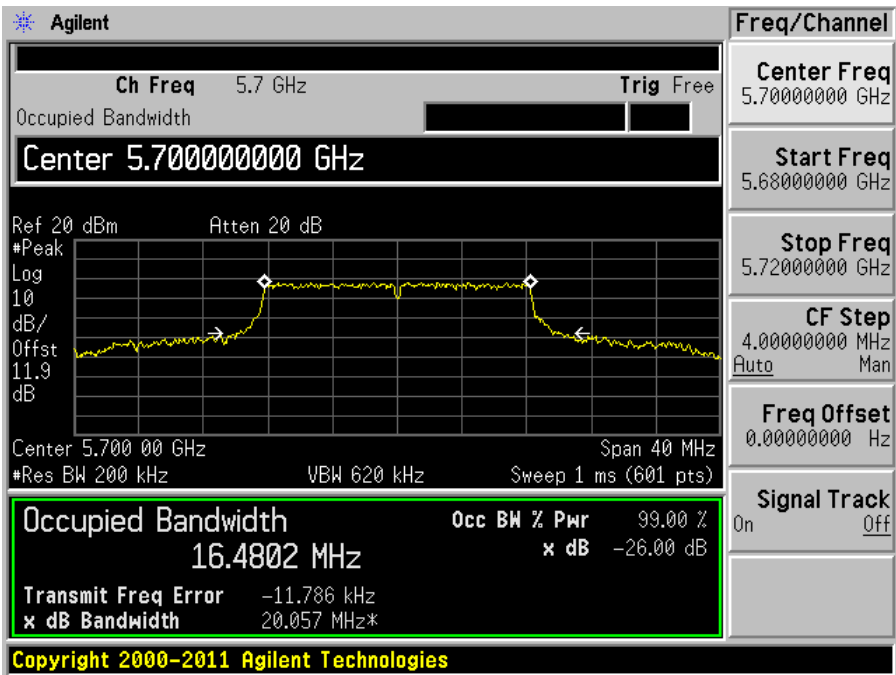
802.11a mode, 5500 MHz



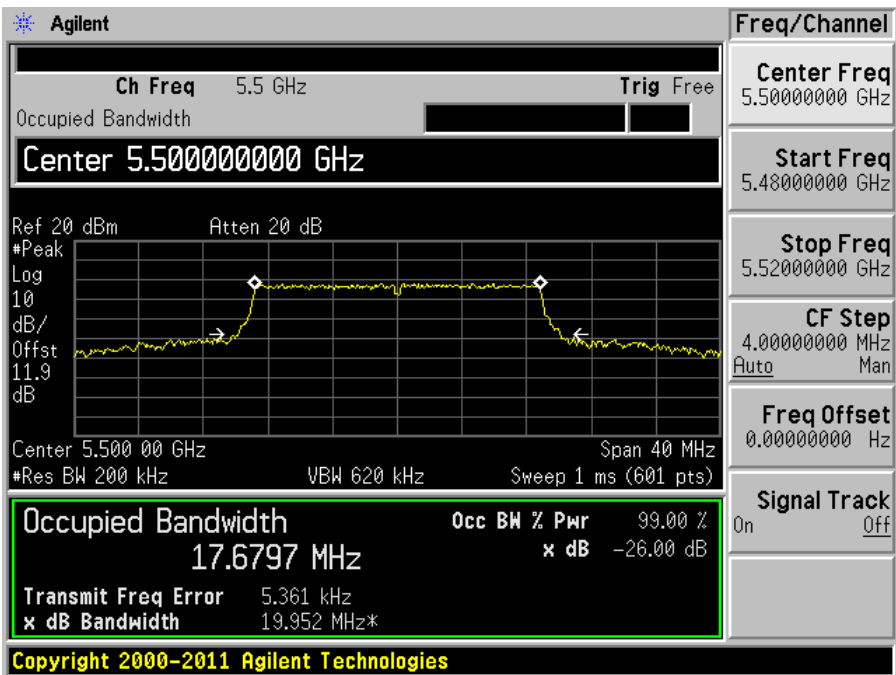
802.11a mode, 5580 MHz



802.11a mode, 5700 MHz

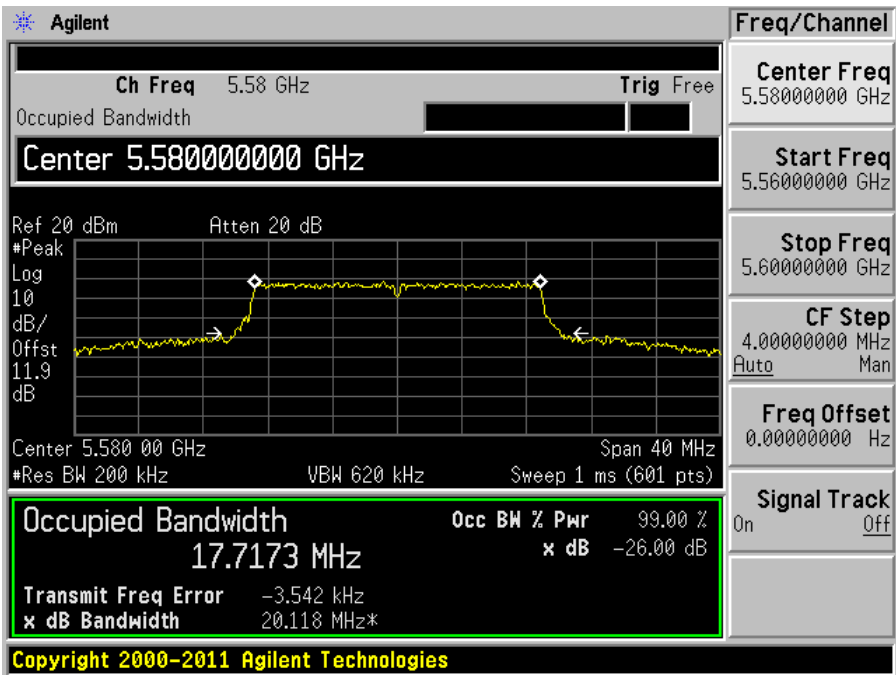


802.11n-HT20 mode, 5500 MHz

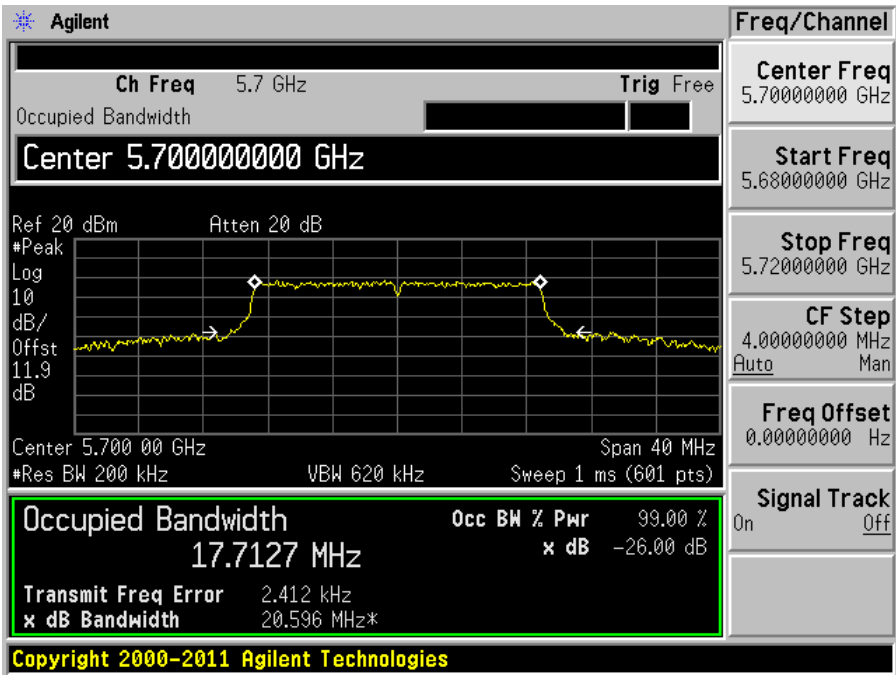




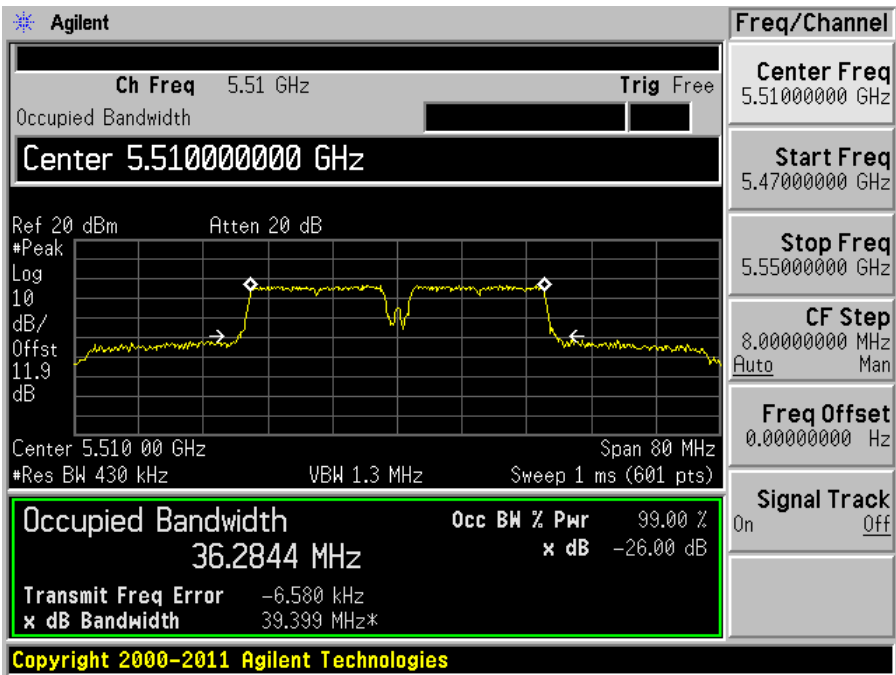
802.11n-HT20 mode, 5580 MHz



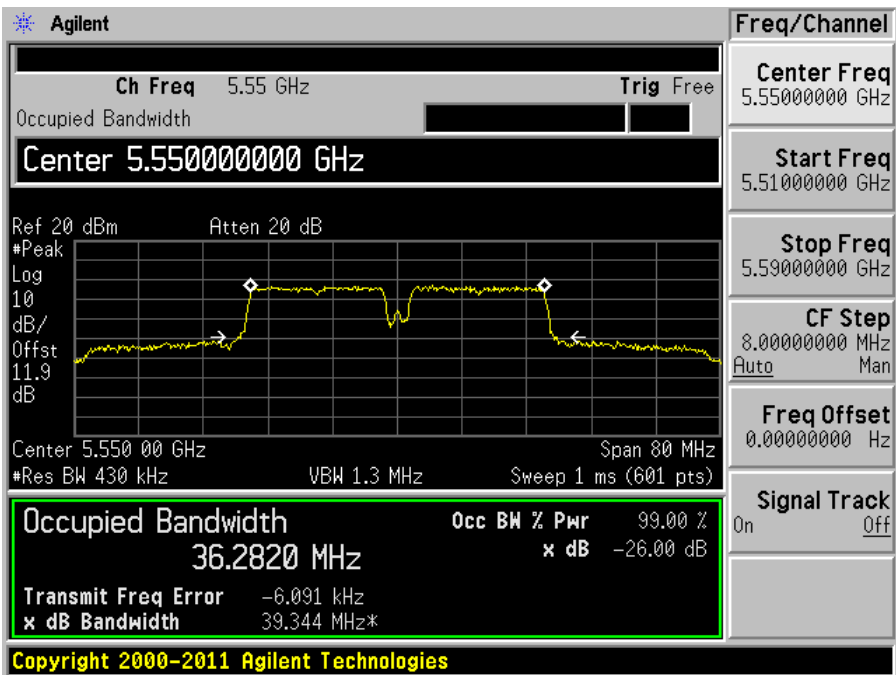
802.11n-HT20 mode, 5700 MHz



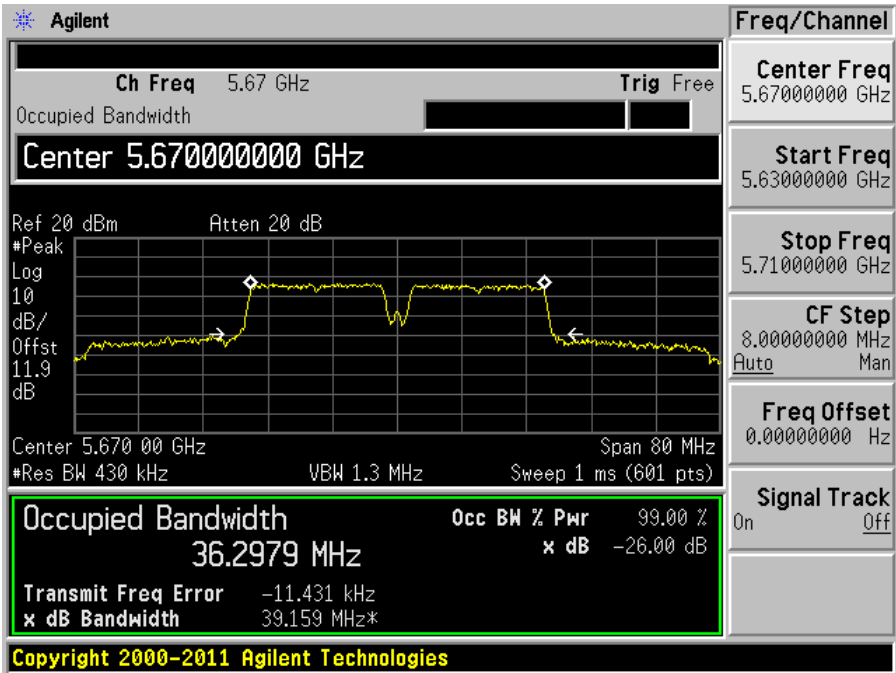
802.11n-HT40 mode, 5510 MHz



802.11n-HT40 mode, 5550 MHz



802.11n-HT40 mode, 5670 MHz



## 9 FCC §407(a)(1) - Peak Output Power Measurement

### 9.1 Applicable Standard

#### According to FCC §15.407(a)(2)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 9.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D01 General UNII Test Procedures v01r03: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section E: Maximum conducted output power

### 9.3 Test Equipment List and Details

| Manufacturer | Description       | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4446A    | US44300386 | 2012-09-29       | 1 year               |

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 9.4 Test Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 21 °C     |
| Relative Humidity: | 51 %      |
| ATM Pressure:      | 101.3 kPa |

The testing was performed by Lionel Lara on 2013-05-07 in the RF site.

## 9.5 Test Results

### Chip Antenna:

#### 5150 - 5250 MHz

| Channel           | Frequency (MHz) | Conducted Output Power (dBm) | Limit (dBm) | Margin (dB) | Power Setting |
|-------------------|-----------------|------------------------------|-------------|-------------|---------------|
| 802.11a mode      |                 |                              |             |             |               |
| Low               | 5180            | 14.16                        | 17          | -2.84       | 19            |
| Middle            | 5200            | 14.26                        | 17          | -2.74       | 19            |
| High              | 5240            | 14.25                        | 17          | -2.75       | 19            |
| 802.11n-HT20 mode |                 |                              |             |             |               |
| Low               | 5180            | 14.68                        | 17          | -2.32       | 19            |
| Middle            | 5200            | 14.24                        | 17          | -2.76       | 19            |
| High              | 5240            | 13.97                        | 17          | -3.03       | 19            |
| 802.11n-HT40 mode |                 |                              |             |             |               |
| Low               | 5190            | 11.83                        | 17          | -5.17       | 16            |
| High              | 5230            | 14.34                        | 17          | -2.66       | 19            |

#### 5250 - 5350 MHz

| Channel           | Frequency (MHz) | Conducted Output Power (dBm) | Limit (dBm) | Margin (dB) | Power Setting |
|-------------------|-----------------|------------------------------|-------------|-------------|---------------|
| 802.11a mode      |                 |                              |             |             |               |
| Low               | 5260            | 15.67                        | 24          | -8.33       | 20            |
| Middle            | 5280            | 15.95                        | 24          | -8.05       | 20            |
| High              | 5320            | 16.82                        | 24          | -7.18       | 20            |
| 802.11n-HT20 mode |                 |                              |             |             |               |
| Low               | 5260            | 15.68                        | 24          | -8.32       | 20            |
| Middle            | 5280            | 16.20                        | 24          | -7.8        | 20            |
| High              | 5320            | 16.68                        | 24          | -7.32       | 20            |
| 802.11n-HT40 mode |                 |                              |             |             |               |
| Low               | 5270            | 15.12                        | 24          | -8.88       | 20            |
| High              | 5310            | 12.45                        | 24          | -11.55      | 16            |

**5470 - 5725 MHz**

| Channel           | Frequency (MHz) | Conducted Output Power (dBm) | Limit (dBm) | Margin (dB) | Power Setting |
|-------------------|-----------------|------------------------------|-------------|-------------|---------------|
| 802.11a mode      |                 |                              |             |             |               |
| Low               | 5500            | 15.20                        | 24          | -8.8        | 20            |
| Middle            | 5580            | 15.12                        | 24          | -8.88       | 20            |
| High              | 5700            | 15.29                        | 24          | -8.71       | 20            |
| 802.11n-HT20 mode |                 |                              |             |             |               |
| Low               | 5500            | 15.45                        | 24          | -8.55       | 20            |
| Middle            | 5580            | 14.99                        | 24          | -9.01       | 20            |
| High              | 5700            | 14.58                        | 24          | -9.42       | 19            |
| 802.11n-HT40 mode |                 |                              |             |             |               |
| Low               | 5510            | 12.07                        | 24          | -11.93      | 16            |
| Middle            | 5550            | 14.04                        | 24          | -9.96       | 20            |
| High              | 5670            | 14.96                        | 24          | -9.04       | 20            |

**Dipole Antenna:**

Note: Only the channels with different power settings were remeasured; All other data shares from the chip antenna.

**5150 - 5250 MHz**

## 802.11n-HT40 mode

| Channel | Frequency (MHz) | Conducted Output Power (dBm) | Limit (dBm) | Margin (dB) | Power Setting |
|---------|-----------------|------------------------------|-------------|-------------|---------------|
| Low     | 5190            | 10.41                        | 17          | -6.59       | 15            |

**5250 - 5350 MHz**

| Channel           | Frequency (MHz) | Conducted Output Power (dBm) | Limit (dBm) | Margin (dB) | Power Setting |
|-------------------|-----------------|------------------------------|-------------|-------------|---------------|
| 802.11a mode      |                 |                              |             |             |               |
| High              | 5320            | 14.84                        | 24          | -9.16       | 19            |
| 802.11n-HT20 mode |                 |                              |             |             |               |
| High              | 5320            | 14.69                        | 24          | -9.31       | 19            |
| 802.11n-HT40 mode |                 |                              |             |             |               |
| High              | 5310            | 10.69                        | 24          | -13.31      | 15            |

**5470 - 5725 MHz**

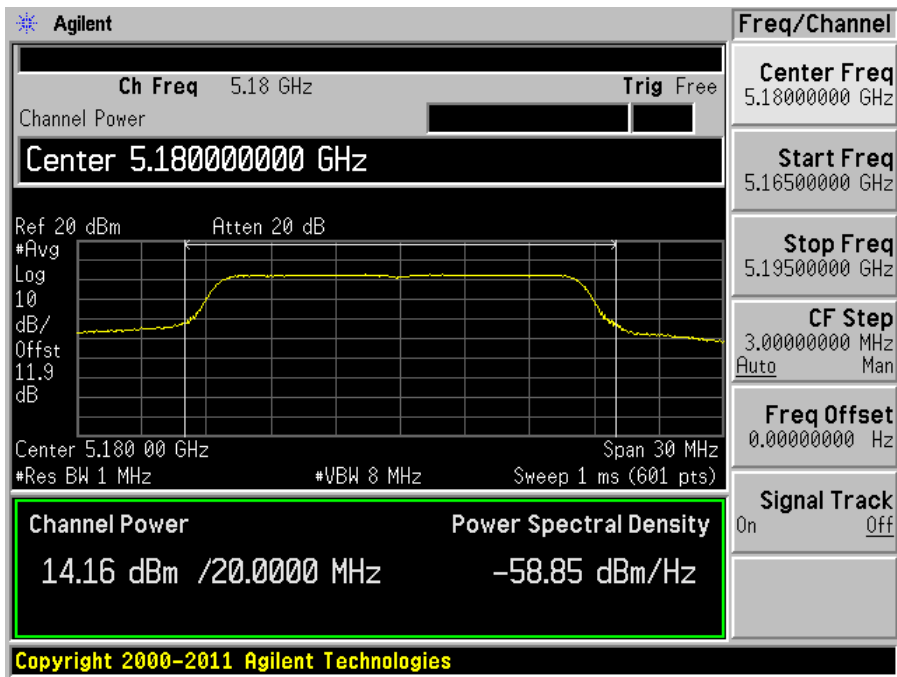
| <b>Channel</b>    | <b>Frequency<br/>(MHz)</b> | <b>Conducted<br/>Output Power<br/>(dBm)</b> | <b>Limit<br/>(dBm)</b> | <b>Margin<br/>(dB)</b> | <b>Power<br/>Setting</b> |
|-------------------|----------------------------|---|------------------------|------------------------|--------------------------|
| 802.11a mode      |                            |   |                        |                        |                          |
| High              | 5700                       | 13.87                                       | 24                     | -10.13                 | 19                       |
| 802.11n-HT20 mode |                            |   |                        |                        |                          |
| High              | 5700                       | 12.73                                       | 24                     | -11.27                 | 17                       |
| 802.11n-HT40 mode |                            |   |                        |                        |                          |
| Low               | 5510                       | 10.35                                       | 24                     | -13.65                 | 15                       |
| High              | 5670                       | 13.17                                       | 24                     | -10.83                 | 19                       |

Please refer to the following plots.

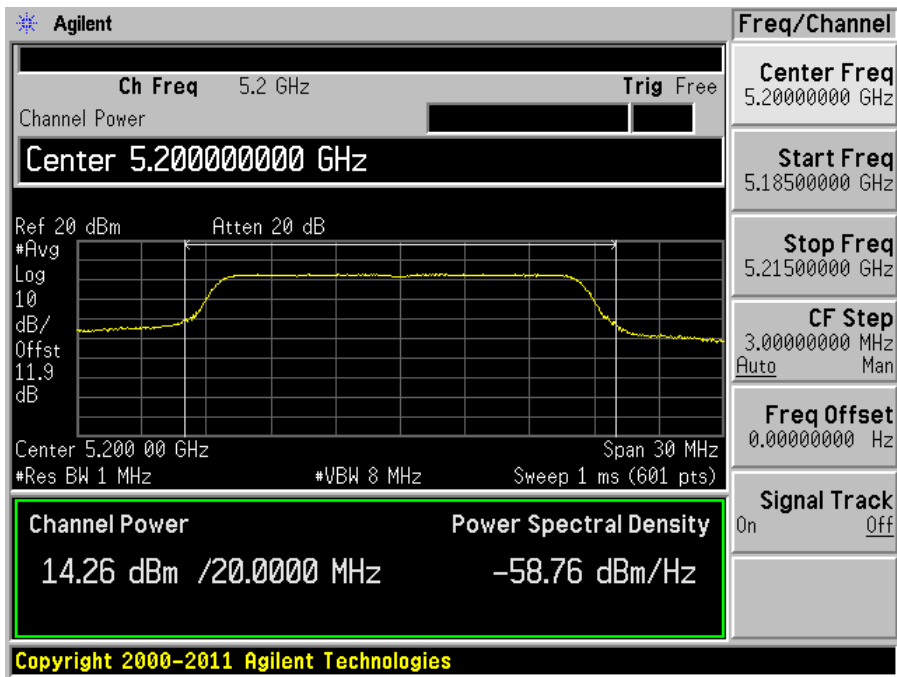
Chip Antenna :

5150 - 5250 MHz

802.11a mode, Low Channel : 5180 MHz

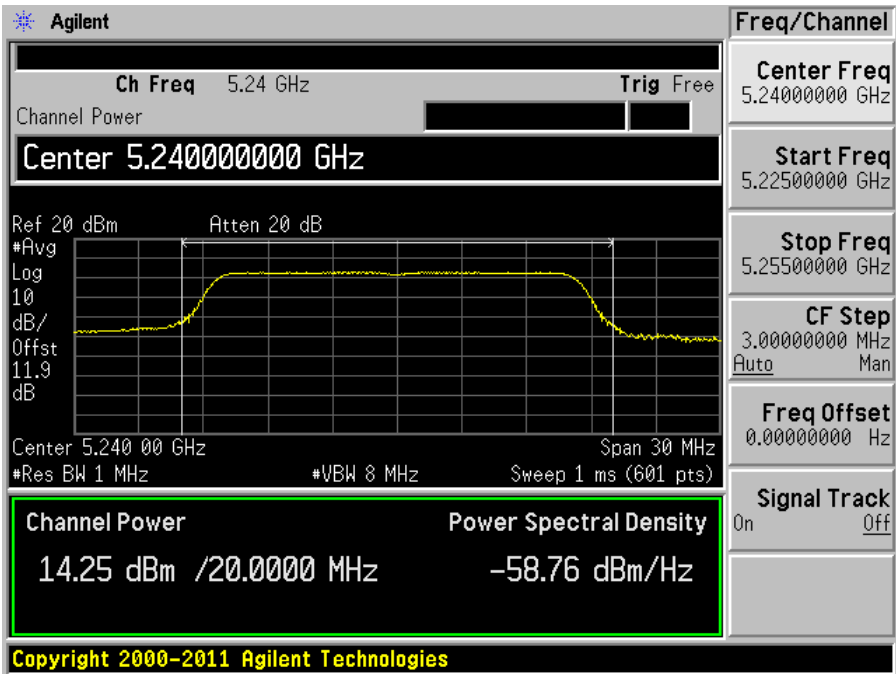


802.11a mode, Middle Channel : 5200 MHz

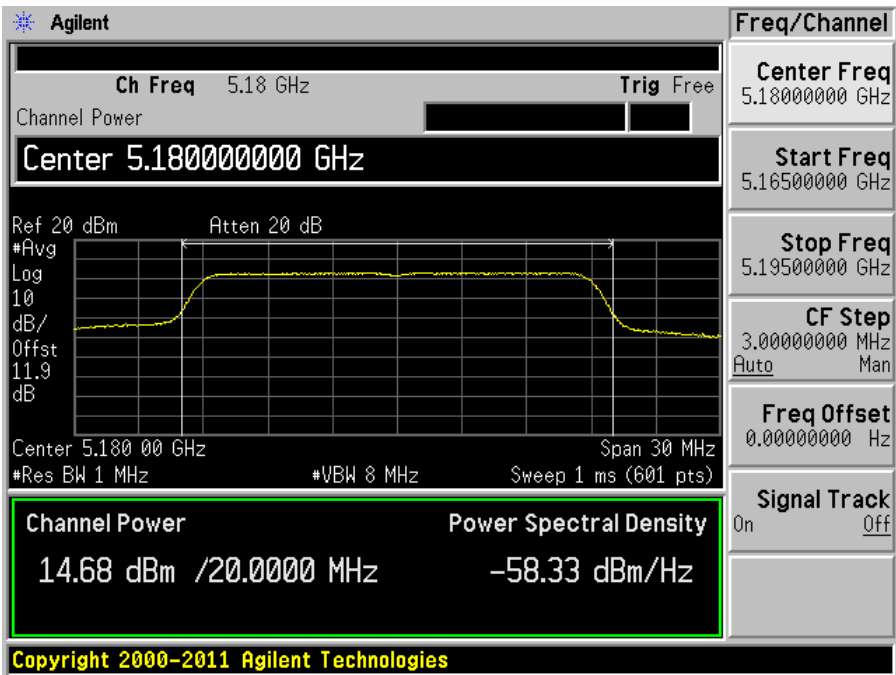




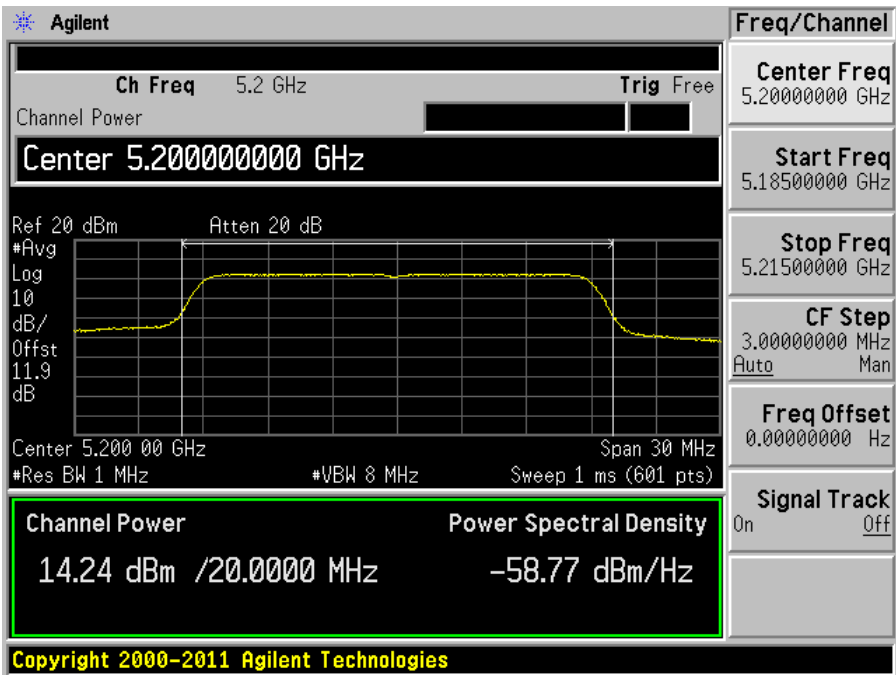
802.11a mode, High Channel : 5240 MHz



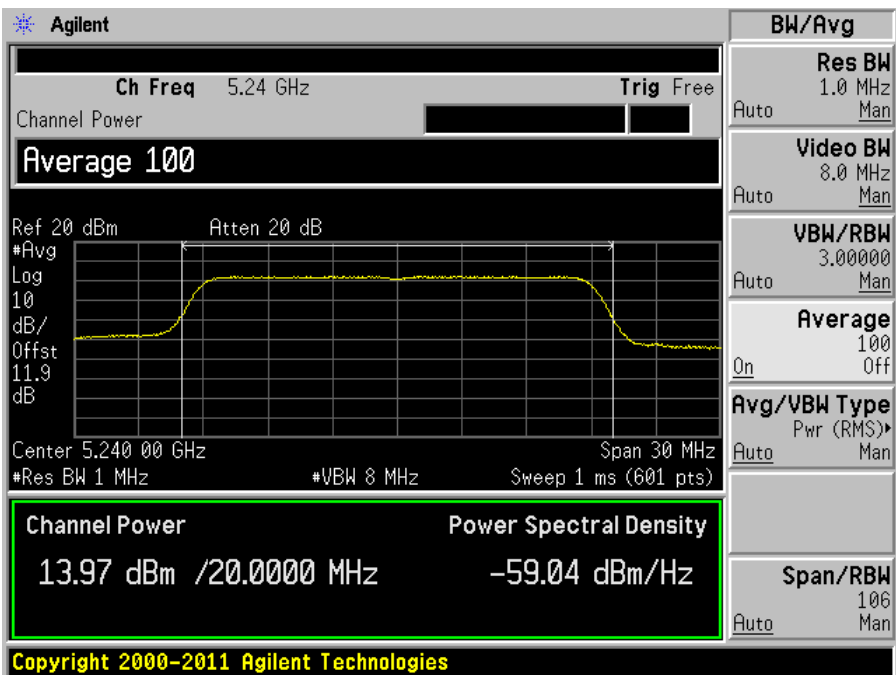
802.11n-HT20 mode, Low Channel: 5180 MHz



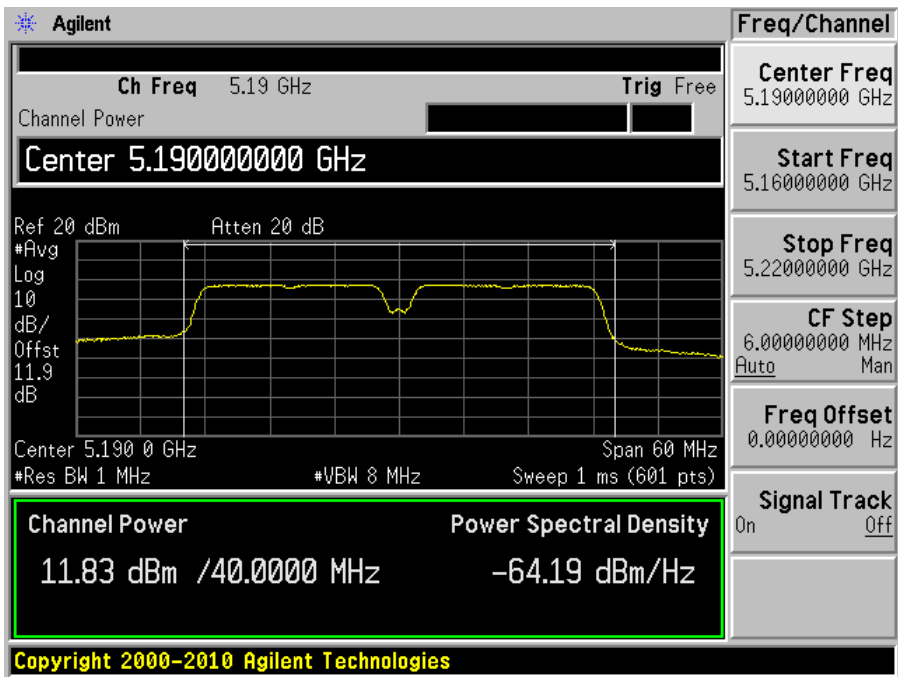
802.11n-HT20 mode, Middle Channel: 5200 MHz



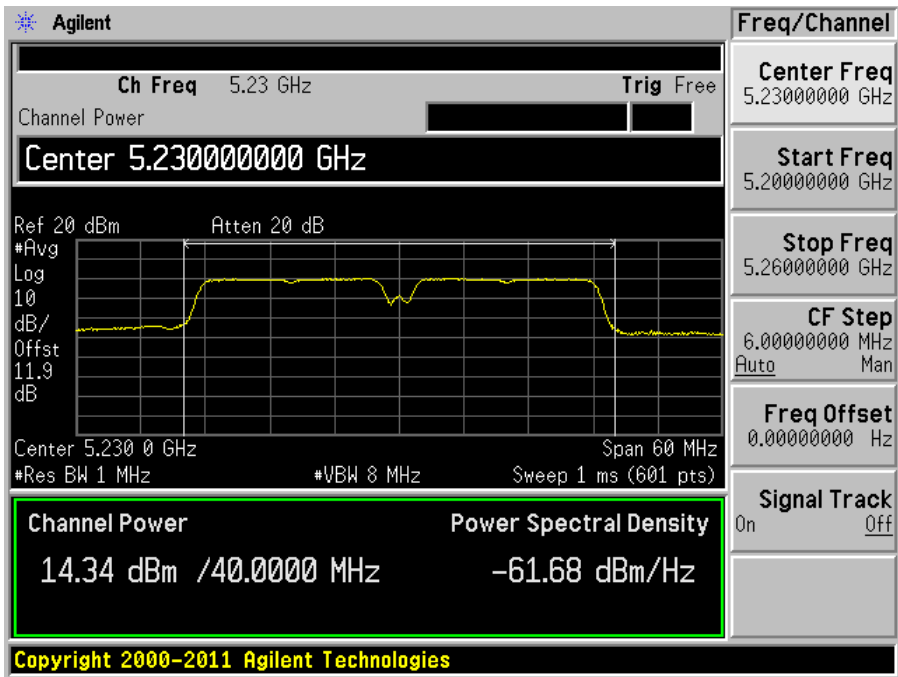
802.11n-HT20 mode, High Channel: 5240 MHz



802.11n-HT40 mode, Low Channel: 5190 MHz

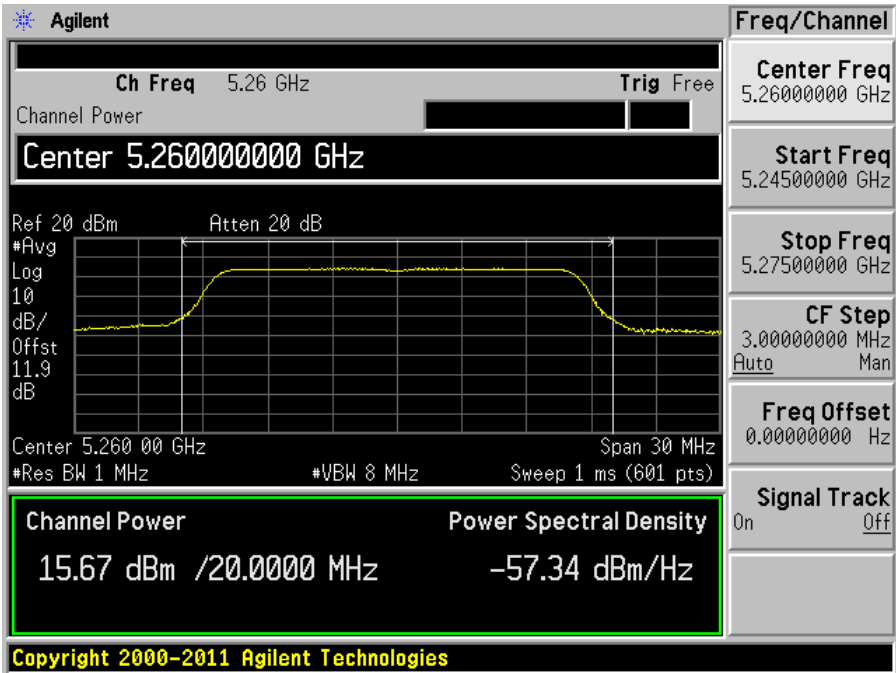


802.11n-HT40 mode, High Channel: 5230 MHz

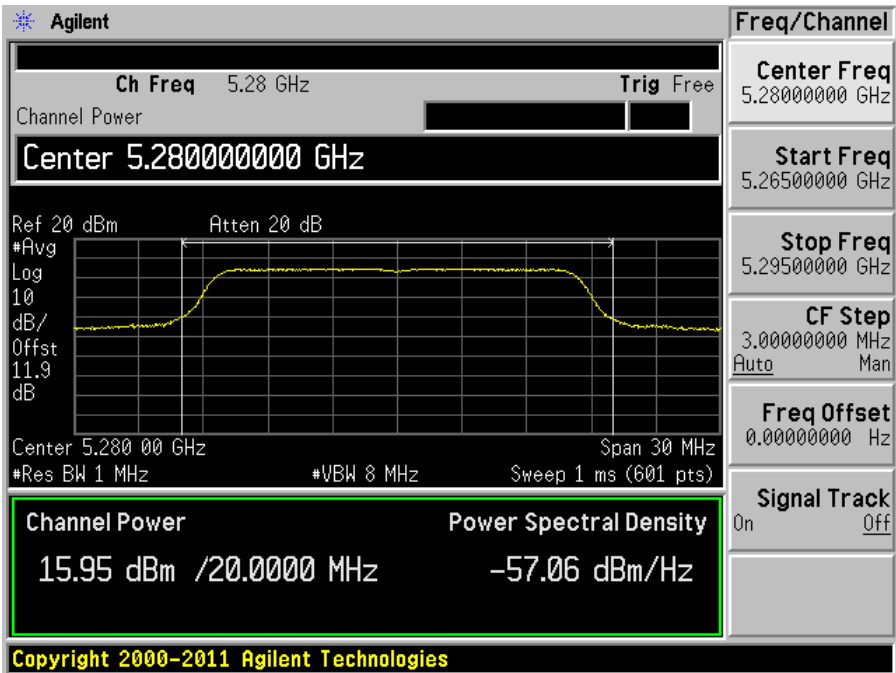


5250 - 5350 MHz

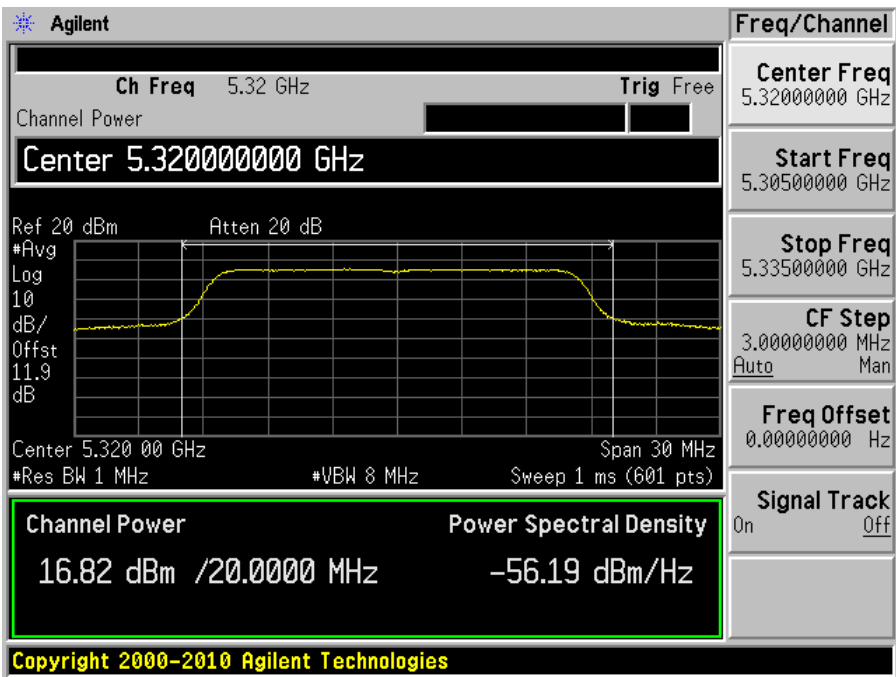
802.11a mode, Low Channel: 5260 MHz



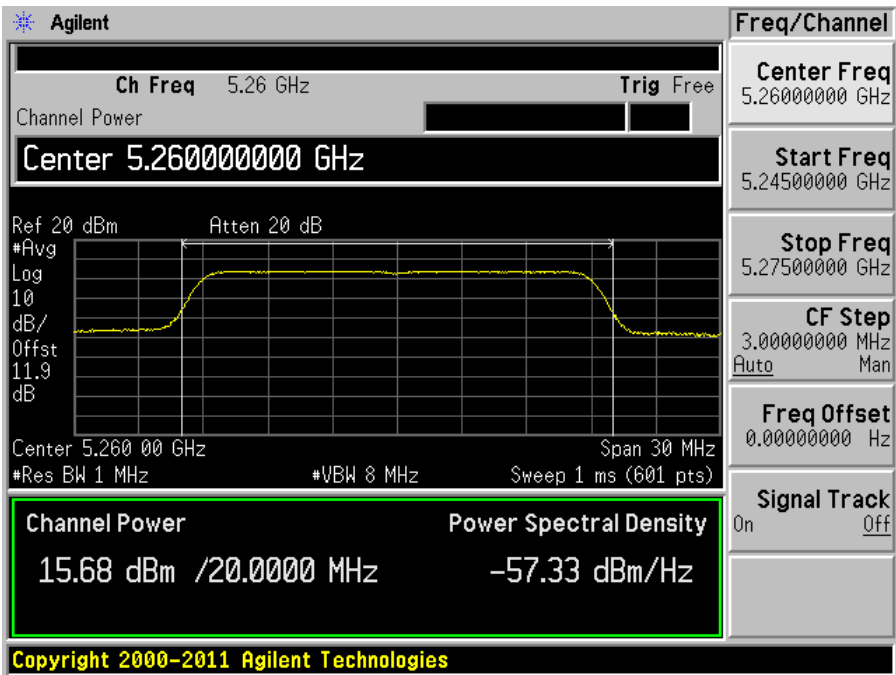
802.11a mode, Middle Channel: 5280 MHz



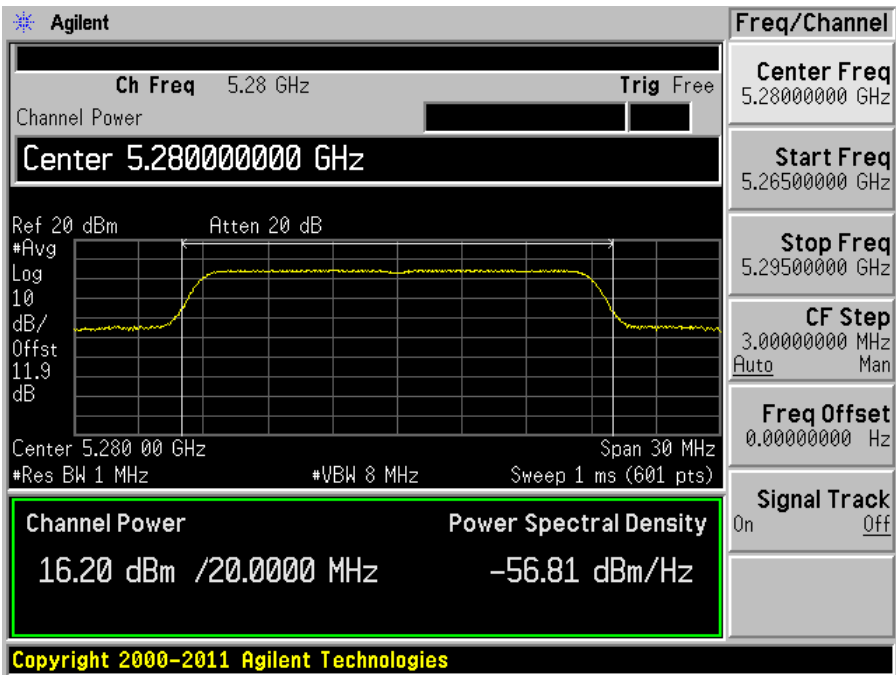
802.11a mode, High Channel: 5320 MHz



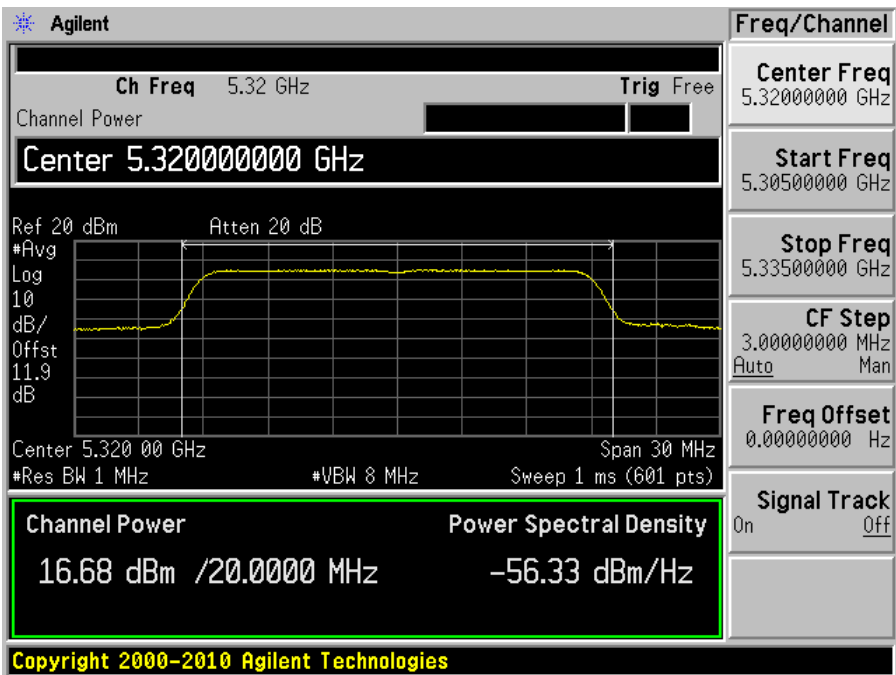
802.11n-HT20 mode, Low Channel: 5260 MHz



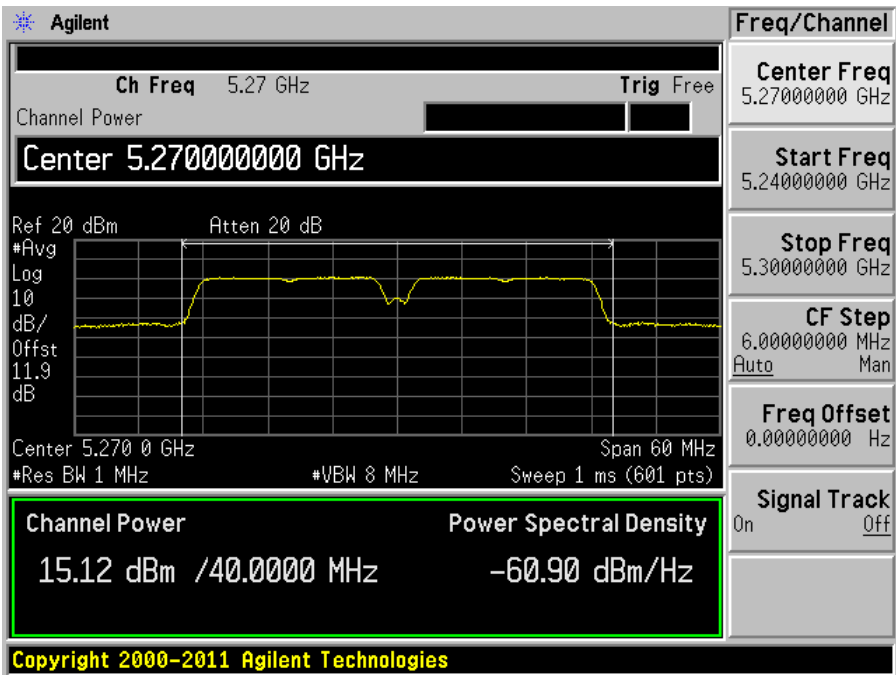
802.11n-HT20 mode, Middle Channel: 5280 MHz



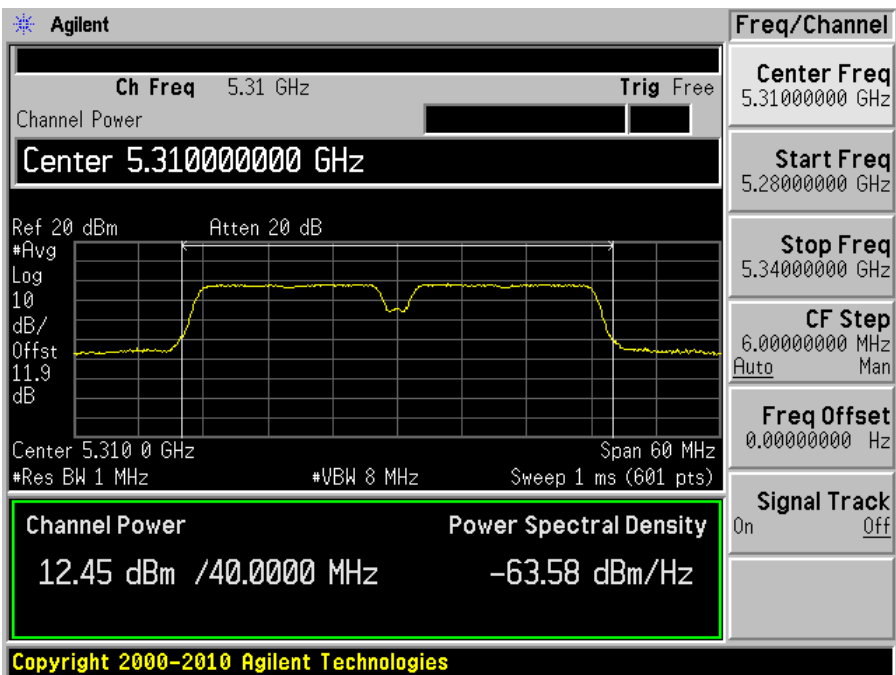
802.11n-HT20 mode, High Channel: 5320 MHz



802.11n-HT40 mode, Low Channel: 5270 MHz

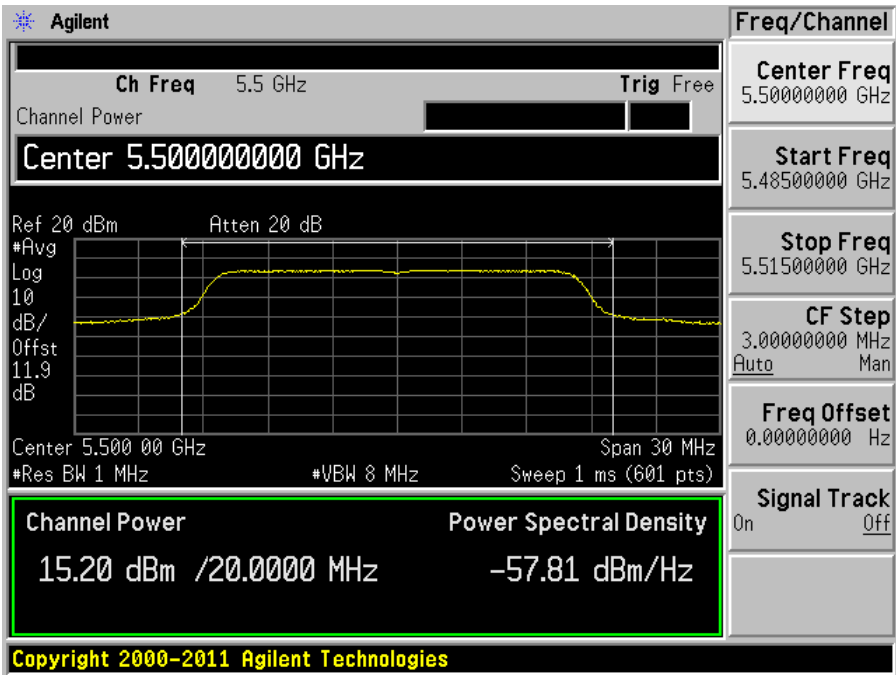


802.11n-HT40 mode, High Channel: 5310 MHz

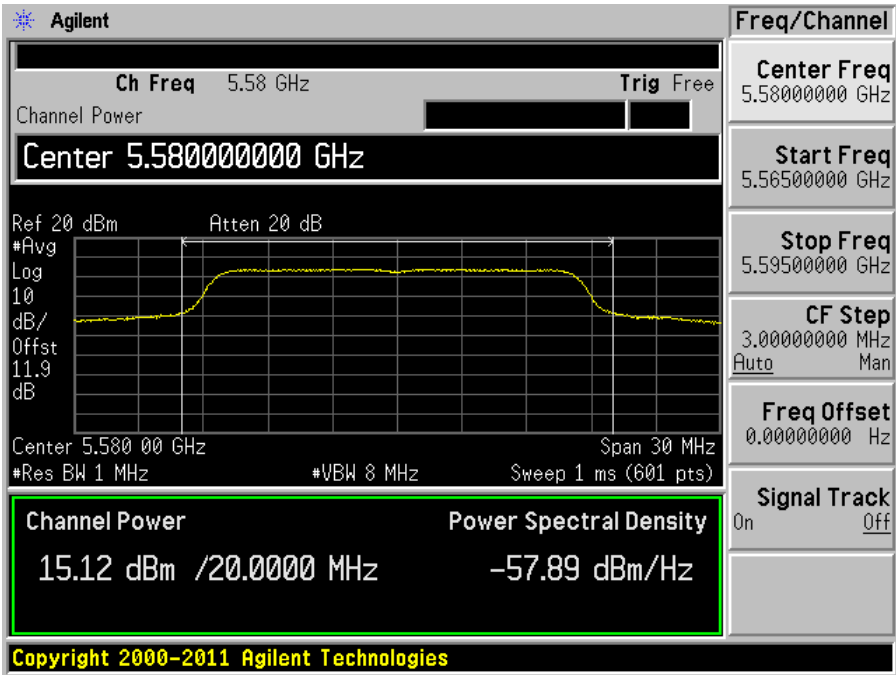


5470 - 5725 MHz

802.11a mode, Low Channel: 5500 MHz

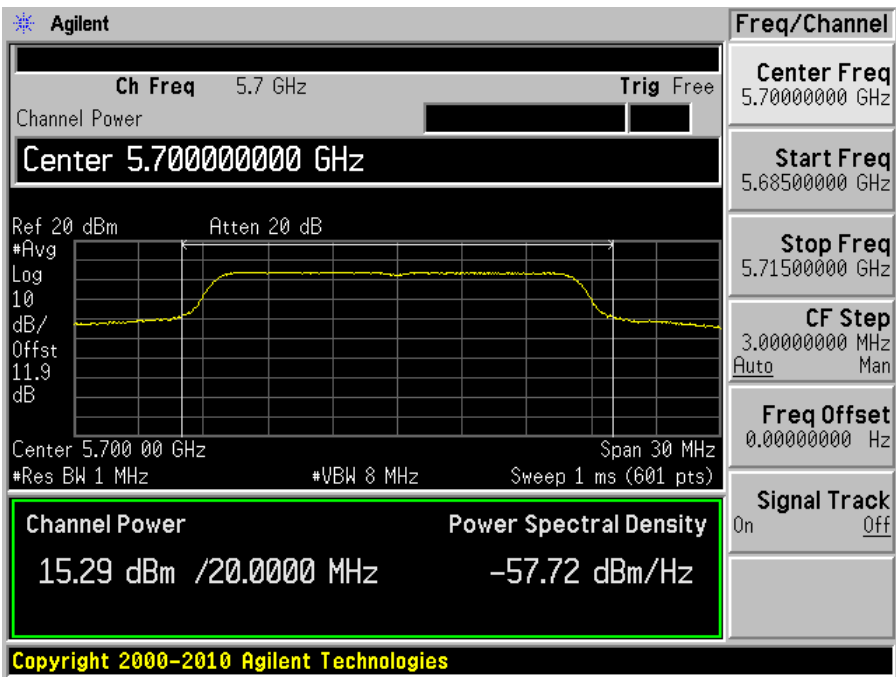


802.11a mode, Middle Channel: 5580 MHz

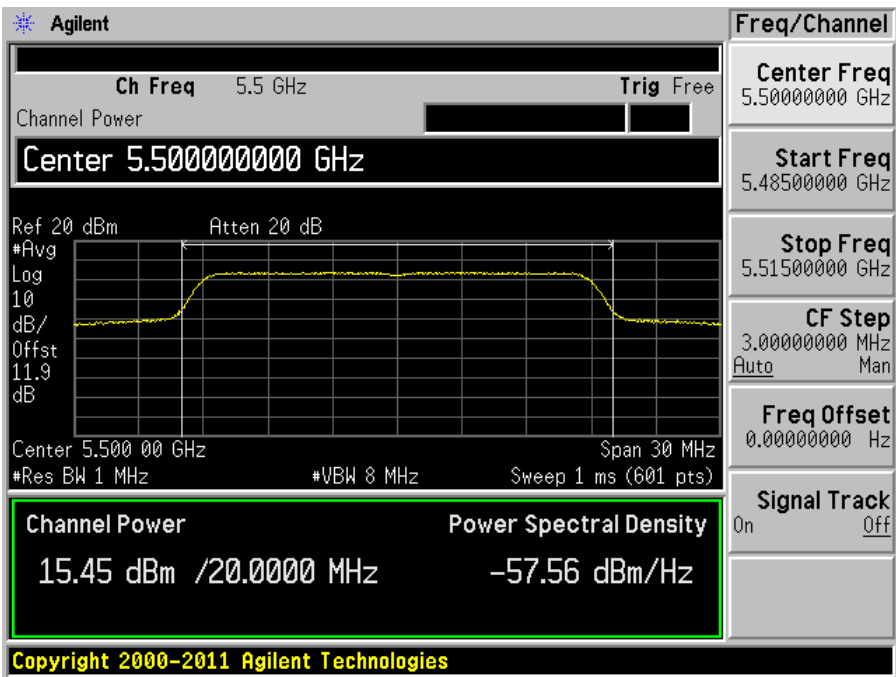




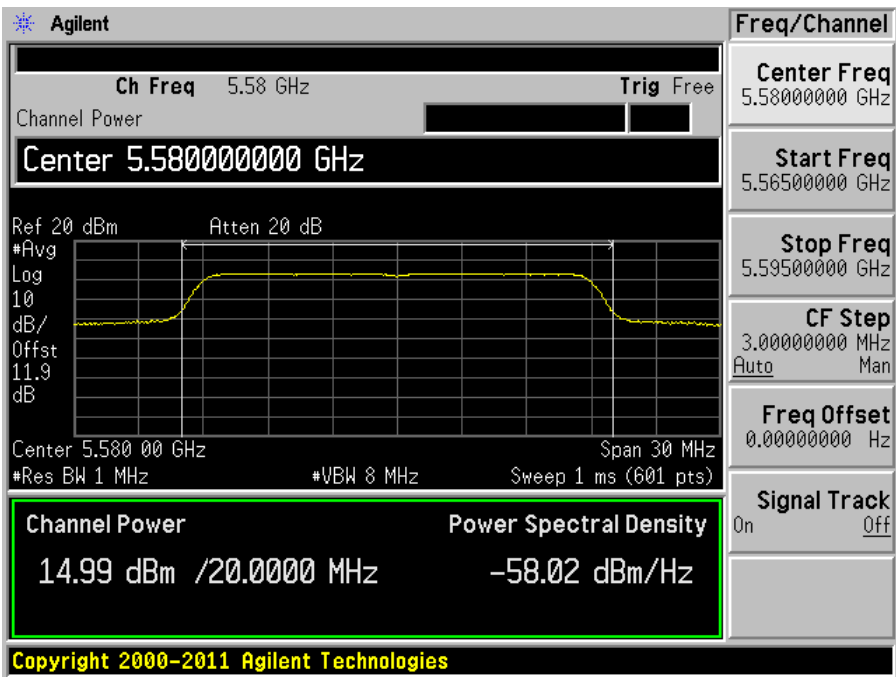
802.11a mode, High Channel: 5700 MHz



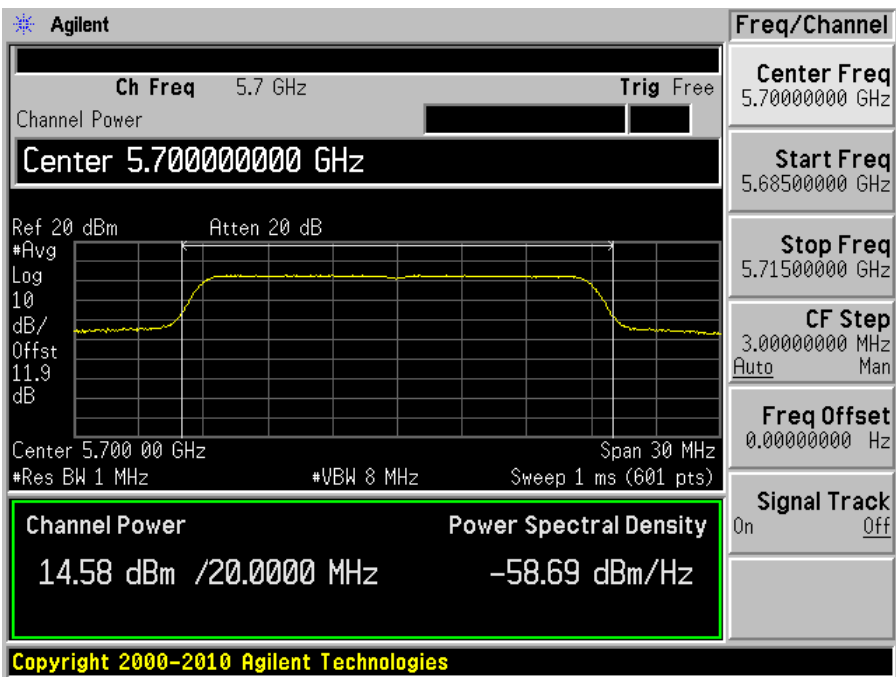
802.11n-HT20 mode, Low Channel: 5500 MHz



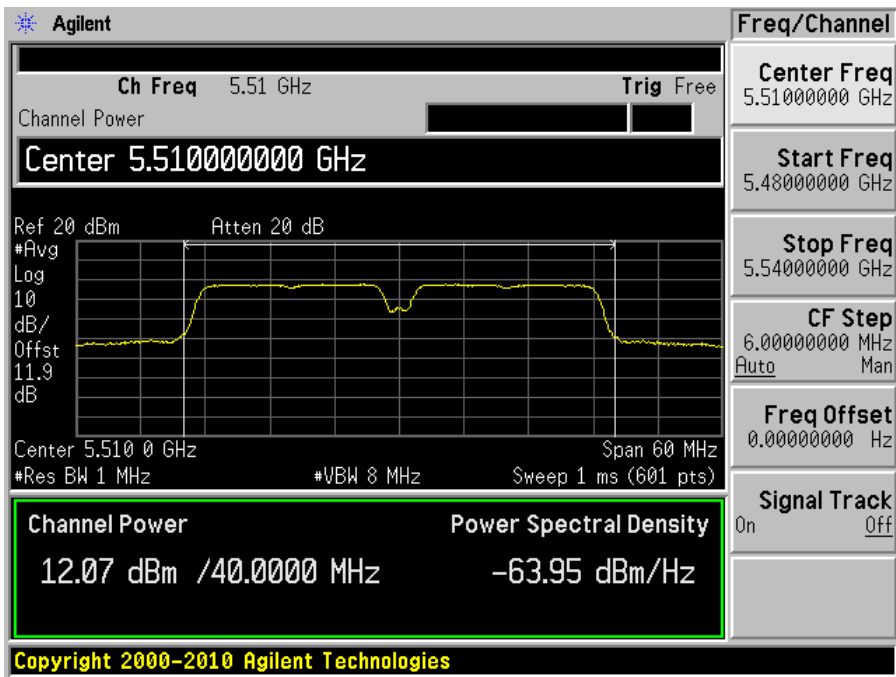
802.11n-HT20 mode, Middle Channel: 5580 MHz



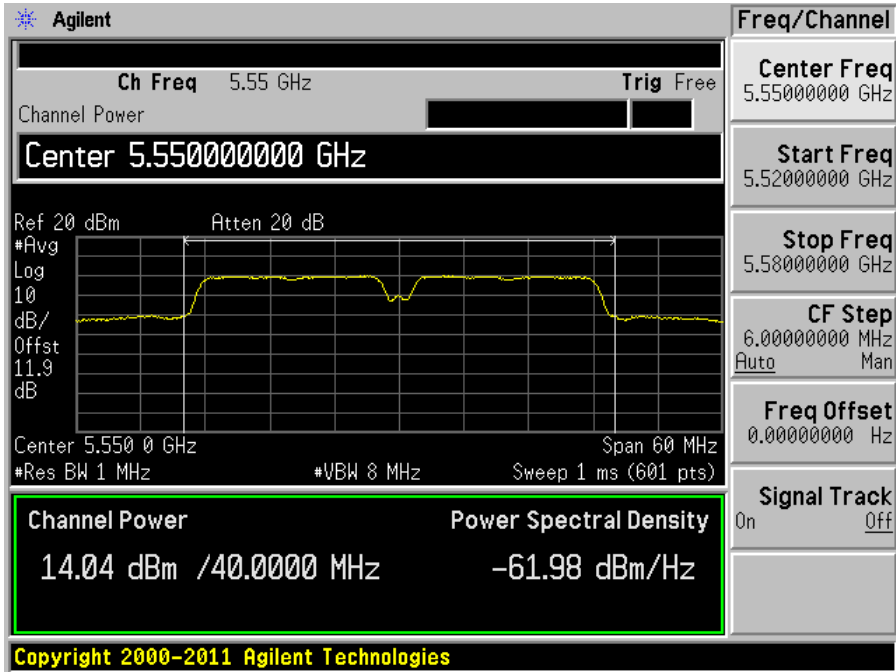
802.11n-HT20 mode, High Channel: 5700 MHz



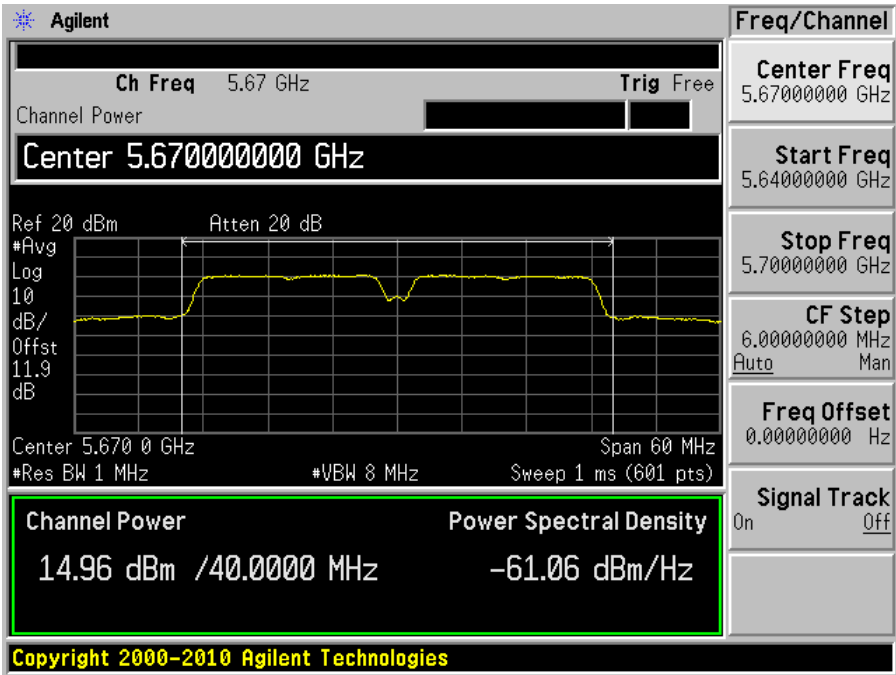
802.11n-HT40 mode, Low Channel: 5510 MHz



802.11n-HT40 mode, Middle Channel: 5550 MHz



802.11n-HT40 mode, High Channel: 5670 MHz

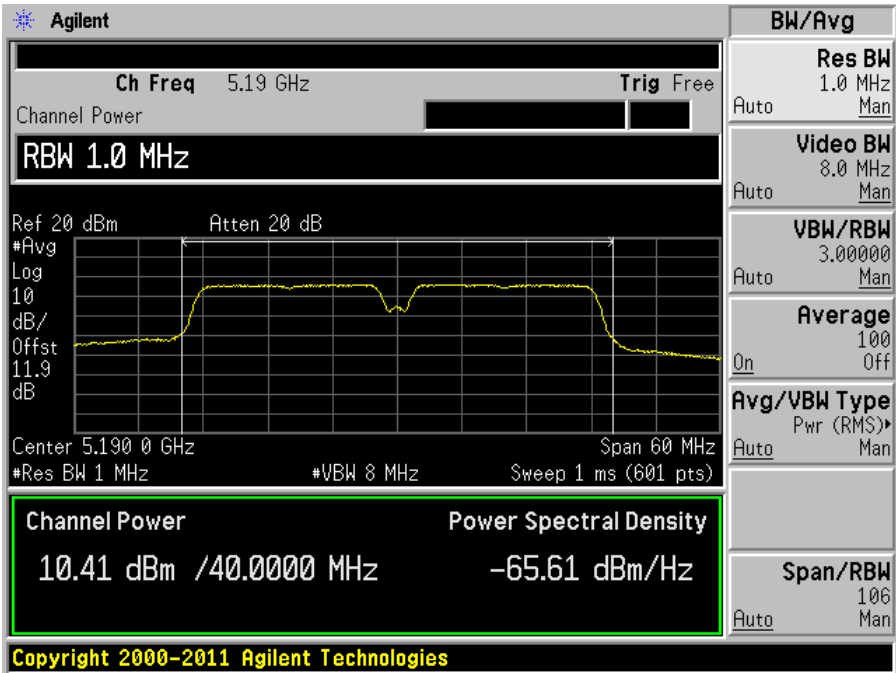


Dipole Antenna:

Note: Only the channels with different power settings were remeasured; all other data shares from the chip antenna.

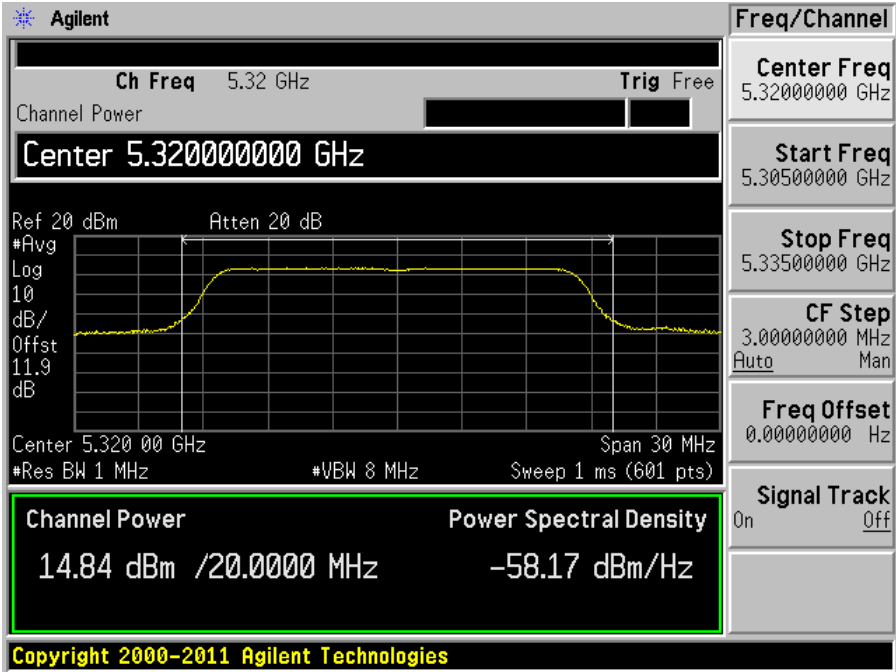
5150 - 5250 MHz

802.11n-HT40 mode, Low Channel: 5190 MHz

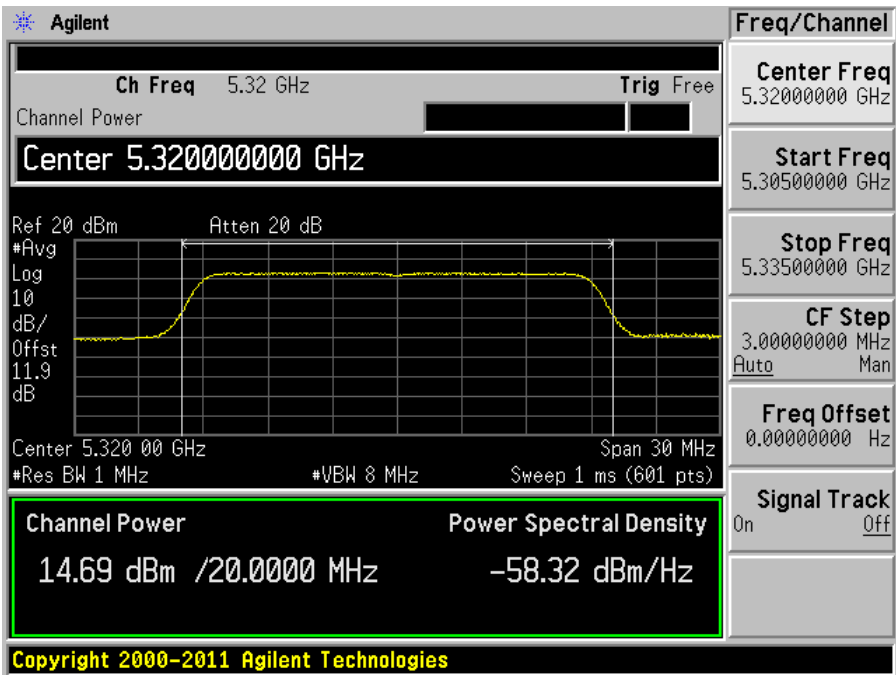


5250 - 5350 MHz

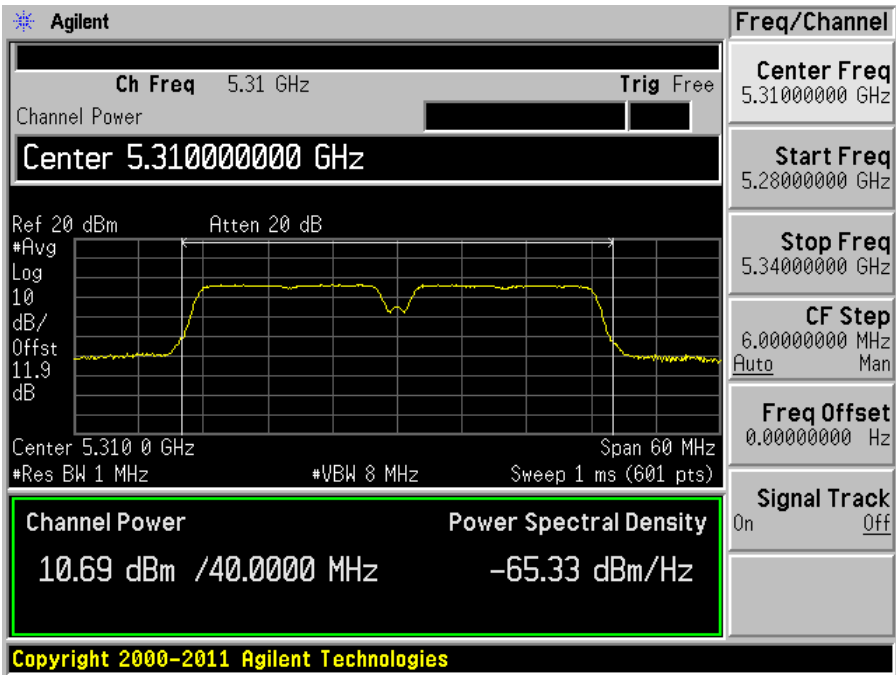
802.11a mode, High Channel: 5320 MHz



802.11n-HT20 mode, High Channel: 5320 MHz

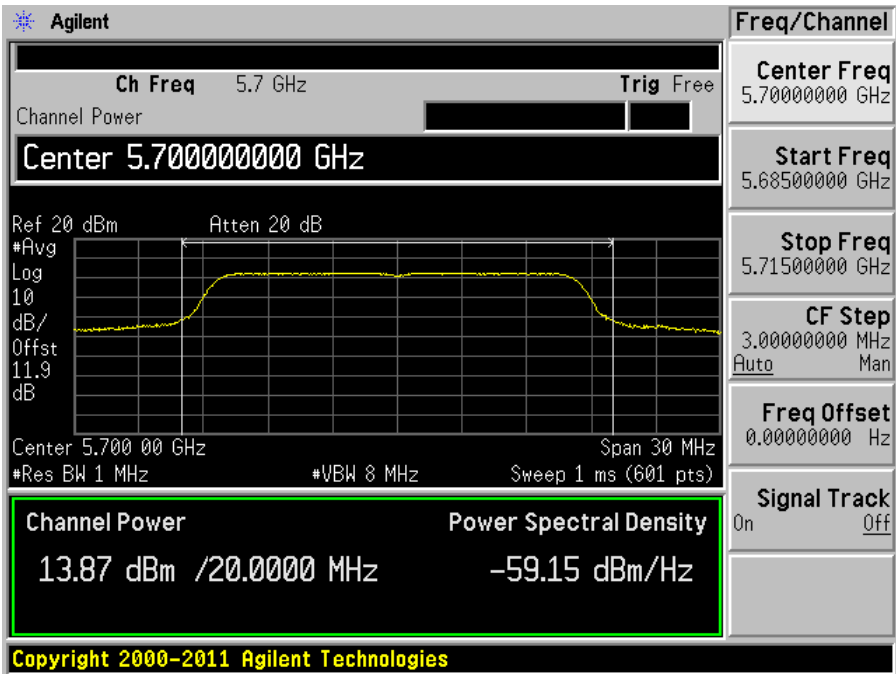


802.11n-HT40 mode, High Channel: 5310 MHz

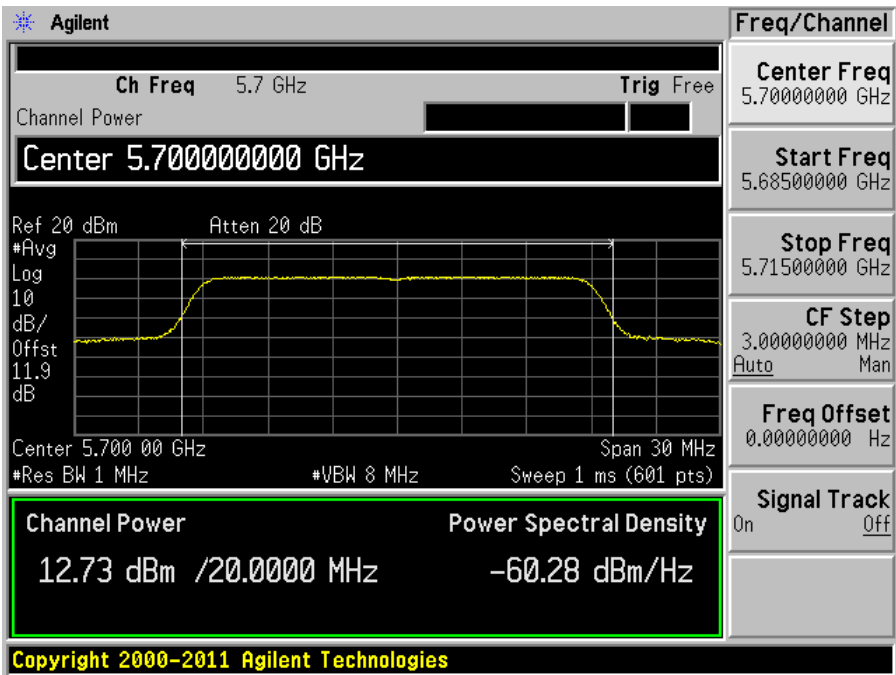


5470 - 5725 MHz

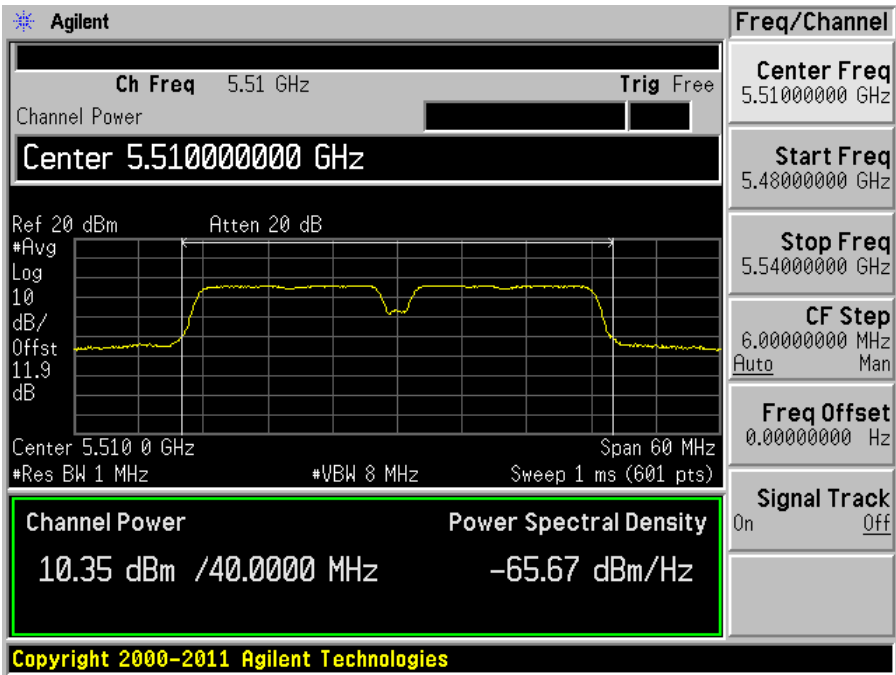
802.11a mode, High Channel: 5700 MHz



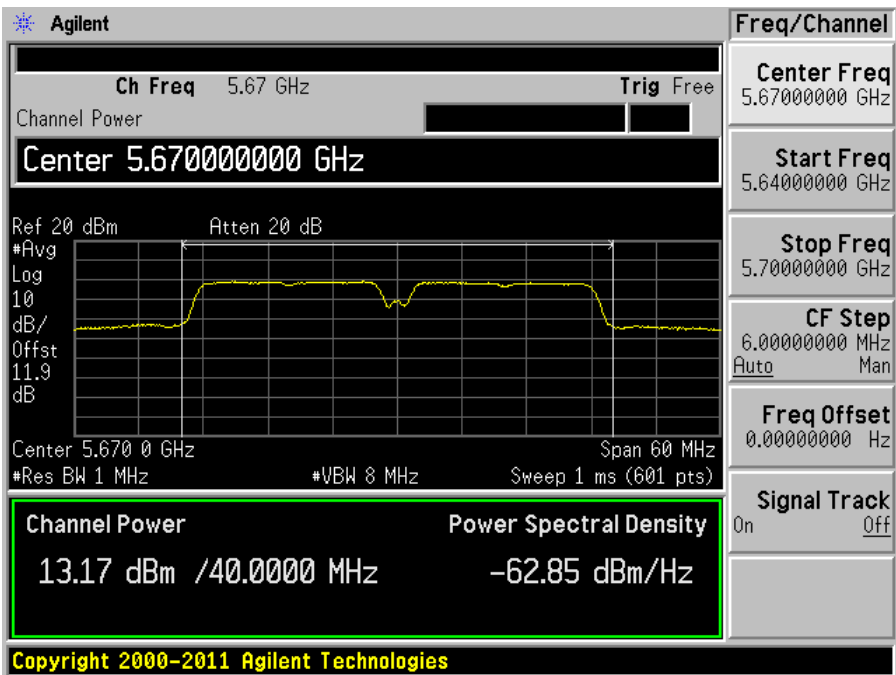
802.11n-HT20 mode, High Channe: 5700 MHz



802.11n-HT40 mode, Low Channel: 5510 MHz



802.11n-HT40 mode, High Channel: 5670 MHz





## 10 FCC §15.407(b) - Out of Band Emissions

### 10.1 Applicable Standard

#### According to FCC §15.407(b)

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of –27 dBm/MHz.

### 10.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D01 General UNII Test Procedures v01r03: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section H: Unwanted emissions measurement

### 10.3 Test Equipment List and Details

| Manufacturer | Description       | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4446A    | US44300386 | 2012-09-29       | 1 year               |

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 10.4 Test Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 20 °C     |
| Relative Humidity: | 49 %      |
| ATM Pressure:      | 101.1 kPa |

The testing was performed by Lionel Lara on 2013-05-10 in the RF site.

### 10.5 Test Results

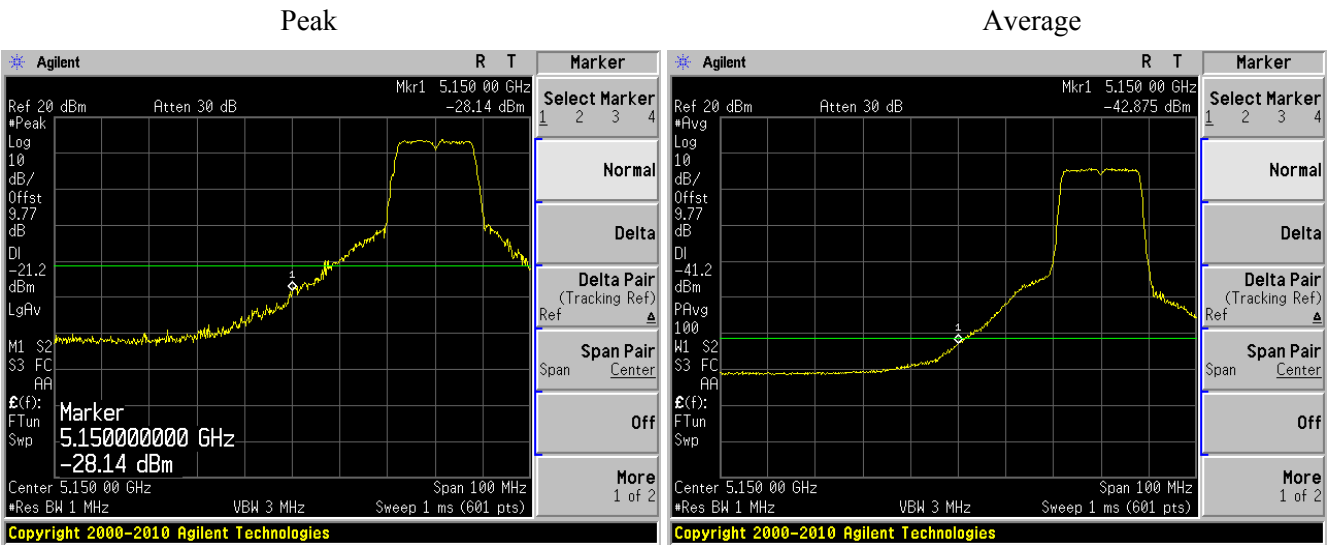
Please refer to following pages for plots of band edge.

Dipole Antenna:

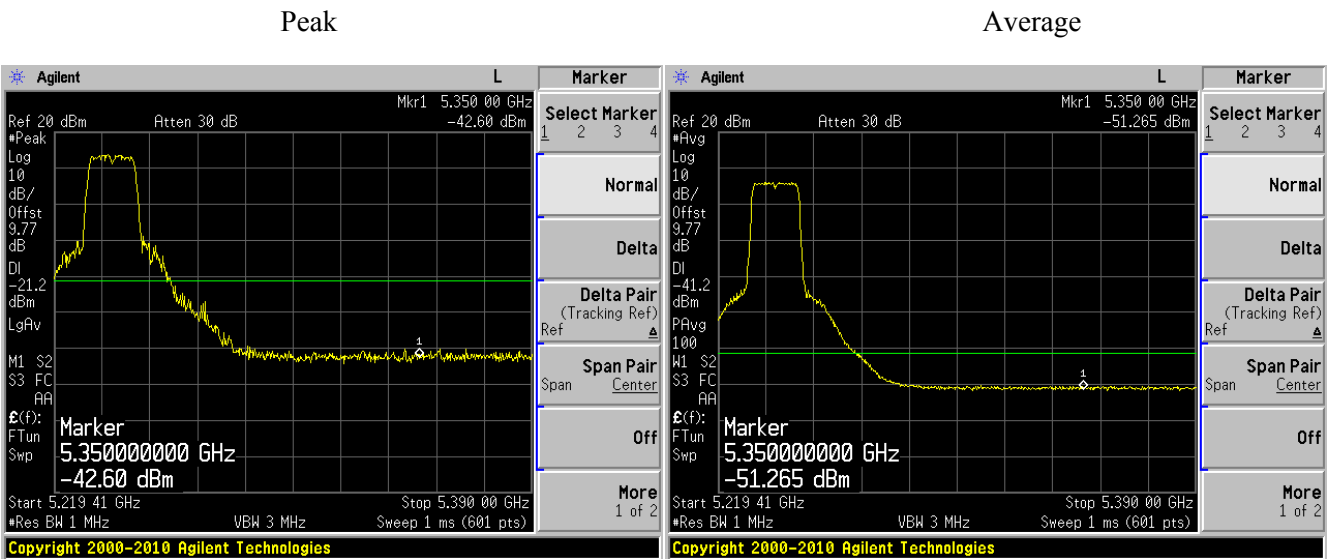
Note: The antenna gain was included in the offset of these plots.

5150-5250 MHz Band

802.11a mode, Low Channel



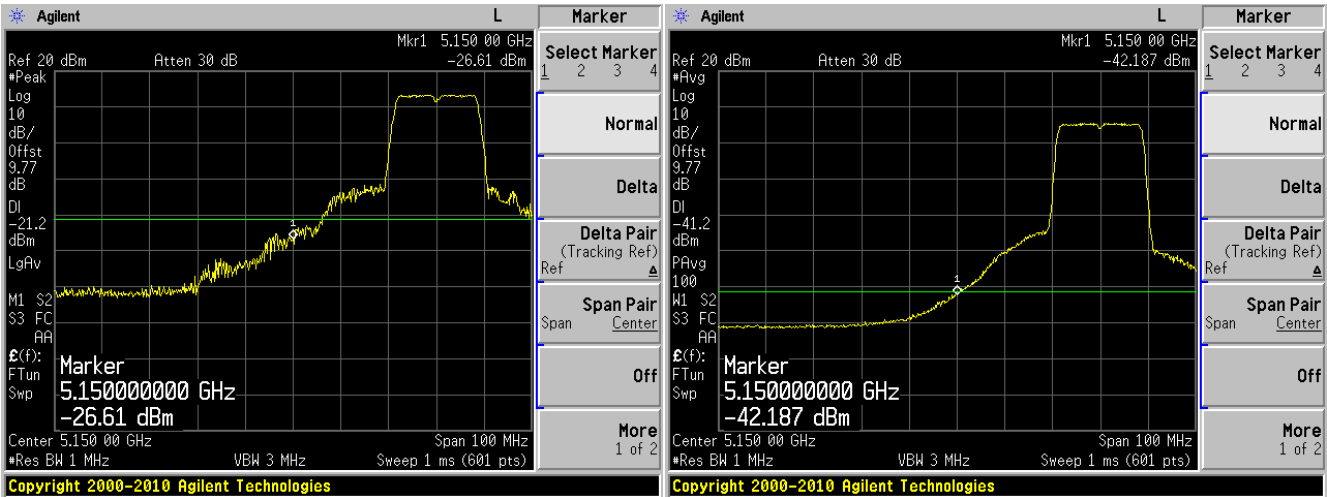
802.11a mode, High Channel



802.11n-HT20 mode, Low Channel

Peak

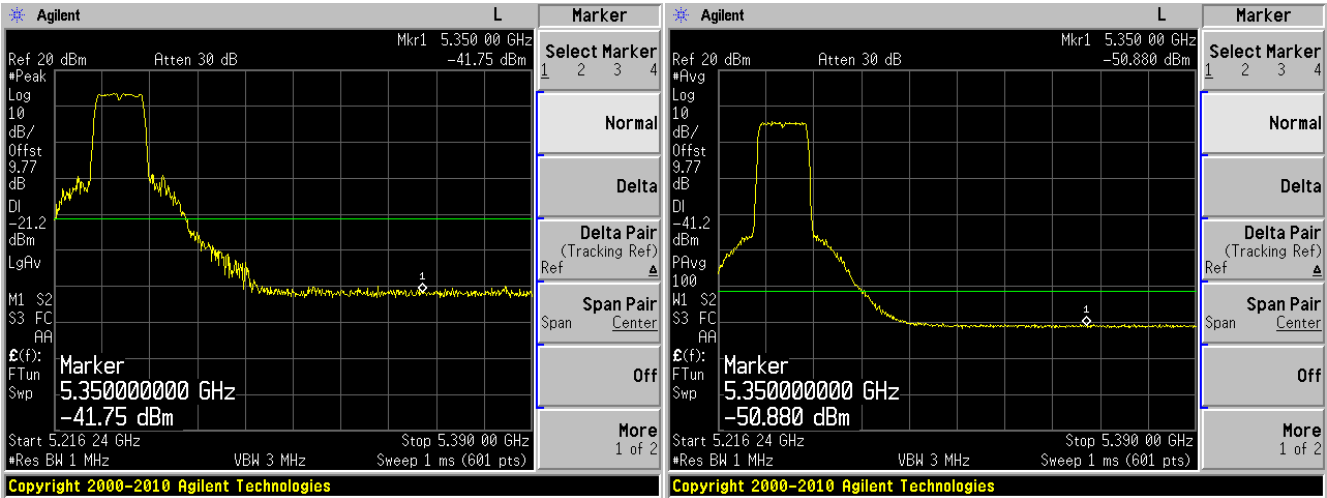
Average



802.11n-HT20 mode, High Channel

Peak

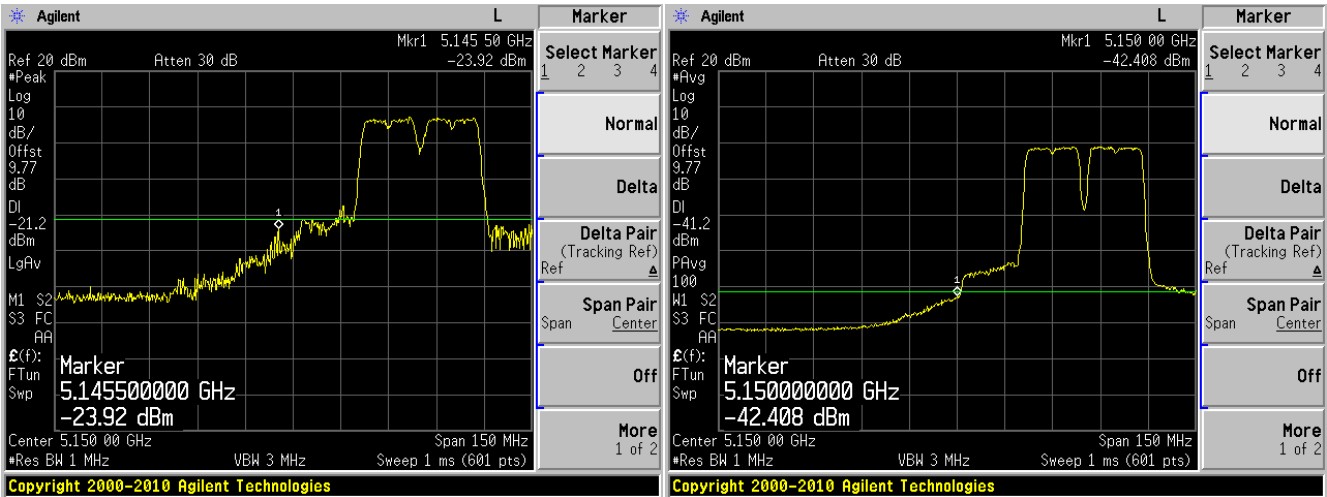
Average



802.11n-HT40 mode, Low Channel

Peak

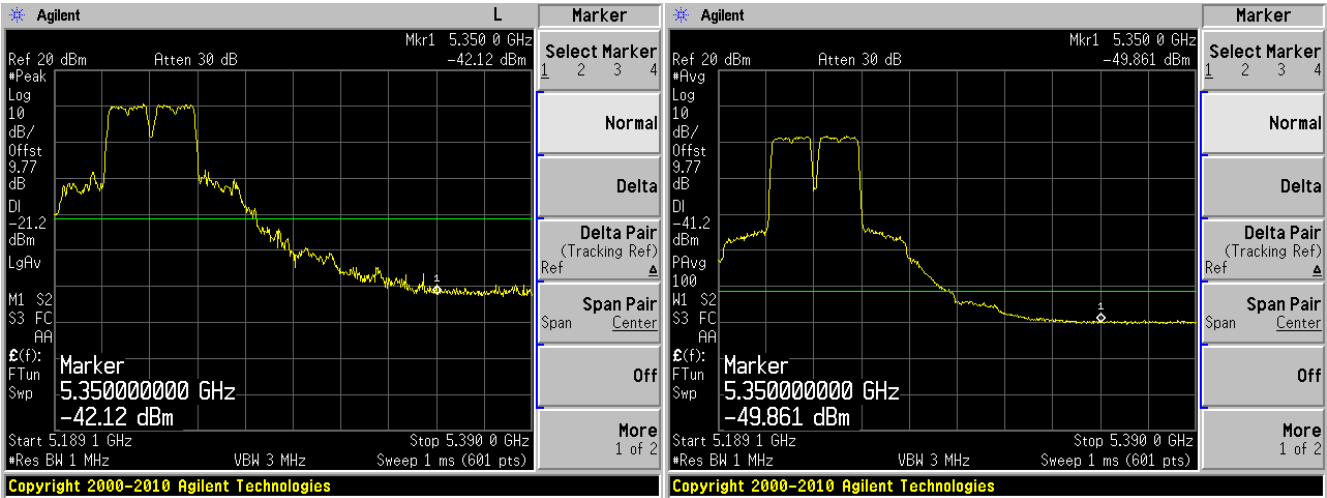
Average



802.11n-HT40 mode, High Channel

Peak

Average

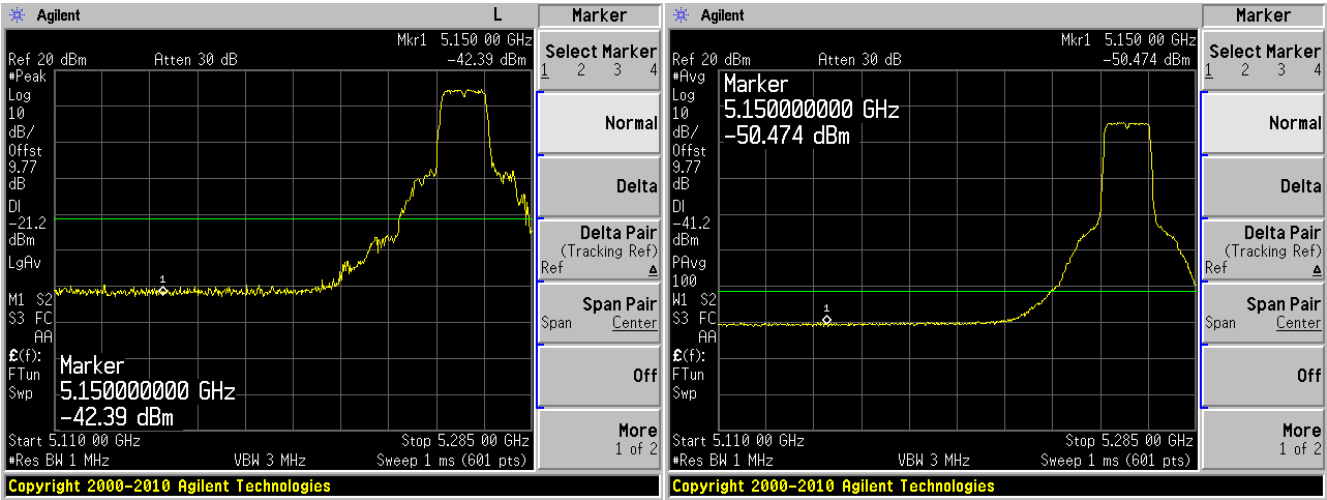


5250-5350 MHz Band

802.11a mode, Low Channel

Peak

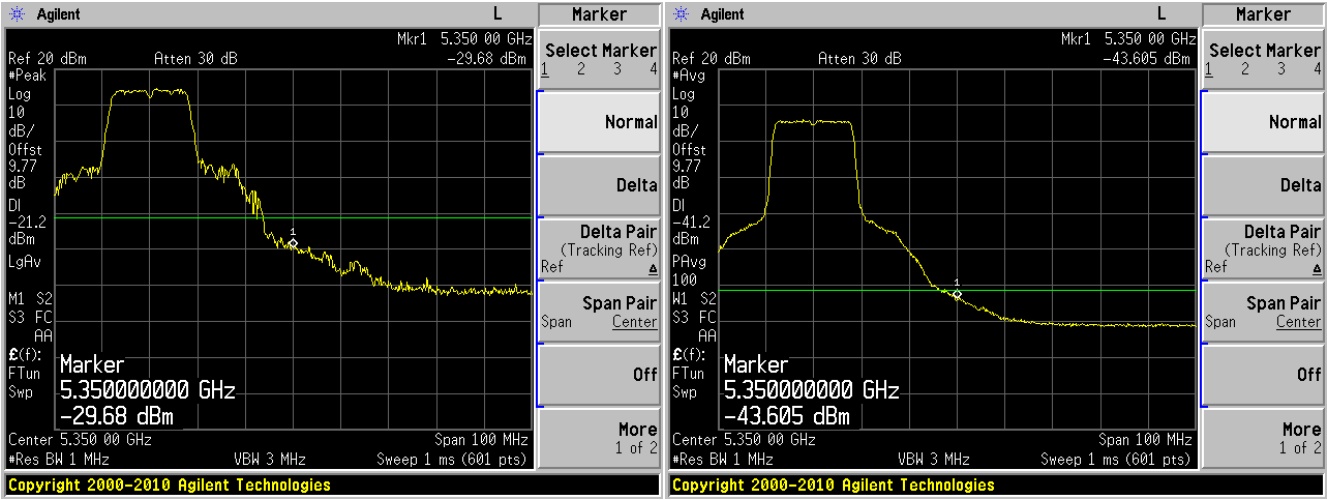
Average



802.11a mode, High Channel

Peak

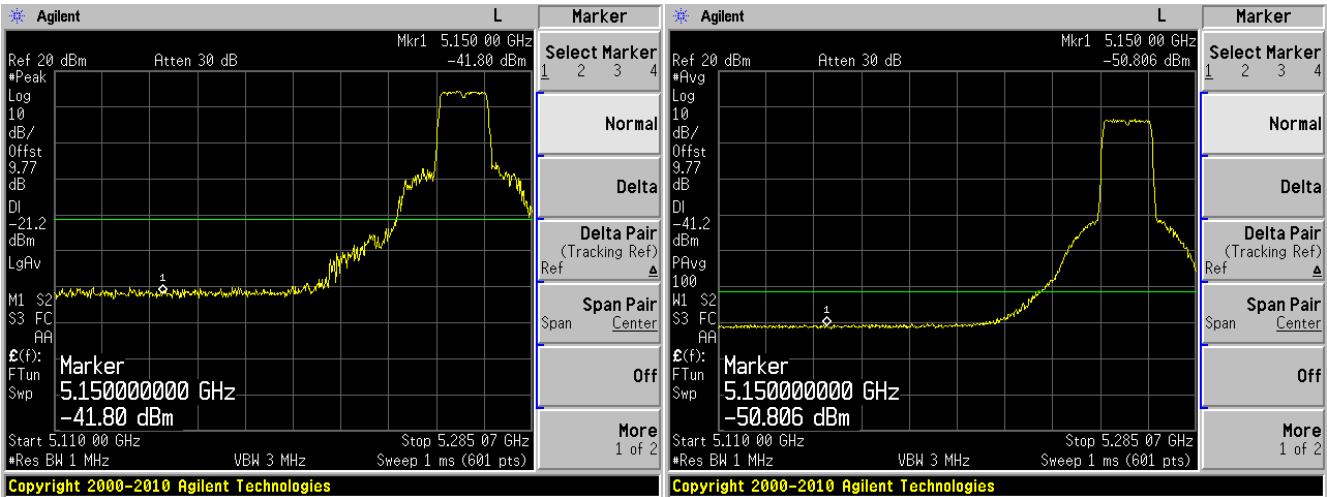
Average



802.11n-HT20 mode, Low Channel

Peak

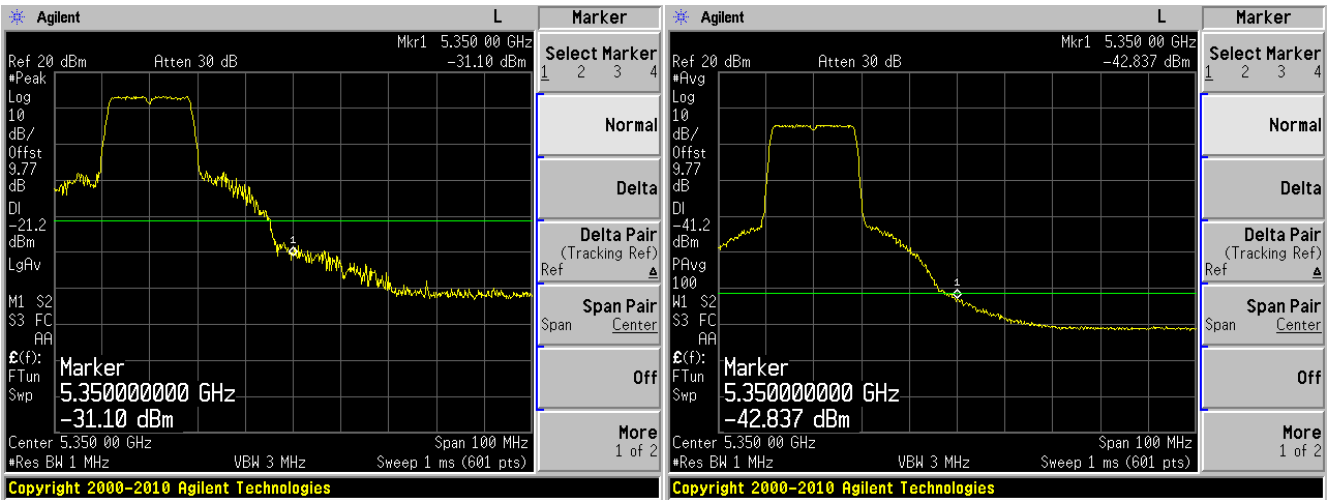
Average



802.11n-HT20 mode, High Channel

Peak

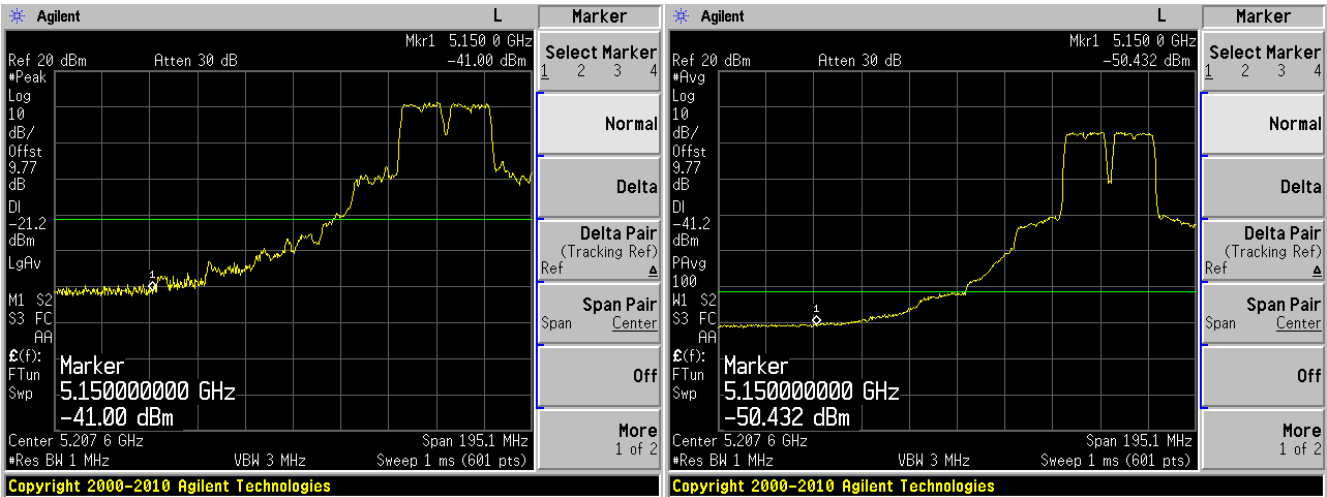
Average



802.11n-HT40 mode, Low Channel

Peak

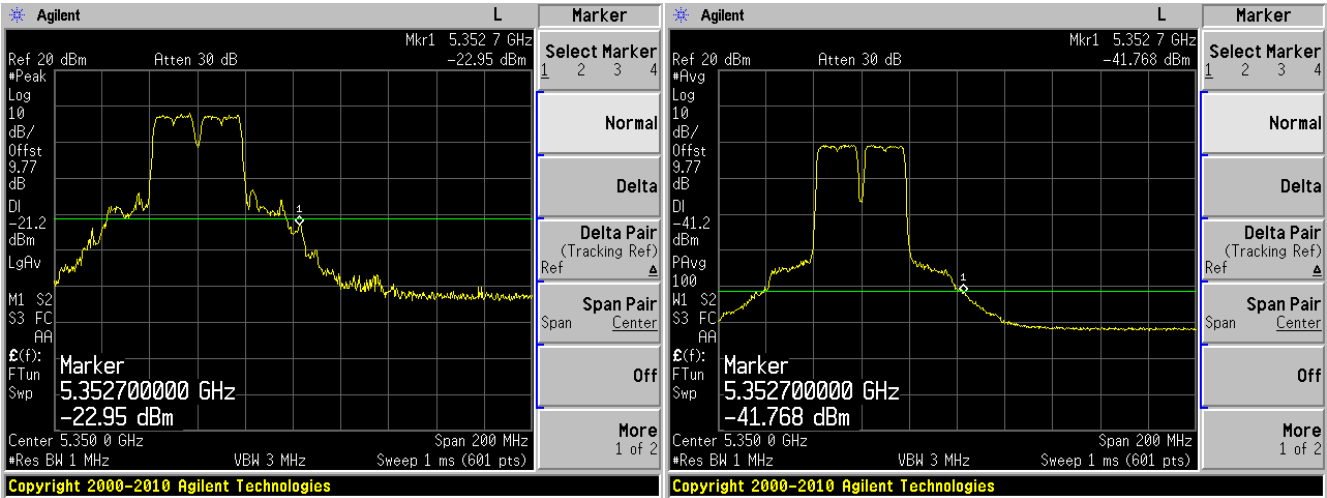
Average



802.11n-HT40 mode, High Channel

Peak

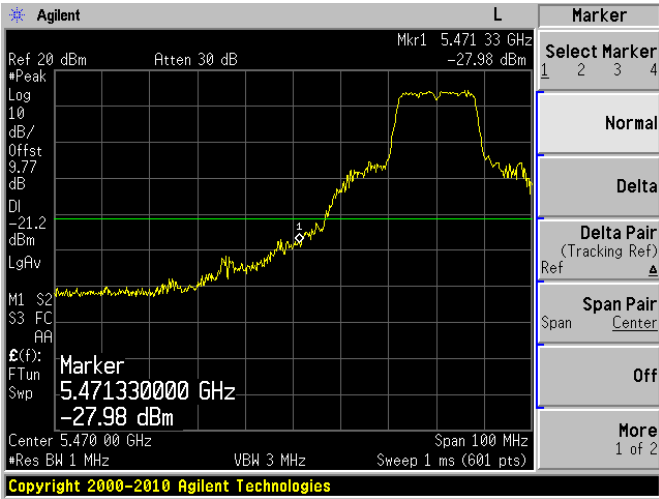
Average



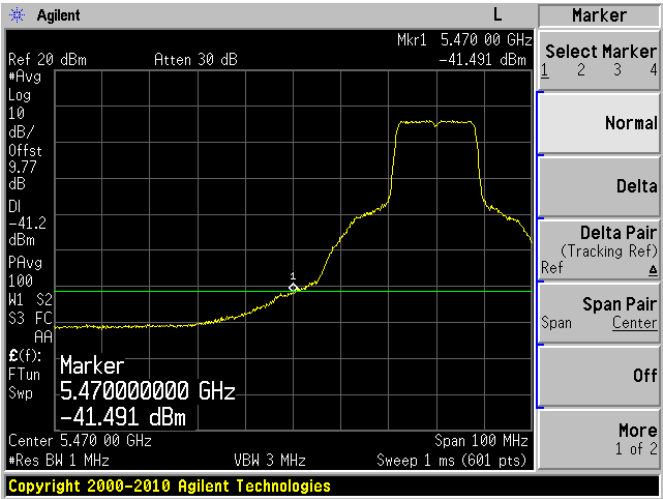
5470-5725 MHz Band

802.11a mode, Low Channel

Peak

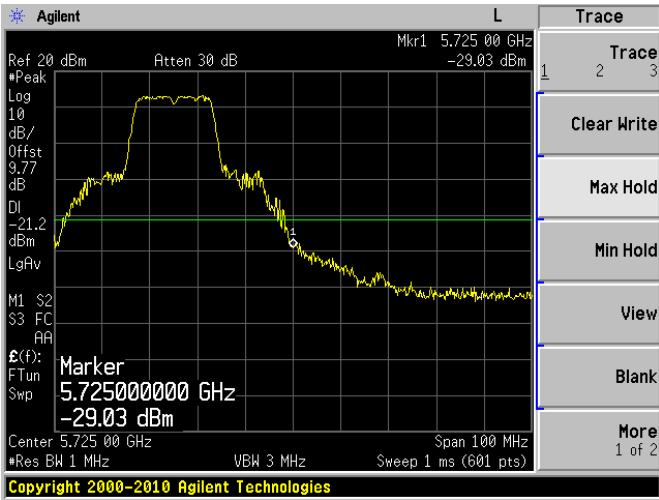


Average

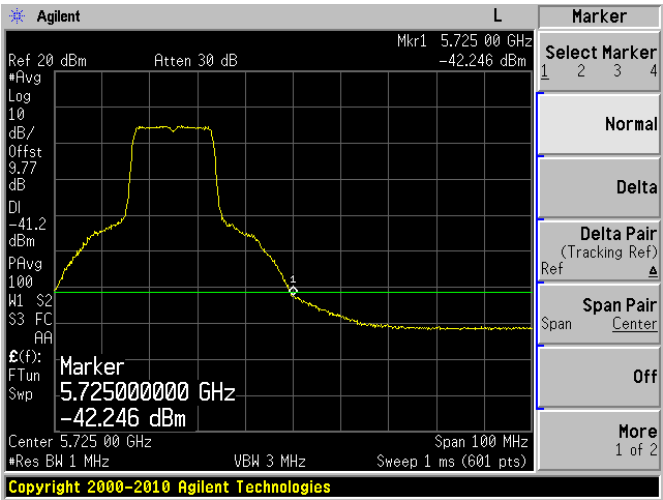


802.11a mode, High Channel

Peak



Average

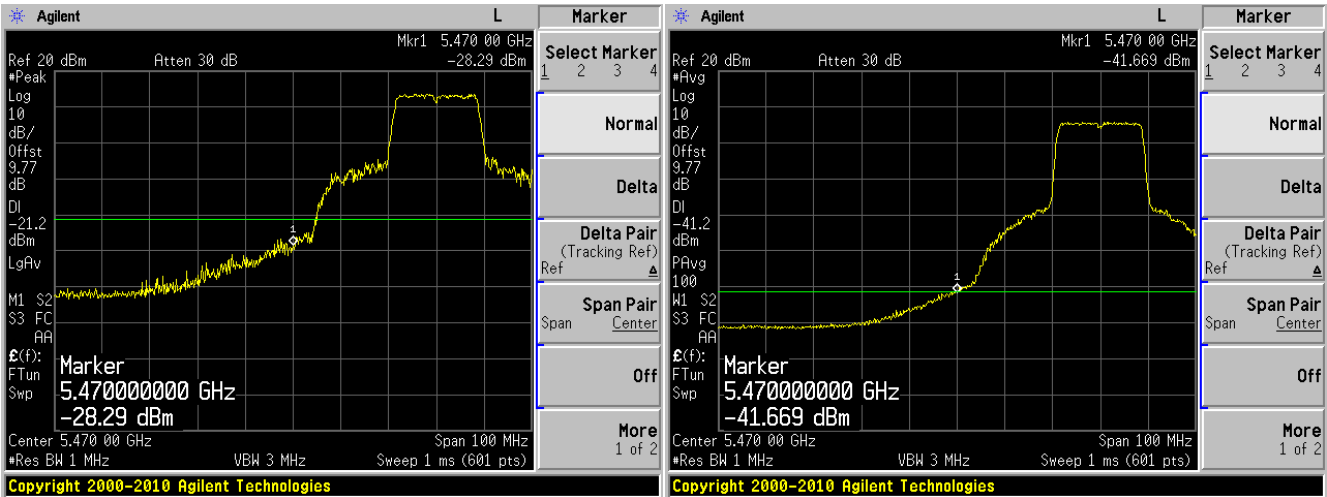




802.11n-HT20 mode, Low Channel

Peak

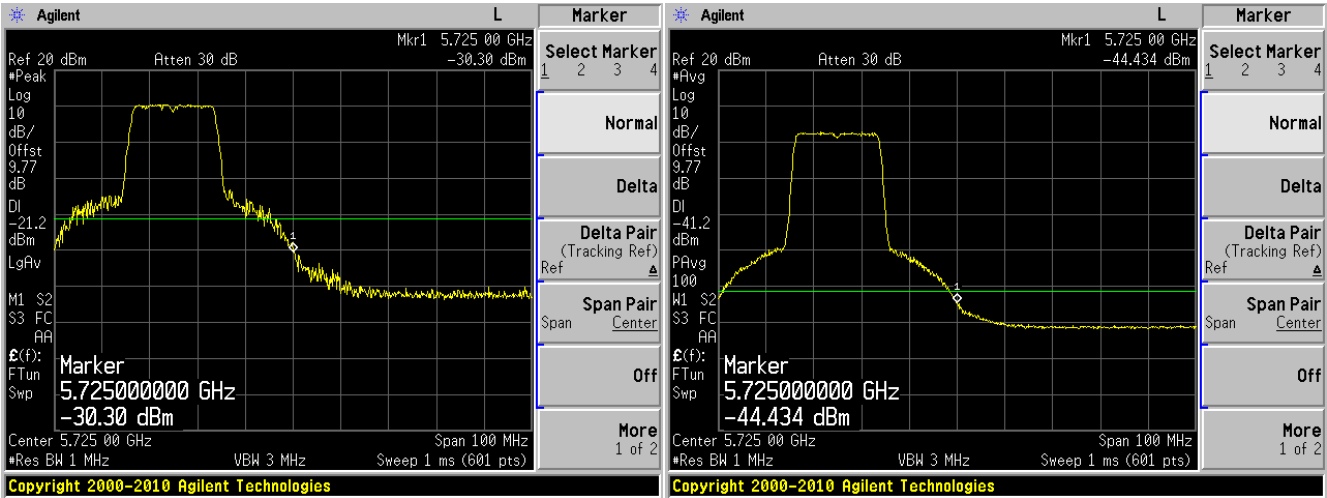
Average



802.11n-HT20 mode, High Channel

Peak

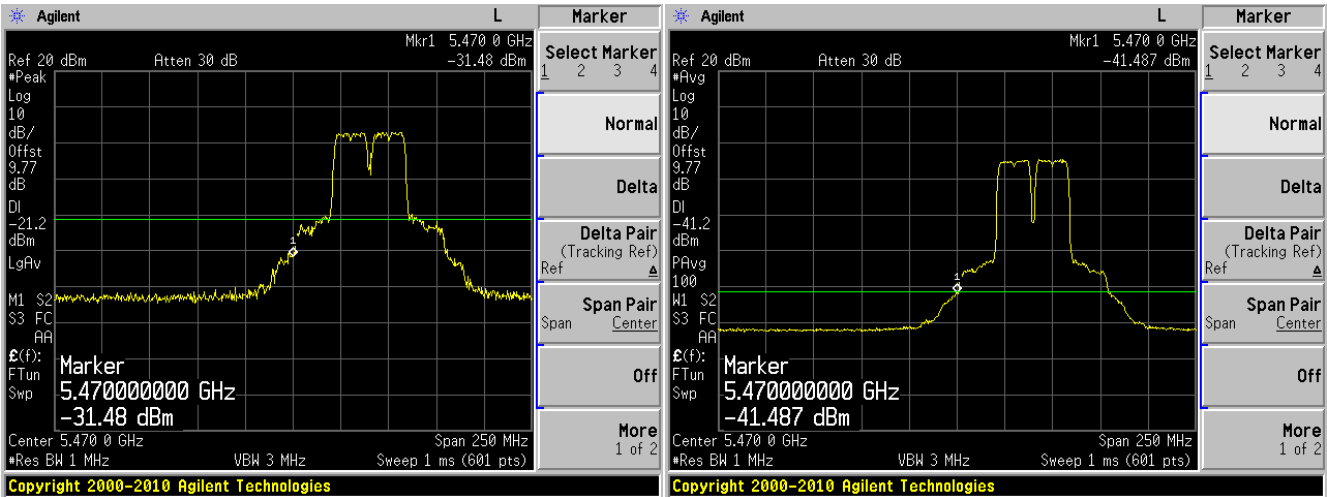
Average



802.11n-HT40 mode, Low Channel

Peak

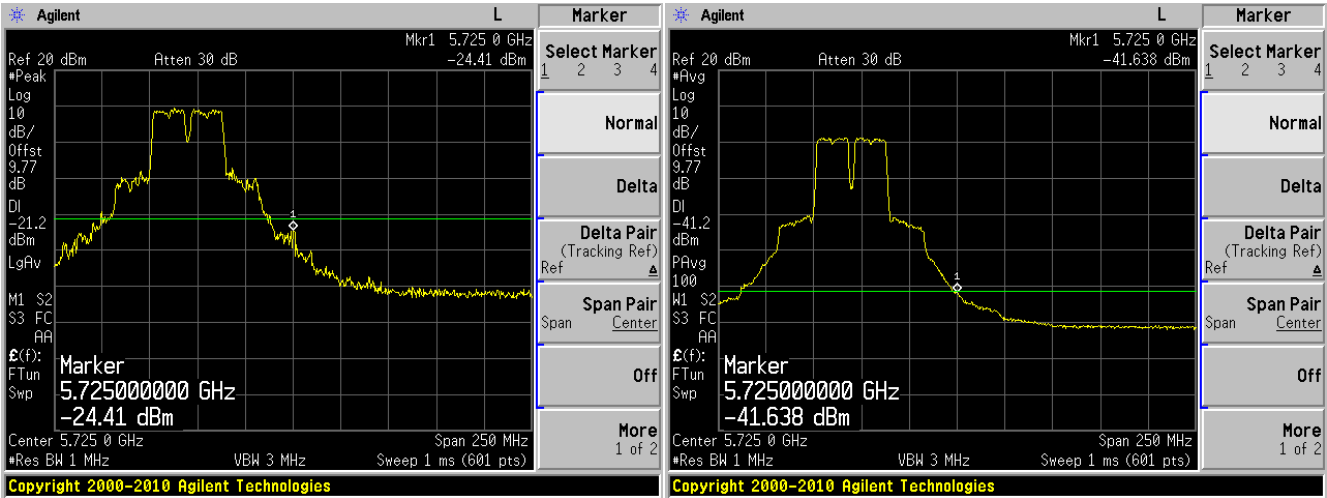
Average



802.11n-HT40 mode, High Channel

Peak

Average



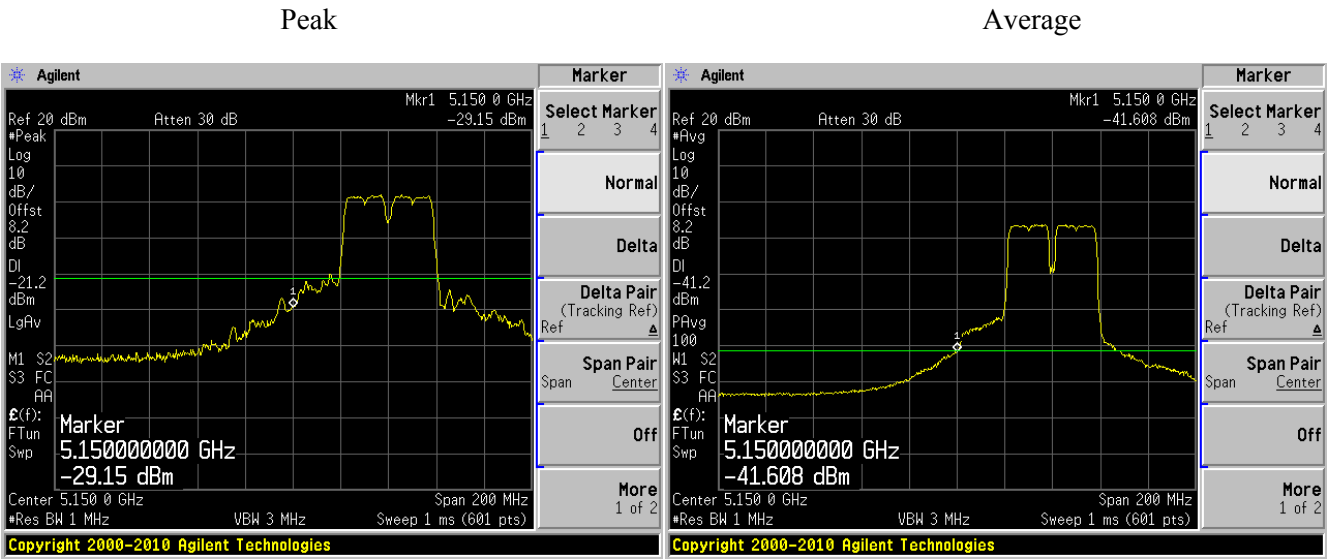
Chip Antenna:

Note 1: The antenna gain was included in the offset of these plots.

Note 2: The chip antenna has a lower gain than the dipole antenna (-3.7dBi vs. 2.9dBi); therefore only the channels with different power settings were remeasured; all other plots share with the dipole antenna.

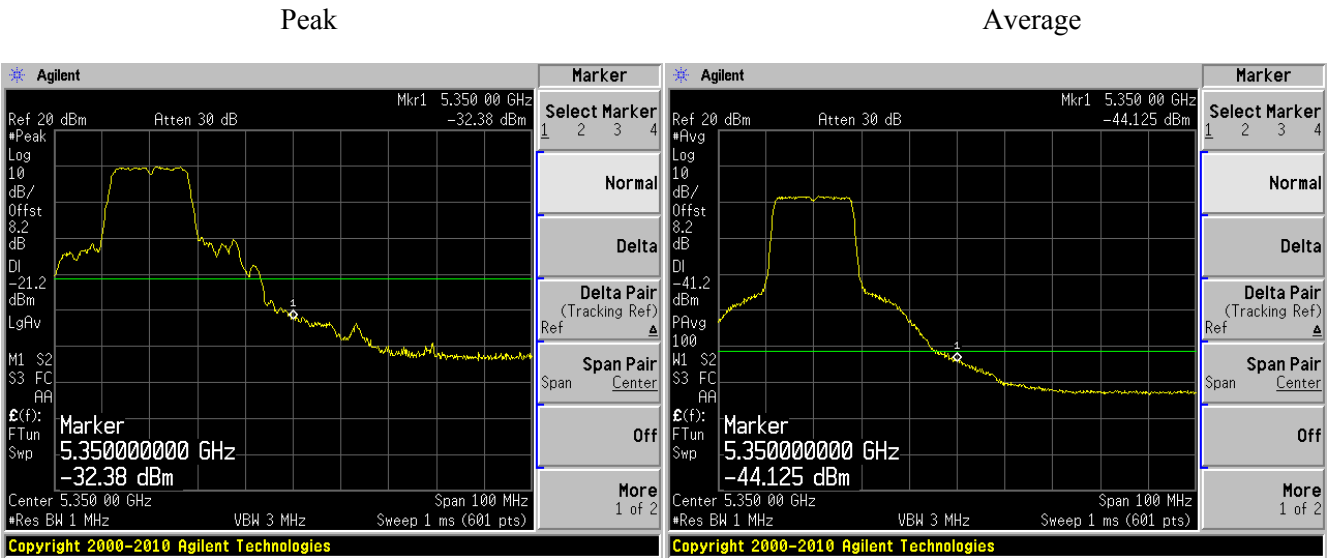
5150-5250 MHz Band

802.11n-HT40 mode, Low Channel



5250-5350 MHz Band

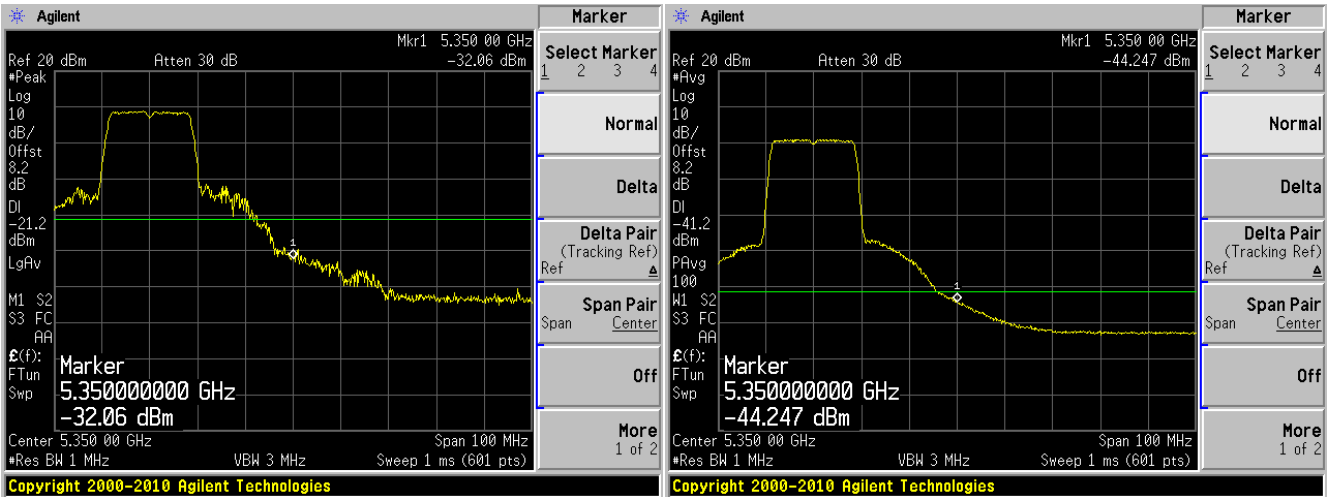
802.11a mode, High Channel



802.11n-HT20 mode, High Channel

Peak

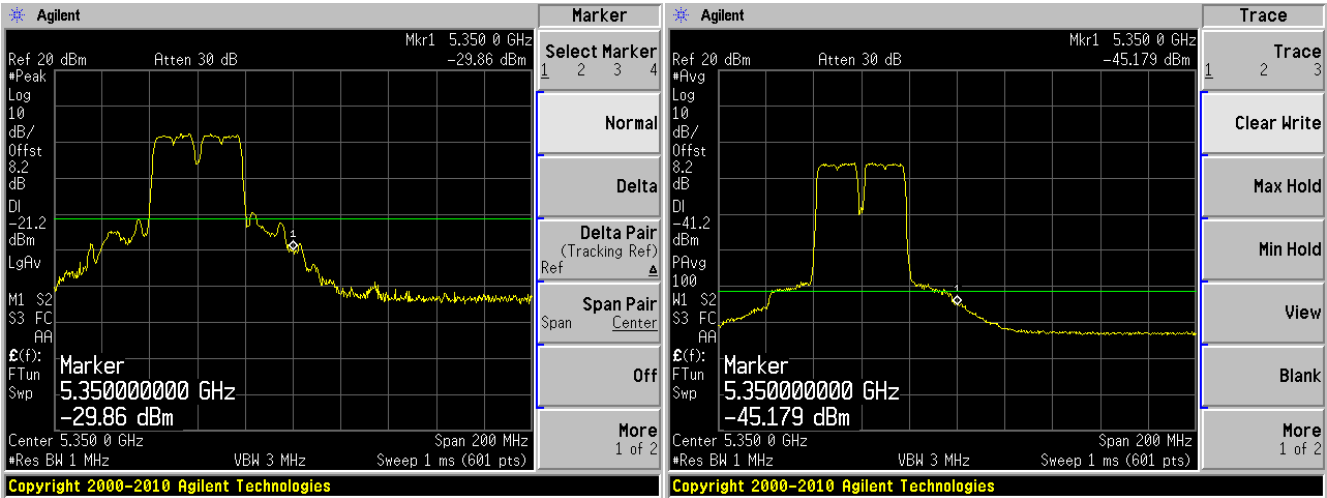
Average



802.11n-HT40 mode, High Channel

Peak

Average

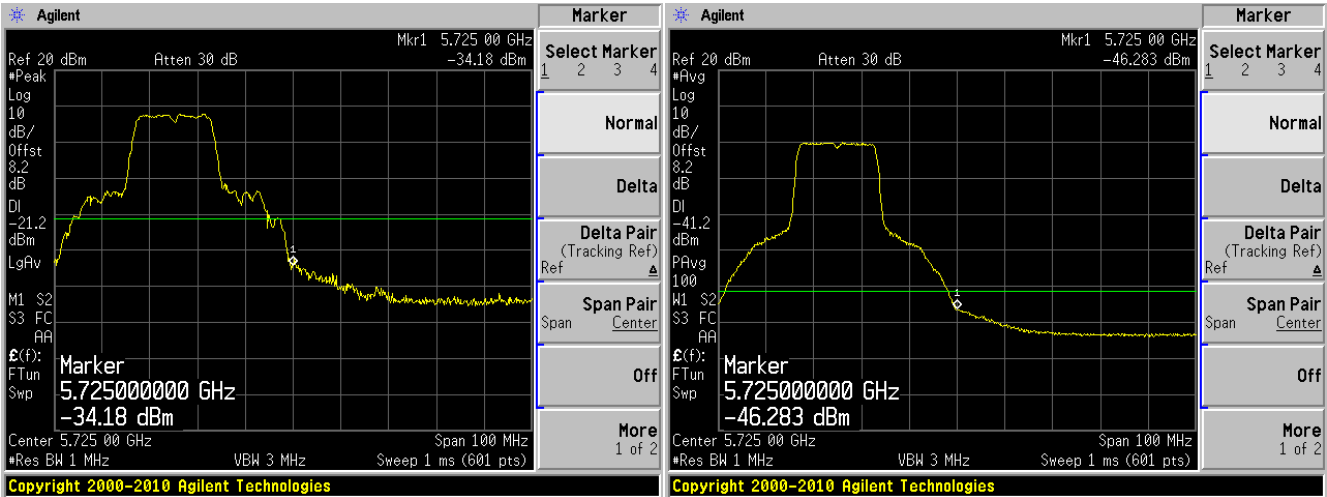


5470-5725 MHz Band

802.11a mode, High Channel

Peak

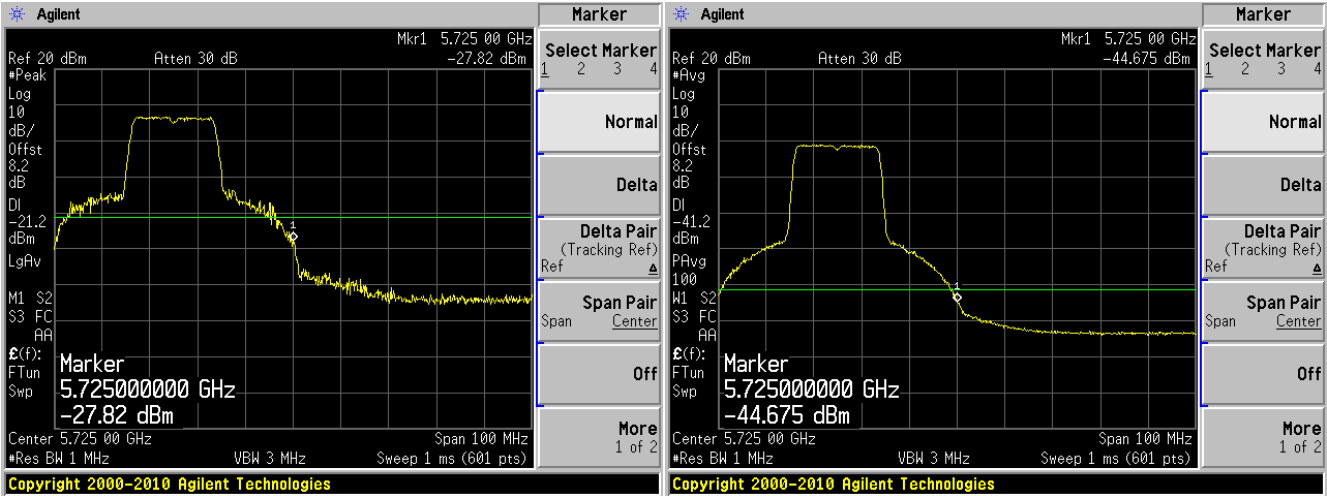
Average



802.11n-HT20 mode, High Channel

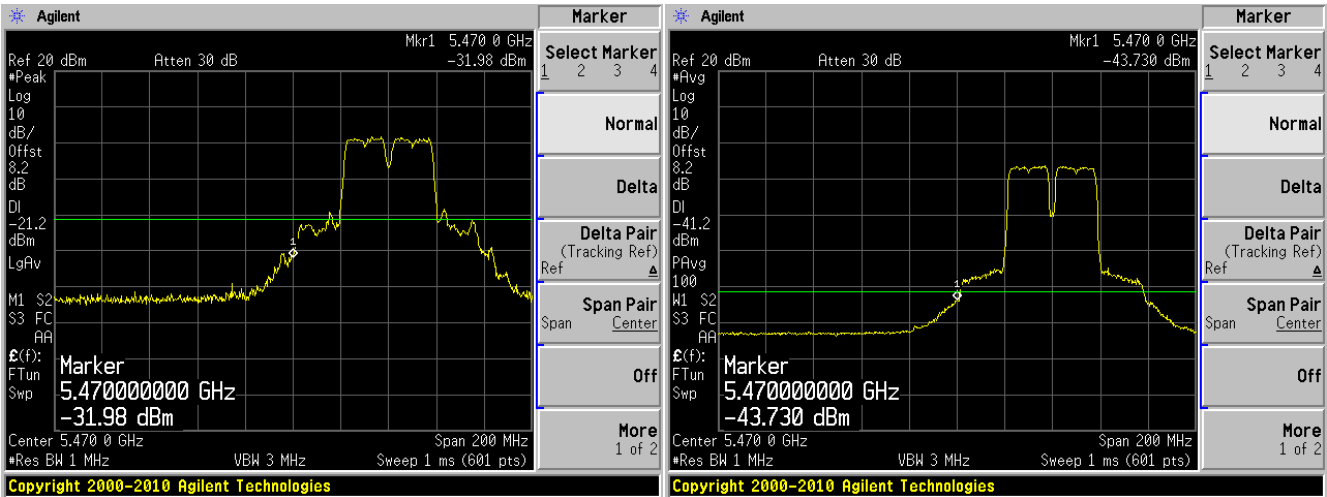
Peak

Average



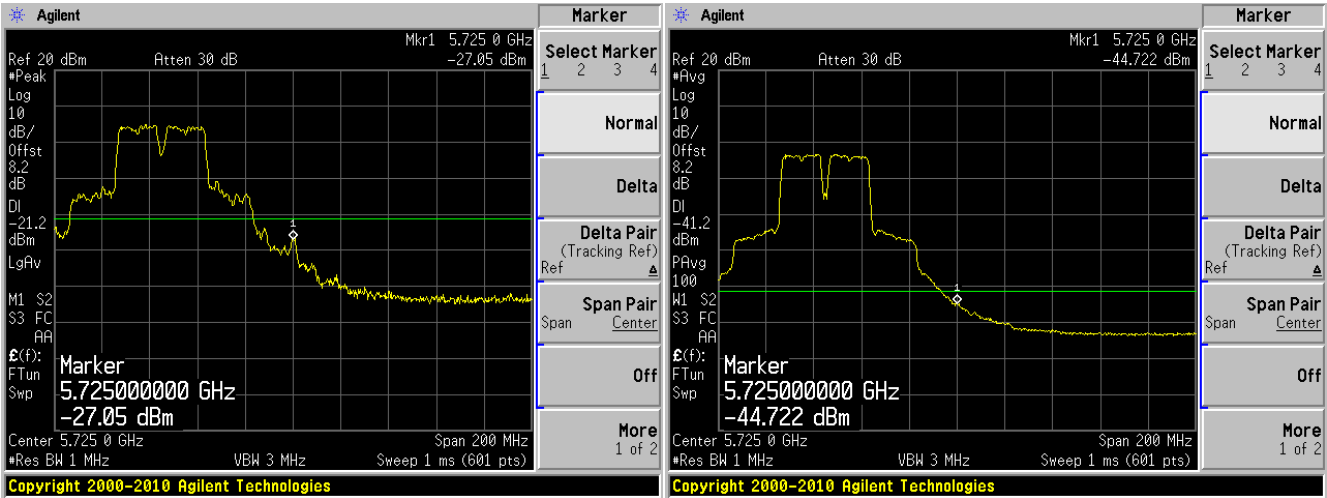
802.11n-HT40 mode, Low Channel

PeakAverage



802.11n-HT40 mode, High Channel

PeakAverage



## 11 FCC §15.407(a)(2) - Power Spectral Density

### 11.1 Applicable Standard

#### According to FCC §15.407(a)(2)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 11.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D01 General UNII Test Procedures v01r03: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section F:  
Peak power spectral density (PPSD)

### 11.3 Test Equipment List and Details

| Manufacturer | Description       | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4446A    | US44300386 | 2012-09-29       | 1 year               |

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 11.4 Test Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 21 °C     |
| Relative Humidity: | 51 %      |
| ATM Pressure:      | 101.3 kPa |

The testing was performed by Lionel Lara on 2013-05-07 in the RF site.

## 11.5 Test Results

Note: The higher power setting (chip antenna settings) was used for all power spectral density testing.

### 5150-5250 MHz

| Channel           | Frequency (MHz) | PSD (dBm) | Limit (dBm) | Margin (dB) |
|-------------------|-----------------|-----------|-------------|-------------|
| 802.11a mode      |                 |           |             |             |
| Low               | 5180            | 3.712     | 4           | -0.288      |
| Middle            | 5200            | 3.862     | 4           | -0.138      |
| High              | 5240            | 3.667     | 4           | -0.333      |
| 802.11n-HT20 mode |                 |           |             |             |
| Low               | 5180            | 3.130     | 4           | -0.87       |
| Middle            | 5200            | 3.284     | 4           | -0.716      |
| High              | 5240            | 3.325     | 4           | -0.675      |
| 802.11n-HT40 mode |                 |           |             |             |
| Low               | 5190            | -2.097    | 4           | -6.097      |
| High              | 5230            | 0.832     | 4           | -3.168      |

### 5250-5350 MHz

| Channel           | Frequency (MHz) | PSD (dBm) | Limit (dBm) | Margin (dB) |
|-------------------|-----------------|-----------|-------------|-------------|
| 802.11a mode      |                 |           |             |             |
| Low               | 5260            | 4.865     | 11          | -6.135      |
| Middle            | 5280            | 5.443     | 11          | -5.557      |
| High              | 5320            | 4.677     | 11          | -6.323      |
| 802.11n-HT20 mode |                 |           |             |             |
| Low               | 5260            | 4.496     | 11          | -6.504      |
| Middle            | 5280            | 4.888     | 11          | -6.112      |
| High              | 5320            | 4.193     | 11          | -6.807      |
| 802.11n-HT40 mode |                 |           |             |             |
| Low               | 5270            | -0.557    | 11          | -11.557     |
| High              | 5310            | -2.285    | 11          | -13.285     |



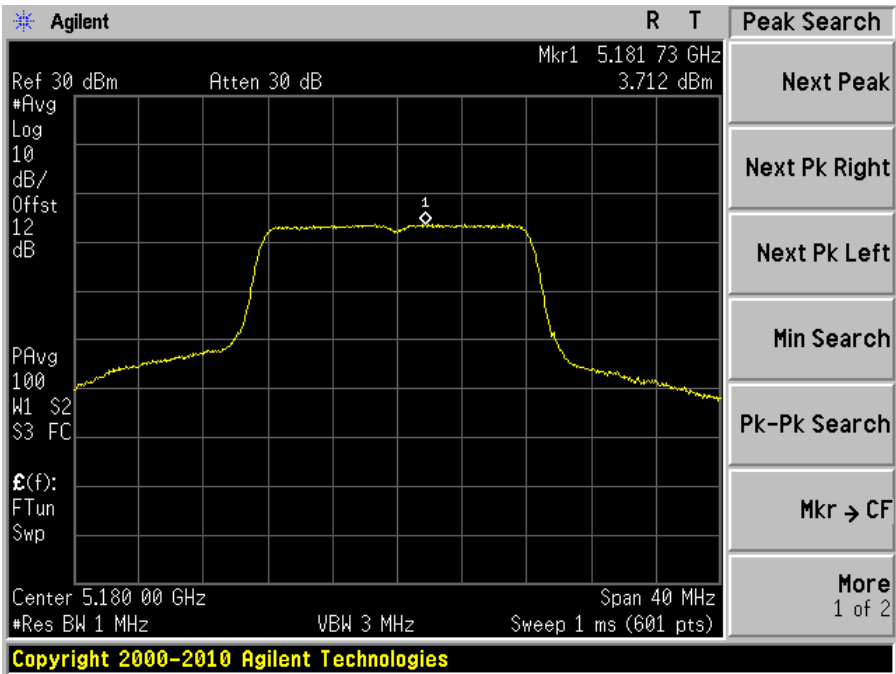
**5470-5725 MHz**

| <b>Channel</b>    | <b>Frequency<br/>(MHz)</b> | <b>PSD<br/>(dBm)</b> | <b>Limit<br/>(dBm)</b> | <b>Margin<br/>(dB)</b> |
|-------------------|----------------------------|----------------------|------------------------|------------------------|
| 802.11a mode      |                            |                      |                        |                        |
| Low               | 5500                       | 4.288                | 11                     | -6.712                 |
| Middle            | 5580                       | 4.171                | 11                     | -6.829                 |
| High              | 5700                       | 2.405                | 11                     | -8.595                 |
| 802.11n-HT20 mode |                            |                      |                        |                        |
| Low               | 5500                       | 3.903                | 11                     | -7.097                 |
| Middle            | 5580                       | 3.985                | 11                     | -7.015                 |
| High              | 5700                       | 0.536                | 11                     | -10.464                |
| 802.11n-HT40 mode |                            |                      |                        |                        |
| Low               | 5510                       | -2.650               | 11                     | -13.65                 |
| Middle            | 5550                       | 0.097                | 11                     | -10.903                |
| High              | 5670                       | -0.313               | 11                     | -11.313                |

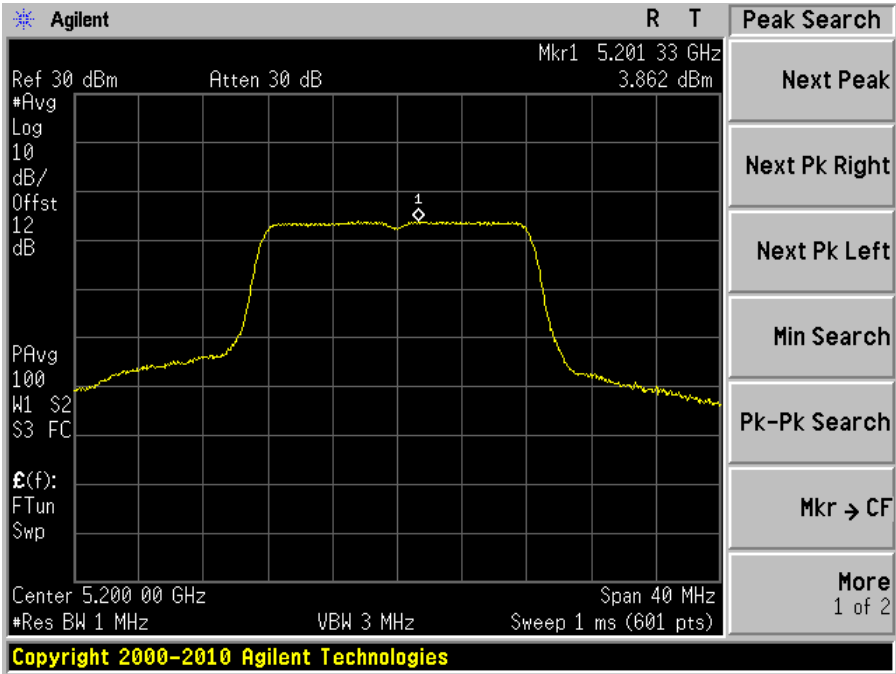
Please refer to the following plots.

5150-5250 MHz

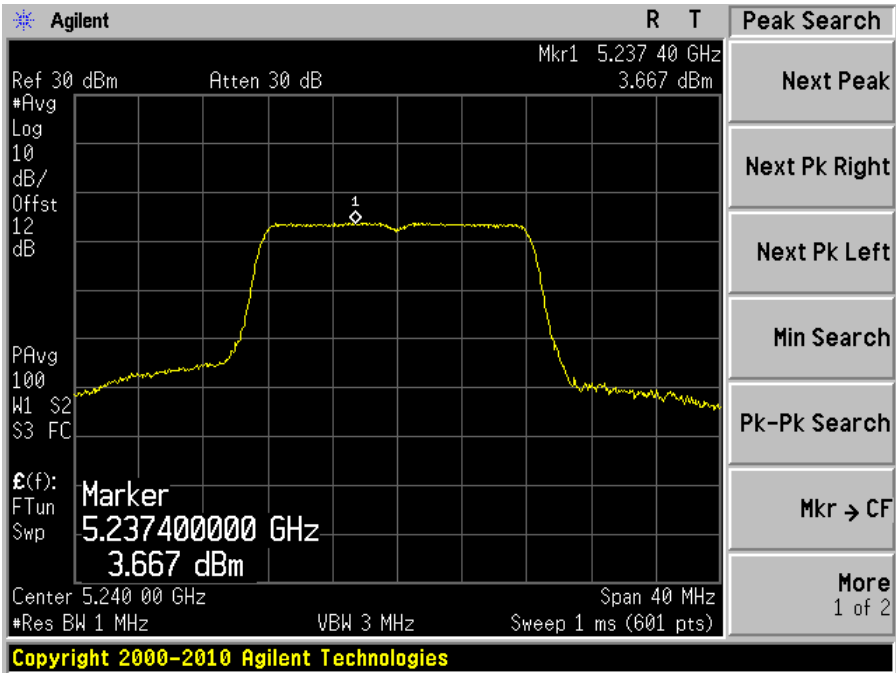
802.11a mode, 5180 MHz



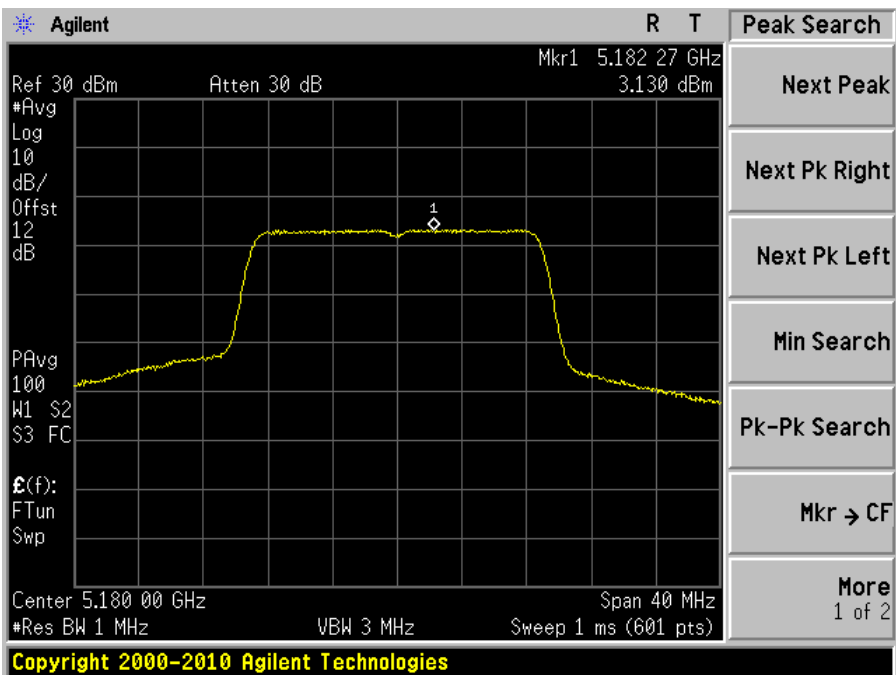
802.11a mode, 5200 MHz



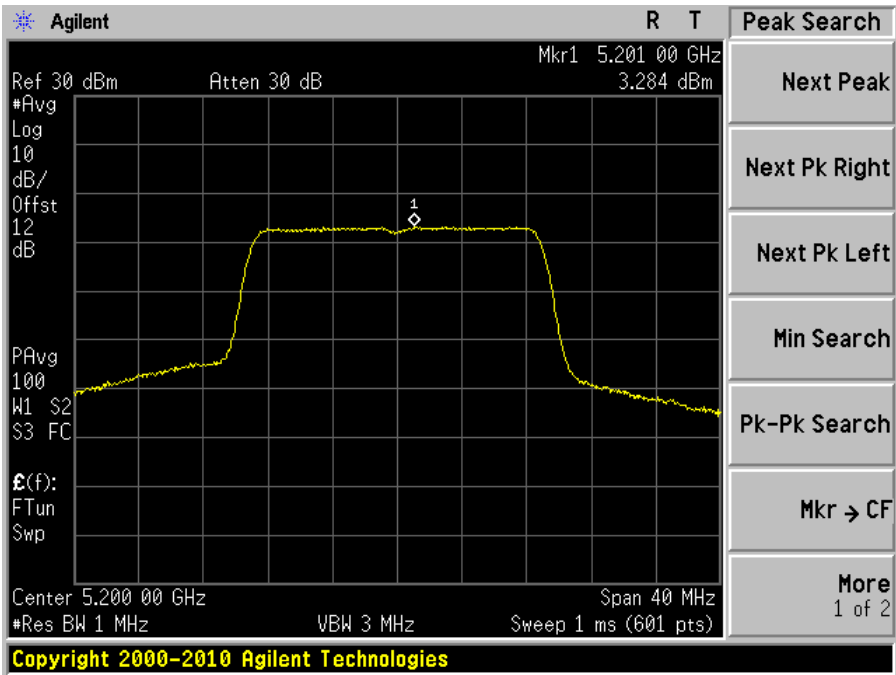
802.11a mode, 5240 MHz



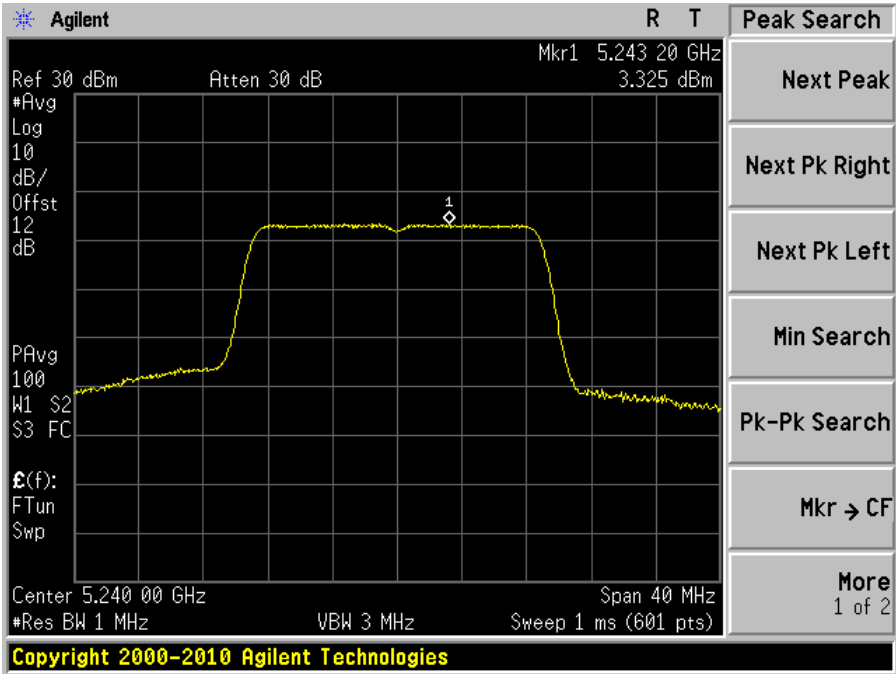
802.11n-HT20 mode, 5180 MHz



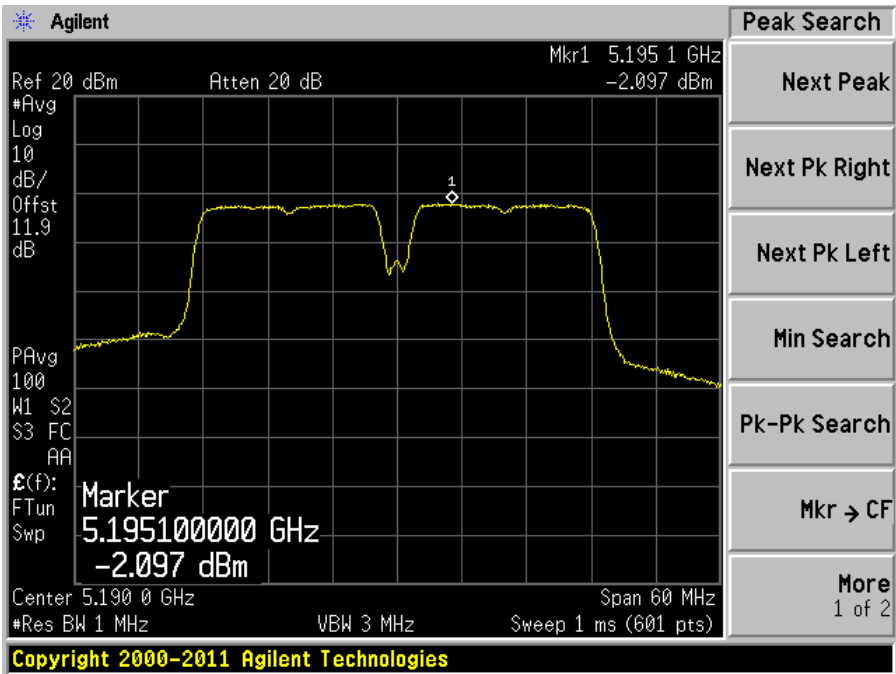
802.11n-HT20 mode, 5200 MHz



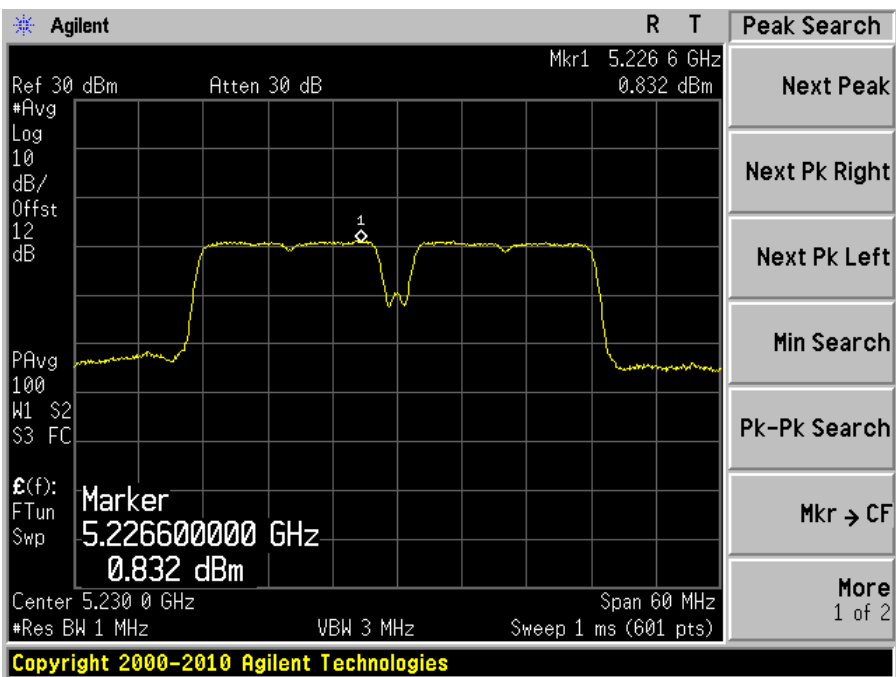
802.11n-HT20 mode, 5240 MHz



802.11n-HT40 mode, 5190 MHz

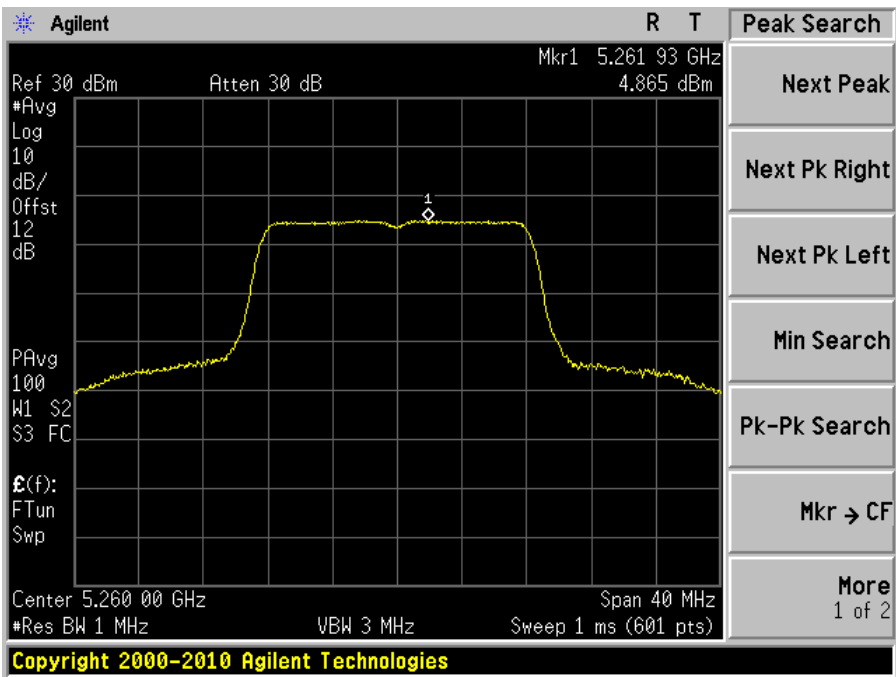


802.11n-HT40 mode, 5230 MHz

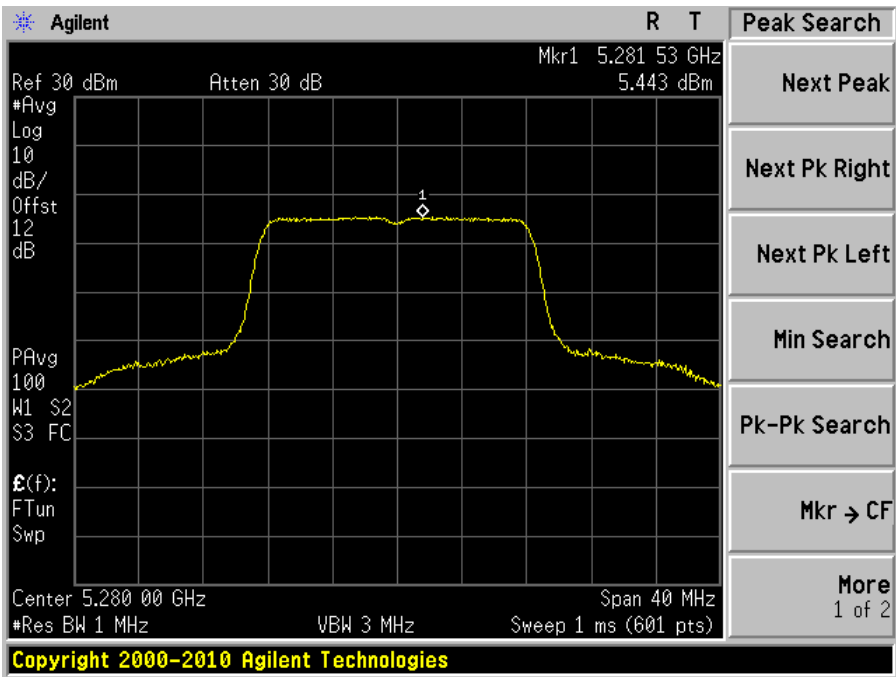


5250-5350 MHz

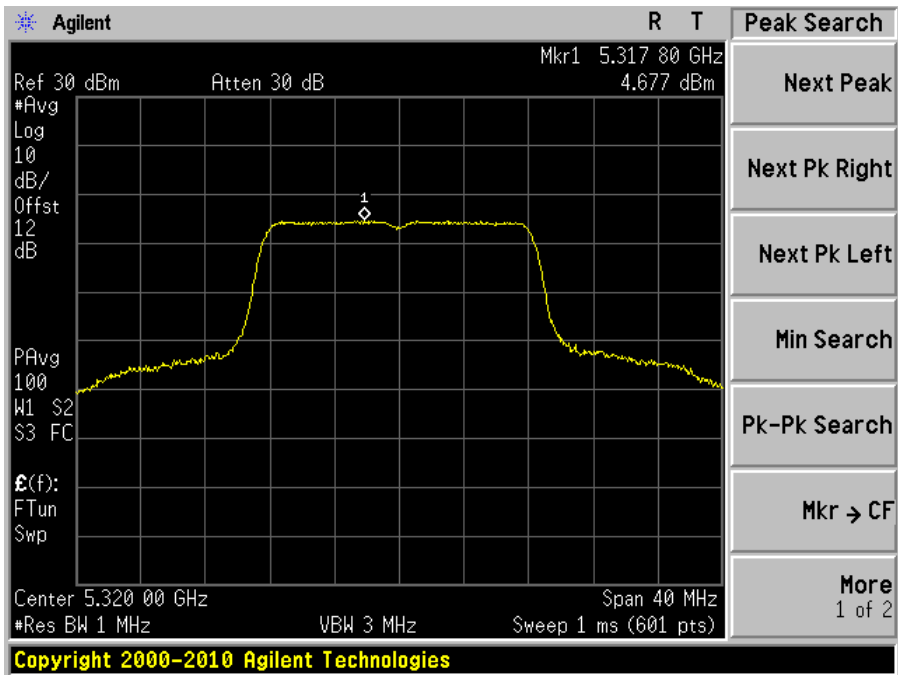
802.11a mode, 5260 MHz



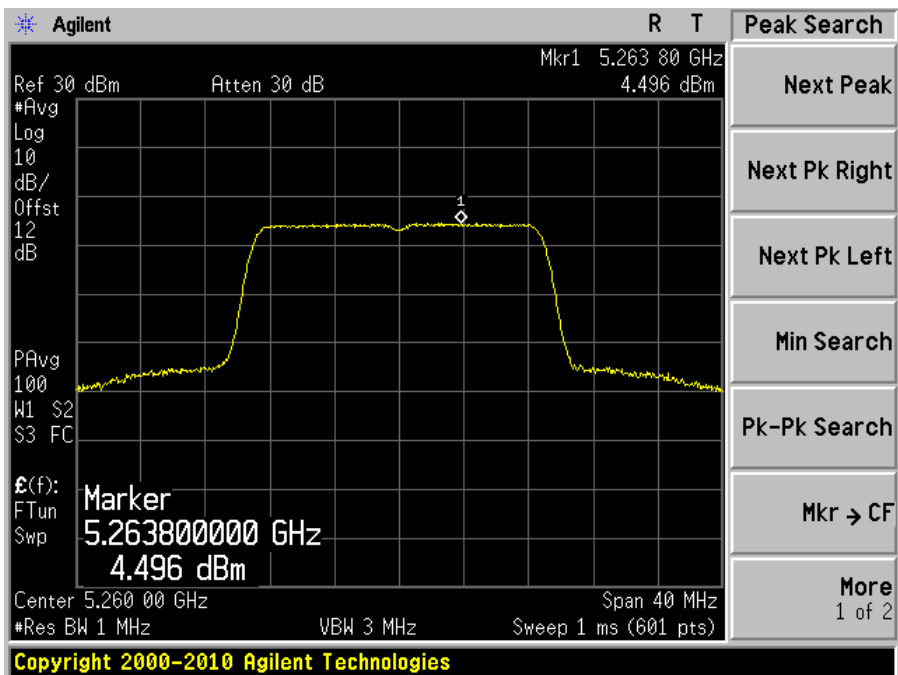
802.11a mode, 5280 MHz



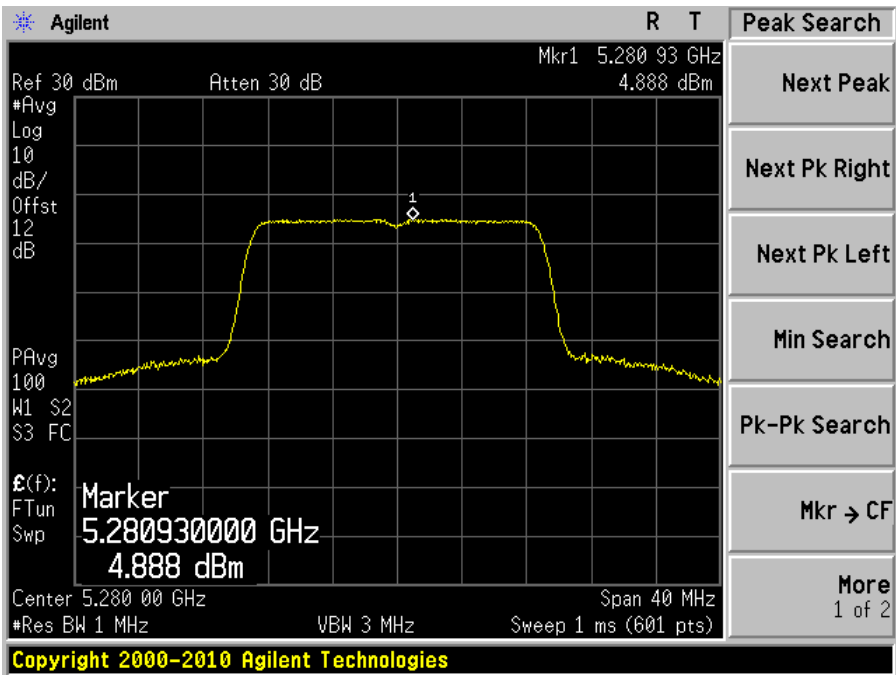
802.11a mode, 5320 MHz



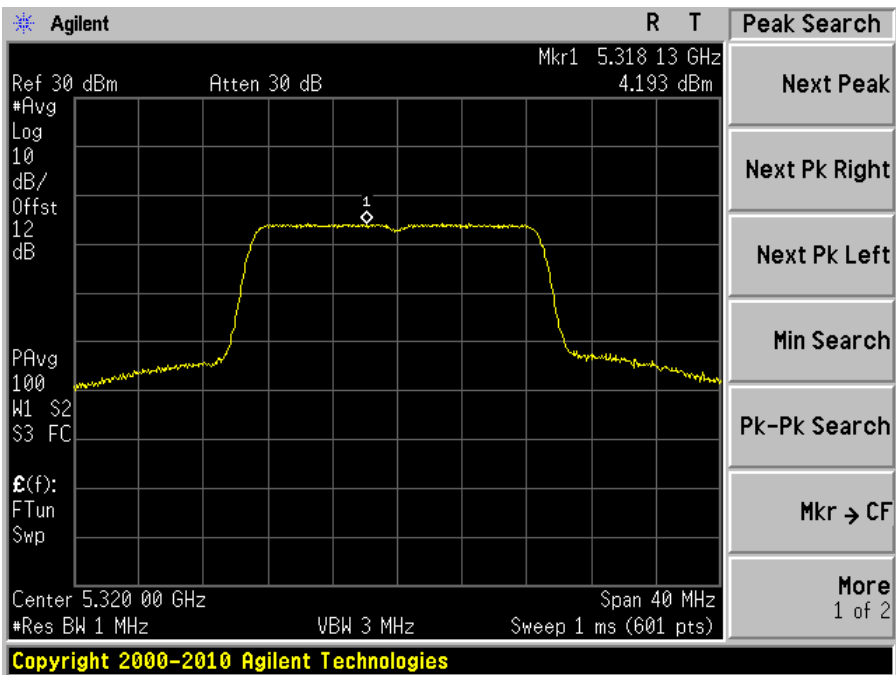
802.11n-HT20 mode, 5260 MHz



802.11n-HT20 mode, 5280 MHz

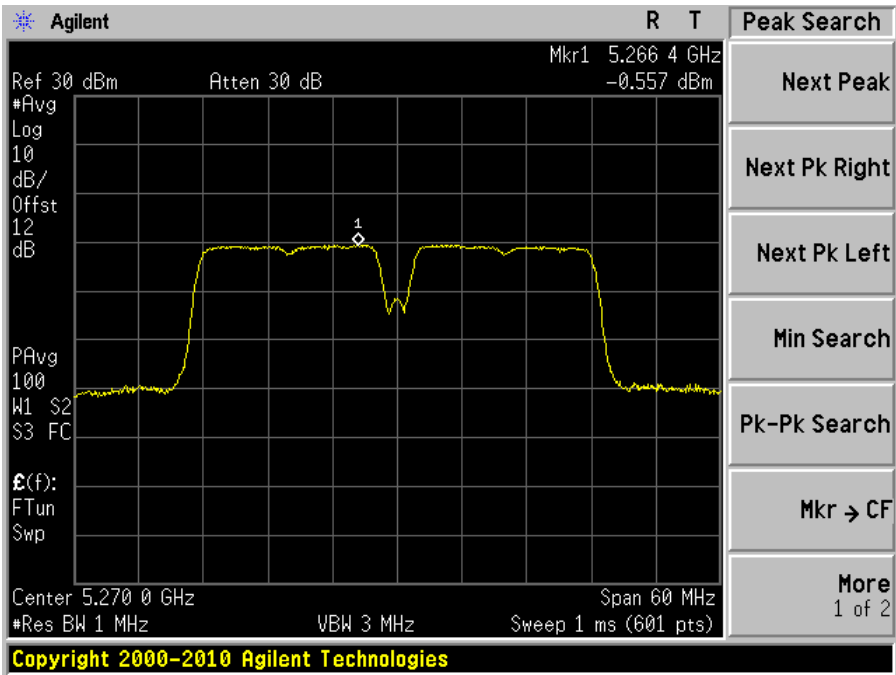


802.11n-HT20 mode, 5320 MHz

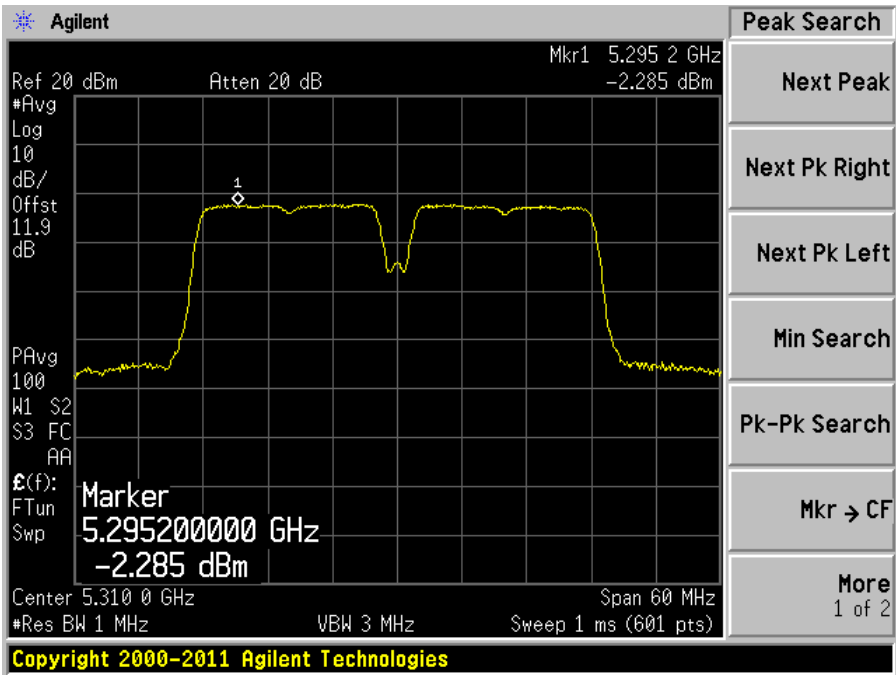




802.11n-HT40 mode, 5270 MHz

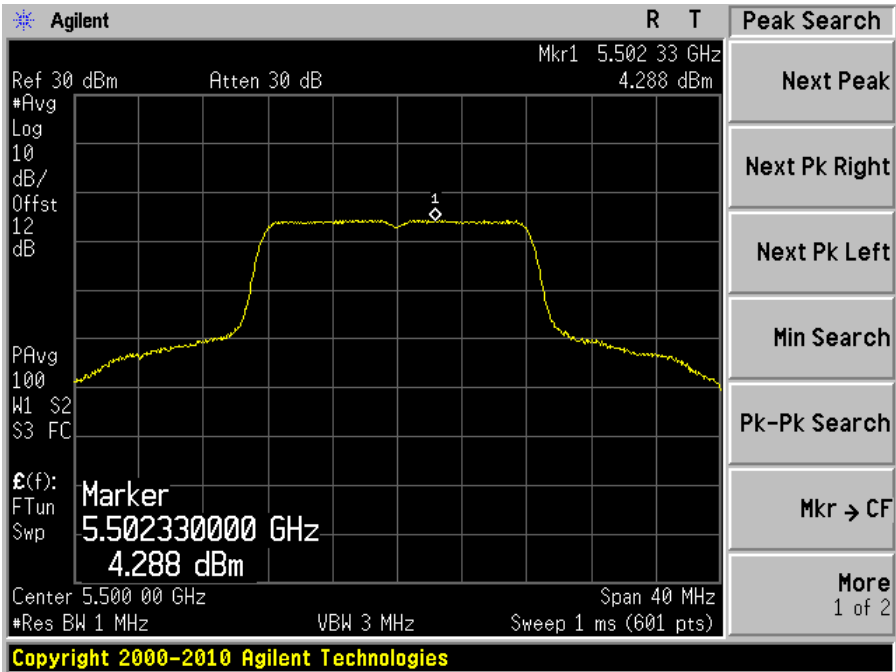


802.11n-HT40 mode, 5310 MHz

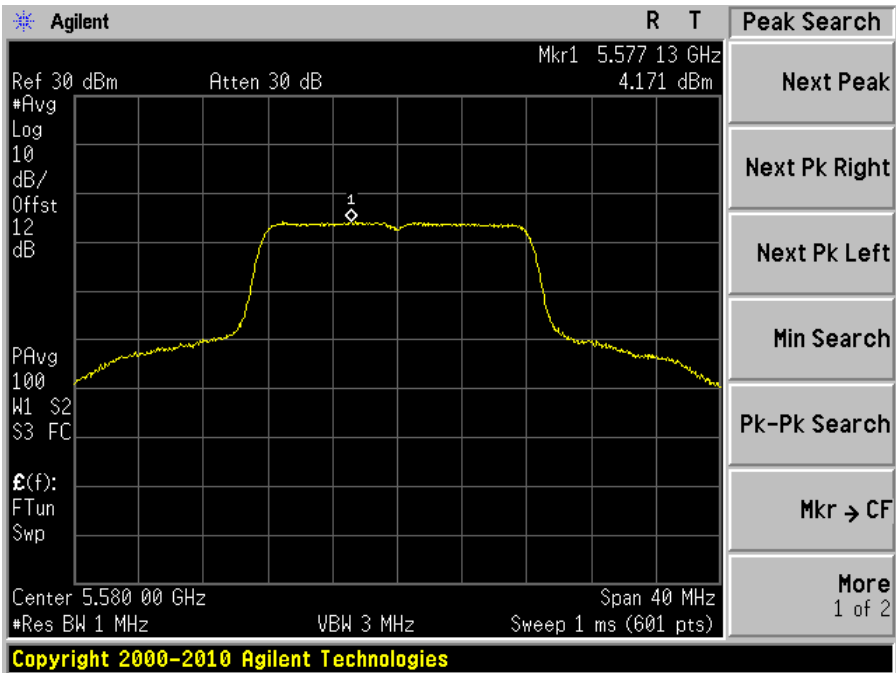


5470-5725 MHz

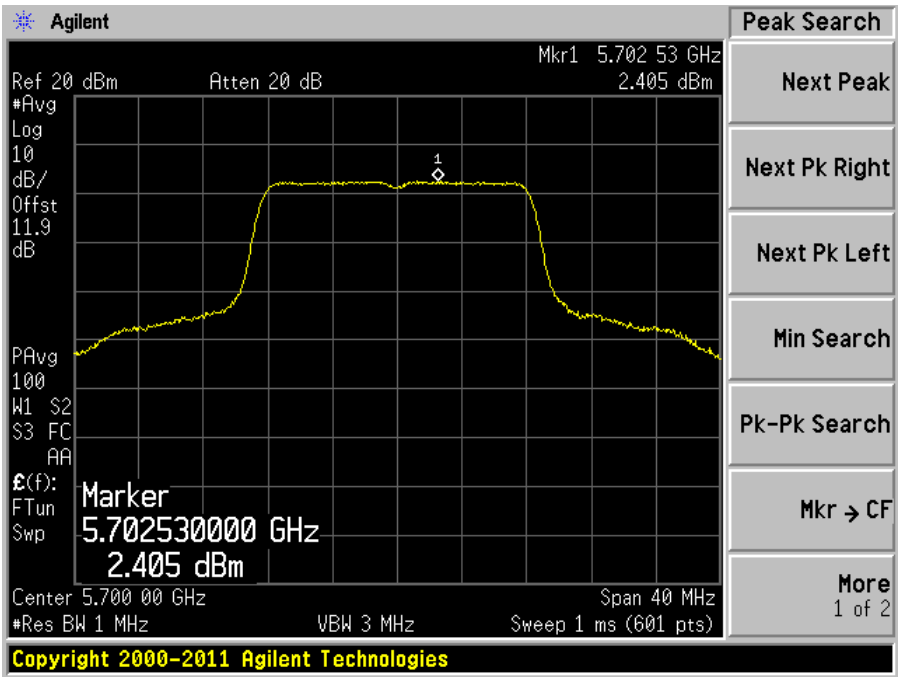
802.11a mode, 5500 MHz



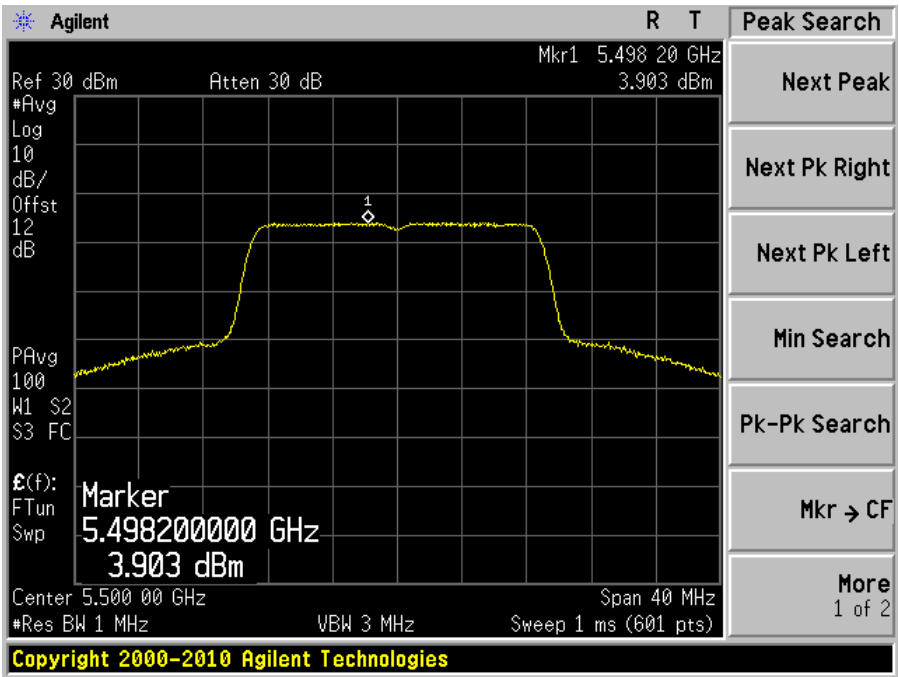
802.11a mode, 5580 MHz



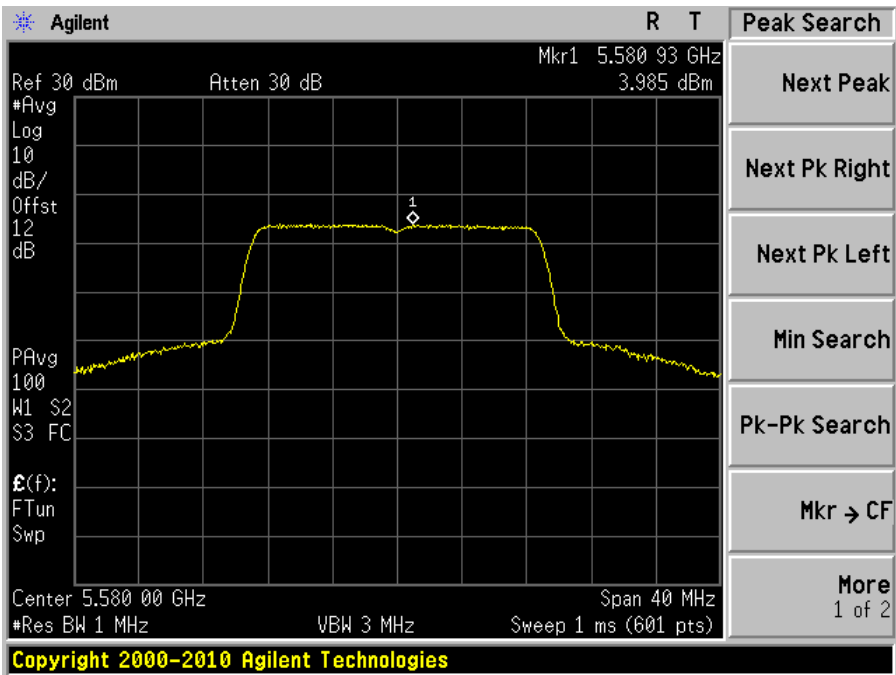
802.11a mode, 5700 MHz



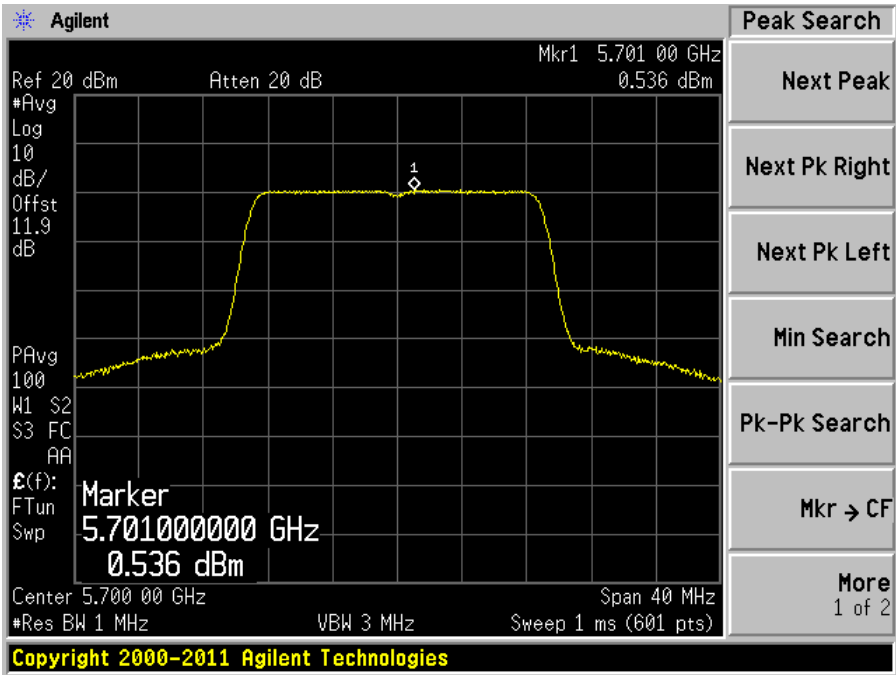
802.11n-HT20 mode, 5500 MHz



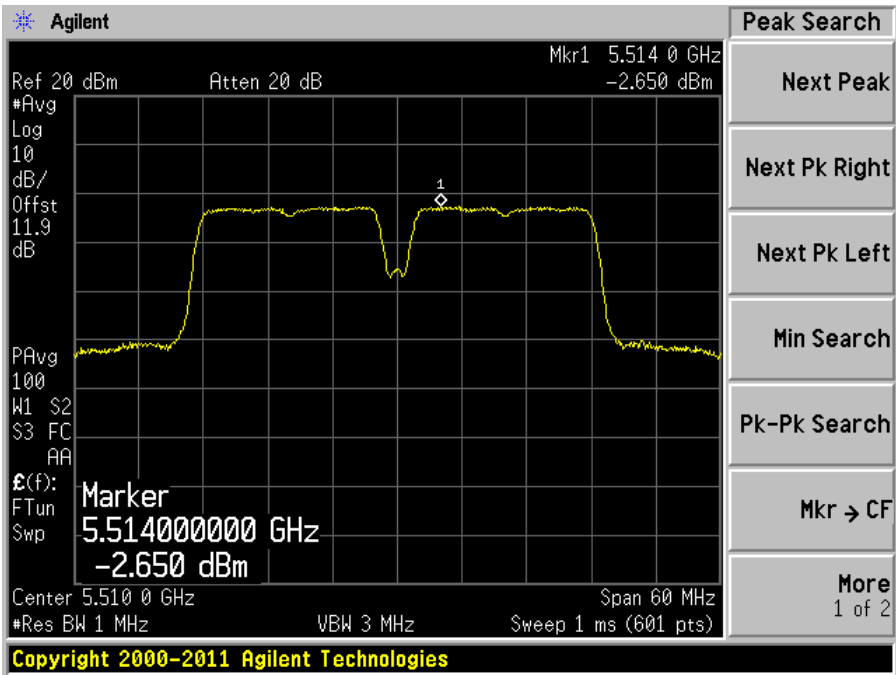
802.11n-HT20 mode, 5580 MHz



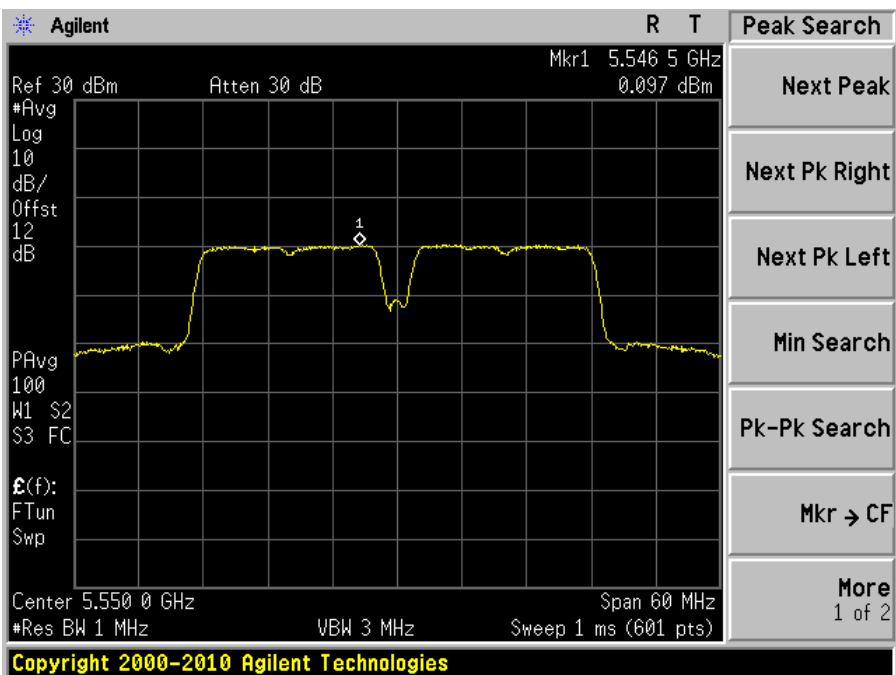
802.11n-HT20 mode, 5700 MHz



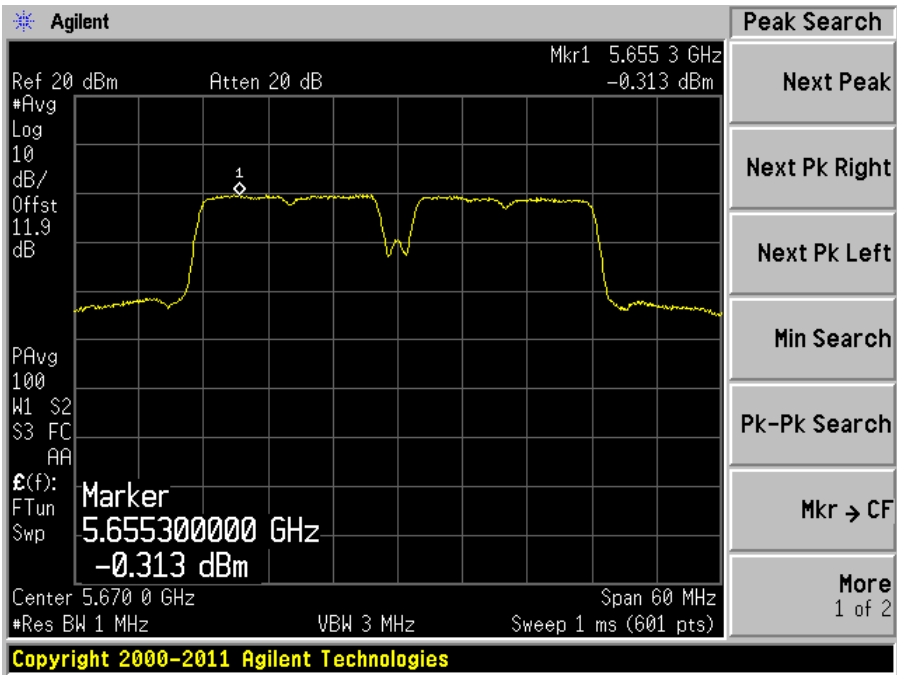
802.11n-HT40 mode, 5510 MHz



802.11n-HT40 mode, 5550 MHz



802.11n-HT40 mode, 5670 MHz



## 12 FCC §15.407(a)(6) – Peak Excursion Ratio

### 12.1 Applicable Standard

According to FCC §15.407(a) (6), the ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

### 12.2 Test Procedure

The measurements are base on FCC KDB 789033 D01 General UNII Test Procedures v01r03: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section G: Peak excursion measurement

### 12.3 Test Equipment List and Details

| Manufacturer | Description       | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4446A    | US44300386 | 2012-09-29       | 1 year               |

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 12.4 Test Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 21 °C     |
| Relative Humidity: | 51 %      |
| ATM Pressure:      | 101.3 kPa |

The testing was performed by Lionel Lara on 2013-05-07 in the RF site.

## 12.5 Test Results

### 5150-5250 MHz Band

#### 802.11a mode

| Channel | Frequency (MHz) | Results (dB) | Limit (dB) |
|---------|-----------------|--------------|------------|
| Middle  | 5200            | 8.348        | 13         |

#### 802.11n-HT20 amode

| Channel | Frequency (MHz) | Results (dB) | Limit (dB) |
|---------|-----------------|--------------|------------|
| Middle  | 5200            | 8.746        | 13         |

#### 802.11n-HT40 amode

| Channel | Frequency (MHz) | Results (dB) | Limit (dB) |
|---------|-----------------|--------------|------------|
| Low     | 5190            | 12.017       | 13         |

### 5250-5350 MHz Band

#### 802.11a mode

| Channel | Frequency (MHz) | Results (dB) | Limit (dB) |
|---------|-----------------|--------------|------------|
| Middle  | 5280            | 7.897        | 13         |

#### 802.11n-HT20 amode

| Channel | Frequency (MHz) | Results (dB) | Limit (dB) |
|---------|-----------------|--------------|------------|
| Middle  | 5280            | 8.352        | 13         |

#### 802.11n-HT40 amode

| Channel | Frequency (MHz) | Results (dB) | Limit (dB) |
|---------|-----------------|--------------|------------|
| Low     | 5270            | 9.997        | 13         |



**5470-5725 MHz Band**

## 802.11a amode

| Channel | Frequency (MHz) | Results (dB) | Limit (dB) |
|---------|-----------------|--------------|------------|
| Middle  | 5580            | 8.139        | 13         |

## 802.11n-HT20 amode

| Channel | Frequency (MHz) | Results (dB) | Limit (dB) |
|---------|-----------------|--------------|------------|
| Middle  | 5580            | 7.975        | 13         |

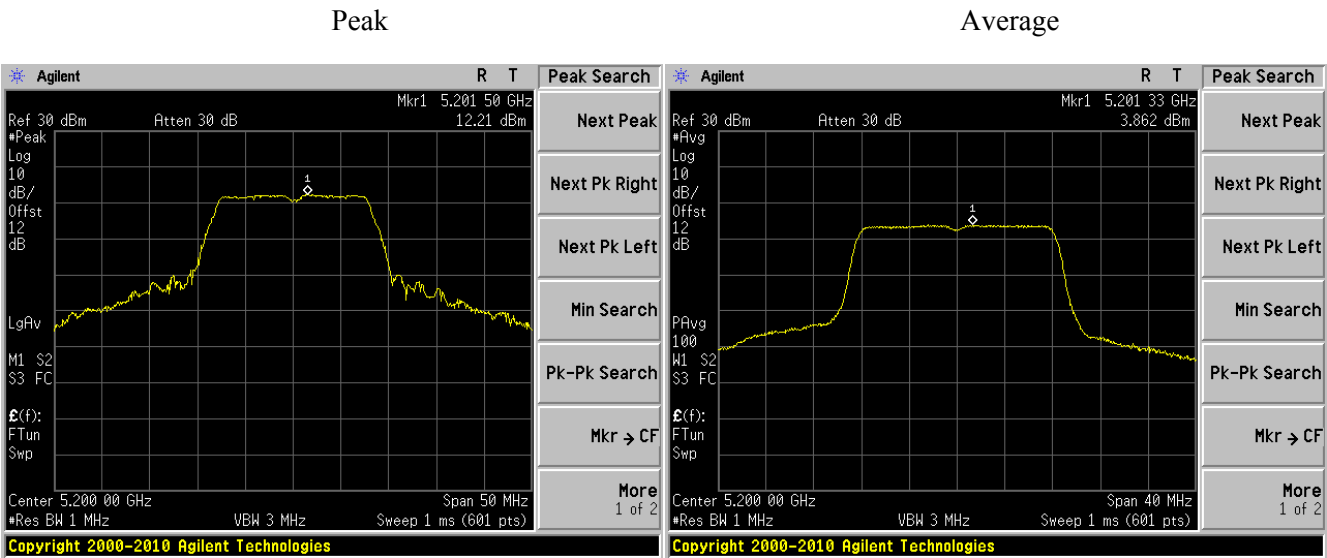
## 802.11n-HT40 amode

| Channel | Frequency (MHz) | Results (dB) | Limit (dB) |
|---------|-----------------|--------------|------------|
| Middle  | 5550            | 8.433        | 13         |

Please refer to the following plots for detailed test results:

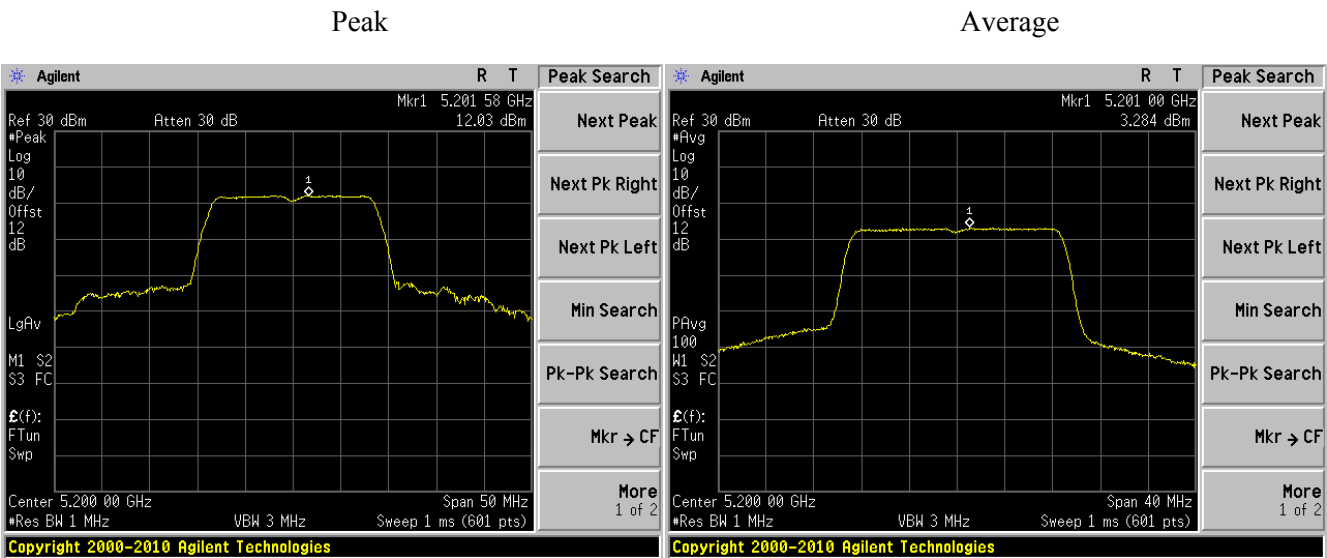
5150-5250 MHz Band

802.11a mode, 5200 MHz



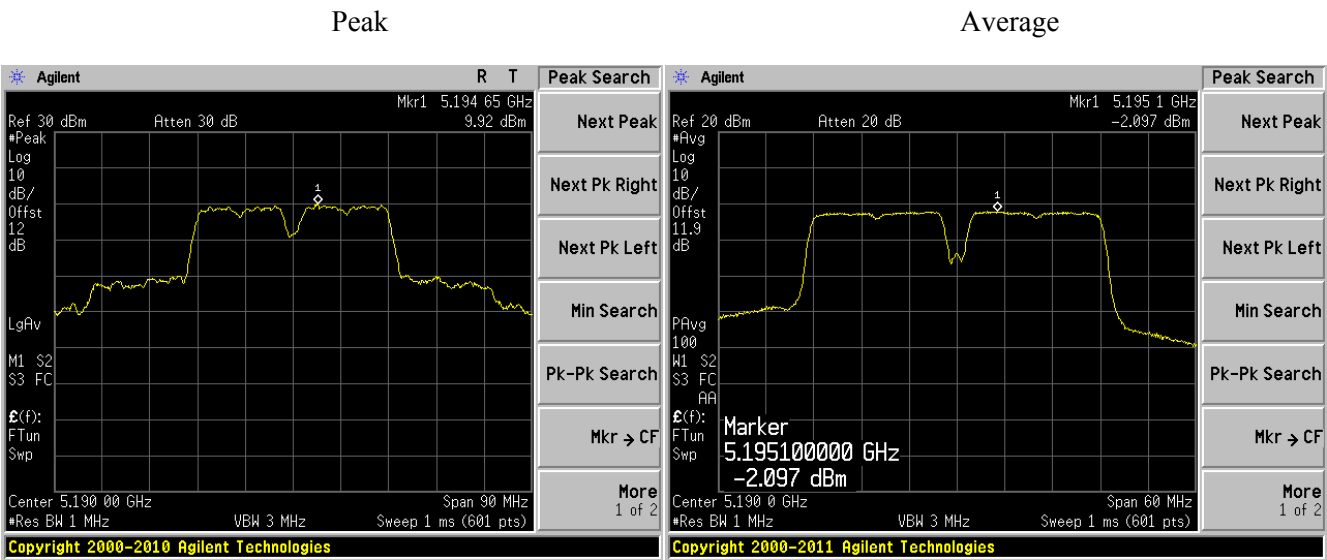
Note: The peak excursion ratio is 12.21 dBm – 3.862 dBm = 8.348 dB

802.11n-HT20 mode, 5200 MHz



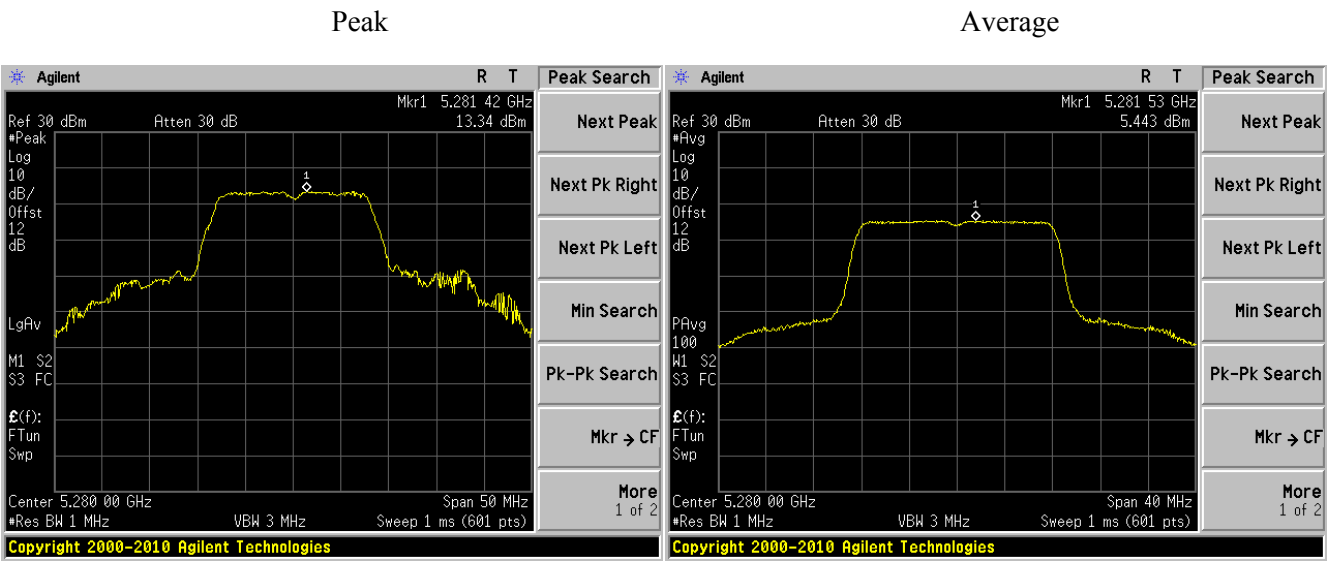
Note: The peak excursion ratio is 12.03 dBm – 3.284 dBm = 8.746 dB

802.11n-HT40 mode, 5190 MHz

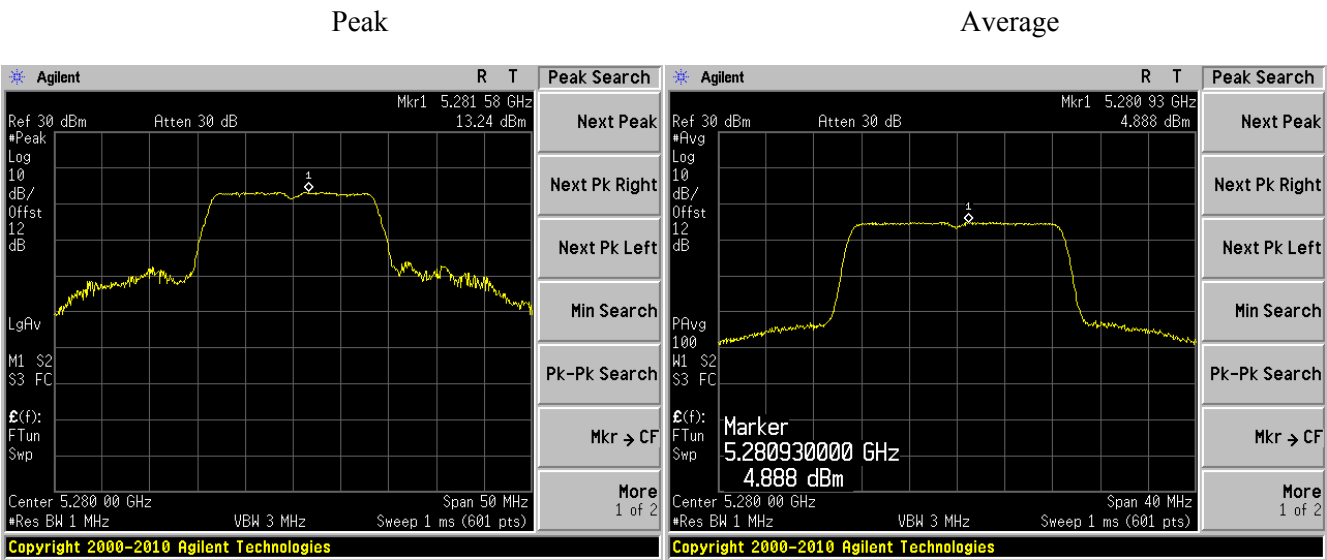


5250-5350 MHz Band

802.11a mode, 5280 MHz

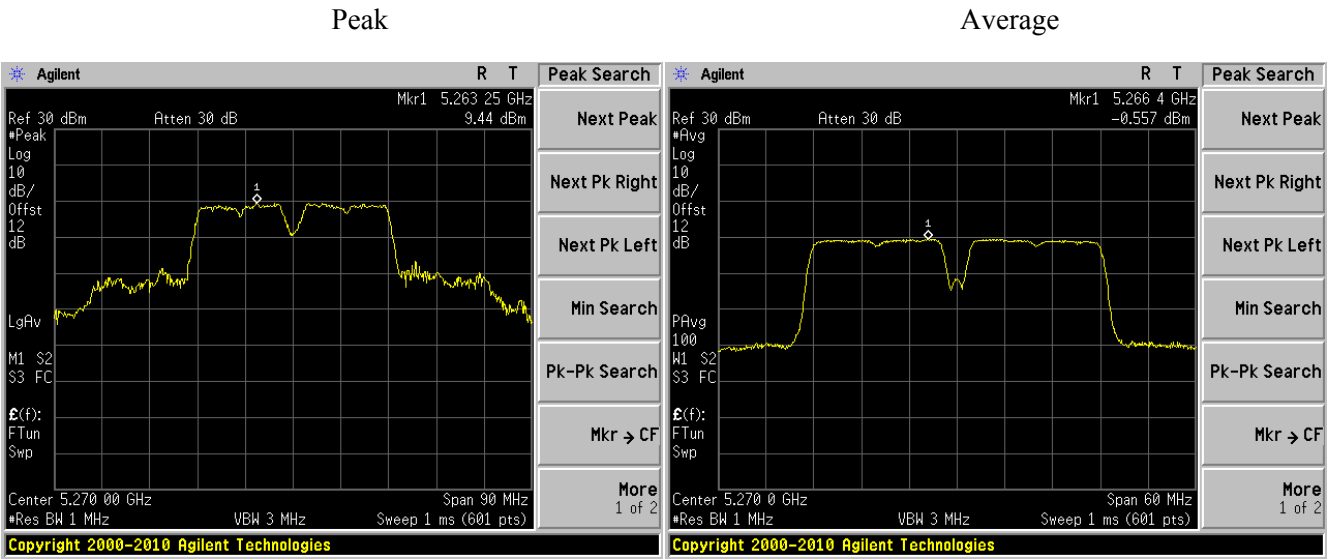


802.11n-HT20 mode, 5280 MHz



Note: The peak excursion ratio is 13.24 dBm – 4.888 dBm = 8.352 dB

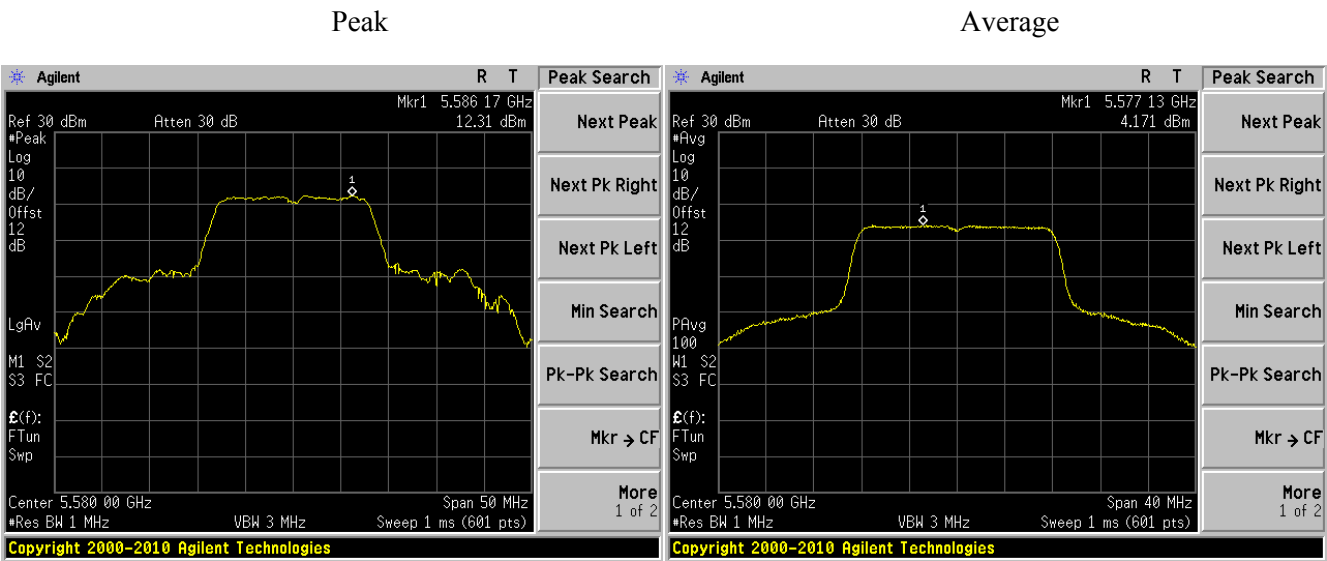
802.11n-HT40 mode, 5270 MHz



Note: The peak excursion ratio is 9.44 dBm – (-0.557) dBm = 9.997 dB

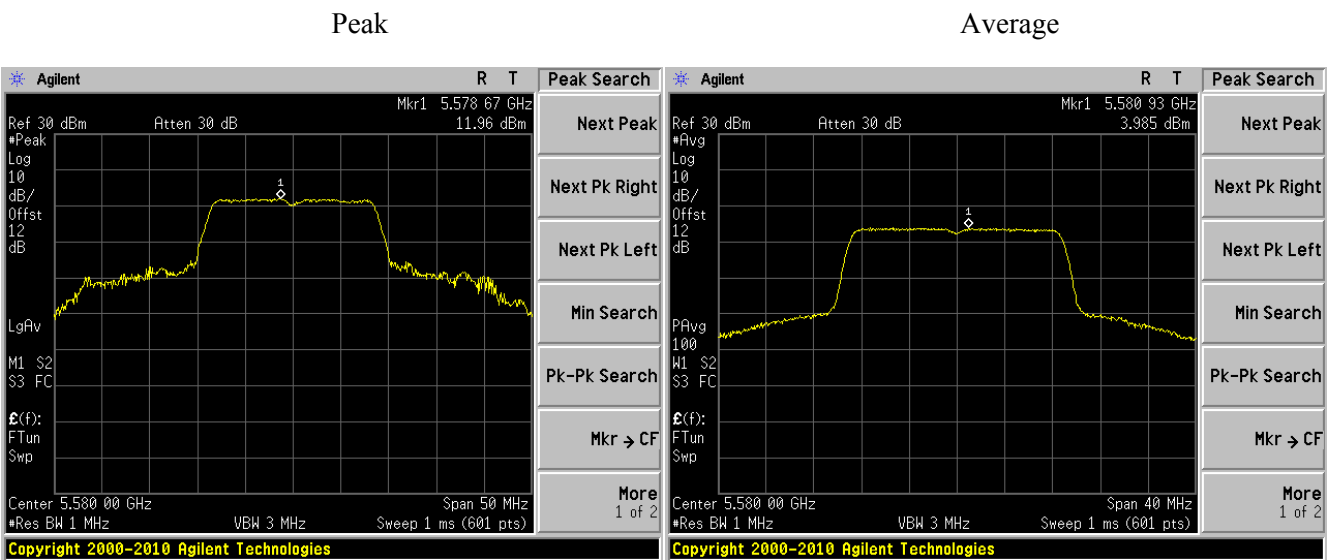
5470-5725 MHz Band

802.11a mode, 5580 MHz



Note: The peak excursion ratio is 12.31 dBm – 4.171 dBm = 8.139 dB

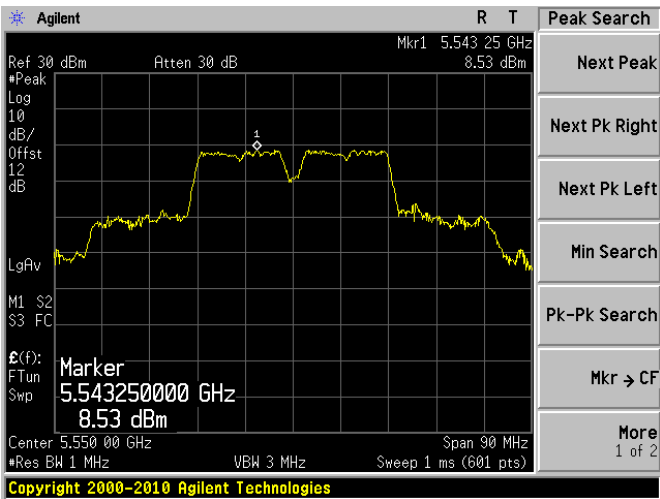
802.11n-HT20 mode, 5580 MHz



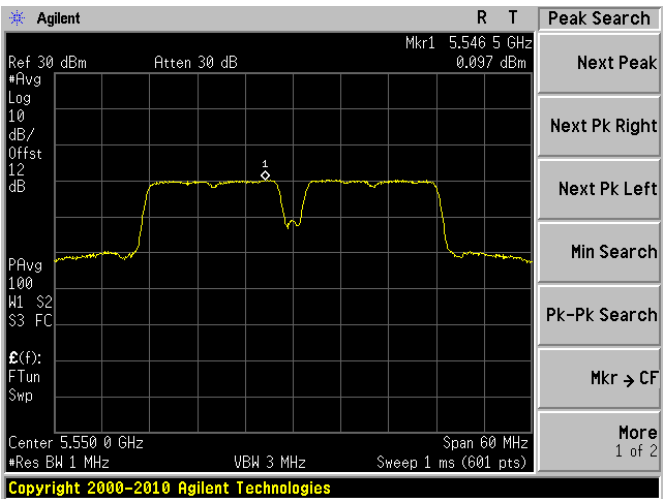
Note: The peak excursion ratio is 11.96 dBm – 3.985 dBm = 7.975 dB

802.11n-HT40 mode, 5550 MHz

Peak



Average



Note: The peak excursion ratio is 8.53 dBm – 0.097 dBm = 8.433 dB

## 13 FCC §15.407(b) - Spurious Emissions at Antenna Terminals

### 13.1 Applicable Standard

#### According to FCC §15.407(b)

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of –27 dBm/MHz.

### 13.2 Measurement Procedure

The measurements are base on FCC KDB 789033 D01 General UNII Test Procedures v01r03: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section H: Unwanted emissions measurement

### 13.3 Test Equipment List and Details

| Manufacturer | Description       | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4446A    | US44300386 | 2012-09-29       | 1 year               |

**Statement of Traceability:** *BACL Corp.* attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

### 13.4 Test Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 22 °C     |
| Relative Humidity: | 48 %      |
| ATM Pressure:      | 101.3 kPa |

The testing was performed by Lionel Lara on 2013-05-17 in the RF site.

### 13.5 Test Results

Please refer to following plots of spurious emissions.

Note: Only spurious emissions that fall into the restricted bands were remeasured with a smaller span.

Dipole Antenna:

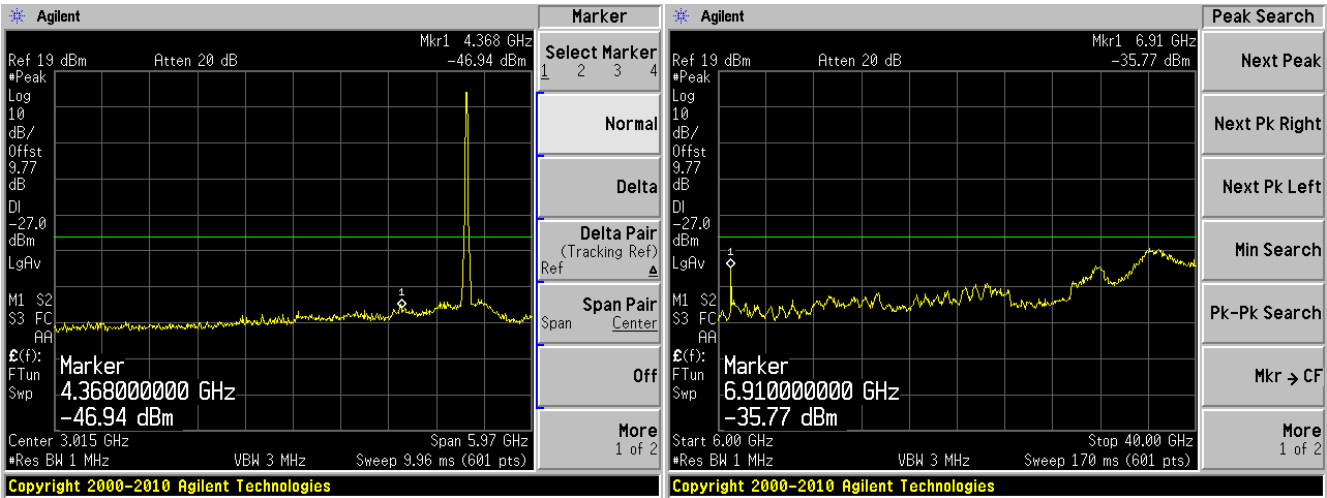
Note 1: The antenna gain was included in the offset of these plots.

5150-5250 MHz Band

802.11a, Low Channel, 5180 MHz

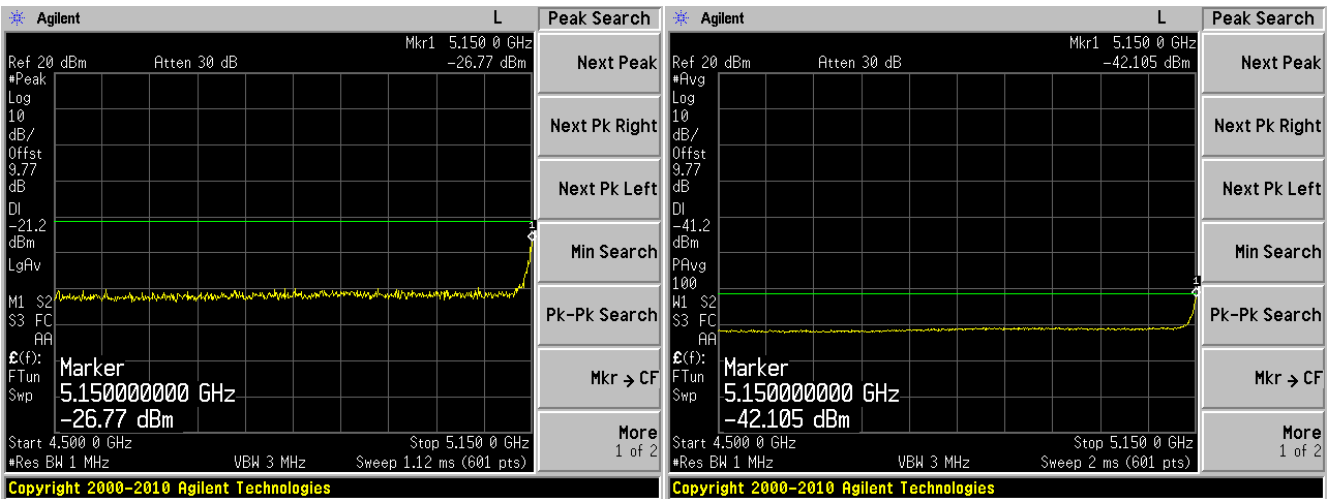
30 MHz – 6 GHz

6 GHz – 40 GHz



Restricted Band Edge Peak

Restricted Band Edge Average

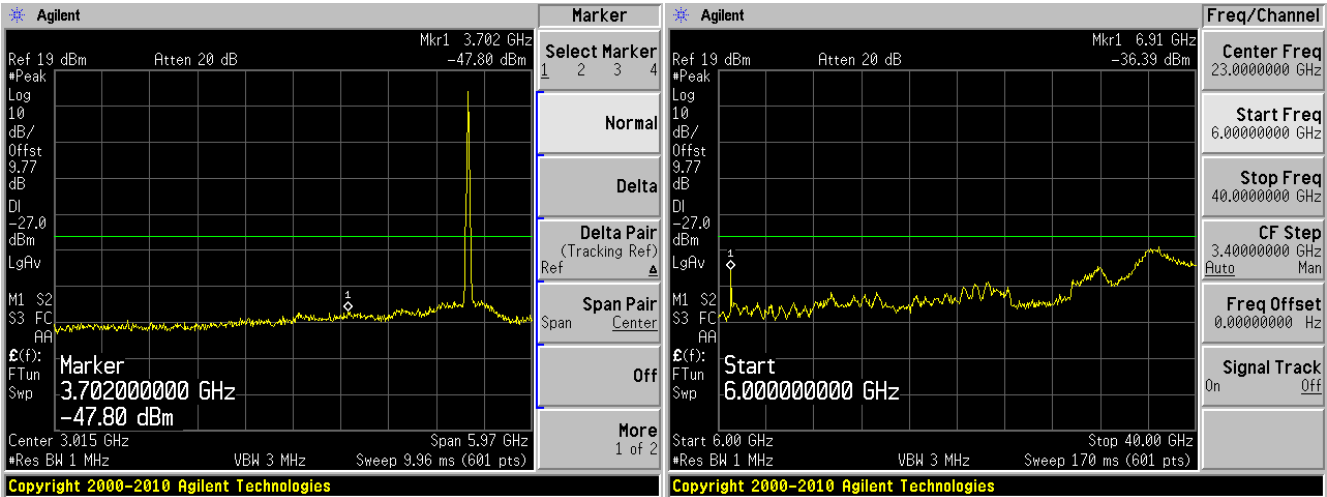




802.11a, Middle Channel, 5200 MHz

30 MHz – 6 GHz

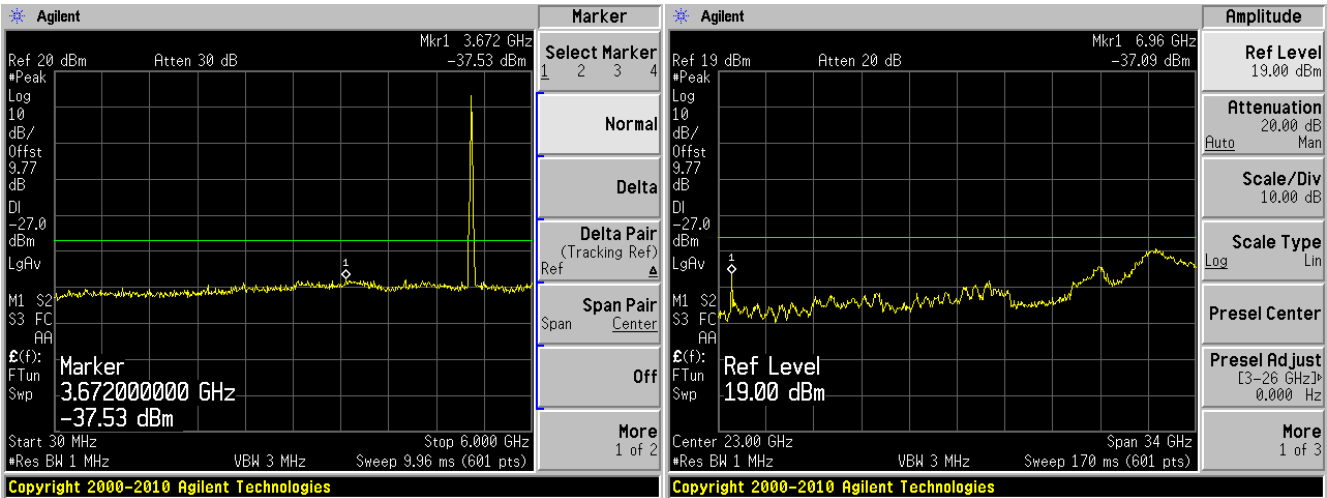
6 GHz – 40 GHz



802.11a, High Channel, 5240 MHz

30 MHz – 6 GHz

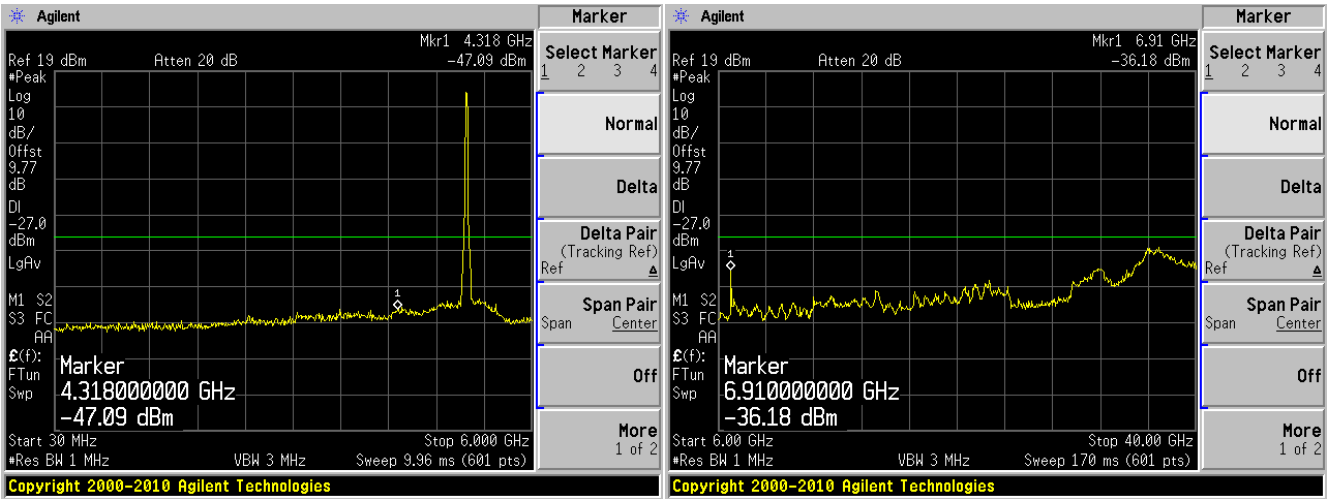
6 GHz – 40 GHz



802.11n-HT20, Low Channel, 5180 MHz

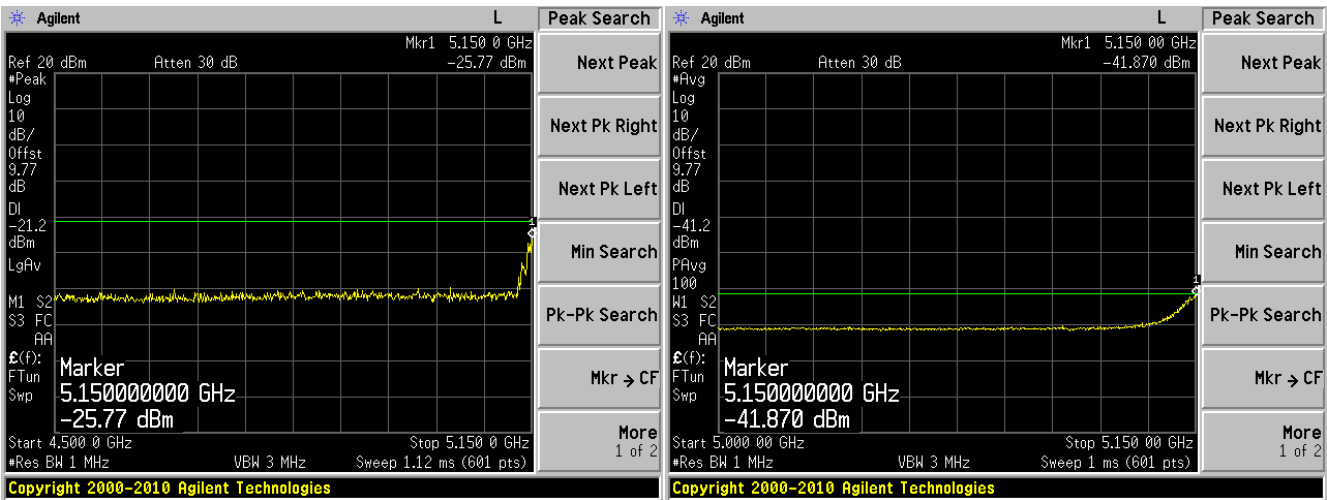
30 MHz – 6 GHz

6 GHz – 40 GHz



Restricted Band Edge Peak

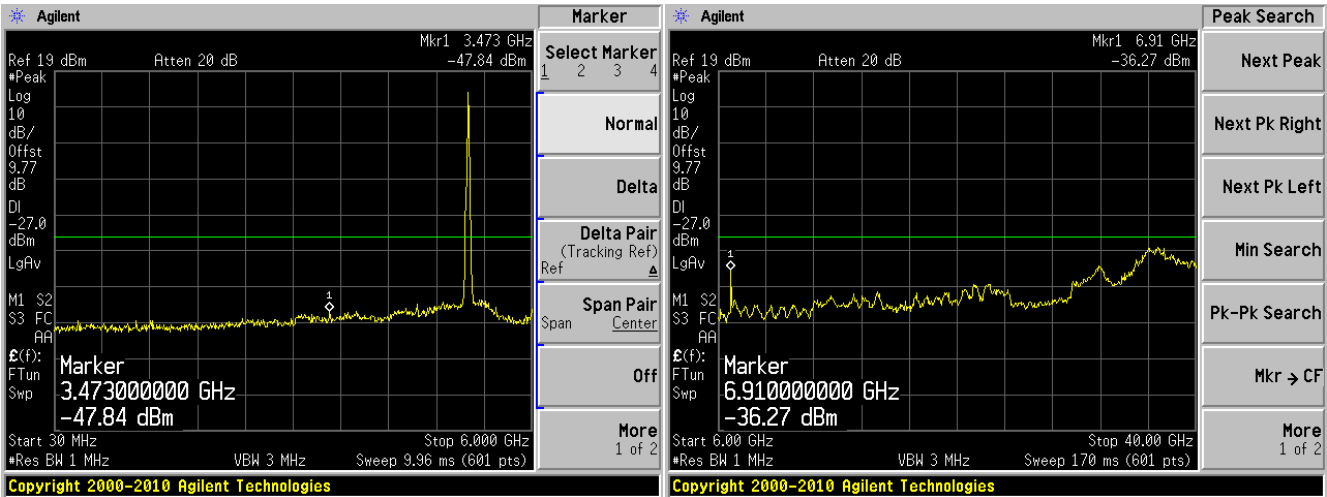
Restricted Band Edge Average



802.11n-HT20, Middle Channel, 5200 MHz

30 MHz – 6 GHz

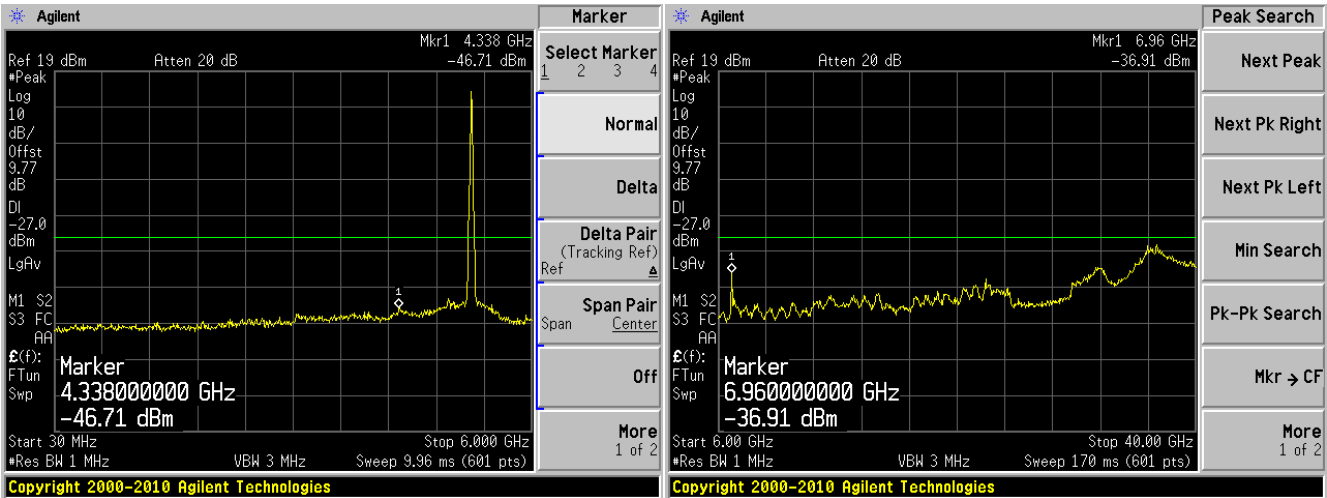
6 GHz – 40 GHz



802.11n-HT20, High Channel, 5240 MHz

30 MHz – 6 GHz

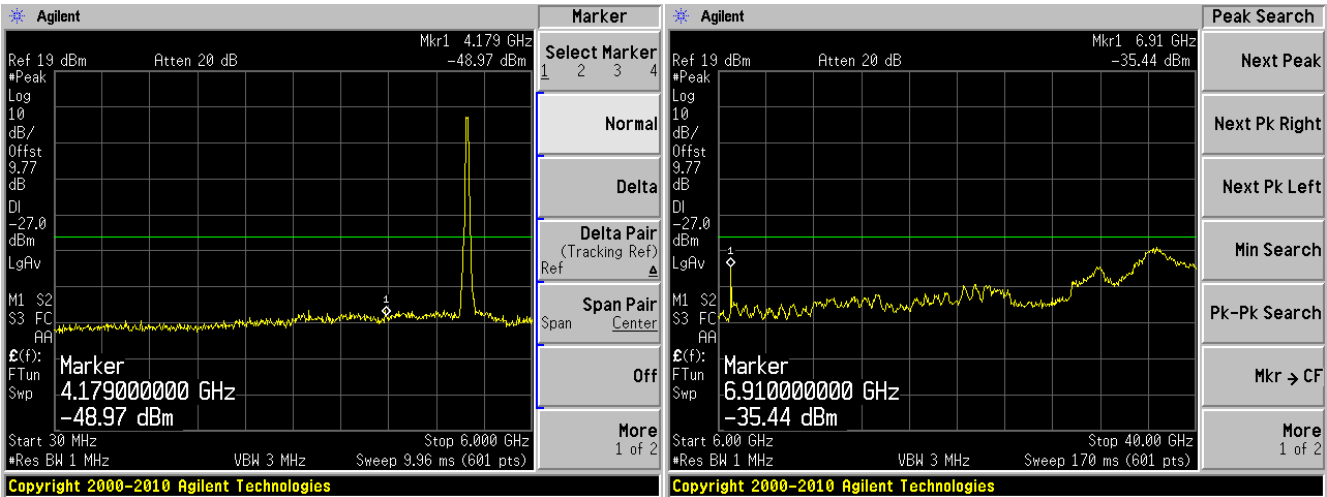
6 GHz – 40 GHz



802.11n-HT40, Low Channel, 5190 MHz

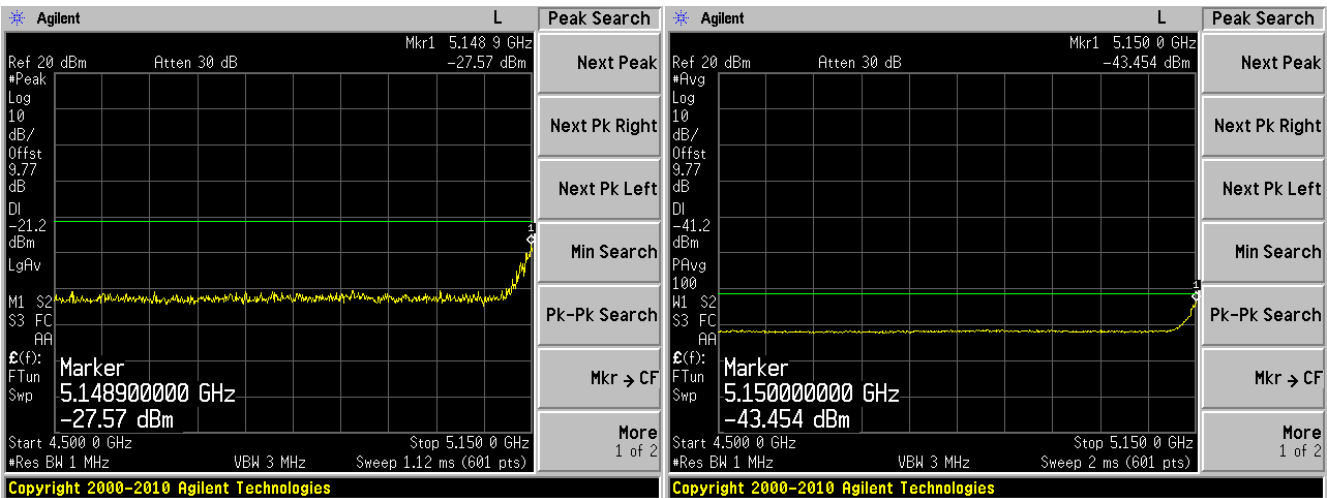
30 MHz – 6 GHz

6 GHz – 40 GHz



Restricted Band Edge Peak

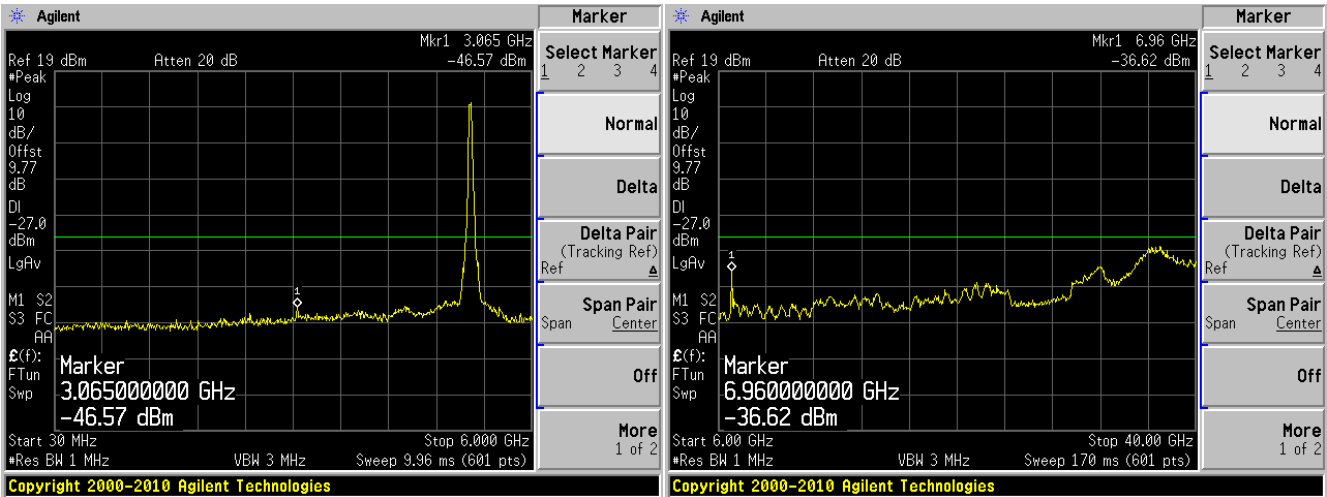
Restricted Band Edge Average



802.11n-HT40, High Channel, 5230 MHz

30 MHz – 6 GHz

6 GHz – 40 GHz

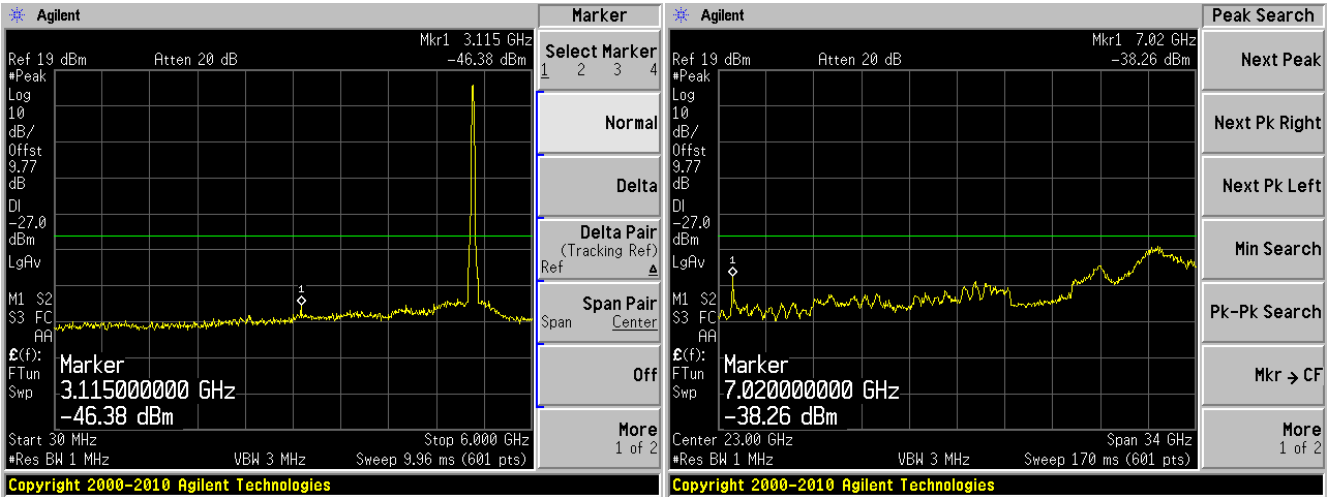


5250-5350 MHz Band

802.11a, Low Channel, 5260 MHz

30 MHz – 6 GHz

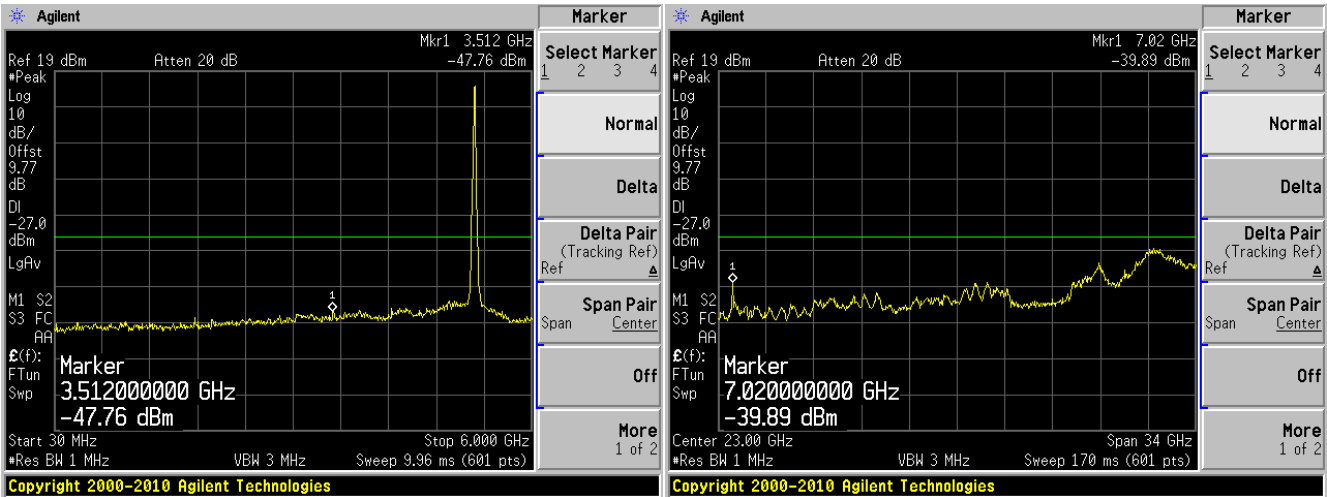
6 GHz – 40 GHz



802.11a, Middle Channel, 5280 MHz

30 MHz – 6 GHz

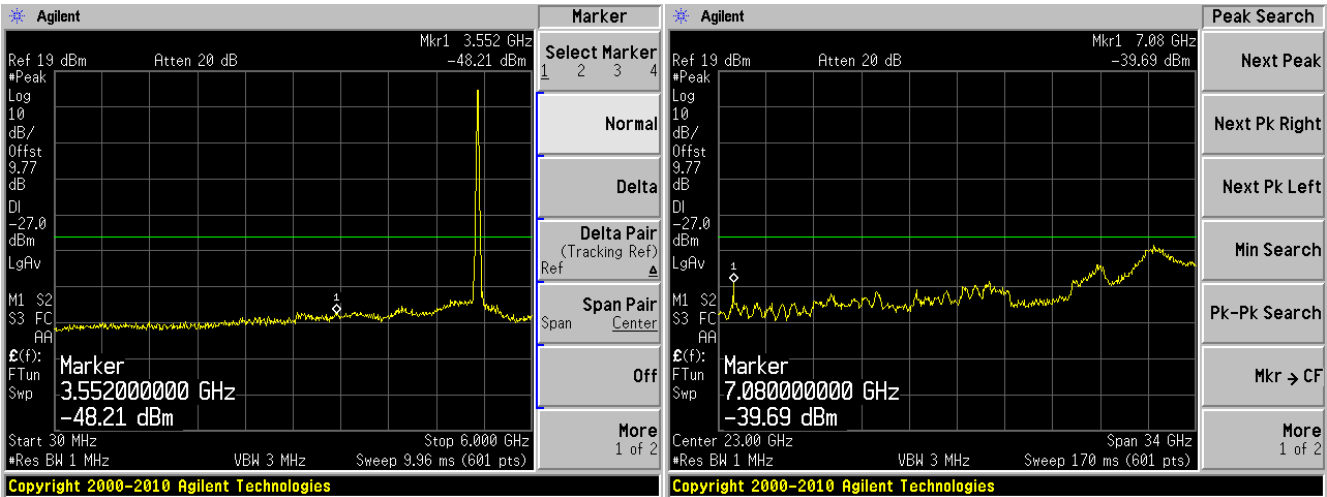
6 GHz – 25 GHz



802.11a, High Channel, 5320 MHz

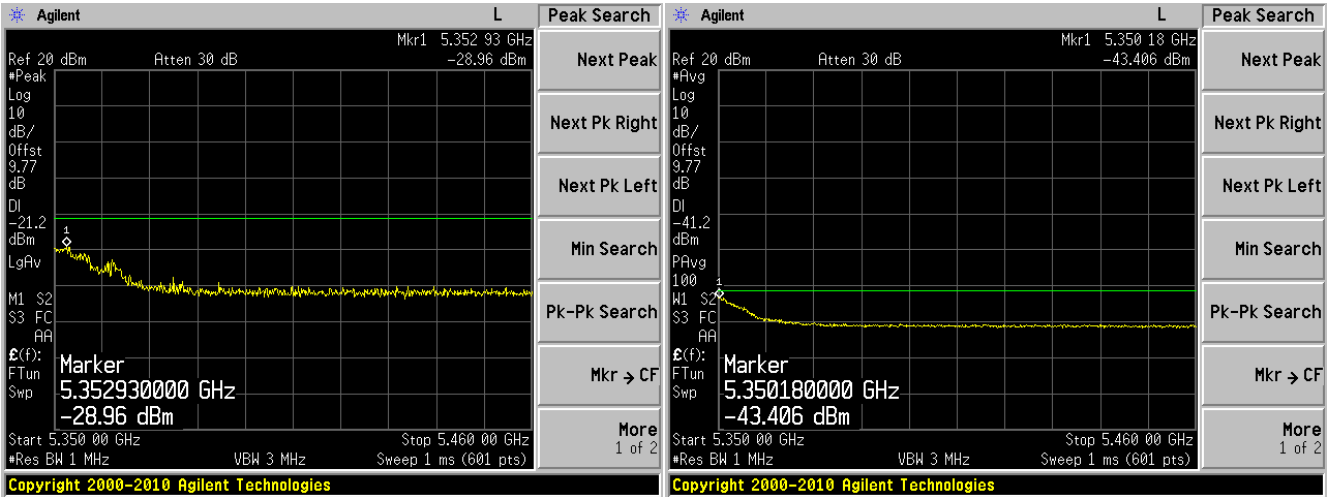
30 MHz – 6 GHz

6 GHz – 40 GHz



Restricted Band Edge Peak

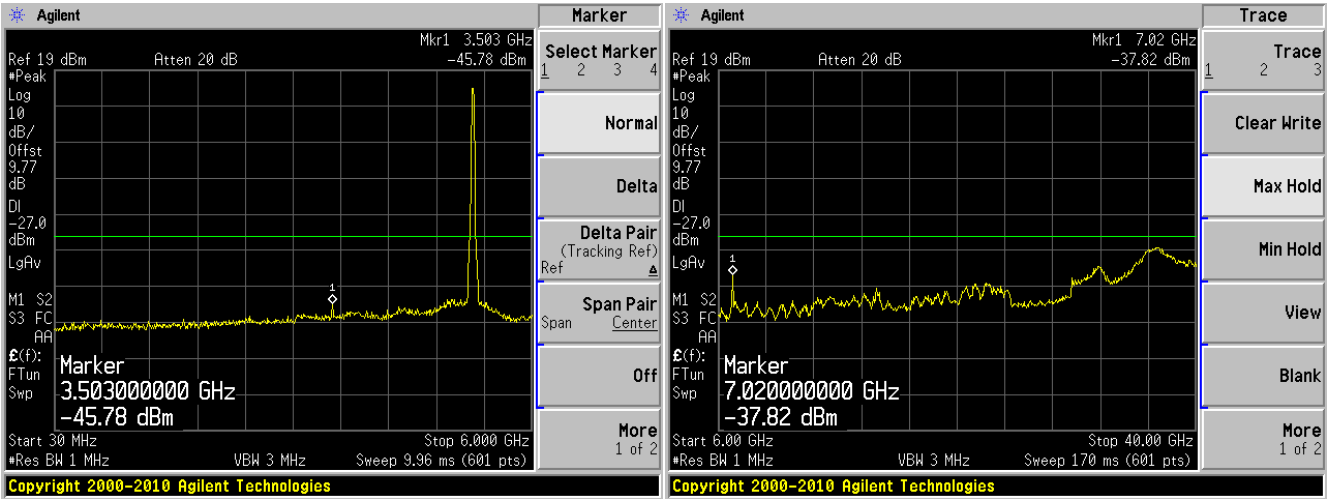
Restricted Band Edge Average



802.11n-HT20, Low Channel, 5260 MHz

30 MHz – 6 GHz

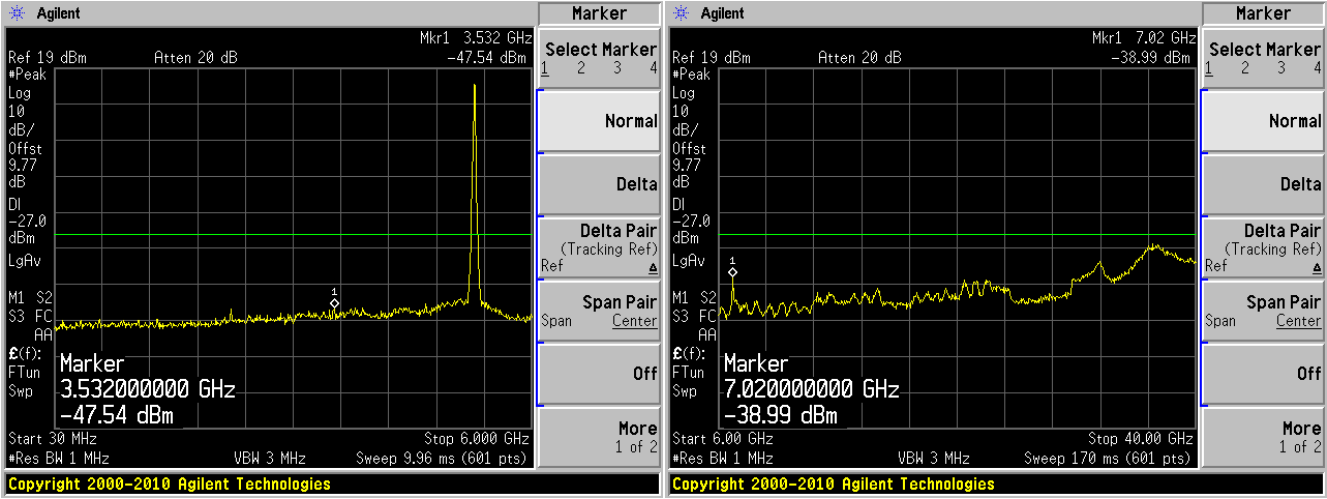
6 GHz – 40 GHz



802.11n HT20, Middle Channel, 5280 MHz

30 MHz – 6 GHz

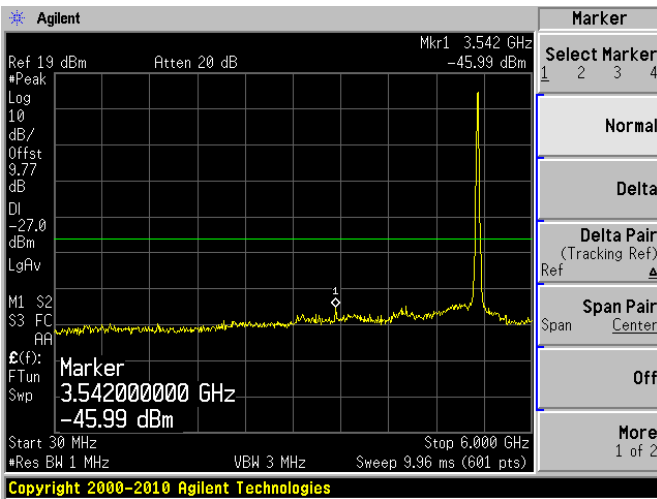
6 GHz – 40 GHz



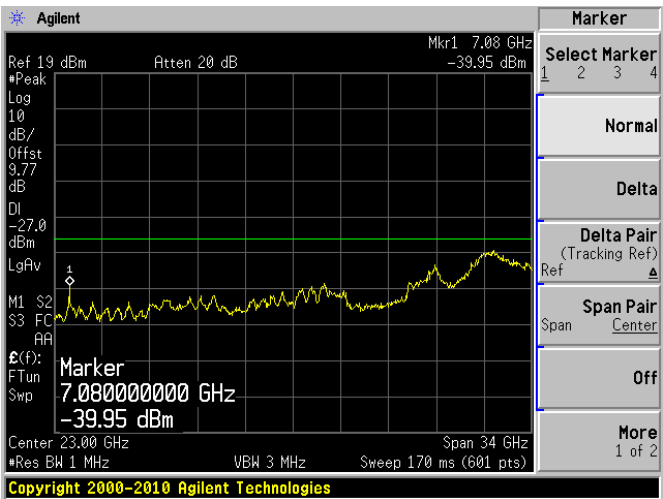


802.11n-HT20, High Channel, 5320 MHz

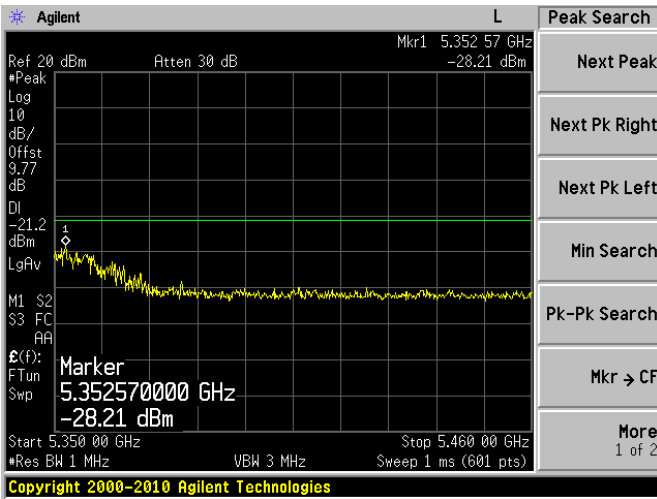
30 MHz – 6 GHz



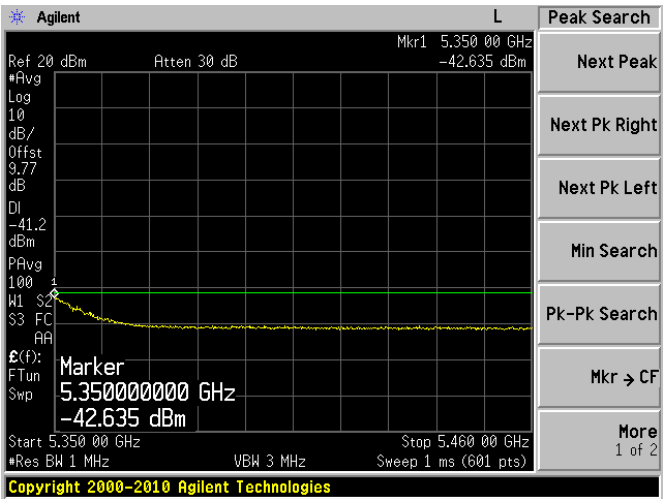
6 GHz – 40 GHz



Restricted Band Edge Peak



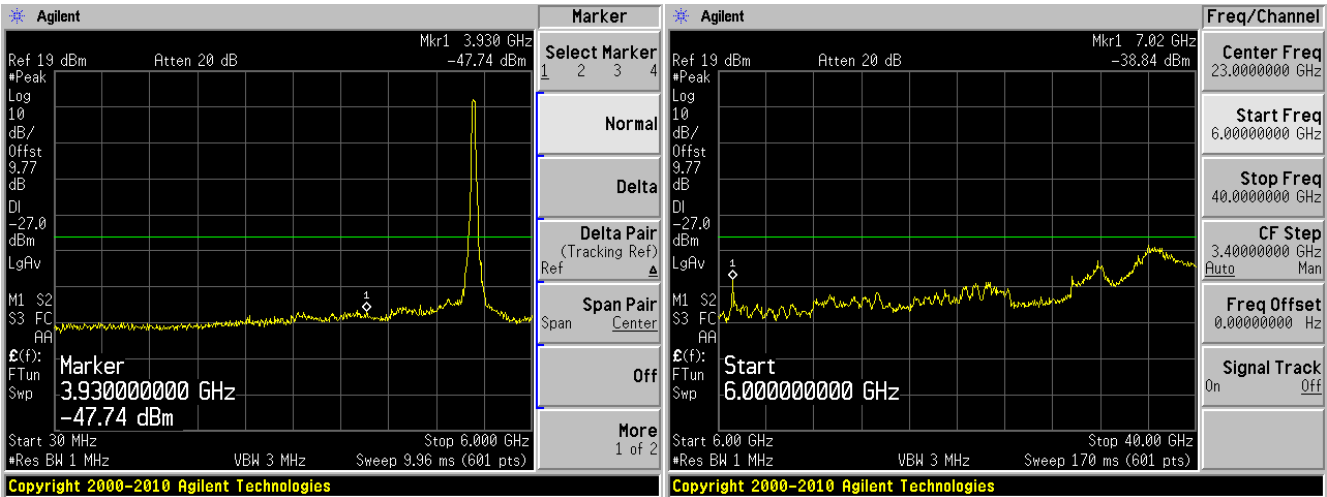
Restricted Band Edge Average



802.11n-HT40, Low Channel, 5270 MHz

30 MHz – 6 GHz

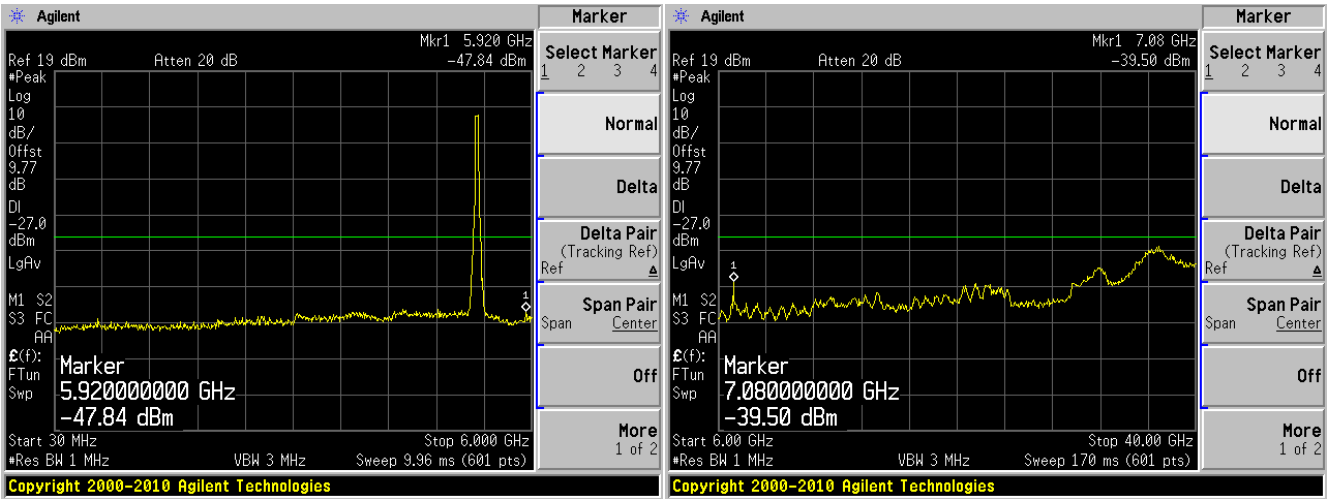
6 GHz – 40 GHz



802.11n-HT40, High Channel, 5310 MHz

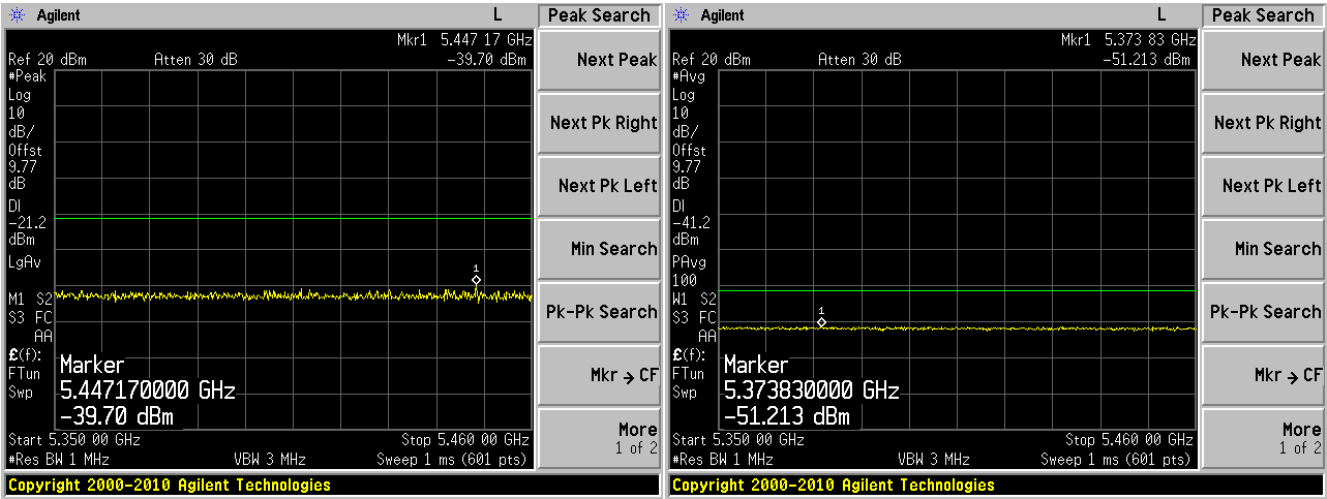
30 MHz – 6 GHz

6 GHz – 40 GHz



Restricted Band Edge Peak

Restricted Band Edge Average

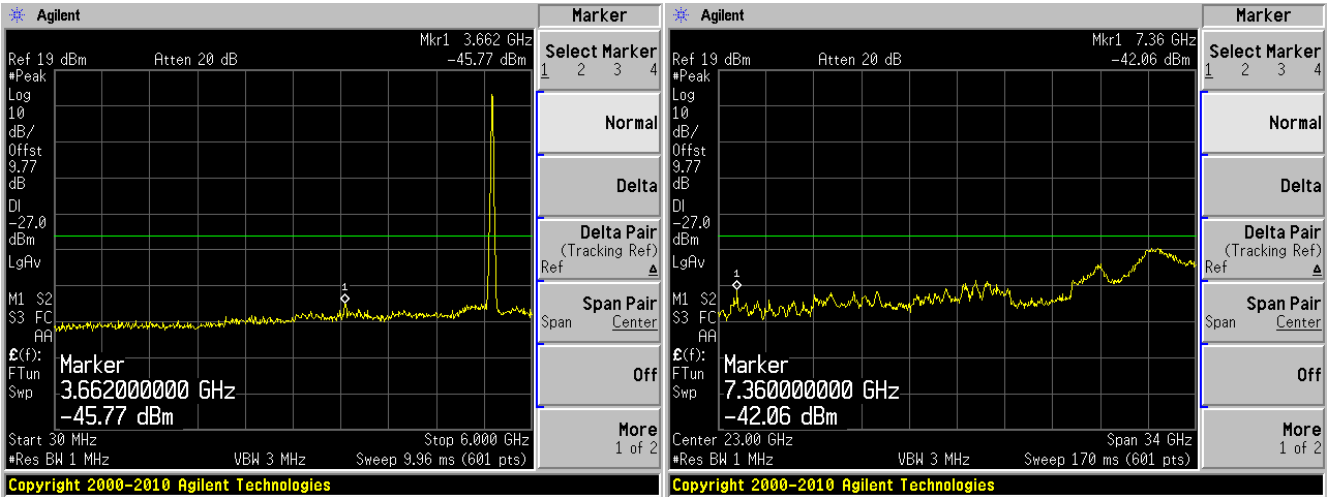


5470-5725 MHz Band

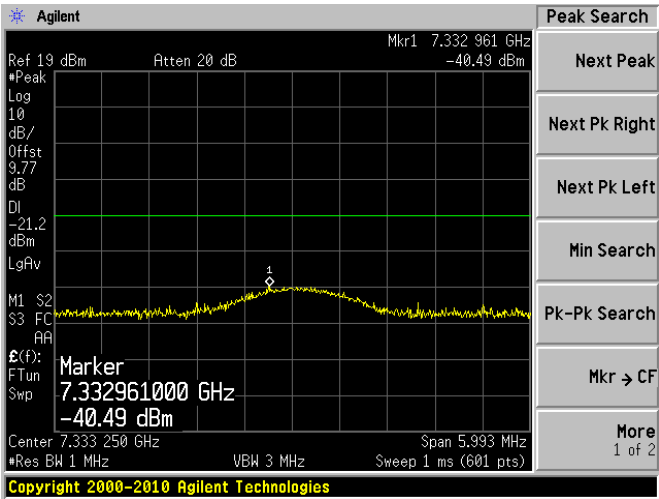
802.11a, Low Channel, 5500 MHz

30 MHz – 6 GHz

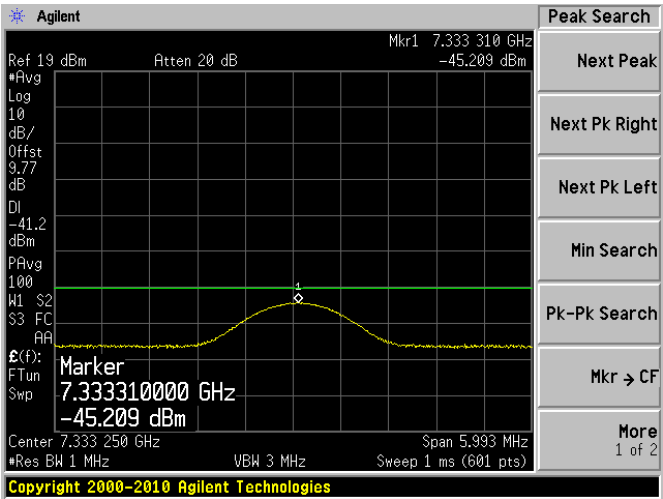
6 GHz – 40 GHz



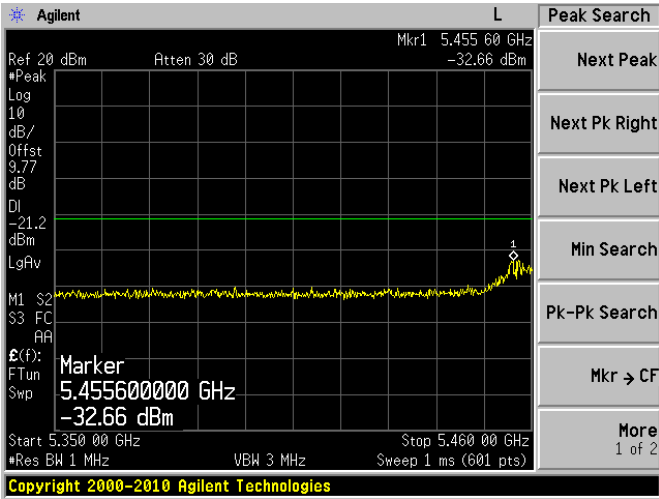
Spurious Emission 2 Peak



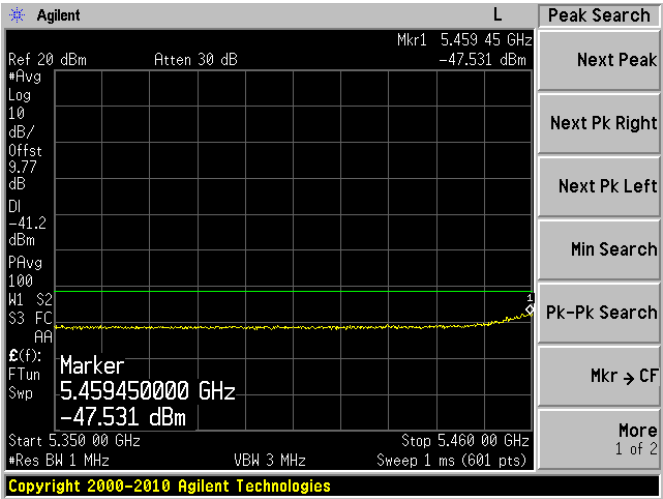
Spurious Emission 2 Average



Restricted Band Edge Peak

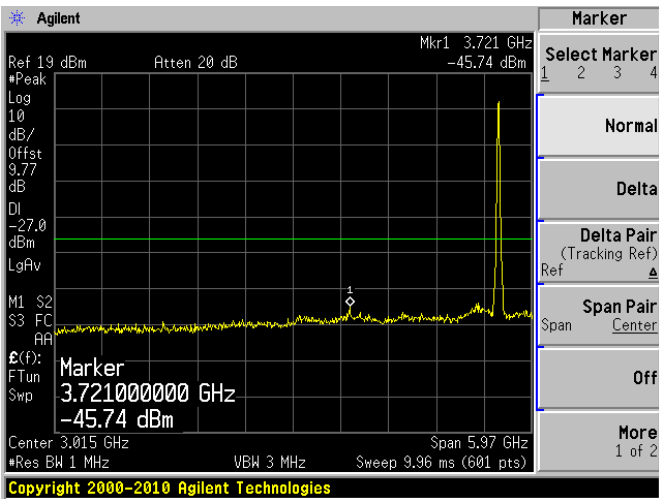


Restricted Band Edge Average

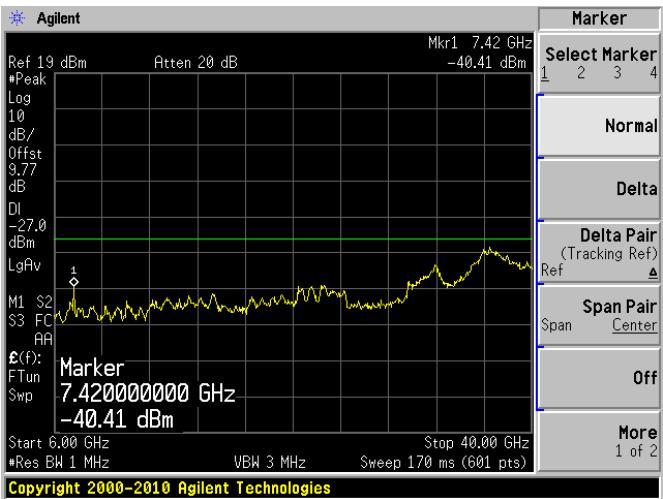


802.11a, Middle Channel, 5580 MHz

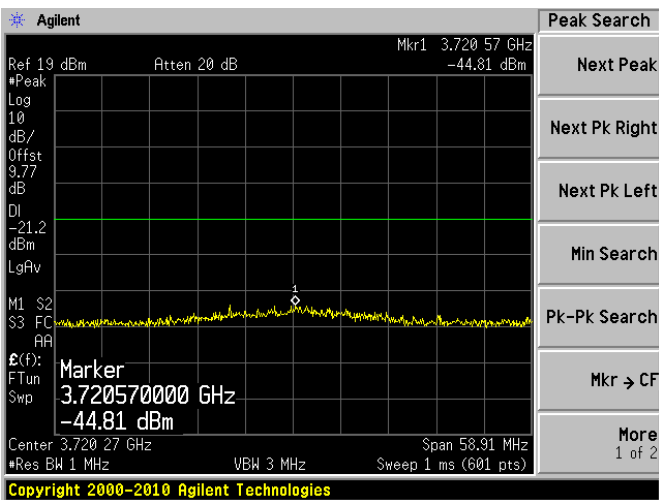
30 MHz – 6 GHz



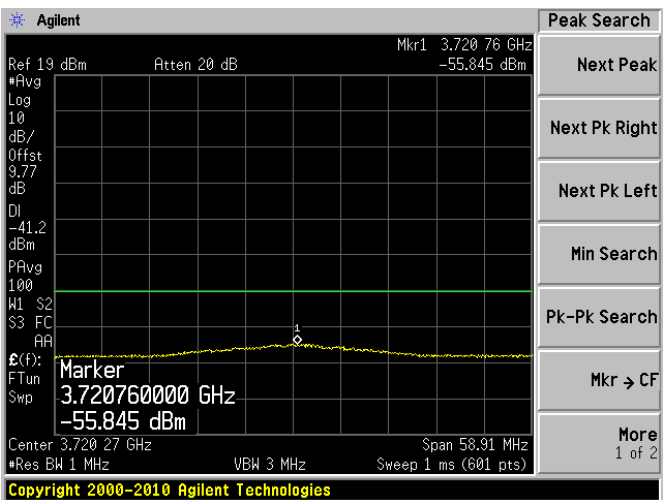
6 GHz –40 GHz



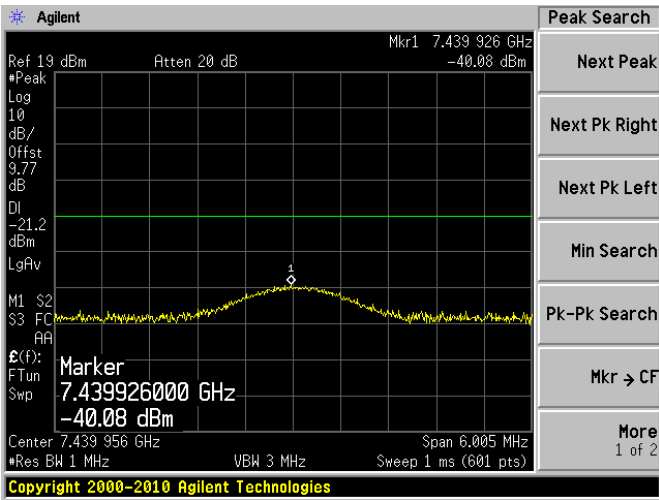
Spurious Emission 1 Peak



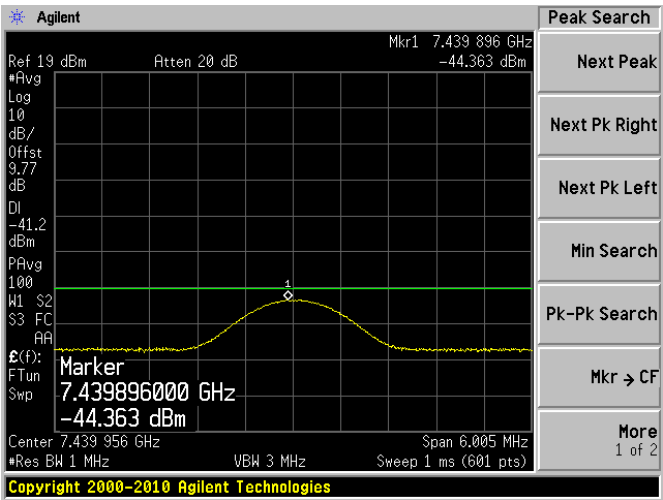
Spurious Emission 1 Average



Spurious Emission 2 Peak



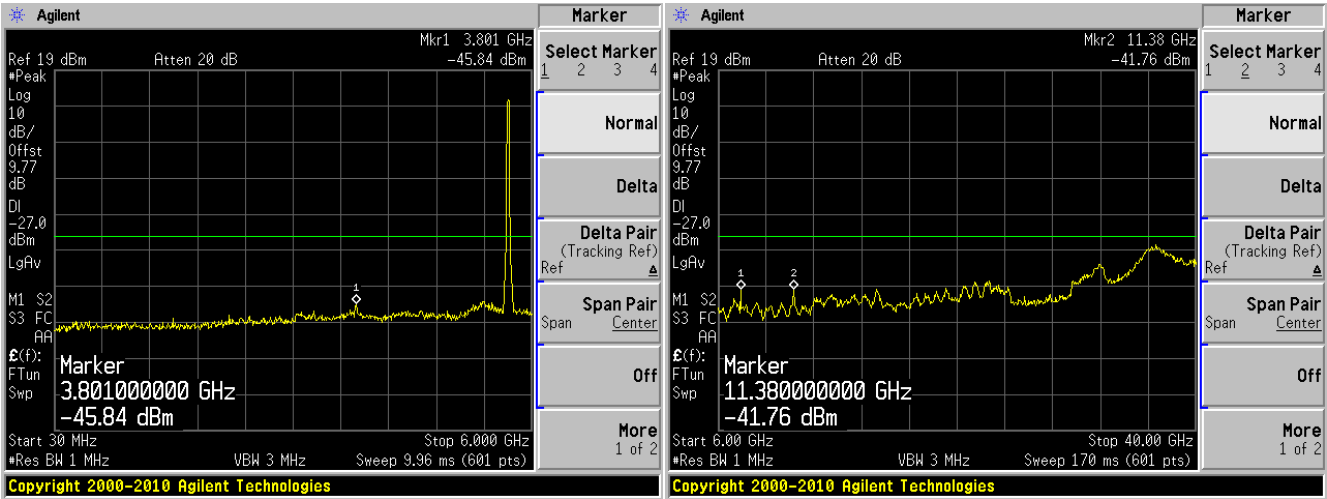
Spurious Emission 2 Average



802.11a, High Channel, 5700 MHz

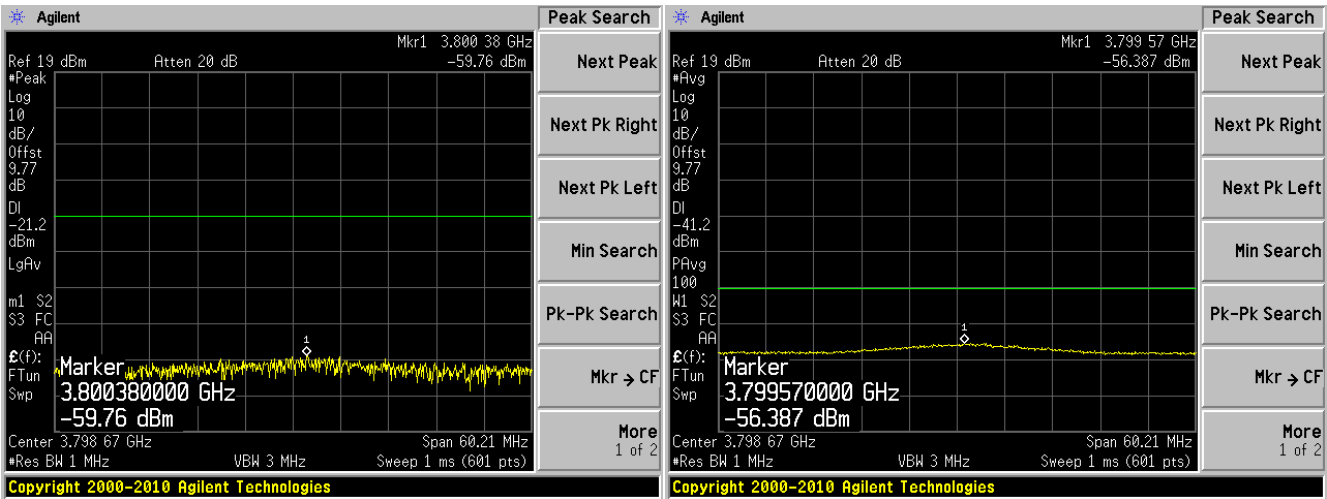
30 MHz – 6 GHz

6 GHz – 40 GHz



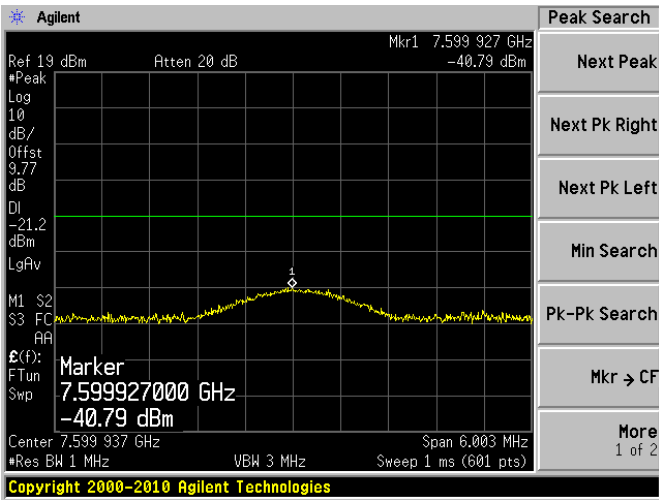
Spurious Emission 1 Peak

Spurious Emission 1 Average

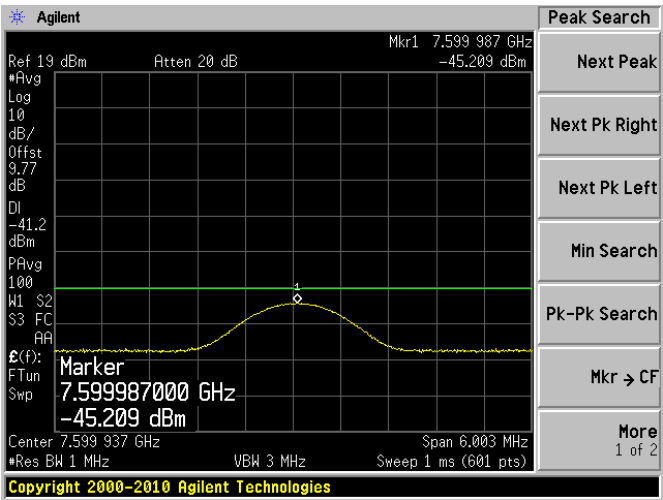




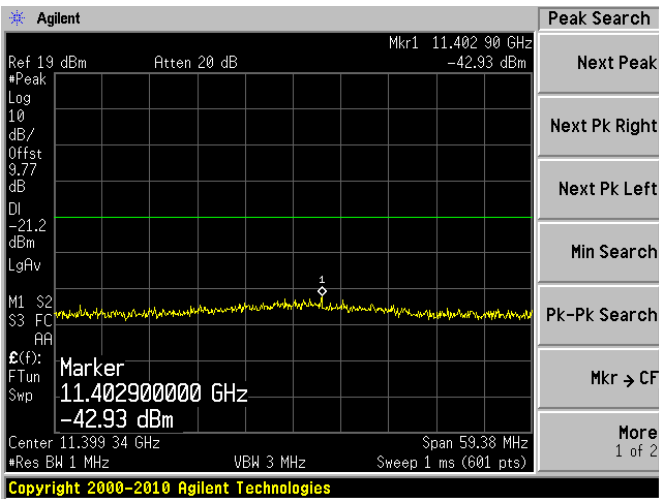
Spurious Emission 2 Peak



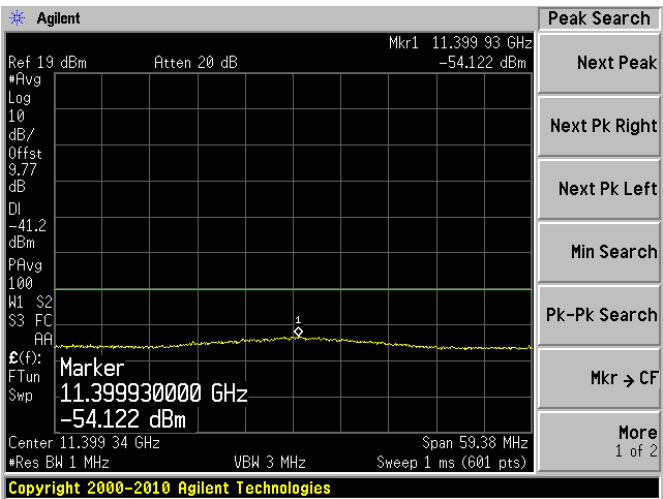
Spurious Emission 2 Average



2<sup>nd</sup> Harmonic Peak



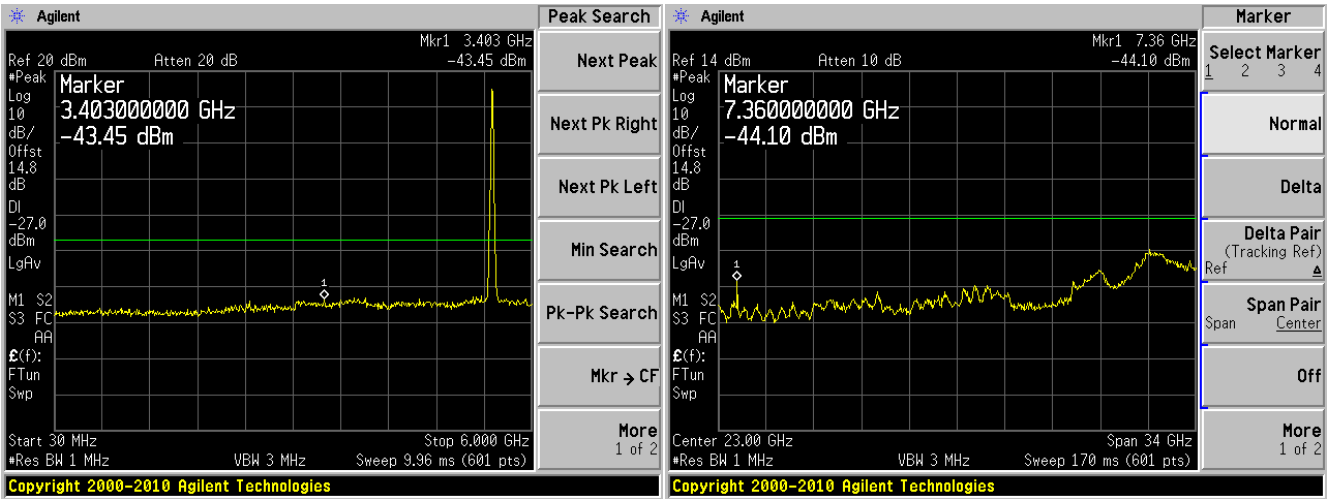
2<sup>nd</sup> Harmonic Average



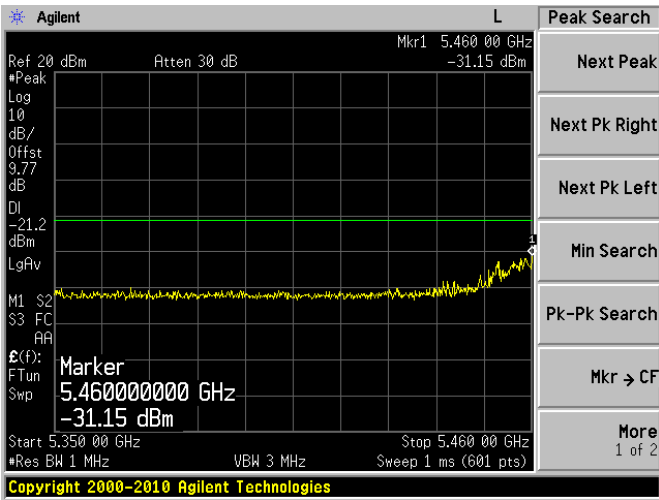
802.11n-HT20, Low Channel, 5500 MHz

30 MHz – 6 GHz

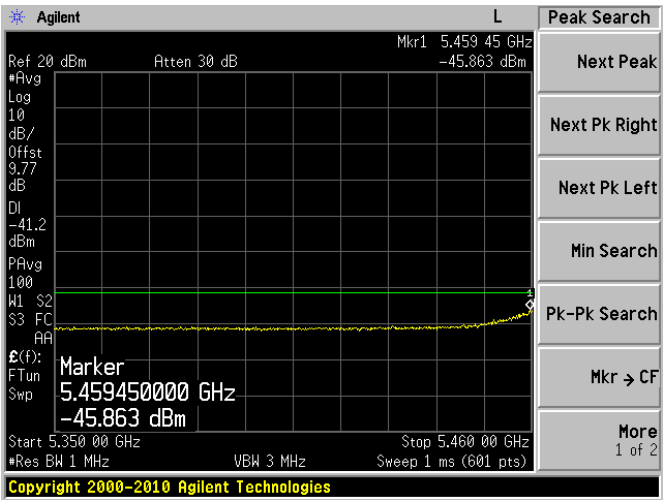
6 GHz – 40 GHz



Restricted Band Edge Peak

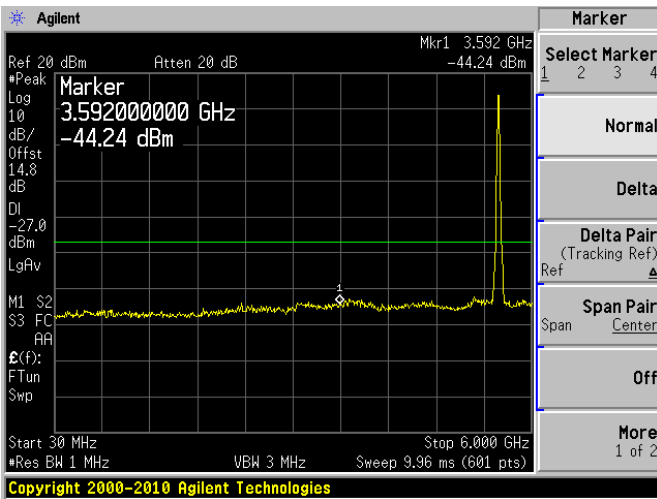


Restricted Band Edge Average

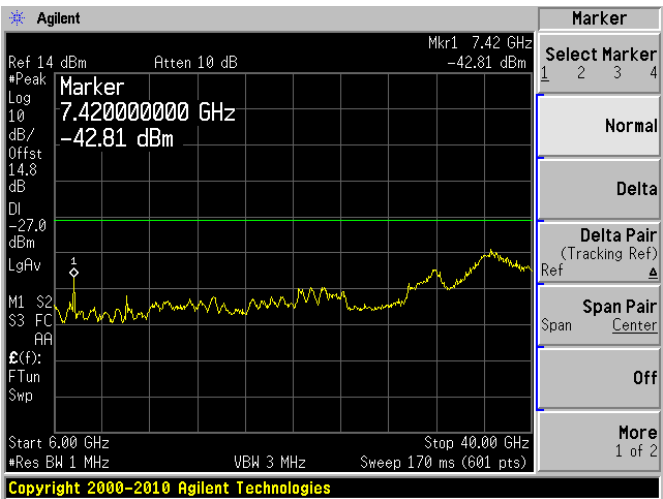


802.11n-HT20, Middle Channel, 5580 MHz

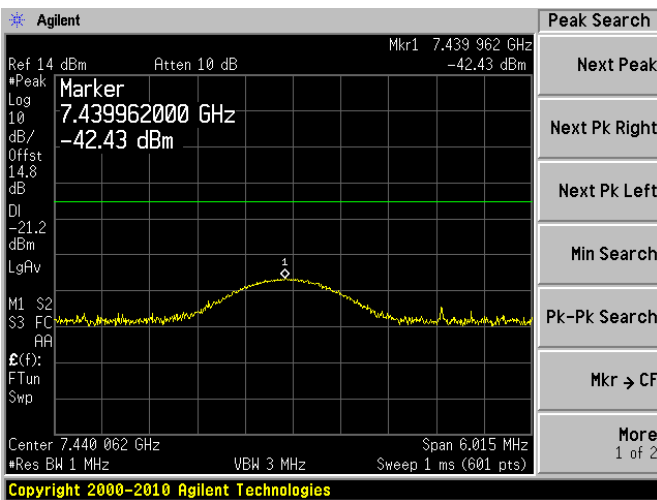
30 MHz – 6 GHz



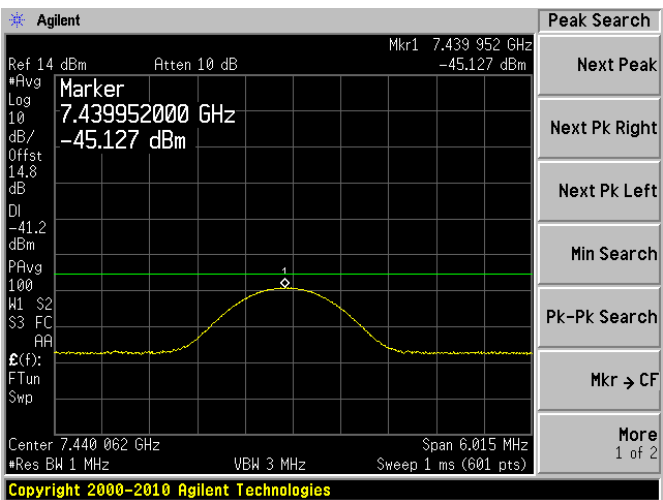
6 GHz – 40 GHz



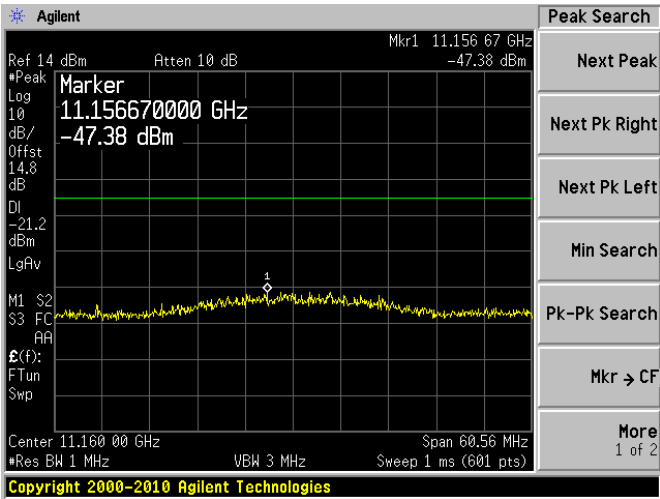
Spurious Emission 1 Peak



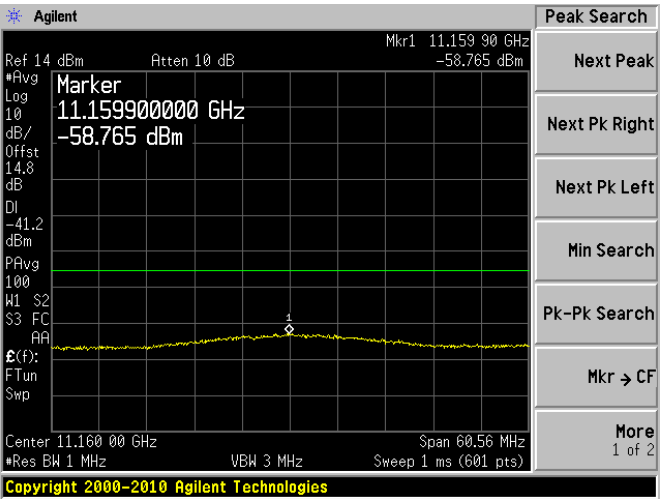
Spurious Emission 1 Average



2<sup>nd</sup> Harmonic Peak

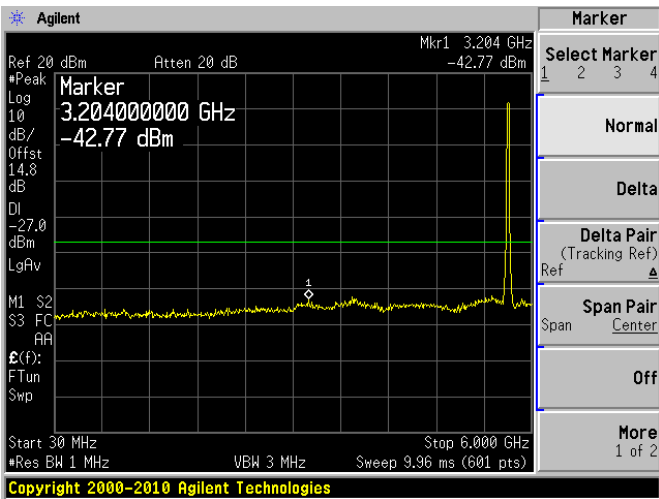


2<sup>nd</sup> Harmonic Average

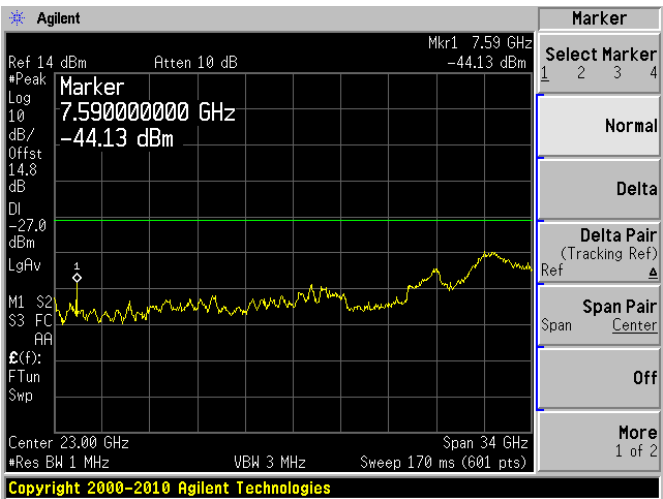


802.11n-HT20, High Channel, 5700 MHz

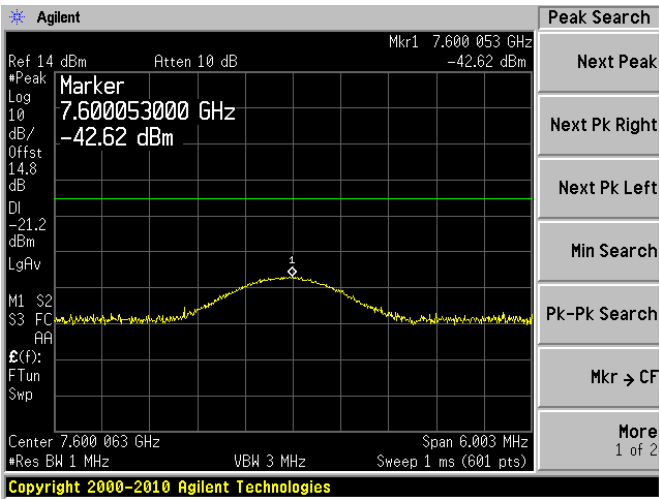
30 MHz – 6 GHz



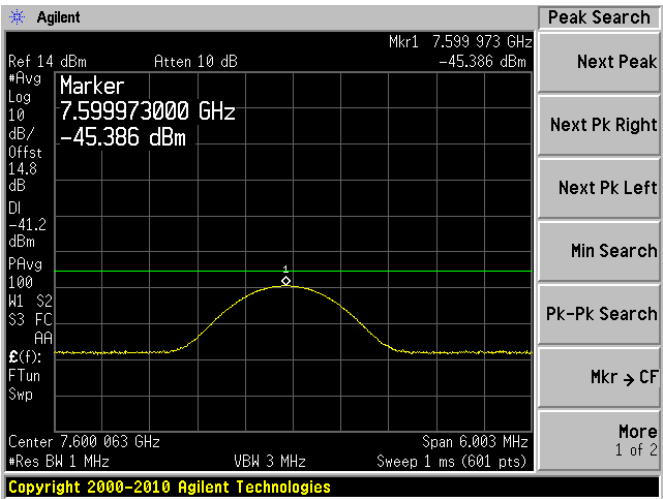
6 GHz – 40 GHz



Spurious Emission 1 Peak

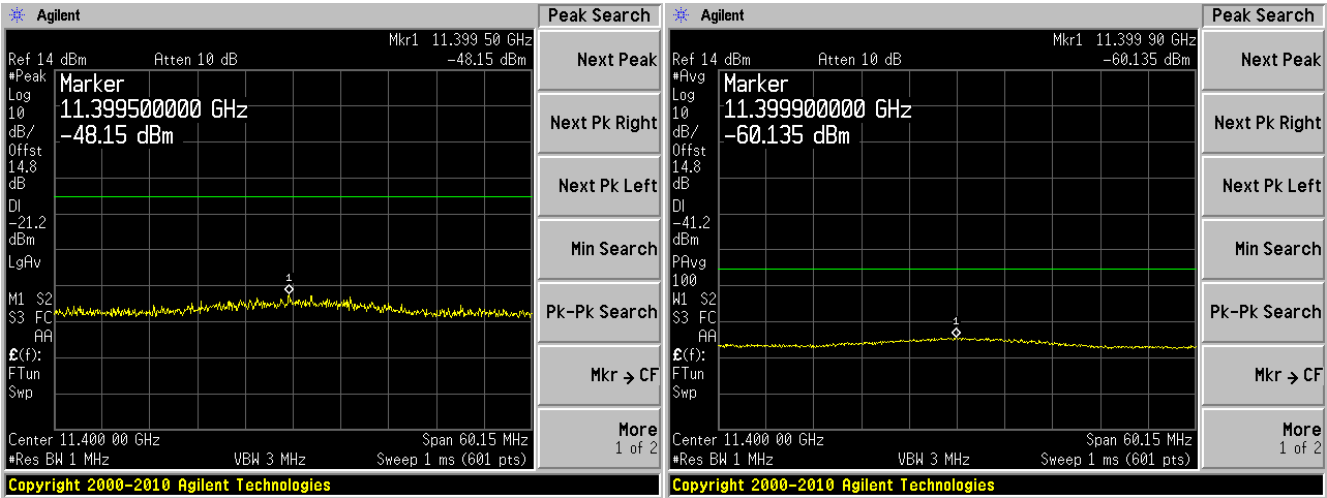


Spurious Emission 1 Average



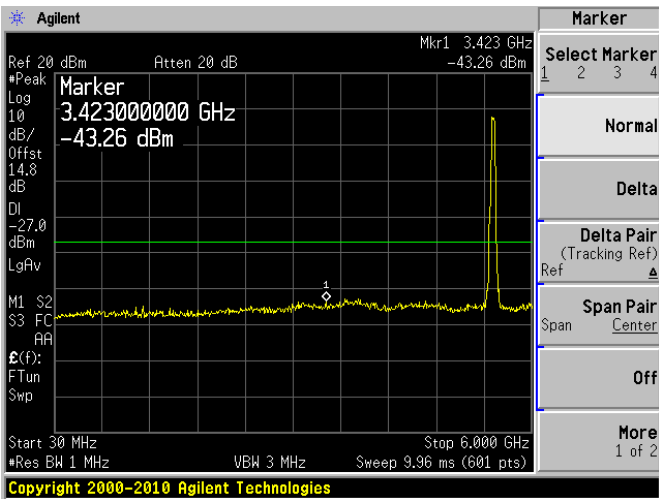
2<sup>nd</sup> Harmonic Peak

2<sup>nd</sup> Harmonic Average

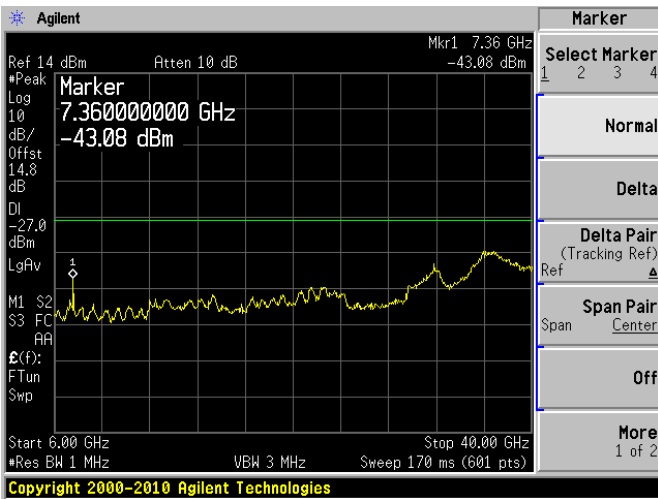


802.11n-HT40, Low Channel, 5510 MHz

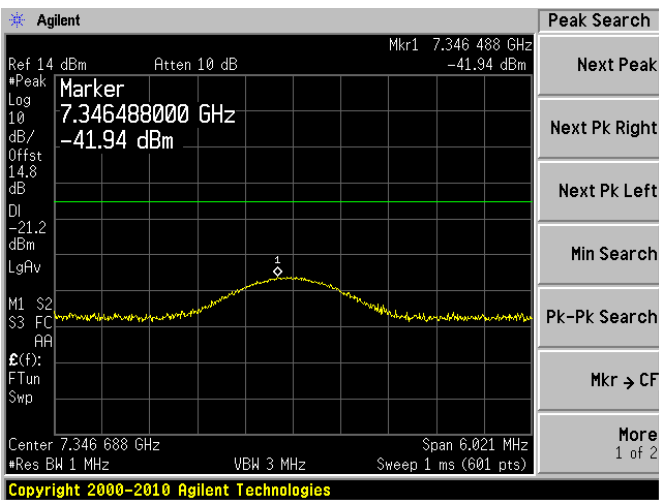
30 MHz – 6 GHz



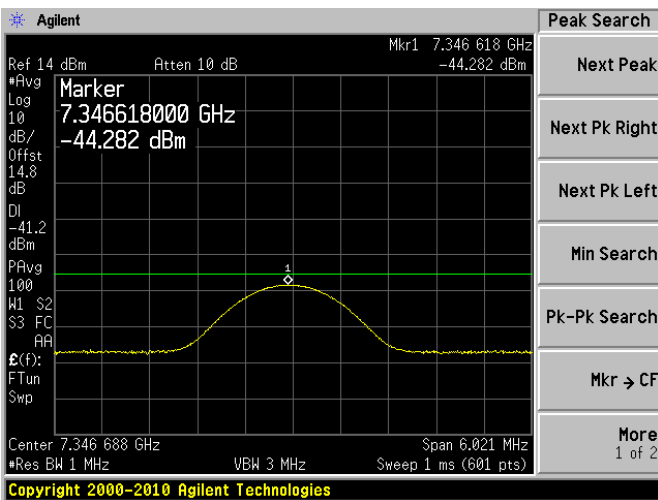
6 GHz – 40 GHz



Spurious Emission 1 Peak

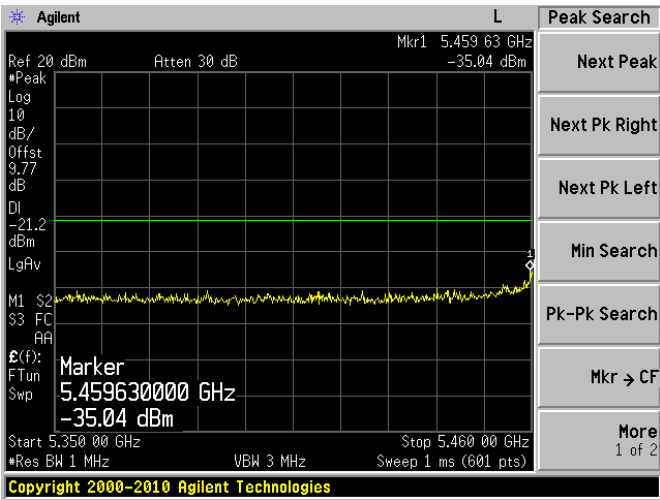


Spurious Emission 1 Average

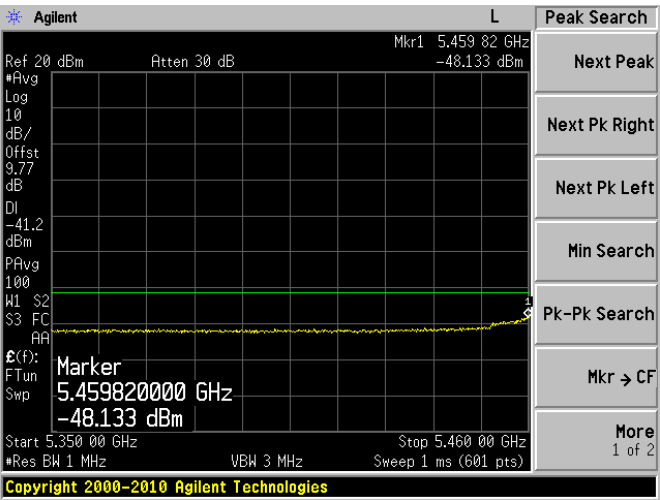




Restricted Band Edge Peak



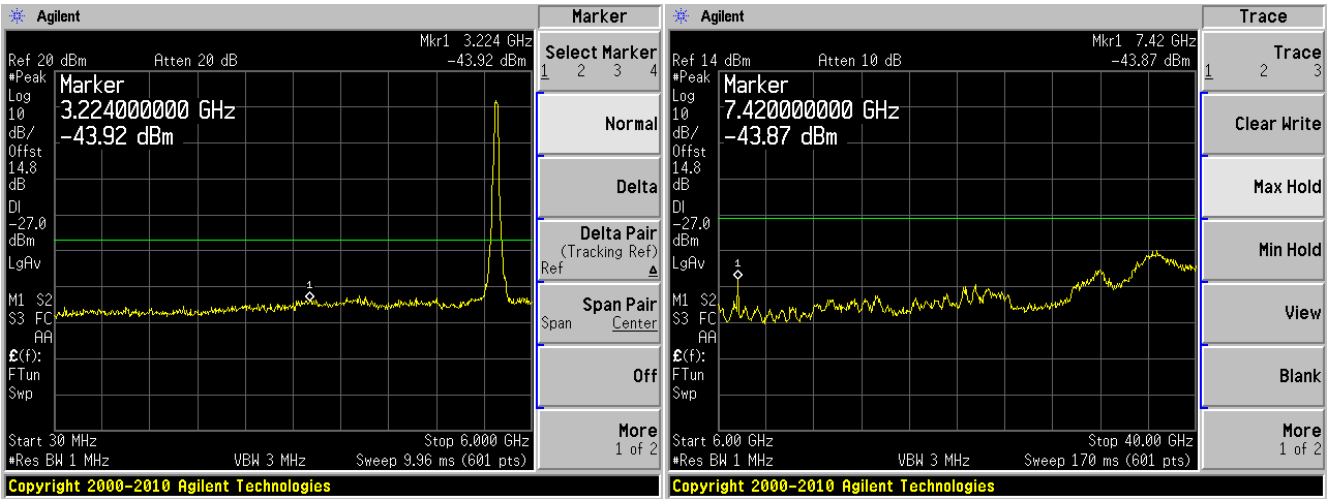
Restricted Band Edge Average



802.11n-HT40, Middle Channel, 5550 MHz

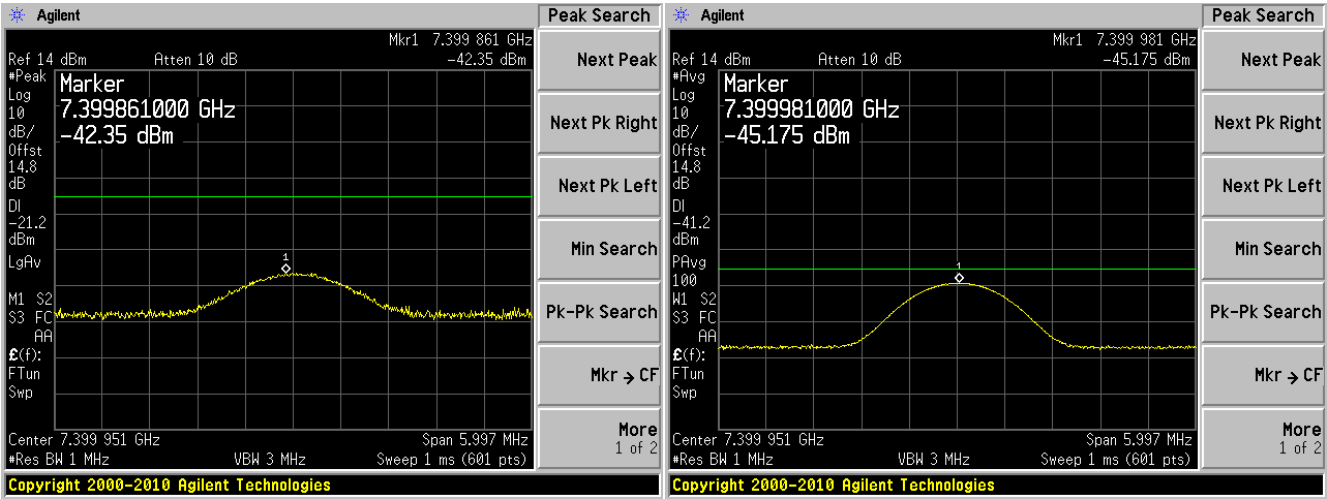
30 MHz – 6 GHz

6 GHz – 40 GHz



Spurious Emission 1 Peak

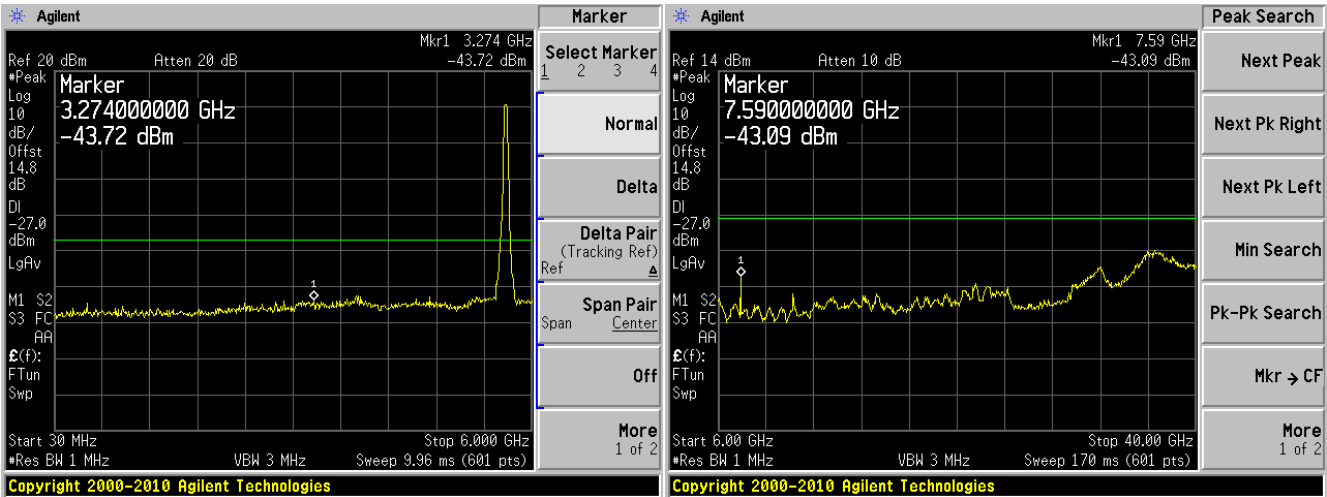
Spurious Emission 1 Average



802.11n-HT40, High Channel, 5670 MHz

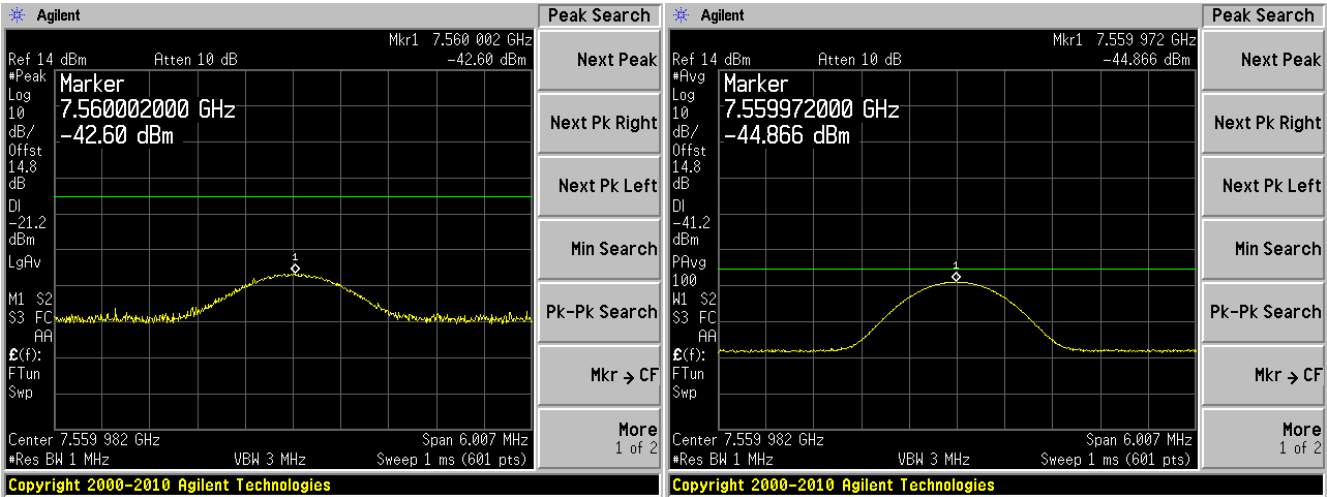
30 MHz – 6 GHz

6 GHz – 40 GHz



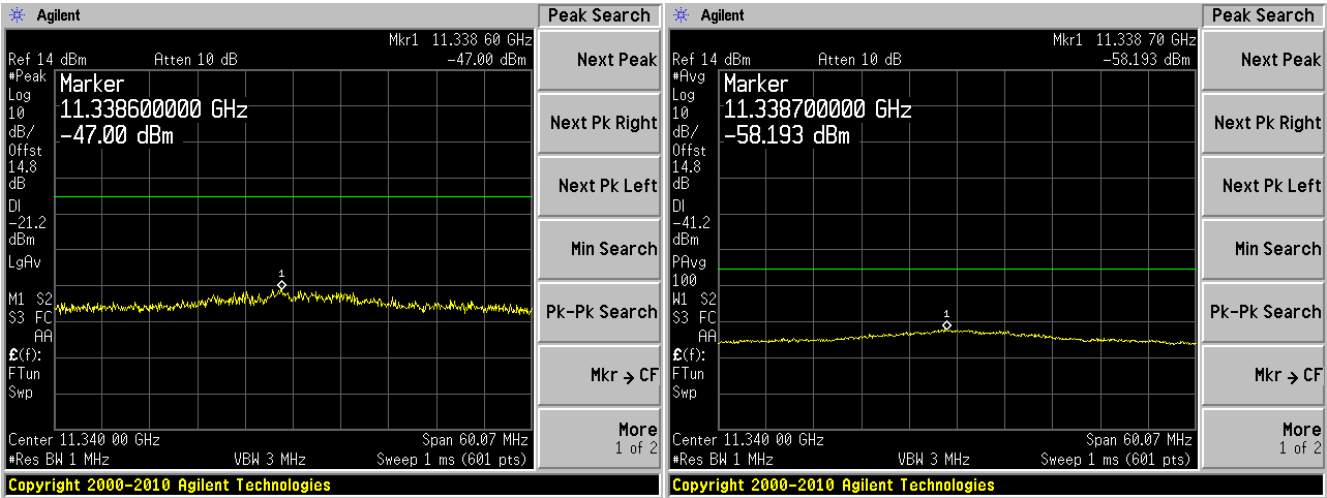
Spurious Emission 1 Peak

Spurious Emission 1 Average



2<sup>nd</sup> Harmonic Peak

2<sup>nd</sup> Harmonic Average



Chip Antenna:

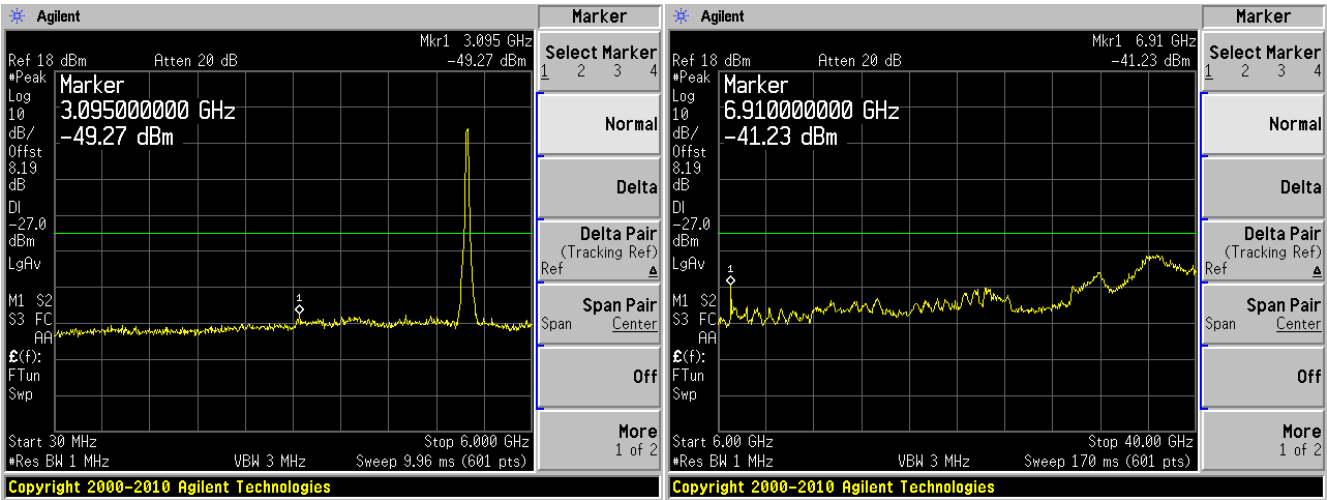
- Note 1: The antenna gain was included in the offset of these plots.
- Note 2: The chip antenna has a lower gain than the dipole antenna (-3.7dBi vs. 2.9dBi); therefore only the channels with different power settings were remeasured; all other plots share with the dipole antenna.

5150-5250 MHz Band

802.11n-HT40, Low Channel, 5190 MHz

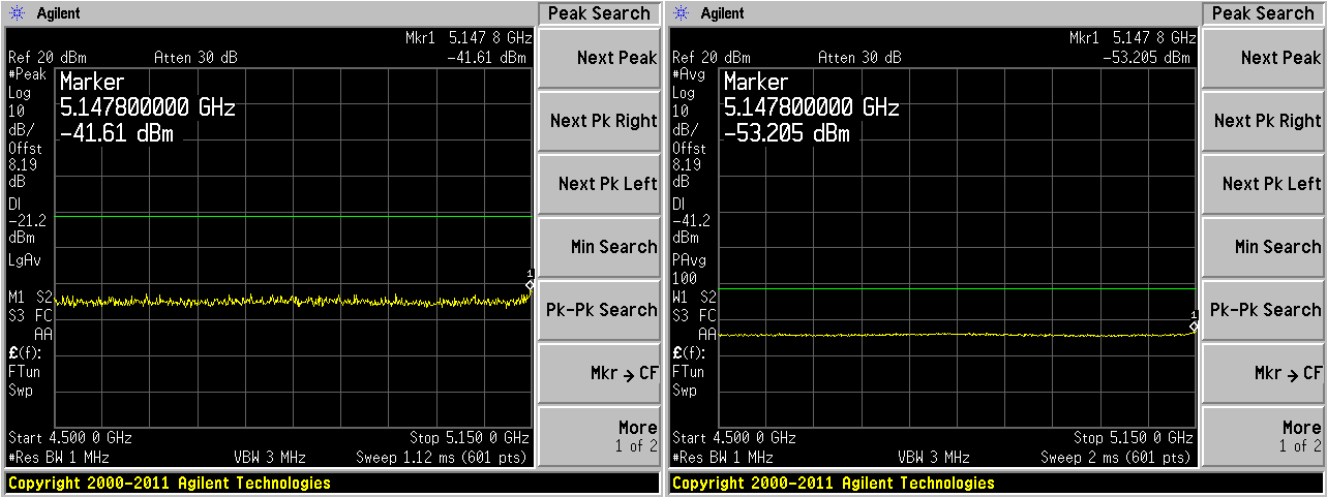
30 MHz – 6 GHz

6 GHz – 40 GHz



Restricted Band Edge Peak

Restricted Band Edge Average

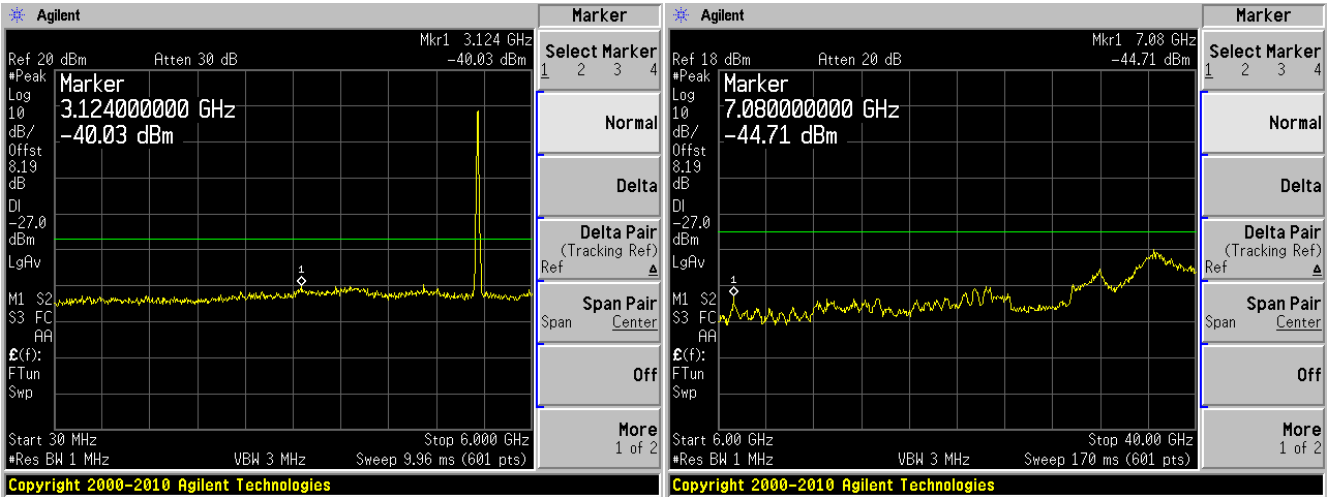


5250-5350 MHz Band

802.11a, High Channel, 5320 MHz

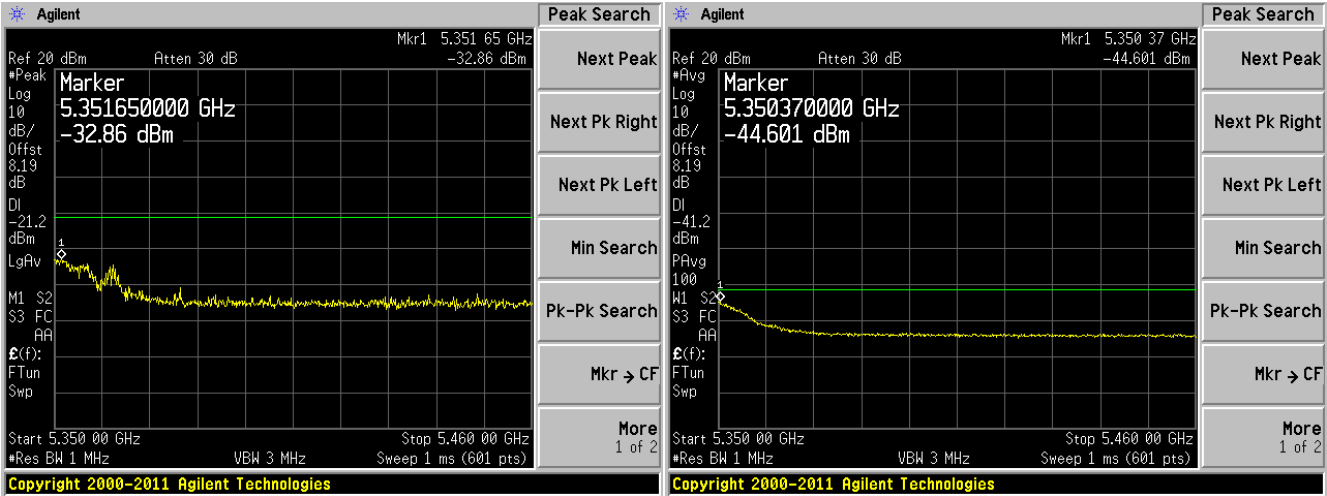
30 MHz – 6 GHz

6 GHz – 40 GHz



Restricted Band Edge Peak

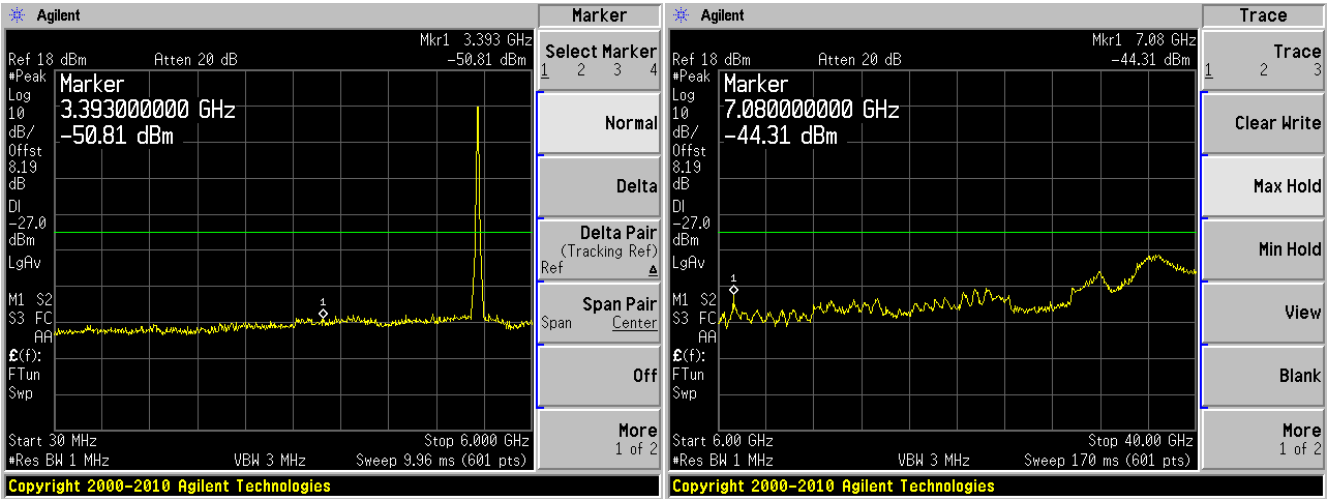
Restricted Band Edge Average



802.11n-HT20, High Channel, 5320 MHz

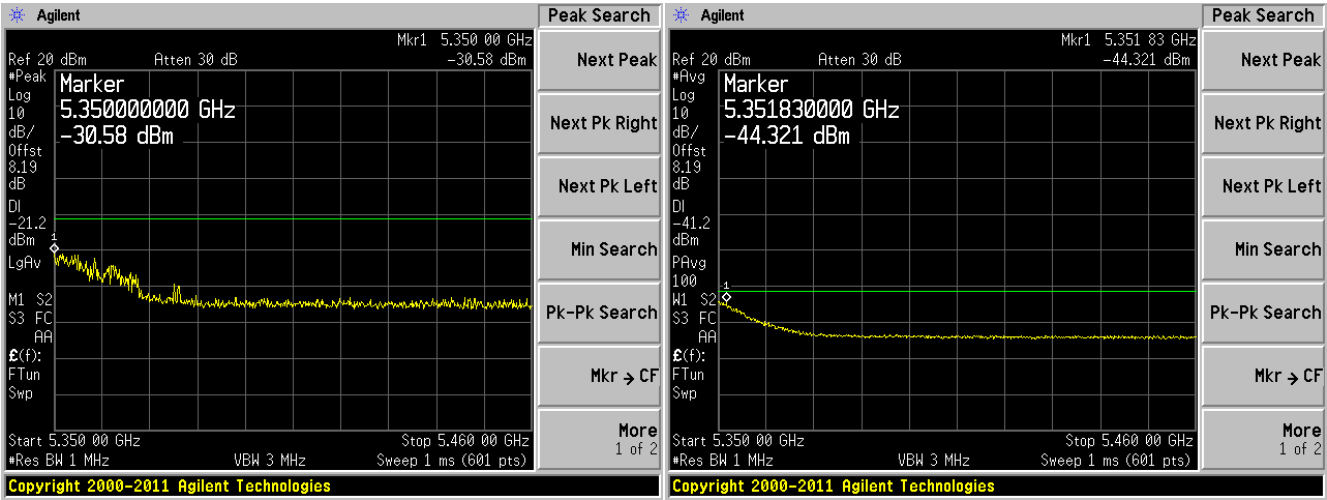
30 MHz – 6 GHz

6 GHz – 40 GHz



Restricted Band Edge Peak

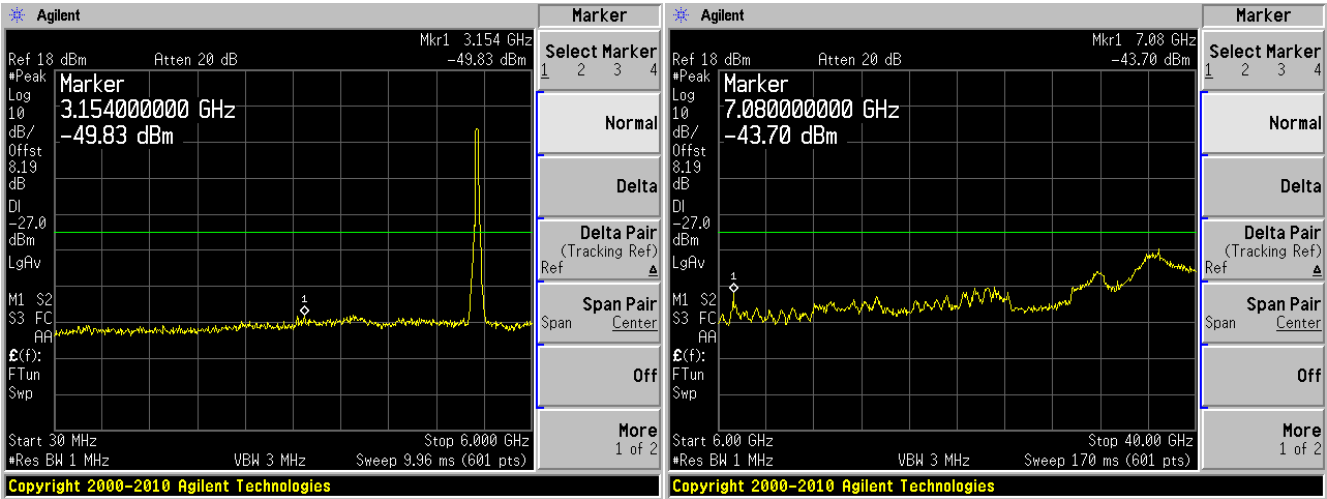
Restricted Band Edge Average



802.11n-HT40, High Channel, 5310 MHz

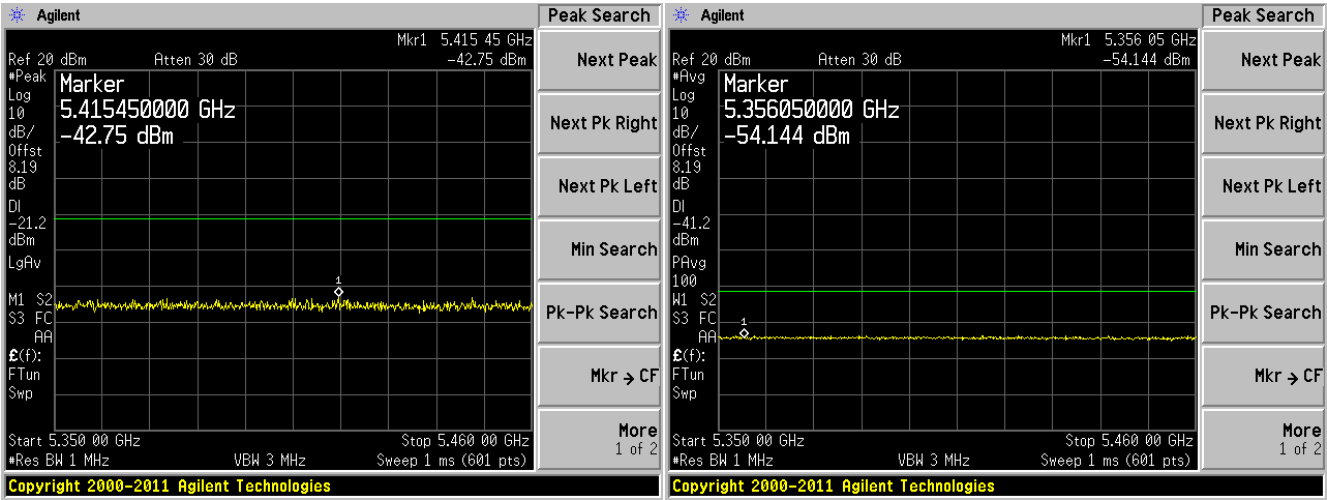
30 MHz – 6 GHz

6 GHz – 40 GHz



Restricted Band Edge Peak

Restricted Band Edge Average



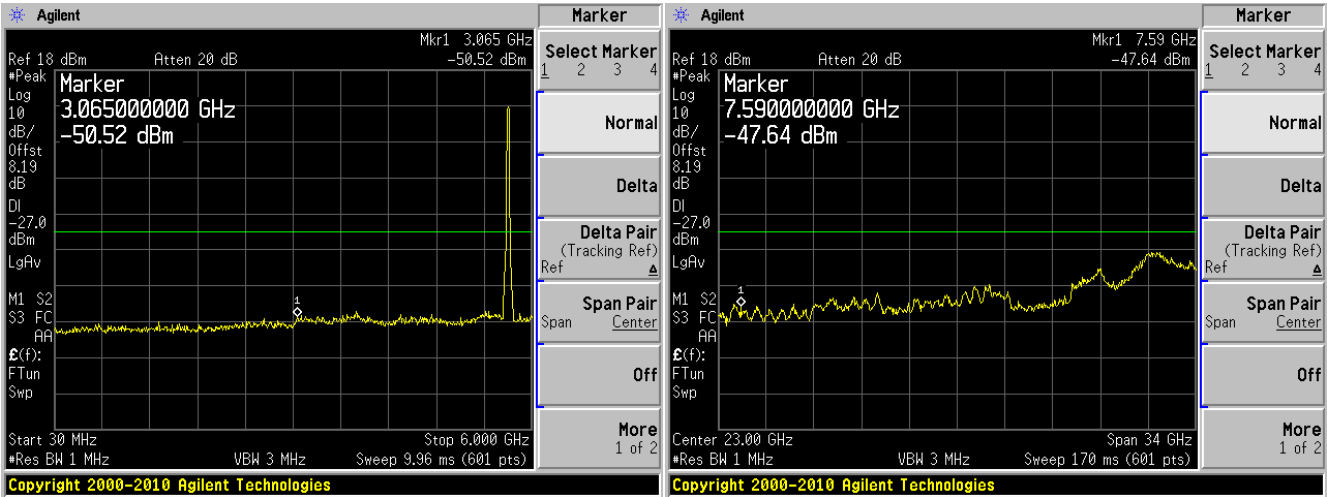


5470-5725 MHz Band

802.11a, High Channel, 5700 MHz

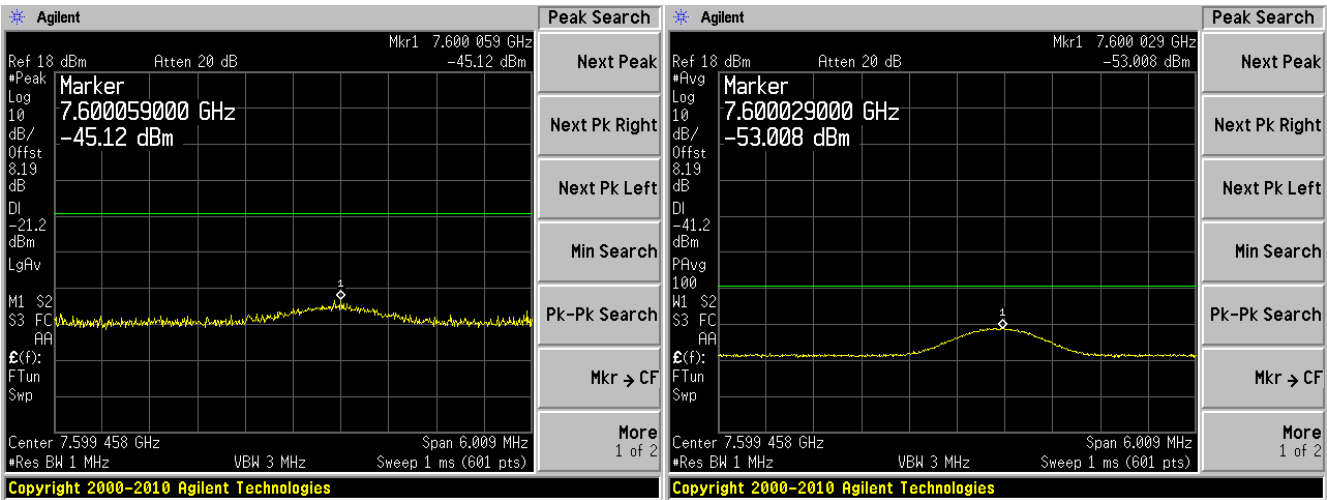
30 MHz – 6 GHz

6 GHz – 40 GHz



Spurious Emission 1 Peak

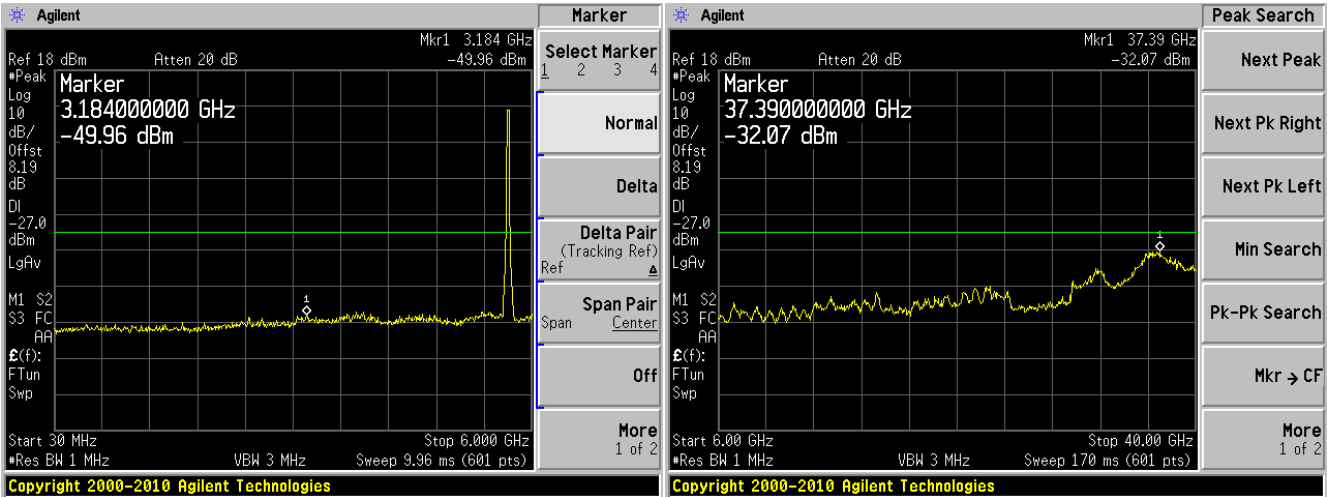
Spurious Emission 1 Average



802.11n-HT20, High Channel, 5700 MHz

30 MHz – 6 GHz

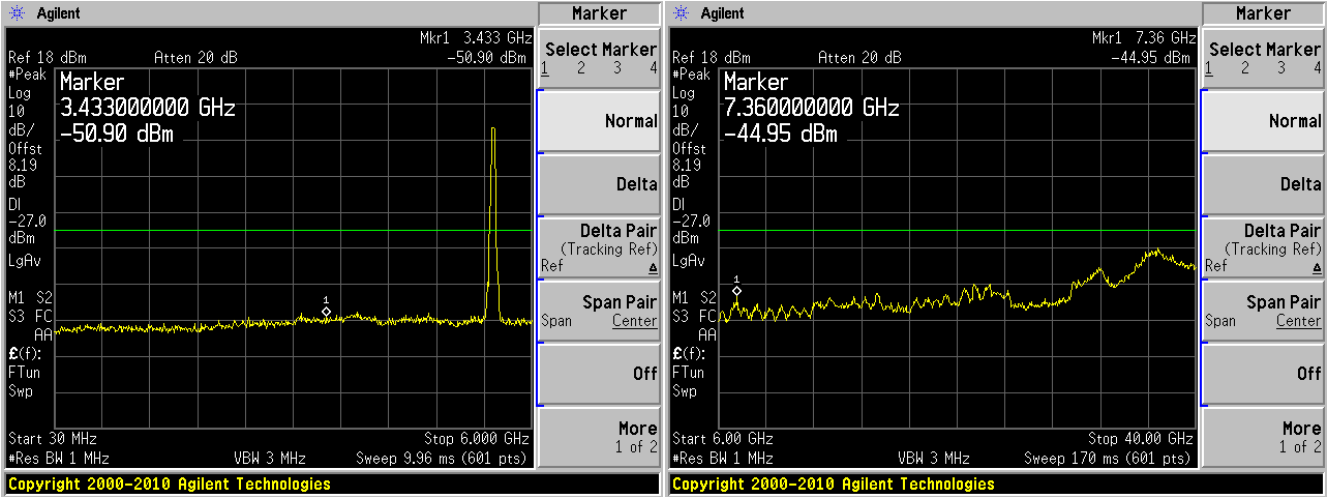
6 GHz – 40 GHz



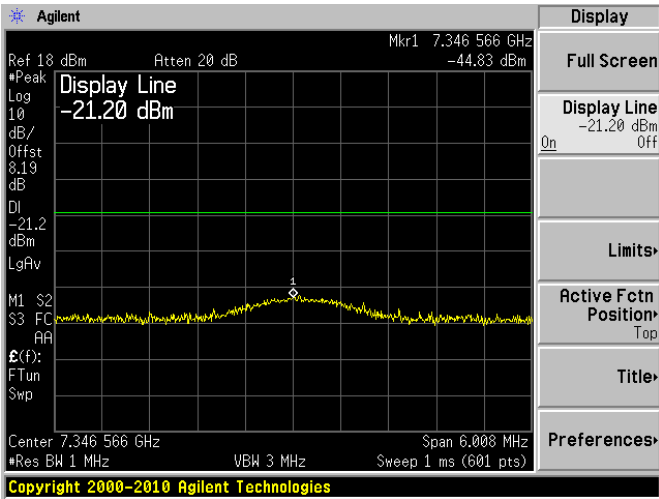
802.11n-HT40, Low Channel, 5510 MHz

30 MHz – 6 GHz

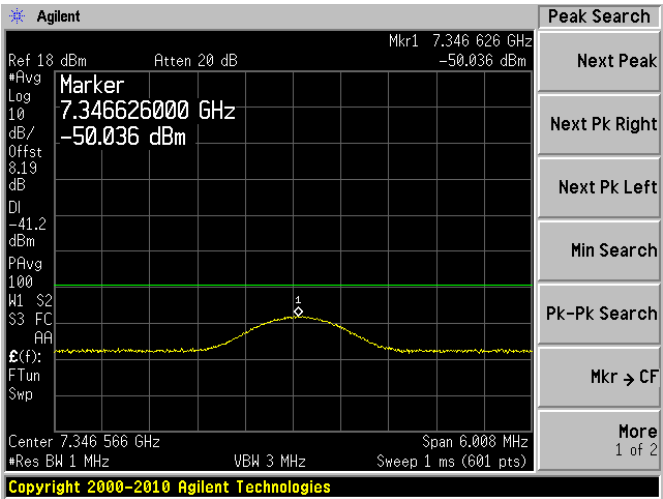
6 GHz – 40 GHz



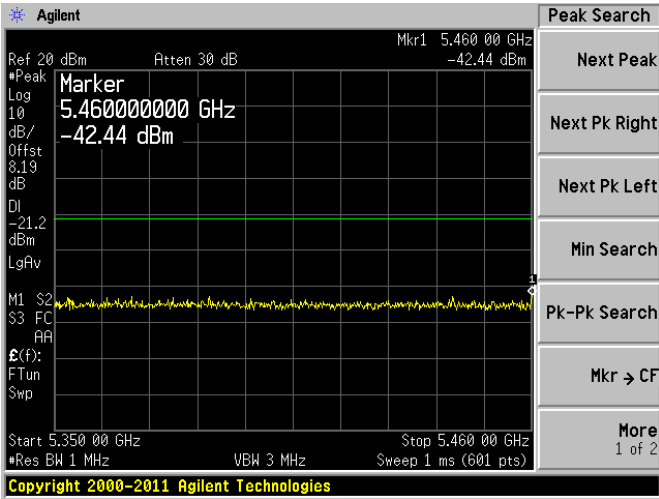
Spurious Emission 1 Peak



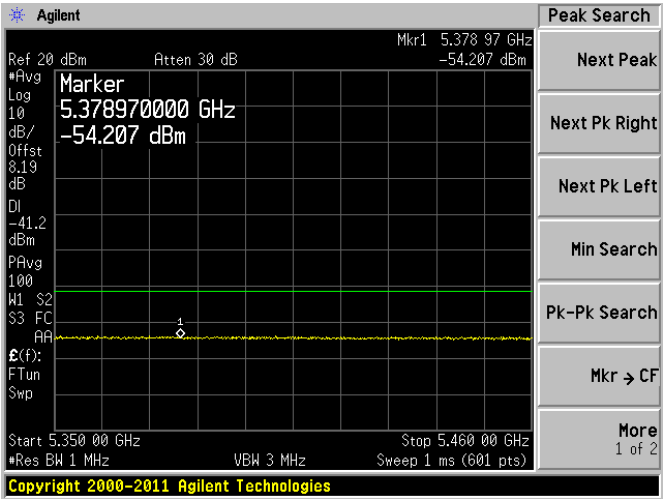
Spurious Emission 1 Average



Restricted Band Edge Peak

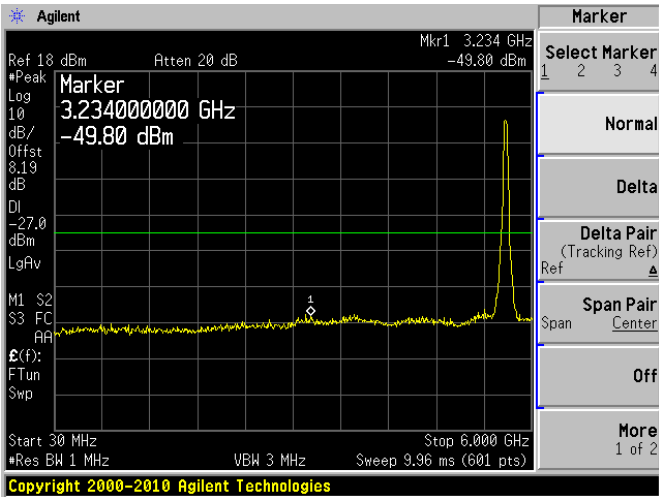


Restricted Band Edge Average

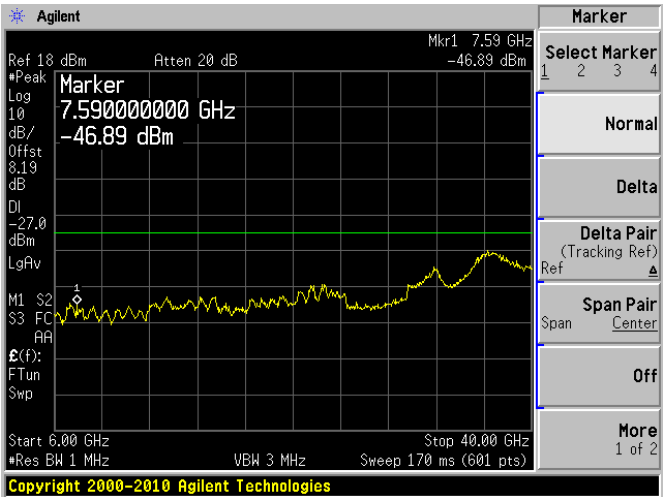


802.11n-HT40, High Channel, 5670 MHz

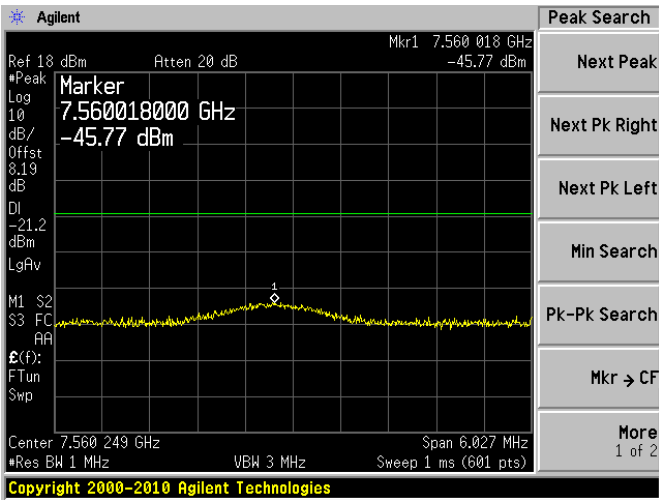
30 MHz – 6 GHz



6 GHz – 40 GHz



Spurious Emission 1 Peak



Spurious Emission 1 Average

