





FCC PART 15.407
IC RSS-210, ISSUE 8, DEC 2010
TEST AND MEASUREMENT REPORT

For

Ruckus Wireless, Inc.

350 West Java Drive,
Sunnyvale, CA 94089, USA

FCC ID: S9GZF7372E
IC: 5912A-ZF7372E

| | |
|--|---|
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| Report Number: <u>R1303042-407W52</u> | |
| Report Date: <u>2013-04-23</u> | |
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DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|------------------------|----------------------|--------------------------------|-------------------------|
| 0 | R1303042-407W52 | Original Report | 2013-04-23 |

1 General Description

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Ruckus Wireless, Inc.*, and their product model: *ZoneFlex 7372E* with FCC ID: S9GZF7372E, IC: 5912A-ZF7372E or the “EUT” as referred to in this report. The EUT is a 2x2 MIMO 802.11 a/b/g/n WLAN Access Point.

1.2 Mechanical Description of EUT

The EUT measures approximately 160 cm (L) x 160 cm (W) x 35 cm (H) and weighs 334.5g.

The test data gathered are from typical production sample, serial number: 093 and 141 provided by the manufacturer

1.3 Objective

This report is prepared on behalf of *Ruckus Wireless, Inc.*, in accordance with FCC CFR47 §15.407 and IC RSS-210 Issue 8, Dec 2010.

The objective is to determine compliance with FCC Part 15.407 and IC RSS-210 rules for Antenna Requirements, Conducted Emissions, Occupied Bandwidth, Output Power, Power Spectral Density, Radiated and Conducted Spurious Emissions, and Band Edge. Please refer to the detail antenna list in the antenna requirement section.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS with FCC ID: S9GZF7372E, IC: 5912A-ZF7372E

1.5 Test Methodology

FCC CFR 47 Part2, Part15.407 and IC RSS-210 Issue 8, Dec 2010.

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 ± 2.0 dB for Conducted Emissions tests and ± 4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BAEL 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

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 C63.4-2003, 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.

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 St Bernard Art, was provided by Ruckus Wireless Inc., and was verified 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 |
|--------------|-------------|--|--------------------|
| Ruckus | Motherboard | St. Bernard ASM 120 11214 001 REV A | 7115110152012CN02E |

2.7 Interface Ports and Cables

| Cable Description | Length (m) | To | From |
|-------------------|------------|--------|------|
| RF Cable | <1.0 | PSA | EUT |
| RJ 45 Cable | <1.0 | Laptop | EUT |

2.8 Power Supply List and Details

| Manufacturer | Description | Model | Part Number |
|---------------------|---------------------------------|--------------------------|--------------------|
| Ruckus | Switching Adapter | ADS-18C-12N 12018GPCU | 740-64129-011 |
| Ruckus | POE | NPE-5818 | 740-64157-001 |
| Ruckus | POE Switch-Mode Power Supply | 8A-201WU48 | 740-64125-010 |

3 Summary of Test Results

| FCC & IC Rules | Description of Test | Result |
|---|---|-----------|
| FCC §15.407(f), §2.1091 IC RSS-102 | RF Exposure | Compliant |
| FCC §15.203 IC RSS-Gen §7.1.2 | Antenna Requirement | Compliant |
| FCC §15.207 IC RSS-Gen §7.2.4 | AC Power Line Conducted Emissions | Compliant |
| FCC §15.209(a), 15.407(b) IC RSS-210 §A9.2 | Spurious Radiated Emissions | Compliant |
| FCC §15.407(a) IC RSS-210 §A9.2 | 26 dB and 99% Emission Bandwidth | Compliant |
| FCC §407(a)(1) IC RSS-210 §A9.2 | Peak Output Power Measurement | Compliant |
| FCC §2.1051, §15.407(b) IC RSS-210 §A9.2 | Out of Band Emissions | Compliant |
| FCC §15.407(a)(1) IC RSS-210 §A9.2 | Power Spectral Density | Compliant |
| FCC §15.407(a)(6) | Peak Excursion Ratio | Compliant |
| IC RSS-210 §2.3 IC RSS-Gen §6.1 | Receiver Spurious Radiated Emissions | Compliant |
| FCC §2.1051, §15.407(b) IC RSS-210 §A9.2 | Spurious Emissions at Antenna Terminals | Compliant |

4 FCC §15.407(f), §2.1091 & IC RSS-102 - 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 ²) | 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 ²) | 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

Before equipment certification is granted, the procedure of IC RSS-102 must be followed concerning the exposure of humans to RF fields.

According to IC RSS-102 Issue 2 section 4.1, RF limits used for general public will be applied to the EUT.

| Frequency Range (MHz) | Electric Field (V/m rms) | Magnetic Field (A/m rms) | Power Density (W/m ²) | Time Averaging (min) |
|-----------------------|--------------------------|--|-----------------------------------|---------------------------|
| 0.003 - 1 | 280 | 2.19 | - | 6 |
| 1 - 10 | 280 / f | 2.19 / f | - | 6 |
| 10 - 30 | 28 | 2.19 / f | - | 6 |
| 30 - 300 | 28 | 0.073 | 2* | 6 |
| 300 - 1 500 | 1.585 f ^{0.5} | 0.0042 f ^{0.5} | f / 150 | 6 |
| 1 500 - 15 000 | 61.4 | 0.163 | 10 | 6 |
| 15 000 - 150 000 | 61.4 | 0.163 | 10 | 616000 / f ^{1.2} |
| 150 000- 300 000 | 0.158 f ^{0.5} | 4.21 x 10 ⁻⁴ f ^{0.5} | 6.67 x 10 ⁻⁵ f | 616000 / f ^{1.2} |

Note: f is frequency in MHz

* = Power density limit is applicable at frequencies greater than 100 MHz

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

Dipole Antenna:

W52 Band:

| | |
|---|--------------|
| <u>Maximum peak output power at antenna input terminal (dBm):</u> | <u>15.95</u> |
| <u>Maximum peak output power at antenna input terminal (mW):</u> | <u>39.36</u> |
| <u>Prediction distance (cm):</u> | <u>20</u> |
| <u>Prediction frequency (MHz):</u> | <u>5230</u> |
| <u>Maximum Antenna Gain, typical (dBi):</u> | <u>3.7</u> |
| <u>Maximum Antenna Gain (numeric):</u> | <u>2.34</u> |
| <u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u> | <u>0.018</u> |
| <u>Power density of prediction frequency at 20.0 cm (W/m²):</u> | <u>0.18</u> |
| <u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u> | <u>1.0</u> |
| <u>MPE limit for uncontrolled exposure at prediction frequency (W/m²):</u> | <u>10</u> |

Patch Antenna:

W52 Band:

| | |
|---|--------------|
| <u>Maximum peak output power at antenna input terminal (dBm):</u> | <u>15.95</u> |
| <u>Maximum peak output power at antenna input terminal (mW):</u> | <u>39.36</u> |
| <u>Prediction distance (cm):</u> | <u>20</u> |
| <u>Prediction frequency (MHz):</u> | <u>5230</u> |
| <u>Maximum Antenna Gain, typical (dBi):</u> | <u>5</u> |
| <u>Maximum Antenna Gain (numeric):</u> | <u>3.16</u> |
| <u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u> | <u>0.025</u> |
| <u>Power density of prediction frequency at 20.0 cm (W/m²):</u> | <u>0.25</u> |
| <u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u> | <u>1.0</u> |
| <u>MPE limit for uncontrolled exposure at prediction frequency (W/m²):</u> | <u>10</u> |

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

5 FCC §15.203 & IC RSS-Gen §7.1.2 – Antenna Requirements

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.

As per IC RSS-Gen §7.1.2: Transmitter Antenna

A transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

5.2 Antenna List

| Manufacturers | Models/Name | Antenna Gain (dBi) @ 5.2 GHz |
|---------------------------------|--|------------------------------|
| Laird Technologies, Inc. | WTS2450-RPSMA/ MAF94110 | 3.7 |
| Mars Antennas & RF Systems Ltd. | Dual Band Small Sector Antenna 120° | 2 X 5 dBi |

Note: The power setting was controlled by manufacturer with different antenna configuration. The power setting of the different antenna will be set with the corresponded value and no more than the level reported.

The dipole antennas and patch antenna consist of SMA connectors with less than 6 dBi gain; therefore, it complies with the antenna requirement. Please refer to the internal photos.

6 FCC §15.207 & IC RSS-Gen §7.2.4 - AC Power Line Conducted Emissions

6.1 Applicable Standards

As per FCC §15.207 and IC RSS-Gen §7.2.4 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 μ 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 (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 C63.4-2003 measurement procedure. The specification used was FCC §15.207 and IC RSS-Gen §7.2.4 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

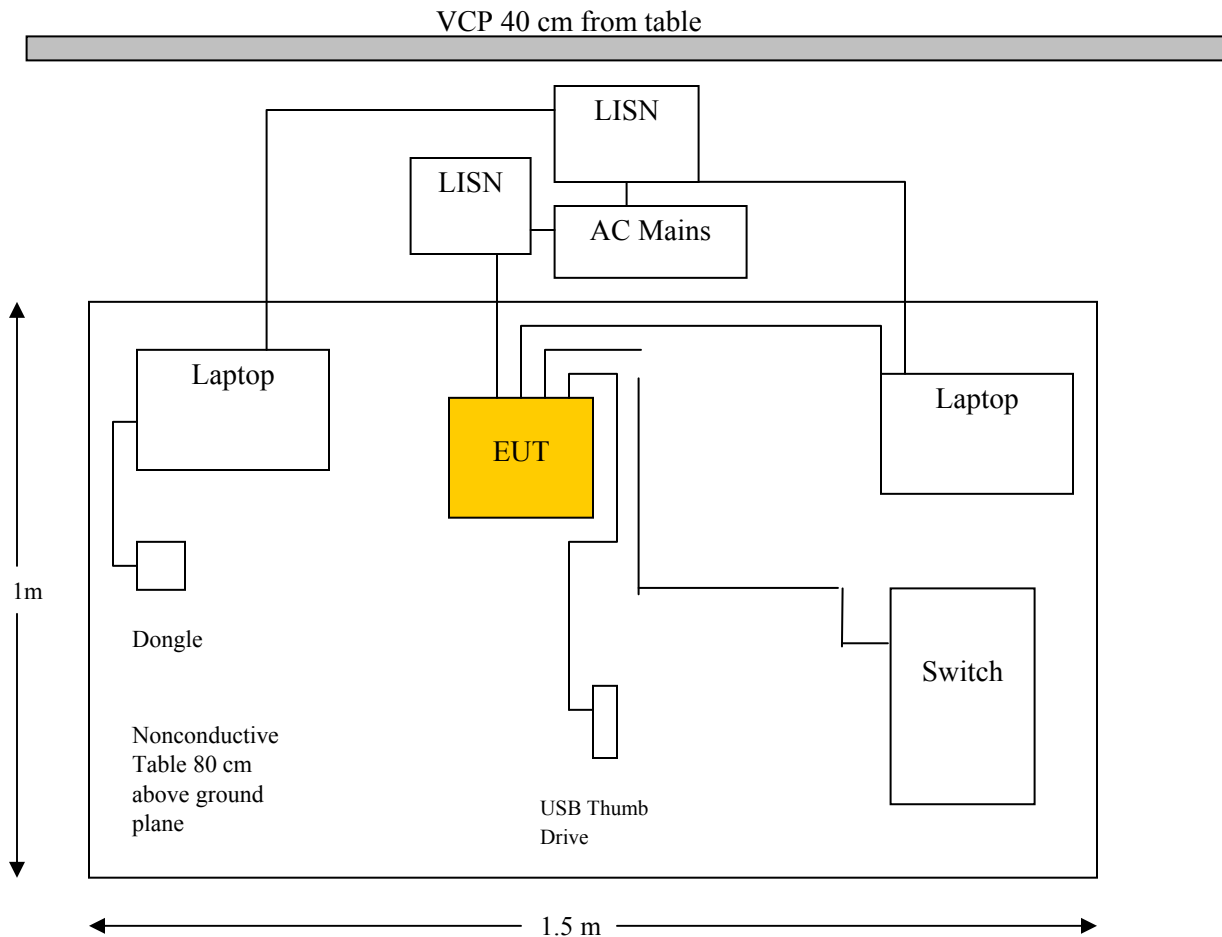
During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-2.

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".

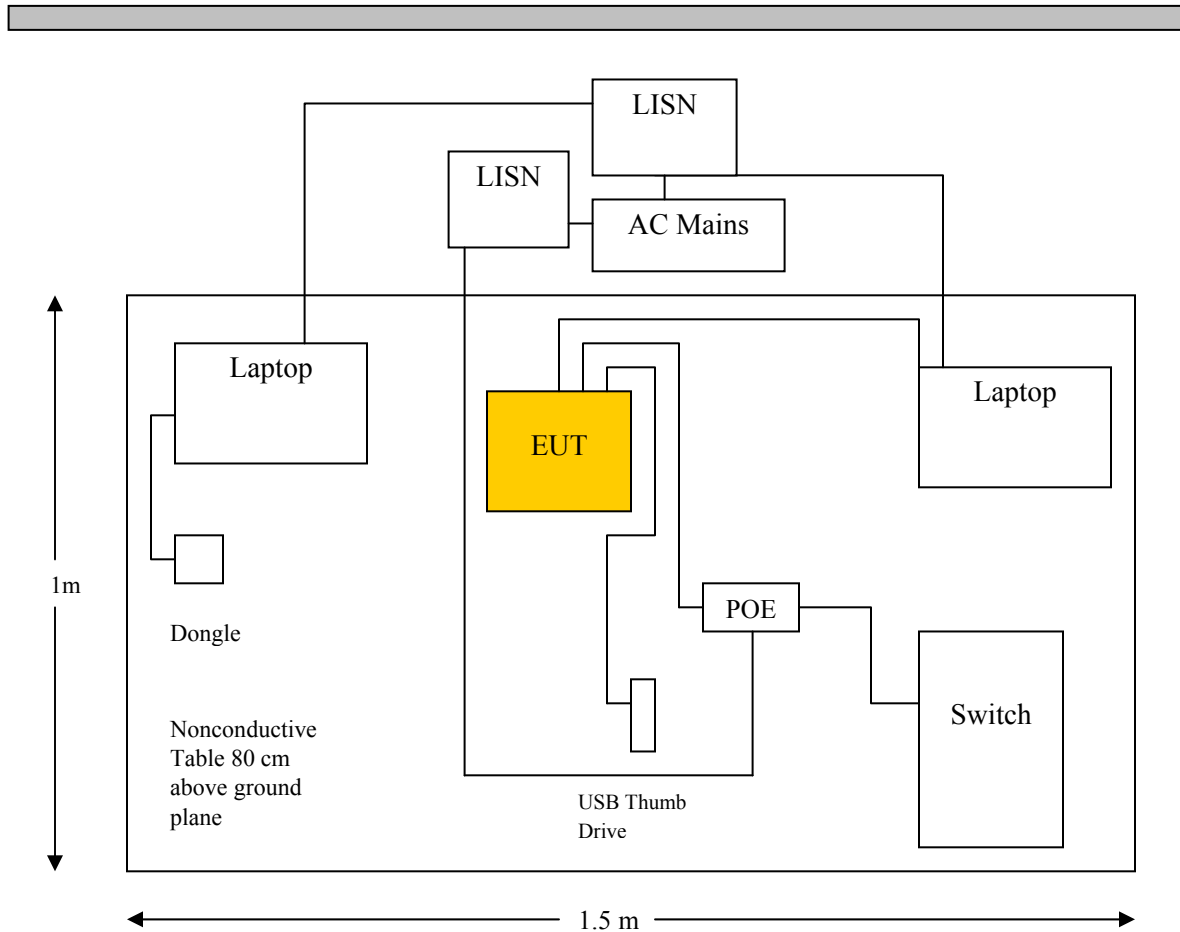
6.4 Test Setup Block Diagram

AC/DC Adaptor:



POE:

VCP 40 cm from table



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:

$$CA = Ai + CL + Atten$$

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:

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

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 | 2012-04-18 | 1 year |
| Solar Electronics | LISN | 9252-R-24-BNC | 511205 | 2012-06-25 | 1 year |
| TTE | Filter, High Pass | H9962-150K-50-21378 | K7133 | 2012-05-30 | 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: | 21 °C |
| Relative Humidity: | 51% |
| ATM Pressure: | 101.42 kPa |

The testing was performed by Bryan Smith on 2012-09-27 in 5 m chamber 2.

6.8 Summary of Test Results

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

Transmitting Mode: Worst case with both 2.4GHz and 5GHz operating:

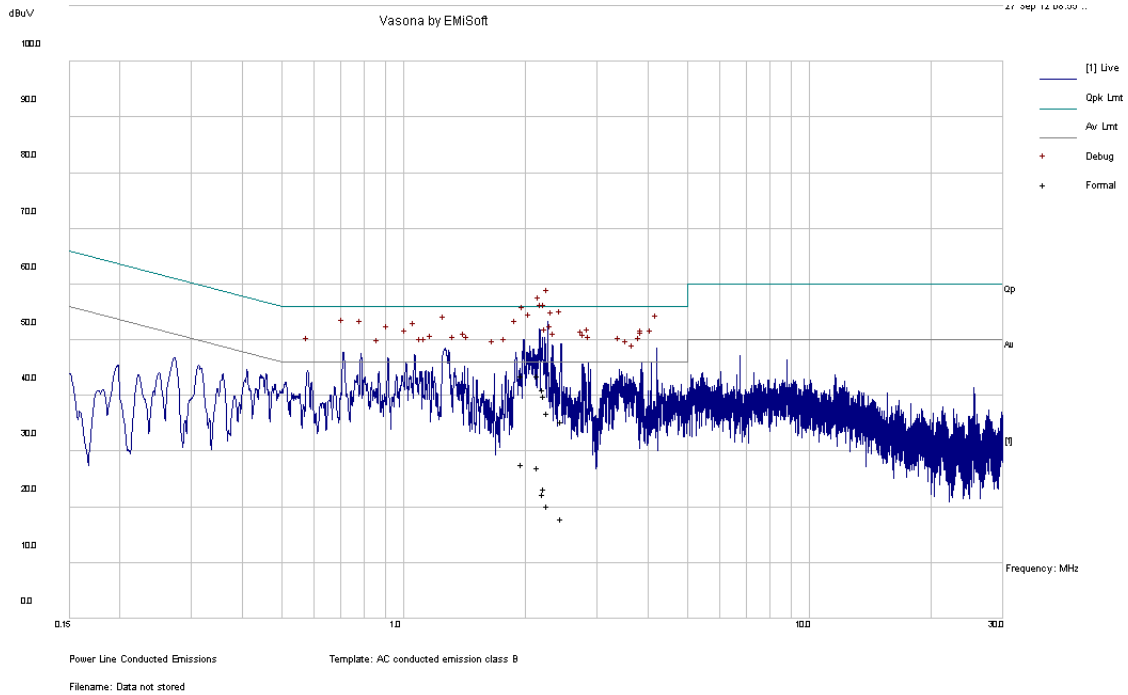
| Connection: 120 V/60 Hz, AC | | | |
|-----------------------------|-----------------|--------------------------|-------------|
| Margin (dB) | Frequency (MHz) | Conductor (Line/Neutral) | Range (MHz) |
| -10.10 | 2.033856 | Neutral | 0.15-30 |

6.9 Conducted Emissions Test Plots and Data

Please refer to the following tables and plots.

Transmitting Mode: Worst case with both 2.4 GHz and 5 GHz operating:

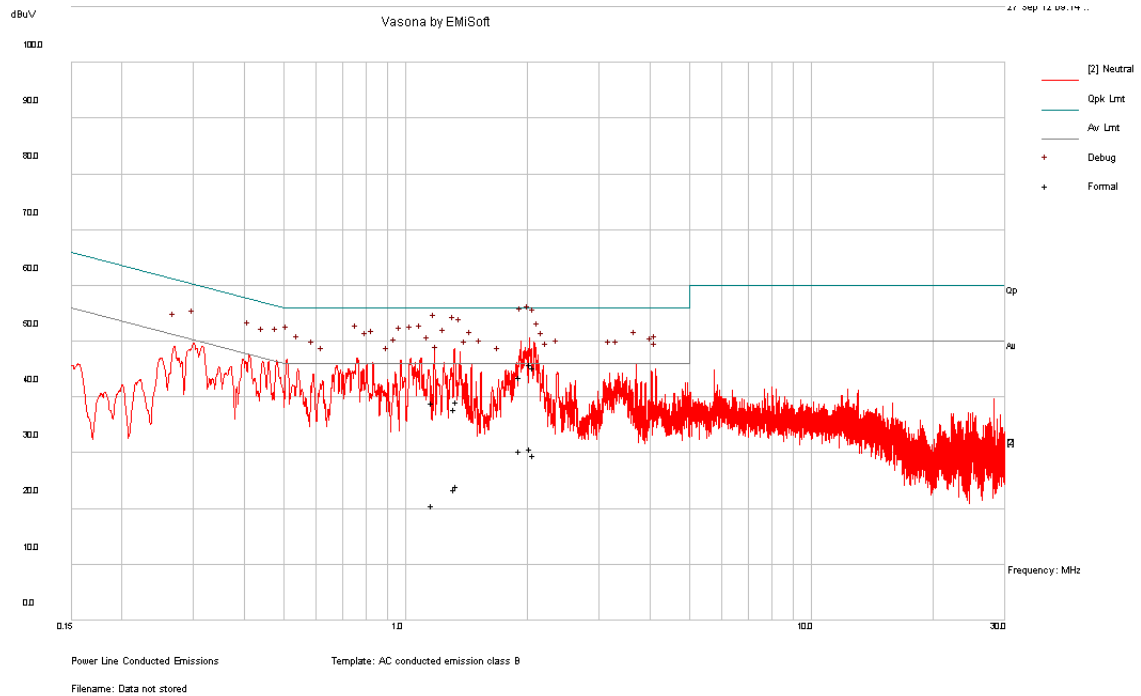
120 V, 60 Hz – Line, AC/DC Adaptor



| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 2.14583 | 43.66 | Line | 56 | -12.34 | QP |
| 1.961336 | 43.55 | Line | 56 | -12.45 | QP |
| 2.2109 | 41.09 | Line | 56 | -14.91 | QP |
| 2.224376 | 40.04 | Line | 56 | -15.96 | QP |
| 2.272382 | 36.93 | Line | 56 | -19.07 | QP |
| 2.42981 | 34.75 | Line | 56 | -21.25 | QP |

| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 1.961336 | 28.18 | Line | 46 | -17.82 | Ave. |
| 2.14583 | 27.08 | Line | 46 | -18.92 | Ave. |
| 2.224376 | 23.21 | Line | 46 | -22.79 | Ave. |
| 2.2109 | 22.26 | Line | 46 | -23.74 | Ave. |
| 2.272382 | 20.26 | Line | 46 | -25.74 | Ave. |
| 2.42981 | 16.59 | Line | 46 | -29.41 | Ave. |

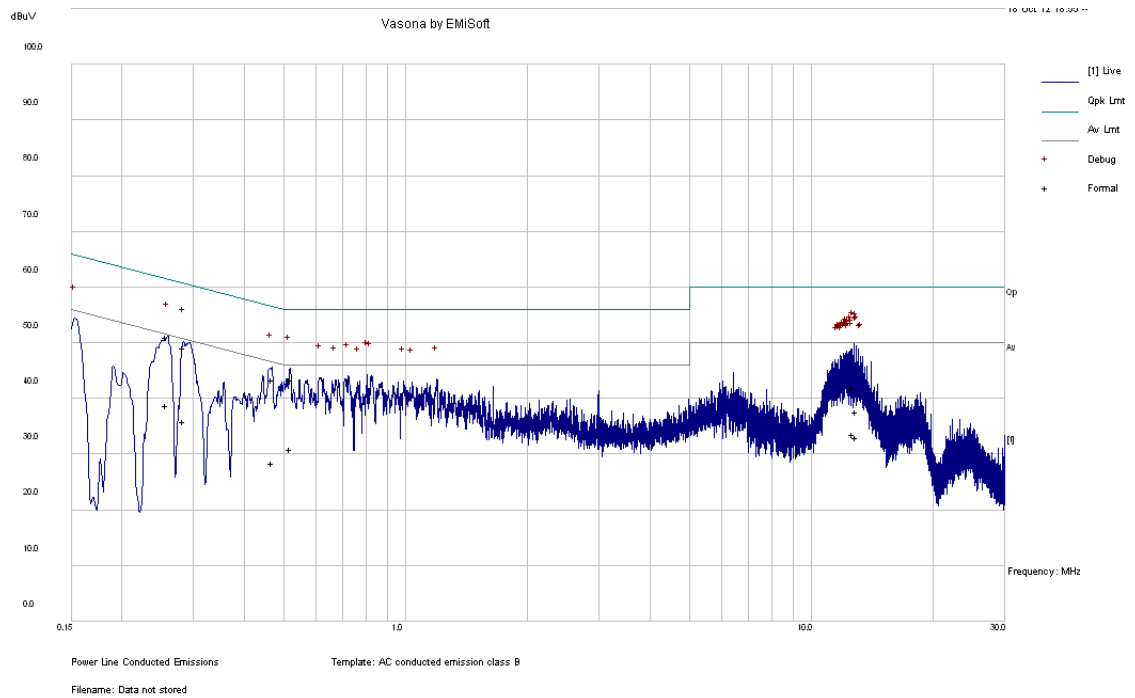
120 V, 60 Hz – Neutral, AC/DC Adaptor



| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 2.033856 | 45.9 | Neutral | 56 | -10.10 | QP |
| 2.069532 | 45.25 | Neutral | 56 | -10.75 | QP |
| 1.913054 | 43.57 | Neutral | 56 | -12.43 | QP |
| 1.342622 | 39.21 | Neutral | 56 | -16.79 | QP |
| 1.168757 | 39.01 | Neutral | 56 | -16.99 | QP |
| 1.324043 | 37.93 | Neutral | 56 | -18.07 | QP |

| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 2.033856 | 30.74 | Neutral | 46 | -15.26 | Ave. |
| 1.913054 | 30.3 | Neutral | 46 | -15.70 | Ave. |
| 2.069532 | 29.64 | Neutral | 46 | -16.36 | Ave. |
| 1.342622 | 24.12 | Neutral | 46 | -21.88 | Ave. |
| 1.324043 | 23.38 | Neutral | 46 | -22.62 | Ave. |
| 1.168757 | 20.62 | Neutral | 46 | -25.38 | Ave. |

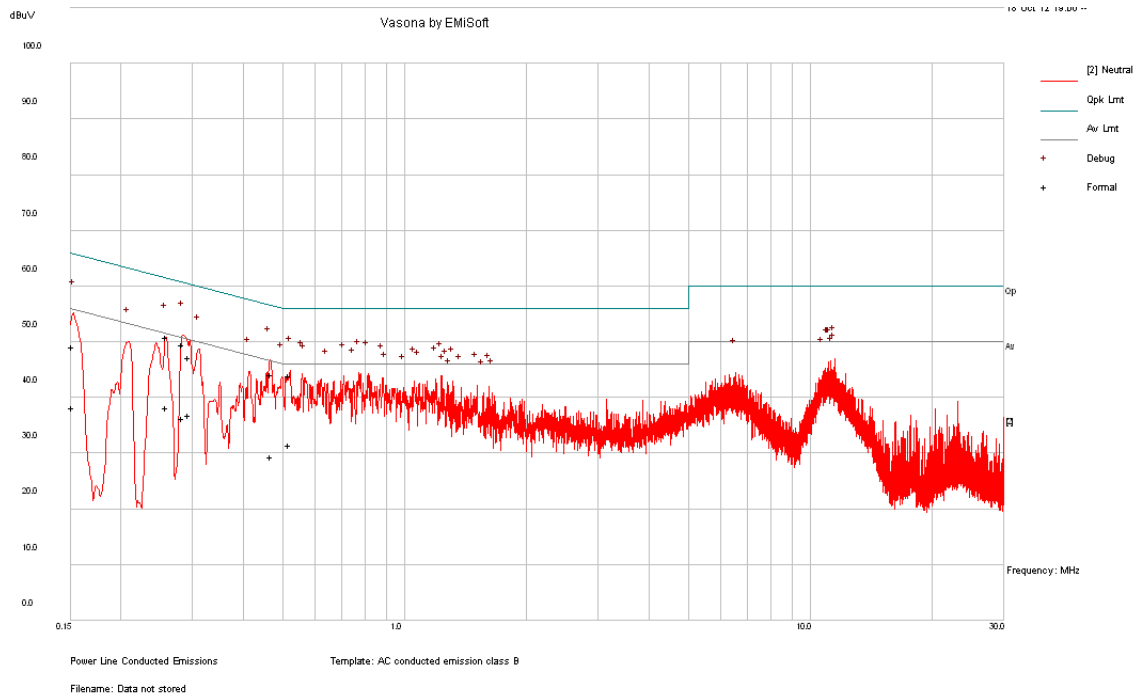
120 V, 60 Hz – Line, POE



| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 0.258441 | 51.1 | Line | 61.48 | -10.38 | QP |
| 0.283167 | 49.13 | Line | 60.72 | -11.59 | QP |
| 0.519939 | 43.43 | Line | 56 | -12.57 | QP |
| 0.468858 | 43.39 | Line | 56.53 | -13.15 | QP |
| 12.69896 | 41.97 | Line | 60 | -18.03 | QP |
| 12.89667 | 37.71 | Line | 60 | -22.29 | QP |

| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 0.258441 | 38.73 | Line | 51.48 | -12.75 | Ave. |
| 0.283167 | 36.02 | Line | 50.72 | -14.70 | Ave. |
| 0.519939 | 31.03 | Line | 46 | -14.97 | Ave. |
| 12.69896 | 33.58 | Line | 50 | -16.42 | Ave. |
| 12.89667 | 33.06 | Line | 50 | -16.94 | Ave. |
| 0.468858 | 28.48 | Line | 46.53 | -18.05 | Ave. |

120 V, 60 Hz – Neutral, POE



| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 0.259128 | 50.95 | Neutral | 61.46 | -10.51 | QP |
| 0.283362 | 49.59 | Neutral | 60.72 | -11.13 | QP |
| 0.520359 | 43.88 | Neutral | 56 | -12.12 | QP |
| 0.468399 | 44.21 | Neutral | 56.54 | -12.34 | QP |
| 0.294582 | 47.32 | Neutral | 60.39 | -13.07 | QP |
| 0.152043 | 49.2 | Neutral | 65.89 | -16.68 | QP |

| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|----------------------------|--------------------------|--------------|-------------|--------------------|
| 0.259128 | 38.19 | Neutral | 51.46 | -13.27 | Ave. |
| 0.294582 | 36.98 | Neutral | 50.39 | -13.42 | Ave. |
| 0.283362 | 36.33 | Neutral | 50.72 | -14.39 | Ave. |
| 0.520359 | 31.56 | Neutral | 46 | -14.44 | Ave. |
| 0.468399 | 29.42 | Neutral | 46.54 | -17.12 | Ave. |
| 0.152043 | 38.23 | Neutral | 55.89 | -17.65 | Ave. |

7 FCC §15.209, §15.407(b) & IC RSS-210 §A9.2 - 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) and IC RSS-210: 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) and IC RSS-210, 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.

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

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:

$$\text{RBW} = 100 \text{ kHz} / \text{VBW} = 300 \text{ kHz} / \text{Sweep} = \text{Auto}$$

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:

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

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:

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

7.5 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------------|---------------------|----------------------|------------|------------------|----------------------|
| Sunol Science Corp | System Controller | SC99V | 122303-1 | N/R | N/R |
| Sunol Science Corp | Combination Antenna | JB3 | A020106-2 | 2012-08-15 | 1 year |
| Hewlett Packard | Pre-amplifier | 8447D | 2944A06639 | 2012-06-09 | 1 year |
| Mini-Circuits | Pre-amplifier | ZVA-183-S | 570400946 | 2012-05-09 | 1 year |
| Agilent | Spectrum Analyzer | E4440A | MY44303352 | 2012-10-16 | 1 year |
| EMCO | Horn Antenna | 3115 | 9511-4627 | 2012-10-17 | 1 year |
| Rohde & Schwarz | EMI Test Receiver | ESCI 1166.5950K03 | 100338 | 2012-09-19 | 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: | 101-102 kPa |

The testing was performed by Lionel Lara from 2013-03-05 to 2013-04-12 at 5 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 & IC RSS-210, RSS-Gen standard's radiated emissions limits, and had the worst margin of:

5150-5250 MHz

| Mode: Transmitting | | | |
|---------------------------|-----------------|------------------------------------|---------------------------------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Channel, Range, Mode, Antenna |
| -0.42 | 56.01462 | Vertical | 30 MHz to 1 GHz, Co-location, Patch |
| -0.59 | 5150 | Vertical | 1 GHz to 40 GHz, 802.11n HT40, Dipole |

7.8 Radiated Emissions Test Result Data

1) Radiated Emission at 3 meters, 5150-5250 MHz Band, Dipole Antennas

802.11a Mode, Low Channel

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|--|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| Low Channel 5180 MHz, measured at 3 meters | | | | | | | | | | | |
| 5180 | 72.15 | 127 | 100 | V | 34.71 | 4.52 | 0 | 111.38 | Fund. | - | Peak |
| 5180 | 64.65 | 39 | 100 | H | 34.71 | 4.52 | 0 | 103.88 | Fund. | - | Peak |
| 5180 | 60.55 | 127 | 100 | V | 34.71 | 4.52 | 0 | 99.78 | Fund. | - | Ave |
| 5180 | 53.52 | 39 | 100 | H | 34.71 | 4.52 | 0 | 92.75 | Fund. | - | Ave |
| 10360 | 31.7 | 0 | 100 | V | 38.33 | 6.14 | 26.98 | 49.19 | 74 | -24.81 | Peak |
| 10360 | 31.7 | 0 | 100 | H | 38.33 | 6.14 | 26.98 | 49.19 | 74 | -24.81 | Peak |
| 10360 | 17.04 | 0 | 100 | V | 38.33 | 6.14 | 26.98 | 34.53 | 54 | -19.47 | Ave |
| 10360 | 17.04 | 0 | 100 | H | 38.33 | 6.14 | 26.98 | 34.53 | 54 | -19.47 | Ave |
| 15540 | 32.36 | 0 | 100 | V | 38.43 | 7.47 | 25.92 | 52.34 | 74 | -21.66 | Peak |
| 15540 | 32.36 | 0 | 100 | H | 38.43 | 7.47 | 25.92 | 52.34 | 74 | -21.66 | Peak |
| 15540 | 17.77 | 0 | 100 | V | 38.43 | 7.47 | 25.92 | 37.75 | 54 | -16.25 | Ave |
| 15540 | 17.77 | 0 | 100 | H | 38.43 | 7.47 | 25.92 | 37.75 | 54 | -16.25 | Ave |
| 20720 | 32.1 | 0 | 100 | V | 34.4 | 9.36 | 29 | 46.86 | 74 | -27.14 | Peak |
| 20720 | 32.1 | 0 | 100 | H | 34.4 | 9.36 | 29 | 46.86 | 74 | -27.14 | Peak |
| 20720 | 17.22 | 0 | 100 | V | 34.4 | 9.36 | 29 | 31.98 | 54 | -22.02 | Ave |
| 20720 | 17.22 | 0 | 100 | H | 34.4 | 9.36 | 29 | 31.98 | 54 | -22.02 | Ave |

Note: All emissions are at noise floor level.

802.11a Mode, Middle Channel

Below 1 GHz

| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB μ V/m) | Margin (dB) | Comment |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|---------|
| 499.965 | 33.83 | 165 | H | 271 | 46 | -12.17 | QP |
| 374.988 | 28.66 | 100 | H | 334 | 46 | -17.34 | QP |
| 57.017 | 33.25 | 237 | V | 184 | 40 | -6.75 | QP |

Note: Only digital emissions present from 30 MHz to 1GHz, therefore only one channel was tested per modulation for below 1GHz.

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/IC | | Comments |
|---|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| Middle Channel 5200 MHz, measured at 3 meters | | | | | | | | | | | |
| 5200 | 70.27 | 209 | 100 | V | 34.71 | 4.52 | 0 | 109.5 | Fund. | - | Peak |
| 5200 | 64.38 | 321 | 106 | H | 34.71 | 4.52 | 0 | 103.61 | Fund. | - | Peak |
| 5200 | 59.28 | 209 | 100 | V | 34.71 | 4.52 | 0 | 98.51 | Fund. | - | Ave |
| 5200 | 53.08 | 321 | 106 | H | 34.71 | 4.52 | 0 | 92.31 | Fund. | - | Ave |
| 10400 | 30.65 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 48.15 | 74 | -25.85 | Peak |
| 10400 | 30.65 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 48.15 | 74 | -25.85 | Peak |
| 10400 | 16.52 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 34.02 | 54 | -19.98 | Ave |
| 10400 | 16.52 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 34.02 | 54 | -19.98 | Ave |
| 15600 | 33.53 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 53.41 | 74 | -20.59 | Peak |
| 15600 | 33.53 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 53.41 | 74 | -20.59 | Peak |
| 15600 | 18.58 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 38.46 | 54 | -15.54 | Ave |
| 15600 | 18.58 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 38.46 | 54 | -15.54 | Ave |
| 20800 | 32.64 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 47.7 | 74 | -26.3 | Peak |
| 20800 | 32.64 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 47.7 | 74 | -26.3 | Peak |
| 20800 | 17.5 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 32.56 | 54 | -21.44 | Ave |
| 20800 | 17.5 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 32.56 | 54 | -21.44 | Ave |

802.11a Mode, High Channel

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/IC | | Comments |
|---|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| High Channel 5240 MHz, measured at 3 meters | | | | | | | | | | | |
| 5240 | 71.29 | 234 | 101 | V | 34.71 | 4.52 | 0 | 110.52 | Fund. | - | Peak |
| 5240 | 64.53 | 321 | 100 | H | 34.71 | 4.52 | 0 | 103.76 | Fund. | - | Peak |
| 5240 | 60.01 | 234 | 101 | V | 34.71 | 4.52 | 0 | 99.24 | Fund. | - | Ave |
| 5240 | 52.85 | 321 | 100 | H | 34.71 | 4.52 | 0 | 92.08 | Fund. | - | Ave |
| 10480 | 30.98 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 48.53 | 74 | -25.47 | Peak |
| 10480 | 30.98 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 48.53 | 74 | -25.47 | Peak |
| 10480 | 16.69 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 34.24 | 54 | -19.76 | Ave |
| 10480 | 16.69 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 34.24 | 54 | -19.76 | Ave |
| 15720 | 33.41 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 53.1 | 74 | -20.9 | Peak |
| 15720 | 33.41 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 53.1 | 74 | -20.9 | Peak |
| 15720 | 18.51 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 38.2 | 54 | -15.8 | Ave |
| 15720 | 18.51 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 38.2 | 54 | -15.8 | Ave |
| 20960 | 32.7 | 0 | 100 | V | 34.6 | 9.36 | 29 | 47.66 | 74 | -26.34 | Peak |
| 20960 | 32.7 | 0 | 100 | H | 34.6 | 9.36 | 29 | 47.66 | 74 | -26.34 | Peak |
| 20960 | 17.53 | 0 | 100 | V | 34.6 | 9.36 | 29 | 32.49 | 54 | -21.51 | Ave |
| 20960 | 17.53 | 0 | 100 | H | 34.6 | 9.36 | 29 | 32.49 | 54 | -21.51 | Ave |

802.11n HT20 Mode, Low Channel

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|--|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| Low Channel 5180 MHz, measured at 3 meters | | | | | | | | | | | |
| 5180 | 72.96 | 125 | 100 | V | 34.71 | 4.52 | 0 | 112.19 | Fund. | - | Peak |
| 5180 | 64.75 | 40 | 100 | H | 34.71 | 4.52 | 0 | 103.98 | Fund. | - | Peak |
| 5180 | 60.92 | 125 | 100 | V | 34.71 | 4.52 | 0 | 100.15 | Fund. | - | Ave |
| 5180 | 52.96 | 40 | 100 | H | 34.71 | 4.52 | 0 | 92.19 | Fund. | - | Ave |
| 10360 | 31.49 | 0 | 100 | V | 38.33 | 6.14 | 26.98 | 48.98 | 74 | -25.02 | Peak |
| 10360 | 31.49 | 0 | 100 | H | 38.33 | 6.14 | 26.98 | 48.98 | 74 | -25.02 | Peak |
| 10360 | 17.13 | 0 | 100 | V | 38.33 | 6.14 | 26.98 | 34.62 | 54 | -19.38 | Ave |
| 10360 | 17.13 | 0 | 100 | H | 38.33 | 6.14 | 26.98 | 34.62 | 54 | -19.38 | Ave |
| 15540 | 32.58 | 0 | 100 | V | 38.43 | 7.47 | 25.92 | 52.56 | 74 | -21.44 | Peak |
| 15540 | 32.58 | 0 | 100 | H | 38.43 | 7.47 | 25.92 | 52.56 | 74 | -21.44 | Peak |
| 15540 | 17.79 | 0 | 100 | V | 38.43 | 7.47 | 25.92 | 37.77 | 54 | -16.23 | Ave |
| 15540 | 17.79 | 0 | 100 | H | 38.43 | 7.47 | 25.92 | 37.77 | 54 | -16.23 | Ave |
| 20720 | 31.53 | 0 | 100 | V | 34.4 | 9.36 | 29 | 46.29 | 74 | -27.71 | Peak |
| 20720 | 31.53 | 0 | 100 | H | 34.4 | 9.36 | 29 | 46.29 | 74 | -27.71 | Peak |
| 20720 | 17.25 | 0 | 100 | V | 34.4 | 9.36 | 29 | 32.01 | 54 | -21.99 | Ave |
| 20720 | 17.25 | 0 | 100 | H | 34.4 | 9.36 | 29 | 32.01 | 54 | -21.99 | Ave |

802.11n HT20 Mode, Middle Channel

Below 1 GHz

| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB μ V/m) | Margin (dB) | Comment |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|---------|
| 499.965 | 33.75 | 165 | H | 273 | 46 | -12.25 | QP |
| 374.988 | 28.82 | 99 | H | 336 | 46 | -17.18 | QP |
| 57.017 | 33.27 | 237 | V | 184 | 40 | -6.73 | QP |

Note: Only digital emissions present from 30 MHz to 1GHz, therefore only one channel was tested per modulation for below 1GHz.

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/IC | | Comments |
|---|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| Middle Channel 5200 MHz, measured at 3 meters | | | | | | | | | | | |
| 5200 | 71.09 | 198 | 100 | V | 34.71 | 4.52 | 0 | 110.32 | Fund. | - | Peak |
| 5200 | 64.27 | 321 | 115 | H | 34.71 | 4.52 | 0 | 103.5 | Fund. | - | Peak |
| 5200 | 58.97 | 198 | 100 | V | 34.71 | 4.52 | 0 | 98.2 | Fund. | - | Ave |
| 5200 | 53 | 321 | 115 | H | 34.71 | 4.52 | 0 | 92.23 | Fund. | - | Ave |
| 10400 | 30.87 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 48.37 | 74 | -25.63 | Peak |
| 10400 | 30.87 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 48.37 | 74 | -25.63 | Peak |
| 10400 | 16.66 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 34.16 | 54 | -19.84 | Ave |
| 10400 | 16.66 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 34.16 | 54 | -19.84 | Ave |
| 15600 | 33.62 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 53.5 | 74 | -20.5 | Peak |
| 15600 | 33.62 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 53.5 | 74 | -20.5 | Peak |
| 15600 | 18.69 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 38.57 | 54 | -15.43 | Ave |
| 15600 | 18.69 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 38.57 | 54 | -15.43 | Ave |
| 20800 | 32.81 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 47.87 | 74 | -26.13 | Peak |
| 20800 | 32.81 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 47.87 | 74 | -26.13 | Peak |
| 20800 | 17.61 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 32.67 | 54 | -21.33 | Ave |
| 20800 | 17.61 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 32.67 | 54 | -21.33 | Ave |

802.11n HT20 Mode, High Channel

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/IC | | Comments |
|---|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| High Channel 5240 MHz, measured at 3 meters | | | | | | | | | | | |
| 5240 | 71.11 | 234 | 100 | V | 34.71 | 4.52 | 0 | 110.34 | Fund. | - | Peak |
| 5240 | 62.55 | 294 | 114 | H | 34.71 | 4.52 | 0 | 101.78 | Fund. | - | Peak |
| 5240 | 59.36 | 234 | 100 | V | 34.71 | 4.52 | 0 | 98.59 | Fund. | - | Ave |
| 5240 | 50.85 | 294 | 114 | H | 34.71 | 4.52 | 0 | 90.08 | Fund. | - | Ave |
| 10480 | 31.08 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 48.63 | 74 | -25.37 | Peak |
| 10480 | 31.08 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 48.63 | 74 | -25.37 | Peak |
| 10480 | 16.64 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 34.19 | 54 | -19.81 | Ave |
| 10480 | 16.64 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 34.19 | 54 | -19.81 | Ave |
| 15720 | 33.16 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 52.85 | 74 | -21.15 | Peak |
| 15720 | 33.16 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 52.85 | 74 | -21.15 | Peak |
| 15720 | 18.33 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 38.02 | 54 | -15.98 | Ave |
| 15720 | 18.33 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 38.02 | 54 | -15.98 | Ave |
| 20960 | 32.12 | 0 | 100 | V | 34.6 | 9.36 | 29 | 47.08 | 74 | -26.92 | Peak |
| 20960 | 32.12 | 0 | 100 | H | 34.6 | 9.36 | 29 | 47.08 | 74 | -26.92 | 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

Below 1 GHz

| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB μ V/m) | Margin (dB) | Comment |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|---------|
| 499.965 | 33.77 | 165 | H | 273 | 46 | -12.23 | QP |
| 374.989 | 28.56 | 99 | H | 333 | 46 | -17.44 | QP |
| 57.018 | 34.04 | 182 | V | 236 | 40 | -5.96 | QP |

Note: Only digital emissions present from 30 MHz to 1GHz, therefore only one channel was tested per modulation for below 1GHz.

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|--|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| Low Channel 5190 MHz, measured at 3 meters | | | | | | | | | | | |
| 5190 | 66.18 | 93 | 100 | V | 34.71 | 4.52 | 0 | 105.41 | Fund. | - | Peak |
| 5190 | 61.22 | 40 | 100 | H | 34.71 | 4.52 | 0 | 100.45 | Fund. | - | Peak |
| 5190 | 55.17 | 93 | 100 | V | 34.71 | 4.52 | 0 | 94.4 | Fund. | - | Ave |
| 5190 | 49.52 | 40 | 100 | H | 34.71 | 4.52 | 0 | 88.75 | Fund. | - | Ave |
| 10460 | 31.23 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 48.78 | 74 | -25.22 | Peak |
| 10460 | 31.23 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 48.78 | 74 | -25.22 | Peak |
| 10460 | 16.67 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 34.22 | 54 | -19.78 | Ave |
| 10460 | 16.67 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 34.22 | 54 | -19.78 | Ave |
| 15690 | 32.8 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 52.49 | 74 | -21.51 | Peak |
| 15690 | 32.8 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 52.49 | 74 | -21.51 | Peak |
| 15690 | 18.31 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 38 | 54 | -16 | Ave |
| 15690 | 18.31 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 38 | 54 | -16 | Ave |
| 20920 | 31.88 | 0 | 100 | V | 34.6 | 9.36 | 29 | 46.84 | 74 | -27.16 | Peak |
| 20920 | 31.88 | 0 | 100 | H | 34.6 | 9.36 | 29 | 46.84 | 74 | -27.16 | Peak |
| 20920 | 17.37 | 0 | 100 | V | 34.6 | 9.36 | 29 | 32.33 | 54 | -21.67 | Ave |
| 20920 | 17.37 | 0 | 100 | H | 34.6 | 9.36 | 29 | 32.33 | 54 | -21.67 | Ave |

802.11n HT40 Mode, High Channel

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|---|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| High Channel 5230 MHz, measured at 3 meters | | | | | | | | | | | |
| 5230 | 68.7 | 250 | 100 | V | 34.71 | 4.52 | 0 | 107.93 | Fund. | - | Peak |
| 5230 | 62.29 | 119 | 103 | H | 34.71 | 4.52 | 0 | 101.52 | Fund. | - | Peak |
| 5230 | 56.82 | 250 | 100 | V | 34.71 | 4.52 | 0 | 96.05 | Fund. | - | Ave |
| 5230 | 50.84 | 119 | 103 | H | 34.71 | 4.52 | 0 | 90.07 | Fund. | - | Ave |
| 10380 | 31.54 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 49.04 | 74 | -24.96 | Peak |
| 10380 | 31.54 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 49.04 | 74 | -24.96 | Peak |
| 10380 | 16.78 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 34.28 | 54 | -19.72 | Ave |
| 10380 | 16.78 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 34.28 | 54 | -19.72 | Ave |
| 15570 | 32.39 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 52.27 | 74 | -21.73 | Peak |
| 15570 | 32.39 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 52.27 | 74 | -21.73 | Peak |
| 15570 | 18.11 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 37.99 | 54 | -16.01 | Ave |
| 15570 | 18.11 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 37.99 | 54 | -16.01 | Ave |
| 20760 | 31.82 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 46.88 | 74 | -27.12 | Peak |
| 20760 | 31.82 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 46.88 | 74 | -27.12 | Peak |
| 20760 | 17.36 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 32.42 | 54 | -21.58 | Ave |
| 20760 | 17.36 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 32.42 | 54 | -21.58 | Ave |

2) Restricted Band Edges, Dipole Antennas

802.11a Mode

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|--|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| Low Channel 5180 MHz, measured at 3 meters | | | | | | | | | | | |
| 5150 | 26.79 | 127 | 100 | V | 34.71 | 4.38 | 0 | 65.88 | 74 | -8.12 | Peak |
| 5150 | 26.57 | 39 | 100 | H | 34.71 | 4.38 | 0 | 65.66 | 74 | -8.34 | Peak |
| 5150 | 14.06 | 127 | 100 | V | 34.71 | 4.38 | 0 | 53.15 | 54 | -0.85 | Ave |
| 5150 | 13.95 | 39 | 100 | H | 34.71 | 4.38 | 0 | 53.04 | 54 | -0.96 | Ave |

802.11n HT20 Mode

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|--|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| Low Channel 5180 MHz, measured at 3 meters | | | | | | | | | | | |
| 5150 | 27.13 | 125 | 100 | V | 34.71 | 4.38 | 0 | 66.22 | 74 | -7.78 | Peak |
| 5150 | 26.85 | 40 | 100 | H | 34.71 | 4.38 | 0 | 65.94 | 74 | -8.06 | Peak |
| 5150 | 14.15 | 125 | 100 | V | 34.71 | 4.38 | 0 | 53.24 | 54 | -0.76 | Ave |
| 5150 | 14.05 | 40 | 100 | H | 34.71 | 4.38 | 0 | 53.14 | 54 | -0.86 | Ave |

802.11n HT40 Mode

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|--|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| Low Channel 5190 MHz, measured at 3 meters | | | | | | | | | | | |
| 5150 | 26.24 | 93 | 100 | V | 34.71 | 4.38 | 0 | 65.33 | 74 | -8.67 | Peak |
| 5150 | 26.78 | 40 | 100 | H | 34.71 | 4.38 | 0 | 65.87 | 74 | -8.13 | Peak |
| 5150 | 14.32 | 93 | 100 | V | 34.71 | 4.38 | 0 | 53.41 | 54 | -0.59 | Ave |
| 5150 | 14.28 | 40 | 100 | H | 34.71 | 4.38 | 0 | 53.37 | 54 | -0.63 | Ave |

3) Co-location with 2.4 GHz and 5 GHz, Dipole Antennas

Worst Case: 2.4 GHz: 802.11b, 2412 MHz; 5.2GHz: 802.11a, 5240MHz

30-1000 MHz:

| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB μ V/m) | Margin (dB) |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|
| 56.01341 | 39.25 | 119 | V | 50 | 40 | -0.75 |
| 75.1442 | 30.2 | 115 | V | 320 | 40 | -9.8 |
| 500.0628 | 32.71 | 100 | H | 188 | 46 | -13.29 |

Above 1 GHz:

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|-----------------|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| 4824 | 41.12 | 91 | 100 | V | 33.46 | 4.06 | 27.7 | 50.94 | 74 | -23.06 | Peak |
| 4824 | - ¹ | - | - | H | - | - | - | - | 74 | - | Peak |
| 4824 | 29.09 | 91 | 100 | V | 33.46 | 4.06 | 27.7 | 38.91 | 54 | -15.09 | Ave |
| 4824 | - ¹ | - | - | H | - | - | - | - | 54 | - | Ave |

Note¹: All emissions at noise floor.

4) Radiated Emission at 3 meters, 5150-5250 MHz Band, Patch Antenna**802.11a Mode, Low Channel**

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/IC | | Comments |
|--|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| Low Channel 5180 MHz, measured at 3 meters | | | | | | | | | | | |
| 5180 | 70.87 | 36 | 100 | V | 34.71 | 4.52 | 0 | 110.1 | Fund. | - | Peak |
| 5180 | 73.26 | 4 | 100 | H | 34.71 | 4.52 | 0 | 112.49 | Fund. | - | Peak |
| 5180 | 58.97 | 36 | 100 | V | 34.71 | 4.52 | 0 | 98.2 | Fund. | - | Ave |
| 5180 | 62.4 | 4 | 100 | H | 34.71 | 4.52 | 0 | 101.63 | Fund. | - | Ave |
| 10360 | 31.21 | 0 | 100 | V | 38.33 | 6.14 | 26.98 | 48.7 | 74 | -25.3 | Peak |
| 10360 | 31.21 | 0 | 100 | H | 38.33 | 6.14 | 26.98 | 48.7 | 74 | -25.3 | Peak |
| 10360 | 16.52 | 0 | 100 | V | 38.33 | 6.14 | 26.98 | 34.01 | 54 | -19.99 | Ave |
| 10360 | 16.52 | 0 | 100 | H | 38.33 | 6.14 | 26.98 | 34.01 | 54 | -19.99 | Ave |
| 15540 | 31.69 | 0 | 100 | V | 38.43 | 7.47 | 25.92 | 51.67 | 74 | -22.33 | Peak |
| 15540 | 31.69 | 0 | 100 | H | 38.43 | 7.47 | 25.92 | 51.67 | 74 | -22.33 | Peak |
| 15540 | 17.38 | 0 | 100 | V | 38.43 | 7.47 | 25.92 | 37.36 | 54 | -16.64 | Ave |
| 15540 | 17.38 | 0 | 100 | H | 38.43 | 7.47 | 25.92 | 37.36 | 54 | -16.64 | Ave |
| 20720 | 31.37 | 0 | 100 | V | 34.4 | 9.36 | 29 | 46.13 | 74 | -27.87 | Peak |
| 20720 | 31.37 | 0 | 100 | H | 34.4 | 9.36 | 29 | 46.13 | 74 | -27.87 | Peak |
| 20720 | 16.91 | 0 | 100 | V | 34.4 | 9.36 | 29 | 31.67 | 54 | -22.33 | Ave |
| 20720 | 16.91 | 0 | 100 | H | 34.4 | 9.36 | 29 | 31.67 | 54 | -22.33 | Ave |

802.11a Mode, Middle Channel

Below 1 GHz

| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Comment |
|-----------------|------------------------------|---------------------|------------------------|-----------------------------|----------------|-------------|---------|
| 56.73 | 34.57 | 180 | V | 180 | 40 | -5.43 | QP |
| 323.8635 | 12.12 | 342 | V | 174 | 46 | -33.88 | QP |
| 499.9958 | 40.63 | 173 | H | 289 | 46 | -5.37 | QP |
| 375.001 | 38.44 | 99 | H | 79 | 46 | -7.56 | QP |

Note: Only digital emissions present from 30 MHz to 1GHz, therefore only one channel was tested per modulation for below 1GHz.

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dBμV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBμV/m) | FCC/IC | | Comments |
|---|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBμV/m) | Margin (dB) | |
| Middle Channel 5200 MHz, measured at 3 meters | | | | | | | | | | | |
| 5200 | 70.06 | 343 | 130 | V | 34.71 | 4.52 | 0 | 109.29 | Fund. | - | Peak |
| 5200 | 72.38 | 0 | 100 | H | 34.71 | 4.52 | 0 | 111.61 | Fund. | - | Peak |
| 5200 | 59.39 | 343 | 130 | V | 34.71 | 4.52 | 0 | 98.62 | Fund. | - | Ave |
| 5200 | 60.85 | 0 | 100 | H | 34.71 | 4.52 | 0 | 100.08 | Fund. | - | Ave |
| 10400 | 30.58 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 48.08 | 74 | -25.92 | Peak |
| 10400 | 30.58 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 48.08 | 74 | -25.92 | Peak |
| 10400 | 16.47 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 33.97 | 54 | -20.03 | Ave |
| 10400 | 16.47 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 33.97 | 54 | -20.03 | Ave |
| 15600 | 33.62 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 53.5 | 74 | -20.5 | Peak |
| 15600 | 33.62 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 53.5 | 74 | -20.5 | Peak |
| 15600 | 18.6 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 38.48 | 54 | -15.52 | Ave |
| 15600 | 18.6 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 38.48 | 54 | -15.52 | Ave |
| 20800 | 32.73 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 47.79 | 74 | -26.21 | Peak |
| 20800 | 32.73 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 47.79 | 74 | -26.21 | Peak |
| 20800 | 17.66 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 32.72 | 54 | -21.28 | Ave |
| 20800 | 17.66 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 32.72 | 54 | -21.28 | Ave |

802.11a Mode, High Channel

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dBμV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBμV/m) | FCC/IC | | Comments |
|---|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBμV/m) | Margin (dB) | |
| High Channel 5240 MHz, measured at 3 meters | | | | | | | | | | | |
| 5240 | 69.32 | 345 | 131 | V | 34.71 | 4.52 | 0 | 108.55 | Fund. | - | Peak |
| 5240 | 71.51 | 0 | 100 | H | 34.71 | 4.52 | 0 | 110.74 | Fund. | - | Peak |
| 5240 | 58.67 | 345 | 131 | V | 34.71 | 4.52 | 0 | 97.9 | Fund. | - | Ave |
| 5240 | 60.12 | 0 | 100 | H | 34.71 | 4.52 | 0 | 99.35 | Fund. | - | Ave |
| 10480 | 31.06 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 48.61 | 74 | -25.39 | Peak |
| 10480 | 31.06 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 48.61 | 74 | -25.39 | Peak |
| 10480 | 16.19 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 33.74 | 54 | -20.26 | Ave |
| 10480 | 16.19 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 33.74 | 54 | -20.26 | Ave |
| 15720 | 31.89 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 51.58 | 74 | -22.42 | Peak |
| 15720 | 31.89 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 51.58 | 74 | -22.42 | Peak |
| 15720 | 17.88 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 37.57 | 54 | -16.43 | Ave |
| 15720 | 17.88 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 37.57 | 54 | -16.43 | Ave |
| 20960 | 31.41 | 0 | 100 | V | 34.6 | 9.36 | 29 | 46.37 | 74 | -27.63 | Peak |
| 20960 | 31.41 | 0 | 100 | H | 34.6 | 9.36 | 29 | 46.37 | 74 | -27.63 | Peak |
| 20960 | 17.22 | 0 | 100 | V | 34.6 | 9.36 | 29 | 32.18 | 54 | -21.82 | Ave |
| 20960 | 17.22 | 0 | 100 | H | 34.6 | 9.36 | 29 | 32.18 | 54 | -21.82 | Ave |

802.11n HT20 Mode, Low Channel

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|--|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| Low Channel 5180 MHz, measured at 3 meters | | | | | | | | | | | |
| 5180 | 70.6 | 36 | 100 | V | 34.71 | 4.52 | 0 | 109.83 | Fund. | - | Peak |
| 5180 | 73.57 | 0 | 100 | H | 34.71 | 4.52 | 0 | 112.8 | Fund. | - | Peak |
| 5180 | 59.22 | 36 | 100 | V | 34.71 | 4.52 | 0 | 98.45 | Fund. | - | Ave |
| 5180 | 61.27 | 0 | 100 | H | 34.71 | 4.52 | 0 | 100.5 | Fund. | - | Ave |
| 10360 | 30.89 | 0 | 100 | V | 38.33 | 6.14 | 26.98 | 48.38 | 74 | -25.62 | Peak |
| 10360 | 30.89 | 0 | 100 | H | 38.33 | 6.14 | 26.98 | 48.38 | 74 | -25.62 | Peak |
| 10360 | 16.46 | 0 | 100 | V | 38.33 | 6.14 | 26.98 | 33.95 | 54 | -20.05 | Ave |
| 10360 | 16.46 | 0 | 100 | H | 38.33 | 6.14 | 26.98 | 33.95 | 54 | -20.05 | Ave |
| 15540 | 31.38 | 0 | 100 | V | 38.43 | 7.47 | 25.92 | 51.36 | 74 | -22.64 | Peak |
| 15540 | 31.38 | 0 | 100 | H | 38.43 | 7.47 | 25.92 | 51.36 | 74 | -22.64 | Peak |
| 15540 | 17.41 | 0 | 100 | V | 38.43 | 7.47 | 25.92 | 37.39 | 54 | -16.61 | Ave |
| 15540 | 17.41 | 0 | 100 | H | 38.43 | 7.47 | 25.92 | 37.39 | 54 | -16.61 | Ave |
| 20720 | 31.46 | 0 | 100 | V | 34.4 | 9.36 | 29 | 46.22 | 74 | -27.78 | Peak |
| 20720 | 31.46 | 0 | 100 | H | 34.4 | 9.36 | 29 | 46.22 | 74 | -27.78 | Peak |
| 20720 | 16.93 | 0 | 100 | V | 34.4 | 9.36 | 29 | 31.69 | 54 | -22.31 | Ave |
| 20720 | 16.93 | 0 | 100 | H | 34.4 | 9.36 | 29 | 31.69 | 54 | -22.31 | Ave |

802.11n HT20 Mode, Middle Channel

Below 1 GHz

| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB μ V/m) | Margin (dB) | Comment |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|---------|
| 53.057 | 37.46 | 172 | V | 53 | 40 | -2.54 | QP |
| 500.014 | 40.57 | 174 | H | 287 | 46 | -5.43 | QP |
| 375.0143 | 37.57 | 100 | H | 96 | 46 | -8.43 | QP |

Note: Only digital emissions present from 30 MHz to 1GHz, therefore only one channel was tested per modulation for below 1GHz.

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dBμV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBμV/m) | FCC/IC | | Comments |
|---|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBμV/m) | Margin (dB) | |
| Middle Channel 5200 MHz, measured at 3 meters | | | | | | | | | | | |
| 5200 | 69.27 | 37 | 100 | V | 34.71 | 4.52 | 0 | 108.5 | Fund. | - | Peak |
| 5200 | 72.41 | 0 | 100 | H | 34.71 | 4.52 | 0 | 111.64 | Fund. | - | Peak |
| 5200 | 57.96 | 37 | 100 | V | 34.71 | 4.52 | 0 | 97.19 | Fund. | - | Ave |
| 5200 | 60.82 | 0 | 100 | H | 34.71 | 4.52 | 0 | 100.05 | Fund. | - | Ave |
| 10400 | 30.51 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 48.01 | 74 | -25.99 | Peak |
| 10400 | 30.51 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 48.01 | 74 | -25.99 | Peak |
| 10400 | 16.47 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 33.97 | 54 | -20.03 | Ave |
| 10400 | 16.47 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 33.97 | 54 | -20.03 | Ave |
| 15600 | 33.68 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 53.56 | 74 | -20.44 | Peak |
| 15600 | 33.68 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 53.56 | 74 | -20.44 | Peak |
| 15600 | 18.72 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 38.6 | 54 | -15.4 | Ave |
| 15600 | 18.72 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 38.6 | 54 | -15.4 | Ave |
| 20800 | 32.86 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 47.92 | 74 | -26.08 | Peak |
| 20800 | 32.86 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 47.92 | 74 | -26.08 | Peak |
| 20800 | 17.62 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 32.68 | 54 | -21.32 | Ave |
| 20800 | 17.62 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 32.68 | 54 | -21.32 | Ave |

802.11n HT20 Mode, High Channel

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dBμV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBμV/m) | FCC/IC | | Comments |
|---|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBμV/m) | Margin (dB) | |
| High Channel 5240 MHz, measured at 3 meters | | | | | | | | | | | |
| 5240 | 67.39 | 37 | 100 | V | 34.71 | 4.52 | 0 | 106.62 | Fund. | - | Peak |
| 5240 | 70.85 | 0 | 100 | H | 34.71 | 4.52 | 0 | 110.08 | Fund. | - | Peak |
| 5240 | 56.13 | 37 | 100 | V | 34.71 | 4.52 | 0 | 95.36 | Fund. | - | Ave |
| 5240 | 58.76 | 0 | 100 | H | 34.71 | 4.52 | 0 | 97.99 | Fund. | - | Ave |
| 10480 | 31.07 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 48.62 | 74 | -25.38 | Peak |
| 10480 | 31.07 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 48.62 | 74 | -25.38 | Peak |
| 10480 | 16.22 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 33.77 | 54 | -20.23 | Ave |
| 10480 | 16.22 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 33.77 | 54 | -20.23 | Ave |
| 15720 | 32.58 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 52.27 | 74 | -21.73 | Peak |
| 15720 | 32.58 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 52.27 | 74 | -21.73 | Peak |
| 15720 | 17.9 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 37.59 | 54 | -16.41 | Ave |
| 15720 | 17.9 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 37.59 | 54 | -16.41 | Ave |
| 20960 | 31.48 | 0 | 100 | V | 34.6 | 9.36 | 29 | 46.44 | 74 | -27.56 | Peak |
| 20960 | 31.48 | 0 | 100 | H | 34.6 | 9.36 | 29 | 46.44 | 74 | -27.56 | Peak |
| 20960 | 17.25 | 0 | 100 | V | 34.6 | 9.36 | 29 | 32.21 | 54 | -21.79 | Ave |
| 20960 | 17.25 | 0 | 100 | H | 34.6 | 9.36 | 29 | 32.21 | 54 | -21.79 | Ave |

802.11n HT40 Mode, Low Channel

Below 1 GHz

| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB μ V/m) | Margin (dB) | Comment |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|---------|
| 51.8905 | 32.92 | 153 | V | 81 | 40 | -7.08 | QP |
| 499.9995 | 40.32 | 174 | H | 296 | 46 | -5.68 | QP |
| 375.0028 | 38.31 | 99 | H | 87 | 46 | -7.69 | QP |

Note: Only digital emissions present from 30 MHz to 1GHz, therefore only one channel was tested per modulation for below 1GHz.

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|--|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| Low Channel 5190 MHz, measured at 3 meters | | | | | | | | | | | |
| 5190 | 63.41 | 35 | 100 | V | 34.71 | 4.52 | 0 | 102.64 | Fund. | - | Peak |
| 5190 | 66.29 | 0 | 100 | H | 34.71 | 4.52 | 0 | 105.52 | Fund. | - | Peak |
| 5190 | 51.76 | 35 | 100 | V | 34.71 | 4.52 | 0 | 90.99 | Fund. | - | Ave |
| 5190 | 54.47 | 0 | 100 | H | 34.71 | 4.52 | 0 | 93.7 | Fund. | - | Ave |
| 10460 | 31.82 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 49.37 | 74 | -24.63 | Peak |
| 10460 | 31.82 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 49.37 | 74 | -24.63 | Peak |
| 10460 | 16.9 | 0 | 100 | V | 38.34 | 6.14 | 26.93 | 34.45 | 54 | -19.55 | Ave |
| 10460 | 16.9 | 0 | 100 | H | 38.34 | 6.14 | 26.93 | 34.45 | 54 | -19.55 | Ave |
| 15690 | 32.41 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 52.1 | 74 | -21.9 | Peak |
| 15690 | 32.41 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 52.1 | 74 | -21.9 | Peak |
| 15690 | 18.16 | 0 | 100 | V | 38.19 | 7.47 | 25.97 | 37.85 | 54 | -16.15 | Ave |
| 15690 | 18.16 | 0 | 100 | H | 38.19 | 7.47 | 25.97 | 37.85 | 54 | -16.15 | Ave |
| 20920 | 31.44 | 0 | 100 | V | 34.6 | 9.36 | 29 | 46.4 | 74 | -27.6 | Peak |
| 20920 | 31.44 | 0 | 100 | H | 34.6 | 9.36 | 29 | 46.4 | 74 | -27.6 | Peak |
| 20920 | 17.27 | 0 | 100 | V | 34.6 | 9.36 | 29 | 32.23 | 54 | -21.77 | Ave |
| 20920 | 17.27 | 0 | 100 | H | 34.6 | 9.36 | 29 | 32.23 | 54 | -21.77 | Ave |

802.11n HT40 Mode, High Channel

Above 1 GHz

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|---|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| High Channel 5230 MHz, measured at 3 meters | | | | | | | | | | | |
| 5230 | 67.81 | 38 | 100 | V | 34.71 | 4.52 | 0 | 107.04 | Fund. | - | Peak |
| 5230 | 69.08 | 0 | 100 | H | 34.71 | 4.52 | 0 | 108.31 | Fund. | - | Peak |
| 5230 | 56.24 | 38 | 100 | V | 34.71 | 4.52 | 0 | 95.47 | Fund. | - | Ave |
| 5230 | 57.64 | 0 | 100 | H | 34.71 | 4.52 | 0 | 96.87 | Fund. | - | Ave |
| 10380 | 31.55 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 49.05 | 74 | -24.95 | Peak |
| 10380 | 31.55 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 49.05 | 74 | -24.95 | Peak |
| 10380 | 16.8 | 0 | 100 | V | 38.33 | 6.14 | 26.97 | 34.3 | 54 | -19.7 | Ave |
| 10380 | 16.8 | 0 | 100 | H | 38.33 | 6.14 | 26.97 | 34.3 | 54 | -19.7 | Ave |
| 15570 | 32.55 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 52.43 | 74 | -21.57 | Peak |
| 15570 | 32.55 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 52.43 | 74 | -21.57 | Peak |
| 15570 | 18.2 | 0 | 100 | V | 38.33 | 7.47 | 25.92 | 38.08 | 54 | -15.92 | Ave |
| 15570 | 18.2 | 0 | 100 | H | 38.33 | 7.47 | 25.92 | 38.08 | 54 | -15.92 | Ave |
| 20760 | 31.98 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 47.04 | 74 | -26.96 | Peak |
| 20760 | 31.98 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 47.04 | 74 | -26.96 | Peak |
| 20760 | 17.49 | 0 | 100 | V | 34.6 | 9.36 | 28.9 | 32.55 | 54 | -21.45 | Ave |
| 20760 | 17.49 | 0 | 100 | H | 34.6 | 9.36 | 28.9 | 32.55 | 54 | -21.45 | Ave |

5) Restricted Band Edges, Patch Antenna**802.11a Mode**

| Frequency (MHz) | S.A. Reading (dBμV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBμV/m) | FCC/IC | | Comments |
|--|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBμV/m) | Margin (dB) | |
| Low Channel 5180 MHz, measured at 3 meters | | | | | | | | | | | |
| 5150 | 27.45 | 36 | 100 | V | 34.71 | 4.38 | 0 | 66.54 | 74 | -7.46 | Peak |
| 5150 | 27.74 | 4 | 100 | H | 34.71 | 4.38 | 0 | 66.83 | 74 | -7.17 | Peak |
| 5150 | 13.54 | 36 | 100 | V | 34.71 | 4.38 | 0 | 52.63 | 54 | -1.37 | Ave |
| 5150 | 13.63 | 4 | 100 | H | 34.71 | 4.38 | 0 | 52.72 | 54 | -1.28 | Ave |

802.11n HT20 Mode

| Frequency (MHz) | S.A. Reading (dBμV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBμV/m) | FCC/IC | | Comments |
|--|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBμV/m) | Margin (dB) | |
| Low Channel 5180 MHz, measured at 3 meters | | | | | | | | | | | |
| 5150 | 27.73 | 36 | 100 | V | 34.71 | 4.38 | 0 | 66.82 | 74 | -7.18 | Peak |
| 5150 | 27.39 | 0 | 100 | H | 34.71 | 4.38 | 0 | 66.48 | 74 | -7.52 | Peak |
| 5150 | 13.46 | 36 | 100 | V | 34.71 | 4.38 | 0 | 52.55 | 54 | -1.45 | Ave |
| 5150 | 13.61 | 0 | 100 | H | 34.71 | 4.38 | 0 | 52.7 | 54 | -1.3 | Ave |

802.11n HT40 Mode

| Frequency (MHz) | S.A. Reading (dBμV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBμV/m) | FCC/IC | | Comments |
|--|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBμV/m) | Margin (dB) | |
| Low Channel 5190 MHz, measured at 3 meters | | | | | | | | | | | |
| 5150 | 28.3 | 35 | 100 | V | 34.71 | 4.38 | 0 | 67.39 | 74 | -6.61 | Peak |
| 5150 | 27.6 | 0 | 100 | H | 34.71 | 4.38 | 0 | 66.69 | 74 | -7.31 | Peak |
| 5150 | 13.64 | 35 | 100 | V | 34.71 | 4.38 | 0 | 52.73 | 54 | -1.27 | Ave |
| 5150 | 14.25 | 0 | 100 | H | 34.71 | 4.38 | 0 | 53.34 | 54 | -0.66 | Ave |

6) Co-location with 2.4 GHz and 5 GHz, Patch Antenna

Worst Case: 2.4 GHz: 802.11b, 2412 MHz; 5.2GHz: 802.11a, 5240MHz

30-1000 MHz:

| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB μ V/m) | Margin (dB) |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|
| 56.01462 | 39.58 | 122 | V | 54 | 40 | -0.42 |
| 75.15216 | 30.22 | 112 | V | 321 | 40 | -9.78 |
| 500.0614 | 32.85 | 100 | H | 185 | 46 | -13.15 |

Above 1 GHz:

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | FCC/IC | | Comments |
|-----------------|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| 4824 | 41.44 | 16 | 100 | V | 33.46 | 4.06 | 27.7 | 51.26 | 74 | -22.74 | Peak |
| 4824 | 42.21 | 0 | 100 | H | 33.46 | 4.06 | 27.7 | 52.03 | 74 | -21.97 | Peak |
| 4824 | 29.52 | 16 | 100 | V | 33.46 | 4.06 | 27.7 | 39.34 | 54 | -14.66 | Ave |
| 4824 | 31.54 | 0 | 100 | H | 33.46 | 4.06 | 27.7 | 41.36 | 54 | -12.64 | Ave |

8 FCC §15.407(a) & IC RSS-210 §A9.2 – 26 dB & 99% Emission Bandwidth

8.1 Applicable Standard

FCC §15.407(a) and IC RSS-210 §A9.2.

8.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 26 dB from the reference level. Record the frequency difference as the emissions bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

8.3 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent | Spectrum Analyzer | E4440A | US42221851 | 2012-02-28 | 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: | 22 °C |
| Relative Humidity: | 43 % |
| ATM Pressure: | 101.1 kPa |

The testing was performed by Jeffrey Wu on 2012-10-17 in 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) | Limit (kHz) | Results |
|----------|-----------------|--------------------------------|------------------------------|-------------|-----------|
| Chain J0 | | | | | |
| Low | 5180 | 23.267 | 16.9112 | > 500 | Compliant |
| Middle | 5200 | 22.553 | 16.8436 | > 500 | Compliant |
| High | 5240 | 24.019 | 16.9090 | > 500 | Compliant |
| Chain J1 | | | | | |
| Low | 5180 | 23.580 | 17.0160 | > 500 | Compliant |
| Middle | 5200 | 25.076 | 16.9917 | > 500 | Compliant |
| High | 5240 | 25.457 | 16.9786 | > 500 | Compliant |

802.11n HT20 mode

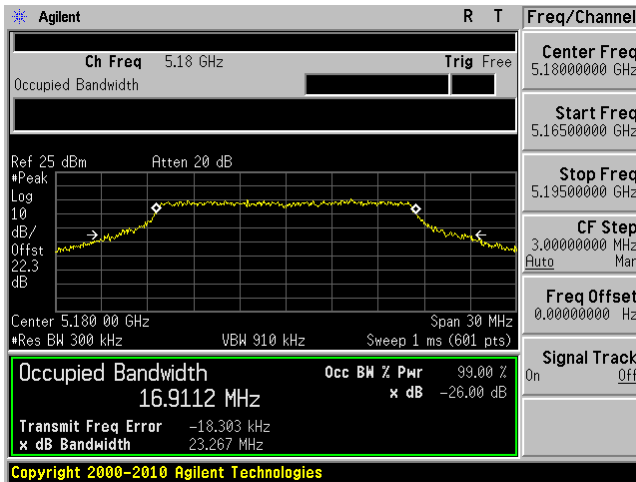
| Channel | Frequency (MHz) | 26 dB Emission Bandwidth (MHz) | 99% Emission Bandwidth (MHz) | Limit (kHz) | Results |
|----------|-----------------|--------------------------------|------------------------------|-------------|-----------|
| Chain J0 | | | | | |
| Low | 5180 | 24.563 | 18.0252 | > 500 | Compliant |
| Middle | 5200 | 24.693 | 18.0157 | > 500 | Compliant |
| High | 5240 | 24.686 | 18.1046 | > 500 | Compliant |
| Chain J1 | | | | | |
| Low | 5180 | 24.792 | 18.1423 | > 500 | Compliant |
| Middle | 5200 | 24.425 | 18.0967 | > 500 | Compliant |
| High | 5240 | 24.757 | 18.1508 | > 500 | Compliant |

802.11n HT40 mode

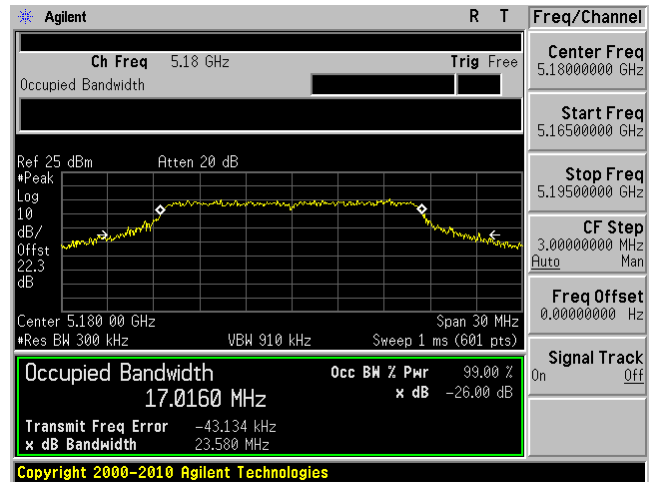
| Channel | Frequency (MHz) | 26 dB Emission Bandwidth (MHz) | 99% Emission Bandwidth (MHz) | Limit (kHz) | Results |
|----------|-----------------|--------------------------------|------------------------------|-------------|-----------|
| Chain J0 | | | | | |
| Low | 5190 | 48.119 | 36.8389 | > 500 | Compliant |
| High | 5230 | 50.151 | 36.7987 | > 500 | Compliant |
| Chain J1 | | | | | |
| Low | 5190 | 49.997 | 37.1143 | > 500 | Compliant |
| High | 5230 | 50.302 | 37.0477 | > 500 | Compliant |

5150-5250 MHz Band

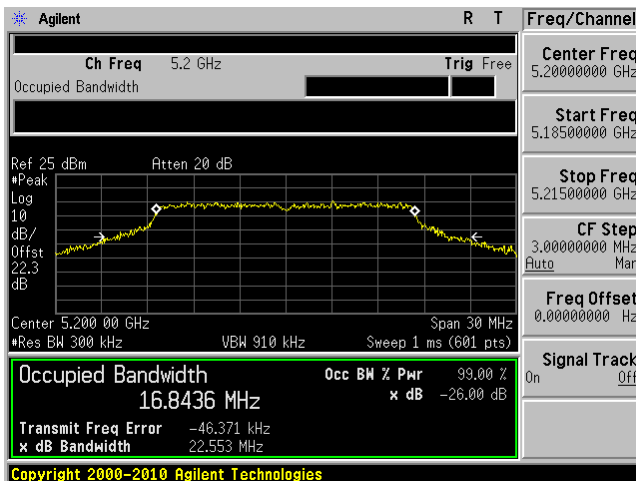
802.11a mode, 5180 MHz, Chain J0



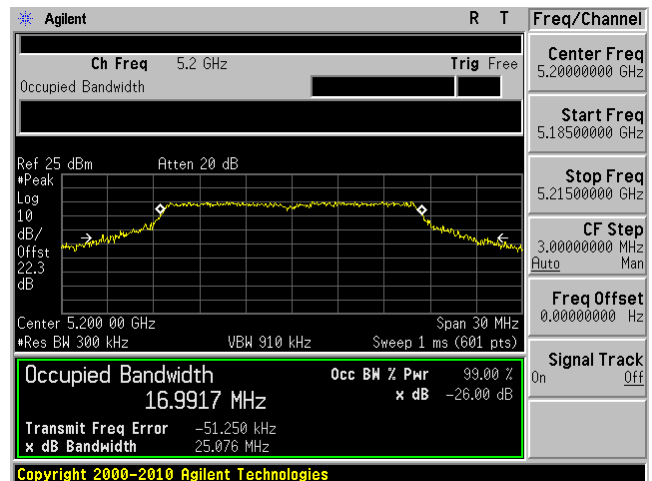
802.11a mode, 5180 MHz, Chain J1



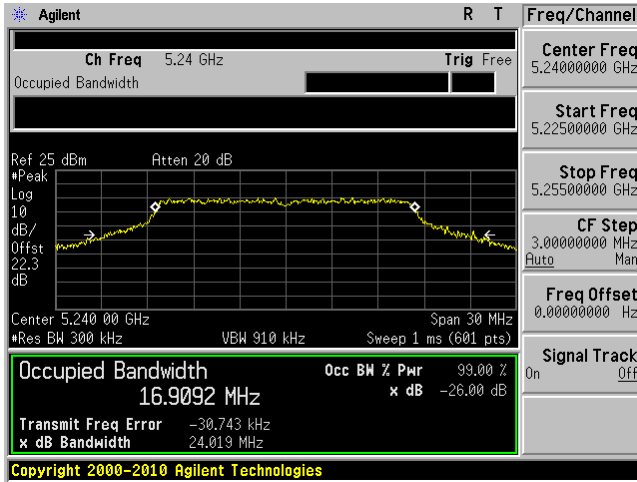
802.11a mode, 5200 MHz, Chain J0



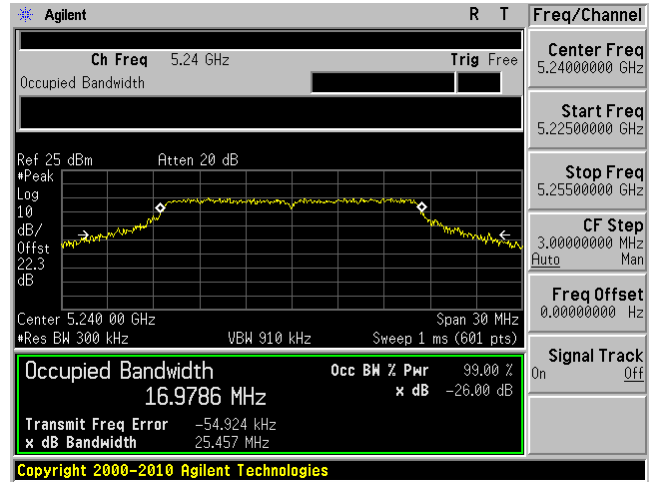
802.11a mode, 5200 MHz, Chain J1



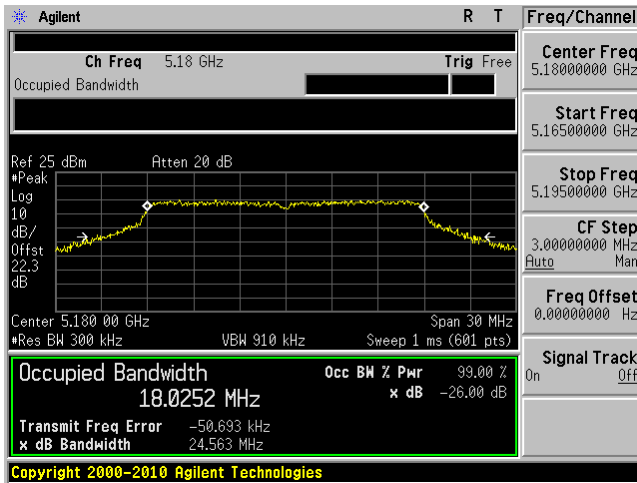
802.11a mode, 5240 MHz, Chain J0



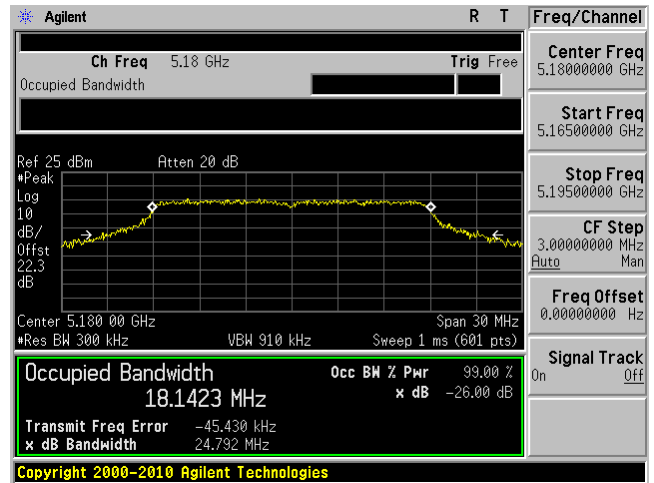
802.11a mode, 5240 MHz, Chain J1



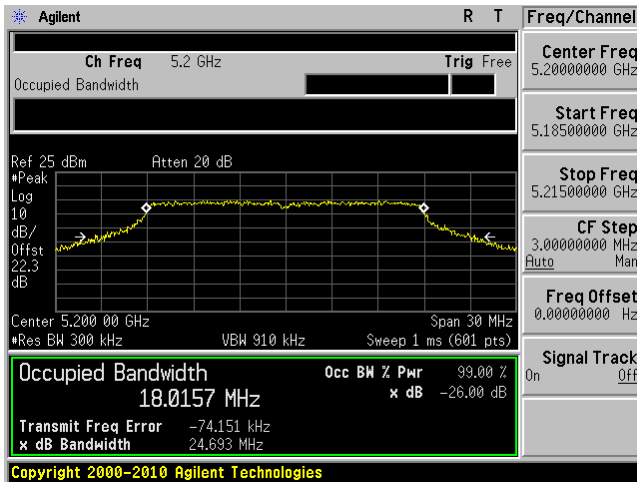
802.11n HT20 mode, 5180 MHz, Chain J0



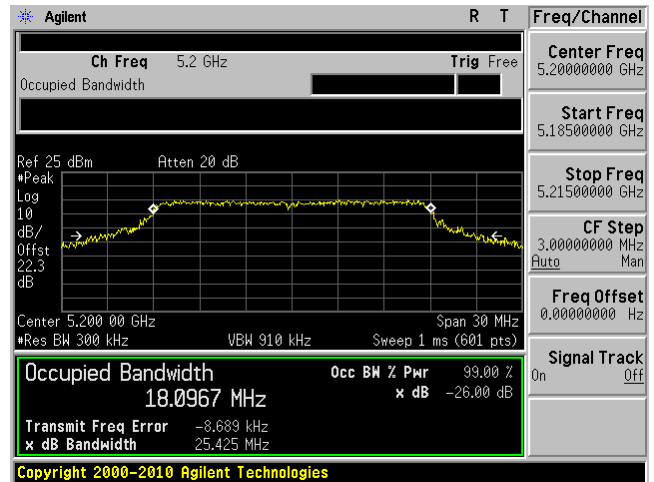
802.11n HT20 mode, 5180 MHz, Chain J1



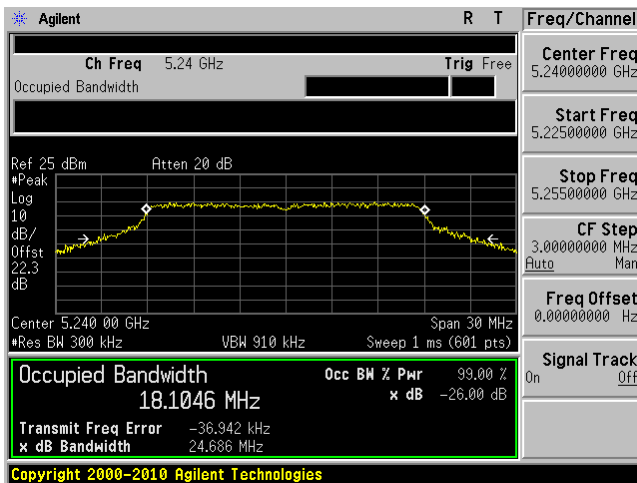
802.11n HT20 mode, 5200 MHz, Chain J0



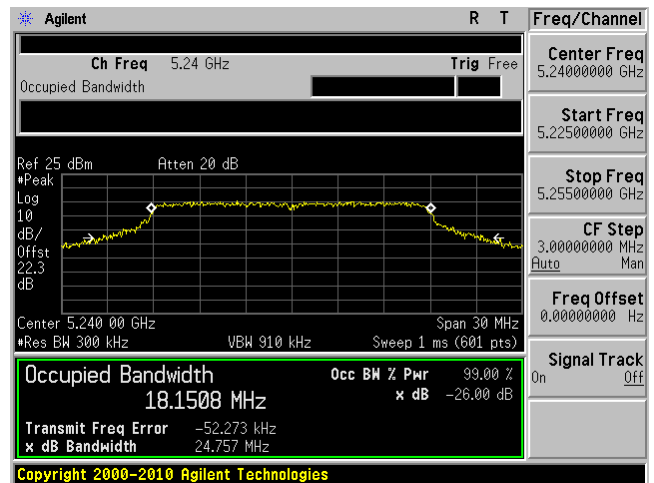
802.11n HT20 mode, 5200 MHz, Chain J1



802.11n HT20 mode, 5240 MHz, Chain J0

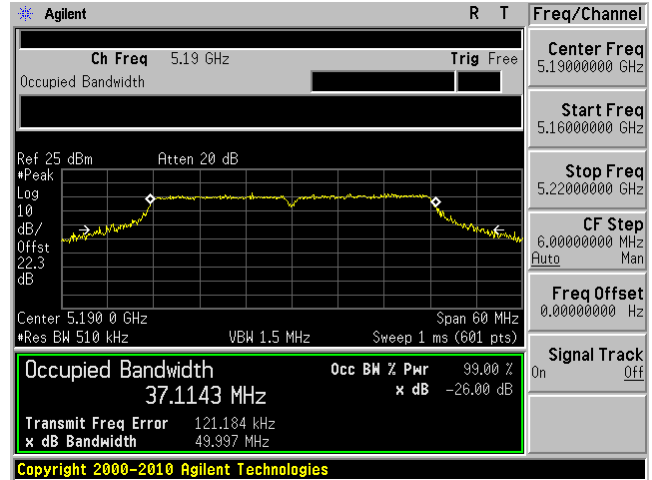
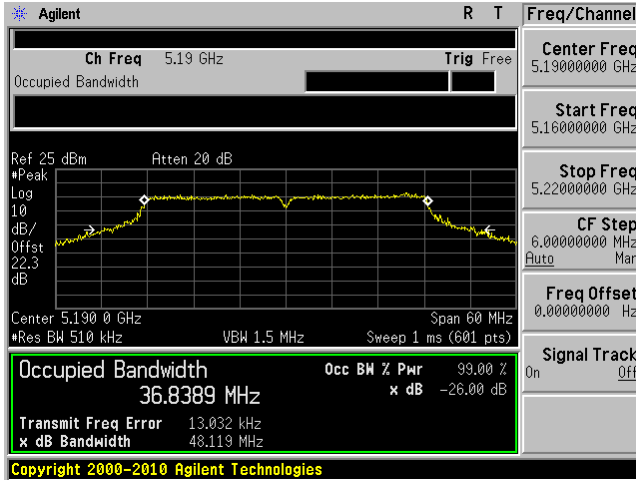


802.11n HT20 mode, 5240 MHz, Chain J1



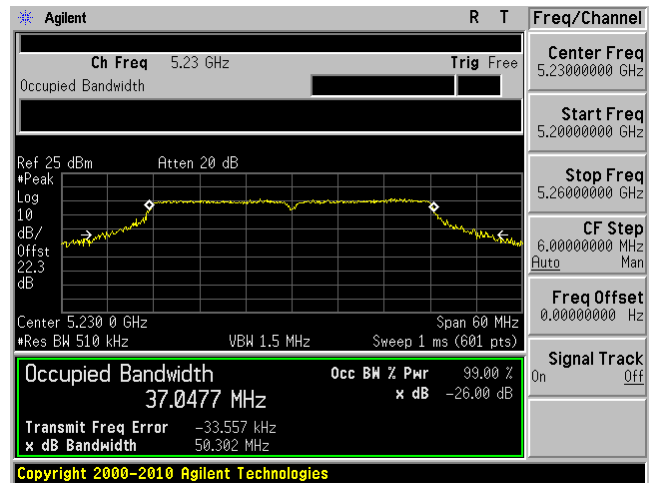
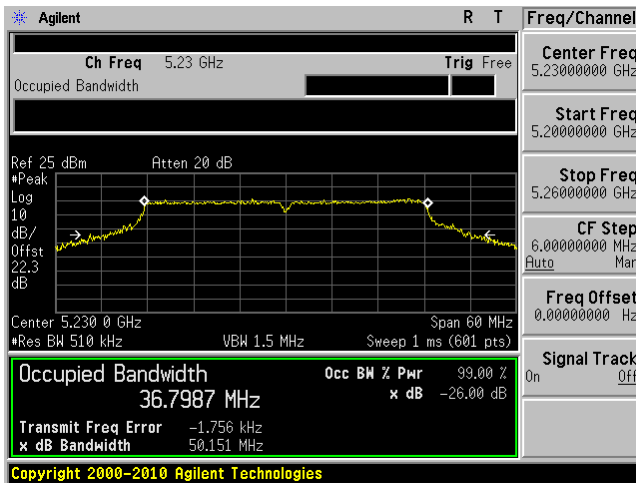
802.11n HT40 mode, 5190 MHz, Chain J0

802.11n HT40 mode, 5190 MHz, Chain J1



802.11n HT40 mode, 5230 MHz, Chain J0

802.11n HT40 mode, 5230 MHz, Chain J1



9 FCC §407(a)(1) & IC RSS-210 §A9.2 - Peak Output Power Measurement

9.1 Applicable Standard

According to FCC §15.407(a)(1)

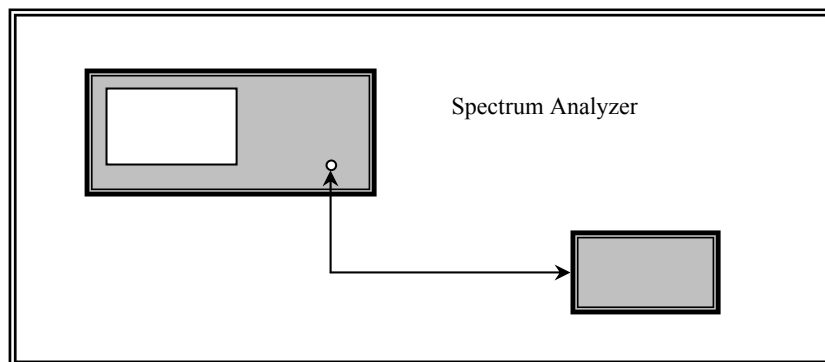
For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. 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.

According to IC RSS-210 §A9.2:

For the 5.15–5.250 GHz bands, the maximum e.i.r.p shall not exceed 200 mW or $10 + 10 \log B$, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p spectral density shall not exceed 10 dBm in any 1.0 MHz band.

9.2 Measurement Procedure

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



9.3 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent | Spectrum Analyzer | E4440A | MY44303352 | 2012-10-16 | 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: | 43 % |
| ATM Pressure: | 101.3kPa |

The testing was performed by Lionel Lara from 2013-04-10 at the RF site.

9.5 Test Results

Dipole Antennas/ Patch Antenna:

802.11a mode

| Channel | Frequency (MHz) | TX Chain J0 Power (dBm) | TX Chain J1 Power (dBm) | Total Power (dBm) | Limit (dBm) | Margin (dB) | Power Setting |
|---------|-----------------|-------------------------|-------------------------|-------------------|-------------|-------------|---------------|
| Low | 5180 | 12.03 | 11.50 | 14.78 | 17 | -2.22 | 14 |
| Middle | 5200 | 12.66 | 11.96 | 15.33 | 17 | -1.67 | 13 |
| High | 5240 | 13.36 | 11.31 | 15.47 | 17 | -1.53 | 14 |

802.11n HT20 mode

| Channel | Frequency (MHz) | TX Chain J0 Power (dBm) | TX Chain J1 Power (dBm) | Total Power (dBm) | Limit (dBm) | Margin (dB) | Power Setting |
|---------|-----------------|-------------------------|-------------------------|-------------------|-------------|-------------|---------------|
| Low | 5180 | 12.14 | 11.17 | 14.69 | 17 | -2.31 | 14 |
| Middle | 5200 | 12.16 | 12.00 | 15.09 | 17 | -1.91 | 13 |
| High | 5240 | 13.09 | 11.41 | 15.34 | 17 | -1.66 | 14 |

802.11n HT40 mode

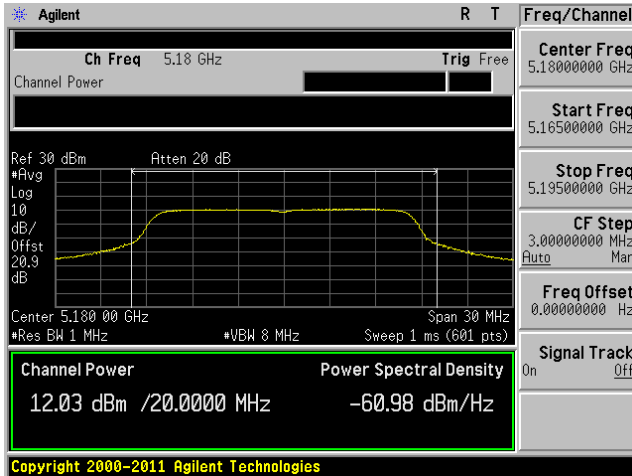
| Channel | Frequency (MHz) | TX Chain J0 Power (dBm) | TX Chain J1 Power (dBm) | Total Power (dBm) | Limit (dBm) | Margin (dB) | Power Setting |
|---------|-----------------|-------------------------|-------------------------|-------------------|-------------|-------------|---------------|
| Low | 5190 | 12.12 | 11.66 | 14.91 | 17 | -2.09 | 14 |
| High | 5230 | 13.07 | 12.80 | 15.95 | 17 | -1.05 | 14 |

Note: Dipole and patch antennas have the same software settings for every mode and channel, therefore the output at the antenna port is the same.

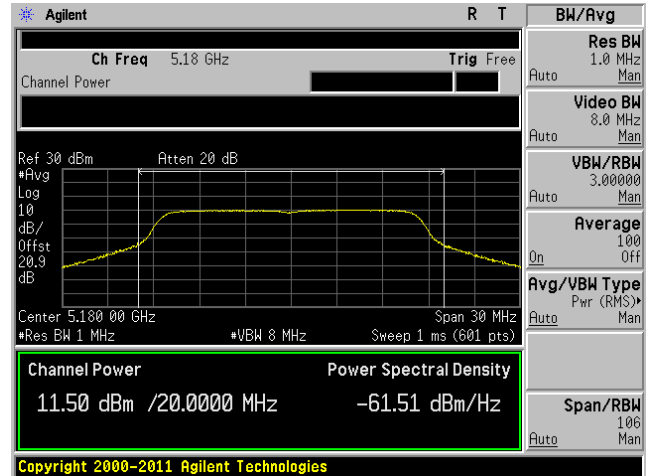
Dipole Antennas/ Patch Antenna :

802.11a mode

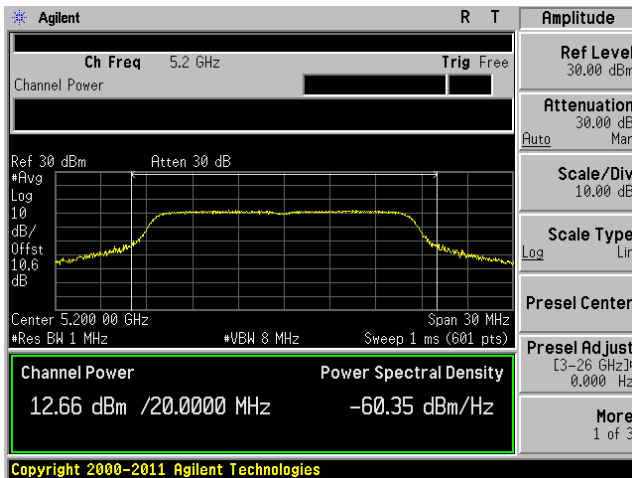
802.11a mode, 5180 MHz, Chain J0



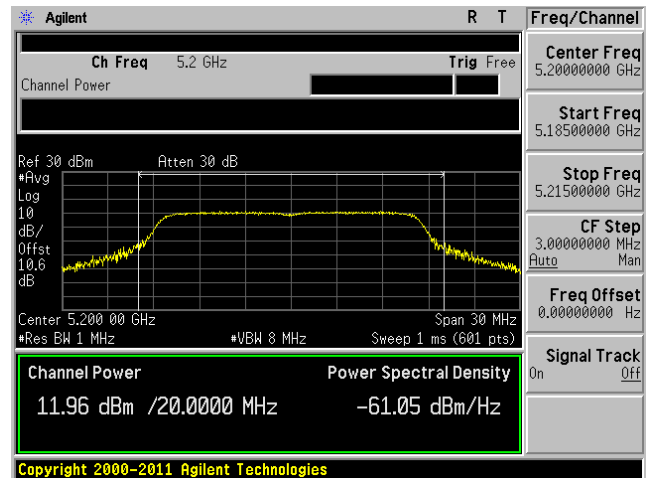
802.11a mode, 5180 MHz, Chain J1



802.11a mode, 5200 MHz, Chain J0

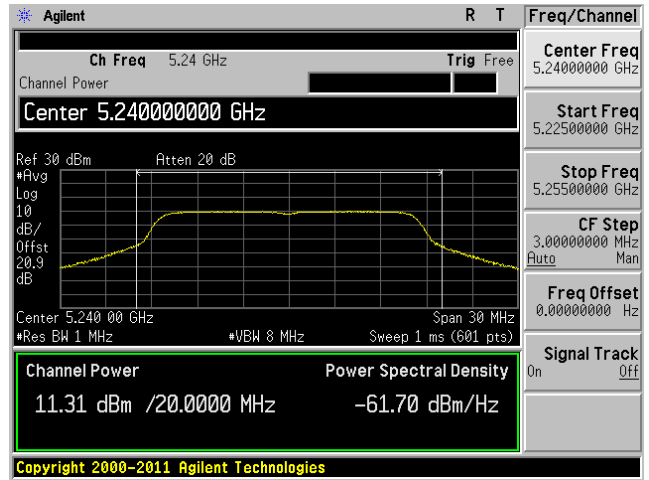
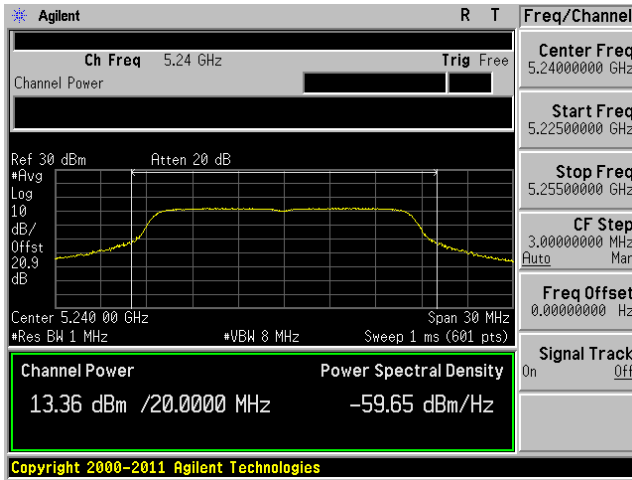


802.11a mode, 5200 MHz, Chain J1



802.11a mode, 5240 MHz, Chain J0

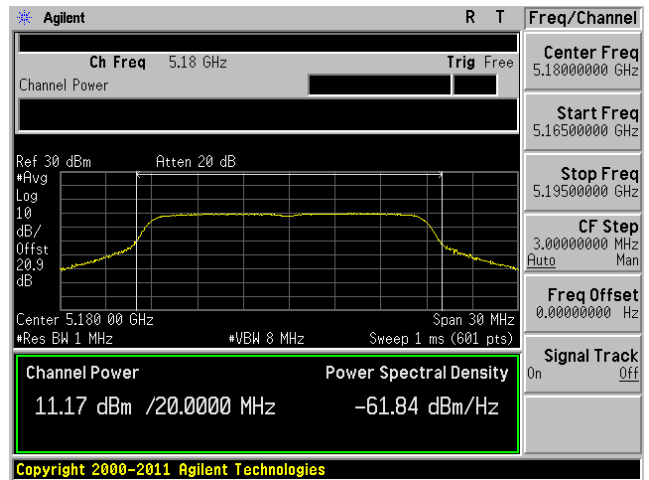
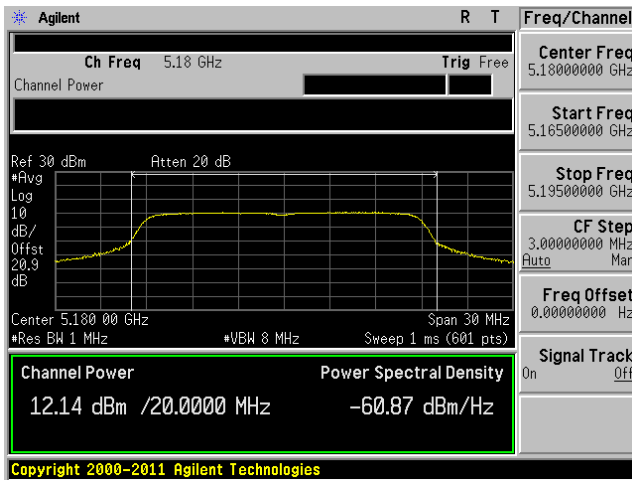
802.11a mode, 5240 MHz, Chain J1



802.11n HT20 mode

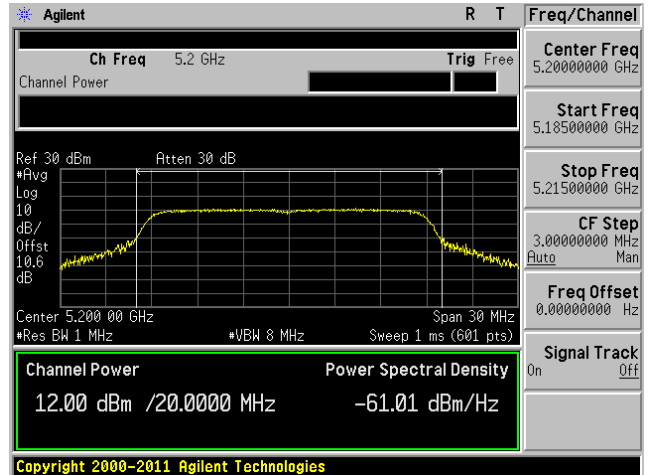
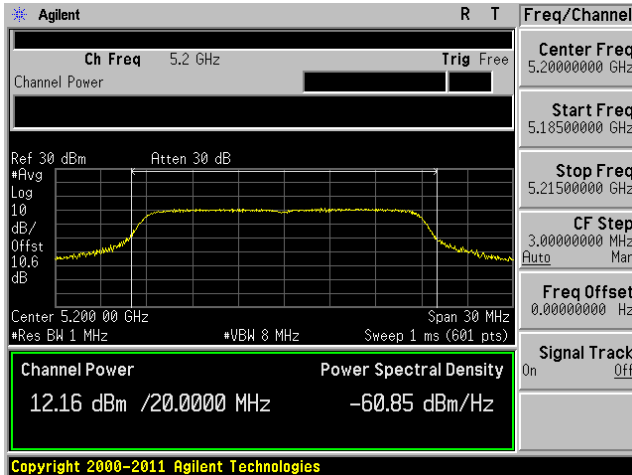
802.11n HT20 mode, 5180 MHz, Chain J0

802.11n HT20 mode, 5180 MHz, Chain J1



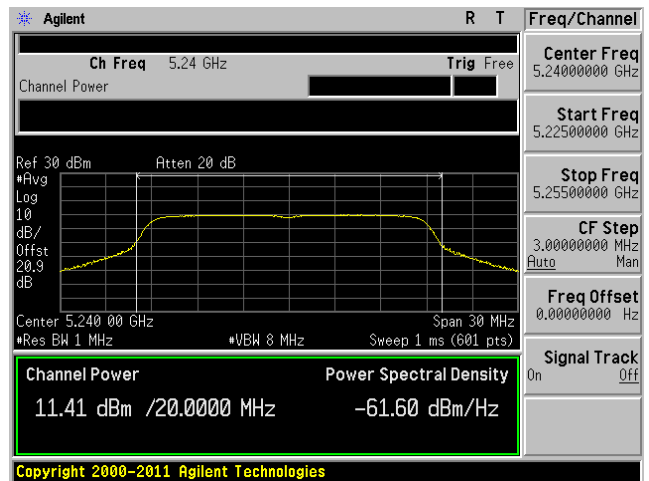
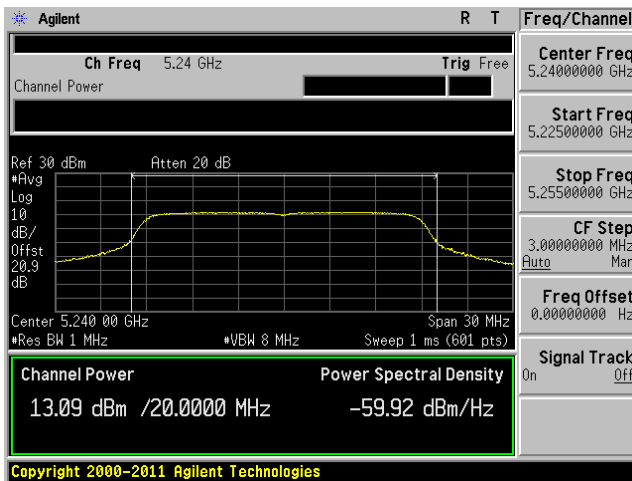
802.11n HT20 mode, 5200 MHz, Chain J0

802.11n HT20 mode, 5200 MHz, Chain J1



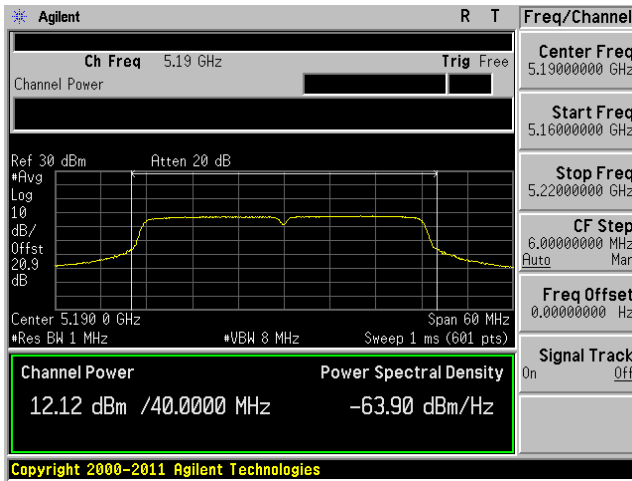
802.11n HT20 mode, 5240 MHz, Chain J0

802.11n HT20 mode, 5240 MHz, Chain J1

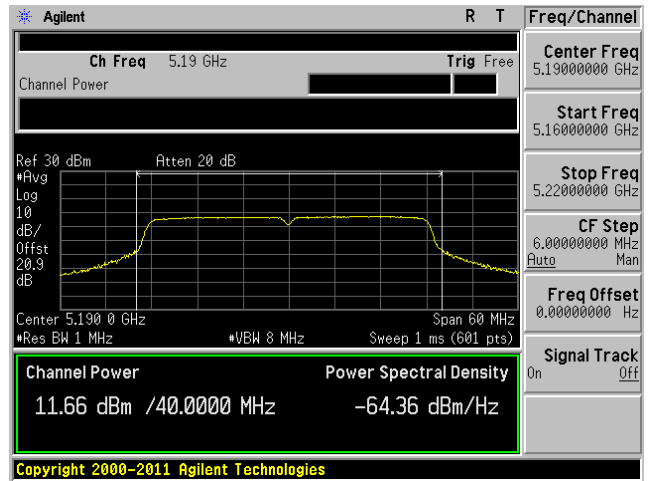


802.11n HT40 mode

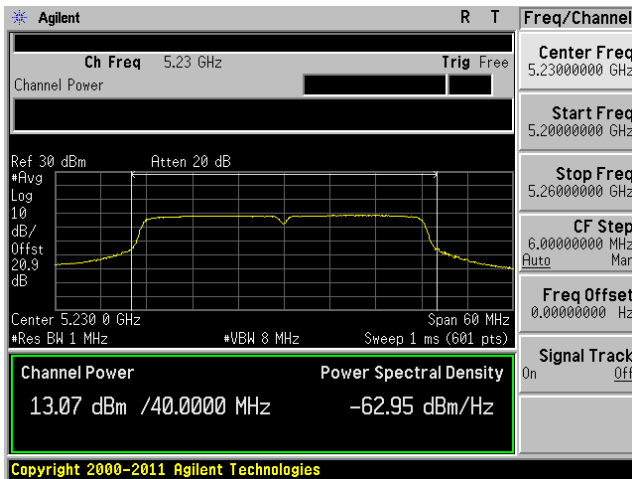
802.11n HT40 mode, 5190 MHz, Chain J0



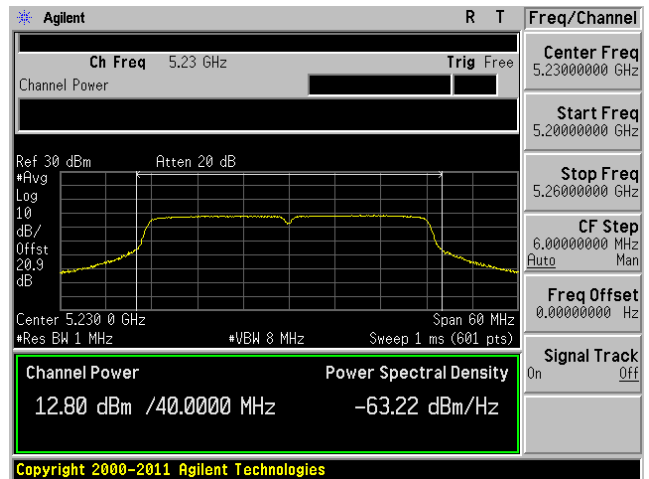
802.11n HT40 mode, 5190 MHz, Chain J1



802.11n HT40 mode, 5230 MHz, Chain J0



802.11n HT40 mode, 5230 MHz, Chain J1



10 FCC §15.407(b) & IC RSS-210 §A9.2 - 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

According to RSS-210 §A9.2, emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz

10.2 Measurement Procedure

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

10.3 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent | Spectrum Analyzer | E4440A | US42221851 | 2012-02-28 | 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: | 23 °C |
| Relative Humidity: | 44 % |
| ATM Pressure: | 101.2 kPa |

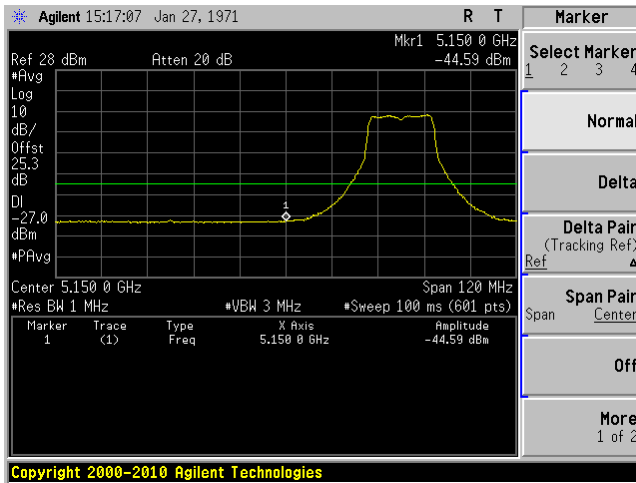
The testing was performed by Jeffrey Wu on 2012-09-17 in RF site.

10.5 Test Results

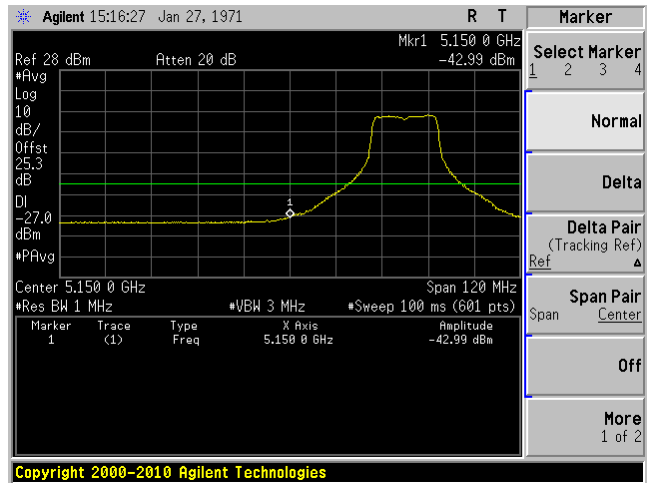
Please refer to following pages for plots of band edge.

5150-5250 MHz Band

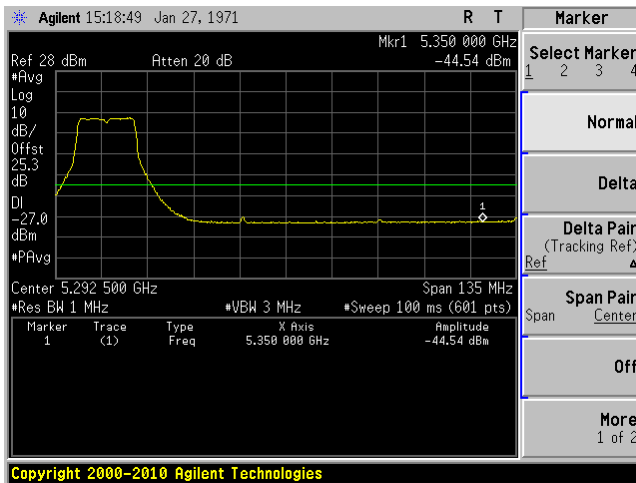
802.11a mode, Lowest Channel, Chain J0



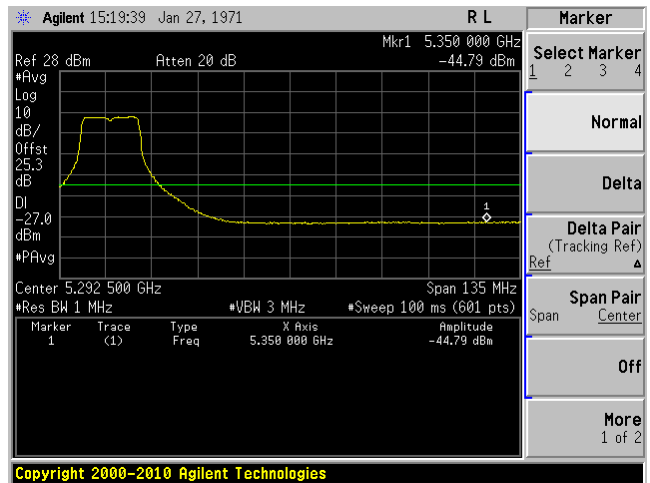
802.11a mode, Lowest Channel, Chain J1



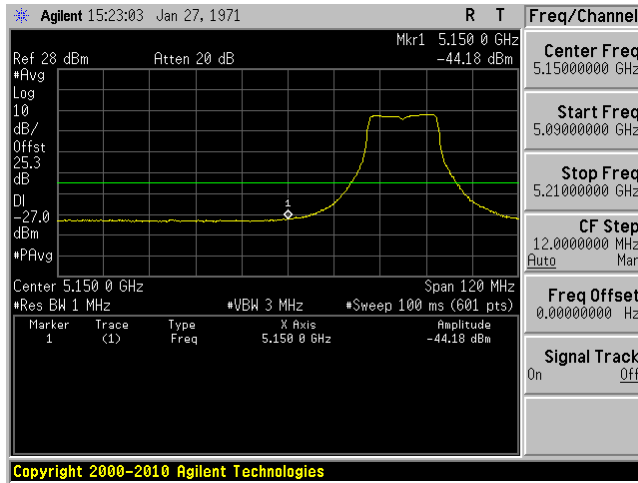
802.11a mode, Highest Channel, Chain J0



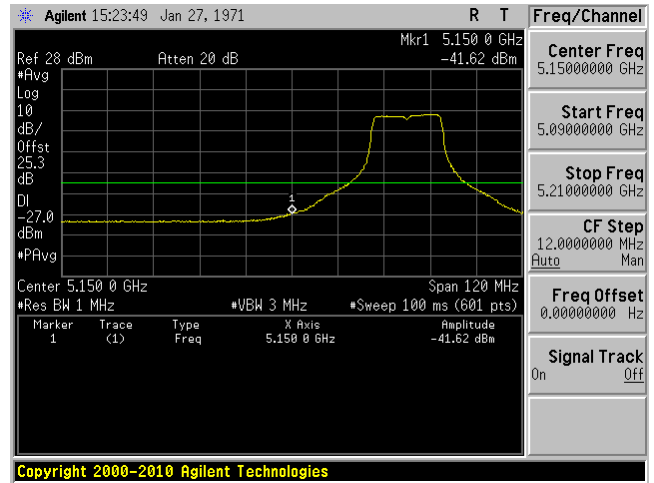
802.11a mode, Highest Channel, Chain J1



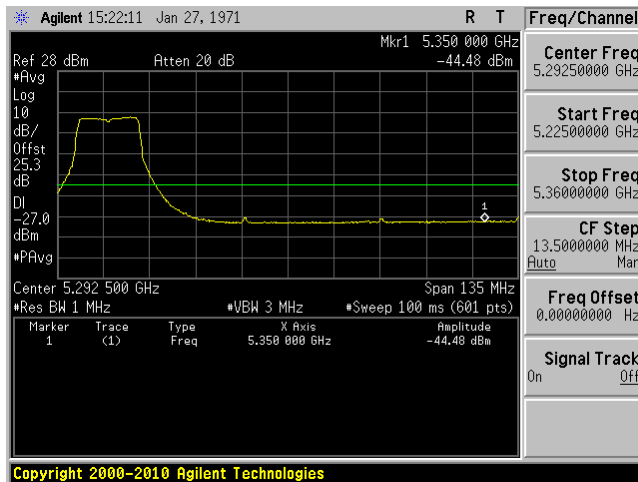
802.11n HT20 mode, Lowest Channel, Chain J0



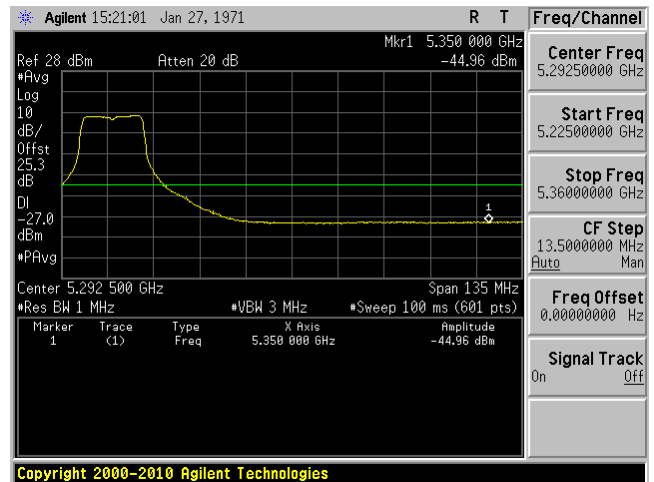
802.11n HT20 mode, Lowest Channel, Chain J1



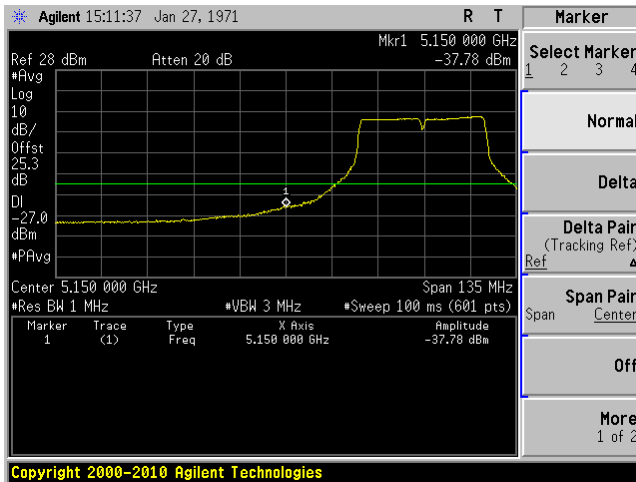
802.11n HT20 mode, Highest Channel, Chain J0



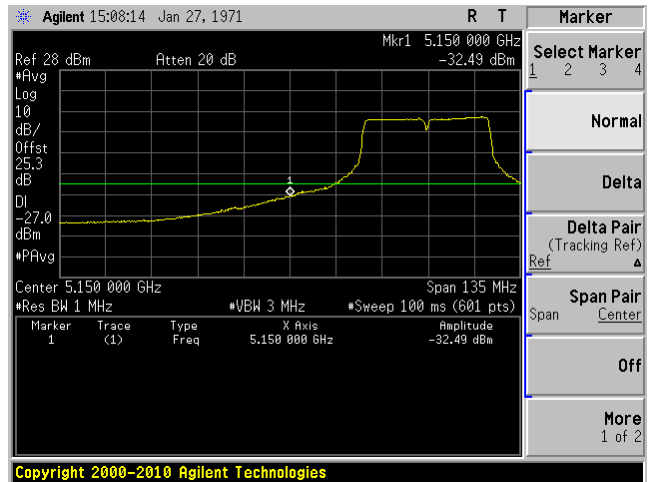
802.11n HT20 mode, Highest Channel, Chain J1



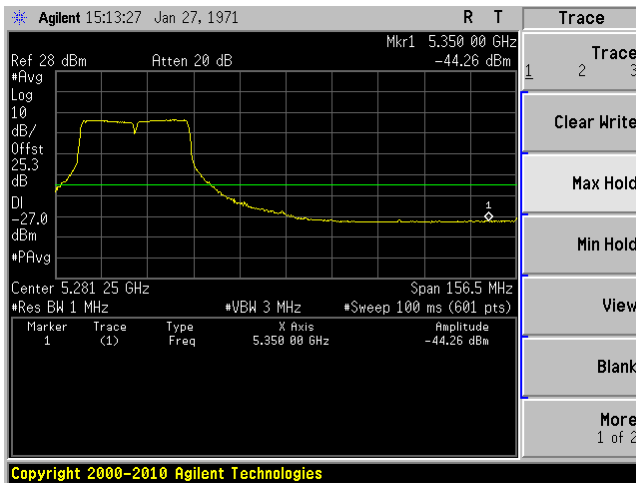
802.11n HT40 mode, Lowest Channel, Chain J0



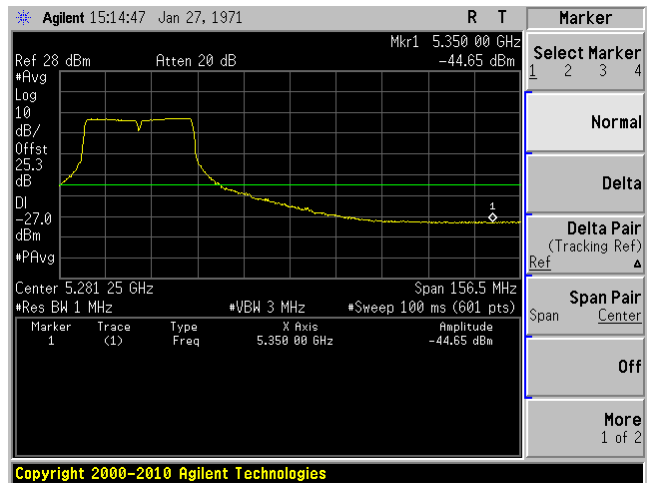
802.11n HT40 mode, Lowest Channel, Chain J1



802.11n HT40 mode, Highest Channel, Chain J0



802.11n HT40 mode, Highest Channel, Chain J1



11 FCC §15.407(a)(1) & IC RSS-210 §A9.2 - Power Spectral Density

11.1 Applicable Standard

According to FCC §15.407(a)(1)

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.

According to IC RSS-210 §A9.2:

5150-5250MHz the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log₁₀ B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

11.2 Measurement Procedure

- (i) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- (ii) Set RBW = 1 MHz.
- (iii) Set VBW ≥ 3 MHz.
- (iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
- (v) Sweep time = auto.
- (vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- (vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”.
- (viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
- (ix) Compute power by integrating the spectrum across the 26 dB EBW of the signal using the spectrum analyzer’s band power measurement function with band limits set equal to the EBW band edges. If the spectrum analyzer does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW of the spectrum.

11.3 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent | Spectrum Analyzer | E4440A | MY44303352 | 2012-10-16 | 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: | 23 °C |
| Relative Humidity: | 45 % |
| ATM Pressure: | 101.7 kPa |

The testing was performed by Lionel Lara from 2013-04-11 at the RF site.

11.5 Test Results

Dipole Antennas/ Patch Antenna:

802.11a mode

| Channel | Frequency (MHz) | TX Chain J0 Power (dBm) | TX Chain J1 Power (dBm) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|-------------------------|-------------------------|-------------------|-------------|-------------|
| Low | 5180 | 0.978 | 0.986 | 3.99 | 4 | -0.01 |
| Middle | 5200 | 0.918 | 0.714 | 3.83 | 4 | -0.17 |
| High | 5240 | 1.301 | 0.582 | 3.97 | 4 | -0.03 |

802.11n HT20 mode

| Channel | Frequency (MHz) | TX Chain J0 Power (dBm) | TX Chain J1 Power (dBm) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|-------------------------|-------------------------|-------------------|-------------|-------------|
| Low | 5180 | 0.829 | -0.685 | 3.15 | 4 | -0.85 |
| Middle | 5200 | 0.800 | 0.773 | 3.80 | 4 | -0.20 |
| High | 5240 | 1.616 | -0.802 | 3.58 | 4 | -0.42 |

802.11n HT40 mode

| Channel | Frequency (MHz) | TX Chain J0 Power (dBm) | TX Chain J8 Power (dBm) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|-------------------------|-------------------------|-------------------|-------------|-------------|
| Low | 5190 | -2.398 | -3.132 | 0.26 | 4 | -3.74 |
| High | 5230 | -1.711 | -2.455 | 0.94 | 4 | -3.06 |

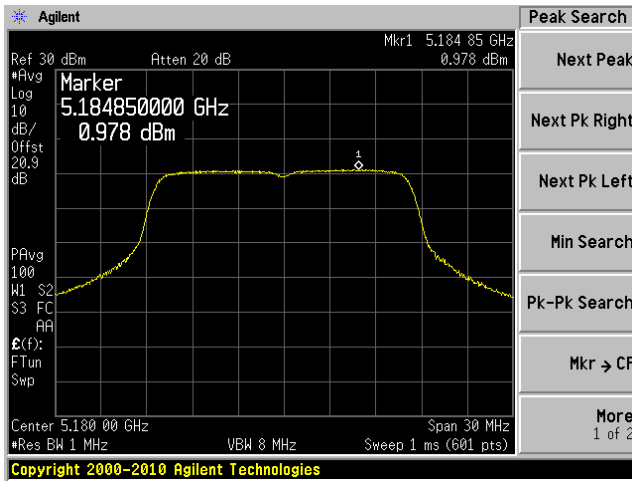
Note: Dipole and patch antennas have the same software settings for every mode and channel, therefore the output at the antenna port is the same.

Please refer to the following plots.

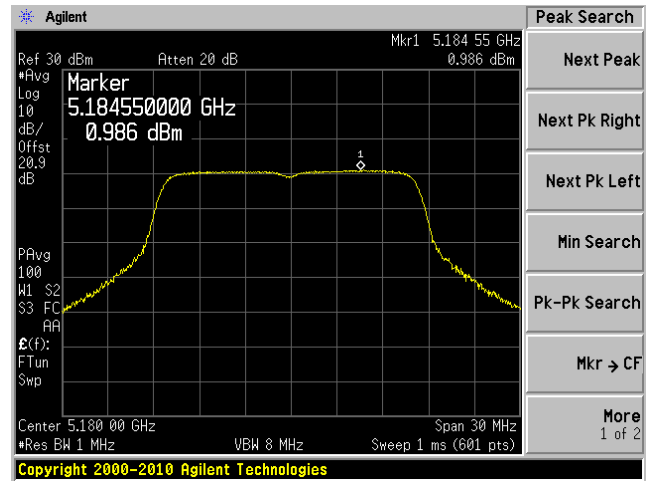
Dipole Antennas/ Patch Antenna:

802.11a mode

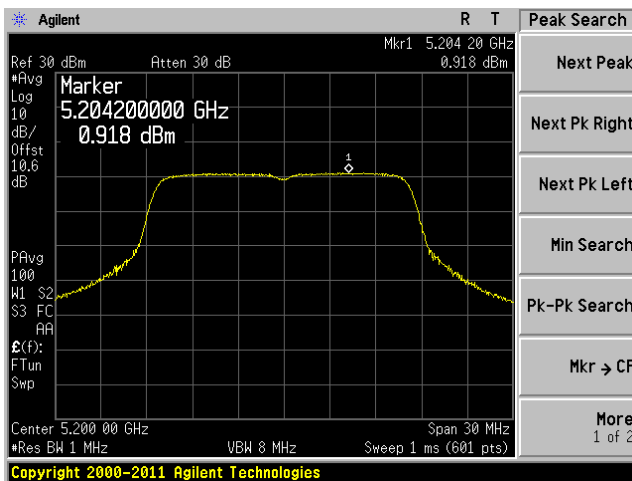
802.11a mode, 5180 MHz, Chain J0



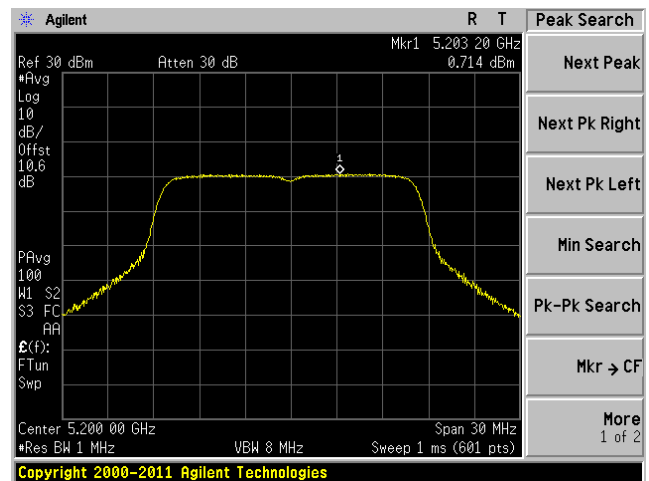
802.11a mode, 5180 MHz, Chain J1



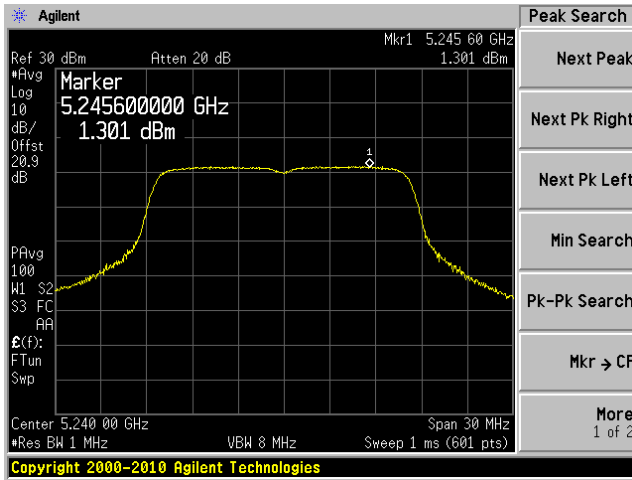
802.11a mode, 5200 MHz, Chain J0



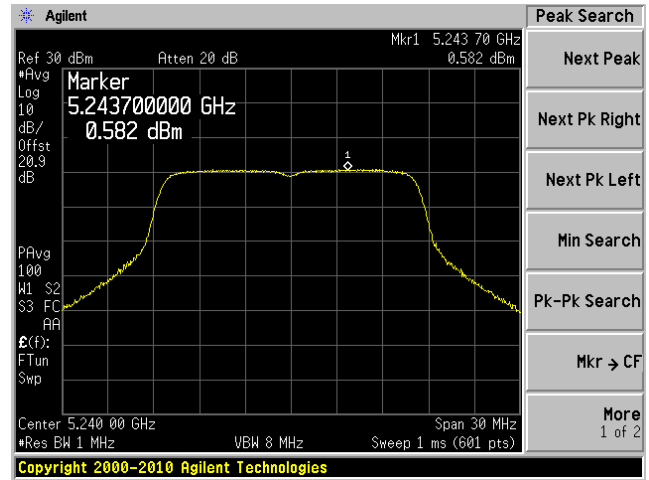
802.11a mode, 5200 MHz, Chain J1



802.11a mode, 5240 MHz, Chain J0

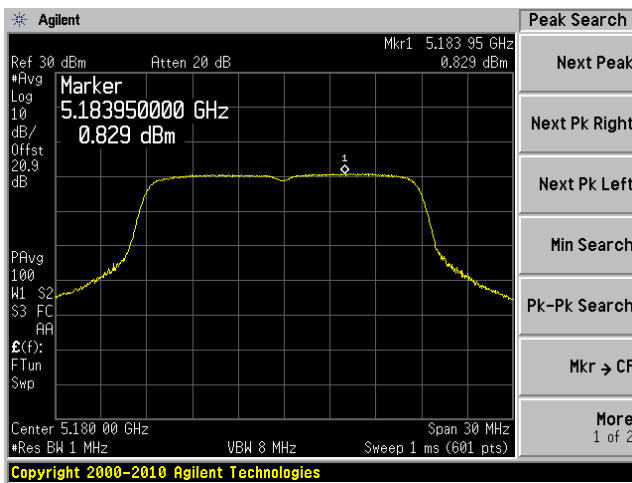


802.11a mode, 5240 MHz, Chain J1

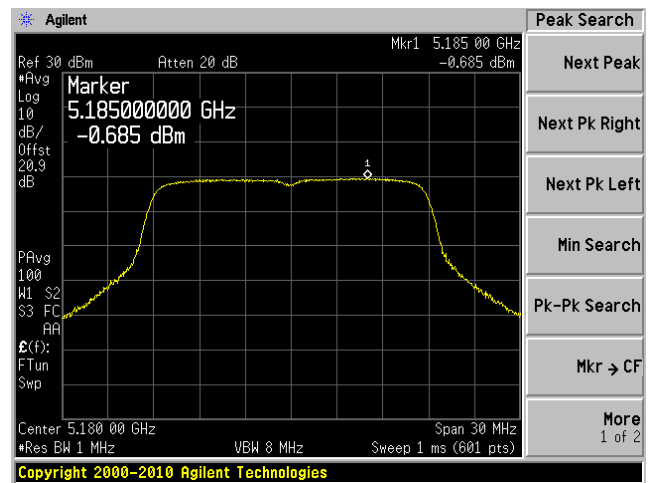


802.11n HT20 mode

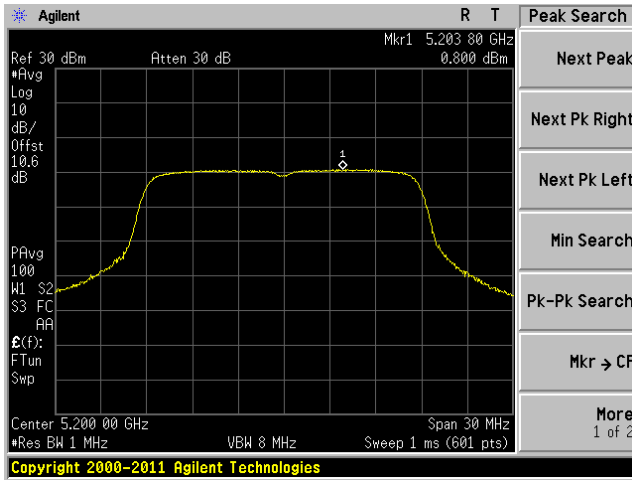
802.11n HT20 mode, 5180 MHz, Chain J0



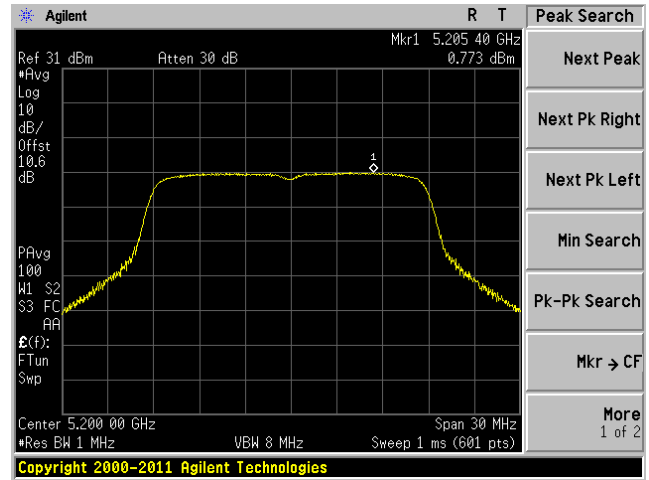
802.11n HT20 mode, 5180 MHz, Chain J1



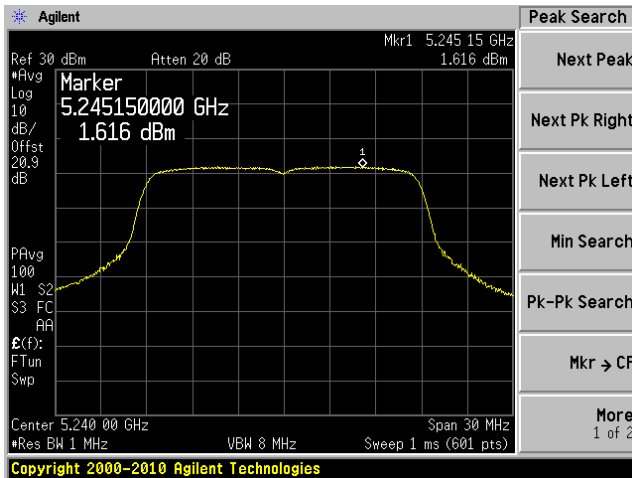
802.11n HT20 mode, 5200 MHz, Chain J0



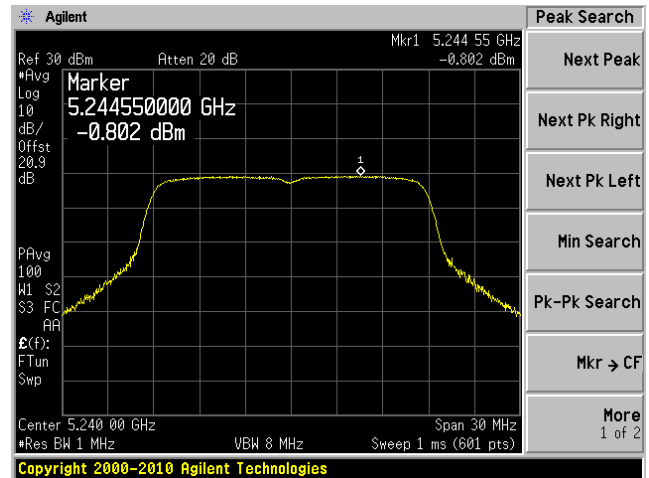
802.11n HT20 mode, 5200 MHz, Chain J1



802.11n HT20 mode, 5240 MHz, Chain J0

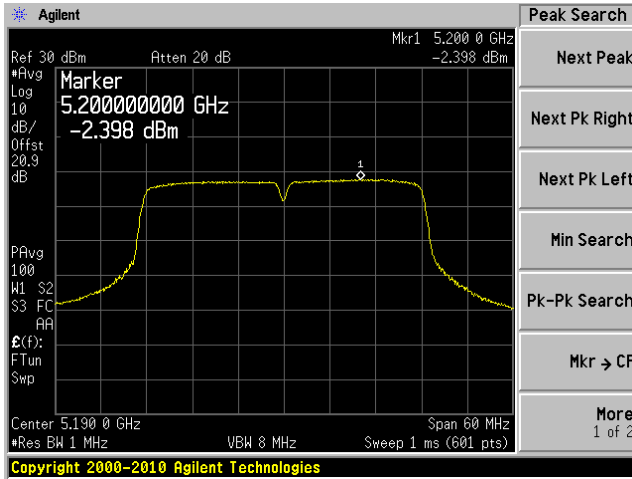


802.11n HT20 mode, 5240 MHz, Chain J1

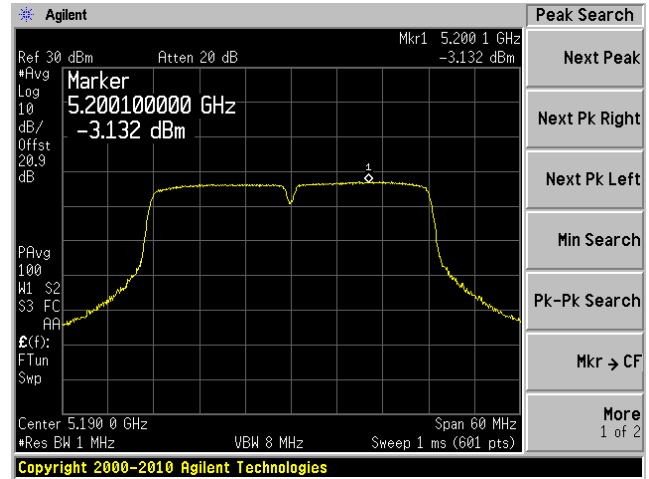


802.11n HT40 mode

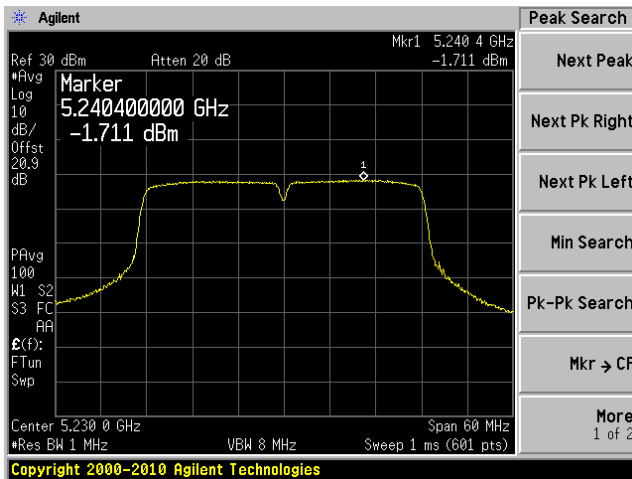
802.11n HT40 mode, 5190 MHz, Chain J0



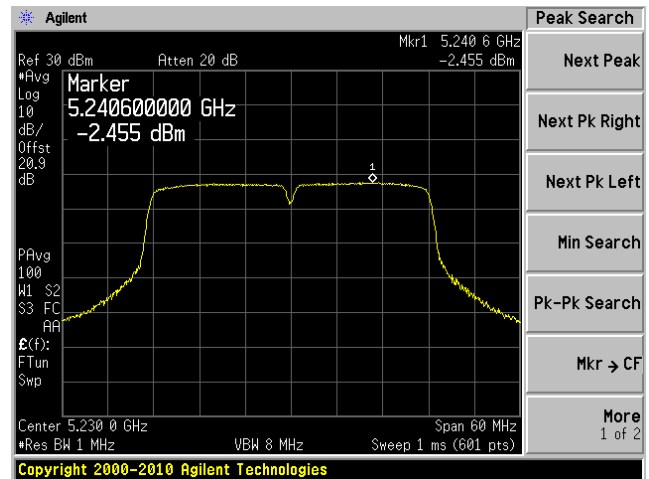
802.11n HT40 mode, 5190 MHz, Chain J1



802.11n HT40 mode, 5230 MHz, Chain J0



802.11n HT40 mode, 5230 MHz, Chain J1



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

Set the spectrum analyzer span to view the entire emission bandwidth. The largest difference between the following two traces must be ≤ 13 dB for all frequencies across the emission bandwidth. Submit a plot.

1st Trace:

- Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and maxhold settings.

2nd Trace:

- create the 2nd trace using the settings described in the section “FCC §15.407(a)(1)(2) – CONDUCTED TRANSMITTER OUTPUT POWER”.

12.3 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent | Spectrum Analyzer | E4440A | US42221851 | 2012-02-28 | 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: | 23 °C |
| Relative Humidity: | 44 % |
| ATM Pressure: | 101.2 kPa |

The testing was performed by Jeffrey Wu on 2012-09-17 in RF site.

12.5 Test Results

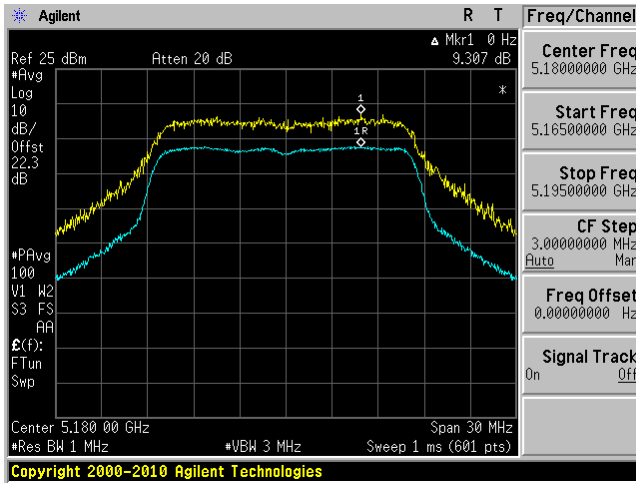
5150-5250 MHz Band

| Channel | Frequency (MHz) | TX Chain J0 PER (dB) | TX Chain J1 PER (dB) | Limit (dB) |
|-------------------|-----------------|----------------------|----------------------|------------|
| 802.11a mode | | | | |
| Low | 5180 | 9.307 | 8.555 | 13 |
| Middle | 5200 | 9.181 | 8.265 | |
| High | 5240 | 8.849 | 8.956 | |
| 802.11n HT20 mode | | | | |
| Low | 5180 | 8.702 | 7.918 | 13 |
| Middle | 5200 | 8.381 | 8.292 | |
| High | 5240 | 8.271 | 8.131 | |
| 802.11n HT40 mode | | | | |
| Low | 5190 | 9.475 | 8.023 | 13 |
| High | 5230 | 9.821 | 8.152 | |

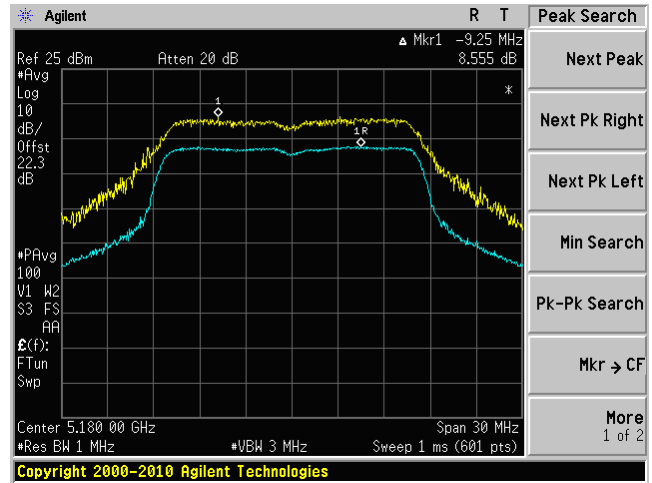
Please refer to the following plots for detailed test results:

5150-5250 MHz Band

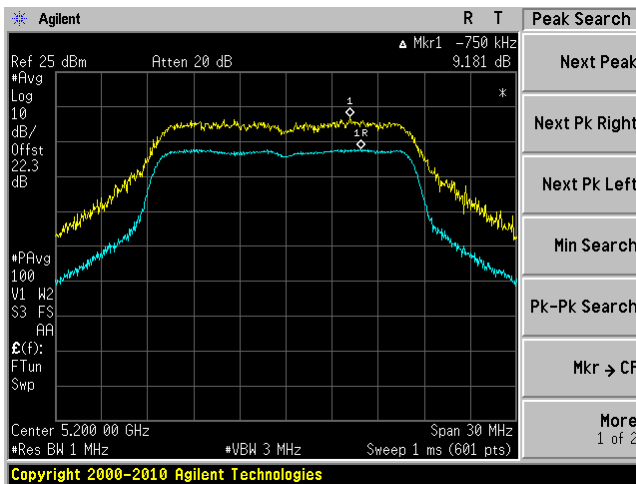
802.11a mode, 5180 MHz, Chain J0



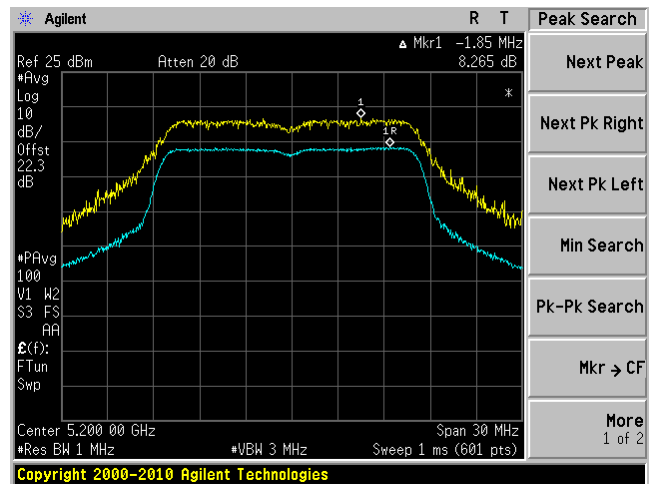
802.11a mode, 5180 MHz, Chain J1



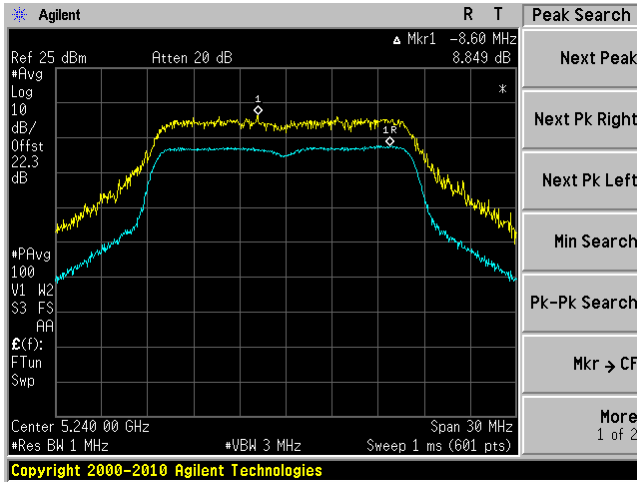
802.11a mode, 5200 MHz, Chain J0



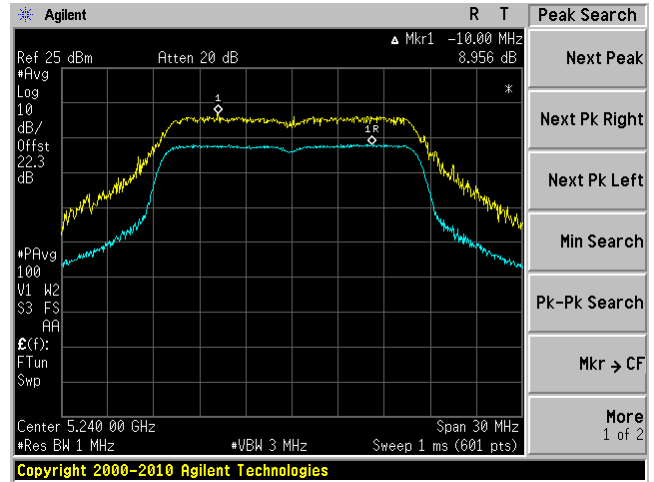
802.11a mode, 5200 MHz, Chain J1



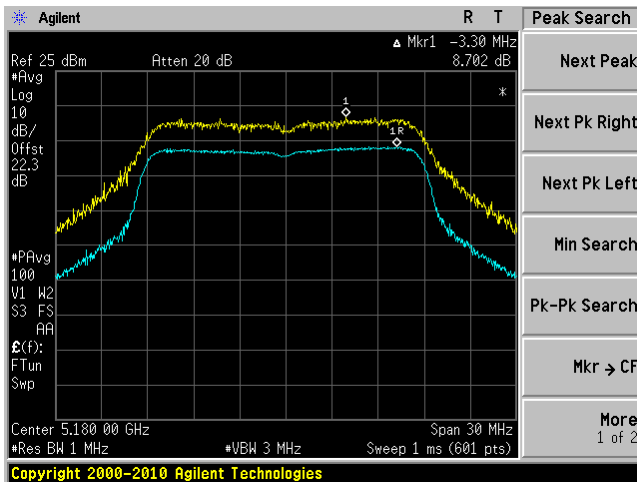
802.11a mode, 5240 MHz, Chain J0



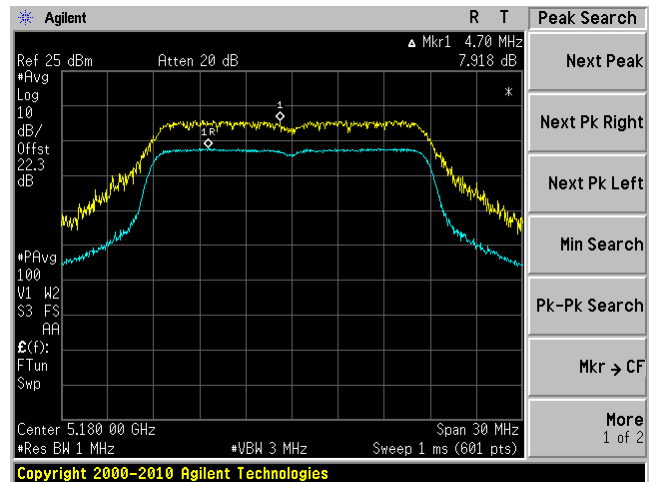
802.11a mode, 5240 MHz, Chain J1



802.11n HT20 mode, 5180 MHz, Chain J0

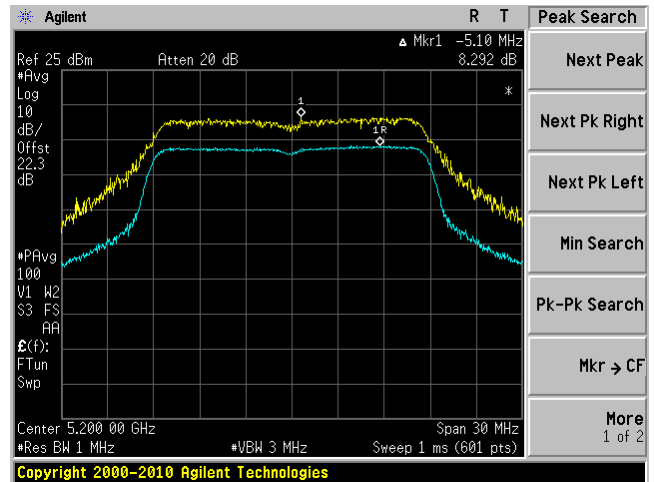
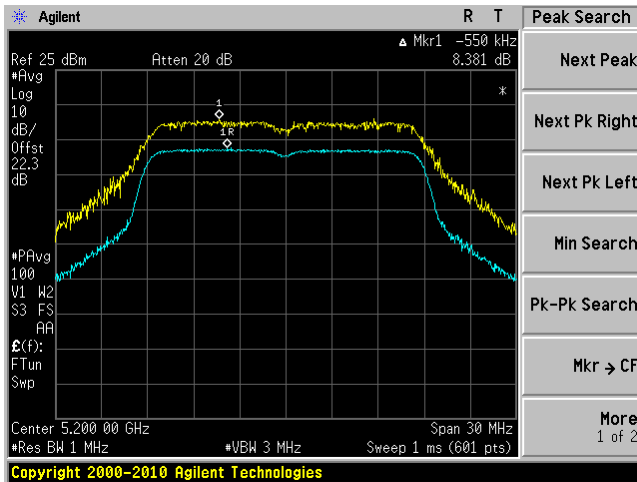


802.11n HT20 mode, 5180 MHz, Chain J1



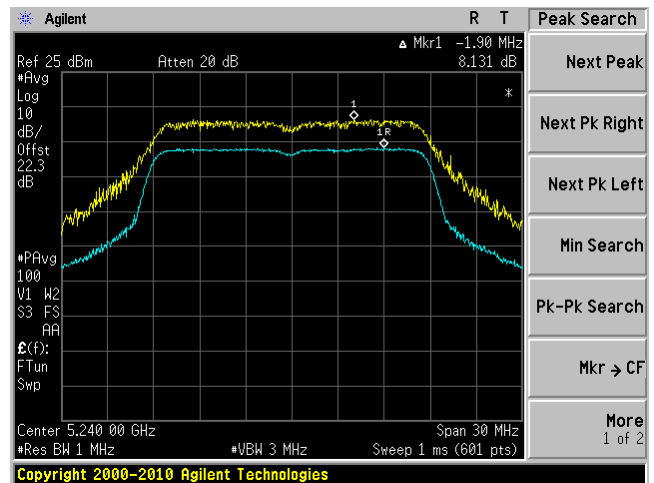
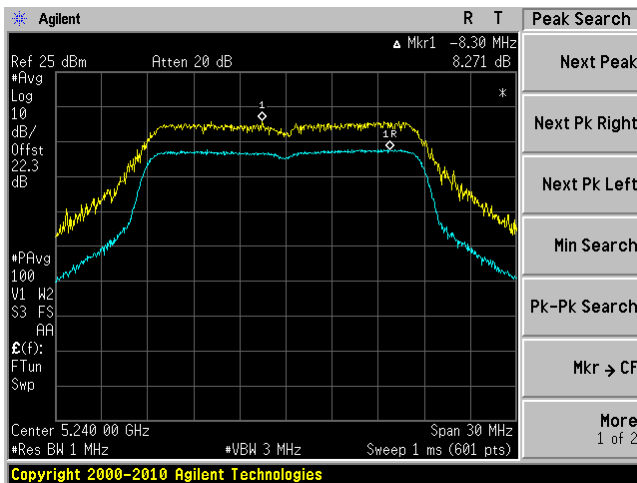
802.11n HT20 mode, 5200 MHz, Chain J0

802.11n HT20 mode, 5200 MHz, Chain J1

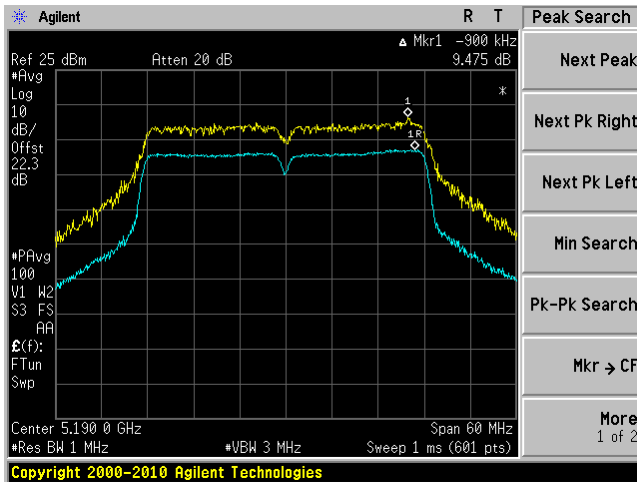


802.11n HT20 mode, 5240 MHz, Chain J0

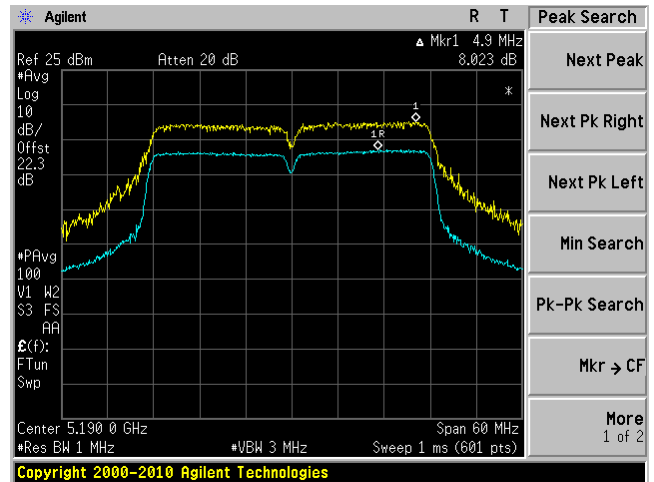
802.11n HT20 mode, 5240 MHz, Chain J1



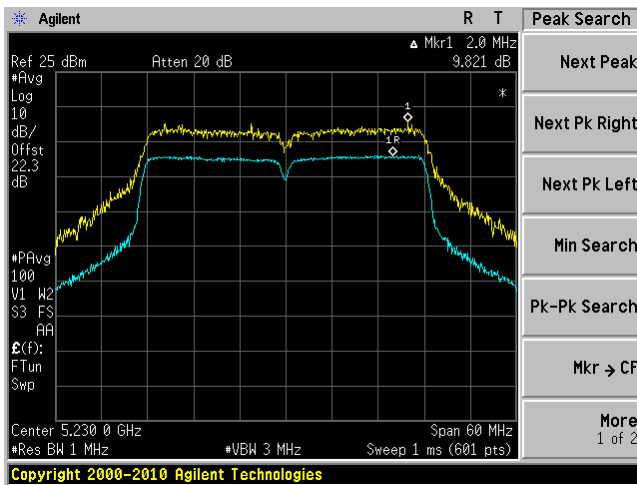
802.11n HT40 mode, 5190 MHz, Chain J0



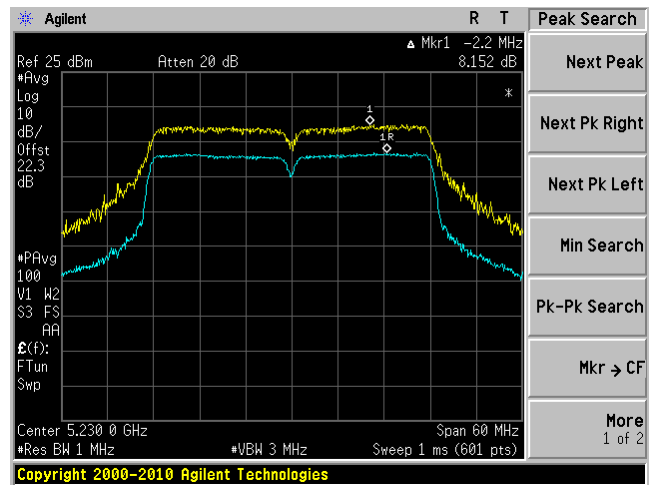
802.11n HT40 mode, 5190 MHz, Chain J1



802.11n HT40 mode, 5230 MHz, Chain J0



802.11n HT40 mode, 5230 MHz, Chain J1



13 IC RSS-210 §2.3 & RSS-Gen §6.1 - Receiver Spurious Radiated Emissions

13.1 Applicable Standard

According to IC RSS-Gen §6.1, spurious emissions from receivers shall not exceed the radiated limits shown in the table below.

Table 2: General Field Strength Limits for Transmitters and Receivers at Frequencies above 30 MHz

| Frequency (MHz) | Field Strength Microvolts/m at 3 meters Receivers |
|-----------------|---|
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above 960 | 500 |

13.2 EUT Setup

The radiated emissions tests were performed in the 3 meter chamber, using the setup in accordance with ANSI C63.4-2009.

13.3 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

All data were recorded in the peak detection mode. Quasi-peak readings was performed only when an emissions was found to be marginal (within -4 dB of specification limits), and are distinguished with a "QP" in the data table.

13.4 Corrected Amplitude & Margin Calculation

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

$$CA = Ai + AF + CL + Atten - Ga$$

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 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:

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

13.5 Test Equipment Lists and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------------|---------------------|----------------------|------------|------------------|----------------------|
| Sunol Science Corp | System Controller | SC99V | 122303-1 | N/R | N/R |
| Sunol Science Corp | Combination Antenna | JB3 | A020106-2 | 2012-08-15 | 1 year |
| Hewlett Packard | Pre-amplifier | 8447D | 2944A06639 | 2012-06-09 | 1 year |
| Mini-Circuits | Pre-amplifier | ZVA-183-S | 570400946 | 2012-05-09 | 1 year |
| Agilent | Spectrum Analyzer | E4440A | MY44303352 | 2012-10-16 | 1 year |
| EMCO | Horn Antenna | 3115 | 9511-4627 | 2012-10-17 | 1 year |
| Rohde & Schwarz | EMI Test Receiver | ESCI 1166.5950K03 | 100338 | 2012-09-19 | 1 year |

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

13.6 Test Environmental Conditions

| | |
|---------------------------|-------------|
| Temperature: | 18-22 °C |
| Relative Humidity: | 45-48 % |
| ATM Pressure: | 101-102 kPa |

The testing was performed by Lionel Lara from 2013-03-05 to 2013-04-12 at 5 meter 3.

13.7 Summary of Test Results

According to the test data, the EUT complied with the with the IC RSS-210, with the closest margins from the limit listed below:

| Mode: Receiving | | | |
|------------------------|-----------------|------------------------------------|----------------------|
| Margin (dB) | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz), Antenna |
| -0.88 | 56.0212 | Vertical | 30-18000, Dipole |

Note: Both 2.4 GHz and 5 GHz radios were under receiver mode.

13.8 Test Results and Plots

1) 30-1000 MHz, Measured at 3 meters, Dipole Antennas

With AC/DC Adaptor

| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB μ V/m) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|--------------------|
| 56.0212 | 39.12 | 136 | V | 41 | 40 | -0.88 | QP |
| 50.548 | 38.61 | 100 | V | 173 | 40 | -1.39 | QP |
| 108.65 | 26.75 | 170 | V | 238 | 43.5 | -16.75 | QP |
| 499.997 | 32.88 | 100 | H | 155 | 46 | -13.12 | QP |
| 64.862 | 27.84 | 115 | V | 95 | 40 | -12.16 | QP |
| 225.019 | 33.55 | 100 | H | 181 | 46 | -12.45 | QP |

With POE

| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB μ V/m) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|--------------------|
| 374.9826 | 42.91 | 100 | H | 203 | 46 | -3.09 | QP |
| 50.6616 | 33.16 | 122 | V | 88 | 40 | -6.84 | QP |
| 64.25883 | 22.75 | 125 | V | 321 | 40 | -17.25 | QP |
| 81.03622 | 22.81 | 100 | V | 212 | 40 | -17.19 | QP |
| 499.9964 | 33.35 | 103 | V | 196 | 46 | -12.65 | QP |
| 875.5281 | 21.76 | 256 | H | 82 | 46 | -24.24 | QP |

2) Above 1 GHz Measured at 3 meters, Dipole Antennas**With AC/DC Adaptor**

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | IC | | Comments |
|-----------------|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| 2465.96 | 45.69 | 39 | 100 | V | 29.3 | 3.01 | 27.76 | 50.24 | 74 | -23.76 | Peak |
| 2465.96 | 44.38 | 1 | 100 | H | 29.3 | 3.01 | 27.76 | 48.93 | 74 | -25.07 | Peak |
| 2465.96 | 30.52 | 39 | 100 | V | 29.3 | 3.01 | 27.76 | 35.07 | 54 | -18.93 | Ave |
| 2465.96 | 26.49 | 1 | 100 | H | 29.3 | 3.01 | 27.76 | 31.04 | 54 | -22.96 | Ave |

With POE

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | IC | | Comments |
|-----------------|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| 2458.9 | 49.41 | 0 | 100 | V | 29.3 | 3.01 | 27.76 | 53.96 | 74 | -20.04 | Peak |
| 2458.9 | 42.33 | 117 | 100 | H | 29.3 | 3.01 | 27.76 | 46.88 | 74 | -27.12 | Peak |
| 2458.9 | 29.26 | 0 | 100 | V | 29.3 | 3.01 | 27.76 | 33.81 | 54 | -20.19 | Ave |
| 2458.9 | 24.89 | 117 | 100 | H | 29.3 | 3.01 | 27.76 | 29.44 | 54 | -24.56 | Ave |
| 1125 | 40.45 | 139 | 100 | V | 25 | 1.88 | 27.11 | 40.22 | 74 | -33.78 | Peak |
| 1125 | 42.61 | 325 | 100 | H | 25 | 1.88 | 27.11 | 42.38 | 74 | -31.62 | Peak |
| 1125 | 28.83 | 139 | 100 | V | 25 | 1.88 | 27.11 | 28.6 | 54 | -25.4 | Ave |
| 1125 | 32.76 | 325 | 100 | H | 25 | 1.88 | 27.11 | 32.53 | 54 | -21.47 | Ave |

3) 30-1000 MHz, Measured at 3 meters, Patch Antenna

With AC/DC Adaptor

| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB μ V/m) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|--------------------|
| 56.0035 | 39.06 | 134 | V | 42 | 40 | -0.94 | QP |
| 50.436 | 37.78 | 103 | V | 171 | 40 | -2.22 | QP |
| 108.81 | 26.86 | 174 | V | 234 | 43.5 | -16.64 | QP |
| 499.99 | 32.73 | 99 | H | 163 | 46 | -13.27 | QP |
| 64.782 | 28.01 | 112 | V | 92 | 40 | -11.99 | QP |
| 225.0023 | 33.52 | 100 | H | 182 | 46 | -12.48 | QP |

With POE

| Frequency (MHz) | Corrected Amplitude (dB μ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB μ V/m) | Margin (dB) | Detector (QP/Ave.) |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|--------------------|
| 374.9878 | 42.72 | 99 | H | 204 | 46 | -3.28 | QP |
| 50.61125 | 33.82 | 125 | V | 85 | 40 | -6.18 | QP |
| 64.25675 | 22.72 | 124 | V | 321 | 40 | -17.28 | QP |
| 81.0395 | 22.77 | 100 | V | 211 | 40 | -17.23 | QP |
| 499.9818 | 33.41 | 108 | V | 194 | 46 | -12.59 | QP |
| 875.5098 | 21.81 | 261 | H | 78 | 46 | -24.19 | QP |

4) Above 1 GHz Measured at 3 meters, Patch Antenna

With AC/DC Adaptor

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | IC | | Comments |
|-----------------|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| 2465.96 | 45.71 | 39 | 100 | V | 29.3 | 3.01 | 27.76 | 50.26 | 74 | -23.74 | Peak |
| 2465.96 | 44.39 | 1 | 100 | H | 29.3 | 3.01 | 27.76 | 48.94 | 74 | -25.06 | Peak |
| 2465.96 | 30.45 | 39 | 100 | V | 29.3 | 3.01 | 27.76 | 35.00 | 54 | -19.00 | Ave |
| 2465.96 | 26.46 | 1 | 100 | H | 29.3 | 3.01 | 27.76 | 31.01 | 54 | -22.99 | Ave |

With POE

| Frequency (MHz) | S.A. Reading (dB μ V) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dB μ V/m) | IC | | Comments |
|-----------------|---------------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------------|----------------------|-------------|----------|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dB μ V/m) | Margin (dB) | |
| 2458.9 | 49.35 | 0 | 100 | V | 29.3 | 3.01 | 27.76 | 53.9 | 74 | -20.1 | Peak |
| 2458.9 | 42.55 | 117 | 100 | H | 29.3 | 3.01 | 27.76 | 47.1 | 74 | -26.9 | Peak |
| 2458.9 | 29.18 | 0 | 100 | V | 29.3 | 3.01 | 27.76 | 33.73 | 54 | -20.27 | Ave |
| 2458.9 | 24.97 | 117 | 100 | H | 29.3 | 3.01 | 27.76 | 29.52 | 54 | -24.48 | Ave |
| 1125 | 40.42 | 139 | 100 | V | 25 | 1.88 | 27.11 | 40.19 | 74 | -33.81 | Peak |
| 1125 | 42.57 | 325 | 100 | H | 25 | 1.88 | 27.11 | 42.34 | 74 | -31.66 | Peak |
| 1125 | 28.82 | 139 | 100 | V | 25 | 1.88 | 27.11 | 28.59 | 54 | -25.41 | Ave |
| 1125 | 32.72 | 325 | 100 | H | 25 | 1.88 | 27.11 | 32.49 | 54 | -21.51 | Ave |

14 FCC §15.407(b) & IC RSS-210 §A9.2 - Spurious Emissions at Antenna Terminals

14.1 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.

According to RSS-210 §A9.2 all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.

14.2 Measurement Procedure

4) Procedure for Unwanted Emissions Measurements Below 1000 MHz.

- a) Follow the requirements in section G)3), “General Requirements for Unwanted Emissions Measurements”.
- b) Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

6) Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

- a) Follow the requirements in section G)3), “General Requirements for Unwanted Emissions Measurements”.

b) Average emission levels shall be measured using one of the following two methods.

c) Method AD (Average Detection): Primary method

(i) RBW = 1 MHz.

(ii) VBW \geq 3 MHz.

(iii) Detector = RMS, if span/(# of points in sweep) \leq RBW/2. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, the detector mode shall be set to peak.

(iv) Averaging type = power (i.e., RMS)

- As an alternative, the detector and averaging type may be set for linear voltage averaging. Some analyzers require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

(v) Sweep time = auto.

(vi) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, the number of traces shall be increased by a factor of 1/x, where x is the duty cycle. For example, with 50 percent duty cycle, at least 200 traces should be averaged.

(vii) If tests are performed with the EUT transmitting at a duty cycle less than 98 percent, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:

- If power averaging (RMS) mode was used in step (iv) above, the correction factor is $10 \log(1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 3 dB must be added to the measured emission levels.
- If linear voltage averaging mode was used in step (iv) above, the correction factor is $20 \log(1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 6 dB must be added to the measured emission levels.

14.3 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.

14.4 Test Environmental Conditions

| | |
|--------------------|----------|
| Temperature: | 24 °C |
| Relative Humidity: | 44 % |
| ATM Pressure: | 101.3kPa |

The testing was performed by Jeffrey Wu on 2012-10-04 in RF site.

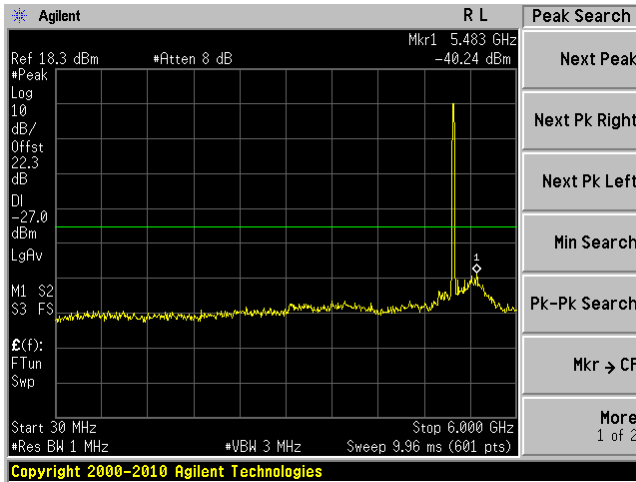
14.5 Test Results

Please refer to following plots of spurious emissions.

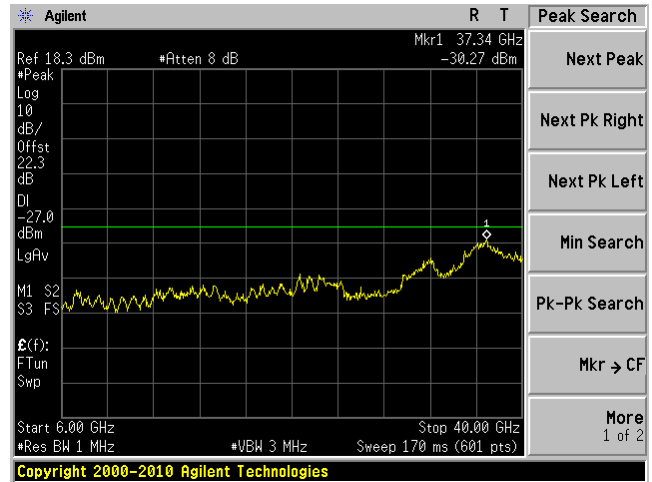
5150-5250 MHz Band

802.11 a mode, Low Channel

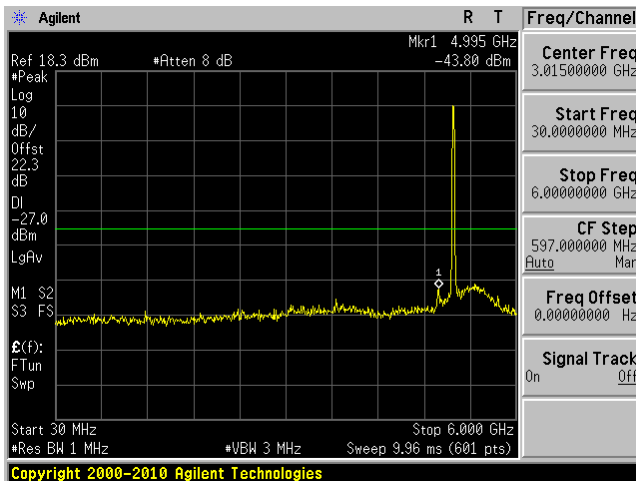
802.11 a mode, 5180MHz, Chain J0 1



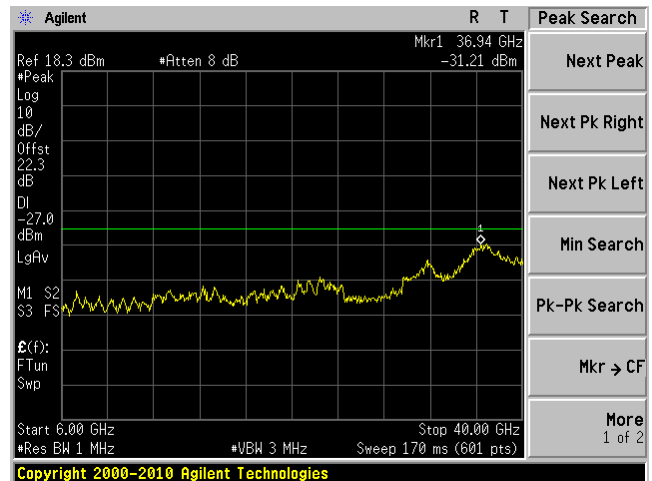
802.11 a mode, 5180 MHz, Chain J0 2



802.11a mode, 5180 MHz, Chain J1 1

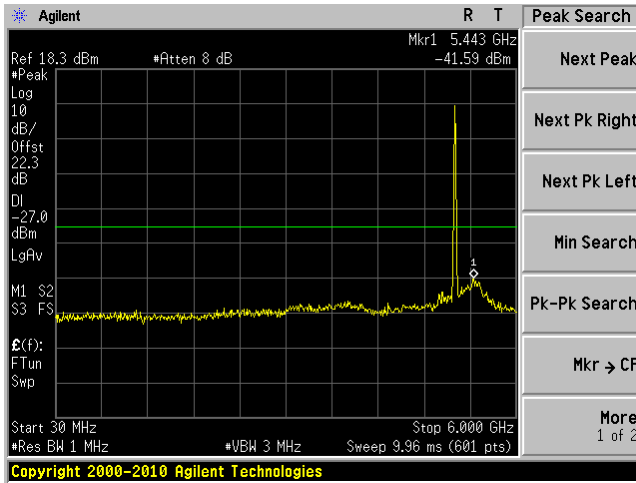


802.11a mode, 5180 MHz, Chain J1 2

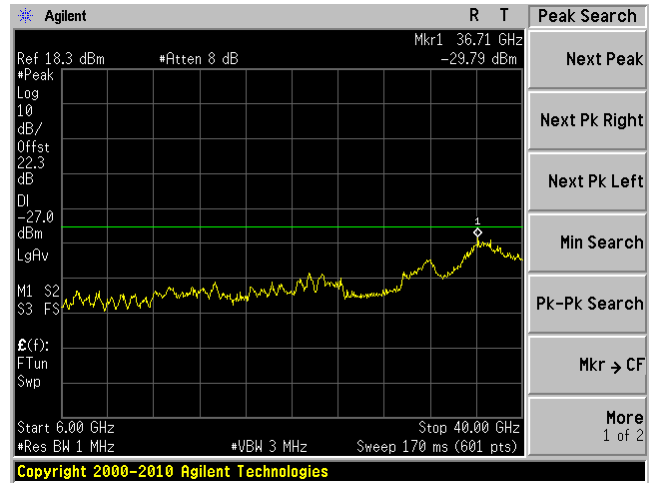


802.11a mode, Middle Channel

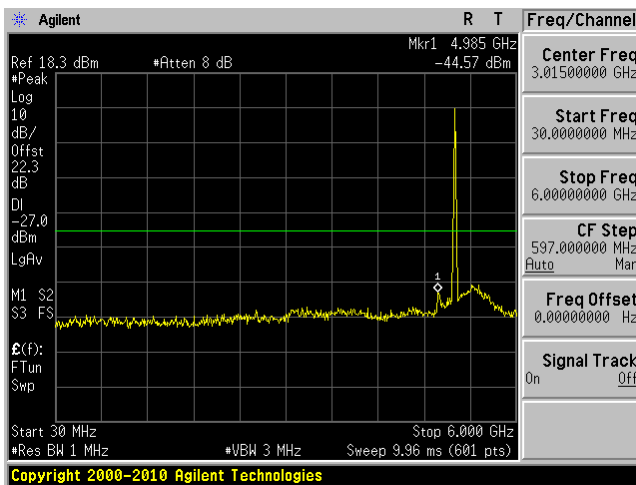
802.11a mode, 5200 MHz, Chain J0 1



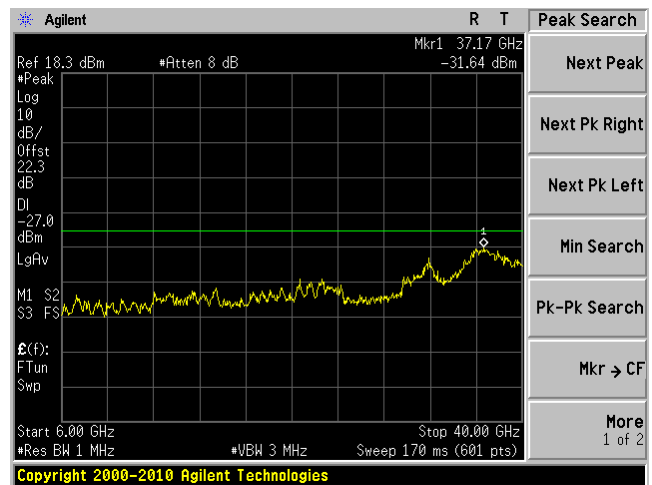
802.11a mode, 5200 MHz, Chain J0 2



802.11a mode, 5200 MHz, Chain J1 1

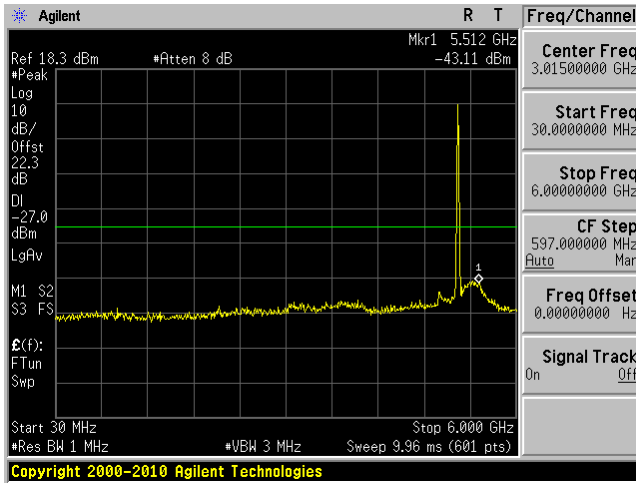


802.11a mode, 5200 MHz, Chain J1 2

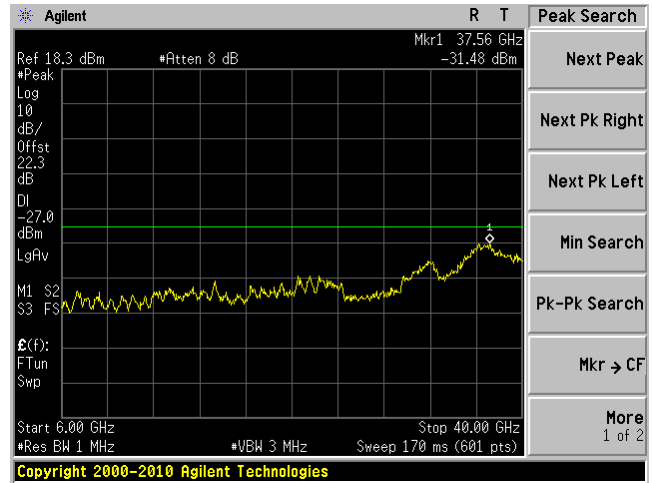


802.11a mode, High Channel

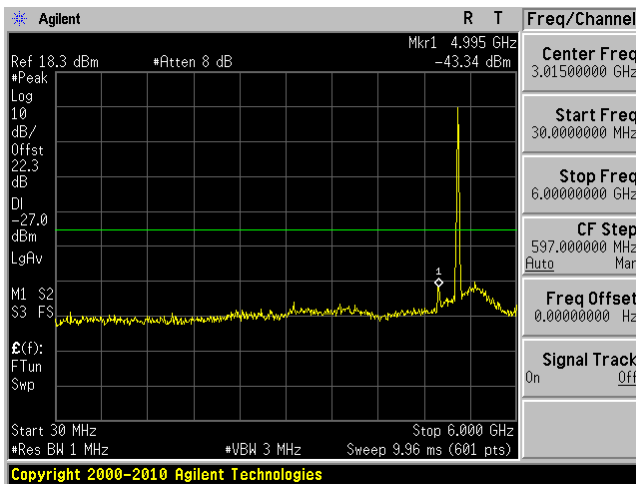
802.11 a mode, 5240 MHz, Chain J0 1



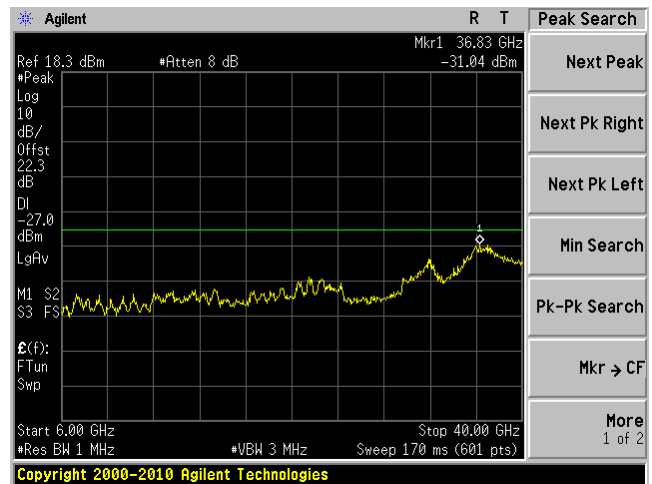
802.11a mode, 5240 MHz, Chain J0 2



802.11a mode, 5240 MHz, Chain J1 1



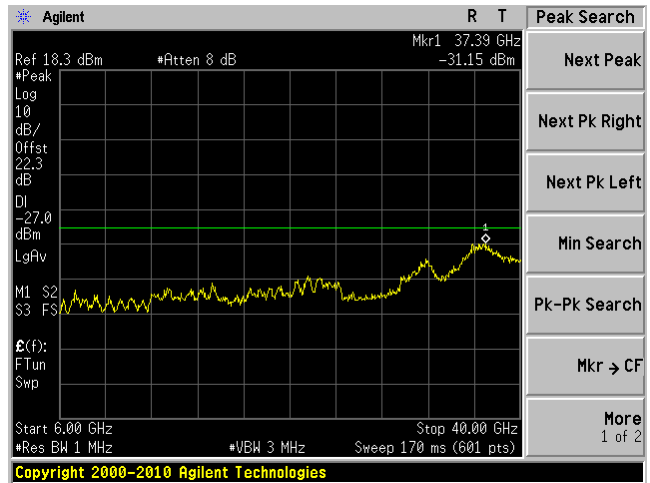
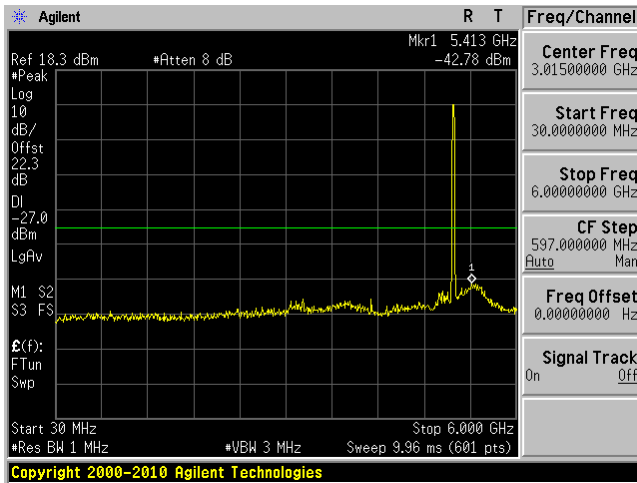
802.11a mode, 5240 MHz, Chain J1 2



802.11 n HT20 mode, Low channel

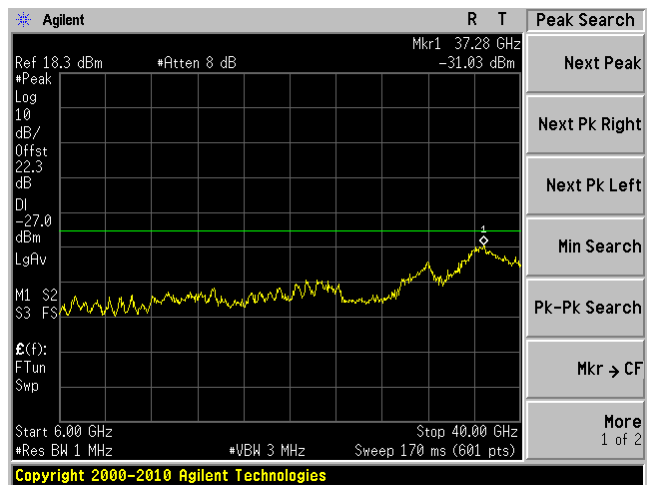
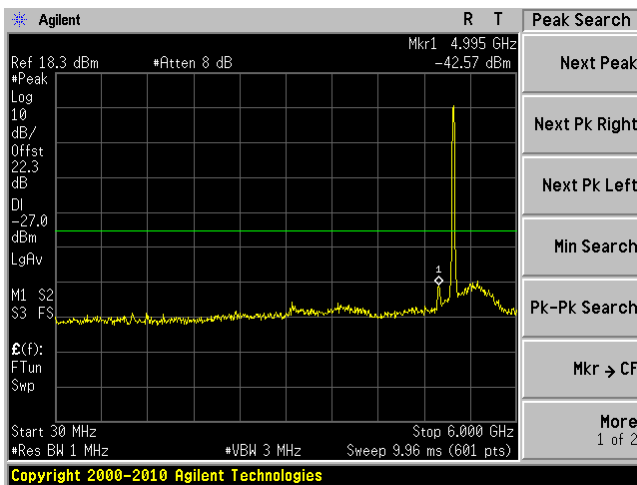
802.11n HT20 mode, 5180 MHz, Chain J0 1

802.11n HT20 mode, 5180 MHz, Chain J0 2



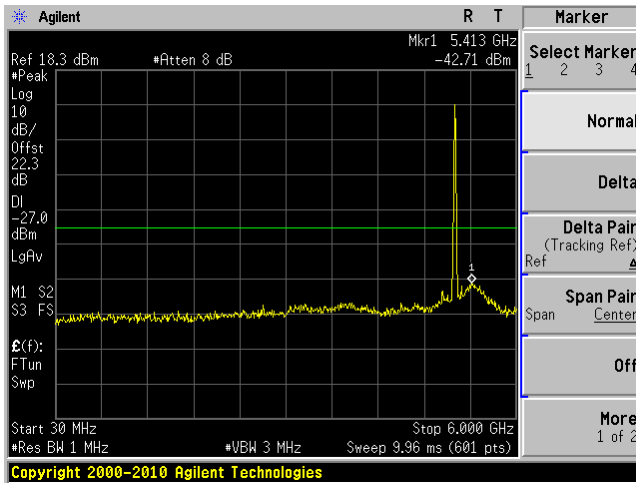
802.11n HT20 mode, 5180 MHz, Chain J1 1

802.11n HT20 mode, 5180 MHz, Chain J1 2

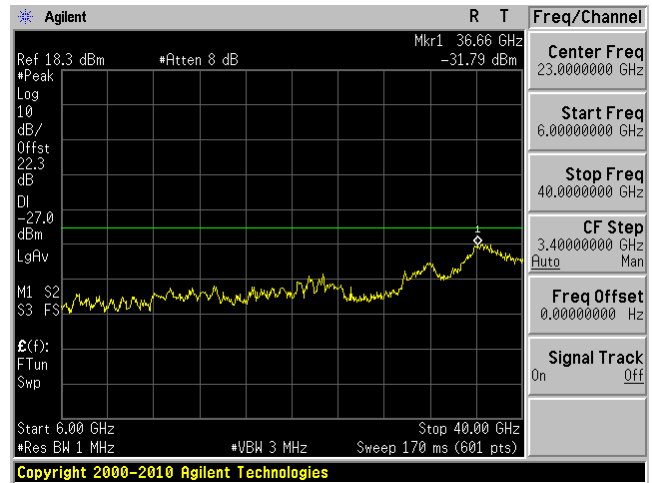


802.11 n HT20 mode, Middle Channel

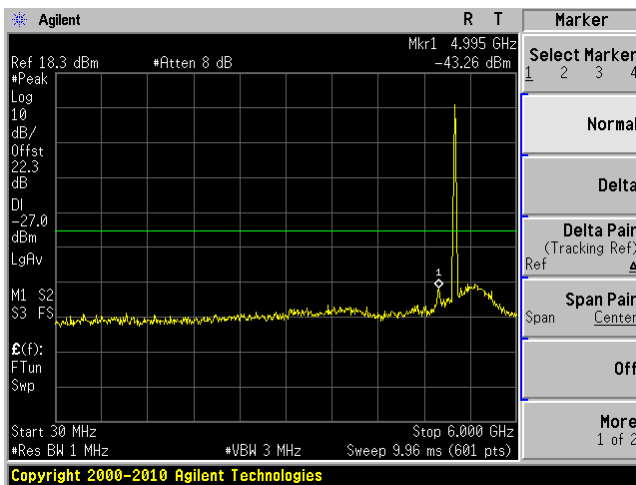
802.11n HT20 mode, 5200 MHz, Chain J0 1



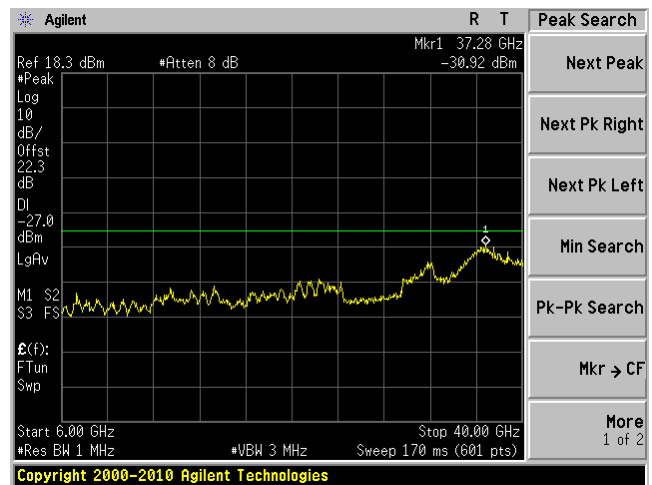
802.11n HT20 mode, 5200 MHz, Chain J0 2



802.11n HT20 mode, 5200 MHz, Chain J1 1

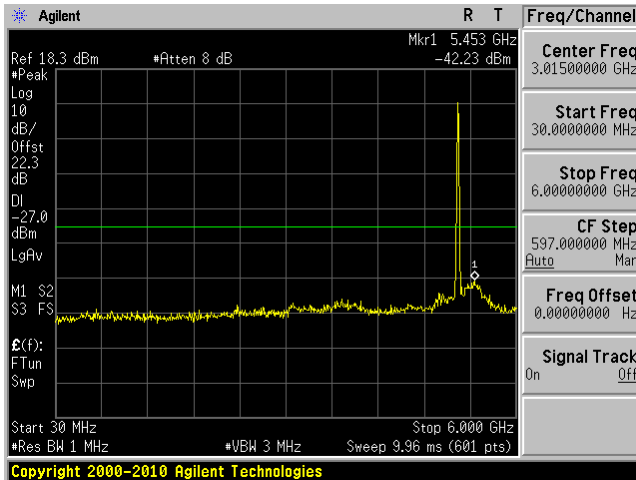


802.11n HT20 mode, 5200 MHz, Chain J1 2

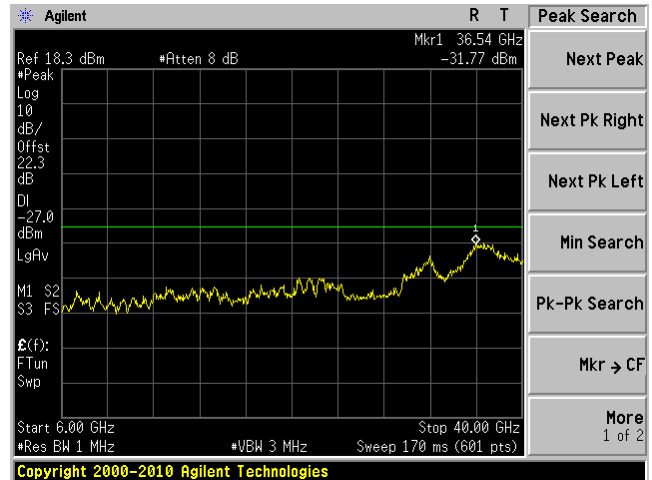


802.11 n HT20 mode, High Channel

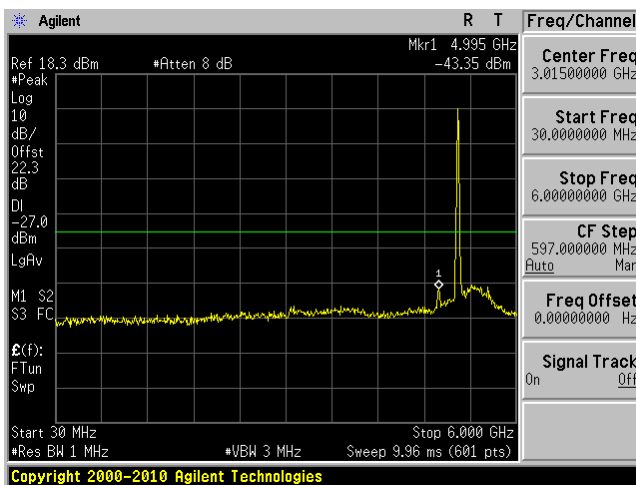
802.11n HT20 mode, 5240 MHz, Chain J0 1



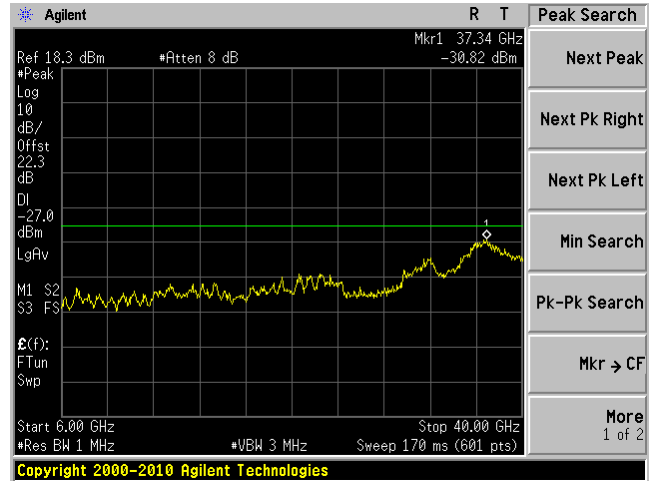
802.11n HT20 mode, 5240 MHz, Chain J0 2



802.11n HT20 mode, 5240 MHz, Chain J1 1

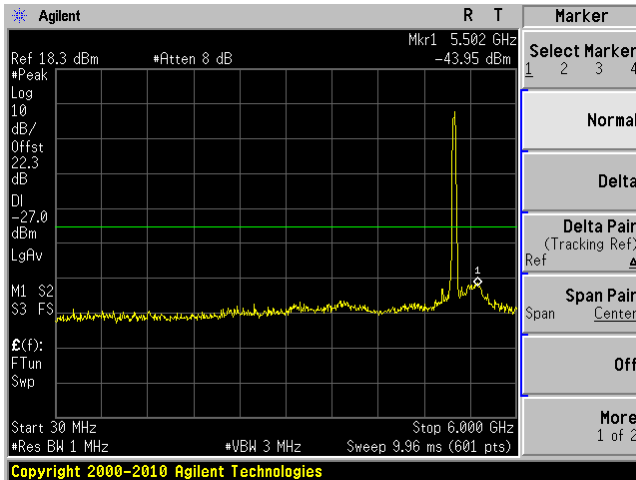


802.11n HT20 mode, 5240 MHz, Chain J1 2

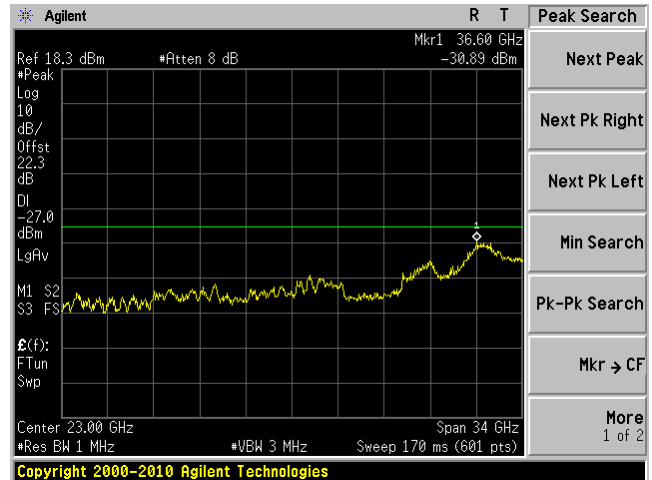


802.11n HT40 mode, Low channel

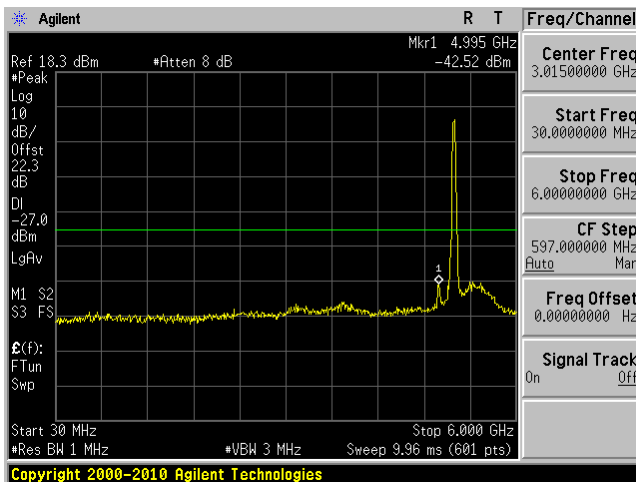
802.11n HT40 mode, 5190 MHz, Chain J0 1



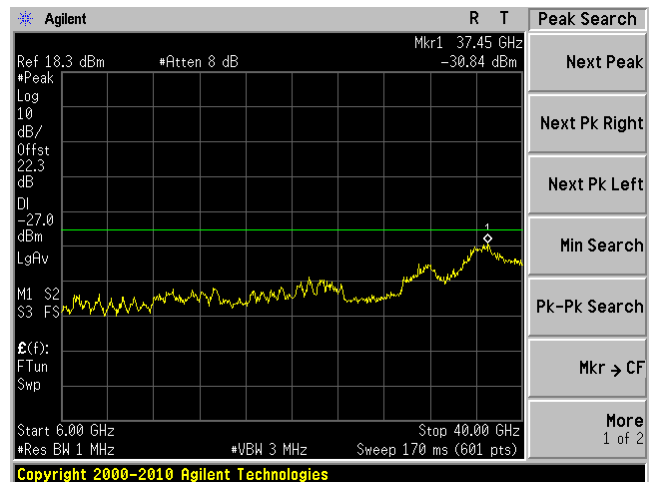
802.11n HT40 mode, 5190 MHz, Chain J0 2



802.11n HT40 mode, 5190 MHz, Chain J1 1

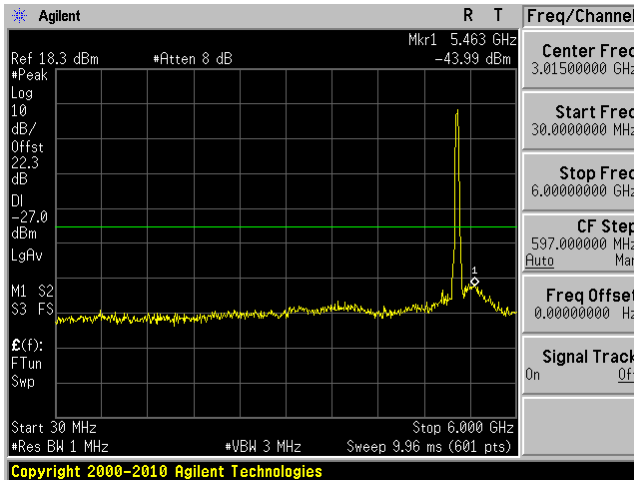


802.11n HT40 mode, 5190 MHz, Chain J1 2

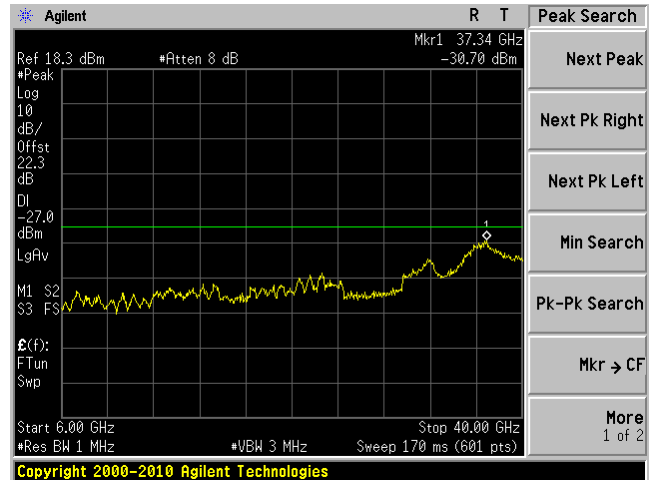


802.11n HT40 mode, High Channel

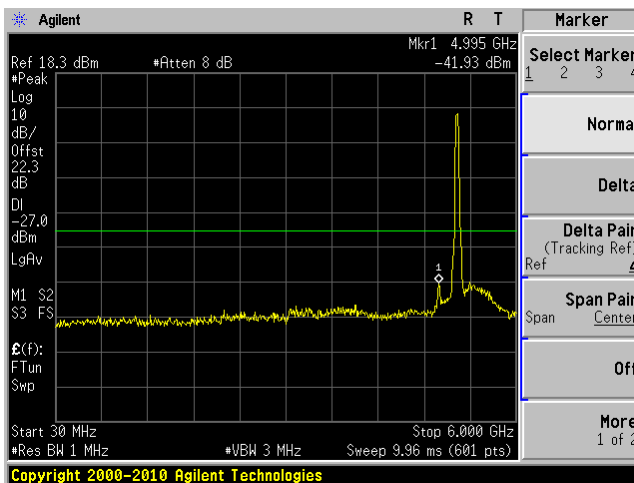
802.11n HT40 mode, 5230 MHz, Chain J0 1



802.11n HT40 mode, 5230 MHz, Chain J0 2



802.11n HT40 mode, 5230 MHz, Chain J1 1



802.11n HT40 mode, 5230 MHz, Chain J1 2

