# FCC PART 15, SUBPART C
# IC RSS-210, ISSUE 8, DECEMBER 2010

# TEST AND MEASUREMENT REPORT

For

## NVIDIA Corporation

2701 San Tomas Expressway,

Santa Clara, CA 95050, USA

**FCC ID: VOB-P2450A**
**IC: 7361A-P2450A**
**Model: P2450**

| **Report Type:** | **Product Type:** |
|---|---|
| Original Report | Portable Gaming Device |

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**Report Number:** R1304241-247 DTS

**Report Date:** 2013-05-23

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# DOCUMENT REVISION HISTORY

| Revision Number | Report Number | Description of Revision | Date of Revision |
|---|---|---|---|
| 0 | R1304241-247 DTS | Original Report | 2013-05-23 |

# 1 General Description

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

This test and measurement report has been compiled on behalf of *NVIDIA Corporation,* and their product, FCC ID: VOB-P2450A, IC: 7361A-P2450A, model number: P2450, which henceforth is referred to as the EUT (Equipment Under Test.), The EUT is a portable gaming device operates in 2.4 GHz and 5 GHz bands.

## 1.2 Mechanical Description of EUT

The EUT measures approximately 160 mm (L) x 135 mm (W) x 55 mm (H) and weighs approximately 585 g.

*The data gathered are from a typical production sample provided by the manufacturer with serial number: TRB2-0020*

## 1.3 Objective

This report is prepared on behalf of *NVIDIA Corporation* in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commission's rules and IC RSS-210 Issue 8, Dec 2010.

The objective is to determine compliance with FCC Part 15.247 and IC RSS-210 rules for Output Power, Antenna Requirements, AC Line Conducted Emissions, 6 dB Bandwidth, power spectral density, 100 kHz Bandwidth of Band Edges Measurement, Spurious Emissions, Conducted and Radiated Spurious Emissions.

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

FCC Part 15.247 DSS, 15.407 NII with FCC IC: VOB-P2450A and IC RSS-210 with IC: 7361A-P2450A.

## 1.5 Test Methodology

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

## 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 CISPR16-4-2:2011, The Treatment of Uncertainty in EMC Measurements, the values ranging from $\pm$2.0 dB for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

## 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=8430d44f1f47cf2996124343c704b3678l6b

# 2 System 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 software is provided by customer. The EUT exercise program used during testing was designed to exercise the system components.

The EUT had been tested with the following data rate settings:

| Radio Mode | Frequency Band | Frequency/Data rate | | |
|---|---|---|---|---|
| | | Low CH (MHz/Mbps) | Mid CH (MHz/Mbps) | High CH (MHz) |
| 802.11b | 2.4 GHz | 2412/1 | 2437/1 | 2462/1 |
| 802.11g | 2.4 GHz | 2412/6 | 2437/6 | 2462/6 |
| 802.11n HT20 | 2.4 GHz | 2412/MCS0 | 2437/ MCS0 | 2462/MCS0 |
| 802.11n HT40 | 2.4 GHz | 2422/MCS0 | 2437/MCS0 | 2452/MCS0 |

| Radio Mode | Frequency Band | Frequency/Data rate | | |
|---|---|---|---|---|
| | | Low CH (MHz/Mbps) | Mid CH (MHz/Mbps) | High CH (MHz) |
| 802.11a | 5.8 GHz | 5745/6 | 5785/6 | 5825/6 |
| 802.11n HT20 | 5.8 GHz | 5745/MCS0 | 5785/ MCS0 | 5825/MCS0 |
| 802.11n HT40 | 5.8 GHz | 5755/MCS0 | - | 5795/MCS0 |

## 2.3 Special Equipment

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

## 2.4 Equipment Modifications

No modifications were made to the EUT.

## 2.5 Local Support Equipment

| Manufacturer | Description | Model No. | Serial No. |
|---|---|---|---|
| Lenovo | Laptop | G560-0679 | CB08585694 |
| DELL | Laptop | PP18L | PF329 A03 |

## 2.6 EUT Internal Configuration Details

| Manufacturer | Description | Type | Serial Number |
|---|---|---|---|
| NVIDIA Corporation | Joystick board | Gaming control stick | 0511613700054 |
| NVIDIA Corporation | Control panel | Button board | 0511613600173 |
| Sanyo | Battery | Battery | 027-0012-000 |
| NVIDIA Corporation | Mother board | Mother Board | 0511613500407 |
| Delta Electronics Inc. | Fan | Fan | - |

## 2.7 Interface Ports and Cables

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

## 2.8 Power Supply List and Details

| Manufacturer | Description | Model | Part Number |
|---|---|---|---|
| NVIDIA Corporation | Power Adapter | P2551 | - |

# 3 Summary of Test Results

Results reported relate only to the product tested.

| FCC & IC Rules | Description of Test | Results |
|---|---|---|
| FCC §15.247(i), §2.1093<br>IC RSS-102 | RF Exposure | Refer to BACL SAR report No.: R1304241-SAR |
| FCC §15.203<br>IC RSS-Gen §7.1.2 | Antenna Requirement | Compliant |
| FCC §15.207(a)<br>IC RSS-Gen §7.2.4 | AC Line Conducted Emissions | Compliant |
| FCC §15.247 (d)<br>IC RSS-210 §A8.5 | Spurious Emissions at Antenna Port | Compliant |
| FCC §15.205<br>IC RSS-210 §2.2 | Restricted Bands | Compliant |
| FCC §15.209, §15.247 (d)<br>IC RSS-210 §A8.5 | Radiated Spurious Emissions | Compliant |
| FCC §15.247(a)(2)<br>IC RSS-210 §A8.2 | 6 dB Emission Bandwidth | Compliant |
| FCC §15.247(b)(3)<br>IC RSS-210 §A8.4 | Maximum Peak Output Power | Compliant |
| FCC §15.247(d)<br>IC RSS-210 §A8.5 | 100 kHz Bandwidth of Frequency Band Edge | Compliant |
| FCC §15.247(e)<br>IC RSS-210 §A8.2(b) | Power Spectral Density | Compliant |
| IC RSS-210 §2.3<br>& RSS-Gen §6.1 | Receiver Spurious Emission | Compliant |

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

## 4.1 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.

According to 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 mW or less. For devices of output powers greater than 10 mW, 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.

## 4.2 Antenna List

| Antenna Location | Manufacturers | Models/Name | Antenna Gain (dBi) @ 2.4 GHz | Antenna Gain (dBi) @ 5 GHz |
|---|---|---|---|---|
| Top | Amphenol | NV4157-12-005-R-FC | 2.46 | 5.04 |
| Right | Amphenol | NV4158-12-005-R-FC | 2.83 | 5.18 |

The antenna consists of non-standard (UFL) connectors with less 6 dBi gain; Antenna gain that exceeds 6 dBi was added to RF measurement therefore, it complies with the antenna requirement. Please refer to the internal photos.

# 5 FCC §15.207 & IC RSS-Gen §7.2.4 – AC Line Conducted Emissions

## 5.1 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 μH/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 | 56 to 46 Note |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

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

## 5.2 Test Setup

The measurement was performed at P2450 room, using the setup per ANSI C63.4-2009 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 EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

## 5.3 Test Procedure

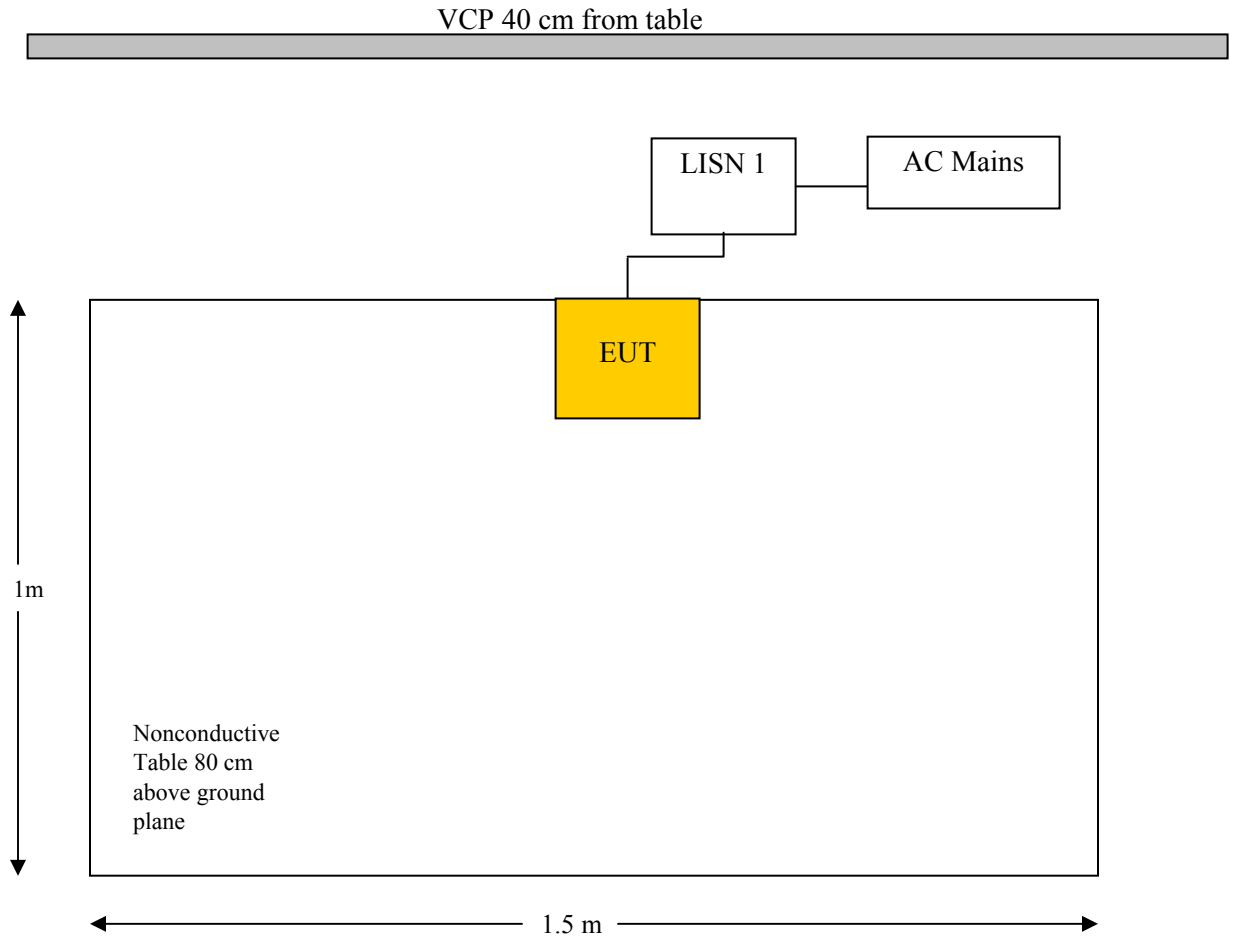
During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1 and the power cord of the support equipment was connected to LISN-2.

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”.

## 5.4 Test Setup Block Diagram

**AC/DC Adaptor:**




## 5.5 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:

Margin = Corrected Amplitude - Limit

## 5.6 Test Equipment List and Details

| Manufacturer | Description | Model No. | Serial No. | Calibration Date | Calibration Interval |
|---|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver | ESCI 1166.5950K03 | 100337 | 2013-03-28 | 1 year |
| Solar Electronics | LISN | 9252-50-R-24-N | 511205 | 2012-06-25 | 1 year |
| TTE | Filter, High Pass | H962-150k-50-21378 | K7133 | 2012-05-30 | 1 year |

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

## 5.7 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 21° C |
| **Relative Humidity:** | 41% |
| **ATM Pressure:** | 102.10 KPa |

*The testing was performed by Bo Li on 2013-05-09 in 5m chamber3.*

## 5.8 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC 15C and IC RSS 210 standard's conducted emissions limits, with the margin reading of:

**2.4 GHz Band**

| Connection: AC/DC adapter connected to 120 V/60 Hz, AC | | | |
|---|---|---|---|
| **Margin (dB)** | **Frequency (MHz)** | **Conductor Mode (Line/Neutral)** | **Range (MHz)** |
| -6.95 | 0.403821 | Line | 0.15-30 |

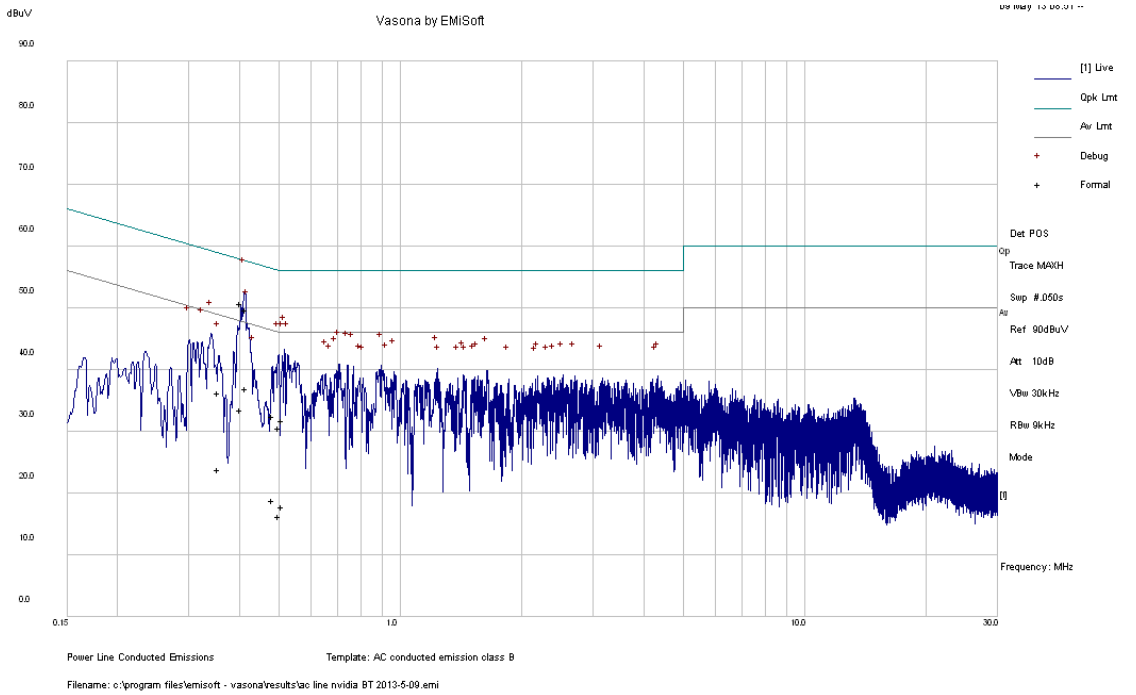
**5 GHz Band**

| Connection: AC/DC adapter connected to 120 V/60 Hz, AC | | | |
|---|---|---|---|
| **Margin (dB)** | **Frequency (MHz)** | **Conductor Mode (Line/Neutral)** | **Range (MHz)** |
| -7.66 | 0.408888 | Neutral | 0.15-30 |

## 5.9 Conducted Emissions Test Plots and Data

### 2.4 GHz Band

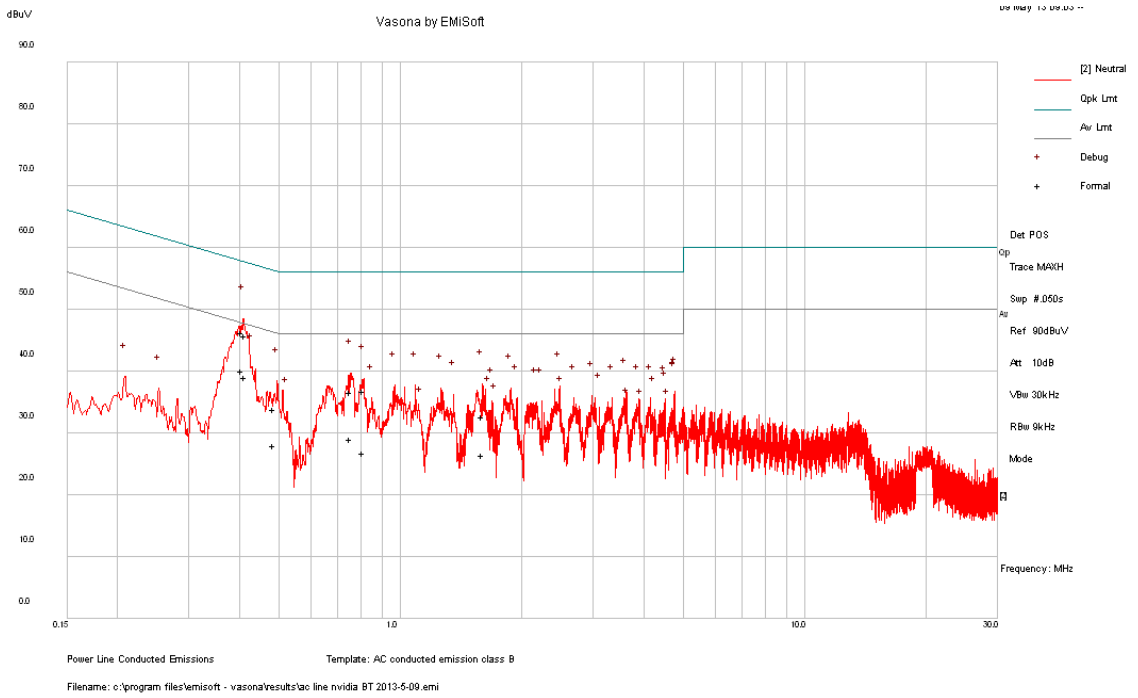
**120 V, 60 Hz – Line, AC/DC Adaptor**




| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 0.403821 | 50.83 | Line | 57.77 | -6.95 | QP |
| 0.415233 | 49.70 | Line | 57.54 | -7.84 | QP |
| 0.355542 | 36.31 | Line | 58.83 | -22.53 | QP |
| 0.484917 | 32.48 | Line | 56.25 | -23.78 | QP |
| 0.509958 | 31.78 | Line | 56.00 | -24.22 | QP |
| 0.503043 | 30.64 | Line | 56.00 | -25.36 | QP |

| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 0.415233 | 37.02 | Line | 47.54 | -10.52 | Ave. |
| 0.403821 | 33.55 | Line | 47.77 | -14.23 | Ave. |
| 0.355542 | 23.85 | Line | 48.83 | -24.98 | Ave. |
| 0.484917 | 18.92 | Line | 46.25 | -27.33 | Ave. |
| 0.509958 | 17.78 | Line | 46 | -28.22 | Ave. |
| 0.503043 | 16.28 | Line | 46 | -29.72 | Ave. |

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

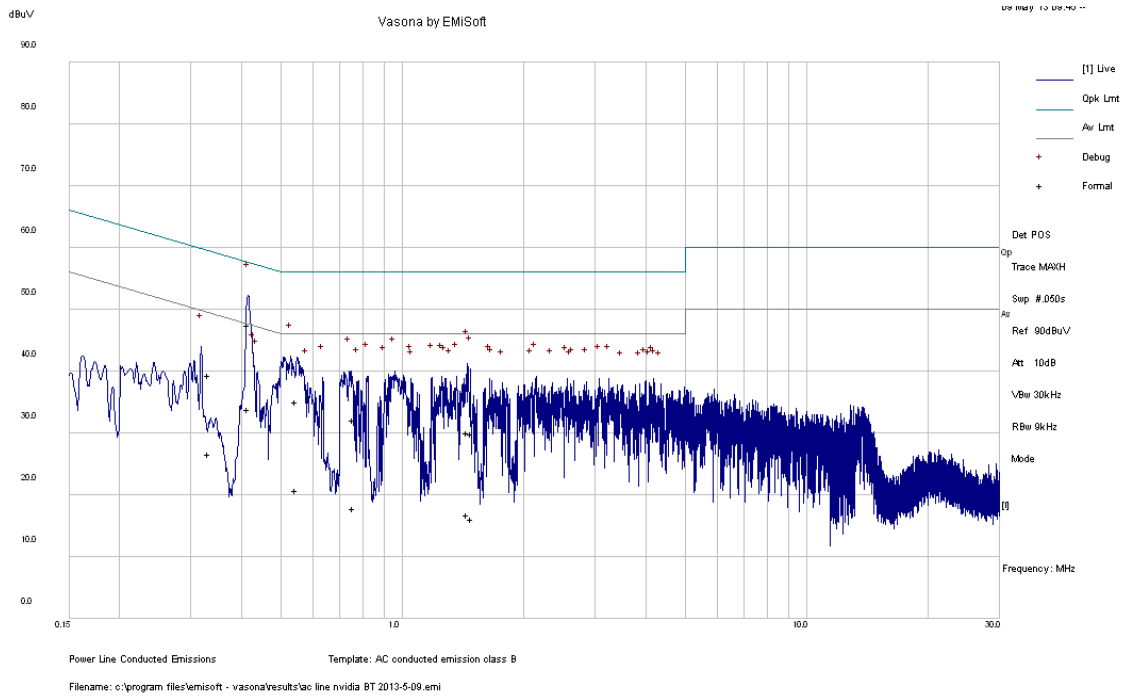



| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 0.40626 | 46.26 | Neutral | 57.72 | -11.47 | QP |
| 0.414768 | 45.80 | Neutral | 57.55 | -11.75 | QP |
| 0.809445 | 36.76 | Neutral | 56 | -19.24 | QP |
| 0.753633 | 36.60 | Neutral | 56 | -19.40 | QP |
| 0.485901 | 33.97 | Neutral | 56.24 | -22.27 | QP |
| 1.597623 | 32.68 | Neutral | 56 | -23.32 | QP |

| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 0.40626 | 40.15 | Neutral | 47.72 | -7.57 | Ave. |
| 0.414768 | 39.10 | Neutral | 47.55 | -8.45 | Ave. |
| 0.753633 | 28.99 | Neutral | 46 | -17.01 | Ave. |
| 0.485901 | 28.01 | Neutral | 46.24 | -18.22 | Ave. |
| 0.809445 | 26.86 | Neutral | 46 | -19.14 | Ave. |
| 1.597623 | 26.50 | Neutral | 46 | -19.50 | Ave. |

## 5 GHz Band

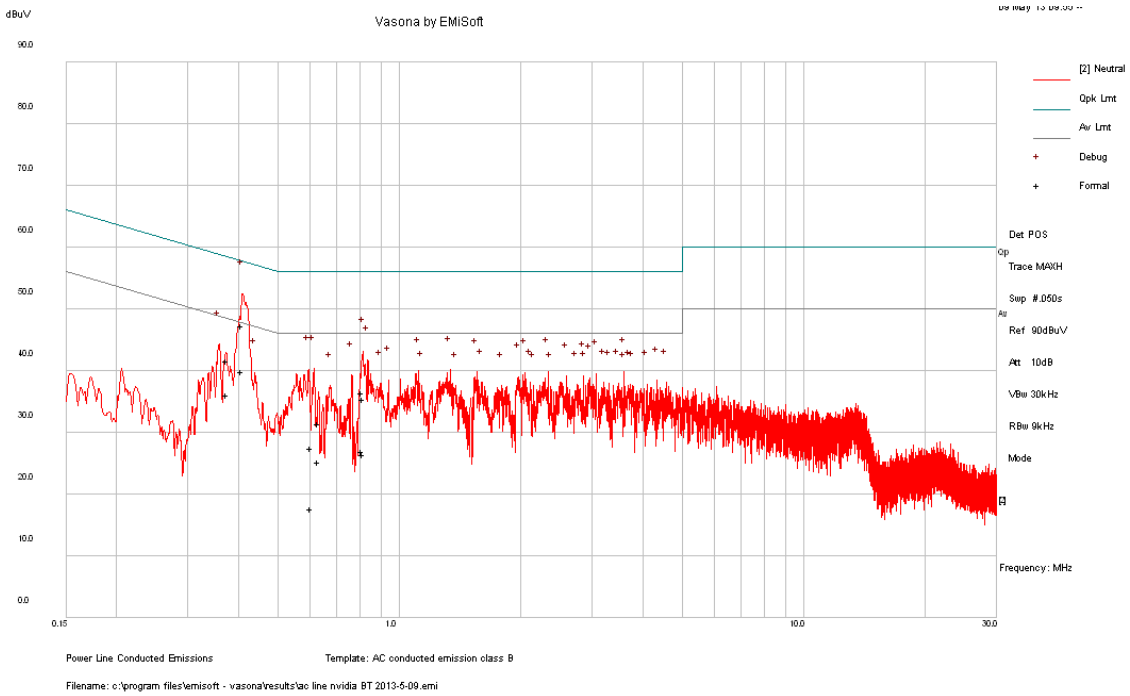
### 120 V, 60 Hz – Line, AC/DC Adaptor




| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 0.414846 | 47.59 | Line | 57.55 | -9.96 | QP |
| 0.332268 | 39.44 | Line | 59.39 | -19.95 | QP |
| 0.54615 | 35.15 | Line | 56 | -20.85 | QP |
| 0.756363 | 32.16 | Line | 56 | -23.84 | QP |
| 1.446609 | 30.16 | Line | 56 | -25.84 | QP |
| 1.489194 | 29.98 | Line | 56 | -26.02 | QP |

| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 0.414846 | 33.83 | Line | 47.55 | -13.72 | Ave. |
| 0.332268 | 26.73 | Line | 49.39 | -22.67 | Ave. |
| 0.54615 | 20.73 | Line | 46 | -25.27 | Ave. |
| 0.756363 | 17.86 | Line | 46 | -28.14 | Ave. |
| 1.446609 | 16.75 | Line | 46 | -29.25 | Ave. |
| 1.489194 | 16.19 | Line | 46 | -29.81 | Ave. |

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




| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 0.408888 | 47.26 | Neutral | 57.67 | -10.41 | QP |
| 0.375177 | 41.63 | Neutral | 58.39 | -16.76 | QP |
| 0.812643 | 36.47 | Neutral | 56 | -19.53 | QP |
| 0.81729 | 35.43 | Neutral | 56 | -20.57 | QP |
| 0.630888 | 31.40 | Neutral | 56 | -24.60 | QP |
| 0.604956 | 27.53 | Neutral | 56 | -28.47 | QP |

| Frequency (MHz) | Corrected Amplitude (dBµV) | Conductor (Line/Neutral) | Limit (dBµV) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|
| 0.408888 | 40.01 | Neutral | 47.67 | -7.66 | Ave. |
| 0.375177 | 36.14 | Neutral | 48.39 | -12.24 | Ave. |
| 0.812643 | 26.96 | Neutral | 46 | -19.04 | Ave. |
| 0.81729 | 26.50 | Neutral | 46 | -19.50 | Ave. |
| 0.630888 | 25.34 | Neutral | 46 | -20.66 | Ave. |
| 0.604956 | 17.60 | Neutral | 46 | -28.40 | Ave. |

# 6 FCC §2.1051, §15.247(d) & IC RSS-210 §A8.5 – Spurious Emissions at Antenna Terminals

## 6.1 Applicable Standards

For FCC §15.247(d) and IC RSS-210 §A8.5 in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

## 6.2 Measurement Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

## 6.3 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.*

## 6.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22-24 °C |
| **Relative Humidity:** | 42-45 % |
| **ATM Pressure:** | 101-102 kPa |

*The testing was performed by Bo Li from 2013-05-06 to 2013-05-09 at RF site.*

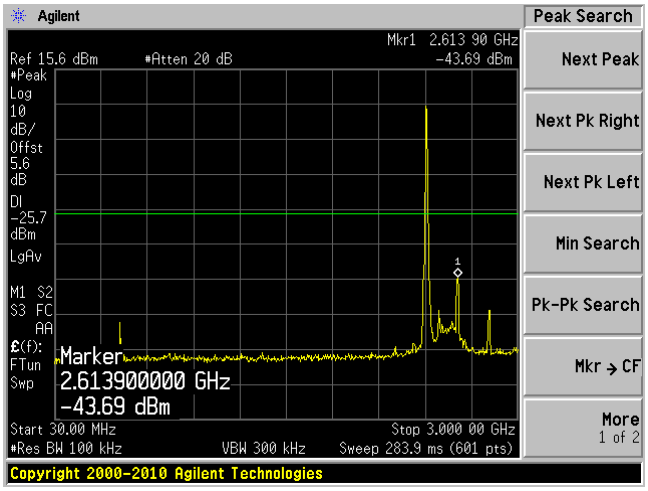
## 6.5 Test Results

Please refer to following plots of spurious emissions.

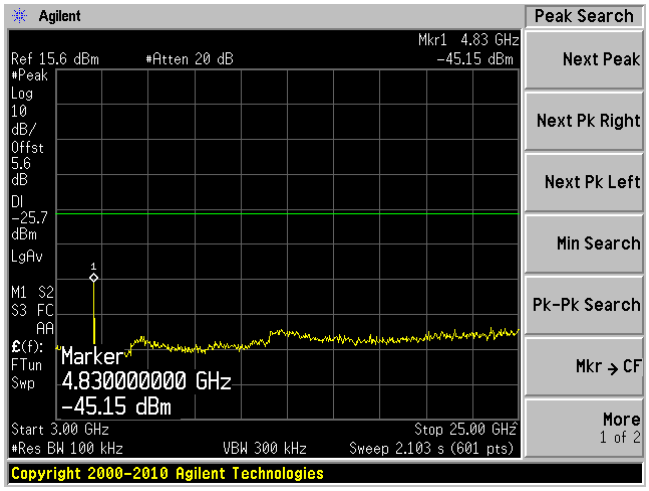
**2400-2483.5 MHz**

**802.11b, Low Channel, 2412 MHz**

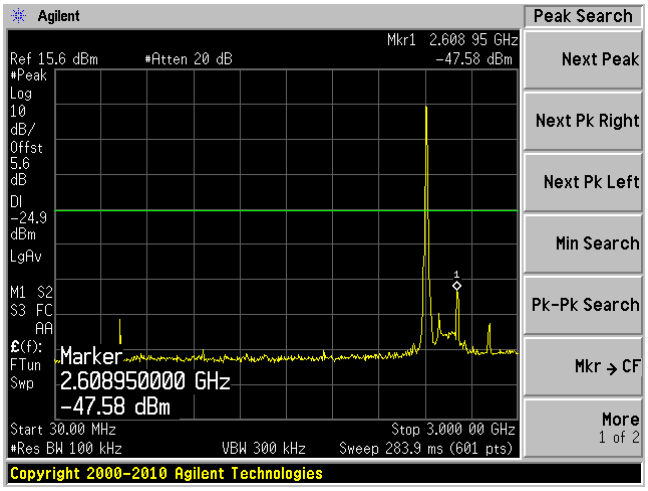
Chain 0, Plot: 30 MHz – 3 GHz



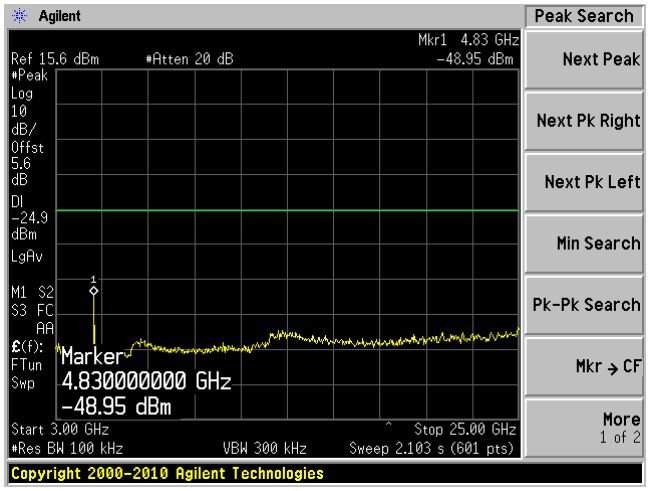

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz

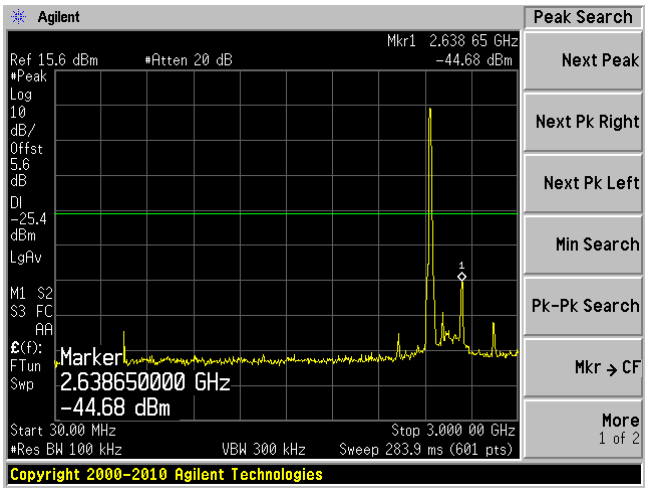



Chain 1, Plot: 3 GHz – 25 GHz

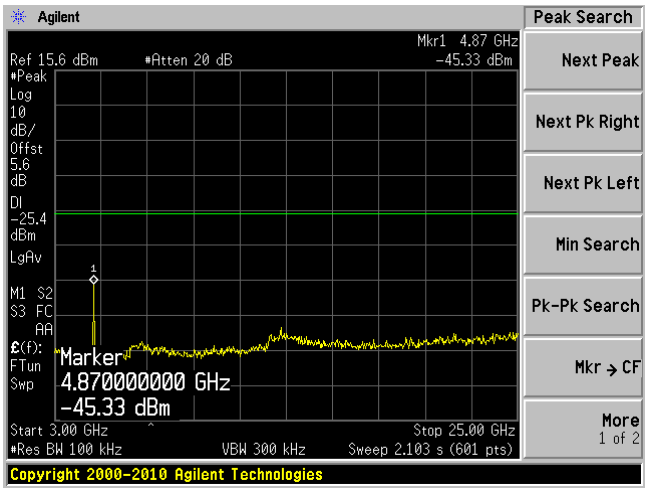


**802.11b, Middle Channel, 2437 MHz**

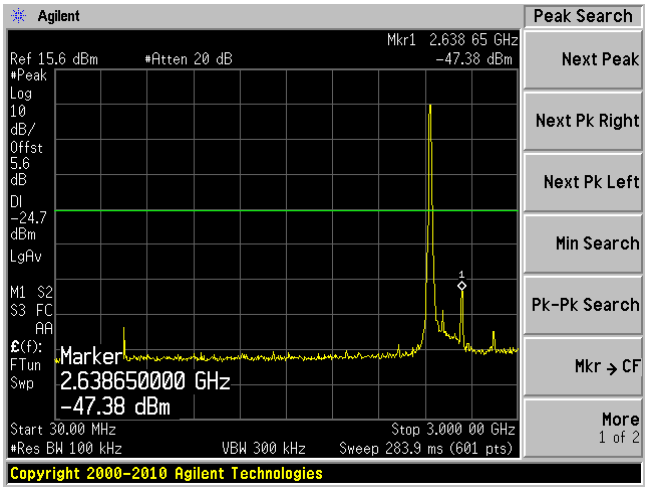
Chain 0, Plot: 30 MHz – 3 GHz



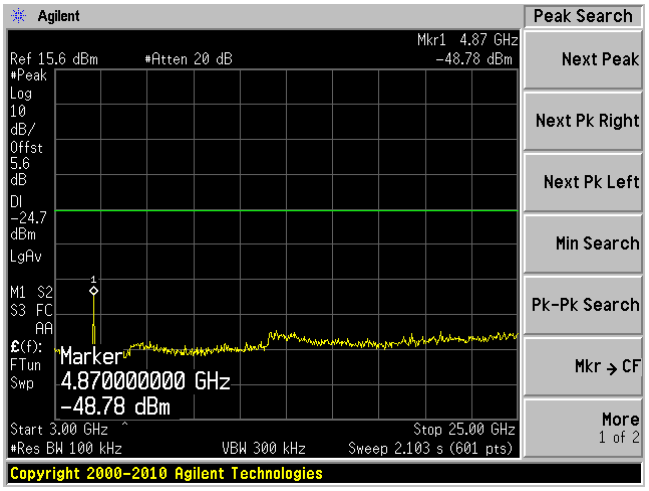

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz

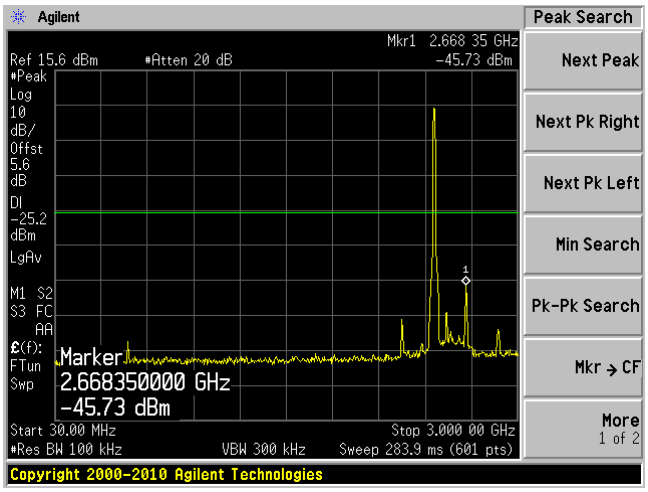



Chain 1, Plot: 3 GHz – 25 GHz

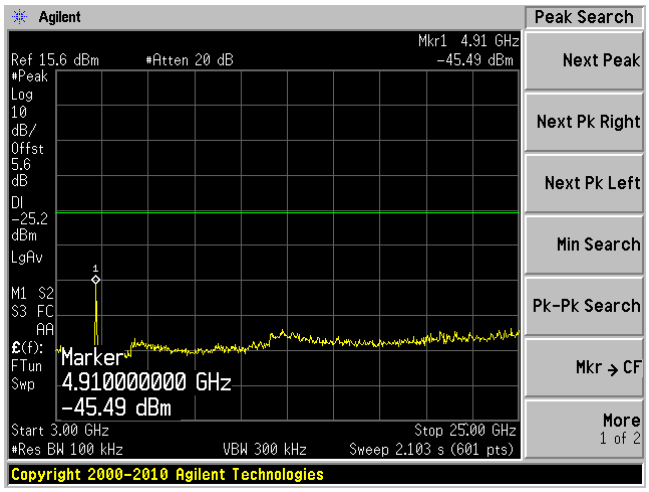


**802.11b, High Channel, 2462 MHz**

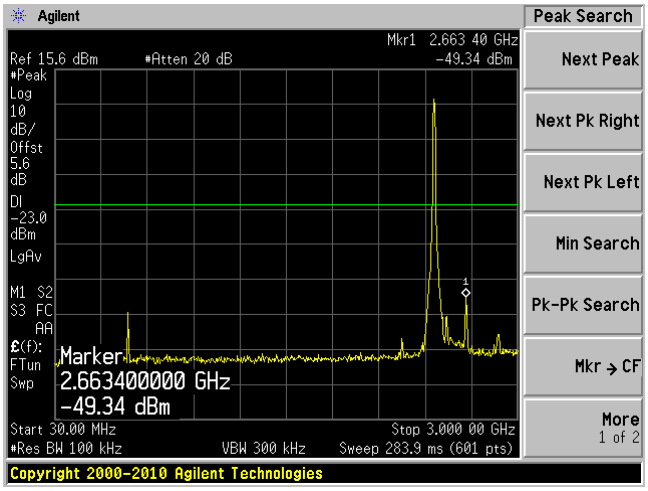
Chain 0, Plot: 30 MHz – 3 GHz



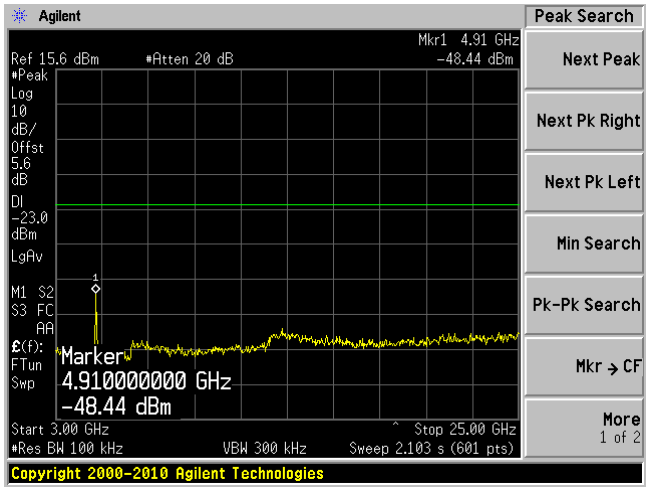

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz

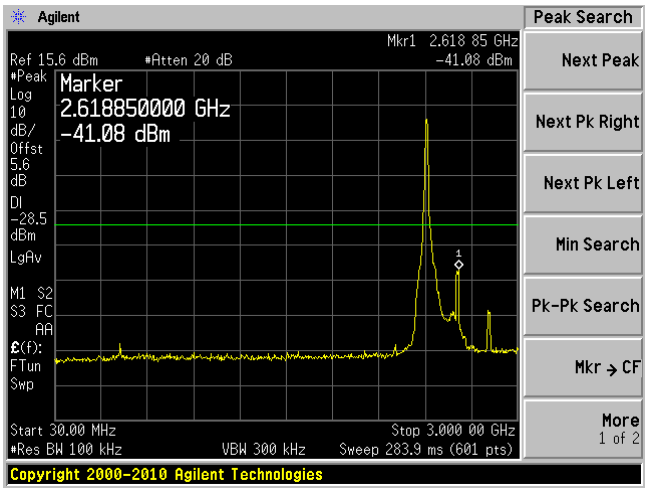



Chain 1, Plot: 3 GHz – 25 GHz

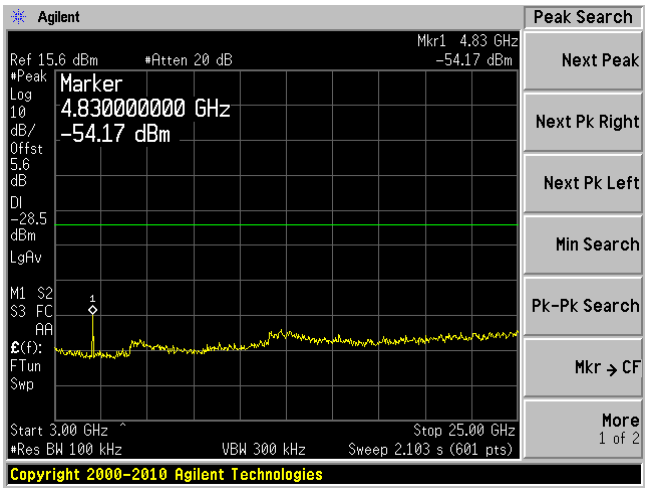


## 802.11g, Low Channel 2412 MHz

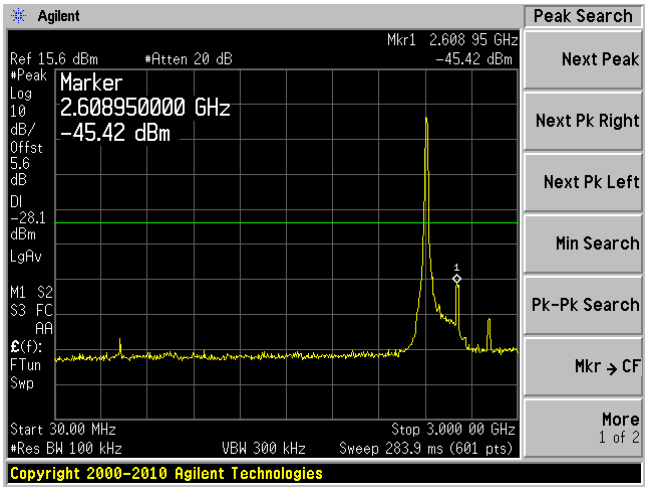
Chain 0, Plot: 30 MHz – 3 GHz



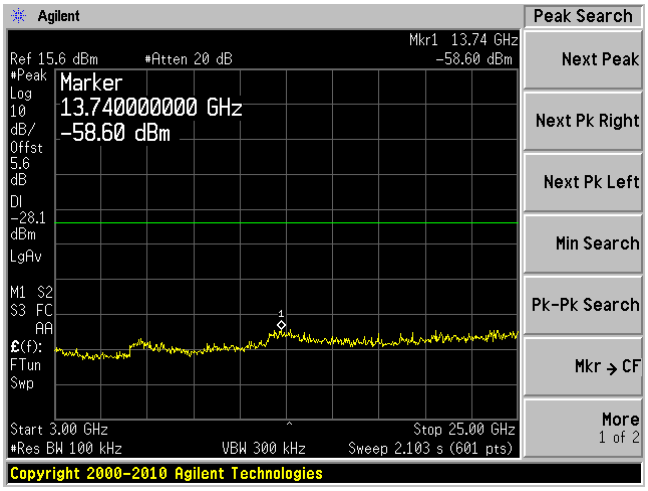

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz

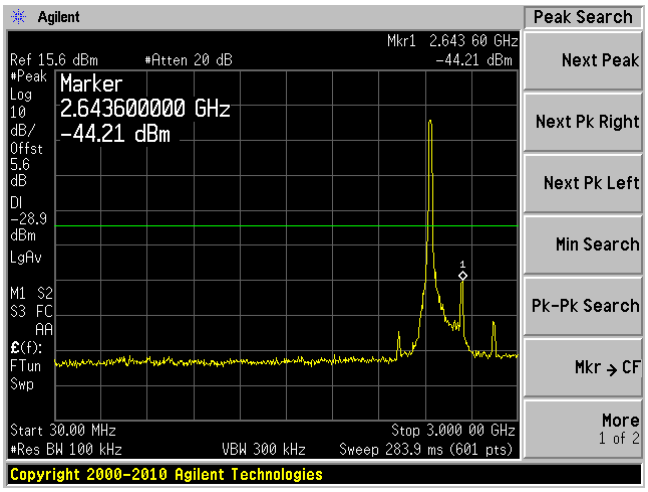



Chain 1, Plot: 3 GHz – 25 GHz

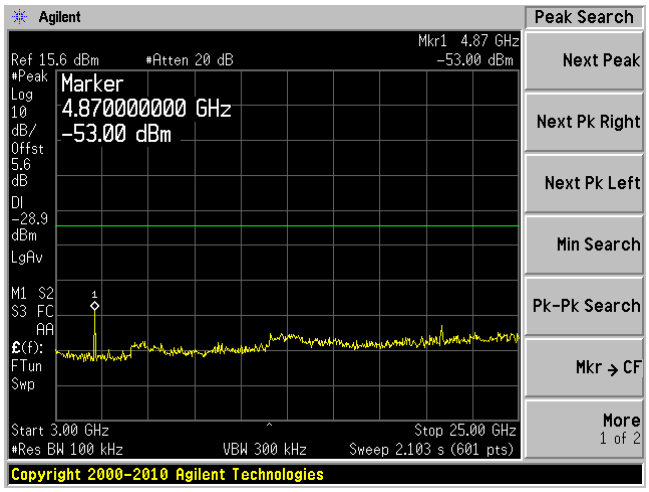


**802.11g, Middle Channel 2437 MHz**

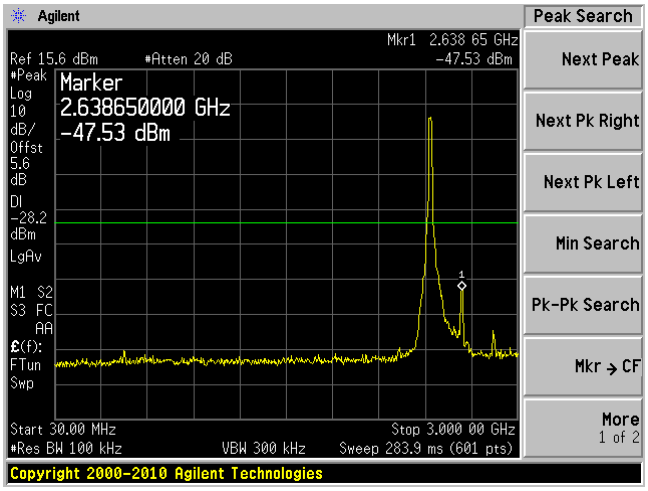
Chain 0, Plot: 30 MHz – 3 GHz



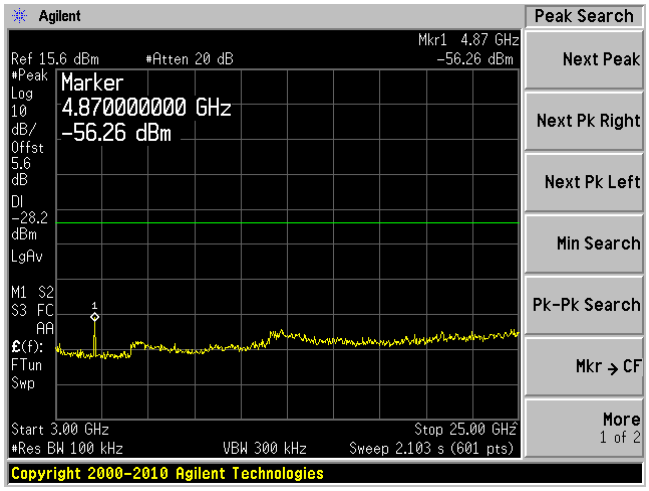

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz

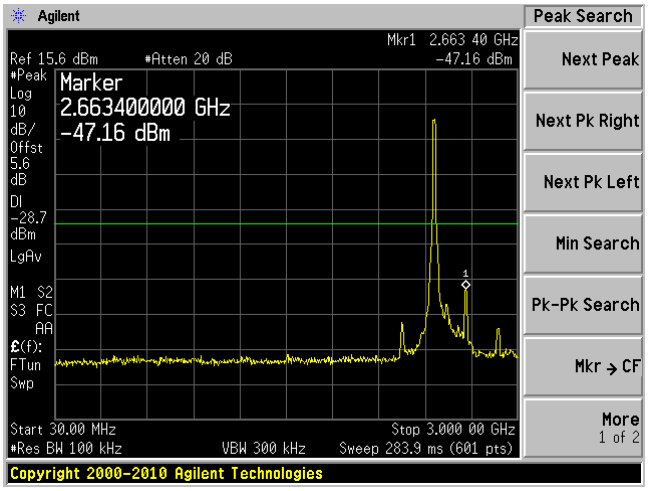



Chain 1, Plot: 3 GHz – 25 GHz

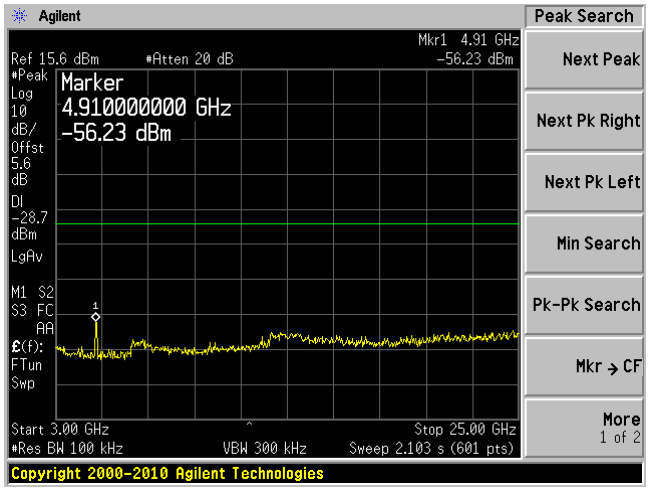


## 802.11g, High Channel 2462 MHz

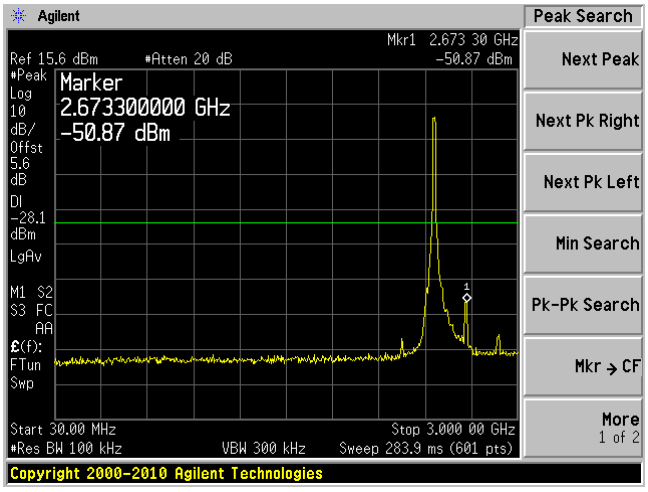
Chain 0, Plot: 30 MHz – 3 GHz



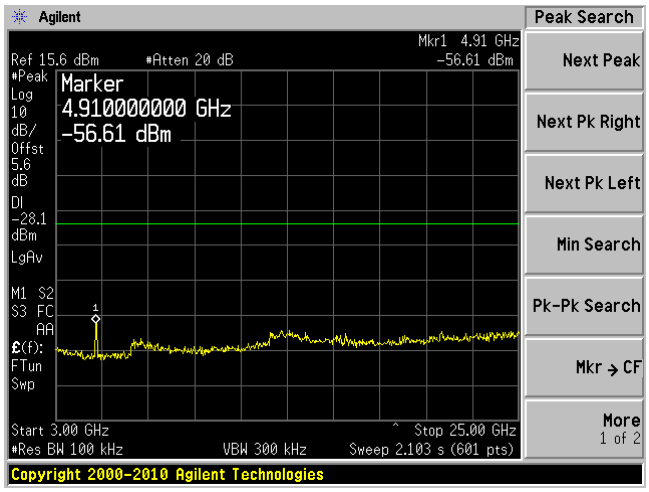

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz

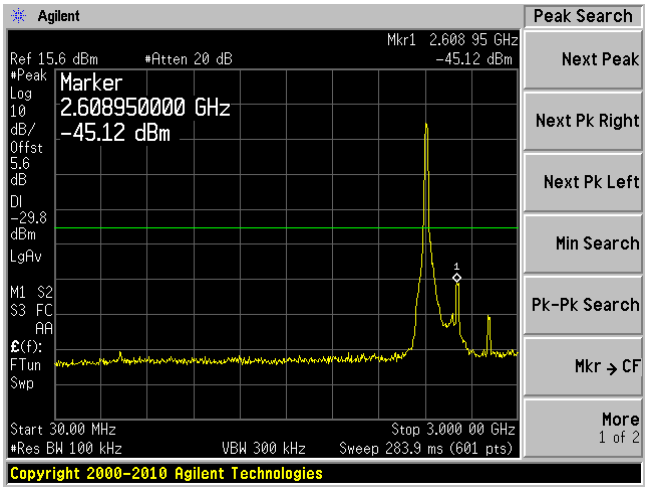



Chain 1, Plot: 3 GHz – 25 GHz

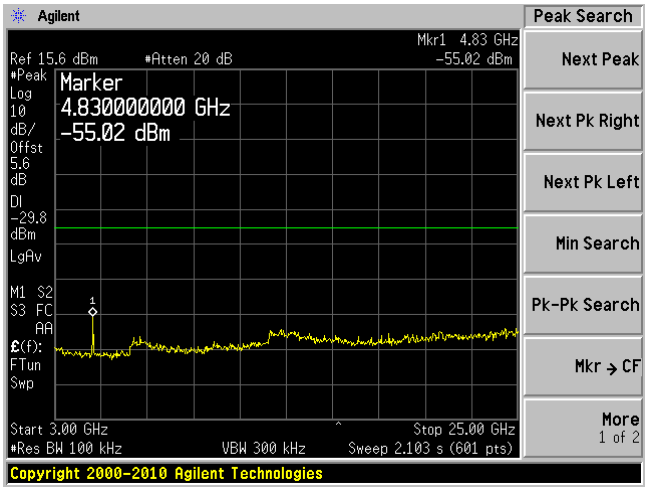


## 802.11n HT20, Low Channel 2412 MHz

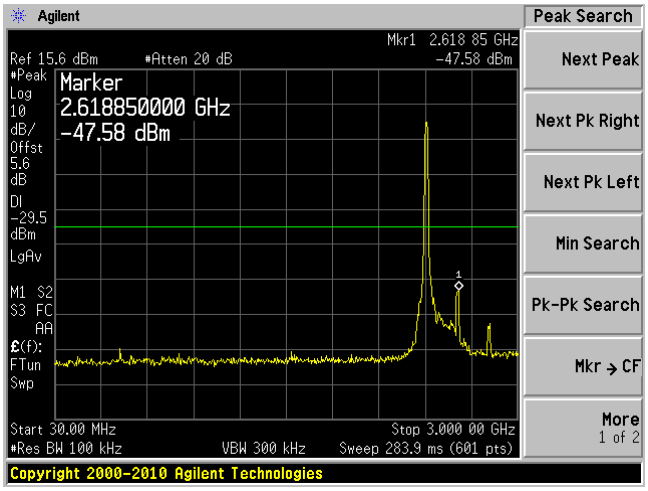
Chain 0, Plot: 30 MHz – 3 GHz



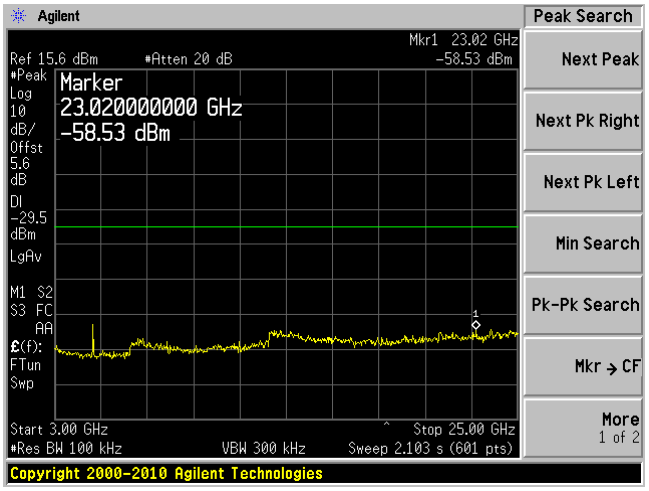

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz

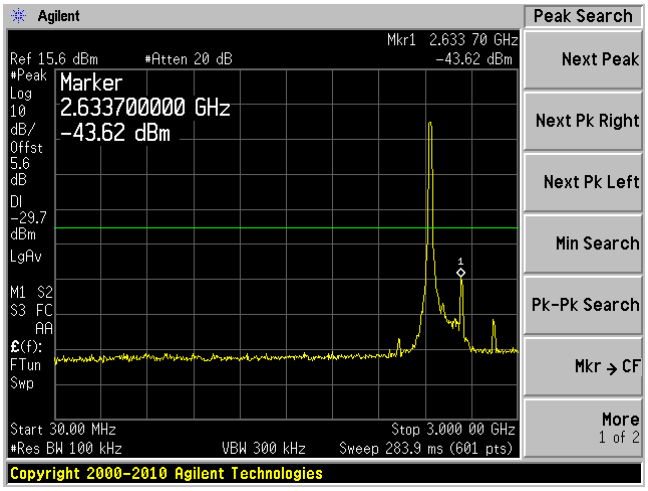



Chain 1, Plot: 3 GHz – 25 GHz

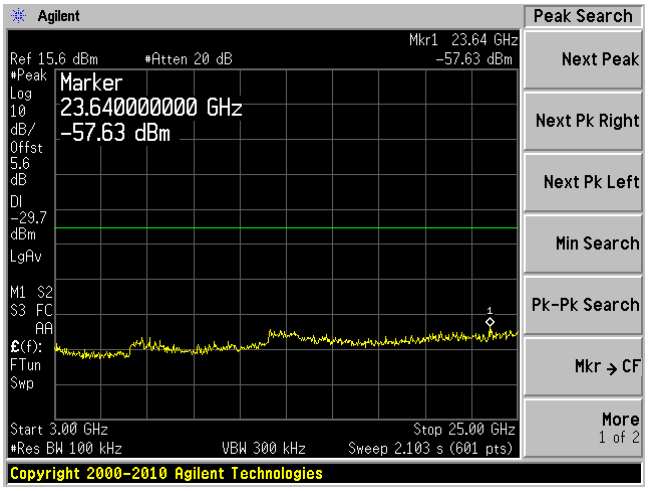


**802.11n HT20, Middle Channel 2437 MHz**

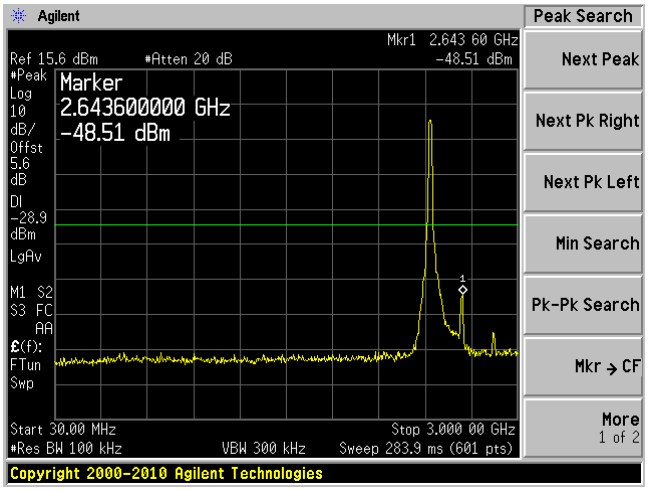
Chain 0, Plot: 30 MHz – 3 GHz



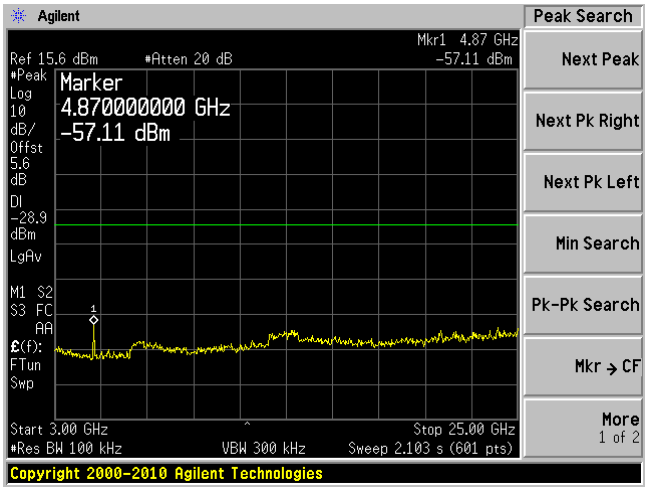

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz

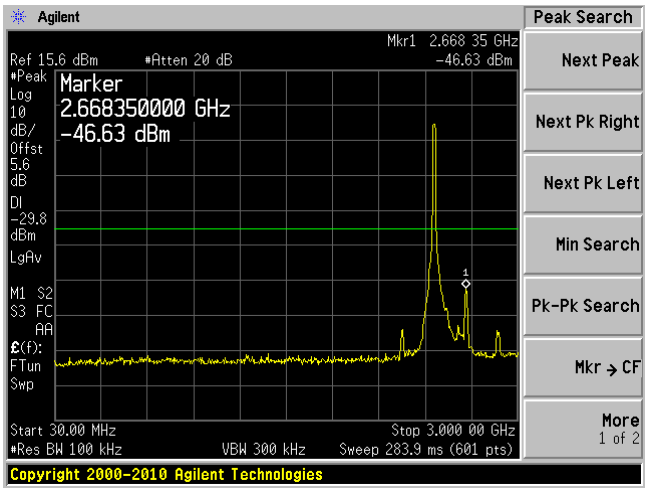



Chain 1, Plot: 3 GHz – 25 GHz

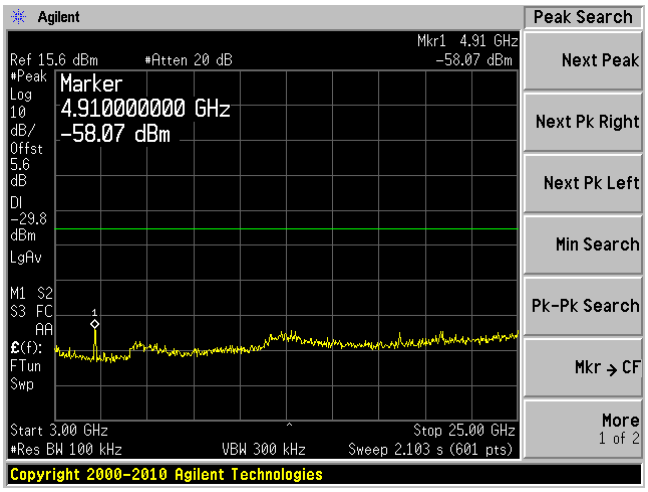


## 802.11n HT20, High Channel 2462 MHz

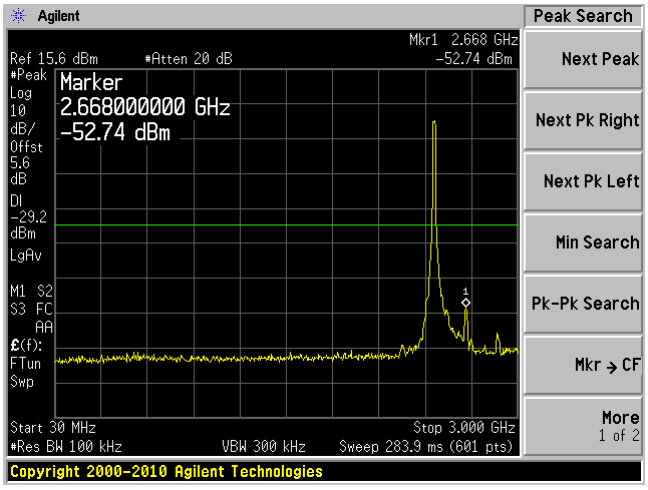
Chain 0, Plot: 30 MHz – 3 GHz



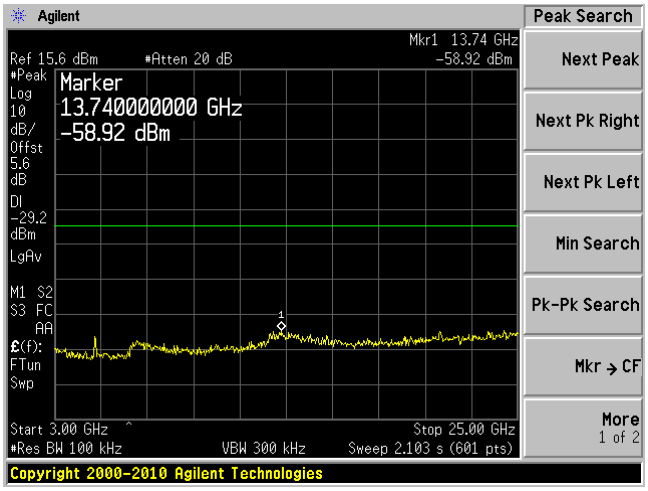

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz

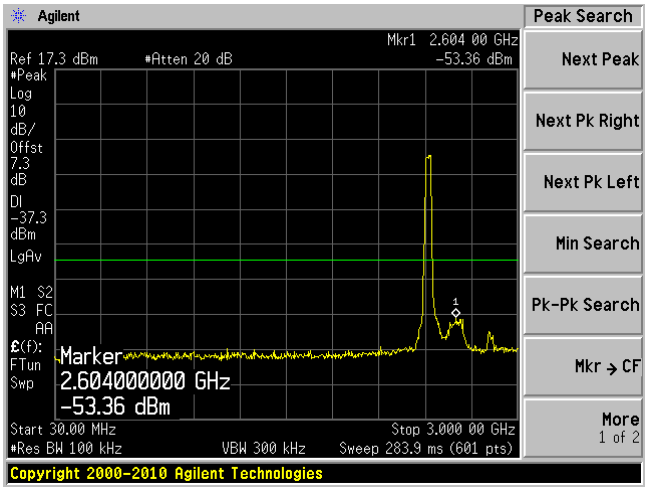



Chain 1, Plot: 3 GHz – 25 GHz

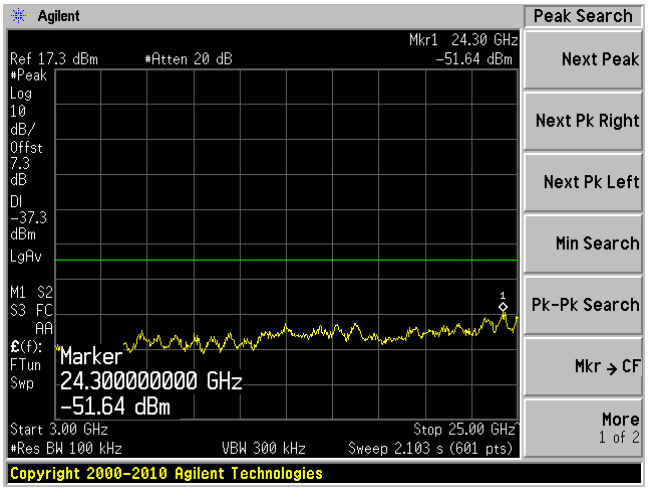


**802.11n HT40, Low Channel 2422 MHz**

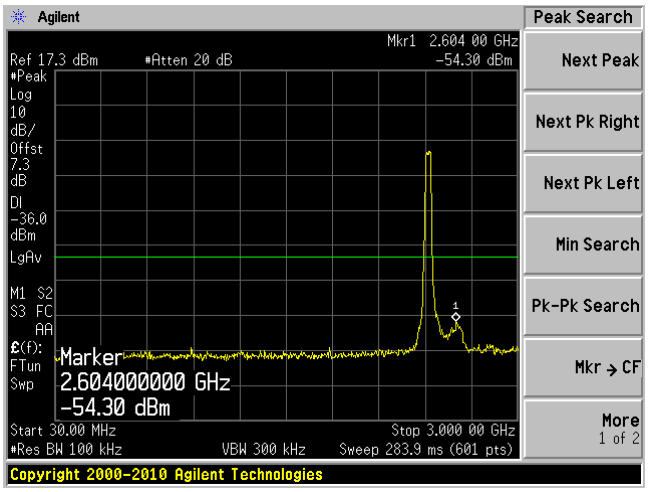
Chain 0, Plot: 30 MHz – 3 GHz



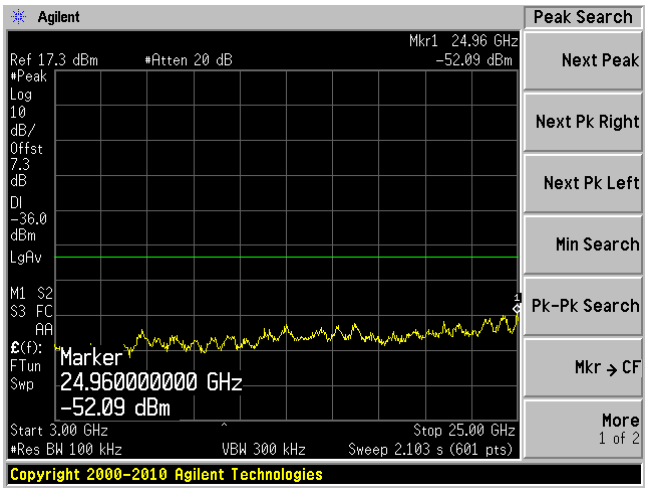

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz

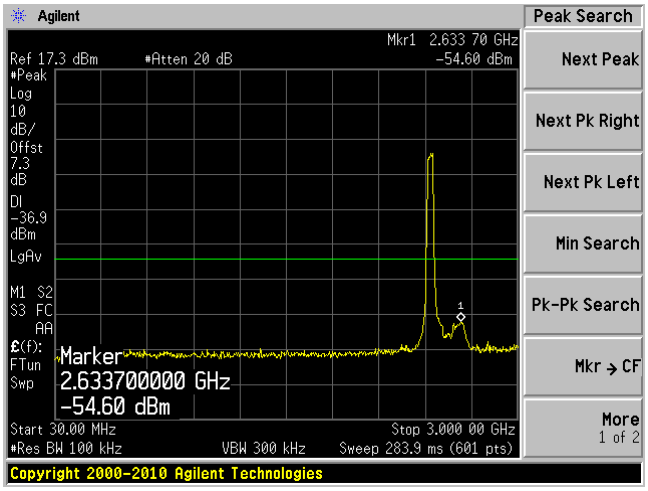



Chain 1, Plot: 3 GHz – 25 GHz

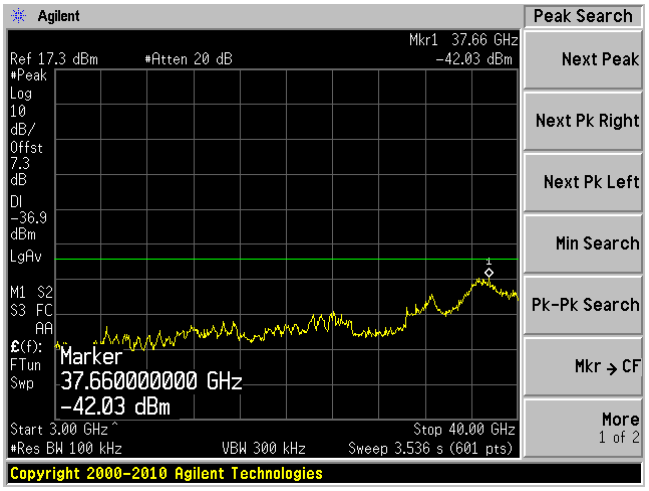


## 802.11n HT40, Middle Channel 2437 MHz

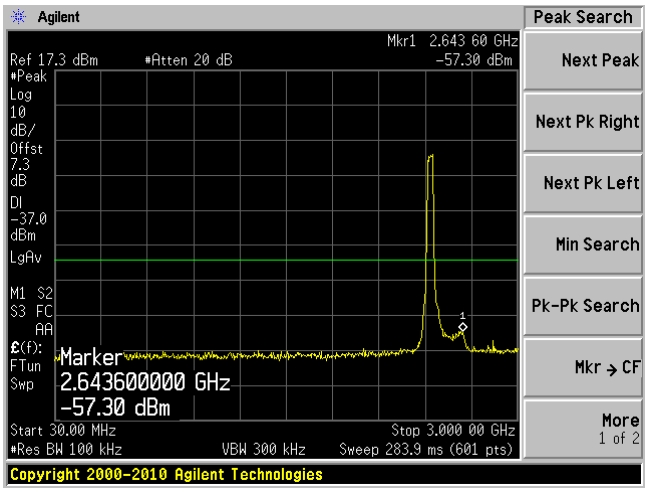
Chain 0, Plot: 30 MHz – 3 GHz



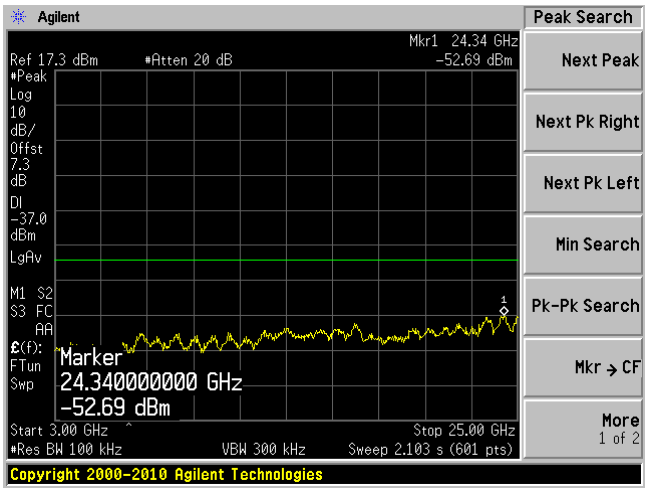

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz

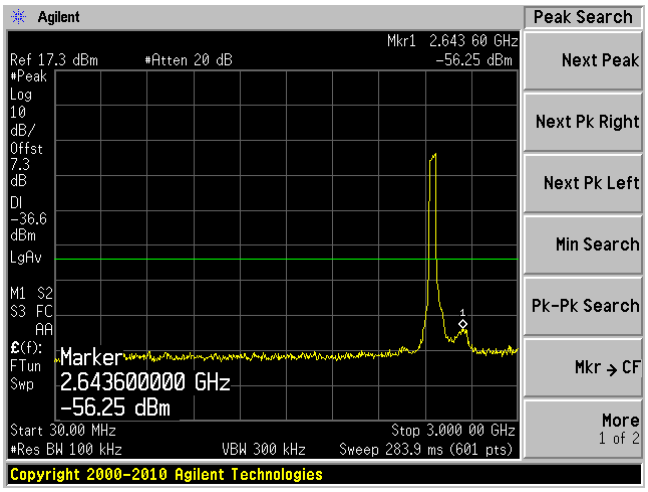



Chain 1, Plot: 3 GHz – 25 GHz

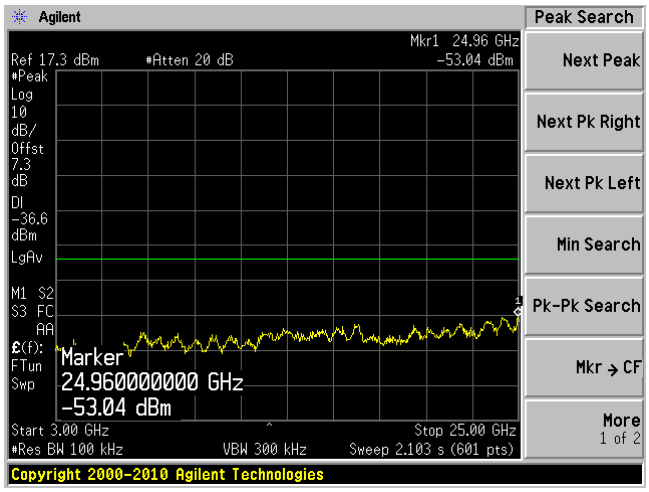


## 802.11n HT40, High Channel 2452 MHz

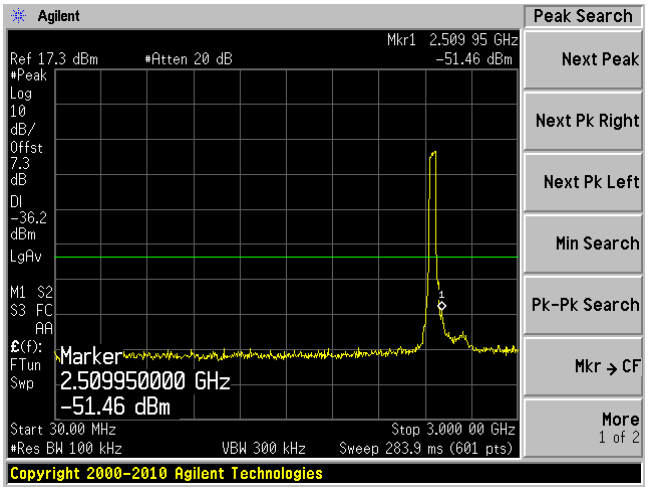
Chain 0, Plot: 30 MHz – 3 GHz



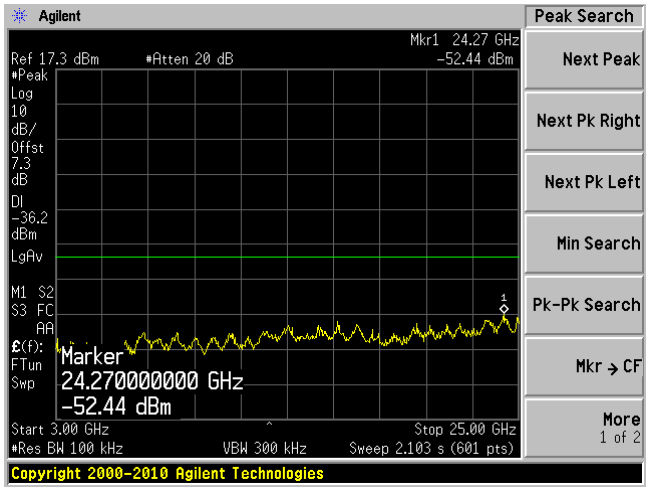

Chain 0, Plot: 3 GHz – 25 GHz




Chain 1, Plot: 30 MHz – 3 GHz



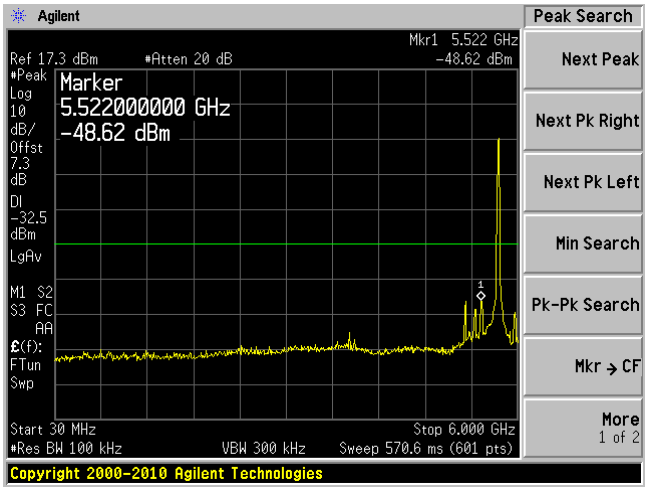

Chain 1, Plot: 3 GHz – 25 GHz



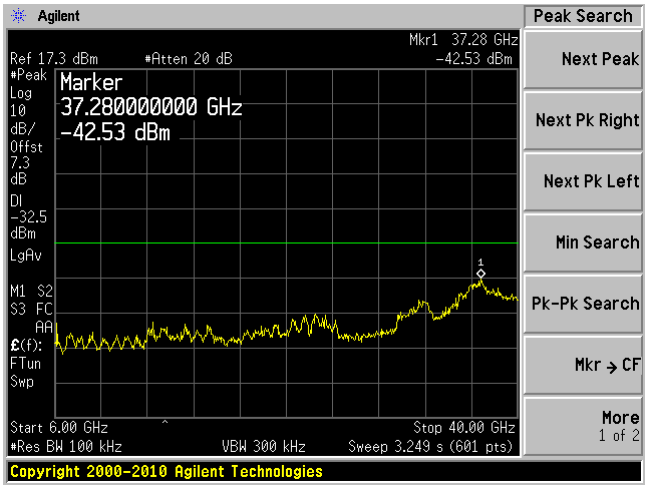
**5725-5845 MHz**

**802.11a, Low Channel 5745 MHz**

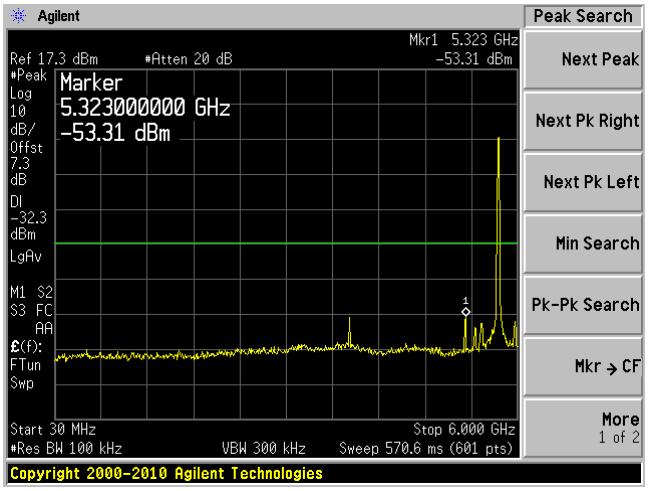
Chain 0, Plot: 30 MHz – 6 GHz



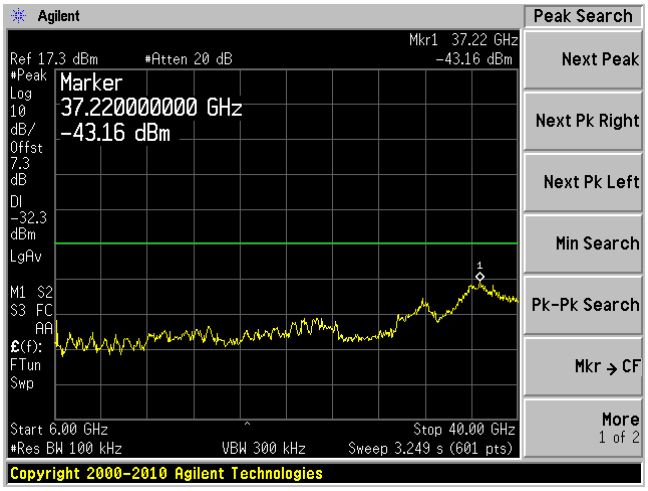

Chain 0, Plot: 6 GHz – 40 GHz




Chain 1, Plot: 30 MHz – 6 GHz

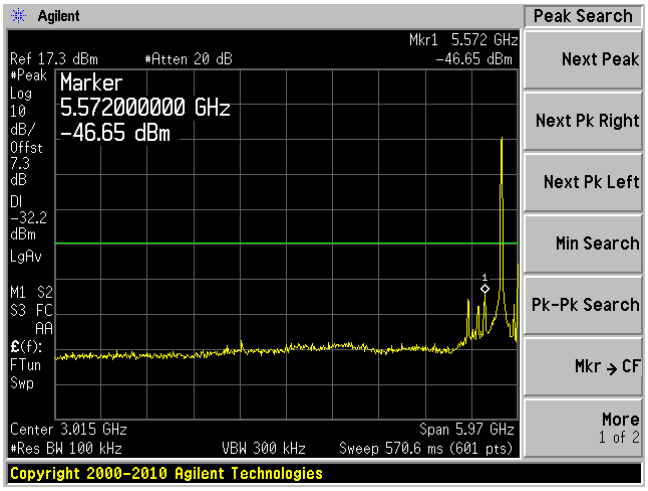



Chain 1, Plot: 6 GHz – 40 GHz

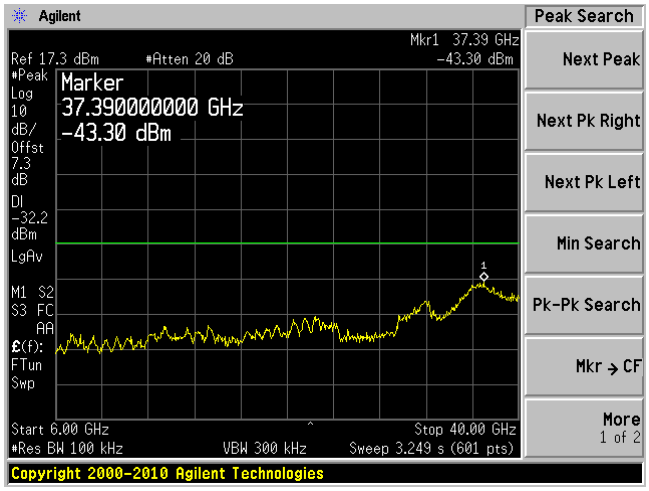


**802.11a, Middle Channel 5785 MHz**

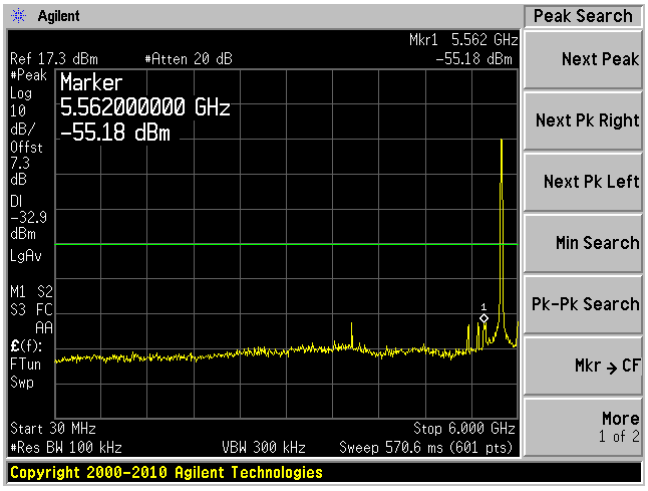
Chain 0, Plot: 30 MHz – 6 GHz



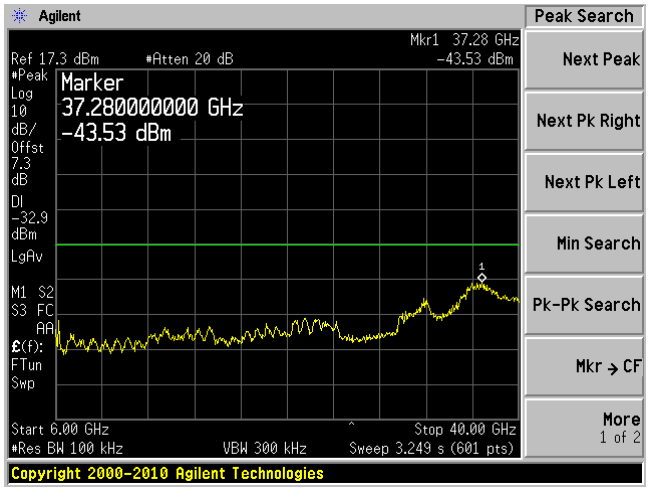

Chain 0, Plot: 6 GHz – 40 GHz




Chain 1, Plot: 30 MHz – 6 GHz

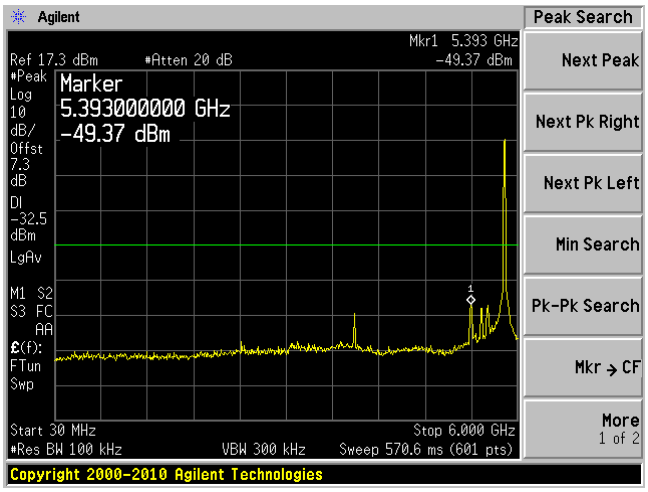



Chain 1, Plot: 6 GHz – 40 GHz

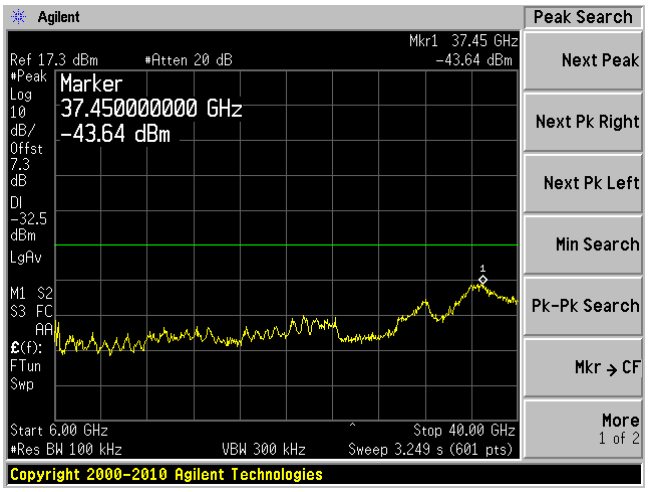


## 802.11a, High Channel 5825 MHz

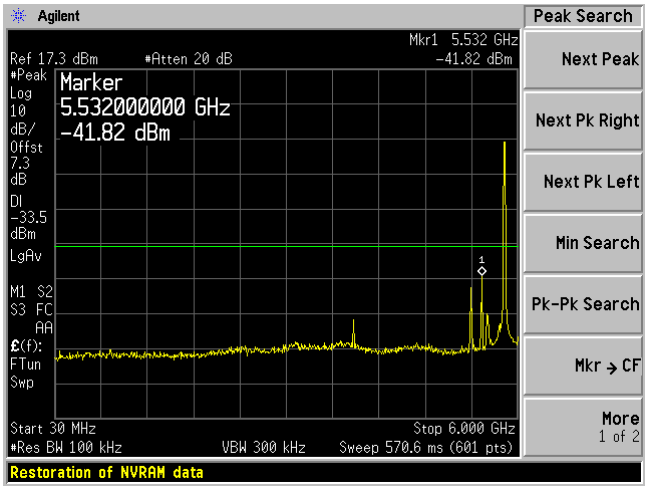
Chain 0, Plot: 30 MHz – 6 GHz



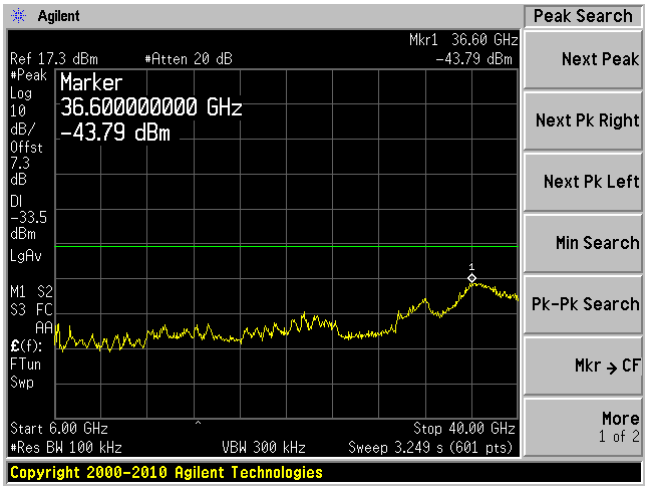

Chain 0, Plot: 6 GHz – 40 GHz




Chain 1, Plot: 30 MHz – 6 GHz

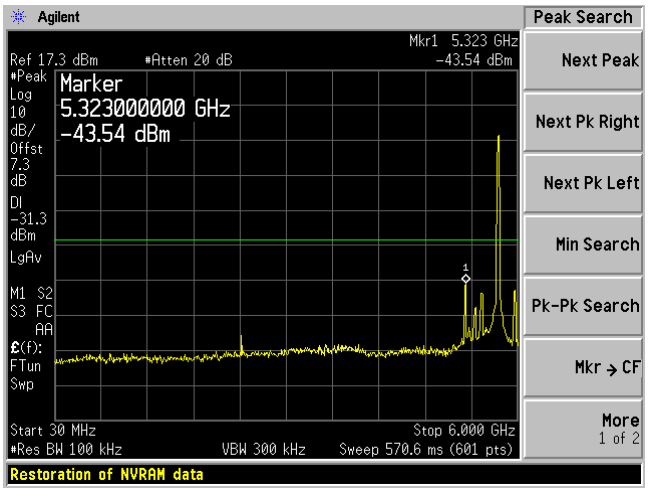



Chain 1, Plot: 6 GHz – 40 GHz

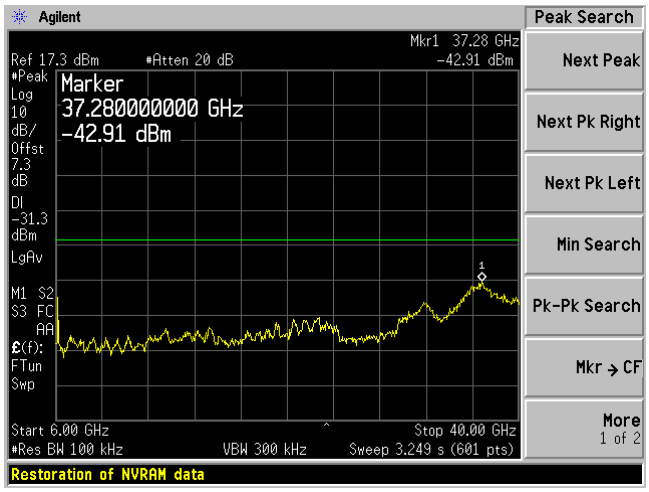


**802.11n HT20, Low Channel 5745 MHz**

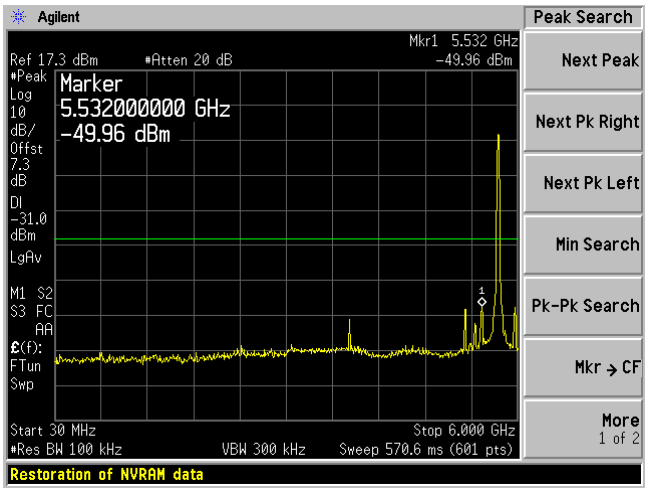
Chain 0, Plot: 30 MHz – 6 GHz



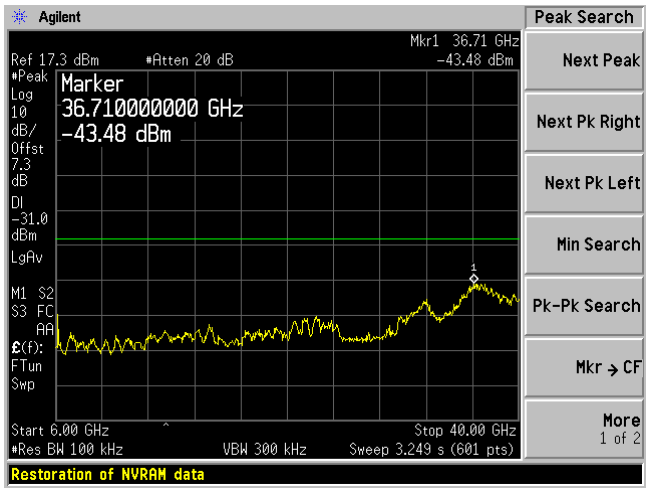

Chain 0, Plot: 6 GHz – 40 GHz




Chain 1, Plot: 30 MHz – 6 GHz

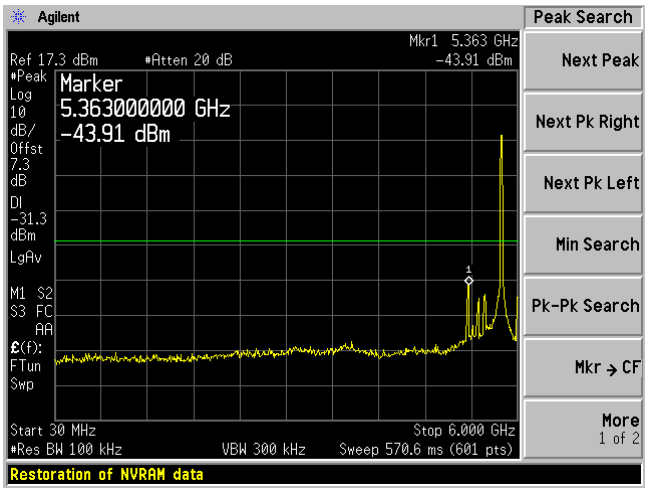



Chain 1, Plot: 6 GHz – 40 GHz

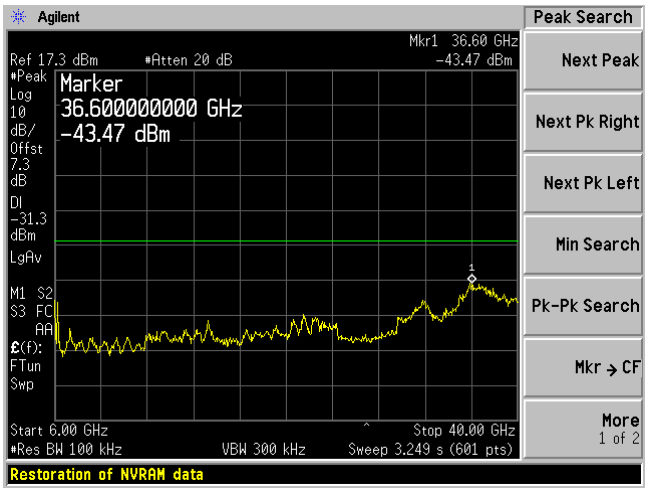


**802.11n HT20, Middle Channel 5785 MHz**

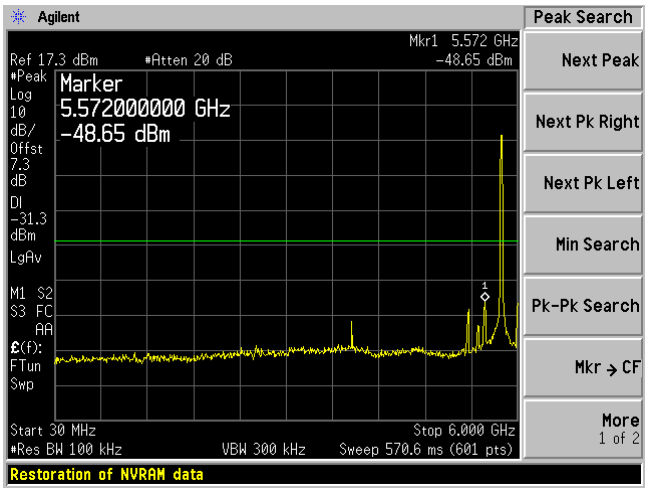
Chain 0, Plot: 30 MHz – 6 GHz



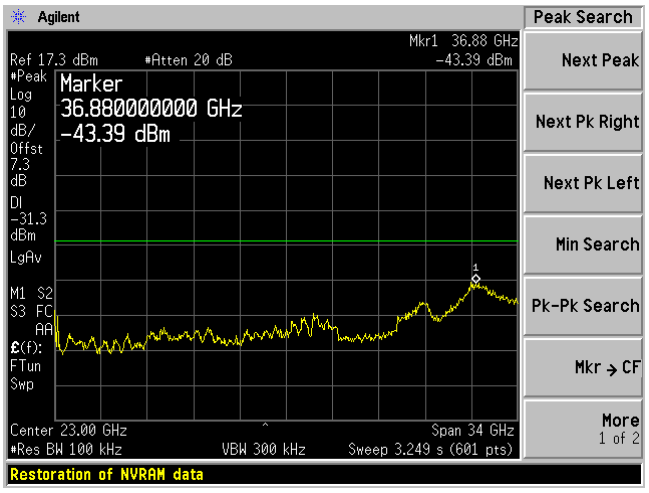

Chain 0, Plot: 6 GHz – 40 GHz




Chain 1, Plot: 30 MHz – 6 GHz

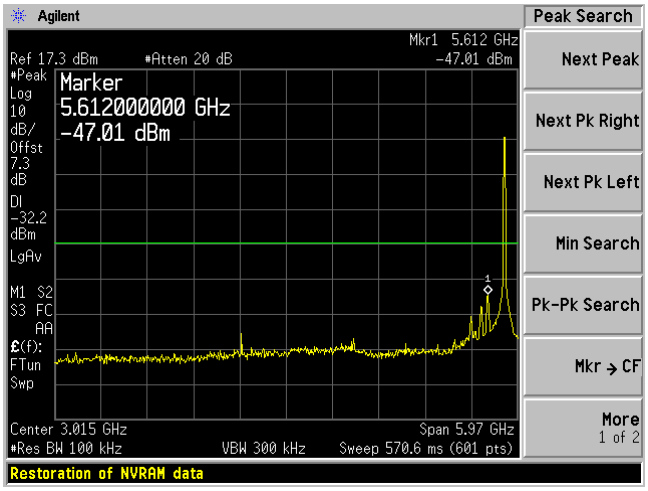



Chain 1, Plot: 6 GHz – 40 GHz

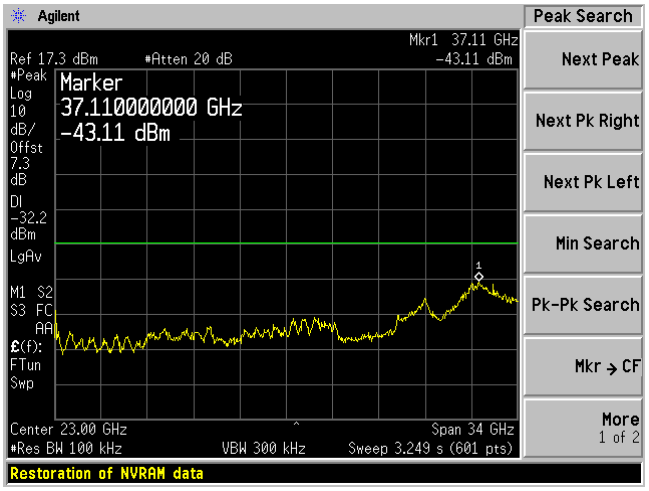


## 802.11n HT20, High Channel 5825 MHz

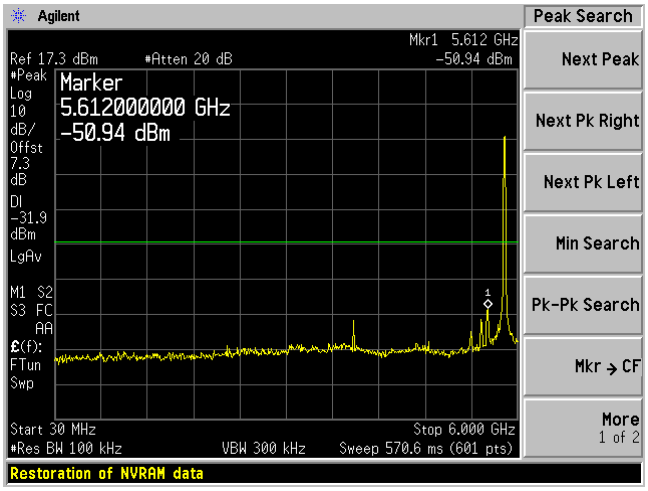
Chain 0, Plot: 30 MHz – 6 GHz



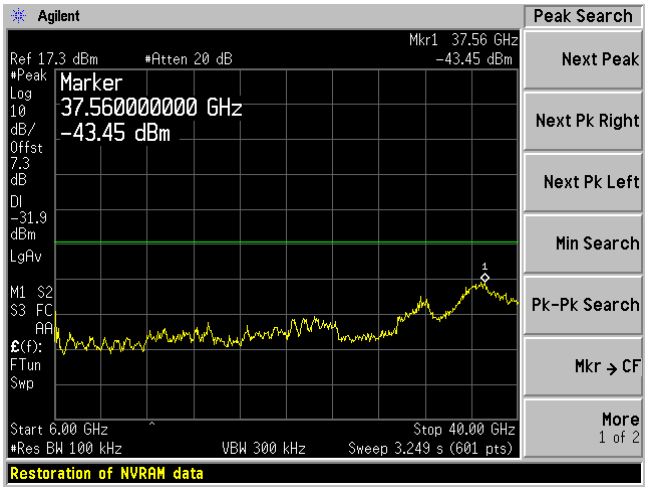

Chain 0, Plot: 6 GHz – 40 GHz




Chain 1, Plot: 30 MHz – 6 GHz

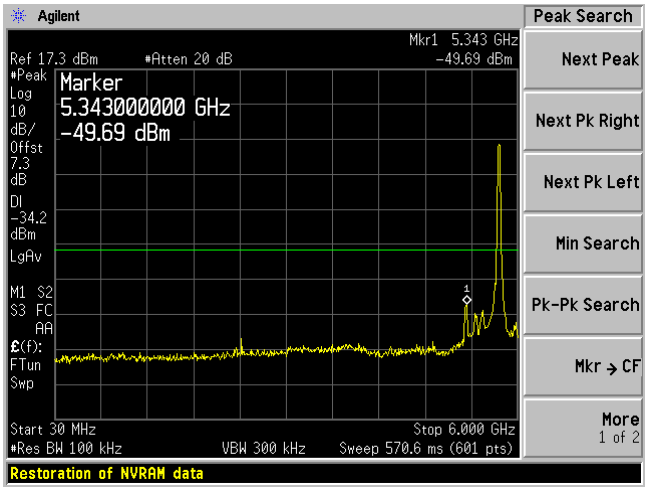



Chain 1, Plot: 6 GHz – 40 GHz

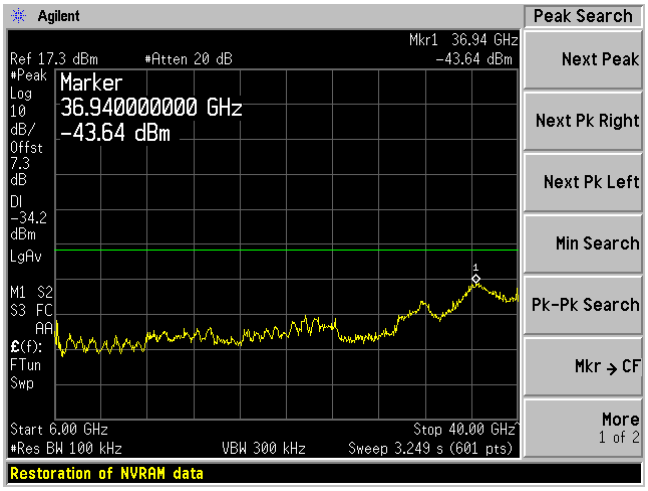


**802.11n HT40, Low Channel 5755 MHz**

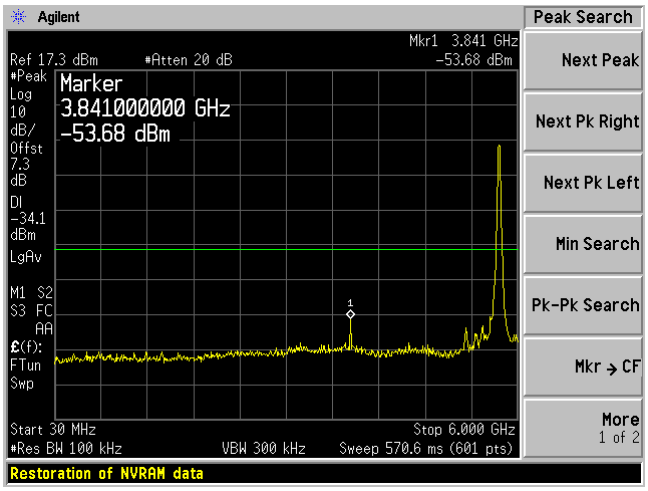
Chain 0, Plot: 30 MHz – 6 GHz



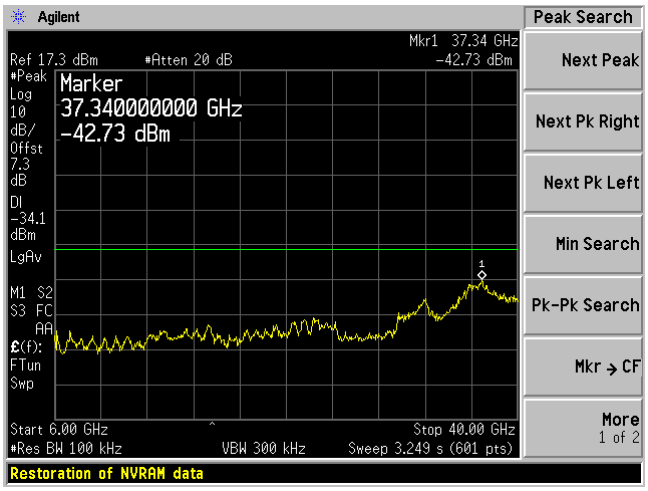

Chain 0, Plot: 6 GHz – 40 GHz




Chain 1, Plot: 30 MHz – 6 GHz

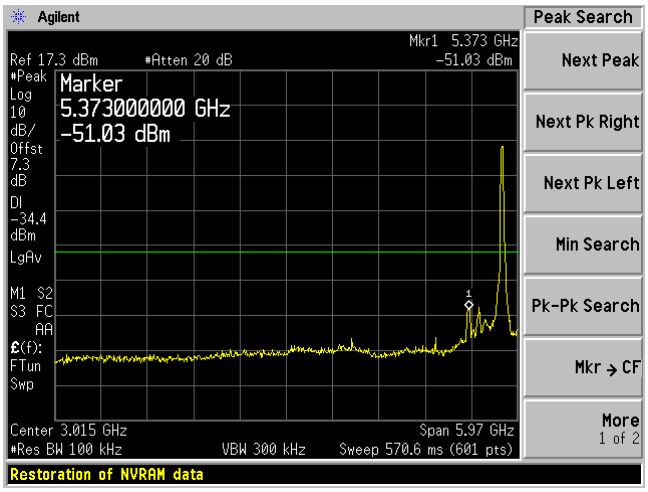



Chain 1, Plot: 6 GHz – 40 GHz

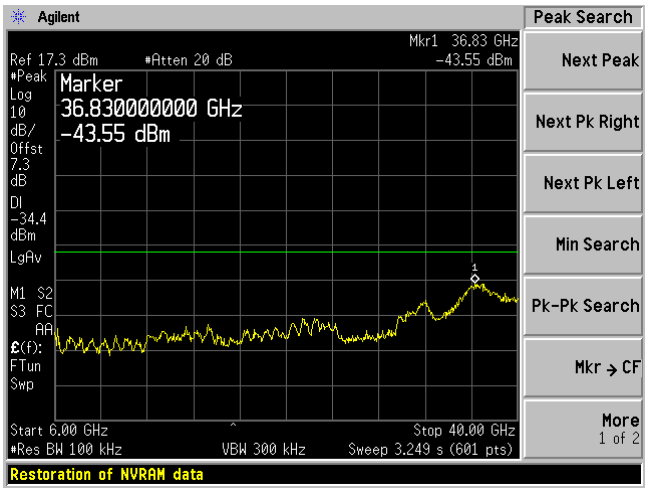


## 802.11n HT40, High Channel 5795 MHz

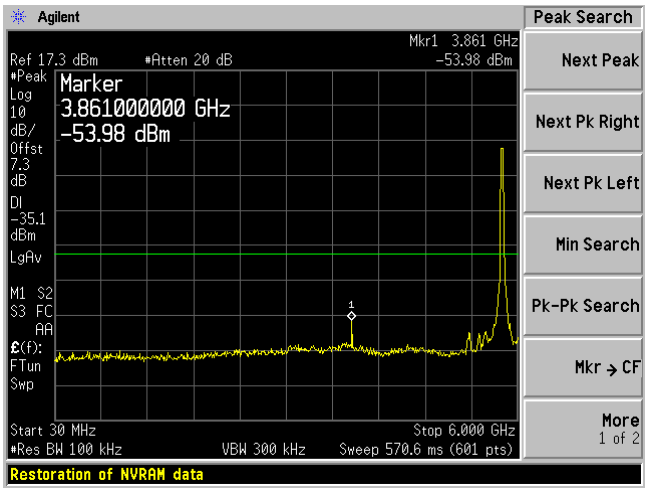
Chain 0, Plot: 30 MHz – 6 GHz



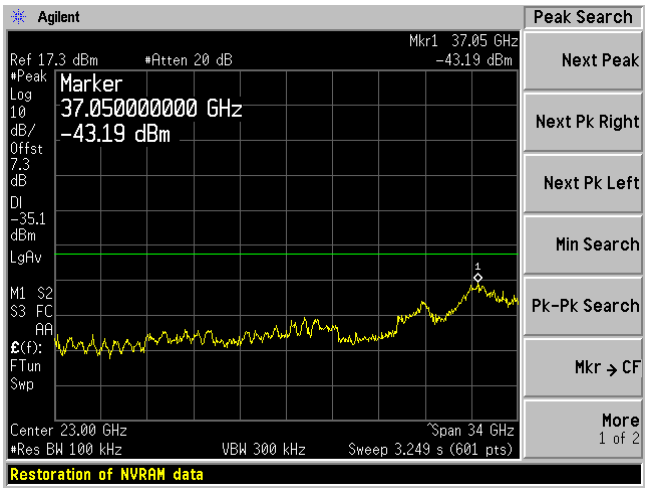

Chain 0, Plot: 6 GHz – 40 GHz




Chain 1, Plot: 30 MHz – 6 GHz




Chain 1, Plot: 6 GHz – 40 GHz



# 7 FCC §15.205, §15.209 & §15.247(d) & IC RSS-210 §A8.5 – Spurious Radiated Emissions

## 7.1 Applicable Standards

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 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** | 3 |
| 88 - 216 | 150** | 3 |
| 216 - 960 | 200** | 3 |
| Above 960 | 500 | 3 |

** 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 §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

As per IC RSS-210 A8.5 Out-of-band Emissions, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

## 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 15 Subpart C and IC RSS-210 limits.

The spacing between the peripherals was 3 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:

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

Above 1000 MHz:

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

## 7.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the 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:

Margin = Corrected Amplitude - 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 |
| 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 | E4446A | US44300386 | 2012-09-29 | 1 year |
| EMCO | Horn Antenna | 3315 | 9511-4627 | 2012-10-17 | 1 year |
| Rohde & Schwarz | EMI Test Receiver | ESCI 1166.5950K03 | 100337 | 2013-03-28 | 1 year |
| Sunol Science Corp | Combination Antenna | JB3 | A020106-2 | 2012-08-15 | 1 year |

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

## 7.6 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 21-25°C |
| **Relative Humidity:** | 43-46% |
| **ATM Pressure:** | 101-103kPa |

*The testing was performed by Bo Li from 2013-5-6 to 2013-5-9 at 5 meter 3 and 5 meter 2.*

## 7.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15C and IC RSS-210 standard's radiated emissions limits, and had the worst margin of:

**30-1000 MHz:**

2.4 GHz Band

| Mode: Transmitting | | | |
|---|---|---|---|
| **Margin (dB)** | **Frequency (MHz)** | **Polarization (Horizontal/Vertical)** | **Mode, Channel** |
| -4.03 | 39.99625 | Vertical | 802.11n HT40 mode High Channel |

5.8 GHz Band

| Mode: Transmitting | | | |
|---|---|---|---|
| **Margin (dB)** | **Frequency (MHz)** | **Polarization (Horizontal/Vertical)** | **Mode, Channel** |
| -3.43 | 39.99975 | Vertical | 802.11n HT40 mode High Channel |

**1 – 25 GHz:**

2.4 GHz Band

| Mode: Transmitting | | | |
|---|---|---|---|
| **Margin (dB)** | **Frequency (MHz)** | **Polarization (Horizontal/Vertical)** | **Mode, Channel** |
| -0.475 | 2483.5 | Vertical | 802.11n HT20 mode High Channel |

**1-40 GHz:**

5.8 GHz Band

| Mode: Transmitting | | | |
|---|---|---|---|
| **Margin (dB)** | **Frequency (MHz)** | **Polarization (Horizontal/Vertical)** | **Mode, Channel** |
| -4.48 | 22980 | Horizontal | 802.11n HT20 mode Low Channel |

Please refer to the following table and plots for specific test result details

## 7.8 Radiated Emissions Test Data and Plots

### 1) 30 MHz – 1 GHz, Measured at 3 meters

**2.4 GHz Band, Quasi-Peak Measurements**

**802.11b mode**

All 30 MHz–1 GHz spurious are digital, other emissions are on the noise floor level. Report only the worst case data as shown below:

| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|
| 39.937 | 33.48 | 148 | V | 36 | 40 | -6.52 |
| 176.02675 | 29.22 | 141 | V | 150 | 43.5 | -14.28 |
| 914.21575 | 27.29 | 98 | V | 234 | 46 | -18.71 |
| 128.68125 | 20.62 | 131 | V | 149 | 43.5 | -22.88 |
| 261.11625 | 20.56 | 117 | H | 277 | 46 | -25.44 |
| 311.98375 | 15.81 | 99 | V | 184 | 46 | -30.19 |

**802.11n HT20 mode**

All 30 MHz–1 GHz spurious are digital, other emissions are on the noise floor level. Report only the worst case data as shown below:

| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|
| 39.94325 | 34.86 | 126 | V | 330 | 40 | -5.14 |
| 178.30575 | 30.84 | 102 | V | 147 | 43.50 | -12.66 |
| 360.10725 | 32.34 | 124 | V | 162 | 46 | -13.66 |
| 249.956 | 28.63 | 99 | V | 171 | 46 | -17.37 |
| 130.06825 | 21.88 | 110 | V | 253 | 43.50 | -21.62 |

**802.11n HT40 mode**

All 30 MHz–1 GHz spurious are digital, other emissions are on the noise floor level. Report only the worst case data as shown below:

| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|
| 39.99625 | 35.97 | 109 | V | 80 | 40 | -4.03 |
| 199.9915 | 33.74 | 110 | V | 53 | 43.50 | -9.76 |
| 261.0745 | 27.29 | 124 | H | 290 | 46 | -18.71 |
| 121.44575 | 21.94 | 225 | H | 261 | 43.50 | -21.56 |
| 311.55725 | 14.60 | 174 | H | 229 | 46 | -31.40 |

## 5.8 GHz Band, Quasi-Peak Measurements

### 802.11a mode

All 30 MHz–1 GHz spurious are digital, other emissions are on the noise floor level. Report only the worst case data as shown below:

| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|
| 39.1635 | 29.90 | 224 | V | 161 | 40 | -10.10 |
| 109.32225 | 24.20 | 105 | V | 269 | 43.5 | -19.30 |
| 127.64575 | 18.97 | 222 | V | 195 | 43.5 | -24.53 |
| 996.2655 | 28.95 | 115 | V | 334 | 54 | -25.05 |
| 322.97275 | 17.50 | 142 | V | 164 | 46 | -28.50 |
| 251.0435 | 16.15 | 141 | H | 283 | 46 | -29.85 |

### 802.11n HT20 mode

All 30 MHz–1 GHz spurious are digital, other emissions are on the noise floor level. Report only the worst case data as shown below:

| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|
| 38.6035 | 31.71 | 110 | V | 54 | 40 | -8.29 |
| 115.52875 | 22.30 | 371 | H | 261 | 43.50 | -21.20 |
| 900.15425 | 23.85 | 196 | V | 290 | 46 | -22.15 |
| 997.66125 | 31.63 | 139 | V | 37 | 54 | -22.37 |
| 323.78625 | 20.56 | 168 | V | 332 | 46 | -25.44 |
| 249.66575 | 17.28 | 114 | H | 140 | 46 | -28.72 |

### 802.11n HT40 mode

All 30 MHz–1 GHz spurious are digital, other emissions are on the noise floor level. Report only the worst case data as shown below:

| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|
| 39.99975 | 36.57 | 99 | V | 26 | 40 | -3.43 |
| 118.92275 | 34.36 | 193 | H | 288 | 43.5 | -9.14 |
| 328.42525 | 28.90 | 105 | H | 246 | 46 | -17.10 |
| 327.06725 | 27.50 | 113 | H | 107 | 46 | -18.50 |
| 1000 | 25.71 | 129 | H | 85 | 54 | -28.29 |
| 242.1545 | 17.49 | 161 | H | 328 | 46 | -28.51 |

**2) 1–25 GHz, Measured at 3 meters**

**2.4 GHz Band, 802.11b 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 2412 MHz, measured at 3 meters | | | | | | | | | | | |
| 2412 | 77.85 | 309 | 100 | V | 28.956 | 3.12 | 0 | 109.926 | N/A | N/A | Peak |
| 2412 | 79.69 | 335 | 173 | H | 28.956 | 3.12 | 0 | 111.766 | N/A | N/A | Peak |
| 2412 | 68.89 | 309 | 100 | V | 28.956 | 3.12 | 0 | 100.966 | N/A | N/A | Ave |
| 2412 | 70.99 | 335 | 173 | H | 28.956 | 3.12 | 0 | 103.066 | N/A | N/A | Ave |
| 2390 | 30.02 | 304 | 100 | V | 28.956 | 3.12 | 0 | 62.096 | 74 | -11.904 | Peak |
| 2390 | 30.7 | 336 | 177 | H | 28.956 | 3.12 | 0 | 62.776 | 74 | -11.224 | Peak |
| 2390 | 14.75 | 304 | 100 | V | 28.956 | 3.12 | 0 | 46.826 | 54 | -7.174 | Ave |
| 2390 | 16.32 | 336 | 177 | H | 28.956 | 3.12 | 0 | 48.396 | 54 | -5.604 | Ave |
| 4824 | 45.18 | 44 | 100 | V | 33.097 | 4.56 | 27.7 | 55.137 | 74 | -18.863 | Peak |
| 4824 | 44.79 | 310 | 113 | H | 33.097 | 4.56 | 27.7 | 54.747 | 74 | -19.253 | Peak |
| 4824 | 42.35 | 44 | 100 | V | 33.097 | 4.56 | 27.7 | 52.307 | 54 | -1.693 | Ave |
| 4824 | 41.33 | 310 | 113 | H | 33.097 | 4.56 | 27.7 | 51.287 | 54 | -2.713 | Ave |
| 7236 | 33.34 | 0 | 100 | V | 35.928 | 5.49 | 27.58 | 47.178 | 89.926 | -42.748 | Peak |
| 7236 | 33.48 | 0 | 100 | H | 35.928 | 5.49 | 27.58 | 47.318 | 91.766 | -44.448 | Peak |
| 7236 | 18.66 | 0 | 100 | V | 35.928 | 5.49 | 27.58 | 32.498 | 80.966 | -48.468 | Ave |
| 7236 | 18.19 | 0 | 100 | H | 35.928 | 5.49 | 27.58 | 32.028 | 83.066 | -51.038 | Ave |
| 9648 | 32.43 | 0 | 100 | V | 37.954 | 6.54 | 27.06 | 49.864 | 89.926 | -40.062 | Peak |
| 9648 | 31.95 | 0 | 100 | H | 37.954 | 6.54 | 27.06 | 49.384 | 91.766 | -42.382 | Peak |
| 9648 | 17.32 | 0 | 100 | V | 37.954 | 6.54 | 27.06 | 34.754 | 80.966 | -46.212 | Ave |
| 9648 | 17.9 | 0 | 100 | H | 37.954 | 6.54 | 27.06 | 35.334 | 83.066 | -47.732 | Ave |
| Middle Channel 2437 MHz, measured at 3 meters | | | | | | | | | | | |
| 2437 | 78.01 | 121 | 117 | V | 28.956 | 3.12 | 0 | 110.086 | N/A | N/A | Peak |
| 2437 | 79.67 | 316 | 170 | H | 28.956 | 3.12 | 0 | 111.746 | N/A | N/A | Peak |
| 2437 | 69.42 | 121 | 117 | V | 28.956 | 3.12 | 0 | 101.496 | N/A | N/A | Ave |
| 2437 | 71.06 | 316 | 170 | H | 28.956 | 3.12 | 0 | 103.136 | N/A | N/A | Ave |
| 4874 | 44.91 | 46 | 100 | V | 33.327 | 4.54 | 27.76 | 55.017 | 74 | -18.983 | Peak |
| 4874 | 44.01 | 303 | 125 | H | 33.327 | 4.54 | 27.76 | 54.117 | 74 | -19.883 | Peak |
| 4874 | 41.71 | 46 | 100 | V | 33.327 | 4.54 | 27.76 | 51.817 | 54 | -2.183 | Ave |
| 4874 | 40.86 | 303 | 125 | H | 33.327 | 4.54 | 27.76 | 50.967 | 54 | -3.033 | Ave |
| 7311 | 33.6 | 0 | 100 | V | 36.369 | 5.57 | 27.51 | 48.029 | 74 | -25.971 | Peak |
| 7311 | 33.77 | 0 | 100 | H | 36.369 | 5.57 | 27.51 | 48.199 | 74 | -25.801 | Peak |
| 7311 | 18.27 | 0 | 100 | V | 36.369 | 5.57 | 27.51 | 32.699 | 54 | -21.301 | Ave |
| 7311 | 18.25 | 0 | 100 | H | 36.369 | 5.57 | 27.51 | 32.679 | 54 | -21.321 | Ave |
| 9748 | 32.46 | 0 | 100 | V | 38.087 | 6.62 | 26.98 | 50.187 | 90.086 | -39.899 | Peak |
| 9748 | 32.48 | 0 | 100 | H | 38.087 | 6.62 | 26.98 | 50.207 | 91.746 | -41.539 | Peak |
| 9748 | 17.4 | 0 | 100 | V | 38.087 | 6.62 | 26.98 | 35.127 | 81.496 | -46.369 | Ave |
| 9748 | 17.4 | 0 | 100 | H | 38.087 | 6.62 | 26.98 | 35.127 | 83.136 | -48.009 | Ave |

| 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 2462 MHz, measured at 3 meters | | | | | | | | | | | |
| 2462 | 78.22 | 309 | 100 | V | 29.155 | 3.25 | 0 | 110.625 | N/A | N/A | Peak |
| 2462 | 81.26 | 334 | 170 | H | 29.155 | 3.25 | 0 | 113.665 | N/A | N/A | Peak |
| 2462 | 69.45 | 309 | 100 | V | 29.155 | 3.25 | 0 | 101.855 | N/A | N/A | Ave |
| 2462 | 72.3 | 334 | 170 | H | 29.155 | 3.25 | 0 | 104.705 | N/A | N/A | Ave |
| 2483.5 | 29.63 | 303 | 100 | V | 29.155 | 3.25 | 0 | 62.035 | 74 | -11.965 | Peak |
| 2483.5 | 32.44 | 336 | 165 | H | 29.155 | 3.25 | 0 | 64.845 | 74 | -9.155 | Peak |
| 2483.5 | 15.79 | 303 | 100 | V | 29.155 | 3.25 | 0 | 48.195 | 54 | -5.805 | Ave |
| 2483.5 | 18.63 | 336 | 165 | H | 29.155 | 3.25 | 0 | 51.035 | 54 | -2.965 | Ave |
| 4924 | 40.63 | 266 | 100 | V | 33.327 | 4.52 | 27.75 | 50.727 | 74 | -23.273 | Peak |
| 4924 | 41.03 | 23 | 100 | H | 33.327 | 4.52 | 27.75 | 51.127 | 74 | -22.873 | Peak |
| 4924 | 37.55 | 266 | 100 | V | 33.327 | 4.52 | 27.75 | 47.647 | 54 | -6.353 | Ave |
| 4924 | 37.68 | 23 | 100 | H | 33.327 | 4.52 | 27.75 | 47.777 | 54 | -6.223 | Ave |
| 7386 | 33.15 | 0 | 100 | V | 36.565 | 5.62 | 27.51 | 47.825 | 74 | -26.175 | Peak |
| 7386 | 33.83 | 0 | 100 | H | 36.565 | 5.62 | 27.51 | 48.505 | 74 | -25.495 | Peak |
| 7386 | 18.28 | 0 | 100 | V | 36.565 | 5.62 | 27.51 | 32.955 | 54 | -21.045 | Ave |
| 7386 | 18.7 | 0 | 100 | H | 36.565 | 5.62 | 27.51 | 33.375 | 54 | -20.625 | Ave |
| 9848 | 33.02 | 0 | 100 | V | 38.287 | 6.55 | 26.98 | 50.877 | 88.225 | -37.348 | Peak |
| 9848 | 32.14 | 0 | 100 | H | 38.287 | 6.55 | 26.98 | 49.997 | 90.605 | -40.608 | Peak |
| 9848 | 17.76 | 0 | 100 | V | 38.287 | 6.55 | 26.98 | 35.617 | 85.235 | -49.618 | Ave |
| 9848 | 21.5 | 0 | 100 | H | 38.287 | 6.55 | 26.98 | 39.357 | 87.905 | -48.548 | Ave |

## 2.4 GHz Band, 802.11g 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 2412 MHz, measured at 3 meters | | | | | | | | | | | |
| 2412 | 68.01 | 180 | 100 | V | 28.956 | 3.12 | 0 | 100.086 | N/A | N/A | Peak |
| 2412 | 72.27 | 338 | 139 | H | 28.956 | 3.12 | 0 | 104.346 | N/A | N/A | Peak |
| 2412 | 52.33 | 180 | 100 | V | 28.956 | 3.12 | 0 | 84.406 | N/A | N/A | Ave |
| 2412 | 56.56 | 338 | 139 | H | 28.956 | 3.12 | 0 | 88.636 | N/A | N/A | Ave |
| 2390 | 29.07 | 180 | 100 | V | 28.956 | 3.12 | 0 | 61.146 | 74 | -12.854 | Peak |
| 2390 | 33.02 | 338 | 139 | H | 28.956 | 3.12 | 0 | 65.096 | 74 | -8.904 | Peak |
| 2390 | 12.21 | 180 | 100 | V | 28.956 | 3.12 | 0 | 44.286 | 54 | -9.714 | Ave |
| 2390 | 13.98 | 338 | 139 | H | 28.956 | 3.12 | 0 | 46.056 | 54 | -7.944 | Ave |
| 4824 | 42.16 | 265 | 100 | V | 33.097 | 4.56 | 27.7 | 52.117 | 74 | -21.883 | Peak |
| 4824 | 38.14 | 208 | 100 | H | 33.097 | 4.56 | 27.7 | 48.097 | 74 | -25.903 | Peak |
| 4824 | 27.77 | 265 | 100 | V | 33.097 | 4.56 | 27.7 | 37.727 | 54 | -16.273 | Ave |
| 4824 | 23.75 | 208 | 100 | H | 33.097 | 4.56 | 27.7 | 33.707 | 54 | -20.293 | Ave |
| 7236 | 33.16 | 0 | 100 | V | 35.928 | 5.49 | 27.58 | 46.998 | 80.086 | -33.088 | Peak |
| 7236 | 33.32 | 0 | 100 | H | 35.928 | 5.49 | 27.58 | 47.158 | 84.346 | -37.188 | Peak |
| 7236 | 18.11 | 0 | 100 | V | 35.928 | 5.49 | 27.58 | 31.948 | 64.406 | -32.458 | Ave |
| 7236 | 18.09 | 0 | 100 | H | 35.928 | 5.49 | 27.58 | 31.928 | 68.636 | -36.708 | Ave |
| 9648 | 31.56 | 0 | 100 | V | 37.954 | 6.54 | 27.06 | 48.994 | 80.086 | -31.092 | Peak |
| 9648 | 31.33 | 0 | 100 | H | 37.954 | 6.54 | 27.06 | 48.764 | 84.346 | -35.582 | Peak |
| 9648 | 16.43 | 0 | 100 | V | 37.954 | 6.54 | 27.06 | 33.864 | 64.406 | -30.542 | Ave |
| 9648 | 16.37 | 0 | 100 | H | 37.954 | 6.54 | 27.06 | 33.804 | 68.636 | -34.832 | Ave |
| Middle Channel 2437 MHz, measured at 3 meters | | | | | | | | | | | |
| 2437 | 71.06 | 79 | 107 | V | 28.956 | 3.12 | 0 | 103.136 | N/A | N/A | Peak |
| 2437 | 74.74 | 155 | 148 | H | 28.956 | 3.12 | 0 | 106.816 | N/A | N/A | Peak |
| 2437 | 55.4 | 79 | 107 | V | 28.956 | 3.12 | 0 | 87.476 | N/A | N/A | Ave |
| 2437 | 58.79 | 155 | 148 | H | 28.956 | 3.12 | 0 | 90.866 | N/A | N/A | Ave |
| 4874 | 41.37 | 271 | 100 | V | 33.327 | 4.54 | 27.76 | 51.477 | 74 | -22.523 | Peak |
| 4874 | 37.35 | 202 | 100 | H | 33.327 | 4.54 | 27.76 | 47.457 | 74 | -26.543 | Peak |
| 4874 | 27.63 | 271 | 100 | V | 33.327 | 4.54 | 27.76 | 37.737 | 54 | -16.263 | Ave |
| 4874 | 24.12 | 202 | 100 | H | 33.327 | 4.54 | 27.76 | 34.227 | 54 | -19.773 | Ave |
| 7311 | 32.81 | 0 | 100 | V | 36.369 | 5.57 | 27.51 | 47.239 | 74 | -26.761 | Peak |
| 7311 | 33.05 | 0 | 100 | H | 36.369 | 5.57 | 27.51 | 47.479 | 74 | -26.521 | Peak |
| 7311 | 18.01 | 0 | 100 | V | 36.369 | 5.57 | 27.51 | 32.439 | 54 | -21.561 | Ave |
| 7311 | 17.98 | 0 | 100 | H | 36.369 | 5.57 | 27.51 | 32.409 | 54 | -21.591 | Ave |
| 9748 | 31.35 | 0 | 100 | V | 38.087 | 6.62 | 26.98 | 49.077 | 83.136 | -34.059 | Peak |
| 9748 | 31.58 | 0 | 100 | H | 38.087 | 6.62 | 26.98 | 49.307 | 86.816 | -37.509 | Peak |
| 9748 | 16.48 | 0 | 100 | V | 38.087 | 6.62 | 26.98 | 34.207 | 67.476 | -33.269 | Ave |
| 9748 | 16.49 | 0 | 100 | H | 38.087 | 6.62 | 26.98 | 34.217 | 70.866 | -36.649 | Ave |

| 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 2462 MHz, measured at 3 meters | | | | | | | | | | | |
| 2462 | 76.81 | 310 | 100 | V | 29.155 | 3.25 | 0 | 109.215 | N/A | N/A | Peak |
| 2462 | 81.18 | 306 | 136 | H | 29.155 | 3.25 | 0 | 113.585 | N/A | N/A | Peak |
| 2462 | 61.38 | 310 | 100 | V | 29.155 | 3.25 | 0 | 93.785 | N/A | N/A | Ave |
| 2462 | 65.67 | 306 | 136 | H | 29.155 | 3.25 | 0 | 98.075 | N/A | N/A | Ave |
| 2483.5 | 33.16 | 273 | 100 | V | 29.155 | 3.25 | 0 | 65.565 | 74 | -8.435 | Peak |
| 2483.5 | 37.55 | 306 | 136 | H | 29.155 | 3.25 | 0 | 69.955 | 74 | -4.045 | Peak |
| 2483.5 | 13.36 | 273 | 100 | V | 29.155 | 3.25 | 0 | 45.765 | 54 | -8.235 | Ave |
| 2483.5 | 14.51 | 306 | 136 | H | 29.155 | 3.25 | 0 | 46.915 | 54 | -7.085 | Ave |
| 4924 | 42.37 | 278 | 100 | V | 33.327 | 4.52 | 27.75 | 52.467 | 74 | -21.533 | Peak |
| 4924 | 39.86 | 335 | 100 | H | 33.327 | 4.52 | 27.75 | 49.957 | 74 | -24.043 | Peak |
| 4924 | 28.18 | 278 | 100 | V | 33.327 | 4.52 | 27.75 | 38.277 | 54 | -15.723 | Ave |
| 4924 | 26 | 335 | 100 | H | 33.327 | 4.52 | 27.75 | 36.097 | 54 | -17.903 | Ave |
| 7386 | 33.18 | 0 | 100 | V | 36.565 | 5.62 | 27.51 | 47.855 | 74 | -26.145 | Peak |
| 7386 | 32.5 | 0 | 100 | H | 36.565 | 5.62 | 27.51 | 47.175 | 74 | -26.825 | Peak |
| 7386 | 18.2 | 0 | 100 | V | 36.565 | 5.62 | 27.51 | 32.875 | 54 | -21.125 | Ave |
| 7386 | 18.16 | 0 | 100 | H | 36.565 | 5.62 | 27.51 | 32.835 | 54 | -21.165 | Ave |

## 2.4 GHz Band, 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 2412 MHz, measured at 3 meters | | | | | | | | | | | |
| 2412 | 77.25 | 73 | 127 | V | 28.956 | 3.12 | 0 | 109.326 | N/A | N/A | Peak |
| 2412 | 75.98 | 337 | 154 | H | 28.956 | 3.12 | 0 | 108.056 | N/A | N/A | Peak |
| 2412 | 57.49 | 73 | 127 | V | 28.956 | 3.12 | 0 | 89.566 | N/A | N/A | Ave |
| 2412 | 55.93 | 337 | 154 | H | 28.956 | 3.12 | 0 | 88.006 | N/A | N/A | Ave |
| 2390 | 36.32 | 71 | 132 | V | 28.956 | 3.12 | 0 | 68.396 | 74 | -5.604 | Peak |
| 2390 | 35.67 | 355 | 154 | H | 28.956 | 3.12 | 0 | 67.746 | 74 | -6.254 | Peak |
| 2390 | 15.66 | 71 | 132 | V | 28.956 | 3.12 | 0 | 47.736 | 54 | -6.264 | Ave |
| 2390 | 15.06 | 355 | 154 | H | 28.956 | 3.12 | 0 | 47.136 | 54 | -6.864 | Ave |
| 4824 | 43.9 | 274 | 100 | V | 33.097 | 4.56 | 27.7 | 53.857 | 74 | -20.143 | Peak |
| 4824 | 42.46 | 208 | 100 | H | 33.097 | 4.56 | 27.7 | 52.417 | 74 | -21.583 | Peak |
| 4824 | 29.22 | 274 | 100 | V | 33.097 | 4.56 | 27.7 | 39.177 | 54 | -14.823 | Ave |
| 4824 | 26.86 | 208 | 100 | H | 33.097 | 4.56 | 27.7 | 36.817 | 54 | -17.183 | Ave |
| 7236 | 33.17 | 0 | 100 | V | 35.928 | 5.49 | 27.58 | 47.008 | 89.326 | -42.318 | Peak |
| 7236 | 33.3 | 0 | 100 | H | 35.928 | 5.49 | 27.58 | 47.138 | 88.056 | -40.918 | Peak |
| 7236 | 18.17 | 0 | 100 | V | 35.928 | 5.49 | 27.58 | 32.008 | 69.566 | -37.558 | Ave |
| 7236 | 18.14 | 0 | 100 | H | 35.928 | 5.49 | 27.58 | 31.978 | 68.006 | -36.028 | Ave |
| 9648 | 31.41 | 0 | 100 | V | 37.954 | 6.54 | 27.06 | 48.844 | 89.326 | -40.482 | Peak |
| 9648 | 31.27 | 0 | 100 | H | 37.954 | 6.54 | 27.06 | 48.704 | 88.056 | -39.352 | Peak |
| 9648 | 16.45 | 0 | 100 | V | 37.954 | 6.54 | 27.06 | 33.884 | 69.566 | -35.682 | Ave |
| 9648 | 16.31 | 0 | 100 | H | 37.954 | 6.54 | 27.06 | 33.744 | 68.006 | -34.262 | Ave |
| Middle Channel 2437 MHz, measured at 3 meters | | | | | | | | | | | |
| 2437 | 77.05 | 70 | 125 | V | 28.956 | 3.12 | 0 | 109.126 | N/A | N/A | Peak |
| 2437 | 76.01 | 334 | 154 | H | 28.956 | 3.12 | 0 | 108.086 | N/A | N/A | Peak |
| 2437 | 56.57 | 70 | 125 | V | 28.956 | 3.12 | 0 | 88.646 | N/A | N/A | Ave |
| 2437 | 56.11 | 334 | 154 | H | 28.956 | 3.12 | 0 | 88.186 | N/A | N/A | Ave |
| 4874 | 42.62 | 281 | 122 | V | 33.327 | 4.54 | 27.76 | 52.727 | 74 | -21.273 | Peak |
| 4874 | 42.79 | 32 | 116 | H | 33.327 | 4.54 | 27.76 | 52.897 | 74 | -21.103 | Peak |
| 4874 | 26.94 | 281 | 122 | V | 33.327 | 4.54 | 27.76 | 37.047 | 54 | -16.953 | Ave |
| 4874 | 27.19 | 32 | 116 | H | 33.327 | 4.54 | 27.76 | 37.297 | 54 | -16.703 | Ave |
| 7311 | 33.68 | 0 | 100 | V | 36.369 | 5.57 | 27.51 | 48.109 | 74 | -25.891 | Peak |
| 7311 | 33.92 | 0 | 100 | H | 36.369 | 5.57 | 27.51 | 48.349 | 74 | -25.651 | Peak |
| 7311 | 18.83 | 0 | 100 | V | 36.369 | 5.57 | 27.51 | 33.259 | 54 | -20.741 | Ave |
| 7311 | 18.86 | 0 | 100 | H | 36.369 | 5.57 | 27.51 | 33.289 | 54 | -20.711 | Ave |
| 9748 | 32.08 | 0 | 100 | V | 38.087 | 6.62 | 26.98 | 49.807 | 89.126 | -39.319 | Peak |
| 9748 | 31.91 | 0 | 100 | H | 38.087 | 6.62 | 26.98 | 49.637 | 88.086 | -38.449 | Peak |
| 9748 | 17.318 | 0 | 100 | V | 38.087 | 6.62 | 26.98 | 35.045 | 68.646 | -33.601 | Ave |
| 9748 | 17.36 | 0 | 100 | H | 38.087 | 6.62 | 26.98 | 35.087 | 68.186 | -33.099 | Ave |

| 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 2462 MHz, measured at 3 meters | | | | | | | | | | | |
| 2462 | 76.54 | 72 | 122 | V | 29.155 | 3.25 | 0 | 108.945 | N/A | N/A | Peak |
| 2462 | 74.58 | 337 | 154 | H | 29.155 | 3.25 | 0 | 106.985 | N/A | N/A | Peak |
| 2462 | 57.55 | 72 | 122 | V | 29.155 | 3.25 | 0 | 89.955 | N/A | N/A | Ave |
| 2462 | 54.25 | 337 | 154 | H | 29.155 | 3.25 | 0 | 86.655 | N/A | N/A | Ave |
| 2483.5 | 41.12 | 72 | 119 | V | 29.155 | 3.25 | 0 | 73.525 | 74 | -0.475 | Peak |
| 2483.5 | 37.24 | 31 | 115 | H | 29.155 | 3.25 | 0 | 69.645 | 74 | -4.355 | Peak |
| 2483.5 | 16.93 | 72 | 119 | V | 29.155 | 3.25 | 0 | 49.335 | 54 | -4.665 | Ave |
| 2483.5 | 14.57 | 31 | 115 | H | 29.155 | 3.25 | 0 | 46.975 | 54 | -7.025 | Ave |
| 4924 | 42.34 | 259 | 114 | V | 33.327 | 4.52 | 27.75 | 52.437 | 74 | -21.563 | Peak |
| 4924 | 40.23 | 66 | 100 | H | 33.327 | 4.52 | 27.75 | 50.327 | 74 | -23.673 | Peak |
| 4924 | 29.15 | 259 | 114 | V | 33.327 | 4.52 | 27.75 | 39.247 | 54 | -14.753 | Ave |
| 4924 | 27.24 | 66 | 100 | H | 33.327 | 4.52 | 27.75 | 37.337 | 54 | -16.663 | Ave |
| 7386 | 33.5 | 0 | 100 | V | 36.565 | 5.62 | 27.51 | 48.175 | 74 | -25.825 | Peak |
| 7386 | 33.65 | 0 | 100 | H | 36.565 | 5.62 | 27.51 | 48.325 | 74 | -25.675 | Peak |
| 7386 | 18.68 | 0 | 100 | V | 36.565 | 5.62 | 27.51 | 33.355 | 54 | -20.645 | Ave |
| 7386 | 18.7 | 0 | 100 | H | 36.565 | 5.62 | 27.51 | 33.375 | 54 | -20.625 | Ave |

## 2.4 GHz Band, 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 2422 MHz, measured at 3 meters | | | | | | | | | | | |
| 2422 | 75.74 | 71 | 100 | V | 28.956 | 3.12 | 0 | 107.816 | N/A | N/A | Peak |
| 2422 | 72.49 | 179 | 187 | H | 28.956 | 3.12 | 0 | 104.566 | N/A | N/A | Peak |
| 2422 | 52.3 | 71 | 100 | V | 28.956 | 3.12 | 0 | 84.376 | N/A | N/A | Ave |
| 2422 | 50.48 | 179 | 187 | H | 28.956 | 3.12 | 0 | 82.556 | N/A | N/A | Ave |
| 2390 | 38.28 | 71 | 100 | V | 28.956 | 3.12 | 0 | 70.356 | 74 | -3.644 | Peak |
| 2390 | 36.87 | 211 | 187 | H | 28.956 | 3.12 | 0 | 68.946 | 74 | -5.054 | Peak |
| 2390 | 18.14 | 71 | 100 | V | 28.956 | 3.12 | 0 | 50.216 | 54 | -3.784 | Ave |
| 2390 | 17.59 | 211 | 187 | H | 28.956 | 3.12 | 0 | 49.666 | 54 | -4.334 | Ave |
| 4844 | 42.56 | 256 | 111 | V | 33.097 | 4.56 | 27.7 | 52.517 | 74 | -21.483 | Peak |
| 4844 | 41.39 | 0 | 100 | H | 33.097 | 4.56 | 27.7 | 51.347 | 74 | -22.653 | Peak |
| 4844 | 25.91 | 256 | 111 | V | 33.097 | 4.56 | 27.7 | 35.867 | 54 | -18.133 | Ave |
| 4844 | 24.22 | 0 | 100 | H | 33.097 | 4.56 | 27.7 | 34.177 | 54 | -19.823 | Ave |
| 7266 | 33.42 | 0 | 100 | V | 35.928 | 5.49 | 27.56 | 47.278 | 74 | -26.722 | Peak |
| 7266 | 33.04 | 0 | 100 | H | 35.928 | 5.49 | 27.56 | 46.898 | 74 | -27.102 | Peak |
| 7266 | 18.71 | 0 | 100 | V | 35.928 | 5.49 | 27.56 | 32.568 | 54 | -21.432 | Ave |
| 7266 | 18.06 | 0 | 100 | H | 35.928 | 5.49 | 27.56 | 31.918 | 54 | -22.082 | Ave |
| 9688 | 31.52 | 0 | 100 | V | 37.954 | 6.54 | 26.98 | 49.034 | 87.816 | -38.782 | Peak |
| 9688 | 31.29 | 0 | 100 | H | 37.954 | 6.54 | 26.98 | 48.804 | 84.566 | -35.762 | Peak |
| 9688 | 17.11 | 0 | 100 | V | 37.954 | 6.54 | 26.98 | 34.624 | 64.376 | -29.752 | Ave |
| 9688 | 17.09 | 0 | 100 | H | 37.954 | 6.54 | 26.98 | 34.604 | 62.556 | -27.952 | Ave |
| Middle Channel 2437 MHz, measured at 3 meters | | | | | | | | | | | |
| 2437 | 75.53 | 73 | 127 | V | 28.956 | 3.12 | 0 | 107.606 | N/A | N/A | Peak |
| 2437 | 72.04 | 171 | 184 | H | 28.956 | 3.12 | 0 | 104.116 | N/A | N/A | Peak |
| 2437 | 52.78 | 73 | 127 | V | 28.956 | 3.12 | 0 | 84.856 | N/A | N/A | Ave |
| 2437 | 50.03 | 171 | 184 | H | 28.956 | 3.12 | 0 | 82.106 | N/A | N/A | Ave |
| 4874 | 42.48 | 260 | 100 | V | 33.327 | 4.54 | 27.76 | 52.587 | 74 | -21.413 | Peak |
| 4874 | 39.12 | 66 | 100 | H | 33.327 | 4.54 | 27.76 | 49.227 | 74 | -24.773 | Peak |
| 4874 | 26.06 | 260 | 100 | V | 33.327 | 4.54 | 27.76 | 36.167 | 54 | -17.833 | Ave |
| 4874 | 27.36 | 66 | 100 | H | 33.327 | 4.54 | 27.76 | 37.467 | 54 | -16.533 | Ave |
| 7311 | 33.2 | 0 | 100 | V | 36.369 | 5.57 | 27.51 | 47.629 | 74 | -26.371 | Peak |
| 7311 | 33.58 | 0 | 100 | H | 36.369 | 5.57 | 27.51 | 48.009 | 74 | -25.991 | Peak |
| 7311 | 18.79 | 0 | 100 | V | 36.369 | 5.57 | 27.51 | 33.219 | 54 | -20.781 | Ave |
| 7311 | 18.82 | 0 | 100 | H | 36.369 | 5.57 | 27.51 | 33.249 | 54 | -20.751 | Ave |
| 9748 | 32.53 | 0 | 100 | V | 38.087 | 6.62 | 26.98 | 50.257 | 87.606 | -37.349 | Peak |
| 9748 | 32.47 | 0 | 100 | H | 38.087 | 6.62 | 26.98 | 50.197 | 84.116 | -33.919 | Peak |
| 9748 | 17.33 | 0 | 100 | V | 38.087 | 6.62 | 26.98 | 35.057 | 64.856 | -29.799 | Ave |
| 9748 | 17.36 | 0 | 100 | H | 38.087 | 6.62 | 26.98 | 35.087 | 62.106 | -27.019 | Ave |

| 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 2452 MHz, measured at 3 meters | | | | | | | | | | | |
| 2452 | 72.66 | 72 | 127 | V | 29.155 | 3.25 | 0 | 105.065 | N/A | N/A | Peak |
| 2452 | 69.09 | 31 | 162 | H | 29.155 | 3.25 | 0 | 101.495 | N/A | N/A | Peak |
| 2452 | 50.68 | 72 | 127 | V | 29.155 | 3.25 | 0 | 83.085 | N/A | N/A | Ave |
| 2452 | 47.68 | 31 | 162 | H | 29.155 | 3.25 | 0 | 80.085 | N/A | N/A | Ave |
| 2483.5 | 41.06 | 74 | 119 | V | 29.155 | 3.25 | 0 | 73.465 | 74 | -0.535 | Peak |
| 2483.5 | 37.17 | 29 | 118 | H | 29.155 | 3.25 | 0 | 69.575 | 74 | -4.425 | Peak |
| 2483.5 | 19.74 | 74 | 119 | V | 29.155 | 3.25 | 0 | 52.145 | 54 | -1.855 | Ave |
| 2483.5 | 17.16 | 29 | 118 | H | 29.155 | 3.25 | 0 | 49.565 | 54 | -4.435 | Ave |
| 4904 | 40.99 | 275 | 123 | V | 33.327 | 4.52 | 27.67 | 51.167 | 74 | -22.833 | Peak |
| 4904 | 38.91 | 67 | 130 | H | 33.327 | 4.52 | 27.67 | 49.087 | 74 | -24.913 | Peak |
| 4904 | 25.94 | 275 | 123 | V | 33.327 | 4.52 | 27.67 | 36.117 | 54 | -17.883 | Ave |
| 4904 | 24.16 | 67 | 130 | H | 33.327 | 4.52 | 27.67 | 34.337 | 54 | -19.663 | Ave |
| 7356 | 32.89 | 0 | 100 | V | 36.565 | 5.62 | 27.57 | 47.505 | 74 | -26.495 | Peak |
| 7356 | 33.42 | 0 | 100 | H | 36.565 | 5.62 | 27.57 | 48.035 | 74 | -25.965 | Peak |
| 7356 | 18.71 | 0 | 100 | V | 36.565 | 5.62 | 27.57 | 33.325 | 54 | -20.675 | Ave |
| 7356 | 18.63 | 0 | 100 | H | 36.565 | 5.62 | 27.57 | 33.245 | 54 | -20.755 | Ave |

### 3) 1–40 GHz, Measured at 3 meters

**5.8 GHz Band, 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 5745 MHz, measured at 3 meters | | | | | | | | | | | |
| 5745 | 64.88 | 343 | 121 | V | 34.392 | 4.85 | 0 | 104.122 | N/A | N/A | Peak |
| 5745 | 64.38 | 63 | 133 | H | 34.392 | 4.85 | 0 | 103.622 | N/A | N/A | Peak |
| 5745 | 50.87 | 343 | 121 | V | 34.392 | 4.85 | 0 | 90.112 | N/A | N/A | Ave |
| 5745 | 49.77 | 63 | 133 | H | 34.392 | 4.85 | 0 | 89.012 | N/A | N/A | Ave |
| 11490 | 32.72 | 0 | 100 | V | 39.047 | 7.6 | 26.94 | 52.427 | 74 | -21.573 | Peak |
| 11490 | 32.41 | 0 | 100 | H | 39.047 | 7.6 | 26.94 | 52.117 | 74 | -21.883 | Peak |
| 11490 | 17.11 | 0 | 100 | V | 39.047 | 7.6 | 26.94 | 36.817 | 54 | -17.183 | Ave |
| 11490 | 17.14 | 0 | 100 | H | 39.047 | 7.6 | 26.94 | 36.847 | 54 | -17.153 | Ave |
| 17235 | 32.31 | 0 | 100 | V | 43.239 | 8.63 | 25.93 | 58.249 | 84.122 | -25.873 | Peak |
| 17235 | 32.33 | 0 | 100 | H | 43.239 | 8.63 | 25.93 | 58.269 | 83.622 | -25.353 | Peak |
| 17235 | 17.16 | 0 | 100 | V | 43.239 | 8.63 | 25.93 | 43.099 | 70.112 | -27.013 | Ave |
| 17235 | 17.15 | 0 | 100 | H | 43.239 | 8.63 | 25.93 | 43.089 | 69.012 | -25.923 | Ave |
| 22980 | 33.32 | 0 | 100 | V | 49.9 | 10.07 | 28.9 | 64.39 | 74 | -9.61 | Peak |
| 22980 | 33.16 | 0 | 100 | H | 49.9 | 10.07 | 28.9 | 64.23 | 74 | -9.77 | Peak |
| 22980 | 18.43 | 0 | 100 | V | 49.9 | 10.07 | 28.9 | 49.5 | 54 | -4.5 | Ave |
| 22980 | 18.43 | 0 | 100 | H | 49.9 | 10.07 | 28.9 | 49.51 | 54 | -4.5 | Ave |
| Middle Channel 5785 MHz, measured at 3 meters | | | | | | | | | | | |
| 5785 | 64.44 | 341 | 126 | V | 34.349 | 4.82 | 0 | 103.609 | N/A | N/A | Peak |
| 5785 | 64.44 | 62 | 128 | H | 34.349 | 4.82 | 0 | 103.609 | N/A | N/A | Peak |
| 5785 | 49.5 | 341 | 126 | V | 34.349 | 4.82 | 0 | 88.669 | N/A | N/A | Ave |
| 5785 | 49.18 | 62 | 128 | H | 34.349 | 4.82 | 0 | 88.349 | N/A | N/A | Ave |
| 11570 | 32.06 | 0 | 100 | V | 39.203 | 7.69 | 26.99 | 51.963 | 74 | -22.037 | Peak |
| 11570 | 31.98 | 0 | 100 | H | 39.203 | 7.69 | 26.99 | 51.883 | 74 | -22.117 | Peak |
| 11570 | 17.21 | 0 | 100 | V | 39.203 | 7.69 | 26.99 | 37.113 | 54 | -16.887 | Ave |
| 11570 | 17.22 | 0 | 100 | H | 39.203 | 7.69 | 26.99 | 37.123 | 54 | -16.877 | Ave |
| 17355 | 33.09 | 0 | 100 | V | 45.311 | 8.64 | 25.84 | 61.201 | 83.609 | -22.408 | Peak |
| 17355 | 32.54 | 0 | 100 | H | 45.311 | 8.64 | 25.84 | 60.651 | 83.609 | -22.958 | Peak |
| 17355 | 17.42 | 0 | 100 | V | 45.311 | 8.64 | 25.84 | 45.531 | 68.669 | -23.138 | Ave |
| 17355 | 17.44 | 0 | 100 | H | 45.311 | 8.64 | 25.84 | 45.551 | 68.349 | -22.798 | Ave |
| 23140 | 33.31 | 0 | 100 | V | 49.9 | 10.23 | 28.8 | 64.64 | 83.609 | -18.969 | Peak |
| 23140 | 33.23 | 0 | 100 | H | 49.9 | 10.23 | 28.8 | 64.56 | 83.609 | -19.049 | Peak |
| 23140 | 18.02 | 0 | 100 | V | 49.9 | 10.23 | 28.8 | 49.35 | 68.669 | -19.319 | Ave |
| 23140 | 17.98 | 0 | 100 | H | 49.9 | 10.23 | 28.8 | 49.31 | 68.349 | -19.039 | Ave |

| 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 5825 MHz, measured at 3 meters | | | | | | | | | | | |
| 5825 | 64.18 | 347 | 123 | V | 34.349 | 4.87 | 0 | 103.399 | N/A | N/A | Peak |
| 5825 | 64.93 | 61 | 104 | H | 34.349 | 4.87 | 0 | 104.149 | N/A | N/A | Peak |
| 5825 | 49.57 | 347 | 123 | V | 34.349 | 4.87 | 0 | 88.789 | N/A | N/A | Ave |
| 5825 | 50.4 | 61 | 104 | H | 34.349 | 4.87 | 0 | 89.619 | N/A | N/A | Ave |
| 11650 | 31.77 | 0 | 100 | V | 39.203 | 7.78 | 27 | 51.753 | 74 | -22.247 | Peak |
| 11650 | 31.8 | 0 | 100 | H | 39.203 | 7.78 | 27 | 51.783 | 74 | -22.217 | Peak |
| 11650 | 17.4 | 0 | 100 | V | 39.203 | 7.78 | 27 | 37.383 | 54 | -16.617 | Ave |
| 11650 | 17.34 | 0 | 100 | H | 39.203 | 7.78 | 27 | 37.323 | 54 | -16.677 | Ave |
| 17475 | 31.86 | 0 | 100 | V | 46.782 | 8.74 | 25.79 | 61.592 | 83.399 | -21.807 | Peak |
| 17475 | 31.88 | 0 | 100 | H | 46.782 | 8.74 | 25.79 | 61.612 | 84.149 | -22.537 | Peak |
| 17475 | 17.33 | 0 | 100 | V | 46.782 | 8.74 | 25.79 | 47.062 | 68.789 | -21.727 | Ave |
| 17475 | 17.52 | 0 | 100 | H | 46.782 | 8.74 | 25.79 | 47.252 | 69.619 | -22.367 | Ave |
| 23300 | 33.21 | 0 | 100 | V | 49.9 | 10.13 | 28.6 | 64.64 | 83.399 | -18.759 | Peak |
| 23300 | 33.26 | 0 | 100 | H | 49.9 | 10.13 | 28.6 | 64.69 | 84.149 | -19.459 | Peak |
| 23300 | 18.14 | 0 | 100 | V | 49.9 | 10.13 | 28.6 | 49.57 | 68.789 | -19.219 | Ave |
| 23300 | 18.16 | 0 | 100 | H | 49.9 | 10.13 | 28.6 | 49.59 | 69.619 | -20.029 | Ave |

## 5.8 GHz Band, 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 5745 MHz, measured at 3 meters | | | | | | | | | | | |
| 5745 | 67.49 | 351 | 108 | V | 34.392 | 4.85 | 0 | 106.732 | N/A | N/A | Peak |
| 5745 | 66.49 | 336 | 116 | H | 34.392 | 4.85 | 0 | 105.732 | N/A | N/A | Peak |
| 5745 | 50.68 | 351 | 108 | V | 34.392 | 4.85 | 0 | 89.922 | N/A | N/A | Ave |
| 5745 | 49.79 | 336 | 116 | H | 34.392 | 4.85 | 0 | 89.032 | N/A | N/A | Ave |
| 11490 | 32.74 | 0 | 100 | V | 39.047 | 7.6 | 26.94 | 52.447 | 74 | -21.553 | Peak |
| 11490 | 32.56 | 0 | 100 | H | 39.047 | 7.6 | 26.94 | 52.267 | 74 | -21.733 | Peak |
| 11490 | 16.95 | 0 | 100 | V | 39.047 | 7.6 | 26.94 | 36.657 | 54 | -17.343 | Ave |
| 11490 | 17.16 | 0 | 100 | H | 39.047 | 7.6 | 26.94 | 36.867 | 54 | -17.133 | Ave |
| 17235 | 32.41 | 0 | 100 | V | 43.239 | 8.63 | 25.93 | 58.349 | 86.732 | -28.383 | Peak |
| 17235 | 32.33 | 0 | 100 | H | 43.239 | 8.63 | 25.93 | 58.269 | 85.732 | -27.463 | Peak |
| 17235 | 17.16 | 0 | 100 | V | 43.239 | 8.63 | 25.93 | 43.099 | 69.922 | -26.823 | Ave |
| 17235 | 17.19 | 0 | 100 | H | 43.239 | 8.63 | 25.93 | 43.129 | 69.032 | -25.903 | Ave |
| 22980 | 33.3 | 0 | 100 | V | 49.9 | 10.07 | 28.9 | 64.37 | 74 | -9.63 | Peak |
| 22980 | 33.14 | 0 | 100 | H | 49.9 | 10.07 | 28.9 | 64.21 | 74 | -9.79 | Peak |
| 22980 | 18.44 | 0 | 100 | V | 49.9 | 10.07 | 28.9 | 49.51 | 54 | -4.49 | Ave |
| 22980 | 18.45 | 0 | 100 | H | 49.9 | 10.07 | 28.9 | 49.51 | 54 | -4.48 | Ave |
| Middle Channel 5785 MHz, measured at 3 meters | | | | | | | | | | | |
| 5785 | 67.57 | 350 | 112 | V | 34.349 | 4.82 | 0 | 106.739 | N/A | N/A | Peak |
| 5785 | 65.82 | 68 | 110 | H | 34.349 | 4.82 | 0 | 104.989 | N/A | N/A | Peak |
| 5785 | 50.26 | 350 | 112 | V | 34.349 | 4.82 | 0 | 89.429 | N/A | N/A | Ave |
| 5785 | 48.1 | 68 | 110 | H | 34.349 | 4.82 | 0 | 87.269 | N/A | N/A | Ave |
| 11570 | 31.96 | 0 | 100 | V | 39.203 | 7.69 | 26.99 | 51.863 | 74 | -22.137 | Peak |
| 11570 | 32.01 | 0 | 100 | H | 39.203 | 7.69 | 26.99 | 51.913 | 74 | -22.087 | Peak |
| 11570 | 17.22 | 0 | 100 | V | 39.203 | 7.69 | 26.99 | 37.123 | 54 | -16.877 | Ave |
| 11570 | 17.12 | 0 | 100 | H | 39.203 | 7.69 | 26.99 | 37.023 | 54 | -16.977 | Ave |
| 17355 | 33.08 | 0 | 100 | V | 45.311 | 8.64 | 25.84 | 61.191 | 86.739 | -25.548 | Peak |
| 17355 | 32.45 | 0 | 100 | H | 45.311 | 8.64 | 25.84 | 60.561 | 84.989 | -24.428 | Peak |
| 17355 | 17.4 | 0 | 100 | V | 45.311 | 8.64 | 25.84 | 45.511 | 69.429 | -23.918 | Ave |
| 17355 | 17.49 | 0 | 100 | H | 45.311 | 8.64 | 25.84 | 45.601 | 67.269 | -21.668 | Ave |
| 23140 | 33.25 | 0 | 100 | V | 49.9 | 10.23 | 28.8 | 64.58 | 86.739 | -22.159 | Peak |
| 23140 | 33.15 | 0 | 100 | H | 49.9 | 10.23 | 28.8 | 64.48 | 84.989 | -20.509 | Peak |
| 23140 | 18.01 | 0 | 100 | V | 49.9 | 10.23 | 28.8 | 49.34 | 69.429 | -20.089 | Ave |
| 23140 | 17.99 | 0 | 100 | H | 49.9 | 10.23 | 28.8 | 49.32 | 67.269 | -17.949 | Ave |

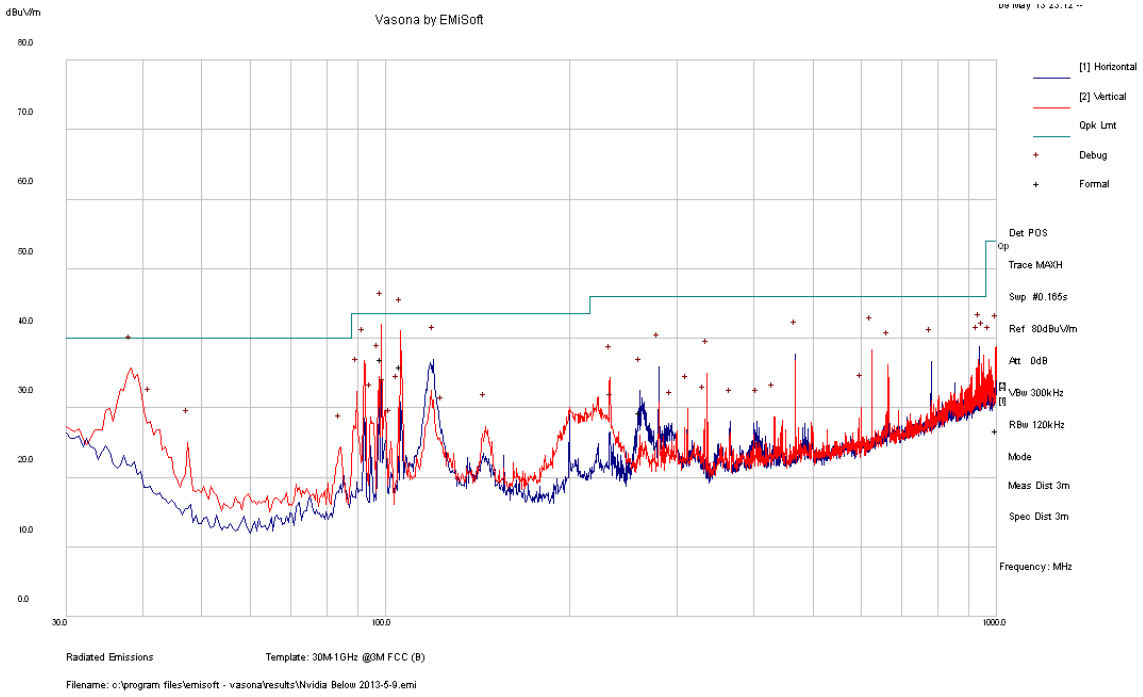
| Frequency (MHz) | S.A. Reading (dBµV) | Turntable Azimuth (degrees) | Test Antenna | | | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBµV/m) | FCC/IC | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Height (cm) | Polarity (H/V) | Factor (dB/m) | | | | Limit (dBµV/m) | Margin (dB) | |
| High Channel 5825 MHz, measured at 3 meters | | | | | | | | | | | |
| 5825 | 67.48 | 351 | 108 | V | 34.349 | 4.87 | 0 | 106.699 | N/A | N/A | Peak |
| 5825 | 65.89 | 67 | 119 | H | 34.349 | 4.87 | 0 | 105.109 | N/A | N/A | Peak |
| 5825 | 50.19 | 351 | 108 | V | 34.349 | 4.87 | 0 | 89.409 | N/A | N/A | Ave |
| 5825 | 48.69 | 67 | 119 | H | 34.349 | 4.87 | 0 | 87.909 | N/A | N/A | Ave |
| 11650 | 31.75 | 0 | 100 | V | 39.203 | 7.78 | 27 | 51.733 | 74 | -22.267 | Peak |
| 11650 | 31.82 | 0 | 100 | H | 39.203 | 7.78 | 27 | 51.803 | 74 | -22.197 | Peak |
| 11650 | 17.49 | 0 | 100 | V | 39.203 | 7.78 | 27 | 37.473 | 54 | -16.527 | Ave |
| 11650 | 16.96 | 0 | 100 | H | 39.203 | 7.78 | 27 | 36.943 | 54 | -17.057 | Ave |
| 17475 | 31.85 | 0 | 100 | V | 46.782 | 8.74 | 25.79 | 61.582 | 86.699 | -25.117 | Peak |
| 17475 | 31.99 | 0 | 100 | H | 46.782 | 8.74 | 25.79 | 61.722 | 85.109 | -23.387 | Peak |
| 17475 | 17.32 | 0 | 100 | V | 46.782 | 8.74 | 25.79 | 47.052 | 69.409 | -22.357 | Ave |
| 17475 | 17.5 | 0 | 100 | H | 46.782 | 8.74 | 25.79 | 47.232 | 67.909 | -20.677 | Ave |
| 23300 | 33.18 | 0 | 100 | V | 49.9 | 10.13 | 28.6 | 64.61 | 86.699 | -22.089 | Peak |
| 23300 | 33.23 | 0 | 100 | H | 49.9 | 10.13 | 28.6 | 64.66 | 85.109 | -20.449 | Peak |
| 23300 | 18.16 | 0 | 100 | V | 49.9 | 10.13 | 28.6 | 49.59 | 69.409 | -19.819 | Ave |
| 23300 | 18.16 | 0 | 100 | H | 49.9 | 10.13 | 28.6 | 49.59 | 67.909 | -18.319 | Ave |

## 5.8 GHz Band, 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 5755 MHz, measured at 3 meters | | | | | | | | | | | |
| 5755 | 63.79 | 355 | 108 | V | 34.349 | 4.82 | 0 | 102.959 | N/A | N/A | Peak |
| 5755 | 60.5 | 289 | 117 | H | 34.349 | 4.82 | 0 | 99.669 | N/A | N/A | Peak |
| 5755 | 46.64 | 355 | 108 | V | 34.349 | 4.82 | 0 | 85.809 | N/A | N/A | Ave |
| 5755 | 44.47 | 289 | 117 | H | 34.349 | 4.82 | 0 | 83.639 | N/A | N/A | Ave |
| 11510 | 31.42 | 0 | 100 | V | 39.047 | 7.6 | 26.99 | 51.077 | 74 | -22.923 | Peak |
| 11510 | 31.59 | 0 | 100 | H | 39.047 | 7.6 | 26.99 | 51.247 | 74 | -22.753 | Peak |
| 11510 | 17.05 | 0 | 100 | V | 39.047 | 7.6 | 26.99 | 36.707 | 54 | -17.293 | Ave |
| 11510 | 17.04 | 0 | 100 | H | 39.047 | 7.6 | 26.99 | 36.697 | 54 | -17.303 | Ave |
| 17265 | 32.35 | 0 | 100 | V | 43.239 | 8.63 | 25.94 | 58.279 | 82.959 | -24.68 | Peak |
| 17265 | 32.09 | 0 | 100 | H | 43.239 | 8.63 | 25.94 | 58.019 | 79.669 | -21.65 | Peak |
| 17265 | 17.18 | 0 | 100 | V | 43.239 | 8.63 | 25.94 | 43.109 | 65.809 | -22.7 | Ave |
| 17265 | 17.34 | 0 | 100 | H | 43.239 | 8.63 | 25.94 | 43.269 | 63.639 | -20.37 | Ave |
| 23020 | 33.22 | 0 | 100 | V | 49.9 | 10.07 | 28.9 | 64.29 | 74 | -9.71 | Peak |
| 23020 | 33.13 | 0 | 100 | H | 49.9 | 10.07 | 28.9 | 64.2 | 74 | -9.8 | Peak |
| 23020 | 18.39 | 0 | 100 | V | 49.9 | 10.07 | 28.9 | 49.46 | 54 | -4.54 | Ave |
| 23020 | 18.39 | 0 | 100 | H | 49.9 | 10.07 | 28.9 | 49.46 | 54 | -4.54 | Ave |
| High Channel 5795 MHz, measured at 3 meters | | | | | | | | | | | |
| 5795 | 62.54 | 353 | 108 | V | 34.349 | 4.82 | 0 | 101.709 | N/A | N/A | Peak |
| 5795 | 60.89 | 61 | 106 | H | 34.349 | 4.82 | 0 | 100.059 | N/A | N/A | Peak |
| 5795 | 46.11 | 353 | 108 | V | 34.349 | 4.82 | 0 | 85.279 | N/A | N/A | Ave |
| 5795 | 44.97 | 61 | 106 | H | 34.349 | 4.82 | 0 | 84.139 | N/A | N/A | Ave |
| 11590 | 31.73 | 0 | 100 | V | 39.203 | 7.69 | 26.99 | 51.633 | 74 | -22.367 | Peak |
| 11590 | 32.2 | 0 | 100 | H | 39.203 | 7.69 | 26.99 | 52.103 | 74 | -21.897 | Peak |
| 11590 | 16.78 | 0 | 100 | V | 39.203 | 7.69 | 26.99 | 36.683 | 54 | -17.317 | Ave |
| 11590 | 17.31 | 0 | 100 | H | 39.203 | 7.69 | 26.99 | 37.213 | 54 | -16.787 | Ave |
| 17385 | 33.34 | 0 | 100 | V | 45.311 | 8.64 | 25.86 | 61.431 | 81.709 | -20.278 | Peak |
| 17385 | 31.26 | 0 | 100 | H | 45.311 | 8.64 | 25.86 | 59.351 | 80.059 | -20.708 | Peak |
| 17385 | 17.46 | 0 | 100 | V | 45.311 | 8.64 | 25.86 | 45.551 | 65.279 | -19.728 | Ave |
| 17385 | 17.58 | 0 | 100 | H | 45.311 | 8.64 | 25.86 | 45.671 | 64.139 | -18.468 | Ave |
| 23180 | 32.3 | 0 | 100 | V | 49.9 | 10.23 | 28.7 | 63.73 | 81.709 | -17.979 | Peak |
| 23180 | 32.76 | 0 | 100 | H | 49.9 | 10.23 | 28.7 | 64.19 | 80.059 | -15.869 | Peak |
| 23180 | 17.83 | 0 | 100 | V | 49.9 | 10.23 | 28.7 | 49.26 | 65.279 | -16.019 | Ave |
| 23180 | 17.95 | 0 | 100 | H | 49.9 | 10.23 | 28.7 | 49.38 | 64.139 | -14.759 | Ave |

## 4) Co-Location

### 2.4 GHz Worst Mode & BT Worst Mode



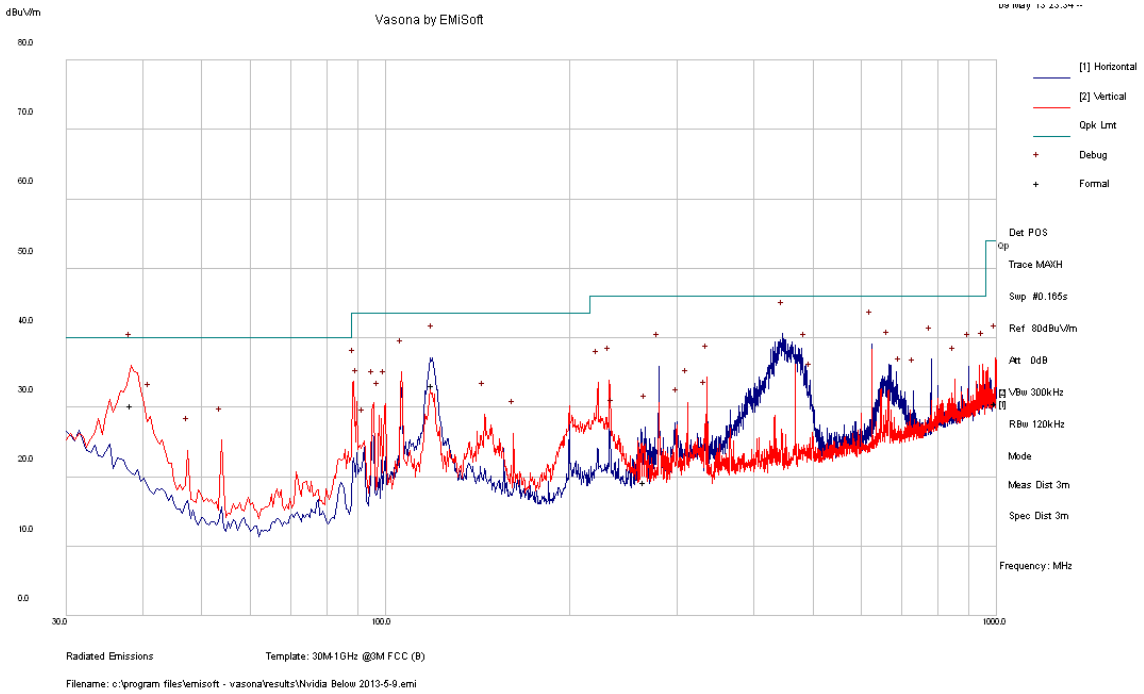

30-1000 MHz:

| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|
| 98.50925 | 37.05 | 293 | V | 23 | 43.5 | -6.45 |
| 105.784 | 35.87 | 172 | V | 291 | 43.5 | -7.63 |
| 261.1025 | 29.31 | 102 | H | 303 | 46 | -16.69 |
| 999.921 | 26.73 | 109 | V | 0 | 54 | -27.27 |

Above 1-25 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) | |
| 4923.83 | 45.07 | 263 | 100 | V | 33.266 | 4.52 | 27.75 | 55.106 | 74 | -18.894 | Peak |
| 4923.83 | 42.24 | 0 | 100 | H | 33.266 | 4.52 | 27.75 | 52.276 | 74 | -21.724 | Peak |
| 4923.83 | 42.7 | 263 | 100 | V | 33.266 | 4.52 | 27.75 | 52.736 | 54 | -1.264 | Ave |
| 4923.83 | 38.51 | 0 | 100 | H | 33.266 | 4.52 | 27.75 | 48.546 | 54 | -5.454 | Ave |

## 5 GHz Worst Mode & BT Worst Mode




30-1000 MHz:

| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|
| 38.403 | 30.34 | 114 | V | 214 | 40 | -9.66 |
| 119.45975 | 33.12 | 159 | H | 131 | 43.5 | -10.38 |
| 995.97825 | 30.55 | 141 | V | 65 | 54 | -23.45 |
| 265.61875 | 19.28 | 99 | H | 290 | 46 | -26.72 |

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) | |
| 4801.63 | 38.61 | 43 | 100 | V | 33.097 | 4.56 | 27.78 | 48.487 | 74 | -25.513 | Peak |
| 4801.63 | 36.28 | 71 | 100 | H | 33.097 | 4.56 | 27.78 | 46.157 | 74 | -27.843 | Peak |
| 4801.63 | 29.68 | 43 | 100 | V | 33.097 | 4.56 | 27.78 | 39.557 | 54 | -14.443 | Ave |
| 4801.63 | 27.04 | 71 | 100 | H | 33.097 | 4.56 | 27.78 | 36.917 | 54 | -17.083 | Ave |
| 11571.93 | 45.3 | 42 | 100 | V | 39.159 | 7.69 | 26.99 | 65.159 | 74 | -8.841 | Peak |
| 11571.93 | 40.37 | 326 | 116 | H | 39.159 | 7.69 | 26.99 | 60.229 | 74 | -13.771 | Peak |
| 11571.93 | 28.25 | 42 | 100 | V | 39.159 | 7.69 | 26.99 | 48.109 | 54 | -5.891 | Ave |
| 11571.93 | 24.51 | 326 | 116 | H | 39.159 | 7.69 | 26.99 | 44.369 | 54 | -9.631 | Ave |

# 8 FCC§15.247(a)(2) & IC RSS-210 §A8.2 – 6 dB & 99% Emission Bandwidth

## 8.1 Applicable Standards

According to FCC §15.247(a)(2) and IC RSS-210 A8.2 (a), systems using digital modulation techniques may operate in the 902~928 MHz, 2400~2483.5 MHz, and 5725~5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz

## 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 6 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 | 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.*

## 8.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22-24 °C |
| **Relative Humidity:** | 42-45 % |
| **ATM Pressure:** | 101-102 kPa |

*The testing was performed by Bo Li from 2013-05-06 to 2013-05-09 at RF site.*

## 8.5 Test Results

### 2.4 GHz Band:

802.11 b mode:

| Channel | Frequency (MHz) | 6 dB Emission Bandwidth (MHz) Tx 0 | 6 dB Emission Bandwidth (MHz) Tx 1 | 99% Emission Bandwidth (MHz) Tx 0 | 99% Emission Bandwidth (MHz) Tx 1 | Limit (MHz) | Results |
|---|---|---|---|---|---|---|---|
| Low | 2412 | 8.107 | 8.102 | 10.0935 | 10.1424 | > 0.5 | Compliant |
| Middle | 2437 | 8.118 | 8.113 | 10.0842 | 10.0755 | > 0.5 | Compliant |
| High | 2462 | 8.072 | 8.113 | 10.0714 | 10.1522 | > 0.5 | Compliant |

802.11 g mode:

| Channel | Frequency (MHz) | 6 dB Emission Bandwidth (MHz) Tx 0 | 6 dB Emission Bandwidth (MHz) Tx 1 | 99% Emission Bandwidth (MHz) Tx 0 | 99% Emission Bandwidth (MHz) Tx 1 | Limit (MHz) | Results |
|---|---|---|---|---|---|---|---|
| Low | 2412 | 16.371 | 16.021 | 16.3256 | 16.3225 | > 0.5 | Compliant |
| Middle | 2437 | 16.079 | 16.044 | 16.3019 | 16.3001 | > 0.5 | Compliant |
| High | 2462 | 16.387 | 16.352 | 16.3298 | 16.3178 | > 0.5 | Compliant |

802.11n HT20 mode:

| Channel | Frequency (MHz) | 6 dB Emission Bandwidth (MHz) Tx 0 | 6 dB Emission Bandwidth (MHz) Tx 1 | 99% Emission Bandwidth (MHz) Tx 0 | 99% Emission Bandwidth (MHz) Tx 1 | Limit (MHz) | Results |
|---|---|---|---|---|---|---|---|
| Low | 2412 | 17.329 | 17.599 | 17.4883 | 17.4999 | > 0.5 | Compliant |
| Middle | 2437 | 17.563 | 17.602 | 17.4795 | 17.5471 | > 0.5 | Compliant |
| High | 2462 | 17.56 | 17.556 | 17.4891 | 17.5014 | > 0.5 | Compliant |

802.11n HT40 mode:

| Channel | Frequency (MHz) | 6 dB Emission Bandwidth (MHz) Tx 0 | 6 dB Emission Bandwidth (MHz) Tx 1 | 99% Emission Bandwidth (MHz) Tx 0 | 99% Emission Bandwidth (MHz) Tx 1 | Limit (MHz) | Results |
|---|---|---|---|---|---|---|---|
| Low | 2422 | 36.416 | 36.461 | 36.1091 | 36.1332 | > 0.5 | Compliant |
| Middle | 2437 | 36.395 | 36.215 | 36.0967 | 36.0528 | > 0.5 | Compliant |
| High | 2452 | 36.479 | 35.982 | 36.1362 | 36.0867 | > 0.5 | Compliant |

**5.8 GHz Band:**

802.11a mode:

| Channel | Frequency (MHz) | 6 dB Emission Bandwidth (MHz) Tx 0 | 6 dB Emission Bandwidth (MHz) Tx 1 | 99% Emission Bandwidth (MHz) Tx 0 | 99% Emission Bandwidth (MHz) Tx 1 | Limit (MHz) | Results |
|---|---|---|---|---|---|---|---|
| Low | 5745 | 15.621 | 16.067 | 16.2823 | 16.3019 | > 0.5 | Compliant |
| Middle | 5785 | 15.704 | 15.822 | 16.2853 | 16.2963 | > 0.5 | Compliant |
| High | 5825 | 16.011 | 15.803 | 16.3241 | 16.3173 | > 0.5 | Compliant |

802.11n HT20 mode:

| Channel | Frequency (MHz) | 6 dB Emission Bandwidth (MHz) Tx 0 | 6 dB Emission Bandwidth (MHz) Tx 1 | 99% Emission Bandwidth (MHz) Tx 0 | 99% Emission Bandwidth (MHz) Tx 1 | Limit (MHz) | Results |
|---|---|---|---|---|---|---|---|
| Low | 5745 | 16.305 | 16.521 | 17.4050 | 17.4750 | > 0.5 | Compliant |
| Middle | 5785 | 15.213 | 15.985 | 17.4433 | 17.4016 | > 0.5 | Compliant |
| High | 5825 | 16.082 | 15.436 | 17.4300 | 17.4011 | > 0.5 | Compliant |

802.11n HT40 mode:

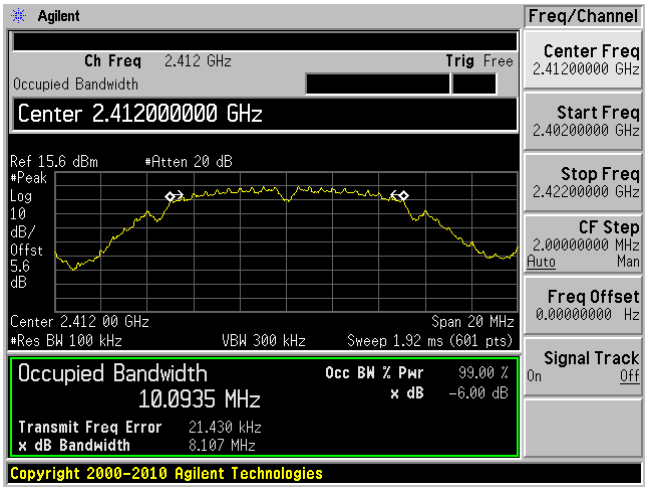
| Channel | Frequency (MHz) | 6 dB Emission Bandwidth (MHz) Tx 0 | 6 dB Emission Bandwidth (MHz) Tx 1 | 99% Emission Bandwidth (MHz) Tx 0 | 99% Emission Bandwidth (MHz) Tx 1 | Limit (MHz) | Results |
|---|---|---|---|---|---|---|---|
| Low | 5755 | 36.272 | 35.953 | 36.1346 | 36.0365 | > 0.5 | Compliant |
| High | 5795 | 36.317 | 35.511 | 36.1030 | 36.0228 | > 0.5 | Compliant |

Please refer to the following plots for detailed test results

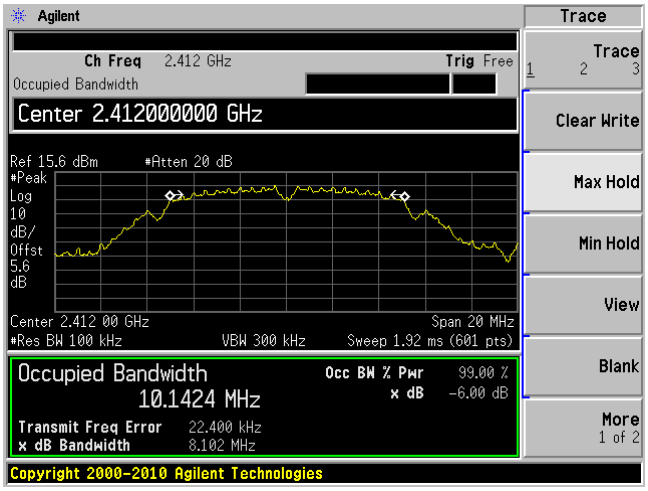
## 2.4 GHz Band

### 802.11b mode

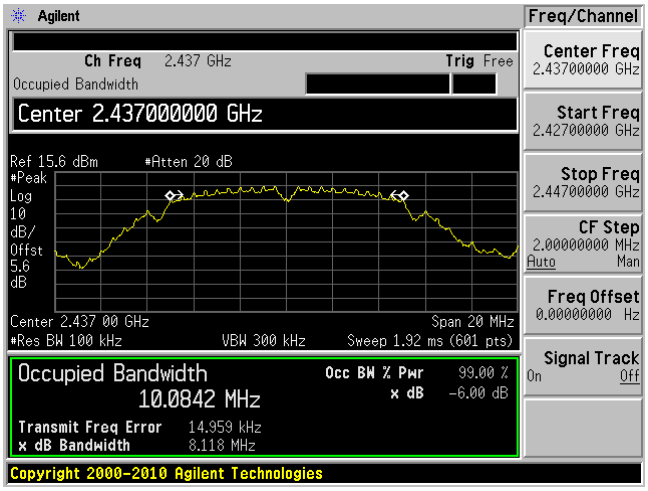
Low channel: 2412 MHz Chain 0



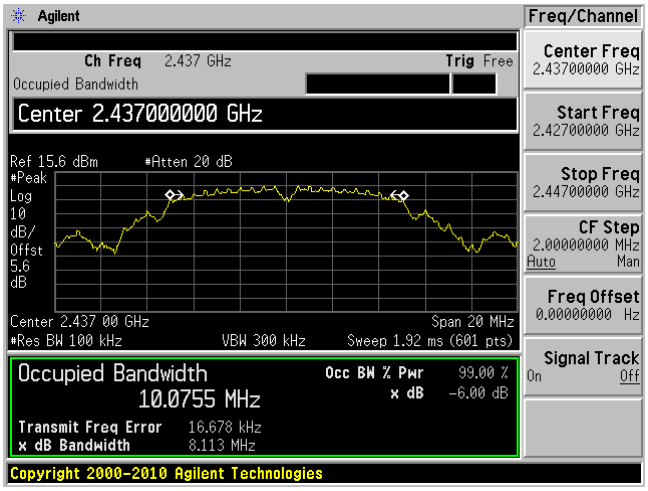

Low channel: 2412 MHz Chain 1



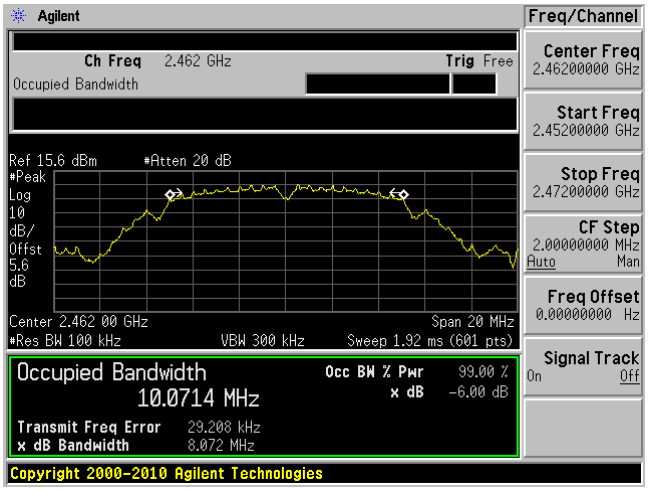

Middle channel: 2437 MHz Chain 0



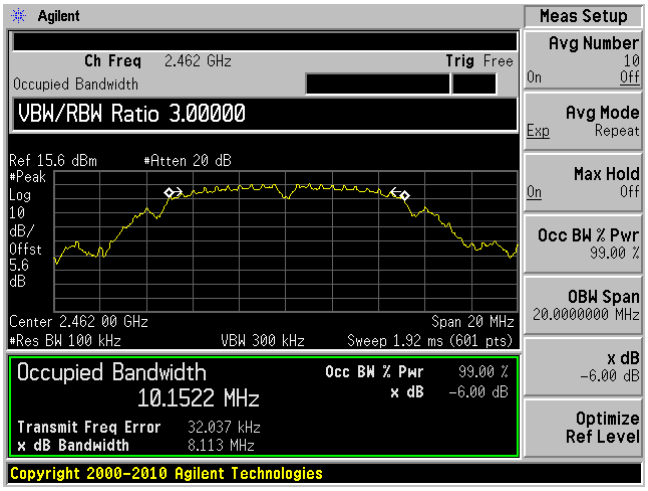

Middle channel: 2437 MHz Chain 1



High channel: 2462 MHz Chain 0

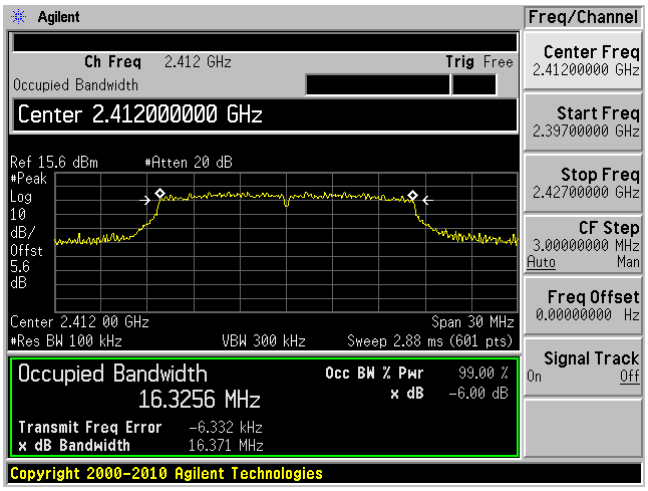



High channel: 2462 MHz Chain 1

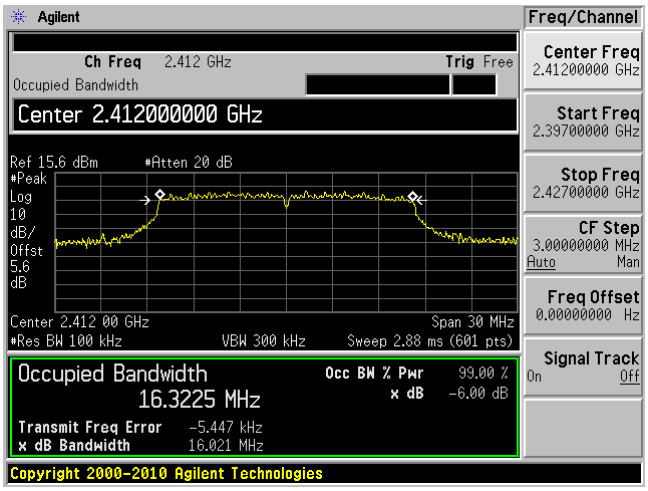



**802.11g mode**

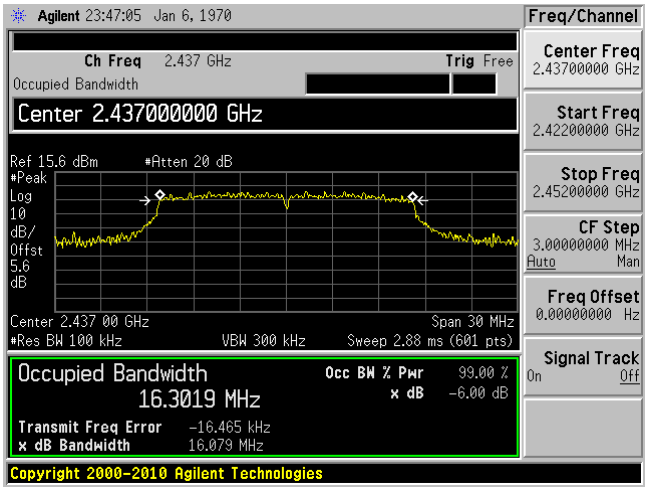
Low channel: 2412 MHz Chain 0



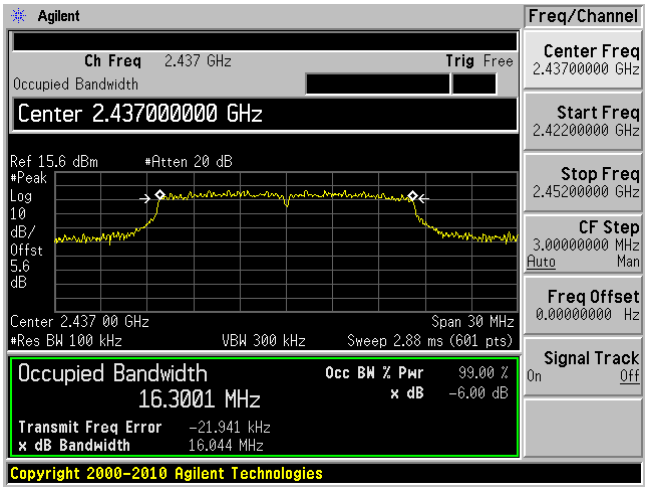

Low channel: 2412 MHz Chain 1



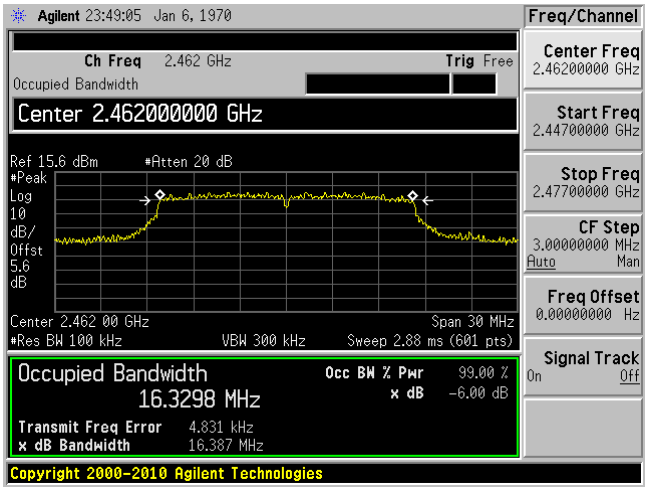
Middle channel: 2437 MHz Chain 0



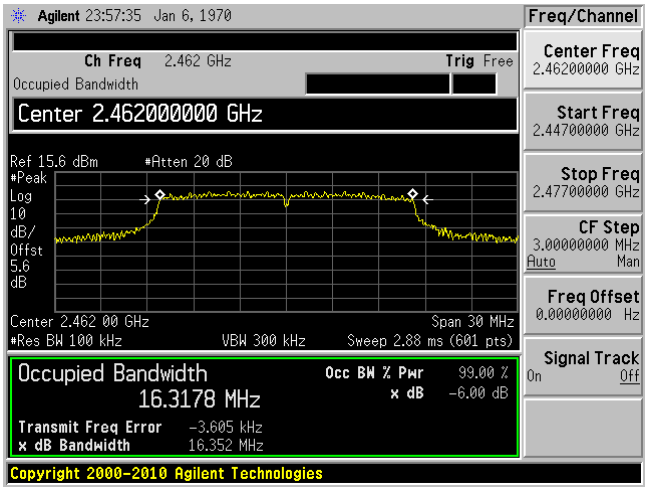

Middle channel: 2437 MHz Chain 1




High channel: 2462 MHz Chain 0

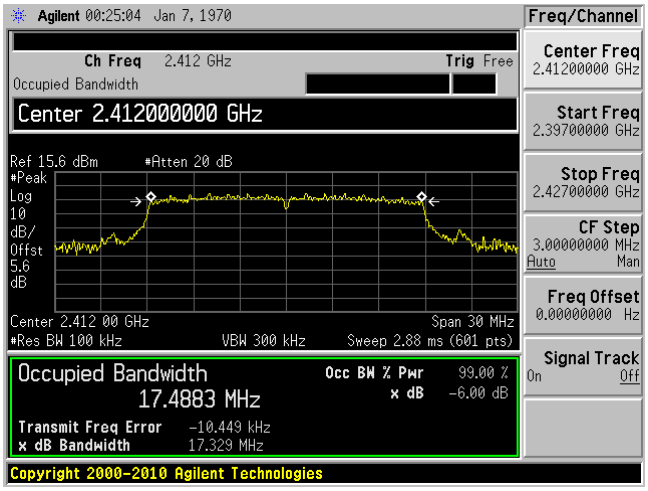



High channel: 2462 MHz Chain 1

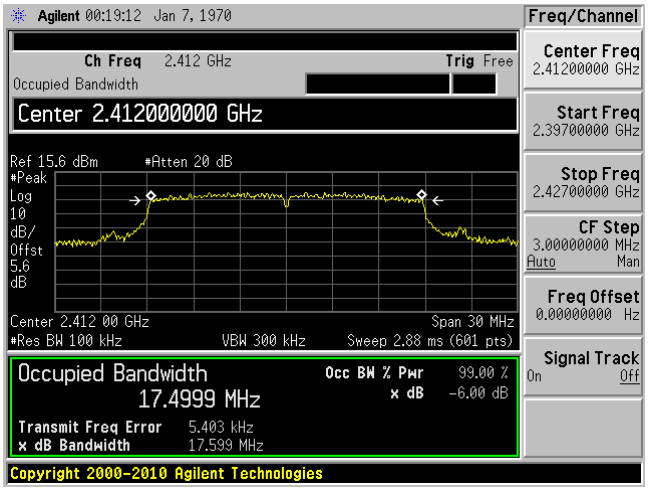


**802.11n HT20 mode**

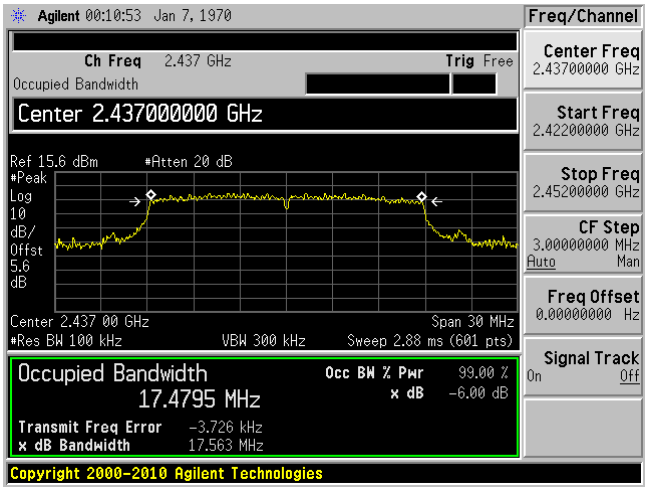
Low channel: 2412 MHz Chain 0



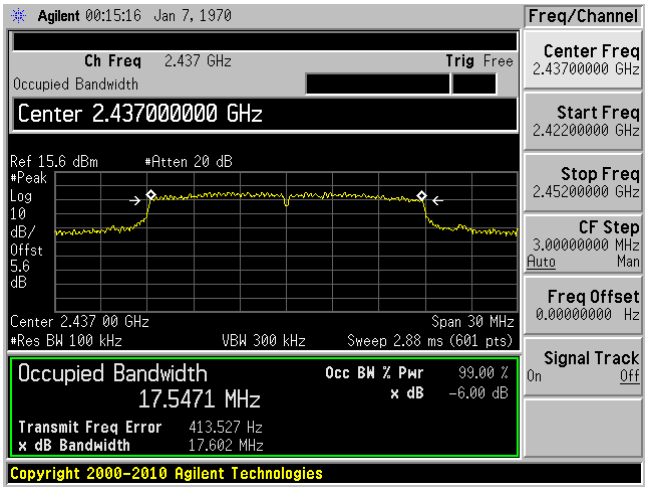

Low channel: 2412 MHz Chain 1



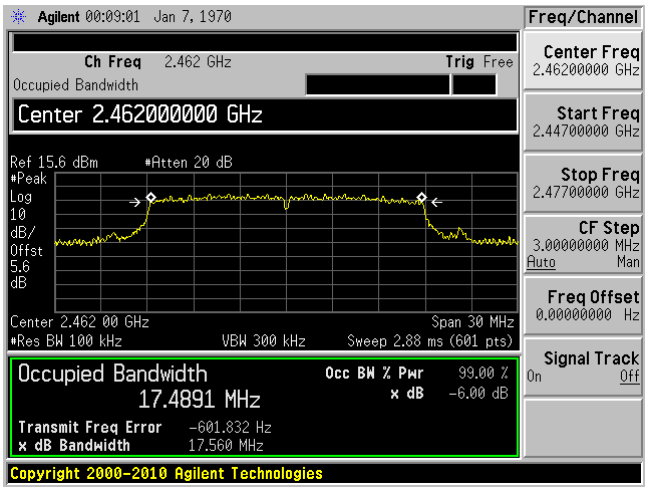

Middle channel: 2437 MHz Chain 0



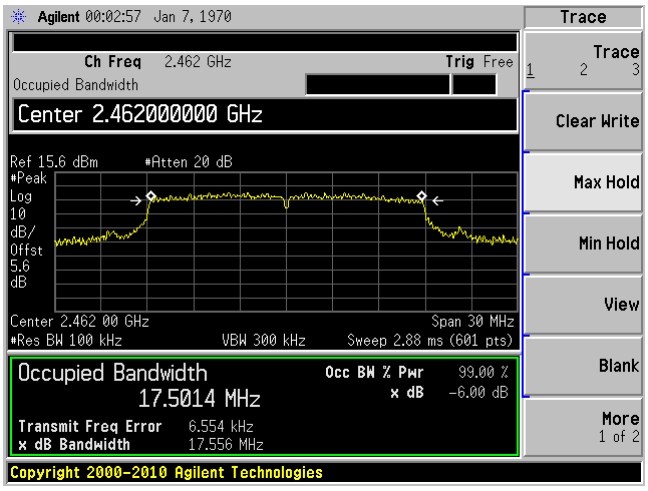

Middle channel: 2437 MHz Chain 1



High channel: 2462 MHz Chain 0

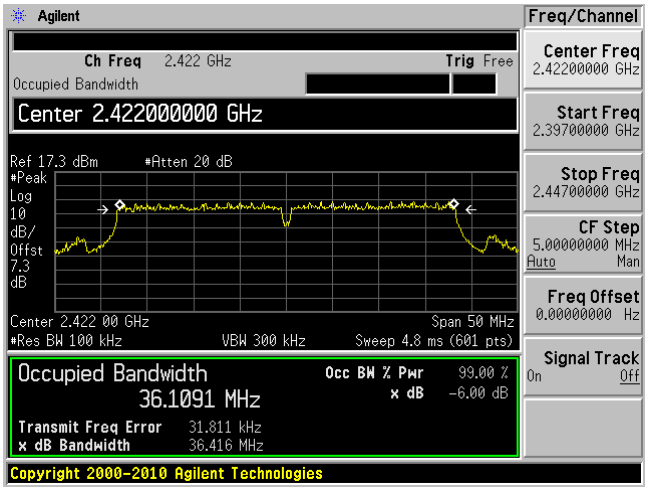



High channel: 2462 MHz Chain 1

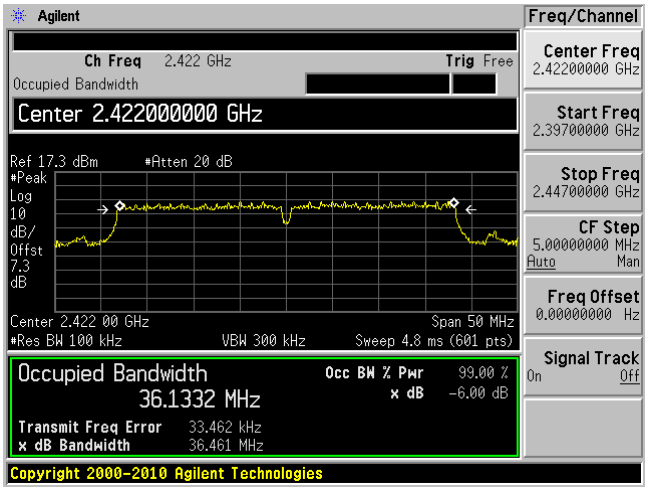



**802.11n HT40 mode**

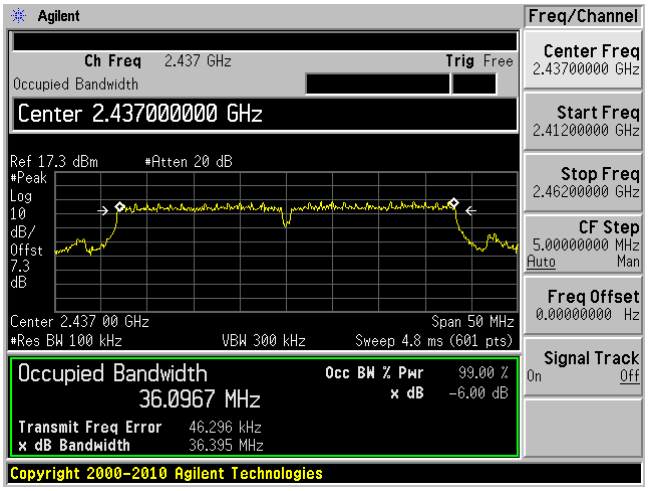
Low channel: 2422 MHz Chain 0



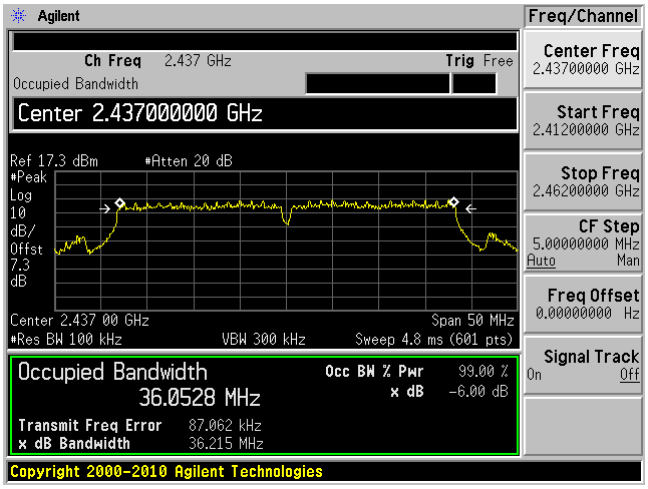

Low channel: 2422 MHz Chain 1



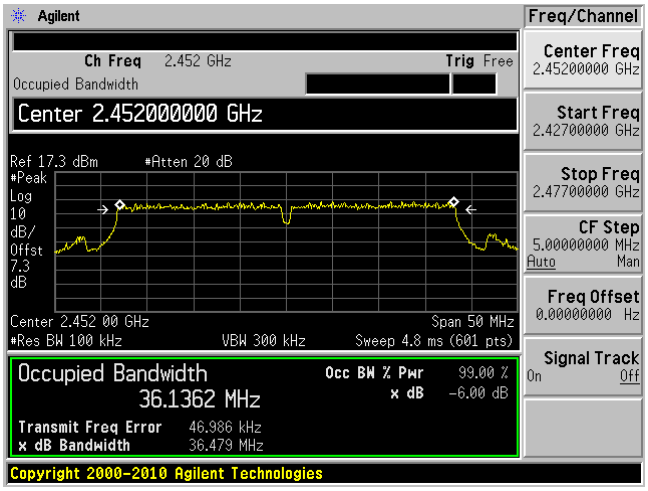
Middle channel: 2437 MHz Chain 0



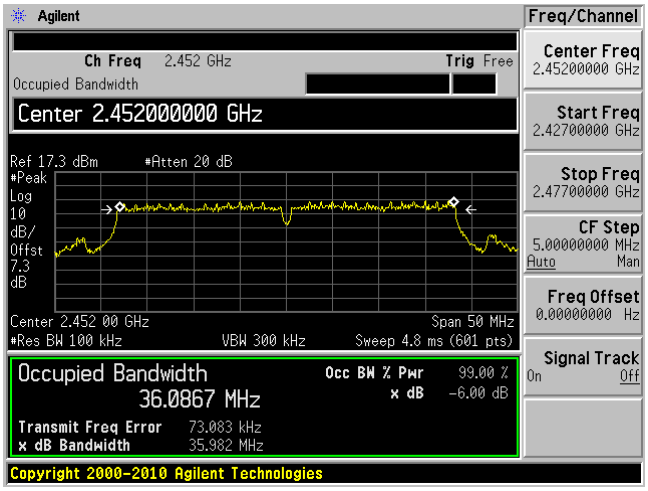

Middle channel: 2437 MHz Chain 1




High channel: 2452 MHz Chain 0



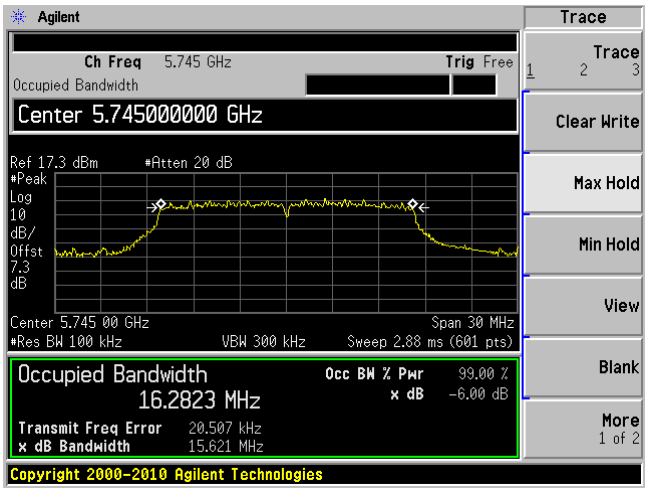

High channel: 2452 MHz Chain 1



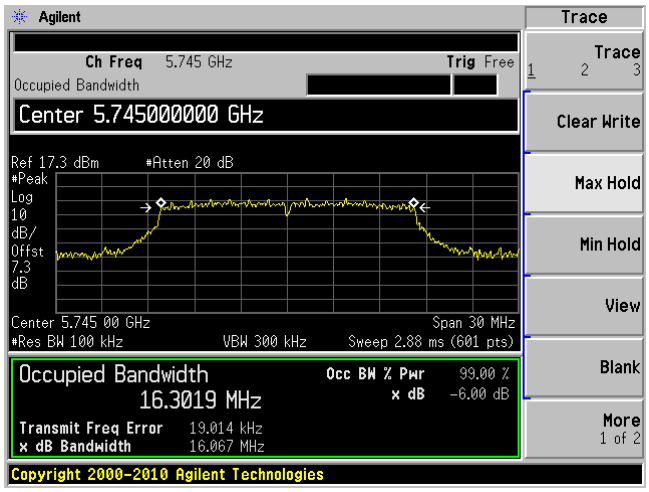
## 5.8 GHz Band

### 802.11a mode

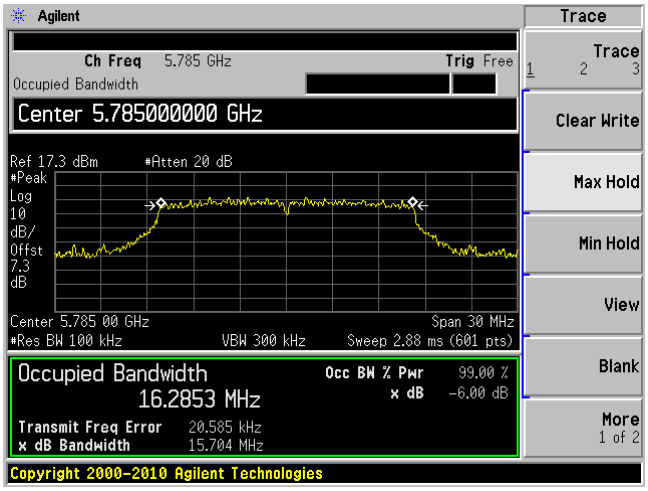
Low channel: 5745 MHz Chain 0



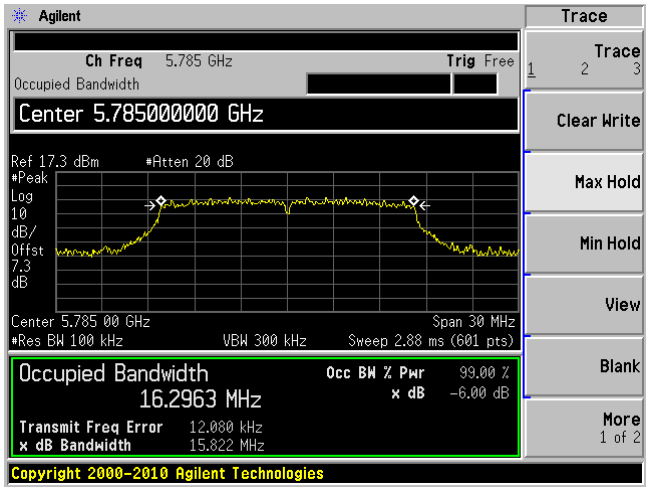

Low channel: 5745 MHz Chain 1



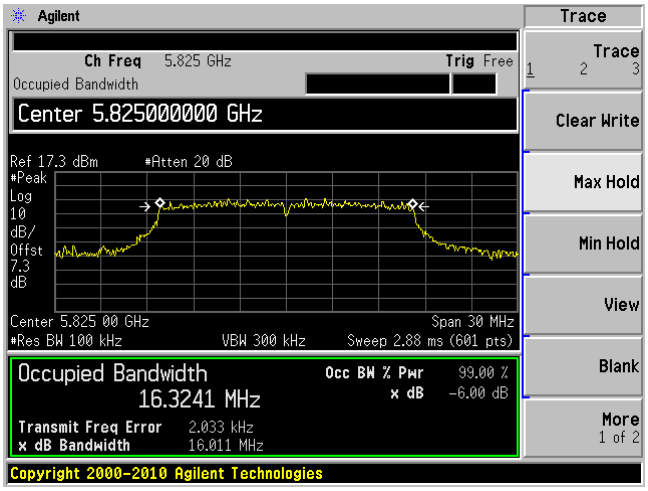

Middle channel: 5785 MHz Chain 0



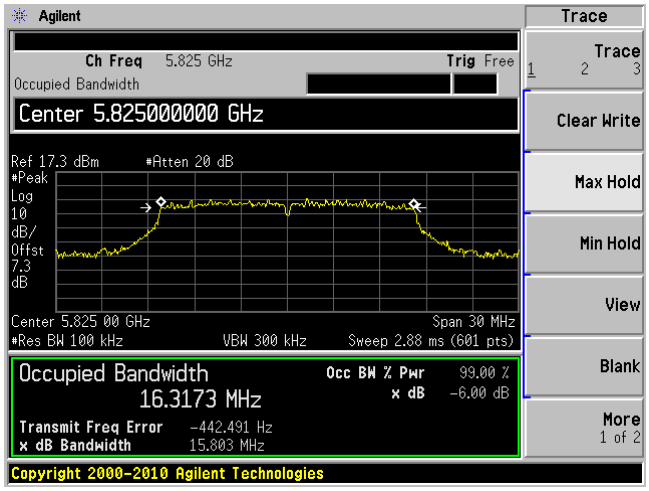

Middle channel: 5785 MHz Chain 1



High channel: 5825 MHz Chain 0

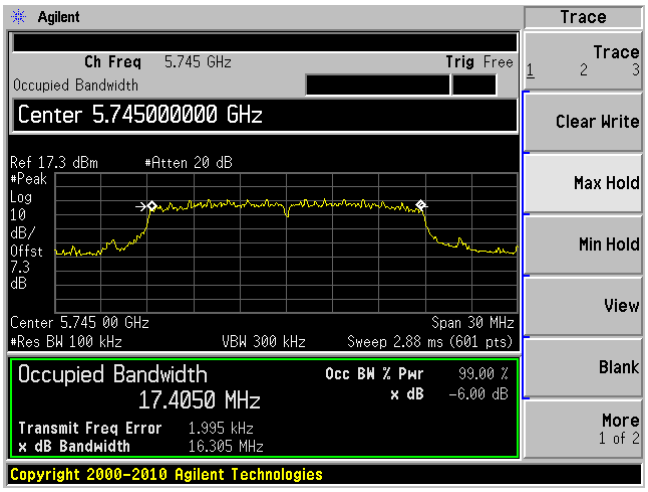



High channel: 5825 MHz Chain 1

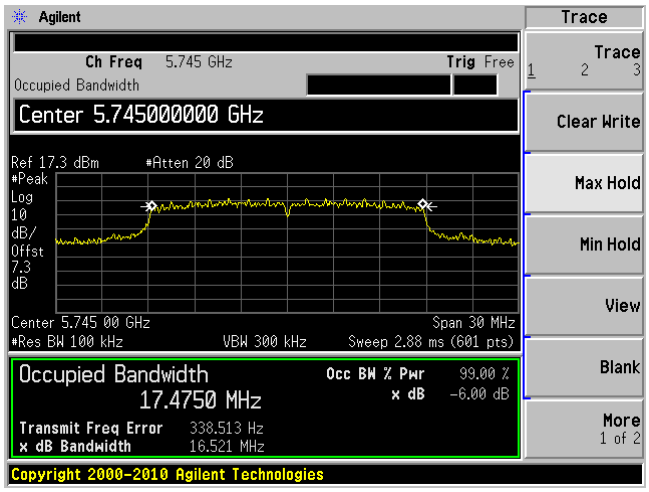



**802.11n HT20 mode**

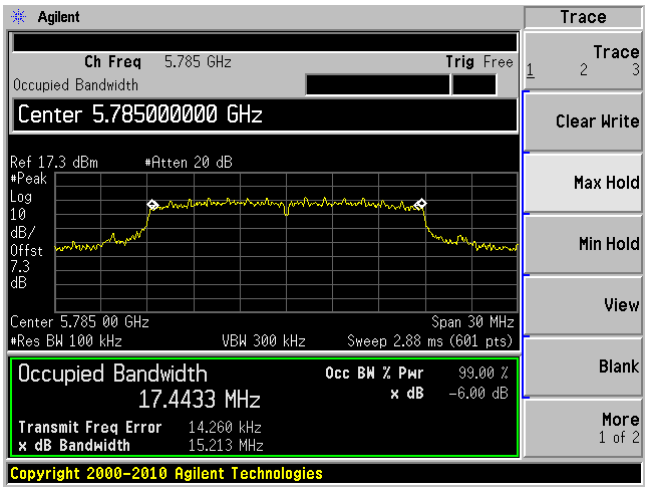
Low channel: 5745 MHz Chain 0



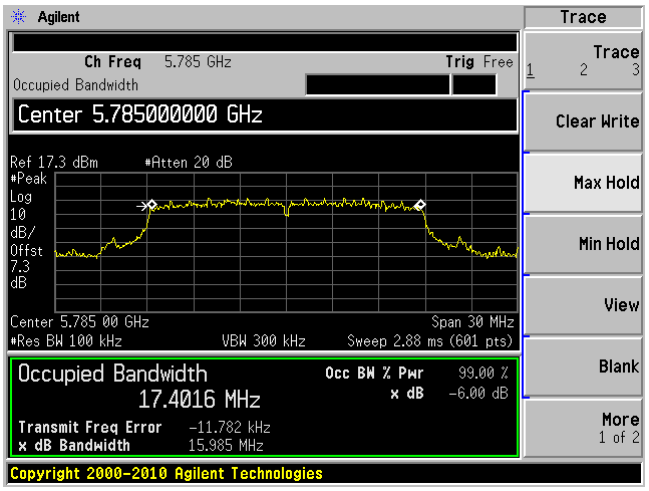

Low channel: 5745 MHz Chain 1



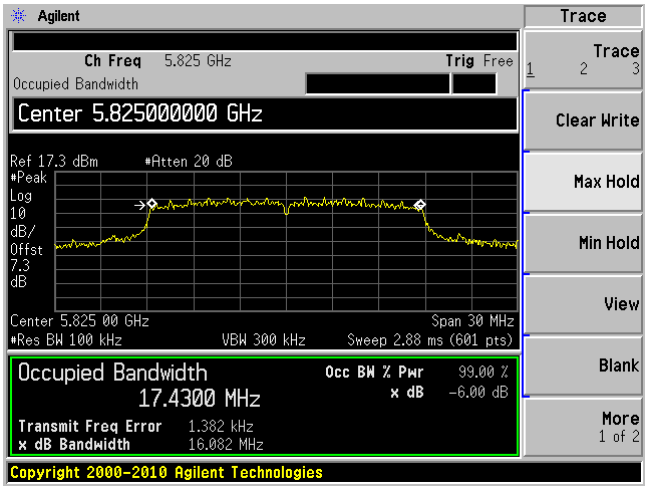
Middle channel: 5785 MHz Chain 0



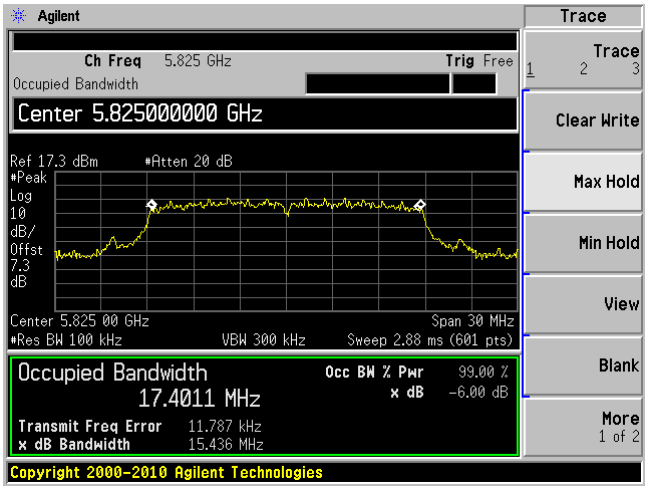

Middle channel: 5785 MHz Chain 1




High channel: 5825 MHz Chain 0

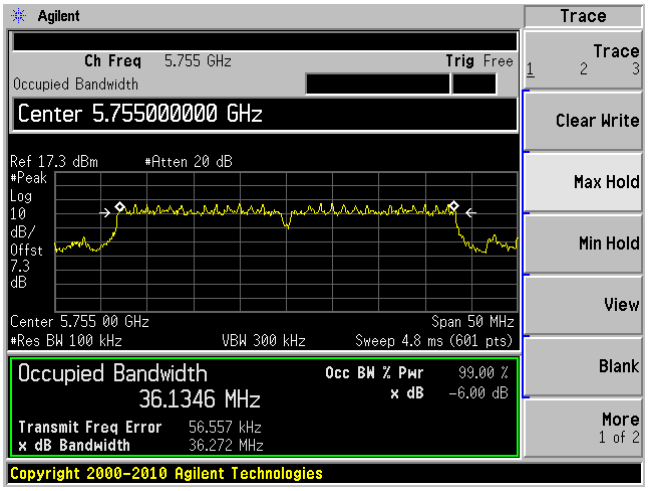



High channel: 5825 MHz Chain 1

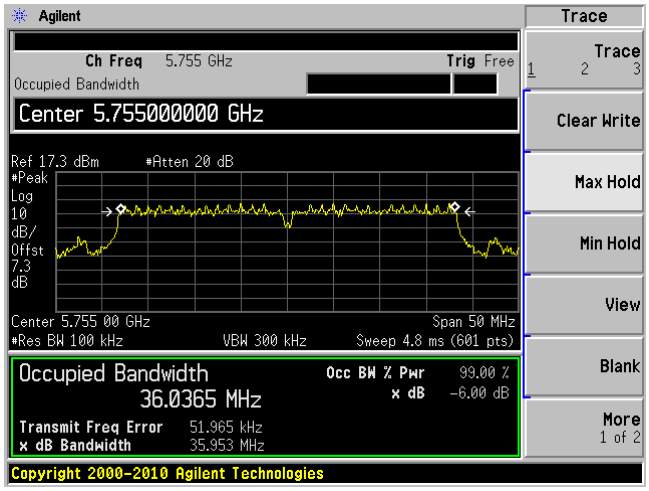


**802.11n HT40 mode**

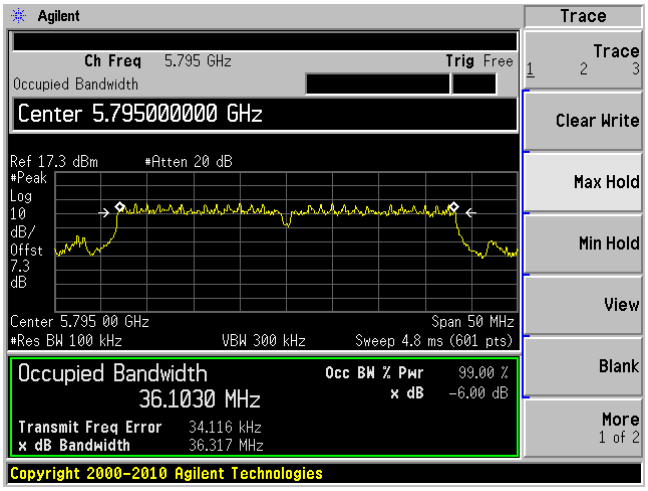
Low channel: 5755 MHz Chain 0



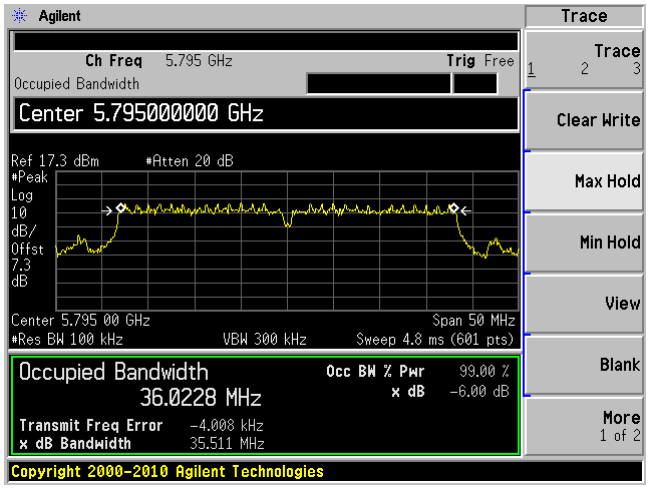

Low channel: 5755 MHz Chain 1




High channel: 5795 MHz Chain 0




High channel: 5795 MHz Chain 1



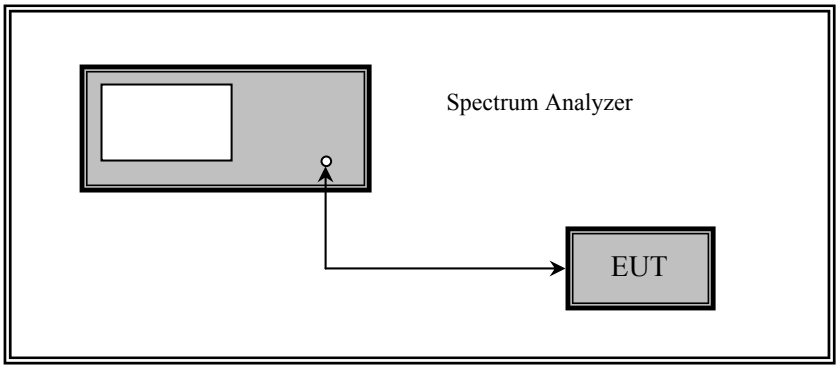
# 9 FCC §15.247(b) & IC RSS-210 §A8.4 – Peak Output Power Measurement

## 9.1 Applicable Standards

According to FCC §15.247(b) and IC RSS-210 §A8.4 (4) for systems using digital modulation in the 902~928 MHz, 2400~2483.5 MHz, and 5725~5850 MHz bands: 1 Watt.

## 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 | 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.*

## 9.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22-24 °C |
| **Relative Humidity:** | 42-45 % |
| **ATM Pressure:** | 101-102kPa |

*The testing was performed by Bo Li from 2013-5-6 to 2013-5-9 at RF site.*

## 9.5 Test Results

### 2.4 GHz Band:

802.11b mode

| Channel | Frequency (MHz) | TX Chain 0 Power (dBm) | TX Chain 1 Power (dBm) | Limit (dBm) | Margin Chain0 (dB) | Margin Chain1 (dB) |
|---|---|---|---|---|---|---|
| Low | 2412 | 14.16 | 14.69 | 30 | -15.84 | -15.31 |
| Middle | 2437 | 14.43 | 14.89 | 30 | -15.57 | -15.11 |
| High | 2462 | 13.97 | 14.86 | 30 | -16.03 | -15.14 |

802.11g mode

| Channel | Frequency (MHz) | TX Chain 0 Power (dBm) | TX Chain 1 Power (dBm) | Limit (dBm) | Margin Chain0 (dB) | Margin Chain1 (dB) |
|---|---|---|---|---|---|---|
| Low | 2412 | 9.05 | 9.62 | 30 | -20.95 | -20.38 |
| Middle | 2437 | 9.16 | 9.63 | 30 | -20.84 | -20.37 |
| High | 2462 | 9.22 | 9.67 | 30 | -20.78 | -20.33 |

802.11n HT20 mode

| Channel | Frequency (MHz) | TX Chain 0 Power (dBm) | TX Chain 1 Power (dBm) | Total Power (mW) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 2412 | 8.55 | 9.14 | 15.36 | 11.87 | 30 | -18.13 |
| Middle | 2437 | 8.68 | 9.15 | 15.60 | 11.93 | 30 | -18.07 |
| High | 2462 | 8.71 | 9.45 | 16.24 | 12.11 | 30 | -17.89 |

802.11n HT40 mode

| Channel | Frequency (MHz) | TX Chain 0 Power (dBm) | TX Chain 1 Power (dBm) | Total Power (mW) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 2422 | 7.04 | 7.67 | 10.91 | 10.38 | 30 | -19.62 |
| Middle | 2437 | 7.17 | 7.53 | 10.87 | 10.36 | 30 | -19.64 |
| High | 2452 | 7.3 | 7.88 | 11.51 | 10.61 | 30 | -19.39 |

**5.8 GHz Band:**

802.11a mode

| Channel | Frequency (MHz) | TX Chain 0 Power (dBm) | TX Chain 1 Power (dBm) | Limit (dBm) | Margin Chain0 (dB) | Margin Chain1 (dB) |
|---|---|---|---|---|---|---|
| Low | 5745 | 8.81 | 9.19 | 30 | -21.19 | -20.81 |
| Middle | 5785 | 9.36 | 9.42 | 30 | -20.64 | -20.58 |
| High | 5825 | 8.97 | 8.48 | 30 | -21.03 | -21.52 |

802.11n HT20 mode

| Channel | Frequency (MHz) | TX Chain 0 Power (dBm) | TX Chain 1 Power (dBm) | Total Power (mW) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5745 | 8.60 | 8.93 | 15.06 | 11.78 | 30 | -18.22 |
| Middle | 5785 | 8.97 | 9.18 | 16.17 | 12.09 | 30 | -17.91 |
| High | 5825 | 8.70 | 8.40 | 14.33 | 11.56 | 30 | -18.44 |

802.11n HT40 mode

| Channel | Frequency (MHz) | TX Chain 0 Power (dBm) | TX Chain 1 Power (dBm) | Total Power (mW) | Total Power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| Low | 5755 | 8.37 | 8.65 | 14.20 | 11.52 | 30 | -18.48 |
| High | 5795 | 8.62 | 8.60 | 14.52 | 11.62 | 30 | -18.38 |

# 10 FCC §15.247(d) & IC RSS-210 §A8.5 – 100 kHz Bandwidth of Band Edges

## 10.1 Applicable Standards

According to FCC §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emissions limits specified in §15.209(a) see §15.205(c).

According to IC Rss-210 §A8.5, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

## 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 both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

## 10.3 Test Equipment List and Details

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

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

## 10.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22-24 °C |
| **Relative Humidity:** | 42-45 % |
| **ATM Pressure:** | 101-102kPa |

*The testing was performed by Bo Li from 2013-05-06 to 2013-05-09 at RF site.*

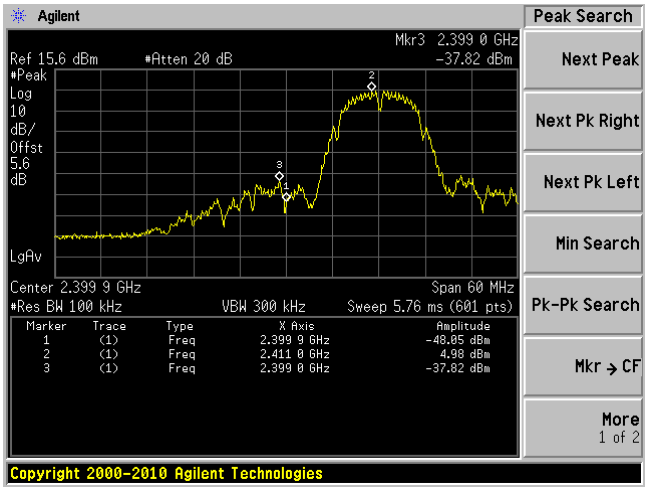
## 10.5 Test Results

Please refer to following pages for plots of band edge.

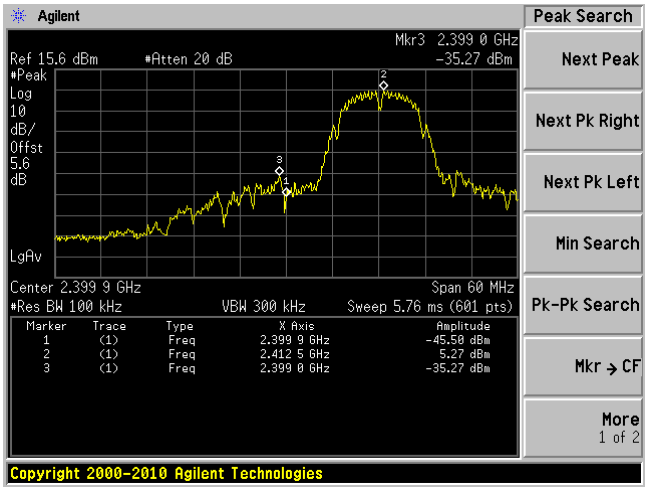
### 2.4 GHz Band

### 802.11b mode

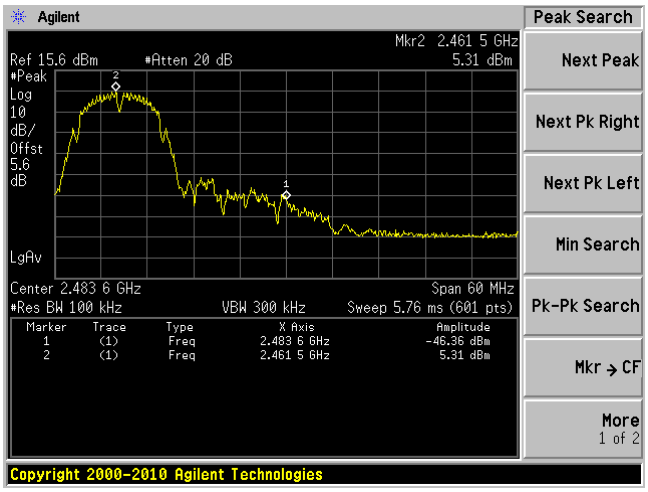
802.11b, Chain 0 Low Band Edge



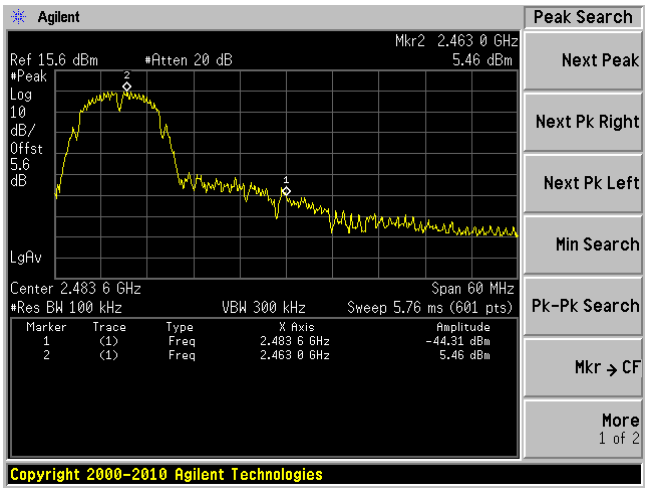

802.11b, Chain 1 Low Band Edge




802.11b, Chain 0 High Band Edge

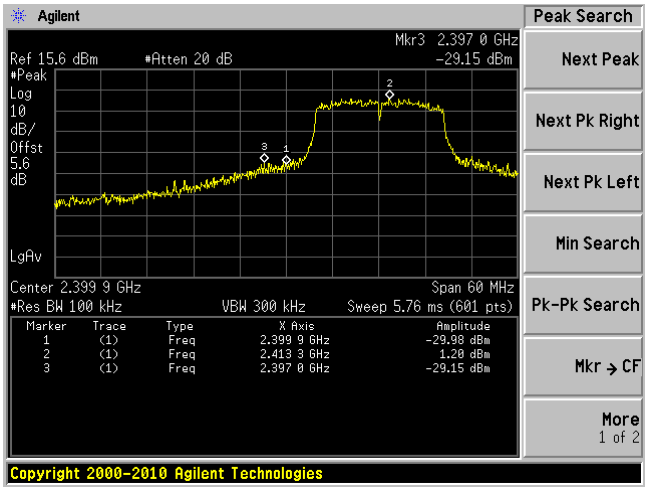



802.11b, Chain 1 High Band Edge

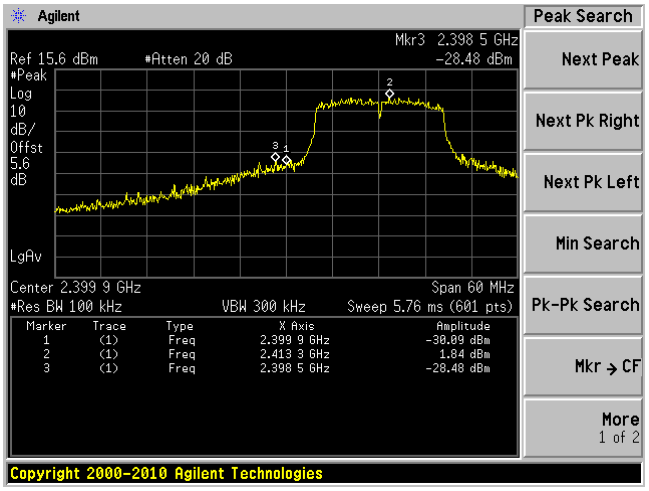


## 802.11g mode

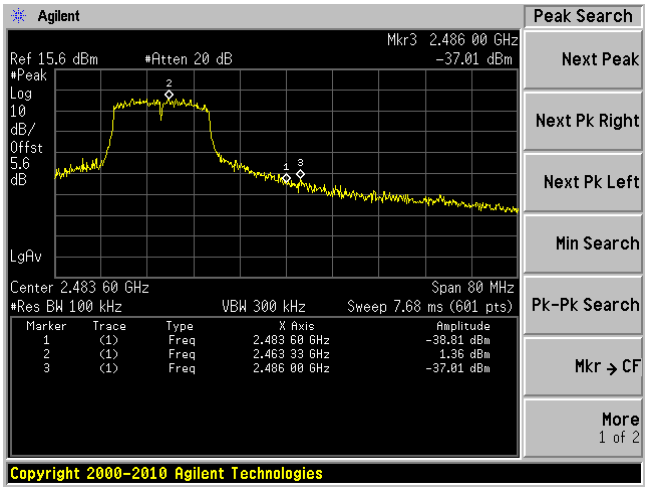
802.11g, Chain 0 Low Band Edge



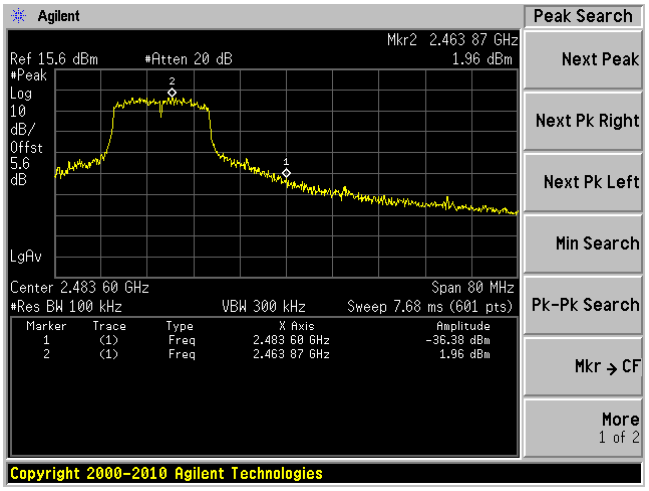

802.11g, Chain 1 Low Band Edge




802.11g, Chain 0 High Band Edge

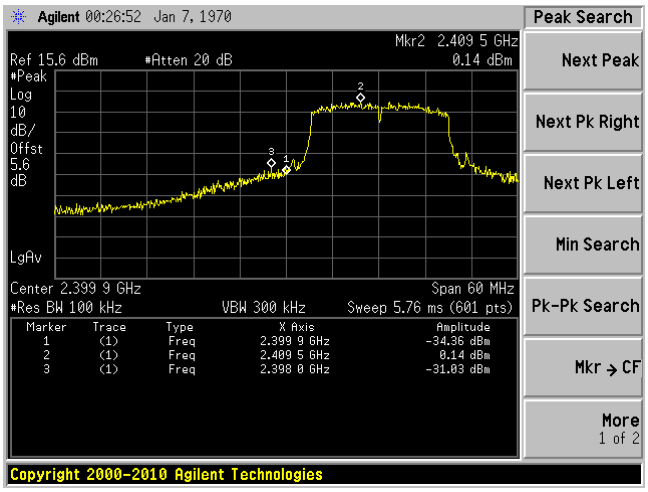



802.11g, Chain 1 High Band Edge

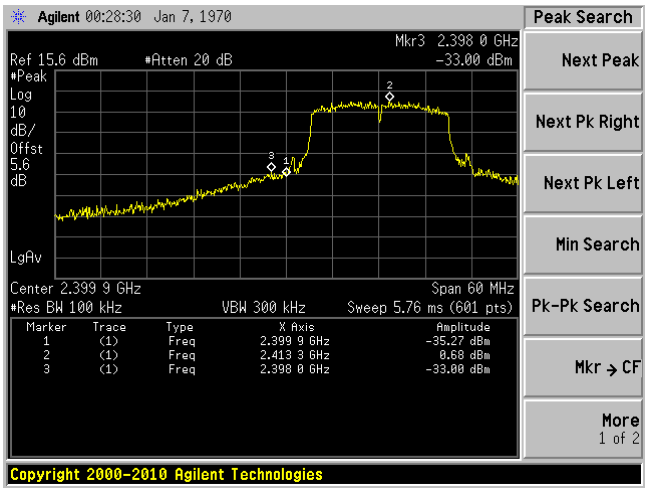


## 802.11n HT20 mode

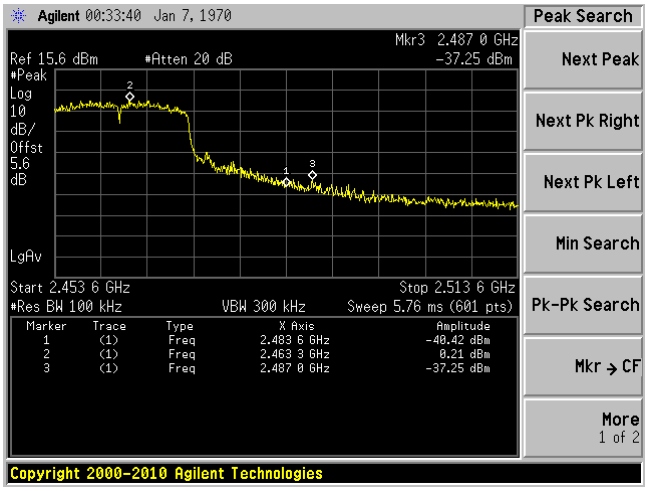
802.11n HT20, Chain 0 Low Band Edge



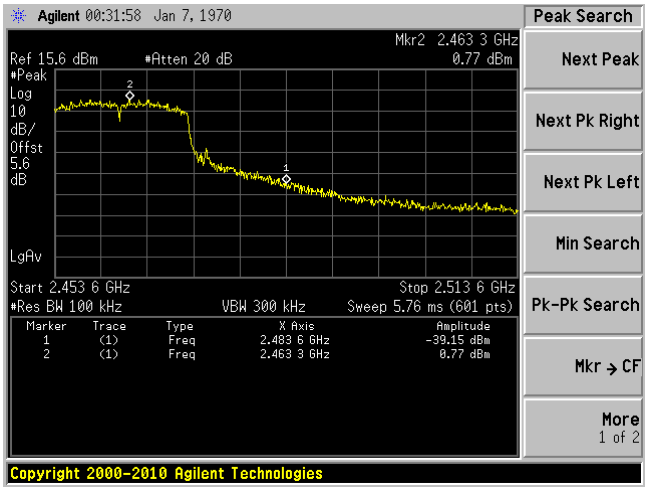

802.11n HT20, Chain 1 Low Band Edge




802.11n HT20, Chain 0 High Band Edge

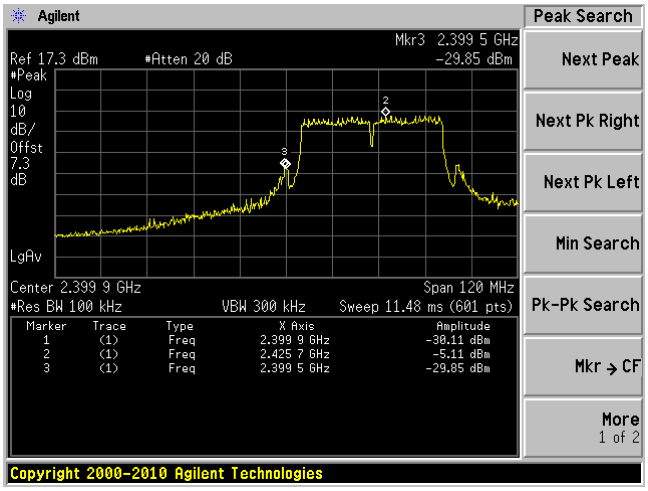



802.11n HT20, Chain 1 High Band Edge

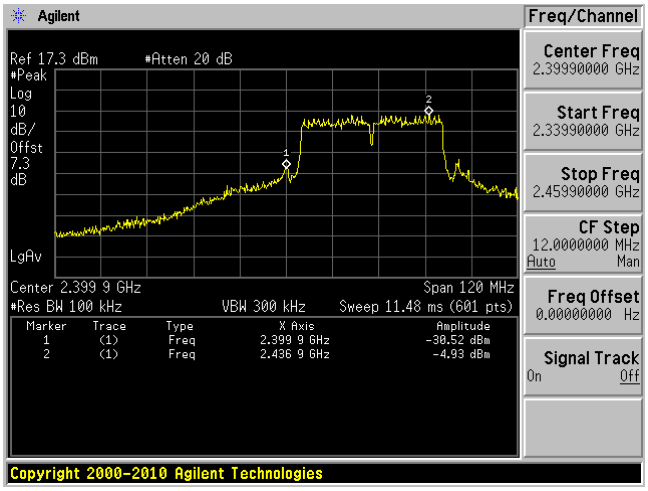


## 802.11n HT40 mode

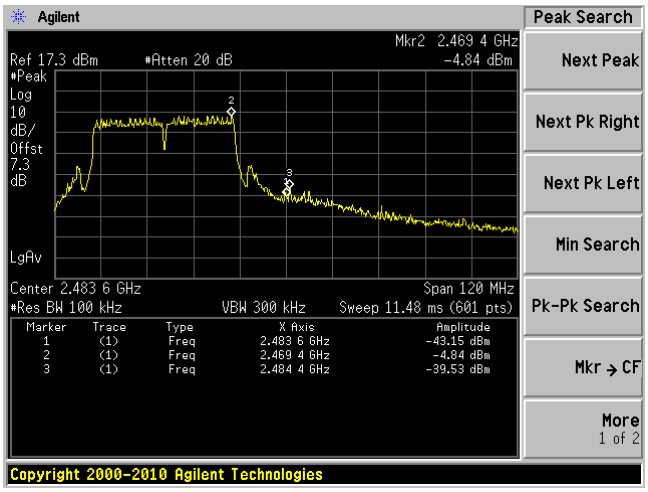
802.11n HT40, Chain 0 Low Band Edge



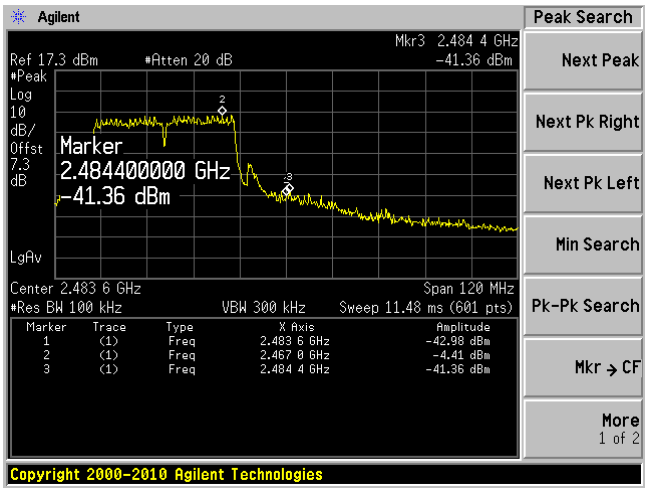

802.11n HT40, Chain 1 Low Band Edge




802.11n HT40, Chain 0 High Band Edge



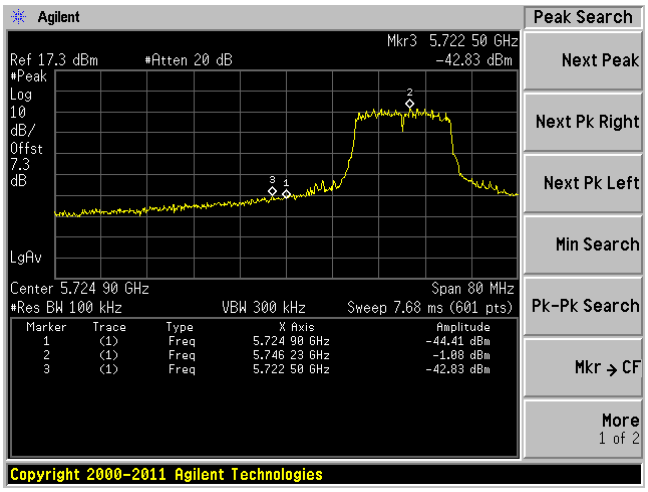

802.11n HT40, Chain 1 High Band Edge



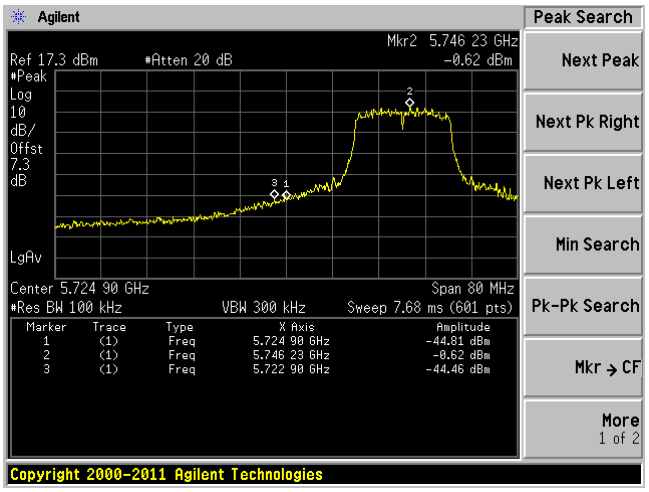
## 5.8 GHz Band

### 802.11a mode

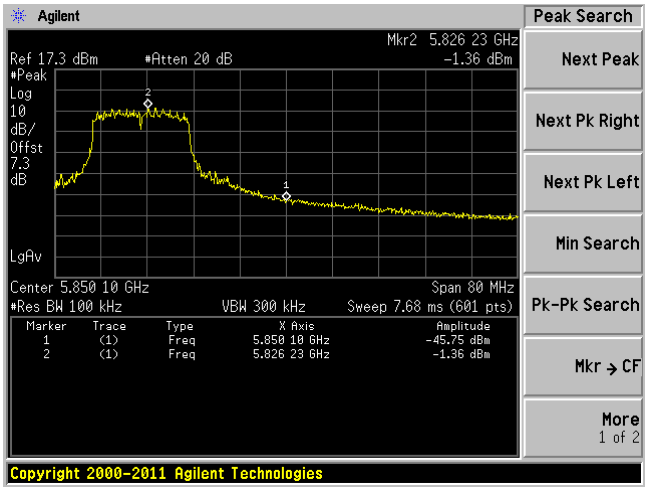
802.11a, Chain 0 Low Band Edge



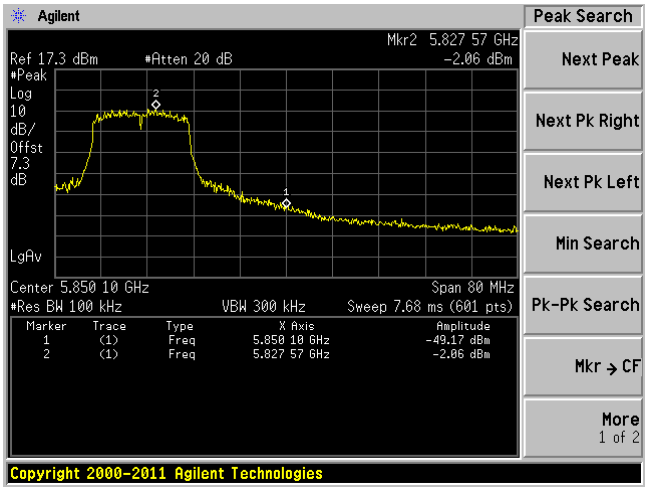

802.11a, Chain 1 Low Band Edge




802.11a, Chain 0 High Band Edge

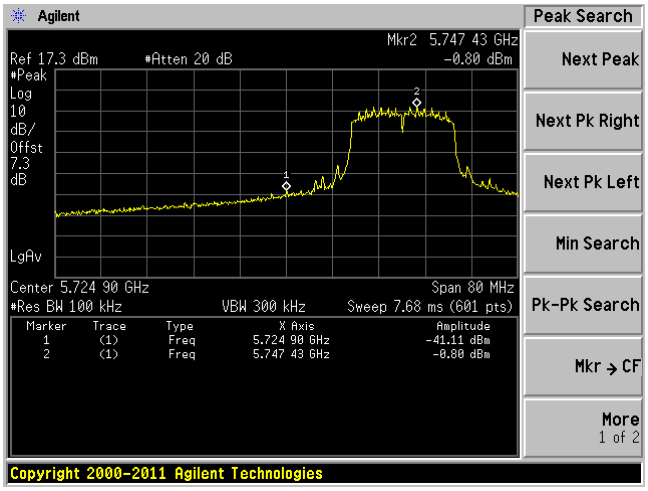



802.11a, Chain 1 High Band Edge

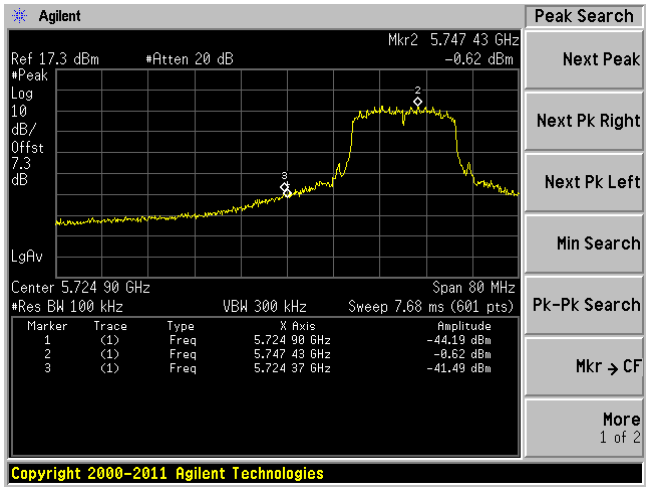


## 802.11n HT20 mode

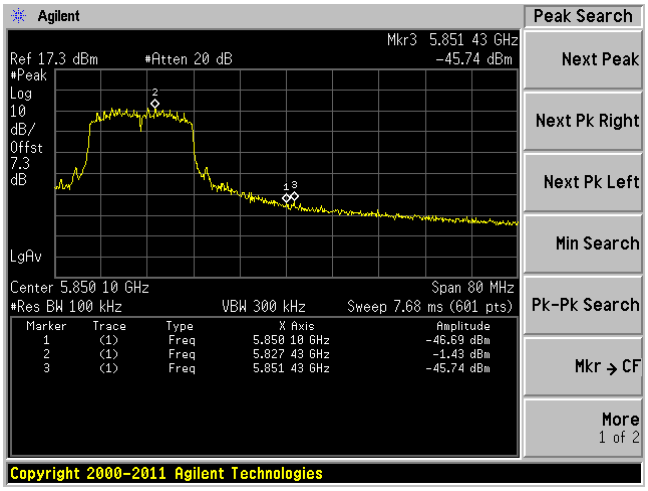
802.11n HT20, Chain 0 Low Band Edge



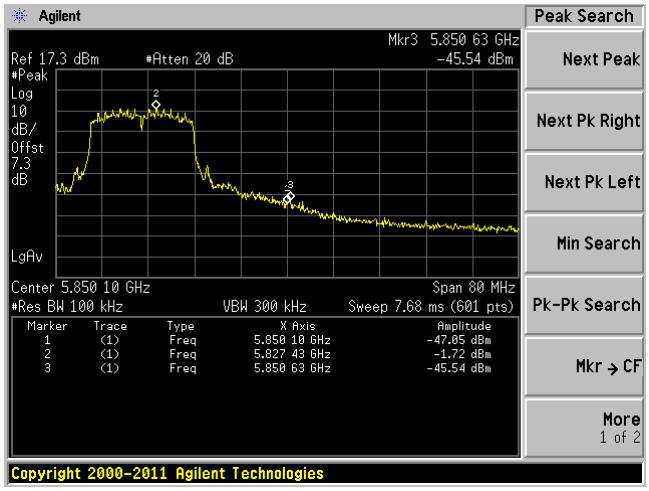

802.11n HT20, Chain 1 Low Band Edge




802.11n HT20, Chain 0 High Band Edge

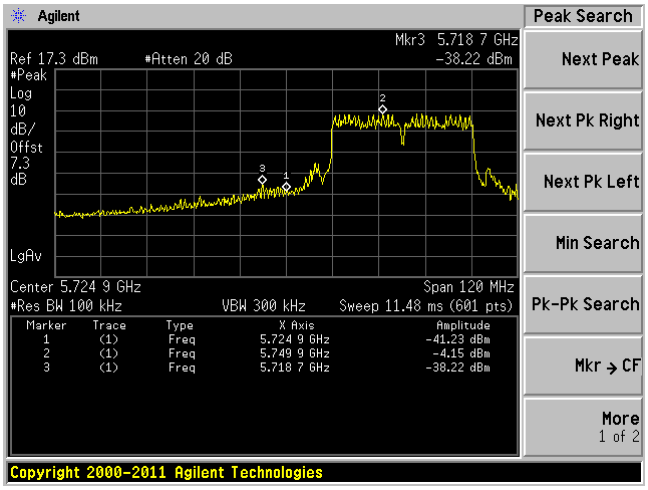



802.11n HT20, Chain 1 High Band Edge

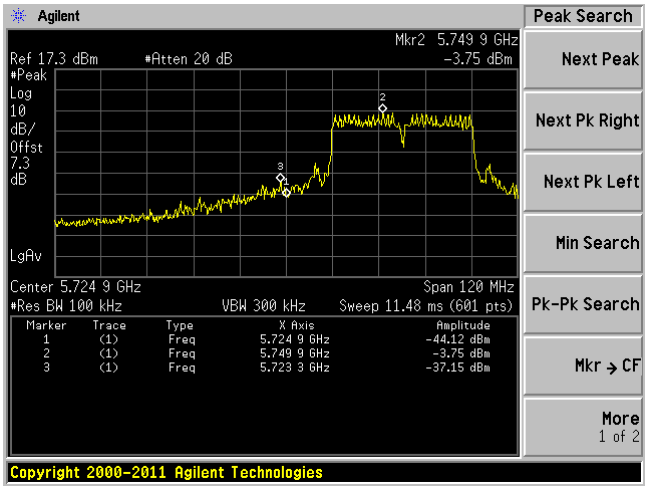


## 802.11n HT40 mode

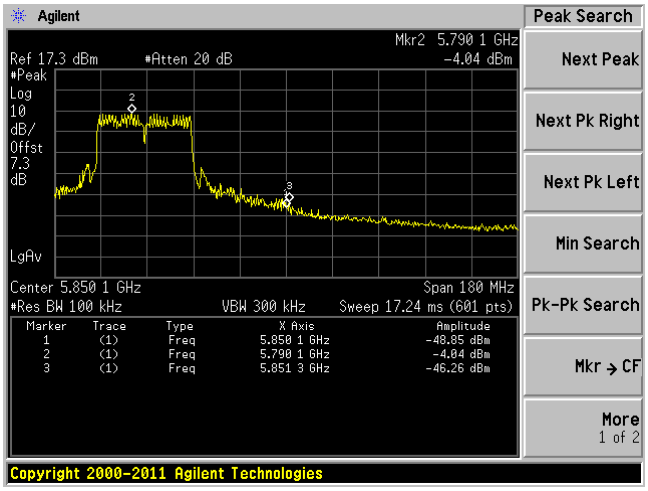
802.11n HT40, Chain 0 Low Band Edge



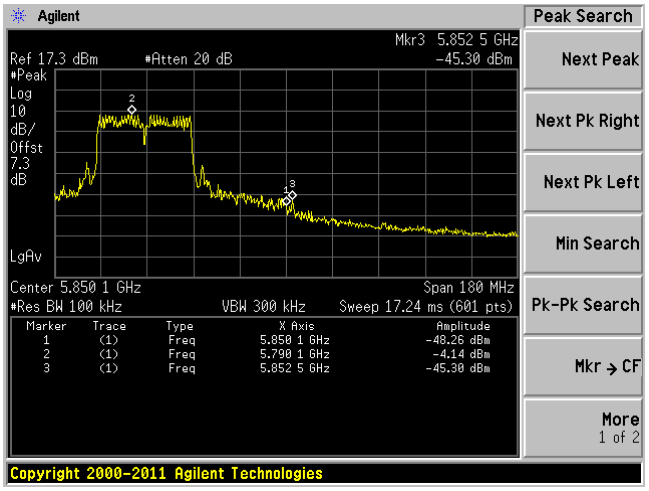

802.11n HT40, Chain 1 Low Band Edge




802.11n HT40, Chain 0 High Band Edge




802.11n HT40, Chain 1 High Band Edge



# 11 FCC §15.247(e) & IC RSS-210 §A8.2 (b) – Power Spectral Density

## 11.1 Applicable Standards

According to FCC §15.247(e) and RSS-210 §A8.2 ( b) , for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

## 11.2 Measurement Procedure

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

## 11.3 Test Equipment List and Details

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

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

## 11.4 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 22-24 °C |
| **Relative Humidity:** | 42-45 % |
| **ATM Pressure:** | 101-102kPa |

*The testing was performed by Bo Li from 2013-05-06 to 2013-05-09 at RF site.*

## 11.5 Test Results

**2.4 GHz Band:**

802.11b mode

| Channel | Frequency (MHz) | TX Chain 0 PSD (dBm) | TX Chain 1 PSD (dBm) | MAX PSD (dBm) | Limit (dBm) | Margin Chain 0 (dB) |
|---|---|---|---|---|---|---|
| Low | 2412 | -9.65 | -8.2 | -8.2 | 8 | -16.2 |
| Middle | 2437 | -9.04 | -8.33 | -8.33 | 8 | -16.33 |
| High | 2462 | -8.09 | -8.14 | -8.09 | 8 | -16.09 |

802.11 g mode

| Channel | Frequency (MHz) | TX Chain 0 PSD (dBm) | TX Chain 1 PSD (dBm) | MAX PSD (dBm) | Limit (dBm) | Margin Chain 0 (dB) |
|---|---|---|---|---|---|---|
| Low | 2412 | -12.55 | -12.43 | -12.43 | 8 | -20.43 |
| Middle | 2437 | -11.97 | -11.12 | -11.12 | 8 | -19.12 |
| High | 2462 | -12.91 | -12.97 | -12.91 | 8 | -20.91 |

802.11n HT20 mode

| Channel | Frequency (MHz) | TX Chain 0 PSD (dBm) | TX Chain 1 PSD (dBm) | Total PSD (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 2412 | -13.50 | -12.71 | -10.08 | 8 | -18.08 |
| Middle | 2437 | -12.74 | -12.90 | -9.81 | 8 | -17.81 |
| High | 2462 | -13.31 | -12.72 | -9.99 | 8 | -17.99 |

802.11n HT40 mode

| Channel | Frequency (MHz) | TX Chain 0 PSD (dBm) | TX Chain 1 PSD (dBm) | Total PSD (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 2422 | -19.53 | -17.29 | -15.26 | 8 | -23.26 |
| Middle | 2437 | -18.78 | -17.64 | -15.16 | 8 | -23.16 |
| High | 2452 | -18.39 | -16.55 | -14.36 | 8 | -22.36 |

**5.8 GHz Band:**

802.11a mode

| Channel | Frequency (MHz) | TX Chain 0 PSD (dBm) | TX Chain 1 PSD (dBm) | MAX PSD (dBm) | Limit (dBm) | Margin Chain 0 (dB) |
|---|---|---|---|---|---|---|
| Low | 5745 | -14.56 | -14.66 | -14.56 | 8 | -22.56 |
| Middle | 5785 | -14.15 | -14.66 | -14.15 | 8 | -22.15 |
| High | 5825 | -17.08 | -16.23 | -16.23 | 8 | -24.23 |

802.11n HT20 mode

| Channel | Frequency (MHz) | TX Chain 0 PSD (dBm) | TX Chain 1 PSD (dBm) | Total PSD (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5745 | -15.02 | -13.18 | -10.99 | 8 | -18.99 |
| Middle | 5785 | -15.52 | -13.90 | -11.62 | 8 | -19.62 |
| High | 5825 | -15.18 | -15.27 | -12.21 | 8 | -20.21 |

802.11n HT40 mode

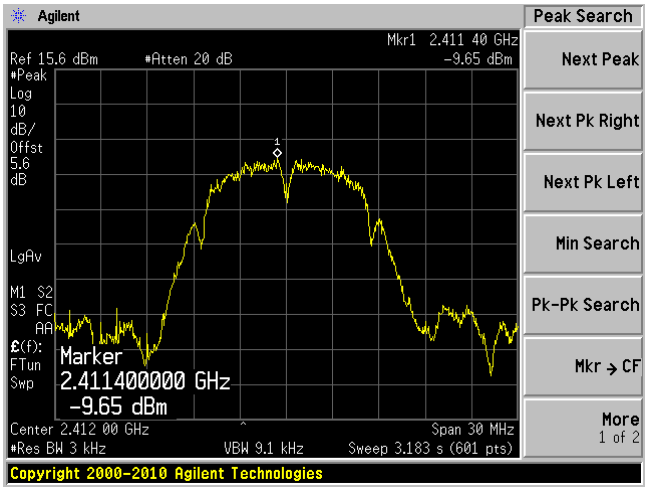
| Channel | Frequency (MHz) | TX Chain 0 PSD (dBm) | TX Chain 1 PSD (dBm) | Total PSD (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|
| Low | 5755 | -17.68 | -14.85 | -10.99 | 8 | -18.99 |
| High | 5795 | -17.29 | -15.92 | -13.03 | 8 | -21.03 |

Please refer to the following plots for detailed test results:

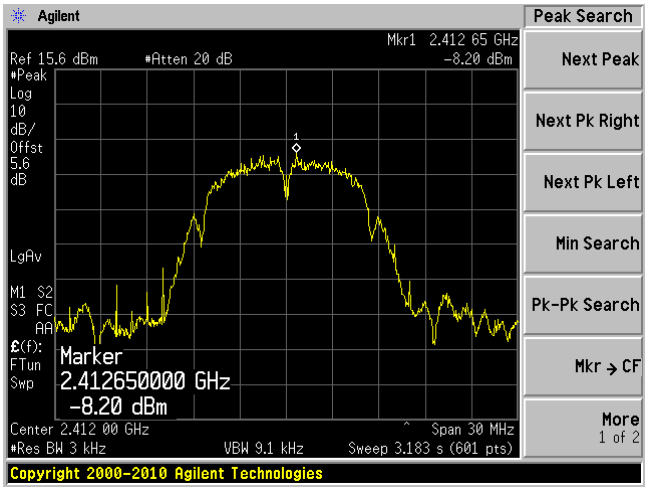
## 2.4 GHz Band

### 802.11b mode

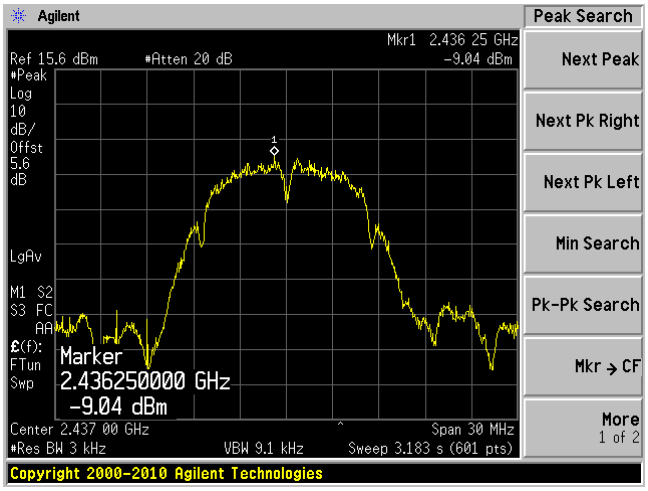
Low channel 0: 2412 MHz



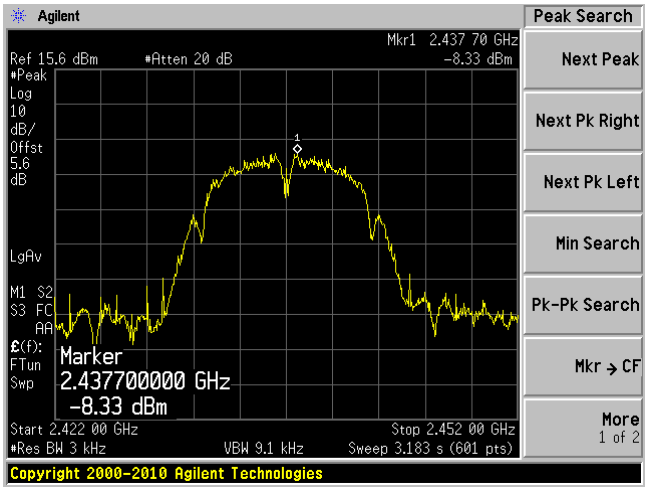

Low channel 1: 2412 MHz



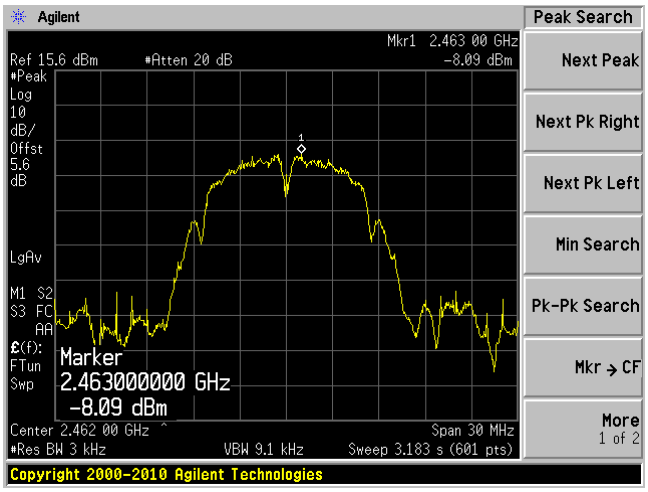

Middle channel 0: 2437 MHz



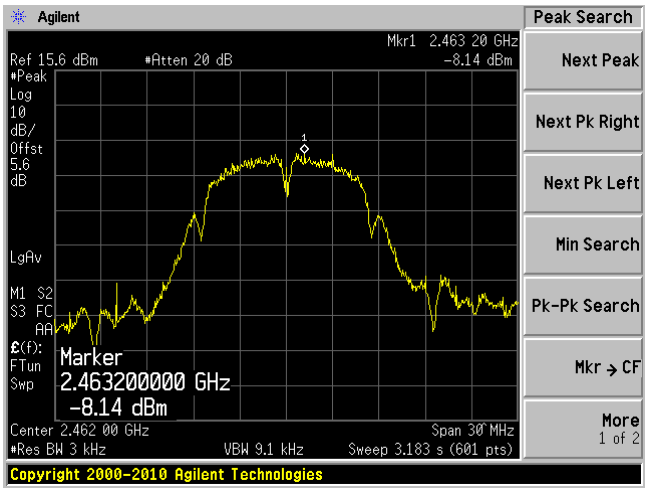

Middle channel 1: 2437 MHz



High channel 0: 2462 MHz

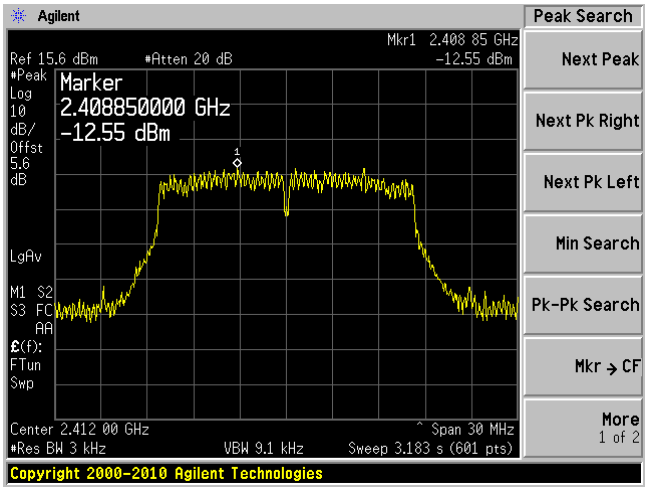



High channel 1: 2462 MHz

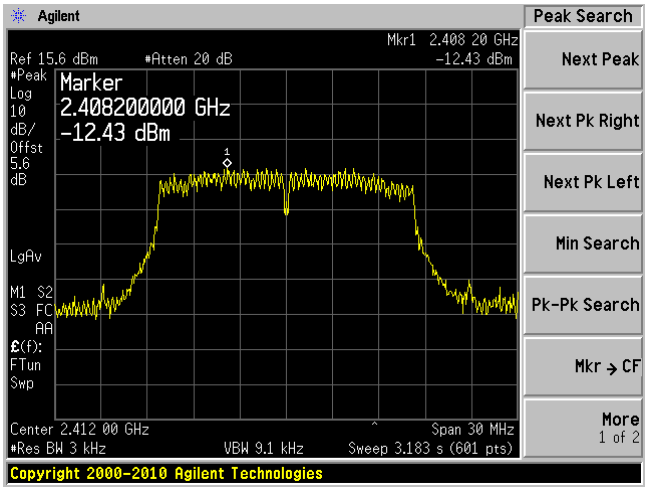



**802.11g mode**

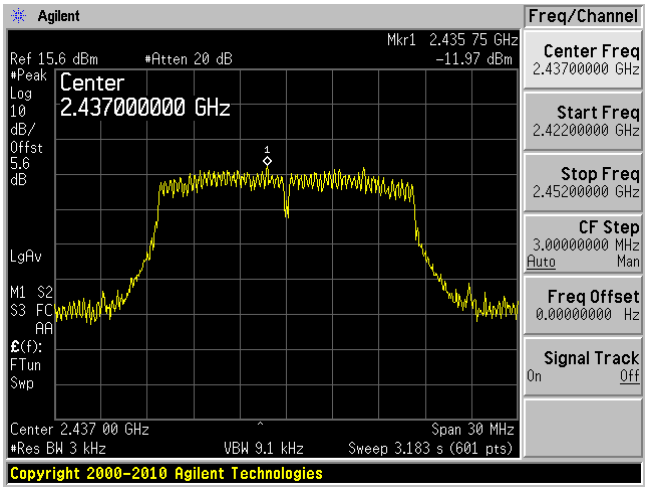
Low channel 0: 2412 MHz



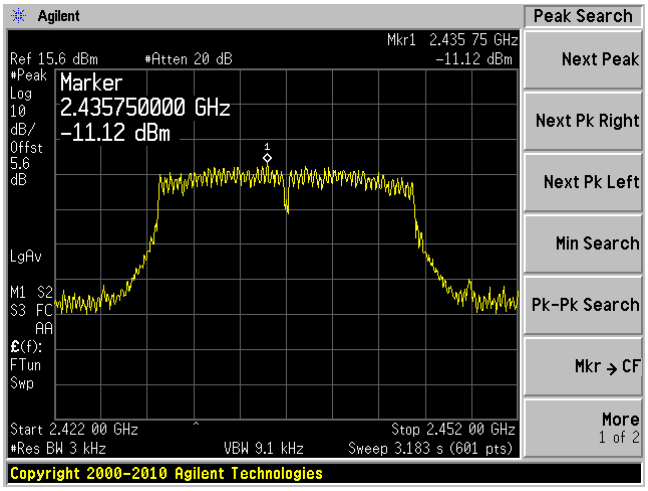

Low channel 1: 2412 MHz



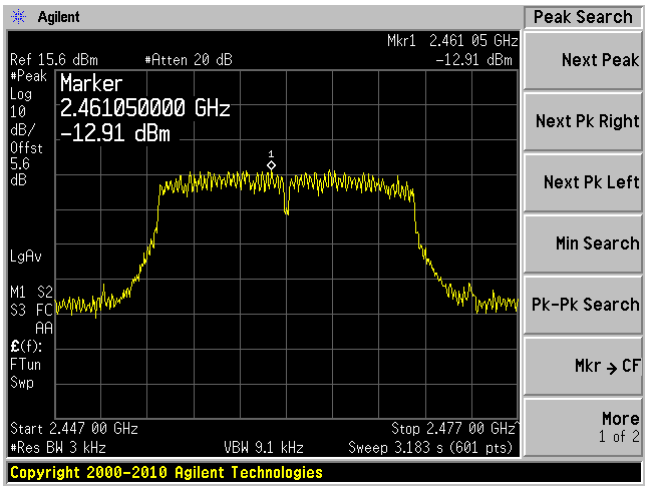
Middle channel 0: 2437 MHz



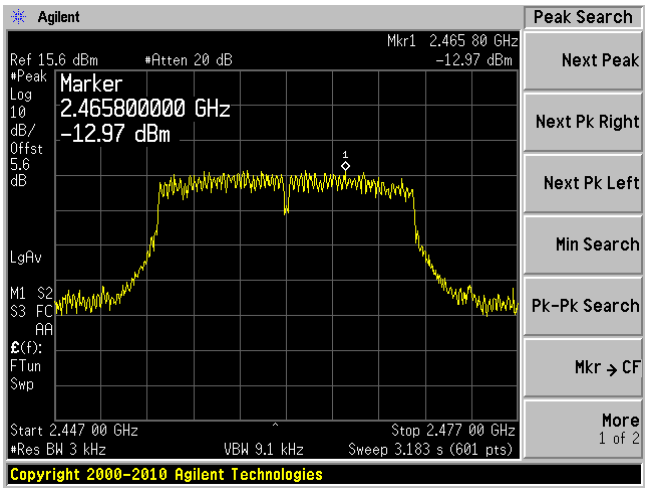

Middle channel 1: 2437 MHz




High channel 0: 2462 MHz

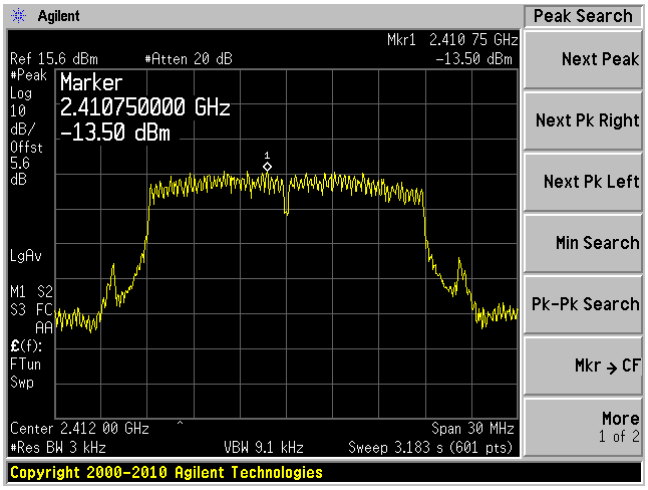



High channel 1: 2462 MHz

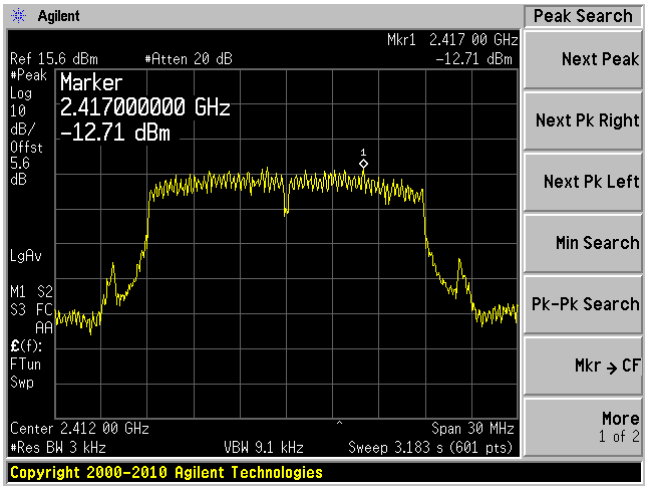


**802.11n HT20 mode**

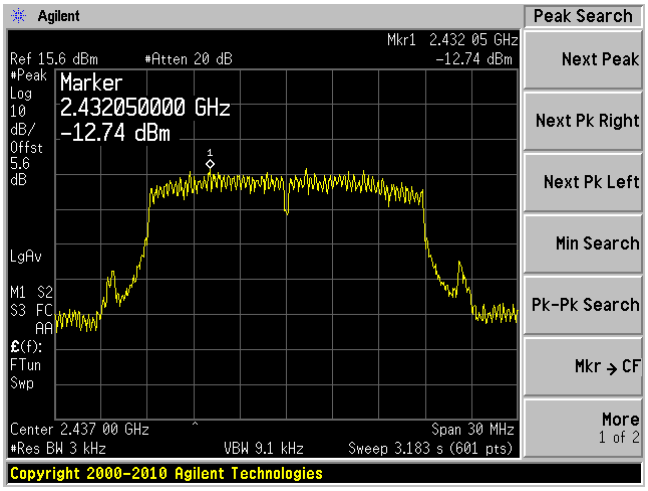
Low channel 0: 2412 MHz



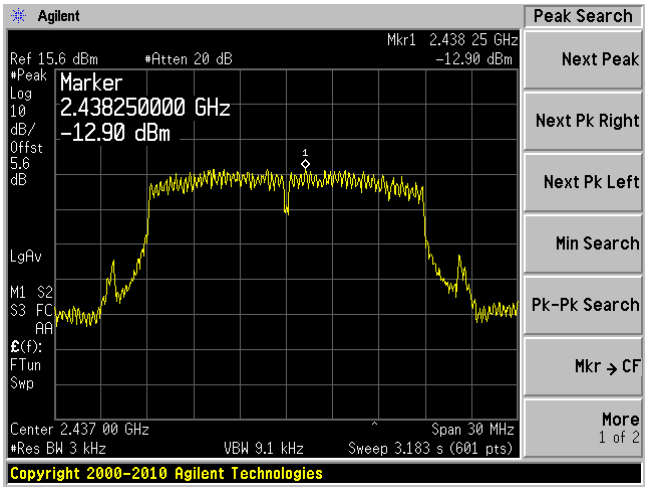

Low channel 1: 2412 MHz



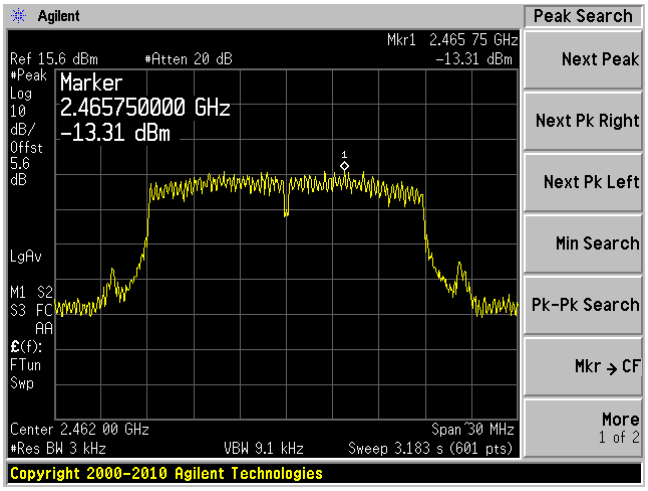

Middle channel 0: 2437 MHz



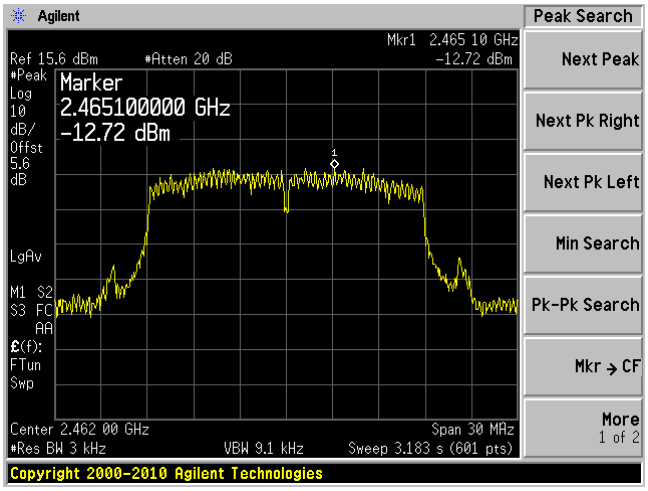

Middle channel 1: 2437 MHz



High channel 0: 2462 MHz

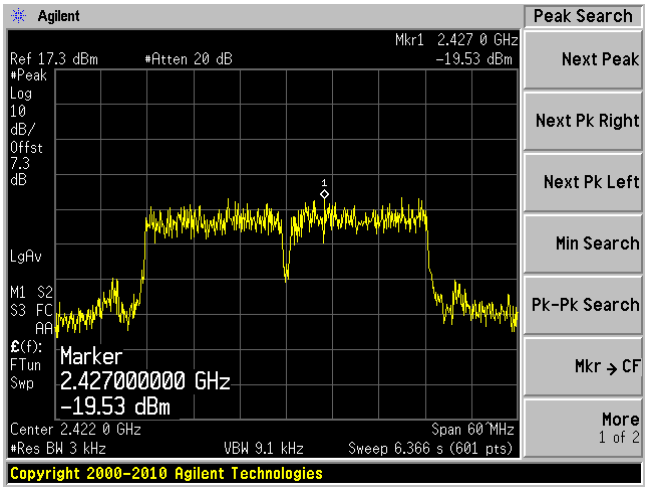



High channel 1: 2462 MHz

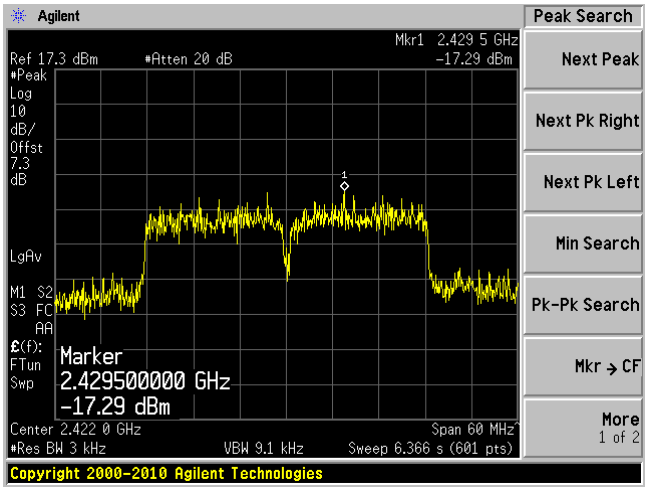



**802.11n HT40 mode**

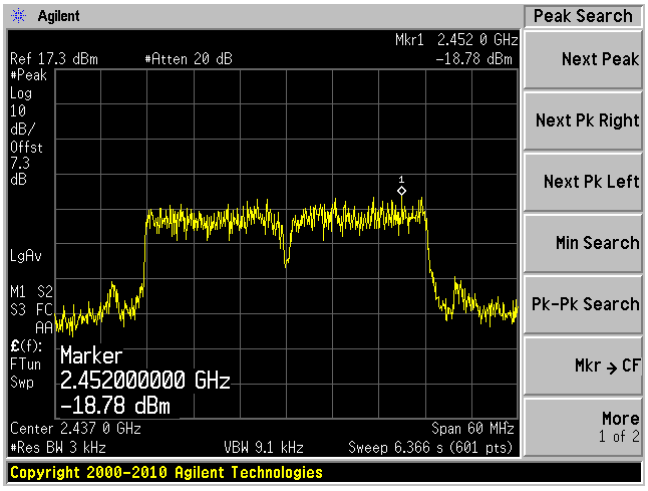
Low channel 0: 2422 MHz



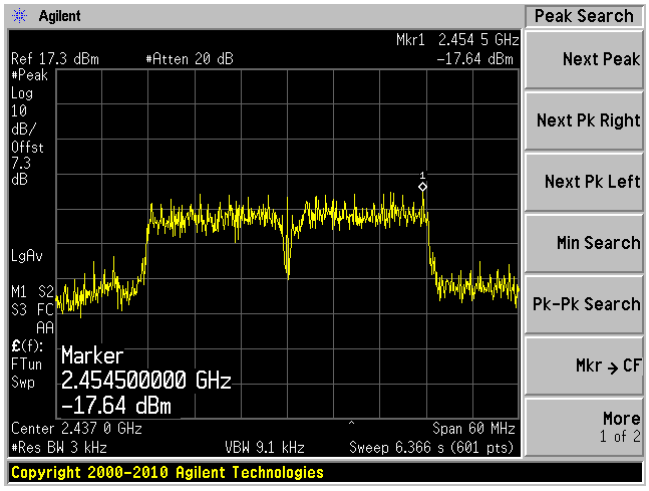

Low channel 1: 2422 MHz



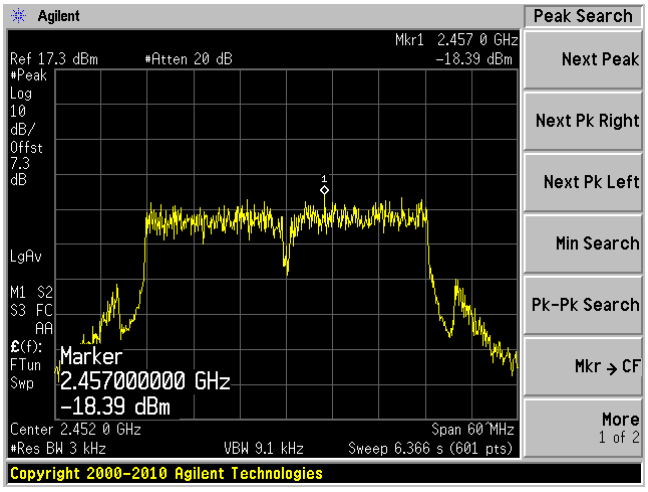
Middle channel 0: 2437 MHz



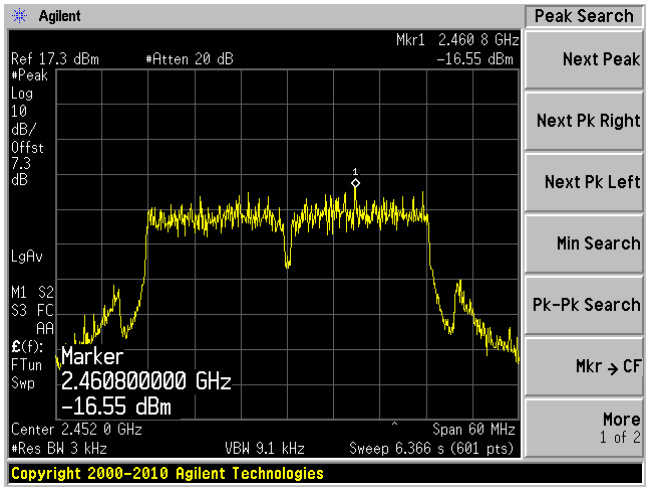

Middle channel 1: 2437 MHz




High channel 0: 2452 MHz



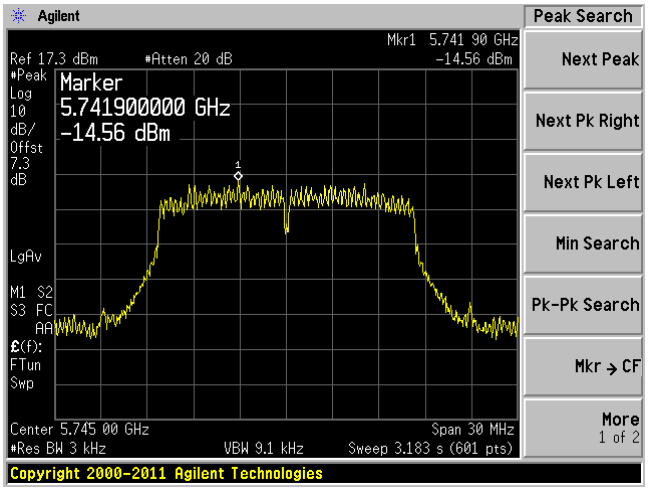

High channel 1: 2452 MHz



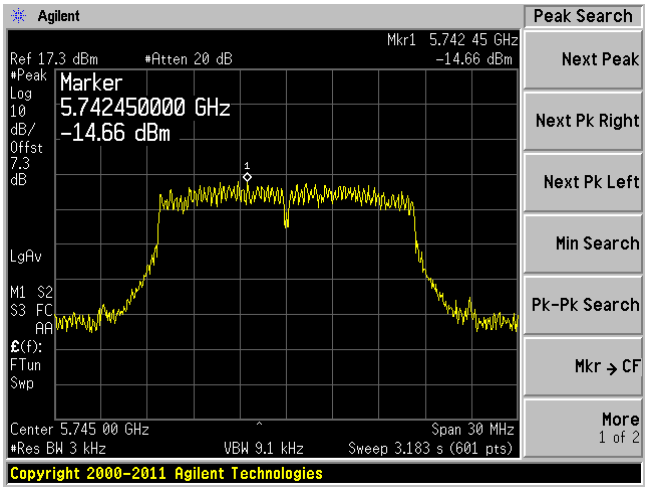
## 5.8 GHz Band

### 802.11a mode

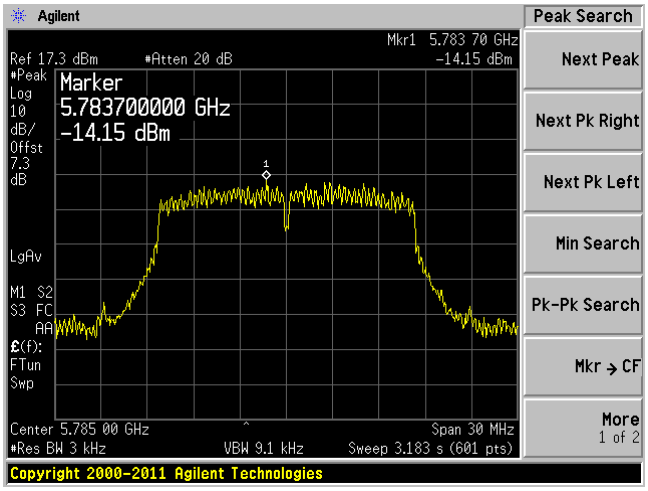
Low channel 0: 5745 MHz



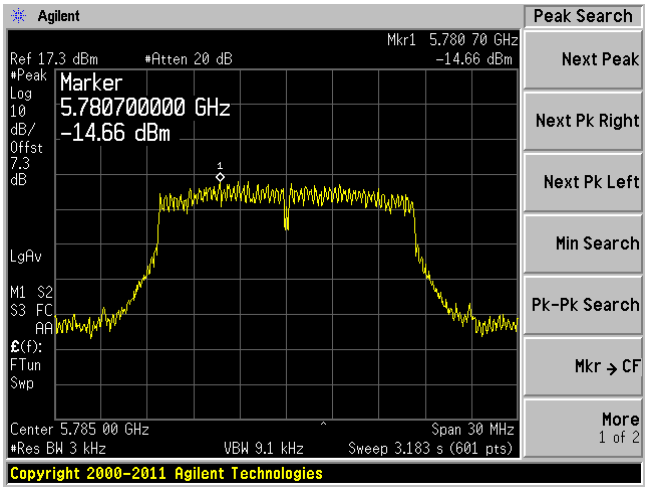

Low channel 1: 5745 MHz



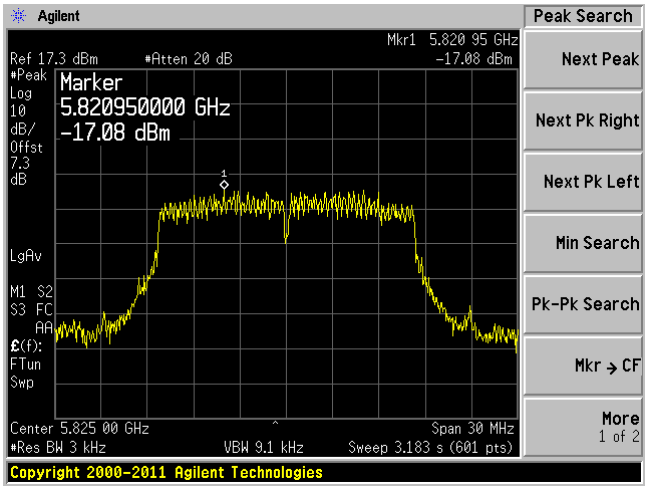

Middle channel 0: 5785 MHz



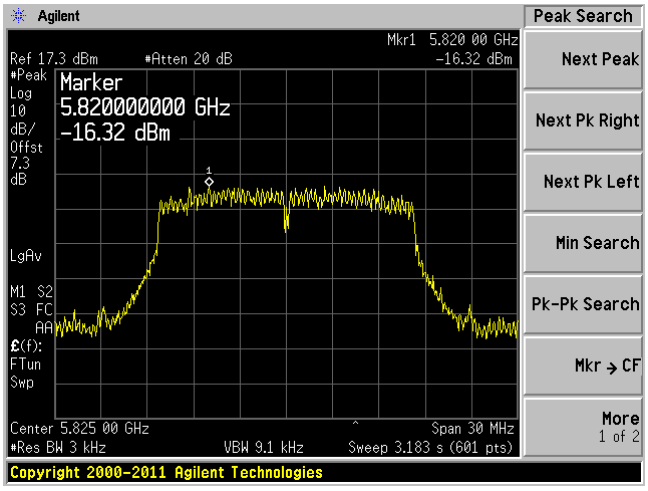

Middle channel 1: 5785 MHz



High channel 0: 5825 MHz

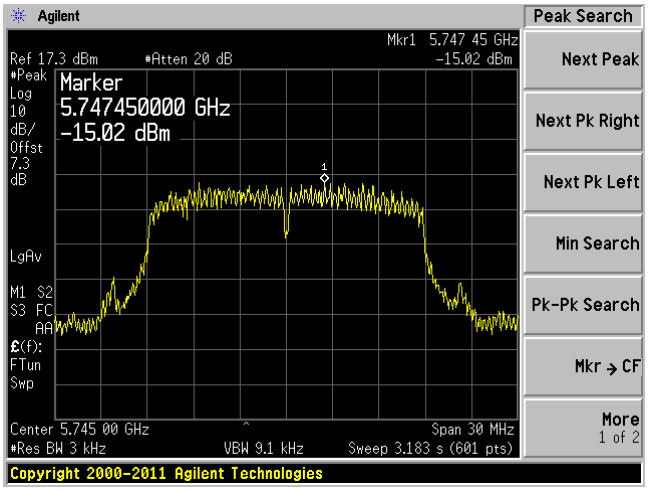



High channel 1: 5825 MHz

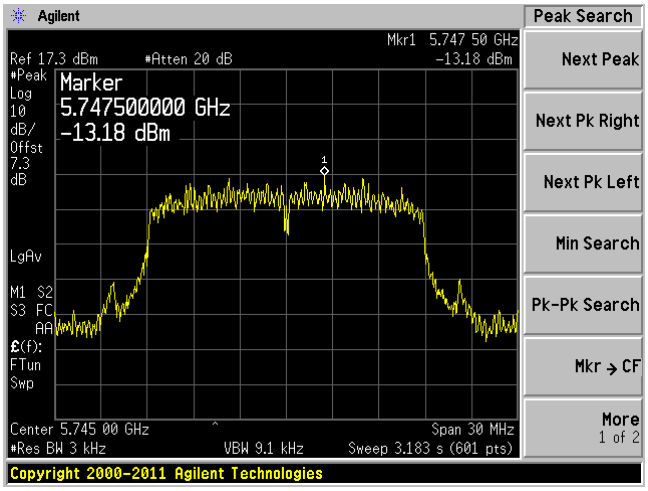



**802.11n HT20 mode**

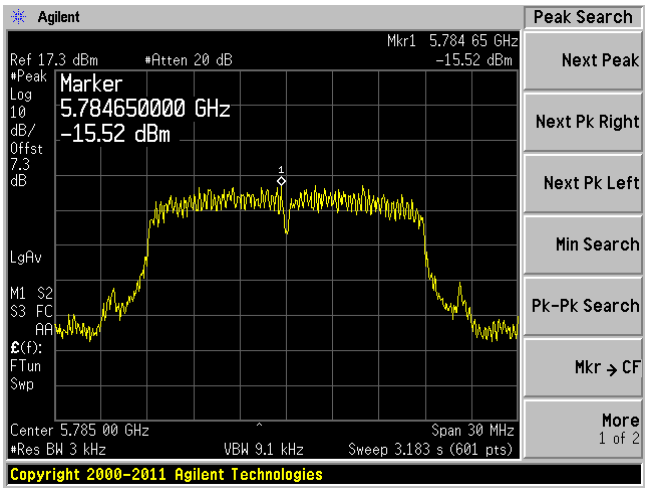
Low channel 0: 5745 MHz



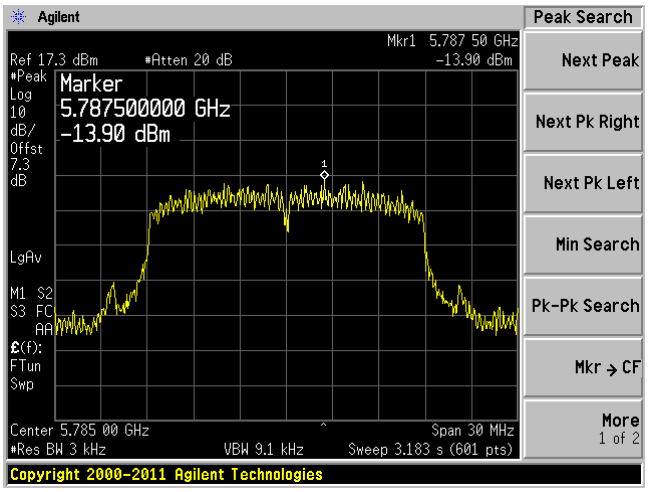

Low channel 1: 5745 MHz



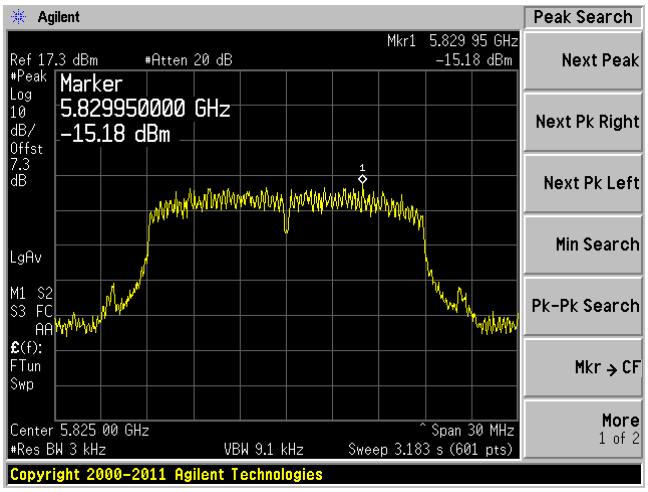
Middle channel 0: 5785 MHz



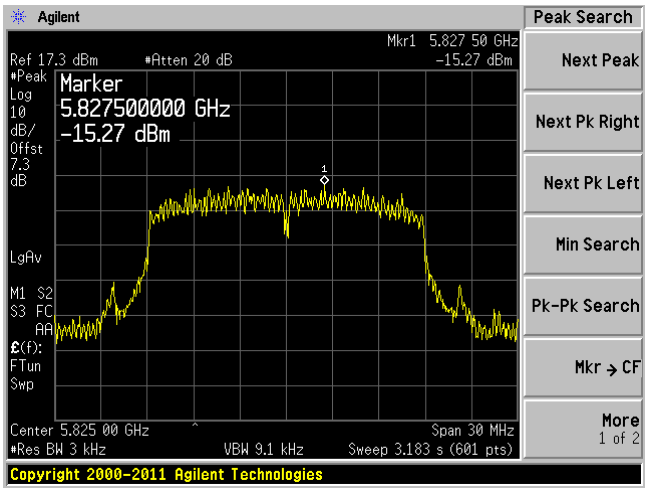

Middle channel 1: 5785 MHz




High channel 0: 5825 MHz

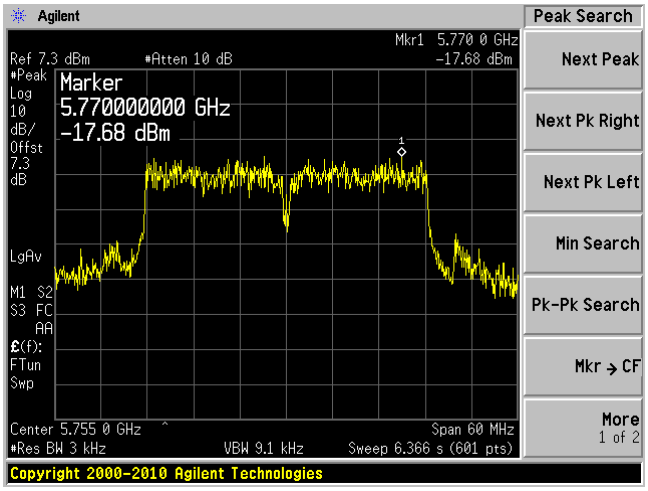



High channel 1: 5825 MHz

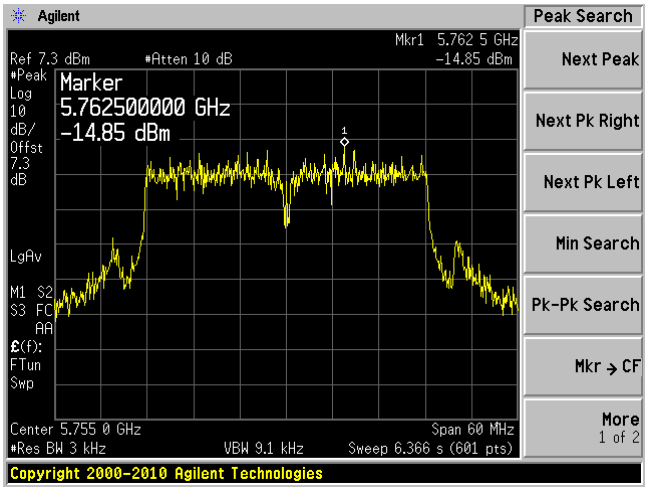


**802.11n HT40 mode**

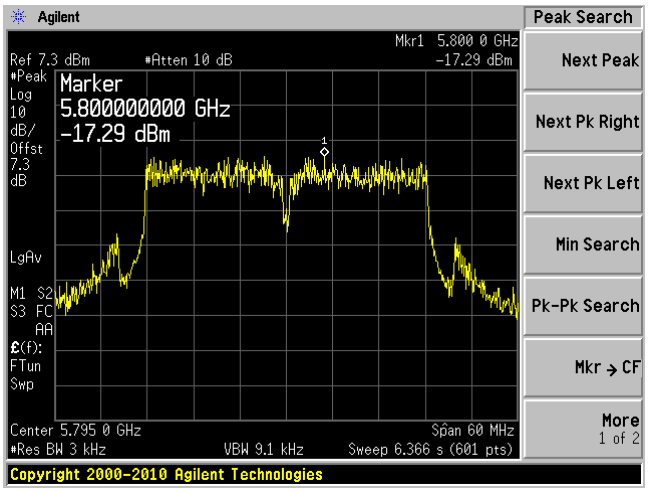
Low channel 0: 5755 MHz



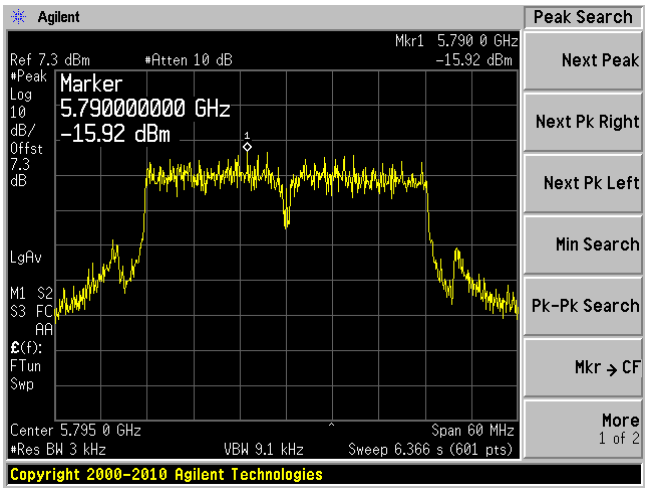

Low channel 1: 5755 MHz




High channel 0: 5795 MHz




High channel 1: 5795 MHz



# 12 IC RSS-210 §2.3 & RSS-Gen §6.1 – Receiver Spurious Radiated Emissions

## 12.1 Applicable Standards

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 |
|---|---|
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above 960 | 500 |

## 12.2 EUT Setup

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

## 12.3 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.

## 12.4 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:

Margin = Corrected Amplitude - Limit

## 12.5 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 | A020106-3 | 2012-06-18 | 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 | E4446A | US44300386 | 2012-09-29 | 1 year |
| EMCO | Horn Antenna | 3315 | 9511-4627 | 2012-10-17 | 1 year |
| Rohde & Schwarz | EMI Test Receiver | ESCI 1166.5950K03 | 100337 | 2013-03-28 | 1 year |

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

## 12.6 Test Environmental Conditions

| | |
|---|---|
| **Temperature:** | 21-25 °C |
| **Relative Humidity:** | 43-46 % |
| **ATM Pressure:** | 101-103 kPa |

*The testing was performed by Bo Li from 2013-5-6 to 2013-5-9 at 5 meter 3.*

## 12.7 Summary of Test Results

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

2.4 GHz

| Mode: Receiving | | | |
|---|---|---|---|
| **Margin (dB)** | **Frequency (MHz)** | **Polarization (Horizontal/Vertical)** | **Range (MHz)** |
| -7.3 | 39.95 | Vertical | 30-25000 |

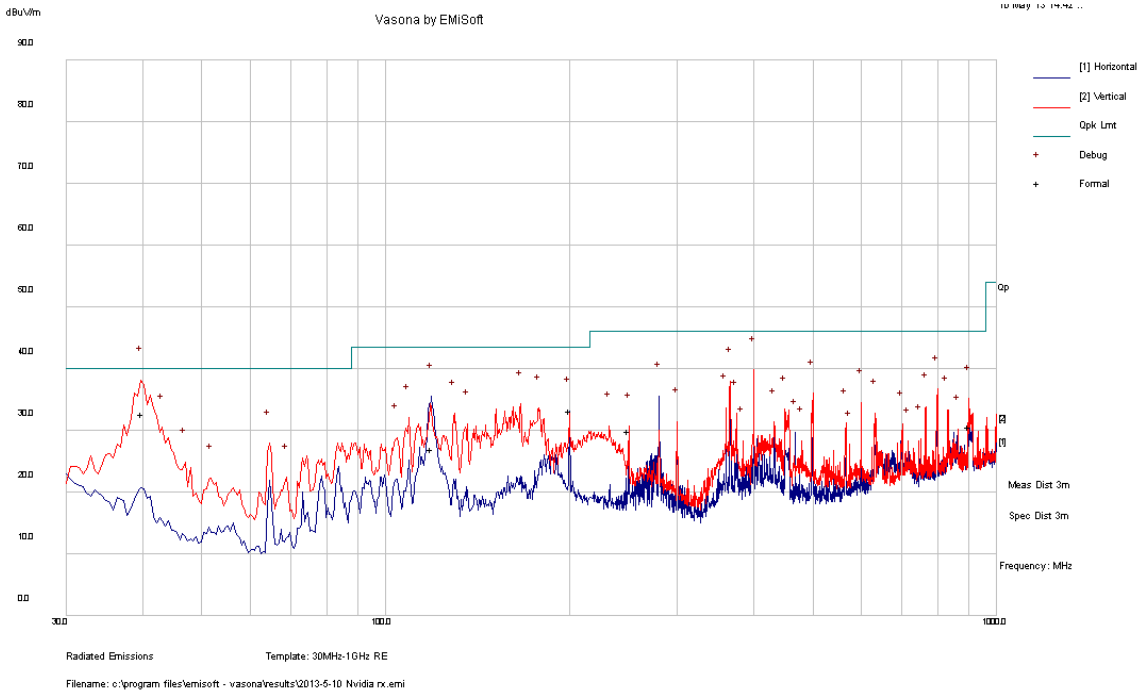
5.8 GHz

| Mode: Receiving | | | |
|---|---|---|---|
| **Margin (dB)** | **Frequency (MHz)** | **Polarization (Horizontal/Vertical)** | **Range (MHz)** |
| -5.25 | 41.22325 | Vertical | 30-40000 |

## 12.8 Test Results and Plots

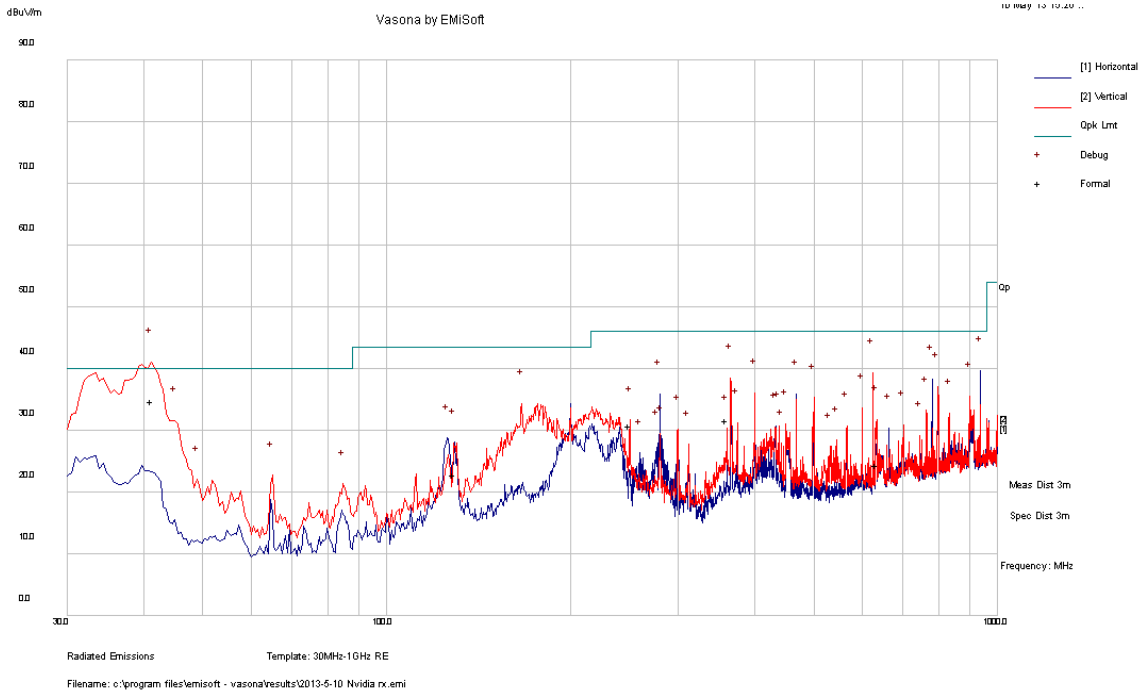
### 1) 30-1000 MHz, Measured at 3 meters

**2.4 GHz**




| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|---|---|
| 39.95 | 32.7 | 98 | V | 67 | 40 | -7.3 | QP |
| 118.979 | 26.98 | 343 | H | 244 | 43.5 | -16.52 | QP |
| 199.9985 | 33.14 | 136 | H | 259 | 43.5 | -10.36 | QP |
| 900.325 | 30.58 | 98 | V | 265 | 46 | -15.42 | QP |
| 250.00625 | 29.85 | 104 | V | 180 | 46 | -16.15 | QP |

## 5 GHz




| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Detector (QP/Ave.) |
|---|---|---|---|---|---|---|---|
| 41.22325 | 34.75 | 123 | V | 224 | 40 | -5.25 | QP |
| 633.10975 | 24.48 | 155 | V | 256 | 46 | -21.52 | QP |
| 249.982 | 30.71 | 98 | V | 142 | 46 | -15.29 | QP |
| 128.857 | 22.91 | 220 | H | 100 | 43.5 | -20.59 | QP |
| 360.08925 | 31.63 | 98 | V | 171 | 46 | -14.37 | QP |

**2) Above 1 GHz Measured at 3 meters**

**2.4 GHz**

| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|
| 1331.5 | 55.954 | 100 | V | 100 | 74 | -18.046 | Peak |
| 1331.5 | 50.344 | 100 | H | 298 | 74 | -23.656 | Peak |
| 1331.5 | 29.344 | 100 | V | 100 | 54 | -24.656 | Ave |
| 1331.5 | 25.894 | 100 | H | 298 | 54 | -28.106 | Ave |
| 15563 | 52.602 | 100 | V | 0 | 74 | -21.398 | Peak |
| 15563 | 52.722 | 100 | H | 0 | 74 | -21.278 | Peak |
| 15563 | 38.422 | 100 | V | 0 | 54 | -15.578 | Ave |
| 15563 | 38.452 | 100 | H | 0 | 54 | -15.548 | Ave |
| 1994.17 | 49.376 | 100 | V | 257 | 74 | -24.624 | Peak |
| 1994.17 | 45.556 | 100 | H | 267 | 74 | -28.444 | Peak |
| 1994.17 | 26.886 | 100 | V | 257 | 54 | -27.114 | Ave |
| 1994.17 | 25.646 | 100 | H | 267 | 54 | -28.354 | Ave |

**5 GHz**

| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|
| 1553.83 | 43.857 | 100 | V | 211 | 74 | -30.143 | Peak |
| 1553.83 | 44.347 | 100 | H | 145 | 74 | -29.653 | Peak |
| 1553.83 | 26.917 | 100 | V | 211 | 54 | -27.083 | Ave |
| 1553.83 | 26.337 | 100 | H | 145 | 54 | -27.663 | Ave |
| 1997.98 | 53.066 | 100 | V | 56 | 74 | -20.934 | Peak |
| 1997.98 | 47.956 | 100 | H | 204 | 74 | -26.044 | Peak |
| 1997.98 | 25.816 | 100 | V | 56 | 54 | -28.184 | Ave |
| 1997.98 | 24.296 | 100 | H | 204 | 54 | -29.704 | Ave |
| 15929.5 | 53.342 | 100 | V | 0 | 74 | -20.658 | Peak |
| 15929.5 | 54.032 | 100 | H | 0 | 74 | -19.968 | Peak |
| 15929.5 | 38.732 | 100 | V | 0 | 54 | -15.268 | Ave |
| 15929.5 | 38.682 | 100 | H | 0 | 54 | -15.318 | Ave |