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

For

PayPal

2211 North First Street,

San Jose, CA 95131, USA

FCC ID: 2AB8CDCBNEE01
IC: 11927A-DCBNEE01
Model: DCBNEE01

Report Type:	**Product Type:**
Original Report	802.11a/b/g/n USB sticker

Prepared By	Chen Ge
Report Number	R1404102-407 W52
Report Date	2014-06-30
Reviewed By	Suhaila Khushzad Engineering Manager
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1404102-407 W52	Original Report	2014-06-30

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *PayPal* and their product FCC ID: 2AB8CDCBNEE01, IC: 11927A-DCBNEE01, model: DCBNEE01 which will henceforth be referred to as the EUT (Equipment Under Testing). The EUT is a USB sticker with 2.4GHz & 5GHz 802.11 a/b/g/n and Bluetooth.

1.2 Mechanical Description of EUT

The EUT measures approximately 9.8 cm (L) x 2.2 cm (W) x 1.0 cm (H) and weighs 18.5 g.

The test data gathered are from typical production sample, serial number: P6H2CK assigned by Client.

1.3 Objective

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

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

1.4 Related Submittal(s)/Grant(s)

FCC Part 15.247, RSS-210 Annex 8 of DTS with FCC ID: 2AB8CDCBNEE01, IC: 11927A-DCBNEE01.

1.5 Test Methodology

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

1.6 Measurement Uncertainty

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

Based on CISPR16-4-2: 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.

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

1.7 Test Facility

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

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

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

4- A Product Certification Body accredited to **ISO Guide 65: 1996** by **A2LA** to certify:
1- Unlicensed, Licensed radio frequency devices and Telephone Terminal Equipment for the FCC. Scope A1, A2, A3, A4, B1, B2, B3, B4 & C.
2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.
3. Radio Communication Equipment for Singapore.
4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.
5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).
6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s),Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

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

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2009, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

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

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

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

2 EUT Test Configuration

2.1 Justification

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

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

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

2.2 EUT Exercise Software

The test utility used was *Terminal* was provided by Whizz System Inc., and was verified by *Chen Ge* to comply with the standard requirements being tested against.

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	Serial Number
HP	Laptop	NX6110	CNU5130969

2.6 EUT Internal Configuration Details

N/A

3 Summary of Test Results

Results reported relate only to the product tested.

FCC & IC Rules	Description of Test	Result
FCC §15.407(f), §2.1093 IC RSS-102	RF Exposure	Compliant
FCC §15.203 IC RSS-Gen §7.1.2	Antenna Requirement	Compliant
FCC §15.207 IC RSS-Gen §7.2.4	AC Power Line Conducted Emissions	Compliant
FCC §15.209(a), 15.407(b) IC RSS-210 §A9.2	Spurious Radiated Emissions	Compliant
FCC §15.407(a) IC RSS-210 §A9.2	26 dB and 99% Emission Bandwidth	Compliant
FCC §407(a)(1) IC RSS-210 §A9.2	Peak Output Power Measurement	Compliant
FCC §2.1051, §15.407(b) IC RSS-210 §A9.2	Band Edges	Compliant
FCC §15.407(a)(1) IC RSS-210 §A9.2	Power Spectral Density	Compliant
FCC §15.407(a)(6)	Peak Excursion Ratio	Compliant
FCC §2.1051, §15.407(b) IC RSS-210 §A9.2	Spurious Emissions at Antenna Terminals	Compliant

4 FCC §15.407(f), §2.1093 & IC RSS-102 - RF Exposure

4.1 Applicable Standards

FCC §15.407(f) and §1.1307(b)(1).
IC RSS-102.

4.2 Test result

Compliant, please refer to SAR report.

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

5.1 Applicable Standards

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.

As per IC RSS-Gen §7.1.2: Transmitter Antenna
A transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.
When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

5.2 Antenna List

Antenna Type/Pattern	Antenna Gain (dBi) @ 5 GHz
Integrated	4.2

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

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

6.1 Applicable Standards

As per FCC §15.207 and IC RSS-Gen §7.2.4 Conducted limits:

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 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 *	56 to 46 *
0.5-5	56	46
5-30	60	50

**Decreases with the logarithm of the frequency.*

6.2 Test Setup

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

6.3 Test Procedure

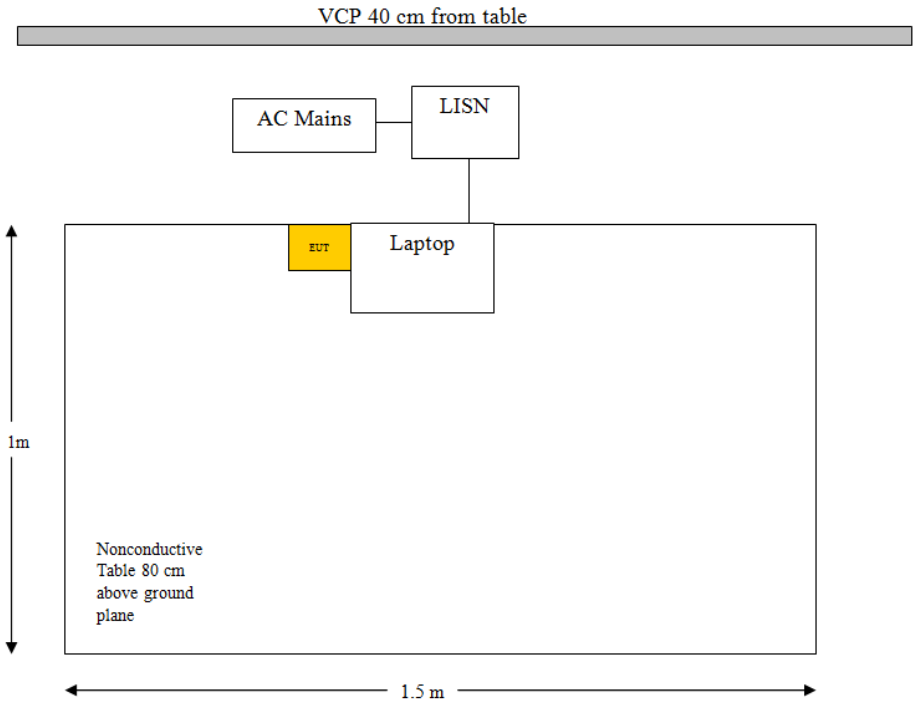
During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1 and the power cord of the support equipment was connected to LISN-2.

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

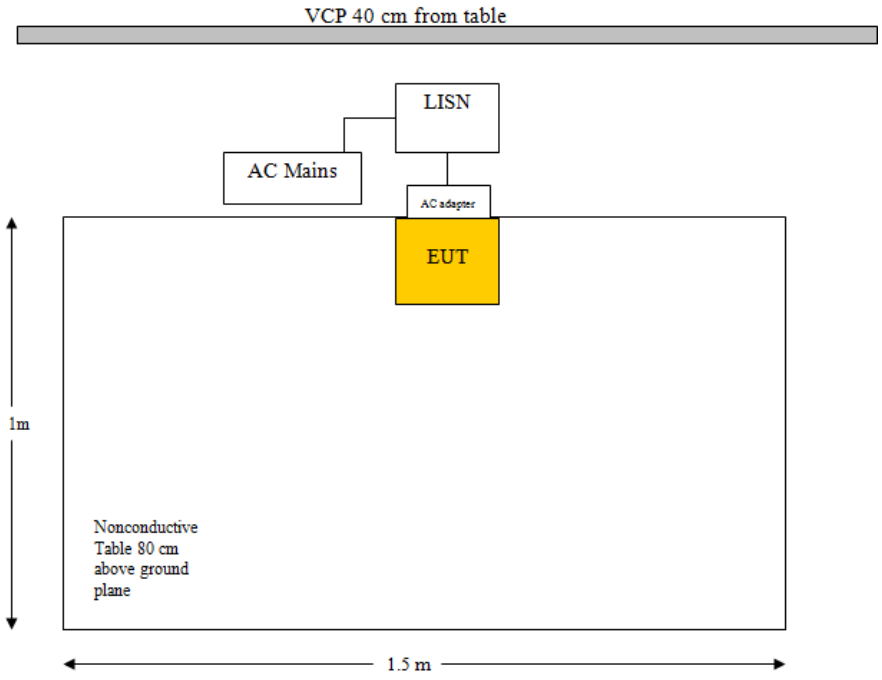
All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a “QP.” Average readings are distinguished with an “Ave”.

6.4 Test Setup Block Diagram

With Laptop:



With AC/DC power Adapter:



6.5 Corrected Amplitude & Margin Calculation

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

CA = Ai + CL + Atten

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

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

Margin = Corrected Amplitude – Limit

6.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2014-03-28	1 year
Solar Electronics	LISN	9252-50-R-24-N	511213	2013-06-25	1 year
TTE	Filter, High Pass	H9962-150K-50-21378	K7133	2013-05-30	1 year

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

6.7 Test Environmental Conditions

Temperature:	22 º C
Relative Humidity:	52 %
ATM Pressure:	101.89 kPa

The testing was performed by Chen Ge on 2014-05-13 in 5 m chamber 3.

6.8 Summary of Test Results

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

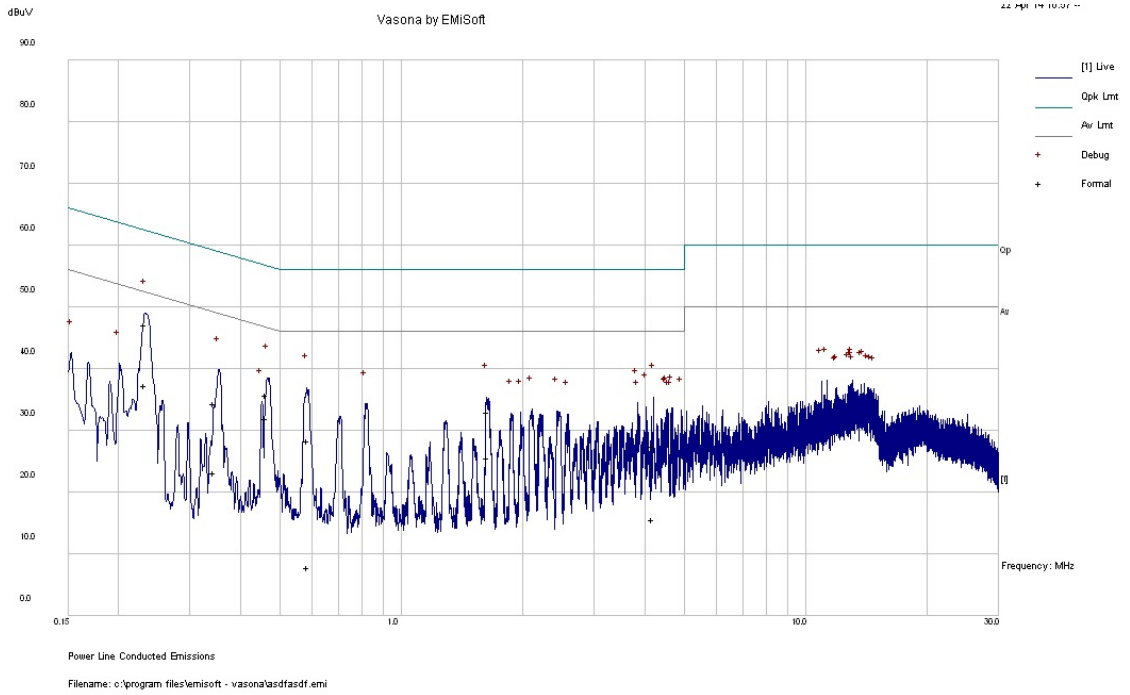
Connection: EUT connected to the laptop			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-13.93	0.465078	Line	0.15-30

Connection: EUT connected to the AC/DC power adapter			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-14.45	0.224199	Neutral	0.15-30

6.9 Conducted Emissions Test Plots and Data

With Laptop:

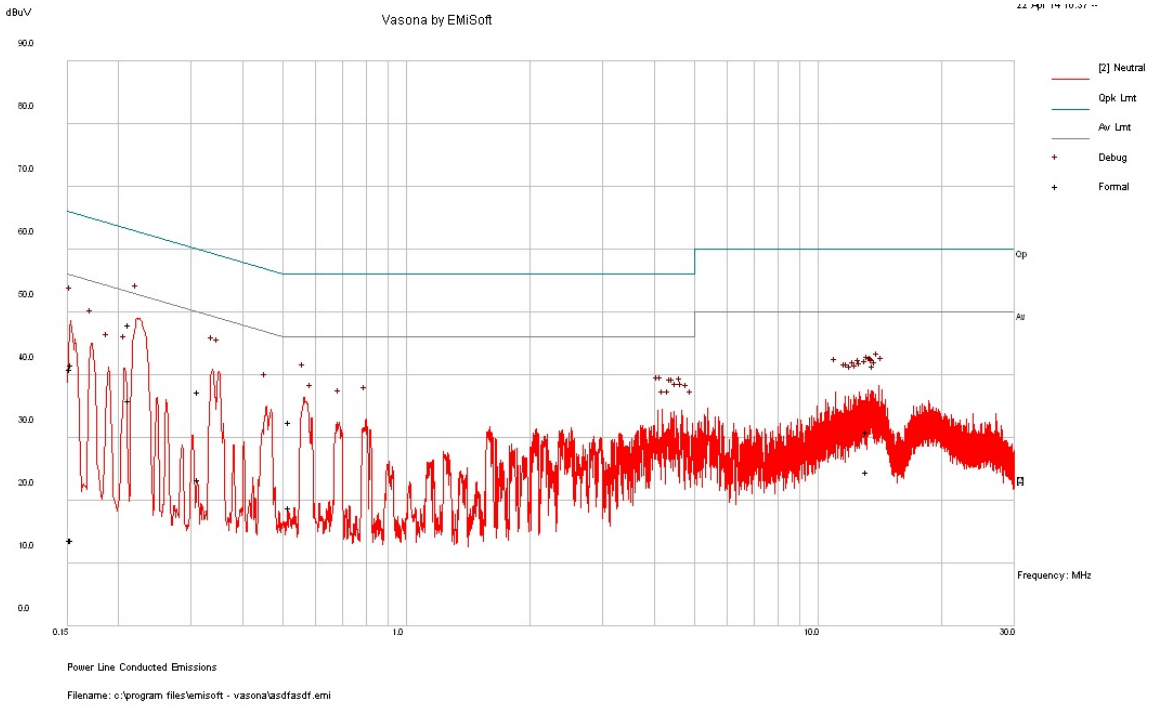
120 V, 60 Hz –Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.232212	48.07	Line	62.37	-14.30	QP
0.465078	36.49	Line	56.6	-20.11	QP
0.587862	28.93	Line	56	-27.07	QP
0.344214	35.07	Line	59.1	-24.03	QP
1.63953	33.64	Line	56	-22.36	QP
4.183547	28.10	Line	56	-27.90	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.232212	38.07	Line	52.37	-14.30	Ave.
0.465078	32.67	Line	46.6	-13.93	Ave.
0.587862	8.02	Line	46	-37.98	Ave.
0.344214	23.69	Line	49.1	-25.41	Ave.
1.63953	26.15	Line	46	-19.85	Ave.
4.183547	15.93	Line	46	-30.07	Ave.

120 V, 60 Hz – Neutral

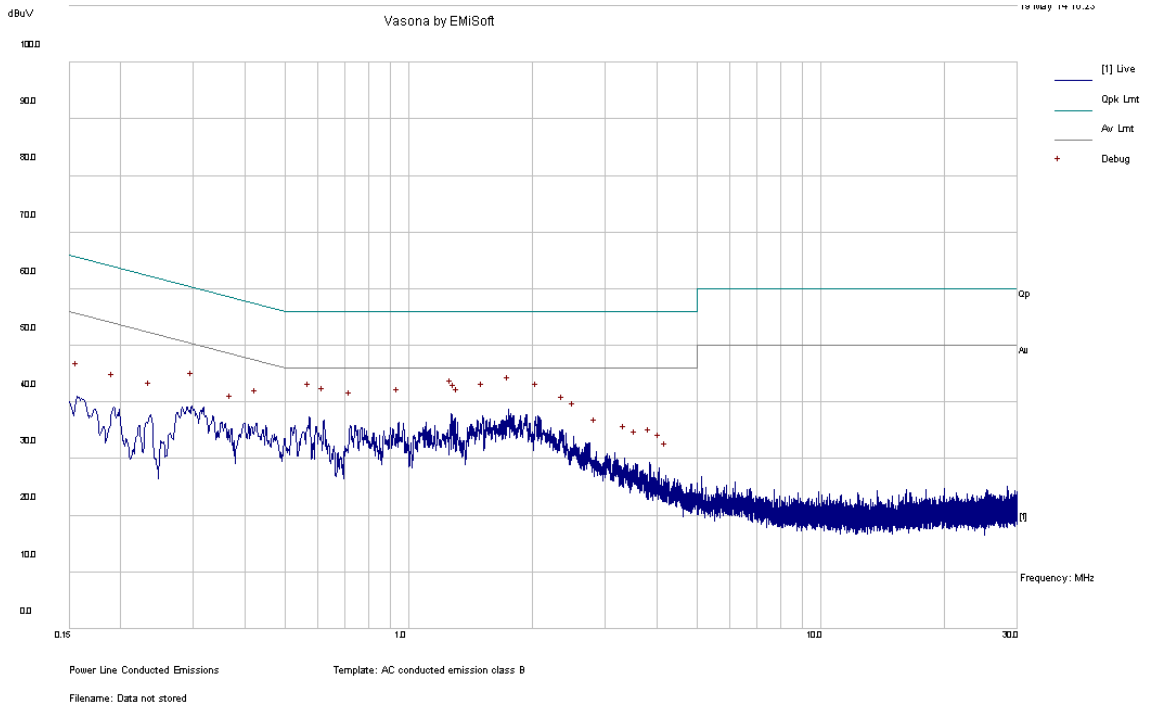


Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.224199	48.21	Neutral	62.66	-14.45	QP
0.154347	42.13	Neutral	65.76	-23.63	QP
0.349374	39.16	Neutral	58.98	-19.83	QP
0.343884	37.18	Neutral	59.11	-21.93	QP
0.576495	33.62	Neutral	56	-22.38	QP
0.155259	41.74	Neutral	65.71	-23.97	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.224199	35.34	Neutral	52.66	-17.32	Ave.
0.154347	17.13	Neutral	55.76	-38.63	Ave.
0.349374	31.17	Neutral	48.98	-17.81	Ave.
0.343884	25.24	Neutral	49.11	-23.87	Ave.
0.576495	25.10	Neutral	46	-20.90	Ave.
0.155259	16.38	Neutral	55.71	-39.33	Ave.

With AC power Adapter:

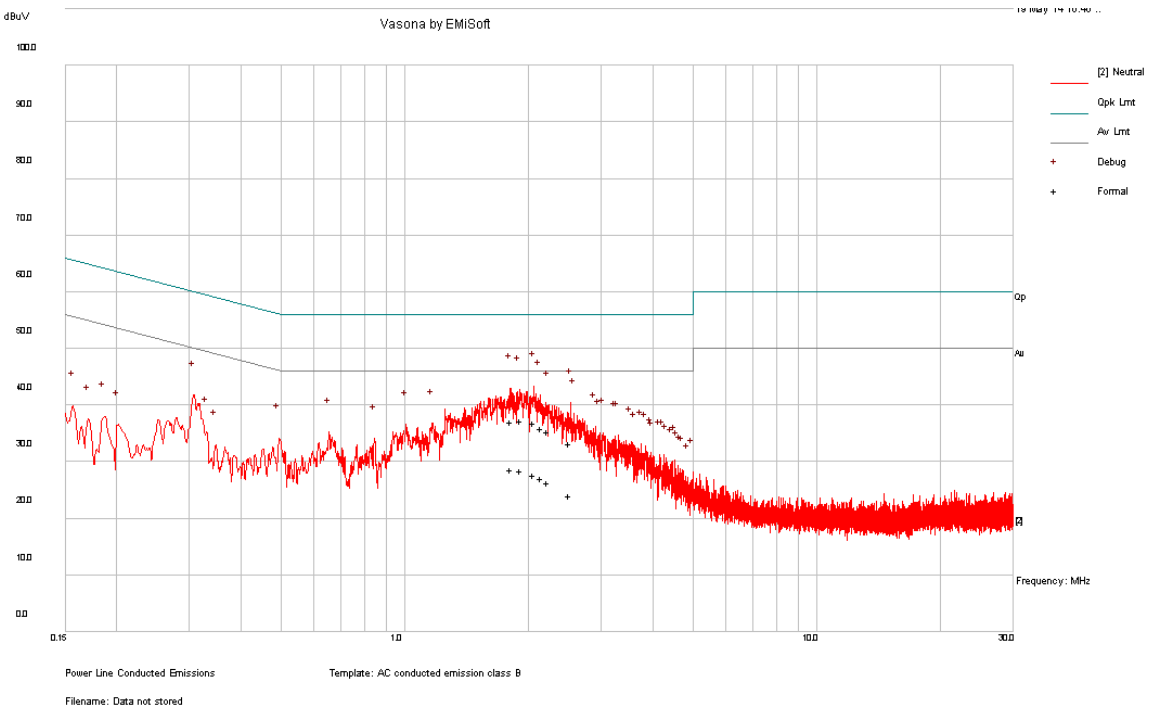
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
1.749798	32.93	Line	56	-23.07	QP
1.26501	31.21	Line	56	-24.79	QP
1.523685	31.52	Line	56	-24.48	QP
2.061245	31.56	Line	56	-24.44	QP
0.58026	30.74	Line	56	-25.26	QP
1.30653	30.82	Line	56	-25.18	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
1.749798	27.43	Line	46	-18.57	Ave.
1.26501	25.08	Line	46	-20.92	Ave.
1.523685	25.28	Line	46	-20.72	Ave.
2.061245	25.95	Line	46	-20.05	Ave.
0.58026	23.24	Line	46	-22.76	Ave.
1.30653	24.95	Line	46	-21.05	Ave.

120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
2.058805	36.84	Neutral	56	-19.16	QP
1.815873	37.12	Neutral	56	-18.88	QP
1.910256	37.22	Neutral	56	-18.78	QP
2.146455	35.98	Neutral	56	-20.02	QP
2.511908	33.33	Neutral	56	-22.67	QP
2.224262	35.33	Neutral	56	-20.67	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
2.058805	27.65	Neutral	46	-18.35	Ave.
1.815873	28.56	Neutral	46	-17.44	Ave.
1.910256	28.52	Neutral	46	-17.48	Ave.
2.146455	27.09	Neutral	46	-18.91	Ave.
2.511908	24.07	Neutral	46	-21.93	Ave.
2.224262	26.27	Neutral	46	-19.73	Ave.

7 FCC §15.209, §15.407(b) & IC RSS-210 §A9.2 - 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 IC RSS-210: Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

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

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

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

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	960 – 1240	4. 5 – 5. 15
0.495 – 0.505	16.69475 – 16.69525	1300 – 1427	5. 35 – 5. 46
2.1735 – 2.1905	25.5 – 25.67	1435 – 1626.5	7.25 – 7.75
4.125 – 4.128	37.5 – 38.25	1645.5 – 1646.5	8.025 – 8.5
4.17725 – 4.17775	73 – 74.6	1660 – 1710	9.0 – 9.2
4.20725 – 4.20775	74.8 – 75.2	1718.8 – 1722.2	9.3 – 9.5
6.215 – 6.218	108 – 121.94	2200 – 2300	10.6 – 12.7
6.26775 – 6.26825	123 – 138	2310 – 2390	13.25 – 13.4
6.31175 – 6.31225	149.9 – 150.05	2483.5 – 2500	14.47 – 14.5
8.291 – 8.294	156.52475 – 156.52525	2690 – 2900	15.35 – 16.2
8.362 – 8.366	156.7 – 156.9	3260 – 3267	17.7 – 21.4
8.37625 – 8.38675	162.0125 –167.17	3.332 – 3.339	22.01 – 23.12
8.41425 – 8.41475	167.72 – 173.2	3 3458 – 3 358	23.6 – 24.0
12.29 – 12.293	240 – 285	3.600 – 4.400	31.2 – 31.8
12.51975 – 12.52025	322 – 335.4		36.43 – 36.5
12.57675 – 12.57725	399.9 – 410		Above 38.6
13.36 – 13.41	608 – 614		

As per FCC §15.407(b)(1) and IC RSS-210, For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

7.2 Test Setup

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

The spacing between the peripherals was 10 centimeters.

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

7.3 Test Procedure

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

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

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

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

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

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

Above 1000 MHz:

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

7.4 Corrected Amplitude & Margin Calculation

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

CA = Ai + CL + Atten

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

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

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
Sunol Science Corp	Combination Antenna	JB3	A020106-3	2013-06-18	1 year
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2013-06-09	1 year
Agilent	Pre-amplifier	8449B	3008A01978	2014-02-04	1 year
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	1 year
EMCO	Horn Antenna	3315	9511-4627	2013-10-17	1 year
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2014-03-28	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:	22 ºC
Relative Humidity:	52 %
ATM Pressure:	101.9 kPa

The testing was performed by Chen Ge on 2014-05-14 in 5 m chamber 3.

7.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Part 15.209, 15.407 & IC RSS-210, RSS-Gen standard's radiated emissions limits, and had the worst margin of:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range**
-2.57	899.0253	Horizontal	Below 1 GHz
-1.59	5350	Horizontal	Above 1 GHz

7.8 Radiated Emissions Test Results

1) 30 MHz – 1 GHz, Measured at 3 meters, EUT antenna port was terminated

Quasi-Peak Measurements @ 3m, worst case

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
802.11a mode						
499.914	41.49	100	V	247	46	-4.51
899.0253	43.43	100	H	50	46	-2.57
566.521	42.75	100	V	66	46	-3.25
687.2785	41.77	100	V	285	46	-4.23
432.003	41.54	117	V	245	46	-4.46

2) 1–40 GHz, Measured at 3 meters, EUT antenna port was terminated

802.11a mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz, measured at 3 meters											
5180	65.19	152	100	V	34.256	4.55	0	103.996	-	-	Peak
5180	69.87	135	100	H	34.256	4.55	0	108.676	-	-	Peak
5180	56.32	152	100	V	34.256	4.55	0	95.126	-	-	Ave
5180	57.05	135	100	H	34.256	4.55	0	95.856	-	-	Ave
5150	27.5	0	100	V	33.097	4.42	0	65.017	74	-8.983	Peak
5150	27.65	0	100	H	32.585	4.35	0	64.585	74	-9.415	Peak
5150	12.07	0	100	V	33.097	4.42	0	49.587	54	-4.413	Ave
5150	12.36	0	100	H	32.585	4.35	0	49.295	54	-4.705	Ave
10360	46.5	0	100	V	38.329	7.02	34.93	56.919	74	-17.081	Peak
10360	46.98	0	100	H	38.329	7.02	34.93	57.399	74	-16.601	Peak
10360	32.4	0	100	V	38.329	7.02	34.93	42.819	54	-11.181	Ave
10360	32.37	0	100	H	38.329	7.02	34.93	42.789	54	-11.211	Ave
15540	35.06	0	100	V	38.432	8.38	34.34	47.532	74	-26.468	Peak
15540	33.67	0	100	H	38.432	8.38	34.34	46.142	74	-27.858	Peak
15540	19.54	0	100	V	38.432	8.38	34.34	32.012	54	-21.988	Ave
15540	19.58	0	100	H	38.432	8.38	34.34	32.052	54	-21.948	Ave
Middle Channel 5200 MHz, measured at 3 meters											
5200	65.37	143	100	V	34.256	4.55	0	104.176	-	-	Peak
5200	69.74	126	100	H	34.256	4.55	0	108.546	-	-	Peak
5200	56.44	143	100	V	34.256	4.55	0	95.246	-	-	Ave
5200	57.99	126	100	H	34.256	4.55	0	96.796	-	-	Ave
10400	45.57	0	100	V	38.329	6.99	34.93	55.959	74	-18.041	Peak
10400	46.69	0	100	H	38.329	6.99	34.93	57.079	74	-16.921	Peak
10400	31.09	0	100	V	38.329	6.99	34.93	41.479	54	-12.521	Ave
10400	31.11	0	100	H	38.329	6.99	34.93	41.499	54	-12.501	Ave
15600	32.55	0	100	V	38.325	8.4	34.34	44.935	74	-29.065	Peak
15600	32.75	0	100	H	38.325	8.4	34.34	45.135	74	-28.865	Peak
15600	19.01	0	100	V	38.325	8.4	34.34	31.395	54	-22.605	Ave
15600	18.95	0	100	H	38.325	8.4	34.34	31.335	54	-22.665	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 5240 MHz, measured at 3 meters											
5240	65.14	58	100	V	34.256	4.6	0	103.996	-	-	Peak
5240	69.81	144	118	H	34.256	4.6	0	108.666	-	-	Peak
5240	48.94	58	100	V	34.256	4.6	0	87.796	-	-	Ave
5240	53.95	144	118	H	34.256	4.6	0	92.806	-	-	Ave
5350	27.09	0	100	V	34.821	4.76	0	66.671	74	-7.329	Peak
5350	27.32	0	100	H	35	4.71	0	67.03	74	-6.97	Peak
5350	12.32	0	100	V	34.821	4.76	0	51.901	54	-2.099	Ave
5350	12.52	0	100	H	35	4.71	0	52.23	54	-1.77	Ave
10480	45.7	0	100	V	38.343	7	34.93	56.113	74	-17.887	Peak
10480	46.03	0	100	H	38.343	7	34.93	56.443	74	-17.557	Peak
10480	31.98	0	100	V	38.343	7	34.93	42.393	54	-11.607	Ave
10480	32.02	0	100	H	38.343	7	34.93	42.433	54	-11.567	Ave
15720	34.87	0	100	H	38.188	8.38	34.34	47.098	74	-26.902	Peak
15720	35.28	0	100	H	38.188	8.38	34.34	47.508	74	-26.492	Peak
15720	20.48	0	100	V	38.188	8.38	34.34	32.708	54	-21.292	Ave
15720	20.51	0	100	H	38.188	8.38	34.34	32.738	54	-21.262	Ave

802.11n-HT 20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5180 MHz, measured at 3 meters											
5180	65.47	136	100	V	34.256	4.55	0	104.276	-	-	Peak
5180	69.55	145	100	H	34.256	4.55	0	108.356	-	-	Peak
5180	48.36	136	100	V	34.256	4.55	0	87.166	-	-	Ave
5180	53.21	145	100	H	34.256	4.55	0	92.016	-	-	Ave
5150	27.14	0	100	V	34.256	4.56	0	65.956	74	-8.044	Peak
5150	27.36	0	100	H	32.547	4.36	0	64.267	74	-9.733	Peak
5150	11.33	0	100	V	34.256	4.56	0	50.146	54	-3.854	Ave
5150	12.24	0	100	H	32.547	4.36	0	49.147	54	-4.853	Ave
10360	45.79	0	100	V	38.329	7.02	34.93	56.209	74	-17.791	Peak
10360	46.13	0	100	H	38.329	7.02	34.93	56.549	74	-17.451	Peak
10360	32.19	0	100	V	38.329	7.02	34.93	42.609	54	-11.391	Ave
10360	32.27	0	100	H	38.329	7.02	34.93	42.689	54	-11.311	Ave
15540	40.52	0	100	V	38.432	8.38	34.34	52.992	74	-21.008	Peak
15540	41.82	0	100	H	38.432	8.38	34.34	54.292	74	-19.708	Peak
15540	26.71	0	100	V	38.432	8.38	34.34	39.182	54	-14.818	Ave
15540	26.66	0	100	H	38.432	8.38	34.34	39.132	54	-14.868	Ave
Middle Channel 5200 MHz, measured at 3 meters											
5200	64.36	152	100	V	34.256	4.55	0	103.166	-	-	Peak
5200	68.71	136	100	H	34.256	4.55	0	107.516	-	-	Peak
5200	55.32	152	100	V	34.256	4.55	0	94.126	-	-	Ave
5200	57.12	136	100	H	34.256	4.55	0	95.926	-	-	Ave
10400	45.51	0	100	V	38.329	6.99	34.93	55.899	74	-18.101	Peak
10400	45.43	0	100	H	38.329	6.99	34.93	55.819	74	-18.181	Peak
10400	31.01	0	100	V	38.329	6.99	34.93	41.399	54	-12.601	Ave
10400	31.25	0	100	H	38.329	6.99	34.93	41.639	54	-12.361	Ave
15600	38.41	0	100	V	38.325	8.4	34.34	50.795	74	-23.205	Peak
15600	37.93	0	100	H	38.325	8.4	34.34	50.315	74	-23.685	Peak
15600	24.92	0	100	V	38.325	8.4	34.34	37.305	54	-16.695	Ave
15600	24.85	0	100	H	38.325	8.4	34.34	37.235	54	-16.765	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 5240 MHz, measured at 3 meters											
5240	65.36	69	100	V	34.256	4.6	0	104.216	-	-	Peak
5240	68.33	102	121	H	34.256	4.6	0	107.186	-	-	Peak
5240	50.21	69	100	V	34.256	4.6	0	89.066	-	-	Ave
5240	54.36	102	121	H	34.256	4.6	0	93.216	-	-	Ave
5350	27.07	0	100	V	34.821	4.76	0	66.651	74	-7.349	Peak
5350	27.41	0	100	H	35	4.76	0	67.17	74	-6.83	Peak
5350	12.02	0	100	V	34.821	4.76	0	51.601	54	-2.399	Ave
5350	12.65	0	100	H	35	4.76	0	52.41	54	-1.59	Ave
10480	47.14	0	100	V	38.343	7	34.93	57.553	74	-16.447	Peak
10480	46.07	0	100	H	38.343	7	34.93	56.483	74	-17.517	Peak
10480	32.26	0	100	V	38.343	7	34.93	42.673	54	-11.327	Ave
10480	32.21	0	100	H	38.343	7	34.93	42.623	54	-11.377	Ave
15720	37.9	0	100	V	38.188	8.38	34.34	50.128	74	-23.872	Peak
15720	37.49	0	100	H	38.188	8.38	34.34	49.718	74	-24.282	Peak
15720	24.40	0	100	V	38.188	8.38	34.34	36.628	54	-17.372	Ave
15720	23.49	0	100	H	38.188	8.38	34.34	35.718	54	-18.282	Ave

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

8.1 Applicable Standards

FCC §15.407(a) and IC RSS-210 §A9.2.

8.2 Measurement Procedure

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

8.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	1 year

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

8.4 Test Environmental Conditions

Temperature:	21-25 °C
Relative Humidity:	41-46 %
ATM Pressure:	101-102 kPa

The testing was performed by Chen Ge from 2014-05-14 and 2014-05-16 at RF site.

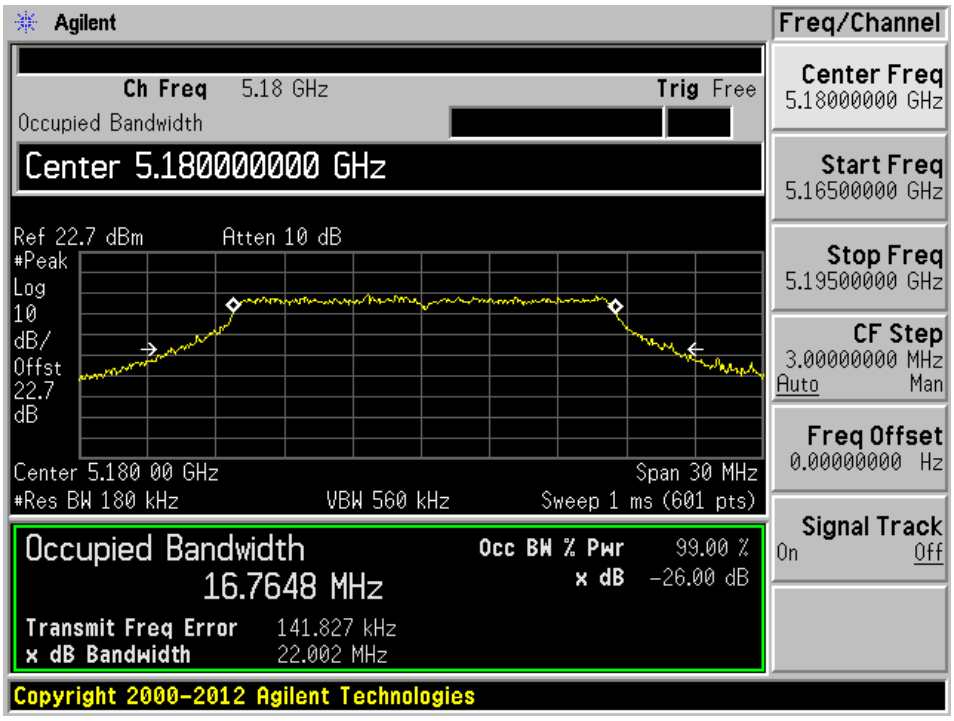
8.5 Test Results

Please refer to the following tables and plots.

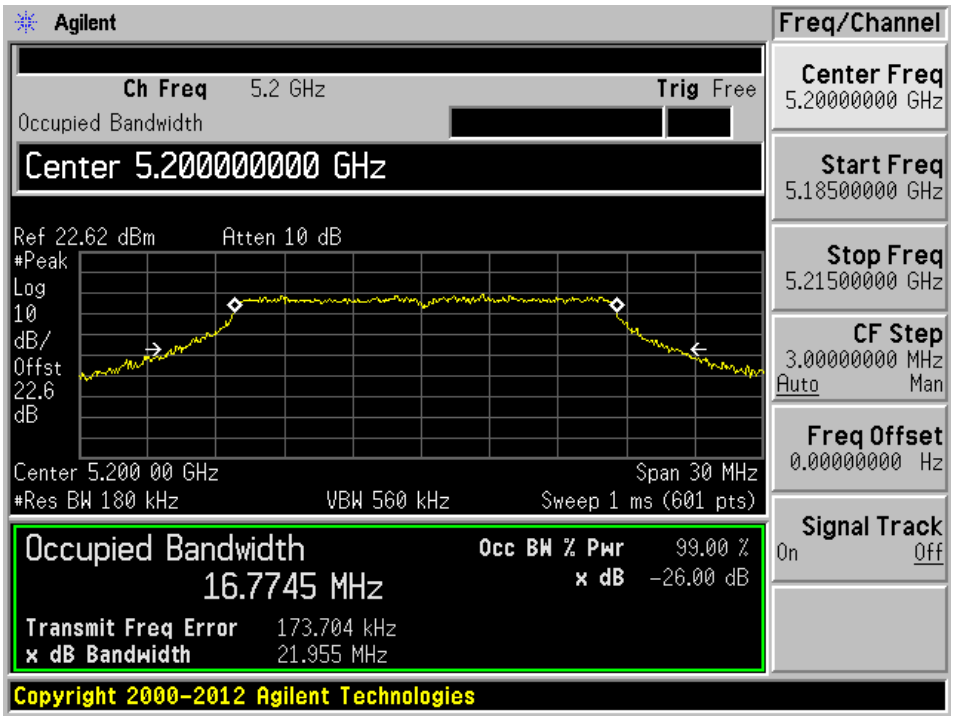
Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)
802.11a mode			
Low	5180	22.002	16.7648
Middle	5200	21.955	16.7745
High	5240	22.217	16.7502
802.11n HT20 mode			
Low	5180	22.762	17.8812
Middle	5200	22.378	17.8818
High	5240	22.132	17.8484

802.11a mode

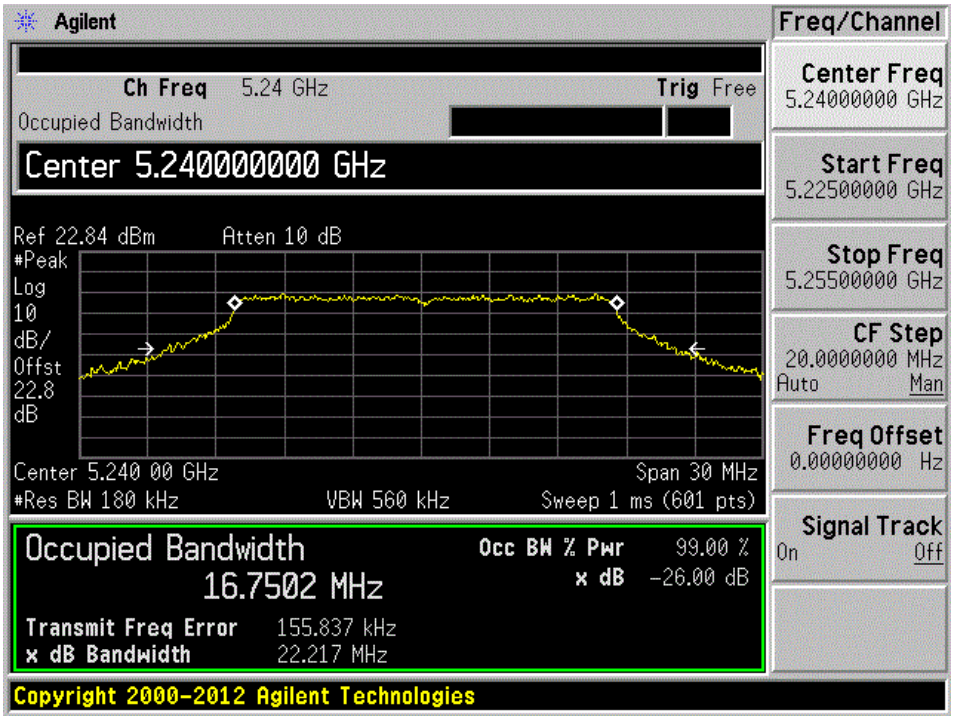
Low channel: 5180 MHz



Middle channel: 5200 MHz

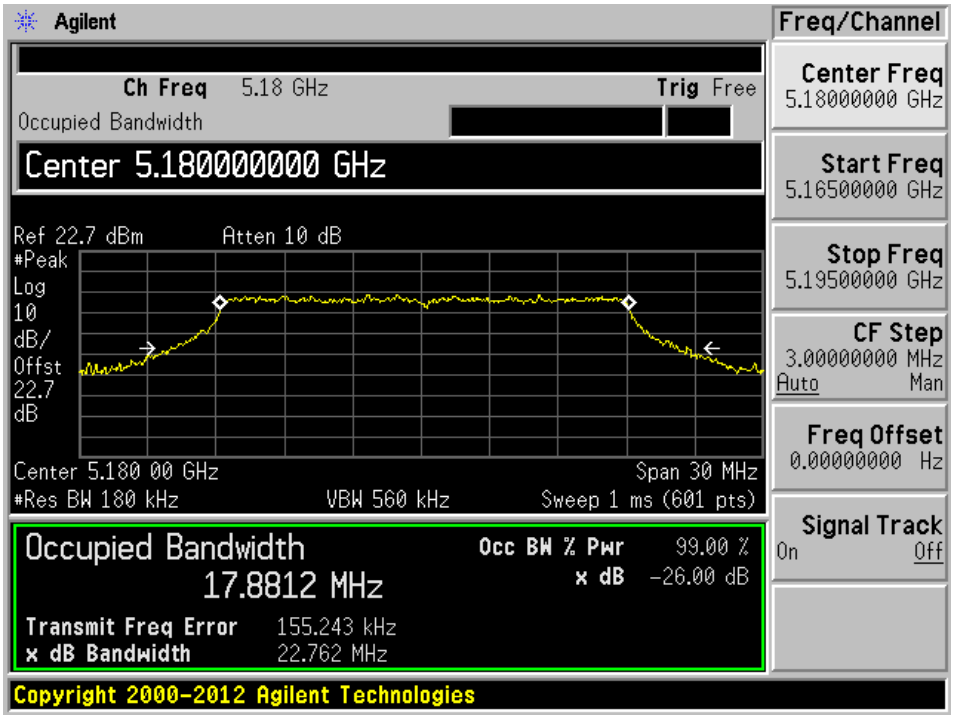


High channel: 5240 MHz

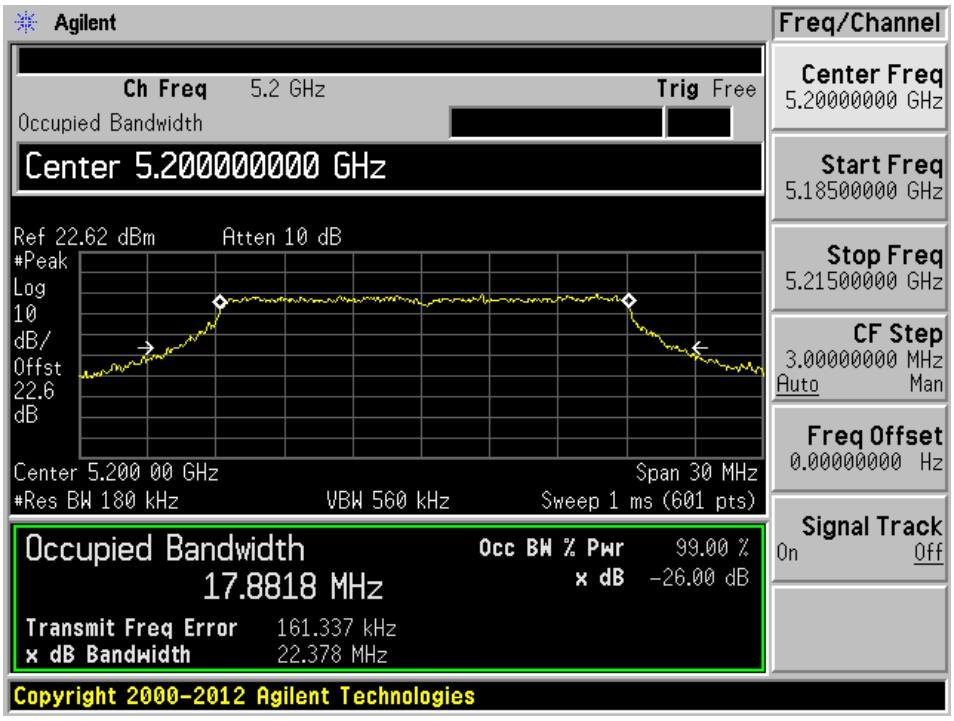


802.11n-HT20 mode

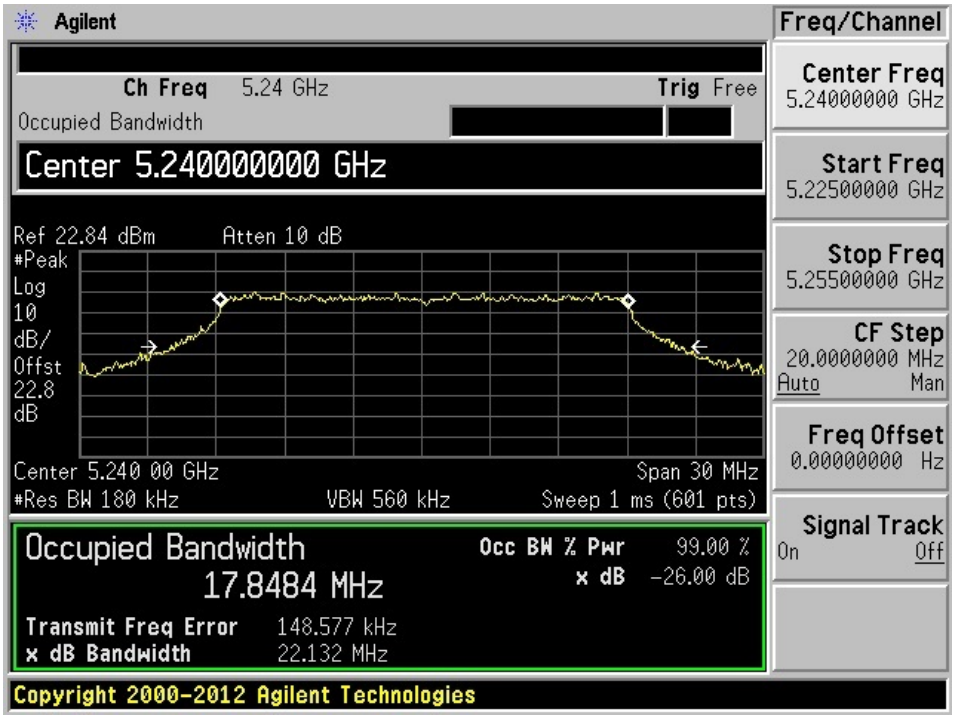
Low channel: 5180 MHz



Middle channel: 5200 MHz



High channel: 5240 MHz



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

9.1 Applicable Standards

According to FCC §15.407(a)(1)

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

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

According to IC RSS-210 §A9.2:

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

9.2 Measurement Procedure

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

9.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	1 year

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

9.4 Test Environmental Conditions

Temperature:	21-25 °C
Relative Humidity:	41-46 %
ATM Pressure:	101-102 kPa

The testing was performed by Chen Ge from 2014-05-14 and 2014-05-16 at RF site.

9.5 Test Results

For FCC:

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11a mode				
Low	5180	11.84	17	-1.27
Mid	5200	12.24	17	-1.08
High	5240	12.44	17	-1.21
802.11n HT20 mode				
Low	5180	12.00	17	-0.54
Mid	5200	12.17	17	-0.6
High	5240	12.54	17	-0.89

For IC :

Channel	Frequency (MHz)	E.I.R.P. (dBm)	Limit (dBm)	Margin (dB)
802.11a mode				
Low	5180	19.93	23	-3.07
Mid	5200	20.12	23	-2.88
High	5240	20.17	23	-2.83
802.11n HT20 mode				
Low	5180	20.66	23	-2.34
Mid	5200	20.60	23	-2.40
High	5240	20.76	23	-2.24

10 FCC §15.407(b) & IC RSS-210 §A9.2 - Out of Band Emissions

10.1 Applicable Standard

According to FCC §15.407(b) and IC RSS-210 §A9.2

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

10.2 Measurement Procedure

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

10.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	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:	101-102 kPa

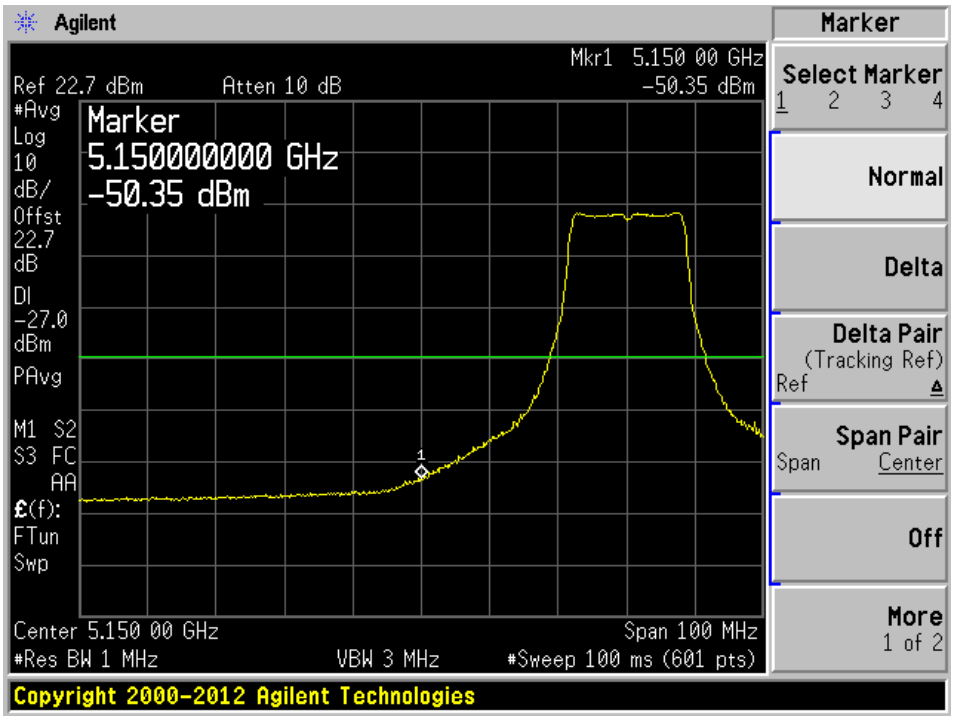
The testing was performed by Chen Ge from 2014-04-07 and 2014-05-09 at RF site.

10.5 Test Results

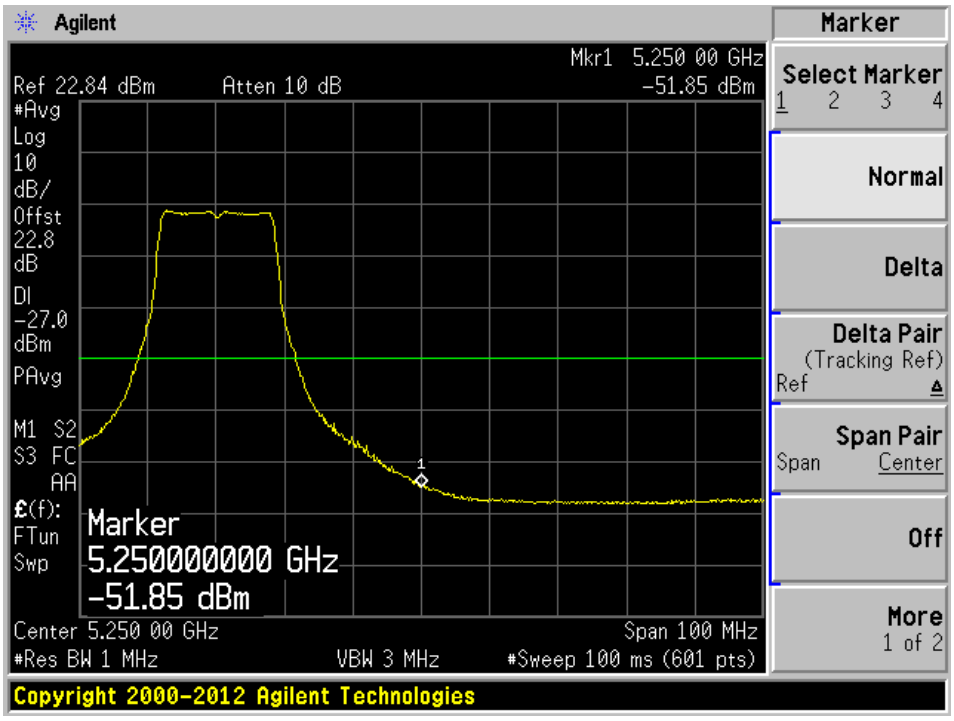
Please refer to following pages for plots of band edge.

802.11a mode

Low channel: 5180 MHz

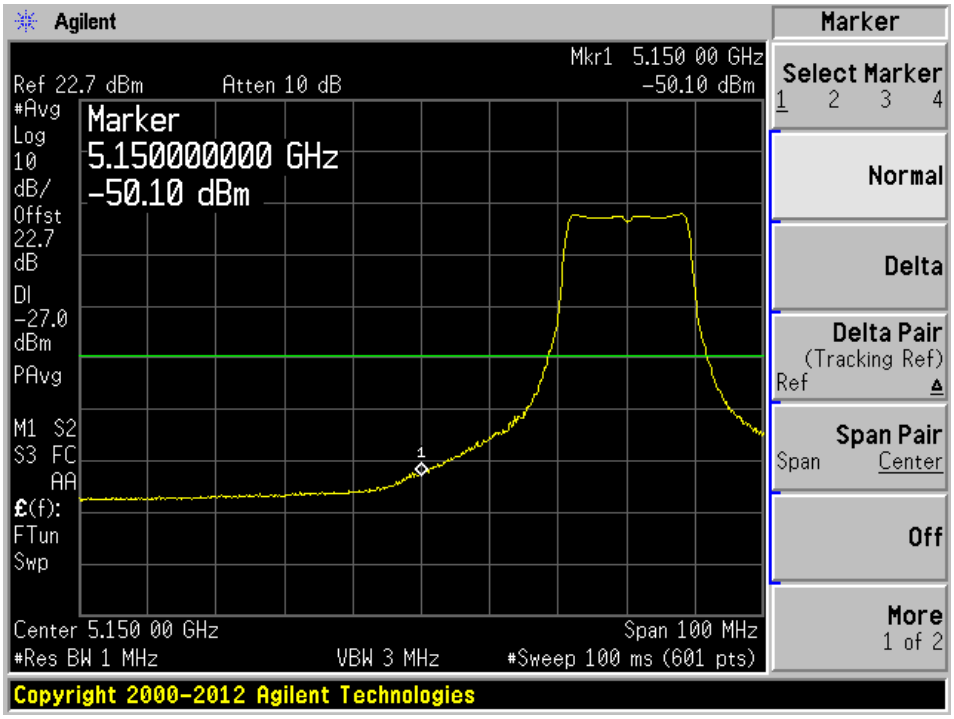


High channel: 5240 MHz

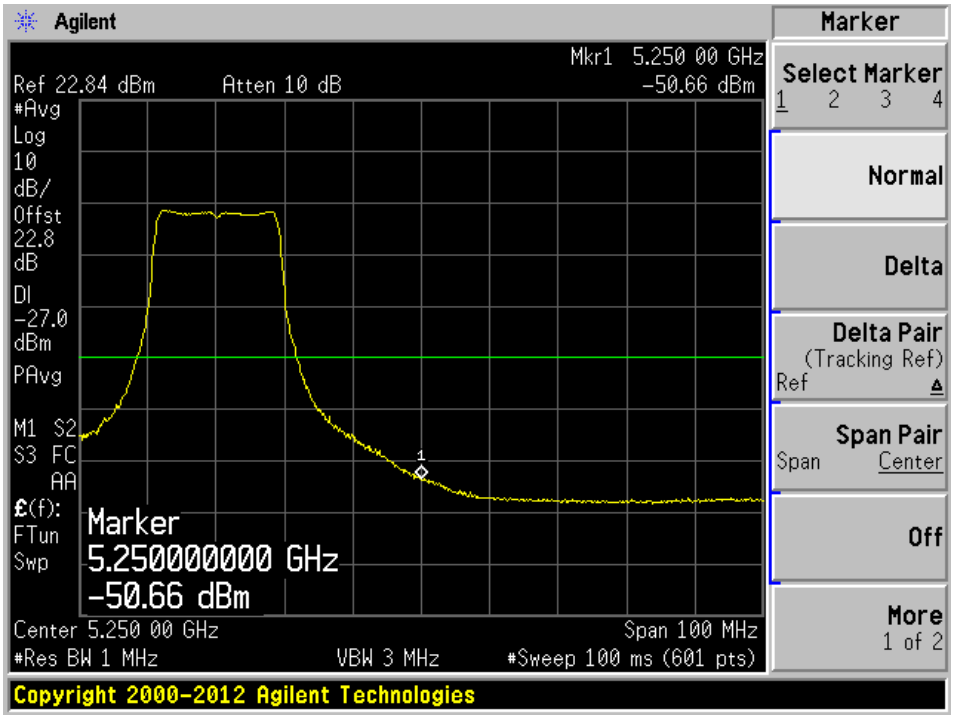


802.11n-HT20 mode

Low channel: 5180 MHz



High channel: 5240 MHz



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

11.1 Applicable Standards

According to FCC §15.407(a)(1)

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

According to IC RSS-210 §A9.2:

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

11.2 Measurement Procedure

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

11.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	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:	101-102 kPa

The testing was performed by Chen Ge from 2014-05-07 and 2014-05-09 at RF site.

11.5 Test Results

For FCC:

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
802.11a mode				
Low	5180	0.483	4	-3.517
Middle	5200	1.028	4	-2.972
High	5240	1.397	4	-2.603
802.11n HT20 mode				
Low	5180	0.632	4	-3.368
Middle	5200	0.951	4	-3.049
High	5240	1.420	4	-2.580

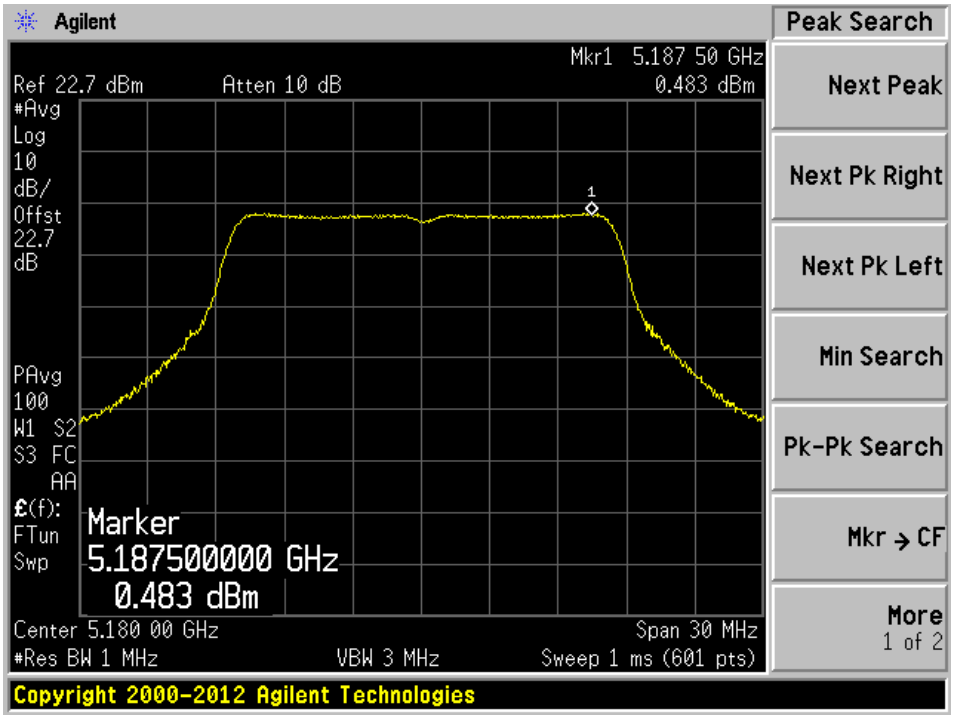
For IC:

Channel	Frequency (MHz)	e.i.r.p Density (dBm)	Limit (dBm)	Margin (dB)
802.11a mode				
Low	5180	4.683	10	-5.317
Middle	5200	5.228	10	-4.772
High	5240	5.597	10	-4.403
802.11n HT20 mode				
Low	5180	4.832	10	-5.168
Middle	5200	5.151	10	-4.849
High	5240	5.620	10	-4.380

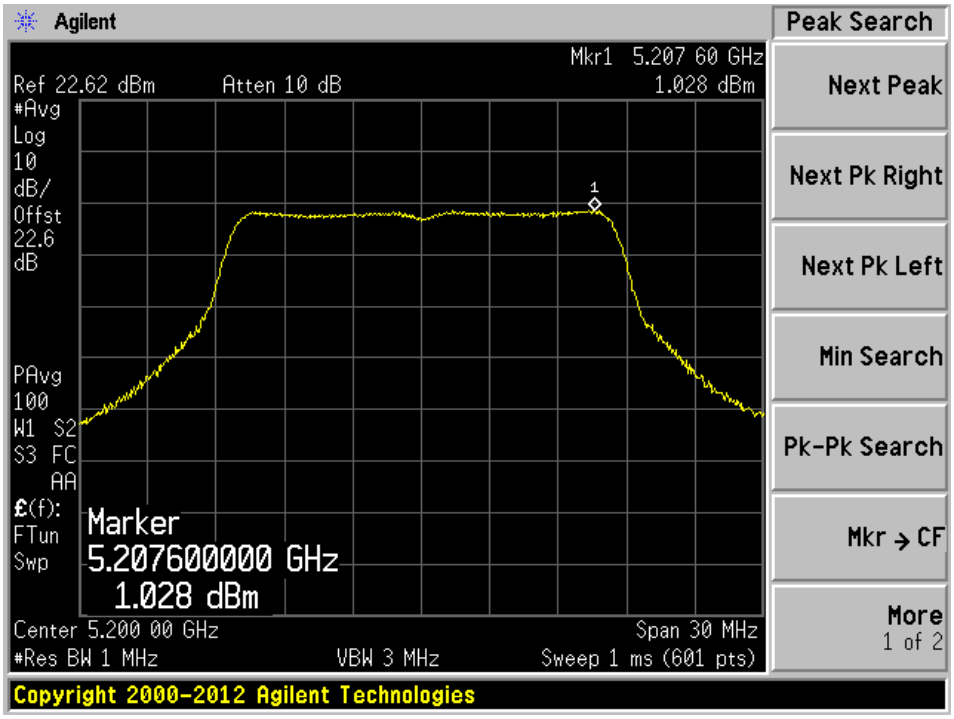
Please refer to the following plots.

802.11a mode

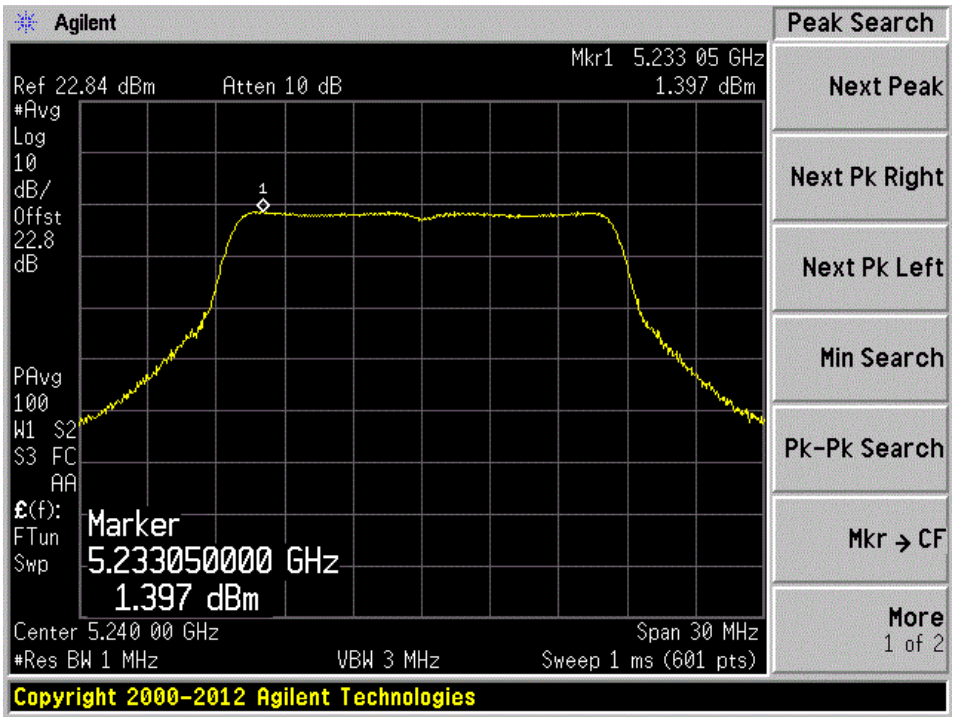
Low channel: 5180 MHz



Middle channel: 5200 MHz

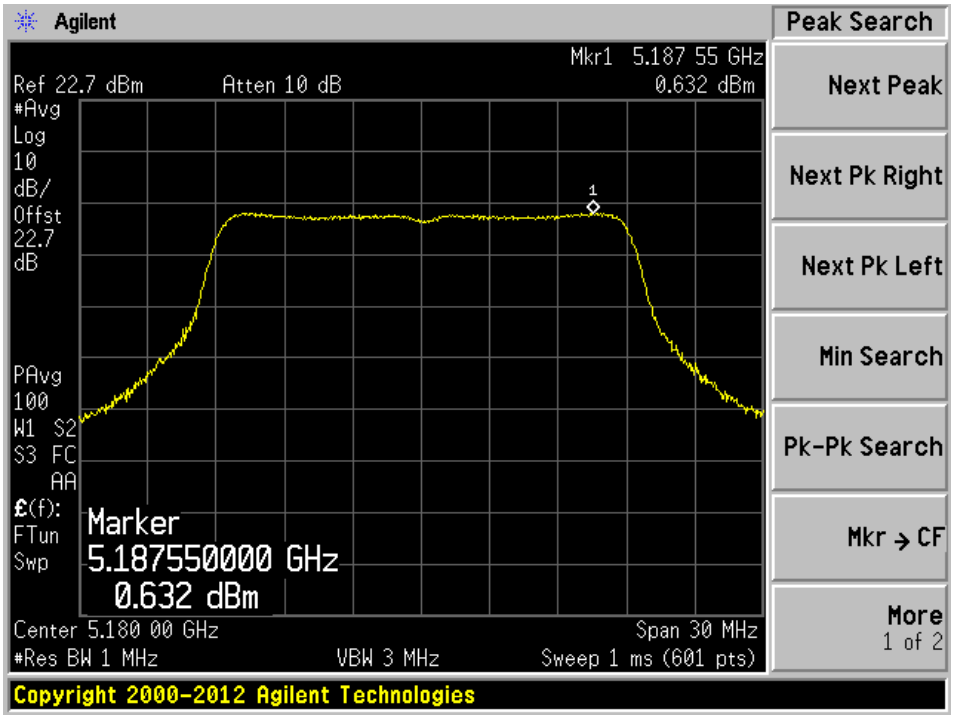


High channel: 5240 MHz

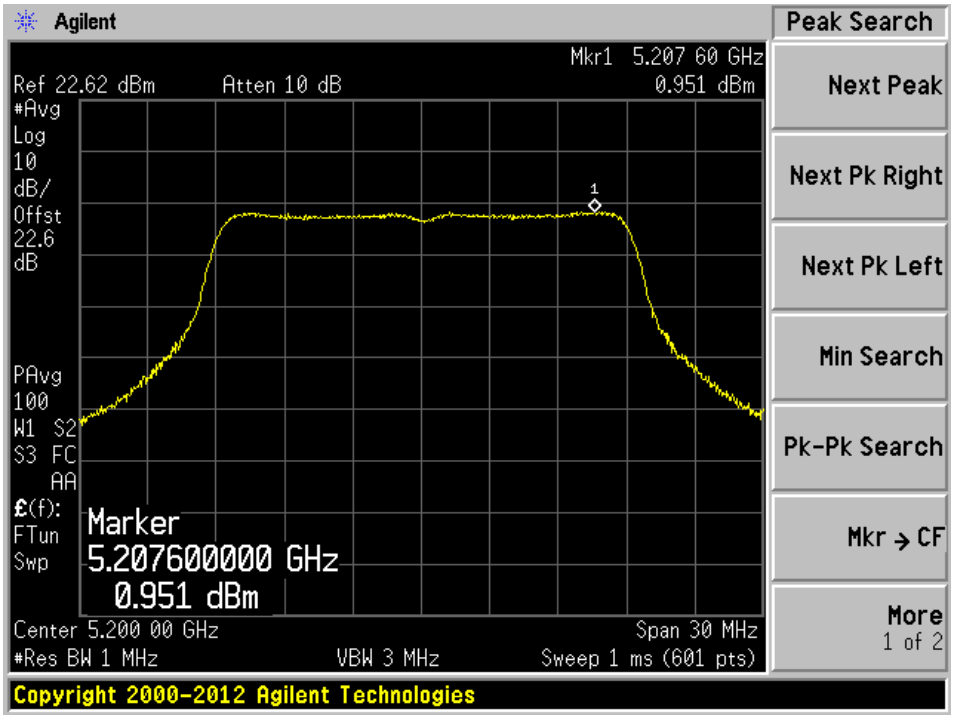


802.11n-HT20 mode

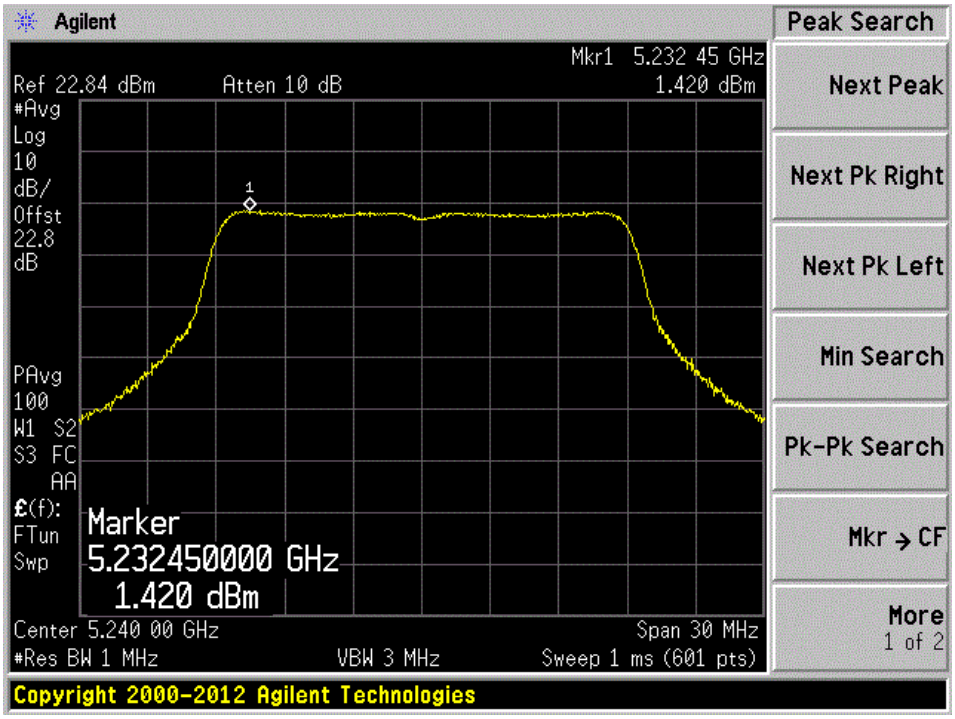
Low channel: 5180 MHz



Middle channel: 5200 MHz



High channel: 5240 MHz



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

12.1 Applicable Standard

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

12.2 Test Procedure

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

12.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	1 year

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

12.4 Test Environmental Conditions

Temperature:	21-25 °C
Relative Humidity:	41-45 %
ATM Pressure:	101-102 kPa

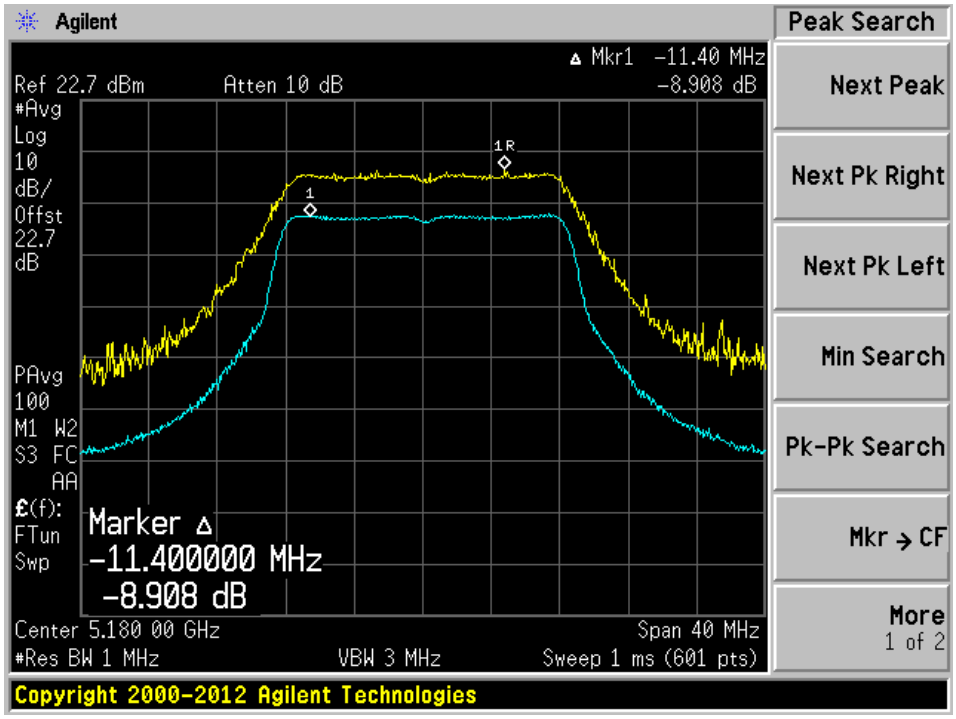
The testing was performed by Chen Ge from 2014-05-14 and 2014-05-16 at RF site.

12.5 Test Results

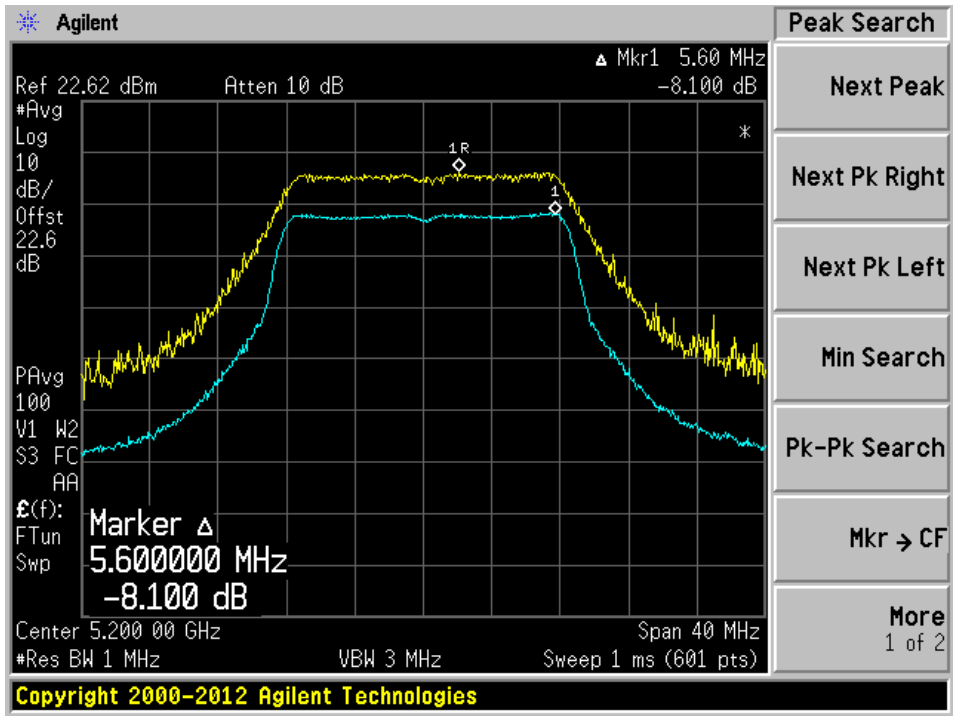
Please refer to the following plots for detailed test results:

802.11a mode

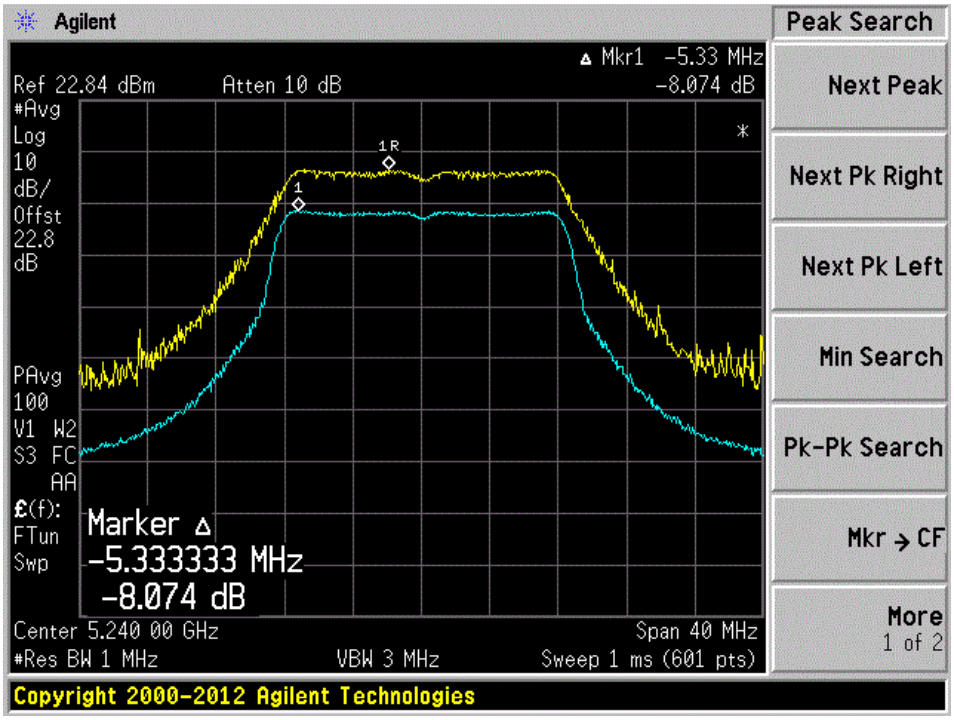
Low channel: 5180 MHz



Middle channel: 5200 MHz

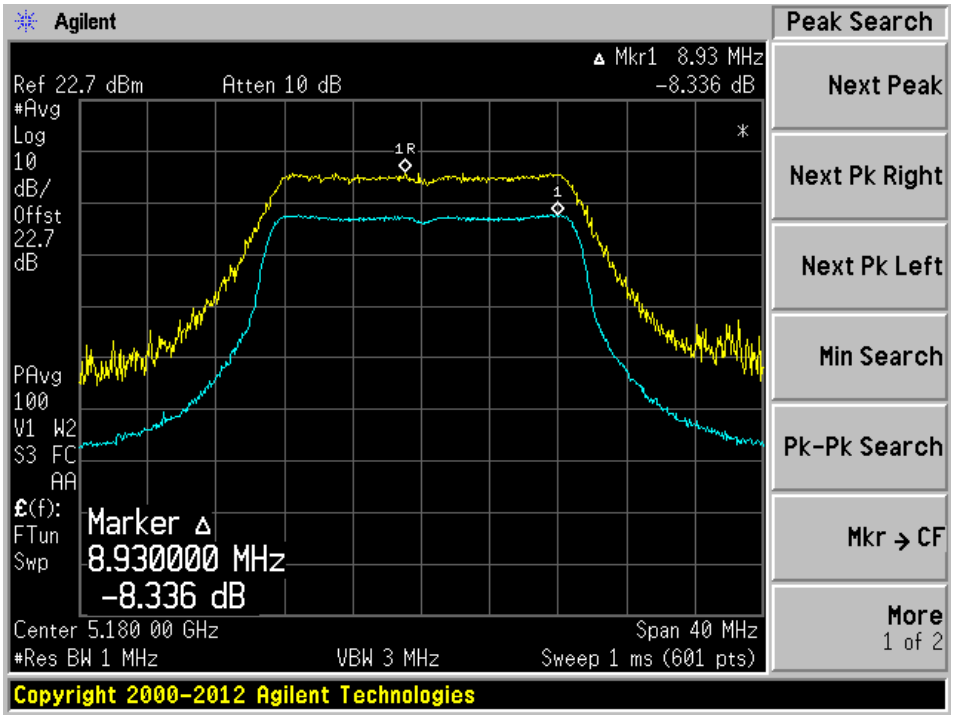


High channel: 5240 MHz

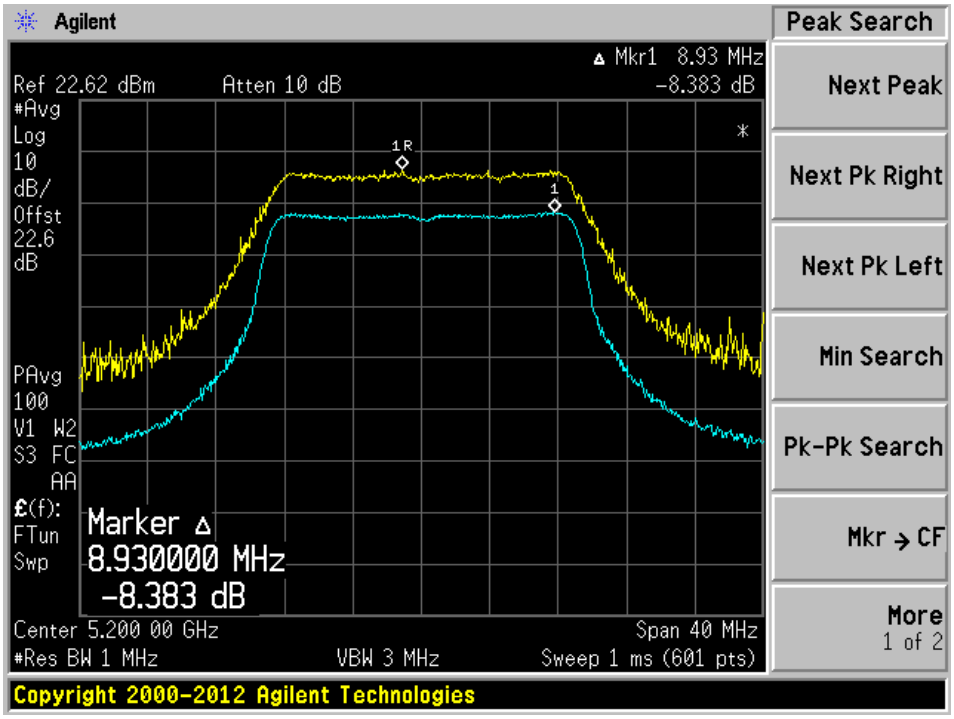


802.11n-HT20 mode

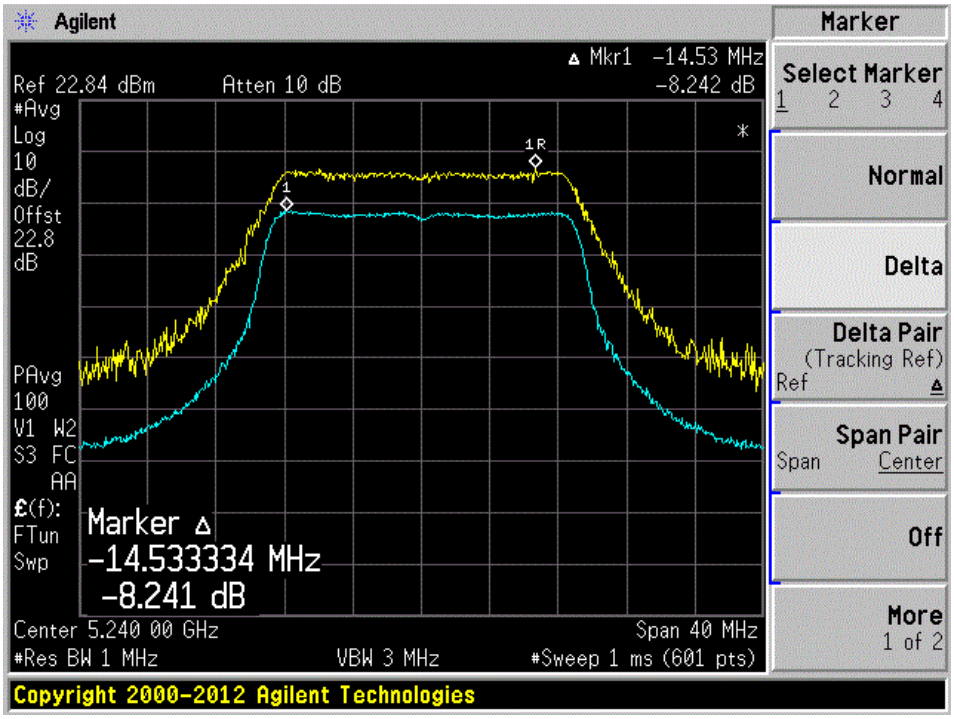
Low channel: 5180 MHz



Middle channel: 5200 MHz



High channel: 5240 MHz



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

13.1 Applicable Standards

According to FCC §15.407(b) and IC RSS-210 §A9.2

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

13.2 Measurement Procedure

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

13.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Agilent	Spectrum Analyzer	E4446A	US44300386	2013-09-29	1 year

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

13.4 Test Environmental Conditions

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

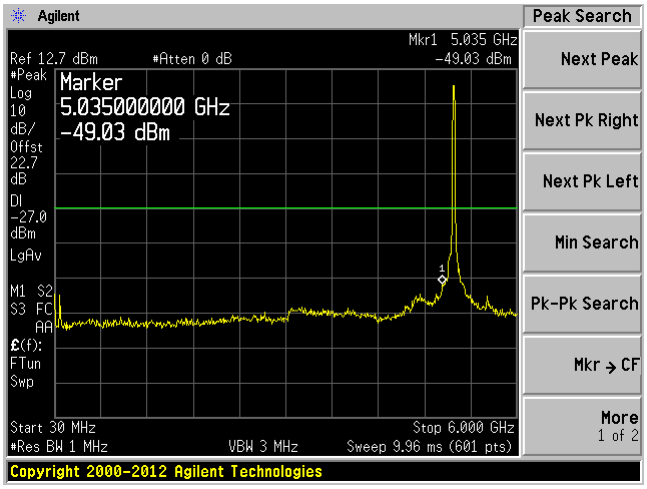
The testing was performed by Chen Ge from 2014-05-07 and 2014-05-09 at RF site.

13.5 Test Results

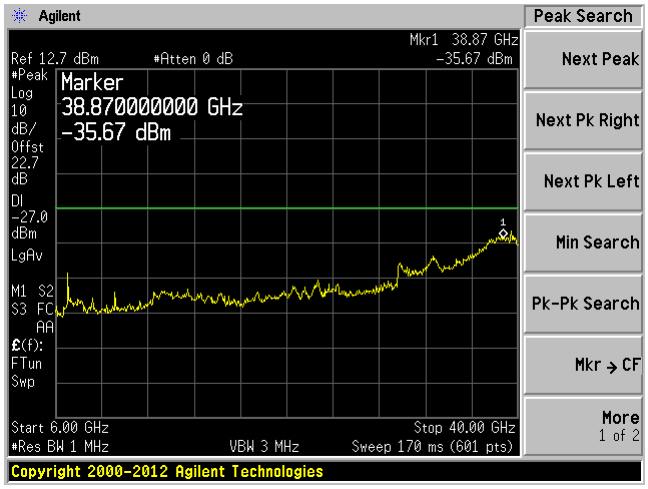
Please refer to following plots of spurious emissions.

802.11a, Low Channel, 5180 MHz

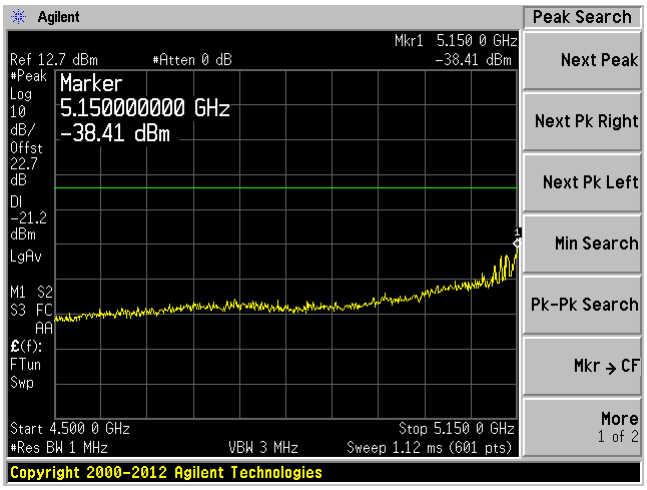
Plot: 30 MHz – 6 GHz



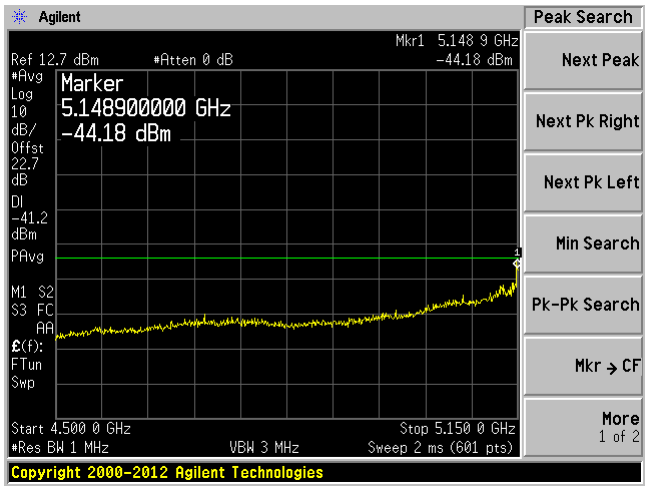
Plot: 6 GHz – 40 GHz



Plot: 4500 MHz – 5150 MHz Peak

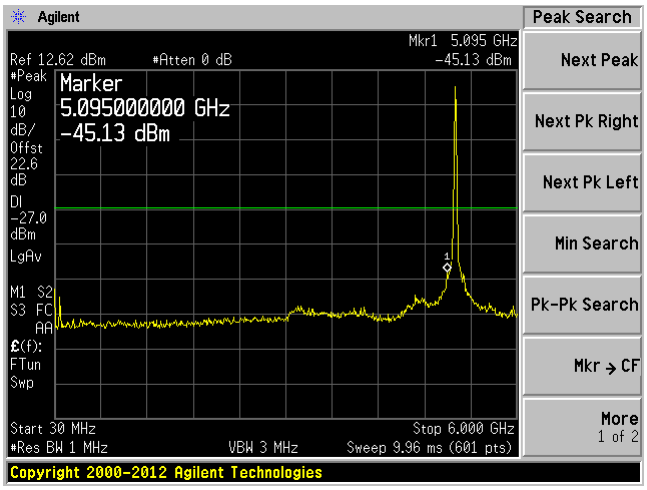


Plot: 4500 MHz – 5150 MHz Ave

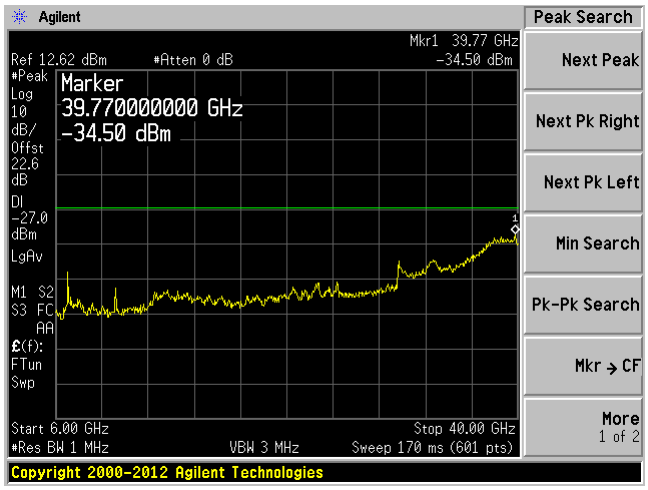


802.11a, Middle Channel, 5200 MHz

Plot: 30 MHz – 6 GHz

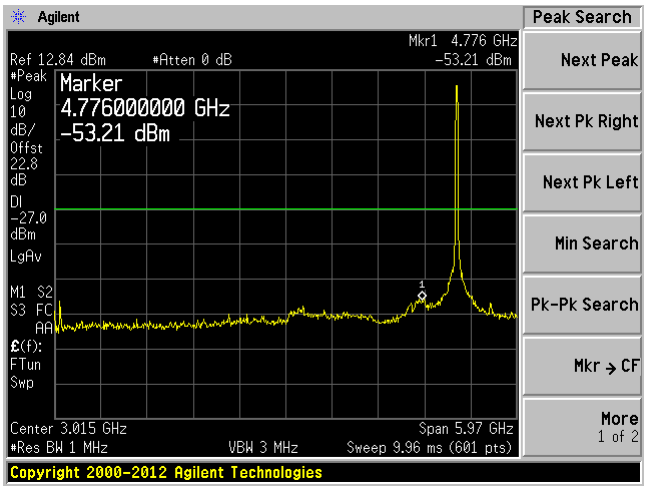


Plot: 6 GHz – 40 GHz

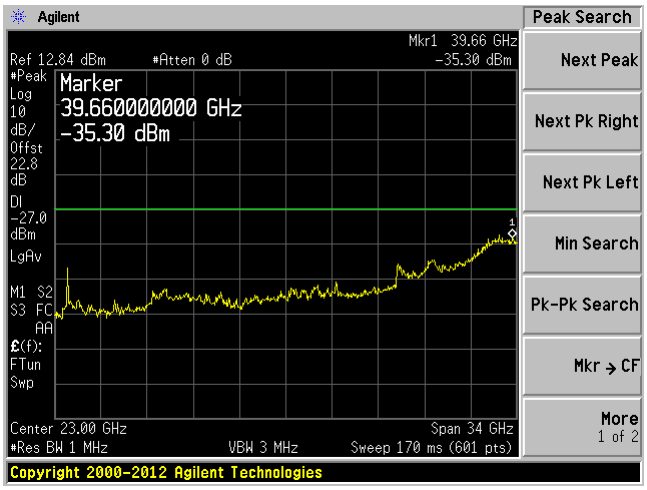


802.11a, High Channel, 5240 MHz

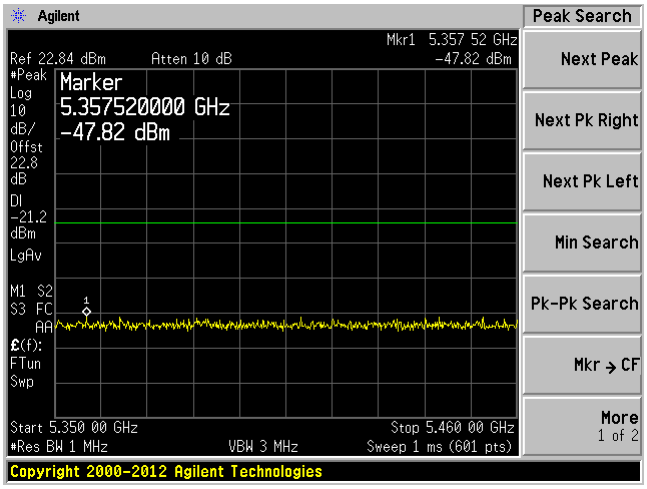
Plot: 30 MHz – 6 GHz



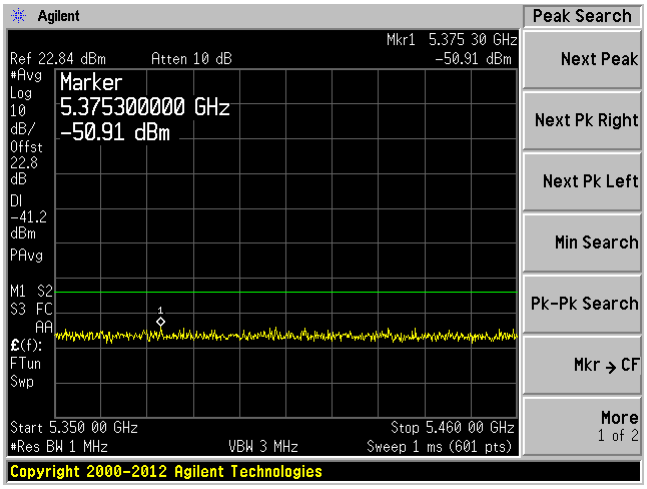
Plot: 6 GHz – 40 GHz



Plot: 5350MHz – 5460 MHz Peak

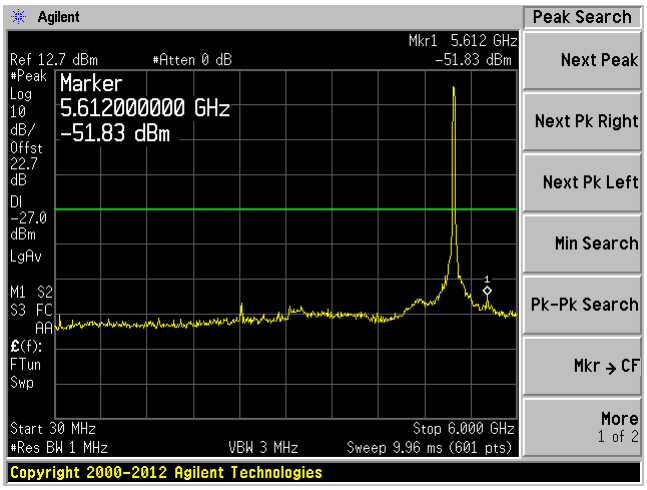


Plot: 5350MHz – 5460 MHz Ave

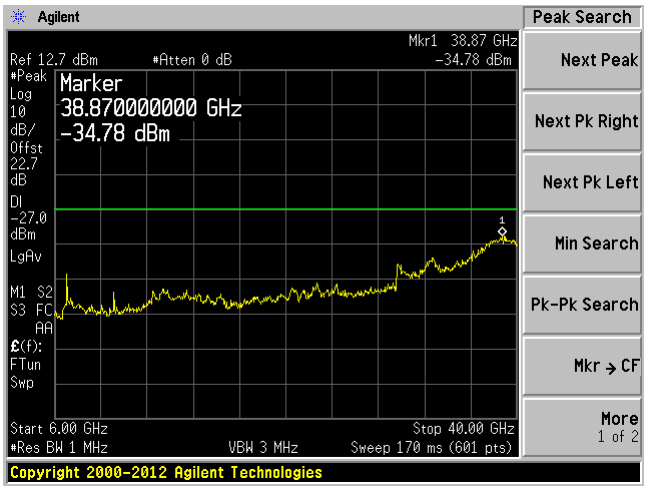


802.11n-HT 20, Low Channel 5180 MHz

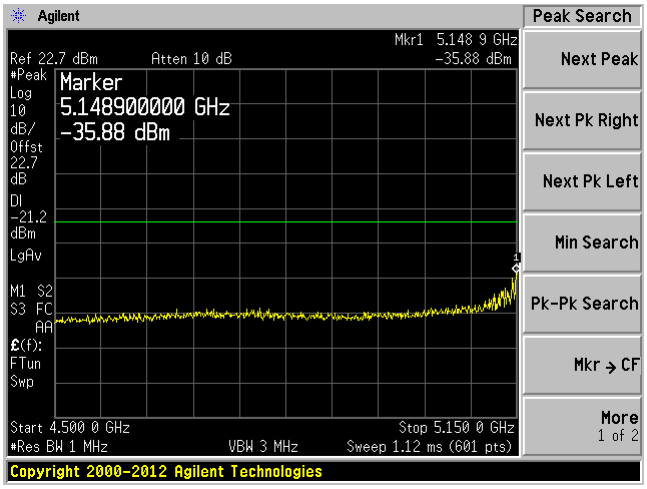
Plot: 30 MHz – 6 GHz



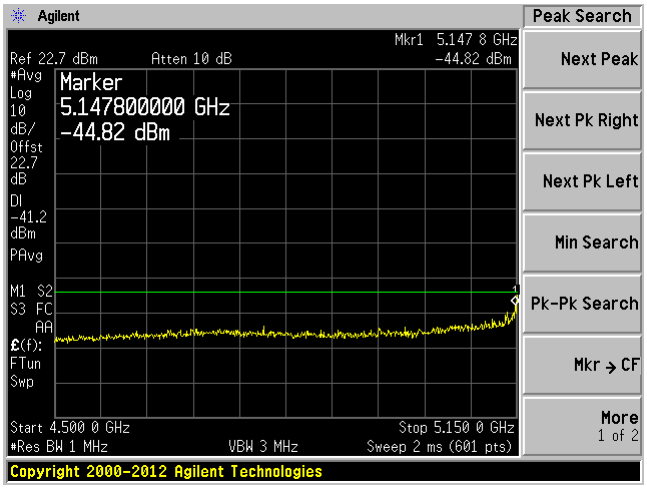
Plot: 6 GHz – 40 GHz



Plot: 4500 MHz – 5150 MHz Peak

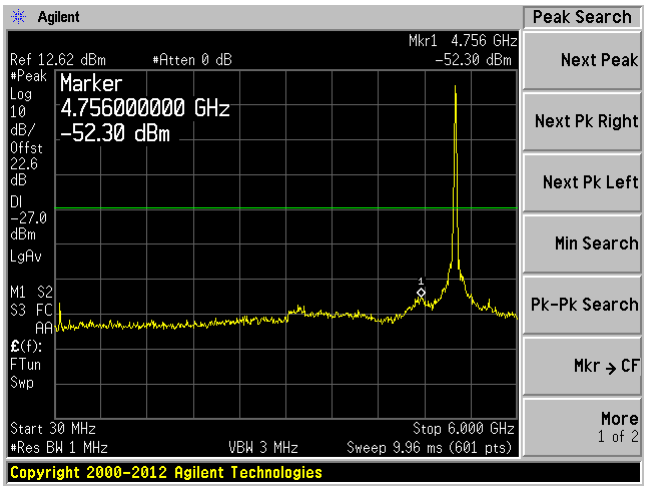


Plot: 4500 MHz – 5150 MHz Ave

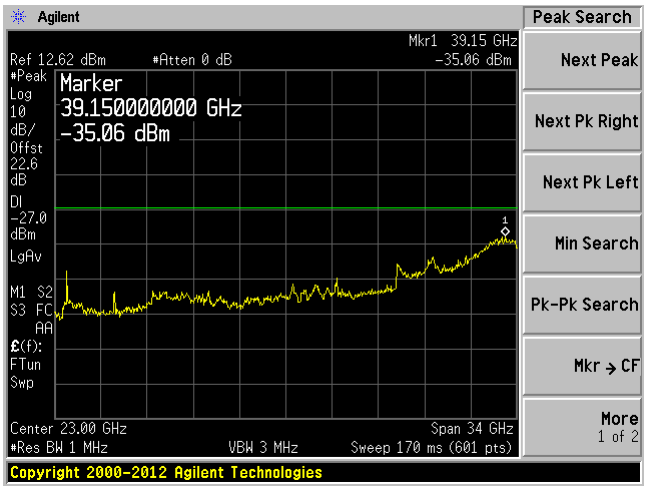


802.11n-HT20, Middle Channel 5200 MHz

Plot: 30 MHz – 6 GHz

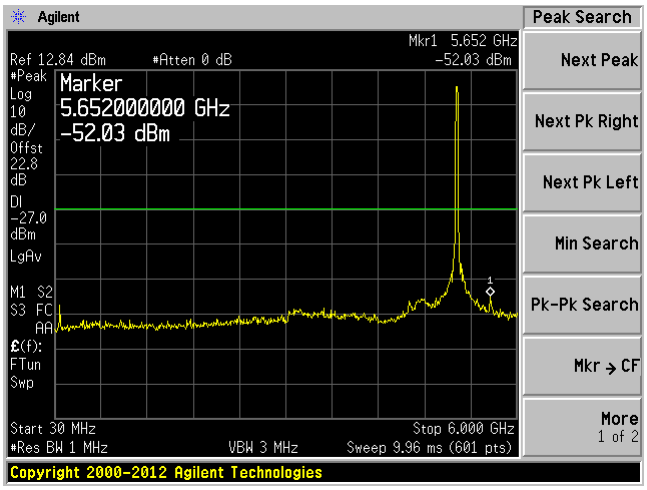


Plot: 6 GHz – 40 GHz

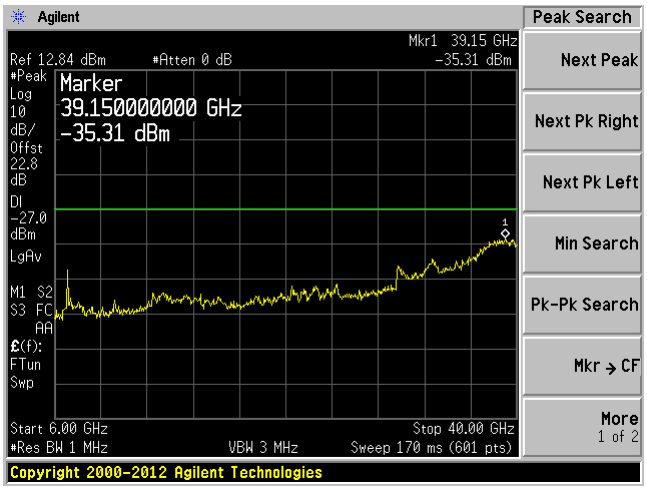


802.11n-HT 20, High Channel 5240 MHz

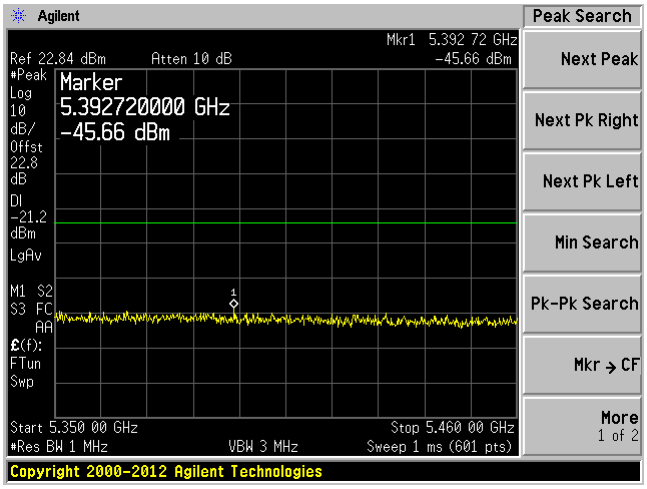
Plot: 30 MHz – 6 GHz



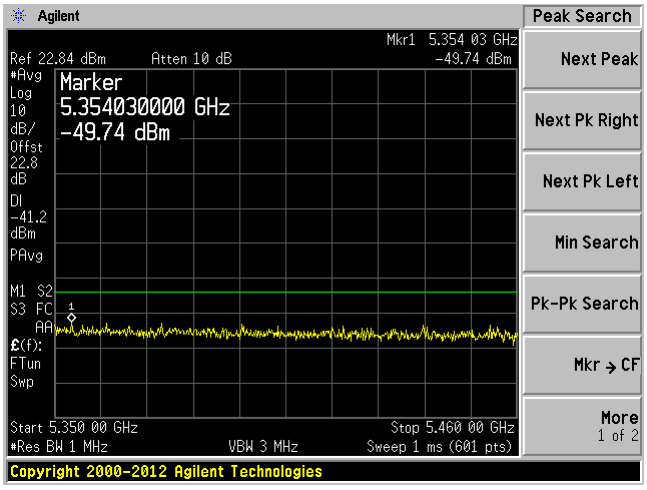
Plot: 6 GHz – 40 GHz



Plot: 5350MHz – 5460 MHz Peak



Plot: 5350MHz – 5460 MHz Ave



Note: Offset= Attenuator + cable loss+ Attenna gain