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

TEST AND MEASUREMENT REPORT

For

PayPal

2211 North First Street,

San Jose, CA 95131, USA

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

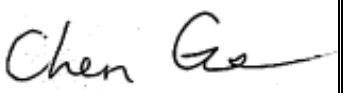
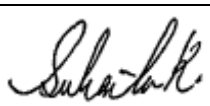
Report Type: Original Report	**Product Type:** 802.11 a/b/g/n USB sticker	
Prepared By	Chen Ge	
Report Number	R1404102-247 Wi-Fi	
Report Date	2014-06-30	
Reviewed By	Suhaila Khushzad Engineering Manager	
	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Avenue, Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732-9164	

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1404102-247 Wi-Fi	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 2.4 GHz & 5 GHz 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 Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions 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, 6 dB Bandwidth, and 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 15.407, RSS-210 Annex 9 of NII 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 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

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

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 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2009 and FCC KDB 558074 D01 DTS Meas Guidance v03r01.

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	Results
FCC §15.247(i), §2.1093 IC RSS-102	RF Exposure	Compliant
FCC §15.203 IC RSS-Gen §7.1.2	Antenna Requirement	Compliant
FCC §15.207(a) IC RSS-Gen §7.2.4	AC Line Conducted Emissions	Compliant
FCC §15.247 (d) IC RSS-210 §A8.5	Spurious Emissions at Antenna Port	Compliant
FCC §15.205 IC RSS-210 §2.2	Restricted Bands	Compliant
FCC §15.209, §15.247 (d) IC RSS-210 §A8.5	Radiated Spurious Emissions	Compliant
FCC §15.247(a)(2) IC RSS-210 §A8.2	6 dB Emission Bandwidth	Compliant
FCC §15.247(b)(3) IC RSS-210 §A8.4	Maximum Peak Output Power	Compliant
FCC §15.247(d) IC RSS-210 §A8.5	100 kHz Bandwidth of Frequency Band Edge	Compliant
FCC §15.247(e) IC RSS-210 §A8.2(b)	Power Spectral Density	Compliant

4 FCC §15.247 (i), §2.1093 & IC RSS-102 – RF Exposure

4.1 Applicable Standards

FCC §15.247(i) 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 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.

5.2 Antenna List

Antenna Type/Pattern	Frequency 2.4 GHz	Frequency 5 GHz
Integrated	3.2 dBi	4.2 dBi

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 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

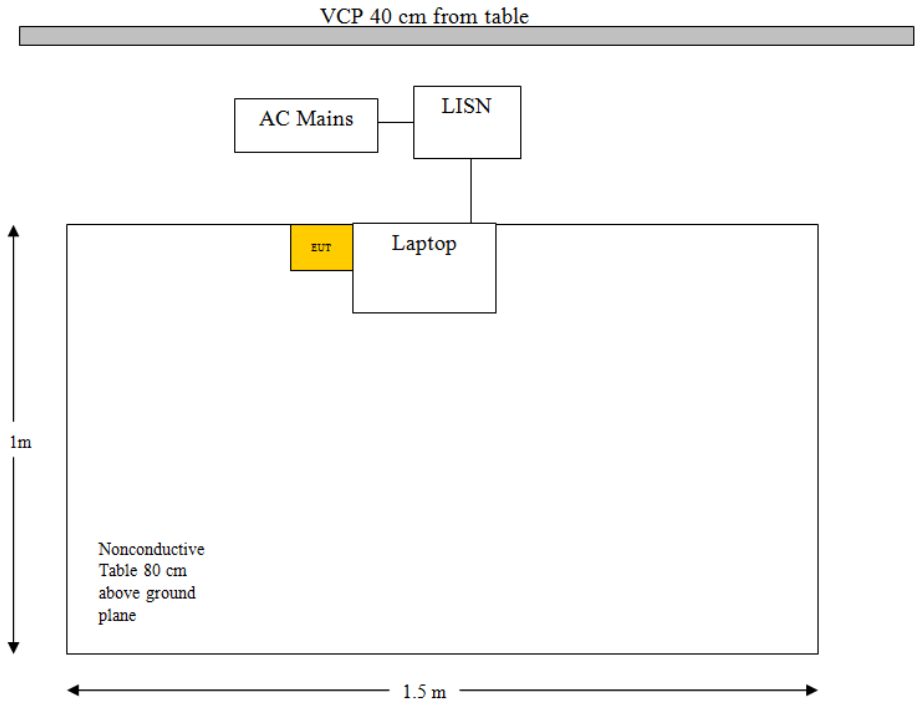
During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-2.

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

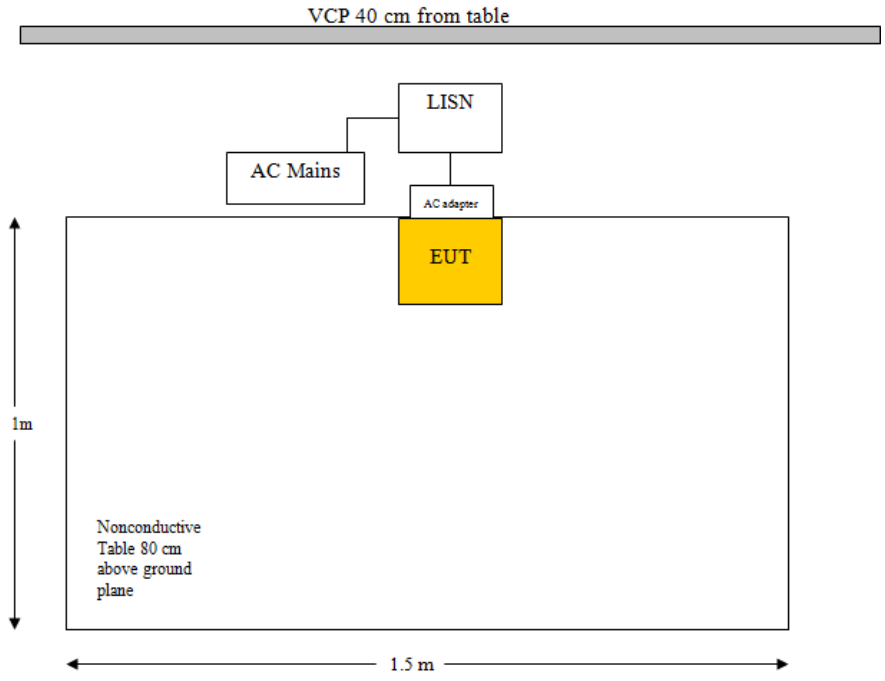
All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a “QP.” Average readings are distinguished with an “Ave”.

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	511205	2013-06-25	1 year
TTE	Filter, High Pass	H9962-150K-50-21378	K7133	2013-05-30	1 year

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

6.7 Test Environmental Conditions

Temperature:	22 ºC
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:

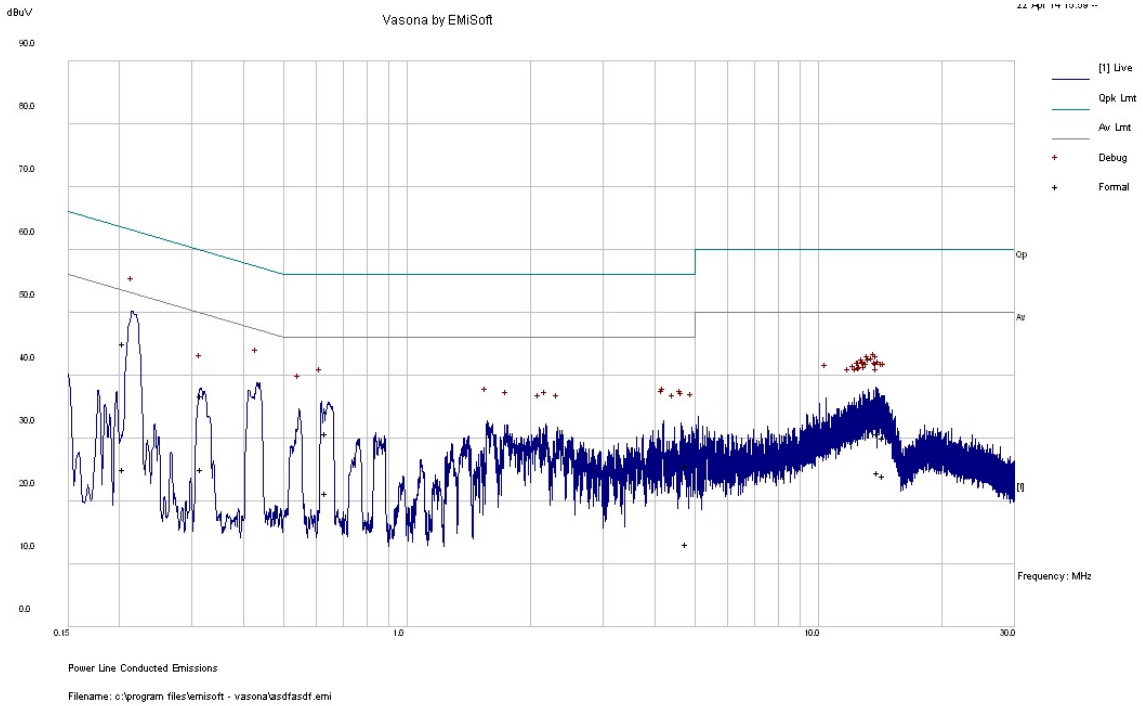
Connection: EUT connected to the laptop			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-17.40	0.204705	Neutral	0.15-30

Connection: EUT connected to the AC power adapter			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-16.99	1.860099	Neutral	0.15-30

6.9 Conducted Emissions Test Plots and Data

With Laptop:

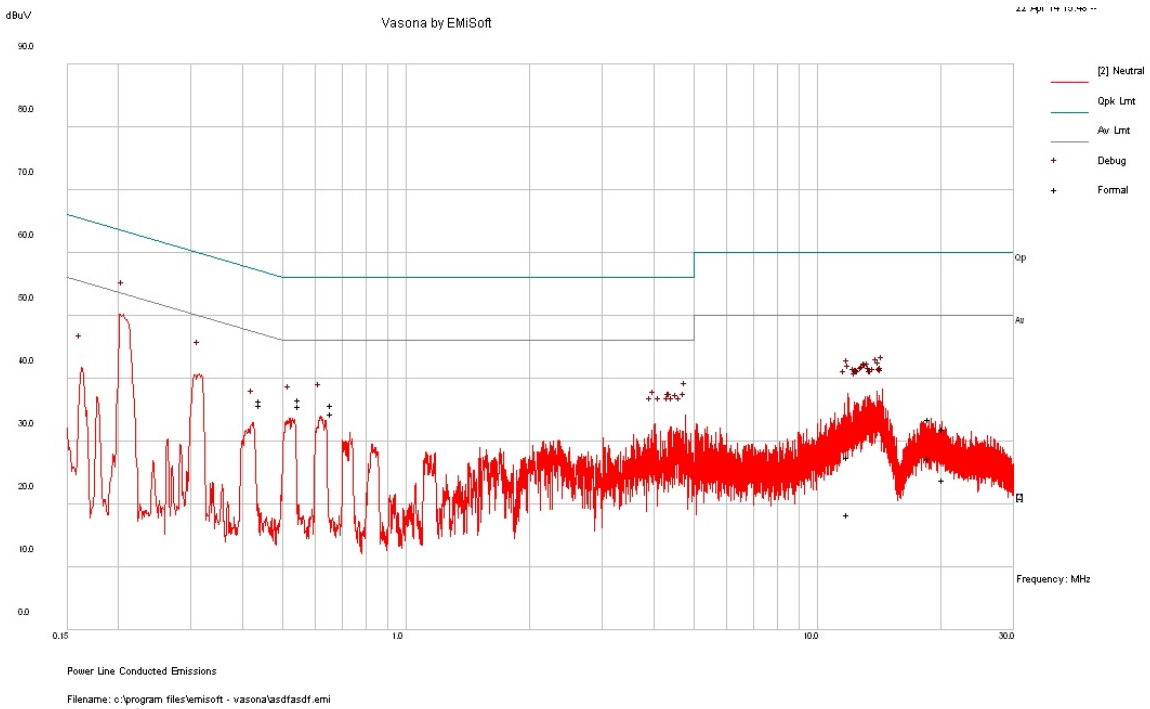
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.202443	37.96	Line	63.51	-25.55	QP
0.439416	36.13	Line	57.07	-20.94	QP
0.620472	31.07	Line	56	-24.93	QP
0.547569	30.41	Line	56	-25.59	QP
13.75206	31.1	Line	60	-28.9	QP
0.326463	29.67	Line	59.54	-29.87	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.202443	19.68	Line	53.51	-33.83	Ave.
0.439416	25.43	Line	47.07	-21.64	Ave.
0.620472	14.88	Line	46	-31.12	Ave.
0.547569	19.92	Line	46	-26.08	Ave.
13.75206	26.74	Line	50	-23.26	Ave.
0.326463	8.05	Line	49.54	-41.49	Ave.

120 V, 60 Hz – Neutral

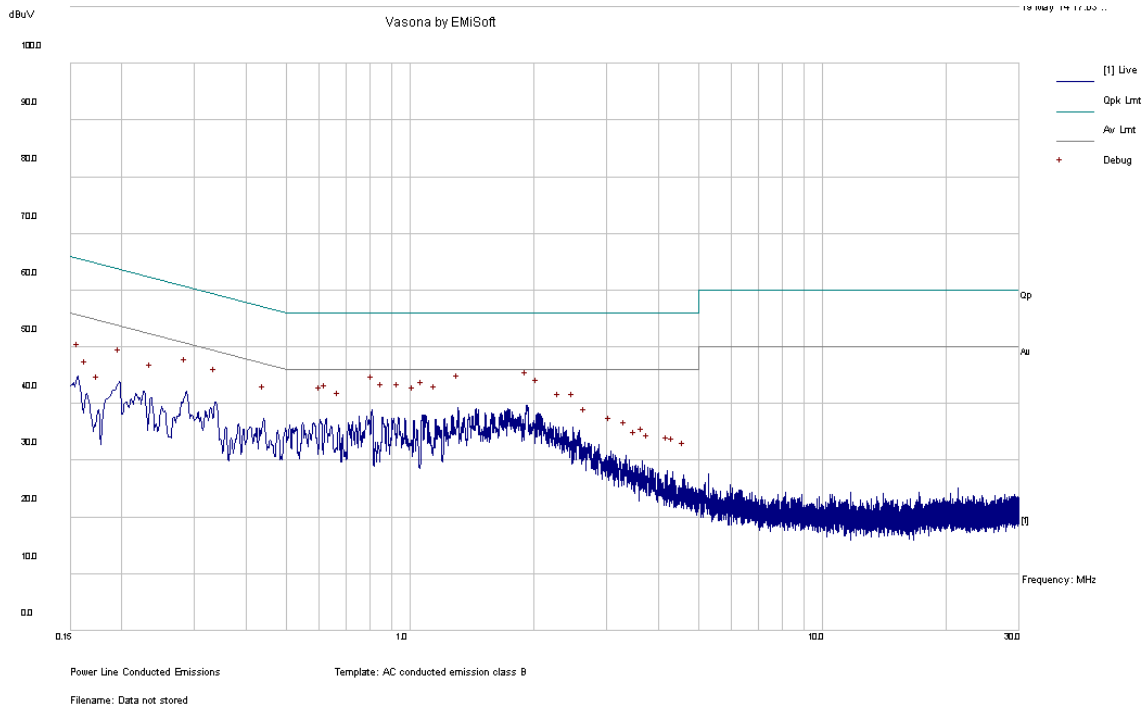


Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.204705	46.02	Neutral	63.42	-17.40	QP
0.316515	38.17	Neutral	59.8	-21.63	QP
14.36706	30.33	Neutral	60	-29.67	QP
4.779077	25.68	Neutral	56	-30.32	QP
0.635433	30.95	Neutral	56	-25.05	QP
13.96948	31.01	Neutral	60	-28.99	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
0.204705	25.23	Neutral	53.42	-28.19	Ave.
0.316515	25.24	Neutral	49.8	-24.56	Ave.
14.36706	24.12	Neutral	50	-25.88	Ave.
4.779077	13.25	Neutral	46	-32.75	Ave.
0.635433	21.37	Neutral	46	-24.63	Ave.
13.96948	24.64	Neutral	50	-25.36	Ave.

With AC power Adapter:

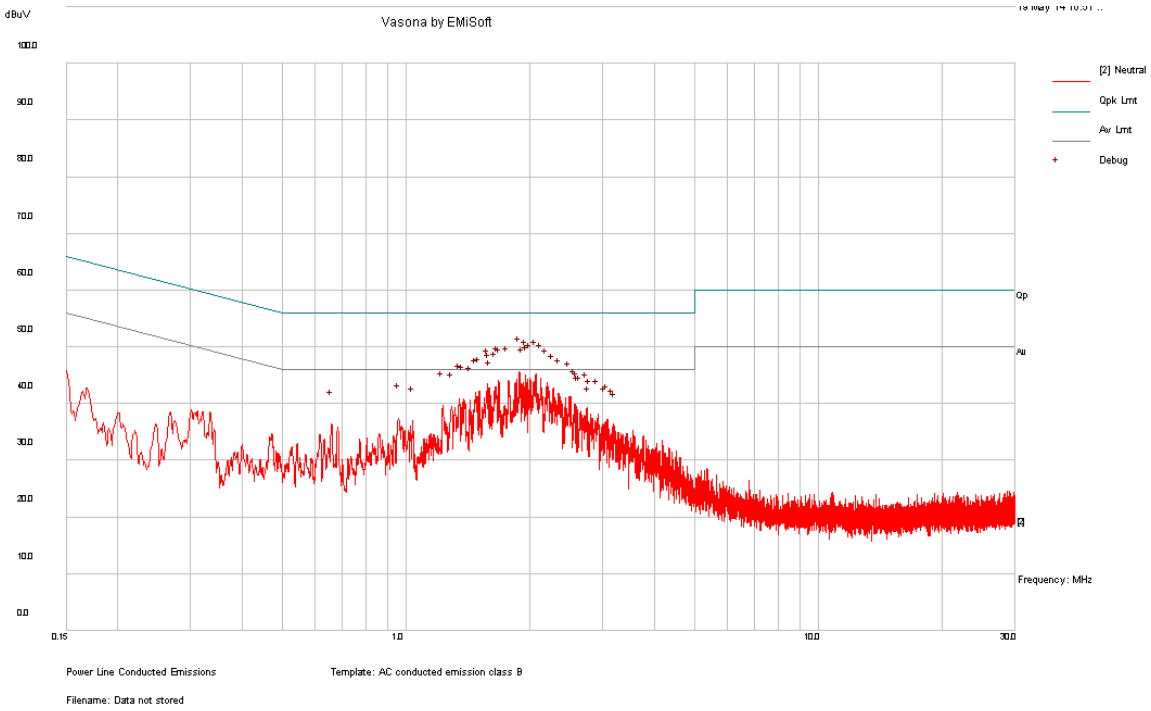
120 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
1.918422	33.51	Line	56	-22.49	QP
1.306452	31.55	Line	56	-24.45	QP
0.796011	30.92	Line	56	-25.08	QP
2.036127	32.83	Line	56	-23.17	QP
1.059585	31.1	Line	56	-24.90	QP
0.93144	31.91	Line	56	-24.09	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
1.918422	25.81	Line	46	-20.19	Ave.
1.306452	23.3	Line	46	-22.70	Ave.
0.796011	21.6	Line	46	-24.4	Ave.
2.036127	24.62	Line	46	-21.38	Ave.
1.059585	20.82	Line	46	-25.18	Ave.
0.93144	22.81	Line	46	-23.19	Ave.

120 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
1.860099	39.01	Neutral	56	-16.99	QP
2.061531	37.24	Neutral	56	-18.76	QP
1.959222	38.06	Neutral	56	-17.94	QP
2.138095	36.55	Neutral	56	-19.45	QP
1.983315	38.29	Neutral	56	-17.71	QP
1.954188	38.01	Neutral	56	-17.99	QP

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/Neutral)	Limit (dBµV)	Margin (dB)	Detector (QP/Ave.)
1.860099	27.28	Neutral	46	-18.72	Ave.
2.061531	26.04	Neutral	46	-19.96	Ave.
1.959222	27.57	Neutral	46	-18.43	Ave.
2.138095	25.37	Neutral	46	-20.63	Ave.
1.983315	27.04	Neutral	46	-18.96	Ave.
1.954188	27.42	Neutral	46	-18.58	Ave.

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

7.1 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.

7.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 11: Emissions in non-restricted frequency bands and section 12: Emissions in restricted frequency bands.

7.3 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.*

7.4 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.

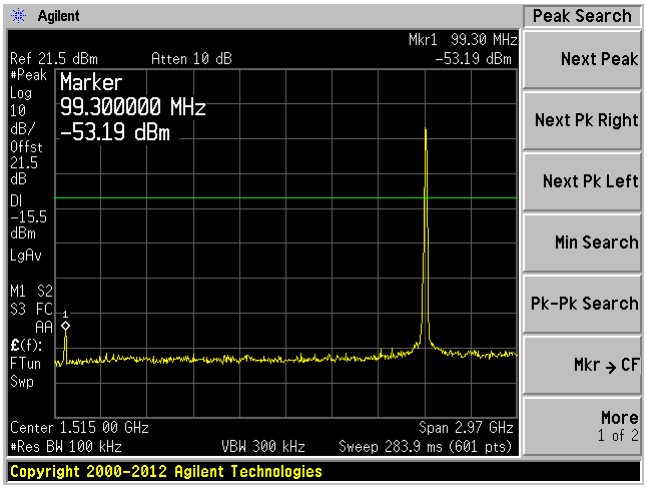
7.5 Test Results

Please refer to following plots of spurious emissions.

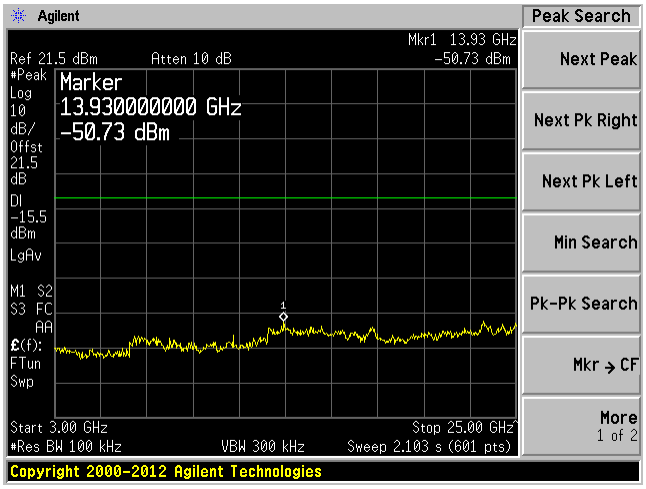
2.4 GHz Band

802.11b, Low Channel, 2412 MHz

Plot: 30 MHz – 3 GHz

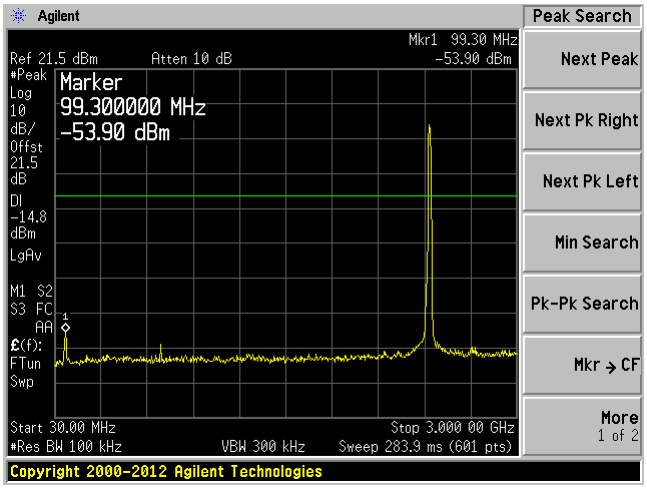


Plot: 3 GHz – 25 GHz

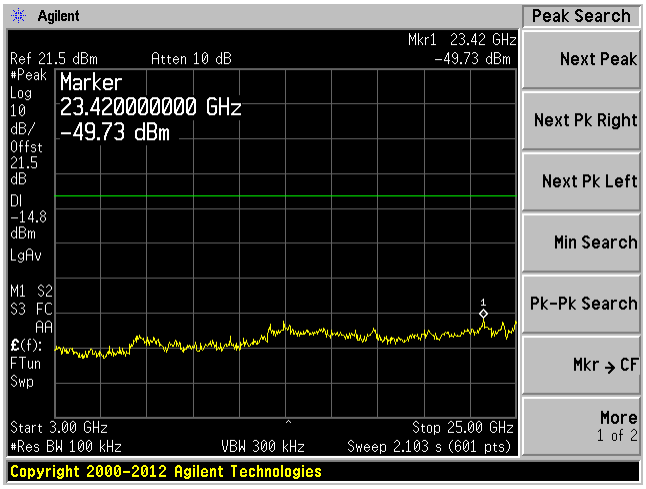


802.11b, Middle Channel, 2437 MHz

Plot: 30 MHz – 3 GHz

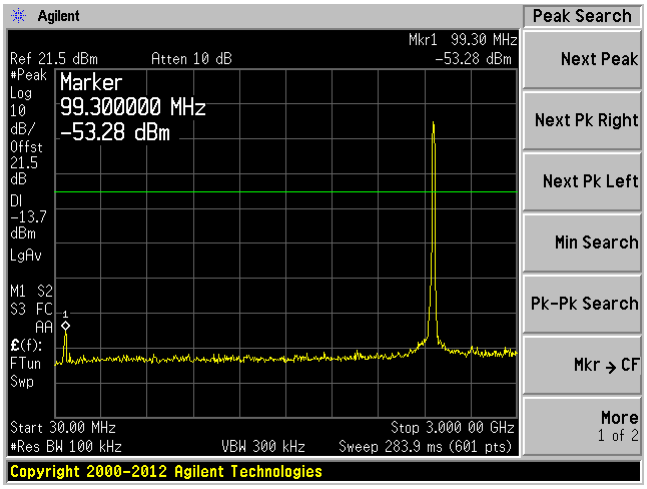


Plot: 3 GHz – 25 GHz

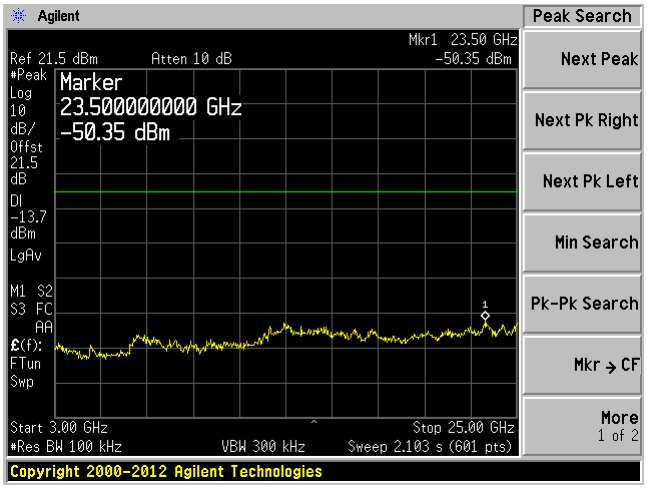


802.11b, High Channel, 2462 MHz

Plot: 30 MHz – 3 GHz

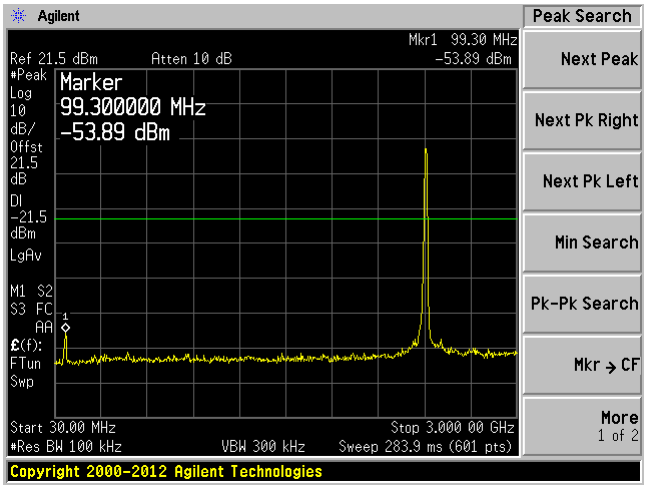


Plot: 3 GHz – 25 GHz

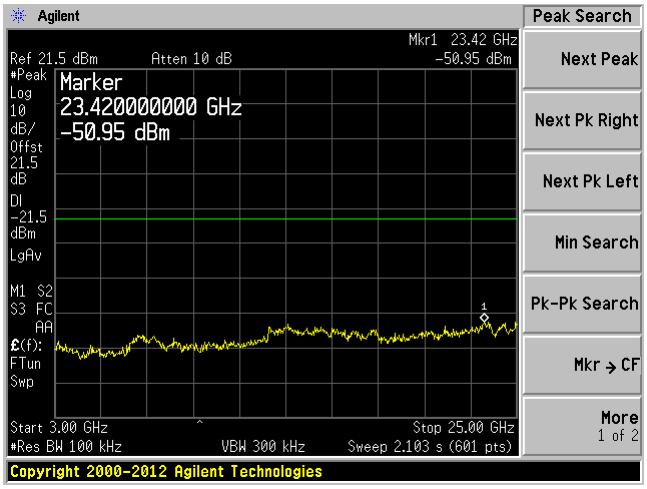


802.11g, Low Channel, 2412 MHz

Plot: 30 MHz – 3 GHz

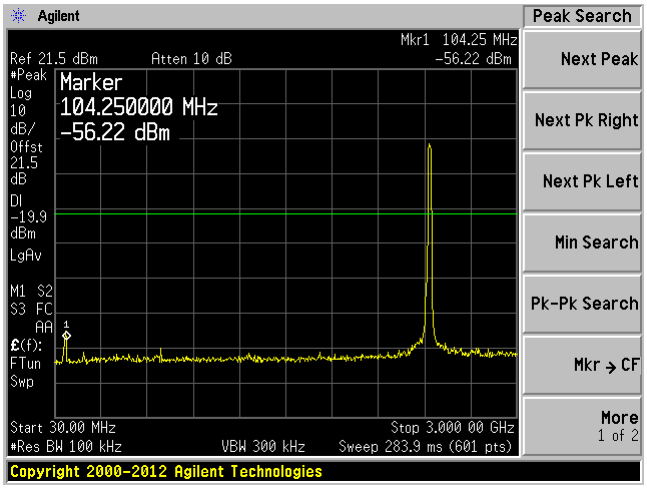


Plot: 3 GHz – 25 GHz

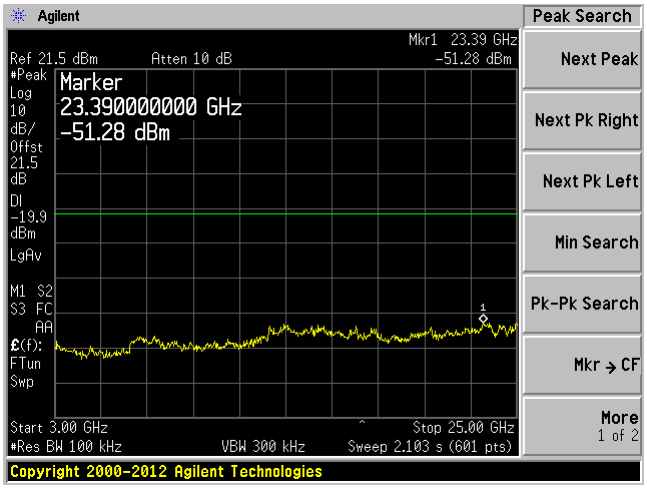


802.11g, Middle Channel, 2437 MHz

Plot: 30 MHz – 3 GHz

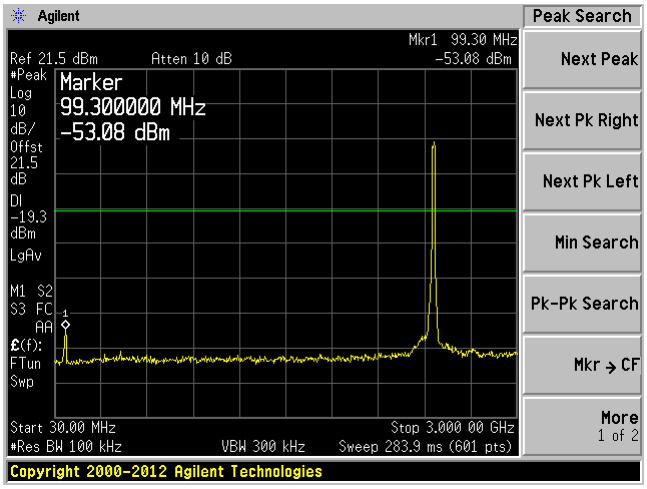


Plot: 3 GHz – 25 GHz

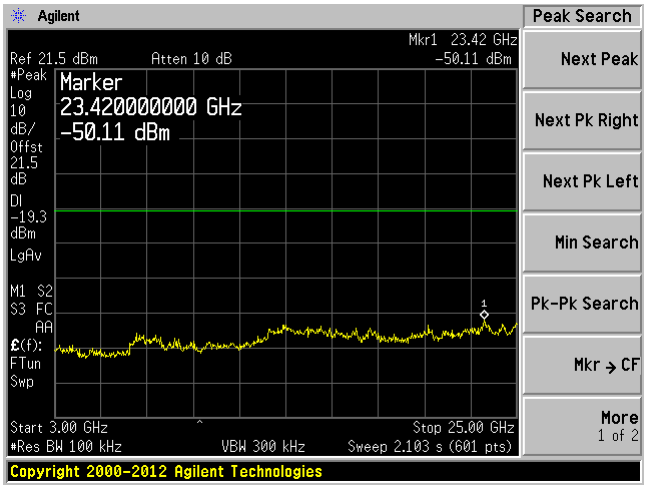


802.11g, High Channel, 2462 MHz

Plot: 30 MHz – 3 GHz

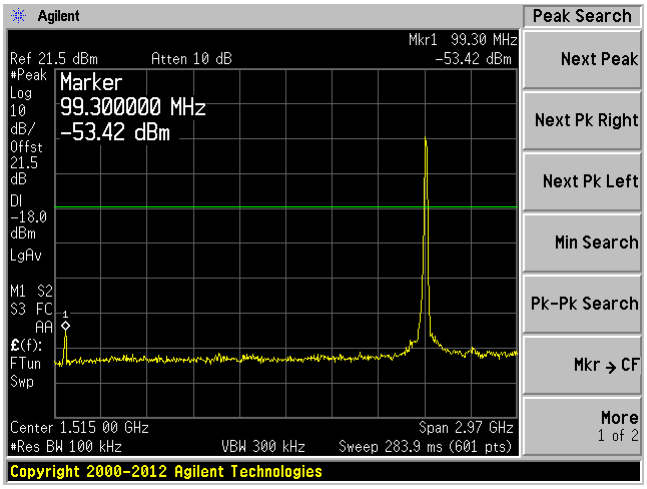


Plot: 3 GHz – 25 GHz

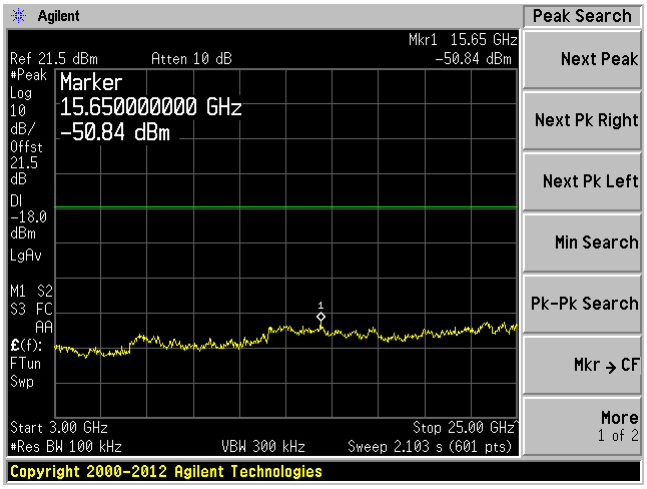


802.11n-HT20, Low Channel 2412 MHz

Plot: 30 MHz – 3 GHz

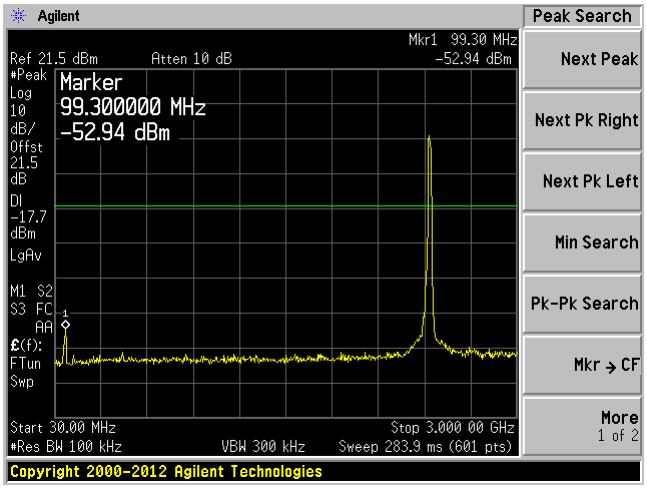


Plot: 3 GHz – 25 GHz

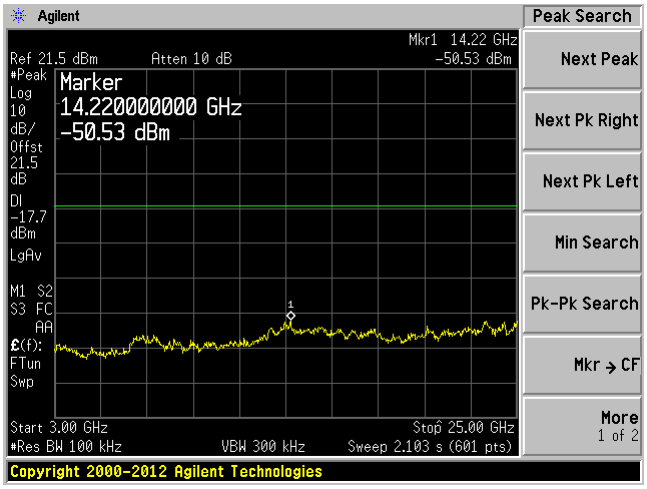


802.11n-HT20, Low Channel 2437 MHz

Plot: 30 MHz – 3 GHz

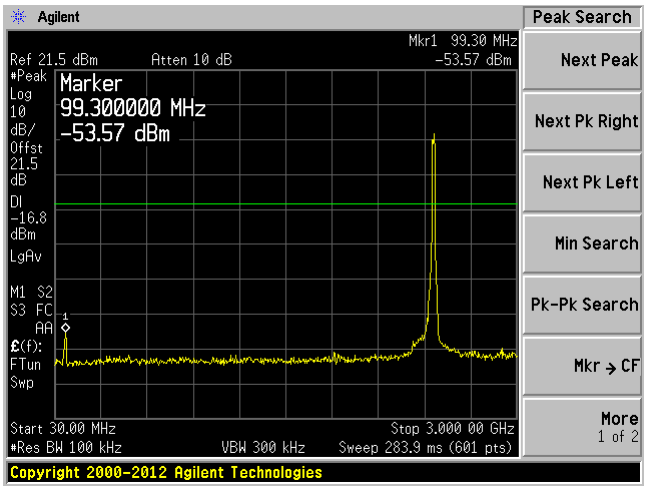


Plot: 3 GHz – 25 GHz

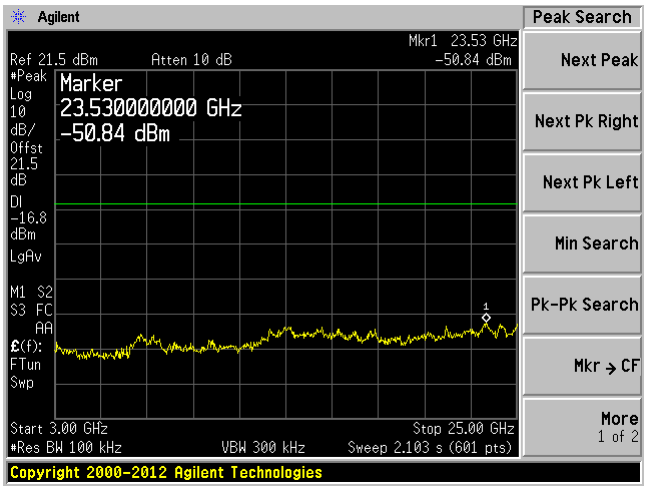


802.11n-HT20, High Channel 2462 MHz

Plot: 30 MHz – 3 GHz



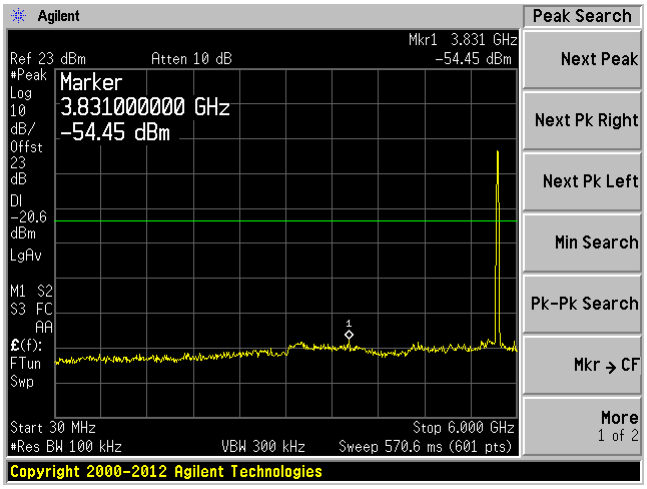
Plot: 3 GHz – 25 GHz



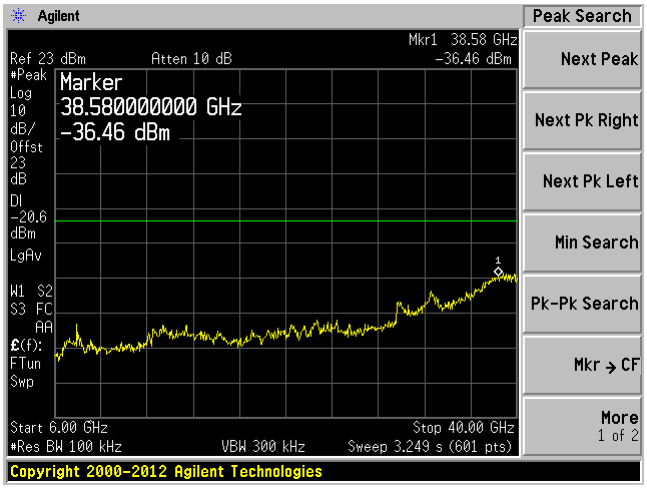
5.8 GHz Band

802.11a, Low Channel 5745 MHz

Plot: 30 MHz – 6 GHz

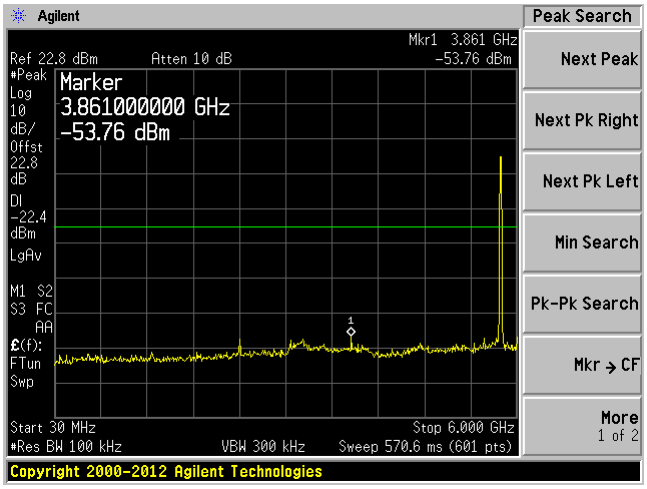


Plot: 6 GHz – 40 GHz

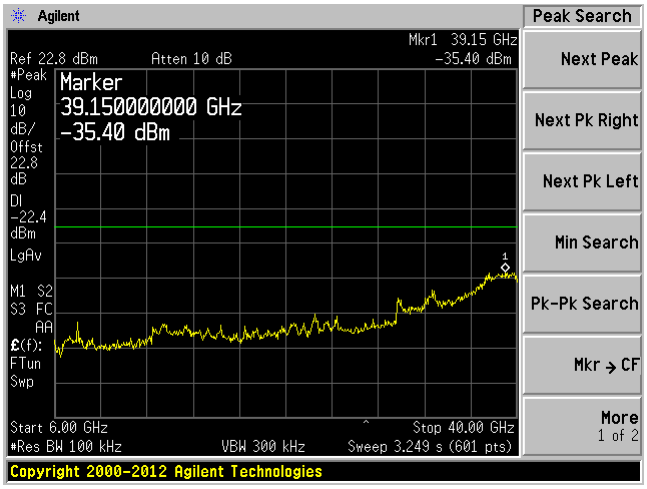


802.11a, Middle Channel 5785 MHz

Plot: 30 MHz – 6 GHz

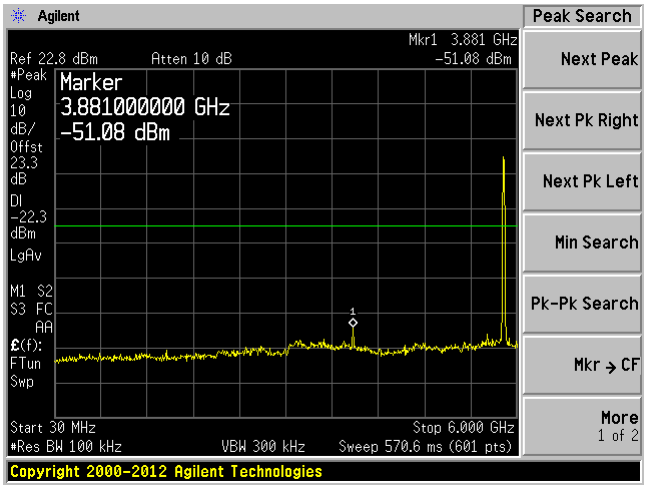


Plot: 6 GHz – 40 GHz

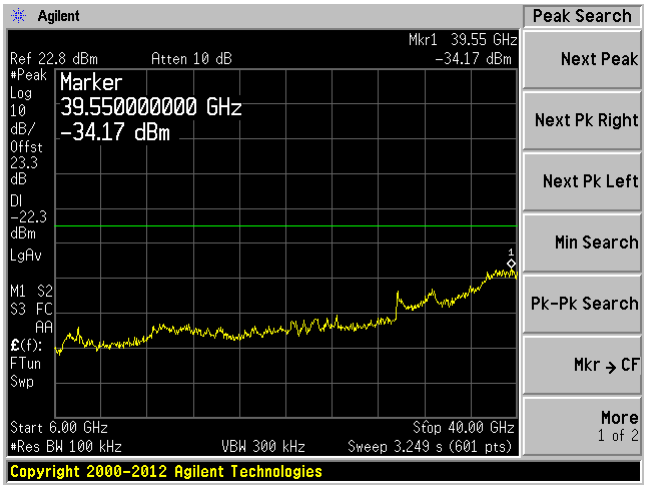


802.11a, High Channel 5825 MHz

Plot: 30 MHz – 6 GHz

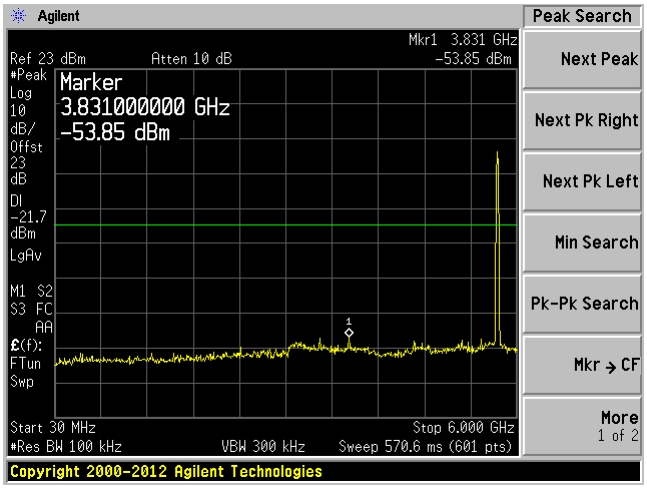


Plot: 6 GHz – 40 GHz

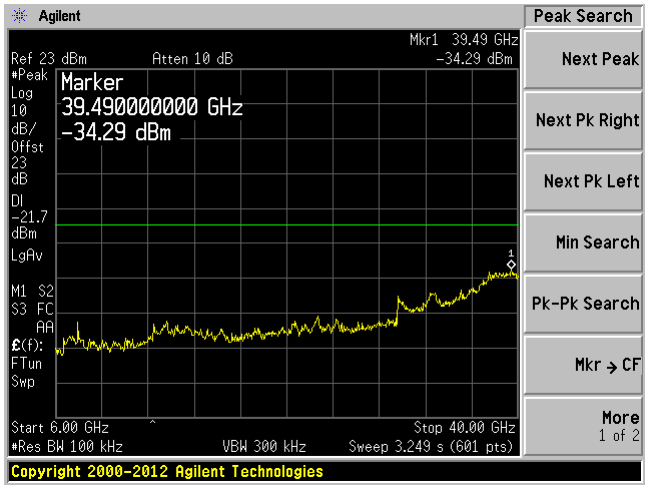


802.11n-HT20, Low Channel 5745 MHz

Plot: 30 MHz – 6 GHz

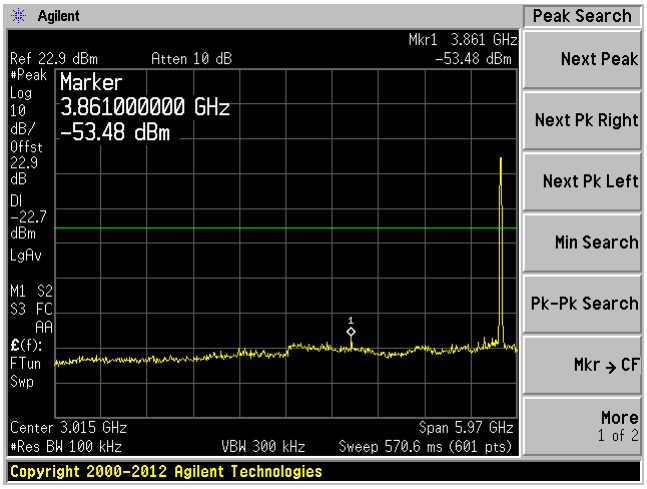


Plot: 6 GHz – 40 GHz

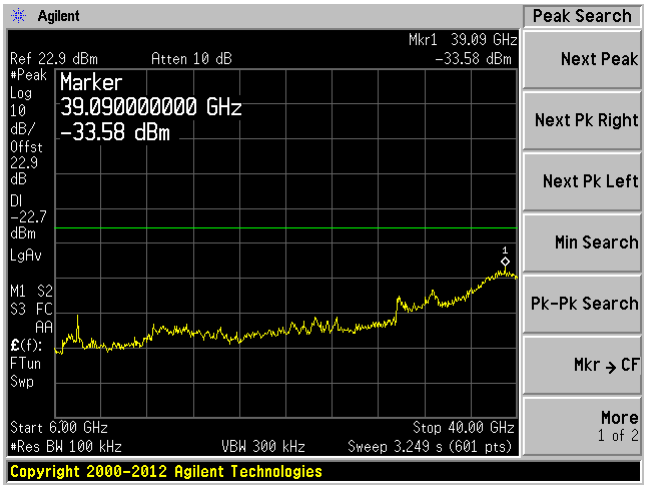


802.11n-HT20, Middle Channel 5785 MHz

Plot: 30 MHz – 6 GHz

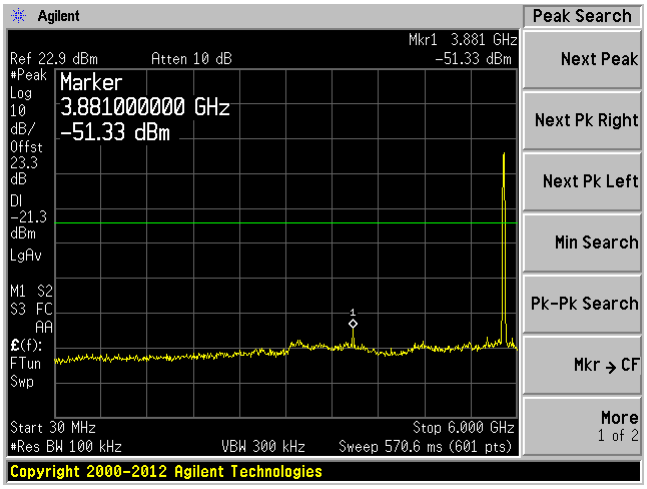


Plot: 6 GHz – 40 GHz

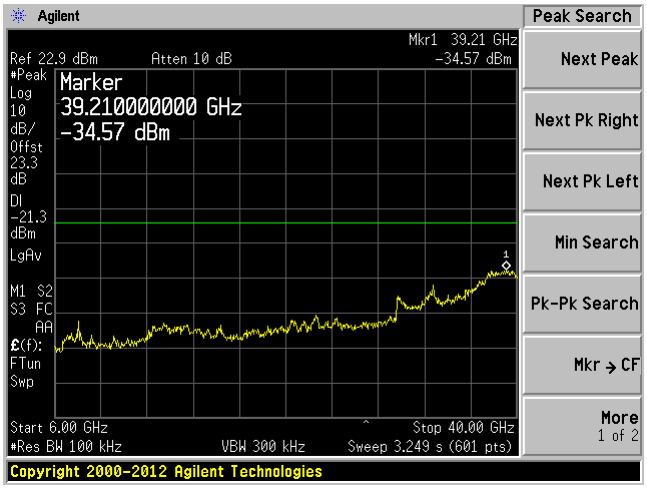


802.11n-HT20, High Channel 5825 MHz

Plot: 30 MHz – 6 GHz



Plot: 6 GHz – 40 GHz



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

8.1 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.

8.2 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 10 centimeters.

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

8.3 Test Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 11: Emissions in non-restricted frequency bands and section 12: Emissions in restricted frequency bands. 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

8.4 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

8.5 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
WiseWave	Horn Antenna	ARH-4223-02	10555-01	2012-08-09	3 Years
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.*

8.6 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.

8.7 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**
-1.44	566.5195	Vertical	worst case

5.8 GHz Band

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-0.94	566.5565	Horizontal	worst case

1–26 GHz:

2.4 GHz Band

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-0.135	2483.5	Horizontal	802.11n 20 mode High Channel

1-40 GHz:

5.8 GHz Band

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, Channel**
-7.513	11490	Vertical	802.11a mode Low Channel

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

8.8 Radiated Emissions Test Results

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

2.4 GHz Band, 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)
802.11b mode						
566.5195	44.56	100	V	99	46	-1.44
455.985	38.08	100	V	4	46	-7.92
383.9935	43.73	100	H	17	46	-2.27
687.2645	40.08	100	V	0	46	-5.92
499.909	39.75	109	V	340	46	-6.25
911.9693	37.3	100	H	73	46	-8.7

5.8 GHz Band, 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						
566.5565	45.06	101	H	260	46	-0.94
499.9045	40.52	100	V	328	46	-5.48
383.9865	42.33	105	H	38	46	-3.67
687.259	41.71	103	H	99	46	-4.29
33.21925	17.4	100	V	0	40	-22.6
431.9665	39.98	100	V	176	46	-6.02

2) 1–26 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	74.64	158	100	V	28.956	3.12	0	106.716	-	-	Peak
2412	72.19	322	136	H	28.956	3.12	0	104.266	-	-	Peak
2412	70.99	158	100	V	28.956	3.12	0	103.066	-	-	Ave
2412	68.55	322	136	H	28.956	3.12	0	100.626	-	-	Ave
2390	30.16	0	100	V	28.956	3.12	0	62.236	74	-11.764	Peak
2390	29.68	0	100	H	28.956	3.12	0	61.756	74	-12.244	Peak
2390	14.92	0	100	V	28.956	3.12	0	46.996	54	-7.004	Ave
2390	14.87	0	100	H	28.956	3.12	0	46.946	54	-7.054	Ave
4824	47.35	0	100	V	33.097	4.56	34.29	50.717	74	-23.283	Peak
4824	47.78	0	100	H	33.097	4.56	34.29	51.147	74	-22.853	Peak
4824	32.45	0	100	V	33.097	4.56	34.29	35.817	54	-18.183	Ave
4824	32.46	0	100	H	33.097	4.56	34.29	35.827	54	-18.173	Ave
7236	47.47	0	100	V	35.928	5.49	34.39	54.498	86.716	-32.218	Peak
7236	47.277	0	100	H	35.928	5.49	34.39	54.305	84.266	-29.961	Peak
7236	32.681	0	100	V	35.928	5.49	34.39	39.709	83.066	-43.357	Ave
7236	32.699	0	100	H	35.928	5.49	34.39	39.727	80.626	-40.899	Ave
9648	47.765	0	100	V	37.954	6.54	34.9	57.359	86.716	-29.357	Peak
9648	47.105	0	100	H	37.954	6.54	34.9	56.699	84.266	-27.567	Peak
9648	33.514	0	100	V	37.954	6.54	34.9	43.108	83.066	-39.958	Ave
9648	33.524	0	100	H	37.954	6.54	34.9	43.118	80.626	-37.508	Ave
Middle Channel 2437 MHz, measured at 3 meters											
2437	73.71	192	100	V	28.956	3.12	0	105.786	-	-	Peak
2437	72.41	321	136	H	28.956	3.12	0	104.486	-	-	Peak
2437	70.26	192	100	V	28.956	3.12	0	102.336	-	-	Ave
2437	68.82	321	136	H	28.956	3.12	0	100.896	-	-	Ave
4874	45.953	0	100	V	33.327	4.54	34.29	49.53	74	-24.47	Peak
4874	46.147	0	100	H	33.327	4.54	34.29	49.724	74	-24.276	Peak
4874	32.017	0	100	V	33.327	4.54	34.29	35.594	54	-18.406	Ave
4874	32.01	0	100	H	33.327	4.54	34.29	35.587	54	-18.413	Ave
7311	45.719	0	100	V	36.369	5.57	34.39	53.268	74	-20.732	Peak
7311	46.19	0	100	H	36.369	5.57	34.39	53.739	74	-20.261	Peak
7311	32.382	0	100	V	36.369	5.57	34.39	39.931	54	-14.069	Ave
7311	32.362	0	100	H	36.369	5.57	34.39	39.911	54	-14.089	Ave
9748	46.708	0	100	V	38.087	6.62	34.9	56.515	85.786	-29.271	Peak
9748	46.633	0	100	H	38.087	6.62	34.9	56.44	84.486	-28.046	Peak
9748	34.876	0	100	V	38.087	6.62	34.9	44.683	82.336	-37.653	Ave
9748	33.096	0	100	H	38.087	6.62	34.9	42.903	80.896	-37.993	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	74.2	187	100	V	29.155	3.25	0	106.605	-	-	Peak
2462	74.11	320	133	H	29.155	3.25	0	106.515	-	-	Peak
2462	70.84	187	100	V	29.155	3.25	0	103.245	-	-	Ave
2462	70.45	320	133	H	29.155	3.25	0	102.855	-	-	Ave
2483.5	29.22	0	100	V	29.155	3.25	0	61.625	74	-12.375	Peak
2483.5	30.36	0	100	H	29.155	3.25	0	62.765	74	-11.235	Peak
2483.5	14.36	0	100	V	29.155	3.25	0	46.765	54	-7.235	Ave
2483.5	14.77	0	100	H	29.155	3.25	0	47.175	54	-6.825	Ave
4924	45.191	0	100	V	33.327	4.52	34.29	48.748	74	-25.252	Peak
4924	44.947	0	100	H	33.327	4.52	34.29	48.504	74	-25.496	Peak
4924	31.531	0	100	V	33.327	4.52	34.29	35.088	54	-18.912	Ave
4924	31.689	0	100	H	33.327	4.52	34.29	35.246	54	-18.754	Ave
7386	45.382	0	100	V	36.565	5.62	34.39	53.177	74	-20.823	Peak
7386	45.67	0	100	H	36.565	5.62	34.39	53.465	74	-20.535	Peak
7386	31.717	0	100	V	36.565	5.62	34.39	39.512	54	-14.488	Ave
7386	31.889	0	100	H	36.565	5.62	34.39	39.684	54	-14.316	Ave
9848	46.388	0	100	V	38.287	6.55	34.9	56.325	86.605	-30.28	Peak
9848	45.991	0	100	H	38.287	6.55	34.9	55.928	86.515	-30.587	Peak
9848	32.545	0	100	V	38.287	6.55	34.9	42.482	83.245	-40.763	Ave
9848	32.537	0	100	H	38.287	6.55	34.9	42.474	82.855	-40.381	Ave

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	75.75	153	100	V	28.956	3.12	0	107.826	-	-	Peak
2412	73.25	332	100	H	28.956	3.12	0	105.326	-	-	Peak
2412	60.36	153	100	V	28.956	3.12	0	92.436	-	-	Ave
2412	57.11	332	100	H	28.956	3.12	0	89.186	-	-	Ave
2390	33.97	112	100	V	28.956	3.12	0	66.046	74	-7.954	Peak
2390	32.45	72	100	H	28.956	3.12	0	64.526	74	-9.474	Peak
2390	18.33	112	100	V	28.956	3.12	0	50.406	54	-3.594	Ave
2390	18.42	72	100	H	28.956	3.12	0	50.496	54	-3.504	Ave
4824	45.817	0	100	V	33.097	4.56	34.29	49.184	74	-24.816	Peak
4824	46.307	0	100	H	33.097	4.56	34.29	49.674	74	-24.326	Peak
4824	32.206	0	100	V	33.097	4.56	34.29	35.573	54	-18.427	Ave
4824	32.232	0	100	H	33.097	4.56	34.29	35.599	54	-18.401	Ave
7236	46.67	0	100	V	35.928	5.49	34.39	53.698	87.826	-34.128	Peak
7236	46.657	0	100	H	35.928	5.49	34.39	53.685	85.326	-31.641	Peak
7236	32.552	0	100	V	35.928	5.49	34.39	39.58	72.436	-32.856	Ave
7236	32.577	0	100	H	35.928	5.49	34.39	39.605	69.186	-29.581	Ave
9648	46.92	0	100	V	37.954	6.54	34.9	56.514	87.826	-31.312	Peak
9648	47.613	0	100	H	37.954	6.54	34.9	57.207	85.326	-28.119	Peak
9648	33.157	0	100	V	37.954	6.54	34.9	42.751	72.436	-29.685	Ave
9648	33.382	0	100	H	37.954	6.54	34.9	42.976	69.186	-26.21	Ave
Middle Channel 2437 MHz, measured at 3 meters											
2437	77.6	156	100	V	28.956	3.12	0	109.676	-	-	Peak
2437	72.74	318	100	H	28.956	3.12	0	104.816	-	-	Peak
2437	61.02	156	100	V	28.956	3.12	0	93.096	-	-	Ave
2437	58.68	318	100	H	28.956	3.12	0	90.756	-	-	Ave
4874	46.655	0	100	V	33.327	4.54	34.29	50.232	74	-23.768	Peak
4874	46.202	0	100	H	33.327	4.54	34.29	49.779	74	-24.221	Peak
4874	32.18	0	100	V	33.327	4.54	34.29	35.757	54	-18.243	Ave
4874	32.174	0	100	H	33.327	4.54	34.29	35.751	54	-18.249	Ave
7311	46.468	0	100	V	36.369	5.57	34.39	54.017	74	-19.983	Peak
7311	46.476	0	100	H	36.369	5.57	34.39	54.025	74	-19.975	Peak
7311	32.373	0	100	V	36.369	5.57	34.39	39.922	54	-14.078	Ave
7311	32.402	0	100	H	36.369	5.57	34.39	39.951	54	-14.049	Ave
9748	47.317	0	100	V	38.087	6.62	34.9	57.124	89.676	-32.552	Peak
9748	47.348	0	100	H	38.087	6.62	34.9	57.155	84.816	-27.661	Peak
9748	33.148	0	100	V	38.087	6.62	34.9	42.955	73.096	-30.141	Ave
9748	33.113	0	100	H	38.087	6.62	34.9	42.92	70.756	-27.836	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	78.34	156	100	V	29.155	3.25	0	110.745	-	-	Peak
2462	75.87	321	128	H	29.155	3.25	0	108.275	-	-	Peak
2462	62.08	156	100	V	29.155	3.25	0	94.485	-	-	Ave
2462	59.91	321	128	H	29.155	3.25	0	92.315	-	-	Ave
2483.5	34.76	153	100	V	29.155	3.25	0	67.165	74	-6.835	Peak
2483.5	36.3	321	132	H	29.155	3.25	0	68.705	74	-5.295	Peak
2483.5	17.06	153	100	V	29.155	3.25	0	49.465	54	-4.535	Ave
2483.5	16.77	321	132	H	29.155	3.25	0	49.175	54	-4.825	Ave
4924	45.937	0	100	V	33.327	4.52	34.29	49.494	74	-24.506	Peak
4924	46.196	0	100	H	33.327	4.52	34.29	49.753	74	-24.247	Peak
4924	31.665	0	100	V	33.327	4.52	34.29	35.222	54	-18.778	Ave
4924	31.696	0	100	H	33.327	4.52	34.29	35.253	54	-18.747	Ave
7386	46.302	0	100	V	36.565	5.62	34.39	54.097	74	-19.903	Peak
7386	46.562	0	100	H	36.565	5.62	34.39	54.357	74	-19.643	Peak
7386	31.851	0	100	V	36.565	5.62	34.39	39.646	54	-14.354	Ave
7386	31.507	0	100	H	36.565	5.62	34.39	39.302	54	-14.698	Ave
9848	47.352	0	100	V	38.287	6.55	34.9	57.289	90.745	-33.456	Peak
9848	47.841	0	100	H	38.287	6.55	34.9	57.778	88.275	-30.497	Peak
9848	32.893	0	100	V	38.287	6.55	34.9	42.83	74.485	-31.655	Ave
9848	32.867	0	100	H	38.287	6.55	34.9	42.804	72.315	-29.511	Ave

802.11n-HT20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz, measured at 3 meters											
2412	76.46	155	100	V	28.956	3.12	0	108.536	-	-	Peak
2412	73.36	321	100	H	28.956	3.12	0	105.436	-	-	Peak
2412	60.34	155	100	V	28.956	3.12	0	92.416	-	-	Ave
2412	56.68	321	100	H	28.956	3.12	0	88.756	-	-	Ave
2390	29.65	0	100	V	28.956	3.12	0	61.726	74	-12.274	Peak
2390	29.75	0	100	H	28.956	3.12	0	61.826	74	-12.174	Peak
2390	14.53	0	100	V	28.956	3.12	0	46.606	54	-7.394	Ave
2390	14.68	0	100	H	28.956	3.12	0	46.756	54	-7.244	Ave
4824	45.97	0	100	V	33.097	4.56	34.29	49.337	74	-24.663	Peak
4824	46.579	0	100	H	33.097	4.56	34.29	49.946	74	-24.054	Peak
4824	31.719	0	100	V	33.097	4.56	34.29	35.086	54	-18.914	Ave
4824	31.725	0	100	H	33.097	4.56	34.29	35.092	54	-18.908	Ave
7236	47.381	0	100	V	35.928	5.49	34.39	54.409	88.536	-34.127	Peak
7236	46.867	0	100	H	35.928	5.49	34.39	53.895	85.436	-31.541	Peak
7236	32.062	0	100	V	35.928	5.49	34.39	39.09	72.416	-33.326	Ave
7236	32.167	0	100	H	35.928	5.49	34.39	39.195	68.756	-29.561	Ave
9648	44.779	0	100	V	37.954	6.54	34.9	54.373	88.536	-34.163	Peak
9648	47.579	0	100	H	37.954	6.54	34.9	57.173	85.436	-28.263	Peak
9648	33.08	0	100	V	37.954	6.54	34.9	42.674	72.416	-29.742	Ave
9648	32.978	0	100	H	37.954	6.54	34.9	42.572	68.756	-26.184	Ave
Middle Channel 2437 MHz, measured at 3 meters											
2437	78.66	157	100	V	28.956	3.12	0	110.736	-	-	Peak
2437	74.58	319	100	H	28.956	3.12	0	106.656	-	-	Peak
2437	62.37	157	100	V	28.956	3.12	0	94.446	-	-	Ave
2437	58.04	319	100	H	28.956	3.12	0	90.116	-	-	Ave
4874	46.135	0	100	V	33.327	4.54	34.29	49.712	74	-24.288	Peak
4874	45.969	0	100	H	33.327	4.54	34.29	49.546	74	-24.454	Peak
4874	31.623	0	100	V	33.327	4.54	34.29	35.2	54	-18.8	Ave
4874	31.627	0	100	H	33.327	4.54	34.29	35.204	54	-18.796	Ave
7311	46.92	0	100	V	36.369	5.57	34.39	54.469	74	-19.531	Peak
7311	46.499	0	100	H	36.369	5.57	34.39	54.048	74	-19.952	Peak
7311	31.955	0	100	V	36.369	5.57	34.39	39.504	54	-14.496	Ave
7311	31.928	0	100	H	36.369	5.57	34.39	39.477	54	-14.523	Ave
9748	46.788	0	100	V	38.087	6.62	34.9	56.595	90.736	-34.141	Peak
9748	47.201	0	100	H	38.087	6.62	34.9	57.008	86.656	-29.648	Peak
9748	32.593	0	100	V	38.087	6.62	34.9	42.4	74.446	-32.046	Ave
9748	32.564	0	100	H	38.087	6.62	34.9	42.371	70.116	-27.745	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	79.64	156	100	V	29.155	3.25	0	112.045	-	-	Peak
2462	75.7	320	100	H	29.155	3.25	0	108.105	-	-	Peak
2462	62.91	156	100	V	29.155	3.25	0	95.315	-	-	Ave
2462	59.51	320	100	H	29.155	3.25	0	91.915	-	-	Ave
2483.5	37.67	151	100	V	29.155	3.25	0	70.075	74	-3.925	Peak
2483.5	41.46	326	100	H	29.155	3.25	0	73.865	74	-0.135	Peak
2483.5	17.35	151	100	V	29.155	3.25	0	49.755	54	-4.245	Ave
2483.5	18.99	326	100	H	29.155	3.25	0	51.395	54	-2.605	Ave
4924	45.947	0	100	V	33.327	4.52	34.29	49.504	74	-24.496	Peak
4924	45.751	0	100	H	33.327	4.52	34.29	49.308	74	-24.692	Peak
4924	31.245	0	100	V	33.327	4.52	34.29	34.802	54	-19.198	Ave
4924	31.272	0	100	H	33.327	4.52	34.29	34.829	54	-19.171	Ave
7386	46.09	0	100	V	36.565	5.62	34.39	53.885	74	-20.115	Peak
7386	45.846	0	100	H	36.565	5.62	34.39	53.641	74	-20.359	Peak
7386	31.564	0	100	V	36.565	5.62	34.39	39.359	54	-14.641	Ave
7386	31.571	0	100	H	36.565	5.62	34.39	39.366	54	-14.634	Ave
9848	46.896	0	100	V	38.287	6.55	34.9	56.833	92.045	-35.212	Peak
9848	47.048	0	100	H	38.287	6.55	34.9	56.985	88.105	-31.12	Peak
9848	32.504	0	100	V	38.287	6.55	34.9	42.441	75.315	-32.874	Ave
9848	32.511	0	100	H	38.287	6.55	34.9	42.448	71.915	-29.467	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	70.57	99	100	V	34.392	4.85	0	109.812	-	-	Peak
5745	65.94	80	132	H	34.392	4.85	0	105.182	-	-	Peak
5745	58.46	99	100	V	34.392	4.85	0	97.702	-	-	Ave
5745	54.24	80	132	H	34.392	4.85	0	93.482	-	-	Ave
11490	47.71	0	100	V	39.047	7.6	33.87	60.487	74	-13.513	Peak
11490	47.38	0	100	H	39.047	7.6	33.87	60.157	74	-13.843	Peak
11490	33.71	0	100	V	39.047	7.6	33.87	46.487	54	-7.513	Ave
11490	33.66	0	100	H	39.047	7.6	33.87	46.437	54	-7.563	Ave
17235	46.99	0	100	V	43.239	8.63	33.82	65.039	89.812	-24.773	Peak
17235	46.95	0	100	H	43.239	8.63	33.82	64.999	85.182	-20.183	Peak
17235	33.96	0	100	V	43.239	8.63	33.82	52.009	77.702	-25.693	Ave
17235	33.04	0	100	H	43.239	8.63	33.82	51.089	73.482	-22.393	Ave
22980	43.25	0	100	V	35.001	6.04	34.79	49.501	74	-24.499	Peak
22980	44.35	0	100	H	35.001	6.04	34.79	50.601	74	-23.399	Peak
22980	28.35	0	100	V	35.001	6.04	34.79	34.601	54	-19.399	Ave
22980	27.55	0	100	H	35.001	6.04	34.79	33.801	54	-20.199	Ave
Middle Channel 5785 MHz, measured at 3 meters											
5785	70.18	99	100	V	34.349	4.82	0	109.349	-	-	Peak
5785	65.75	90	117	H	34.349	4.82	0	104.919	-	-	Peak
5785	58.77	99	100	V	34.349	4.82	0	97.939	-	-	Ave
5785	54.86	90	117	H	34.349	4.82	0	94.029	-	-	Ave
11570	45.61	0	100	V	39.203	7.69	33.87	58.633	74	-15.367	Peak
11570	45.05	0	100	H	39.203	7.69	33.87	58.073	74	-15.927	Peak
11570	31.74	0	100	V	39.203	7.69	33.87	44.763	54	-9.237	Ave
11570	31.72	0	100	H	39.203	7.69	33.87	44.743	54	-9.257	Ave
17355	47.69	0	100	V	45.311	8.64	33.82	67.821	89.349	-21.528	Peak
17355	47.19	0	100	H	45.311	8.64	33.82	67.321	84.919	-17.598	Peak
17355	33.05	0	100	V	45.311	8.64	33.82	53.181	77.939	-24.758	Ave
17355	33.06	0	100	H	45.311	8.64	33.82	53.191	74.029	-20.838	Ave
23140	45.21	0	100	V	35.001	6.04	34.79	51.461	74	-22.539	Peak
23140	45.01	0	100	H	35.001	6.04	34.79	51.261	74	-22.739	Peak
23140	26.87	0	100	V	35.001	6.04	34.79	33.121	54	-20.879	Ave
23140	26.51	0	100	H	35.001	6.04	34.79	32.761	54	-21.239	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	73.6	98	154	V	34.349	4.87	0	112.819	-	-	Peak
5825	68.06	94	104	H	34.349	4.87	0	107.279	-	-	Peak
5825	61.51	98	154	V	34.349	4.87	0	100.729	-	-	Ave
5825	57.57	94	104	H	34.349	4.87	0	96.789	-	-	Ave
11650	46.17	0	100	V	39.203	7.78	33.87	59.283	74	-14.717	Peak
11650	46.1	0	100	H	39.203	7.78	33.87	59.213	74	-14.787	Peak
11650	32.96	0	100	V	39.203	7.78	33.87	46.073	54	-7.927	Ave
11650	32.59	0	100	H	39.203	7.78	33.87	45.703	54	-8.297	Ave
17475	46.83	0	100	V	46.782	8.74	33.82	68.532	92.819	-24.287	Peak
17475	46.9	0	100	H	46.782	8.74	33.82	68.602	87.279	-18.677	Peak
17475	32.93	0	100	V	46.782	8.74	33.82	54.632	80.729	-26.097	Ave
17475	32.86	0	100	H	46.782	8.74	33.82	54.562	76.789	-22.227	Ave
23300	46.21	0	100	V	35.001	6.04	34.79	52.461	74	-21.539	Peak
23300	46.54	0	100	H	35.001	6.04	34.79	52.791	74	-21.209	Peak
23300	27.54	0	100	V	35.001	6.04	34.79	33.791	54	-20.209	Ave
23300	27.66	0	100	H	35.001	6.04	34.79	33.911	54	-20.089	Ave

802.11n-HT20 mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 5745 MHz, measured at 3 meters											
5745	70.07	97	100	V	34.392	4.85	0	109.312	-	-	Peak
5745	65.6	81	118	H	34.392	4.85	0	104.842	-	-	Peak
5745	55.01	97	100	V	34.392	4.85	0	94.252	-	-	Ave
5745	50.88	81	118	H	34.392	4.85	0	90.122	-	-	Ave
11490	45.77	0	100	V	39.047	7.6	33.87	58.547	74	-15.453	Peak
11490	47.06	0	100	H	39.047	7.6	33.87	59.837	74	-14.163	Peak
11490	32.35	0	100	V	39.047	7.6	33.87	45.127	54	-8.873	Ave
11490	32.28	0	100	H	39.047	7.6	33.87	45.057	54	-8.943	Ave
17235	47.87	0	100	V	43.239	8.63	33.82	65.919	89.312	-23.393	Peak
17235	47.84	0	100	H	43.239	8.63	33.82	65.889	84.842	-18.953	Peak
17235	33.64	0	100	V	43.239	8.63	33.82	51.689	74.252	-22.563	Ave
17235	33.74	0	100	H	43.239	8.63	33.82	51.789	70.122	-18.333	Ave
22980	44.28	0	100	V	35.001	6.04	34.79	50.531	74	-23.469	Peak
22980	44.69	0	100	H	35.001	6.04	34.79	50.941	74	-23.059	Peak
22980	27.69	0	100	V	35.001	6.04	34.79	33.941	54	-20.059	Ave
22980	27.57	0	100	H	35.001	6.04	34.79	33.821	54	-20.179	Ave
Middle Channel 5785 MHz, measured at 3 meters											
5785	70.18	99	100	V	34.349	4.82	0	109.349	-	-	Peak
5785	63.58	94	100	H	34.349	4.82	0	102.749	-	-	Peak
5785	55.44	99	100	V	34.349	4.82	0	94.609	-	-	Ave
5785	49.11	94	100	H	34.349	4.82	0	88.279	-	-	Ave
11570	45.13	0	100	V	39.203	7.69	33.87	58.153	74	-15.847	Peak
11570	45.65	0	100	H	39.203	7.69	33.87	58.673	74	-15.327	Peak
11570	31.9	0	100	V	39.203	7.69	33.87	44.923	54	-9.077	Ave
11570	31.81	0	100	H	39.203	7.69	33.87	44.833	54	-9.167	Ave
17355	47.54	0	100	V	45.311	8.64	33.82	67.671	89.349	-21.678	Peak
17355	47.81	0	100	H	45.311	8.64	33.82	67.941	82.749	-14.808	Peak
17355	33.16	0	100	V	45.311	8.64	33.82	53.291	74.609	-21.318	Ave
17355	33.17	0	100	H	45.311	8.64	33.82	53.301	68.279	-14.978	Ave
23140	44.85	0	100	V	35.001	6.04	34.79	51.101	74	-22.899	Peak
23140	44.68	0	100	H	35.001	6.04	34.79	50.931	74	-23.069	Peak
23140	27.02	0	100	V	35.001	6.04	34.79	33.271	54	-20.729	Ave
23140	27.32	0	100	H	35.001	6.04	34.79	33.571	54	-20.429	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	71.46	99	100	V	34.349	4.87	0	110.679	-	-	Peak
5825	66.54	94	115	H	34.349	4.87	0	105.759	-	-	Peak
5825	56.65	99	100	V	34.349	4.87	0	95.869	-	-	Ave
5825	54.04	94	115	H	34.349	4.87	0	93.259	-	-	Ave
11650	46.65	0	100	V	39.203	7.78	33.87	59.763	74	-14.237	Peak
11650	46.58	0	100	H	39.203	7.78	33.87	59.693	74	-14.307	Peak
11650	32.92	0	100	V	39.203	7.78	33.87	46.033	54	-7.967	Ave
11650	32.85	0	100	H	39.203	7.78	33.87	45.963	54	-8.037	Ave
17475	46.88	0	100	V	46.782	8.74	33.82	68.582	90.679	-22.097	Peak
17475	47.16	0	100	H	46.782	8.74	33.82	68.862	85.759	-16.897	Peak
17475	33.12	0	100	V	46.782	8.74	33.82	54.822	75.869	-21.047	Ave
17475	33.1	0	100	H	46.782	8.74	33.82	54.802	73.259	-18.457	Ave
23300	45.72	0	100	V	35.001	6.04	34.79	51.971	74	-22.029	Peak
23300	46.08	0	100	H	35.001	6.04	34.79	52.331	74	-21.669	Peak
23300	27.33	0	100	V	35.001	6.04	34.79	33.581	54	-20.419	Ave
23300	26.92	0	100	H	35.001	6.04	34.79	33.171	54	-20.829	Ave

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

9.1 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

9.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8: DTS bandwidth

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 per the 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 and Plots

2.4 GHz Band:

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Limit (MHz)	Results
802.11b mode					
Low	2412	8.112	13.8132	> 0.5	Compliant
Middle	2437	8.679	13.8554	> 0.5	Compliant
High	2462	8.587	13.8442	> 0.5	Compliant
802.11g mode					
Low	2412	15.157	16.2974	> 0.5	Compliant
Middle	2437	15.161	16.3054	> 0.5	Compliant
High	2462	15.334	16.2881	> 0.5	Compliant
802.11n HT20 mode					
Low	2412	15.152	16.3268	> 0.5	Compliant
Middle	2437	15.379	16.3205	> 0.5	Compliant
High	2462	15.095	16.3085	> 0.5	Compliant

5.8 GHz Band:

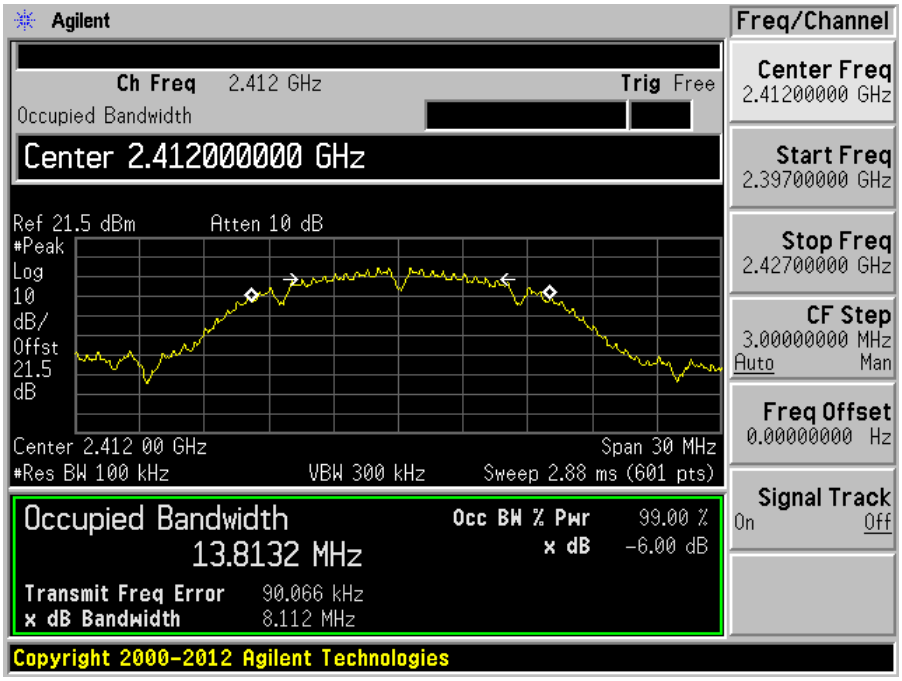
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Limit (MHz)	Results
802.11a mode					
Low	5745	16.414	16.5542	> 0.5	Compliant
Middle	5785	16.443	16.5982	> 0.5	Compliant
High	5825	16.469	16.5673	> 0.5	Compliant
802.11n HT20 mode					
Low	5745	17.637	17.7240	> 0.5	Compliant
Middle	5785	17.690	17.7406	> 0.5	Compliant
High	5825	17.668	17.7515	> 0.5	Compliant

Please refer to the following plots for detailed test results

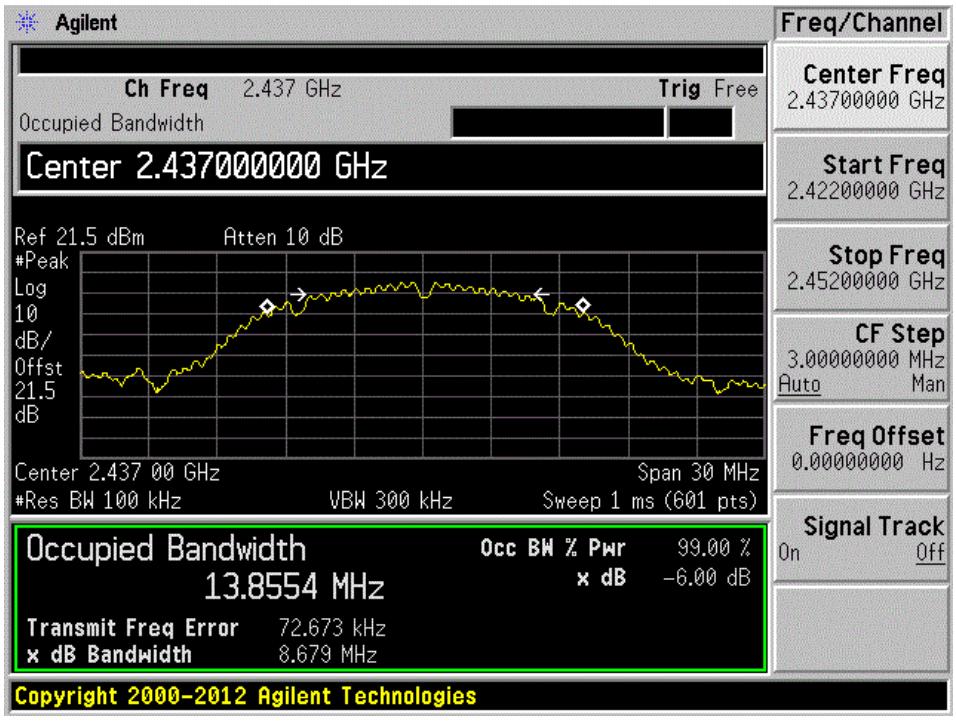
2.4 GHz Band

802.11 b mode

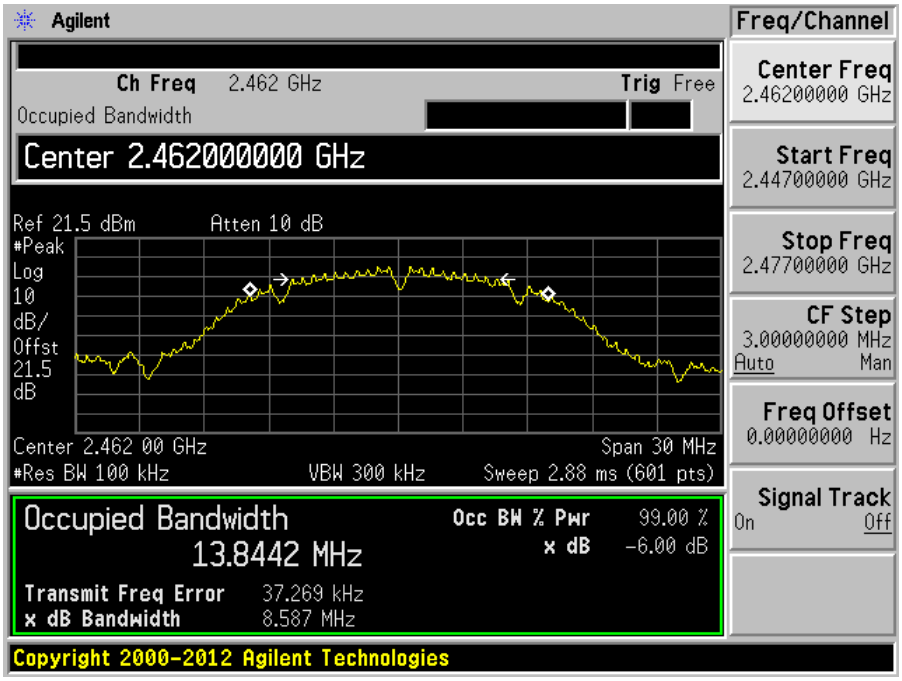
Low channel: 2412 MHz



Middle channel: 2437 MHz

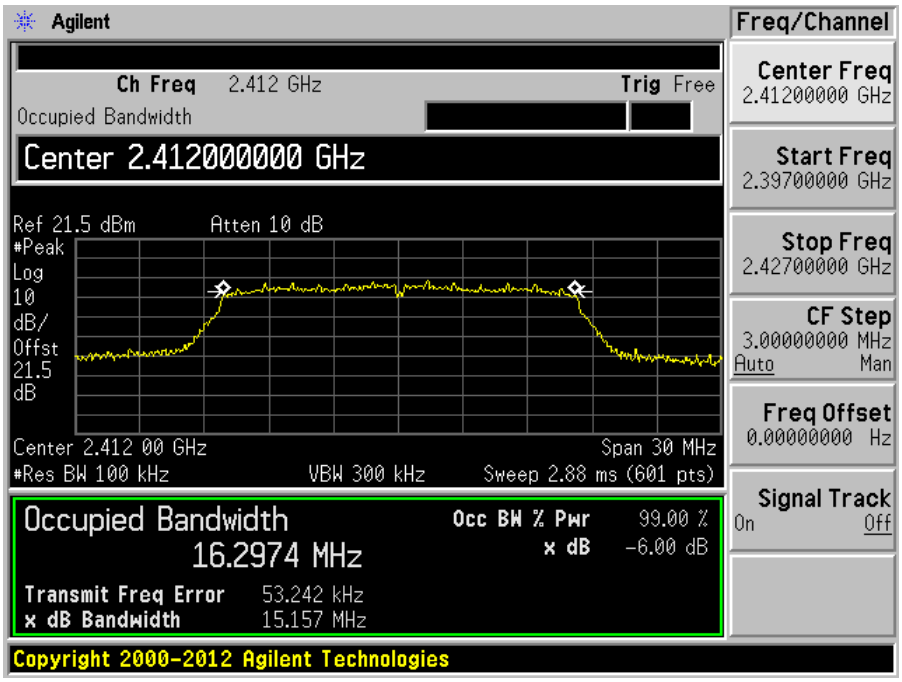


High channel: 2462 MHz

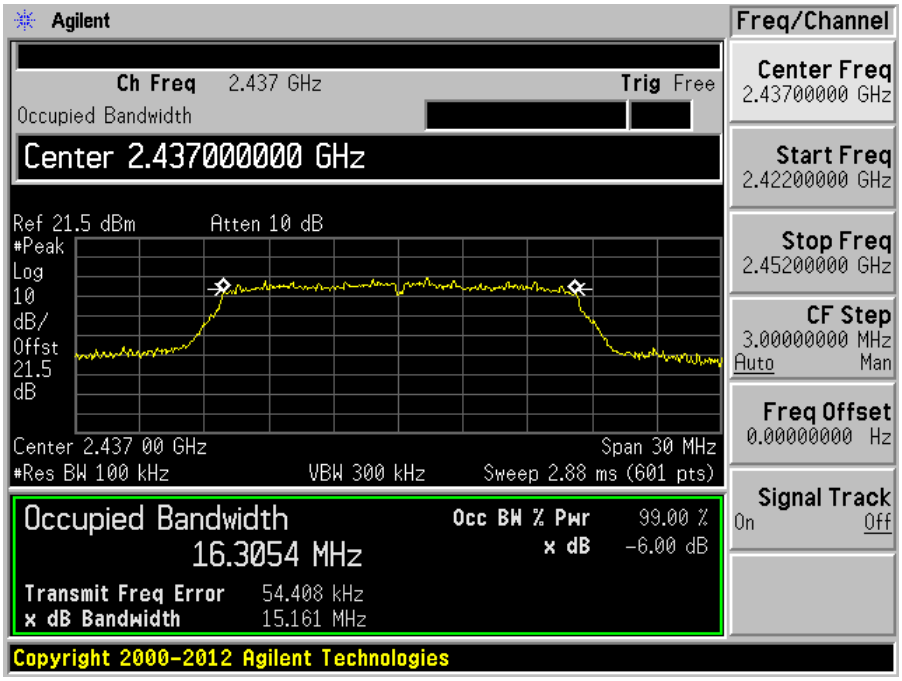


802.11 g mode

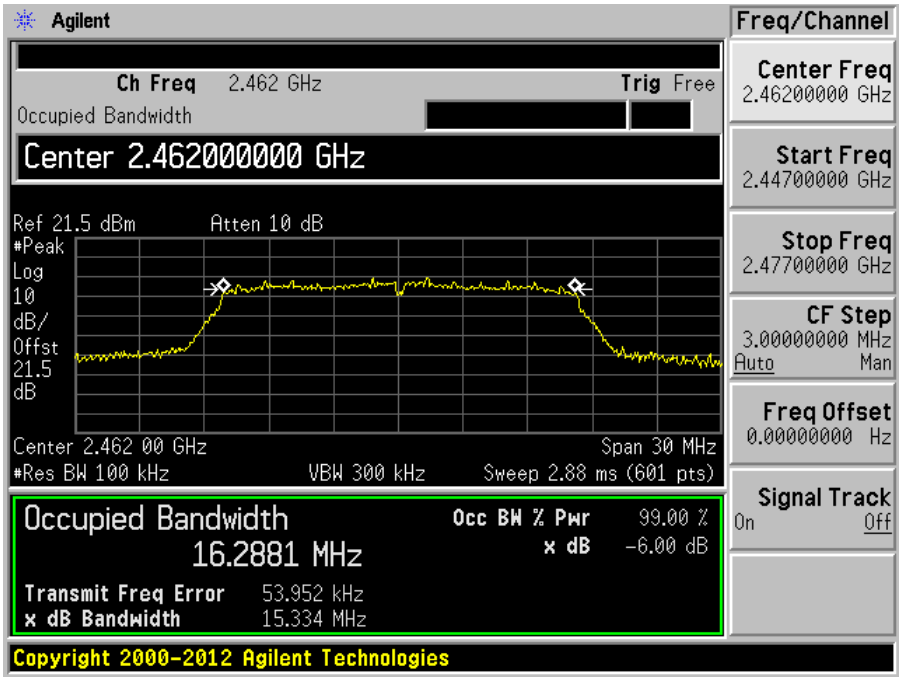
Low channel: 2412 MHz



Middle channel: 2437 MHz

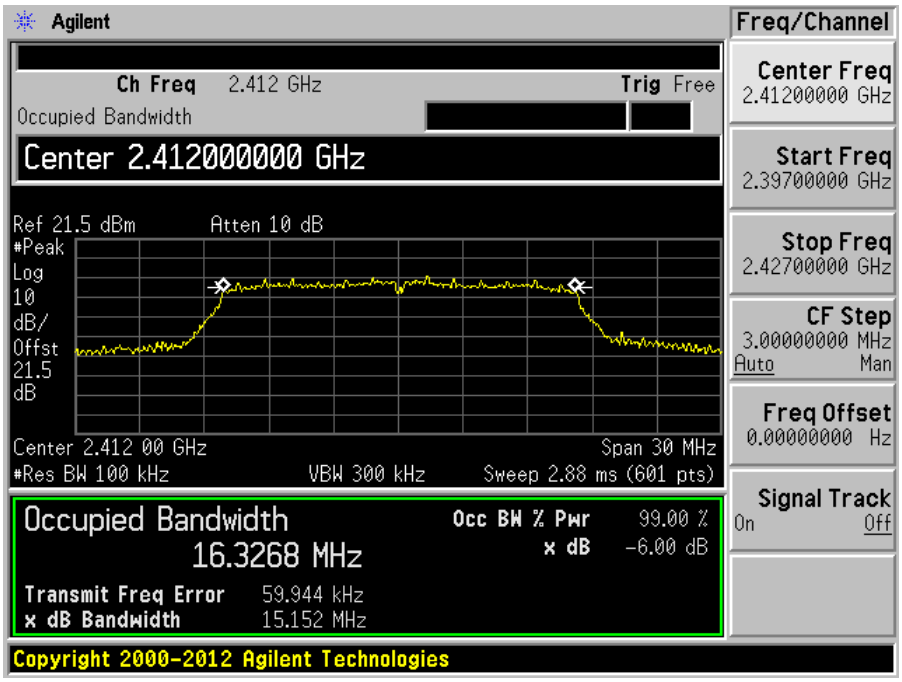


High channel: 2462 MHz

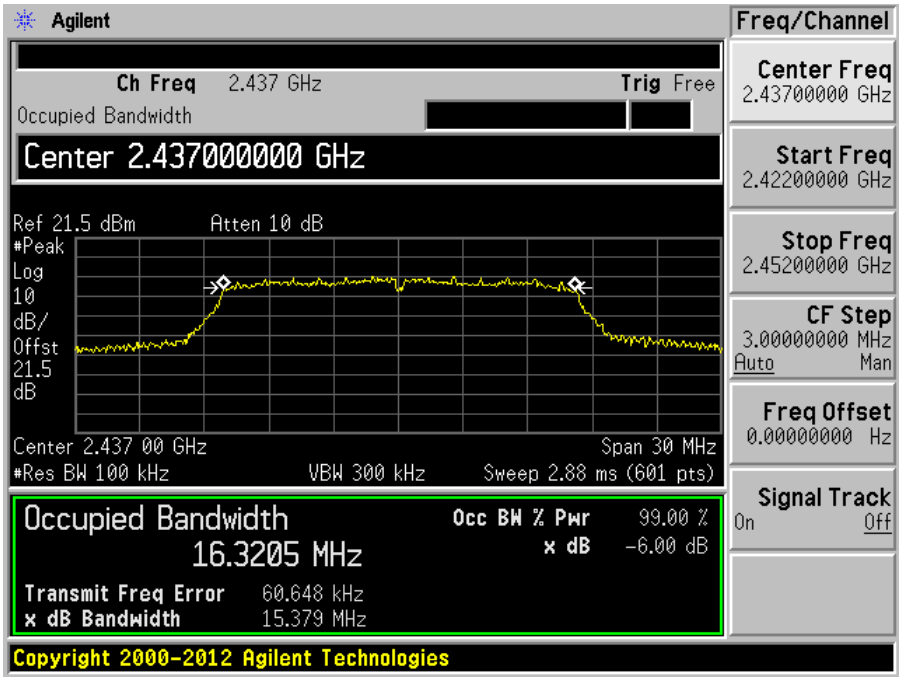


802.11n-HT20 mode

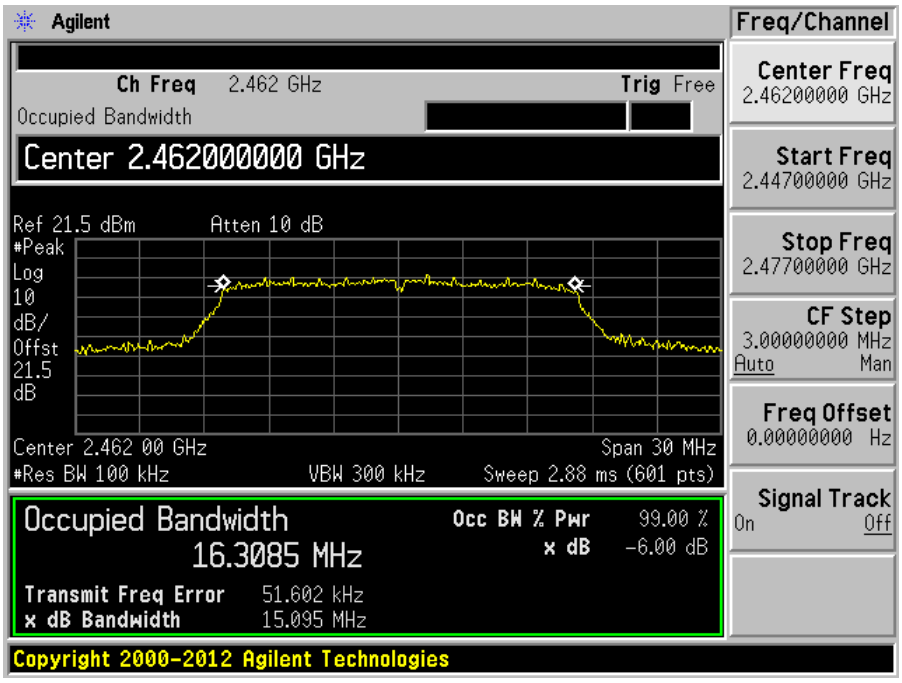
Low channel: 2412 MHz



Middle channel: 2437 MHz



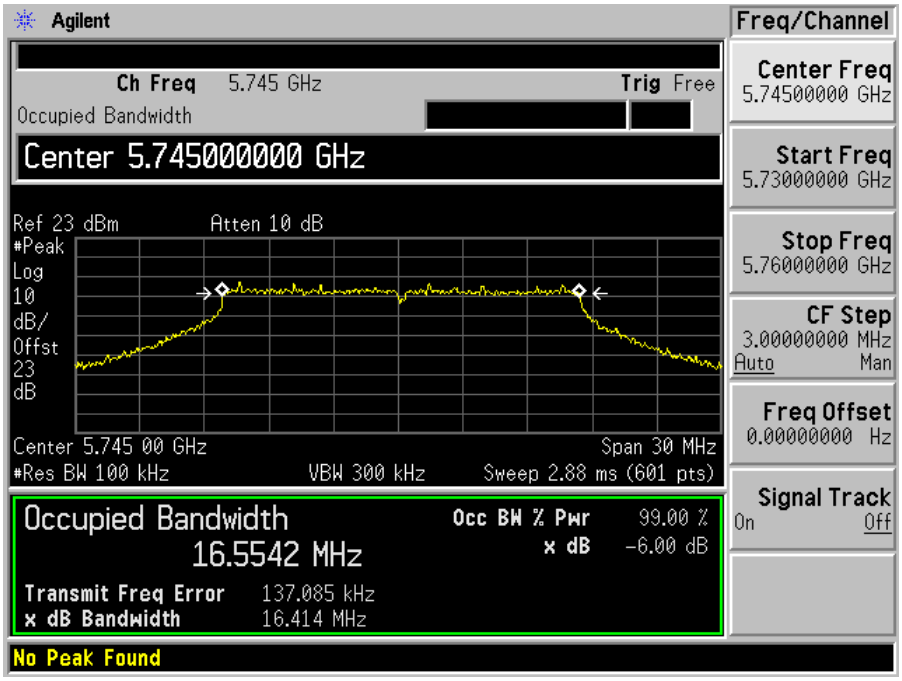
High channel: 2462 MHz



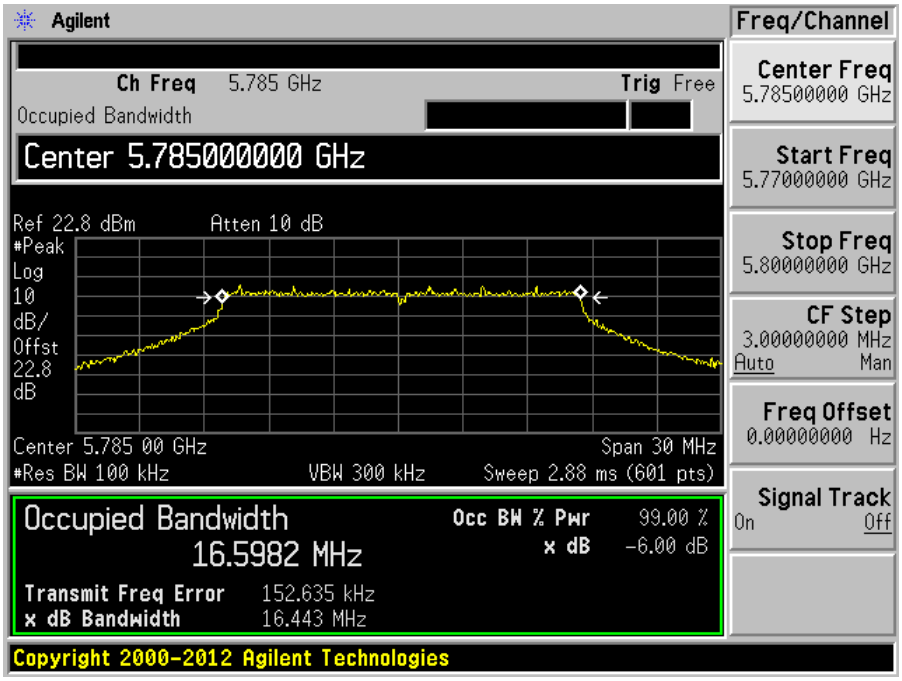
5.8 GHz Band

802.11a mode

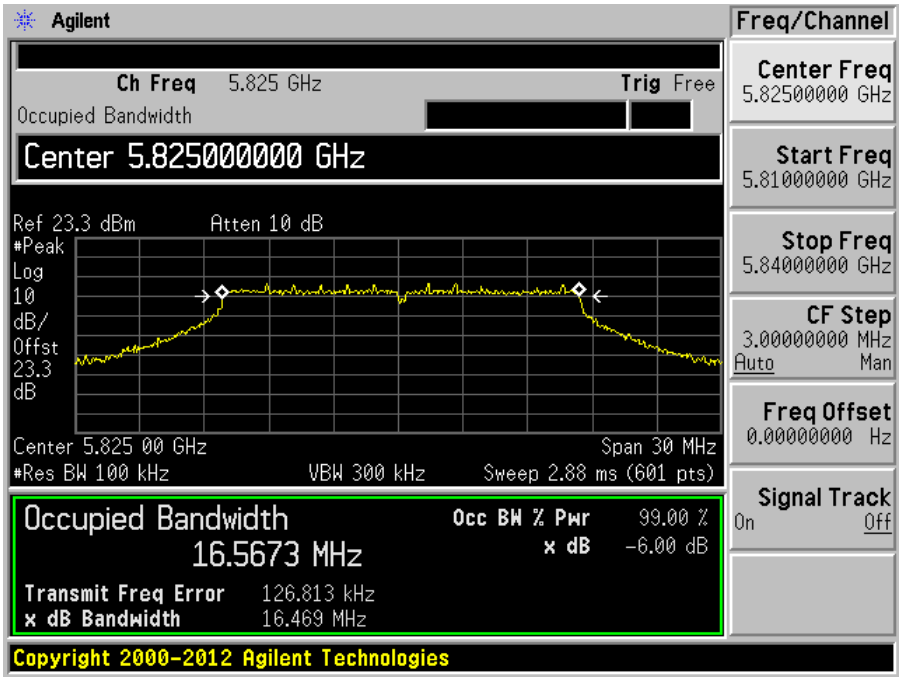
Low channel: 5745 MHz



Middle channel: 5785 MHz

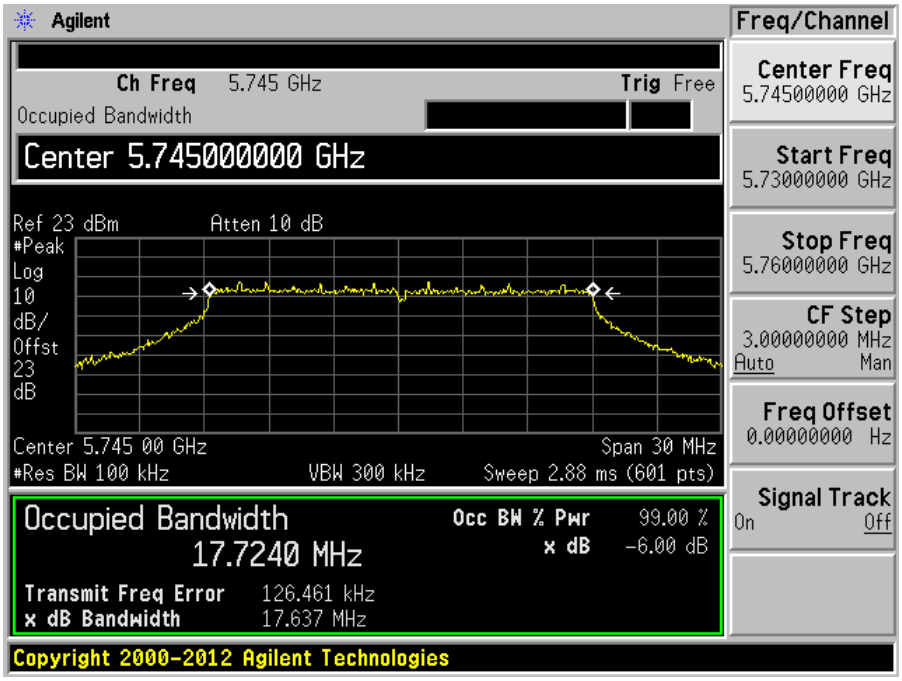


High channel: 5825 MHz

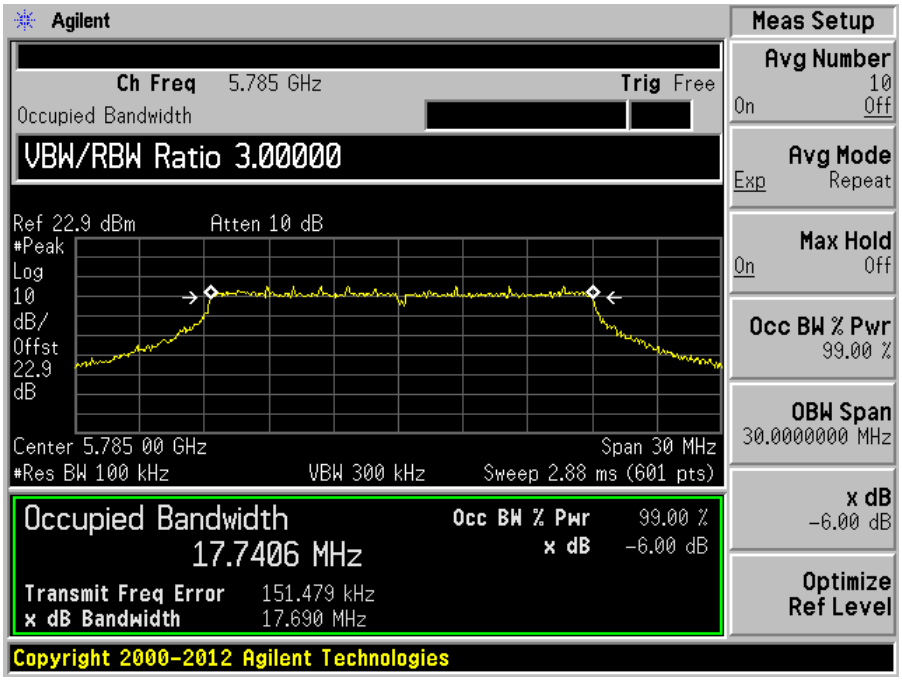


802.11n-HT20 mode

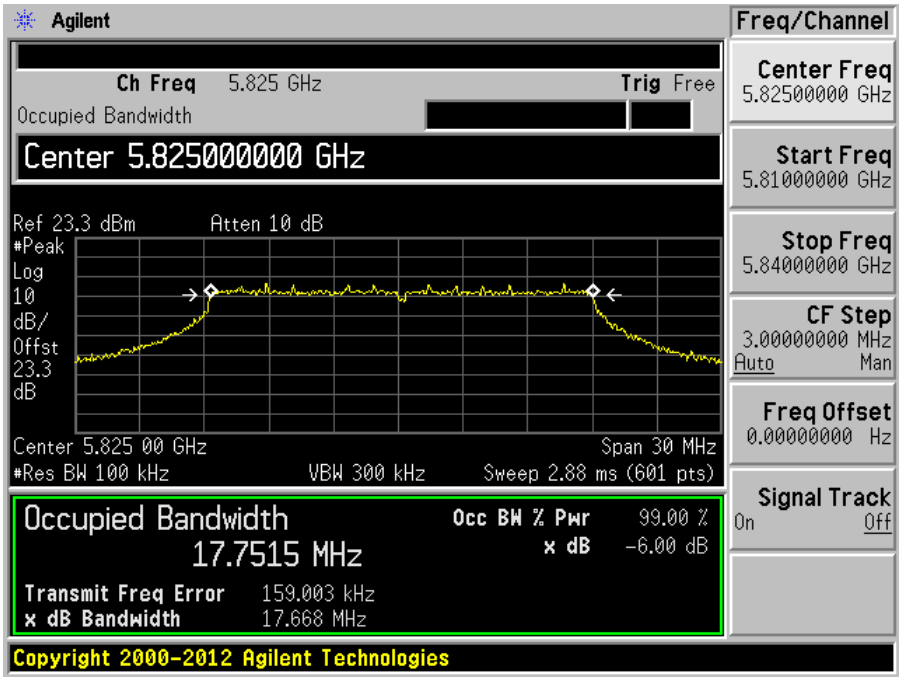
Low channel: 5745 MHz



Middle channel: 5785 MHz



High channel: 5825 MHz



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

10.1 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.

10.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 9: Fundamental emission output power

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:	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.

10.5 Test Results

Note: All the modes are tested using lowest data rate, which is the worst case:

Conducted Peak Power

2.4 GHz Band:

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
802.11b mode					
Low	2412	16.00	30	-14.00	60
Middle	2437	16.87	30	-13.13	60
High	2462	17.16	30	-12.84	60
802.11g mode					
Low	2412	18.56	30	-11.44	62
Middle	2437	19.16	30	-10.84	64
High	2462	19.32	30	-10.68	64
802.11n HT20 mode					
Low	2412	20.43	30	-9.57	64
Middle	2437	21.08	30	-8.92	64
High	2462	21.29	30	-8.71	66

5.8 GHz Band:

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
802.11a mode					
Low	5745	18.85	30	-11.15	64
Middle	5785	17.28	30	-12.72	62
High	5825	18.66	30	-11.34	64
802.11n HT20 mode					
Low	5745	18.92	30	-11.08	64
Middle	5785	17.39	30	-12.61	64
High	5825	18.87	30	-11.13	64

Average Power

2.4 GHz Band:

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
802.11b mode					
Low	2412	12.65	30	-17.35	60
Middle	2437	13.25	30	-16.75	60
High	2462	13.42	30	-16.58	60
802.11g mode					
Low	2412	12.88	30	-17.12	62
Middle	2437	13.02	30	-16.98	64
High	2462	13.24	30	-16.76	64
802.11n HT20 mode					
Low	2412	14.75	30	-15.25	64
Middle	2437	14.81	30	-15.19	64
High	2462	14.97	30	-15.03	66

5.8 GHz Band:

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Margin (dB)	Power Setting
802.11a mode					
Low	5745	13.55	30	-16.45	64
Middle	5785	13.11	30	-16.89	62
High	5825	13.53	30	-16.47	64
802.11n HT20 mode					
Low	5745	13.86	30	-16.14	64
Middle	5785	13.19	30	-16.81	64
High	5825	13.54	30	-16.46	64

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

11.1 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.

11.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 13: Band-edge measurements

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:	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.

11.5 Test Results

Please refer to following pages for plots of band edge.

2.4 GHz band:

Channel	Frequency (MHz)	Delta (dB)	Limit (dB)
802.11b mode			
Low	2412	46.31	20
High	2462	62.69	20
802.11g mode			
Low	2412	37.56	20
High	2462	50.41	20
802.11n HT20 mode			
Low	2412	37.31	20
High	2462	48.16	20

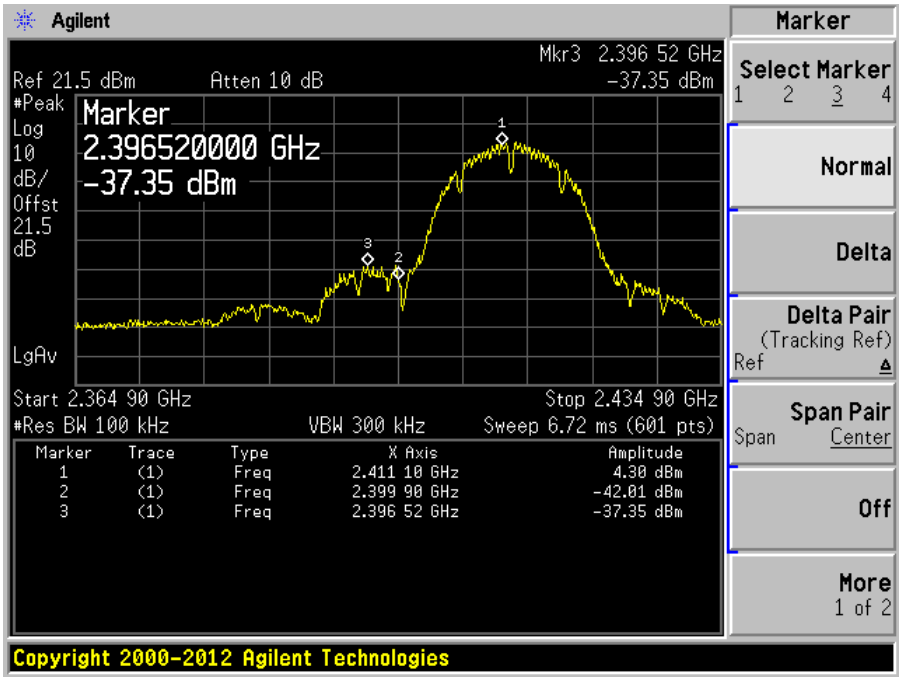
5.8 GHz band:

Channel	Frequency (MHz)	Delta (dB)	Limit (dB)
802.11a mode			
Low	5745	48.75	20
High	5825	50.48	20
802.11n HT20 mode			
Low	5745	46.79	20
High	5825	51.32	20

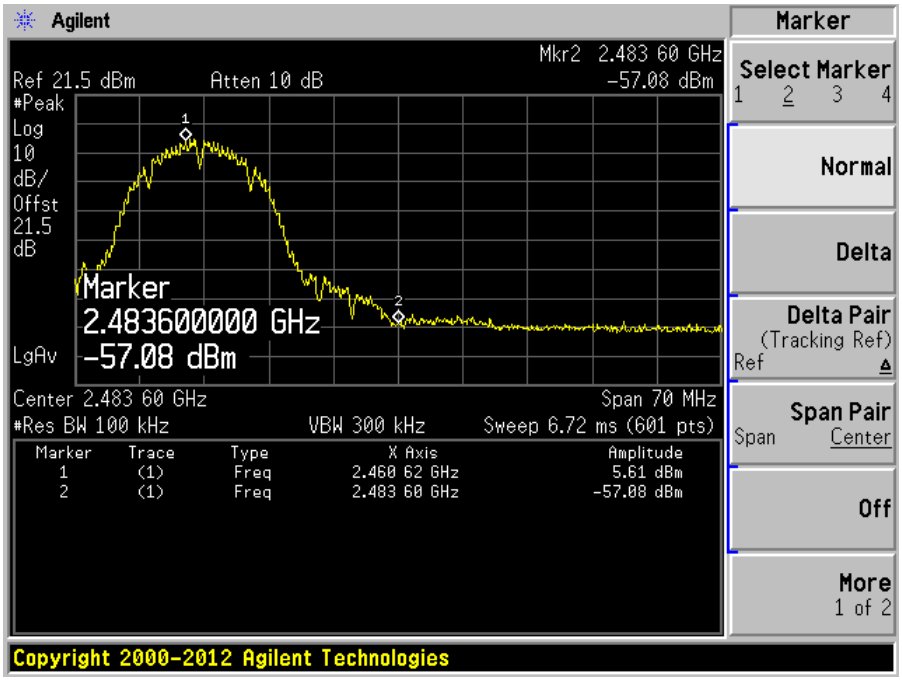
2.4 GHz Band

802.11b mode

802.11b, Low Band Edge

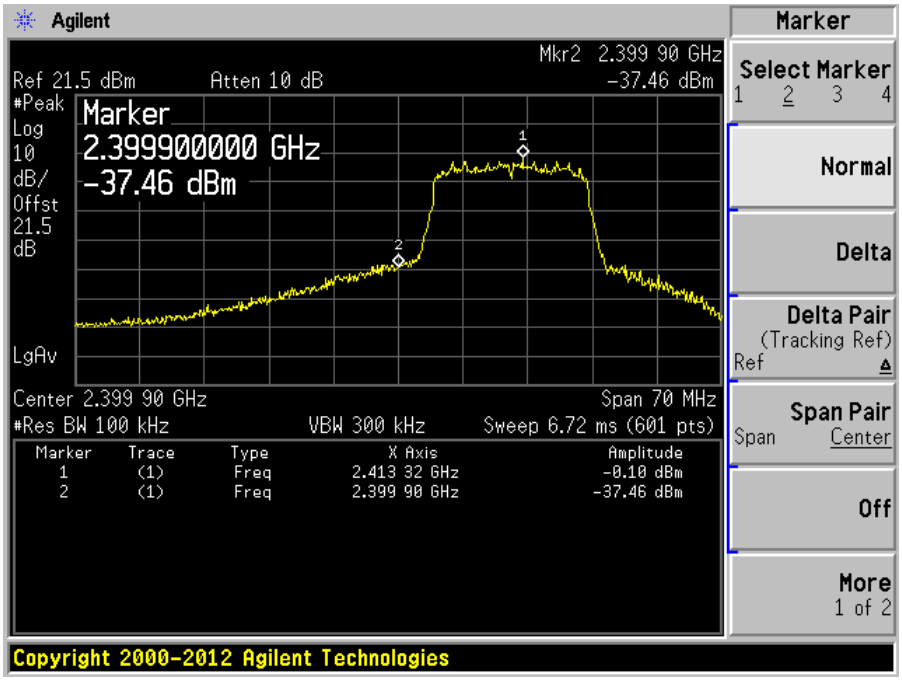


802.11b, High Band Edge

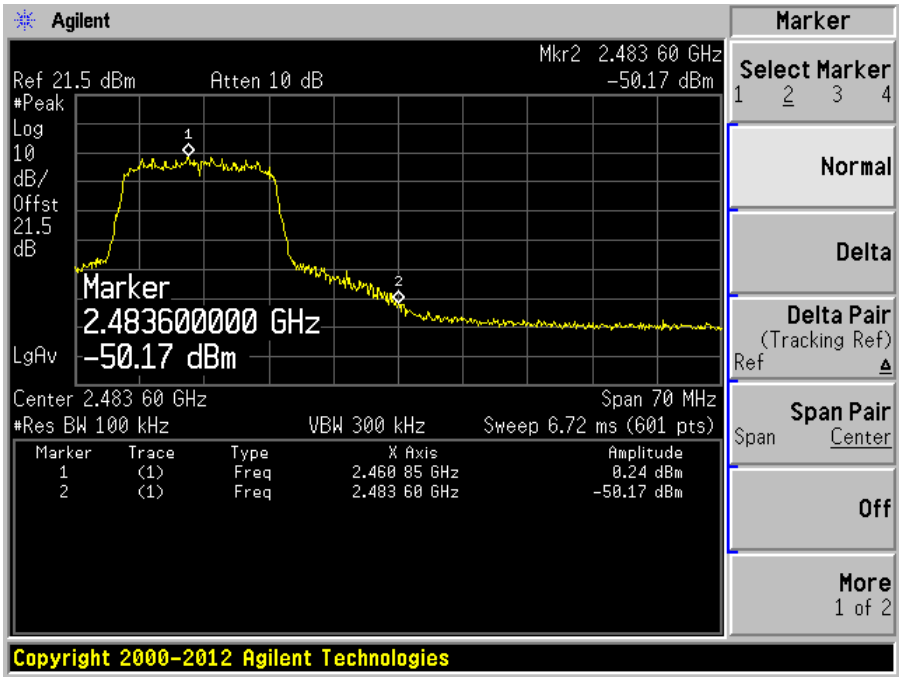


802.11g mode

802.11g, Low Band Edge

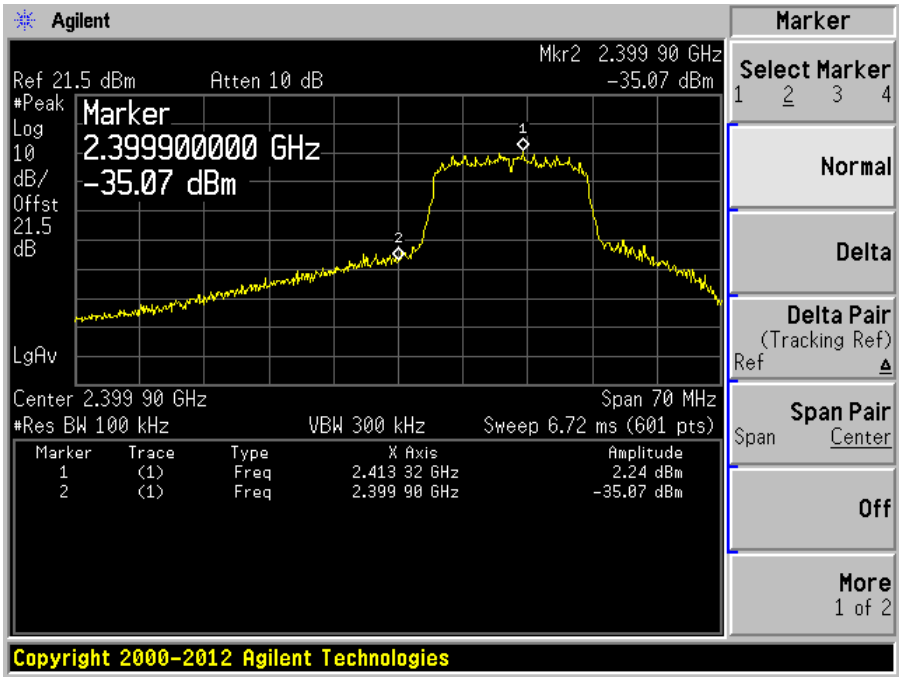


802.11g, High Band Edge

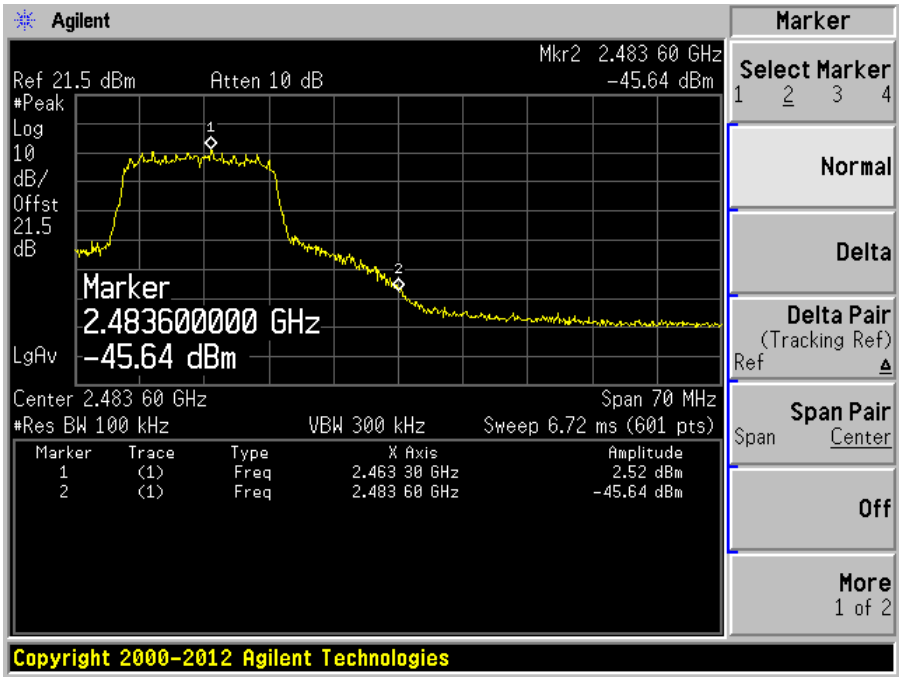


802.11n HT20 mode

802.11n HT20, Low Band Edge



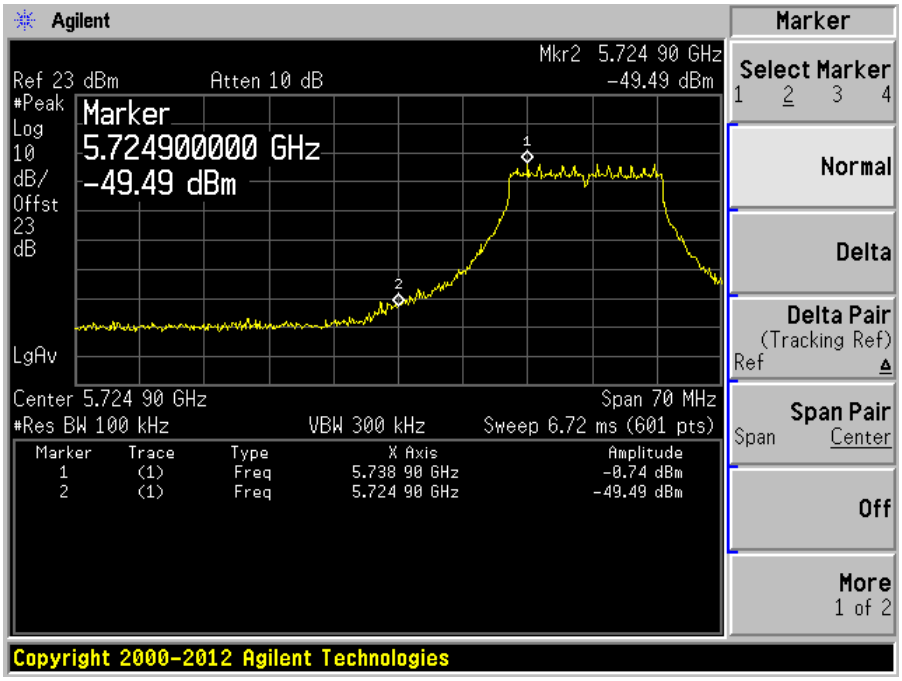
802.11n HT20, High Band Edge



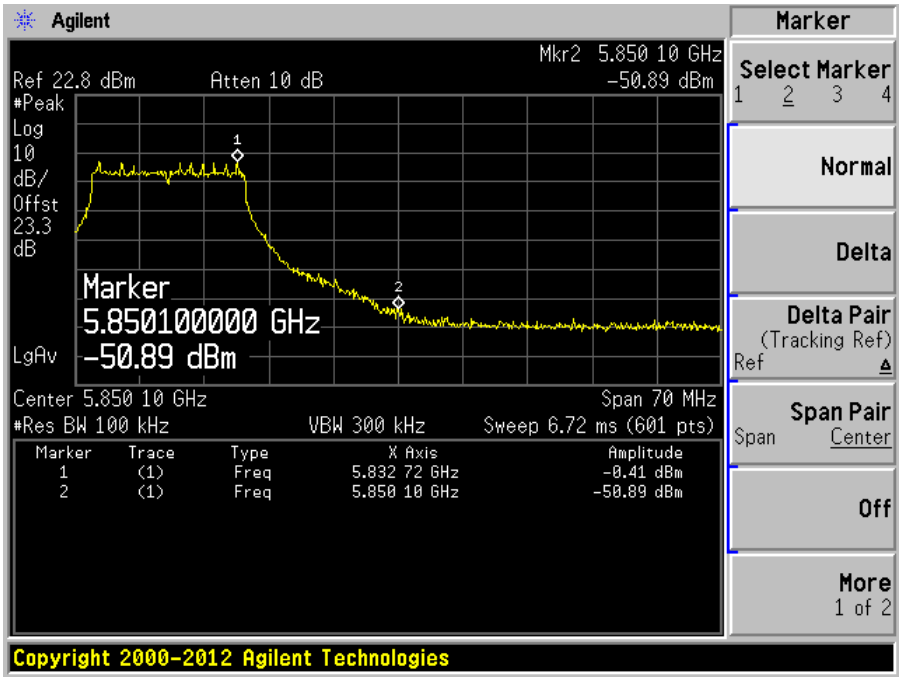
5.8 GHz Band

802.11a mode

802.11a, Low Band Edge

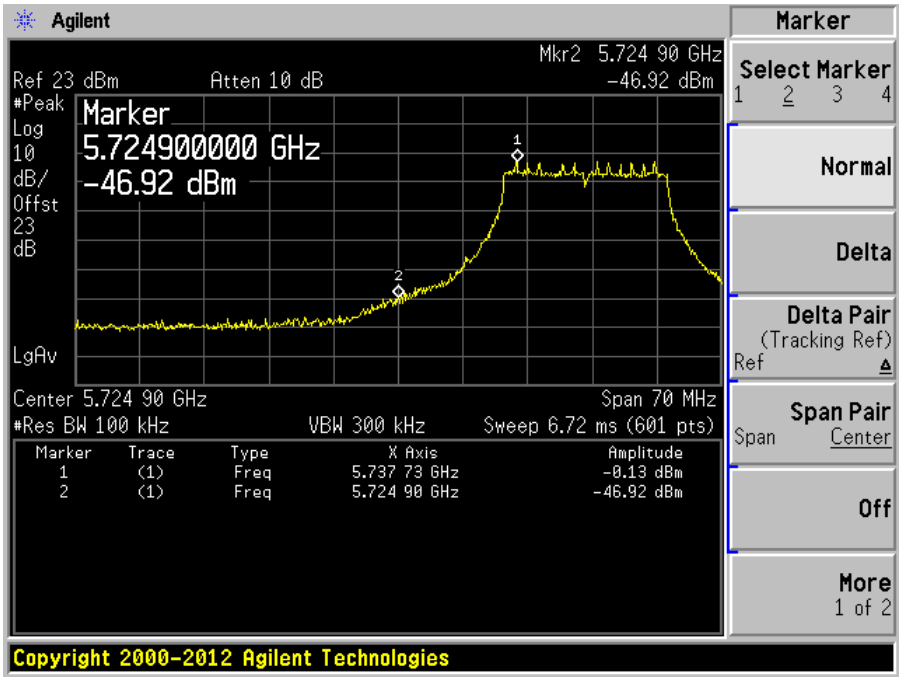


802.11a, High Band Edge

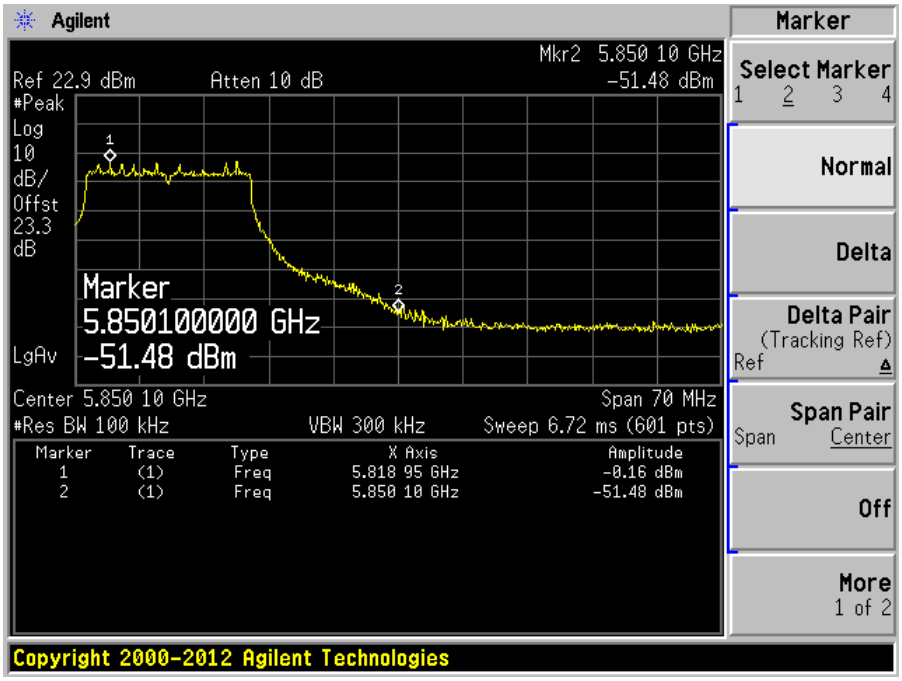


802.11n -HT20 mode

802.11n-HT20, Low Band Edge



802.11n-HT20, High Band Edge



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

12.1 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.

12.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v03r01: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 10: Maximum power spectral density level in the fundamental emission

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

2.4 GHz Band:

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
802.11b mode				
Low	2412	-8.64	8	-16.64
Middle	2437	-8.29	8	-16.29
High	2462	-7.64	8	-15.64
802.11g mode				
Low	2412	-13.69	8	-21.69
Middle	2437	-13.37	8	-21.37
High	2462	-13.64	8	-21.64
802.11n HT20 mode				
Low	2412	-11.80	8	-19.80
Middle	2437	-10.50	8	-18.50
High	2462	-11.29	8	-19.29

5.8 GHz Band:

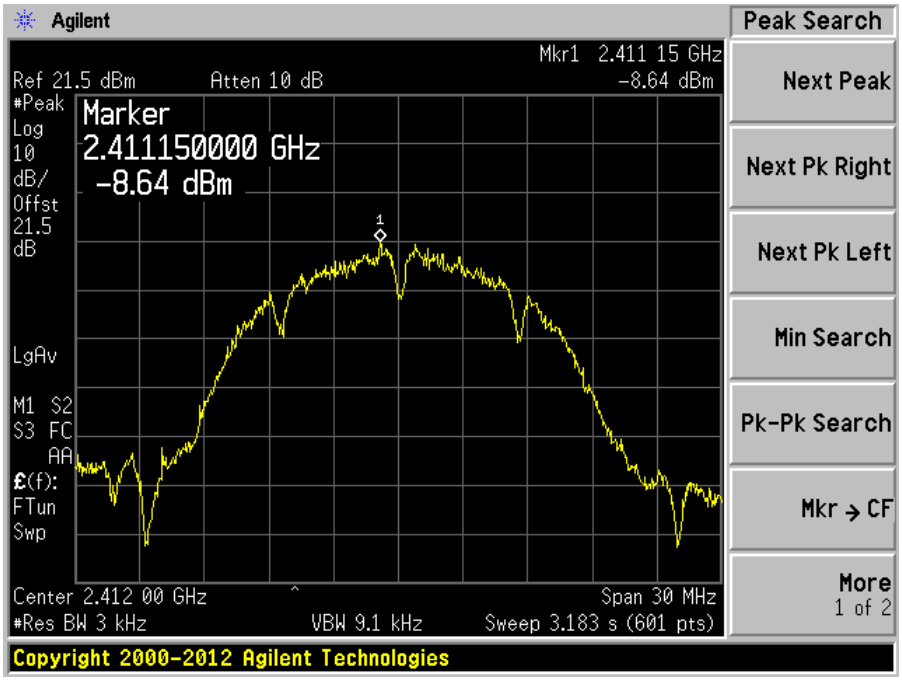
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
802.11a mode				
Low	5745	-14.53	8	-22.53
Middle	5785	-14.39	8	-22.39
High	5825	-12.18	8	-20.18
802.11n HT20 mode				
Low	5745	-14.20	8	-22.20
Middle	5785	-14.82	8	-22.82
High	5825	-13.46	8	-21.46

Please refer to the following plots for detailed test results:

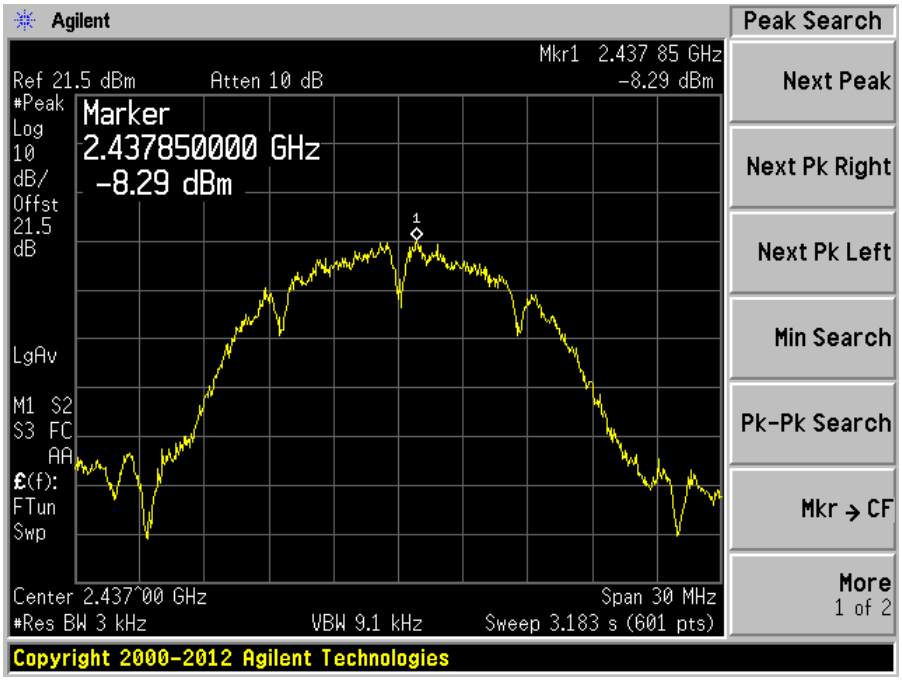
2.4 GHz Band

802.11b mode

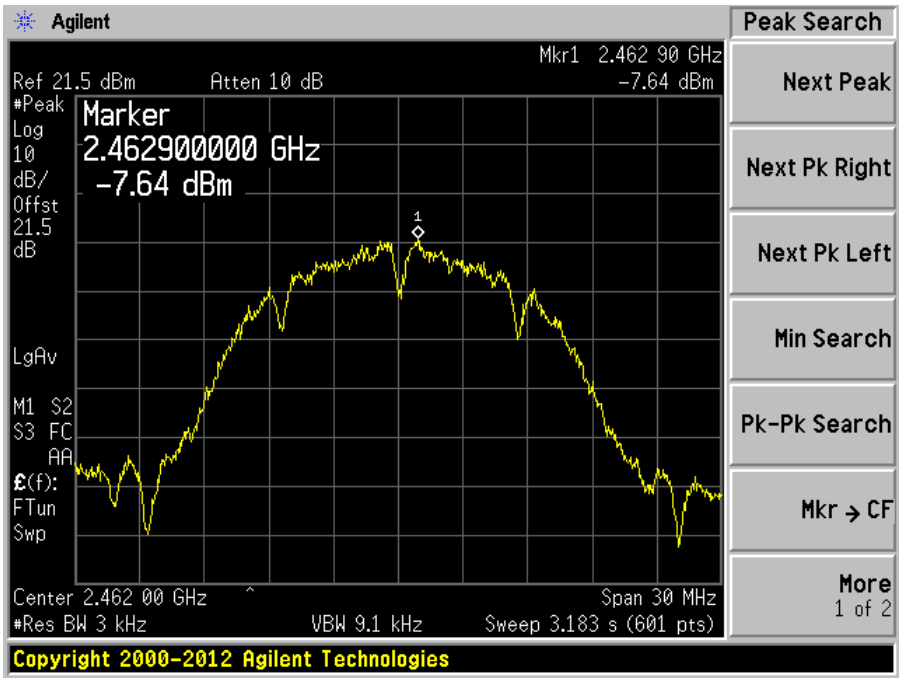
Low channel: 2412 MHz



Middle channel: 2437 MHz

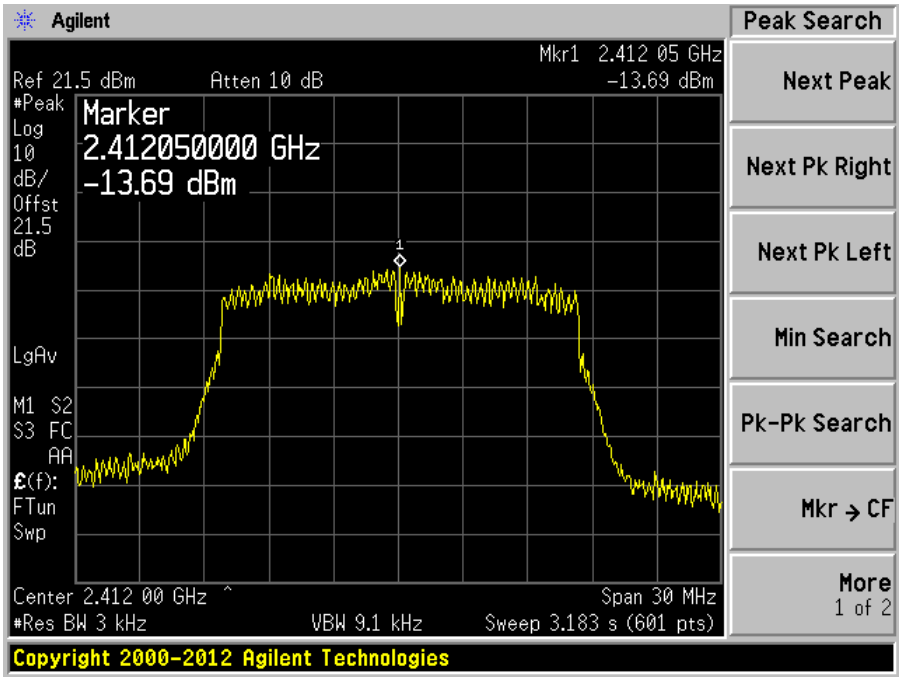


High channel: 2462 MHz

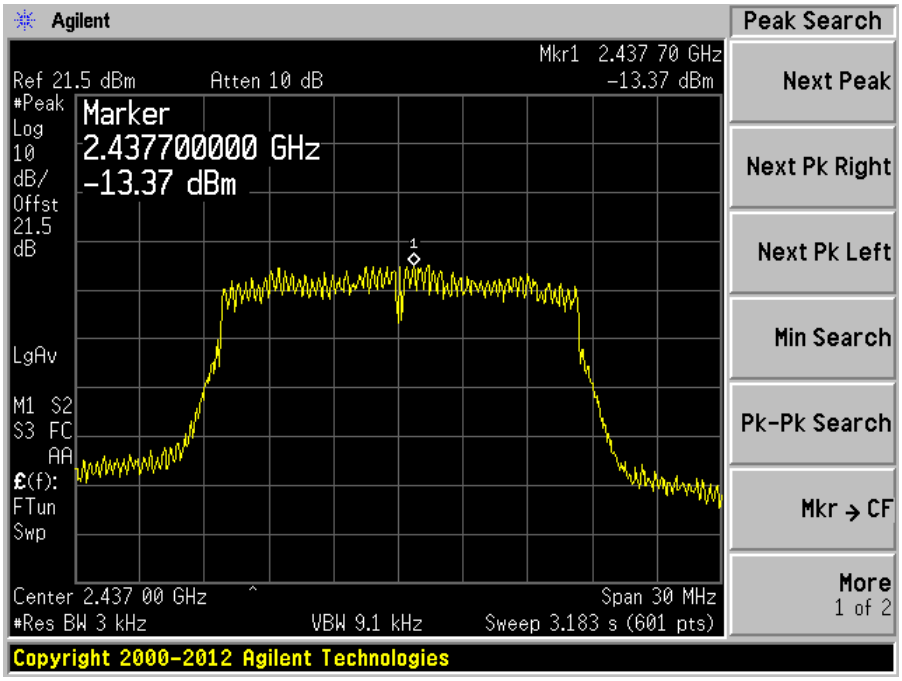


802.11g mode

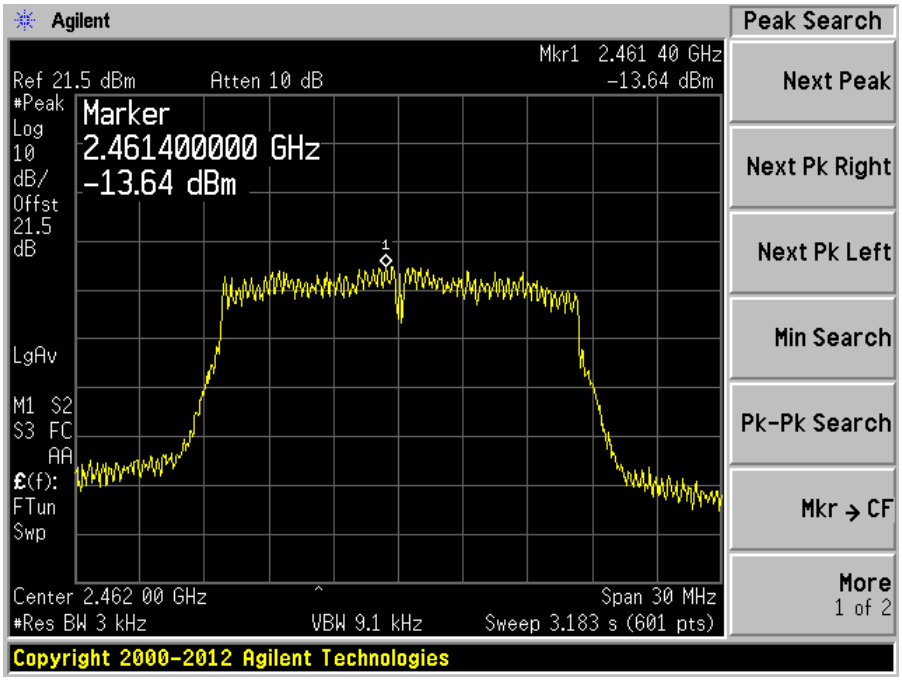
Low channel: 2412 MHz



Middle channel: 2437 MHz

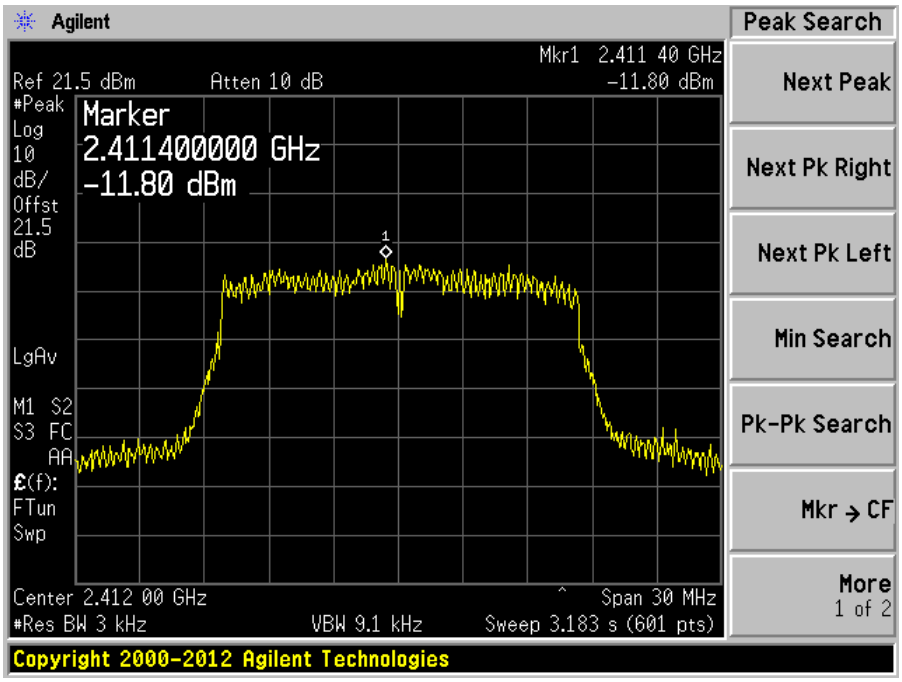


High channel: 2462 MHz

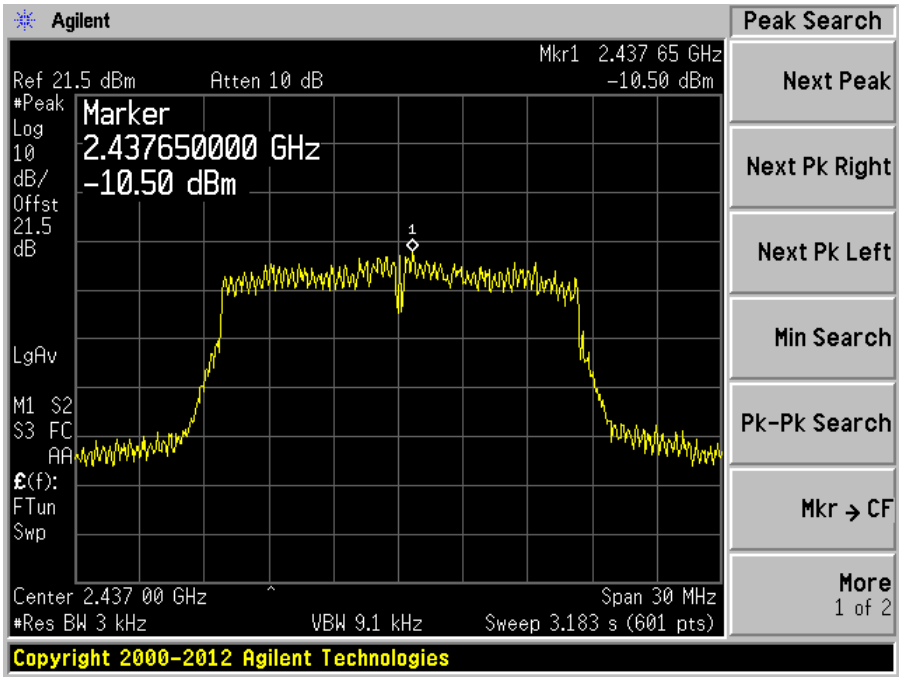


802.11n-HT20 mode

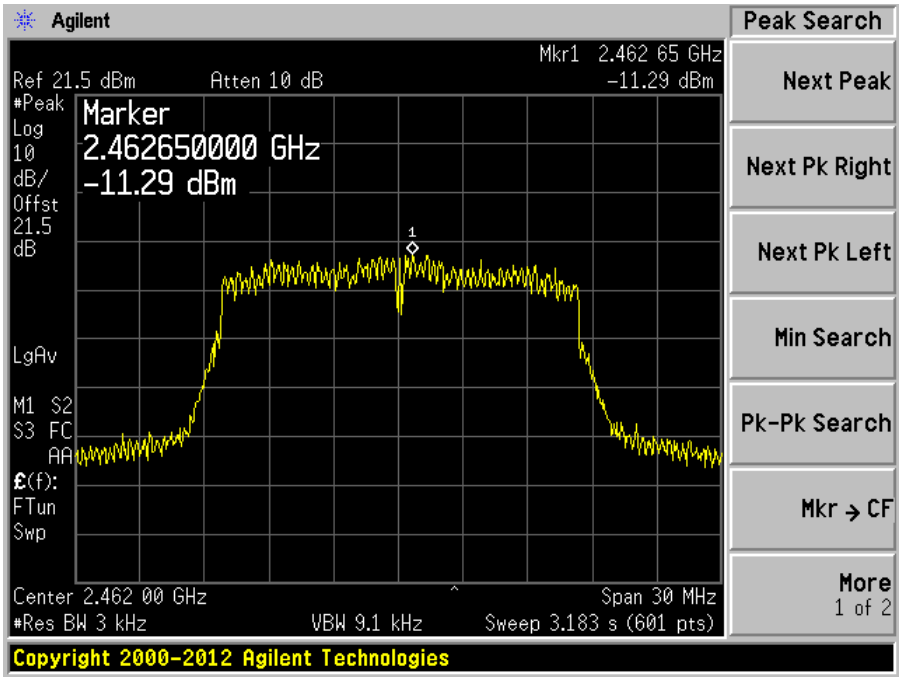
Low channel: 2412 MHz



Middle channel: 2437 MHz



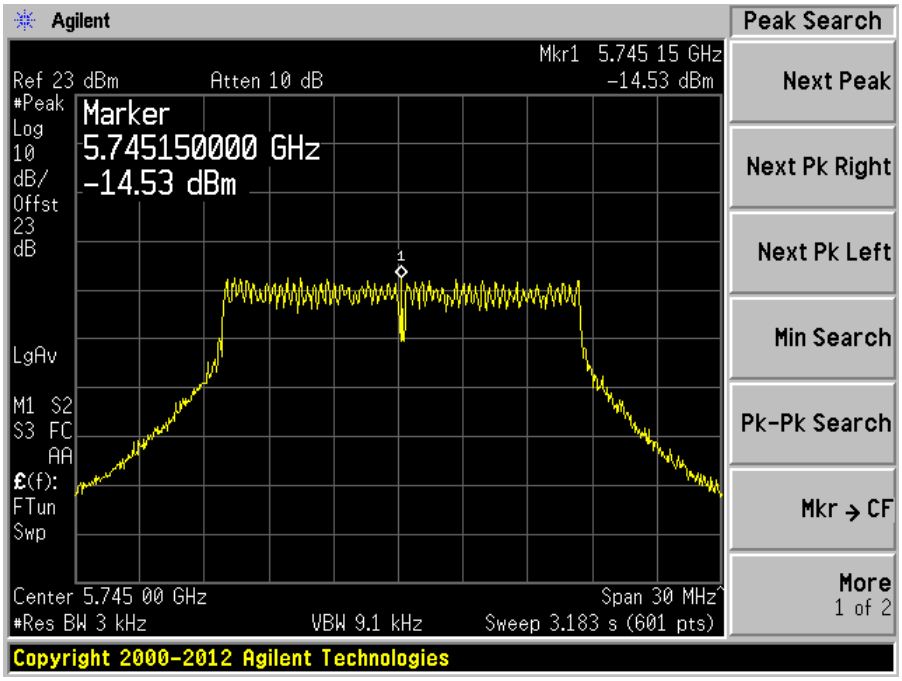
High channel: 2462 MHz



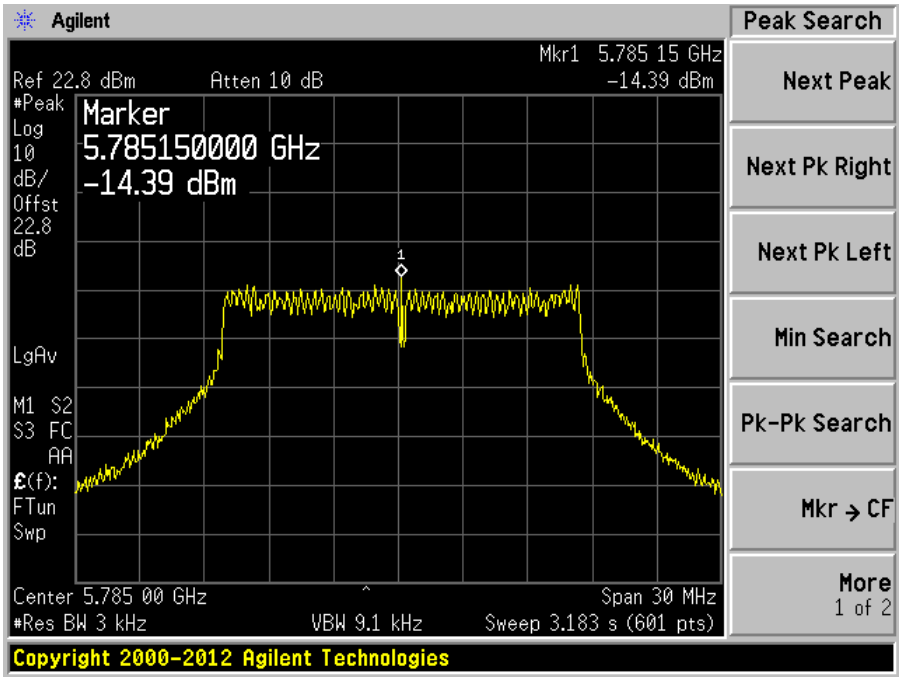
5.8 GHz Band

802.11a mode

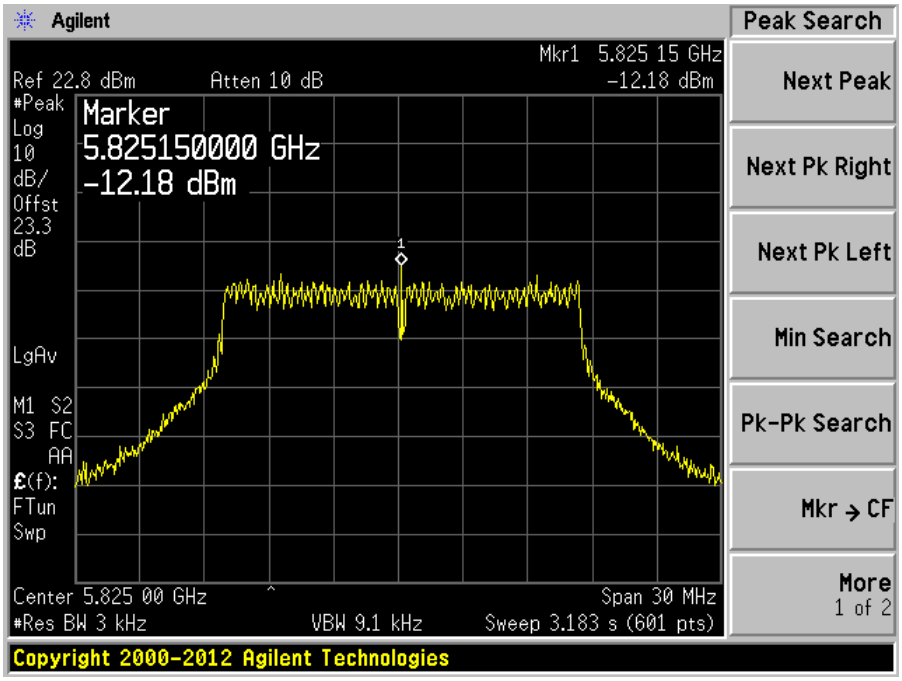
Low channel: 5745 MHz



Middle channel: 5785 MHz

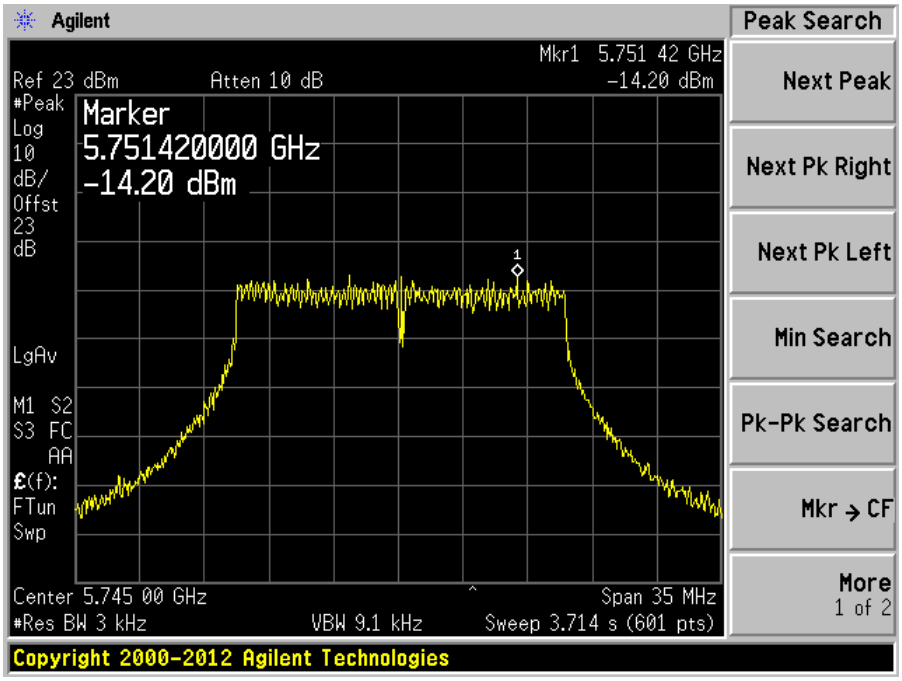


High channel: 5825 MHz

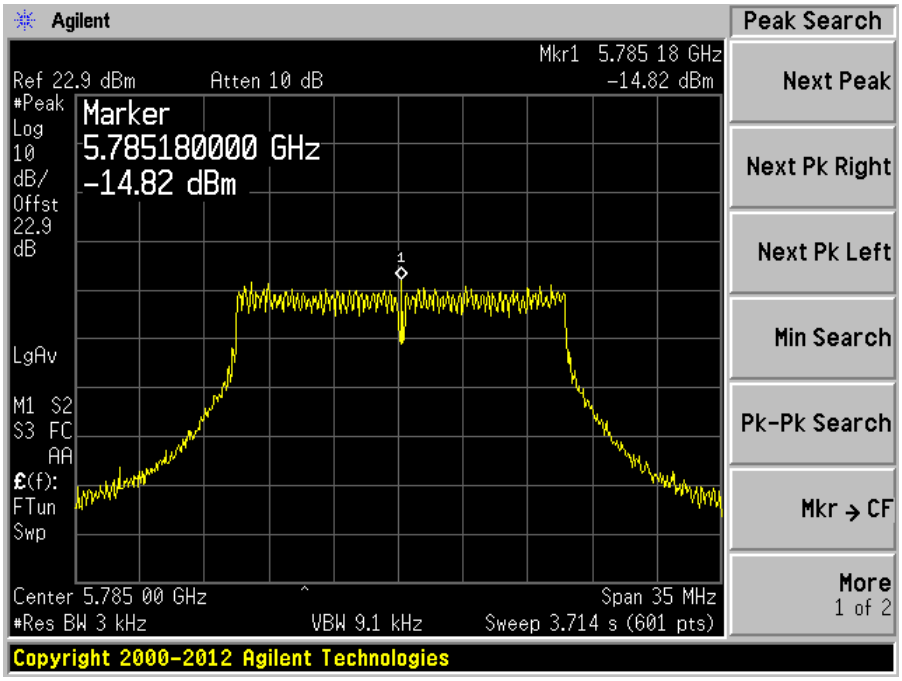


802.11n-HT20 mode

Low channel: 5745 MHz



Middle channel: 5785 MHz



High channel: 5825 MHz