Lab Code: 200167-0

FCC PART 15 SUBPART 247

MEASUREMENT AND TEST REPORT

For

Hospira Inc.

755 Jarvis Drive
Morgan Hill, CA 95037

FCC ID: STJ-2079

This Report Concerns:	Product type:
☒ Original Report	PCB Board with Wireless 802.11 a/b/g USB Dongle

Test Engineer:	James Ma
Report Number:	R0612073-247
Report Date:	2007-01-09
Reviewed By:	Hans Mellberg, VP of Engineering
Prepared By: (12)	**Bay Area Compliance Laboratories Corp. (BACL)** 1274 Anvilwood Ave. Sunnyvale, CA 94089 Tel: (408) 732-9162 Fax: (408) 732 9164

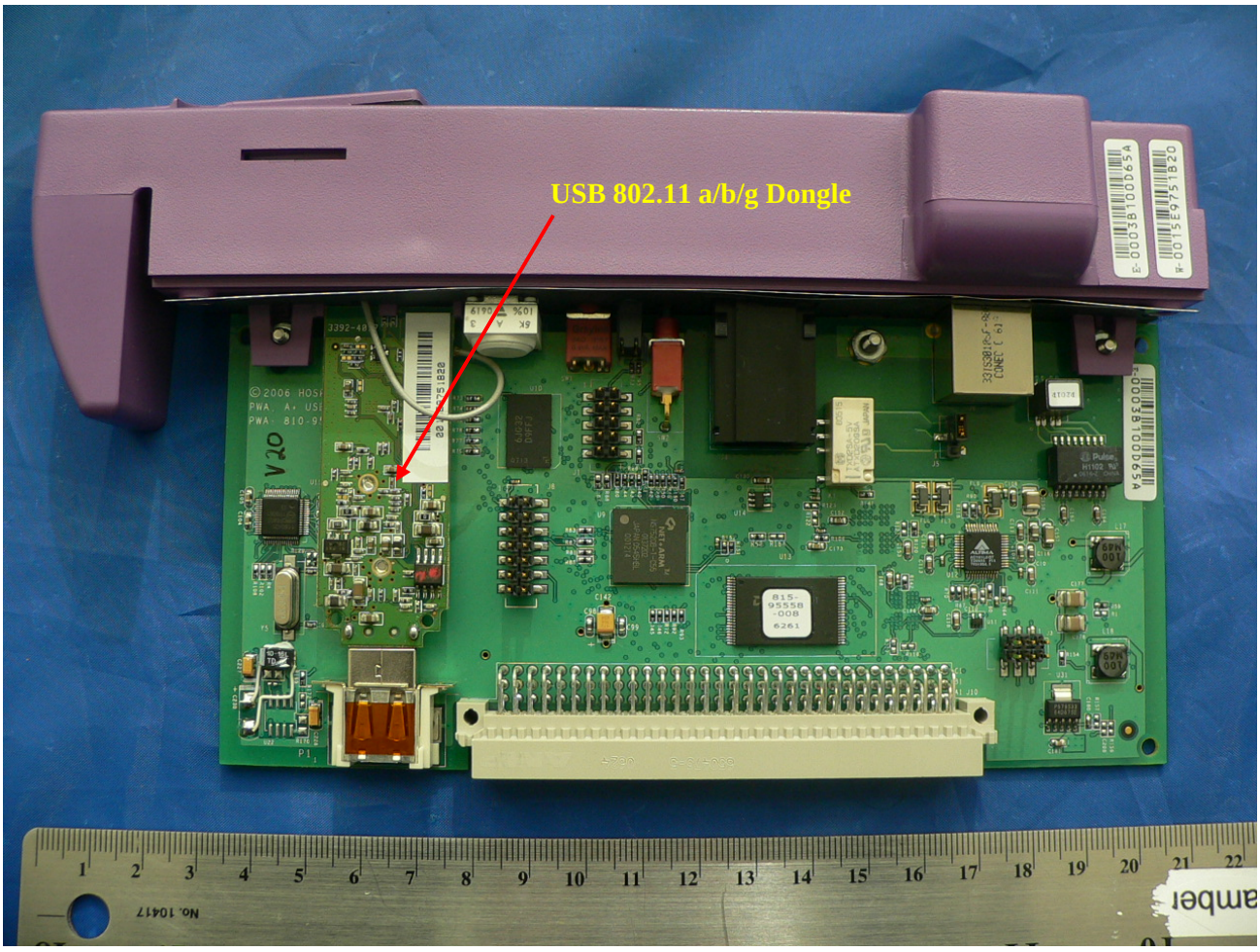
TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

This Bay Area Compliance Laboratories Corp. measurement and test report has been prepared on behalf of *Hospira Inc.* and their device *MedNet 802.11 a/b/g Wireless Upgrade Module FCC ID: STJ-20791*, which will be referred to as the EUT in the rest of this report. The EUT is a PCB Board with Wireless 802.11 a/b/g USB Dongle that is designed as an upgrade module for *Hospira PlumA+ Infusion Systems* models: *20792-04-XX, 20679-04-XX and 12391-04-XX, 11971-04-XX*. Accordingly, the EUT consists of two models with identical function and layout. These models are designated *20791-04-XX* and *20677-04-XX* respectively corresponding to the host units that they are designed to upgrade, where the –XX in the two respective EUT models refer to versions 77 and up. The host units are mobile infusion devices designed to be employed in the medical care environment. The wireless functionality afforded to the host units by the EUT include the ability to download drug library information for simultaneously operating hosts without requiring a physical connection and the time spent visiting the rooms they occupy.

EUT Photo



Additional EUT photos in Exhibit C

Host Device

Mechanical Description

The EUT is a PCB Board with integrated Wireless 802.11 a/b/g USB Dongle, designed as an upgrade module for Hospira Inc. Plum A + Infusion System. It's approximate dimensions are 80 mmL x 25 mmW x 12 mmH.

** The test data gathered are from production sample, with serial number: 0015E9751C08, provided by the manufacturer.*

Objective

This type approval report is prepared on behalf of *Hospira Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC 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.

Related Submittal(s)/Grant(s)

Please see BACL report R0612073-407 for 5100 MHz test results.

Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2003, 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.

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in 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 NIS 81, The Treatment of Uncertainty in EMC Measurements, the values range from ±2.0 for Conducted Emissions tests and ±4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL.

Detailed instrumentation measurement uncertainties can be found in BACL report QAP-018.

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.

Test Facility

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

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11, 1997 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003 & TIA/EIA-603.

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.: R-2463 and C-2698. 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 a National Institute of Standards and Technology (NIST) accredited laboratory under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm.

SYSTEM TEST CONFIGURATION

Justification

The host system was configured for testing according to ANSI C63.4-2003.

The EUT was tested in the 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.

EUT Exercise Software

The EUT is programmed with the following data rate settings that were used during testing:

Channel	2412 MHz	2437 MHz	2462 MHz
802.11b Data rate	11Mbps	11Mbps	11Mbps
802.11g Data rate	54Mbps	54Mbps	54Mbps

Channel	5745 MHz	5785 MHz	5825MHz
802.11a Data Rate	54Mbps	54Mbps	54Mbps

Special Accessories

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

Equipment Modifications

No modifications were made to the EUT.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Dell	Laptop	Latitude – D600	CN-OT9369-48643-52P-4582

SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247(e)(i) §2.1093	RF Exposure	Pls. See SAR Test Report
§15.203	Antenna Requirement	Compliant
§ 15.207 (a)	Conducted Emissions	Compliant
§2.1051 & §15.247(d)	Spurious Emissions at Antenna Port	Compliant
§15.205	Restricted Band	Compliant
§15.109, 15.209 (a) & §15.247(c)	Radiated Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Bandwidth	Compliant
§15.247 (b)(3)	Maximum Peak Output Power	Compliant
§ 15.247 (c)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247 (d)	Power Spectral Density	Compliant

§ 15.247 (e) (i) and § 2.1093 - RF EXPOSURE

Please see BACL SAR report R0612073-SAR for Specific Absorption Rate test results.

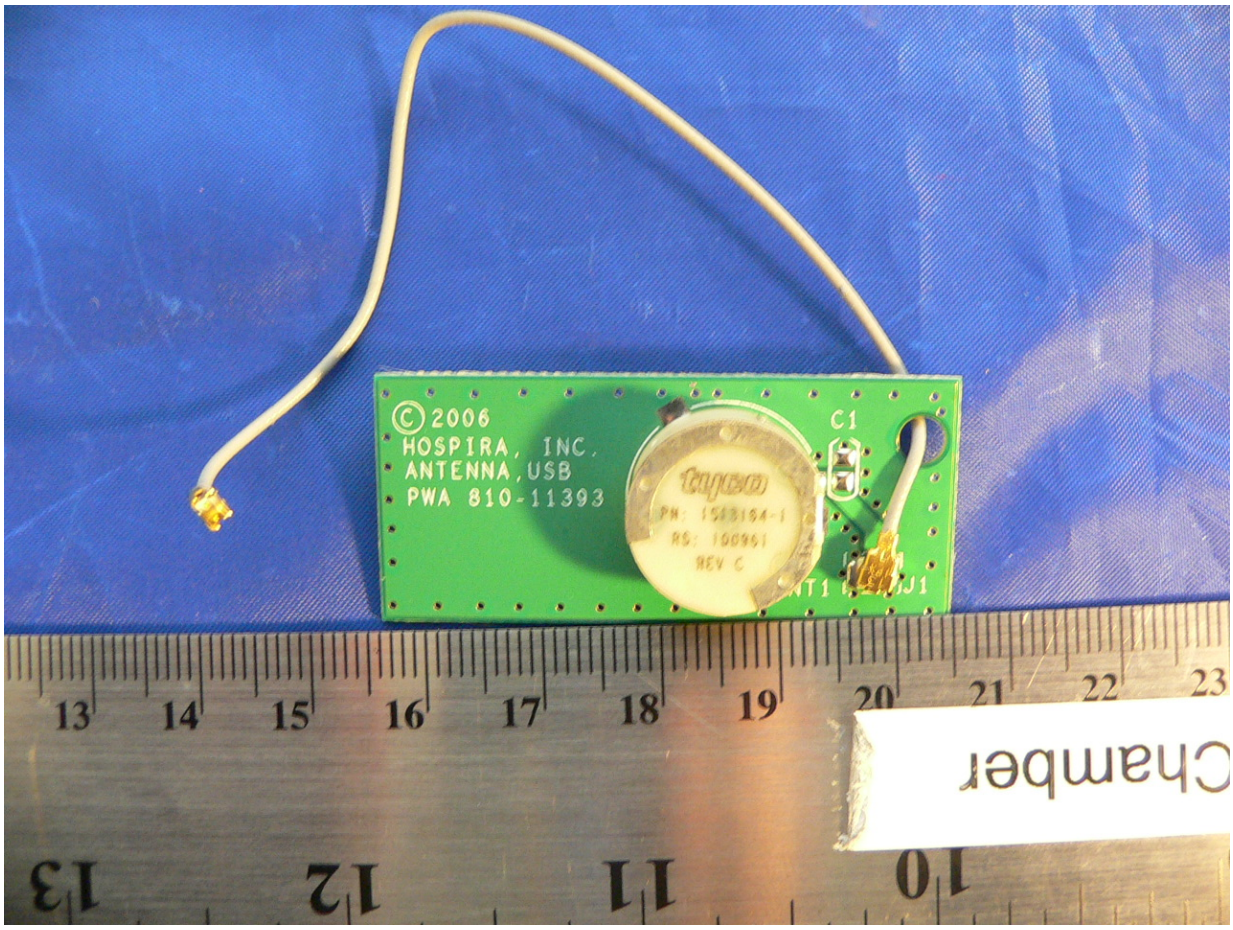
§15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 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 § 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.

Result: Compliant: The antenna is integrated into a PCB assembly, removal or modification of which would result in inoperability of the device as a whole; there are no allowances for replacement or modification without replacement of the entire assembly.



§15.207 - CONDUCTED EMISSIONS

Section 15.207 Conducted limits:

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 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 0.5-5 5-30	66 to 56 * 56 60	56 to 46 * 46 50

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

Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.4 – 2003 measurement procedure. The specification used was FCC Class B limits.

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

The EUT was connected with LISN-2.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Receiver, EMI Test	Receiver, EMI Test	ESCS30	100176	2006-03-16
LISN, Artificial Mains	LISN, Artificial Mains	ESH2-Z5	871884/039	2006-11-14

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

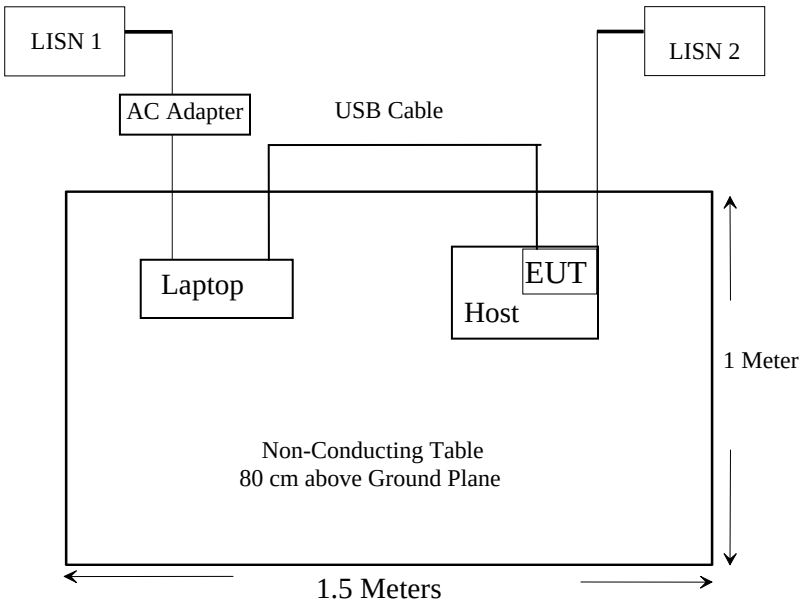
Test Procedure

During the conducted emissions test, the power cord of the EUT 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”.

Test Setup Diagram



Environmental Conditions

Temperature:	20 ° C
Relative Humidity:	40 %
ATM Pressure:	1020 mbar

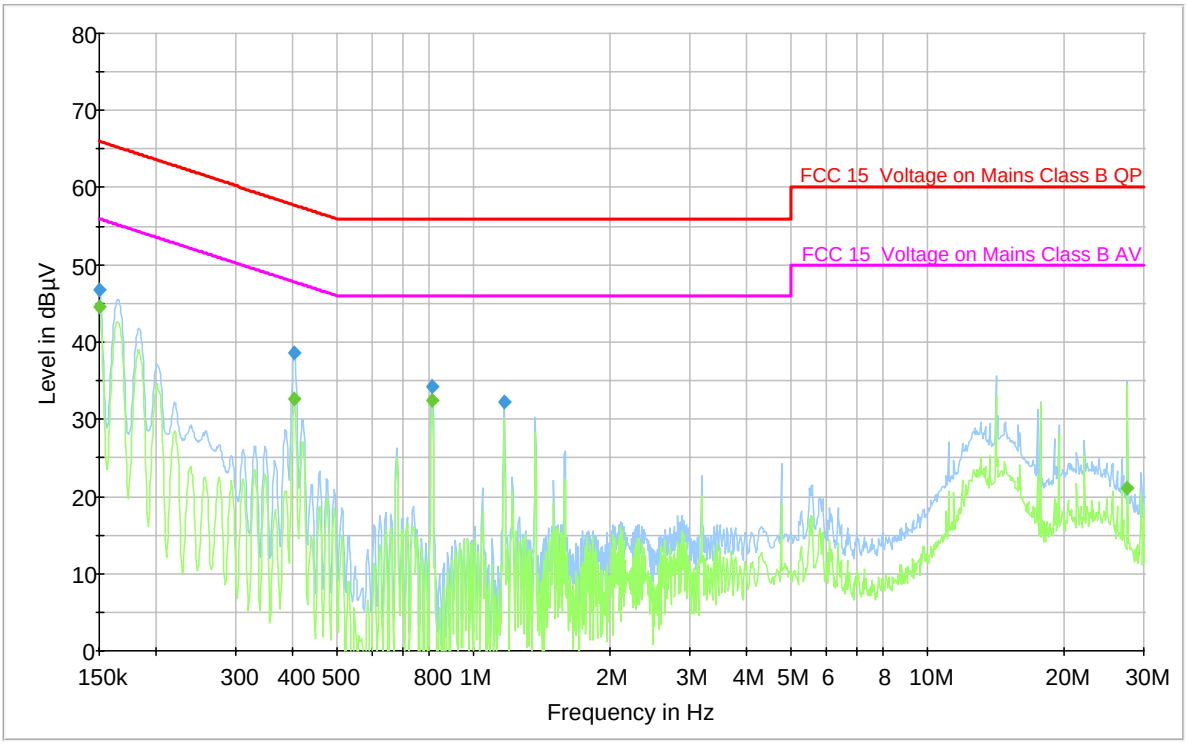
**The testing was performed by James Ma from 2006-12-21*

Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC standard's conducted emissions limits for Class B devices, with the *worst* margin reading of:

-11.4 dB at **0.150000 MHz Line** conductor mode

120V/60 Hz Line:



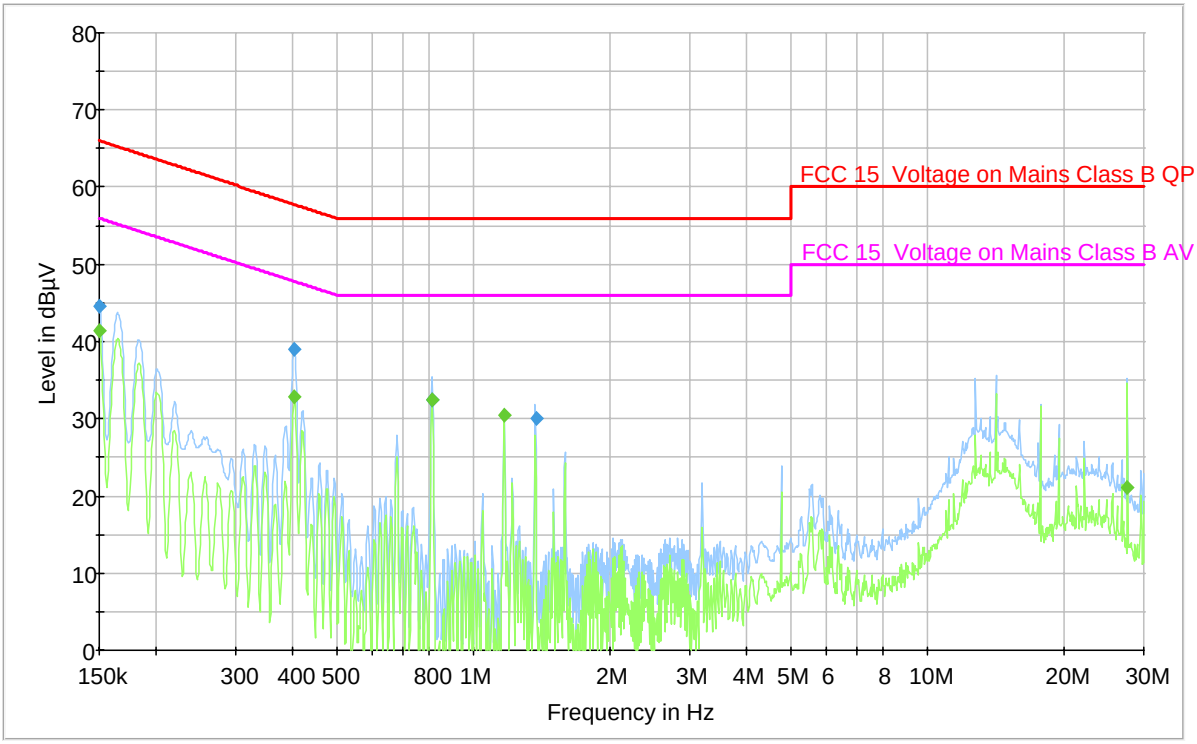
Final Measurement Quasi-Peak Detector

Frequency (MHz)	Quasi Peak (dBµV)	Line	Correction Factor (dB)	Limit (dBµV)	Margin (dB)
0.402710	38.7	L1	0.4	57.8	-19.1
0.150000	46.8	L1	0.1	66.0	-19.2
0.810690	34.3	L1	0.3	56.0	-21.7
1.168300	32.3	L1	0.3	56.0	-23.7

Final Measurement Average Detector

Frequency (MHz)	Average (dBµV)	Line	Correction Factor (dB)	Limit (dBµV)	Margin (dB)
0.150000	44.6	L1	0.1	56.0	-11.4
0.810690	32.4	L1	0.3	46.0	-13.6
0.402710	32.5	L1	0.4	47.8	-15.3
27.607600	21.2	L1	0.5	50.0	-28.9

120V/60 Hz Neutral:



Final Measurement Quasi-Peak Detector

Frequency (MHz)	Quasi Peak (dBµV)	Line	Correction Factor (dB)	Limit (dBµV)	Margin (dB)
0.402710	39.0	N	0.4	57.8	-18.8
0.150000	44.5	N	0.1	66.0	-21.5
0.810690	32.4	N	0.3	56.0	-23.6
1.372970	30.1	N	0.2	56.0	-25.9

Final Measurement Average Detector

Frequency (MHz)	Average (dBµV)	Line	Correction Factor (dB)	Limit (dBµV)	Margin (dB)
0.810690	32.4	N	0.3	46.0	-13.6
0.150000	41.4	N	0.1	56.0	-14.6
0.402710	32.8	N	0.4	47.8	-15.0
1.168300	30.5	N	0.3	46.0	-15.5

§2.1051 & §15.247(d) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

For §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.

Requirements: CFR 47, §2.1051.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in §2.1057.

Measurement Procedure

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

Equipment Lists

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2006-03-06

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

Test Setup Diagram

Environmental Conditions

Temperature:	20 ° C
Relative Humidity:	40 %
ATM Pressure:	1020 mbar

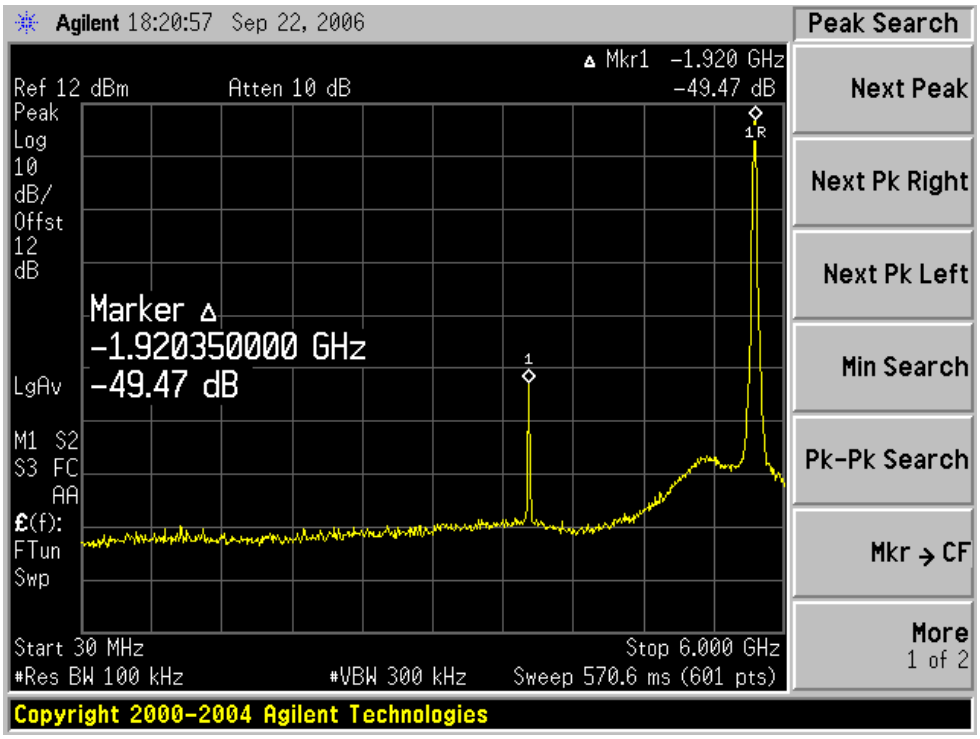
** The testing was performed by James Ma from 2006-12-21.*

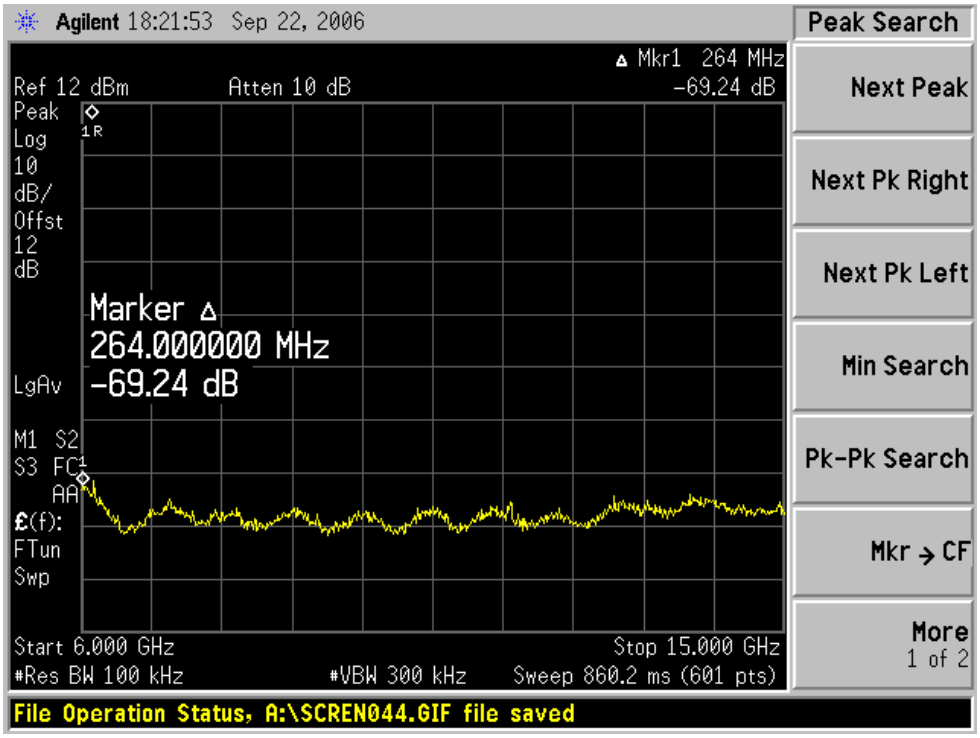
Measurement Result:

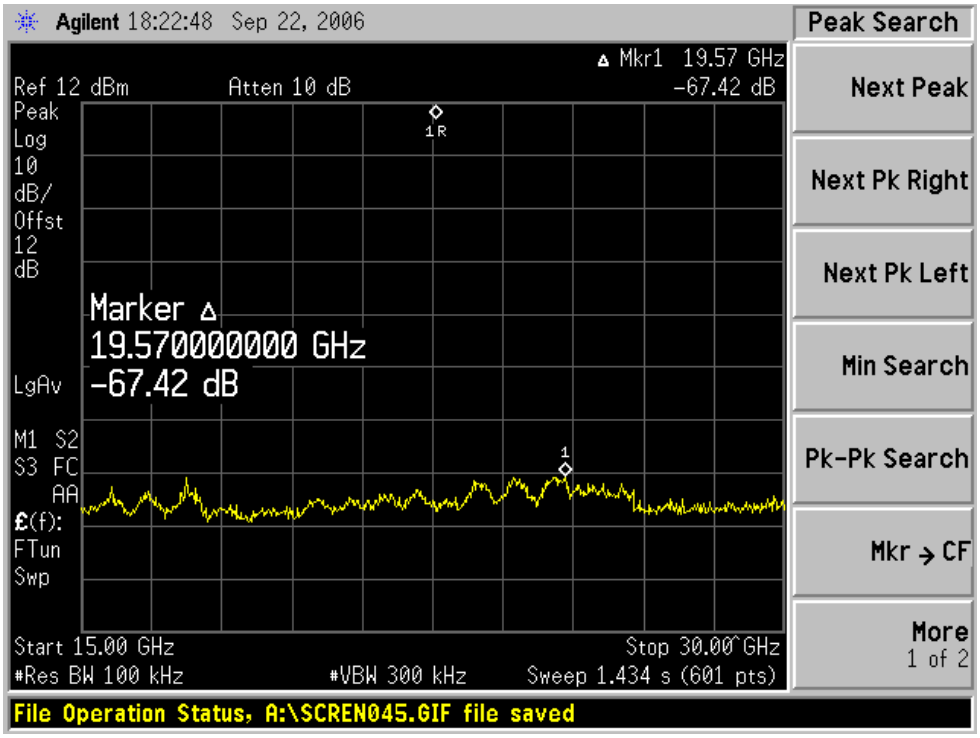
Please refer to following pages for plots of spurious emissions.

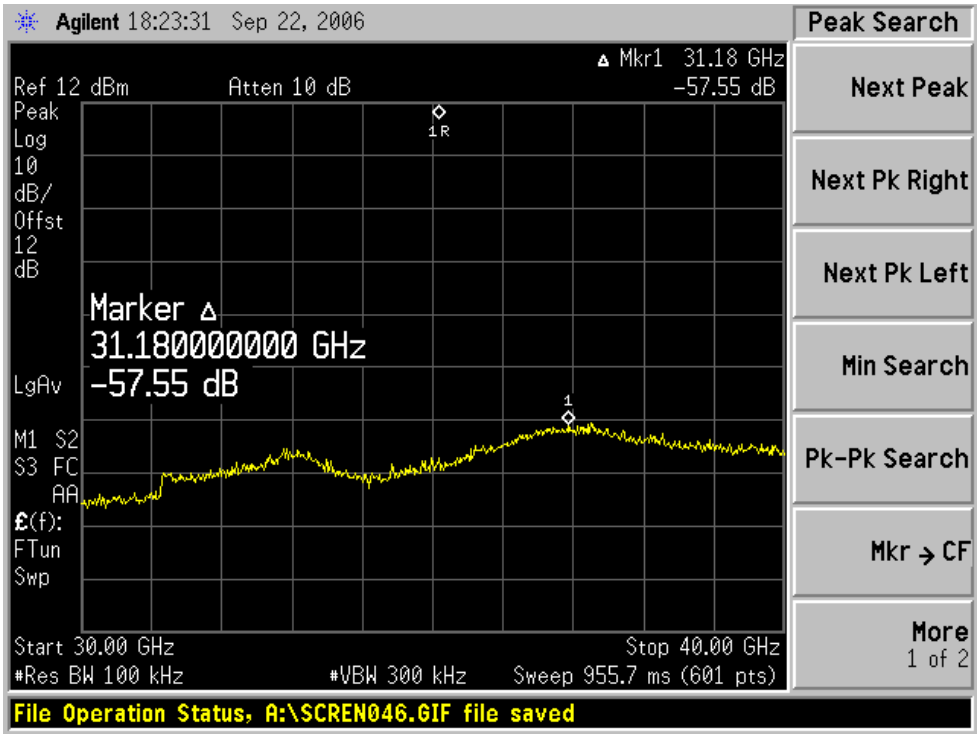
802.11a

Low Channel

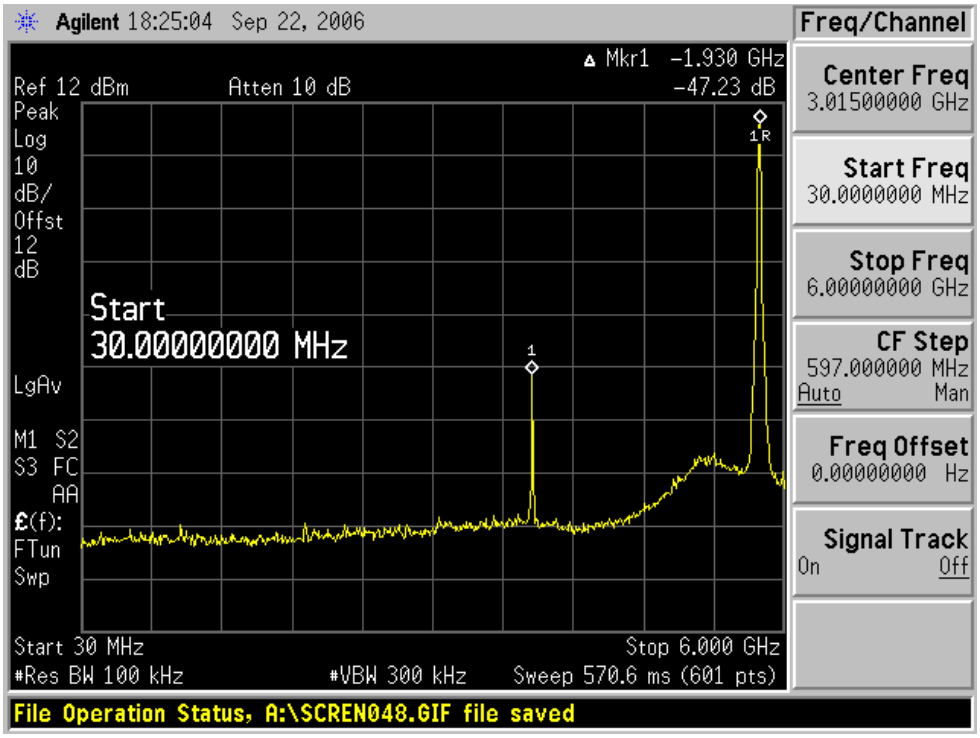


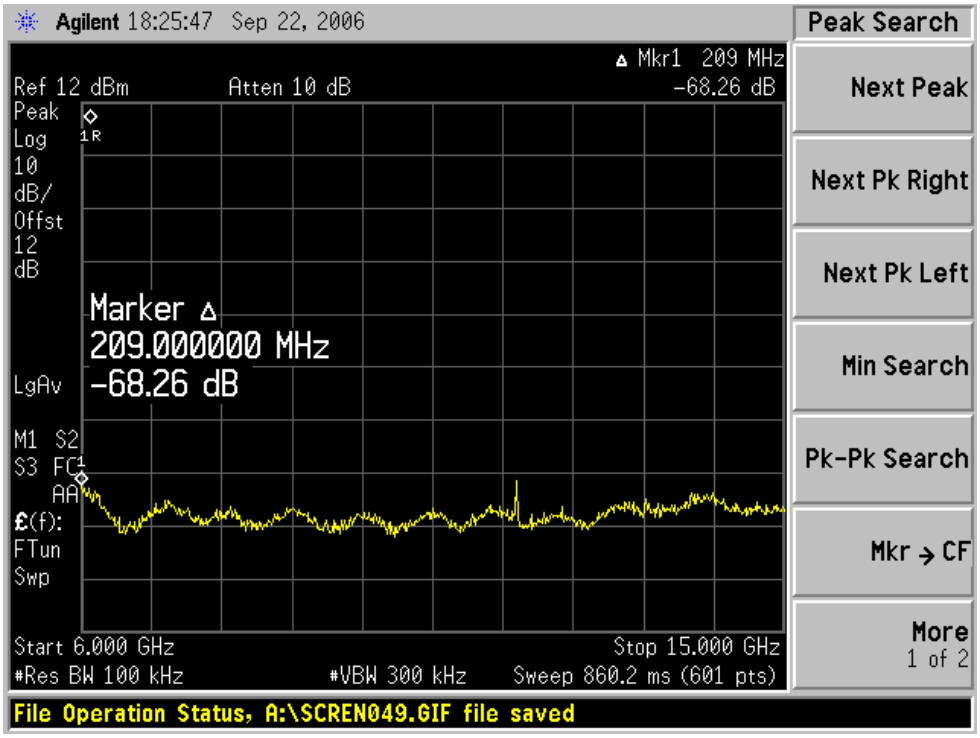


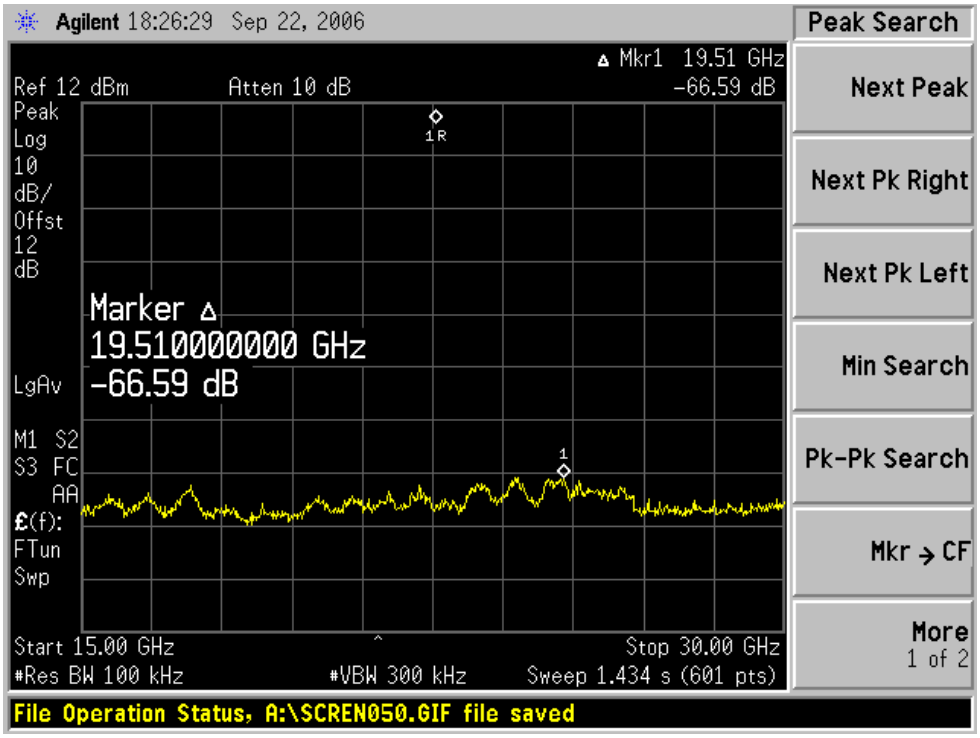

Agilent 18:22:48 Sep 22, 2006
Peak Search
Mkr1 19.57 GHz
Ref 12 dBm
Atten 10 dB
-67.42 dB
Peak
Log
10
dB/
Offst
12
dB
1R
Marker Δ
19.570000000 GHz
-67.42 dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
1
Start 15.00 GHz
Stop 30.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.434 s (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN045.GIF file saved

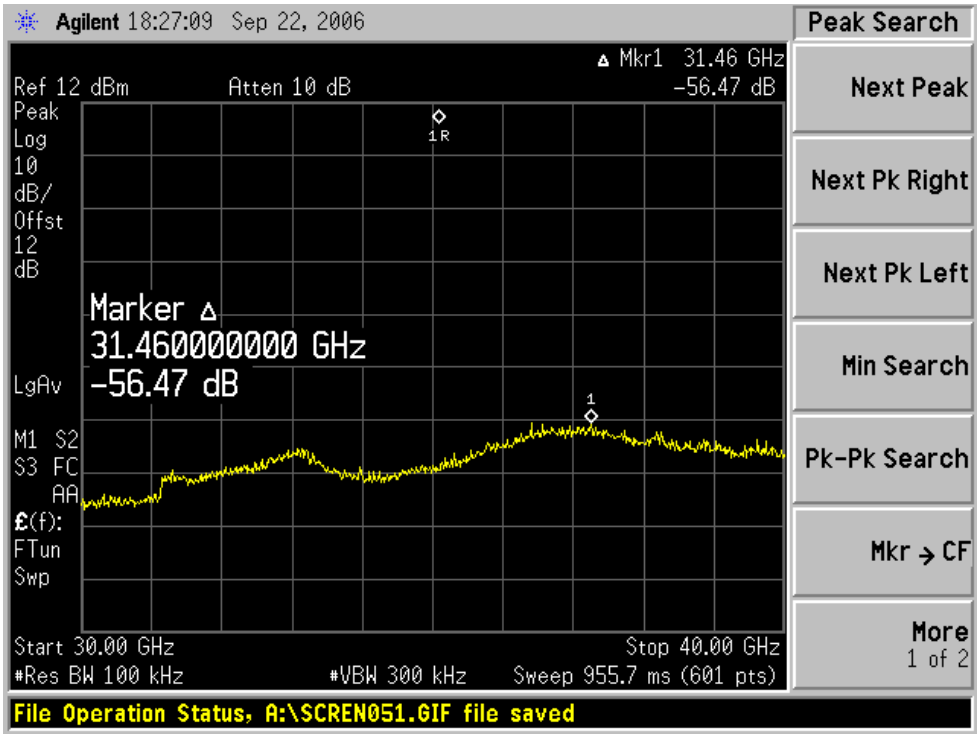

Agilent 18:23:31 Sep 22, 2006
Peak Search
Mkr1 31.18 GHz
Ref 12 dBm
Atten 10 dB
-57.55 dB
Peak
Log
10
dB/
Offst
12
dB
1R
Marker Δ
31.180000000 GHz
-57.55 dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
1
Start 30.00 GHz
Stop 40.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 955.7 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN046.GIF file saved

Middle Channel

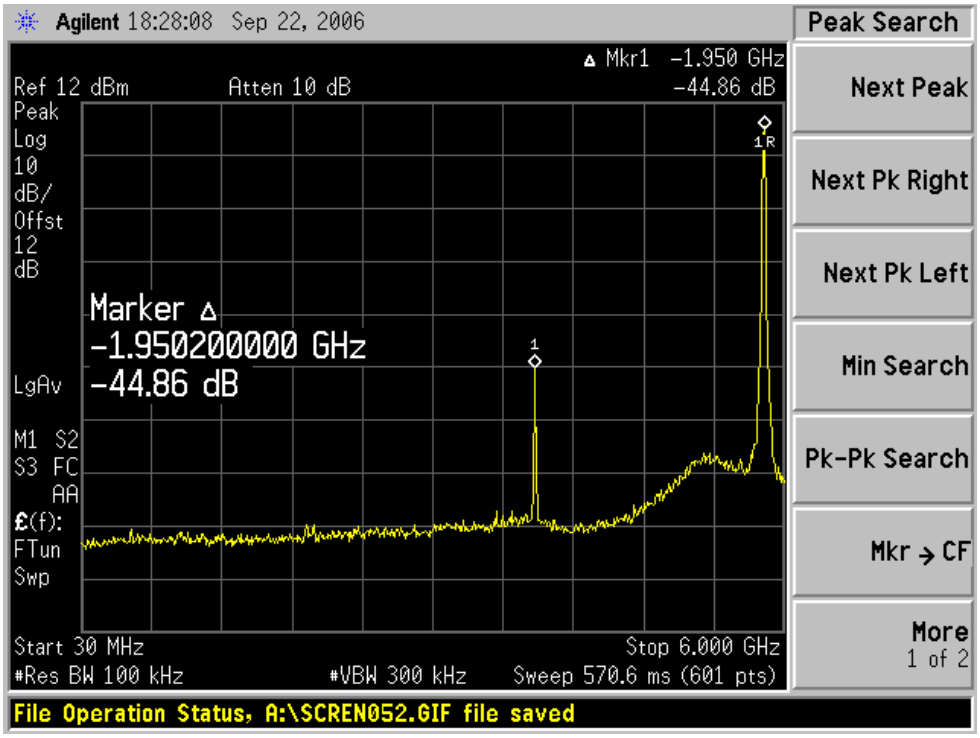


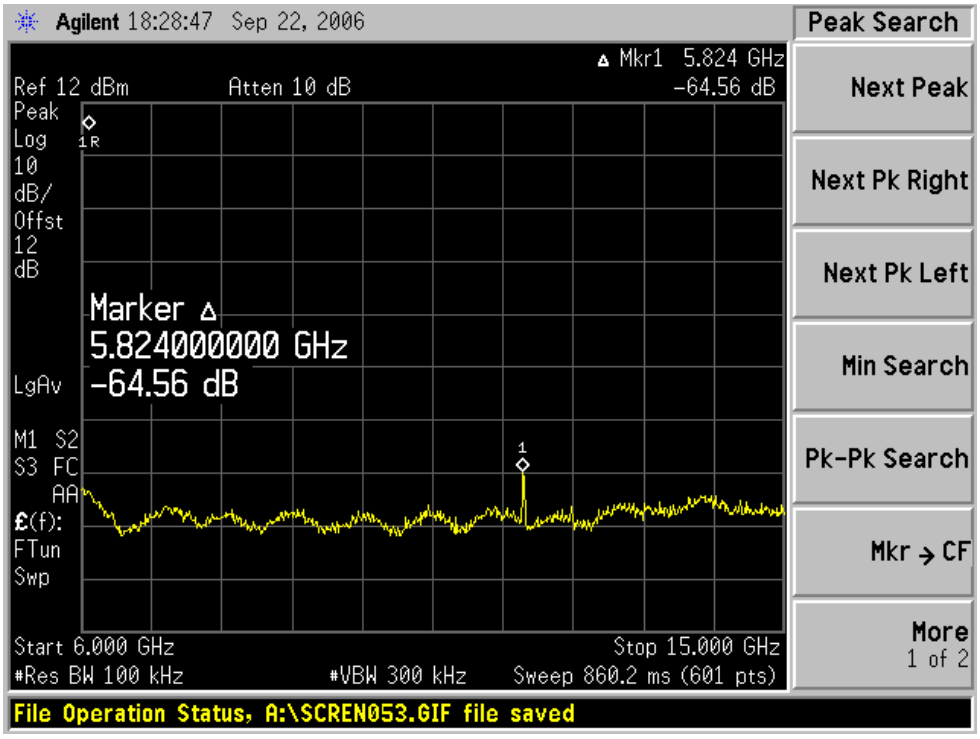


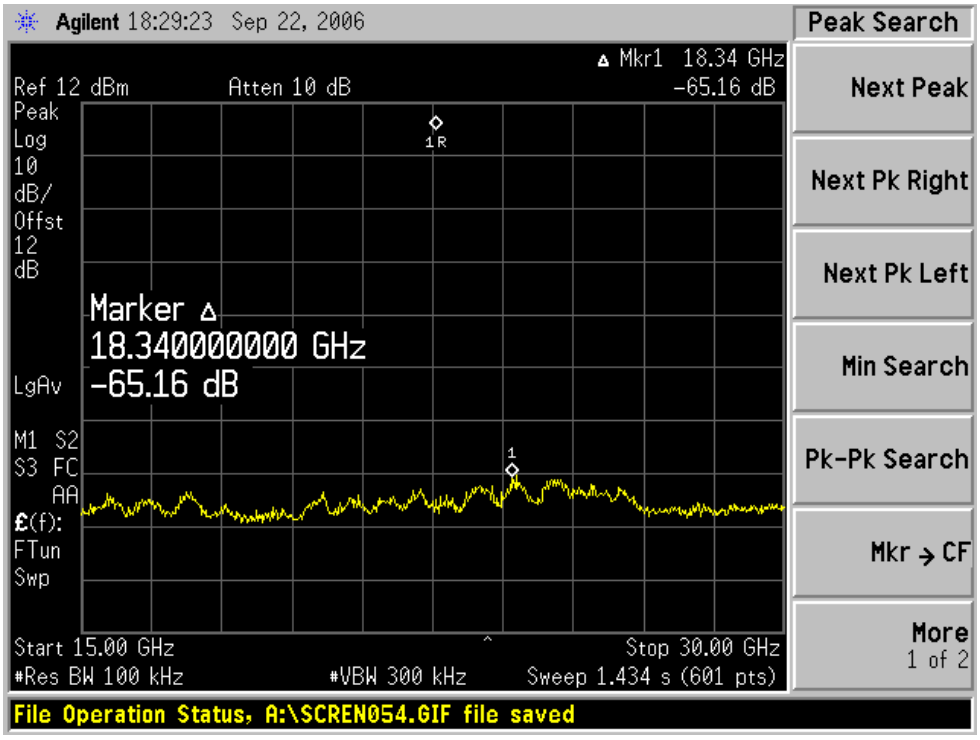

Agilent 18:26:29 Sep 22, 2006
Peak Search
Mkr1 19.51 GHz
Ref 12 dBm
Atten 10 dB
-66.59 dB
Peak
Log
10
dB/
Offst
12
dB
1R
Marker Δ
19.510000000 GHz
-66.59 dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
1
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Start 15.00 GHz
Stop 30.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.434 s (601 pts)
File Operation Status, A:\SCREN050.GIF file saved

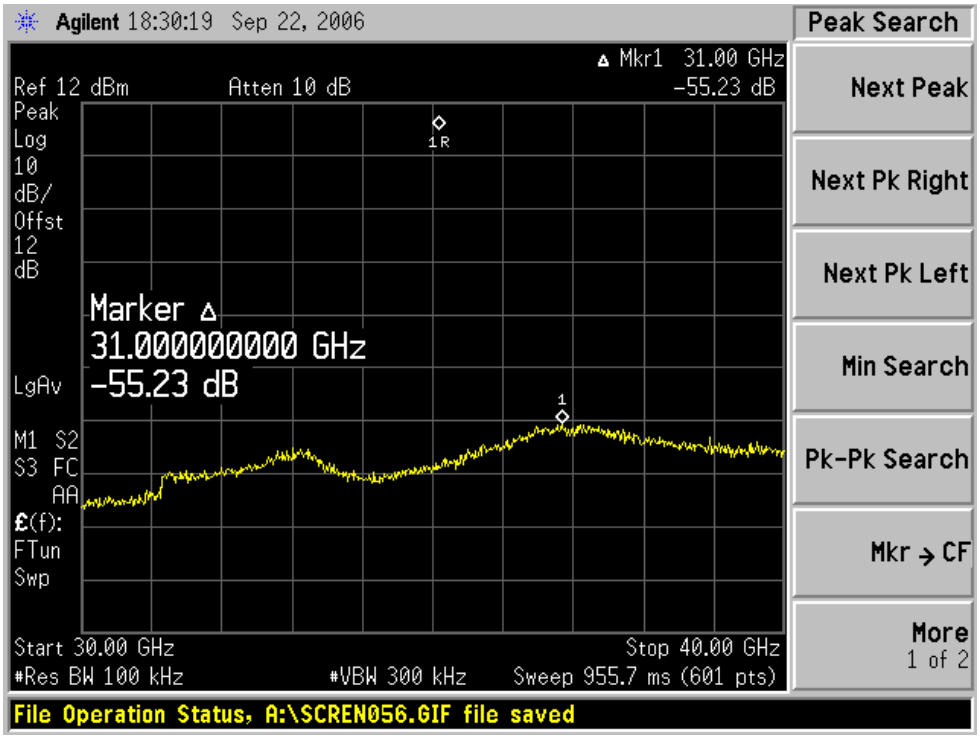

Agilent 18:27:09 Sep 22, 2006
Peak Search
Mkr1 31.46 GHz
Ref 12 dBm
Atten 10 dB
-56.47 dB
Peak
Log
10
dB/
Offst
12
dB
1R
Marker Δ
31.460000000 GHz
-56.47 dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
1
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Start 30.00 GHz
Stop 40.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 955.7 ms (601 pts)
File Operation Status, A:\SCREN051.GIF file saved

High Channel



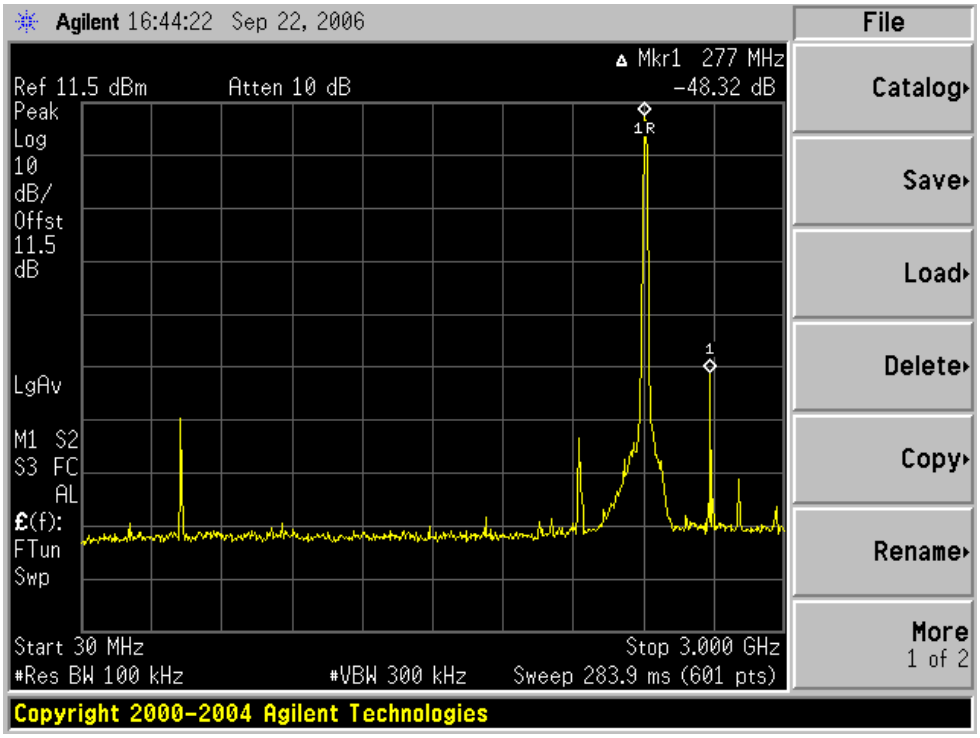


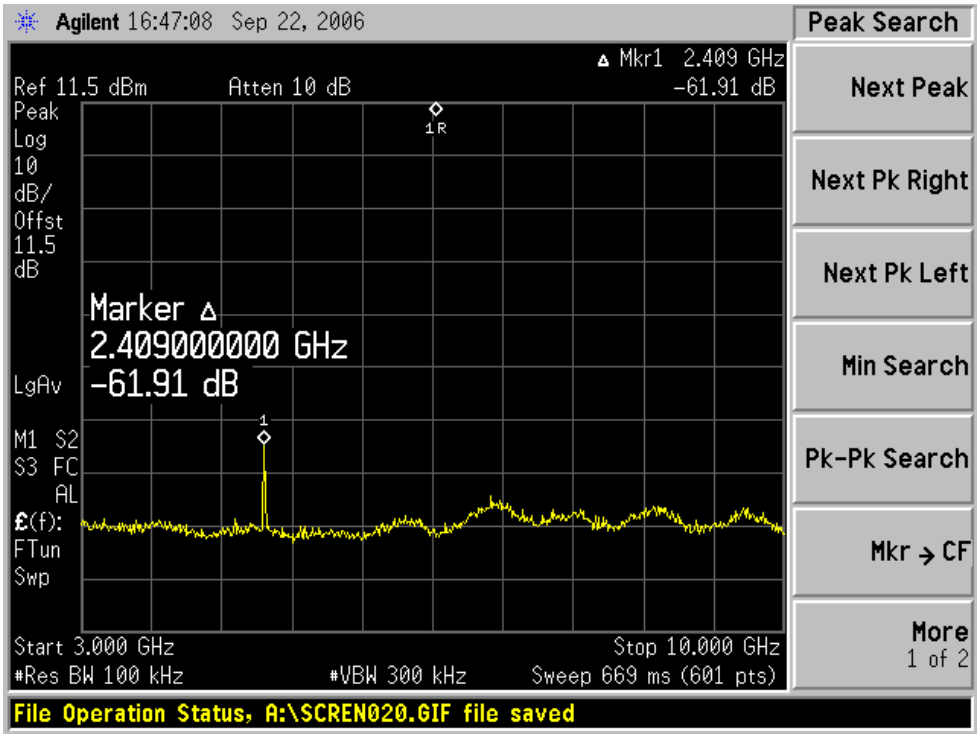

Agilent 18:29:23 Sep 22, 2006
Peak Search
Mkr1 18.34 GHz
-65.16 dB
Ref 12 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
12
dB
1R
Marker Δ
18.340000000 GHz
-65.16 dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 15.00 GHz
Stop 30.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1.434 s (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN054.GIF file saved

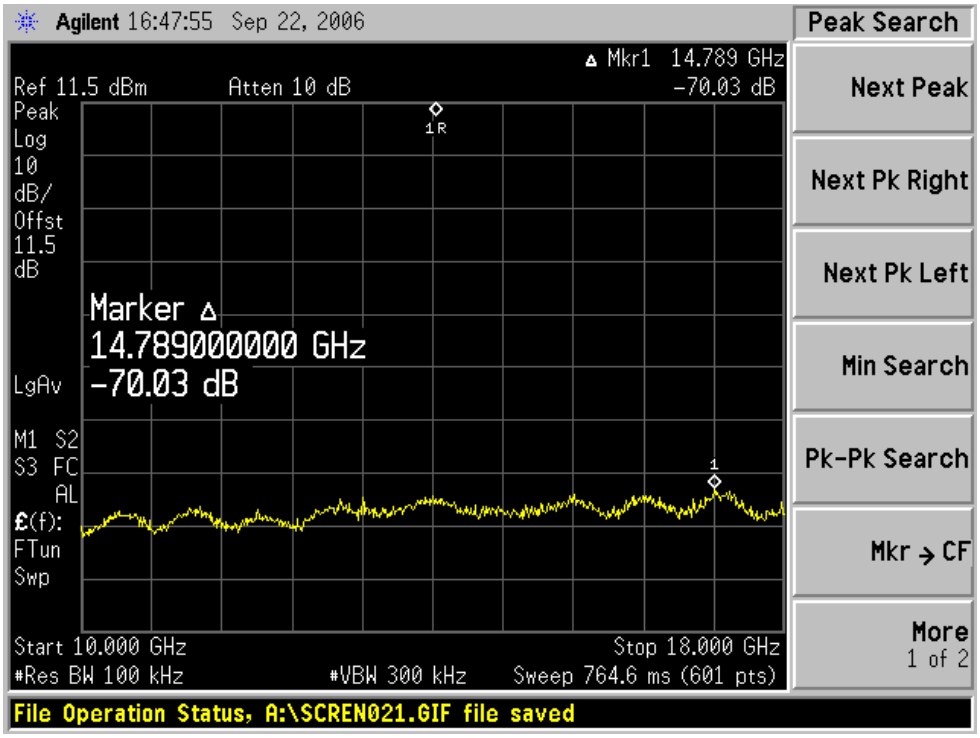

Agilent 18:30:19 Sep 22, 2006
Peak Search
Mkr1 31.00 GHz
-55.23 dB
Ref 12 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
12
dB
1R
Marker Δ
31.000000000 GHz
-55.23 dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 30.00 GHz
Stop 40.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 955.7 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN056.GIF file saved

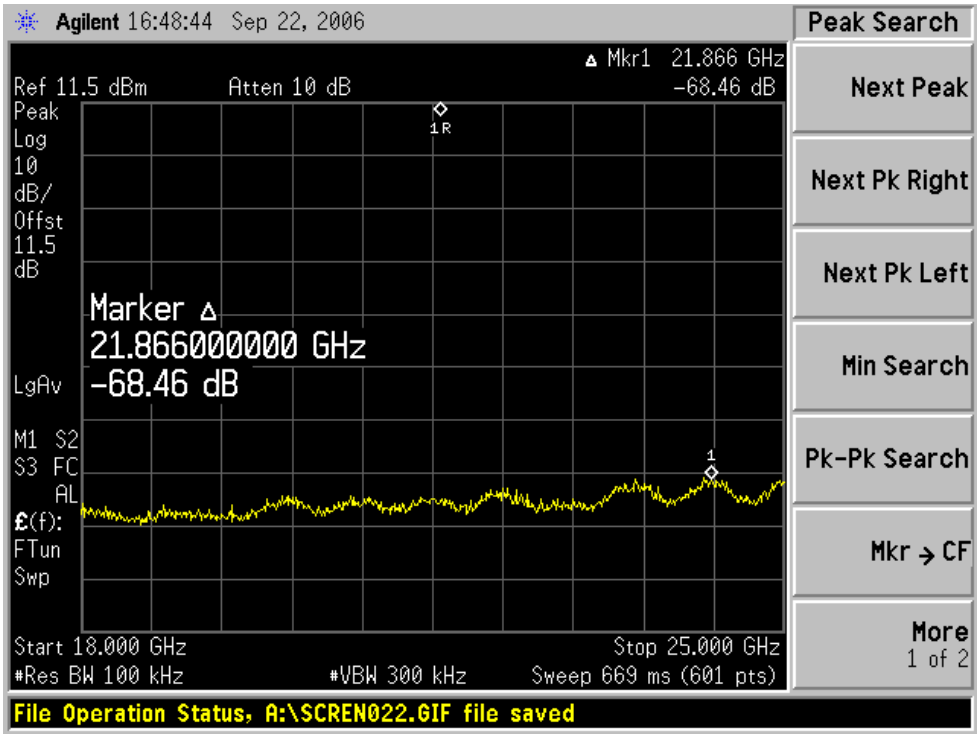
802.11b

Low Channel

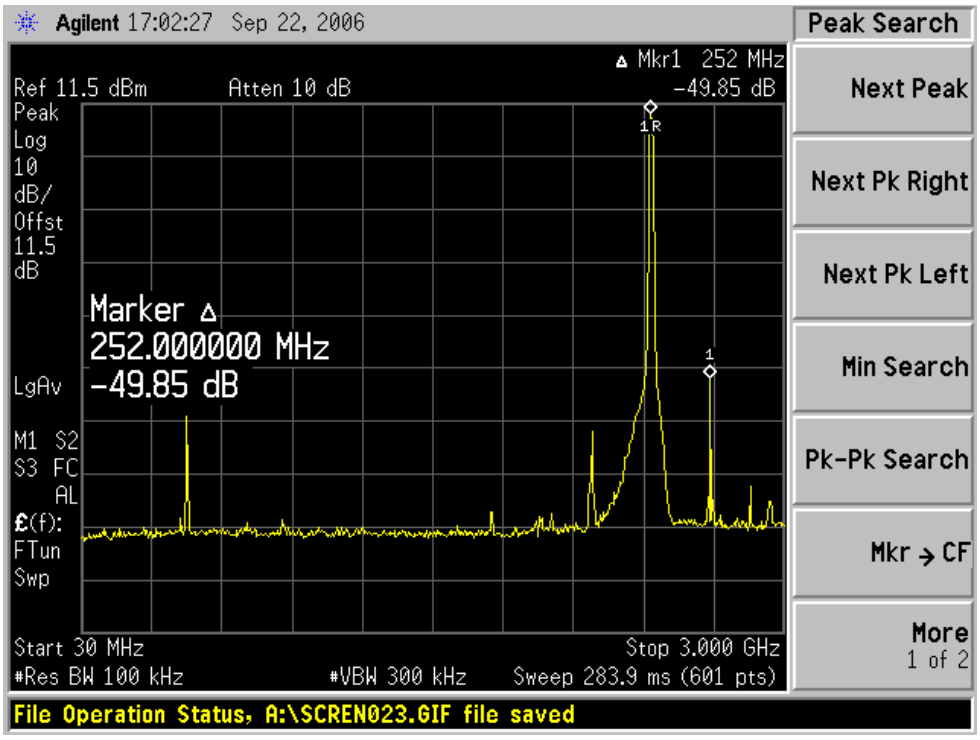


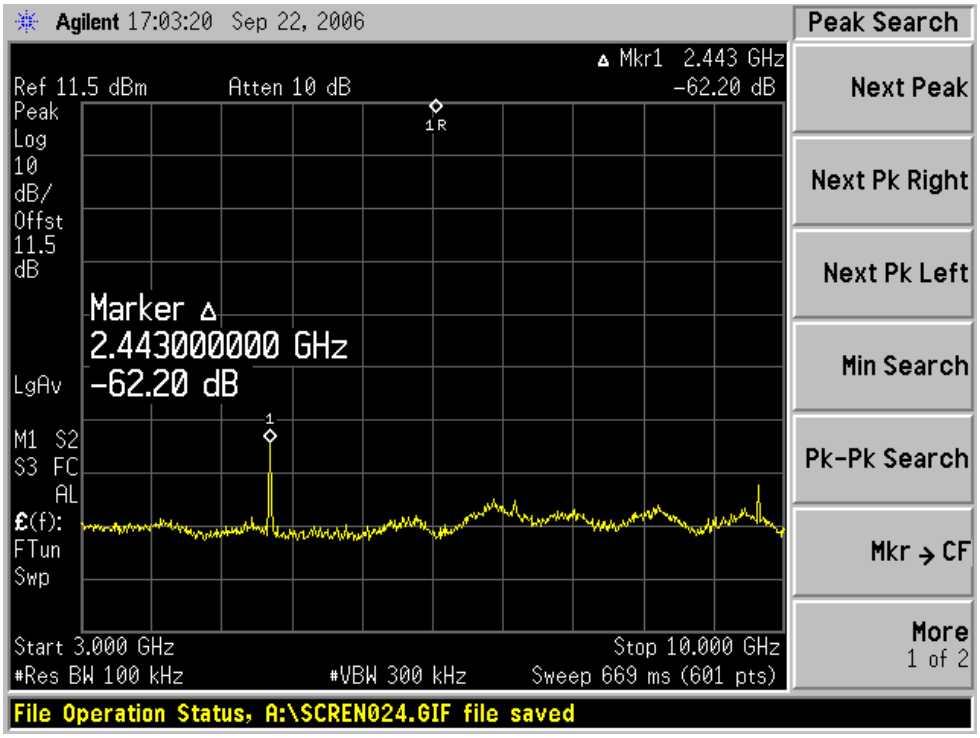


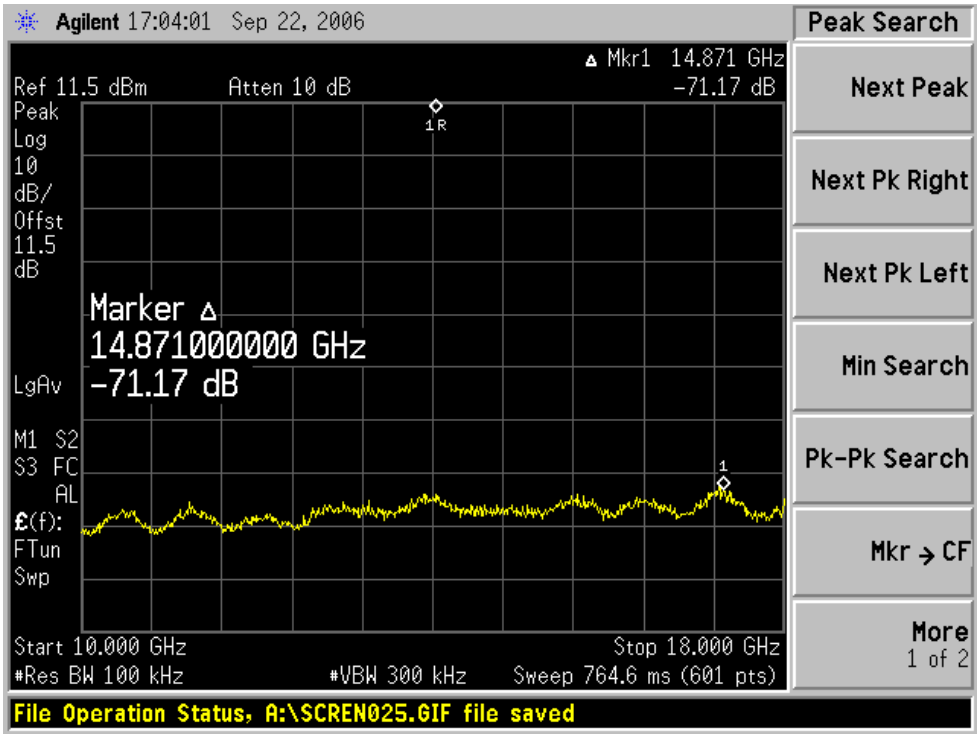

Agilent 16:47:55 Sep 22, 2006
Peak Search
Mkr1 14.789 GHz
-70.03 dB
Ref 11.5 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11.5
dB
1R
Marker Δ
14.789000000 GHz
-70.03 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 10.000 GHz
Stop 18.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 764.6 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN021.GIF file saved

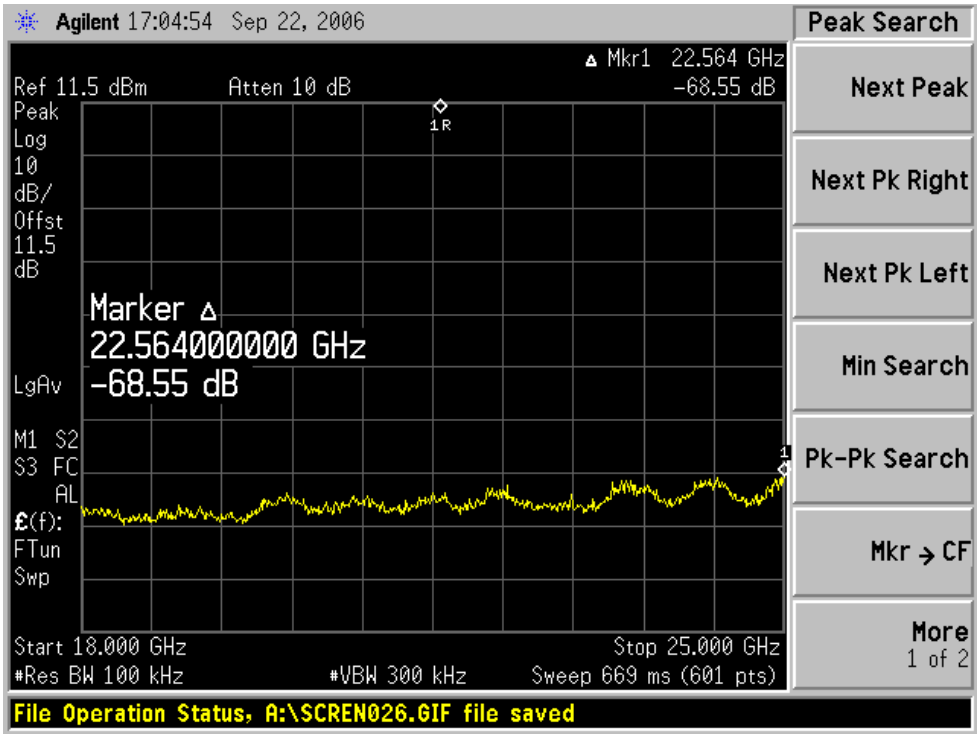

Agilent 16:48:44 Sep 22, 2006
Peak Search
Mkr1 21.866 GHz
-68.46 dB
Ref 11.5 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11.5
dB
1R
Marker Δ
21.866000000 GHz
-68.46 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 18.000 GHz
Stop 25.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 669 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN022.GIF file saved

Middle Channel

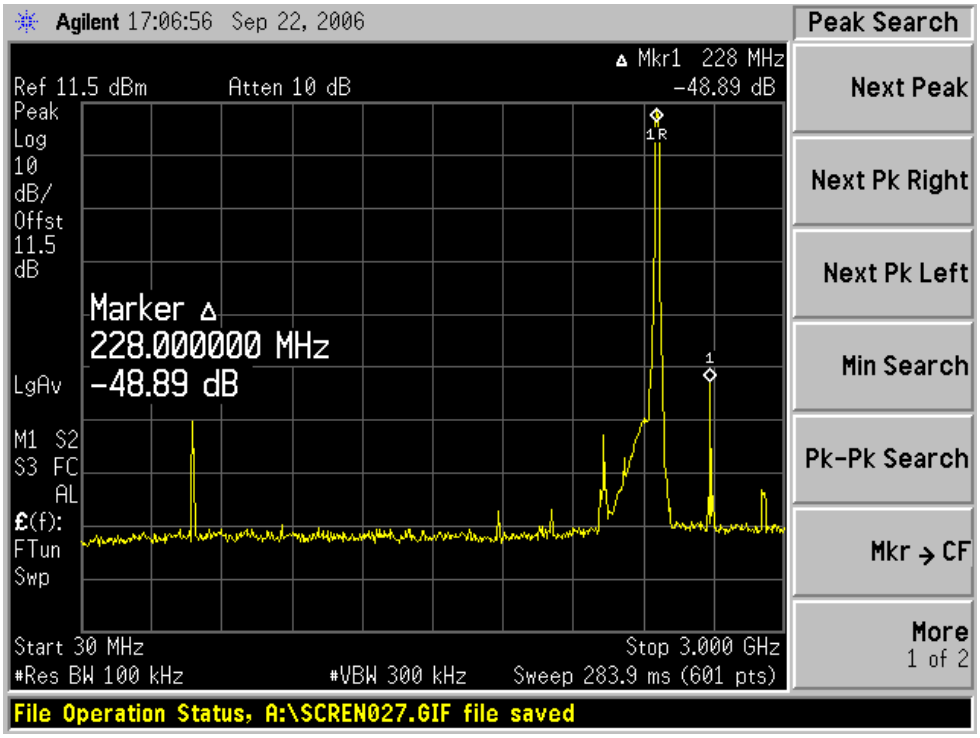


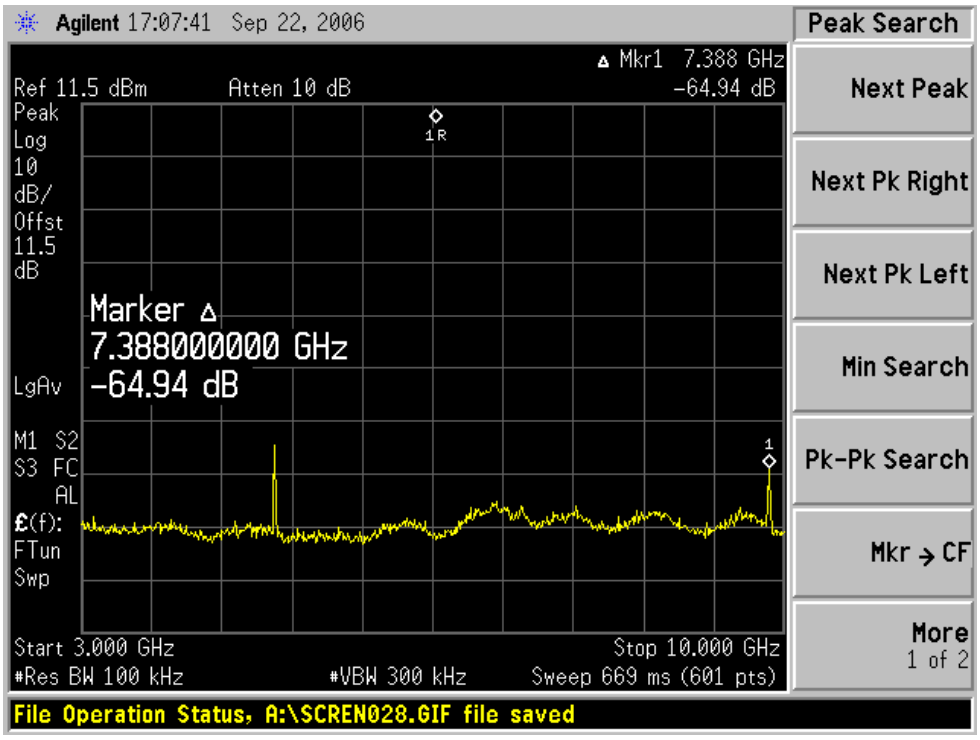


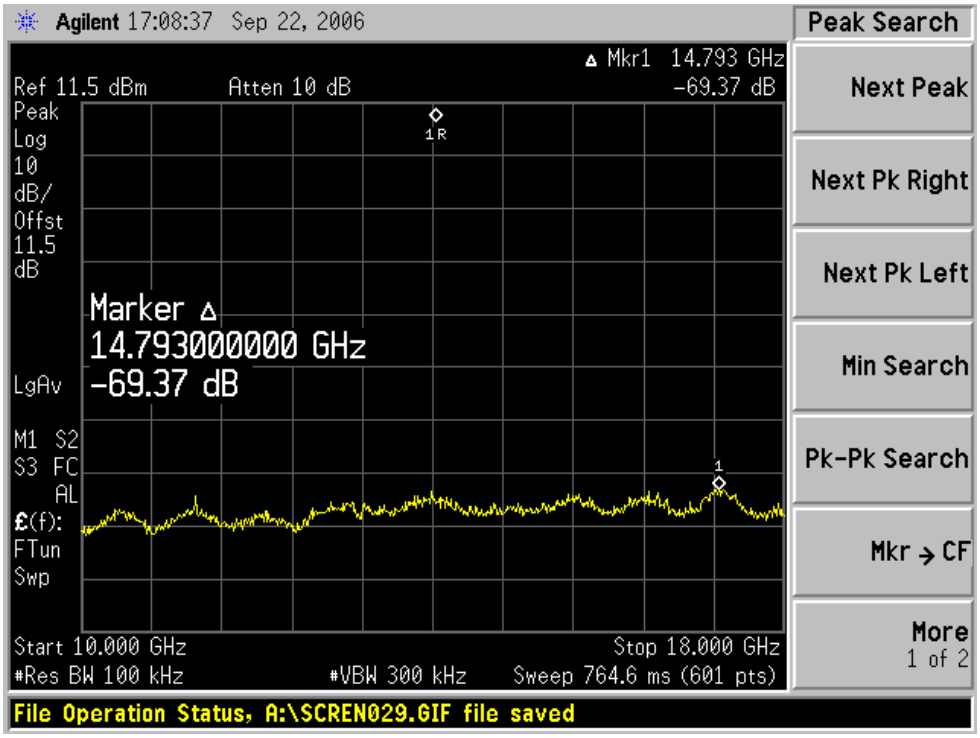

Agilent 17:04:01 Sep 22, 2006
Peak Search
Mkr1 14.871 GHz
-71.17 dB
Ref 11.5 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11.5
dB
1R
Marker Δ
14.871000000 GHz
-71.17 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 10.000 GHz
Stop 18.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 764.6 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN025.GIF file saved

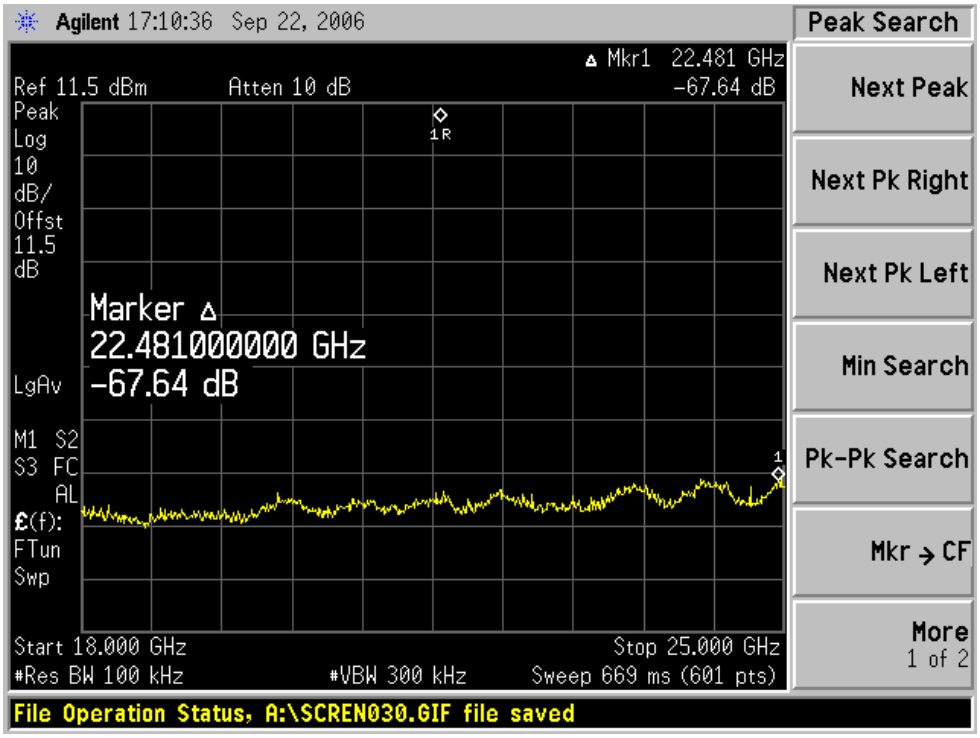

Agilent 17:04:54 Sep 22, 2006
Peak Search
Mkr1 22.564 GHz
-68.55 dB
Ref 11.5 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11.5
dB
1R
Marker Δ
22.564000000 GHz
-68.55 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 18.000 GHz
Stop 25.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 669 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN026.GIF file saved

High Channel



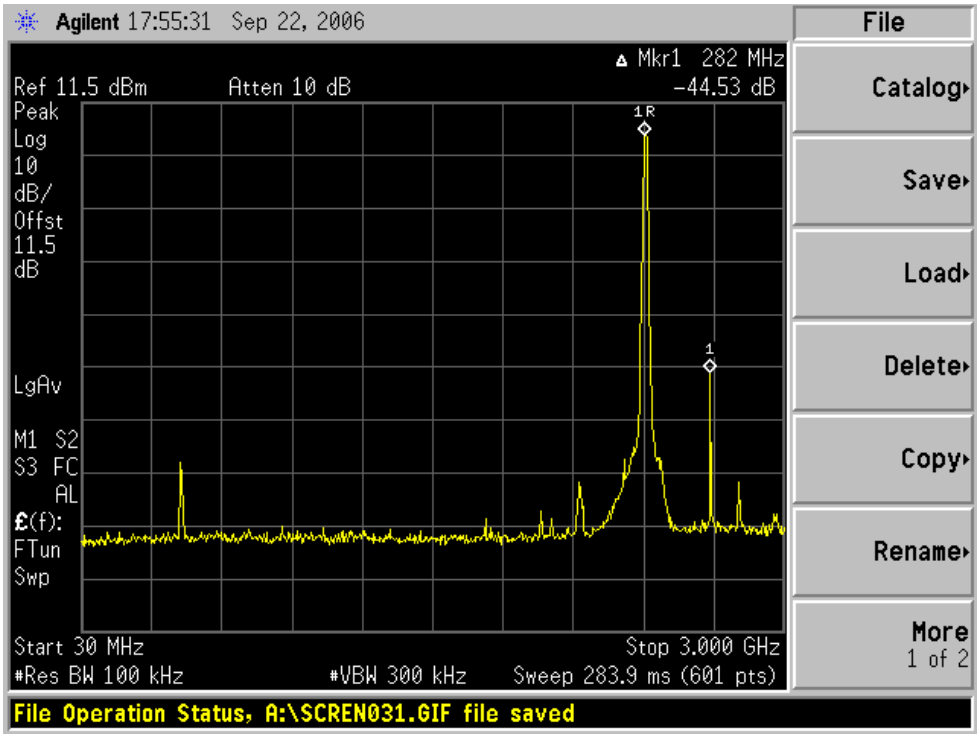


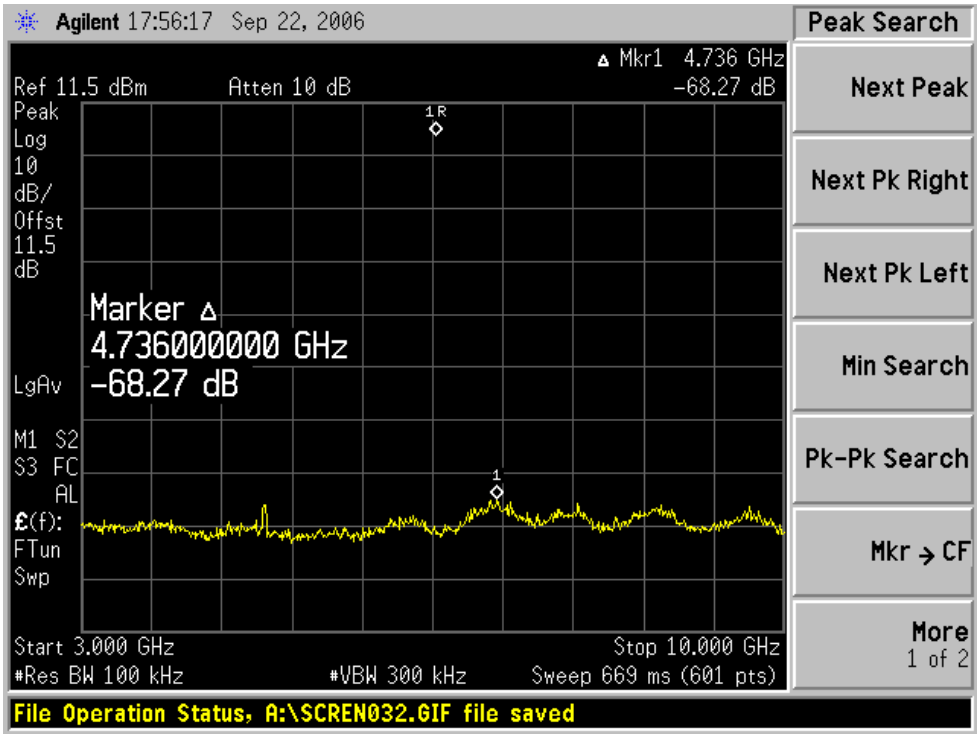

Agilent 17:08:37 Sep 22, 2006
Peak Search
Mkr1 14.793 GHz
-69.37 dB
Ref 11.5 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11.5
dB
1R
Marker Δ
14.793000000 GHz
-69.37 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 10.000 GHz
Stop 18.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 764.6 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN029.GIF file saved

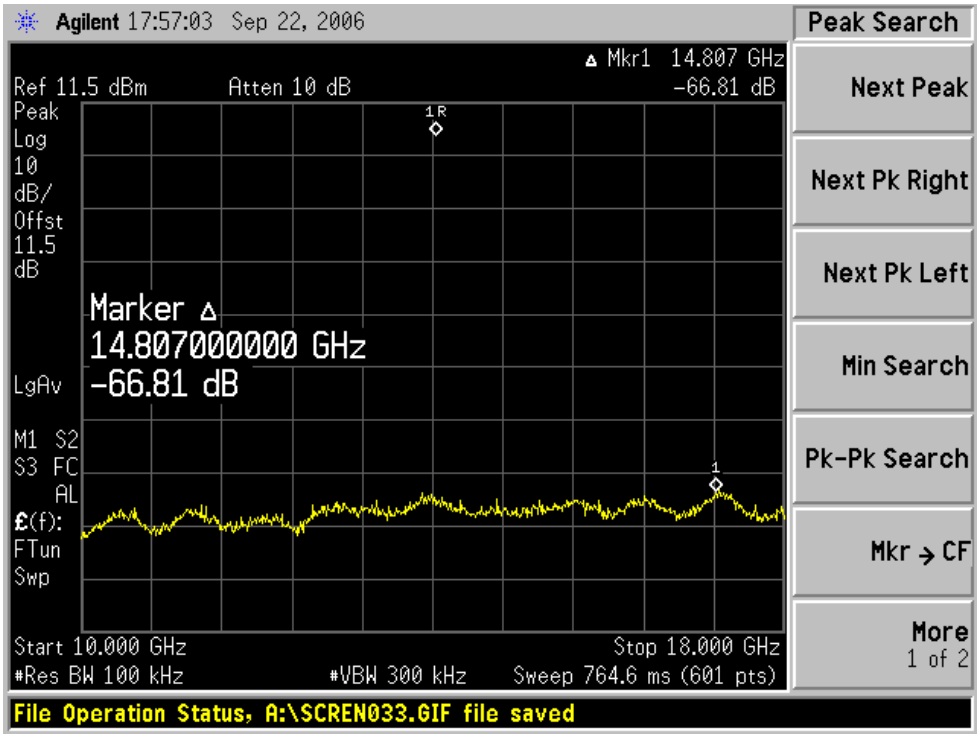

Agilent 17:10:36 Sep 22, 2006
Peak Search
Mkr1 22.481 GHz
-67.64 dB
Ref 11.5 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11.5
dB
1R
Marker Δ
22.481000000 GHz
-67.64 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 18.000 GHz
Stop 25.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 669 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN030.GIF file saved

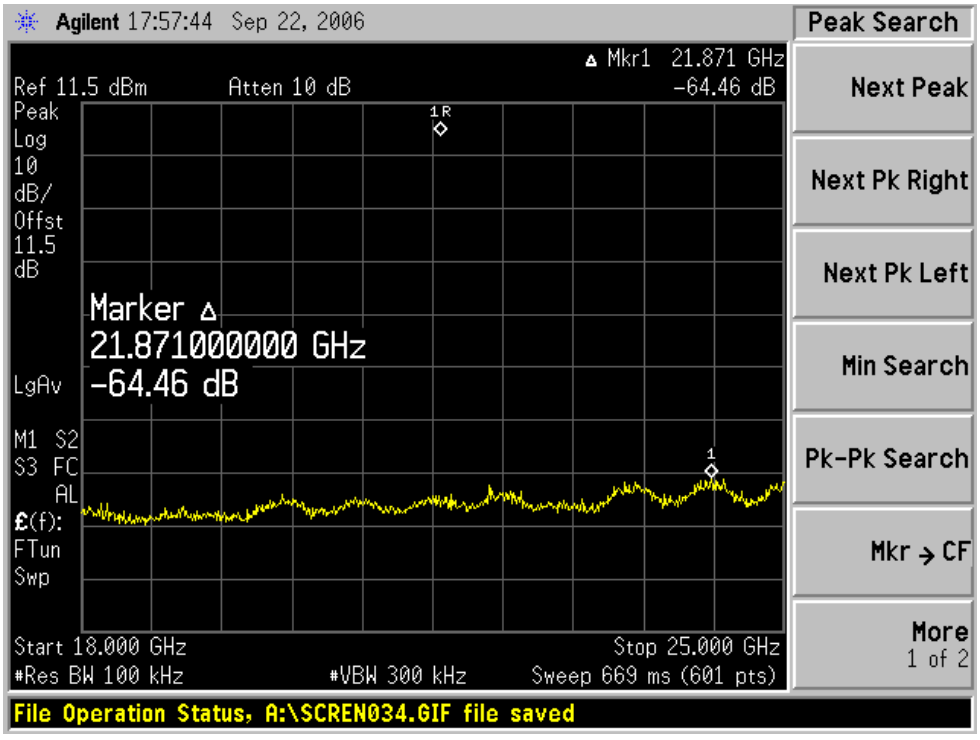
802.11g

Low Channel

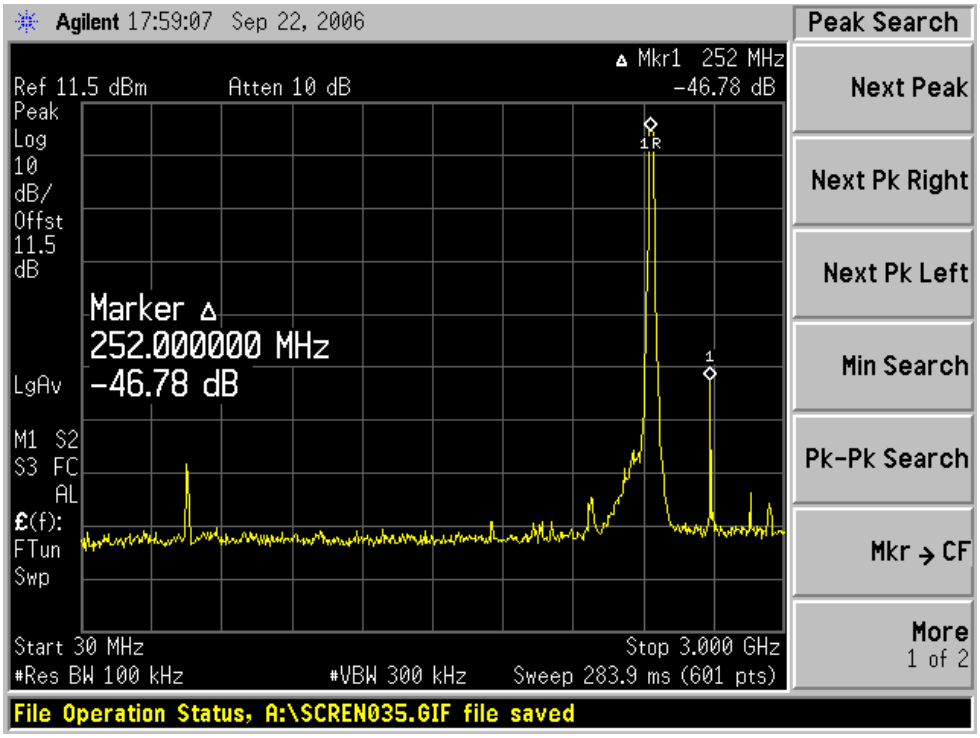


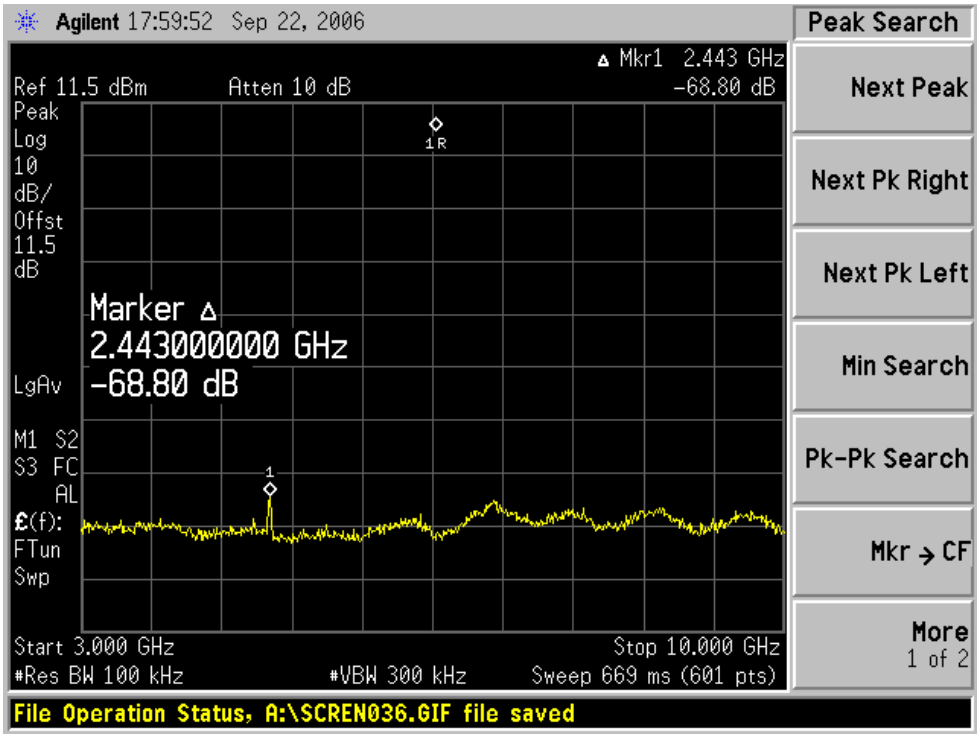


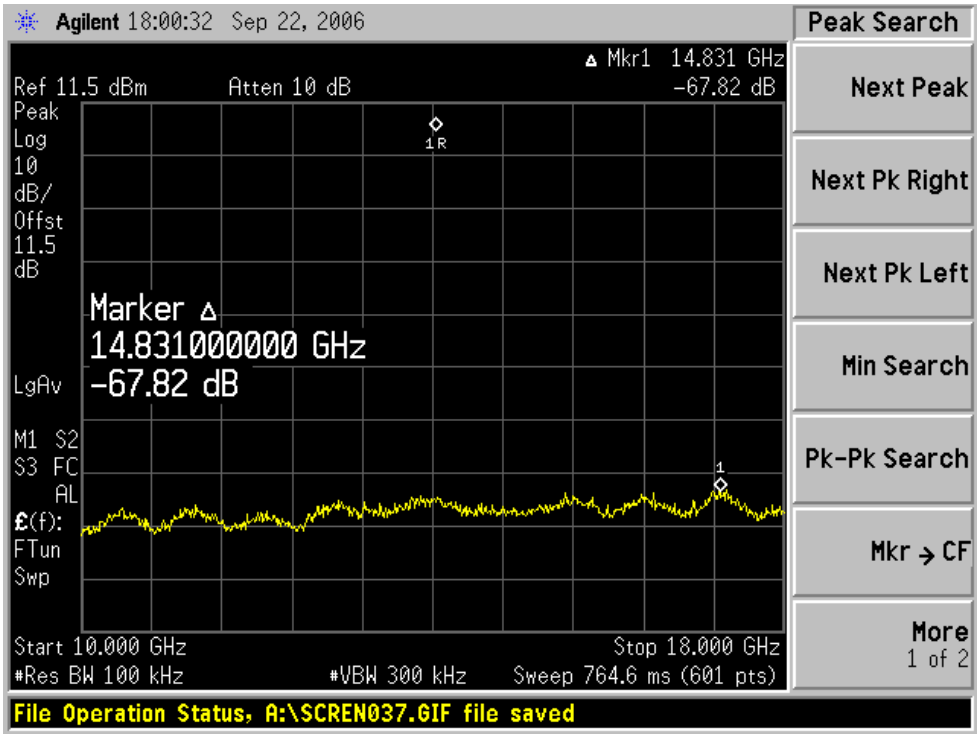

Agilent 17:57:03 Sep 22, 2006
Peak Search
Mkr1 14.807 GHz
Ref 11.5 dBm
Atten 10 dB
-66.81 dB
Peak
Log
10
dB/
Offst
11.5
dB
1R
Marker Δ
14.807000000 GHz
-66.81 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
1
Start 10.000 GHz
Stop 18.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 764.6 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN033.GIF file saved

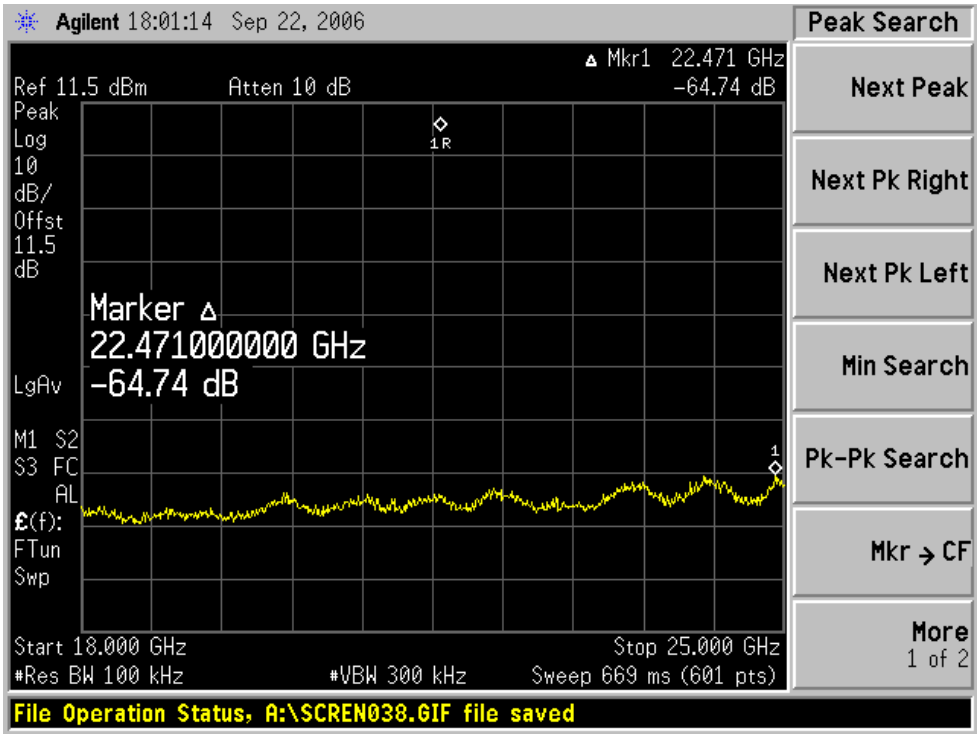

Agilent 17:57:44 Sep 22, 2006
Peak Search
Mkr1 21.871 GHz
Ref 11.5 dBm
Atten 10 dB
-64.46 dB
Peak
Log
10
dB/
Offst
11.5
dB
1R
Marker Δ
21.871000000 GHz
-64.46 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
1
Start 18.000 GHz
Stop 25.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 669 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN034.GIF file saved

Middle Channel

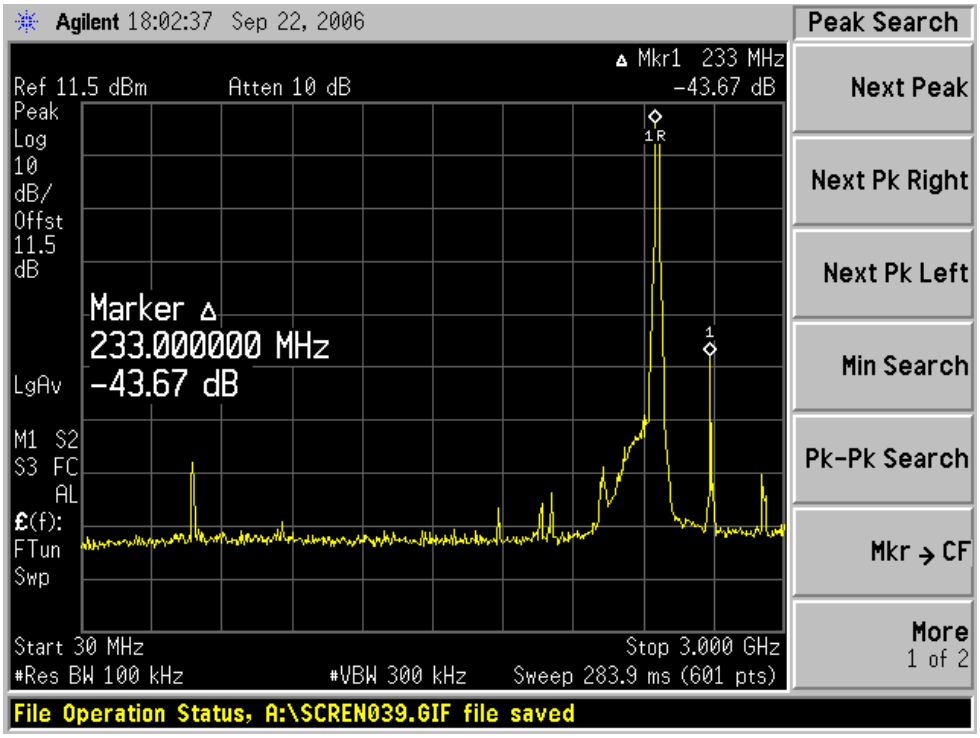


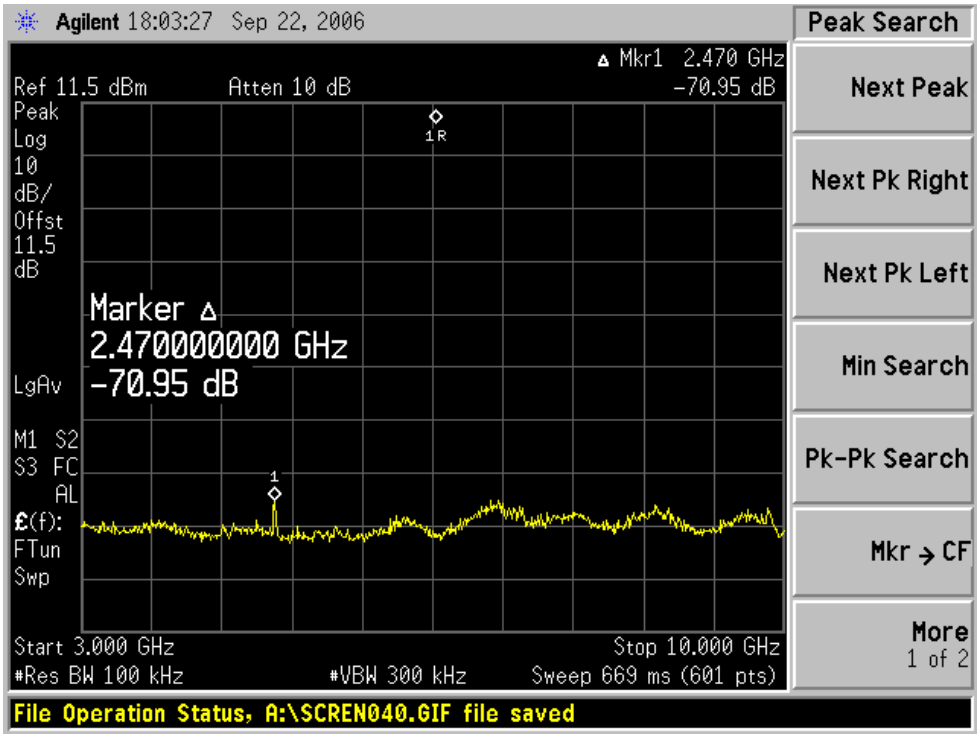


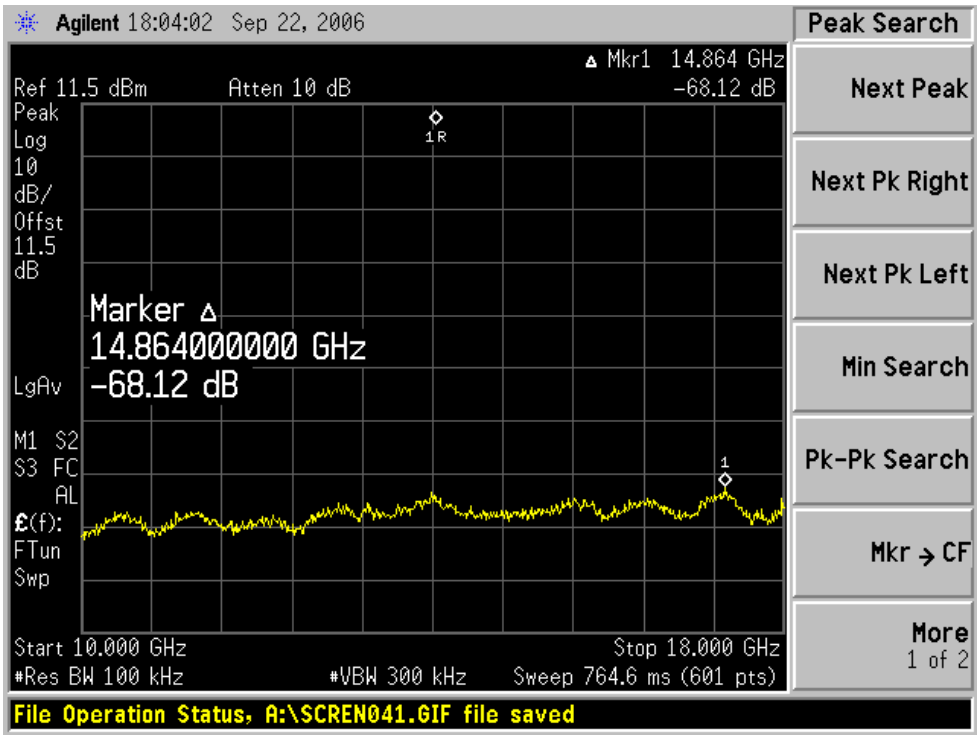

Agilent 18:00:32 Sep 22, 2006
Peak Search
Mkr1 14.831 GHz
-67.82 dB
Ref 11.5 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11.5
dB
Marker Δ
14.831000000 GHz
-67.82 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 10.000 GHz
Stop 18.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 764.6 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN037.GIF file saved

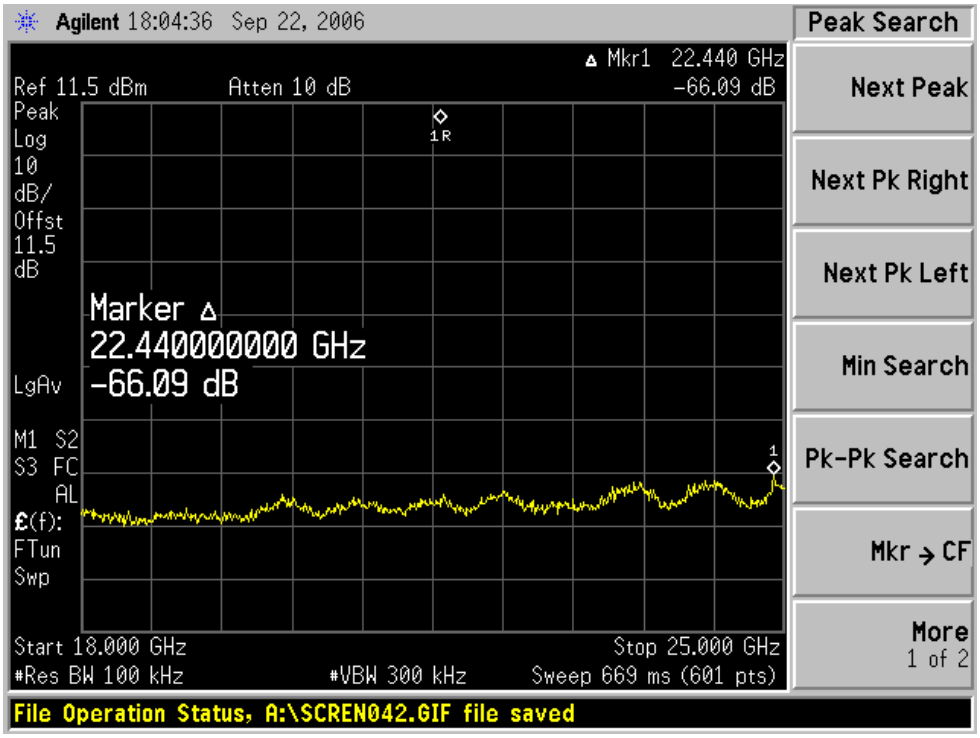

Agilent 18:01:14 Sep 22, 2006
Peak Search
Mkr1 22.471 GHz
-64.74 dB
Ref 11.5 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11.5
dB
Marker Δ
22.471000000 GHz
-64.74 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 18.000 GHz
Stop 25.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 669 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN038.GIF file saved

High Channel






Agilent 18:04:02 Sep 22, 2006
Peak Search
Mkr1 14.864 GHz
-68.12 dB
Ref 11.5 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11.5
dB
Marker Δ
14.864000000 GHz
-68.12 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 10.000 GHz
Stop 18.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 764.6 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN041.GIF file saved


Agilent 18:04:36 Sep 22, 2006
Peak Search
Mkr1 22.440 GHz
-66.09 dB
Ref 11.5 dBm
Atten 10 dB
Peak
Log
10
dB/
Offst
11.5
dB
Marker Δ
22.440000000 GHz
-66.09 dB
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 18.000 GHz
Stop 25.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 669 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
File Operation Status, A:\SCREN042.GIF file saved

§15.109, §15.205, §15.209 & §15.247(c) - SPURIOUS RADIATED EMISSIONS

Applicable Standard

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

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	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 15.247(c)(1)(i): Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

As Per 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		

Test Setup

The radiated emissions tests were performed in the 3-meter open area test site, using the setup in accordance with ANSI C63.4-2003. The specification used was the FCC 15 Subpart C limits.

EUT Setup

The radiated emissions tests were performed using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15C 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Sonoma Instruments	Pre amplifier	317	260408	2006-03-02
Agilent	Pre amplifier	8449B	3008A01978	2006-08-10
Sunol Science Corp	Combination Antenna	JB3 Antenna	A020106-3	2006-02-14
Agilent	Spectrum Analyzer	E4446A	US44300386	2006-03-06
A.R.A	Antenna Horn	DRG-118/A	1132	2006-08-17

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

Test Procedure

For the radiated emissions test, the EUT, 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 mete, 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 1000MHz:

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

Above 1000MHz:

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

Corrected Amplitude & Margin Calculation

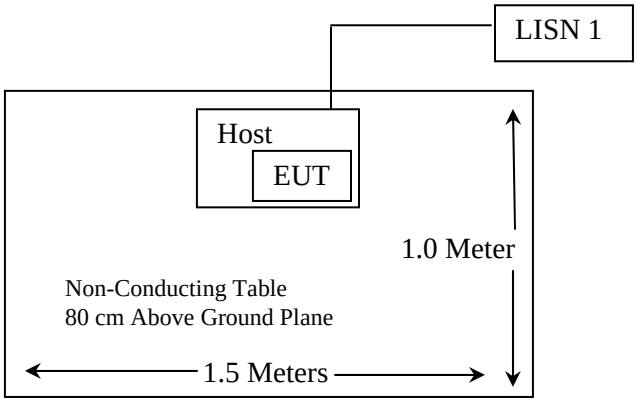
The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

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

Margin = Corrected Amplitude - FCC Limit

Test Setup Diagram



Environmental Conditions

Temperature:	22° C
Relative Humidity:	56 %
ATM Pressure:	1041 mbar

** The testing was performed by James Ma from 2006-12-21.*

Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, and had the worst margin of:

Unintentional Radiated Emissions:

-9.3 dB at **746.508750 MHz** in the **Horizontal** polarization, 30 – 1000 MHz

802.11a

-2.8 dB at **17235.0000 MHz** in the **Horizontal** polarization for Low Channel, 1GHz – 40GHz
-2.5 dB at **17355.0000 MHz** in the **Vertical** polarization for Middle Channel, 1GHz – 40GHz
-3.2 dB at **11650.0000 MHz** in the **Vertical** polarization for High Channel, 1GHz – 40GHz

802.11b

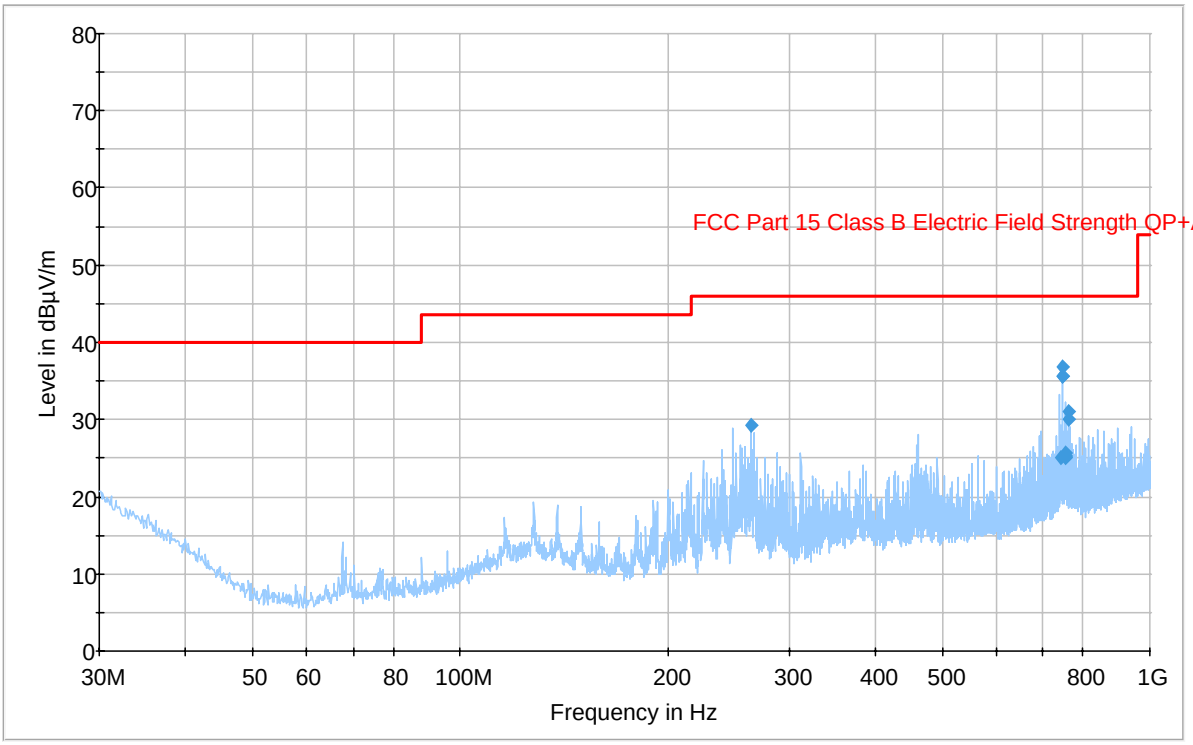
-10.9 dB at **7236.0000 MHz** in the **Vertical** polarization for Low Channel, 1GHz – 25GHz
-10.9 dB at **7311.0000 MHz** in the **Vertical** polarization for Middle Channel, 1GHz – 25GHz
-11.0 dB at **7386.0000 MHz** in the **Vertical** polarization for High Channel, 1GHz – 25GHz

802.11g

-10.8 dB at **7236.0000 MHz** in the **Vertical** polarization for Low Channel, 1GHz – 25GHz
-11.0 dB at **7311.0000 MHz** in the **Vertical** polarization for Middle Channel, 1GHz – 25GHz
-10.6 dB at **7386.0000 MHz** in the **Vertical** polarization for High Channel, 1GHz – 25GHz

Radiated Emissions Test plot & data:

Primary scan 30MHz -1GHz



Frequency (MHz)	Corrected Quasi - Peak (dBµV/m)	Antenna height (cm)	Polarity (H/V)	Turntable position (deg.)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
746.508750	36.7	125.0	H	198.0	-14.2	46.0	-9.3
746.507500	35.7	101.0	H	37.0	-14.2	46.0	-10.3
746.520000	35.6	101.0	H	38.0	-14.2	46.0	-10.4
764.291250	31.0	115.0	H	194.0	-13.9	46.0	-15.0
764.278750	30.0	119.0	H	38.0	-13.9	46.0	-16.0
264.052500	29.3	125.0	H	208.0	-23.4	46.0	-16.7
755.098750	25.6	101.0	H	38.0	-14.0	46.0	-20.4
755.111250	25.3	101.0	H	35.0	-14.0	46.0	-20.7
755.087500	25.1	120.0	H	38.0	-14.0	46.0	-20.9
741.476250	25.0	119.0	H	200.0	-14.3	46.0	-21.0

802.11a: 5745 – 5825 MHz, Measured at 3 meters

Low channel 5745 MHz

Frequency MHz	Reading dBµV	Azimuth Degrees	Height Meters	Polar. H / V	Antenna Factor dB/m	Cable loss dB	Amplifier dB	Corrected Reading dBµV/m	Limit dBµV/m	Margin dB	Comments
5745.00	98.8	60	1.5	V	34.7	6.7	33.3	106.8			Fund/Peak
5745.00	96.6	60	1.5	H	34.7	6.7	33.3	104.6			Fund/Peak
5745.00	90.8	60	1.8	V	34.7	6.7	33.3	98.8			Ave
5745.00	88.1	60	1.5	H	34.7	6.7	33.3	96.1			Ave
17235.00	28.4	200	1.0	H	42.2	13.0	32.4	51.2	54	-2.8	Ave
17235.00	28.2	90	2.0	V	42.2	13.0	32.4	51.0	54	-3.0	Ave
11490.00	30.4	180	2.3	H	40.2	13.0	34.0	49.6	54	-4.4	Ave
11490.00	29.5	270	2.4	V	40.2	13.0	34.0	48.7	54	-5.3	Ave
17235.00	35.4	200	1.0	H	42.2	13.0	32.4	58.2	74	-15.8	Peak
17235.00	35.1	90	2.0	V	42.2	13.0	32.4	57.9	74	-16.1	Peak
11490.00	37.0	70	1.7	H	40.2	13.0	34.0	56.2	74	-17.8	Peak
11490.00	36.4	45	1.7	V	40.2	13.0	34.0	55.6	74	-18.4	Peak

Mid channel 5785 MHz

Frequency MHz	Reading dBµV	Azimuth Degrees	Height Meters	Polar. H / V	Antenna Factor dB/m	Cable loss dB	Amplifier dB	Corrected Reading dBµV/m	Limit dBµV/m	Margin dB	Comments
5785.00	97.2	45	1.0	V	34.7	6.7	33.3	105.2			Fund/Peak
5785.00	97.4	45	1.2	H	34.7	6.7	33.3	105.4			Fund/Peak
5785.00	88.5	45	1.0	V	34.7	6.7	33.3	96.5			Ave
5785.00	88.3	45	1.2	H	34.7	6.7	33.3	96.3			Ave
17355.00	28.7	30	1.3	V	42.2	13.0	32.4	51.5	54	-2.5	Ave
17355.00	28.2	180	1.0	H	42.2	13.0	32.4	51.0	54	-3.0	Ave
11570.00	32.0	160	2.2	H	40.5	14.7	36.7	50.5	54	-3.5	Ave
11570.00	31.4	35	1.5	V	40.5	14.7	36.7	49.9	54	-4.1	Ave
17355.00	34.3	30	1.3	V	42.2	13.0	32.4	57.1	74	-16.9	Peak
17355.00	33.7	180	1.0	H	42.2	13.0	32.4	56.5	74	-17.5	Peak
11570.00	36.1	160	2.2	H	40.5	14.7	36.7	54.6	74	-19.4	Peak
11570.00	35.2	35	1.5	V	40.5	14.7	36.7	53.7	74	-20.3	Peak

High channel 5825 MHz

Frequency MHz	Reading dBµV	Direction Degree	Height Meter	Polar. H / V	Antenna Factor dB/m	Cable loss dB	Amplifier dB	Corrected Reading dBµV/m	Limit dBµV/m	Margin dB	Comments
5825.00	96.4	60	1.3	V	34.7	6.7	33.3	104.4			Fund/Peak
5825.00	95.6	180	1.2	H	34.7	6.7	33.3	103.6			Fund/Peak
5825.00	88.7	60	1.3	V	34.7	6.7	33.3	96.7			Ave
5825.00	87.4	180	1.2	H	34.7	6.7	33.3	95.4			Ave
11650.00	32.3	60	2.0	V	40.5	14.7	36.7	50.8	54	-3.2	Ave
11650.00	31.9	90	2.1	H	40.5	14.7	36.7	50.4	54	-3.6	Ave
17475.00	27.5	270	2.4	V	42.2	13.0	32.4	50.3	54	-3.7	Ave
17475.00	27.2	180	1.2	H	42.2	13.0	32.4	50.0	54	-4.0	Ave
17475.00	33.6	270	2.4	V	42.2	13.0	32.4	56.4	74	-17.6	Peak
17475.00	33.4	180	1.2	H	42.2	13.0	32.4	56.2	74	-17.8	Peak
11650.00	37.1	60	2.0	V	40.5	14.7	36.7	55.6	74	-18.4	Peak
11650.00	36.2	90	2.1	H	40.5	14.7	36.7	54.7	74	-19.3	Peak

802.11b: 2412 - 2462 MHz, Measured at 3 meters

Low channel 2412 MHz

Frequency MHz	Reading dBµV	Azimuth Degrees	Height Meters	Polar. H / V	Antenna Factor dB/m	Cable loss dB	Amplifier dB	Corrected Reading dBµV/m	Limit dBµV/m	Margin dB	Comments
2412.00	109.7	60	1.5	V	28.2	4.4	36.2	106.1			Fund/Peak
2412.00	109.2	60	1.5	H	28.2	4.4	36.2	105.6			Fund/Peak
2412.00	106.2	60	1.8	V	28.2	4.4	36.2	102.6			Ave
2412.00	105.9	60	1.5	H	28.2	4.4	36.2	102.3			Ave
7236.00	30.1	90	2.0	V	37.6	12.3	36.9	43.1	54	-10.9	Ave
7236.00	30.0	200	1.0	H	37.6	12.3	36.9	43.0	54	-11.0	Ave
4824.00	36.3	270	2.4	V	32.1	6.0	34.4	40.0	54	-14.0	Ave
4824.00	36.3	180	2.3	H	32.1	6.0	34.4	40.0	54	-14.0	Ave
4824.00	43.2	70	1.7	H	32.1	6.0	34.4	46.9	74	-27.1	Peak
7236.00	33.6	90	2.0	V	37.6	12.3	36.9	46.6	74	-27.4	Peak
4824.00	42.8	45	1.7	V	32.1	6.0	34.4	46.5	74	-27.5	Peak
7236.00	33.2	200	1.0	H	37.6	12.3	36.9	46.2	74	-27.8	Peak

Middle channel 2437 MHz

Frequency MHz	Reading dBµV	Azimuth Degrees	Height Meters	Polar. H / V	Antenna Factor dB/m	Cable loss dB	Amplifier dB	Corrected Reading dBµV/m	Limit dBµV/m	Margin dB	Comments
2437.00	110.3	45	1.0	V	28.2	4.4	36.2	106.7			Fund/Peak
2437.00	109.2	45	1.2	H	28.2	4.4	36.2	105.6			Fund/Peak
2437.00	104.6	45	1.0	V	28.2	4.4	36.2	101.0			Ave
2437.00	105.3	45	1.2	H	28.2	4.4	36.2	101.7			Ave
7311.00	30.1	30	1.3	V	37.6	12.3	36.9	43.1	54	-10.9	Ave
7311.00	30.0	180	1.0	H	37.6	12.3	36.9	43.0	54	-11.0	Ave
4874.00	34.0	160	2.2	H	32.1	6.0	34.4	37.7	54	-16.3	Ave
4874.00	33.7	35	1.5	V	32.1	6.0	34.4	37.4	54	-16.6	Ave
7311.00	33.3	30	1.3	V	37.6	12.3	36.9	46.3	74	-27.7	Peak
7311.00	32.4	180	1.0	H	37.6	12.3	36.9	45.4	74	-28.6	Peak
4874.00	37.8	160	2.2	H	32.1	6.0	34.4	41.5	74	-32.5	Peak
4874.00	37.4	35	1.5	V	32.1	6.0	34.4	41.1	74	-32.9	Peak

High channel 2462 MHz

Frequency MHz	Reading dBµV	Direction Degrees	Height Meters	Polar. H / V	Antenna Factor dB/m	Cable loss dB	Amplifier dB	Corrected Reading dBµV/m	Limit dBµV/m	Margin dB	Comments
2462.00	110.2	60	1.3	V	28.2	4.4	36.2	106.6			Fund/Peak
2462.00	109.8	180	1.2	H	28.2	4.4	36.2	106.2			Fund/Peak
2462.00	104.6	60	1.3	V	28.2	4.4	36.2	101.0			Ave
2462.00	105.7	180	1.2	H	28.2	4.4	36.2	102.1			Ave
7386.00	30.0	270	2.4	V	37.6	12.3	36.9	43.0	54	-11.0	Ave
7386.00	29.8	180	1.2	H	37.6	12.3	36.9	42.8	54	-11.2	Ave
4924.00	34.2	60	2.0	V	32.1	6.0	34.4	37.9	54	-16.1	Ave
4924.00	34.0	90	2.1	H	32.1	6.0	34.4	37.7	54	-16.3	Ave
7386.00	33.6	270	2.4	V	37.6	12.3	36.9	46.6	74	-27.4	Peak
7386.00	33.4	180	1.2	H	37.6	12.3	36.9	46.4	74	-27.6	Peak
4924.00	38.4	60	2.0	V	32.1	6.0	34.4	42.1	74	-31.9	Peak
4924.00	38.1	90	2.1	H	32.1	6.0	34.4	41.8	74	-32.2	Peak

802.11g: 2412 – 2462 MHz, Measured at 3 meters

Low channel 2412 MHz

Frequency MHz	Reading dBµV	Direction Degrees	Height Meters	Polar. H / V	Antenna Factor dB/m	Cable loss dB	Amplifier dB	Corrected Reading dBµV/m	Limit dBµV/m	Margin	Comments
2412.00	108.2	60	1.5	V	28.2	4.4	36.2	104.6			Fund/Peak
2412.00	107.0	60	1.5	H	28.2	4.4	36.2	103.4			Fund/Peak
2412.00	99.3	60	1.8	V	28.2	4.4	36.2	95.7			Ave
2412.00	98.5	60	1.5	H	28.2	4.4	36.2	94.9			Ave
7236.00	30.2	90	2.0	V	37.6	12.3	36.9	43.2	54	-10.8	Ave
7236.00	30.0	200	1.0	H	37.6	12.3	36.9	43.0	54	-11.0	Ave
4824.00	36.4	180	2.3	H	32.1	6.0	34.4	40.1	54	-13.9	Ave
4824.00	34.8	270	2.4	V	32.1	6.0	34.4	38.5	54	-15.5	Ave
7236.00	36.7	90	2.0	V	37.6	12.3	36.9	49.7	74	-24.3	Peak
7236.00	36.2	200	1.0	H	37.6	12.3	36.9	49.2	74	-24.8	Peak
4824.00	41.7	70	1.7	H	32.1	6.0	34.4	45.4	74	-28.6	Peak
4824.00	40.6	45	1.7	V	32.1	6.0	34.4	44.3	74	-29.7	Peak

Middle channel 2437 MHz

Frequency MHz	Reading dBµV	Direction Degrees	Height Meters	Polar. H / V	Antenna Factor dB/m	Cable loss dB	Amplifier dB	Corrected Reading dBµV/m	Limit dBµV/m	Margin dB	Comments
2437.00	107.8	45	1.0	V	28.2	4.4	36.2	104.2			Fund/Peak
2437.00	106.7	45	1.2	H	28.2	4.4	36.2	103.1			Fund/Peak
2437.00	101.0	45	1.0	V	28.2	4.4	36.2	97.4			Ave
2437.00	99.2	45	1.2	H	28.2	4.4	36.2	95.6			Ave
7311.00	30.0	30	1.3	V	37.6	12.3	36.9	43.0	54	-11.0	Ave
7311.00	29.7	180	1.0	H	37.6	12.3	36.9	42.7	54	-11.3	Ave
4874.00	34.8	35	1.5	V	32.1	6.0	34.4	38.5	54	-15.5	Ave
4874.00	34.0	160	2.2	H	32.1	6.0	34.4	37.7	54	-16.3	Ave
7311.00	35.4	30	1.3	V	37.6	12.3	36.9	48.4	74	-25.6	Peak
7311.00	35.2	180	1.0	H	37.6	12.3	36.9	48.2	74	-25.8	Peak
4874.00	40.7	35	1.5	V	32.1	6.0	34.4	44.4	74	-29.6	Peak
4874.00	39.2	160	2.2	H	32.1	6.0	34.4	42.9	74	-31.1	Peak

High channel 2462 MHz

Frequency MHz	Reading dBµV	Direction Degrees	Height Meters	Polar. H / V	Antenna Factor dB/m	Cable loss dB	Amplifier dB	Corrected Reading dBµV/m	Limit dBµV/m	Margin dB	Comments
2462.00	107.4	60	1.3	V	28.2	4.4	36.2	103.8			Fund/Peak
2462.00	106.2	180	1.2	H	28.2	4.4	36.2	102.6			Fund/Peak
2462.00	100.7	60	1.3	V	28.2	4.4	36.2	97.1			Ave
2462.00	98.5	180	1.2	H	28.2	4.4	36.2	94.9			Ave
7386.00	30.4	270	2.4	V	37.6	12.3	36.9	43.4	54	-10.6	Ave
7386.00	30.0	180	1.2	H	37.6	12.3	36.9	43.0	54	-11.0	Ave
4924.00	34.6	60	2.0	V	32.1	6.0	34.4	38.3	54	-15.7	Ave
4924.00	34.2	90	2.1	H	32.1	6.0	34.4	37.9	54	-16.1	Ave
7386.00	35.7	270	2.4	V	37.6	12.3	36.9	48.7	74	-25.3	Peak
7386.00	35.3	180	1.2	H	37.6	12.3	36.9	48.3	74	-25.7	Peak
4924.00	40.2	60	2.0	V	32.1	6.0	34.4	43.9	74	-30.1	Peak
4924.00	39.4	90	2.1	H	32.1	6.0	34.4	43.1	74	-30.9	Peak

§15.247(a) (2) – 6 dB & 99% BANDWIDTH

Applicable Standard

According to §15.247(a)(2), 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

Measurement Procedure

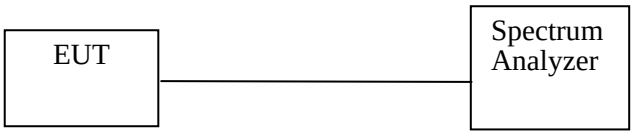
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emissions bandwidth. (6 dB bandwidth for DTS)
4. Repeat above procedures until all frequencies measured were complete.

Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2006-03-06

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

Test Setup Diagram (please revise if necessary)



Environmental Conditions

Temperature:	20° C
Relative Humidity:	40 %
ATM Pressure:	1020 mbar

** The testing was performed by James Ma from 2006-12-21.*

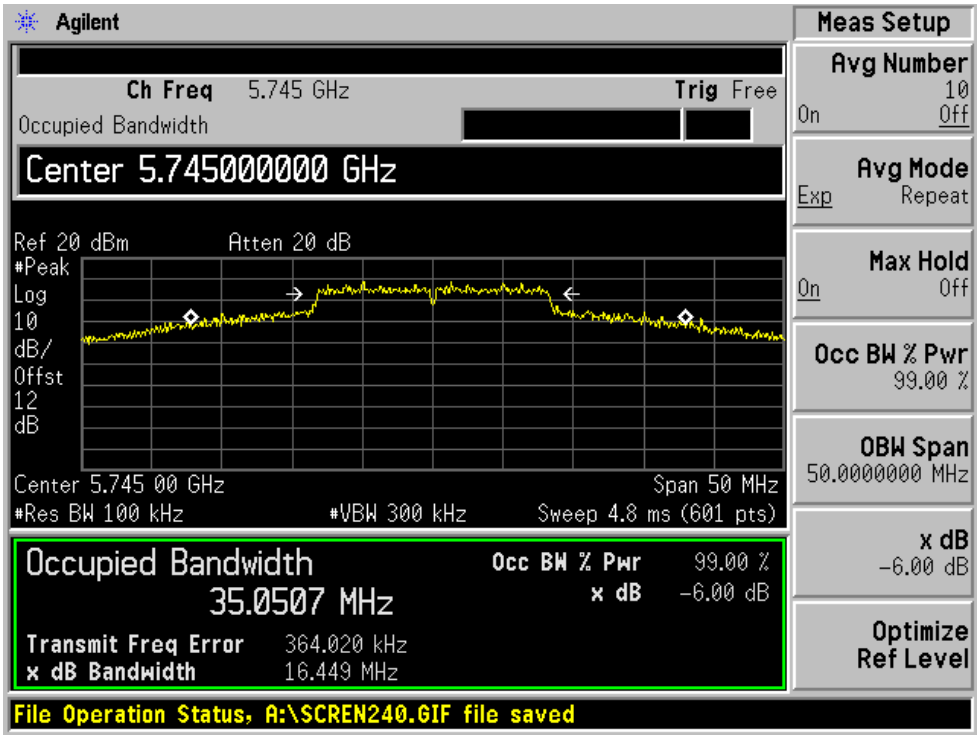
Test Results: Please refer to the plots.

Channel	Frequency (MHz)	6 dB BW (kHz)	Limit (kHz)	Result
802.11a				
Low	5745	16449	500	Pass
Middle	5785	16502	500	Pass
High	5825	16561	500	Pass
802.11 b				
Low	2412	12212	500	Pass
Middle	2437	11940	500	Pass
High	2462	11340	500	Pass
802.11 g				
Low	2412	16545	500	Pass
Middle	2437	16512	500	Pass
High	2462	16498	500	Pass

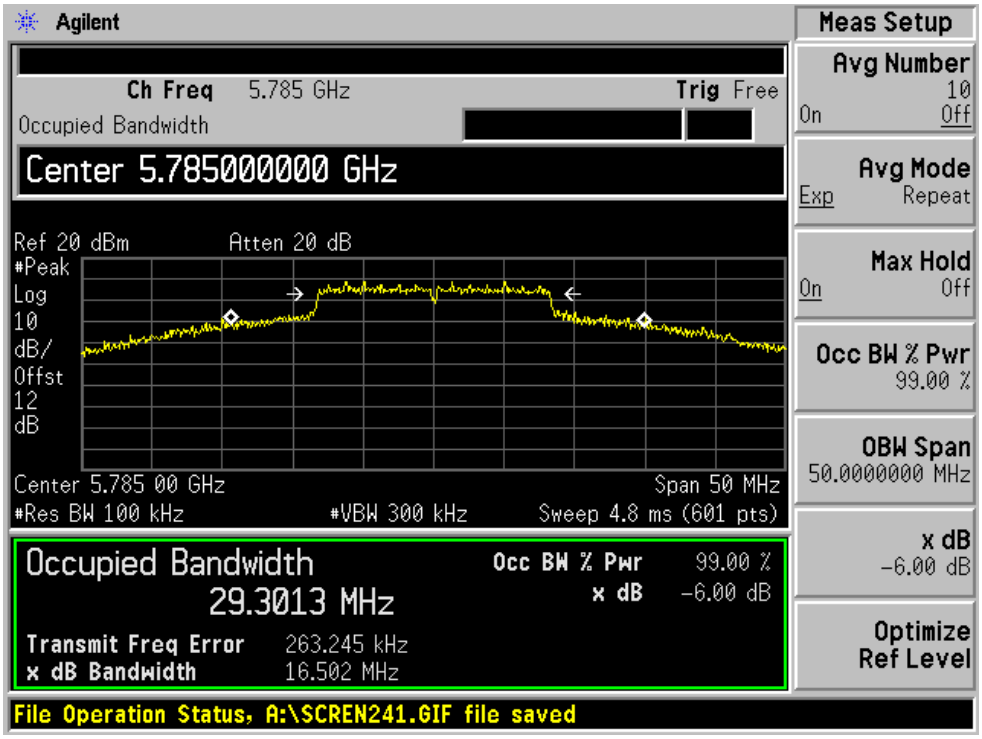
Please refer to the following plots for detailed test results

802.11a

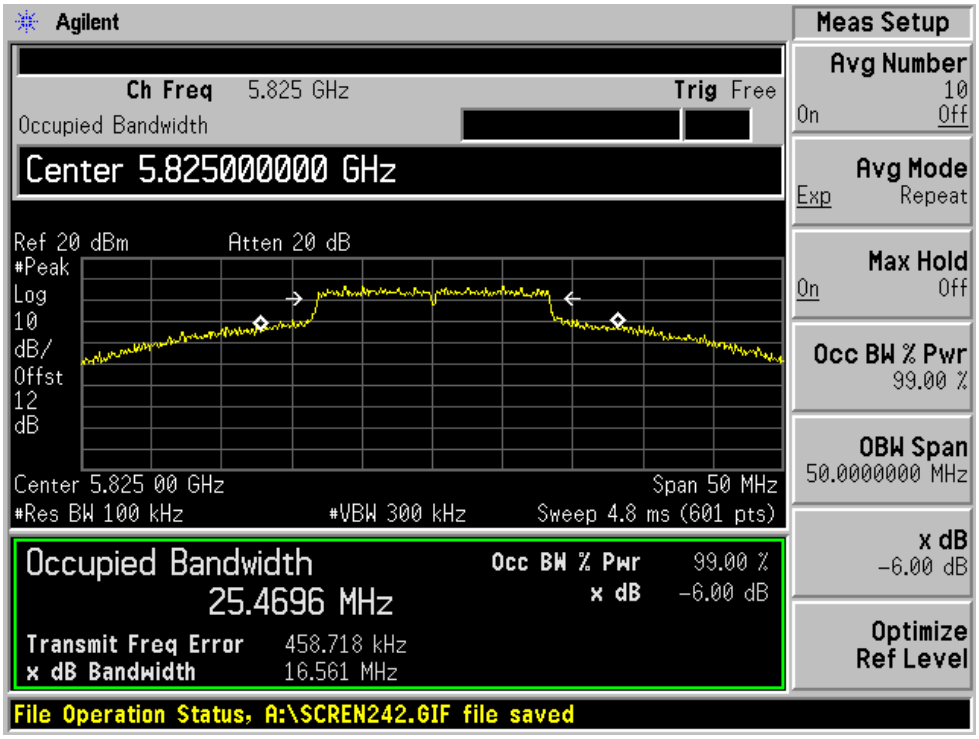
Low Channel



Middle Channel

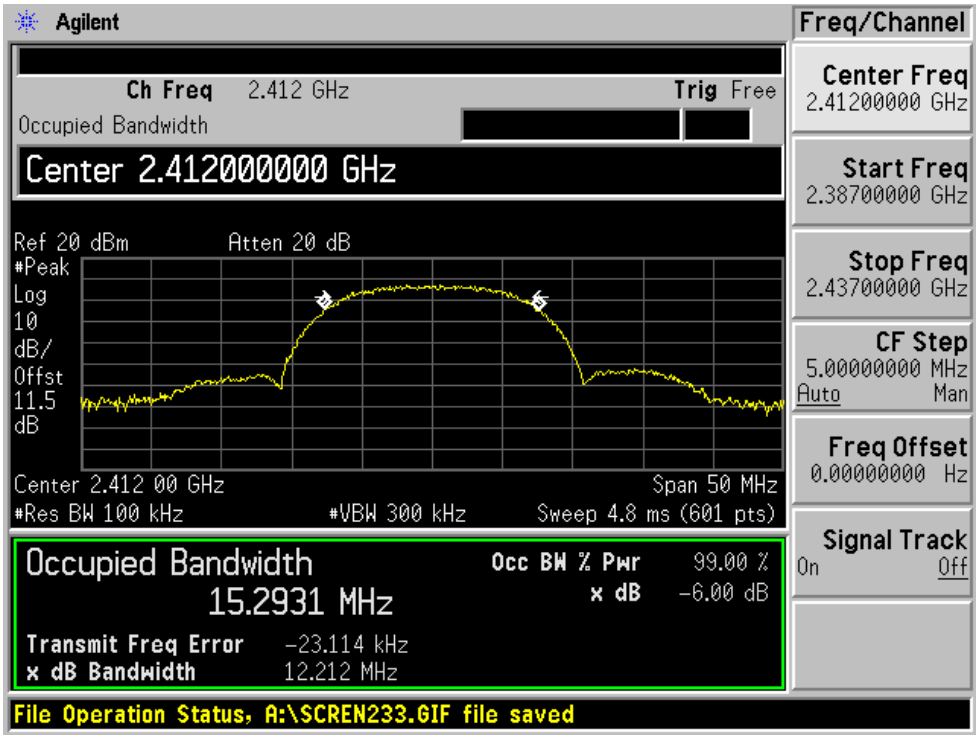


High Channel

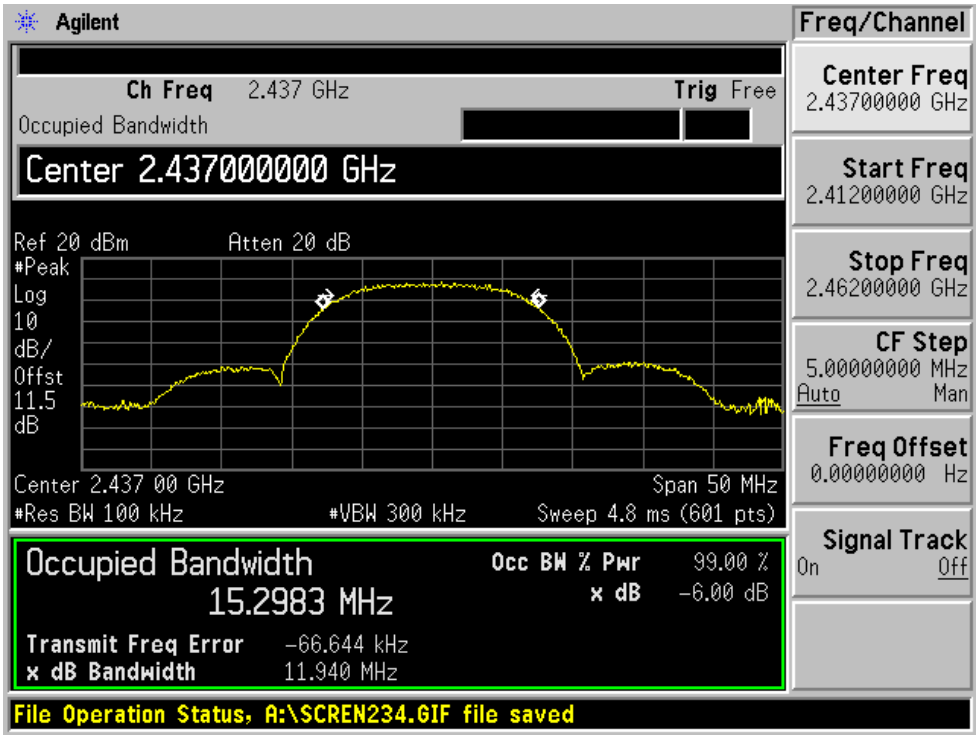


802.11b

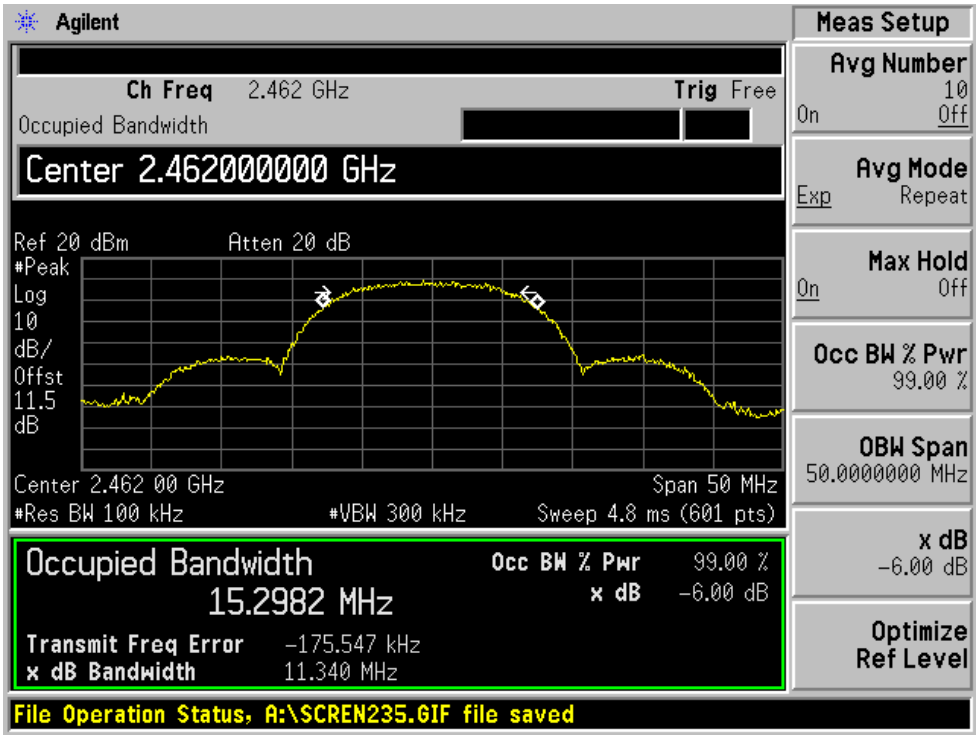
Low Channel



Middle Channel

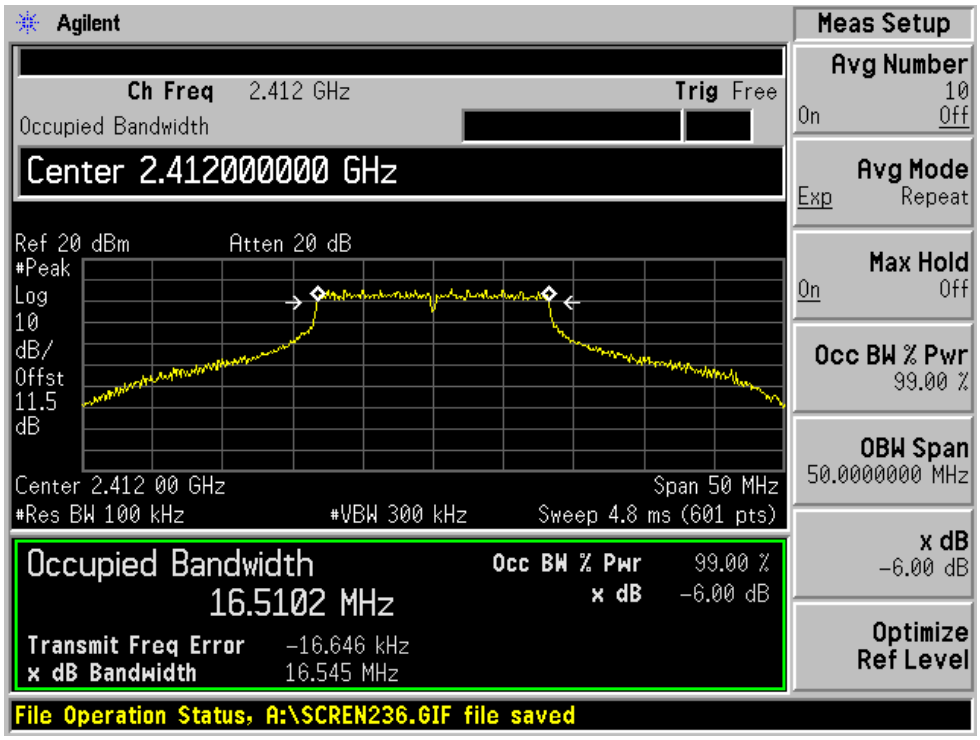


High Channel

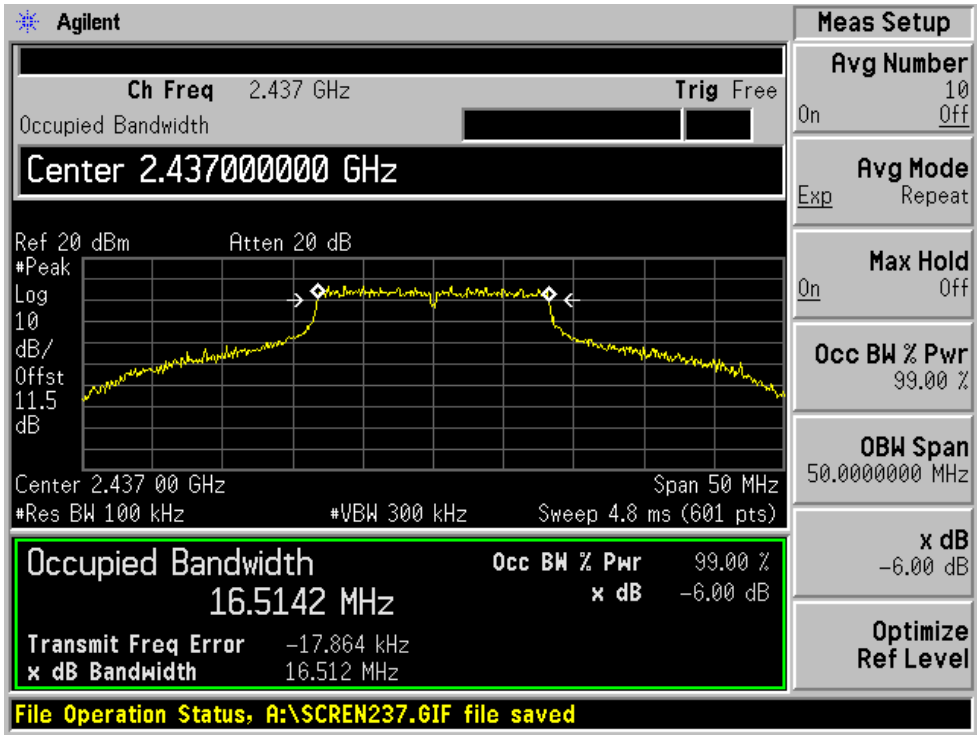


802.11g

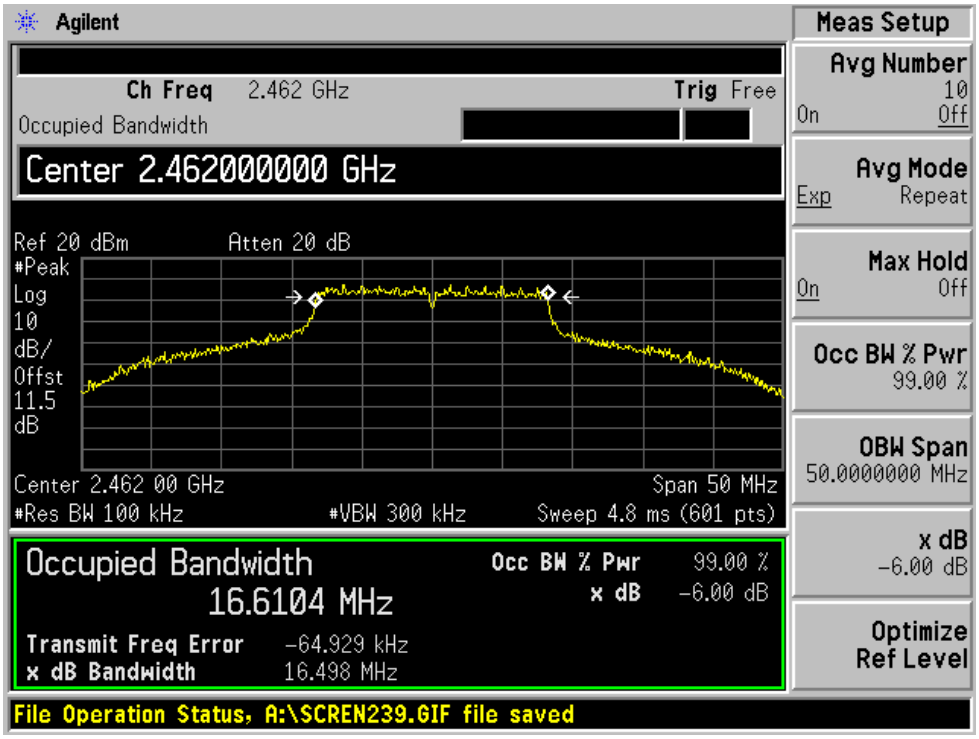
Low Channel



Middle Channel



High Channel



§15.247(b) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

§15.247(b) the maximum peak output power of the intentional radiator shall not exceed the following:

§15.247(b) (3) For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

§15.247(b) (4) (i) Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Measurement Procedure

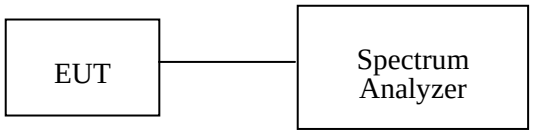
1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a spectrum analyzer.
3. Add a correction factor to the display.

Equipment Lists

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum analyzer	E4446A	US44300386	2006-03-06

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

Test Setup Diagram



Environmental Conditions

Temperature:	20 ° C
Relative Humidity:	44 %
ATM Pressure:	1020 mbar

** The testing was performed by James Ma from 2006-12-21.*

Test Result

802.11a

Frequency (MHz)	Max Power (dBm)	Max Power (mW)	Limit (mW)	Result
5745	19.09	81.10	1000	Pass
5785	18.56	71.78	1000	Pass
5825	18.37	68.71	1000	Pass

802.11b

Frequency (MHz)	Max Power (dBm)	Max Power (mW)	Limit (mW)	Result
2412	17.23	52.84	1000	Pass
2437	17.42	55.21	1000	Pass
2462	17.63	57.94	1000	Pass

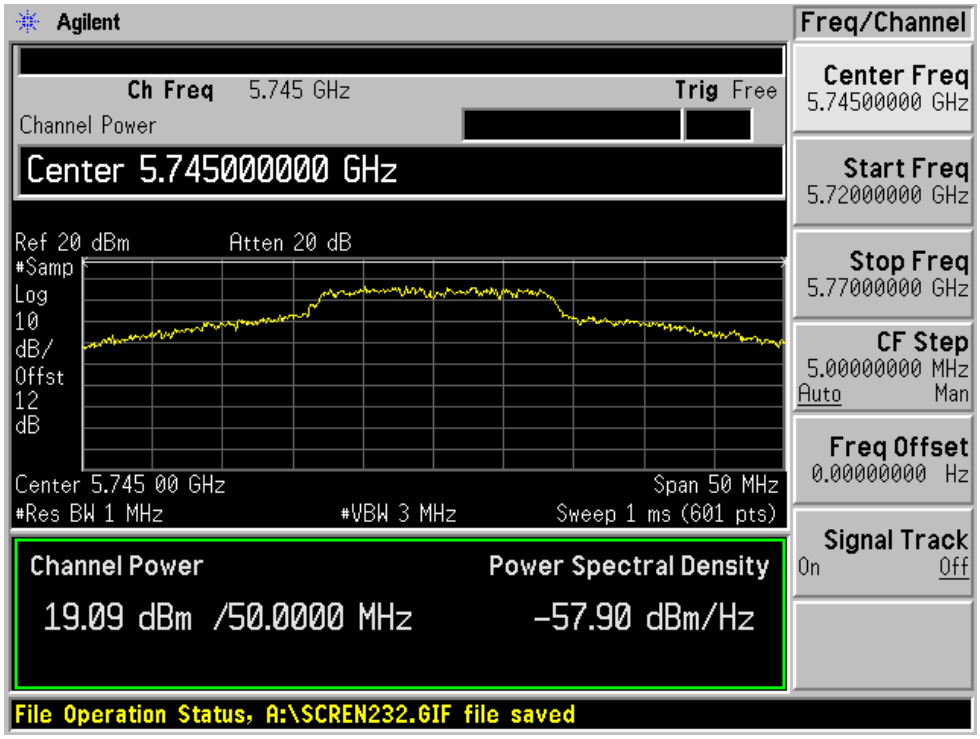
802.11g

Frequency (MHz)	Max Power (dBm)	Max Power (mW)	Limit (mW)	Result
2412	17.26	53.21	1000	Pass
2437	17.32	53.95	1000	Pass
2462	17.59	57.41	1000	Pass

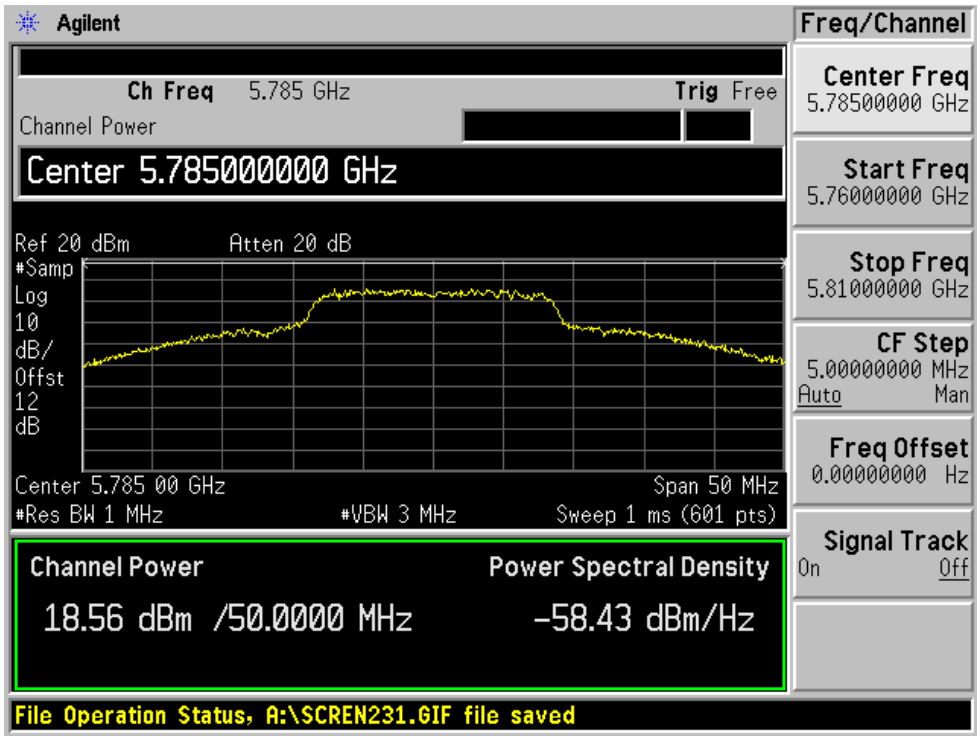
Please refer to the following plots for detailed test results

802.11a

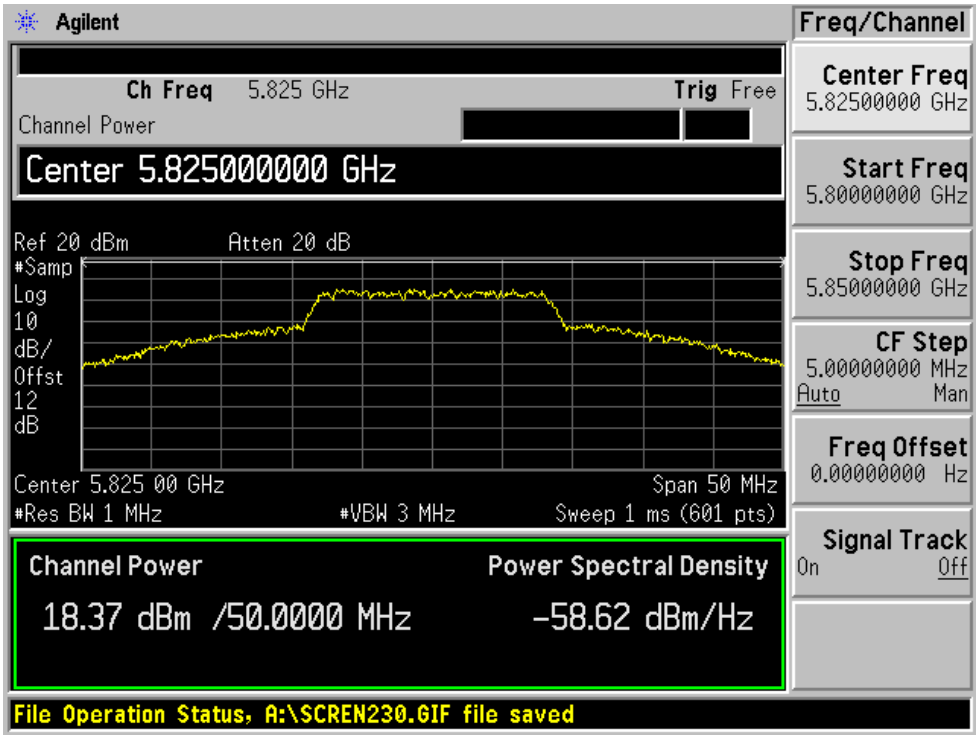
Low Channel



Middle Channel

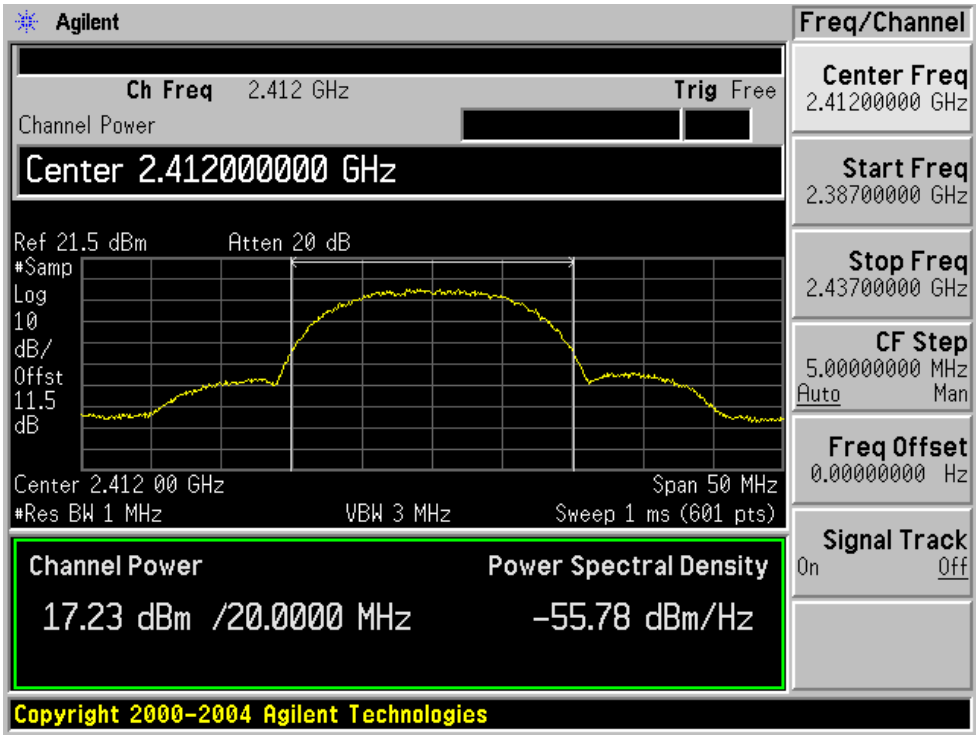


High Channel

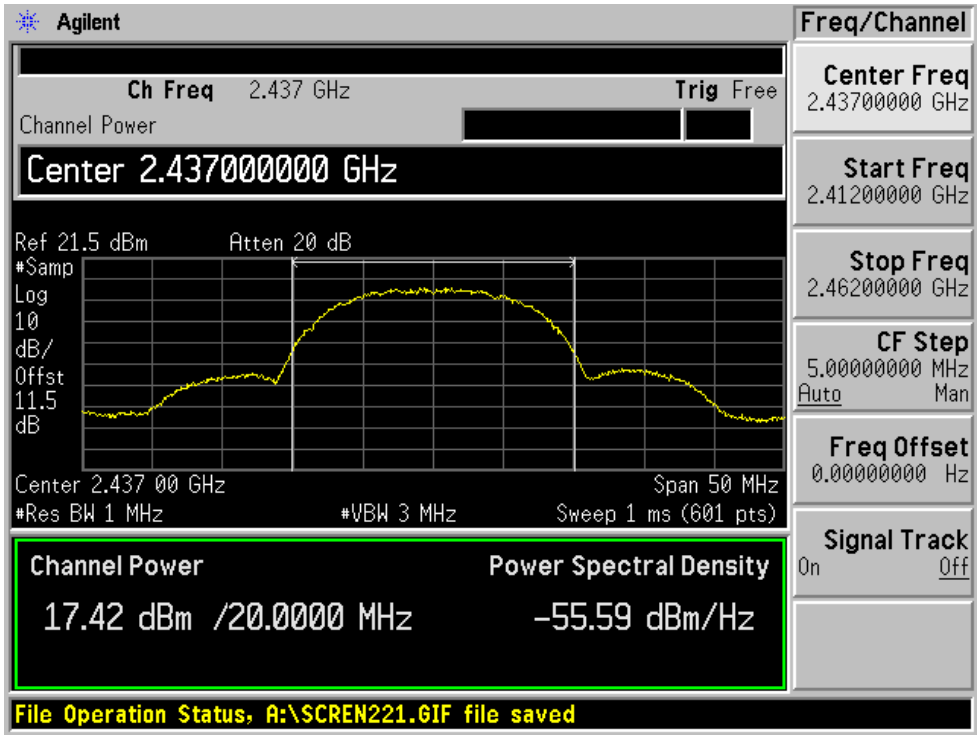


802.11b

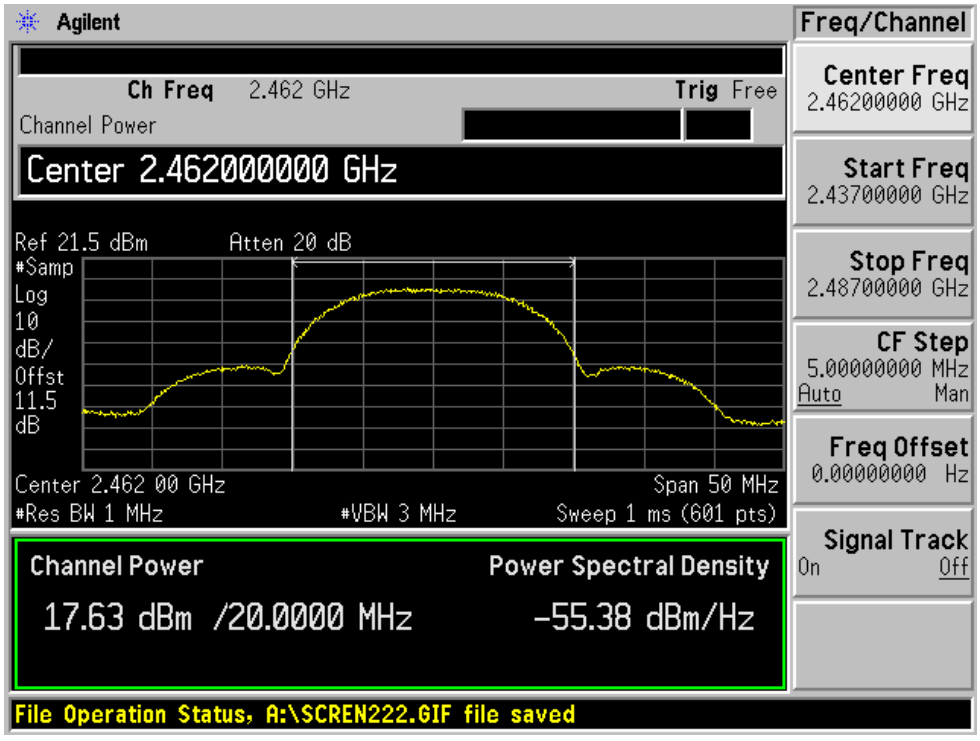
Low Channel



Middle Channel

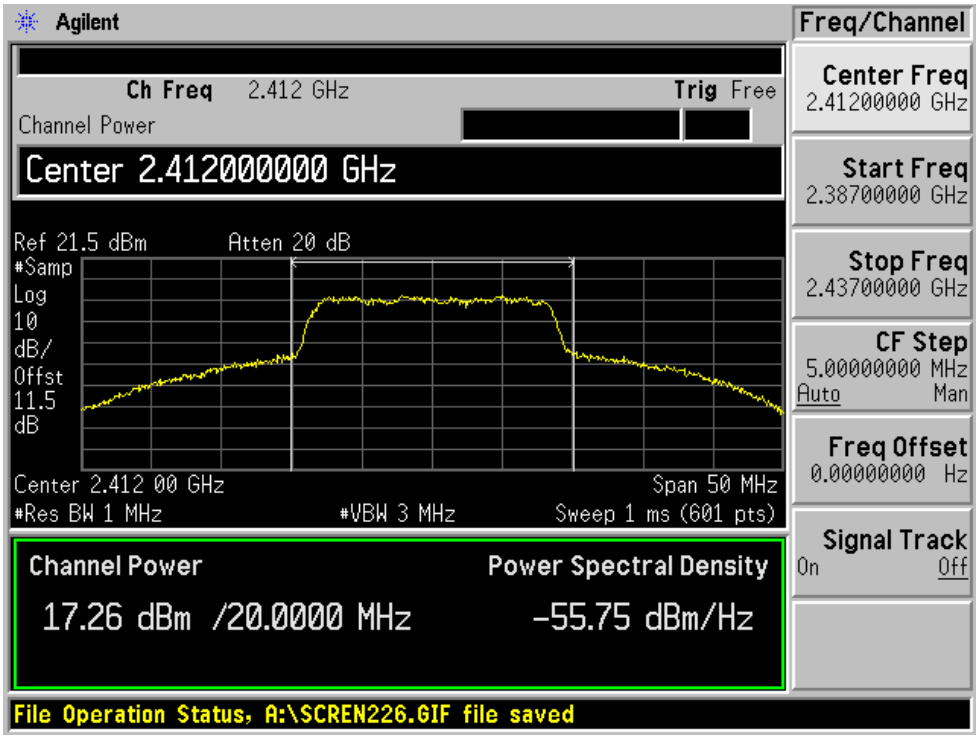


High Channel

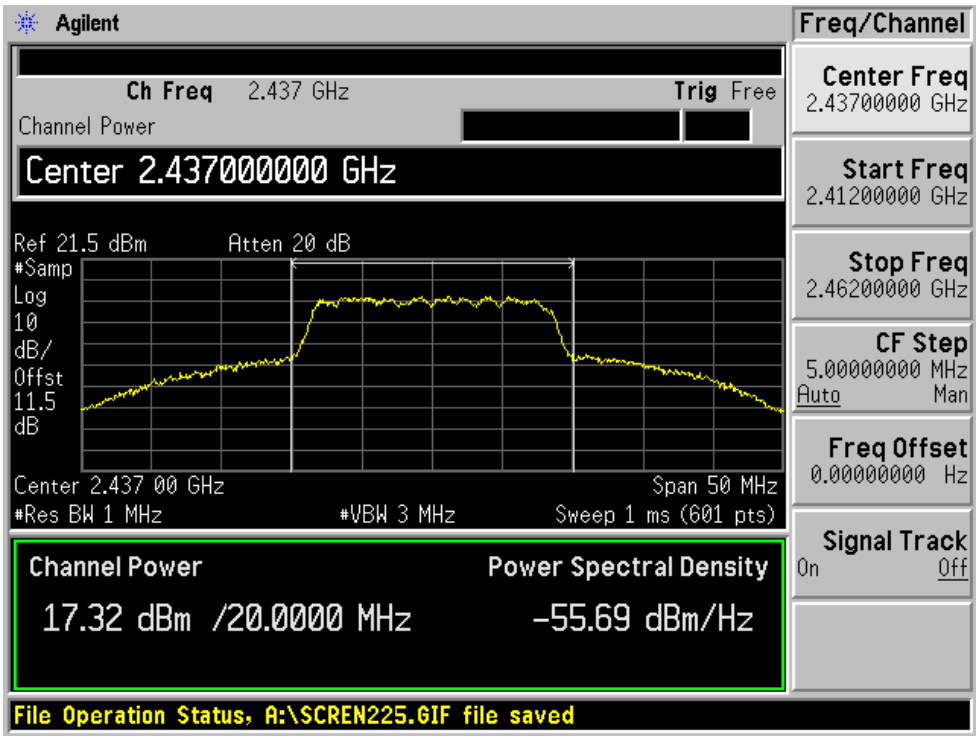


802.11g

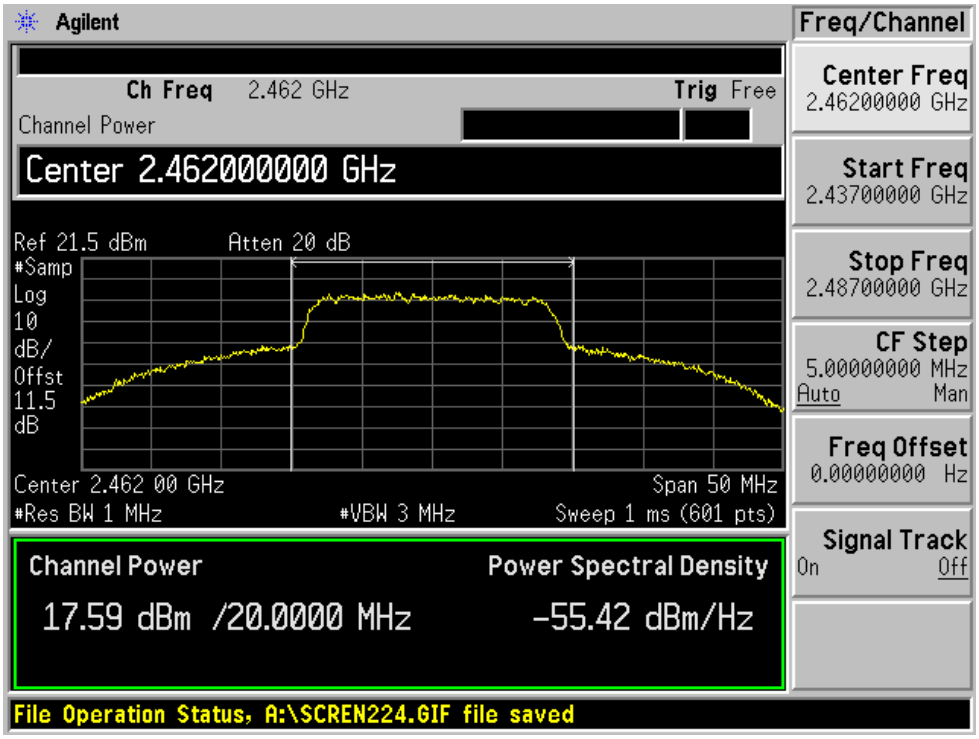
Low Channel



Middle Channel



High Channel



§15.247(d) - 100 kHz BANDWIDTH OF BAND EDGES

Applicable Standard

According to §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)).

Measurement Procedure

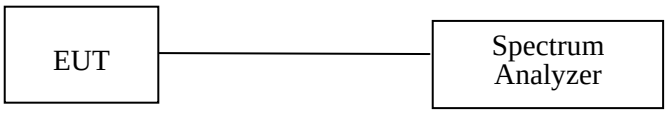
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Equipment Lists

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Spectrum analyzer	E4446A	US44300386	2006-03-06

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

Test Setup Diagram



Environmental Conditions

Temperature:	20 ° C
Relative Humidity:	40 %
ATM Pressure:	1020 mbar

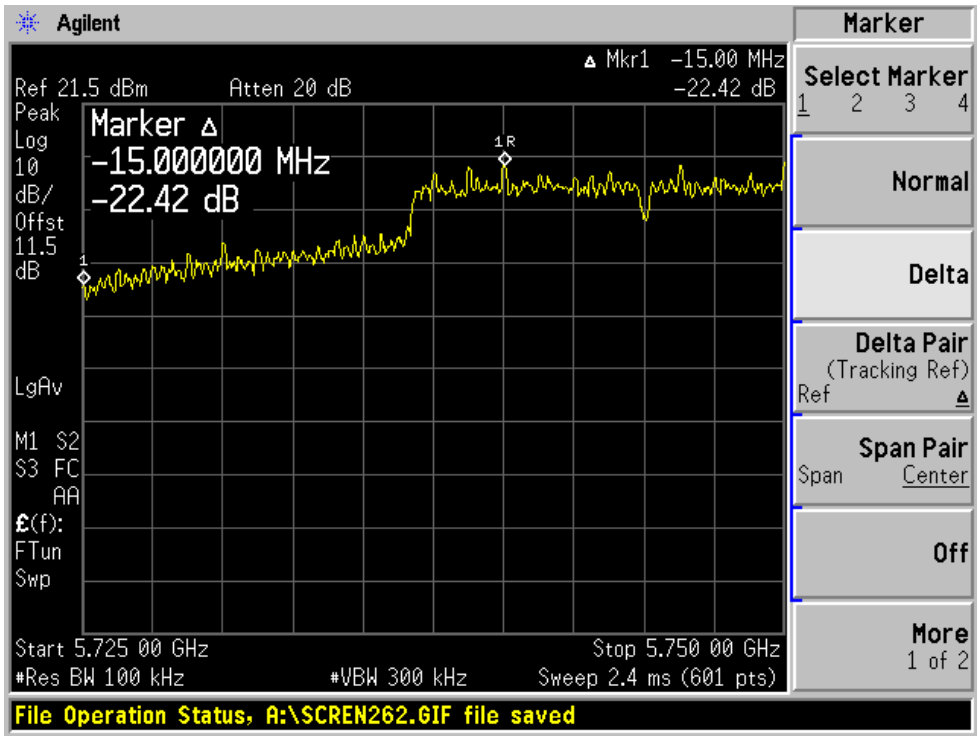
**The testing was performed by James Ma from 2006-12-21.*

Measurement Result

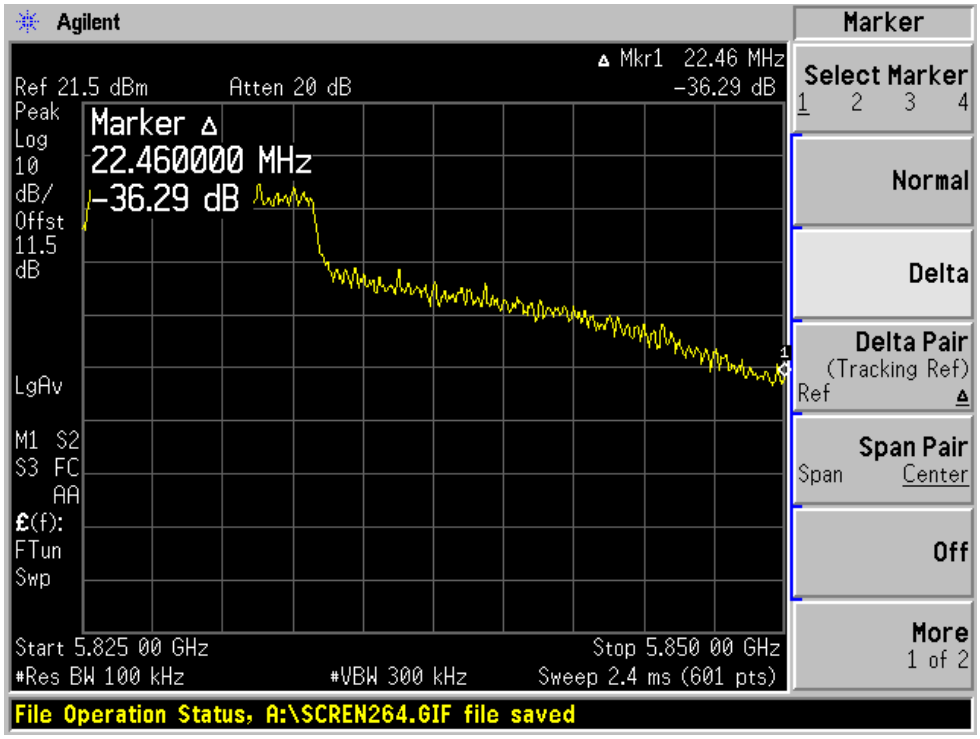
Please refer to following pages for plots of band edge.

802.11a

Low Channel

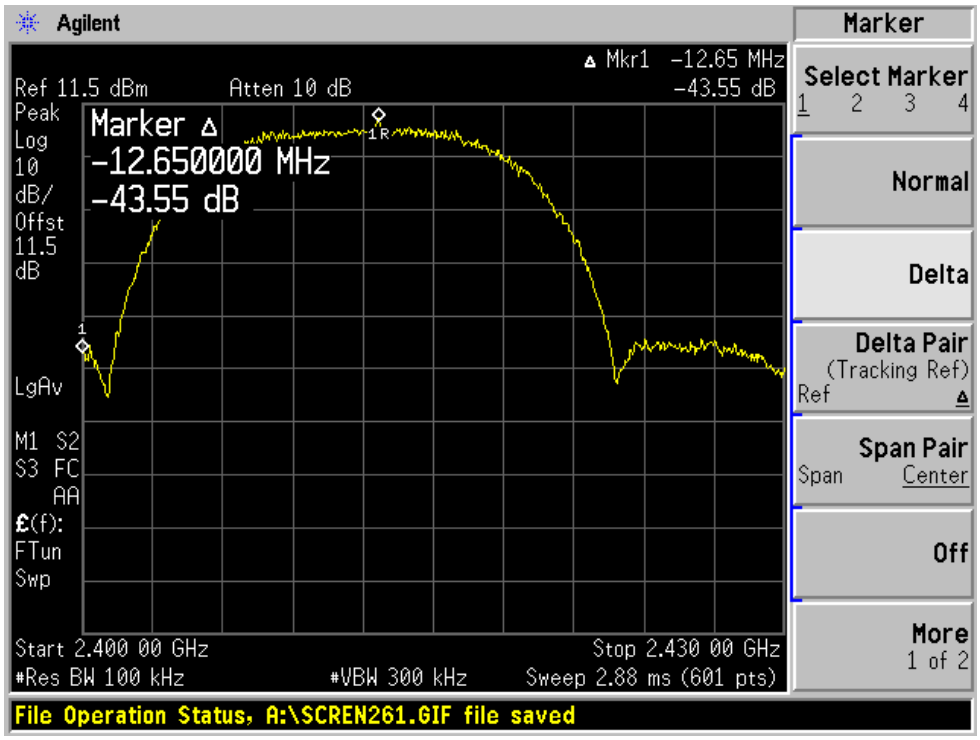


High Channel

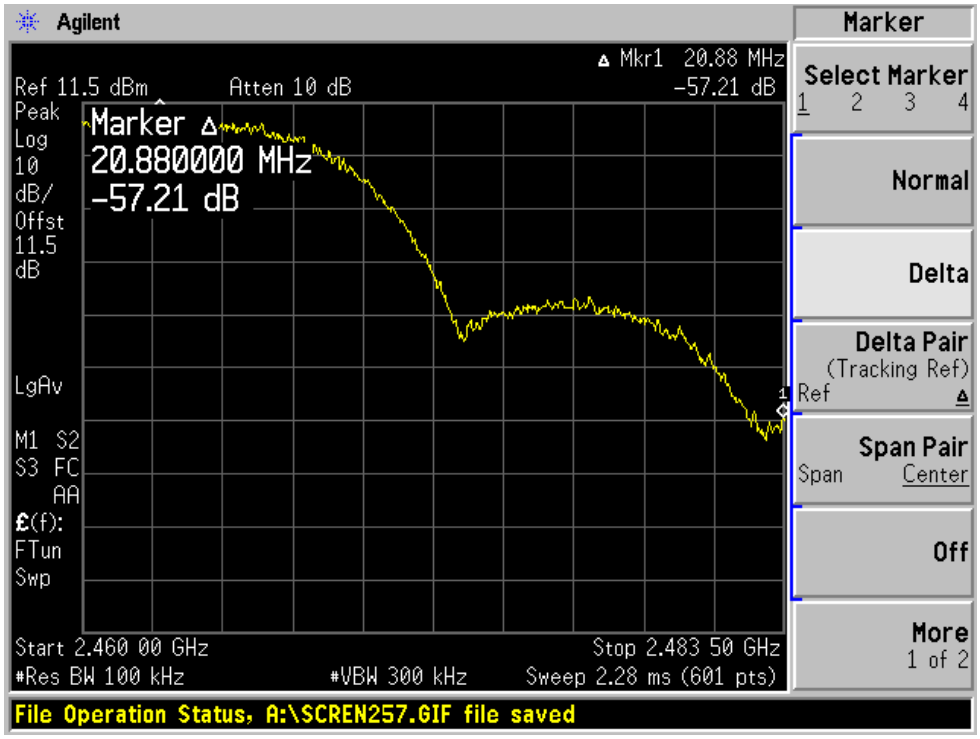


802.11b

Low Channel

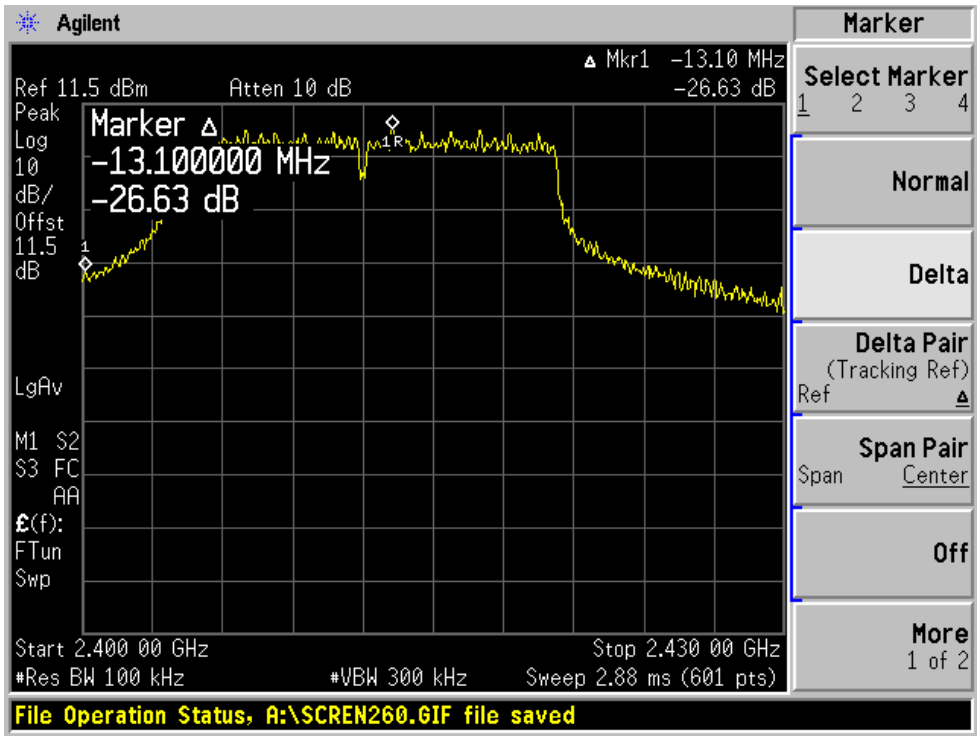


High Channel

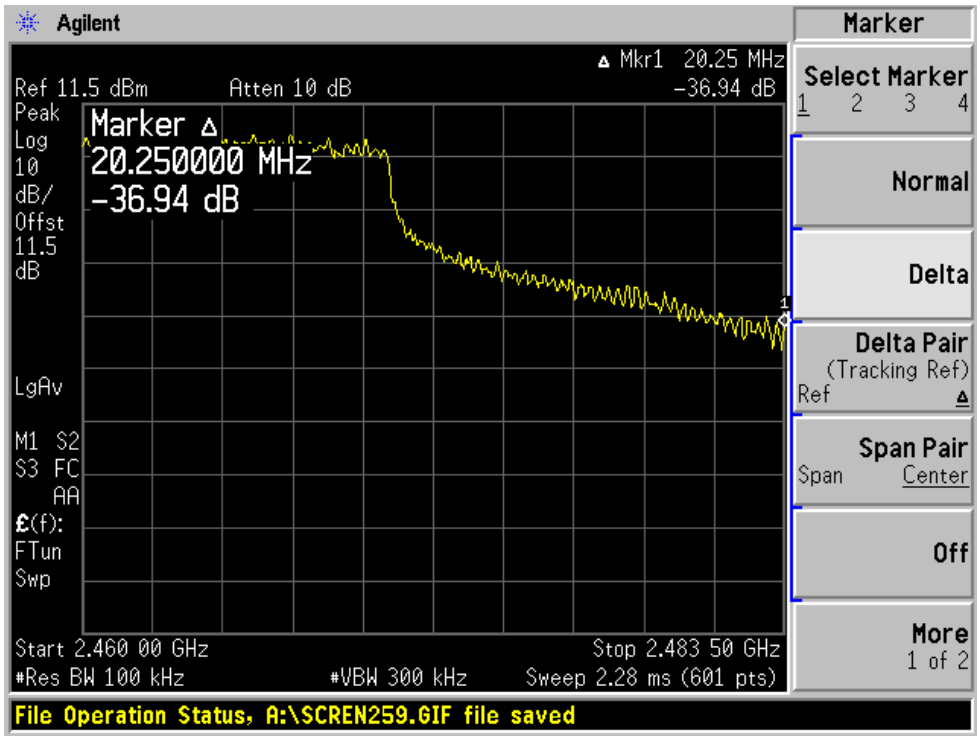


802.11g

Low Channel



High Channel



§15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

According to §15.247 (e), 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.

Measurement Procedure

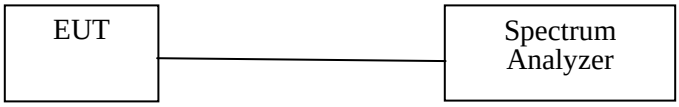
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to 1.5MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (DTS)
4. Repeat above procedures until all frequencies measured were complete.

Equipment Lists

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Spectrum analyzer	E4446A	US44300386	2006-03-06

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

Test Setup Diagram



Environmental Conditions

Temperature:	20 ° C
Relative Humidity:	40 %
ATM Pressure:	1020 mbar

**The testing was performed by James Ma from 2006-12-21.*

802.11a

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
5745	-6.18	8	Pass
5785	-6.84	8	Pass
5825	-7.81	8	Pass

802.11b

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
2412	-3.61	8	Pass
2437	-2.56	8	Pass
2462	-1.84	8	Pass

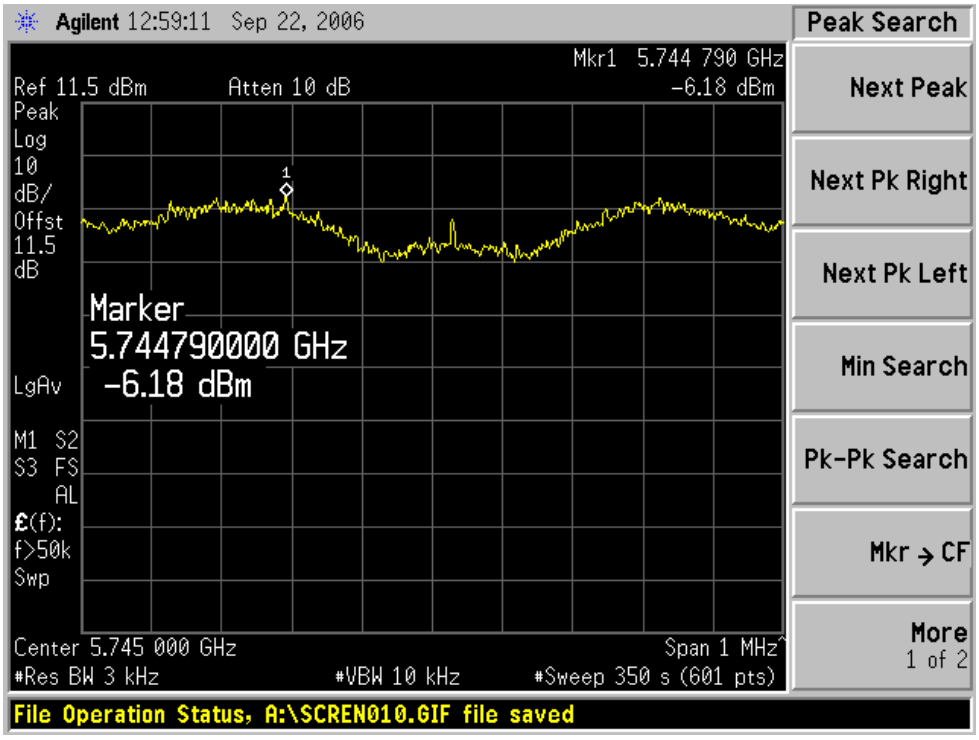
802.11g

Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
2412	-8.69	8	Pass
2437	-8.90	8	Pass
2462	-8.32	8	Pass

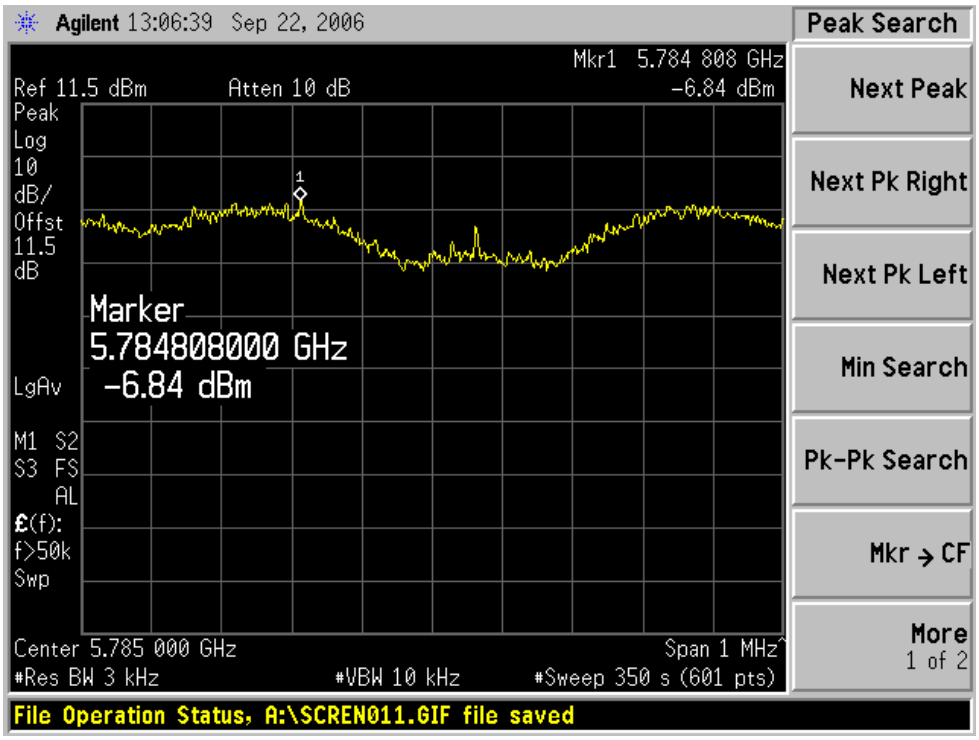
Please refer to the following plots for detailed test results

802.11a

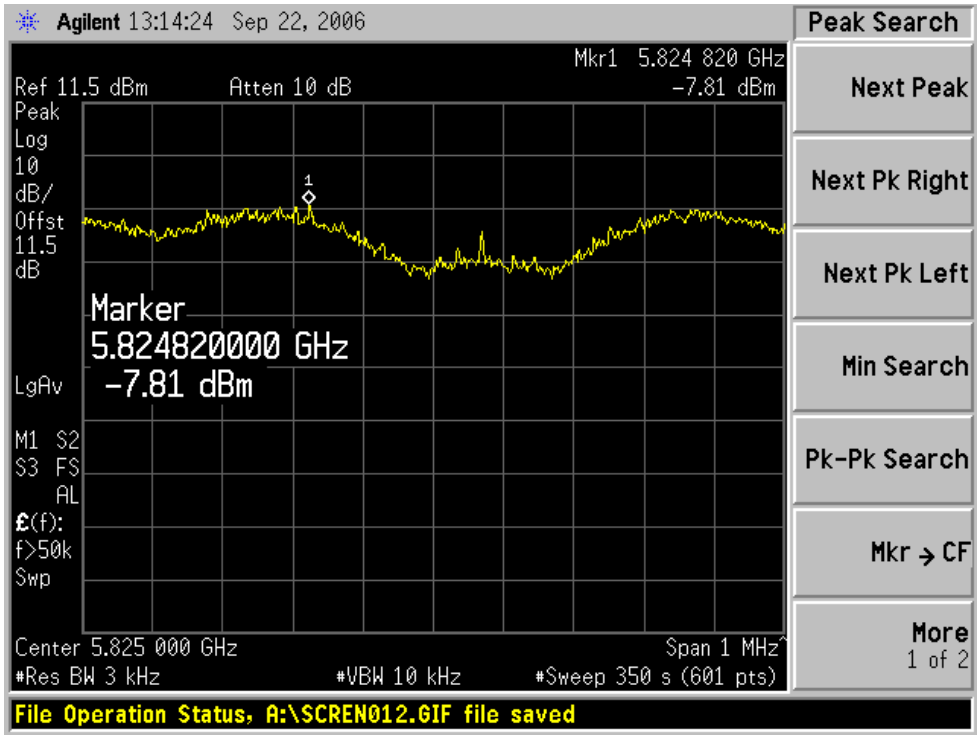
Low Channel



Middle Channel

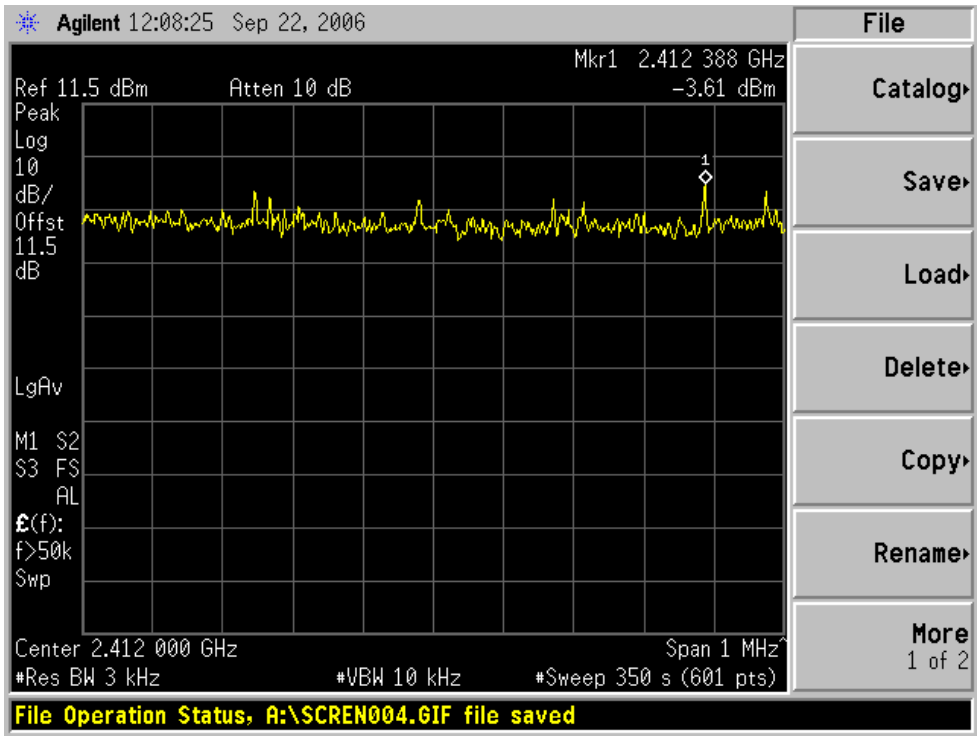


High Channel

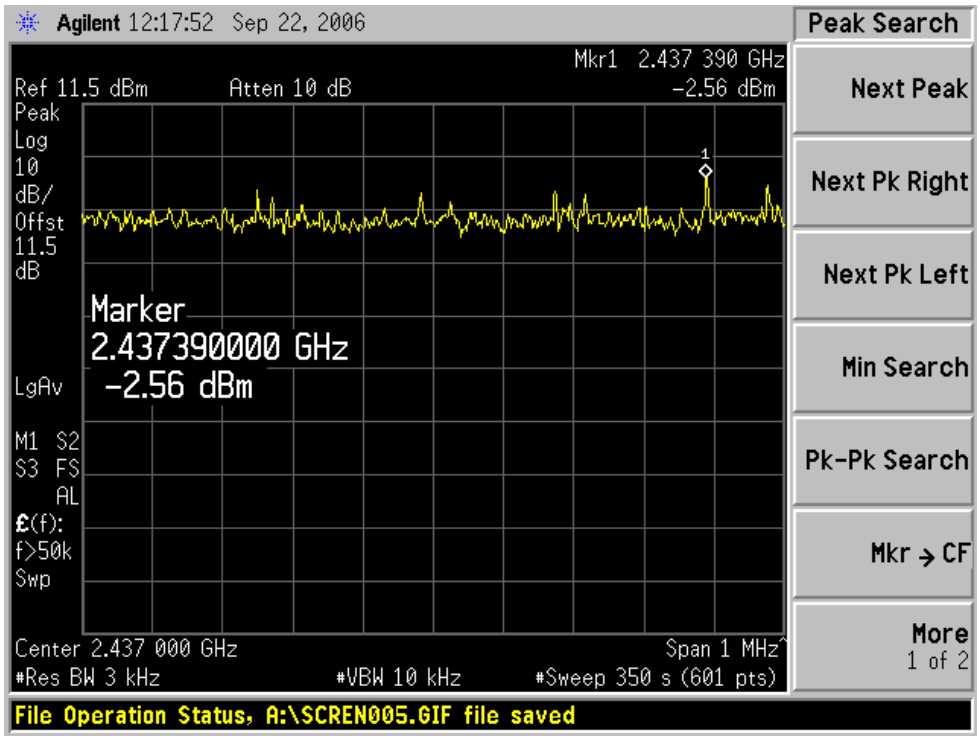


802.11b

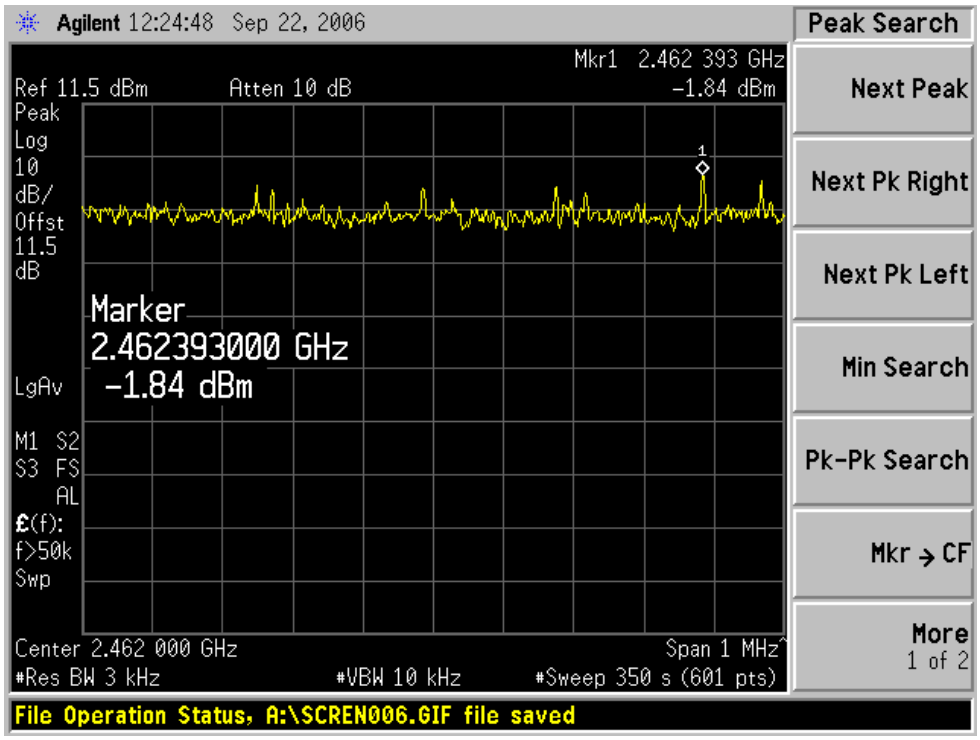
Low Channel



Middle Channel

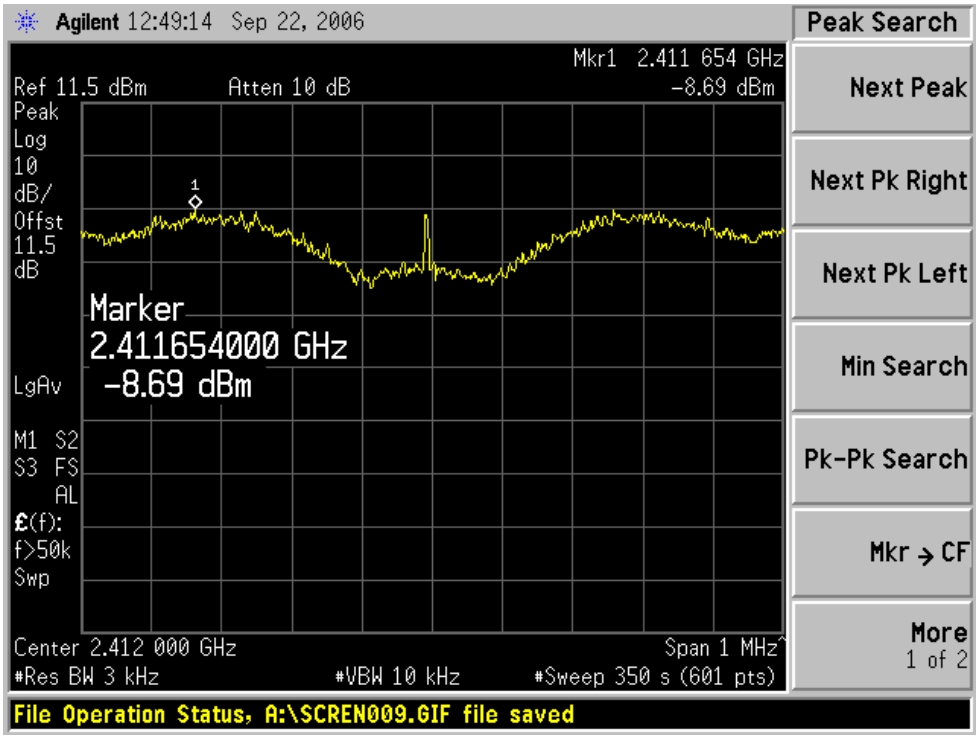


High Channel

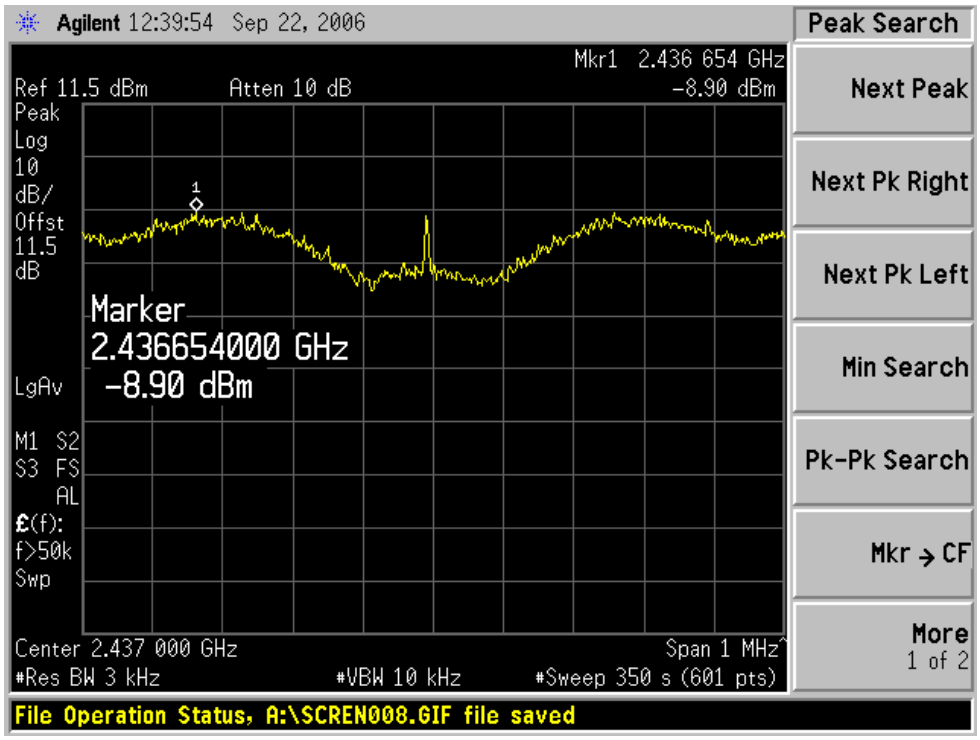


802.11g

Low Channel



Middle Channel



High Channel