Lab Code: 200167-0

FCC PART 15.247

EMI MEASUREMENT AND TEST REPORT

For

Nortel Networks Inc.

533, Hogye-1dong, Dongan-gu
Anyang-shi, Kyongki-do, Anyang-shi
Kyongki-do, Korea 431-749

FCC ID: AB6IP1535

Model: IP1535

This Report Concerns:	**Product name:**
☒ Original Report	Video Phone with 802.11b/g WLAN

Test Engineer:	Tom Chen
Report No.:	R06060131
Report Date:	2006-07-21
Reviewed By:	James Ma
Prepared By:	Bay Area Compliance Laboratory Corporation (BACL) 1274 Anvilwood Ave. Sunnyvale, CA 94089 Tel: (408) 732-9162 Fax: (408) 732 9164

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Nortel Networks Inc.'s* product, Model: *IP Phone 1535* or the "EUT" as referred to in this report is a hybrid PSTN and IP base phone with 802.11b/g Wireless LAN that permits audio and video calls and access to special services available from your communications provider.

Mechanical Description

The *Nortel Networks Inc.'s* product, *FCC ID: AB6IP1535,* or the "EUT" as referred to this report is a *Video Phone with 802.11b/g WLAN* which measures approximately *50.0mmL x 190.0 mmW x 206.0 mmH.*

The antenna for this device is an integral antenna with gain of 0.99 dBi

** The test data gathered are from production sample, serial number: N/A provided by the manufacturer.*

EUT Photo

Additional photos in Exhibit C

Objective

This type approval report is prepared on behalf of Nortel Networks 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 Spurious Radiated Emissions.

Related Submittal(s)/Grant(s)

No Related Submittals.

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.

All radiated and conducted emissions measurements were 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 it's facility in Sunnyvale, California, USA.

Test site at BACL 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 has 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 facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference have the reports on file and are listed under FCC file 31040/SIT 1300F2, IC registration number: 3062A, and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL 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 normal (native) operating mode to represent *worst*-case results during the final qualification test.

EUT Exercise Software

The EUT exercise program using for testing, and the following Channel setting was used during the testing:

802.11b	2412 MHZ	2437 MHz	2462 MHz
802.11g	2412 MHZ	2437 MHz	2462 MHz

Special Accessories

N/A

Equipment Modifications

No modifications were made to the EUT.

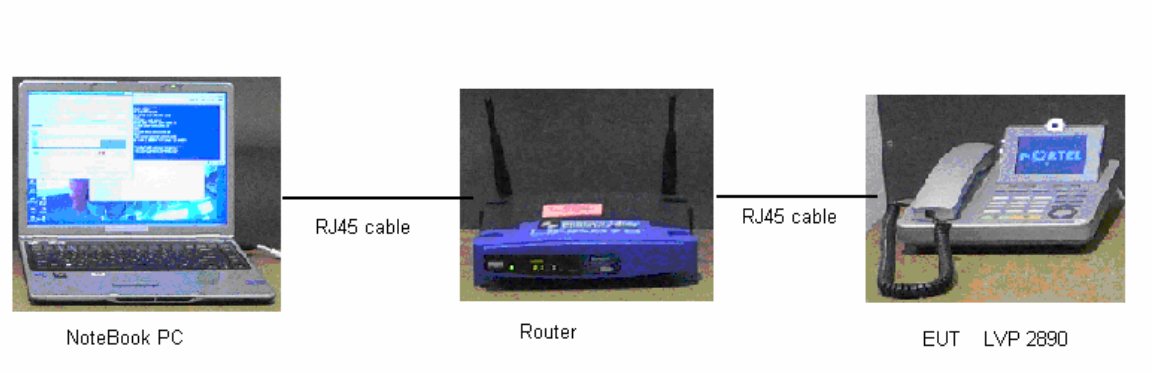
Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
Dream Electronic CO., LTD	AC-DC Adaptor	DEP-05150Y	DRU0605000001

Interface Ports and Cabling

Cable Description	Length (M)	From	To
Power cable	1.8	Power supply	EUT
RJ-45 Cable	1.5	Router	EUT

Test Setup Block Diagram



SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

FCC Rules	Description of Test	Result
§15.247(e)(i) §2.1091	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207	Conducted emission	Compliant
§2.1051 & §15.247(d)	Spurious Emissions at Antenna Port	Compliant
§15.205	Restricted Band	Compliant
§15.209 (a) & §15.247(c)	Radiated 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),§2.1091 - RF EXPOSURE

According to §15.247(e)(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

MPE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 14.10(dBm)
Maximum peak output power at antenna input terminal: 25.70 (mW)
Prediction distance: 20 (cm)
Prediction frequency: 2400 (MHz)
Antenna Gain (typical): 0.99 (dBi)
Antenna gain: 1.256 (numeric)
Power density at prediction frequency at 20 cm: 0.0064(mW/cm^2)

MPE limit for uncontrolled exposure at prediction frequency: 1.0 (mW/cm^2)

Test Result

The EUT is a Home Plug wireless Adapter. The power density level at 20 cm is 0.0064 mW/cm^2, which is below the uncontrolled exposure limit of 1.0mW/cm^2 at 2400 MHz.

§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.

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.

The antenna for this device is an integral antenna with gain of 0.99 dBi.

§15.207 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are receiver, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is $\pm$2.4 dB.

EUT Setup

The measurement was performed in the shielded room, using the setup per ANSI C63.4 - 2003 measurement procedure. The specification used was FCC 15.207 limits.

The external I/O cables were draped along the test table and flushed as required.

The EUT was connected to 120VAC/60Hz power source.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Artificial-Mains Network	ESH2-Z5	871884/039	2005-11-14
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2006-03-13
Agilent	AC Powersource generator	6812B	US38390366	N/R

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

Test Procedure

During the conducted emissions test, the power cord of the EUT was connected to the mains outlet of the LISN-1.

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

All data were 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 Data

According to following recorded data, the EUT complied with the FCC15.207 with the *worst* margin reading of:

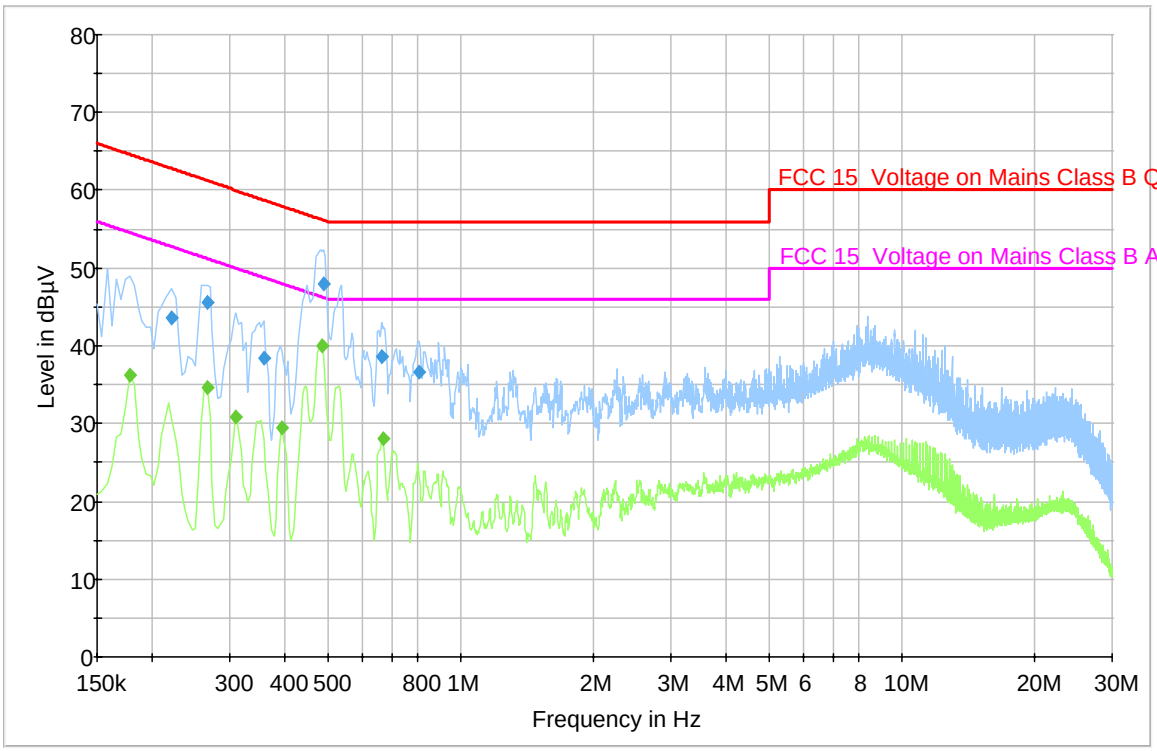
-6.3 dB at **0.486000 MHz** at **Line** mode

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	45%
ATM Pressure:	1020mbar

**Testing was performed by Tom Chen on 2006-06-05.*

120V/60Hz, Line



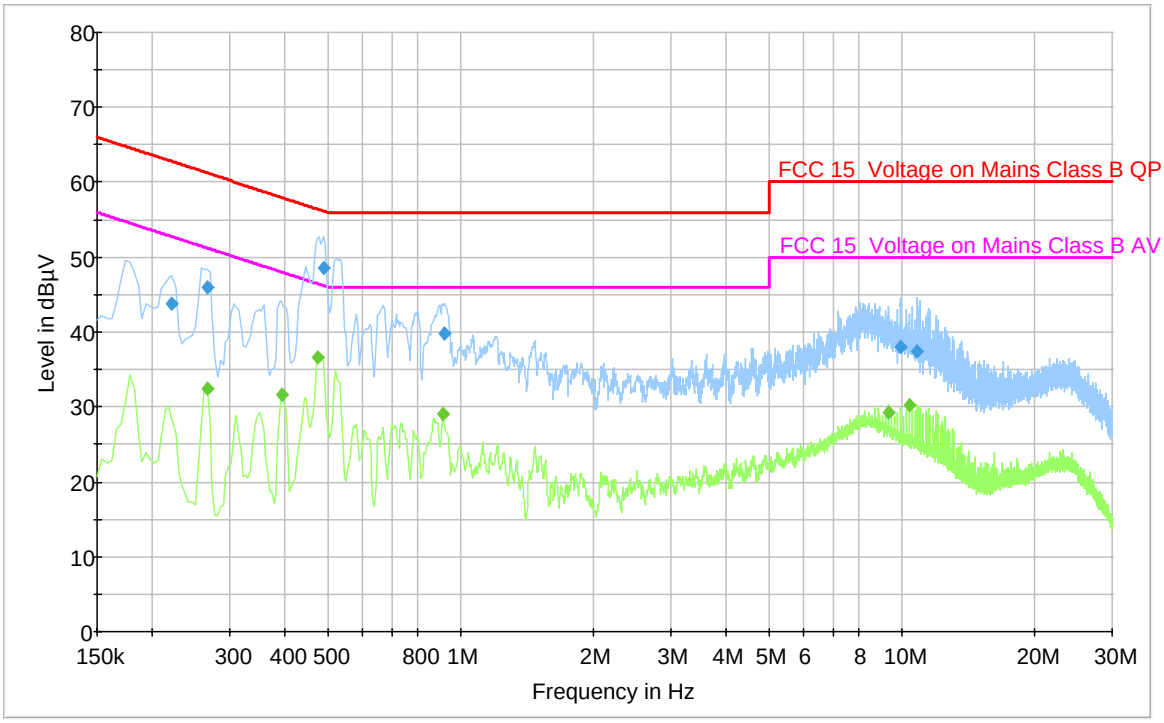
QP Measurement

Frequency (MHz)	Quasi Peak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dBuV)
0.490000	47.9	1000.000	9.000	L1	8.3	56.2
0.266000	45.5	1000.000	9.000	L1	15.7	61.2
0.662000	38.7	1000.000	9.000	L1	17.3	56.0
0.222000	43.5	1000.000	9.000	L1	19.2	62.7
0.806000	36.6	1000.000	9.000	L1	19.4	56.0
0.358000	38.4	1000.000	9.000	L1	20.3	58.8

Average Measurement

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dBuV)
0.486000	40.0	1000.000	9.000	L1	6.3	46.2
0.266000	34.6	1000.000	9.000	L1	16.7	51.2
0.670000	28.0	1000.000	9.000	L1	18.0	46.0
0.178000	36.3	1000.000	9.000	L1	18.3	54.6
0.394000	29.5	1000.000	9.000	L1	18.5	48.0
0.310000	30.8	1000.000	9.000	L1	19.2	50.0

120V/60Hz, Neutral



QP Measurement

Frequency (MHz)	Quasi Peak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dBuV)
0.490000	48.5	1000.000	9.000	N	7.7	56.2
0.266000	45.9	1000.000	9.000	N	15.3	61.2
0.922000	39.9	1000.000	9.000	N	16.1	56.0
0.222000	43.8	1000.000	9.000	N	19.0	62.7
9.950000	38.1	1000.000	9.000	N	22.0	60.0
10.866000	37.5	1000.000	9.000	N	22.5	60.0

Average Measurement

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Margin (dB)	Limit (dBuV)
0.474000	36.7	1000.000	9.000	N	9.8	46.4
0.394000	31.7	1000.000	9.000	N	16.2	48.0
0.910000	29.0	1000.000	9.000	N	17.0	46.0
0.266000	32.5	1000.000	9.000	N	18.7	51.2
10.410000	30.2	1000.000	9.000	N	19.8	50.0
9.334000	29.2	1000.000	9.000	N	20.8	50.0

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

Applicable Standard

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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. 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.

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	45%
ATM Pressure:	1020mbar

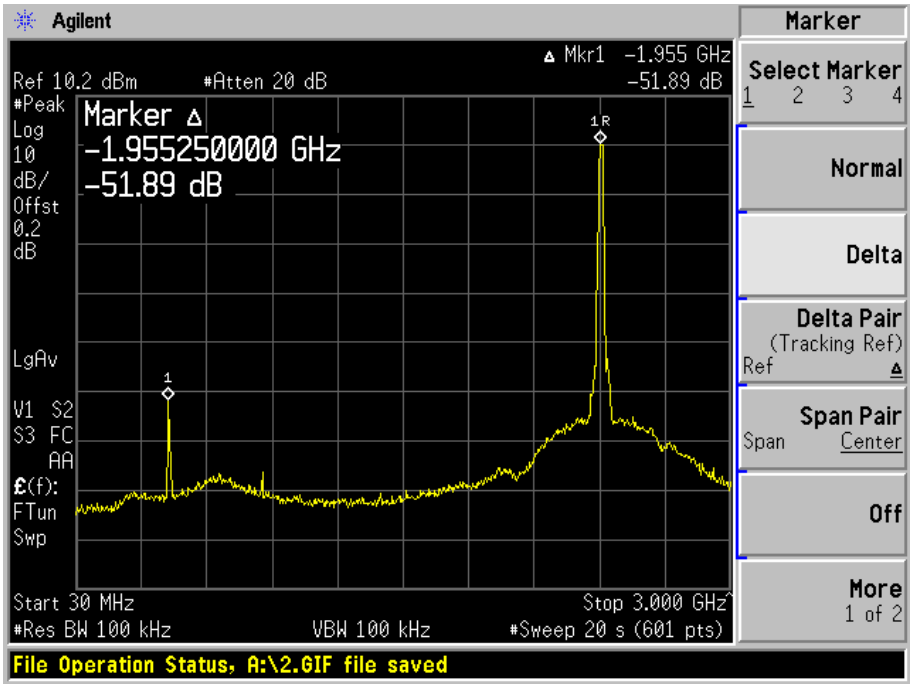
**The testing was performed by Tom Chen on 2006-06-05.*

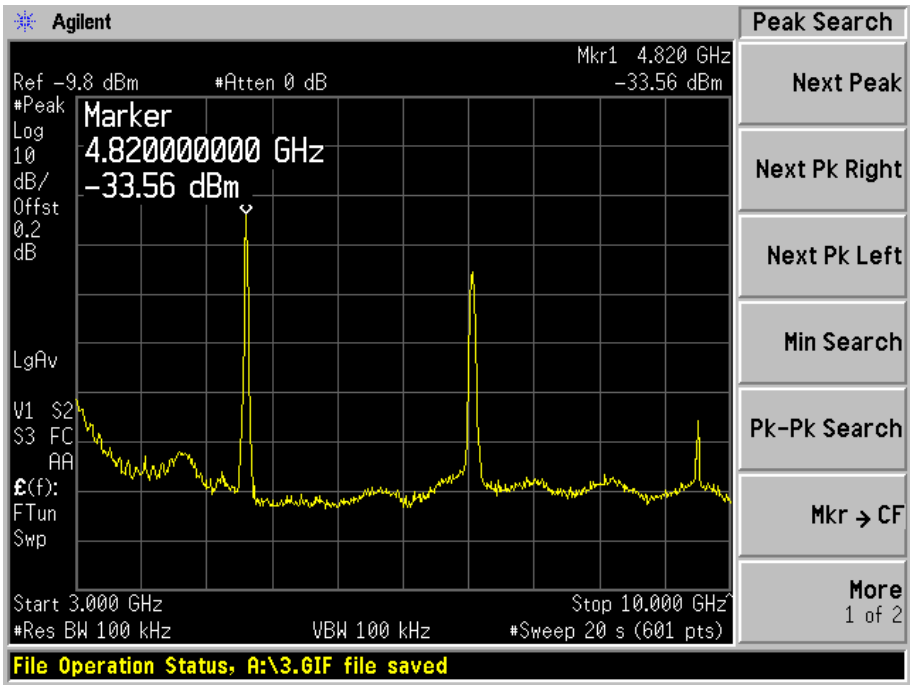
Measurement Result

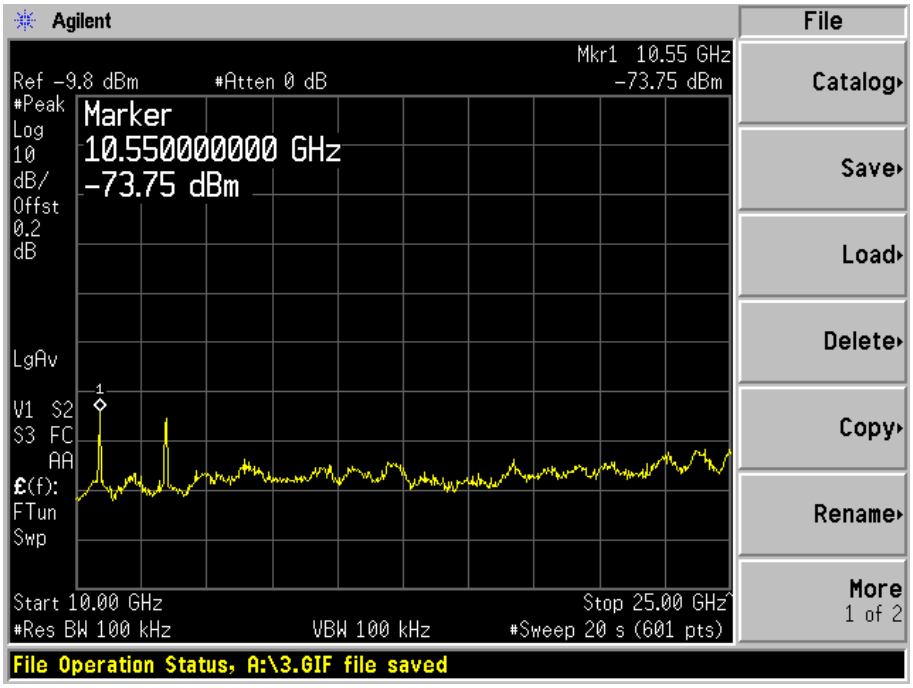
Please refer to following pages for plots of spurious emissions.

802.11b mode:

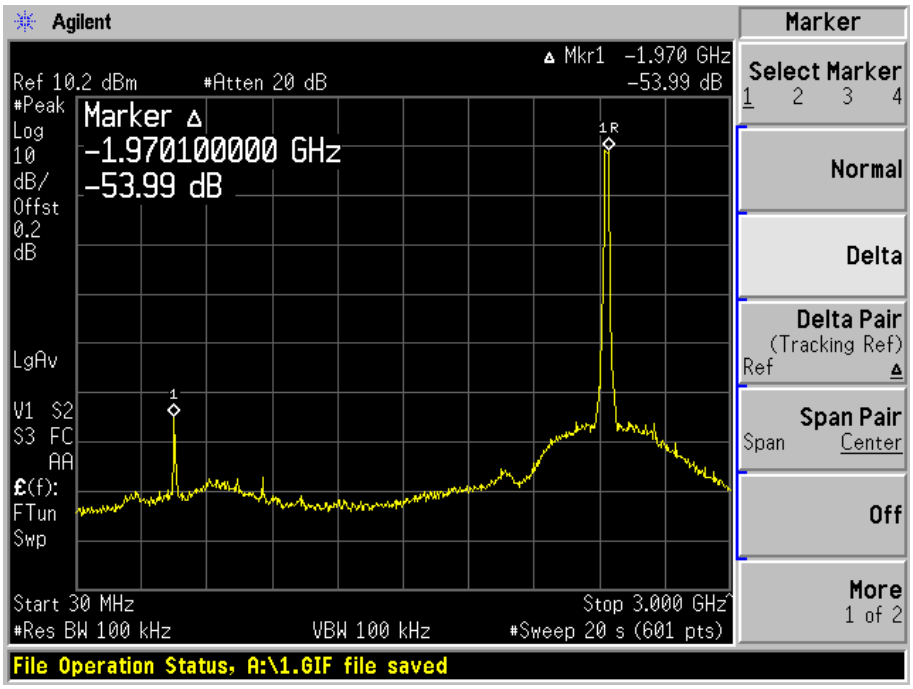
Low Channel

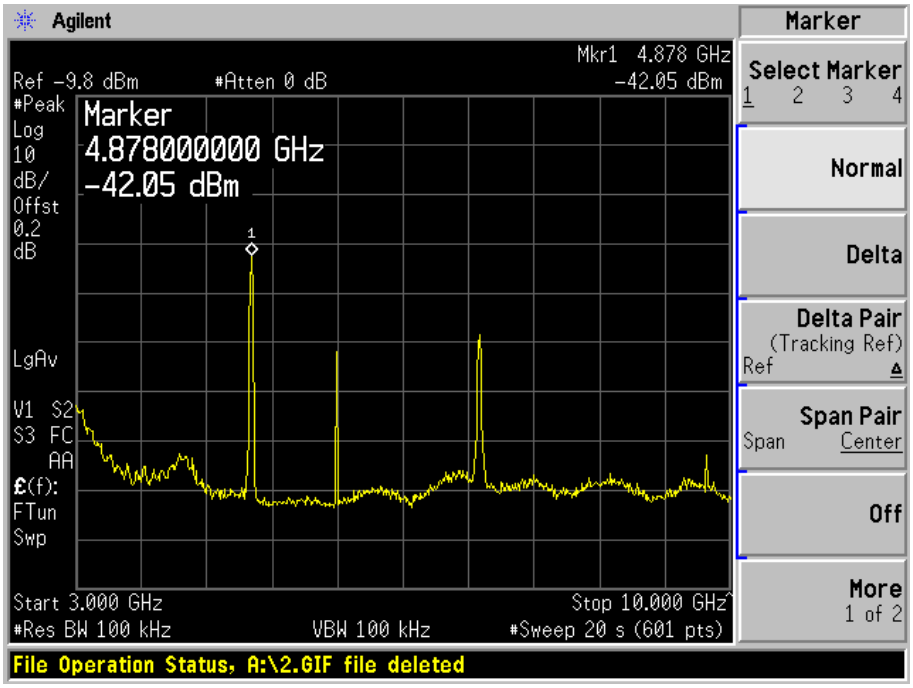


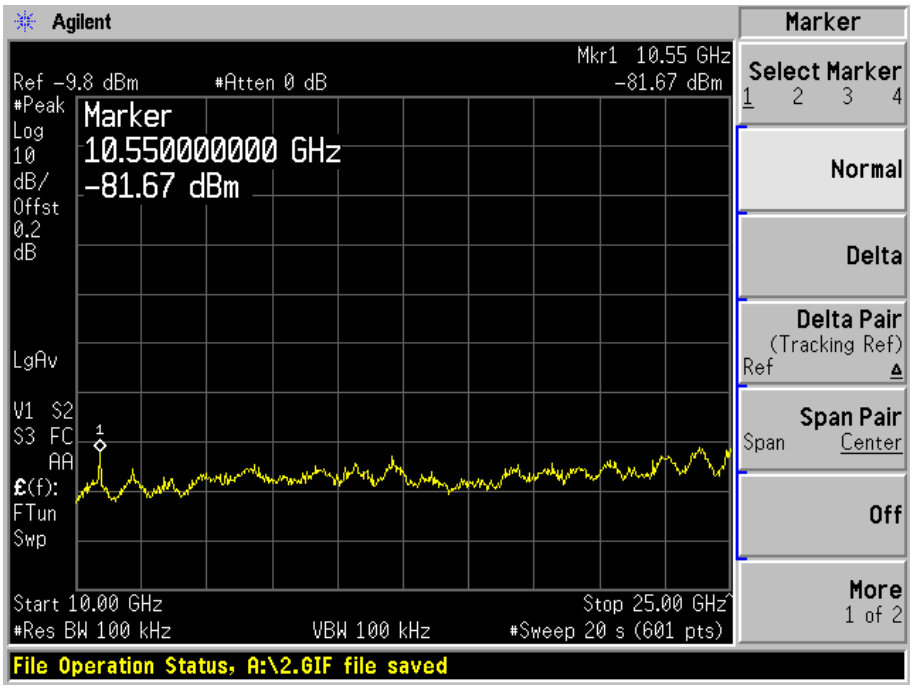



Agilent
File
Mkr1 10.55 GHz
Ref -9.8 dBm
#Atten 0 dB
-73.75 dBm
#Peak
Log
10
dB/
Offst
0.2
dB
Marker
10.550000000 GHz
-73.75 dBm
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 10.00 GHz
Stop 25.00 GHz
#Res BW 100 kHz
VBW 100 kHz
#Sweep 20 s (601 pts)
Catalog
Save
Load
Delete
Copy
Rename
More
1 of 2
File Operation Status, A:\3.GIF file saved

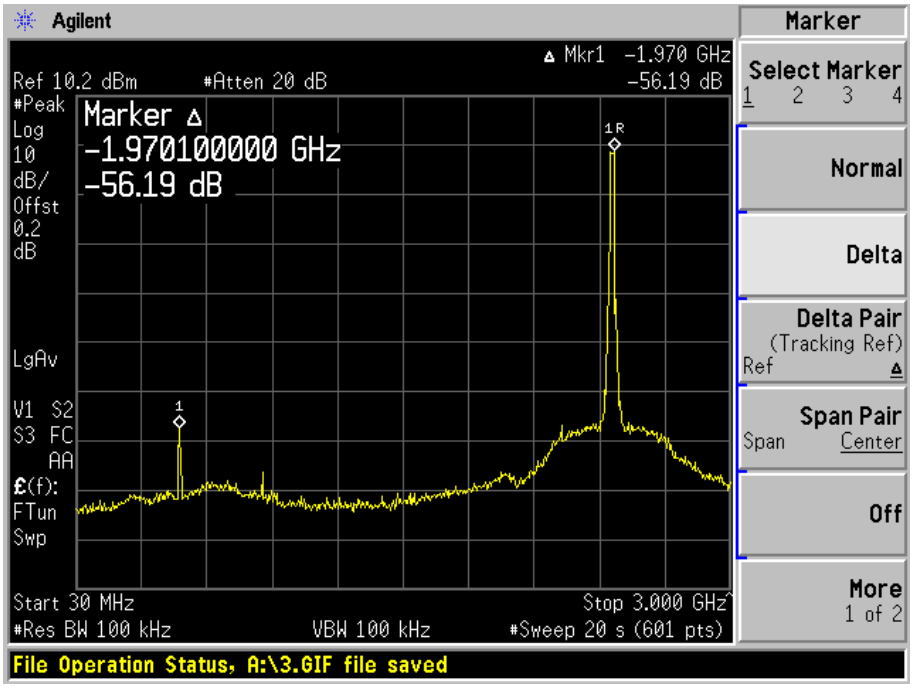
Mid Channel

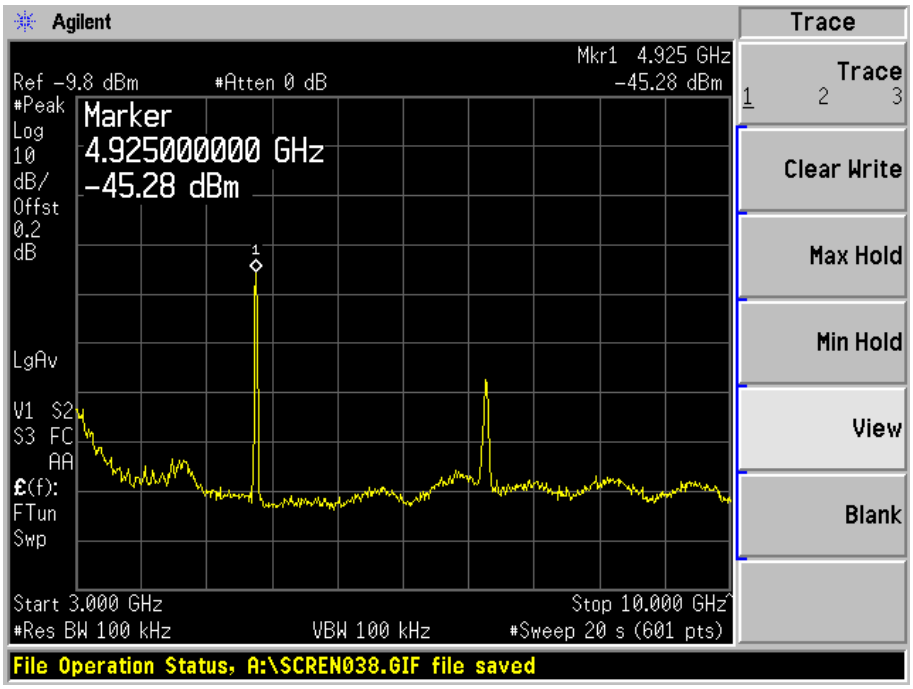

Agilent
Marker
Δ Mkr1 -1.970 GHz
Ref 10.2 dBm
#Atten 20 dB
-53.99 dB
#Peak
Log
10
dB/
Offst
0.2
dB
Marker Δ
-1.970100000 GHz
-53.99 dB
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 30 MHz
Stop 3.000 GHz
#Res BW 100 kHz
VBW 100 kHz
#Sweep 20 s (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Δ
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, A:\1.GIF file saved

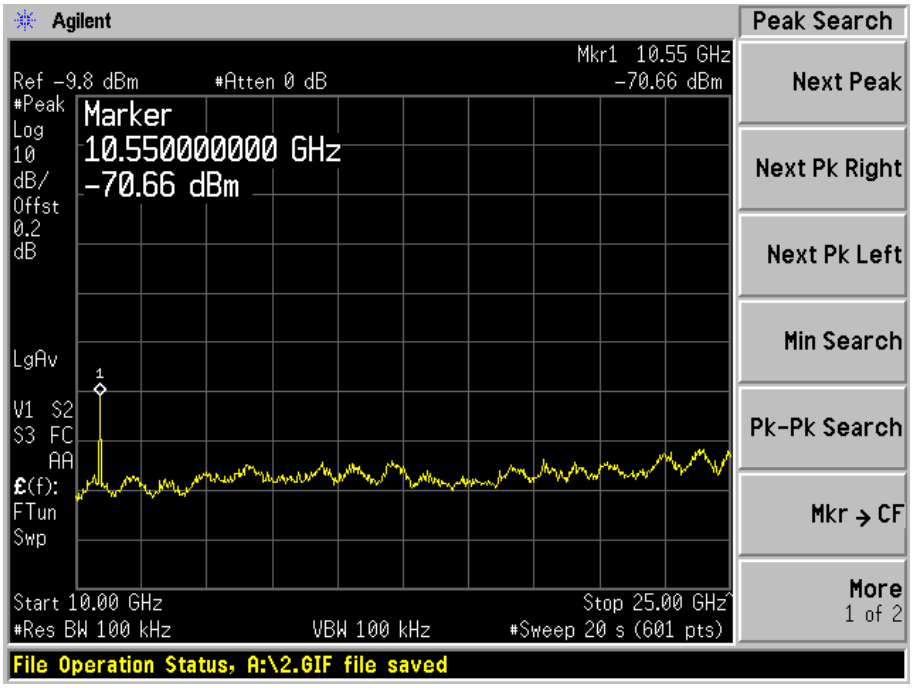

Agilent
Marker
Mkr1 4.878 GHz
Ref -9.8 dBm
#Atten 0 dB
-42.05 dBm
#Peak
Log
10
dB/
Offst
0.2
dB
Marker
4.878000000 GHz
-42.05 dBm
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 3.000 GHz
Stop 10.000 GHz
#Res BW 100 kHz
VBW 100 kHz
#Sweep 20 s (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span
Center
Off
More
1 of 2
File Operation Status, A:\2.GIF file deleted


Agilent
Marker
Mkr1 10.55 GHz
Ref -9.8 dBm
#Atten 0 dB
-81.67 dBm
#Peak
Log
10
dB/
Offst
0.2
dB
Marker
10.550000000 GHz
-81.67 dBm
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 10.00 GHz
Stop 25.00 GHz
#Res BW 100 kHz
VBW 100 kHz
#Sweep 20 s (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span
Center
Off
More
1 of 2
File Operation Status, A:\2.GIF file saved

High Channel

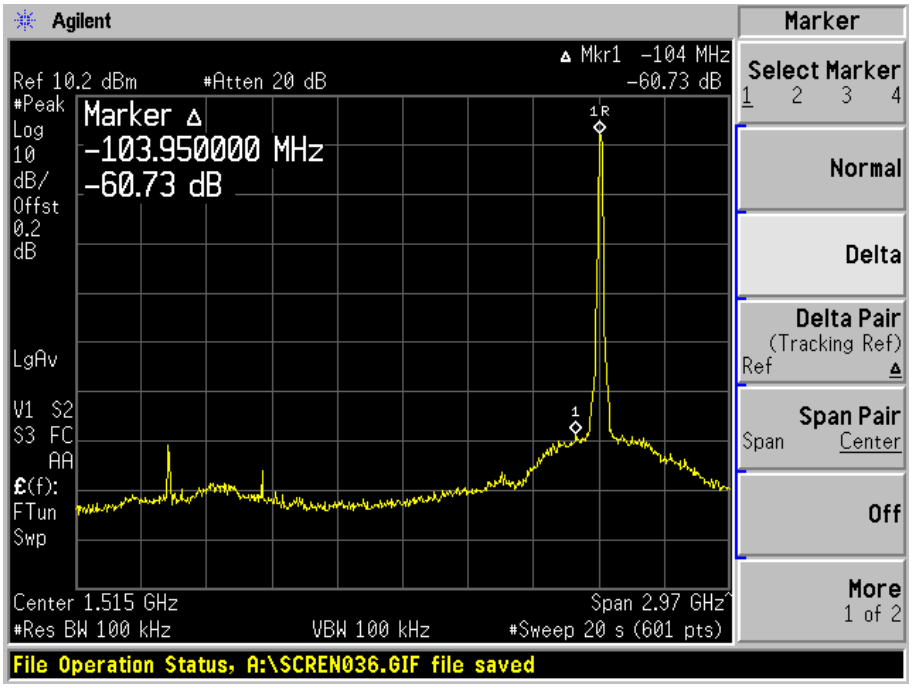


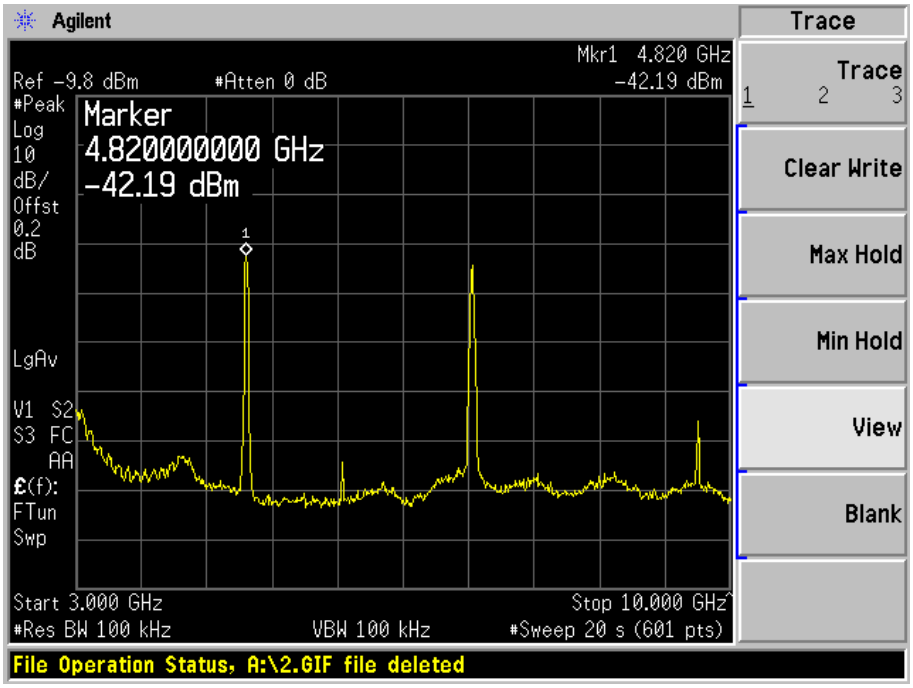


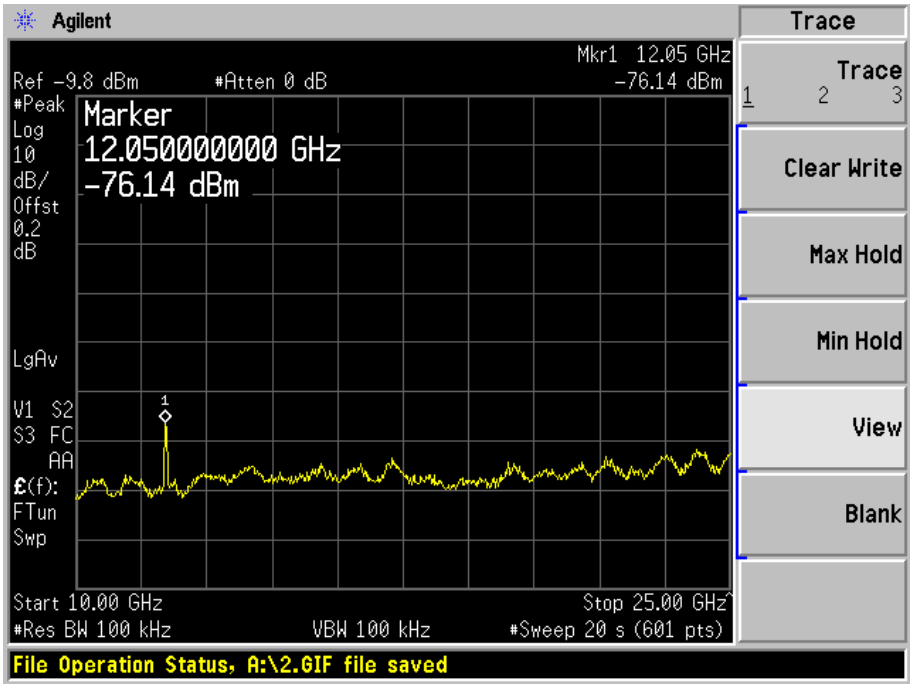


802.11g mode:

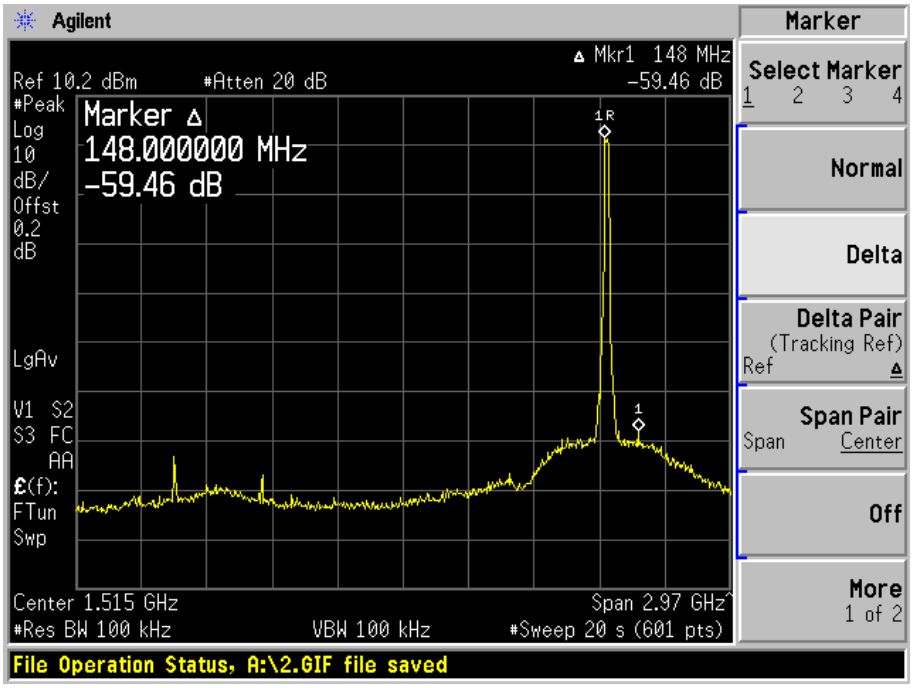
Low Channel

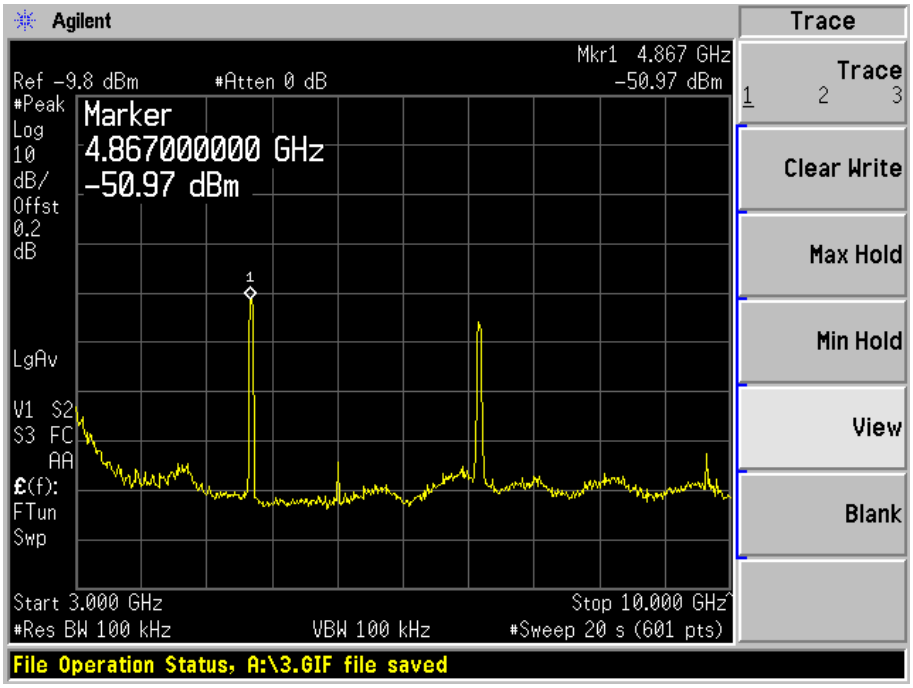


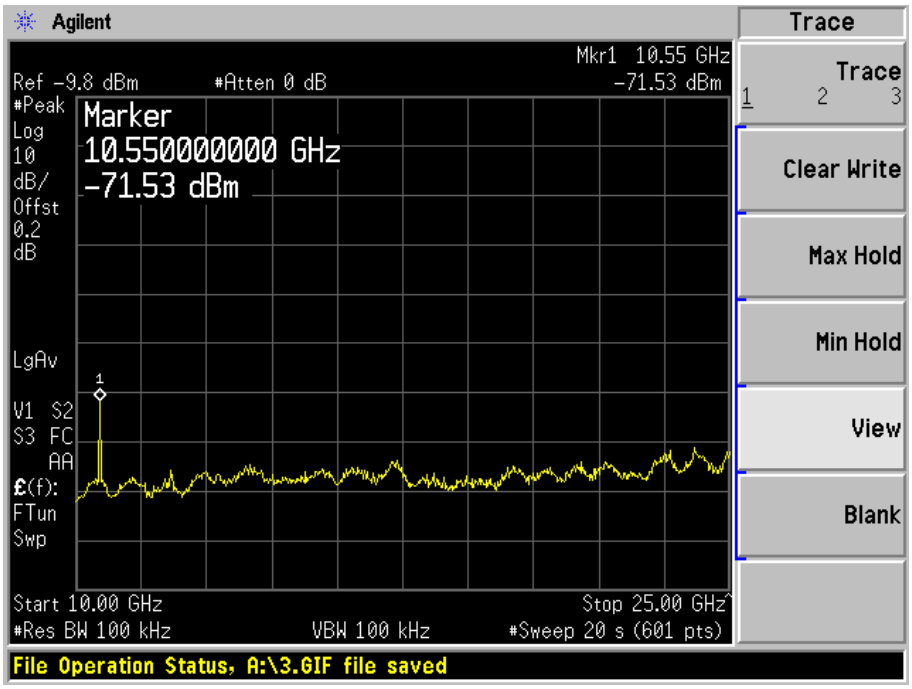

Agilent
Trace
Mkr1 4.820 GHz
Ref -9.8 dBm
#Atten 0 dB
-42.19 dBm
#Peak
Log
10
dB/
Offst
0.2
dB
Marker
4.820000000 GHz
-42.19 dBm
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 3.000 GHz
Stop 10.000 GHz
#Res BW 100 kHz
VBW 100 kHz
#Sweep 20 s (601 pts)
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
File Operation Status, A:\2.GIF file deleted


Agilent
Trace
Mkr1 12.05 GHz
Ref -9.8 dBm
#Atten 0 dB
-76.14 dBm
#Peak
Log
10
dB/
Offst
0.2
dB
Marker
12.050000000 GHz
-76.14 dBm
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 10.00 GHz
Stop 25.00 GHz
#Res BW 100 kHz
VBW 100 kHz
#Sweep 20 s (601 pts)
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
File Operation Status, A:\2.GIF file saved

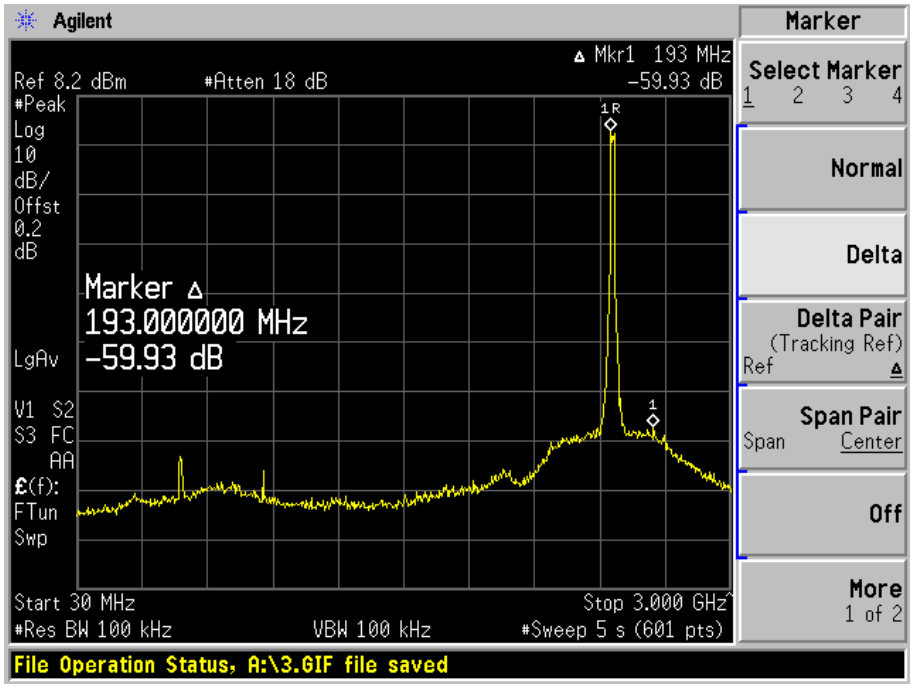
Middle Channel

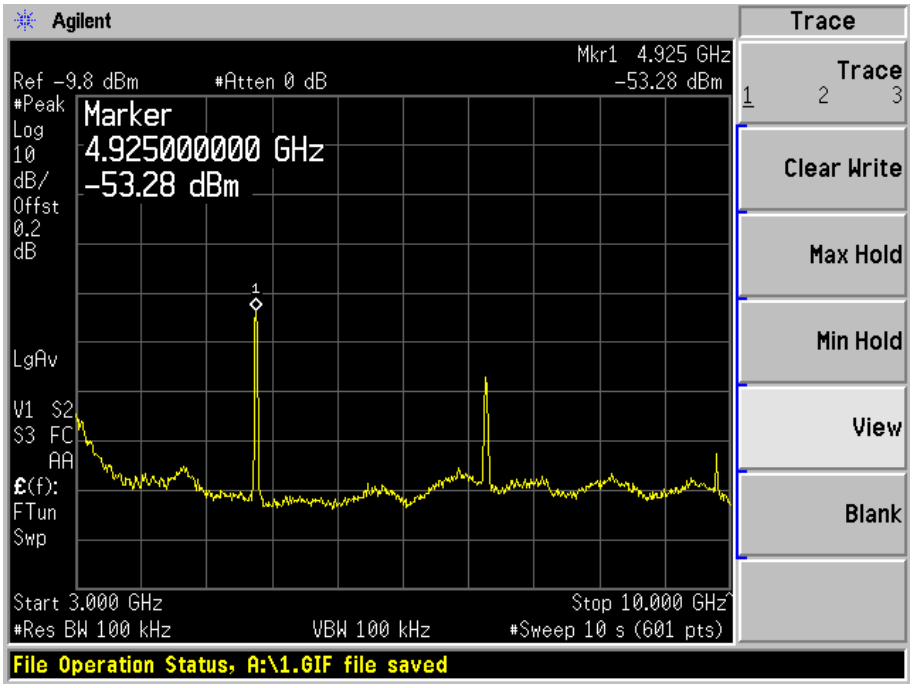


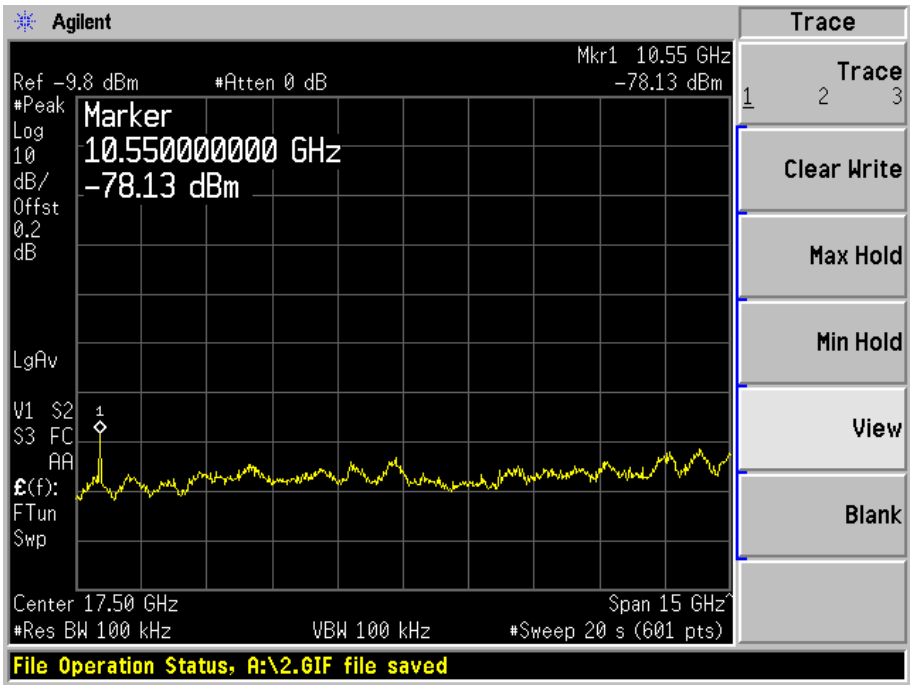




High Channel




Agilent
Trace
Mkr1 4.925 GHz
Ref -9.8 dBm
#Atten 0 dB
-53.28 dBm
#Peak
Log
10
dB/
Offst
0.2
dB
Marker
4.925000000 GHz
-53.28 dBm
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 3.000 GHz
Stop 10.000 GHz
#Res BW 100 kHz
VBW 100 kHz
#Sweep 10 s (601 pts)
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
File Operation Status, A:\1.GIF file saved


Agilent
Trace
Mkr1 10.55 GHz
Ref -9.8 dBm
#Atten 0 dB
-78.13 dBm
#Peak
Log
10
dB/
Offst
0.2
dB
Marker
10.550000000 GHz
-78.13 dBm
LgAv
V1 S2
S3 FC
AA
£(f):
FTun
Swp
Center 17.50 GHz
Span 15 GHz
#Res BW 100 kHz
VBW 100 kHz
#Sweep 20 s (601 pts)
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
File Operation Status, A:\2.GIF file saved

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

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 best estimate of the uncertainty of a radiation emissions measurement at BACL is ±4.0 dB.

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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	8565EC	3946A00131	2006-01-11
Rohde & Schwarz	Generator, Signal	SMIQ03	849192/0085	2006-05-02
Sonoma Instrument	Amplifier, Broadband	317	260408	2006-02-03
HP	Amplifier, Pre, Microwave	8449B	3147A00400	2005-08-10
HP	Generator, Signal	83650B	3614A00276	2006-05-10
A.R.A.	Antenna, Horn	DRG-118/A	1132	2006-08-17
ETS-Lindgren	Antenna	JB3	A020106-3 / S006628	2006-03-14

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

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	45%
ATM Pressure:	1020mbar

**The testing was performed by Tom Chen on 2006-06-05.*

Test Procedure

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

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

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 emissions is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude – Part15.247 Limit

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:

-**11.2 dB** at **9648.0000 MHz** in the **Vertical** polarization, 802.11b Low Channel, 3 meters

-8.3 dB at **9747.9000 MHz** in the **Vertical** polarization, 802.11b Middle Channel, 3 meters

-9.3 dB at **9848.0000 MHz** in the **Vertical** polarization, 802.11b High Channel, 3 meters

-11.0 dB at **9647.9000 MHz** in the **Horizontal** polarization, 802.11g Low Channel, 3 meters

-8.8 dB at **9747.8000 MHz** in the **Vertical** polarization, 802.11g Middle Channel, 3 meters

-9.6 dB at **9847.9000 MHz** in the **Vertical** polarization, 802.11g High Channel, 3 meters

-18.7 dB at **48.44 MHz** in the **Vertical** polarization, 30MHz -1GHz, 3 meter

802.11b Low Channel:

Frequency MHz	Reading dBuV	Azimuth Degrees	Height m	Polar H / V	Antenna Factor dB	Cable loss dB	Amplifier dB	Corrected Reading dBuV/m	15.247 Limit (dBuV/m)	15.247 Margin	Comments
9648.0000	35.2	213	1.3	V	38.1	3.7	34.2	42.8	54	-11.2	Ave
9648.0000	35.0	170	1.1	H	38.1	3.7	34.2	42.6	54	-11.4	Ave
4823.9500	42.8	123	1.3	V	32.5	1.9	34.8	42.4	54	-11.6	Ave
4823.9500	34.3	139	1.3	H	32.5	1.9	34.8	33.9	54	-20.1	Ave
9648.0000	45.8	213	1.3	V	38.1	3.7	34.2	53.5	74	-20.6	Peak
9648.0000	44.8	170	1.1	H	38.1	3.7	34.2	52.4	74	-21.6	Peak
4823.9500	49.2	123	1.3	V	32.5	1.9	34.8	48.8	74	-25.3	Peak
1000.0000	39.1	118	1.1	V	23.3	1.3	36.8	26.8	54	-27.2	Ave
4823.9500	46.7	139	1.3	H	32.5	1.9	34.8	46.3	74	-27.7	Peak
1000.0000	34.3	55	1.0	H	23.3	1.3	36.8	22.0	54	-32.0	Ave
1000.0000	46.8	118	1.1	V	23.3	1.3	36.8	34.5	74	-39.5	Peak
1000.0000	43.4	55	1.0	H	23.3	1.3	36.8	31.1	74	-42.9	Peak

802.11b Middle Channel:

Frequency MHz	Reading dBuV	Azimuth Degrees	Height m	Polar H / V	Antenna Factor dB	Cable loss dB	Amplifier dB	Corrected Reading dBuV/m	15.247 Limit (dBuV/m)	15.247 Margin	Comments
9747.9000	38.1	281	1.4	V	38.1	3.7	34.2	45.7	54	-8.3	Ave
9747.9000	34.1	180	1.4	H	38.1	3.7	34.2	41.7	54	-12.3	Ave
4874.0000	40.1	341	1.4	V	32.5	1.9	34.8	39.7	54	-14.3	Ave
4874.0000	38.0	248	1.0	H	32.5	1.9	34.8	37.6	54	-16.4	Ave
9747.9000	44.9	180	1.4	H	38.1	3.7	34.2	52.5	74	-21.5	Peak
9747.9000	44.3	281	1.4	V	38.1	3.7	34.2	52.0	74	-22.1	Peak
1000.0000	43.3	176	1.4	V	23.3	1.3	36.8	31.0	54	-23.0	Ave
4874.0000	46.7	341	1.4	V	32.5	1.9	34.8	46.3	74	-27.7	Peak
1000.0000	37.3	170	1.2	H	23.3	1.3	36.8	25.0	54	-29.0	Ave
4874.0000	44.7	248	1.0	H	32.5	1.9	34.8	44.3	74	-29.7	Peak
1000.0000	50.2	176	1.4	V	23.3	1.3	36.8	37.9	74	-36.2	Peak
1000.0000	45.5	170	1.2	H	23.3	1.3	36.8	33.2	74	-40.8	Peak

802.11b High Channel:

Frequency MHz	Reading dBuV	Azimuth Degrees	Height m	Polar H / V	Antenna Factor dB	Cable loss dB	Amplifier dB	Corrected Reading dBuV/m	15.247 Limit (dBuV/m)	15.247 Margin	Comments
9848.0000	37.1	281	1.2	V	38.1	3.7	34.2	44.7	54	-9.3	Ave
9848.0000	32.8	245	1.2	H	38.1	3.7	34.2	40.4	54	-13.6	Ave
4924.0000	39.9	158	1.3	V	32.5	1.9	34.8	39.5	54	-14.5	Ave
9848.0000	45.2	281	1.2	V	38.1	3.7	34.2	52.9	74	-21.1	Peak
4924.0000	32.8	180	1.4	H	32.5	1.9	34.8	32.4	54	-21.6	Ave
9848.0000	43.7	245	1.2	H	38.1	3.7	34.2	51.3	74	-22.7	Peak
1000.0000	40.1	217	1.1	V	23.3	1.3	36.8	27.8	54	-26.2	Ave
4924.0000	46.9	158	1.3	V	32.5	1.9	34.8	46.5	74	-27.5	Peak
4924.0000	43.9	180	1.4	H	32.5	1.9	34.8	43.5	74	-30.5	Peak
1000.0000	30.4	173	1.2	H	23.3	1.3	36.8	18.1	54	-35.9	Ave
1000.0000	46.9	217	1.1	V	23.3	1.3	36.8	34.6	74	-39.4	Peak
1000.0000	43.7	173	1.2	H	23.3	1.3	36.8	31.4	74	-42.7	Peak

802.11g Low Channel:

Frequency MHz	Reading dBuV	Azimuth Degrees	Height m	Polar H / V	Antenna Factor dB	Cable loss dB	Amplifier dB	Corrected Reading dBuV/m	15.247 Limit (dBuV/m)	15.247 Margin	Comments
9647.9000	35.4	280	1.5	V	38.1	3.7	34.2	43.0	54	-11.0	Ave
9647.9000	35.3	247	1.2	H	38.1	3.7	34.2	42.9	54	-11.1	Ave
4823.9500	35.7	152	1.4	V	32.5	1.9	34.8	35.3	54	-18.7	Ave
9647.9000	44.7	280	1.5	V	38.1	3.7	34.2	52.3	74	-21.7	Peak
9647.9000	43.3	247	1.2	H	38.1	3.7	34.2	51.0	74	-23.1	Peak
4823.9500	26.5	197	1.4	H	32.5	1.9	34.8	26.1	54	-27.9	Ave
1000.0000	37.0	170	1.3	H	23.3	1.3	36.8	24.7	54	-29.3	Ave
4823.9500	44.8	152	1.4	V	32.5	1.9	34.8	44.4	74	-29.6	Peak
1000.0000	36.0	171	1.5	V	23.3	1.3	36.8	23.7	54	-30.3	Ave
4823.9500	39.9	197	1.4	H	32.5	1.9	34.8	39.5	74	-34.5	Peak
1000.0000	47.3	171	1.5	V	23.3	1.3	36.8	35.0	74	-39.0	Peak
1000.0000	44.1	170	1.3	H	23.3	1.3	36.8	31.8	74	-42.2	Peak

802.11g Middle Channel:

Frequency MHz	Reading dBuV	Azimuth Degrees	Height m	Polar H / V	Antenna Factor dB	Cable loss dB	Amplifier dB	Corrected Readingr dBuV/m	15.247 Limit (dBuV/m)	15.247 Margin	Comments
9747.8000	37.6	216	1.3	V	38.1	3.7	34.2	45.2	54	-8.8	Ave
9747.8000	37.3	167	1.2	H	38.1	3.7	34.2	44.9	54	-9.1	Ave
9747.8000	45.8	216	1.3	V	38.1	3.7	34.2	53.4	74	-20.6	Peak
1000.0000	43.7	162	1.4	V	23.3	1.3	36.8	31.4	54	-22.6	Ave
9747.8000	43.8	167	1.2	H	38.1	3.7	34.2	51.4	74	-22.6	Peak
4874.0000	28.4	209	1.2	H	32.5	1.9	34.8	28.0	54	-26.0	Ave
4874.0000	28.1	246	1.6	V	32.5	1.9	34.8	27.7	54	-26.3	Ave
1000.0000	38.8	149	1.1	H	23.3	1.3	36.8	26.5	54	-27.5	Ave
4874.0000	42.2	246	1.6	V	32.5	1.9	34.8	41.8	74	-32.2	Peak
4874.0000	42.0	209	1.2	H	32.5	1.9	34.8	41.6	74	-32.4	Peak
1000.0000	50.8	162	1.4	V	23.3	1.3	36.8	38.5	74	-35.5	Peak
1000.0000	46.1	149	1.1	H	23.3	1.3	36.8	33.8	74	-40.2	Peak

802.11g High Channel:

Frequency MHz	Reading dBuV	Azimuth Degrees	Height m	Polar H / V	Antenna Factor dB	Cable loss dB	Amplifier dB	Corrected Reading dBuV/m	15.247 Limit (dBuV/m)	15.247 Margin	Comments
9847.9000	36.8	266	1.5	V	38.1	3.7	34.2	44.4	54	-9.6	Ave
9847.9000	28.9	252	1.2	H	38.1	3.7	34.2	36.5	54	-17.5	Ave
9847.9000	45.3	266	1.5	V	38.1	3.7	34.2	53.0	74	-21.1	Peak
1000.0000	43.9	163	1.6	V	23.3	1.3	36.8	31.6	54	-22.4	Ave
9847.9000	42.8	252	1.2	H	38.1	3.7	34.2	50.4	74	-23.6	Peak
4924.0000	28.8	279	1.3	V	32.5	1.9	34.8	28.4	54	-25.6	Ave
4924.0000	27.9	177	1.3	H	32.5	1.9	34.8	27.5	54	-26.5	Ave
1000.0000	38.8	278	1.0	H	23.3	1.3	36.8	26.5	54	-27.5	Ave
4924.0000	42.2	279	1.3	V	32.5	1.9	34.8	41.8	74	-32.2	Peak
4924.0000	41.7	177	1.3	H	32.5	1.9	34.8	41.3	74	-32.8	Peak
1000.0000	51.2	163	1.6	V	23.3	1.3	36.8	38.9	74	-35.2	Peak
1000.0000	46.3	278	1.0	H	23.3	1.3	36.8	34.0	74	-40.0	Peak

Run # 1- 4: Primary scan 30MHz -1GHz

Frequency MHz	Reading dBuV	Azimuth Degrees	Height m	Polar H / V	Antenna Factor dB	Cable loss dB	Amplifier dB	Corrected Reading dBuV/m	15B Limit (dBuV/m)	15B Margin	Comments
48.44	37.8	128	1.0	V	10.6	1.5	28.6	21.3	40	-18.7	Peak
48.43	37.2	129	1.2	V	10.6	1.5	28.6	20.7	40	-19.3	Peak
50.44	37.4	40	1.2	V	8.3	1.6	28.5	18.8	40	-21.2	Peak
45.76	34.9	301	1.0	V	10.6	1.5	28.6	18.4	40	-21.6	Peak
58.74	34.9	29	1.3	V	7.3	1.6	28.5	15.3	40	-24.7	Peak
60.19	32.0	7	1.5	V	7.4	1.7	28.5	12.6	40	-27.4	Peak

§15.247(a)(2) – 6 dB BANDWIDTH

Applicable Standard

According to §15.247(a)(2), for digital modulation techniques, the minimum 6dB 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	E4446A	3946A00131	2006-03-06

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

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	45%
ATM Pressure:	1020mbar

**The testing was performed by Tom Chen on 2006-06-05*

Measurement Result

802.11b mode:

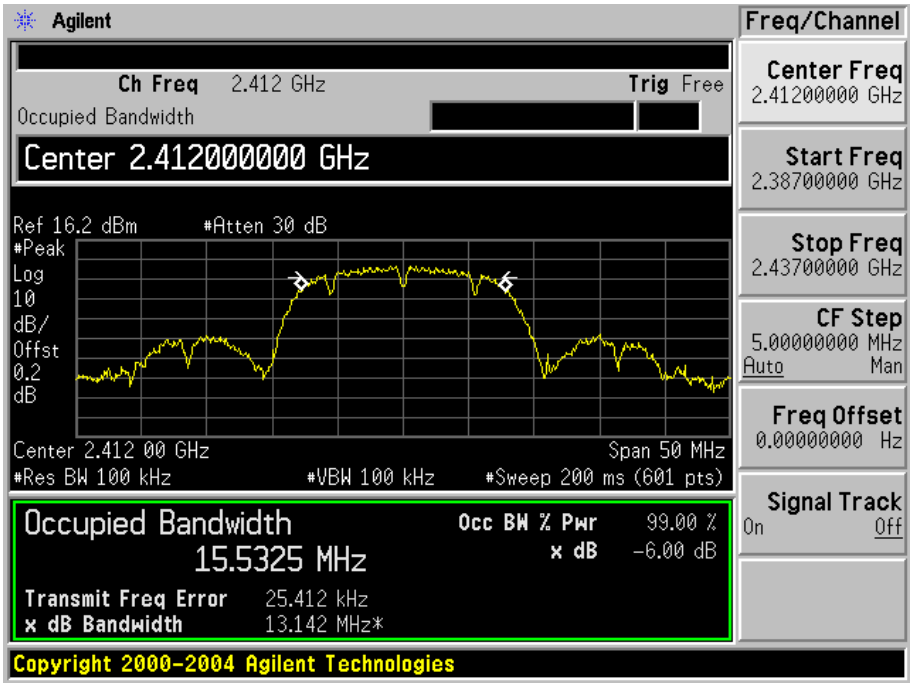
Channel	Frequency (MHz)	Channel Bandwidth (MHz)	Limit (KHz)
Low	2412	13.142	>500
Mid	2437	13.133	>500
High	2462	13.140	>500

802.11g mode:

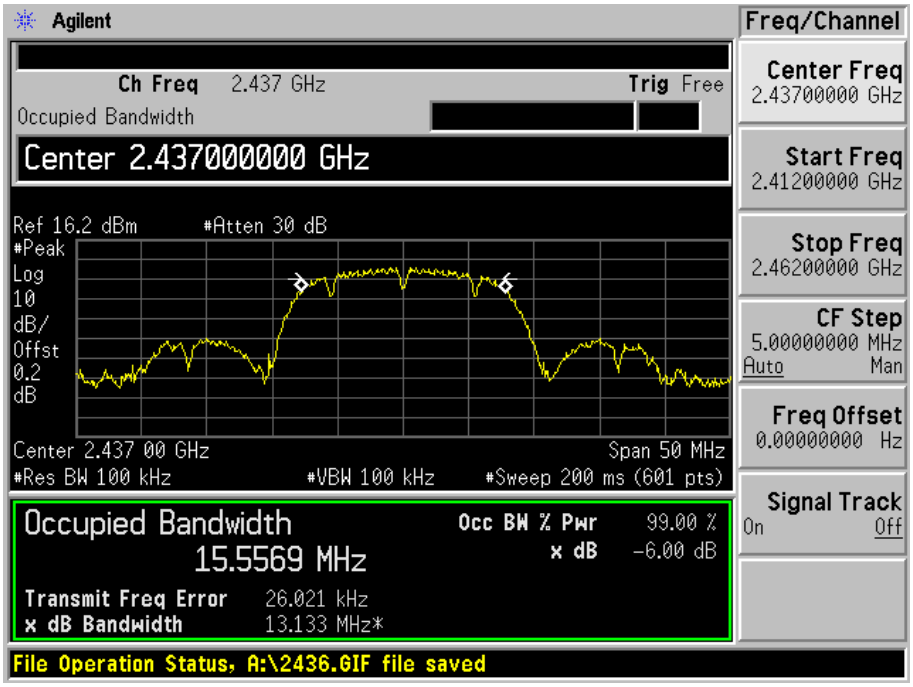
Channel	Frequency (MHz)	Channel Bandwidth (MHz)	Limit (KHz)
Low	2412	16.389	>500
Mid	2437	16.392	>500
High	2462	16.387	>500

802.11b mode:

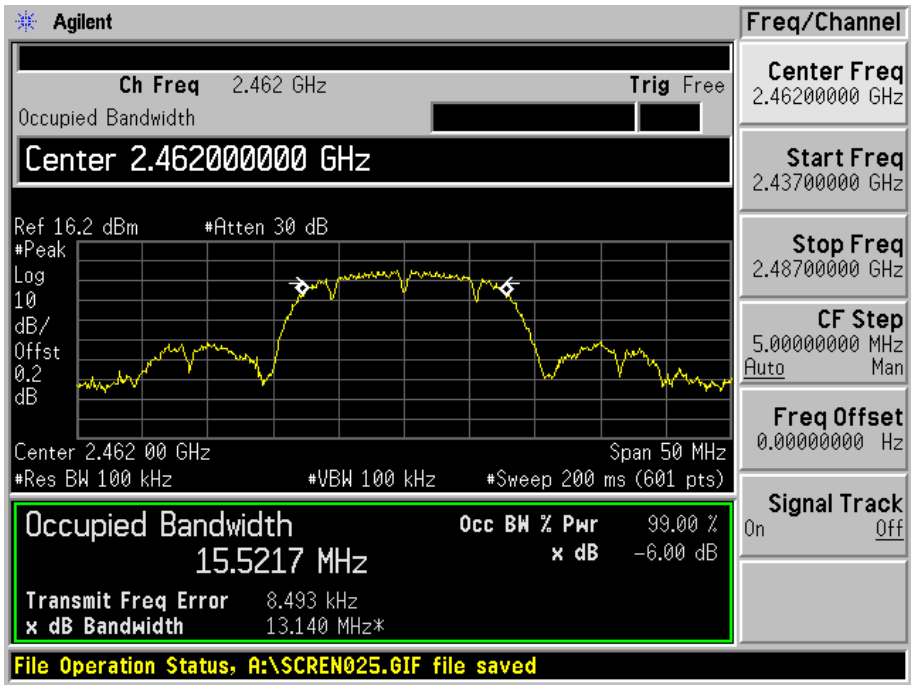
Low Channel



Middle Channel

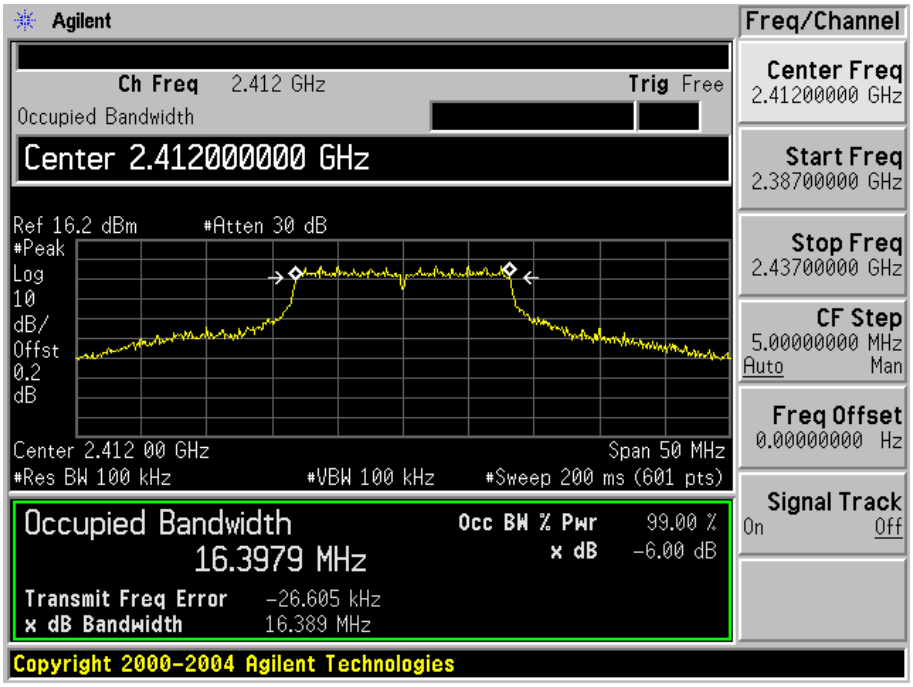


High Channel

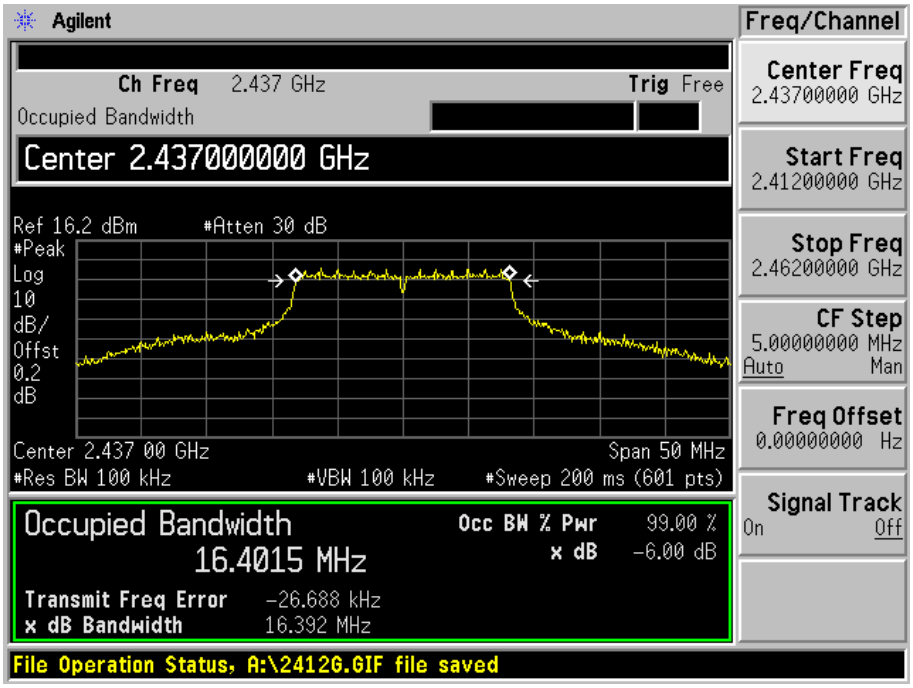


802.11g mode:

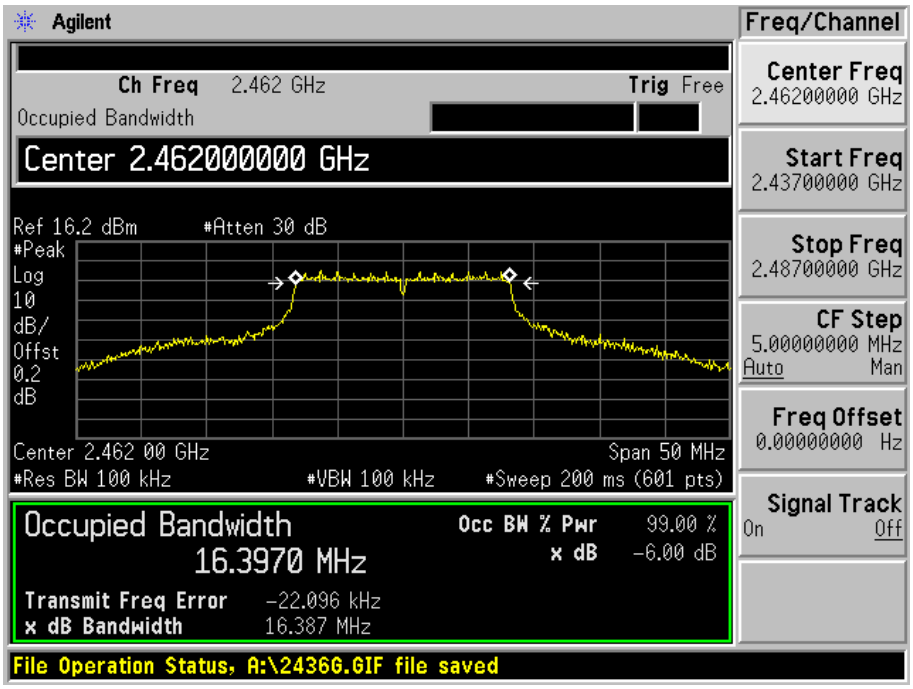
Low Channel



Mid. Channel



High Channel



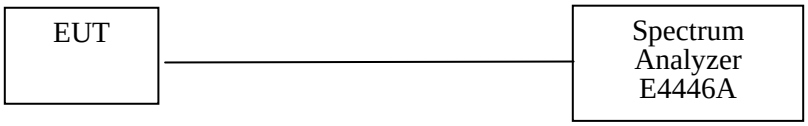
§15.247(b)(3) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to §15.247(b) (3), for systems using digital modulation in 2400-2483.5 MHz: 1 Watt

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.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Sensor, Power	E4412A	US38488542	2006-09-08
Agilent	Meter, Power	E4419B	MY4121511	2006-08-31
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.

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	45%
ATM Pressure:	1020mbar

**The testing was performed by Tom Chen on 2006-06-05.*

Measurement Result

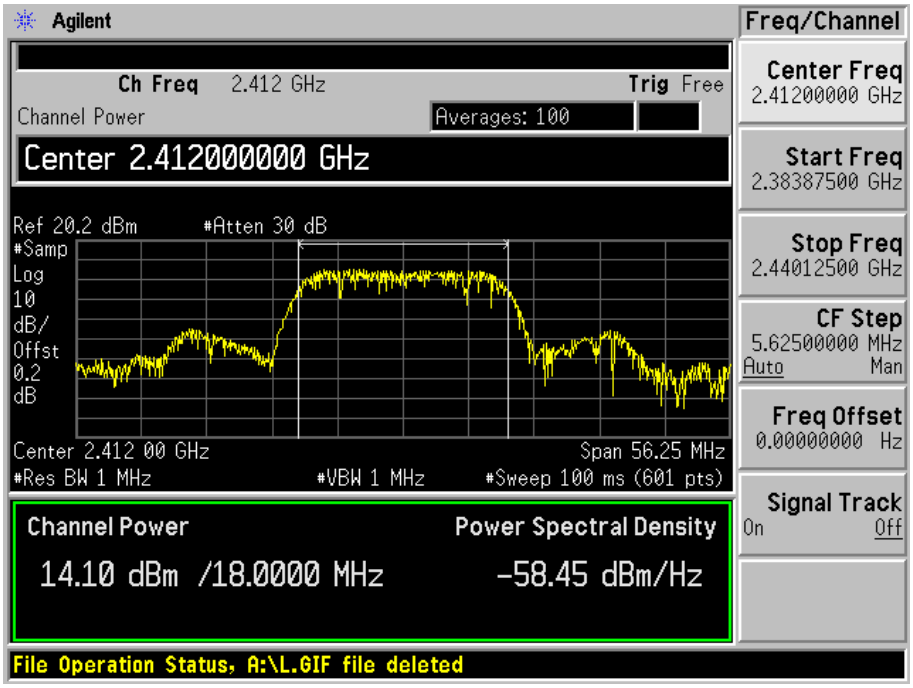
802.11b mode:

Channel	Frequency MHz	Max Peak Output Power		Limit (mw)	Result
		(dBm)	(mw)		
Low	2412	14.1	25.70	1000	Pass
Mid	2437	13.17	20.75	1000	Pass
High	2462	12.49	17.74	1000	Pass

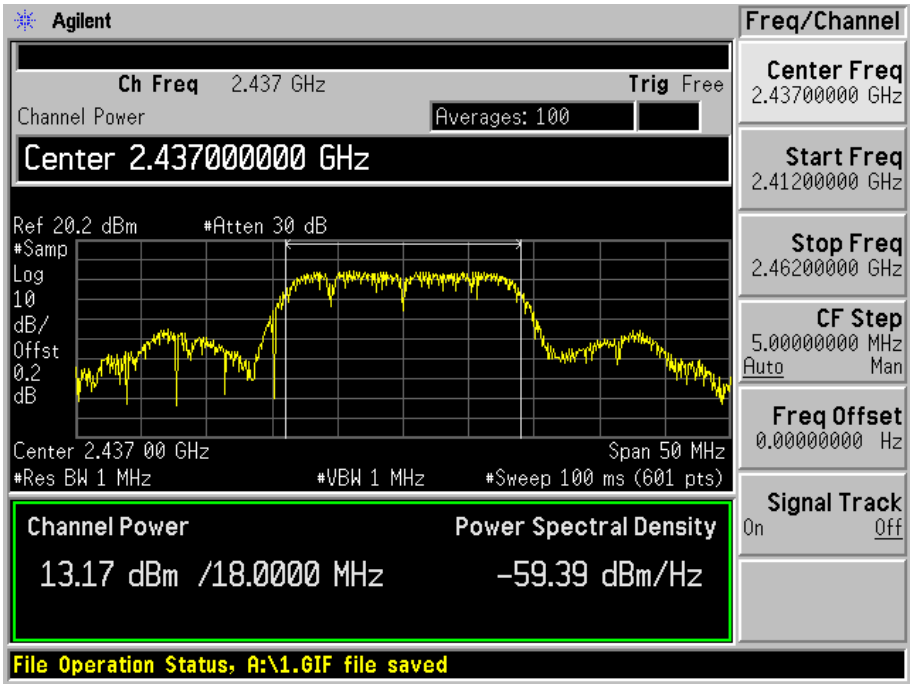
802.11g mode:

Channel	Frequency MHz	Max Peak Output Power		Limit (mw)	Result
		(dBm)	(mw)		
Low	2412	13.7	23.44	1000	Pass
Mid	2437	12.8	19.05	1000	Pass
High	2462	12.13	16.33	1000	Pass

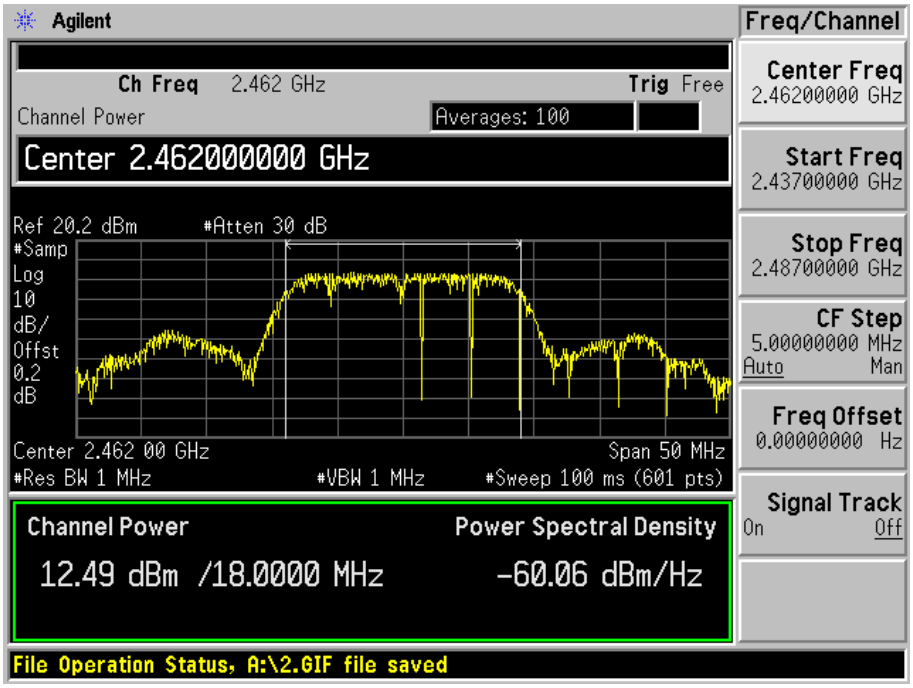
802.11b, Low Channel



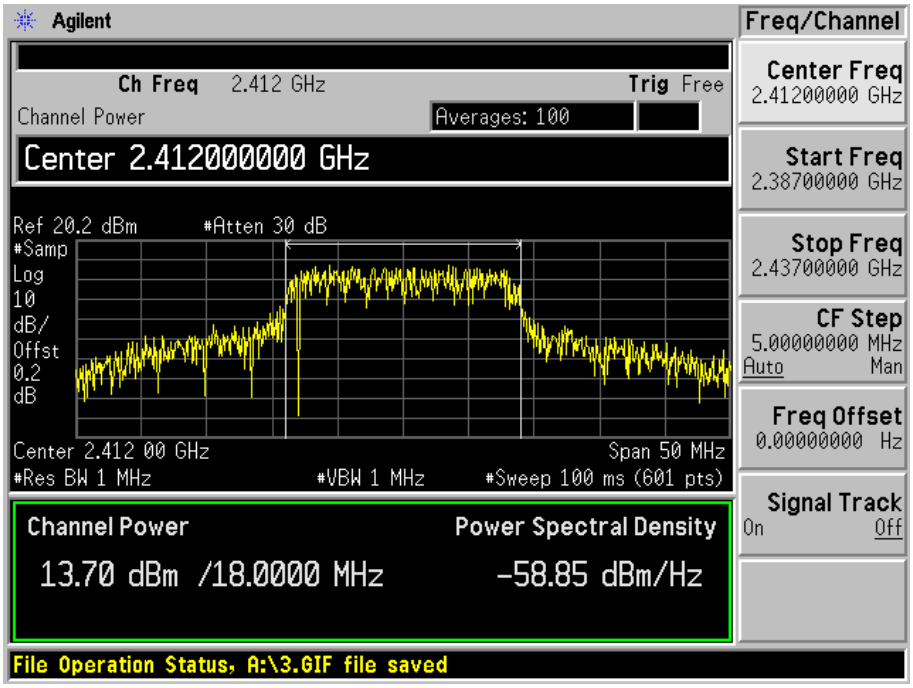
802.11b, Middle Channel



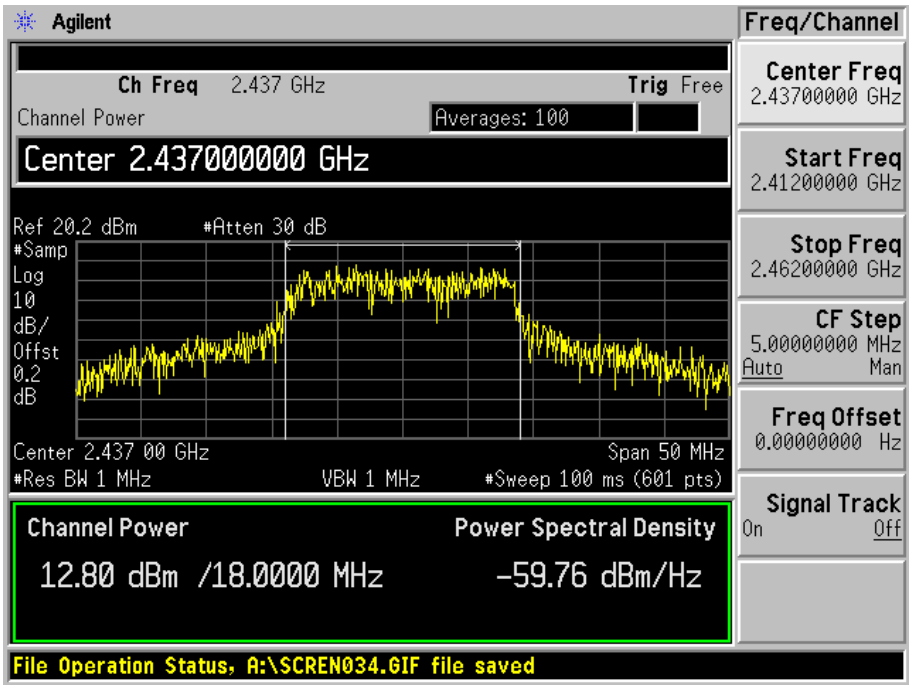
802.11b, High Channel



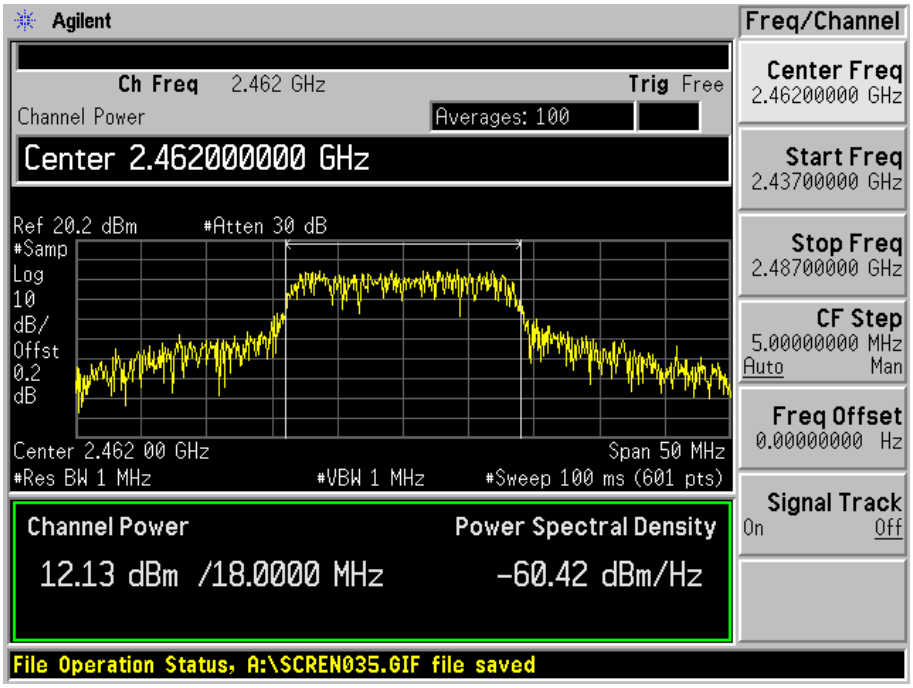
802.11g, Low Channel



802.11g, Middle Channel



802.11g, High Channel



§15.247(c) - 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	E4446A	3946A00131	2006-03-06

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

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	45%
ATM Pressure:	1020mbar

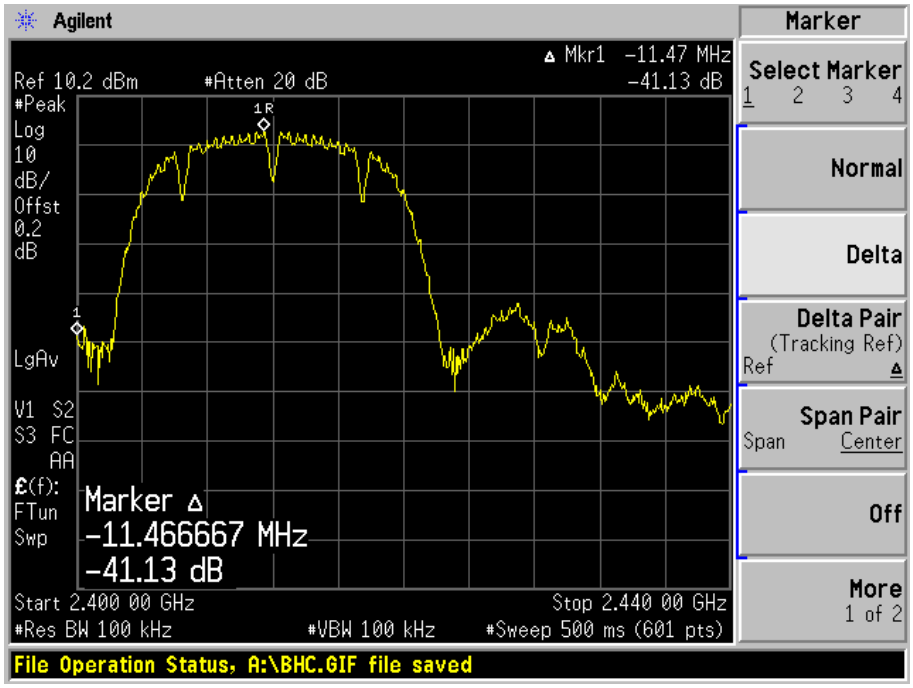
**The testing was performed by Tom Chen on 2006-06-05.*

Measurement Result

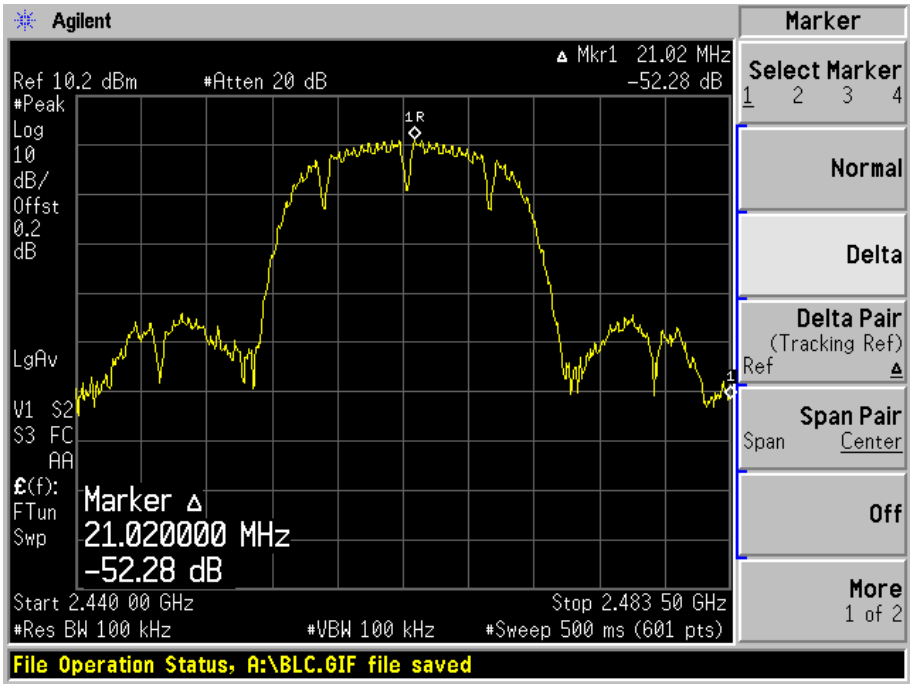
Please refer to following pages for plots of band edge.

802.11b mode:

Low Channel

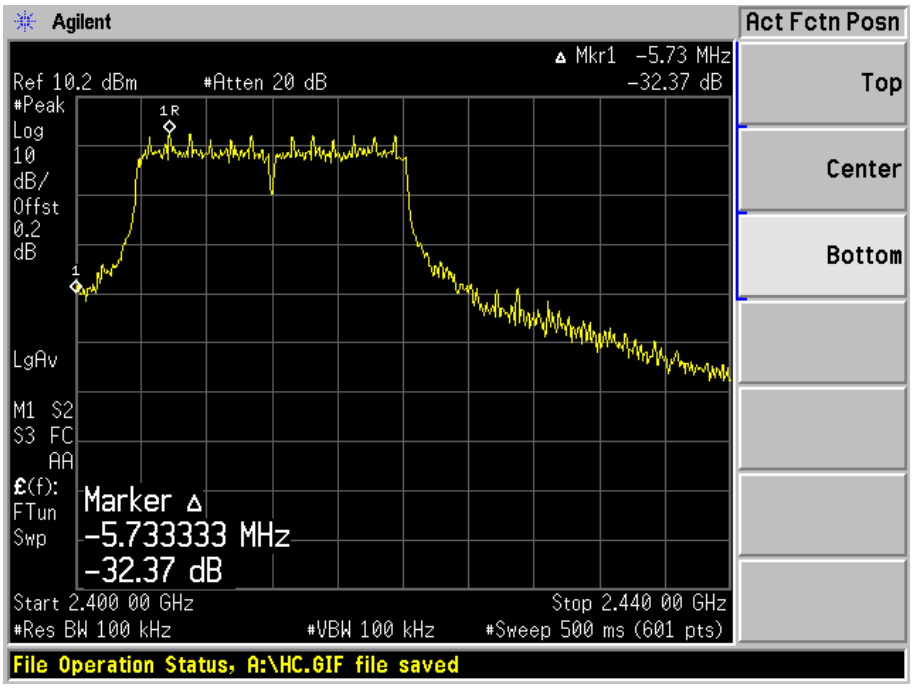


High Channel

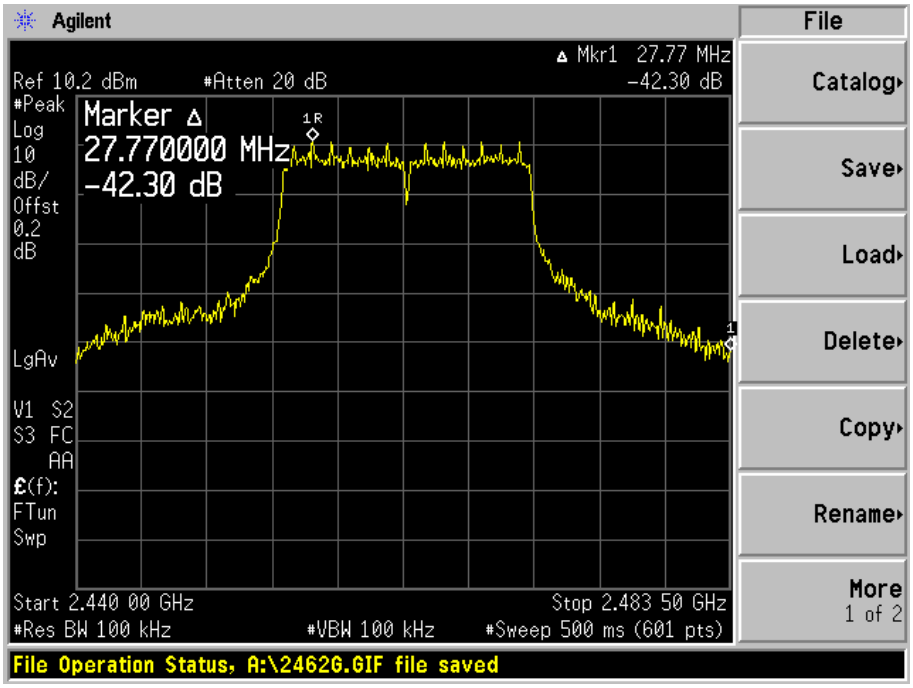


802.11g mode:

Low Channel



High Channel



§15.247(d) - POWER SPECTRAL DENSITY

Applicable Standard

According to §15.247 (d), for direct sequence systems, the peak 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. 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.

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	45%
ATM Pressure:	1020mbar

**The testing was performed by Tom Chen on 2006-06-05*

Measurement Result

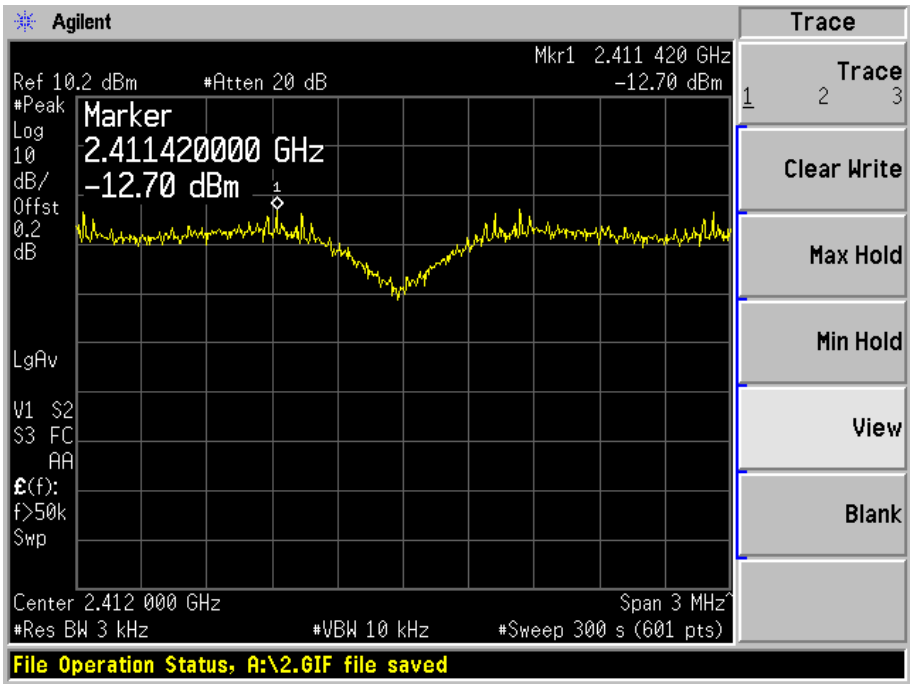
802.11b mode:

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)
Low	2412	-12.7	8
Mid	2437	-13.79	8
High	2462	-14.26	8

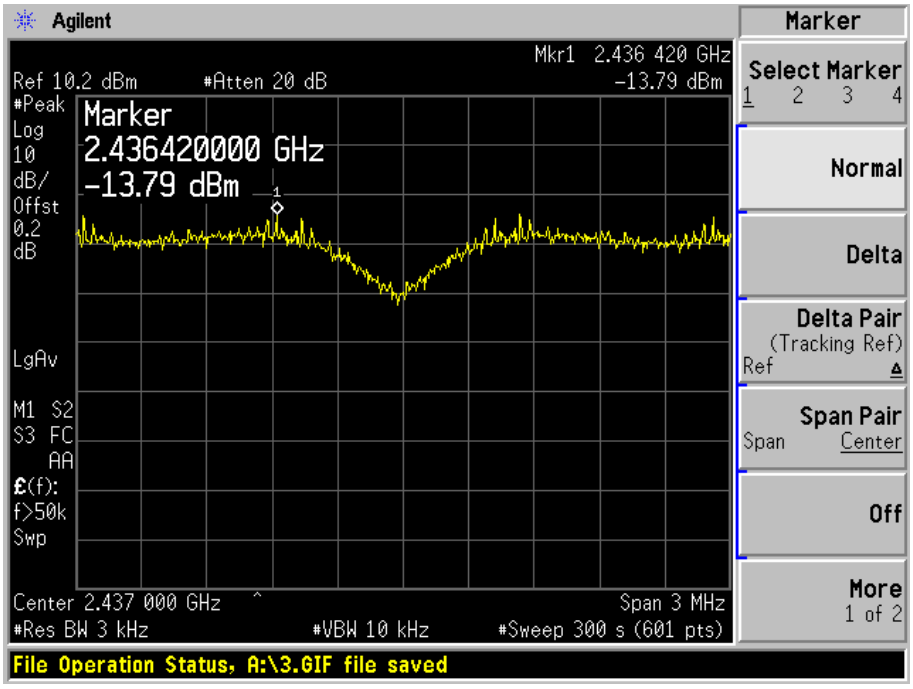
802.11g mode:

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)
Low	2412	-13.32	8
Mid	2437	-14.23	8
High	2462	-14.92	8

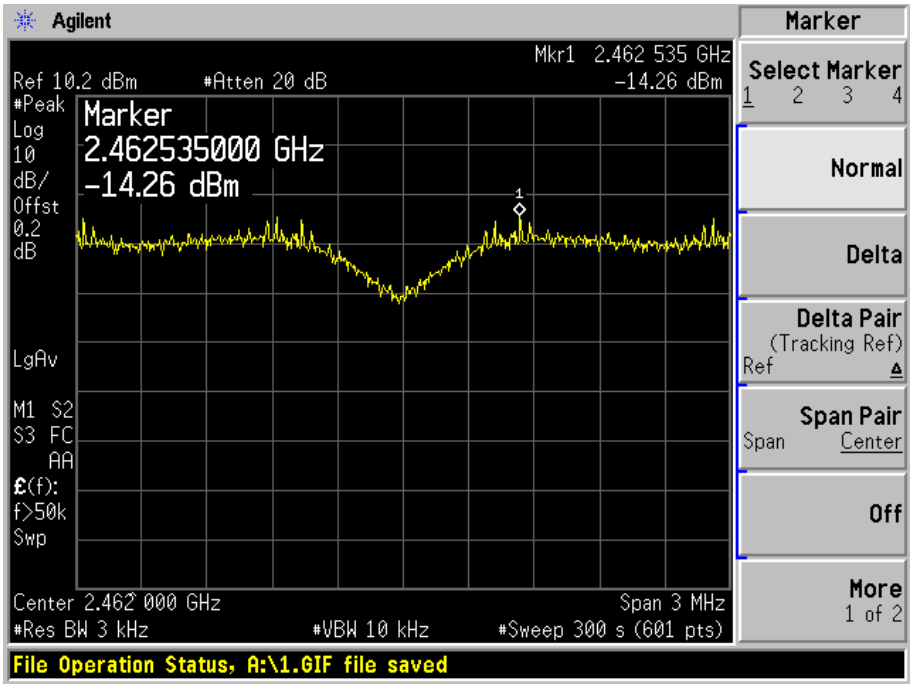
802.11b, Low Channel



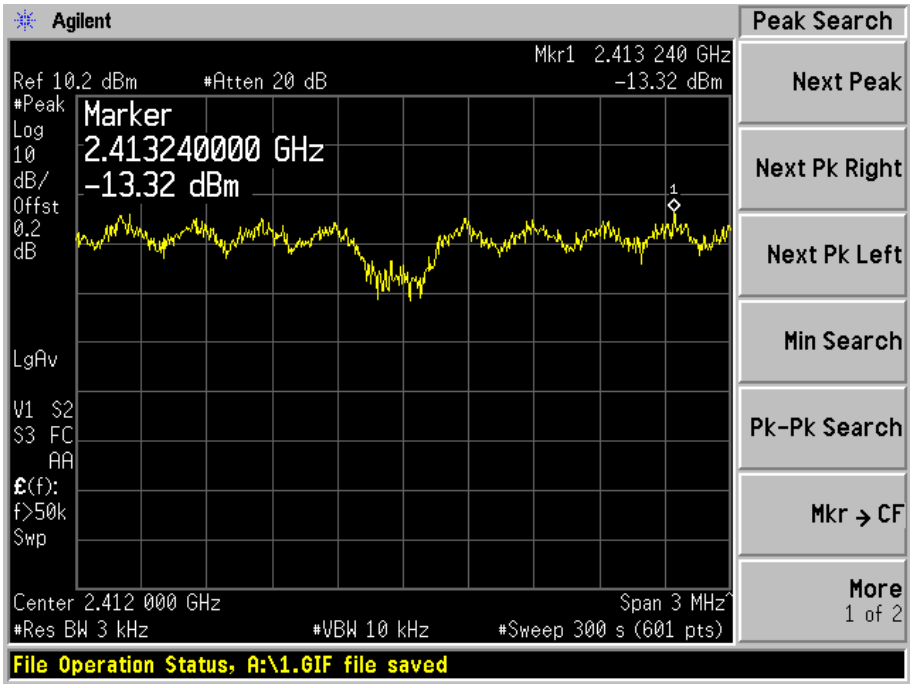
802.11b, Mid. Channel



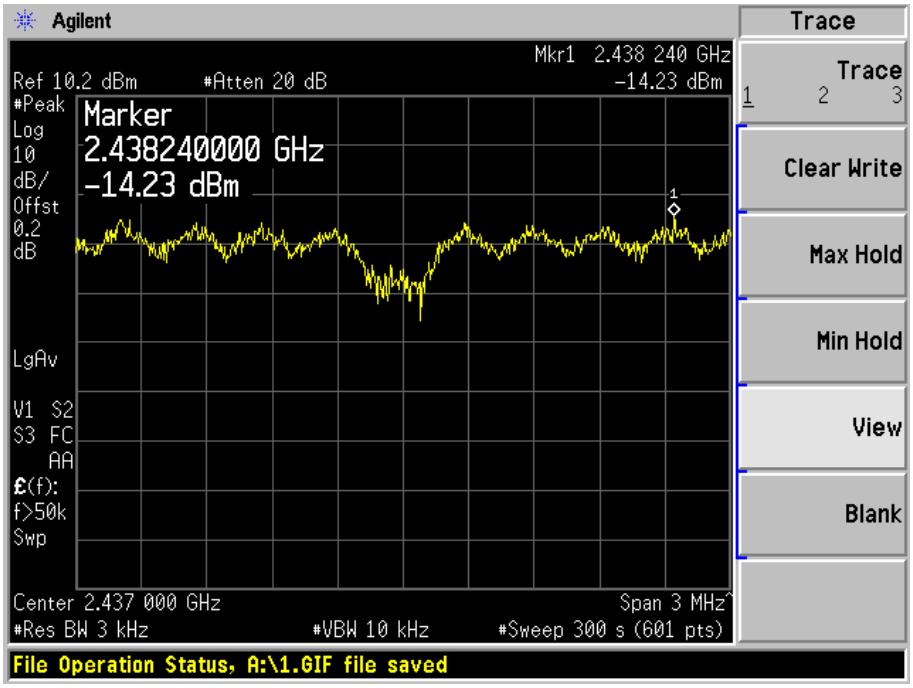
802.11b, High Channel



802.11g, Low Channel



802.11g, Mid Channel



802.11g, High Channel