



World Standardization Certification & Testing CO., LTD
World Standardization Safety and EMC Testing Centre

FCC 47 CFR PART 15 SUBPART C

TEST REPORT

Report Number: WSCT08120306E-RF

For

UMPC

Model: PWS700B

Trade Name: N/A

Prepared for

Hivision Co., Ltd

**Room 2201-2202, COFCO Property Tower, the 3rd Area,
Baoan, ShenZhen, China**

Prepared by

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Applicant: Hivision Co., Ltd
REPORT NUMBER: WSCT08120306E-RF
FCC ID: WZNPWS700B



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1. TEST RESULT CERTIFICATION

Applicant: Hivision Co.,Ltd
Room2201-2202,COFCO Property Tower,the 3rd Area,
Baoan,ShenZhen,China

Equipment Under Test: UMPC

Trade Name: N/A

Model: PWS700B

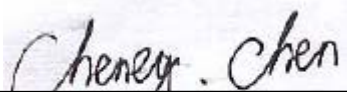
Date of Test: December 05 , 2008~January 07, 2009

APPLICABLE STANDARDS			
Standard	Test Type	Standard	Test Type
15.247(a)(2)	6dB Bandwidth Measurement	15.247(e)	Peak Power Spectral Density
15.247(b)(3) 15.247(b)(4)	Peak Power Measurement	15.247(d) 15.209(a)	Spurious Emissions ● Conducted Measurement ● Radiated Emissions
15.247(d)	Band Edges Measurement	15.207(a)	Power Line Conducted Emissions

Deviation from Applicable Standard
None


The above equipment was tested by World Standardization Certification& Testing CO., LTD.
The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2003 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

Tested By:


(Cheney Chen)

Date: 2009-01-07

Check By:


(Joe Lin)

Date: 2009-01-07

Approved By:


(Sula Huang)

Date: 2009-01-07



2. TEST RESULT SUMMARY

APPLICABLE STANDARDS			
Standard	Test Type	Result	Remark
15.247(a)(2)	6dB Bandwidth Measurement	Pass	Meet the requirement of limit.
15.247(b)(3) 15.247(b)(4)	Peak Power Measurement	Pass	Meet the requirement of limit.
15.247(d)	Band Edges Measurement	Pass	Meet the requirement of limit.
15.247(e)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.247(d) 15.209(a)	Spurious Emissions ● Conducted Measurement ● Radiated Emissions	Pass	Meet the requirement of limit.
15.207(a)	Power line Conducted Emissions	Pass	Meet the requirement of limit.

Note: 1. The test result judgment is decided by the limit of test standard
2. The information of measurement uncertainty is available upon the customer's request.



3. EUT DESCRIPTION

Product	UMPC
Trade Name	N/A
Model Number	PWS700B
Model Difference	N/A
Power Supply	DC 5V Powered by built-in battery or adapter (Adapter)Model number: IT15V050250X INPUT: 100-240V~50-60Hz 350mA Max OUTPUT: DC 5V, 2.5A
Frequency Range	802.11b mode: 2412 ~ 2472 MHz 802.11g mode: 2412 ~ 2472 MHz
Transmit Power	802.11b mode: 13.11 dBm 802.11g mode: 11.77 dBm
Modulation Technique	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: DSSS (CCK, DQPSK, DBPSK) + OFDM (QPSK, BPSK, 16-QAM, 64-QAM)
Transmit Data Rate	IEEE 802.11b: 11, 5.5, 2, 1 Mbps IEEE 802.11g: 54, 48, 18, 12, 11, 9, 6Mbps
Number of Channels	11 Channels
Antenna Specification	2.4GHz High Gain Built-in Antenna with 2 dBi gain(Max)

***Note:** This submittal(s) (test report) comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.*



4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2003 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4: 2003 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown 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	399.9 – 410	4.5 – 5.15
¹ 0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
2. 17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
2. 20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 –	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.52525	2655 – 2900	22.01 – 23.12
8.41425 – 8.41475	156.7 – 156.9	3260 – 3267	23.6 – 24.0
12.29 – 12.293	162.0125 – 167.17	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	167.72 – 173.2	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	240 – 285	3600 – 4400	(²)
13.36 – 13.41	322 – 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

IEEE802.11b: Channel 1(2412MHz), Channel 6(2442MHz) and Channel 11(2472MHz) with 11Mbps highest data rate (worst case) are chosen for the final testing.

IEEE802.11g: Channel 1(2412MHz), Channel 6(2442MHz) and Channel 11(2472MHz) with 54Mbps data rate (the worst case) are chosen for the final testing.



5. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.



6. FACILITIES AND ACCREDITATIONS

FACILITIES

All measurement facilities used to collect the measurement data are located at

1-2/F, Dachong Science&Technology Building, No.28 of Tonggu Road, Nanshan District, ShenZhen.PRC.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4: 2003 and CISPR Publication 22.

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by FCC. Oct 06.2007. The certificate registration number is 276008 to perform Electromagnetic Interference tests according to FCC PART 15 and CISPR 22 requirements.



7. SETUP OF EQUIPMENT UNDER TEST

SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

SUPPORT EQUIPMENT

No	Equipment	Model	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	PC	H1105	SS08502637	DoC	LENOVO	Shielded 1.5m	Unshielded 1.8m
2.	LCD MONITOR	L1706v	N/A	DoC	HP	shielded 1.5m	Unshielded 1.8m
3.	Keyboard	KB-0623	08G00704325D	DoC	LENOVO	N/A	Unshielded 1.8m
4.	Mouse	N/A	N/A	DoC	LENOVO	N/A	Unshielded 1.8m

Notes:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

8. FCC PART 15.247 REQUIREMENTS

6DB BANDWIDTH

LIMIT

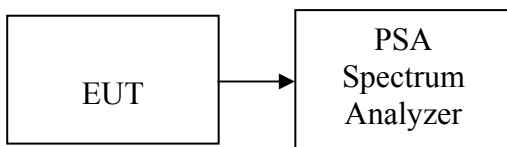
For the direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/08/2009

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = RBW, Span = 20MHz, Sweep = auto.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.



TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	9930	>500	PASS
Mid	2442	9370		PASS
High	2472	9930		PASS

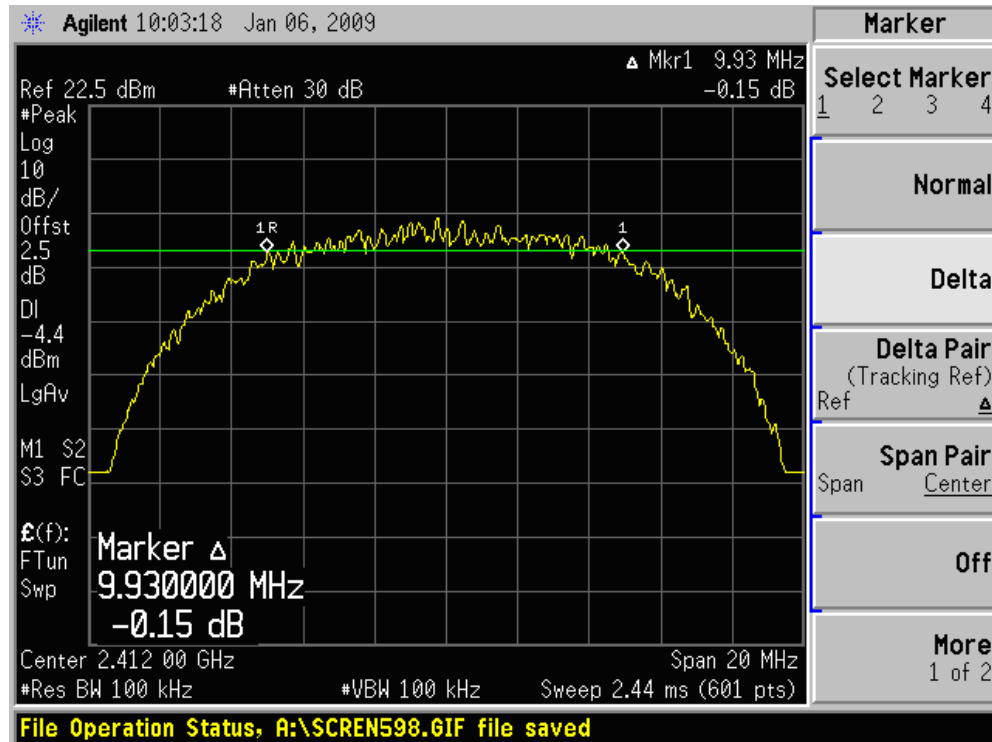
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	16530	>500	PASS
Mid	2442	16530		PASS
High	2472	16570		PASS

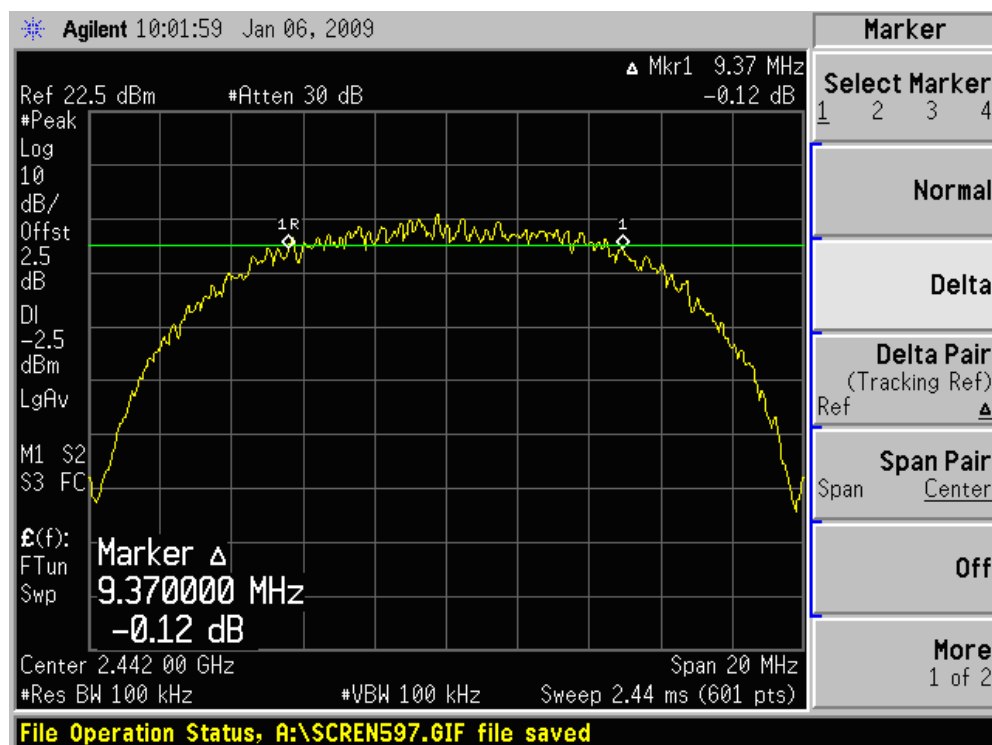
Test Plot

802.11b mode

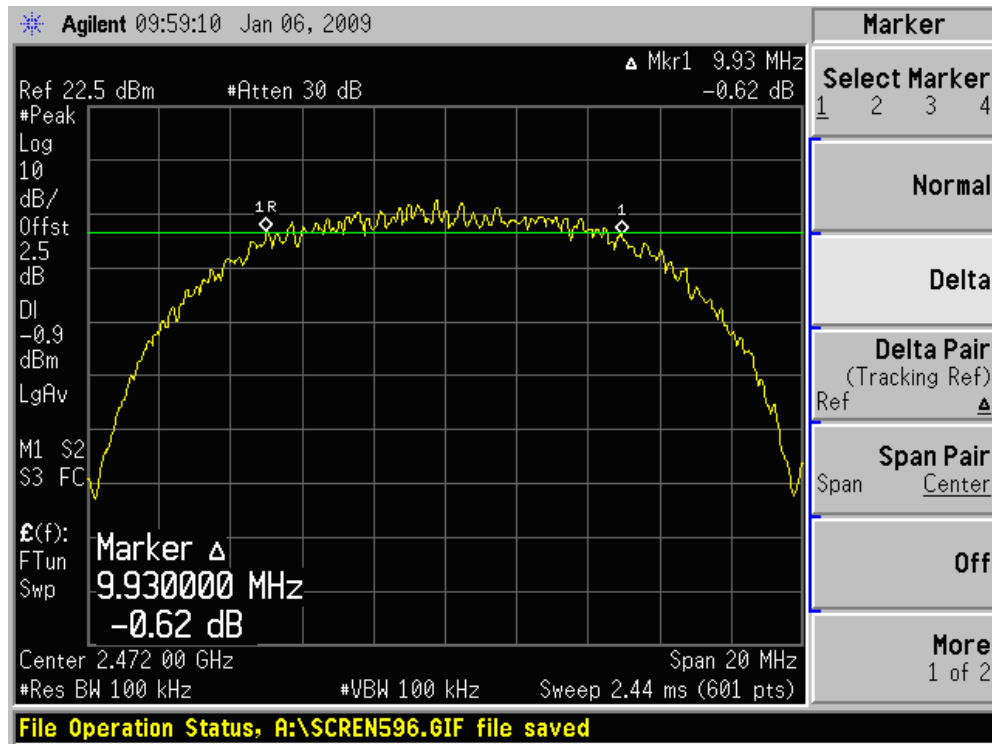
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

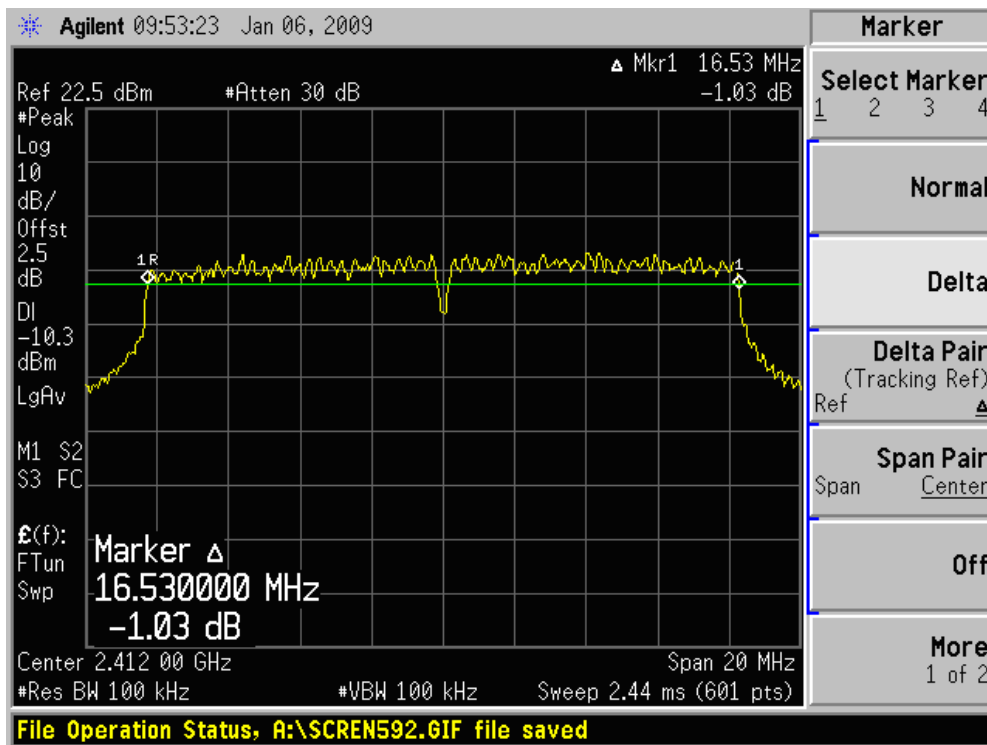


6dB Bandwidth (CH High)

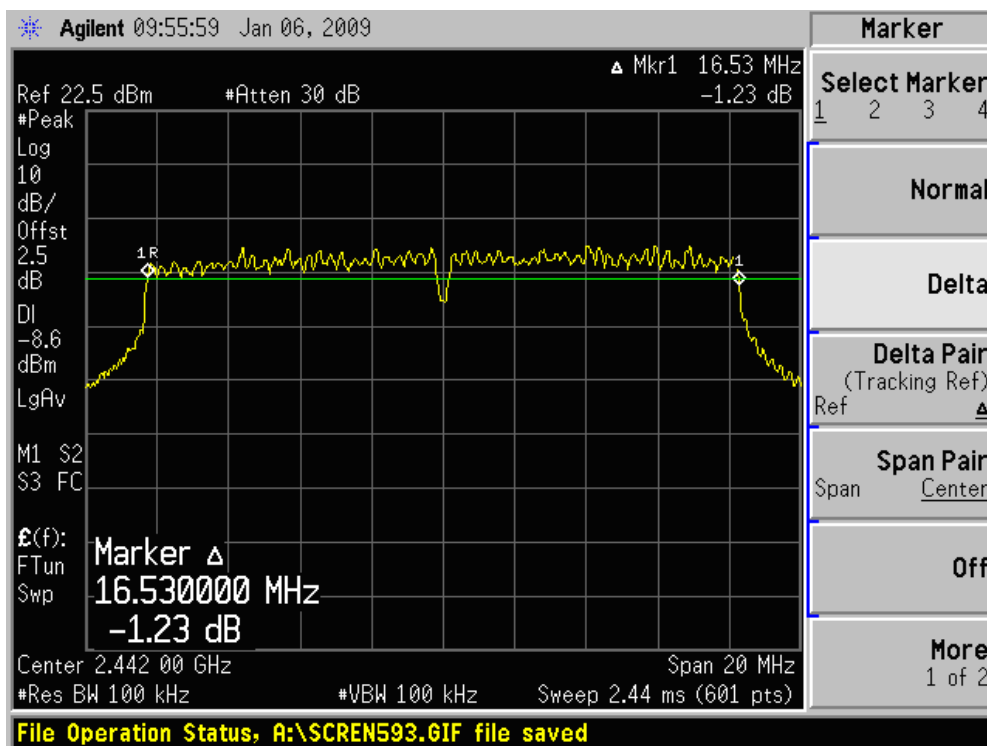


802.11g mode

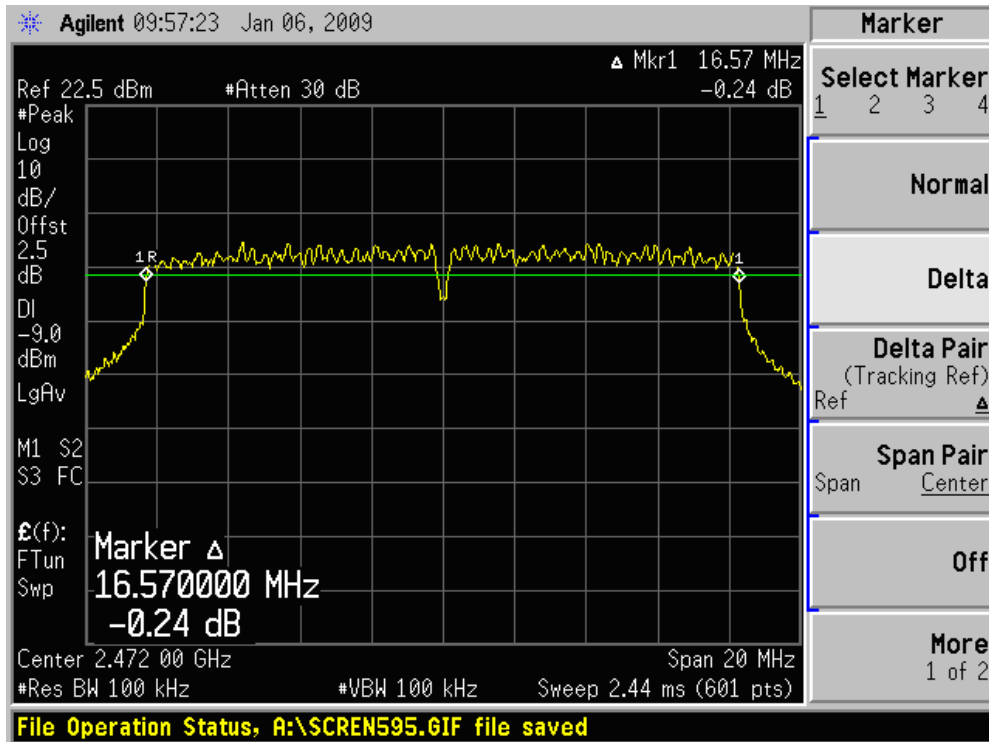
6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



PEAK POWER**LIMIT**

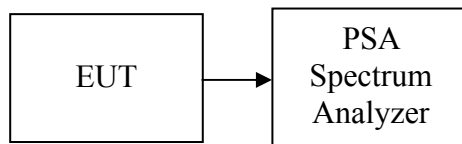
The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/08/2009

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration**TEST PROCEDURE**

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the peak power detection.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Output (dBm)	Factor (dB)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	10.51	2.50	13.01	0.02000	1	PASS
Mid	2442	10.61	2.50	13.11	0.02046	1	PASS
High	2472	9.65	2.50	12.15	0.01641	1	PASS

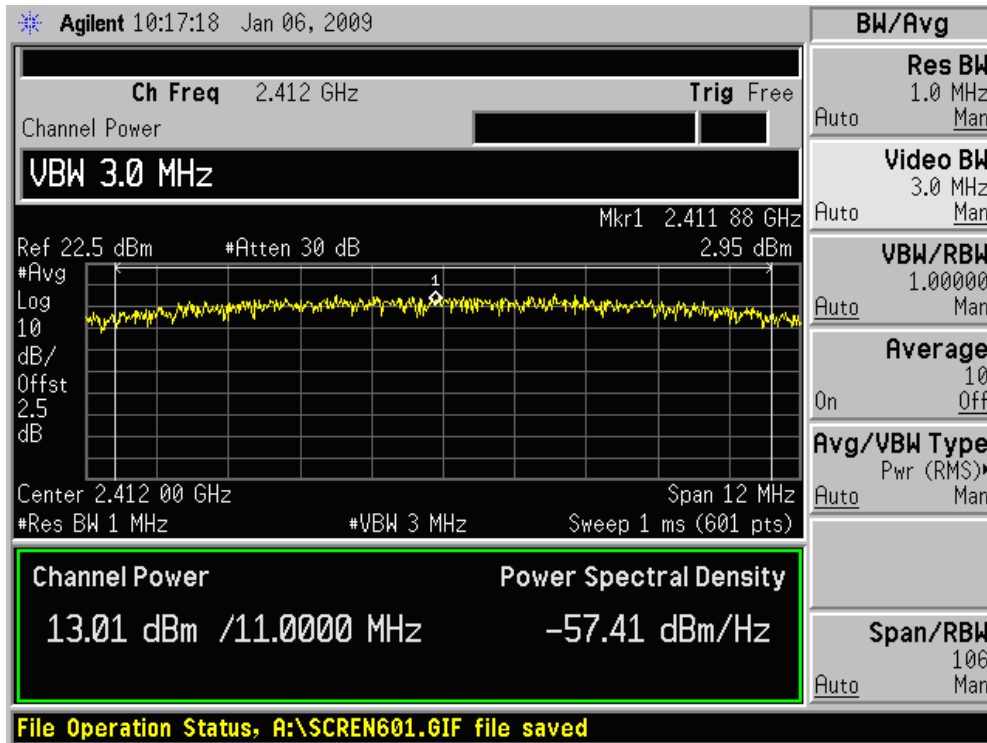
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output (dBm)	Factor (dB)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	8.63	2.50	11.13	0.01297	1	PASS
Mid	2442	8.85	2.50	11.35	0.01365	1	PASS
High	2472	9.27	2.50	11.77	0.01503	1	PASS

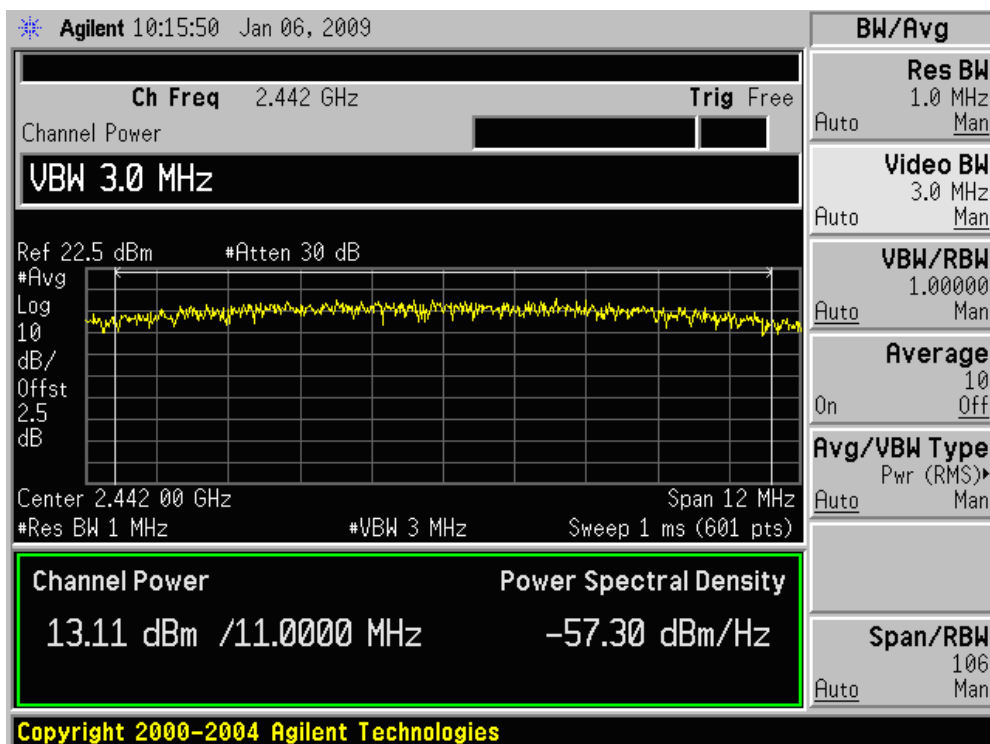
Test Plot

802.11b mode

Peak power (CH Low)

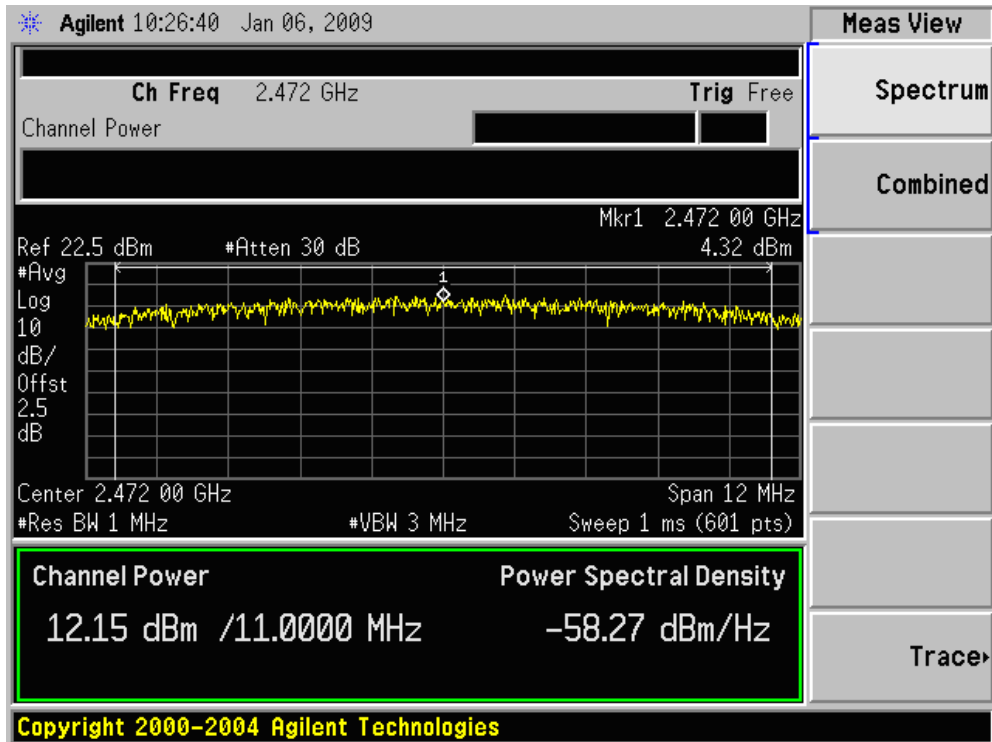


Peak power (CH Mid)



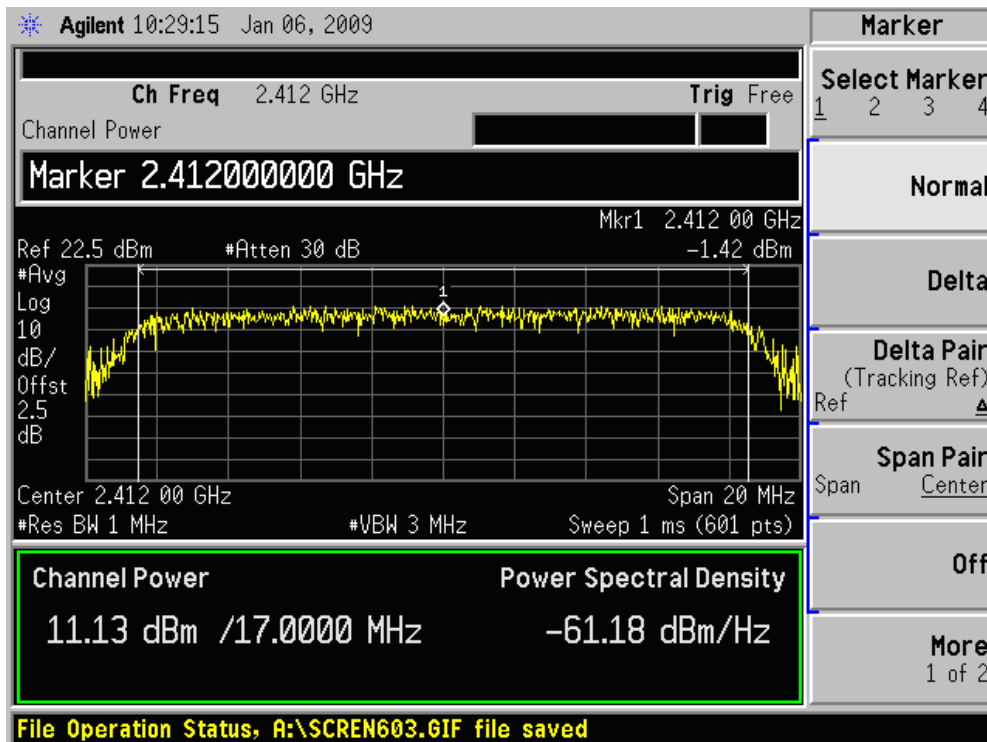


Peak power (CH High)

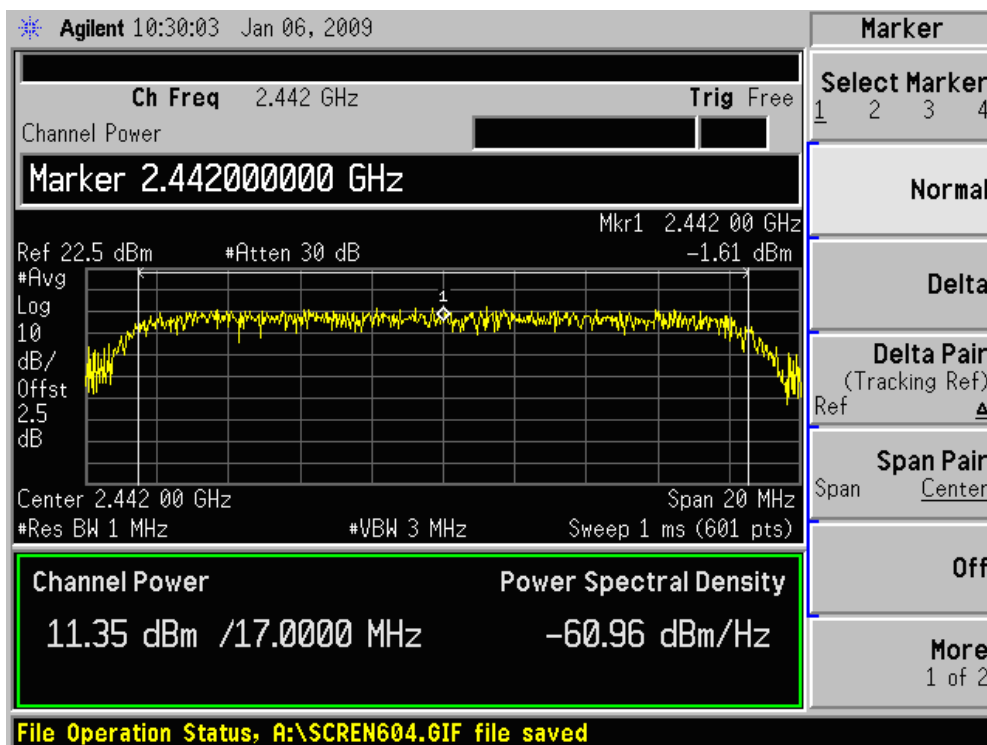


802.11g mode

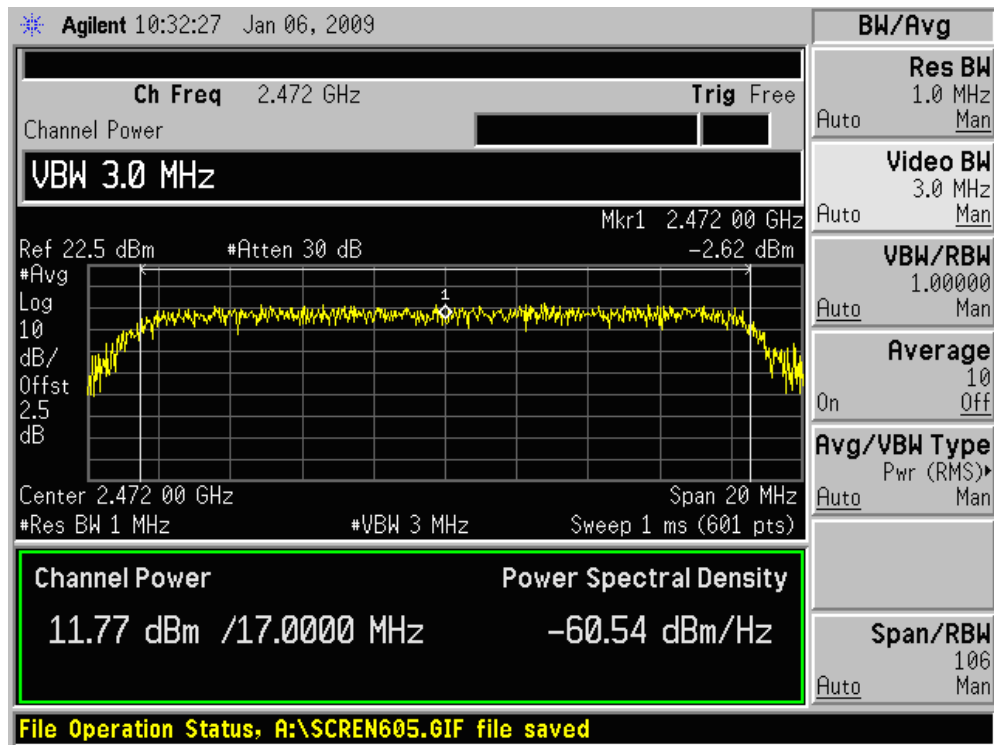
Peak power (CH Low)



Peak power (CH Mid)



Peak power (CH High)



BAND EDGES MEASUREMENT

LIMIT

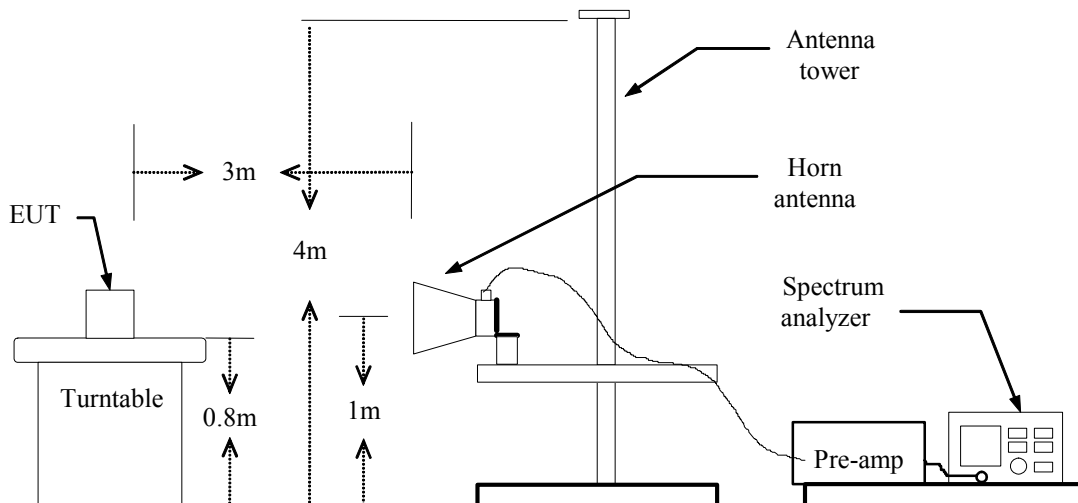
According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains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

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/08/2009

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

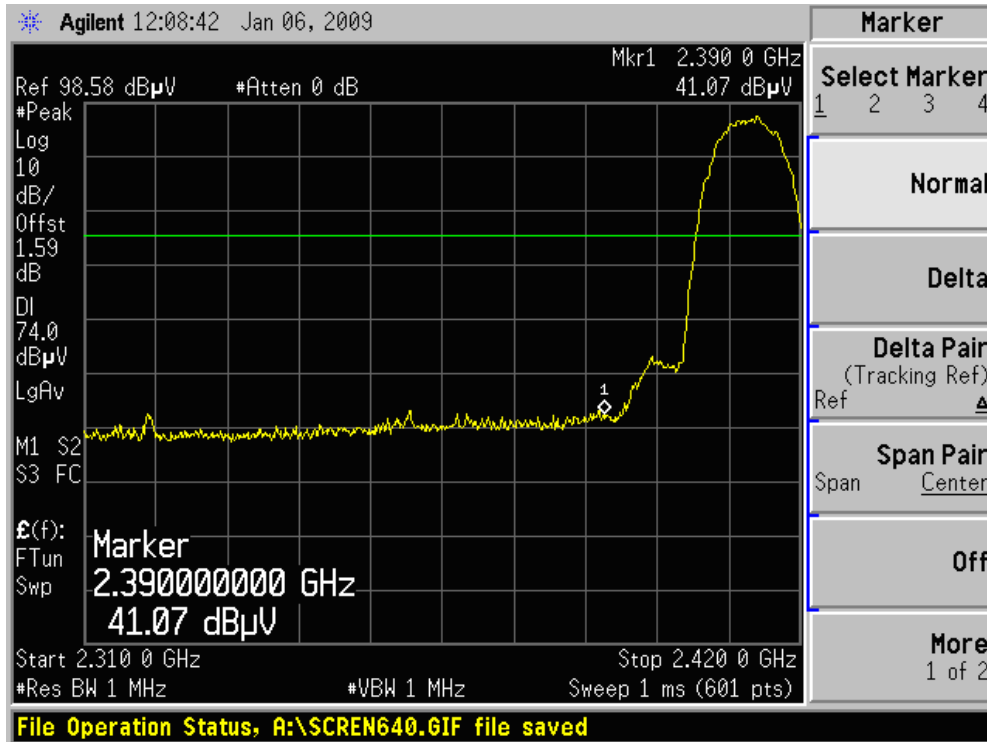
TEST RESULTS

Refer to attach spectrum analyzer data chart.

Band Edges (802.11b / CH Low)

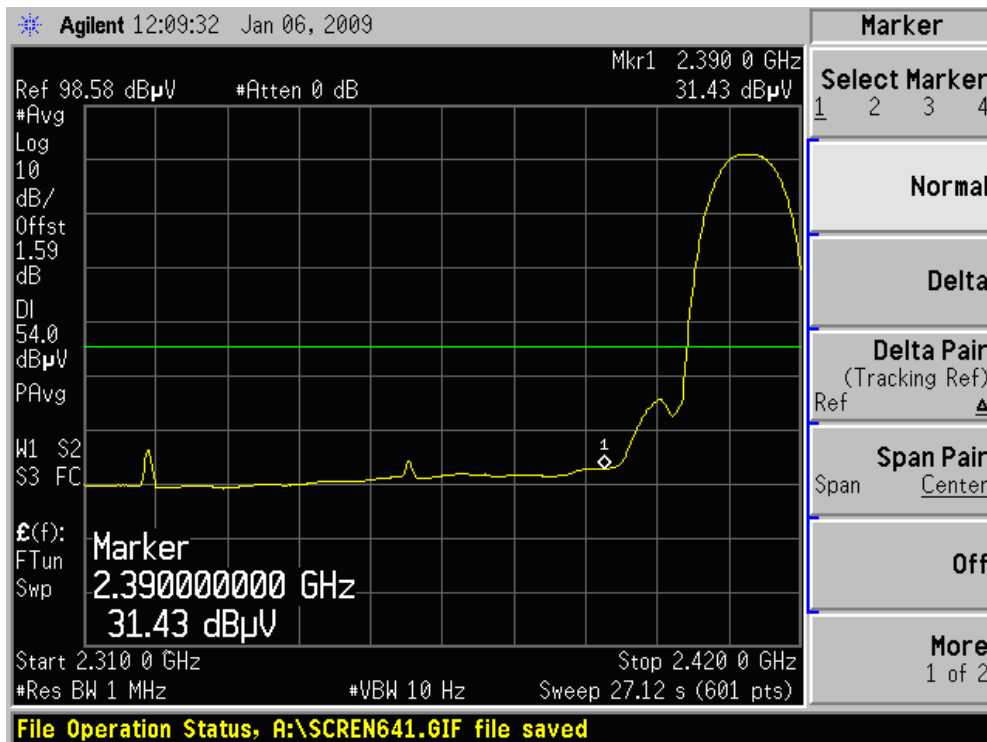
Detector mode: Peak

Polarity: Vertical



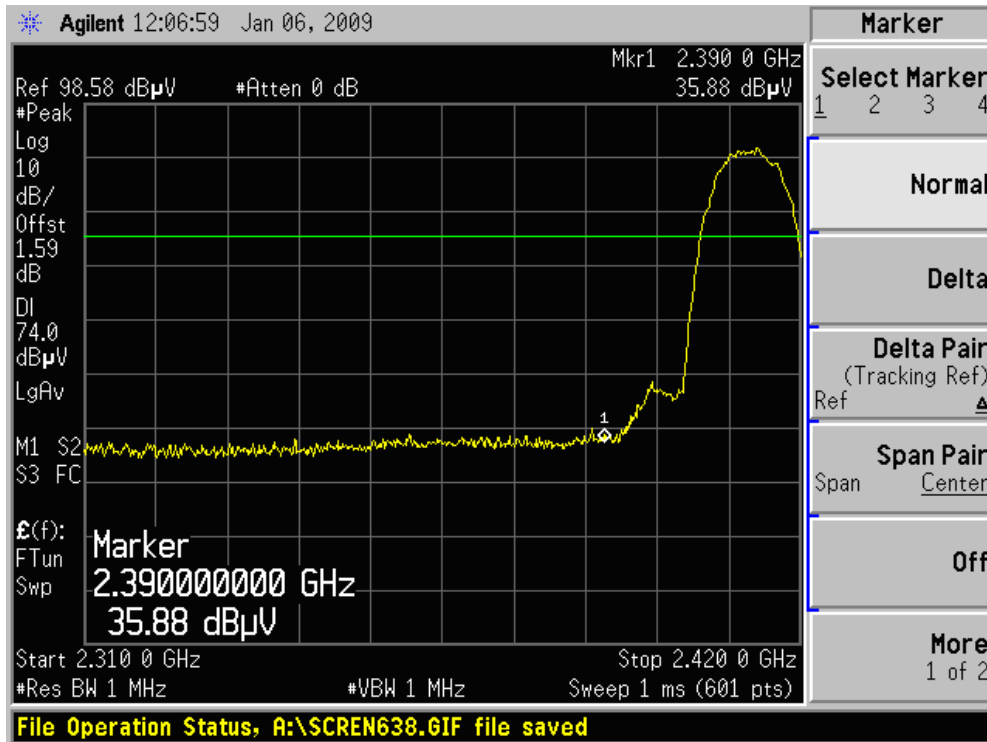
Detector mode: Average

Polarity: Vertical



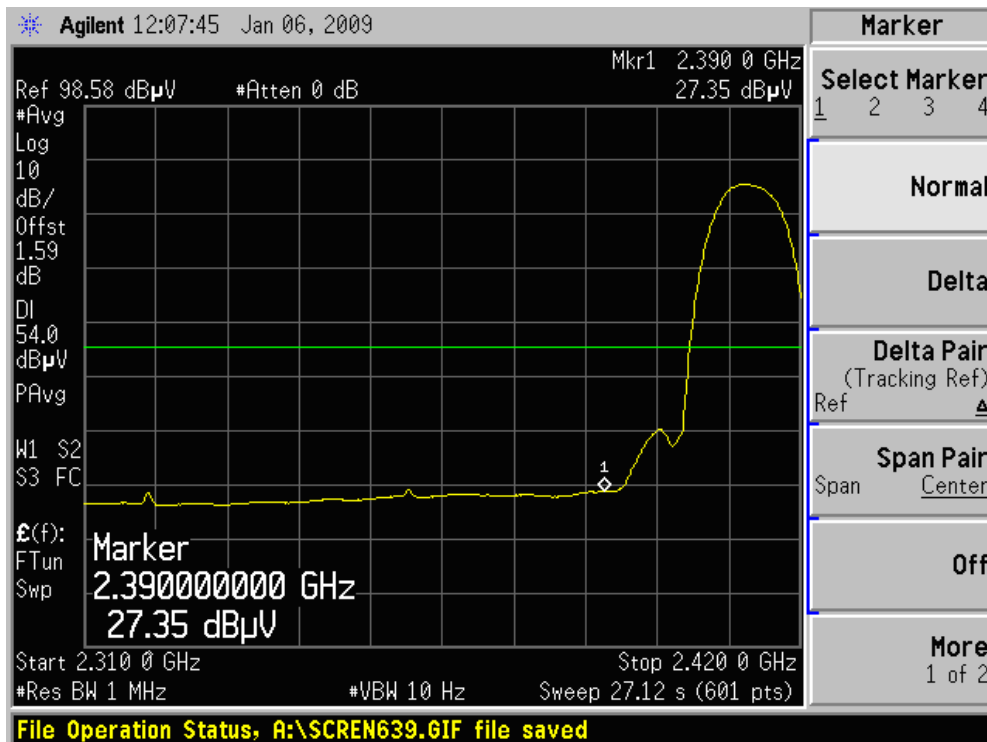
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

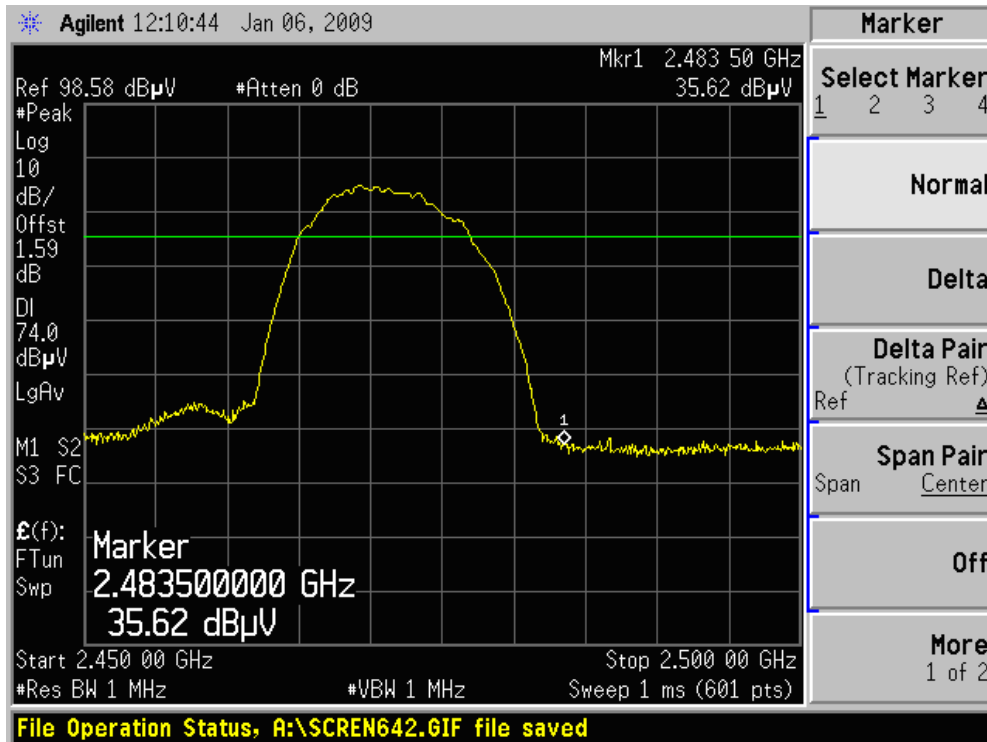
Polarity: Horizontal



Band Edges (802.11b / CH High)

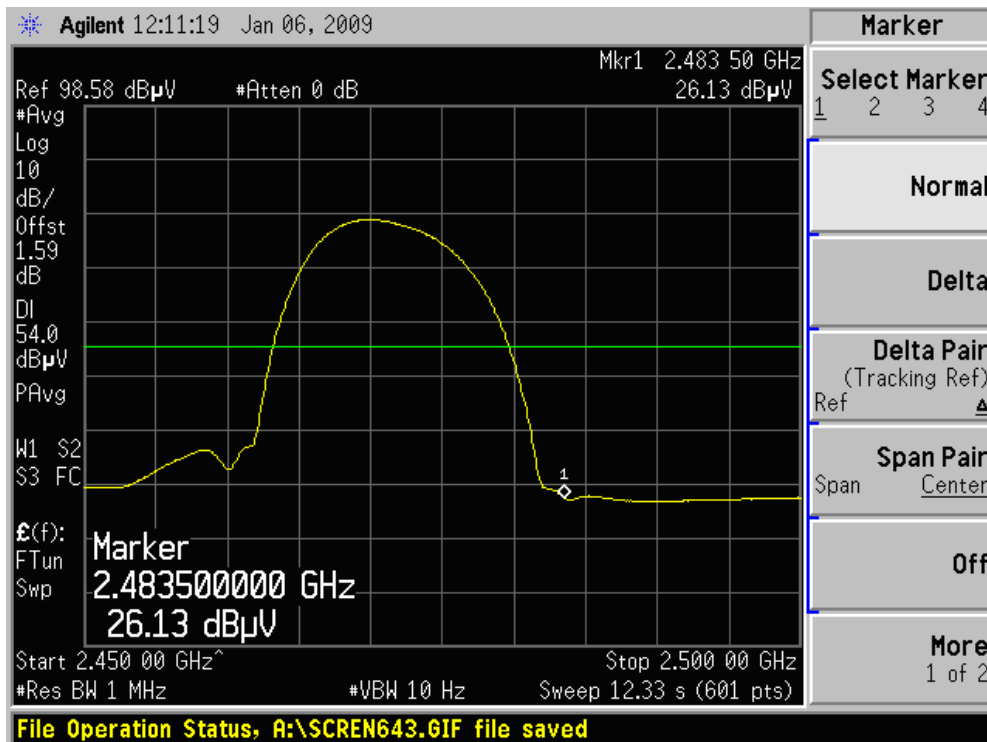
Detector mode: Peak

Polarity: Vertical



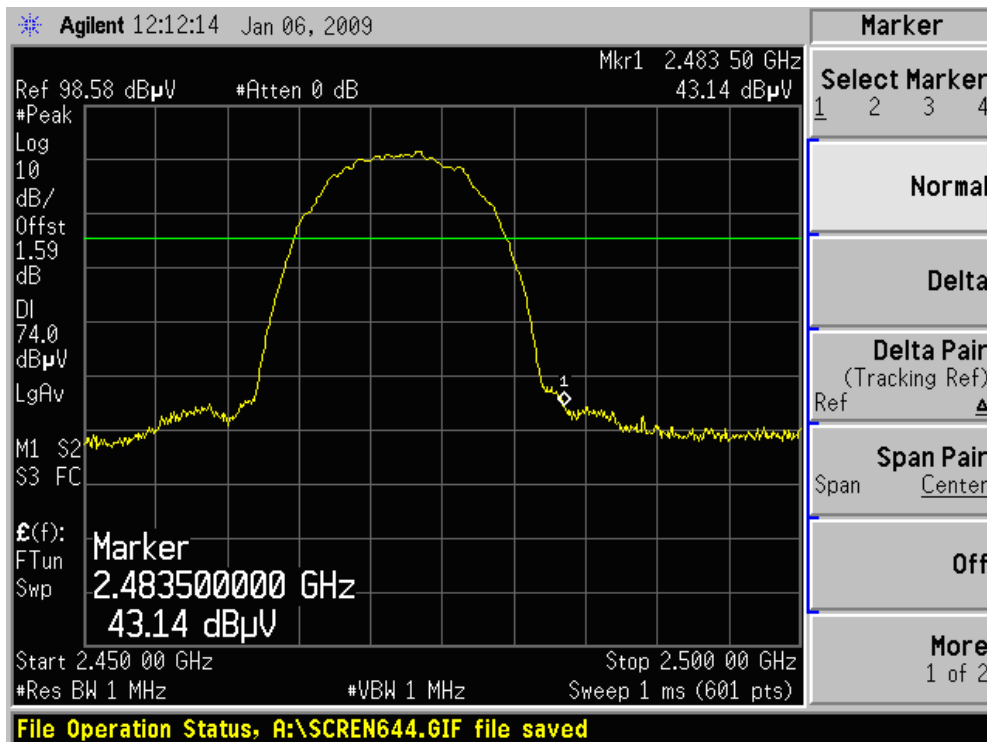
Detector mode: Average

Polarity: Vertical



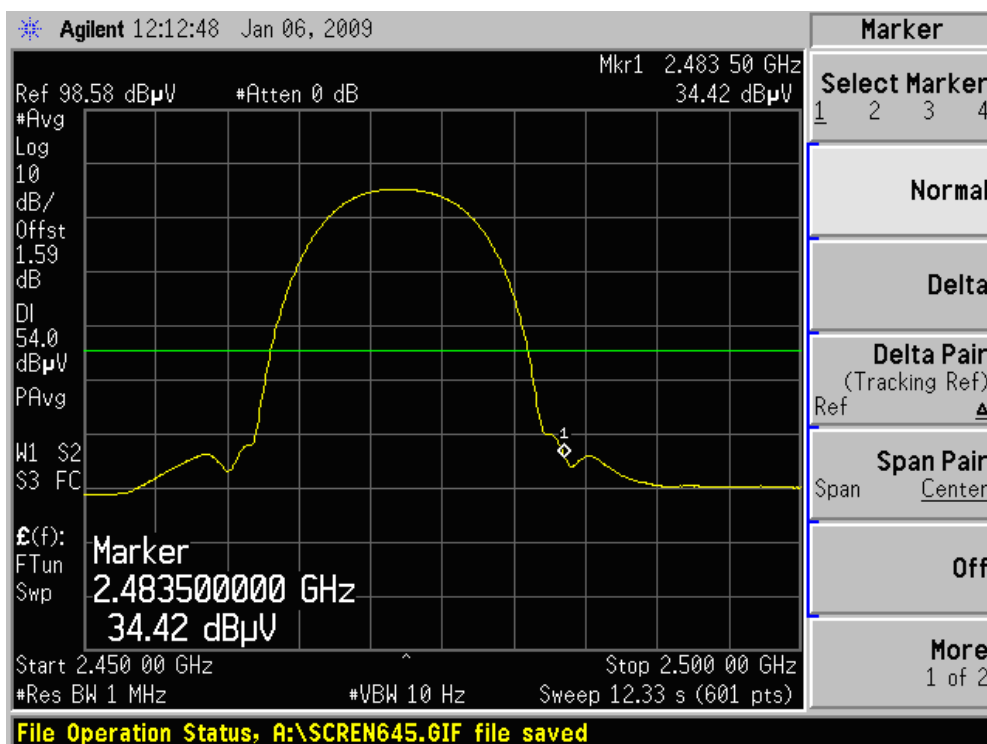
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

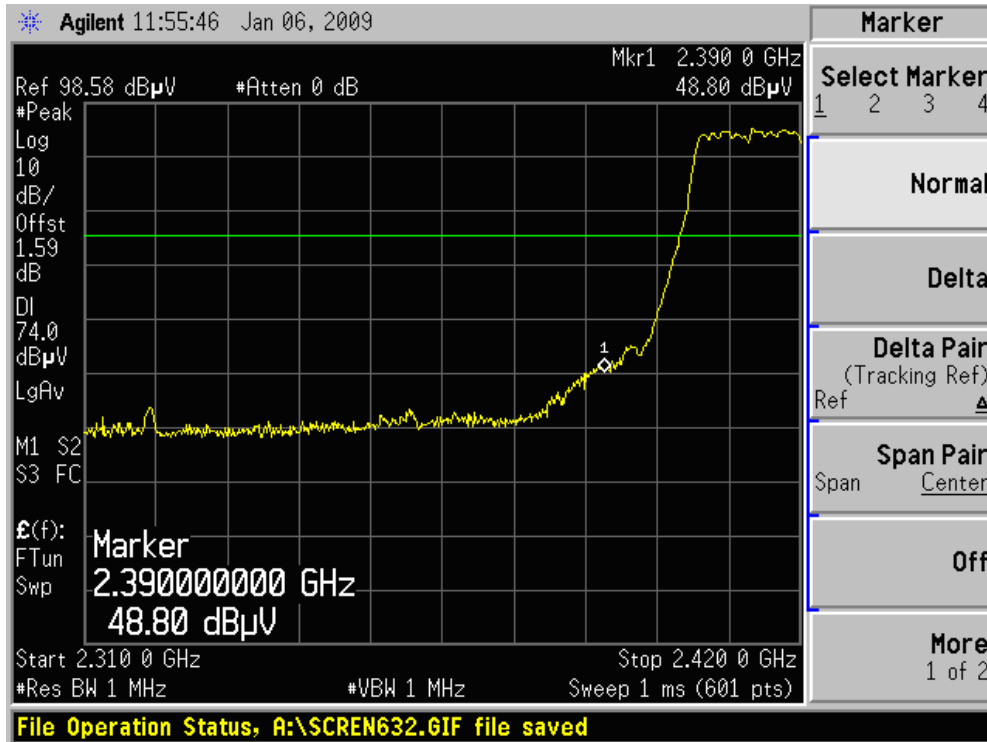
Polarity: Horizontal



Band Edges (802.11g / CH Low)

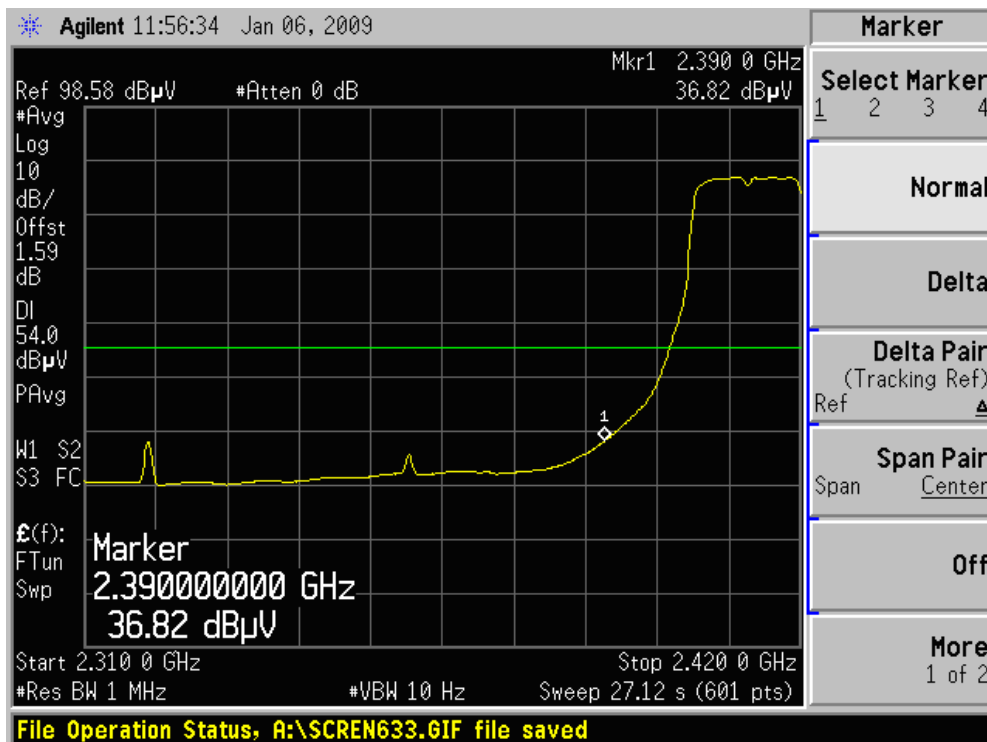
Detector mode: Peak

Polarity: Vertical



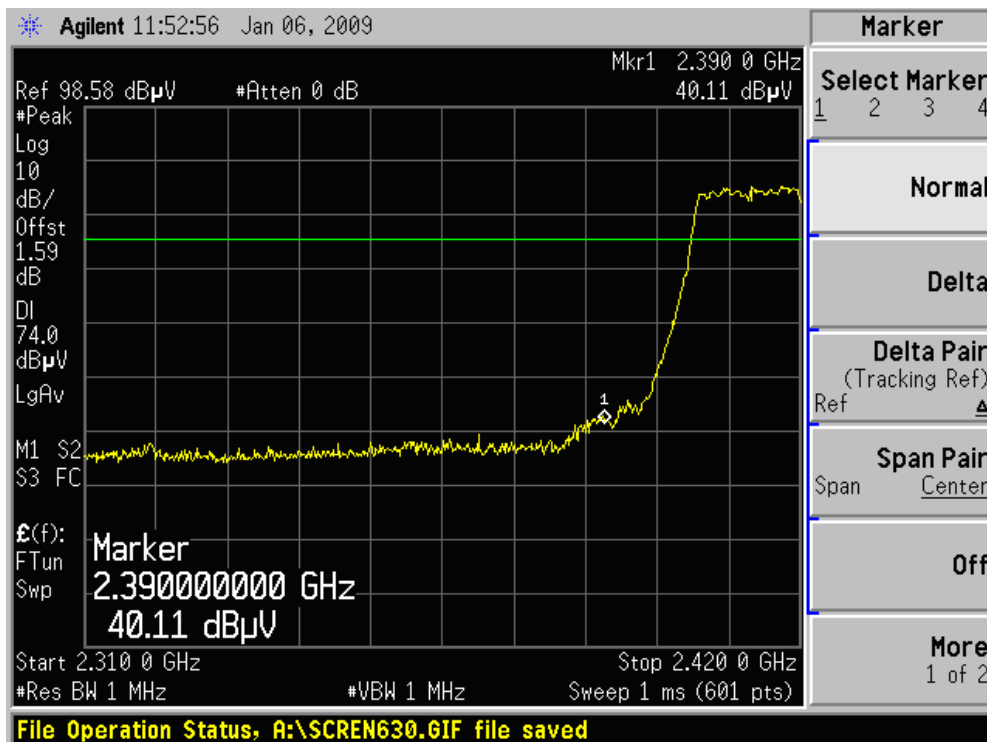
Detector mode: Average

Polarity: Vertical



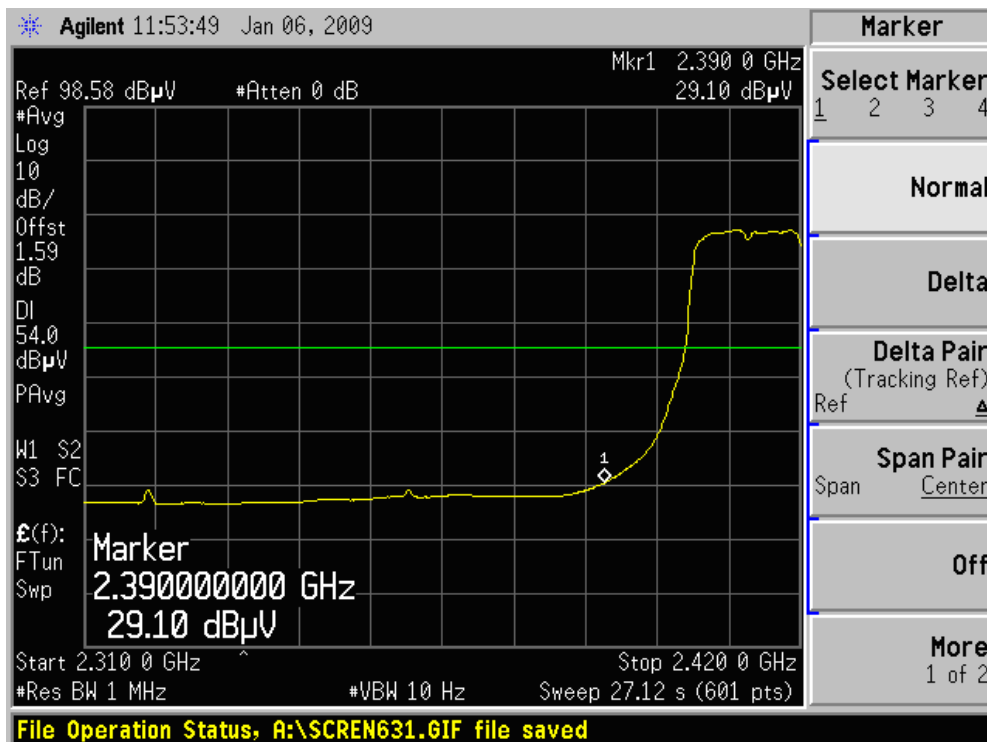
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

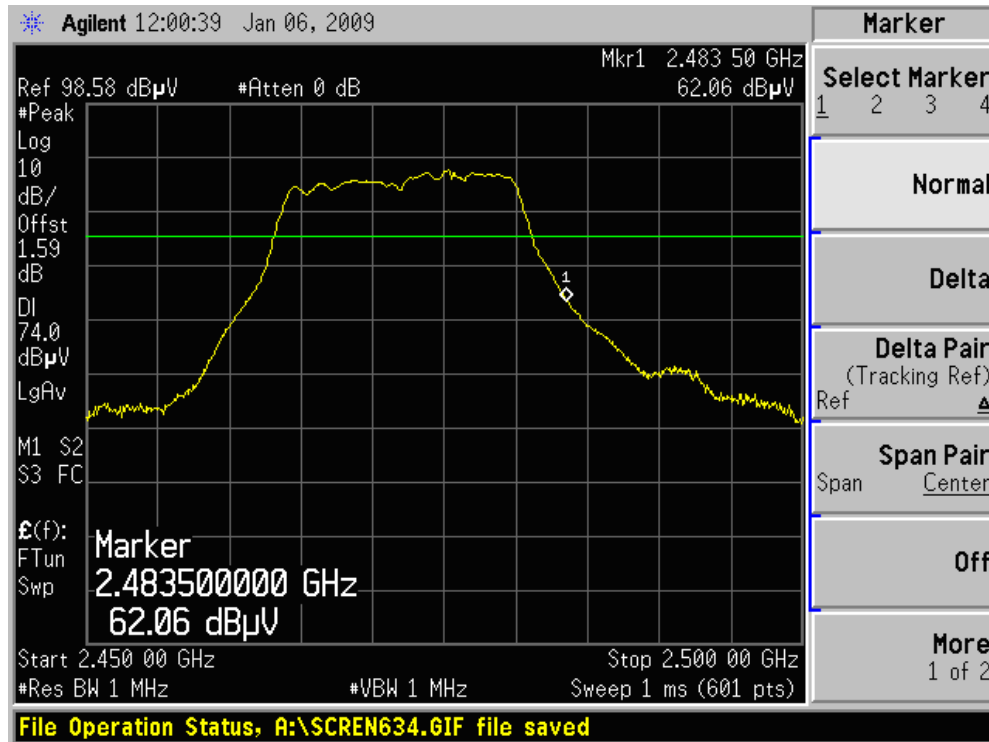
Polarity: Horizontal



Band Edges (802.11g / CH High)

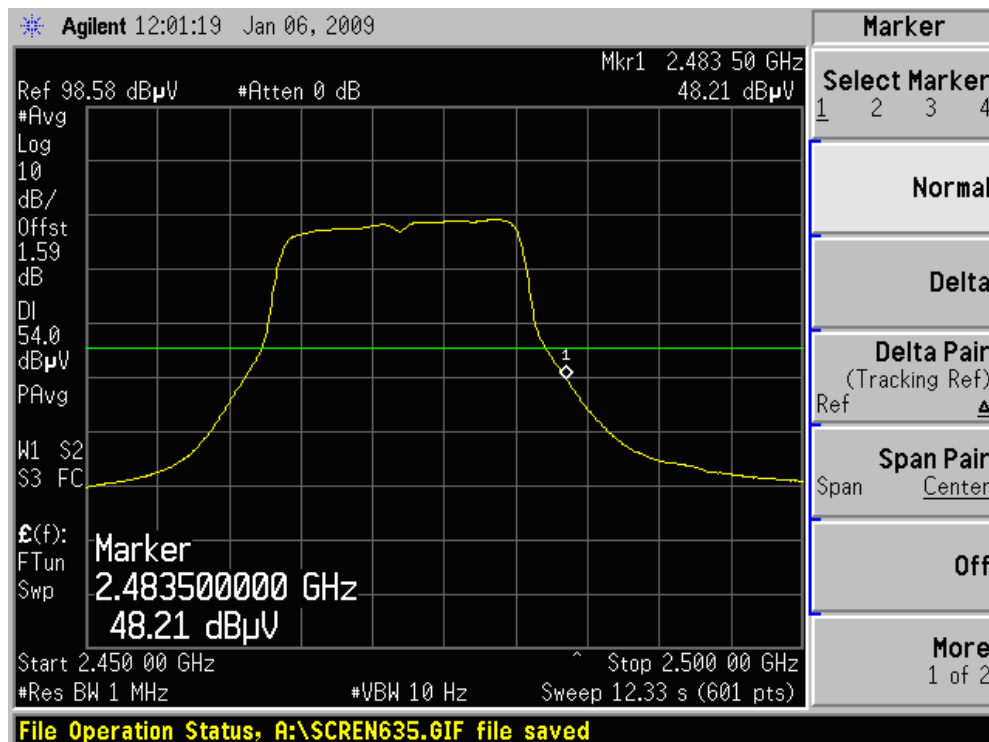
Detector mode: Peak

Polarity: Vertical



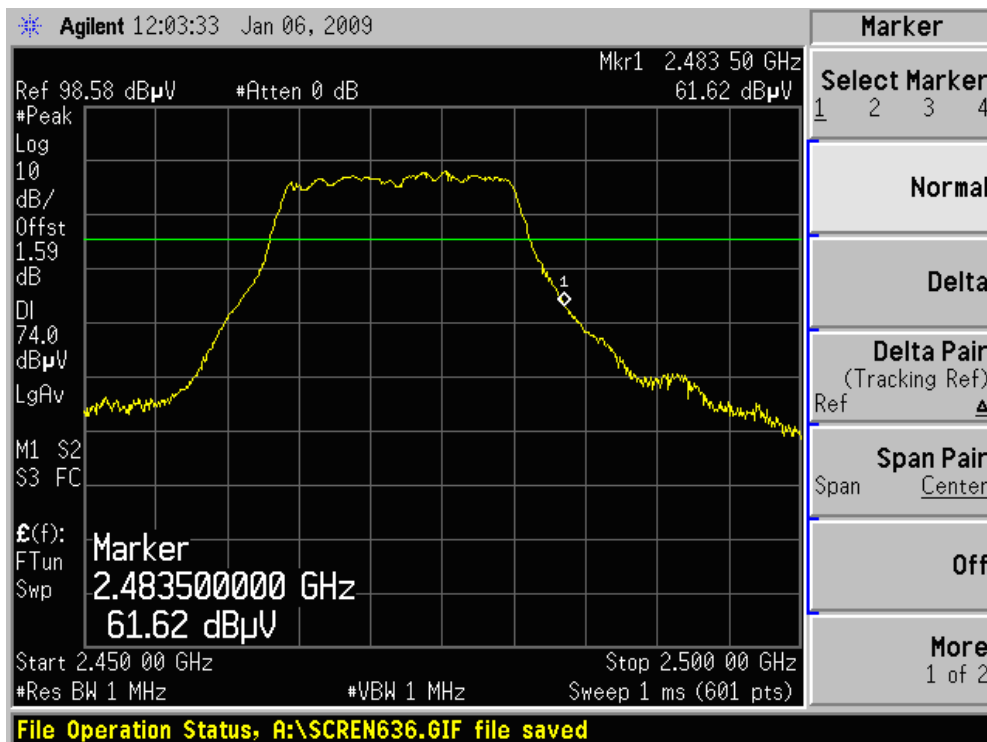
Detector mode: Average

Polarity: Vertical



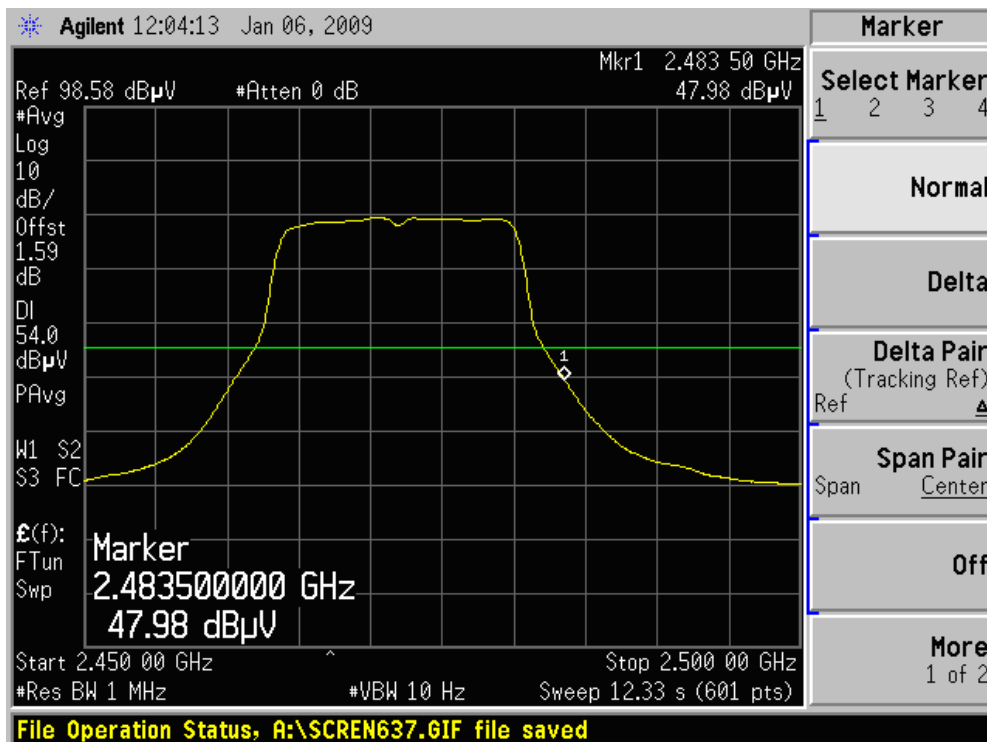
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal



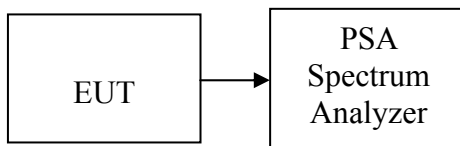
PEAK POWER SPECTRAL DENSITY**LIMIT**

1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/08/2009

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration**TEST PROCEDURE**

1. Place the EUT on the table and set it in transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 300kHz, Sweep=100s
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.



TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b

Channel	Frequency	Reading (dBm)	Factor (dB)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-12.98	2.50	-10.48	8.00	PASS
Mid	2442	-13.17	2.50	-10.67		PASS
High	2472	-15.82	2.50	-13.32		PASS

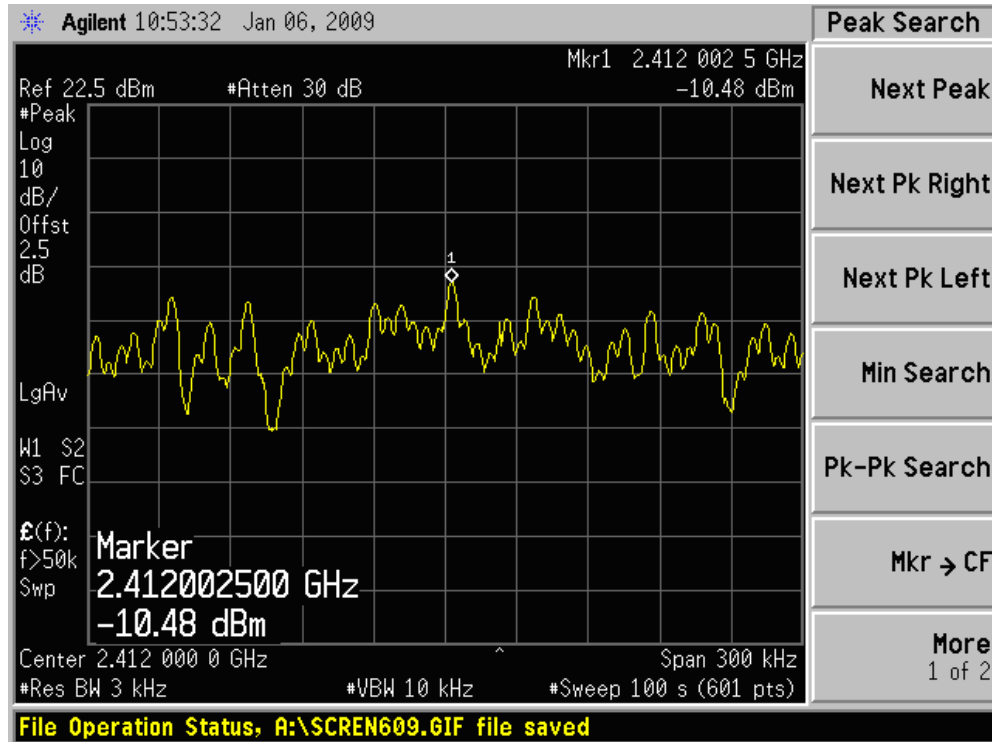
Test mode: IEEE 802.11g

Channel	Frequency	Reading (dBm)	Factor (dB)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-27.79	2.50	-25.29	8.00	PASS
Mid	2442	-28.36	2.50	-25.86		PASS
High	2472	-25.21	2.50	-22.71		PASS

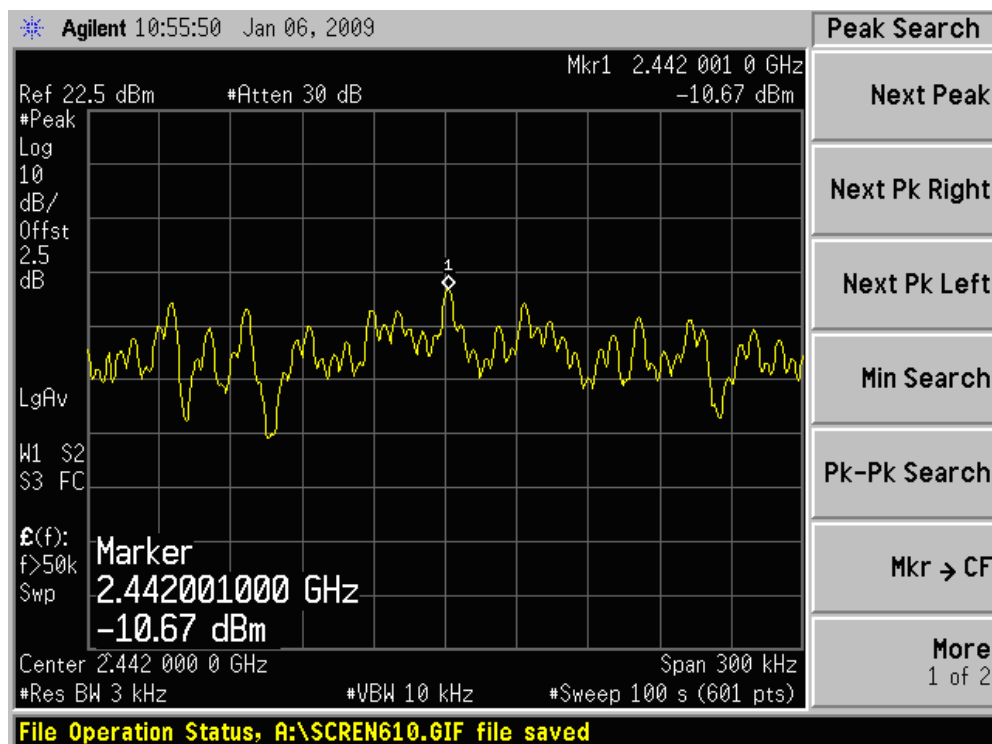
Test Plot

802.11b mode

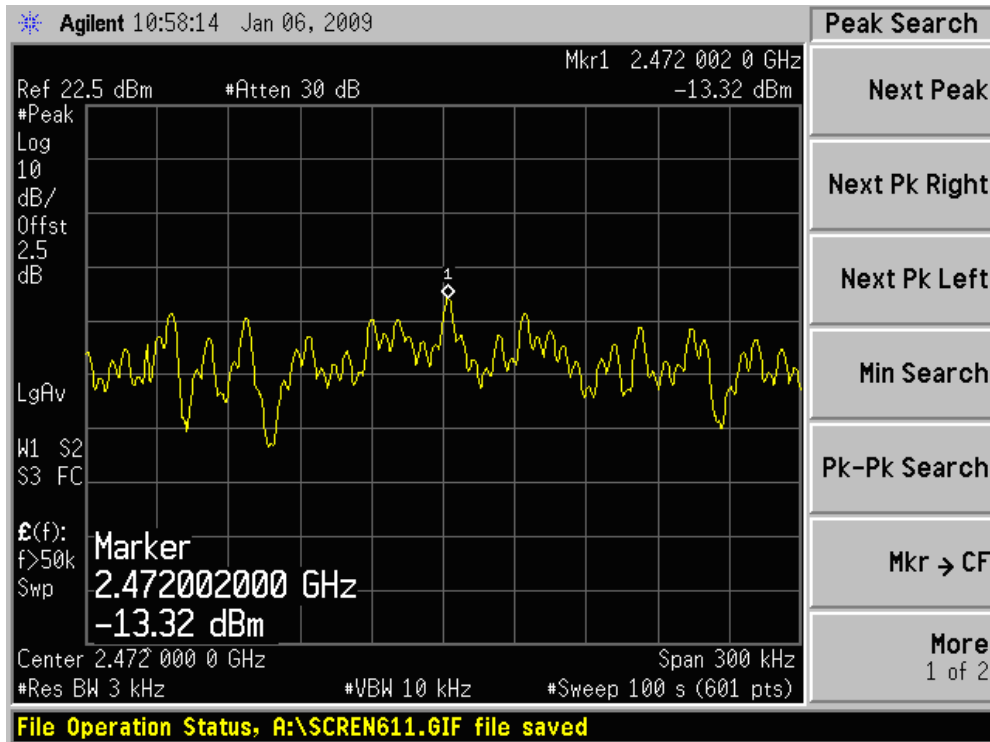
PPSD (CH Low)



PPSD (CH Mid)

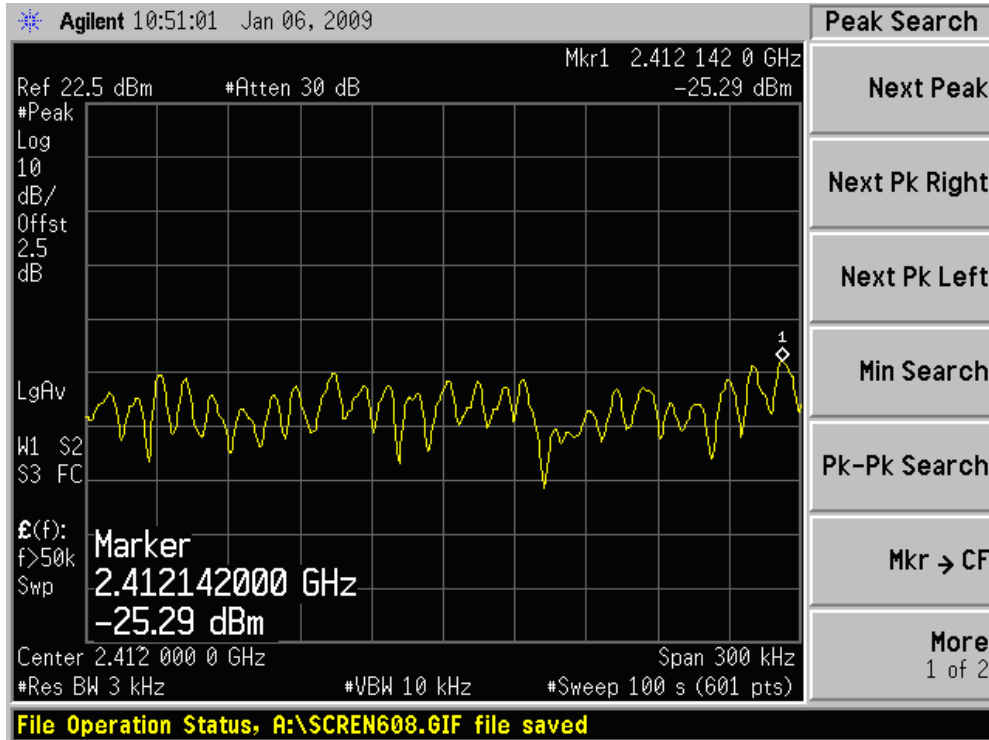


PPSD (CH High)

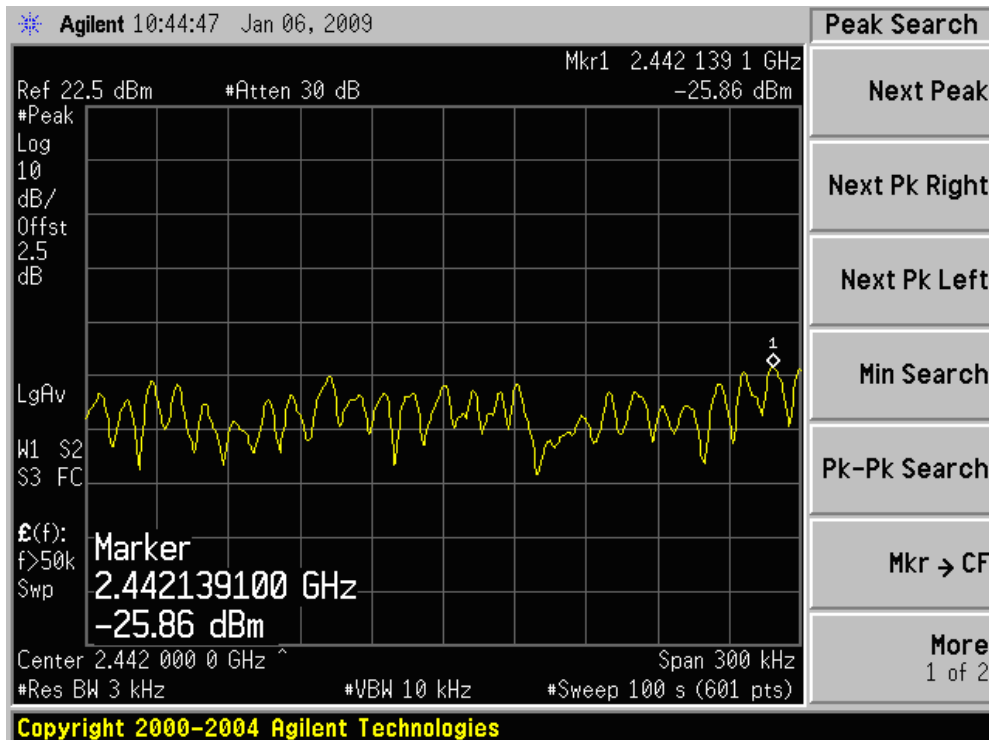


802.11g mode

PPSD (CH Low)

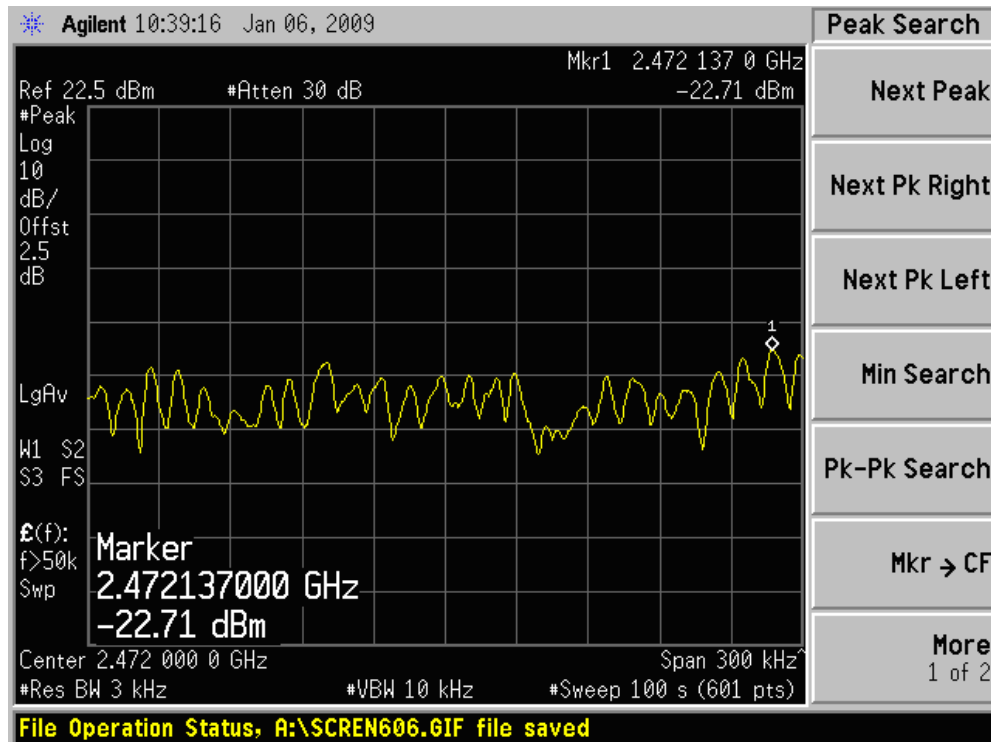


PPSD (CH Mid)





PPSD (CH High)





sPURIOUS eMISSIONS

Conducted Measurement

LIMIT

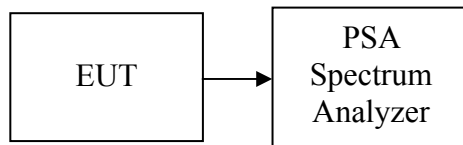
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/08/2009

***Remark:** Each piece of equipment is scheduled for calibration once a year.*

Test Configuration



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 KHz. The video bandwidth is set to 100 KHz.

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

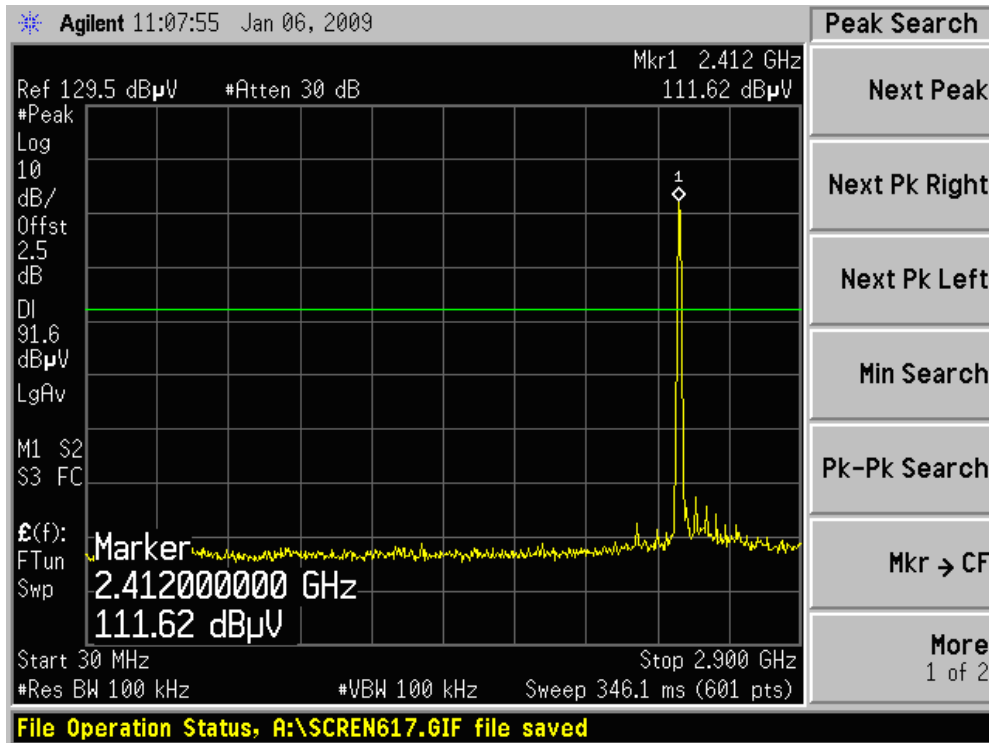
TEST RESULTS

No non-compliance noted

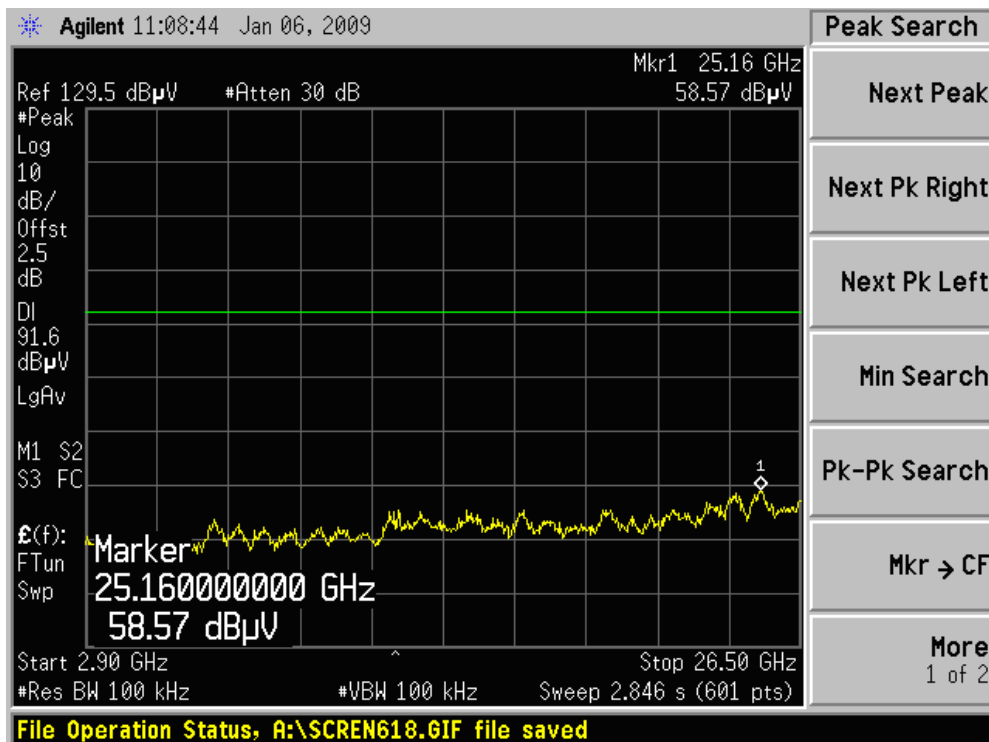
Test Plot

IEEE 802.11b / CH Low

30MHz ~ 2.9GHz

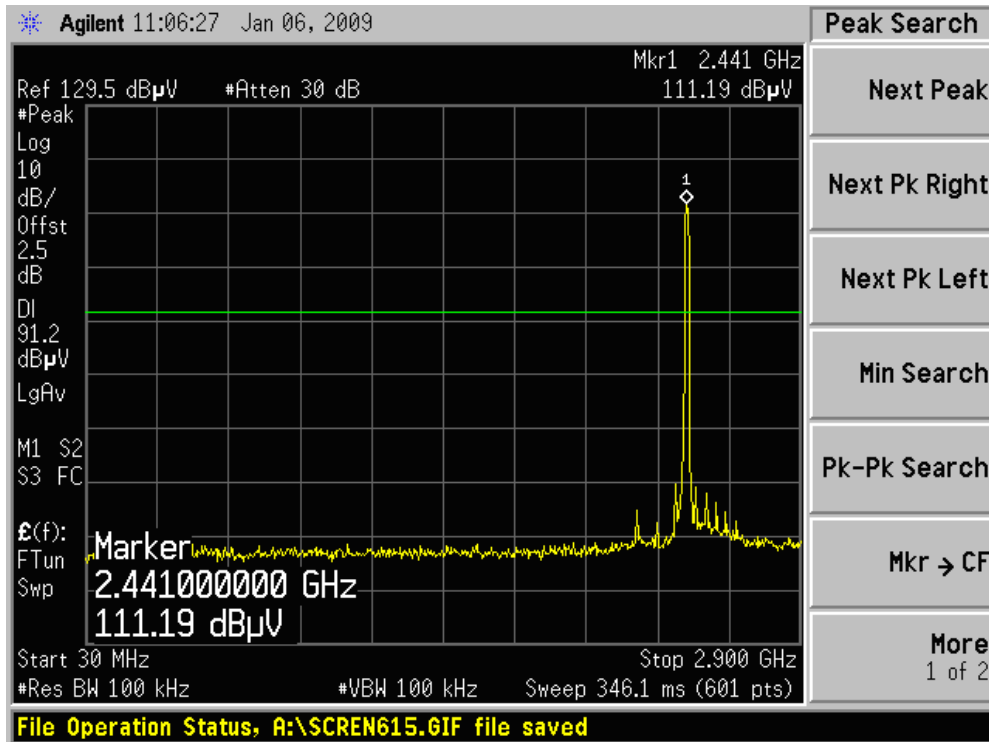


2.9GHz ~ 26.5GHz

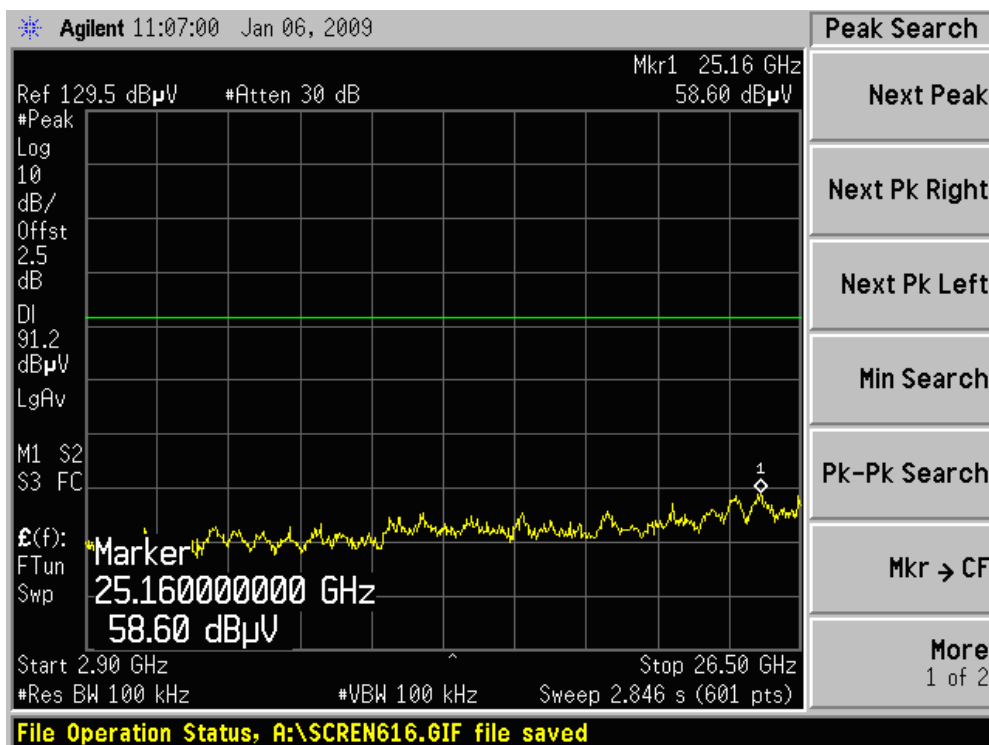


IEEE 802.11b / CH Mid

30MHz ~ 2.9GHz

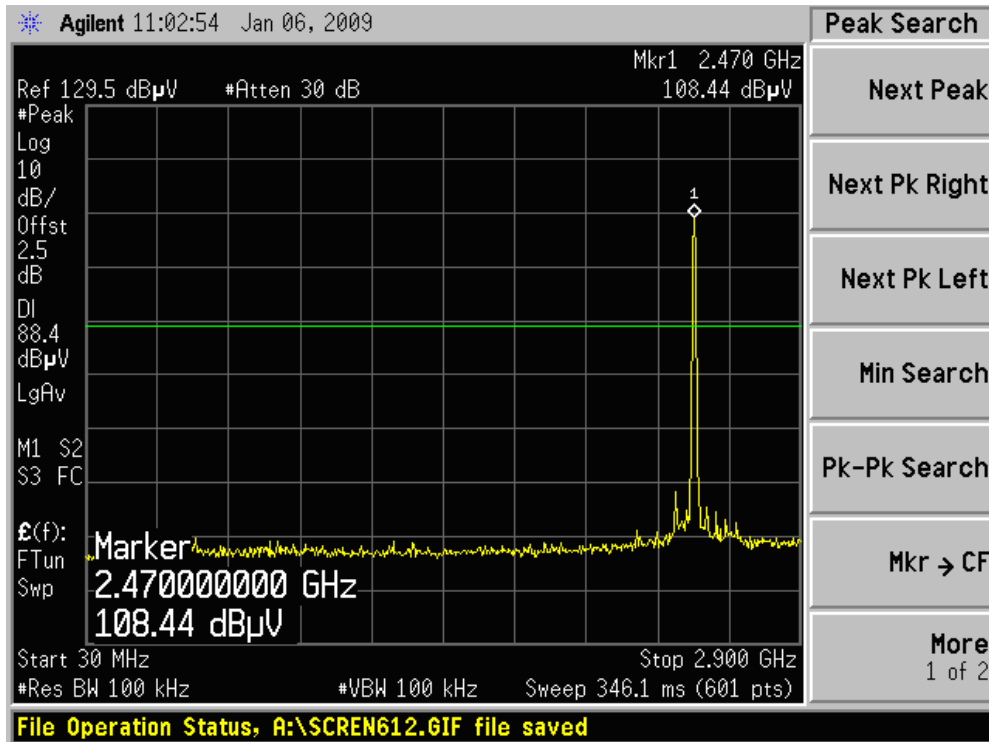


2.9GHz ~ 26.5GHz

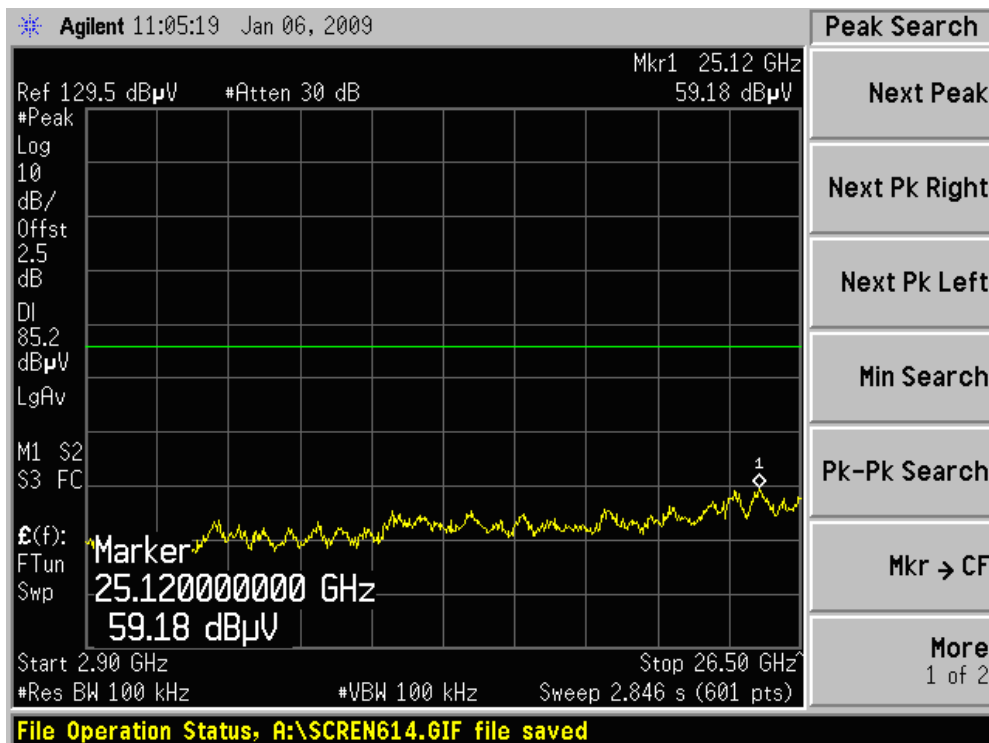


IEEE 802.11b / CH High

30MHz ~ 2.9GHz

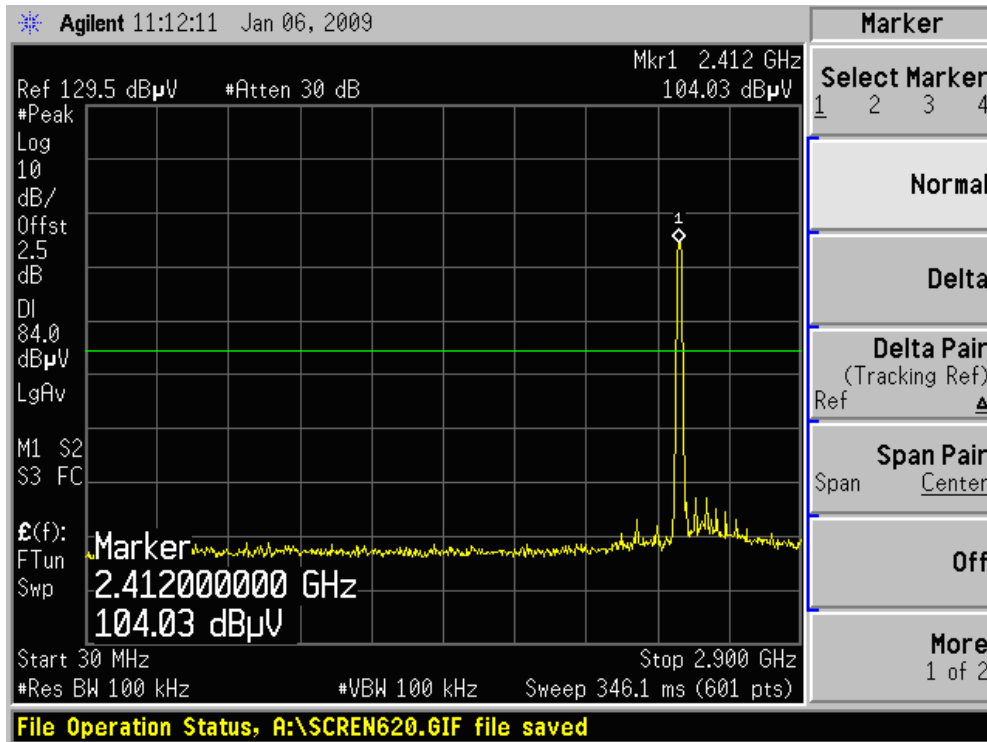


2.9GHz ~ 26.5GHz

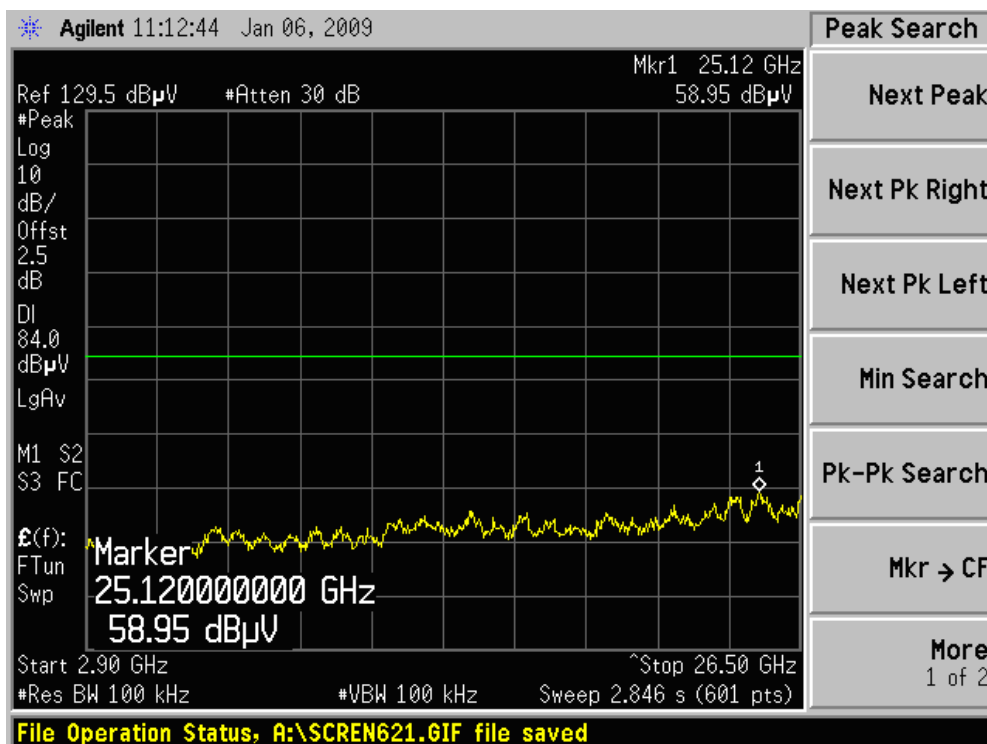


IEEE 802.11g / CH Low

30MHz ~ 2.9GHz

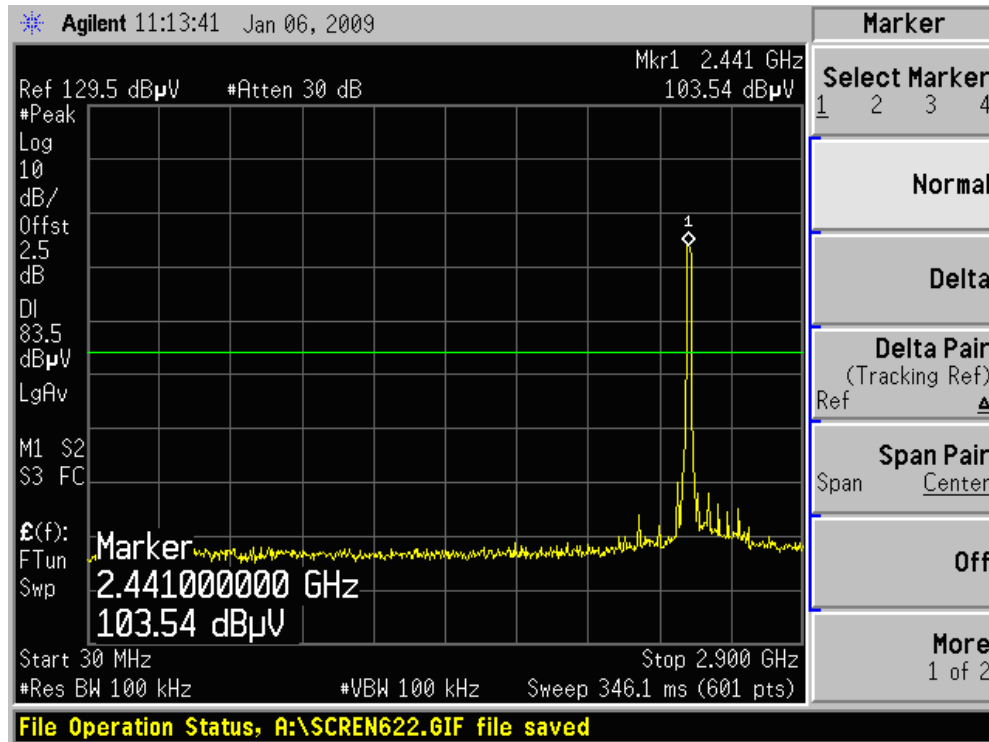


2.9GHz ~ 26.5GHz

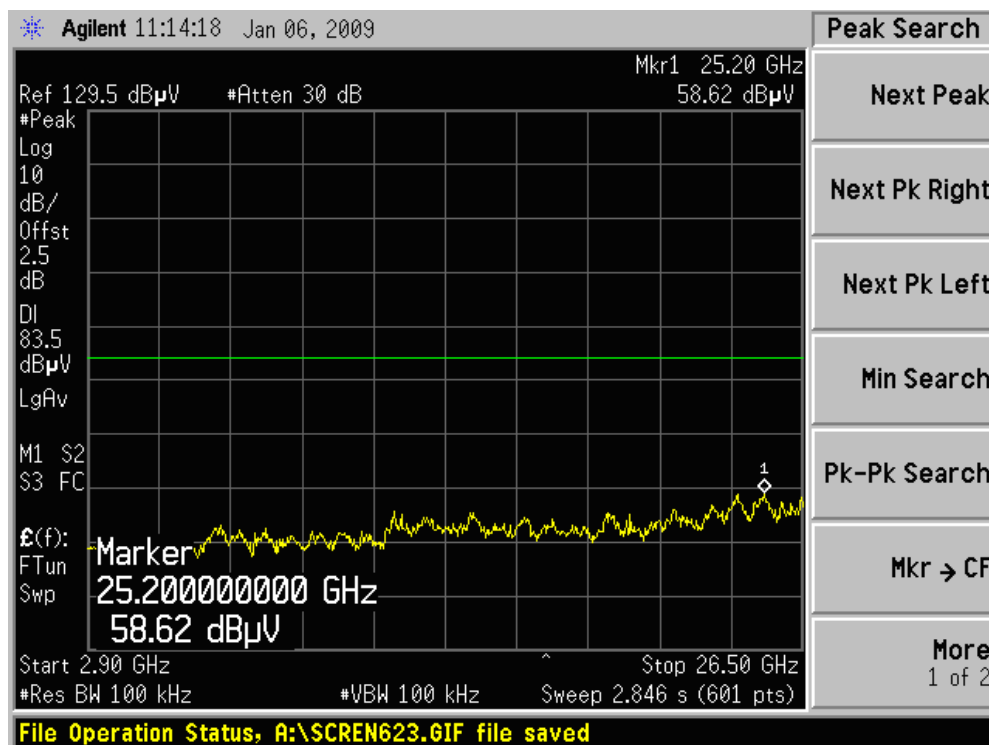


IEEE 802.11g / CH Mid

30MHz ~ 2.9GHz

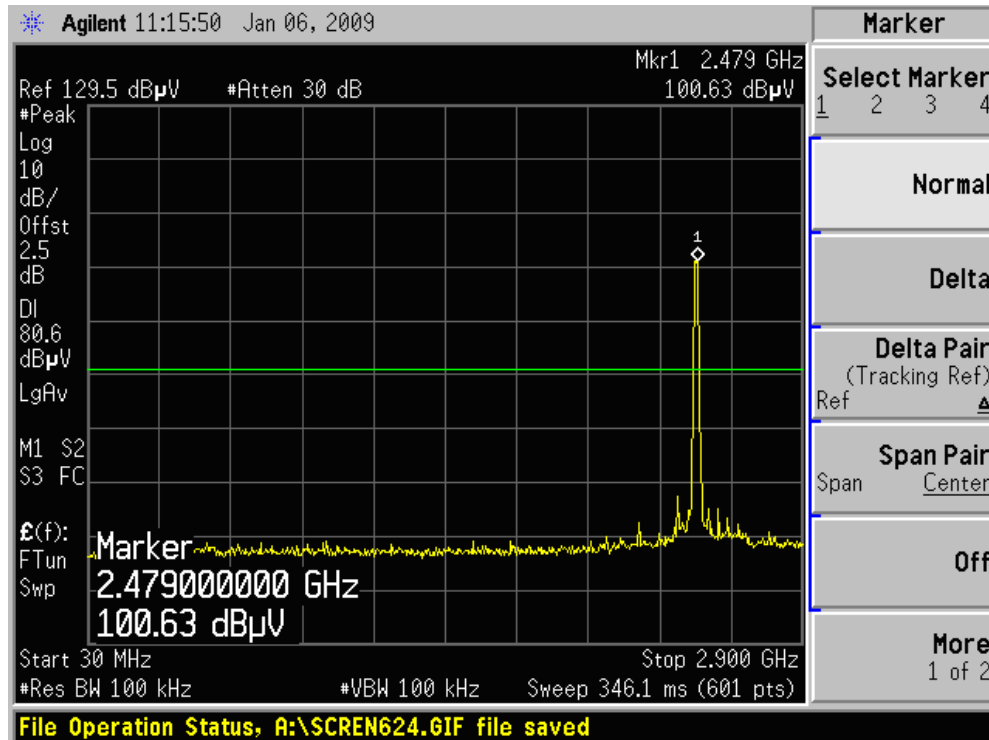


2.9GHz ~ 26.5GHz

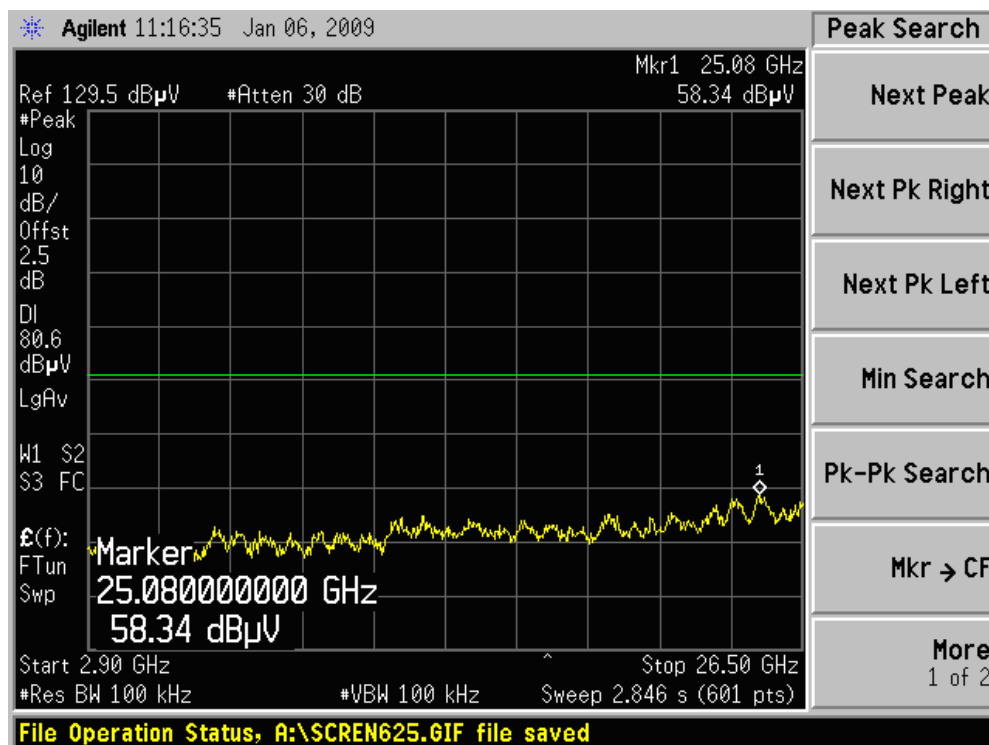


IEEE 802.11g / CH High

30MHz ~ 2.9GHz



2.9GHz ~ 26.5GHz



Radiated Emissions

LIMIT

1. 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 (mV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

***Note:** 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.*

2. In the above emission table, the tighter limit applies at the band edges.

Frequency (Hz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

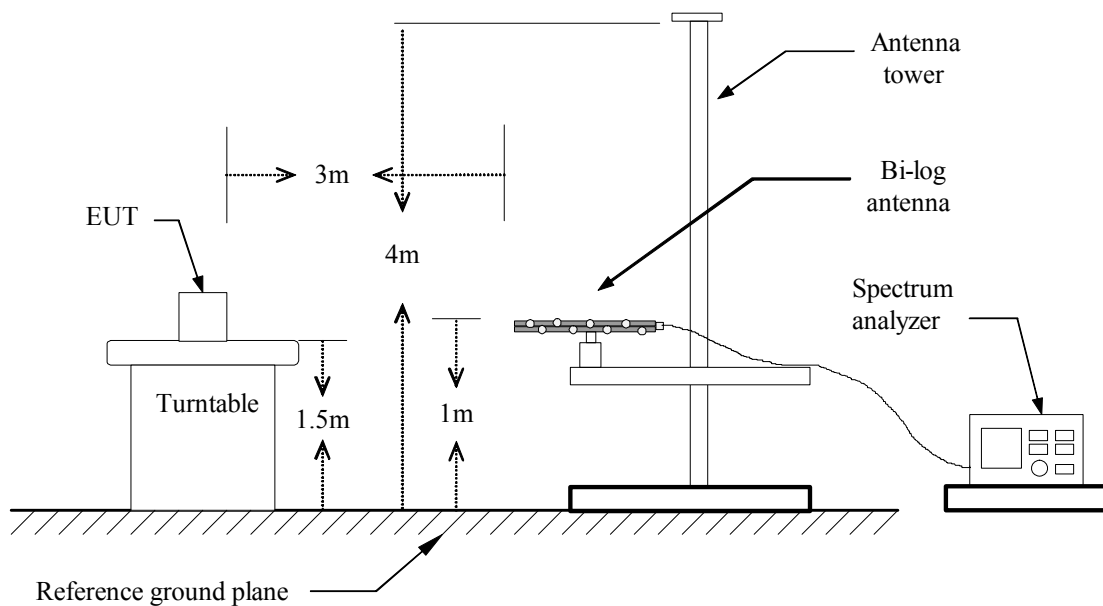
MEASUREMENT EQUIPMENT USED

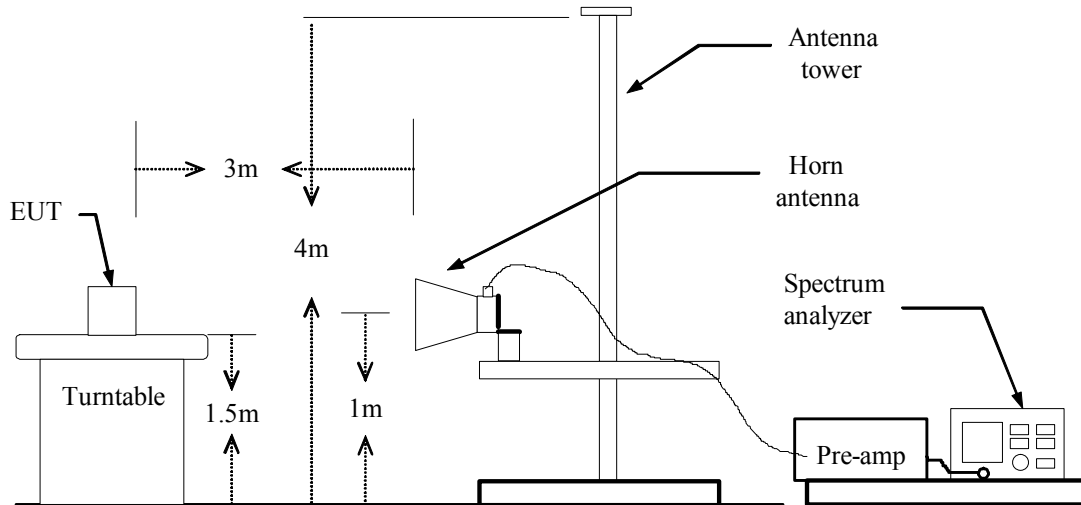
966 CHAMBER				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
PSA Spectrum Analyzer	Agilent	E4446A	US44300399	02/08/2009
EMI Test Receiver	R&S	ESCI	100005	06/23/2009
Pre Amplifier	HP	HP8447E	2945A02715	06/15/2009
Pre Amplifier	Agilent	8449B	N/A	06/04/2009
Bilog Antenna	SUNOL Sciences	JB3	A021907	06/10/2009
Horn Antenna	TRC	N/A	N/A	06/10/2009
Turn Table	CCS	2081-1.21	N/A	N.C.R
Antenna Tower	CT	N/A	N/A	N.C.R
Controller	CCS	N/A	N/A	N.C.R
RF Comm. Test set	HP	8920B	US36142090	N.C.R
Site NSA	C&C	N/A	N/A	06/09/2009

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration

Below 1 GHz



Above 1 GHz**TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.



TEST RESULTS

Below 1 GHz

Operation Mode: TX / IEEE 802.11b / CH Low

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
53.400	V	Q	39.37	-1.32	38.05	40.00	-1.95
65.550	V	Q	38.20	-0.30	37.90	40.00	-2.10
70.950	V	Q	42.92	-4.41	38.51	40.00	-1.49
450.500	V	Q	46.37	-1.84	44.53	46.00	-1.47
500.666	V	Q	43.95	0.17	44.12	46.00	-1.88
720.000	V	Q	42.03	2.53	44.56	46.00	-1.44
176.250	H	Q	52.49	-10.53	41.96	43.50	-1.54
251.400	H	Q	51.12	-6.29	43.83	46.00	-2.17
257.700	H	Q	51.57	-7.27	44.30	46.00	-1.70
459.833	H	Q	40.12	4.15	44.27	46.00	-1.73
500.666	H	Q	43.70	0.57	44.27	46.00	-1.73
720.000	H	Q	48.93	-4.26	44.67	46.00	-1.33

Notes:

- 1. Measuring frequencies from 30 MHz to the 1GHz.*
- 2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.*
- 3. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
- 4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*



ation Mode: TX / IEEE 802.11b / CH Mid

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
70.050	V	Q	41.35	-3.60	37.75	40.00	-2.25
250.500	V	Q	50.71	-6.60	44.11	46.00	-1.89
286.500	V	Q	55.06	-10.84	44.22	46.00	-1.78
433.000	V	Q	48.29	-3.85	44.44	46.00	-1.56
499.500	V	Q	44.05	0.19	44.24	46.00	-1.76
624.333	V	Q	45.72	-0.38	44.34	46.00	-1.66
183.450	H	Q	41.97	-9.79	42.18	43.50	-1.32
259.500	H	Q	51.56	-7.71	43.85	46.00	-2.15
280.200	H	Q	51.20	-7.07	44.13	46.00	-1.87
431.833	H	Q	51.81	-7.14	44.67	46.00	-1.33
498.333	H	Q	44.40	0.21	44.61	46.00	-1.39
720.000	H	Q	48.15	-4.26	43.89	46.00	-2.11

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



Operation Mode: TX / IEEE 802.11b / CH High

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
70.050	V	Q	41.98	-3.60	38.38	40.00	-1.62
149.700	V	Q	49.76	-7.86	41.90	43.50	-1.60
286.500	V	Q	54.63	-10.84	43.79	46.00	-2.21
501.833	V	Q	43.62	0.41	39.03	46.00	-1.97
624.333	V	Q	45.08	-0.38	44.70	46.00	-1.30
720.000	V	Q	41.49	2.53	44.02	46.00	-1.98
64.200	H	Q	38.79	-0.72	38.07	40.00	-1.93
257.250	H	Q	51.77	-7.16	44.61	46.00	-1.39
279.750	H	Q	51.70	-7.11	44.59	46.00	-1.41
459.833	H	Q	40.28	4.15	44.43	46.00	-1.57
500.666	H	Q	43.84	0.57	44.41	46.00	-1.59
720.000	H	Q	48.48	-4.26	44.22	46.00	-1.78

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



Operation Mode: TX / IEEE 802.11g / CH Low

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
52.950	V	Q	39.18	-0.94	38.24	40.00	-1.76
65.550	V	Q	39.00	-0.30	38.70	40.00	-1.30
250.500	V	Q	51.25	-6.60	44.65	46.00	-1.35
498.333	V	Q	45.99	0.56	44.55	46.00	-1.45
624.333	V	Q	45.12	-0.38	44.74	46.00	-1.26
720.000	V	Q	41.23	2.53	43.76	46.00	-2.24
65.100	H	Q	38.64	-0.20	38.44	40.00	-1.56
184.350	H	Q	51.50	-9.60	41.90	43.50	-1.60
261.300	H	Q	52.75	-8.09	44.66	46.00	-1.34
624.333	H	Q	54.15	-10.20	43.95	46.00	-2.05
720.000	H	Q	48.85	-4.26	44.59	46.00	-1.41
815.666	H	Q	50.63	-6.42	44.21	46.00	-1.79

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



Operation Mode: TX / IEEE 802.11g / CH Mid

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
69.600	V	Q	41.66	-3.27	38.39	40.00	-1.61
70.950	V	Q	42.94	-4.41	38.53	40.00	-1.47
286.500	V	Q	54.66	-10.84	43.82	46.00	-2.18
450.500	V	Q	45.88	-1.84	44.04	46.00	-1.96
498.333	V	Q	43.80	0.56	44.36	46.00	-1.64
720.000	V	Q	41.24	2.53	43.77	46.00	-2.23
189.750	H	Q	51.00	-8.87	27.13	43.50	-1.37
255.450	H	Q	50.70	-6.73	43.97	46.00	-2.03
277.950	H	Q	43.32	-8.52	44.80	46.00	-1.20
459.833	H	Q	39.84	4.15	43.99	46.00	-2.01
499.500	H	Q	43.43	0.70	44.13	46.00	-1.87
720.000	H	Q	48.57	-4.26	44.31	46.00	-1.69

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



Operation Mode: TX / IEEE 802.11g / CH High

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
65.550	V	Q	38.85	-0.30	38.55	40.00	-1.45
80.400	V	Q	45.50	-7.12	38.38	40.00	-1.62
286.500	V	Q	54.91	-10.84	44.07	46.00	-1.93
499.500	V	Q	44.27	0.19	44.46	46.00	-1.54
624.333	V	Q	44.64	-0.38	44.26	46.00	-1.74
720.000	V	Q	41.93	2.53	44.46	46.00	-1.54
187.950	H	Q	50.66	-9.09	41.57	43.50	-1.93
258.150	H	Q	53.02	-7.38	44.64	46.00	-1.36
279.300	H	Q	52.30	-7.46	44.84	46.00	-1.16
459.833	H	Q	39.79	4.15	43.94	46.00	-2.06
500.666	H	Q	43.38	0.57	43.95	46.00	-2.05
720.000	H	Q	48.46	-4.26	44.20	46.00	-1.80

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



Above 1 GHz

Operation Mode: TX / IEEE 802.11b / CH Low

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2240.00	V	38.37	---	0.65	39.02	---	74.00	54.00	-14.98	Peak
3375.00	V	35.63	---	1.48	37.11	---	74.00	54.00	-16.89	Peak
4825.00	V	37.77	---	6.16	43.93	---	74.00	54.00	-10.07	Peak
N/A										
1330.00	H	34.54	---	-2.39	32.15	---	74.00	54.00	-21.85	Peak
2520.00	H	32.74	---	0.77	33.51	---	74.00	54.00	-20.49	Peak
4825.00	H	32.69	---	6.16	38.85	---	74.00	54.00	-15.15	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11b / CH Mid

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1333.33	V	37.28	---	-2.40	34.88	---	74.00	54.00	-19.12	Peak
2240.00	V	36.24	---	0.65	36.89	---	74.00	54.00	-17.11	Peak
4875.00	V	34.81	---	6.67	41.48	---	74.00	54.00	-12.52	Peak
N/A										
1336.66	H	34.31	---	-2.41	31.90	---	74.00	54.00	-22.10	Peak
2576.66	H	31.28	---	0.38	31.66	---	74.00	54.00	-22.34	Peak
4725.00	H	30.75	---	5.92	36.67	---	74.00	54.00	-17.33	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11b / CH High

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1330.00	V	38.83	---	-2.39	36.44	---	74.00	54.00	-17.56	Peak
2240.00	V	34.37	---	0.65	35.02	---	74.00	54.00	-18.98	Peak
4625.00	V	30.86	---	5.94	36.80	---	74.00	54.00	-17.20	Peak
N/A										
1336.66	H	33.99	---	-2.41	31.58	---	74.00	54.00	-22.42	Peak
2290.00	H	31.43	---	0.94	32.37	---	74.00	54.00	-21.63	Peak
4641.66	H	31.72	---	5.93	37.65	---	74.00	54.00	-16.35	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11g / CH Low

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1173.33	V	34.73	---	-2.12	32.61	---	74.00	54.00	-21.39	Peak
1330.00	V	37.12	---	-2.39	34.73	---	74.00	54.00	-19.27	Peak
4583.33	V	31.02	---	5.91	36.93	---	74.00	54.00	-17.07	Peak
N/A										
1333.33	H	36.75	---	-2.40	34.35	---	74.00	54.00	-19.65	Peak
2076.66	H	31.32	---	0.35	31.67	---	74.00	54.00	-22.33	Peak
4583.33	H	31.26	---	5.91	37.17	---	74.00	54.00	-16.83	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11g / CH Mid

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1993.33	V	30.85	---	0.28	31.13	---	74.00	54.00	-22.87	Peak
2560.00	V	34.74	---	0.49	35.23	---	74.00	54.00	-18.77	Peak
4850.00	V	31.89	---	6.42	38.31	---	74.00	54.00	-15.69	Peak
N/A										
1333.33	H	36.75	---	-2.40	34.35	---	74.00	54.00	-19.65	Peak
2076.66	H	31.32	---	0.35	31.67	---	74.00	54.00	-22.33	Peak
4583.33	H	31.26	---	5.91	37.17	---	74.00	54.00	-16.83	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



Operation Mode: TX / IEEE 802.11g / CH High

Test Date: January 06,2009

Temperature: 20°C

Tested by: Cheney

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1330.00	V	36.93	---	-2.39	34.54	---	74.00	54.00	-19.46	Peak
2293.33	V	30.91	---	0.96	31.87	---	74.00	54.00	-22.13	Peak
4833.33	V	30.77	---	6.25	37.02	---	74.00	54.00	-16.98	Peak
N/A										
1336.66	H	32.95	---	-2.41	30.54	---	74.00	54.00	-23.46	Peak
1970.00	H	30.82	---	0.16	30.98	---	74.00	54.00	-23.02	Peak
4716.66	H	31.27	---	5.92	37.19	---	74.00	54.00	-16.81	Peak
N/A										

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.

POWERLINE CONDUCTED EMISSIONS**LIMIT**

For an intentional radiator which 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 250 microvolts (The limit decreases Linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

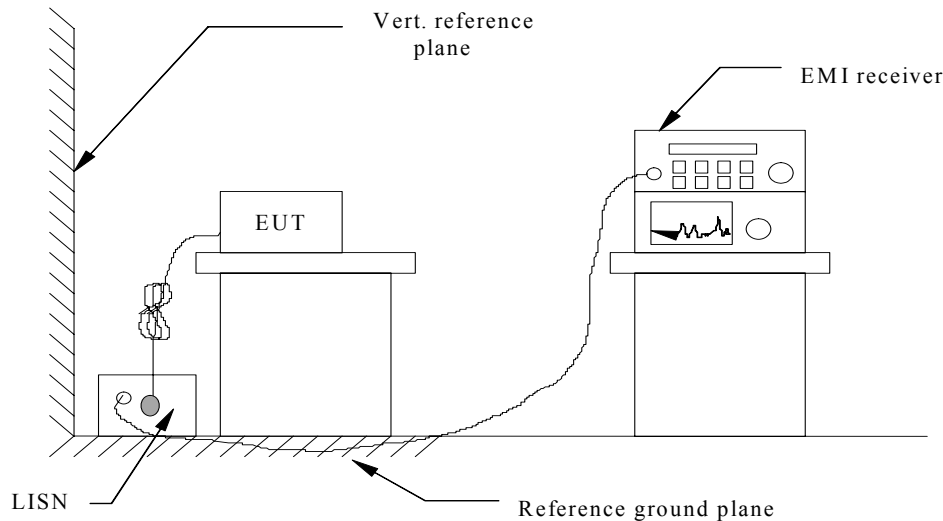
Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power Line (LINE and NEUTRAL) and ground at the power terminals.

MEASUREMENT EQUIPMENT USED

Conducted Emission Test Site Shielding Room 743				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCI	100005	06/23/2009
LISN	AFJ	LS16	16010222119	04/02/2009
LISN	Meestec	AN3016	04/10040	04/02/2009

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.



Test Data

Test Mode: Normal link	Location: Shielding Room 743
Model Name: PWS700B	Test Date: January 07, 2009
Tested by: Cheney	Test Results: Passed

Note: The chart above shows the highest readings taken from the final data.

FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.164	56.31	45.63	18.40	65.58	55.58	-19.95	-37.18	L1
0.257	44.86	---	---	62.93	52.93	---	-8.07	L1
0.372	41.32	---	---	59.64	49.64	---	-8.32	L1
0.554	39.13	---	---	56.00	46.00	---	-6.87	L1
4.188	42.26	---	---	56.00	46.00	---	-3.74	L1
15.683	43.38	---	---	60.00	50.00	---	-6.62	L1
0.213	47.19	---	---	64.20	54.20	---	-7.01	L2
0.976	33.03	---	---	56.00	46.00	---	-12.97	L2
1.710	34.89	---	---	56.00	46.00	---	-11.11	L2
4.052	37.17	---	---	56.00	46.00	---	-8.83	L2
15.683	35.30	---	---	60.00	50.00	---	-14.70	L2
17.895	38.83	---	---	60.00	50.00	---	-11.17	L2

Remark:

1. The measuring frequencies range between 0.15 MHz and 30 MHz.
2. The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.
3. “---” denotes the emission level was or more than 2dB below the Average limit, and no re-check was made.
4. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10KHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz.
5. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)



Note:

Freq. = Emission frequency in KHz

Factor (dB) = cable loss + Insertion loss of LISN+ Insertion loss of TRANSIENT LIMITER (The TRANSIENT LIMITER included 10 dB ATTENUATION)

Amptd dBuV = Uncorrected Analyzer/Receiver reading + cable loss + Insertion loss of LISN+ Insertion loss of TRANSIENT LIMITER,

if it > 0.5 dB

Limit dBuV = Limit stated in standard

Margin dB = Reading in reference to limit

Calculation Formula

Margin (dB) = *Amptd (dBuV)* – *Limit (dBuV)*

Common Mode Conducted Emission

Not applicable



RADIO FREQUENCY EXPOSURE

LIMIT

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 levels in excess of the Commission's guidelines. See §15.247(b)(4) and §1.1307(b)(1) of this chapter.

EUT Specification

EUT	UMPC
Frequency band (Operating)	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz <input type="checkbox"/> Others _____
Device category	<input checked="" type="checkbox"/> Portable (<20cm separation) <input type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others _____
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure ($S = 5mW/cm^2$) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure ($S = 1mW/cm^2$)
Antenna diversity	<input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input checked="" type="checkbox"/> Tx/Rx diversity
Max. output power	13.11 dBm (216.77mW)
Antenna gain (Max)	2dBi (Numeric gain: 1.58)
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

Note:

1. The maximum output power is 13.11 dBm (20.46mW) at 2442MHz (with 1.58 numeric antenna gain.)
2. For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be lesser.

TEST RESULT

No non-compliance noted.

Calculation

Given $E = \sqrt{\frac{30 \times P \times G}{d}}$ & $S = \frac{E^2}{3770}$

Where E = Field Strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$d = \sqrt{\frac{30 \times P \times G}{3770 \times S}}$$

Changing to units of mW and cm, using:

$$P (mW) = P (W) / 1000 \text{ and}$$

$$d (cm) = 100 * d (m)$$

Yields

$$d = 100 \times \sqrt{\frac{30 \times (P / 1000) \times G}{3770 \times S}} = 0.282 \times \sqrt{\frac{P \times G}{S}}$$

Where d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW / cm²

Substituting the logarithmic form of power and gain using:

$$P (mW) = 10^{(P (dBm) / 10)} \text{ and}$$

$$G (\text{numeric}) = 10^{(G (dBi) / 10)}$$

Yields

$$d = 0.282 \times \frac{10^{(P+G)/20}}{\sqrt{20}}$$

Equation 1

Where d = MPE safe distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW / cm²

Maximum Permissible Exposure (2.4 GHz Band)

S = Maximum power density (mW/cm²)

P = Power input to the antenna (mW). = 20.46



G = Numeric power gain of the antenna = 1.58

R = Distance to the center of the radiation of the antenna (20cm = limit for MPE) = 0.02^2

The maximum permissible exposure (MPE) for the general population is 1.00 mW/cm^2 .

$$(20.46 * 1.58) / (4\pi * 0.02^2) = 0.0128 \text{ mW/cm}^2$$

The power density at 20cm does not exceed the 1 mW/cm^2 limit. Therefore, the exposure condition is compliant with FCC rules.