



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

2-Spindle Tablet PC

Model: TA6

Trade Name: Gateway

Issued to

Quanta Computer Inc.

**No. 188, Wen Hwa 2nd RD., Kuei Shan Hsiang,
Taoyuan Hsien, Taiwan, R.O.C.**

Issued by

Compliance Certification Services Inc.

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1. TEST RESULT CERTIFICATION

Applicant: Quanta Computer Inc.
No. 188, Wen Hwa 2nd RD., Kuei Shan Hsiang,
Taoyuan Hsien, Taiwan, R.O.C.

Equipment Under Test: 2-Spindle Tablet PC

Trade Name: Gateway

Model Number: TA6

Date of Test: April 4 ~ 7, 2006

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. 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 conducted and radiated emission limits of FCC Rules Part 15.207, 15.209 and 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Reviewed by:

Gavin Lim
Section Manager
Compliance Certification Services Inc.

Amanda Wu
Section Manager
Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	2-Spindle Tablet PC
Trade Name	Gateway
Model Number	TA6
Model Name Discrepancy	N/A
Power Supply	LITEON / PA1650-01 I/P: AC 100-240V, 1.6A, 50-60Hz O/P: DC 19V, 3.42A Battery: 1. 3UR18650F-2-QC-TA1K 11.1V, 4800mAh 6cells 2. SQU-507 14.4V, 6600mAh 12cells 3. SQU-508 14.4V, 5200mAh 8cells 4. SQU-508 14.8V, 5200mAh 8cells
Frequency Range	IEEE 802.11a: 5.725~5.850 GHz IEEE 802.11b/g: 2.412~2.462 GHz Bluetooth: 2.402~2.480 GHz
Transmit Power	IEEE 802.11a: 18.43 dBm IEEE 802.11b: 18.45 dBm IEEE 802.11g: 18.15 dBm Bluetooth: 3.88 dBm
Modulation Technique	IEEE 802.11a: OFDM (QPSK, BPSK, 16-QAM, 64-QAM) IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: DSSS (CCK, DQPSK, DBPSK) + OFDM (QPSK, BPSK, 16-QAM, 64-QAM) Bluetooth: FHSS (GFSK, $\pi/4$ -DQPSK, 8-DPSK)
Number of Channels	IEEE 802.11a: 5 Channels IEEE 802.11b/g: 11 Channels Bluetooth: 79 Channels
Antenna Specification	IEEE 802.11a: 1.90 dBi IEEE 802.11b/g: 2.15dBi Bluetooth: 2.2 dBi
Antenna Designation	IEEE 802.11a/b/g: PIFA Antenna Bluetooth: PIFA Antenna

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **HFSTA6WM3945ABG** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4. Radiated testing was performed at an antenna to EUT distance 3 meters.

3.1 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.

3.2 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.

3.3 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. 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. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.



3.4 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
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 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 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

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

² Above 38.6

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.



3.5 DESCRIPTION OF TEST MODES

The EUT (model: TA6) comes with four types of batteries for sale. After the preliminary test, the EUT with battery (SQU-507) was found to emit the worst emissions and therefore had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed. After verification, all tests carried out are with the worst-case test modes as shown below except radiated spurious emissions below 1GHz's worst case was in normal link mode.

IEEE802.11a:

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6Mbps data rate were chosen for full testing.

IEEE802.11b:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE802.11g:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

Bluetooth:

Channel Low(2402MHz), Channel Mid(2441MHz) and Channel High(2480MHz) with 3Mbps data rate were chosen for radiated testing.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis) and laptop mode. The worst emission was found in laptop position and the worst case was recorded.



4. INSTRUMENT CALIBRATION

4.1 MEASURING 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.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

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

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2007

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	07/25/2006
Test Receiver	Rohde&Schwarz	ESCI	100064	06/28/2006
Switch Controller	TRC	Switch Controller	SC94050010	05/05/2006
4 Port Switch	TRC	4 Port Switch	SC94050020	05/05/2006
Horn-Antenna	TRC	HA-0502	06	06/02/2006
Horn-Antenna	TRC	HA-0801	04	05/05/2006
Horn-Antenna	TRC	HA-1201A	01	07/04/2006
Horn-Antenna	TRC	HA-1301A	01	07/04/2006
Bilog- Antenna	Sunol Sciences	JB3	A030205	03/09/2007
Turn Table	Max-Full	MFT-120S	T120S940302	N.C.R.
Antenna Tower	Max-Full	MFA-430	A440940302	N.C.R.
Controller	Max-Full	MF-CM886	CC-C-1F-13	N.C.R.
Site NSA	CCS	N/A	FCC: 965860 IC: IC 6106	09/26/2008
Test S/W	LABVIEW (V 6.1)			

Remark: The measurement uncertainty is less than $\pm 2.0065\text{dB}$ (30MHz ~ 1GHz), $\pm 3.0958\text{dB}$ (Above 1GHz) which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI TEST RECEIVER 9kHz-30MHz	ROHDE & SCHWARZ	ESHS30	828144/003	09/24/2006
TWO-LINE V-NETWORK 9kHz-30MHz	SCHAFFNER	NNB41	03/10013	06/11/2006
LISN 10kHz-100MHz	EMCO	3825/2	9106-1809	02/17/2007
Test S/W	LABVIEW (V 6.1)			

Remark: The measurement uncertainty is less than $\pm 2.81\text{dB}$, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☒ No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

5.2 EQUIPMENT

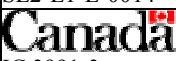
Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

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."

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	EN 55011, EN 55014-1/2, CISPR 11, CISPR 14-1/2, EN 55022, EN 55015, CISPR 22, CISPR 15, AS/NZS 3548, VCCI V3 (2001), CFR 47, FCC Part 15/18, CNS 13783-1, CNS 13439, CNS 13438, CNS 13803, CNS 14115, EN 55024, IEC 801-2, IEC 801-3, IEC 801-4, IEC/EN 61000-3-2, EIC/EN 61000-3-3, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 50081-1/ EN 61000-6-3, EN 50081-2/EN 61000-6-4, EN 50081-2/EN 61000-6-1: 2001	 0824-01
USA	FCC	3/10 meter Open Area Test Sites (93105, 90471) / 3M Semi Anechoic Chamber (965860) to perform FCC Part 15/18 measurements	 93105, 90471 965860
Japan	VCCI	3/10 meter Open Area Test Sites to perform conducted/radiated measurements	 R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	 ELA 124a ELA 124b ELA 124c
Taiwan	TAF	EN 300 328, EN 300 220-1, EN 300 220-2, EN 300 220-3, 47 CFR FCC Part 15 Subpart C, EN 61000-3-2, EN 61000-3-3, CNS 13439, CNS 13783-1, CNS 14115, CNS 13438, AS/NZS CISPR 22, CNS 13022-1, IEC 61000-4-2/3/4/5/6/8/11, CNS 13022-2/3	
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	 SL2-IS-E-0014 SL2-IN-E-0014 SL2-A1-E-0014 SL2-R1-E-0014 SL2-R2-E-0014 SL2-L1-E-0014
Canada	Industry Canada	3/10 meter Open Area Test Sites (IC 3991-3, IC 3991-4) / 3M Semi Anechoic Chamber (IC 6106) to perform RSS 212 Issue 1	 IC 3991-3 IC 3991-4 IC 6106

* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Super a/g 108Mbps Wireless Lan Router (Remote)	PLANEX	BLW-04SAG	40DDA0421	SJ9-BLW54SAG	N/A	Unshielded, 1.8m

Remark:

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.



7. FCC PART 15.247 REQUIREMENTS

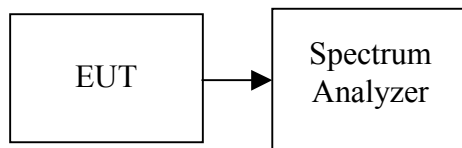
CONDITION A: WLAN OPERATION

7.1 6DB BANDWIDTH

LIMIT

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

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 = 50MHz, 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*****IEEE 802.11a***

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	5745	16580	>500	PASS
Mid	5785	16500		PASS
High	5825	16500		PASS

IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	9000	>500	PASS
Mid	2437	9080		PASS
High	2462	9170		PASS

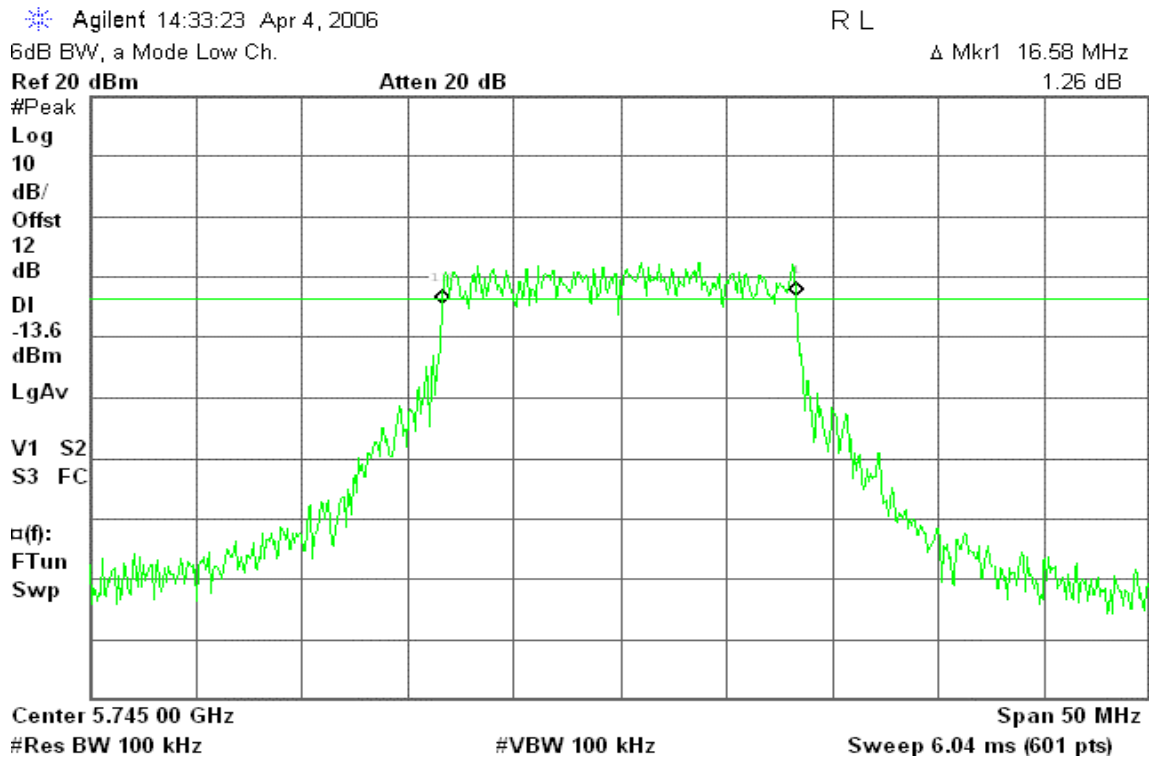
IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	16420	>500	PASS
Mid	2437	16420		PASS
High	2462	16580		PASS

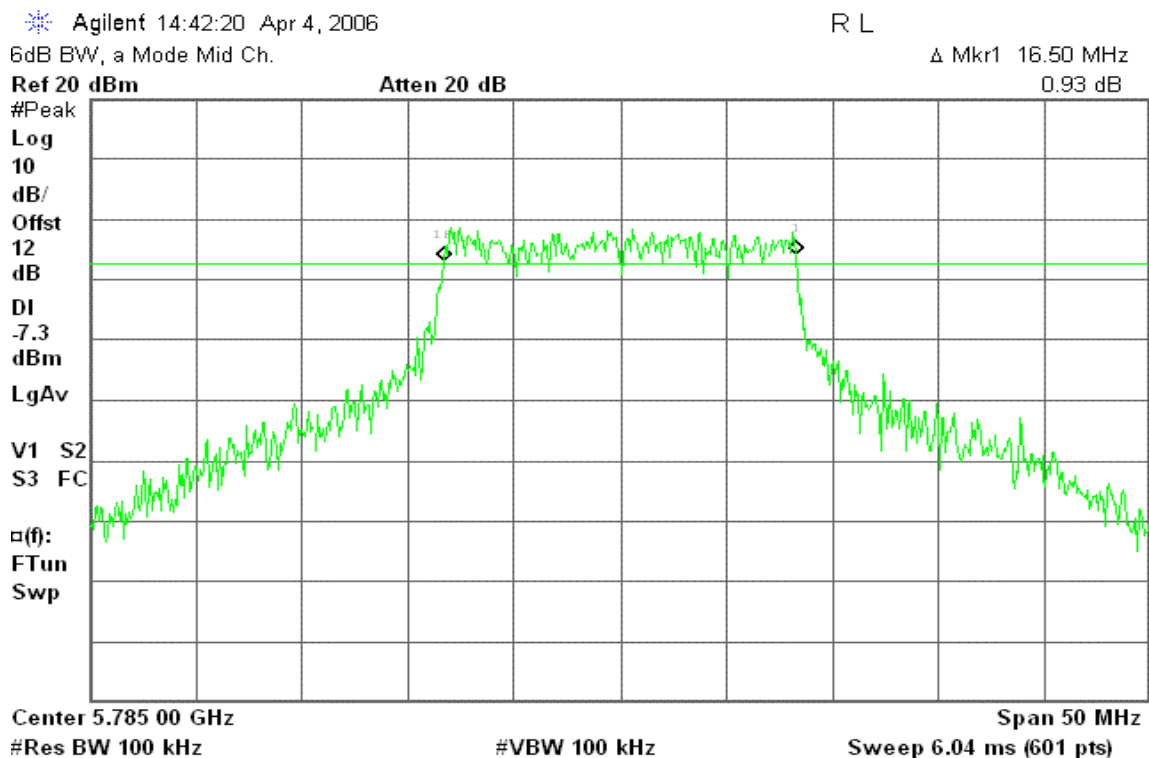


Test Plot

6dB Bandwidth (IEEE 802.11a / CH Low)



6dB Bandwidth (IEEE 802.11a / CH Mid)





6dB Bandwidth (IEEE 802.11a / CH High)

Agilent 15:04:40 Apr 4, 2006

R L

6dB BW, a Mode High Ch.

Δ Mkr1 16.50 MHz

Ref 20 dBm

Atten 20 dB

3.14 dB

#Peak

Log

10

dB/

Offst

12

dB

DI

-5.9

dBm

LgAv

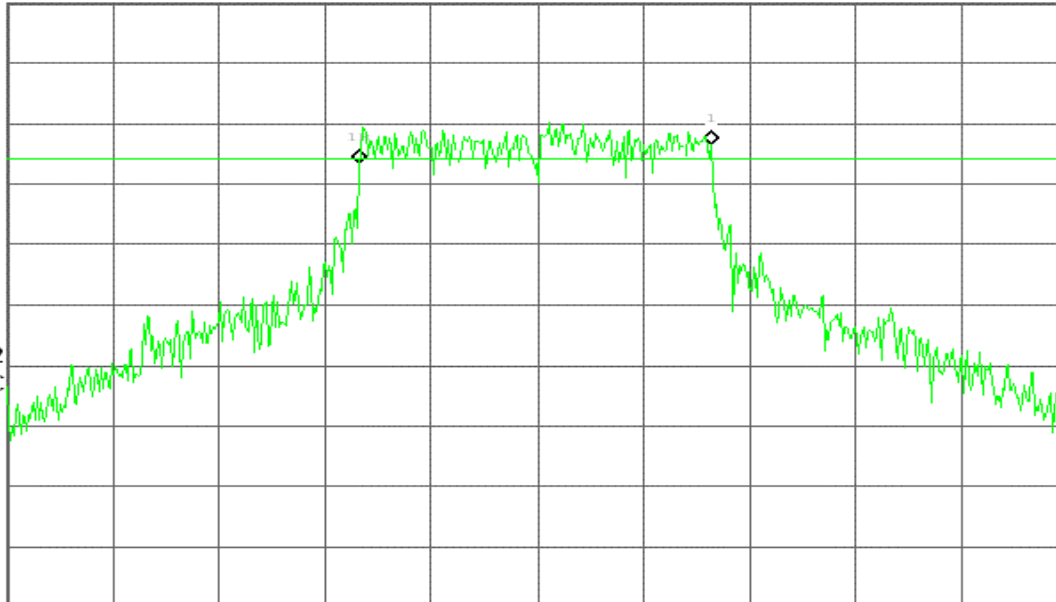
V1 S2

S3 FC

$\square(f)$:

FTun

Swp



Center 5.825 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

6dB Bandwidth (IEEE 802.11b / CH Low)

Agilent 12:20:33 Apr 4, 2006

R L

6dB BW, b Mode Low Ch.

Δ Mkr1 9.00 MHz

Ref 20 dBm

Atten 20 dB

-0.79 dB

#Peak

Log

10

dB/

Offst

11.2

dB

DI

-1.1

dBm

LgAv

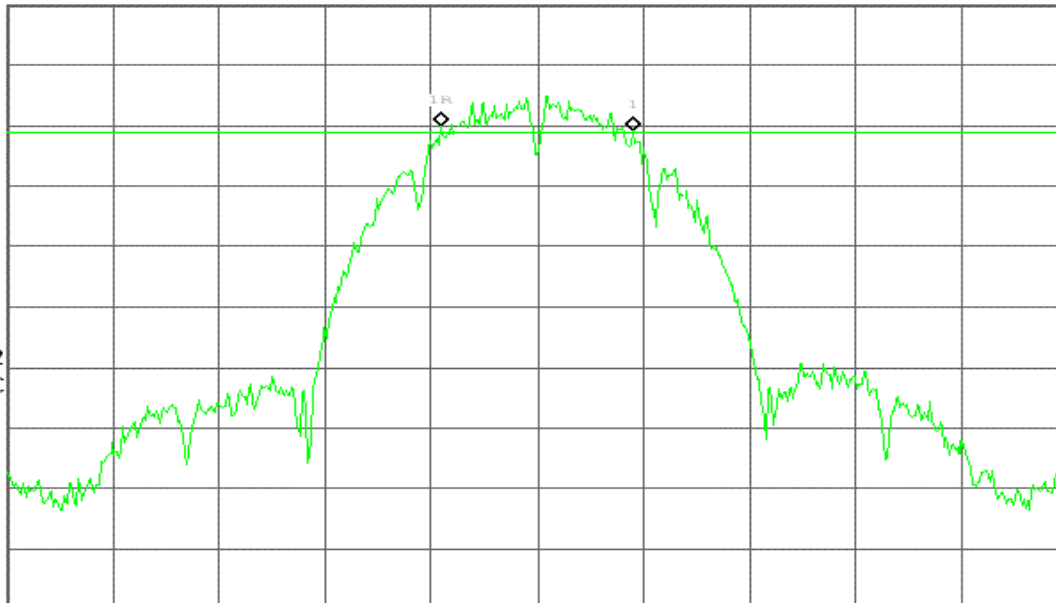
V1 S2

S3 FC

$\square(f)$:

FTun

Swp



Center 2.412 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)



6dB Bandwidth (IEEE 802.11b / CH Mid)

Agilent 12:28:20 Apr 4, 2006

R L

6dB BW, b Mode Mid Ch.

Δ Mkr1 9.08 MHz

Ref 20 dBm

Atten 20 dB

0.75 dB

#Peak

Log

10

dB/

Offst

11.2

dB

DI

-1.2

dBm

LgAv

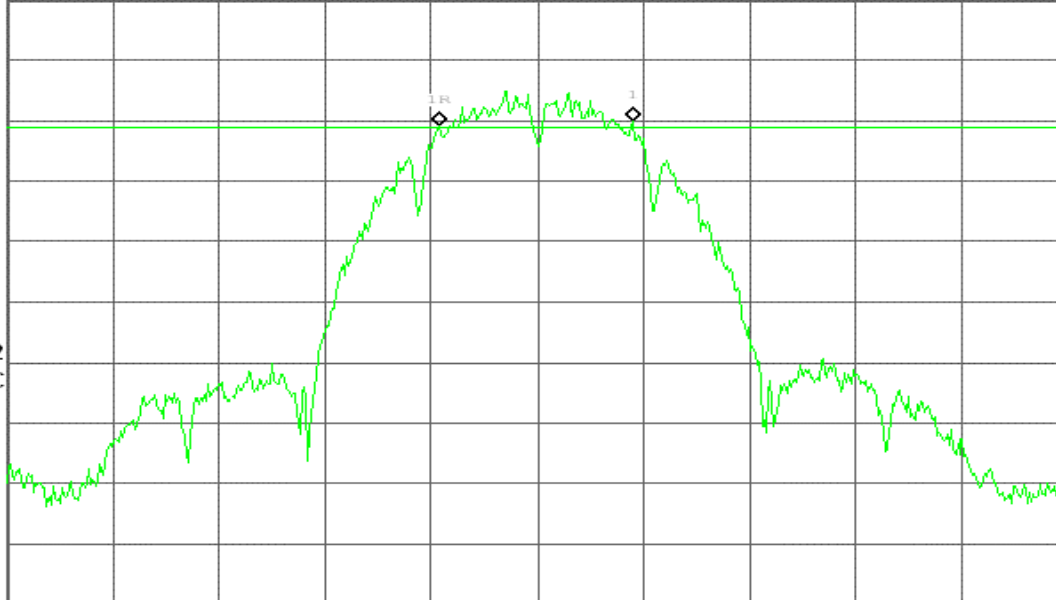
V1 S2

S3 FC

$\alpha(f)$:

FTun

Swp



Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

6dB Bandwidth (IEEE 802.11b / CH High)

Agilent 12:35:27 Apr 4, 2006

R L

6dB BW, b Mode High Ch.

Δ Mkr1 9.17 MHz

Ref 20 dBm

Atten 20 dB

1.57 dB

#Peak

Log

10

dB/

Offst

11.2

dB

DI

-0.5

dBm

LgAv

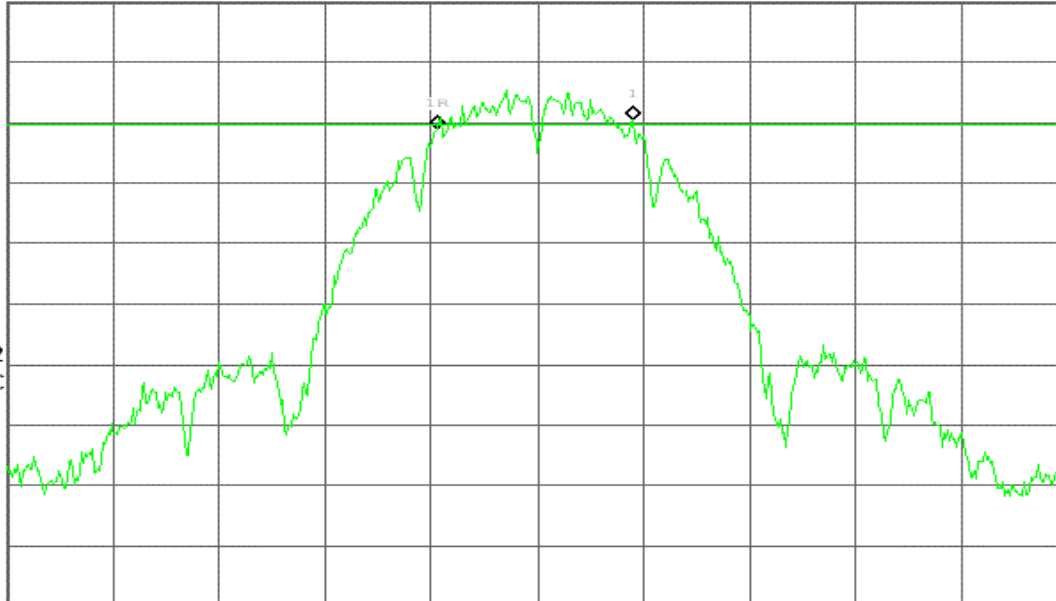
V1 S2

S3 FC

$\alpha(f)$:

FTun

Swp



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)



6dB Bandwidth (IEEE 802.11g / CH Low)

Agilent 14:06:02 Apr 4, 2006

R L

6dB BW, g Mode Low Ch.

Δ Mkr1 16.42 MHz

Ref 20 dBm

Atten 20 dB

1.51 dB

#Peak

Log

10

dB/

Offst

11.2

dB

DI

-8.2

dBm

LgAv

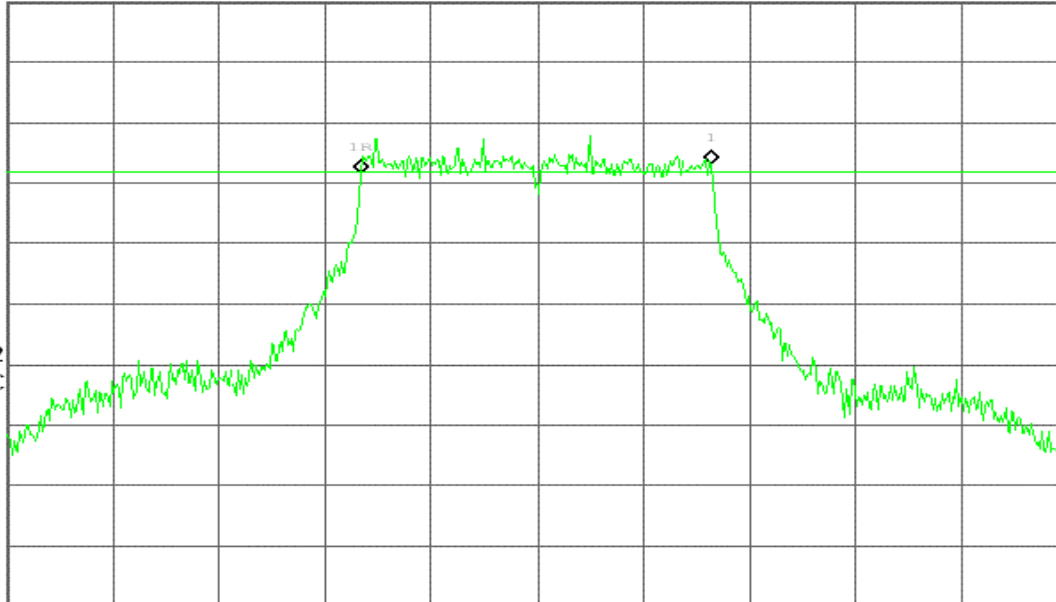
V1 S2

S3 FC

$\alpha(f)$:

FTun

Swp



Center 2.412 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

6dB Bandwidth (IEEE 802.11g / CH Mid)

Agilent 14:15:11 Apr 4, 2006

R L

6dB BW, g Mode Mid Ch.

Δ Mkr1 16.42 MHz

Ref 20 dBm

Atten 20 dB

0.85 dB

#Peak

Log

10

dB/

Offst

11.2

dB

DI

-3.5

dBm

LgAv

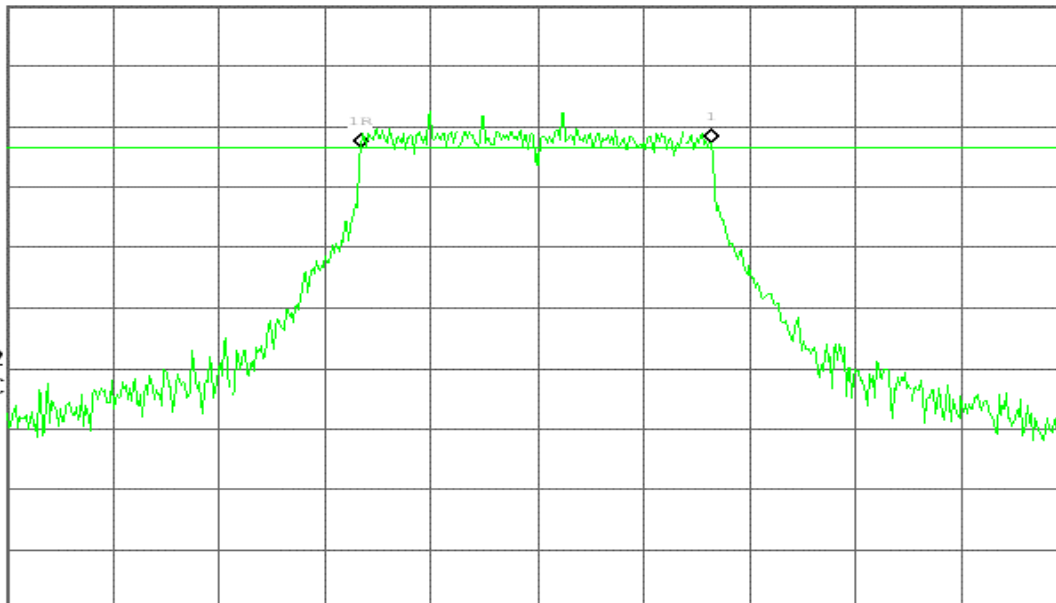
V1 S2

S3 FC

$\alpha(f)$:

FTun

Swp



Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)



6dB Bandwidth (IEEE 802.11g / CH High)

Agilent 14:22:25 Apr 4, 2006

R L

6dB BW, g Mode High Ch.

Δ Mkr1 16.58 MHz

Ref 20 dBm

Atten 20 dB

0.70 dB

#Peak

Log

10

dB/

Offst

11.2

dB

DI

-4.7

dBm

LgAv

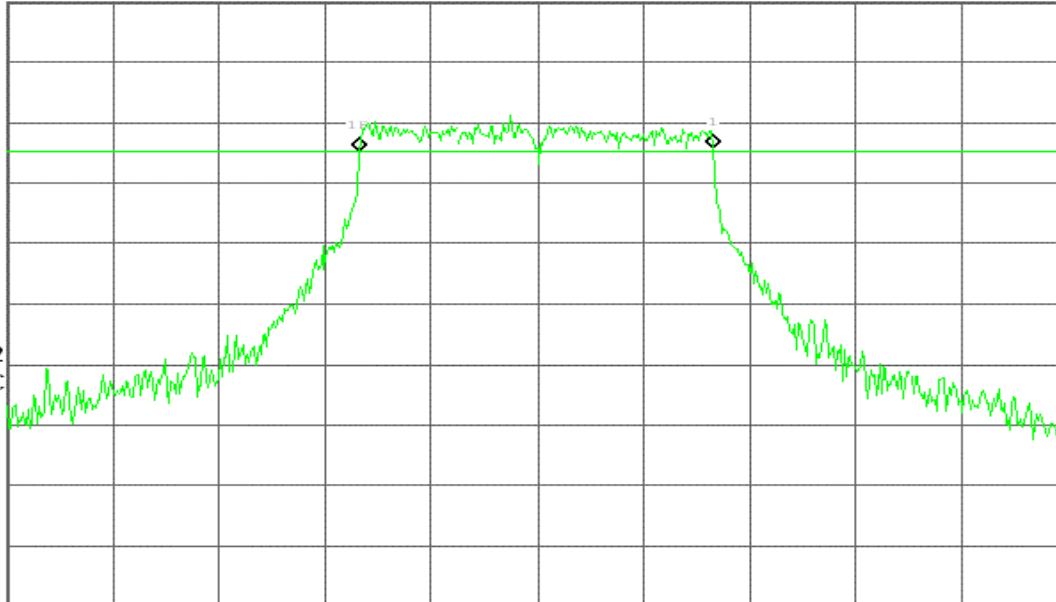
V1 S2

S3 FC

$\alpha(f)$:

FTun

Swp



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)



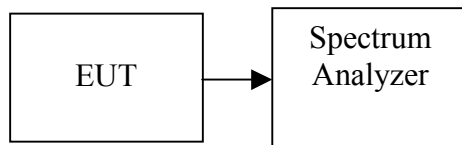
7.2 PEAK POWER

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.

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*****IEEE 802.11a***

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	5745	17.38	0.05470	1	PASS
Mid	5785	17.36	0.05445		PASS
High	5825	18.43	0.06966		PASS

IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2412	17.88	0.06138	1	PASS
Mid	2437	17.90	0.06166		PASS
High	2462	18.45	0.06998		PASS

IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2412	18.15	0.06531	1	PASS
Mid	2437	17.36	0.05445		PASS
High	2462	18.04	0.06368		PASS



Test Plot

Peak Power (IEEE 802.11a / CH Low)

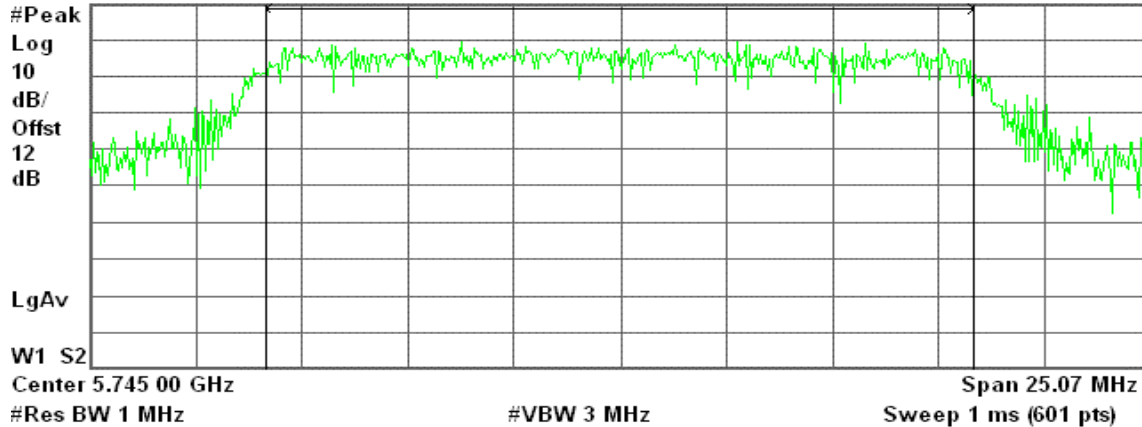
Agilent 14:36:28 Apr 4, 2006

R L

Peak Output Power , a Mode Low Ch.

Ref 20 dBm

Atten 20 dB



Channel Power

Power Spectral Density

17.38 dBm / 16.7100 MHz

-54.85 dBm/Hz

Peak Power (IEEE 802.11a / CH Mid)

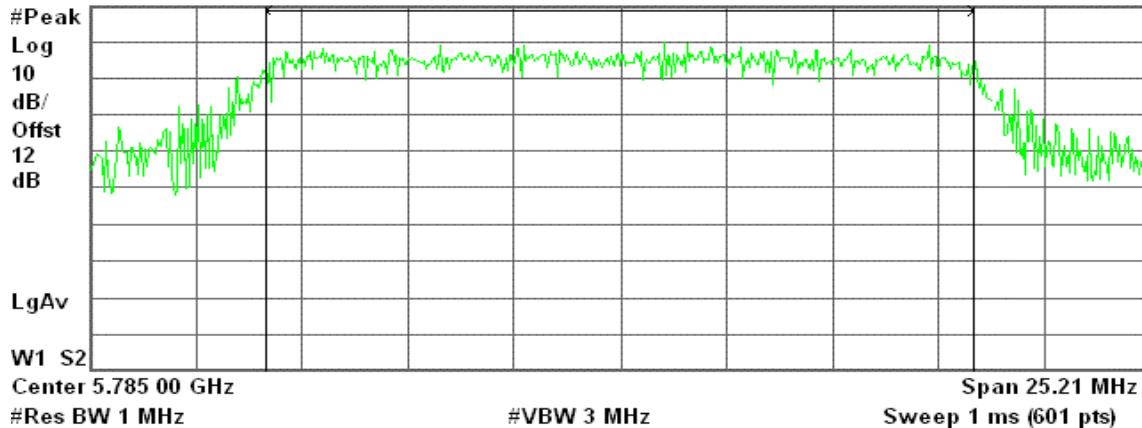
Agilent 14:51:50 Apr 4, 2006

L

Peak Output Power , a Mode Mid Ch.

Ref 20 dBm

Atten 20 dB



Channel Power

Power Spectral Density

17.36 dBm / 16.8040 MHz

-54.90 dBm/Hz



Peak Power (IEEE 802.11a / CH High)

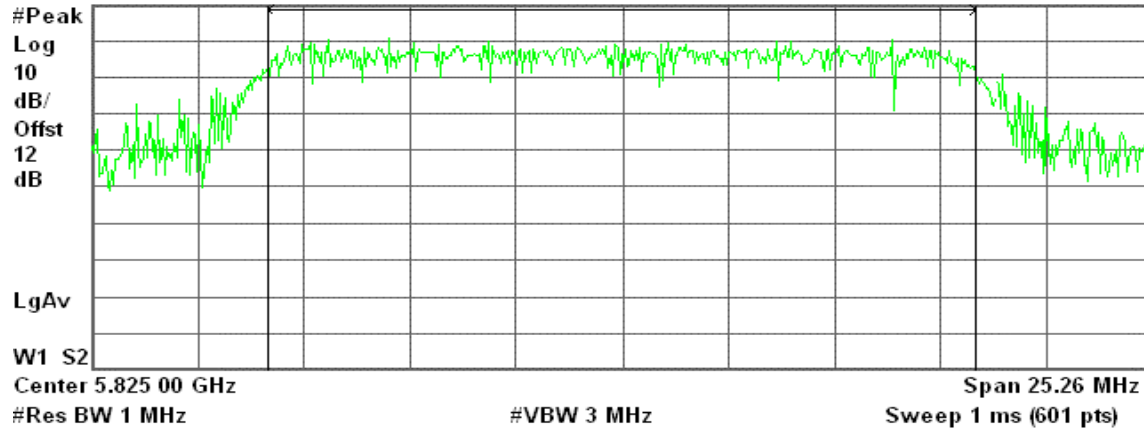
Agilent 15:05:34 Apr 4, 2006

R L

Peak Output Power , a Mode High Ch.

Ref 20 dBm

Atten 20 dB



Channel Power

Power Spectral Density

18.43 dBm / 16.8430 MHz

-53.84 dBm/Hz

Peak Power (IEEE 802.11b / CH Low)

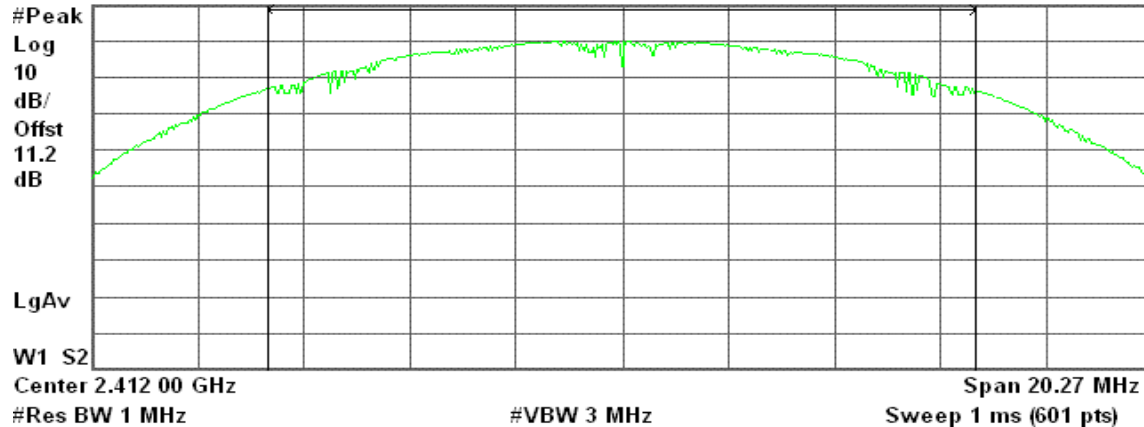
Agilent 12:21:30 Apr 4, 2006

R L

Peak Output Power , b Mode Low Ch.

Ref 20 dBm

Atten 20 dB



Channel Power

Power Spectral Density

17.88 dBm / 13.5150 MHz

-53.43 dBm/Hz



Peak Power (IEEE 802.11b / CH Mid)

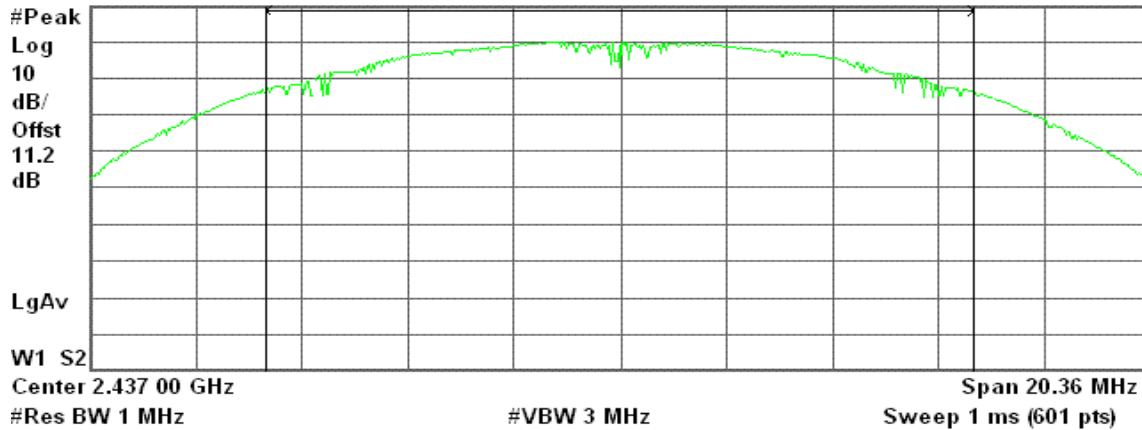
Agilent 12:29:14 Apr 4, 2006

R L

Peak Output Power, b Mode Mid Ch.

Ref 20 dBm

Atten 20 dB



Channel Power

17.90 dBm / 13.5730 MHz

Power Spectral Density

-53.43 dBm/Hz

Peak Power (IEEE 802.11b / CH High)

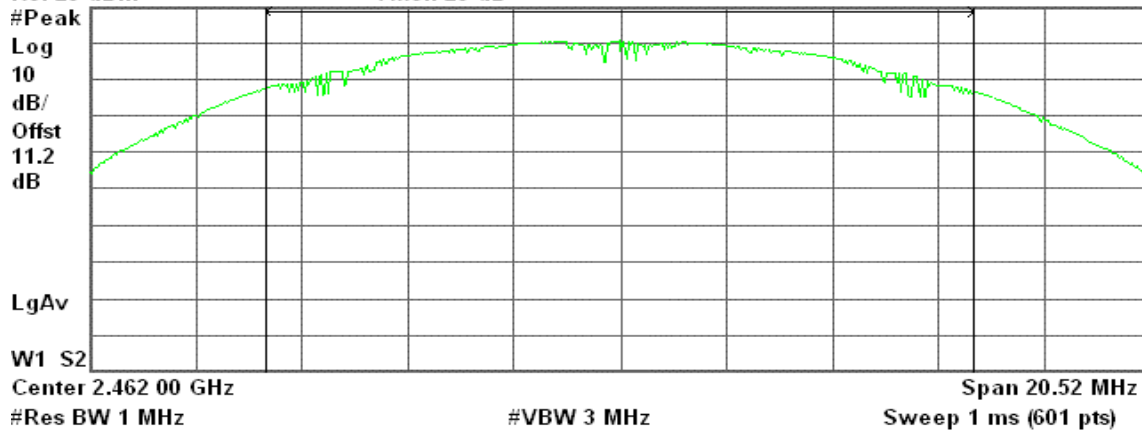
Agilent 12:36:11 Apr 4, 2006

R L

Peak Output Power, b Mode High Ch.

Ref 20 dBm

Atten 20 dB



Channel Power

18.45 dBm / 13.6770 MHz

Power Spectral Density

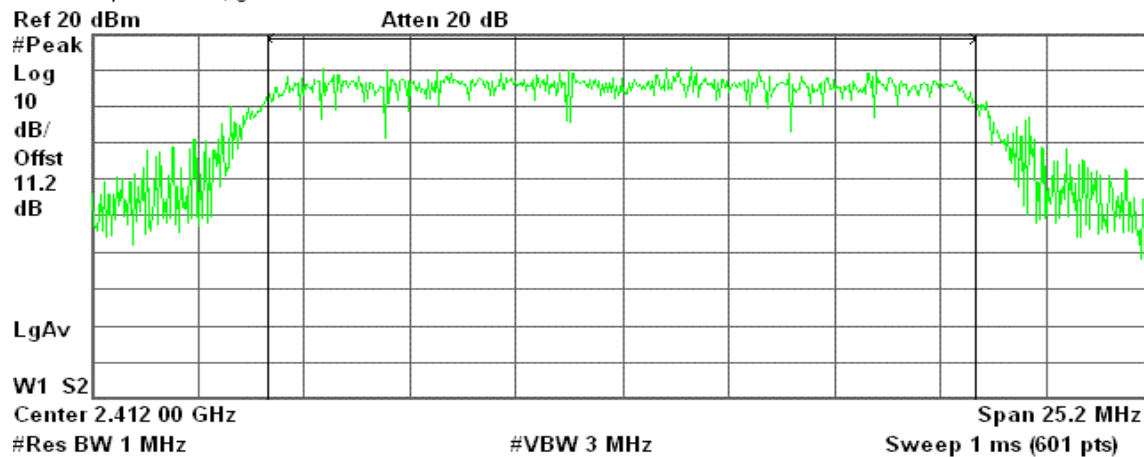
-52.91 dBm/Hz



Peak Power (IEEE 802.11g / CH Low)

Agilent 14:10:18 Apr 4, 2006
Peak Output Power , g Mode Low Ch.

R L



Channel Power

18.15 dBm / 16.7980 MHz

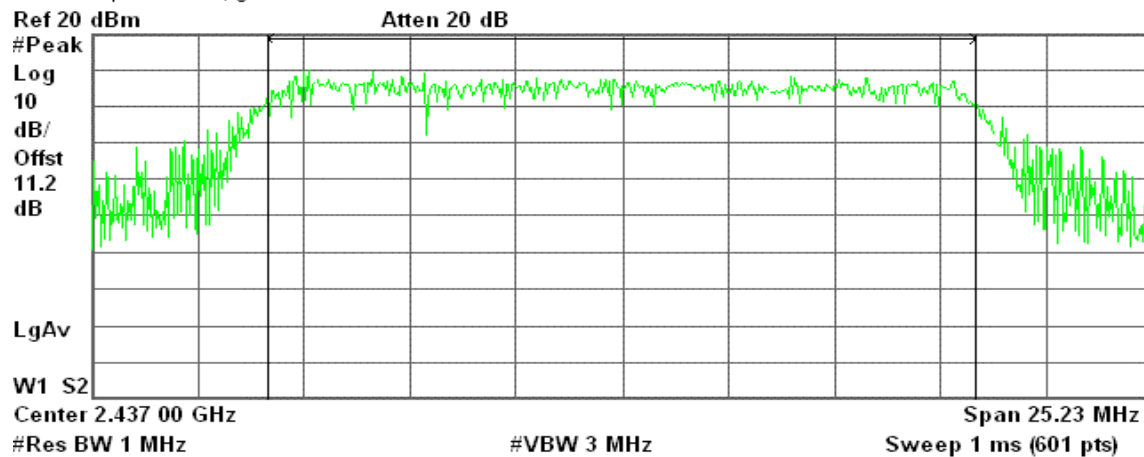
Power Spectral Density

-54.10 dBm/Hz

Peak Power (IEEE 802.11g / CH Mid)

Agilent 14:17:03 Apr 4, 2006
Peak Output Power , g Mode Mid Ch.

R L



Channel Power

17.36 dBm / 16.8230 MHz

Power Spectral Density

-54.90 dBm/Hz



Peak Power (IEEE 802.11g / CH High)

Agilent 14:23:16 Apr 4, 2006

R L

Peak Output Power , g Mode High Ch.

Ref 20 dBm

Atten 20 dB

#Peak

Log

10

dB/

Offst

11.2

dB

LgAv

W1 S2

Center 2.462 00 GHz

Span 25.23 MHz

#Res BW 1 MHz

#VBW 3 MHz

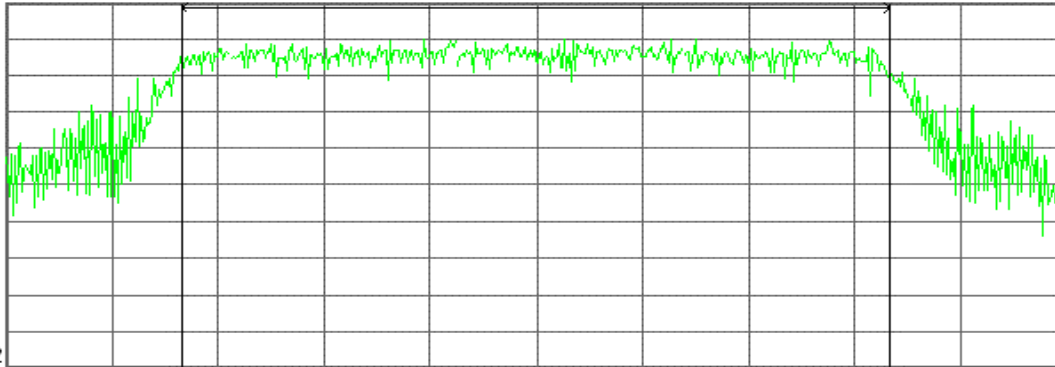
Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

18.04 dBm / 16.8220 MHz

-54.22 dBm/Hz



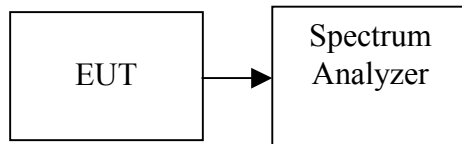


7.3 AVERAGE POWER

LIMIT

None; for reporting purposes only.

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 802.11a

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	5745	13.35	0.02163
Mid	5785	14.10	0.02570
High	5825	14.78	0.03006

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	15.32	0.03404
Mid	2437	15.32	0.03404
High	2462	15.59	0.03936

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	14.24	0.02655
Mid	2437	13.75	0.02371
High	2462	13.88	0.02443



Test Plot

IEEE 802.11a

Average Power (CH Low)

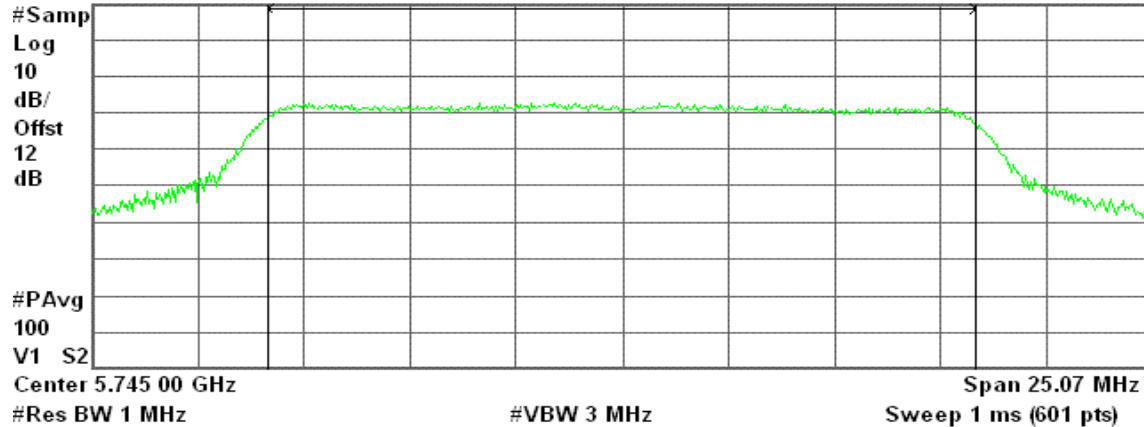
Agilent 14:37:12 Apr 4, 2006

R L

AVG Output Power, a Mode Low Ch.

Ref 30 dBm

Atten 30 dB



Channel Power

Power Spectral Density

13.35 dBm / 16.7100 MHz

-58.88 dBm/Hz

Average Power (CH Mid)

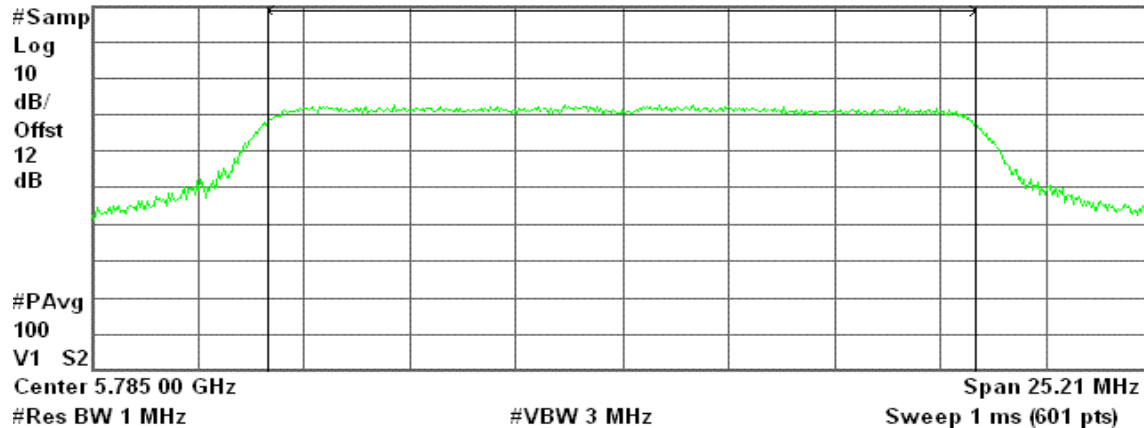
Agilent 14:52:29 Apr 4, 2006

R L

AVG Output Power, a Mode Mid Ch.

Ref 30 dBm

Atten 30 dB



Channel Power

Power Spectral Density

14.10 dBm / 16.8040 MHz

-58.15 dBm/Hz



Average Power (CH High)

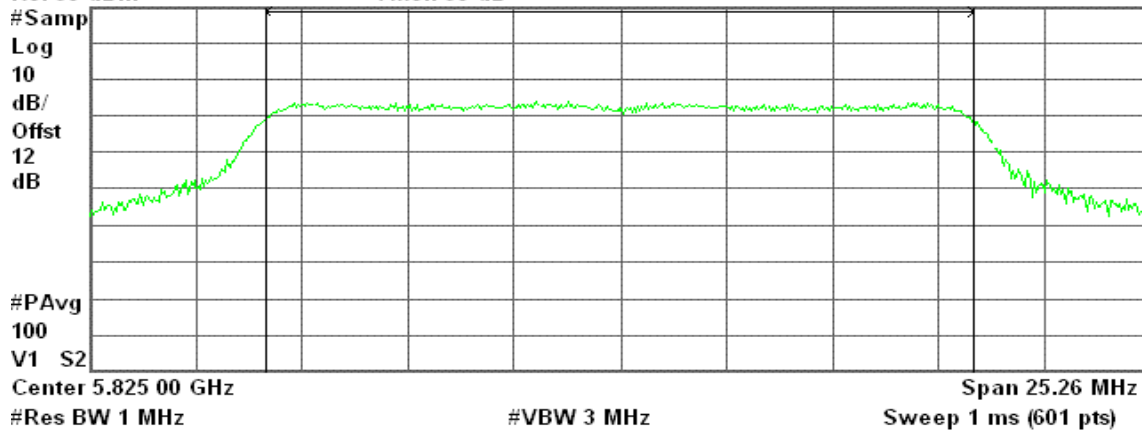
Agilent 15:06:14 Apr 4, 2006

R L

AVG Output Power , a Mode High Ch.

Ref 30 dBm

Atten 30 dB



Channel Power

Power Spectral Density

14.78 dBm / 16.8430 MHz

-57.49 dBm/Hz

IEEE 802.11b

Average Power (CH Low)

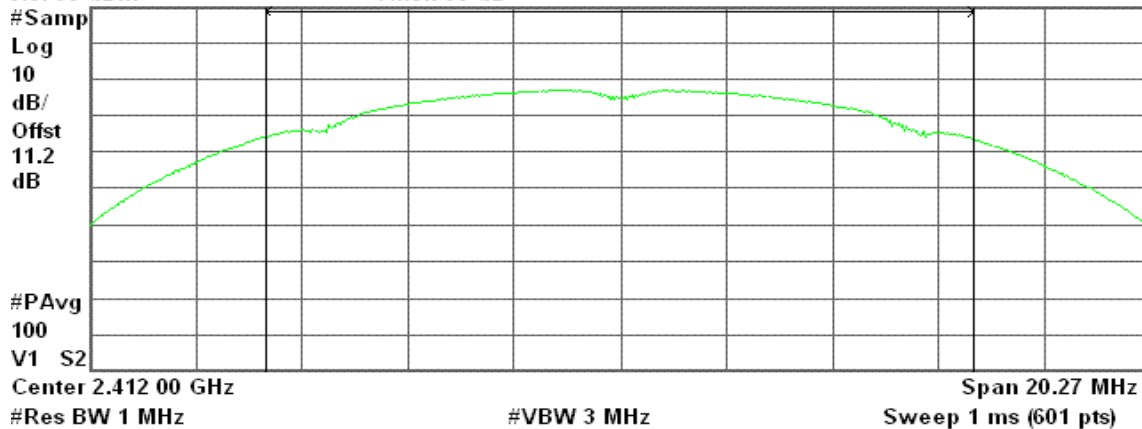
Agilent 12:22:38 Apr 4, 2006

R L

AVG Output Power , b Mode Low Ch.

Ref 30 dBm

Atten 30 dB



Channel Power

Power Spectral Density

15.32 dBm / 13.5150 MHz

-55.99 dBm/Hz



Average Power (CH Mid)

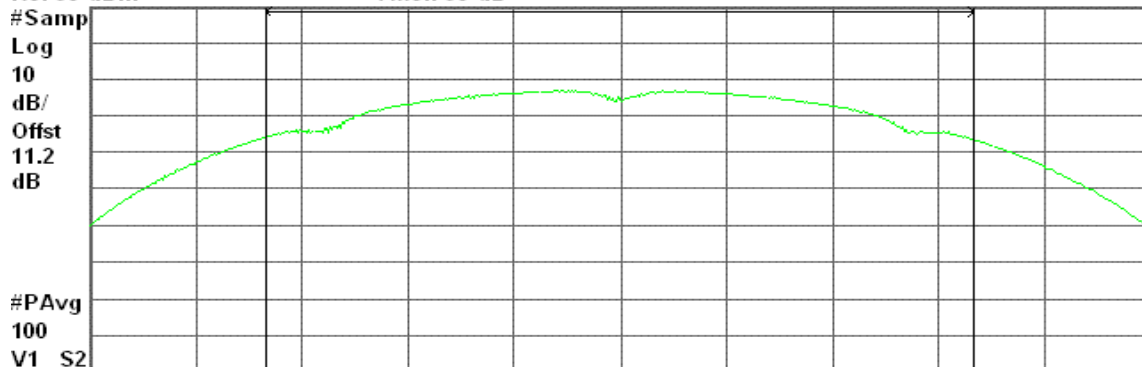
Agilent 12:29:50 Apr 4, 2006

R L

AVG Output Power , b Mode Mid Ch.

Ref 30 dBm

Atten 30 dB



Center 2.437 00 GHz

#VBW 3 MHz

Span 20.36 MHz

#Res BW 1 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

15.32 dBm / 13.5730 MHz

-56.01 dBm/Hz

Average Power (CH High)

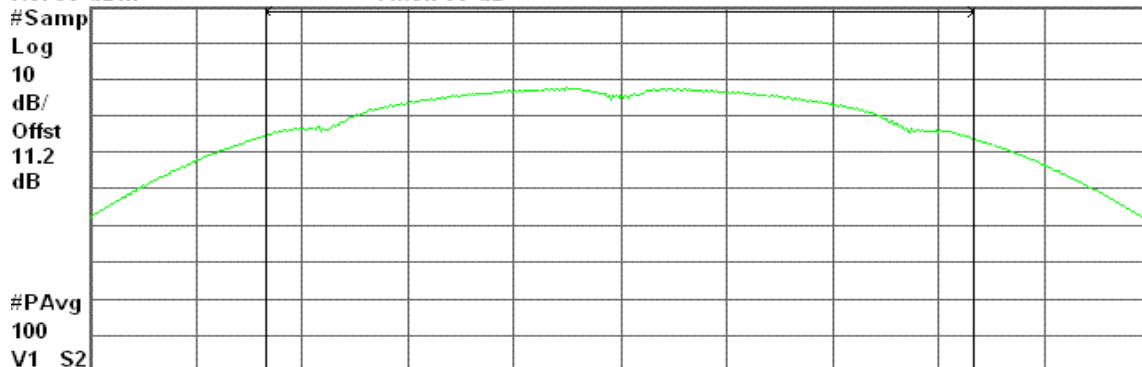
Agilent 12:36:40 Apr 4, 2006

R L

AVG Output Power , b Mode High Ch.

Ref 30 dBm

Atten 30 dB



Center 2.462 00 GHz

#VBW 3 MHz

Span 20.52 MHz

#Res BW 1 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

15.59 dBm / 13.6770 MHz

-55.77 dBm/Hz



IEEE 802.11g

Average Power (CH Low)

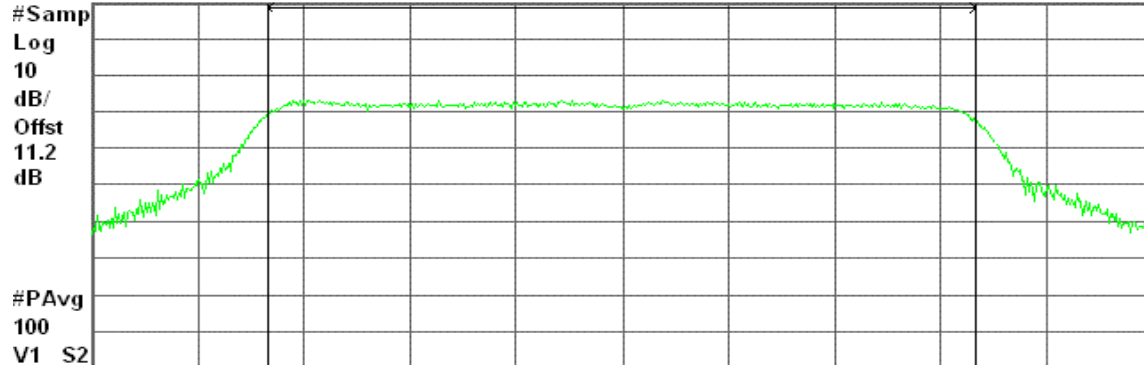
Agilent 14:11:07 Apr 4, 2006

R L

AVG Output Power , g Mode Low Ch.

Ref 30 dBm

Atten 30 dB



Center 2.412 00 GHz

Span 25.2 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

14.24 dBm / 16.7980 MHz

-58.02 dBm/Hz

Average Power (CH Mid)

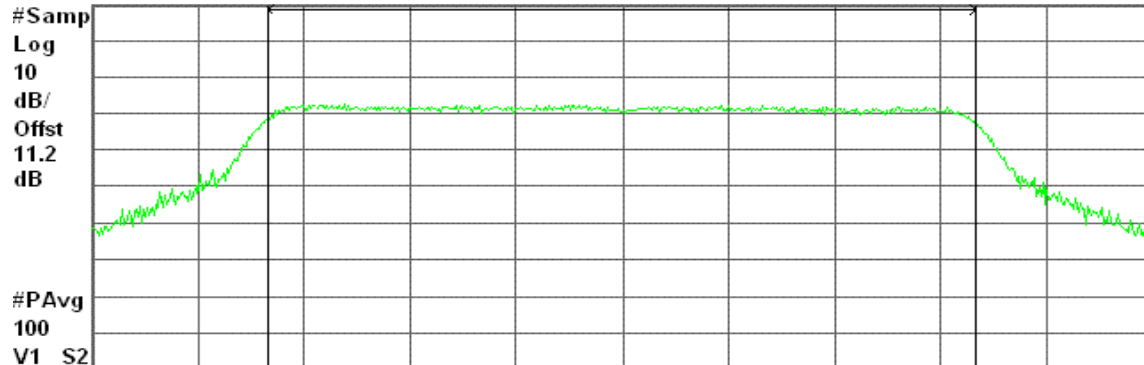
Agilent 14:17:36 Apr 4, 2006

R L

AVG Output Power , g Mode Mid Ch.

Ref 30 dBm

Atten 30 dB



Center 2.437 00 GHz

Span 25.23 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

13.75 dBm / 16.8230 MHz

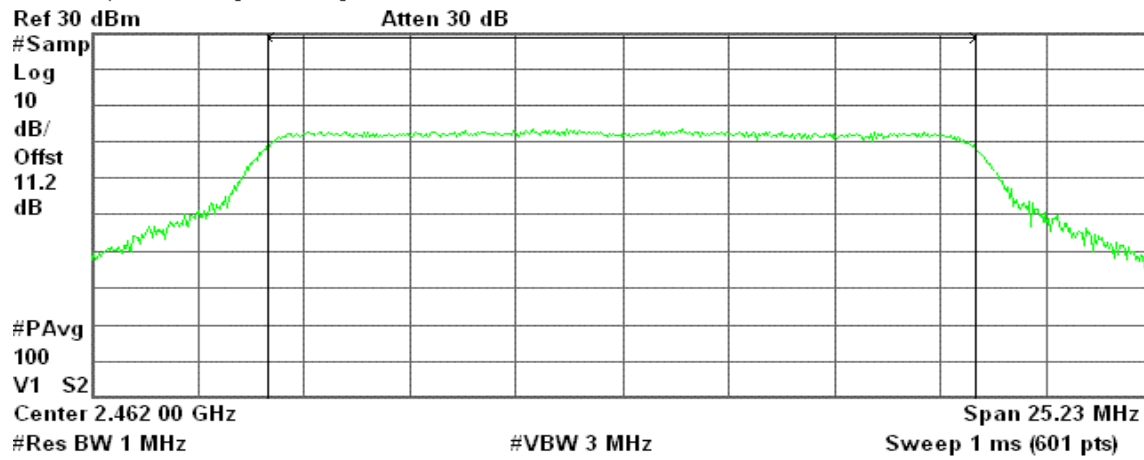
-58.51 dBm/Hz



Average Power (CH High)

Agilent 14:24:35 Apr 4, 2006
AVG Output Power , g Mode High Ch.

R L



Channel Power

13.88 dBm / 16.8220 MHz

Power Spectral Density

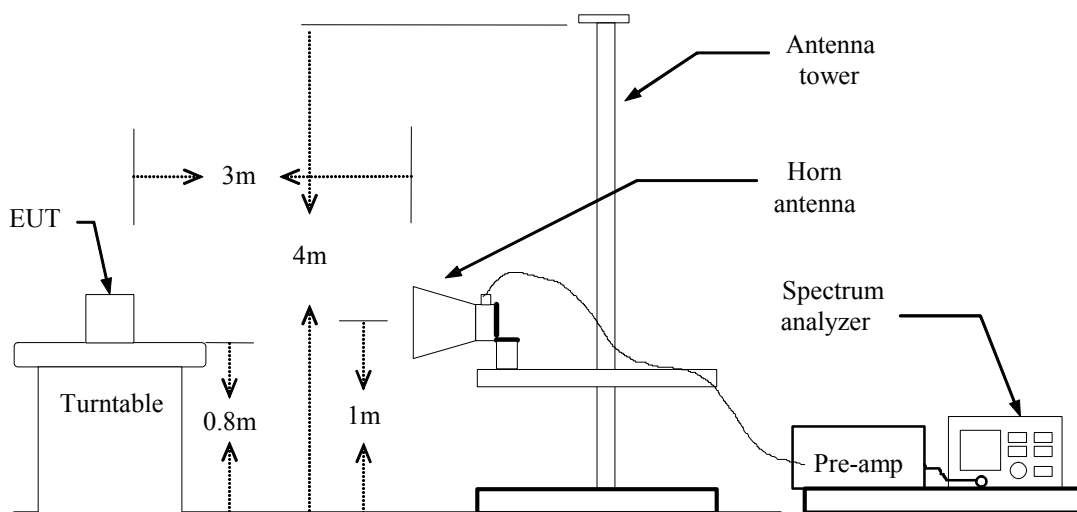
-58.38 dBm/Hz

7.4 BAND EDGES MEASUREMENT

LIMIT

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, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

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.



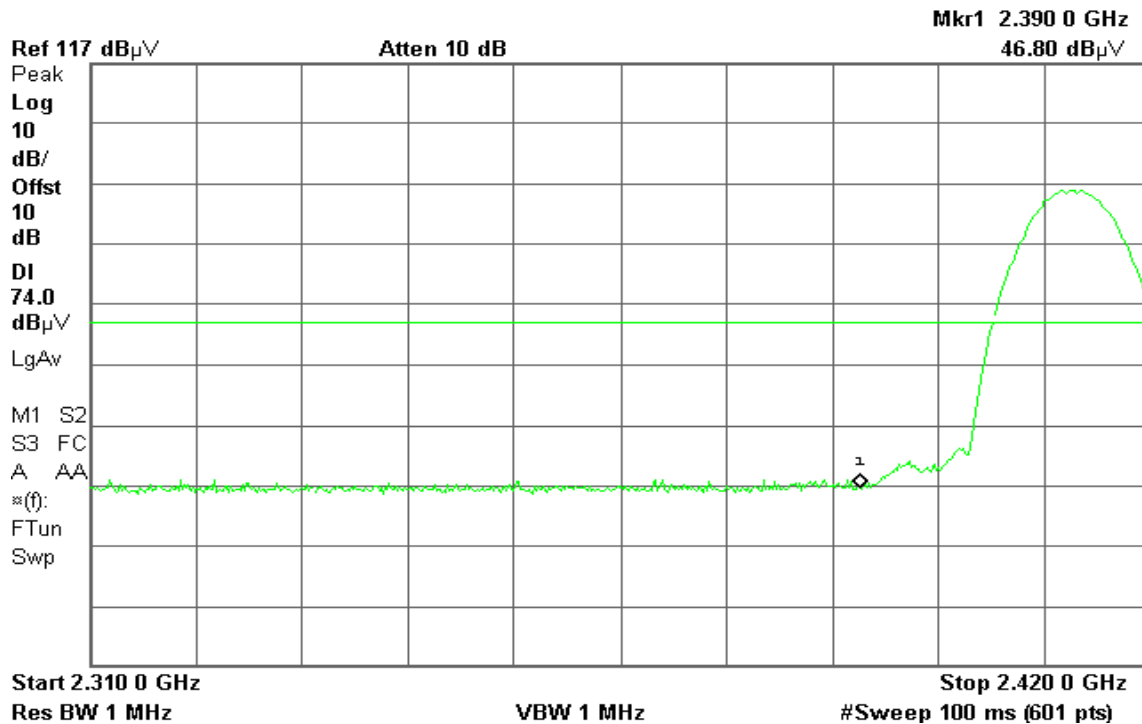
Band Edges (IEEE 802.11b / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 17:14:55 Apr 4, 2006

T

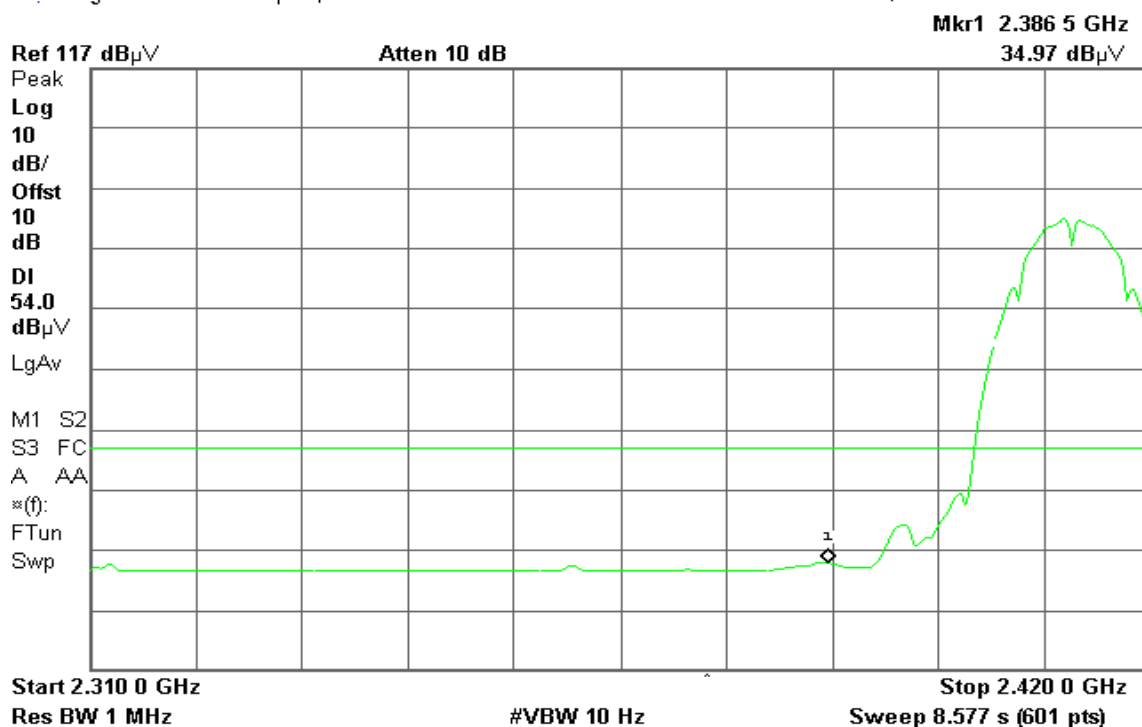


Detector mode: Average

Polarity: Vertical

Agilent 16:19:24 Apr 4, 2006

T



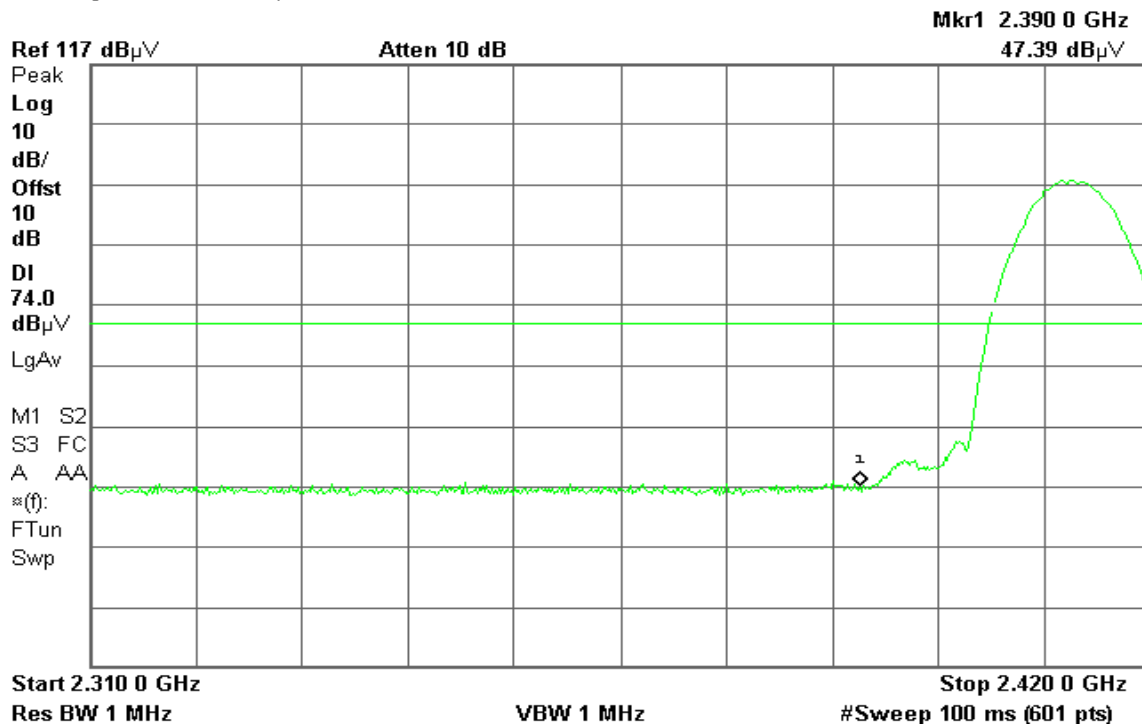


Detector mode: Peak

Polarity: Horizontal

Agilent 17:18:26 Apr 4, 2006

T

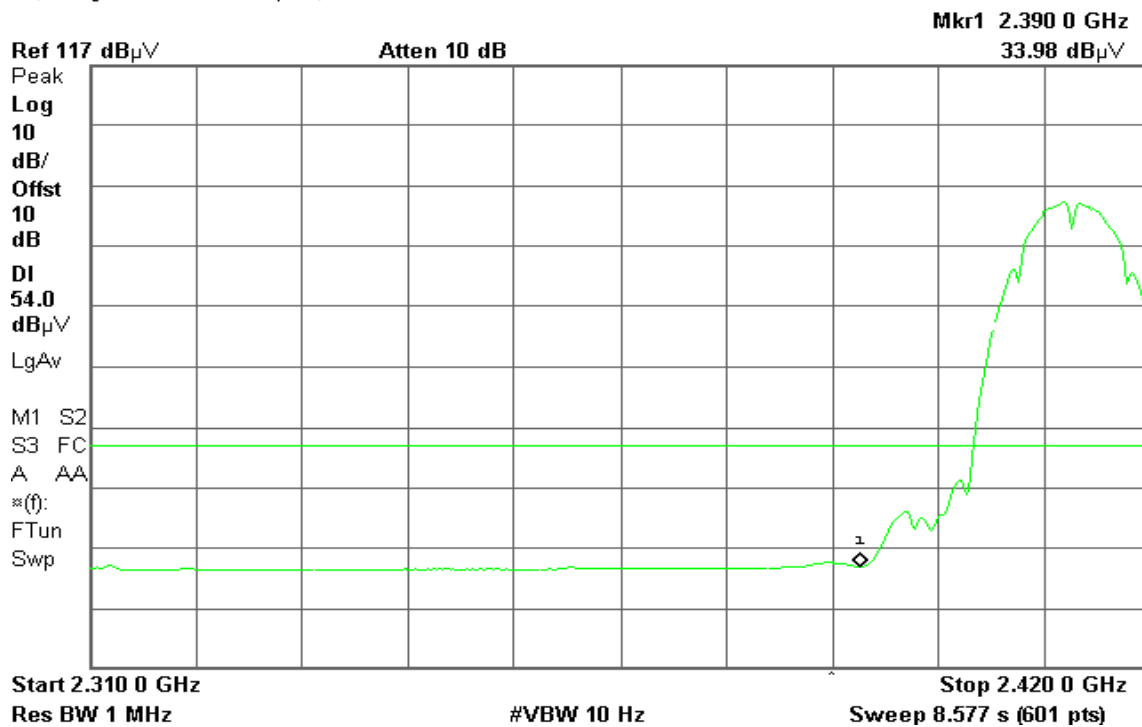


Detector mode: Average

Polarity: Horizontal

Agilent 17:18:59 Apr 4, 2006

T





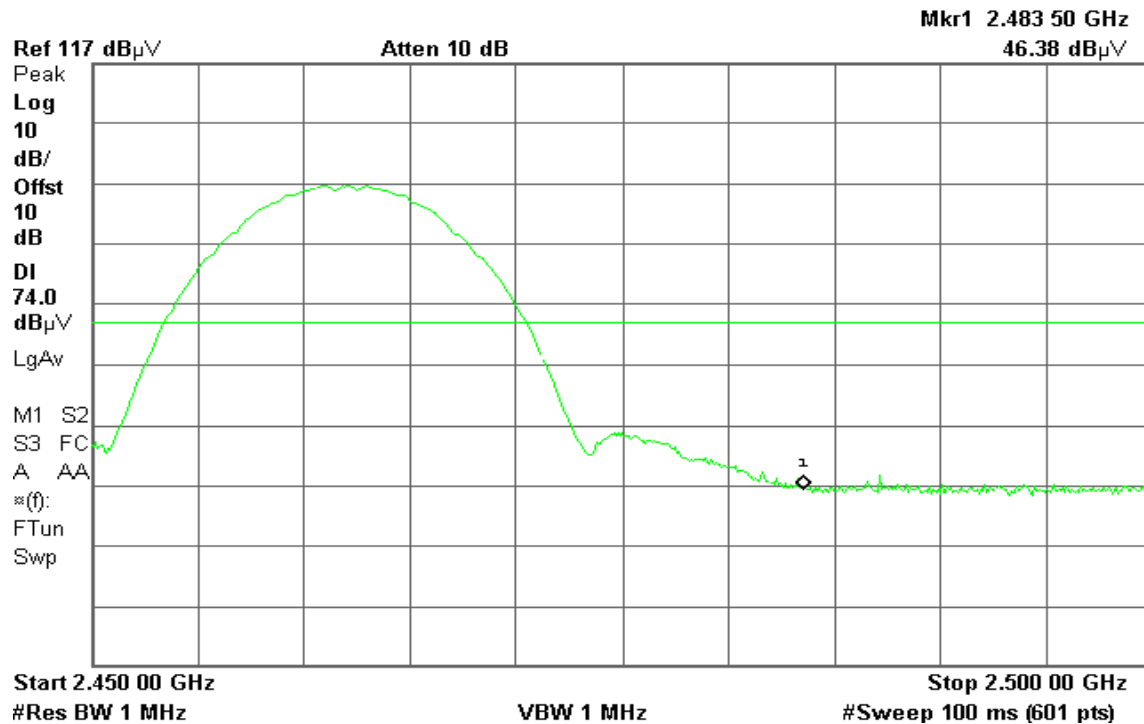
Band Edges (IEEE 802.11b / CH High)

Detector mode: Peak

Polarity: Vertical

Agilent 18:00:08 Apr 4, 2006

T

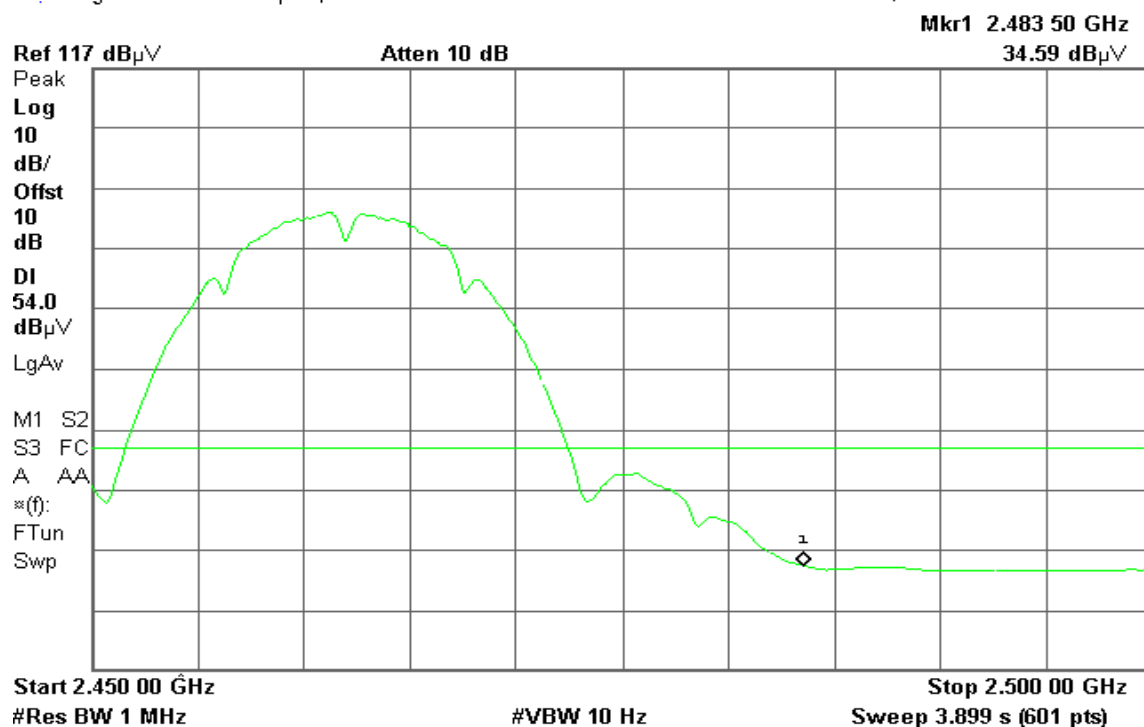


Detector mode: Average

Polarity: Vertical

Agilent 18:00:39 Apr 4, 2006

T





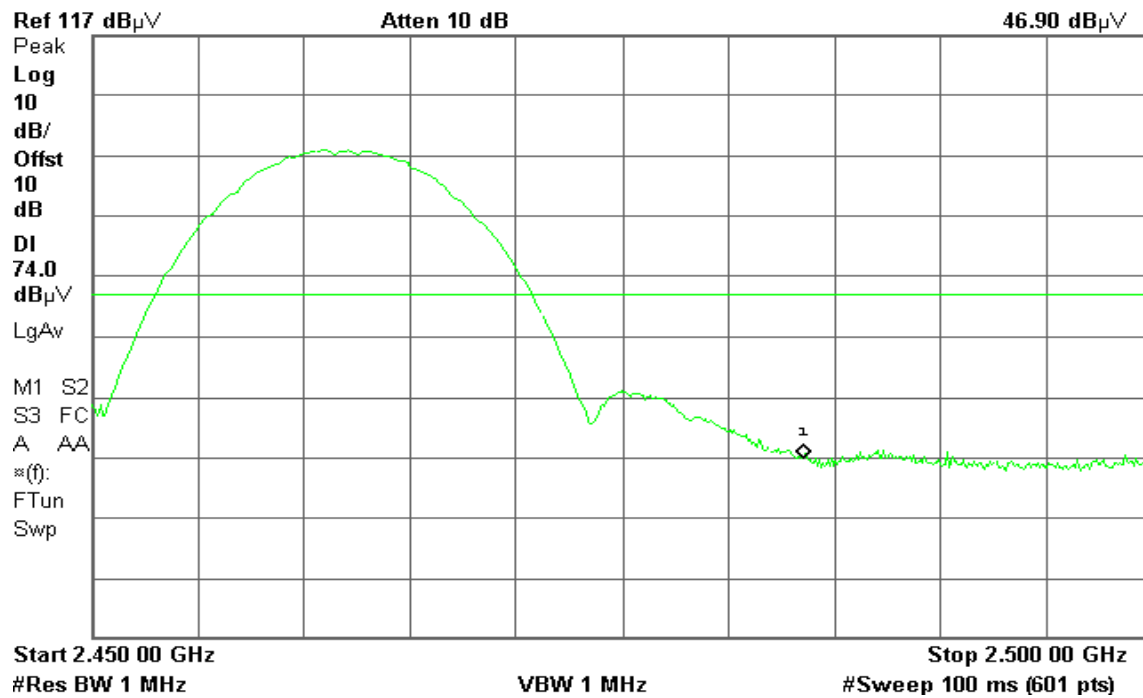
Detector mode: Peak

Polarity: Horizontal

Agilent 17:25:52 Apr 4, 2006

T

Mkr1 2.483 50 GHz
46.90 dB μ V

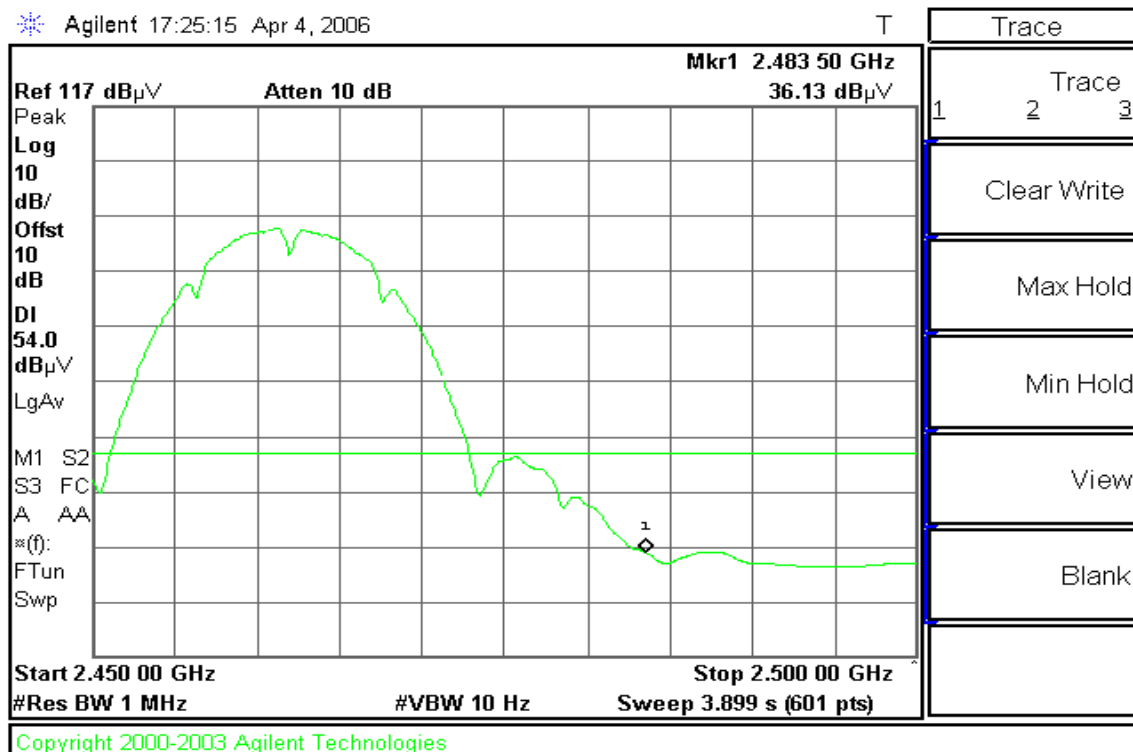


Detector mode: Average

Polarity: Horizontal

Agilent 17:25:15 Apr 4, 2006

T





Band Edges (IEEE 802.11g / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 18:31:22 Apr 4, 2006



Detector mode: Average

Polarity: Vertical

Agilent 18:31:57 Apr 4, 2006



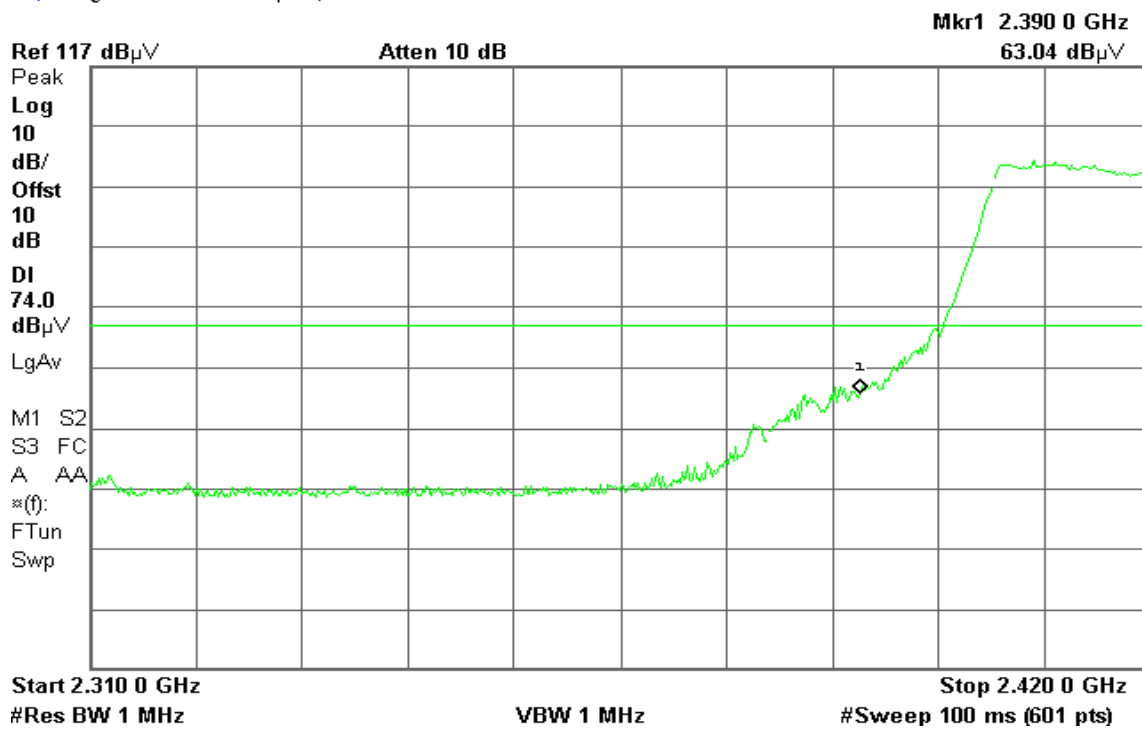


Detector mode: Peak

Polarity: Horizontal

Agilent 18:28:11 Apr 4, 2006

T

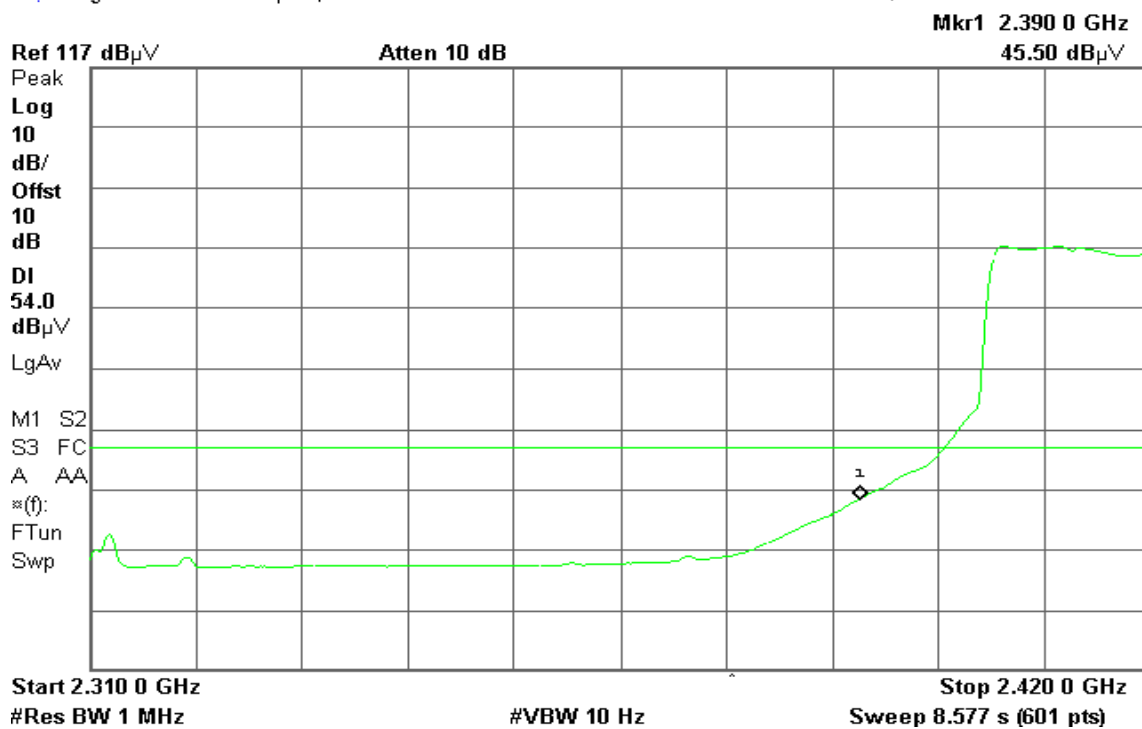


Detector mode: Average

Polarity: Horizontal

Agilent 18:27:10 Apr 4, 2006

T





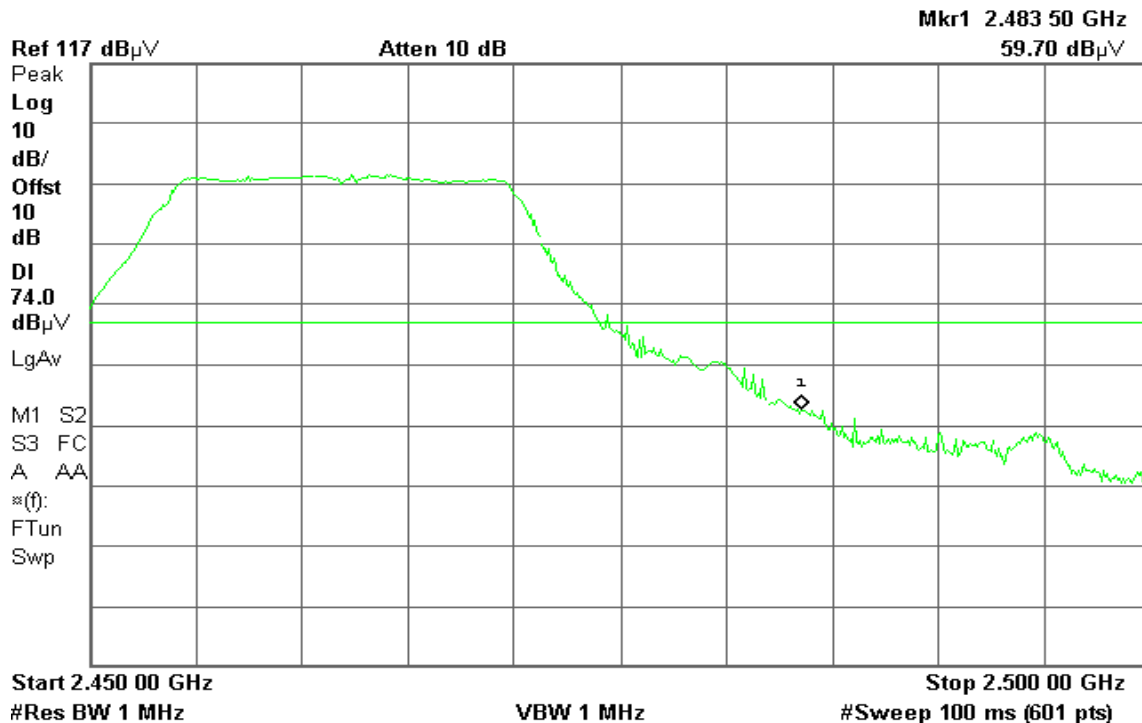
Band Edges (IEEE 802.11g mode / CH High)

Detector mode: Peak

Polarity: Vertical

Agilent 18:18:31 Apr 4, 2006

T

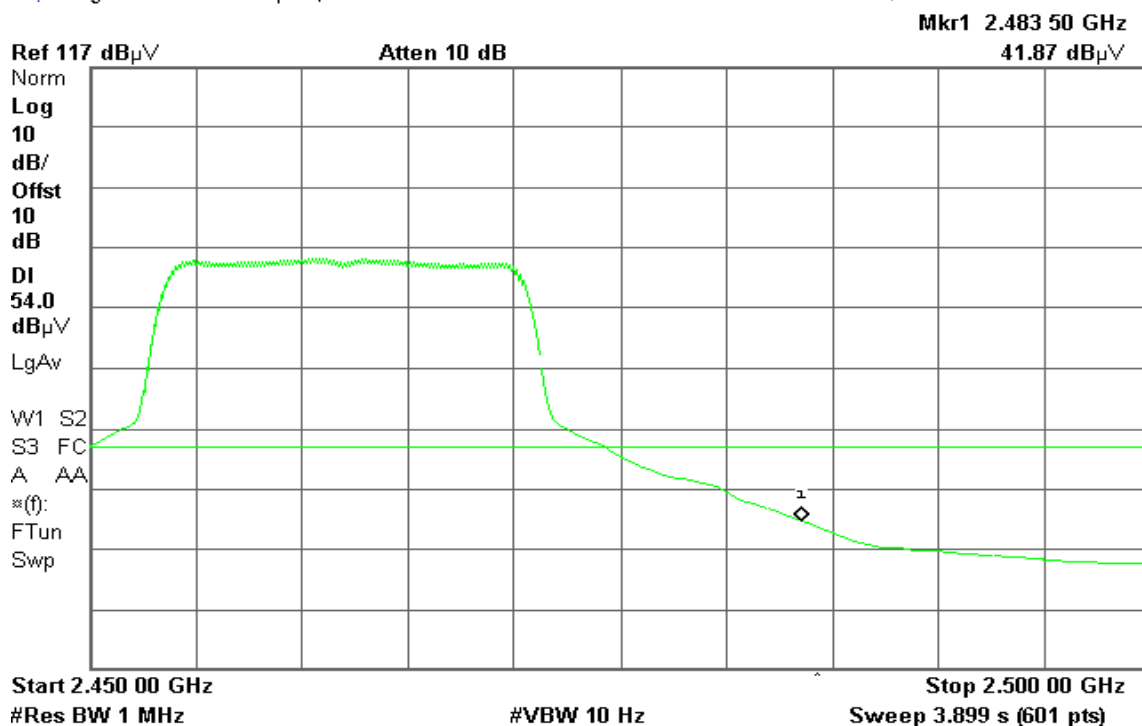


Detector mode: Average

Polarity: Vertical

Agilent 18:18:01 Apr 4, 2006

T



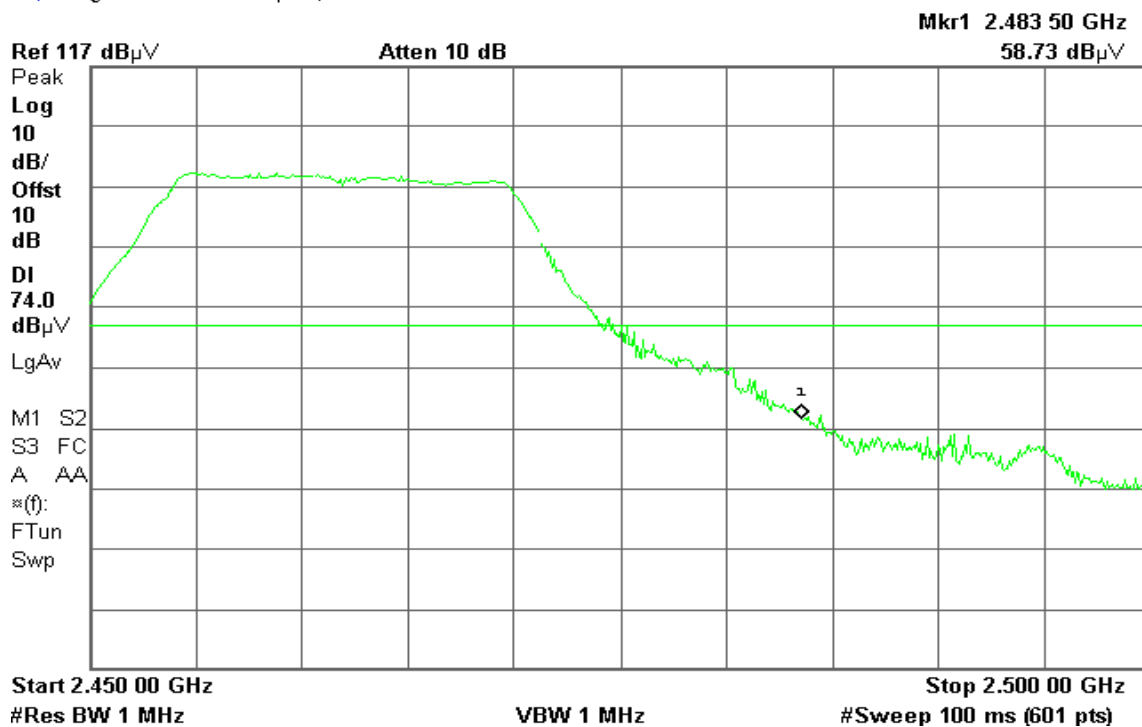


Detector mode: Peak

Polarity: Horizontal

Agilent 18:21:28 Apr 4, 2006

T

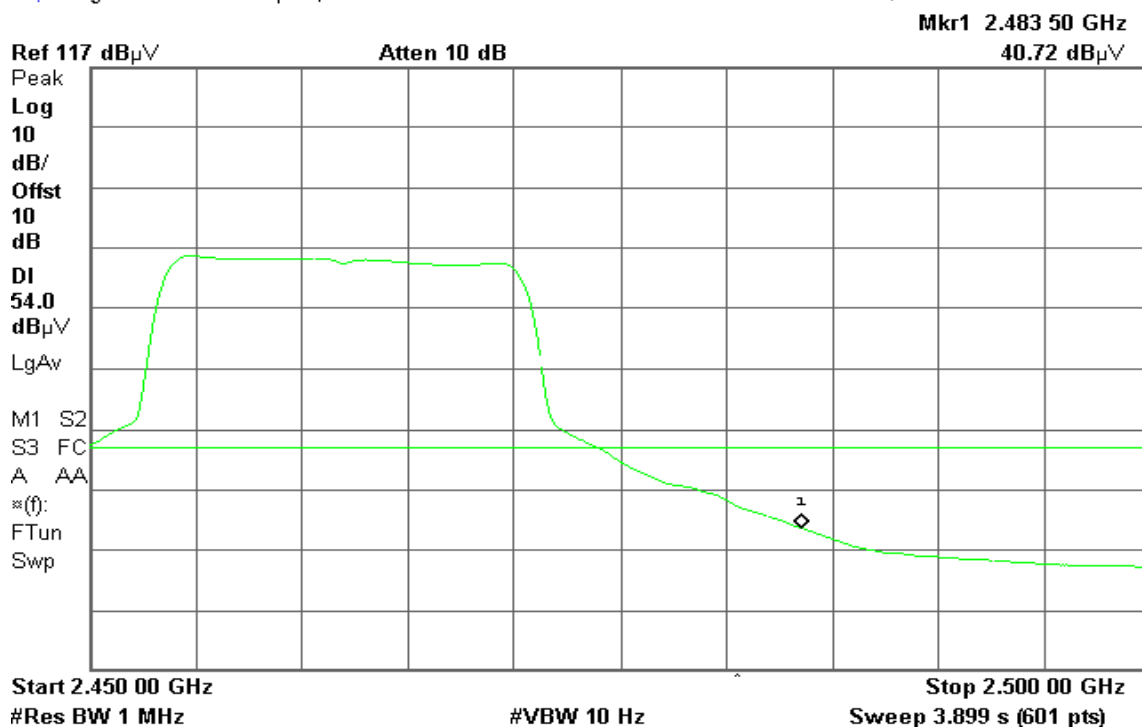


Detector mode: Average

Polarity: Horizontal

Agilent 18:22:08 Apr 4, 2006

T



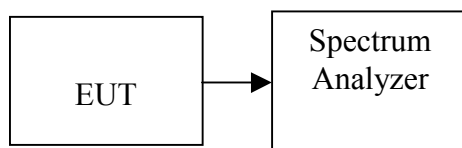


7.5 PEAK POWER SPECTRAL DENSITY

LIMIT

1. According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

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*****IEEE 802.11a***

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	5745	-10.26	8.00	PASS
Mid	5785	-9.91		PASS
High	5825	-8.81		PASS

IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-10.50	8.00	PASS
Mid	2437	-10.22		PASS
High	2462	-9.81		PASS

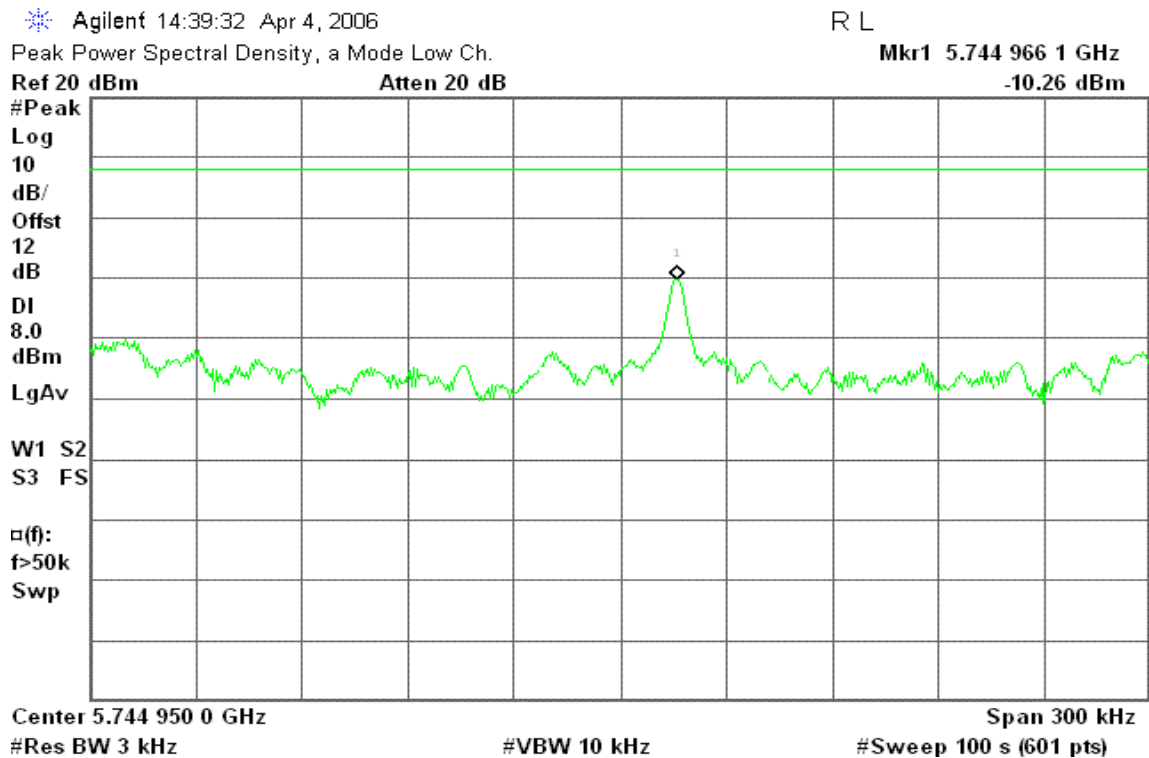
IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-9.23	8.00	PASS
Mid	2437	-9.55		PASS
High	2462	-8.45		PASS

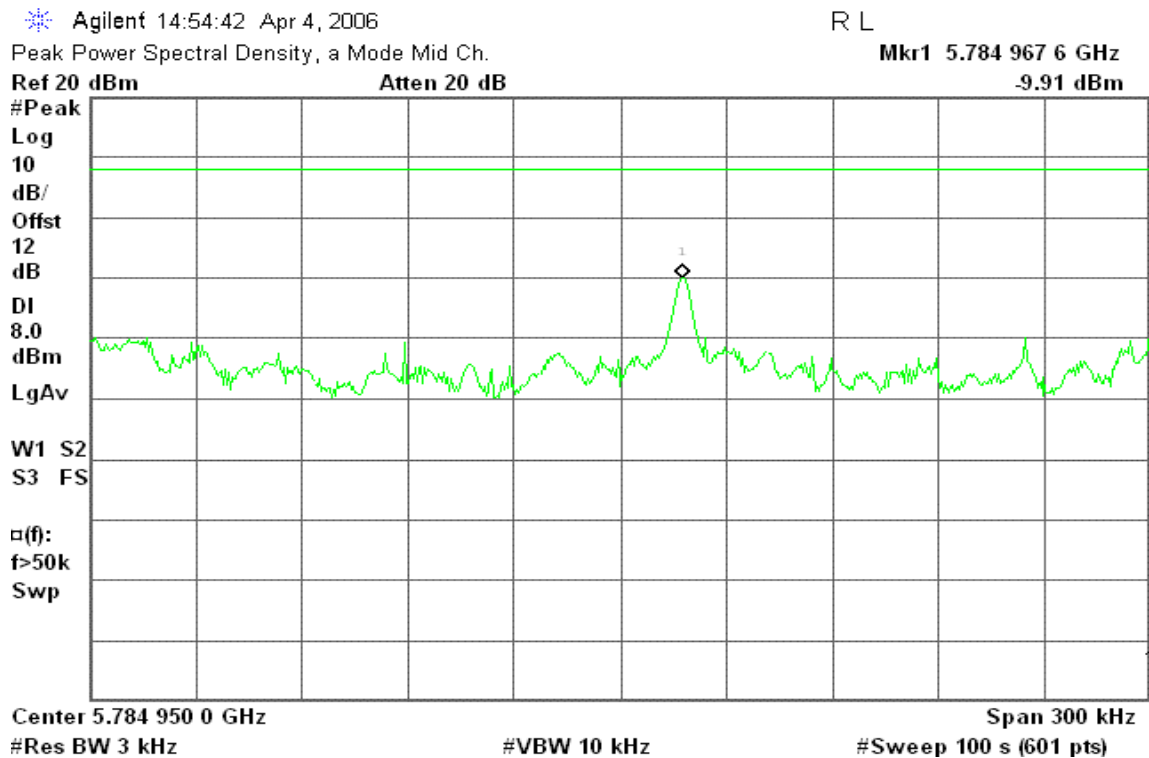


Test Plot

PPSD (IEEE 802.11a / CH Low)



PPSD (IEEE 802.11a / CH Mid)





PPSD (IEEE 802.11a / CH High)

Agilent 15:08:37 Apr 4, 2006

Peak Power Spectral Density, a Mode High Ch.

R L

Mkr1 5.824 968 6 GHz

Ref 20 dBm

Atten 20 dB

-8.81 dBm

#Peak

Log

10

dB/

Offst

12

dB

DI

8.0

dBm

LgAv

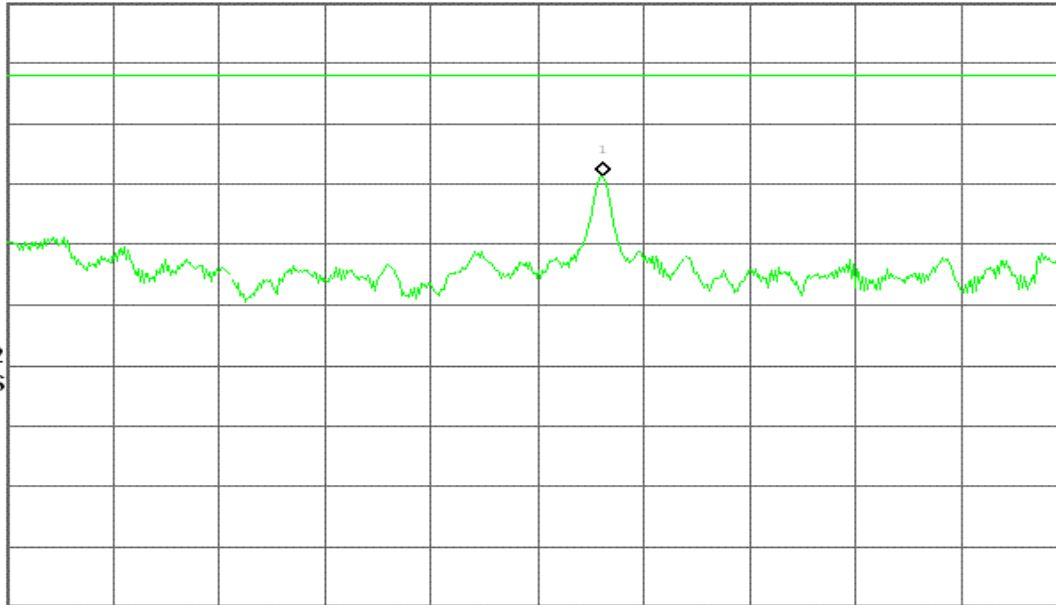
W1 S2

S3 FS

$\square(f)$:

f>50k

Swp



Center 5.824 950 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

PPSD (IEEE 802.11b / CH Low)

Agilent 12:25:08 Apr 4, 2006

Peak Power Spectral Density, b Mode Low Ch.

L

Mkr1 2.410 444 1 GHz

Ref 20 dBm

Atten 20 dB

-10.50 dBm

#Peak

Log

10

dB/

Offst

11.2

dB

DI

8.0

dBm

LgAv

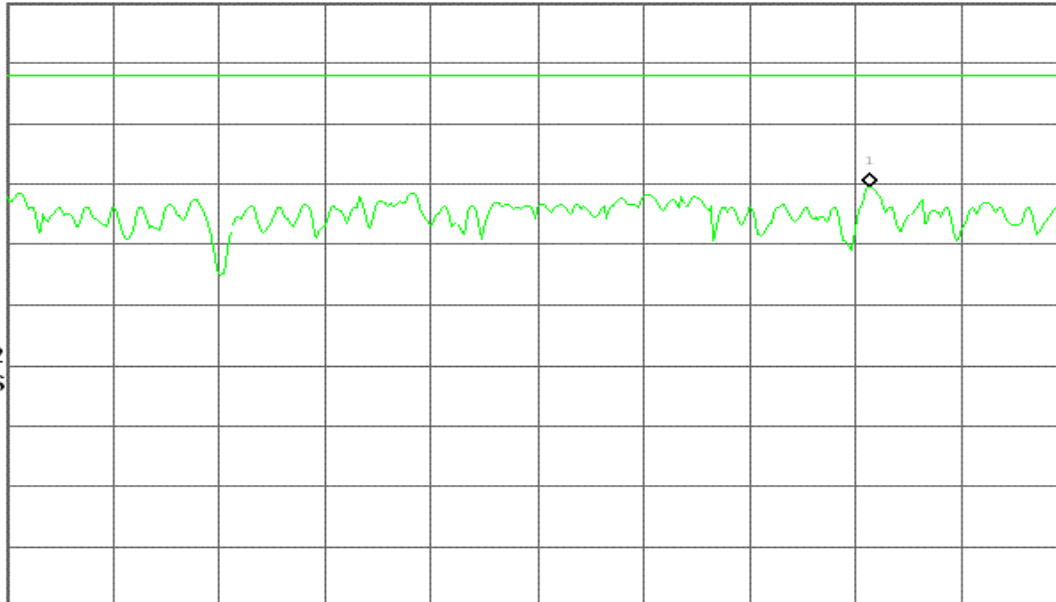
W1 S2

S3 FS

$\square(f)$:

f>50k

Swp



Center 2.410 350 0 GHz

Span 300 kHz

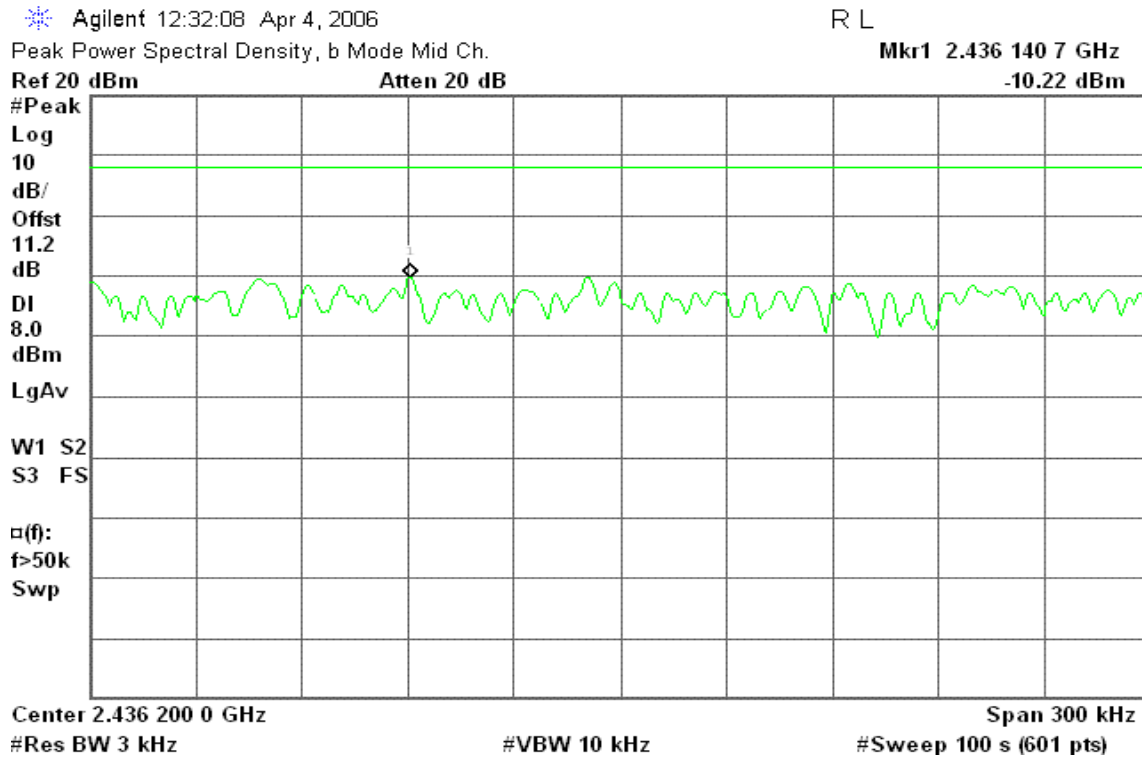
#Res BW 3 kHz

#VBW 10 kHz

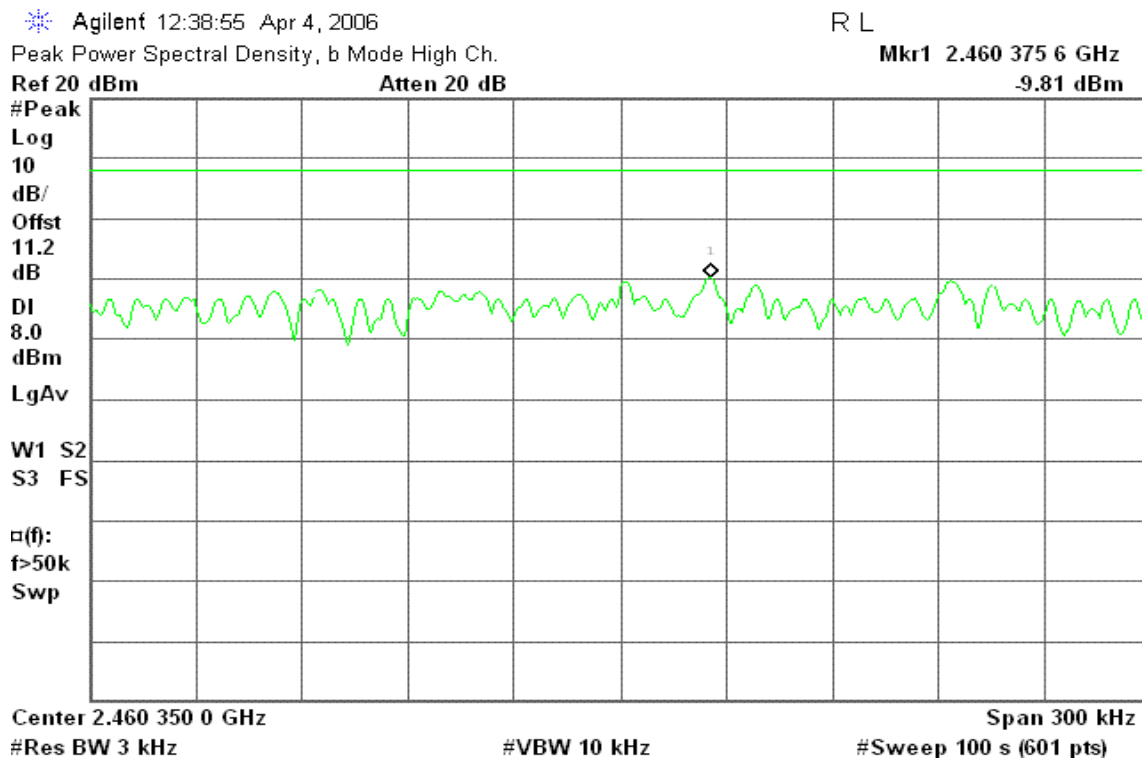
#Sweep 100 s (601 pts)



PPSD (IEEE 802.11b / CH Mid)



PPSD (IEEE 802.11b / CH High)





PPSD (IEEE 802.11g / CH Low)

Agilent 14:13:27 Apr 4, 2006

R L

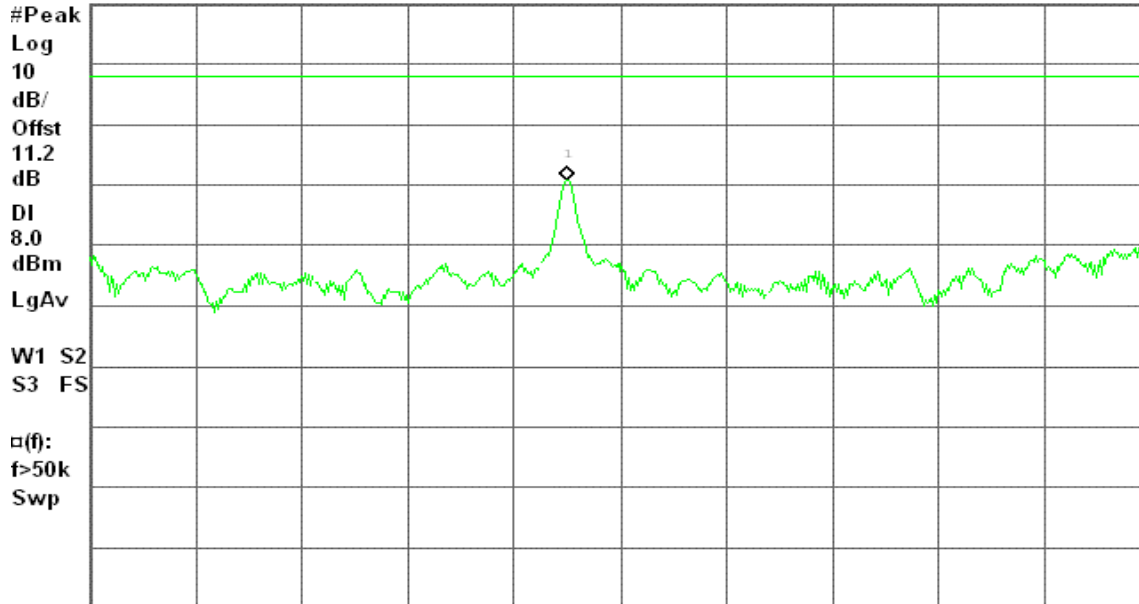
Peak Power Spectral Density, g Mode Low Ch.

Mkr1 2.411 984 9 GHz

Ref 20 dBm

Atten 20 dB

-9.23 dBm



Center 2.412 000 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

PPSD (IEEE 802.11g / CH Mid)

Agilent 14:19:59 Apr 4, 2006

R L

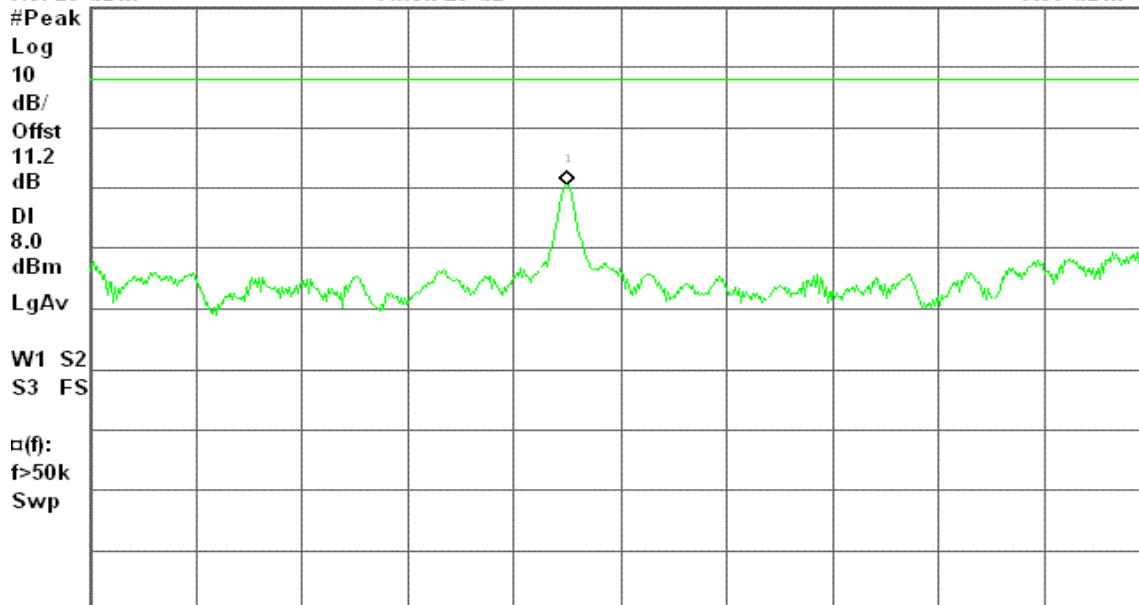
Peak Power Spectral Density, g Mode Mid Ch.

Mkr1 2.436 984 9 GHz

Ref 20 dBm

Atten 20 dB

-9.55 dBm



Center 2.437 000 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



PPSD (IEEE 802.11g / CH High)

Agilent 14:27:07 Apr 4, 2006

R L

Peak Power Spectral Density, g Mode High Ch.

Mkr1 2.461 984 9 GHz

Ref 20 dBm

Atten 20 dB

-8.45 dBm

#Peak

Log

10

dB/

Offst

11.2

dB

DI

8.0

dBm

LgAv

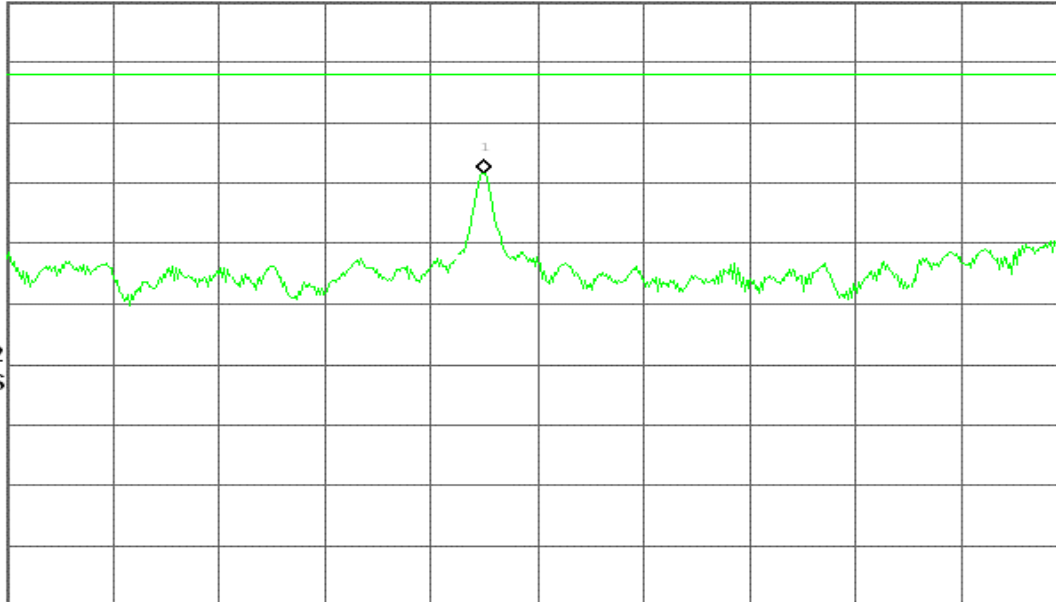
W1 S2

S3 FS

□(f):

f>50k

Swp



Center 2.462 000 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



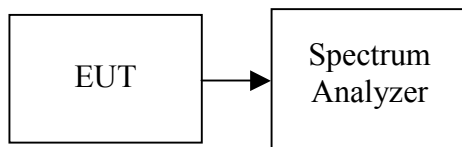
7.6 SPURIOUS EMISSIONS

7.6.1 Conducted Measurement

LIMIT

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, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

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 300 kHz.

Measurements are made over the 30MHz to 26GHz range for IEEE802.11b/g, 30MHz to 40GHz range for IEEE802.11a with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

No non-compliance noted.



Test Plot

IEEE 802.11a / CH Low

30MHz ~ 40GHz

Agilent 14:41:14 Apr 4, 2006

R L

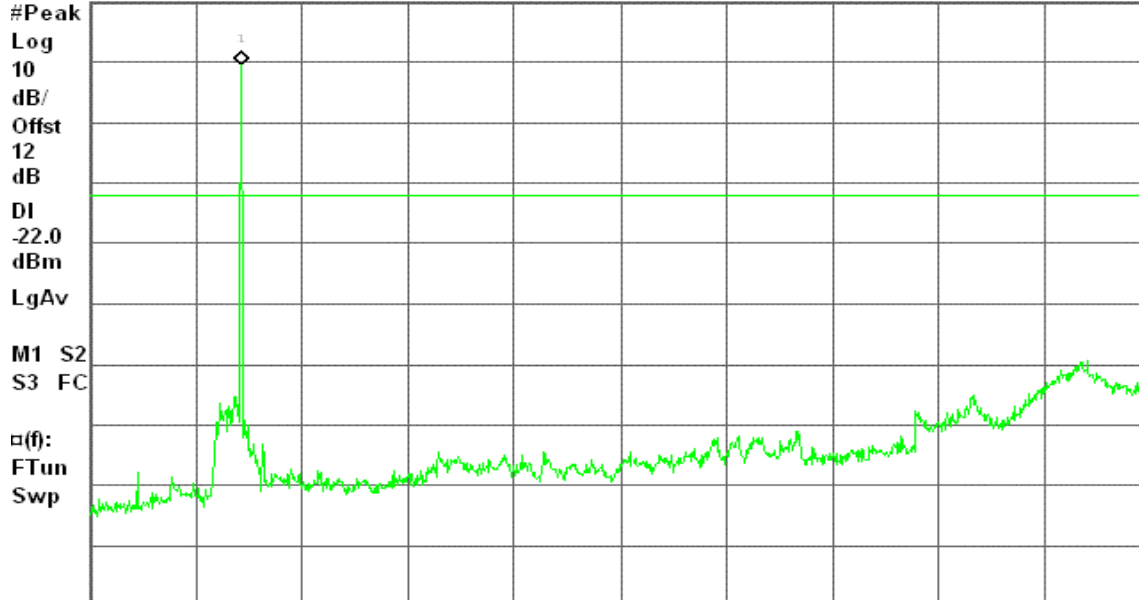
Spurious, a Mode Low Ch.

Mkr1 5.75 GHz

Ref 10 dBm

#Atten 8 dB

-0.49 dBm



Center 20.02 GHz

Span 39.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 4.819 s (1001 pts)

IEEE 802.11a / CH Mid

30MHz ~ 40GHz

Agilent 14:56:03 Apr 4, 2006

L

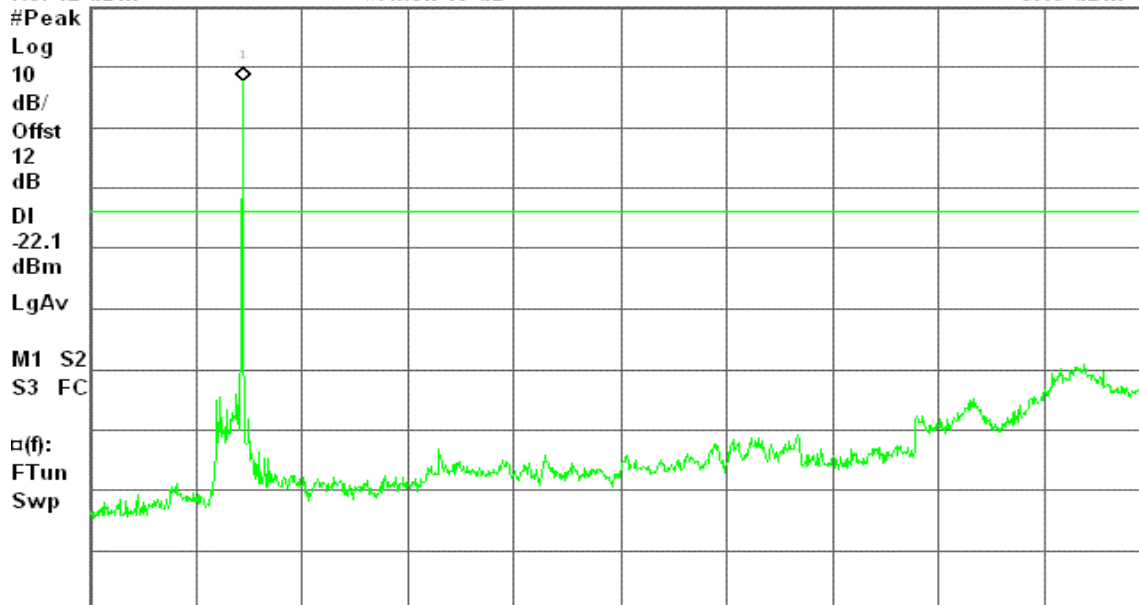
Spurious, a Mode Mid Ch.

Mkr1 5.79 GHz

Ref 12 dBm

#Atten 10 dB

-0.15 dBm



Center 20.02 GHz

Span 39.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 4.819 s (1001 pts)



IEEE 802.11a / CH High

30MHz ~ 40GHz

Agilent 15:10:05 Apr 4, 2006

L

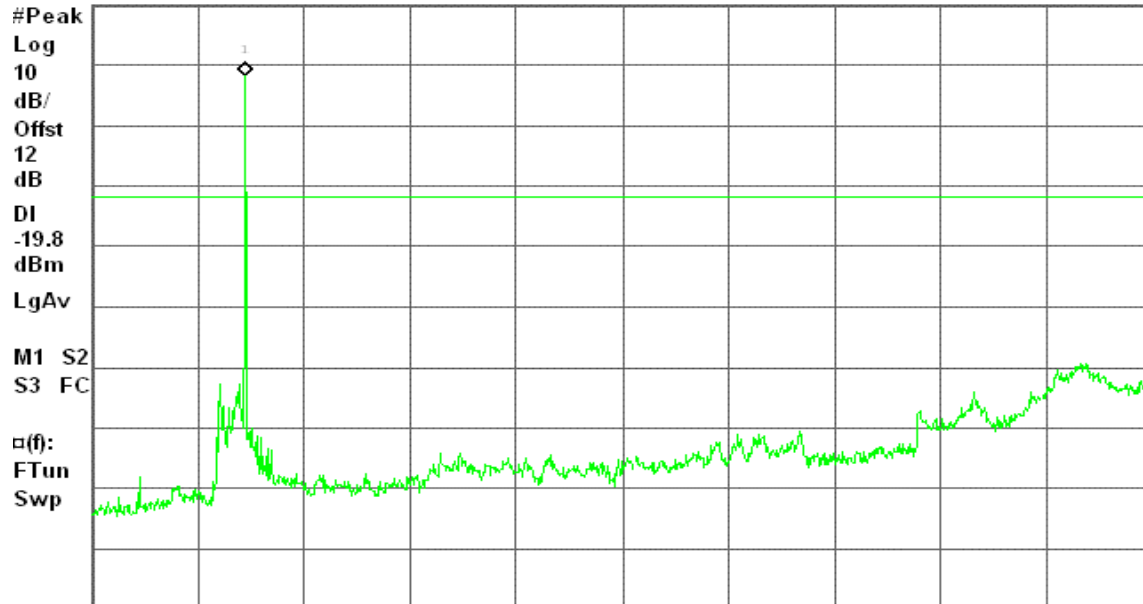
Spurious, a Mode High Ch.

Mkr1 5.83 GHz

Ref 12 dBm

#Atten 10 dB

0.16 dBm



Center 20.02 GHz

Span 39.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 4.819 s (1001 pts)

IEEE 802.11b / CH Low

30MHz ~ 26GHz

Agilent 12:26:39 Apr 4, 2006

L

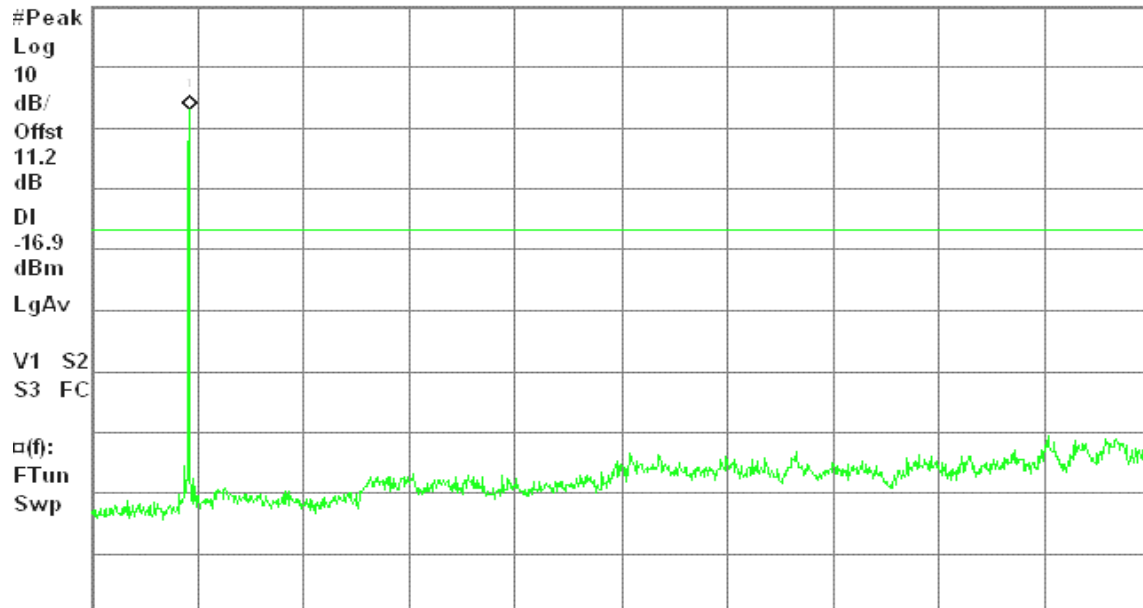
Spurious, b Mode Low Ch.

Mkr1 2.42 GHz

Ref 20 dBm

Atten 20 dB

3.09 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)



IEEE 802.11b / CH Mid

30MHz ~ 26GHz

Agilent 12:34:00 Apr 4, 2006

L

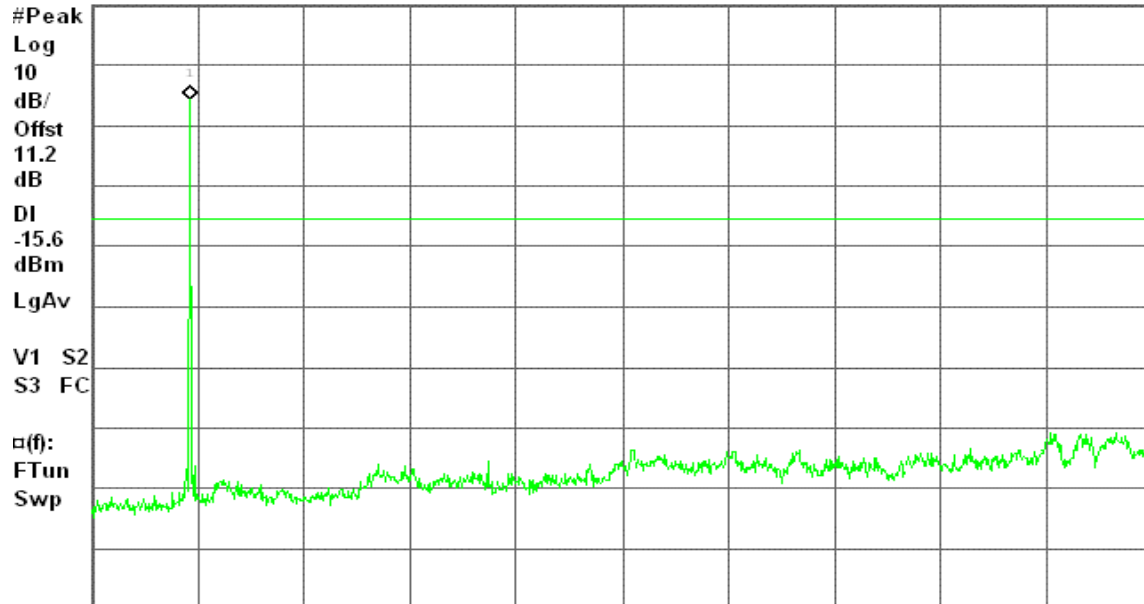
Spurious, b Mode Mid Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 20 dB

4.45 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

IEEE 802.11b / CH High

30MHz ~ 26GHz

Agilent 12:39:44 Apr 4, 2006

L

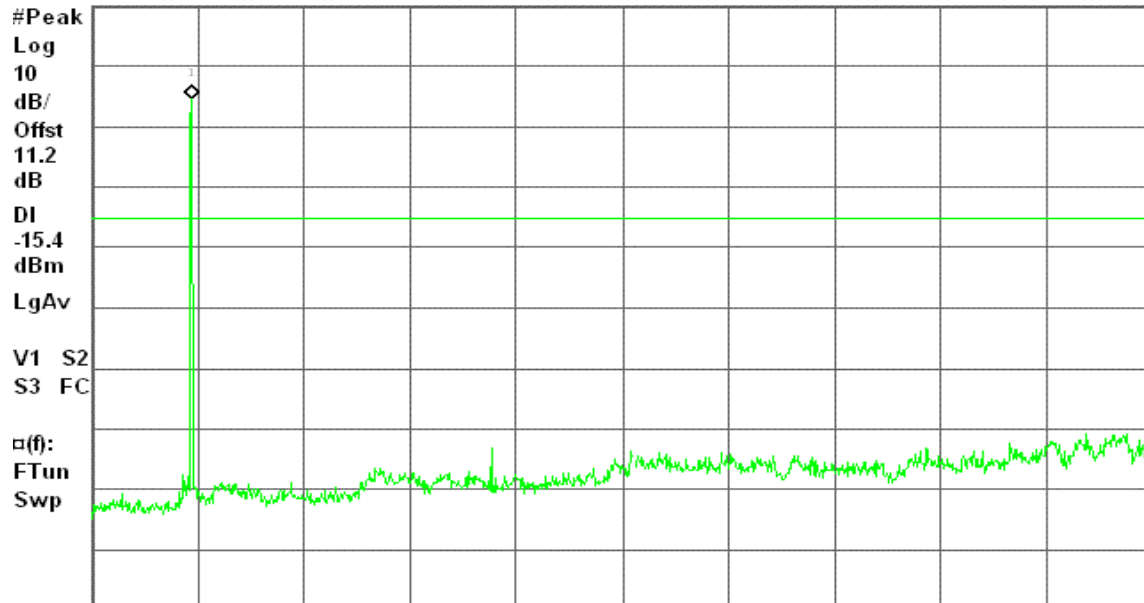
Spurious, b Mode High Ch.

Mkr1 2.47 GHz

Ref 20 dBm

Atten 20 dB

4.63 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)



IEEE 802.11g / CH Low

30MHz ~ 26GHz

Agilent 14:14:22 Apr 4, 2006

L

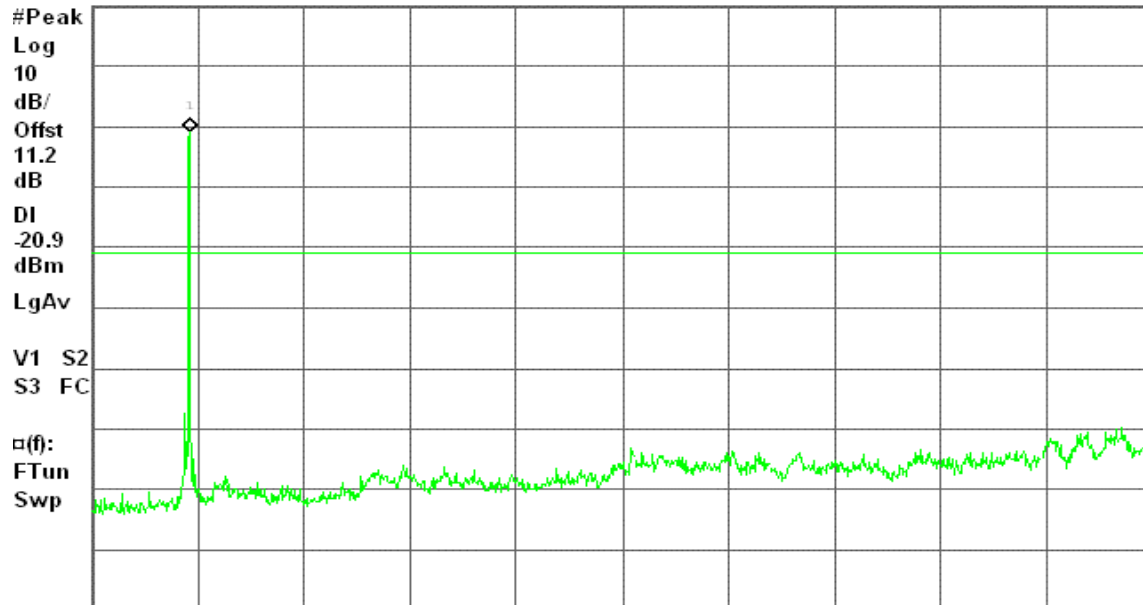
Spurious, g Mode Low Ch.

Mkr1 2.42 GHz

Ref 20 dBm

Atten 20 dB

-0.93 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

IEEE 802.11g / CH Mid

30MHz ~ 26GHz

Agilent 14:21:01 Apr 4, 2006

L

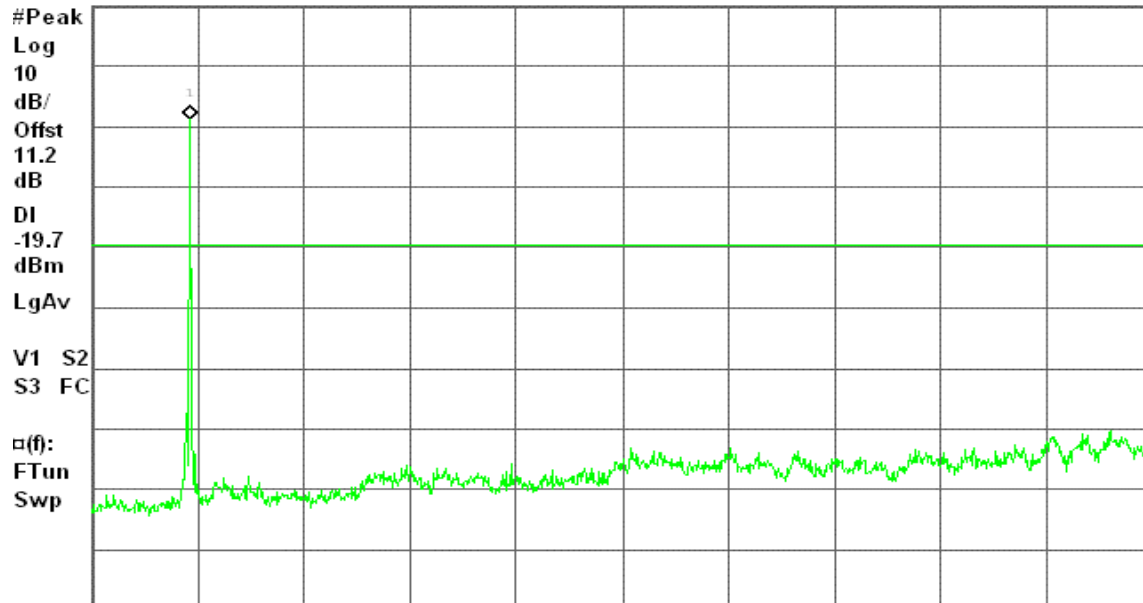
Spurious, g Mode Mid Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 20 dB

1.30 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)



IEEE 802.11g / CH High

30MHz ~ 26GHz

Agilent 14:27:56 Apr 4, 2006

L

Spurious, g Mode High Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 20 dB

-0.56 dBm

#Peak

Log

10

dB/

Offst

11.2

dB

DI

-20.6

dBm

LgAv

V1 S2

S3 FC

□(f):

FTun

Swp

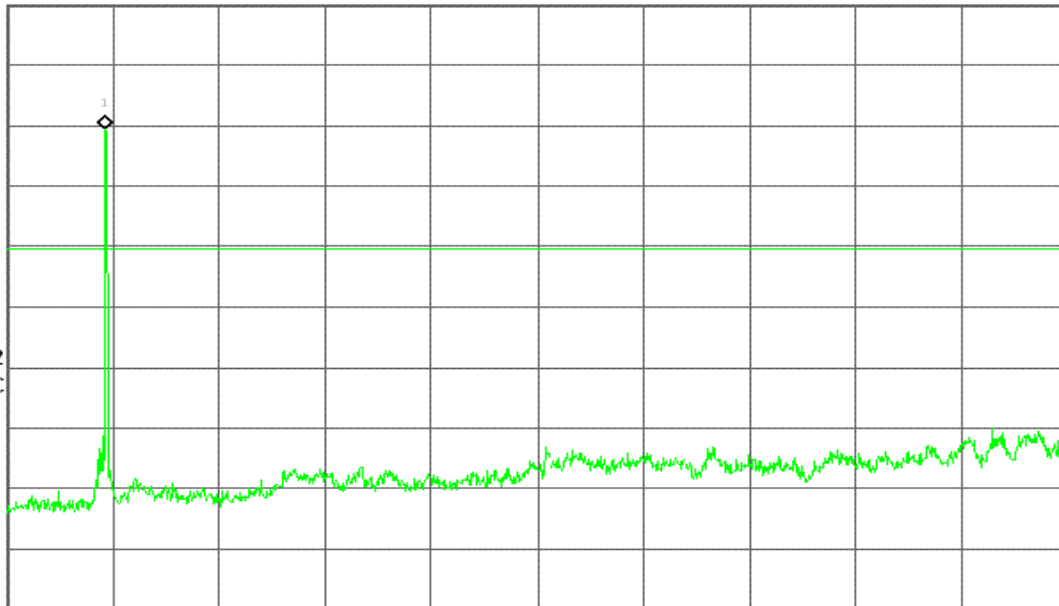
Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)





7.6.2 Radiated Emissions

LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

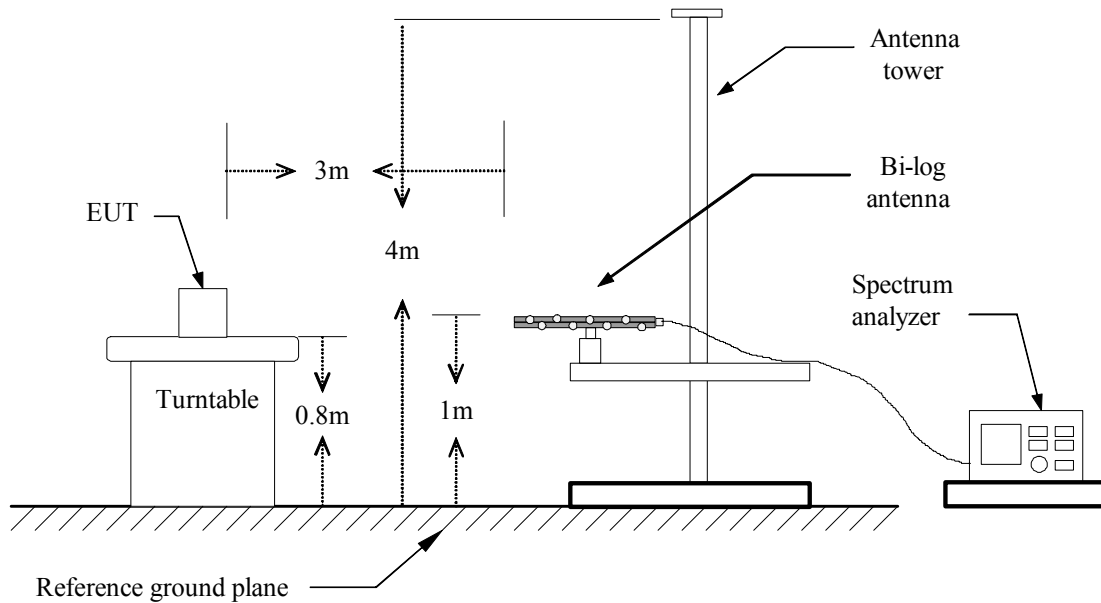
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

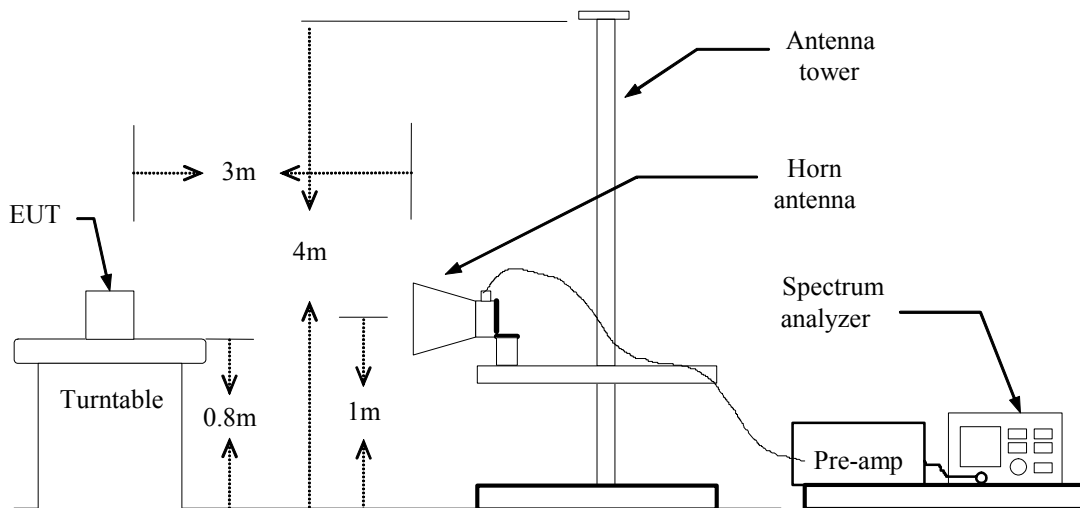
Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3-meter)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

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. Set the spectrum analyzer in the following setting as:
Below 1GHz:
RBW=100kHz / VBW=300kHz / Sweep=AUTO
Above 1GHz:
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

**TEST RESULTS****WLAN OPERATION****Below 1 GHz****Operation Mode:** Normal Link**Test Date:** April 7, 2006**Temperature:** 24.3°C**Tested by:** Rex Lai**Humidity:** 56 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
138.32	V	51.30	-19.82	31.48	43.50	-12.02	Peak
206.22	V	51.49	-21.10	30.40	43.50	-13.10	Peak
277.35	V	52.65	-18.90	33.75	46.00	-12.25	Peak
416.38	V	47.76	-15.56	32.20	46.00	-13.80	Peak
500.45	V	41.55	-13.43	28.12	46.00	-17.88	Peak
700.92	V	41.33	-10.75	30.58	46.00	-15.42	Peak
207.83	H	52.32	-21.45	30.87	43.50	-12.63	Peak
277.35	H	55.24	-18.90	36.34	46.00	-9.66	Peak
700.92	H	45.12	-10.75	34.37	46.00	-11.63	Peak
765.58	H	42.84	-9.83	33.01	46.00	-12.99	Peak
794.68	H	45.28	-9.31	35.97	46.00	-10.03	Peak
927.25	H	41.93	-7.73	34.20	46.00	-11.80	Peak

Remark:

- 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. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.*
- 4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.*
- 5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*

**Above 1 GHz****Operation Mode:** TX / IEEE 802.11a / CH Low**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4733.33	V	53.97	---	-7.81	46.16	---	74.00	54.00	-7.84	Peak
N/A										
4931.67	H	53.04	---	-7.77	45.27	---	74.00	54.00	-8.73	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11a / CH Mid**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4045.00	V	53.72	---	-8.42	45.31	---	74.00	54.00	-8.69	Peak
N/A										
4826.67	H	53.70	---	-7.79	45.91	---	74.00	54.00	-8.09	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11a / CH High**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
4850.00	V	53.70	---	-7.79	45.91	---	74.00	54.00	-8.09	Peak
N/A										
5223.33	H	53.93	---	-7.58	46.35	---	74.00	54.00	-7.65	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11b / CH Low**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2220.00	V	52.56	---	-10.63	41.93	---	74.00	54.00	-12.07	Peak
N/A										
2313.33	H	55.71	---	-10.51	45.20	---	74.00	54.00	-8.80	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11b / CH Mid**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2336.67	V	54.01	---	-10.48	43.53	---	74.00	54.00	-10.47	Peak
3308.33	V	44.15	---	-9.39	34.77	---	74.00	54.00	-19.23	Peak
N/A										
2336.67	H	55.67	---	-10.48	45.19	---	74.00	54.00	-8.81	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11b / CH High**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1923.33	V	52.56	---	-11.37	41.19	---	74.00	54.00	-12.81	Peak
N/A										
2373.33	H	52.74	---	-10.43	42.31	---	74.00	54.00	-11.69	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11g / CH Low**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2016.67	V	52.97	---	-10.89	42.09	---	74.00	54.00	-11.91	Peak
N/A										
2313.33	H	55.67	---	-10.51	45.16	---	74.00	54.00	-8.84	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11g / CH Mid**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2026.67	V	52.39	---	-10.88	41.51	---	74.00	54.00	-12.49	Peak
N/A										
1370.00	H	53.02	---	-14.18	38.84	---	74.00	54.00	-15.16	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11g / CH High**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2273.33	V	53.69	---	-10.56	43.13	---	74.00	54.00	-10.87	Peak
N/A										
1880.00	H	53.60	---	-11.63	41.97	---	74.00	54.00	-12.03	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with “ N/A ” remark, 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.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



CONDITION B: BLUETOOTH OPERATION

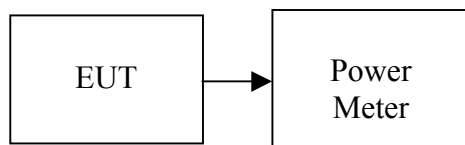
7.7 PEAK POWER

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.

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

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2402	2.94	0.00197	0.125	PASS
Mid	2441	3.52	0.00225		PASS
High	2480	3.88	0.00244		PASS

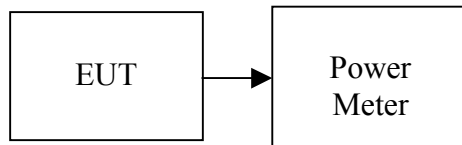


7.8 AVERAGE POWER

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

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

TEST RESULTS

No non-compliance noted.

Test Data

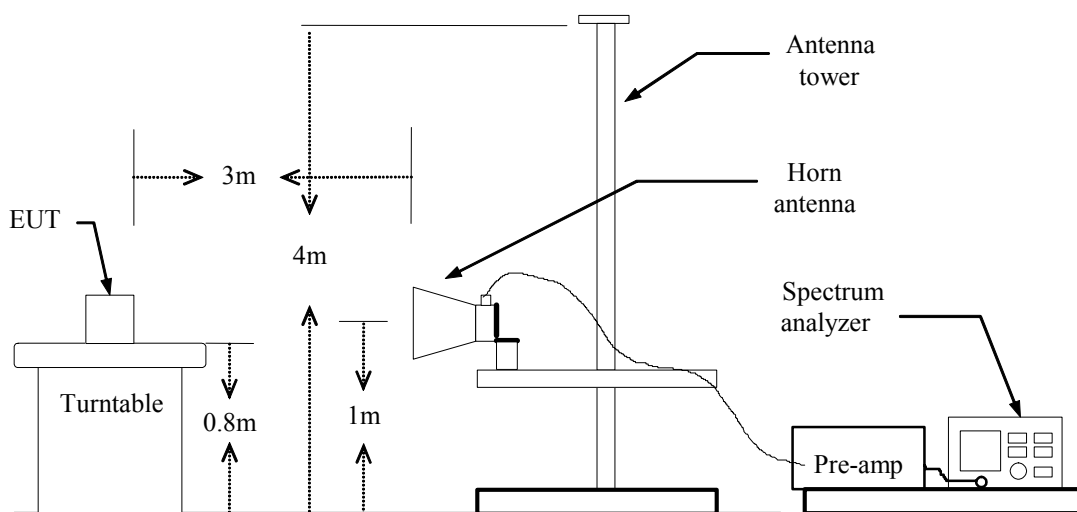
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2402	-0.19	0.00096
Mid	2441	0.47	0.00111
High	2480	0.90	0.00123

7.9 BAND EDGES MEASUREMENT

LIMIT

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, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

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:
 - (c) PEAK: RBW=VBW=1MHz / Sweep=AUTO
 - (d) 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.



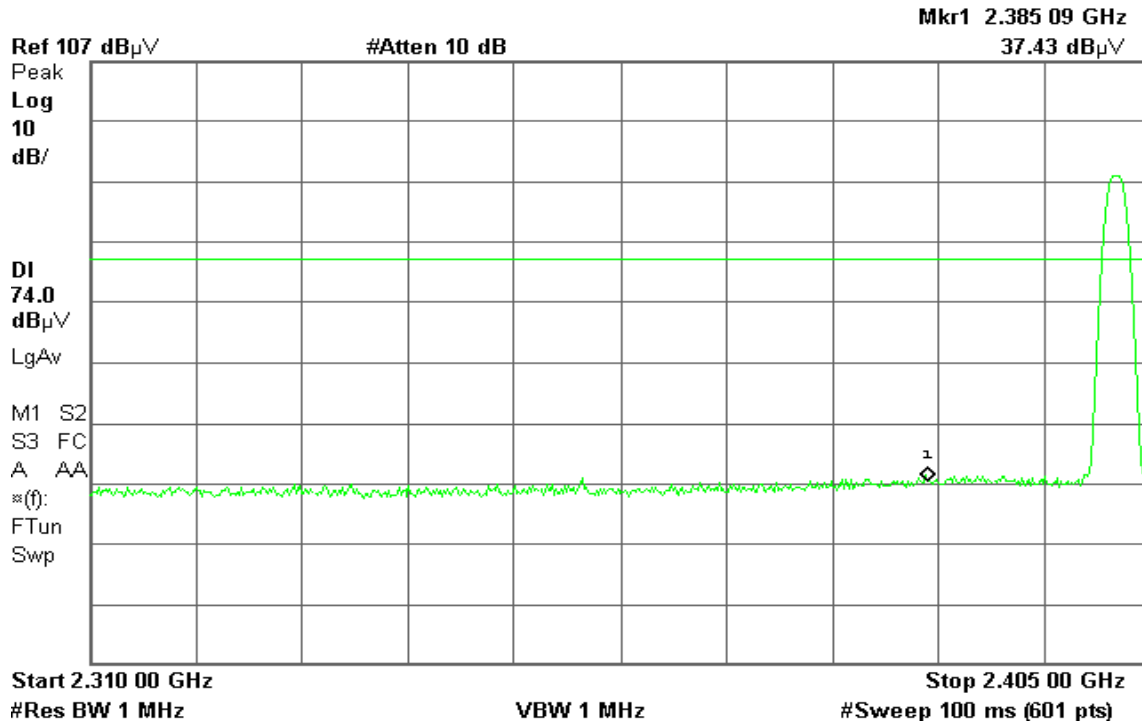
Band Edges (Bluetooth mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 18:26:06 Apr 6, 2006

T

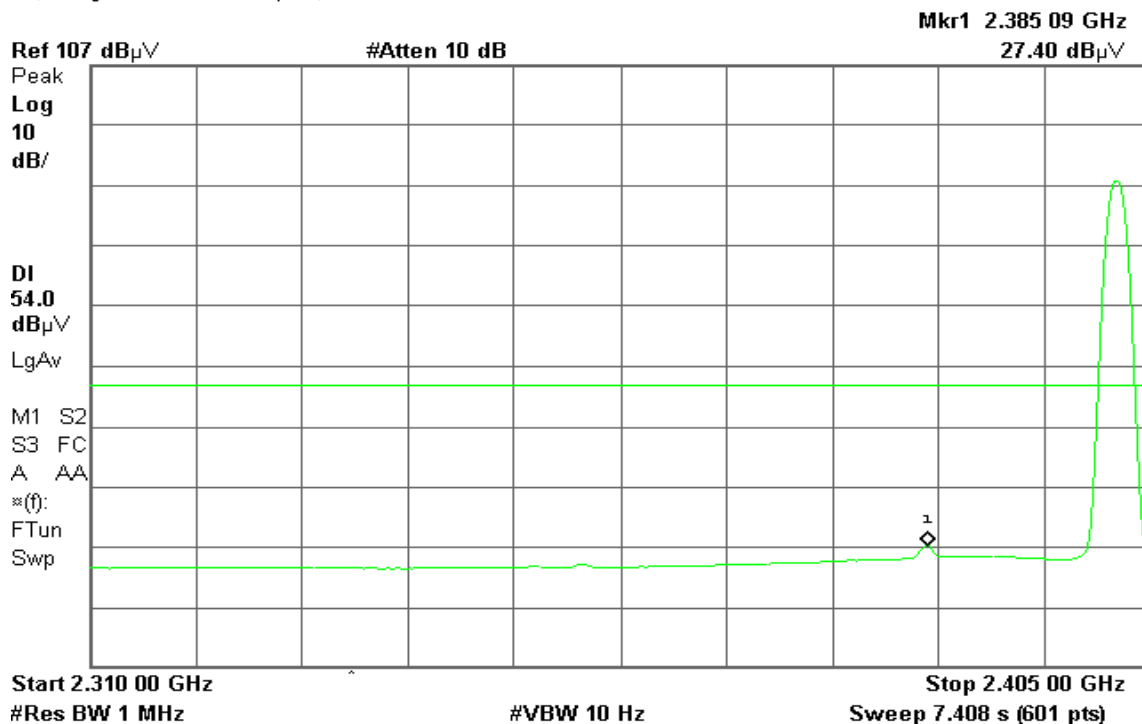


Detector mode: Average

Polarity: Vertical

Agilent 18:25:33 Apr 6, 2006

T





Detector mode: Peak

Polarity: Horizontal

Agilent 18:30:49 Apr 6, 2006

T

Ref 107 dB μ V

#Atten 10 dB

Mkr1 2.385 09 GHz

39.84 dB μ V

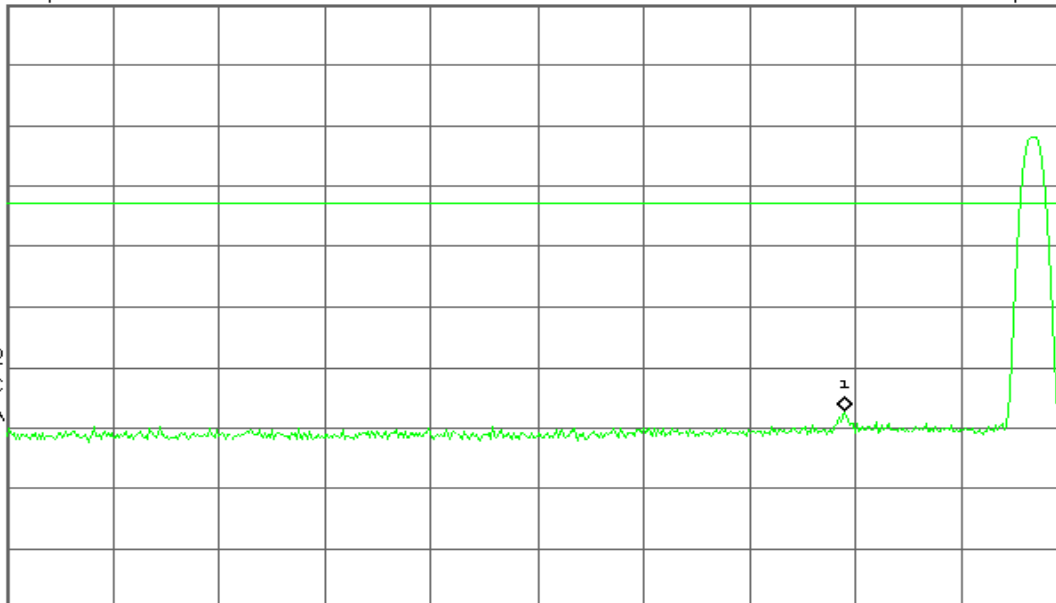
Peak
Log
10
dB/

DI
74.0
dB μ V

LgAv

M1 S2
S3 FC
A AA

*(f):
FTun
Swp



Start 2.310 00 GHz

#Res BW 1 MHz

VBW 1 MHz

Stop 2.405 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent 18:21:30 Apr 6, 2006

R T

Ref 96.99 dB μ V

#Atten 0 dB

Mkr1 2.385 25 GHz

29.17 dB μ V

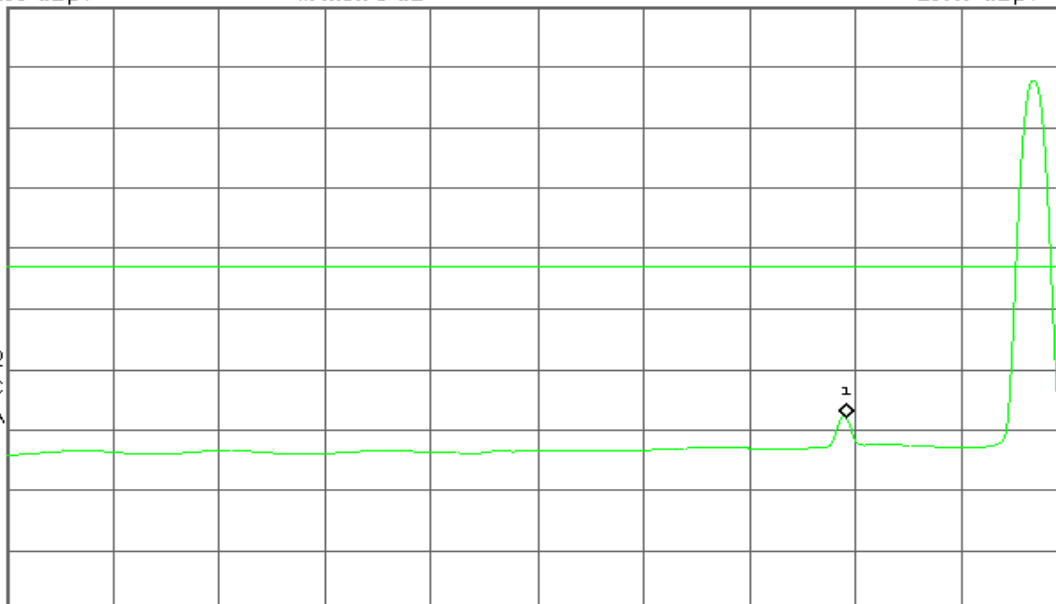
Peak
Log
10
dB/

DI
54.0
dB μ V

LgAv

M1 S2
S3 FC
A AA

*(f):
FTun
Swp



Start 2.310 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.405 00 GHz

Sweep 7.408 s (601 pts)



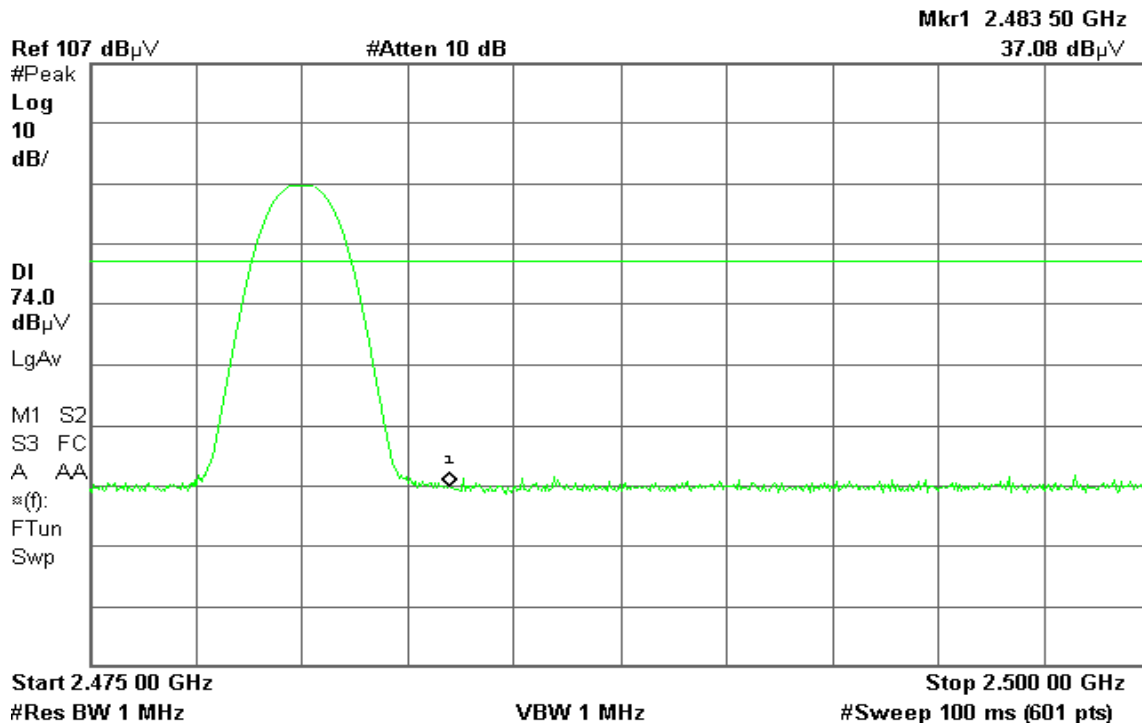
Band Edges (Bluetooth mode / CH High)

Detector mode: Peak

Polarity: Vertical

Agilent 19:39:36 Apr 6, 2006

T

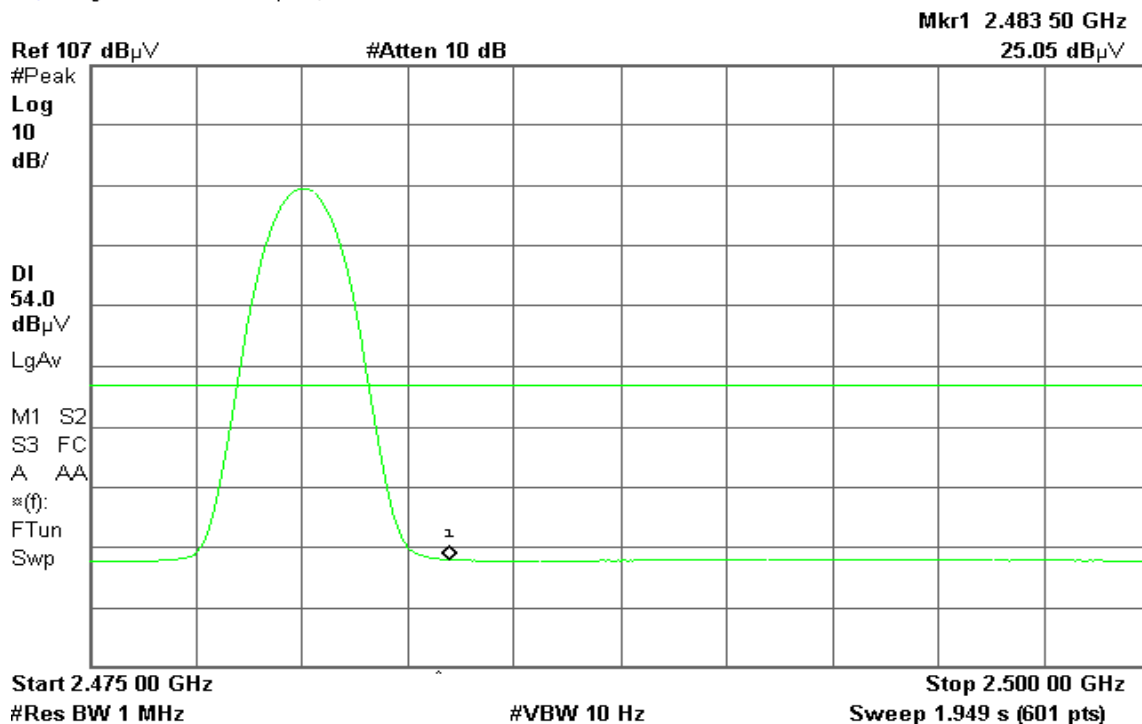


Detector mode: Average

Polarity: Vertical

Agilent 19:39:14 Apr 6, 2006

T



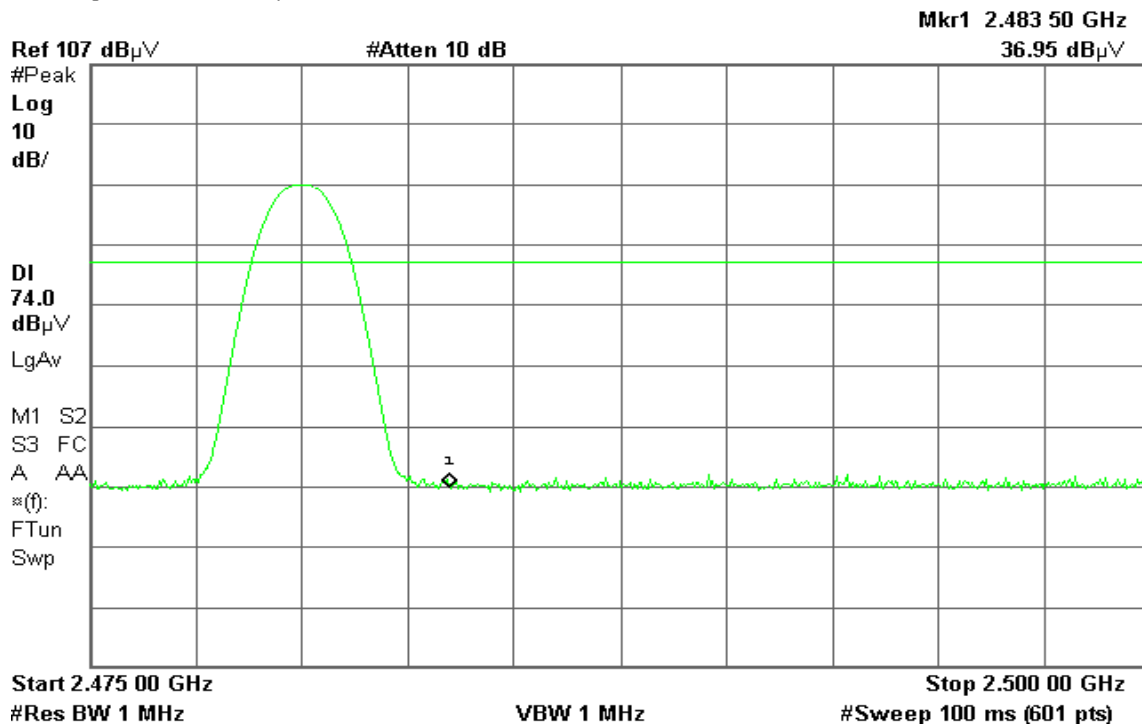


Detector mode: Peak

Polarity: Horizontal

Agilent 18:50:44 Apr 6, 2006

R T

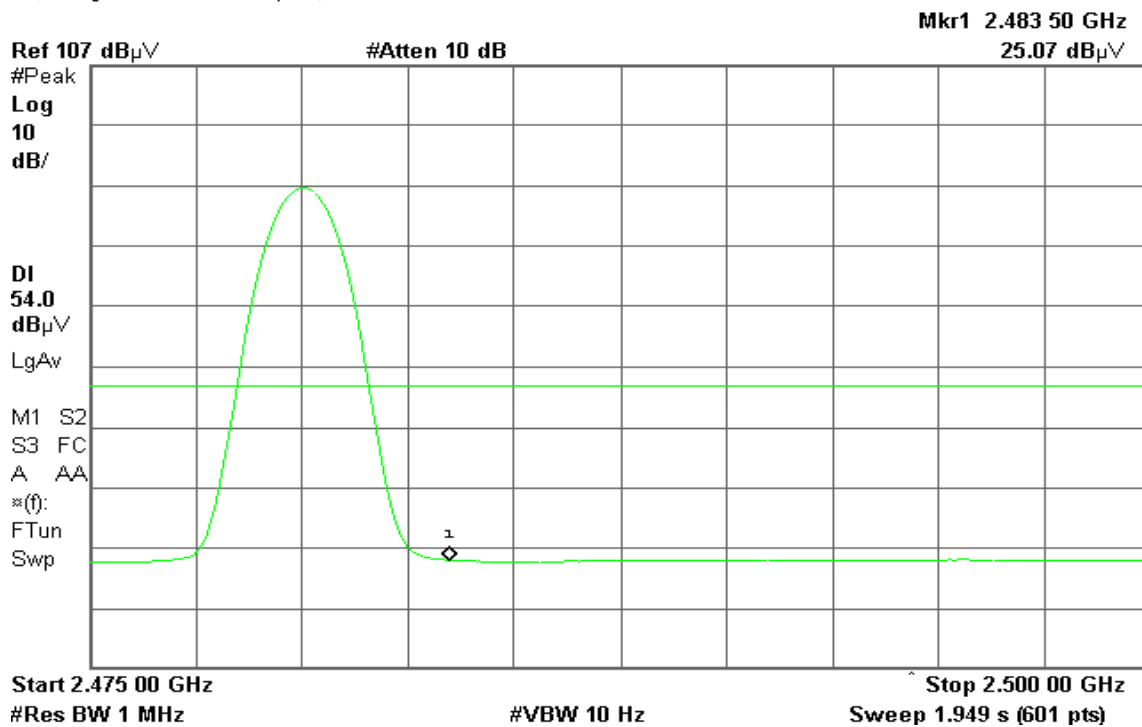


Detector mode: Average

Polarity: Horizontal

Agilent 18:49:53 Apr 6, 2006

R T



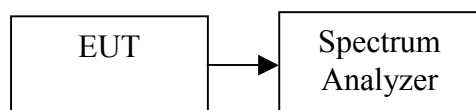


7.10 PEAK POWER SPECTRAL DENSITY

LIMIT

1. According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table 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 the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 300kHz, Sweep=100s
4. Record the max. reading.
5. Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

No non-compliance noted

Test Data

Channel	Frequency	PPSD (dBm)	Limit (dBm)	Result
Low	2402	-13.96	8.00	PASS
Mid	2441	-13.29		PASS
High	2480	-12.82		PASS

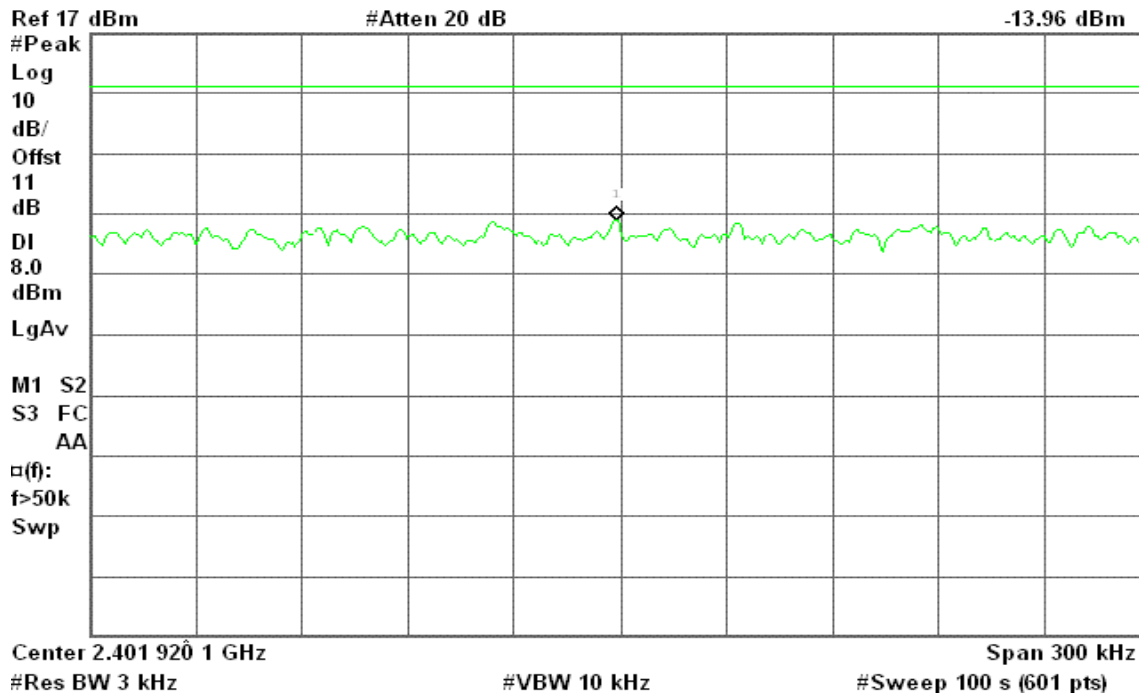


Test Plot

PPSD (Bluetooth mode / CH Low)

Agilent 12:25:22 Apr 10, 2006

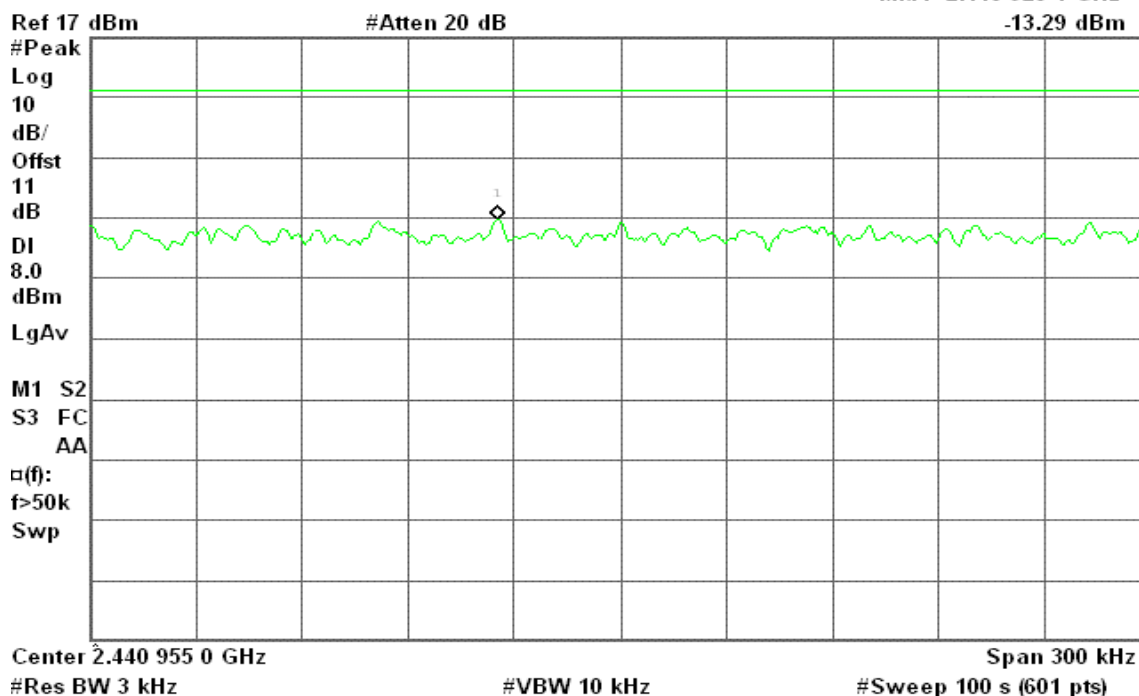
T
Mkr1 2.401 918 6 GHz
-13.96 dBm



PPSD (Bluetooth mode / CH Mid)

Agilent 12:33:28 Apr 10, 2006

T
Mkr1 2.440 920 4 GHz
-13.29 dBm

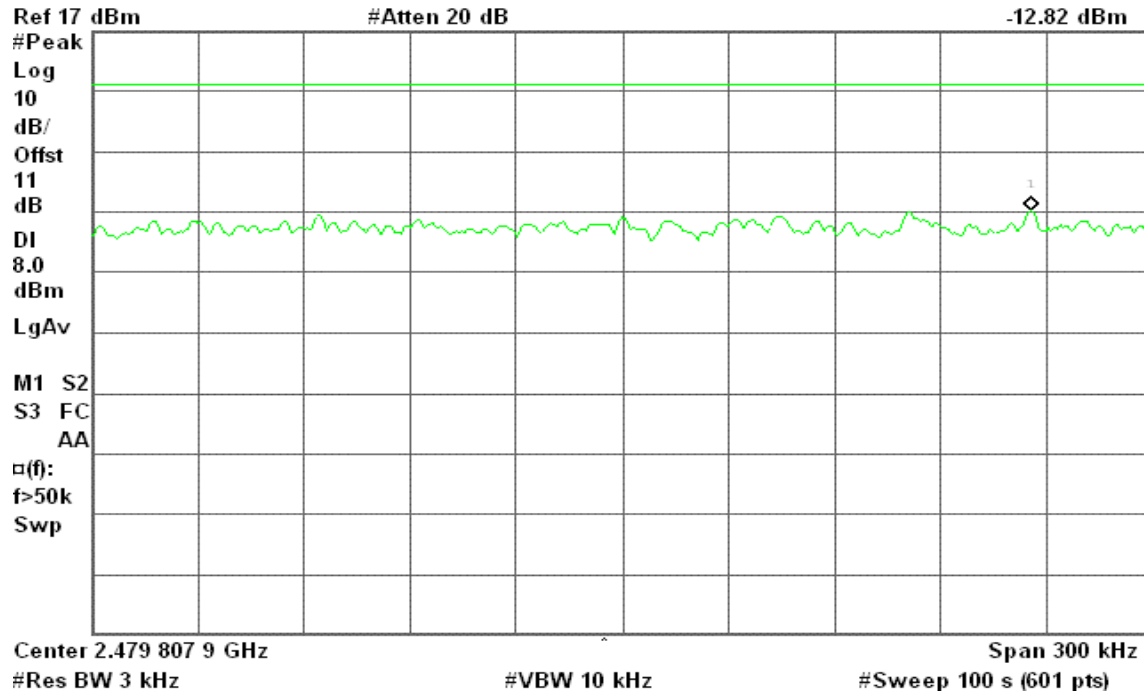




PPSD (Bluetooth mode / CH High)

Agilent 12:36:59 Apr 10, 2006

T
Mkr1 2.479 923 5 GHz





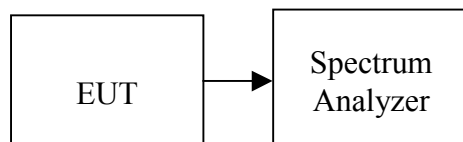
7.11 FREQUENCY SEPARATION

LIMIT

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table 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 the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel.
4. Set the spectrum analyzer as RBW = 30kHz, VBW = 100kHz, Span = 3MHz, Sweep = auto.
5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

TEST RESULTS

No non-compliance noted

Test Data

Channel Separation (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Result
1.00	1350	900	Pass



Test Plot

Measurement of Channel Separation

* Agilent 12:46:59 Apr 10, 2006

T

Mkr3 2.442 020 GHz

-4.10 dBm

Ref 17 dBm

#Atten 20 dB

#Peak

Log

10

dB/

Offst

11

dB

LgAv

M1 S2

Center 2.441 000 GHz

Span 3 MHz

#Res BW 30 kHz

#VBW 100 kHz

Sweep 3.2 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.440 020 GHz	-4.14 dBm
2	(1)	Freq	2.441 020 GHz	-3.64 dBm
3	(1)	Freq	2.442 020 GHz	-4.10 dBm

Measurement of 20dB Bandwidth

* Agilent 12:08:43 Apr 10, 2006

T

Δ Mkr2 1.350 MHz

-0.33 dB

Ref 17 dBm

#Atten 20 dB

#Peak

Log

10

dB/

Offst

11

dB

DI

-28.9

dBm

LgAv

M1 S2

Center 2.402 000 GHz

Span 3 MHz

#Res BW 10 kHz

#VBW 30 kHz

Sweep 28.68 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.402 215 GHz	-8.92 dBm
2R	(1)	Freq	2.401 330 GHz	-29.68 dBm
2Δ	(1)	Freq	1.350 MHz	-0.33 dB

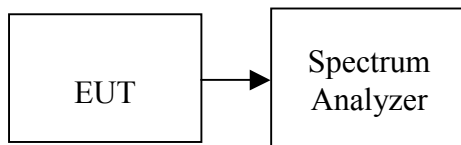


7.12 NUMBER OF HOPPING FREQUENCY

LIMIT

According to §15.247(a)(1)(ii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 75 hopping frequencies.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table 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 the spectrum analyzer.
3. Set spectrum analyzer Start=2400MHz, Stop = 2441.5MHz, Sweep = auto and Start=2441.5MHz, Stop = 2483.5MHz, Sweep = auto.
4. Set the spectrum analyzer as RBW, VBW=510kHz.
5. Max hold, view and count how many channel in the band.

TEST RESULTS

No non-compliance noted

Test Data

Result (No. of CH)	Limit (No. of CH)	Result
79	>75	PASS



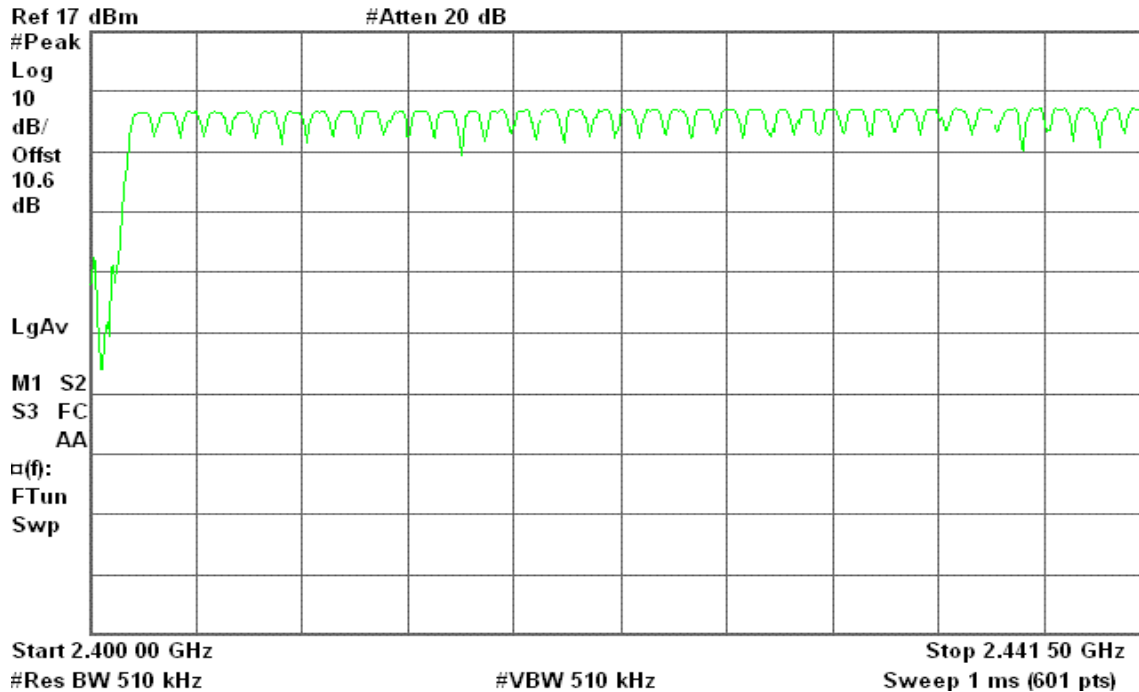
Test Plot

Channel Number

2.4 GHz – 2.441 GHz

Agilent 16:03:22 Apr 10, 2006

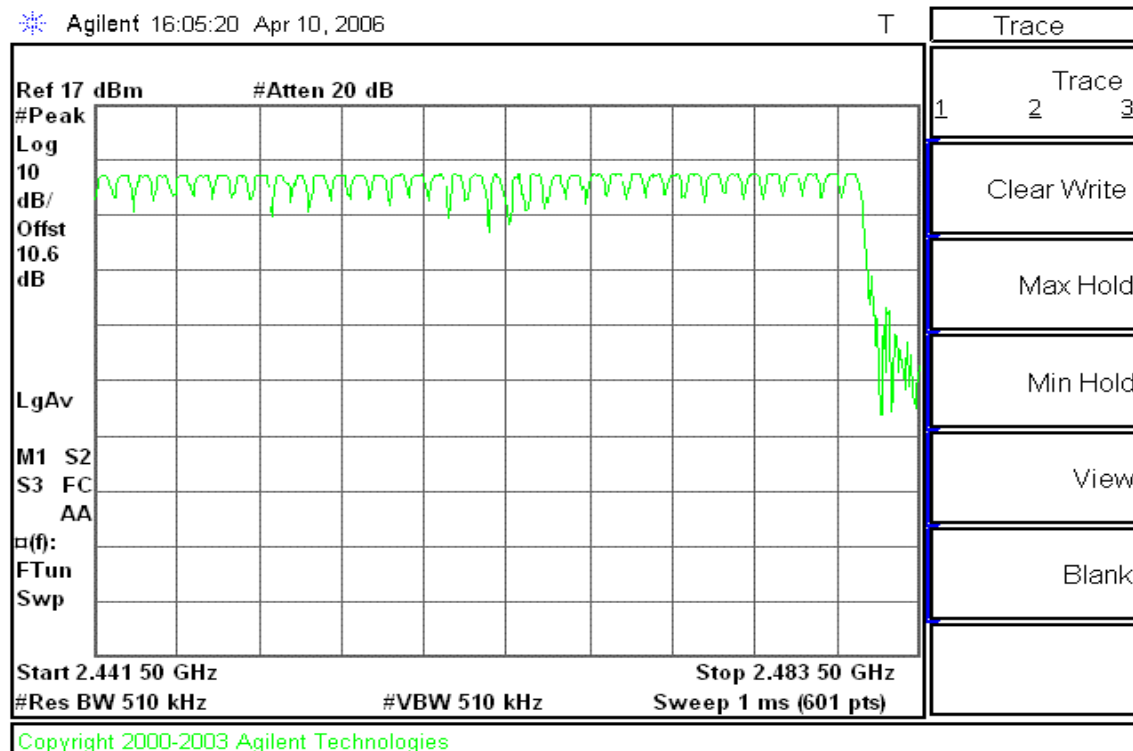
T



2.441 GHz – 2.4835 GHz

Agilent 16:05:20 Apr 10, 2006

T



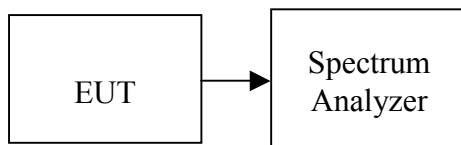


7.13 TIME OF OCCUPANCY (DWELL TIME)

LIMIT

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table 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 the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.
5. Repeat above procedures until all frequency measured were complete.



TEST RESULTS

No non-compliance noted

Test Data

DH 1

CH Low: $0.400 * (1600/2)/79 * 31.60 = 198.40$ (ms)

CH Mid: $0.400 * (1600/2)/79 * 31.60 = 185.60$ (ms)

CH High: $0.400 * (1600/2)/79 * 31.60 = 185.60$ (ms)

CH	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	0.62	198.40	31.60	400.00	PASS
Mid	0.58	185.60	31.60		PASS
High	0.58	185.60	31.60		PASS

DH 3

CH Low: $1.643 * (1600/4)/79 * 31.60 = 300.80$ (ms)

CH Mid: $1.643 * (1600/4)/79 * 31.60 = 291.20$ (ms)

CH High: $1.654 * (1600/4)/79 * 31.60 = 291.20$ (ms)

CH	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	1.88	300.80	31.60	400.00	PASS
Mid	1.82	291.20	31.60		PASS
High	1.82	291.20	31.60		PASS

DH 5

CH Low: $2.900 * (1600/6)/79 * 31.60 = 333.87$ (ms)

CH Mid: $2.900 * (1600/6)/79 * 31.60 = 328.53$ (ms)

CH High: $2.900 * (1600/6)/79 * 31.60 = 332.80$ (ms)

CH	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	3.13	333.87	31.60	400.00	PASS
Mid	3.08	328.53	31.60		PASS
High	3.12	332.80	31.60		PASS



Test Plot

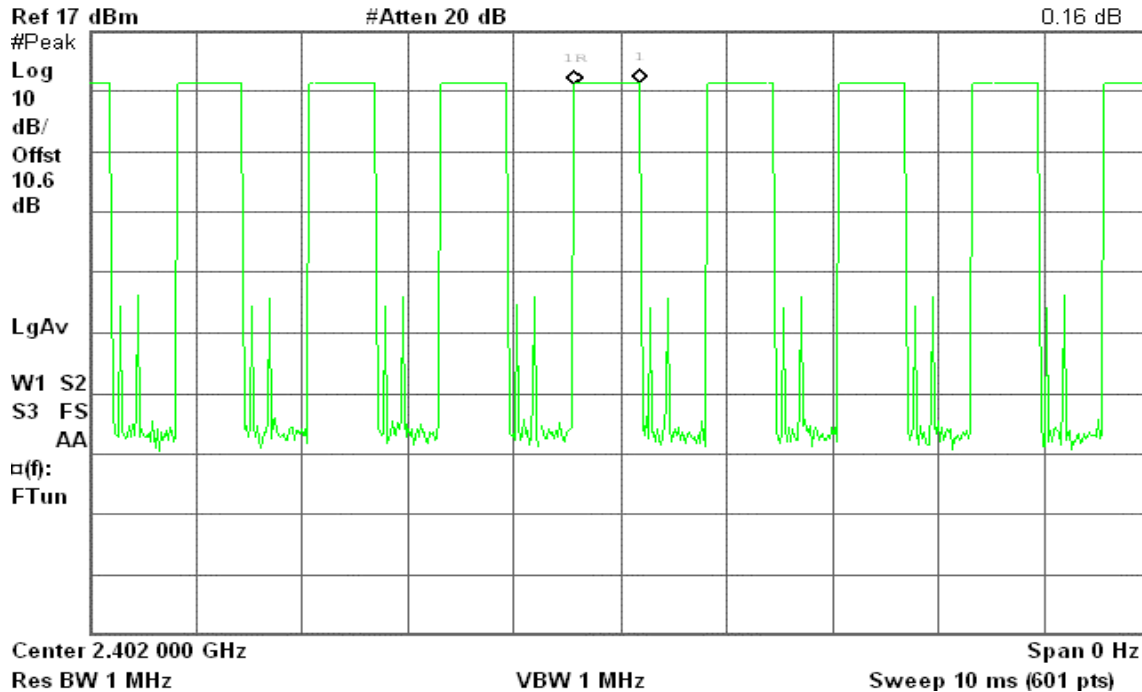
DH 1

(Bluetooth / CH Low)

Agilent 16:10:33 Apr 10, 2006

T

Δ Mkr1 616.7 μs
0.16 dB

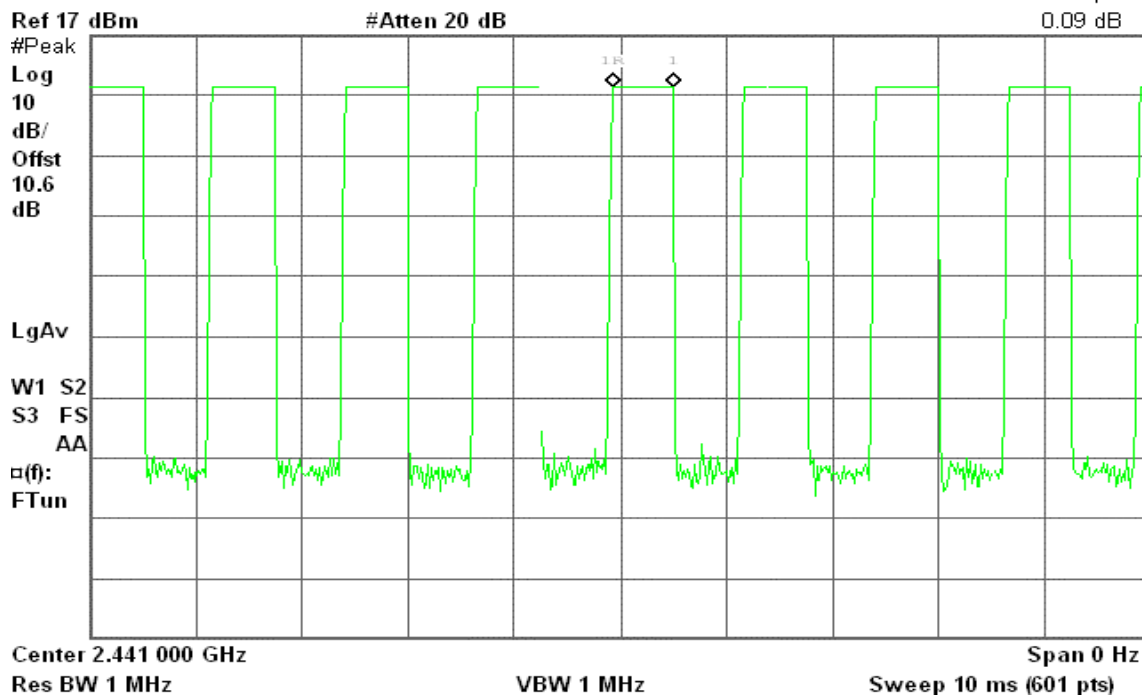


(Bluetooth / CH Mid)

Agilent 16:11:34 Apr 10, 2006

T

Δ Mkr1 583.3 μs
0.09 dB





(Bluetooth / CH High)

Agilent 16:12:32 Apr 10, 2006

T

Δ Mkr1 583.3 μs
-0.01 dB



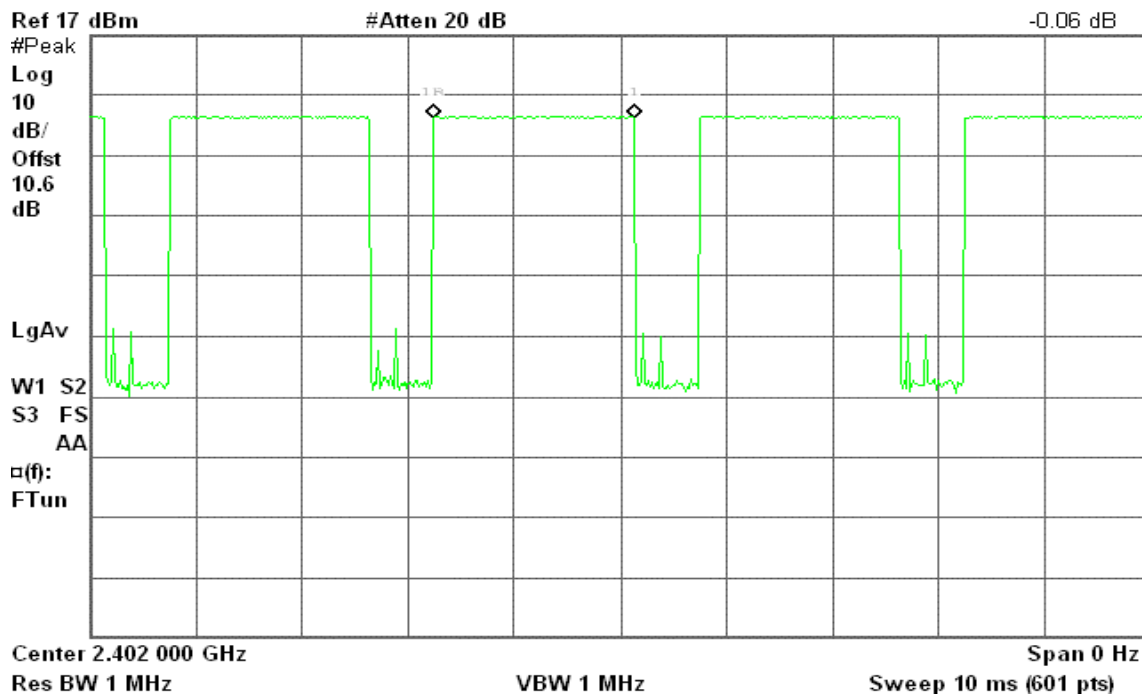
DH 3

(Bluetooth / CH Low)

Agilent 16:33:43 Apr 10, 2006

T

Δ Mkr1 1.883 ms
-0.06 dB



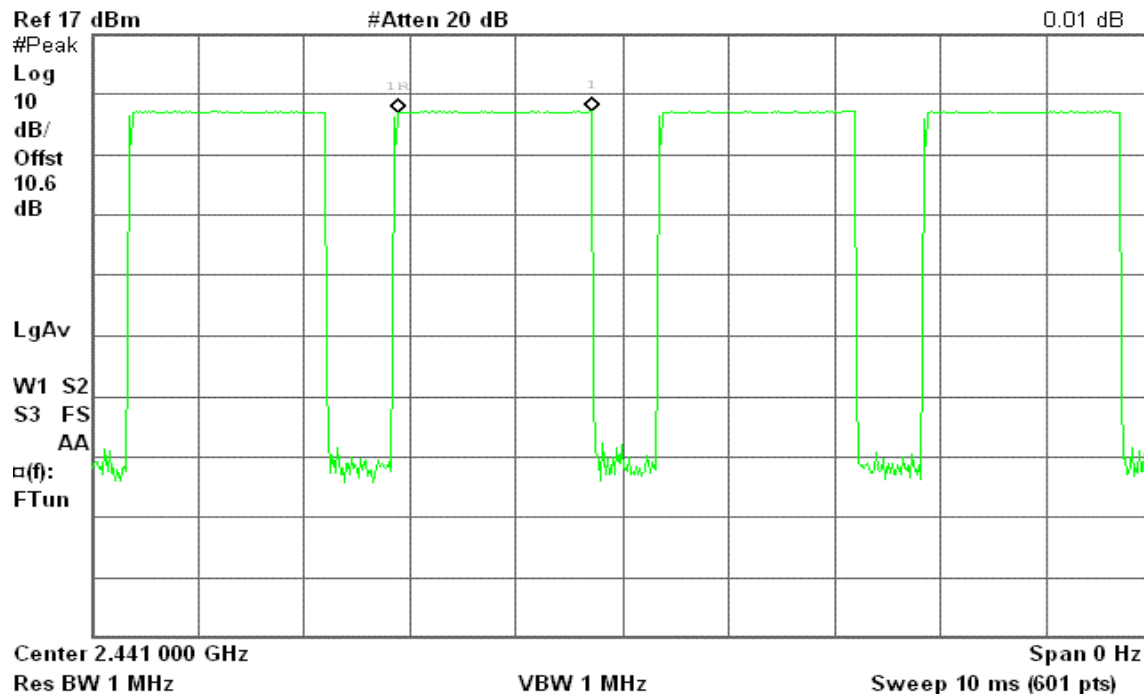


(Bluetooth / CH Mid)

Agilent 16:31:19 Apr 10, 2006

T

Δ Mkr1 1.817 ms
0.01 dB

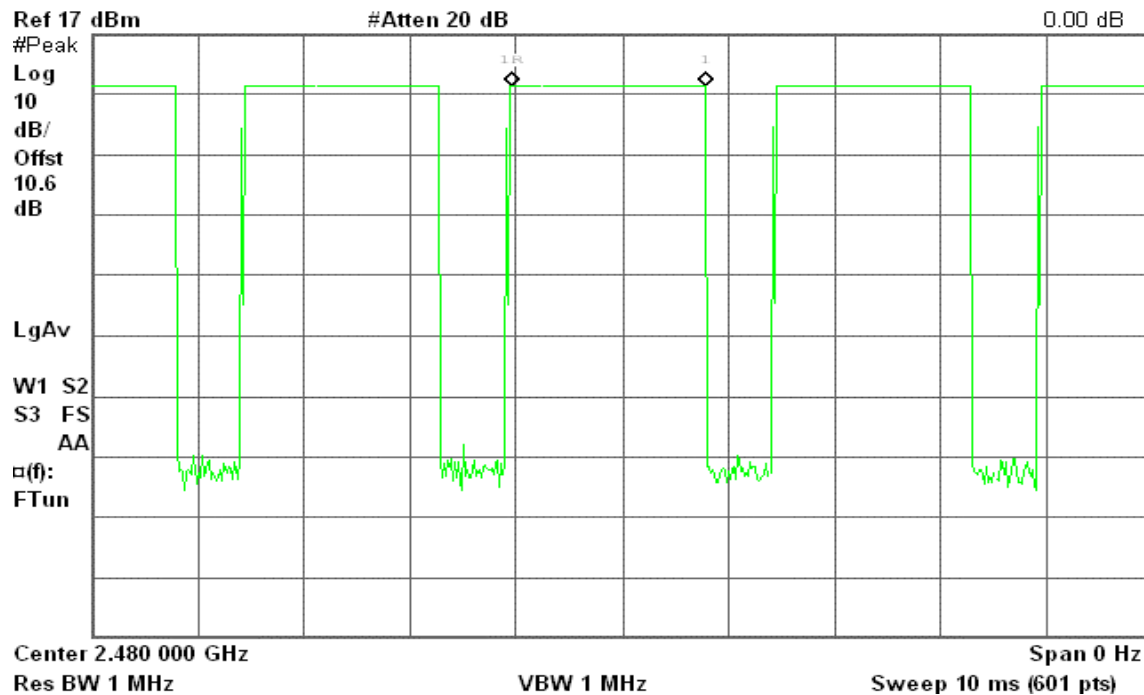


(Bluetooth / CH High)

Agilent 16:13:08 Apr 10, 2006

T

Δ Mkr1 1.817 ms
0.00 dB





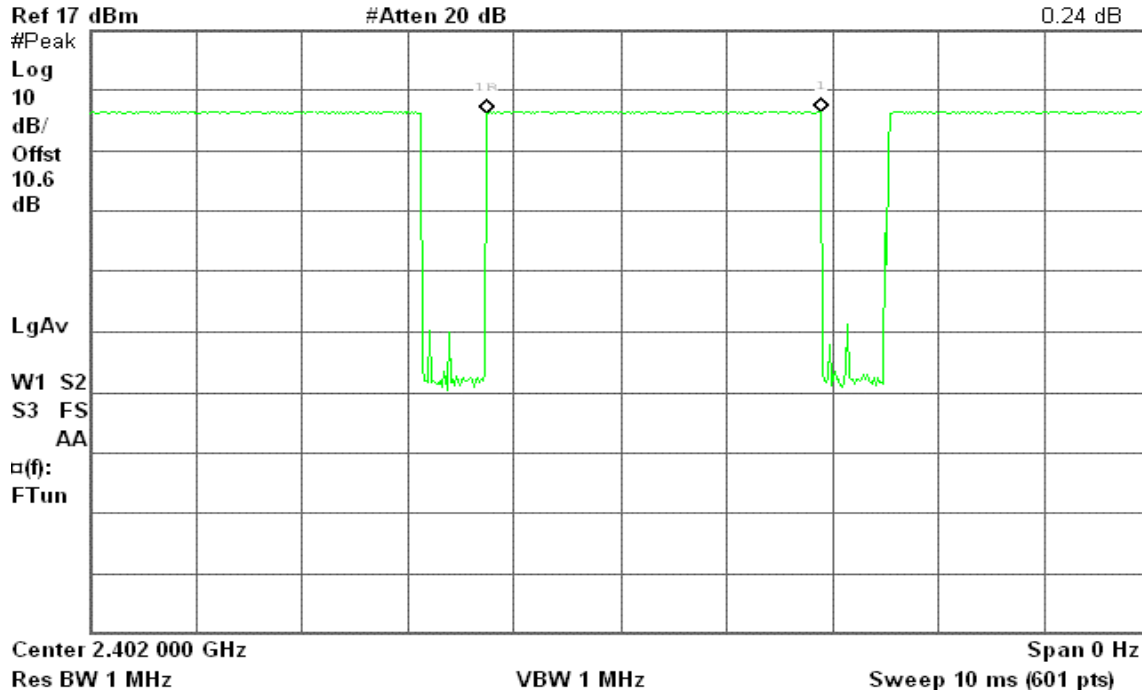
DH 5

(Bluetooth / CH Low)

Agilent 16:32:54 Apr 10, 2006

T

Δ Mkr1 3.133 ms
0.24 dB

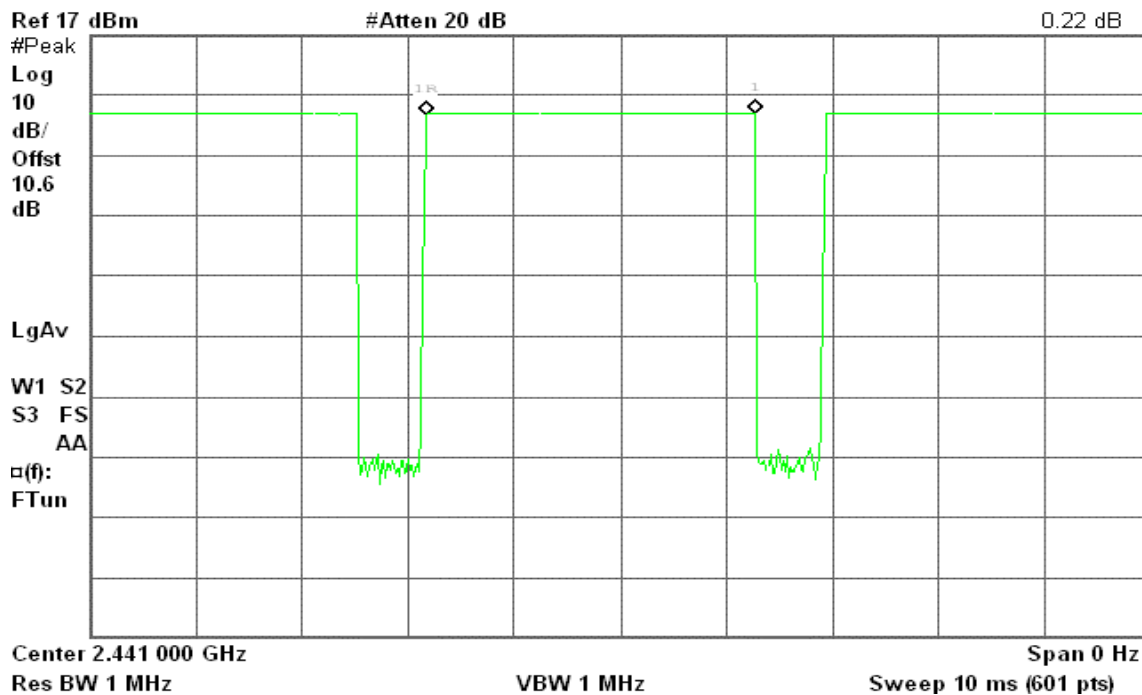


(Bluetooth / CH Mid)

Agilent 16:31:52 Apr 10, 2006

T

Δ Mkr1 3.083 ms
0.22 dB





(Bluetooth / CH High)

Agilent 16:13:39 Apr 10, 2006

T

Δ Mkr1 3.117 ms
7.21 dB

Ref 17 dBm

#Atten 20 dB

#Peak

Log

10

dB/

Offst

10.6

dB

LgAv

W1 S2

S3 FS

AA

α(f):

FTun

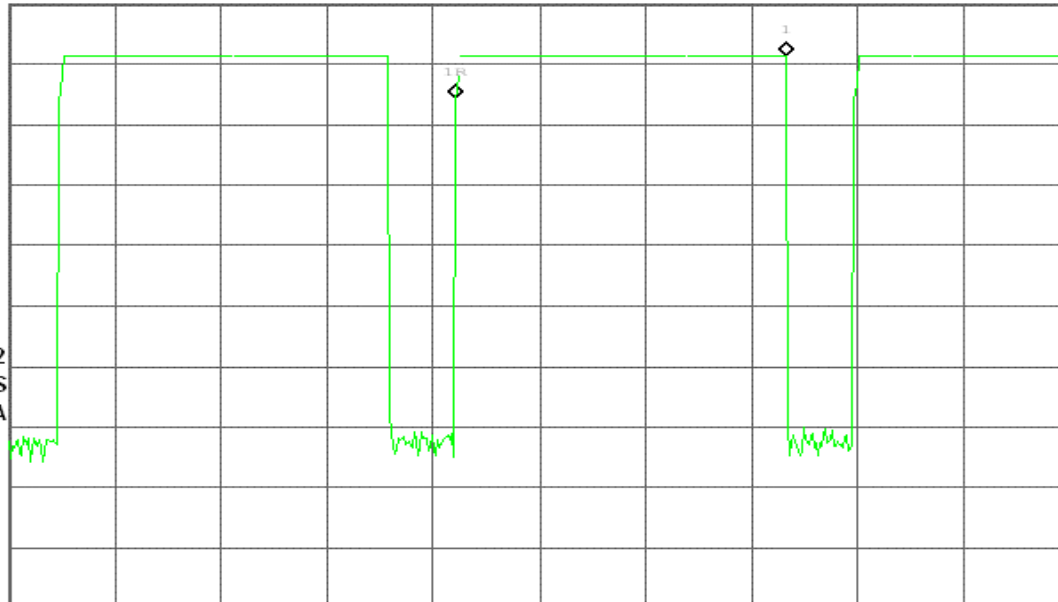
Center 2.480 000 GHz

Res BW 1 MHz

VBW 1 MHz

Sweep 10 ms (601 pts)

Span 0 Hz





7.14 SPURIOUS EMISSIONS

7.14.1 CONDUCTED MEASUREMENT

LIMIT

(Same as Section 7.6.1 in this test report)

TEST PROCEDURE

(Same as Section 7.6.1 in this test report)

TEST RESULTS

No non-compliance noted.

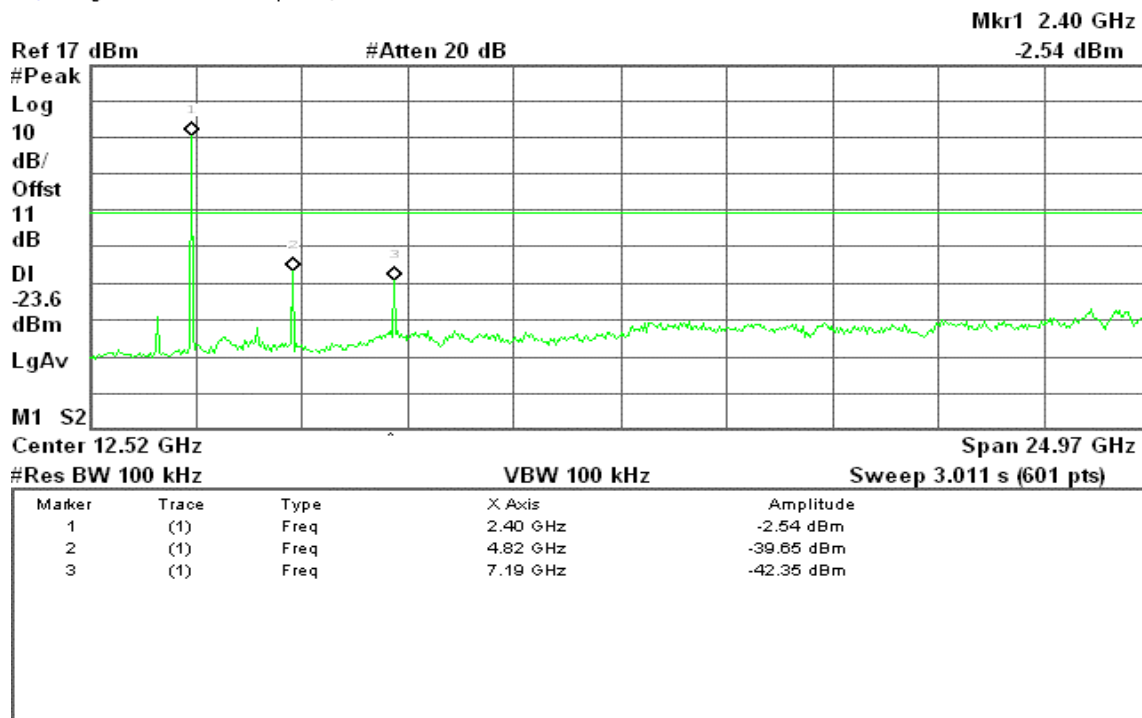


Test Plot

(Bluetooth / CH Low)

Agilent 12:40:58 Apr 10, 2006

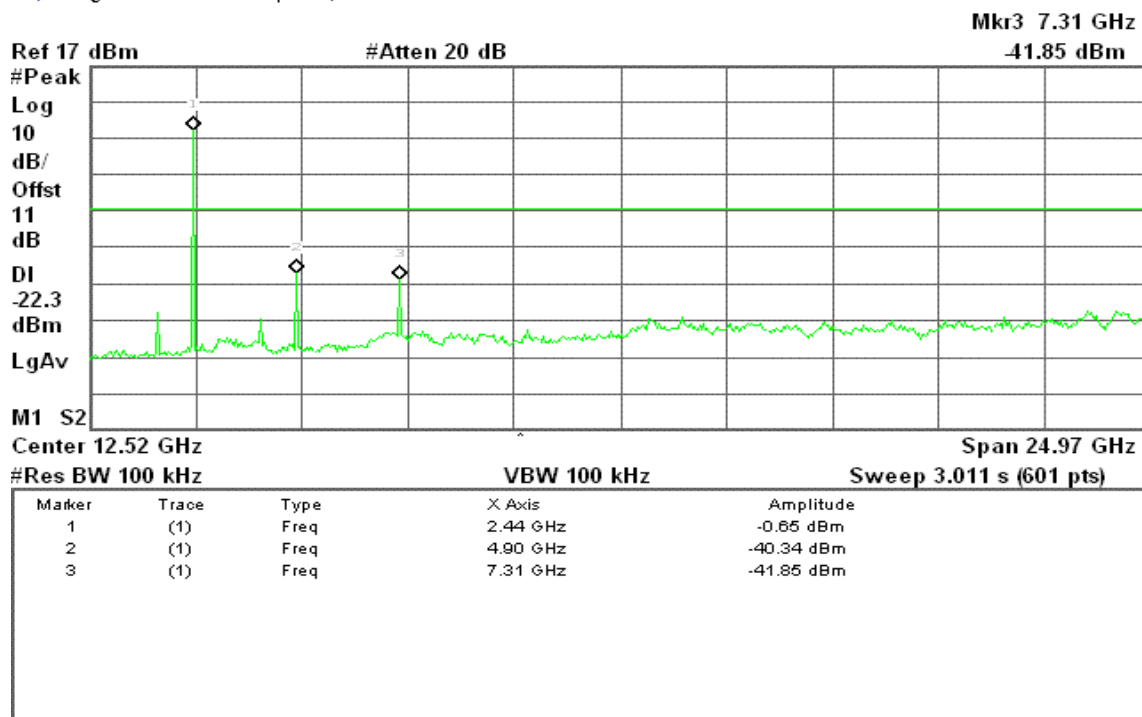
T



(Bluetooth / CH Mid)

Agilent 12:39:56 Apr 10, 2006

T

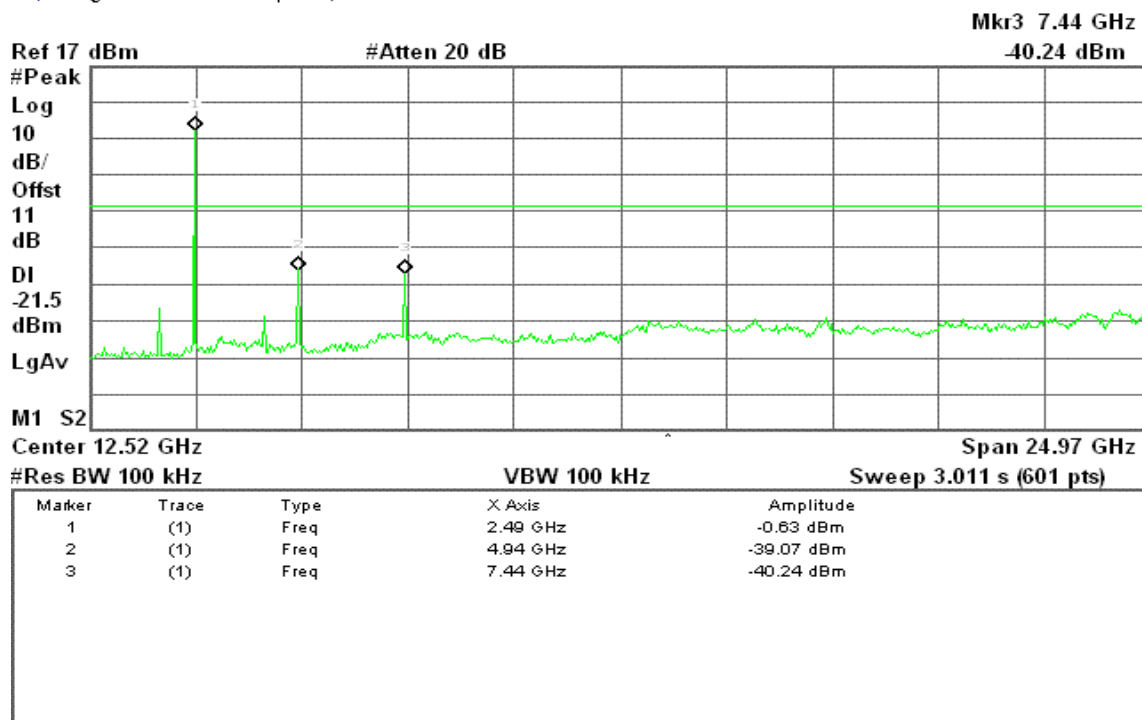




(Bluetooth / CH High)

Agilent 12:38:53 Apr 10, 2006

T





7.14.2 RADIATED EMISSIONS

LIMIT

(Same as Section 7.6.2 in this test report)

TEST PROCEDURE

(Same as Section 7.6.2 in this test report)

**TEST RESULTS****BLUETOOTH OPERATION****Below 1 GHz****Operation Mode:** Normal Link**Test Date:** April 7, 2006**Temperature:** 24.3°C**Tested by:** Rex Lai**Humidity:** 56 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Detector Mode (PK/QP)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)
138.32	V	Peak	51.30	-19.82	31.48	43.50	-12.02
206.22	V	Peak	51.49	-21.10	30.40	43.50	-13.10
277.35	V	Peak	52.65	-18.90	33.75	46.00	-12.25
416.38	V	Peak	47.76	-15.56	32.20	46.00	-13.80
500.45	V	Peak	41.55	-13.43	28.12	46.00	-17.88
700.92	V	Peak	41.33	-10.75	30.58	46.00	-15.42
207.83	H	Peak	52.32	-21.45	30.87	43.50	-12.63
277.35	H	Peak	55.24	-18.90	36.34	46.00	-9.66
700.92	H	Peak	45.12	-10.75	34.37	46.00	-11.63
765.58	H	Peak	42.84	-9.83	33.01	46.00	-12.99
794.68	H	Peak	45.28	-9.31	35.97	46.00	-10.03
927.25	H	Peak	41.93	-7.73	34.20	46.00	-11.80

Remark:

- 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. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.*
- 4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.*
- 5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*

**Above 1 GHz****Operation Mode:** Bluetooth / TX / CH Low**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1200.00	V	48.96	---	-14.51	34.45	---	74.00	54.00	-19.55	Peak
2383.33	V	49.51	---	-10.42	39.09	---	74.00	54.00	-14.91	Peak
2516.67	V	48.61	---	-10.25	38.36	---	74.00	54.00	-15.64	Peak
3183.33	V	46.76	---	-9.49	37.27	---	74.00	54.00	-16.73	Peak
4800.00	V	55.04	---	-7.80	47.24	---	74.00	54.00	-6.76	Peak
N/A										
1600.00	H	46.75	---	-13.32	33.43	---	74.00	54.00	-20.57	Peak
4808.33	H	57.04	---	-7.80	49.24	---	74.00	54.00	-4.76	Peak
7208.33	H	46.02	---	-5.72	40.30	---	74.00	54.00	-13.70	Peak
N/A										

Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
- Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
- Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
- 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.*
- Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.*
- Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

**Operation Mode:** Bluetooth / TX / CH Mid**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2383.33	V	48.67	---	-10.42	38.25	---	74.00	54.00	-15.75	Peak
2516.67	V	49.61	---	-10.25	39.36	---	74.00	54.00	-14.64	Peak
3183.33	V	48.26	---	-9.49	38.77	---	74.00	54.00	-15.23	Peak
4883.33	V	55.93	---	-7.78	48.15	---	74.00	54.00	-5.85	Peak
N/A										
1593.33	H	46.19	---	-13.36	32.84	---	74.00	54.00	-21.16	Peak
4883.33	H	48.42	---	-7.78	40.63	---	74.00	54.00	-13.37	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$.

**Operation Mode:** Bluetooth / TX / CH High**Test Date:** April 6, 2006**Temperature:** 25°C**Tested by:** Rex Lai**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1840.00	V	46.76	---	-11.87	34.88	---	74.00	54.00	-19.12	Peak
3183.33	V	46.10	---	-9.49	36.61	---	74.00	54.00	-17.39	Peak
4958.33	V	52.02	---	-7.77	44.25	---	74.00	54.00	-9.75	Peak
7441.67	V	44.53	---	-5.54	38.99	---	74.00	54.00	-15.01	Peak
N/A										
1193.33	H	48.04	---	-14.53	33.51	---	74.00	54.00	-20.49	Peak
1723.33	H	47.64	---	-12.58	35.06	---	74.00	54.00	-18.94	Peak
4958.33	H	48.65	---	-7.77	40.88	---	74.00	54.00	-13.12	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. 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.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.
6. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$

**CONDITION C: WLAN + BLUETOOTH OPERATION****7.15 POWER LINE CONDUCTED EMISSIONS****LIMIT**

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

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

* Decreases with the logarithm of the frequency.

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.



T 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.

Operation Mode: Normal Link **Test Date:** March 31, 2006
Temperature: 25°C **Tested by:** Ryan Chen
Humidity: 55% RH

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.198	51.700	44.610	0.104	51.804	44.714	63.694	53.694	-11.890	-8.980	L1
0.266	45.250	38.130	0.100	45.350	38.230	61.242	51.242	-15.892	-13.012	L1
0.400	31.860	25.560	0.100	31.960	25.660	57.853	47.853	-25.893	-22.193	L1
1.999	27.920	28.220	0.100	28.020	28.320	56.000	46.000	-27.980	-17.680	L1
3.998	23.720	21.020	0.100	23.820	21.120	56.000	46.000	-32.180	-24.880	L1
7.996	20.220	18.500	0.500	20.720	19.000	60.000	50.000	-39.280	-31.000	L1
0.200	46.040	38.640	0.100	46.140	38.740	63.611	53.611	-17.471	-14.871	L2
0.333	34.300	27.500	0.100	34.400	27.600	59.376	49.376	-24.976	-21.776	L2
0.465	27.510	22.890	0.100	27.610	22.990	56.603	46.603	-28.993	-23.613	L2
1.599	27.980	28.010	0.100	28.080	28.110	56.000	46.000	-27.920	-17.890	L2
3.998	23.260	21.430	0.100	23.360	21.530	56.000	46.000	-32.640	-24.470	L2
5.861	21.190	19.410	0.286	21.476	19.696	60.000	50.000	-38.524	-30.304	L2

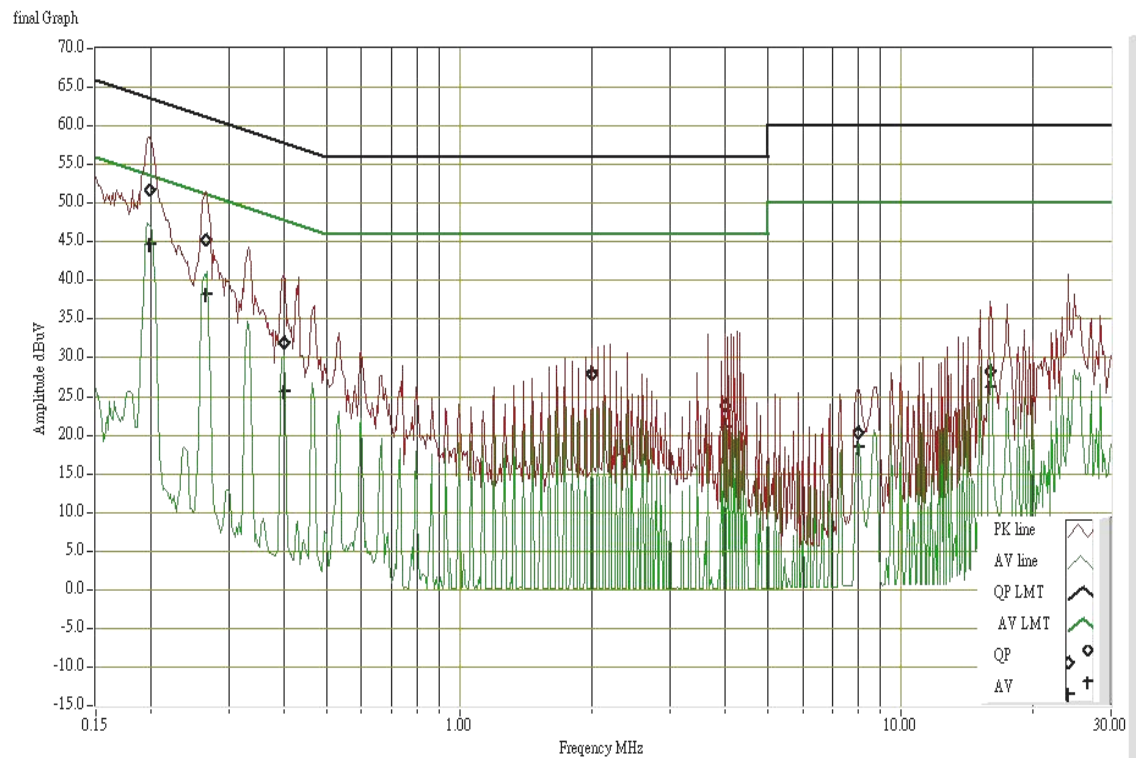
Remark:

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. 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.
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

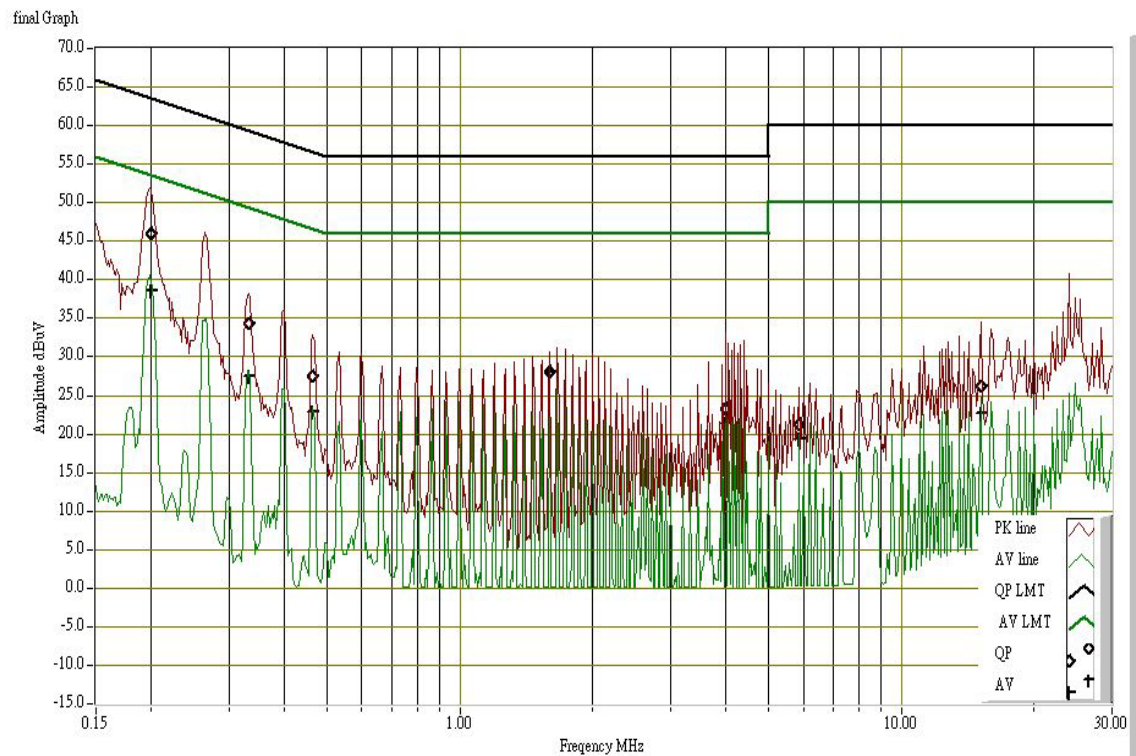


Test Data Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)





APPENDIX I

RADIO FREQUENCY EXPOSURE

LIMIT

According to §15.247(i), 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 § 1.1307(b)(1) of this chapter

EUT Specification

EUT	2-Spindle Tablet PC
Frequency band (Operating)	☐ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☒ WLAN: 5.745GHz ~ 5.825GHz
Device category	☒ Portable (<20cm separation) ☐ Mobile (>20cm separation)
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	IEEE 802.11a: 18.43 dBm (69.66mW)
Antenna gain (Max)	IEEE 802.11a: 1.90 dBi (Numeric gain: 1.55)
Evaluation applied	☐ MPE Evaluation ☒ SAR Evaluation* ☐ N/A

Remark:

1. The maximum output power is 18.43dBm (69.66mW) at 5825MHz (with 1.55 numeric antenna gain.)
2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.
3. 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 RESULTS

No non-compliance noted.

Remark: Please refer to the separated SAR report.

MPE EVALUATION

Not applicable.

**EUT Specification**

EUT	2-Spindle Tablet PC
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz
Device category	☒ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	IEEE 802.11b: 18.45dBm (69.98mW) IEEE 802.11g: 18.15 dBm (65.31mW)
Antenna gain (Max)	2.15 dBi (Numeric gain: 1.64)
Evaluation applied	☐ MPE Evaluation ☒ SAR Evaluation* ☐ N/A

Remark:

1. The maximum output power is 18.45dBm (69.68mW) at 2462MHz (with 1.64 numeric antenna gain.)
2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.
3. 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 RESULTS

No non-compliance noted.

Remark: Please refer to the separated SAR report.

MPE EVALUATION

Not applicable.

**EUT Specification**

EUT	2-Spindle Tablet PC
Frequency band (Operating)	☐ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz ☒ Others: <u>Bluetooth: 2.402GHz ~ 2.480GHz</u>
Device category	☒ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☐ Others _____
Exposure classification	☐ Occupational/Controlled exposure ($S = 5mW/cm^2$) ☒ General Population/Uncontrolled exposure ($S = 1mW/cm^2$)
Antenna diversity	☒ Single antenna ☐ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Max. output power	3.88dBm (2.44mW)
Antenna gain (Max)	2.2 dBi (Numeric gain: 1.66)
Evaluation applied	☐ MPE Evaluation ☐ SAR Evaluation ☒ N/A
Remark: 1. The maximum output power is <u>3.88 dBm (2.44mW) at 2480MHz</u> (with <u>1.66 numeric antenna gain.</u>) 2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance. 3. For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is $1.0 mW/cm^2$ even if the calculation indicates that the power density would be larger.	

TEST RESULTS

No non-compliance noted.

(SAR evaluation is not required for the PORTABLE device while its maximum output power is lower than the general population low threshold: $60/f_{(GHz)} = 60/2.441 = 24.58mW$)