FCC 47 CFR PART 15 SUBPART C
(Class II Permissive Change)

TEST REPORT

For

WIRELESS LAN MINI-PCI EXPRESS, 802.11A/B/G

Model: PA3489U-1MPC

Trade Name: TOSHIBA

Issued to

TOSHIBA CORPORATION DIGITAL MEDIA NETWORK COMPANY
OME COMPLEX, 2-9, SUEHIRO-CHO,
TOKYO, 198-8710,JAPAN

Issued by

Compliance Certification Services Inc.
No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang,
Taoyuan Hsien, (338) Taiwan, R.O.C.
http://www.ccsemc.com.tw
service@tw.ccsemc.com

ACCREDITED
No. 0824-01

TAF
Testing Laboratory
0363

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION

Applicant:	TOSHIBA CORPORATION DIGITAL MEDIA NETWORK COMPANY OME COMPLEX, 2-9, SUEHIRO-CHO, TOKYO, 198-8710,JAPAN
Equipment Under Test:	WIRELESS LAN MINI-PCI EXPRESS, 802.11A/B/G
Trade Name:	TOSHIBA
Model:	PA3489U-1MPC
Date of Test:	September 21 ~25, 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 the requirements of FCC Rules Part 15.207, 15.209, 15.247.

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

Approved by:

Gavin Lim
Section Manager
Compliance Certification Services Inc.

Reviewed by:

Amanda Wu
Section Manager
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	WIRELESS LAN MINI-PCI EXPRESS, 802.11A/B/G
Trade Name	TOSHIBA
Model Number	PA3489U-1MPC
Model Discrepancy	N/A
Power Supply	Powered from host device
Frequency Range	IEEE 802.11a: 5.745~5.825 GHz IEEE 802.11b/g: 2.412~2.462 GHz
Transmit Power	5.745~5.825 GHz: 0.1W 2.412~2.462 GHz: 0.318W
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)
Transmit Data Rate	IEEE 802.11a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps IEEE 802.11b: 11, 5.5, 2, 1 Mbps IEEE 802.11g: 54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, 1Mbps
Number of Channels	IEEE 802.11a: 5 Channels IEEE 802.11b/g: 11 Channels
Antenna Specification	The EUT comes with two different sets of antennas: Approved Antenna PIFA antenna / Gain: 3.06 dBi for 5GHz PIFA antenna / Gain: 0.32dBi for 2.4GHz New Antenna PIFA antenna / Gain: 0.43dBi for 5GHz PIFA antenna / Gain: 1.74dBi for 2.4GHz
Class II Permissive Change	Added one set of antenna, for detail descriptions, please refers to the antenna spec.

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: CJ6UPA3489WL 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 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

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

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

3.5 DESCRIPTION OF TEST MODES

The EUT (model: PA3489U-1MPC) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed. The worst case data rate is determined as the data rate with highest output power.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

IEEE802.11a:
Channel Low(5745MHz), Channel Mid(5785MHz) and Channel High(5825MHz) with 6Mbps data rate were chosen for radiated emission testing only.

IEEE802.11b:
Channel Low(2412MHz), Channel Mid(2437MHz) and Channel High(2462MHz) with 1Mbps data rate were chosen for radiated emission testing only.

IEEE802.11g:
Channel Low(2412MHz), Channel Mid(2437MHz) and Channel High(2462MHz) with 6Mbps data rate were chosen for radiated emission testing only.

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.*

3M Semi Anechoic Chamber				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	Agilent	E4446A	US42510252	07/25/2007
Test Receiver	Rohde&Schwarz	ESCI	100064	11/05/2006
Switch Controller	TRC	Switch Controller	SC94050010	05/05/2007
4 Port Switch	TRC	4 Port Switch	SC94050020	05/05/2007
Horn-Antenna	TRC	HA-0502	06	06/02/2007
Horn-Antenna	TRC	HA-0801	04	05/05/2007
Horn-Antenna	TRC	HA-1201A	01	07/04/2007
Horn-Antenna	TRC	HA-1301A	01	07/04/2007
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 +/-2.0065dB (30MHz ~ 1GHz), +/-3.0958dB (Above 1GHz) 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

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

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, IEC/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	ACCREDITED 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	Testing Laboratory 0363
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.	Test kit	N/A	N/A	N/A	N/A	N/A	N/A

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.*

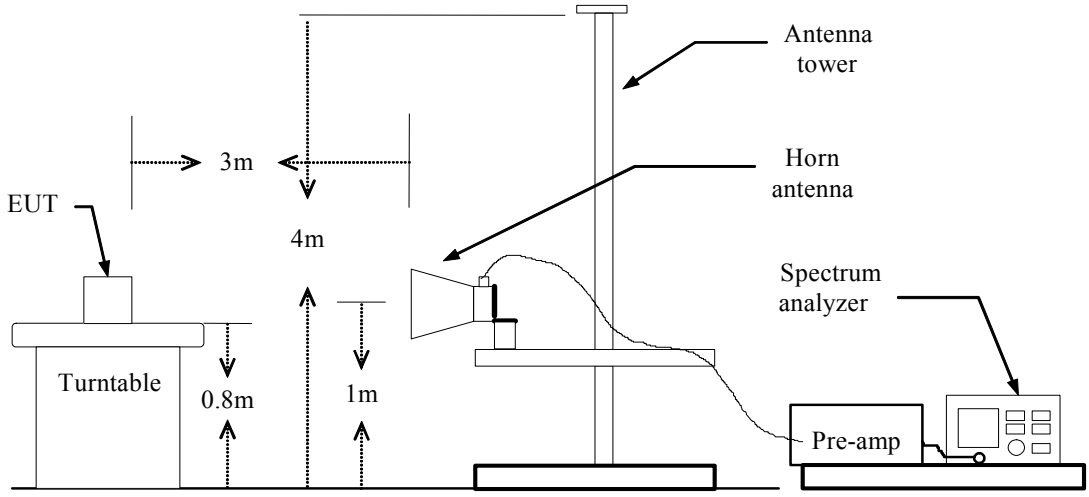
7. FCC PART 15.247 REQUIREMENTS

7.1 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 in 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

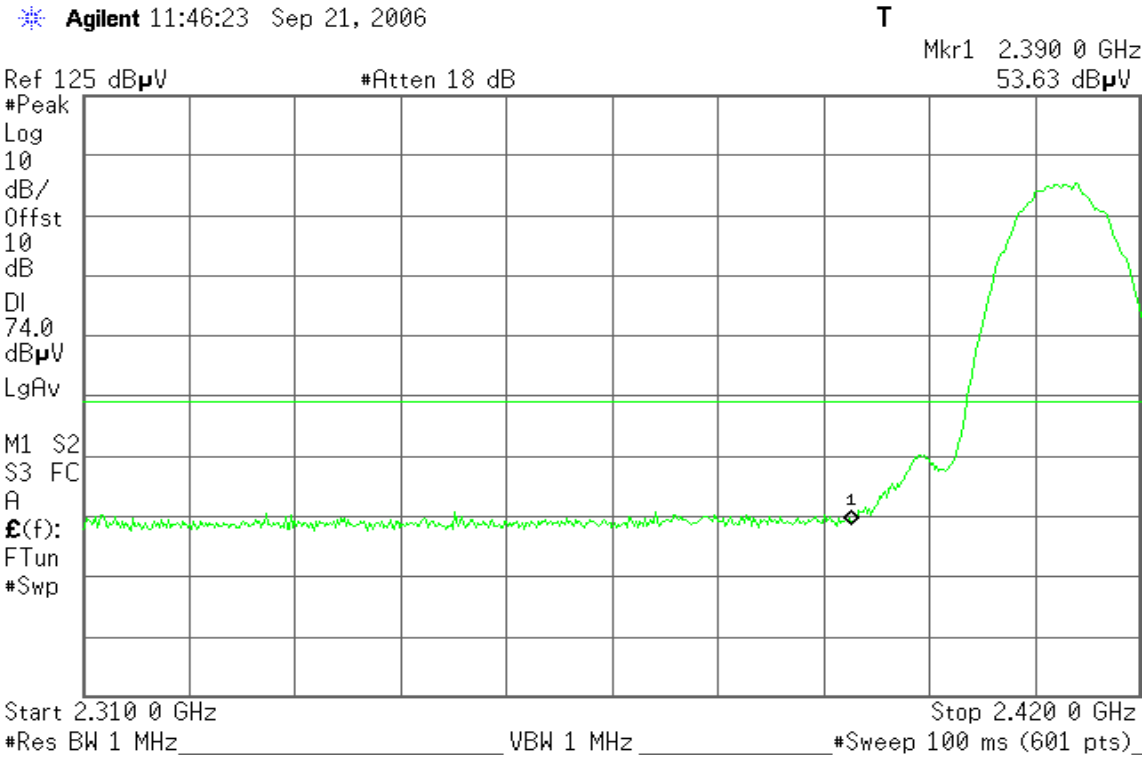
1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the 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

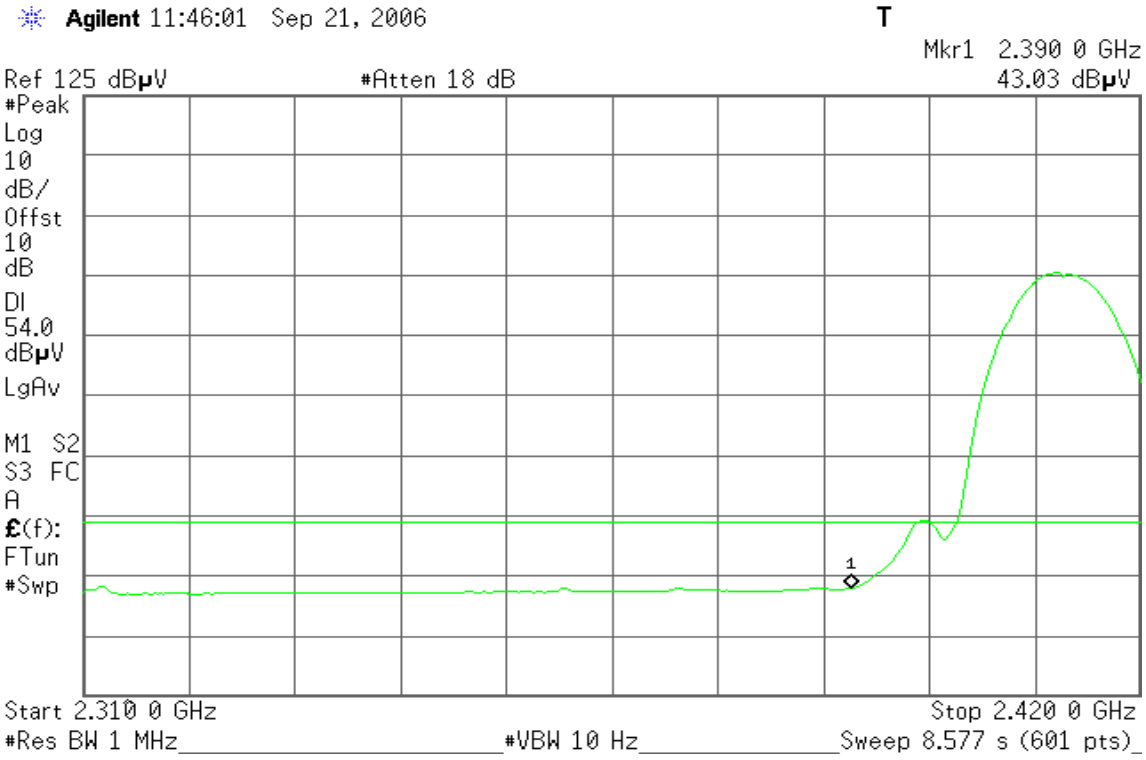
Refer to attach spectrum analyzer data chart.

Band Edges (IEEE 802.11b / CH Low)

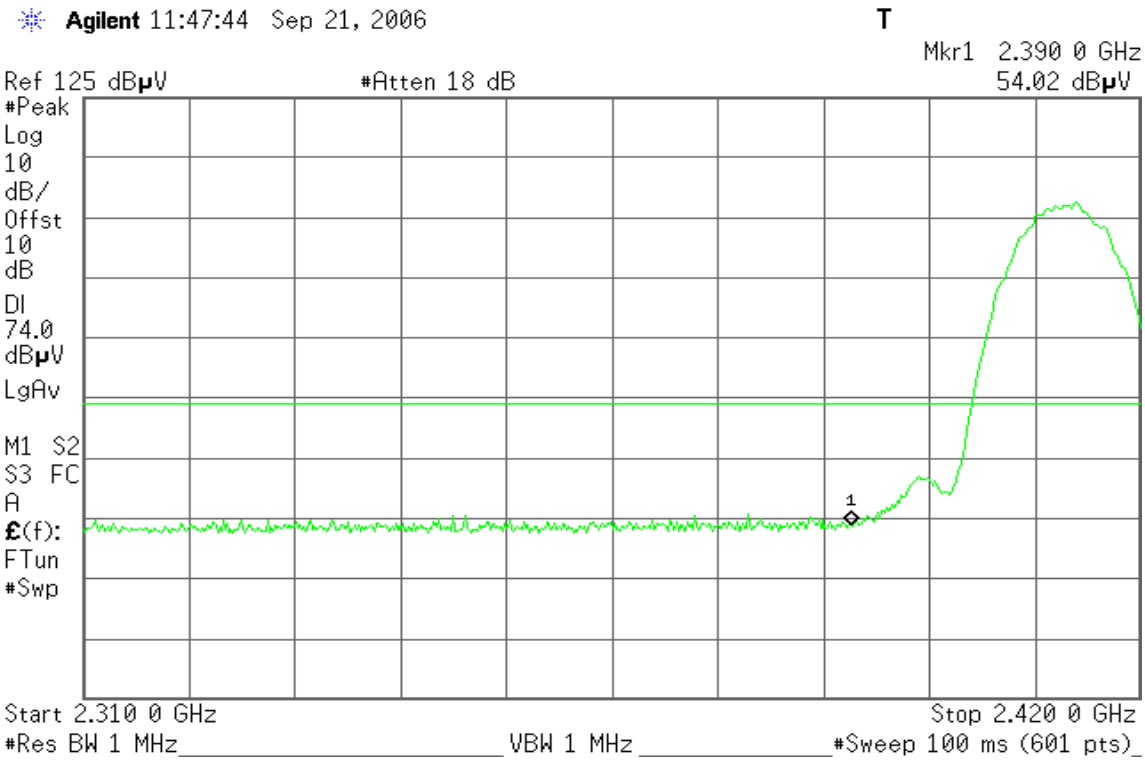
Detector mode: Peak Polarity: Vertical



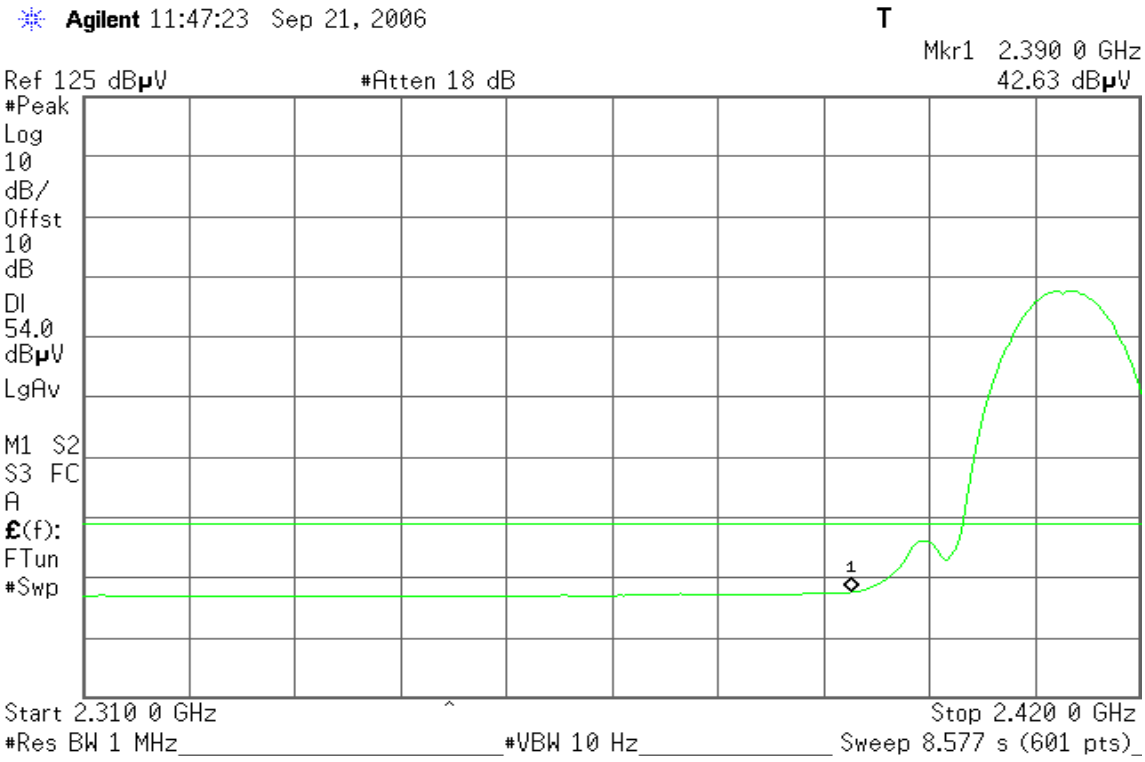
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

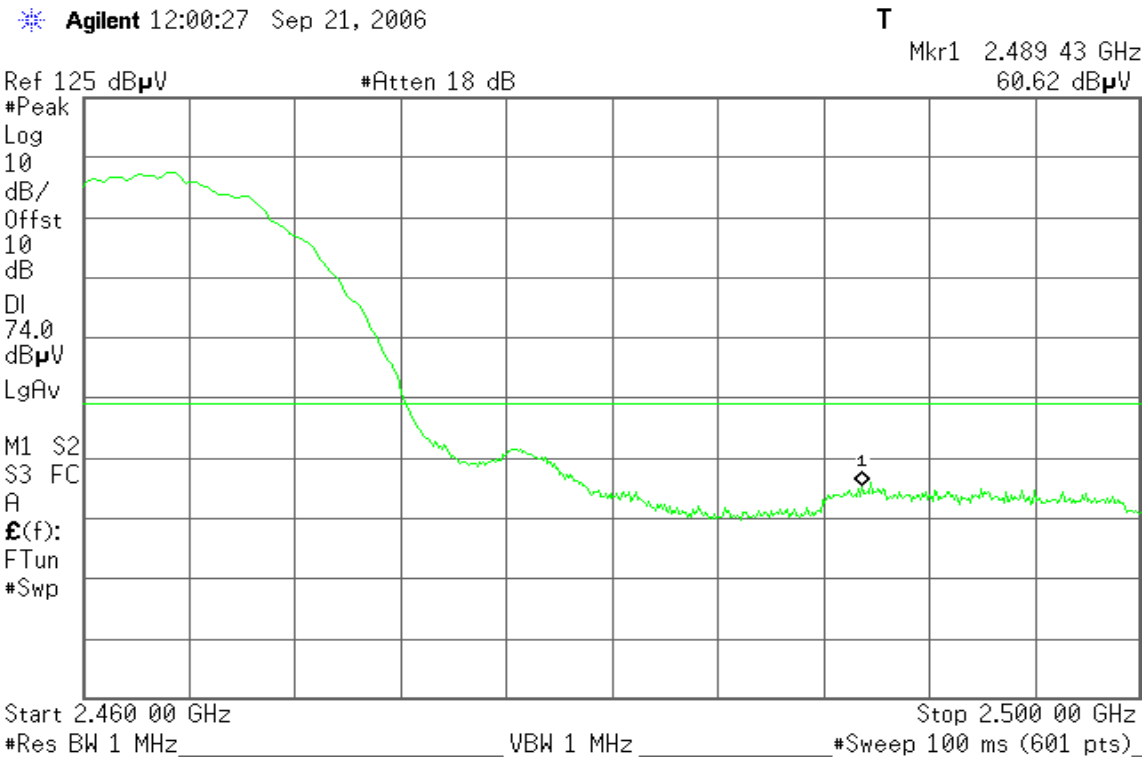


Detector mode: Average **Polarity: Horizontal**

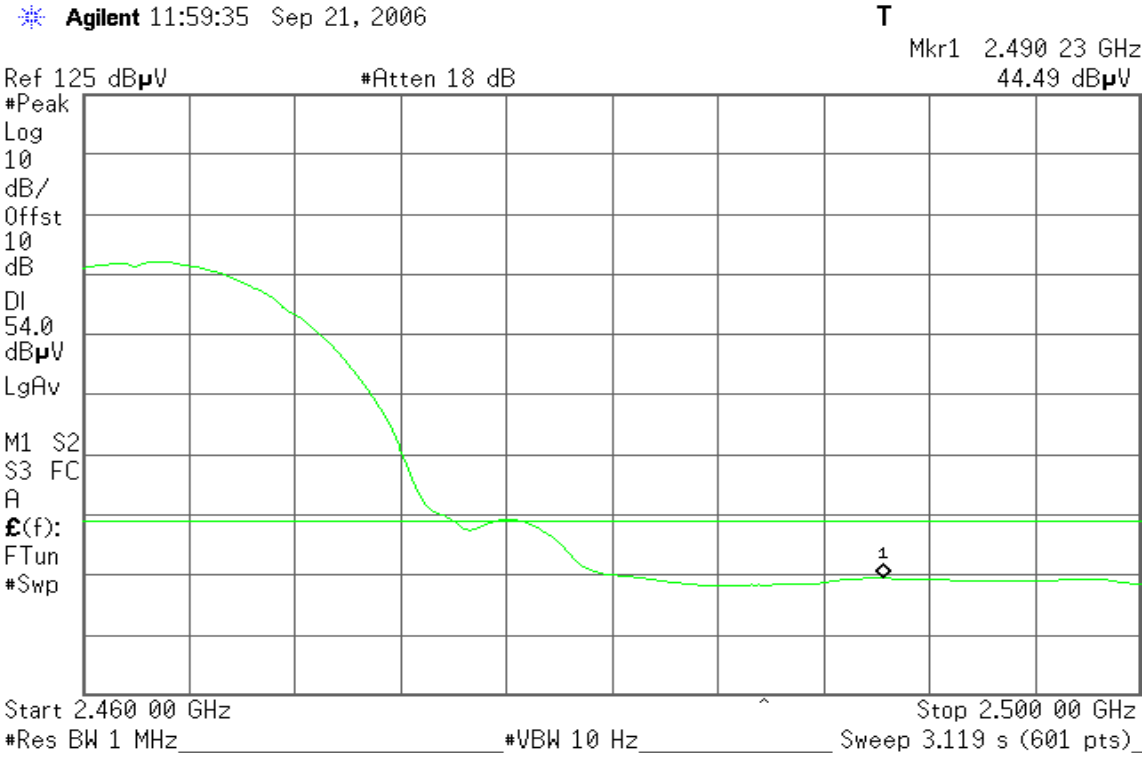


Band Edges (IEEE 802.11b / CH High)

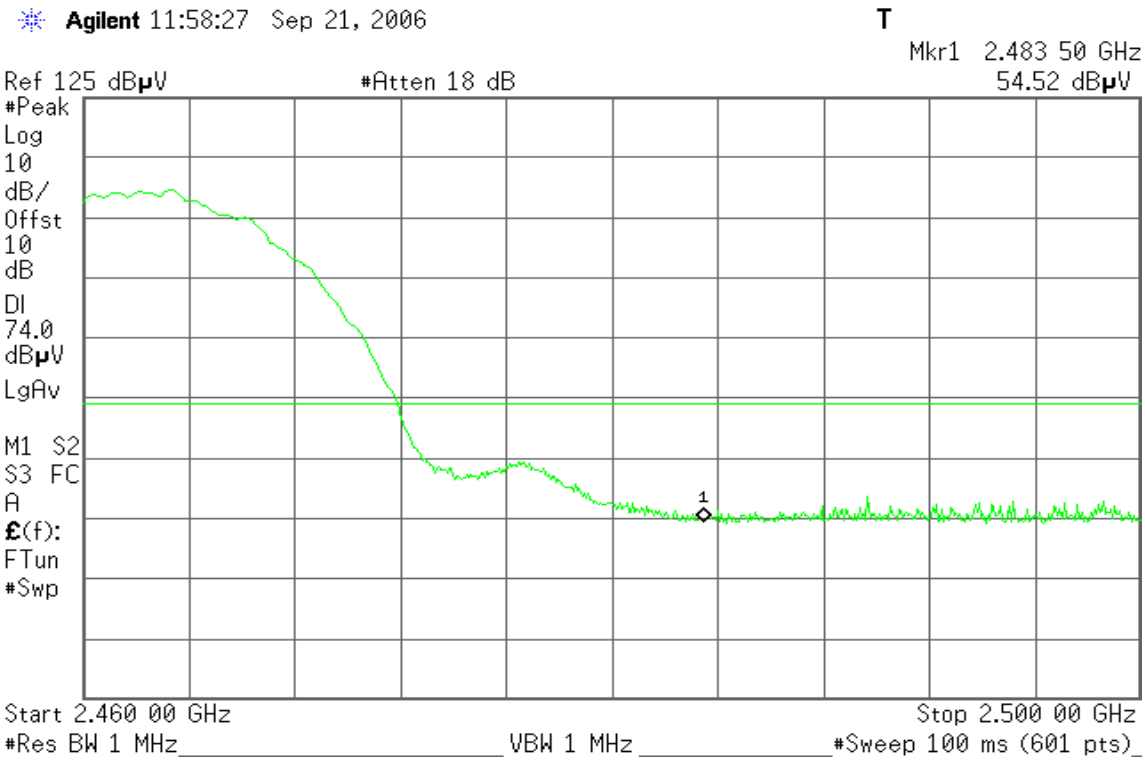
Detector mode: Peak Polarity: Vertical



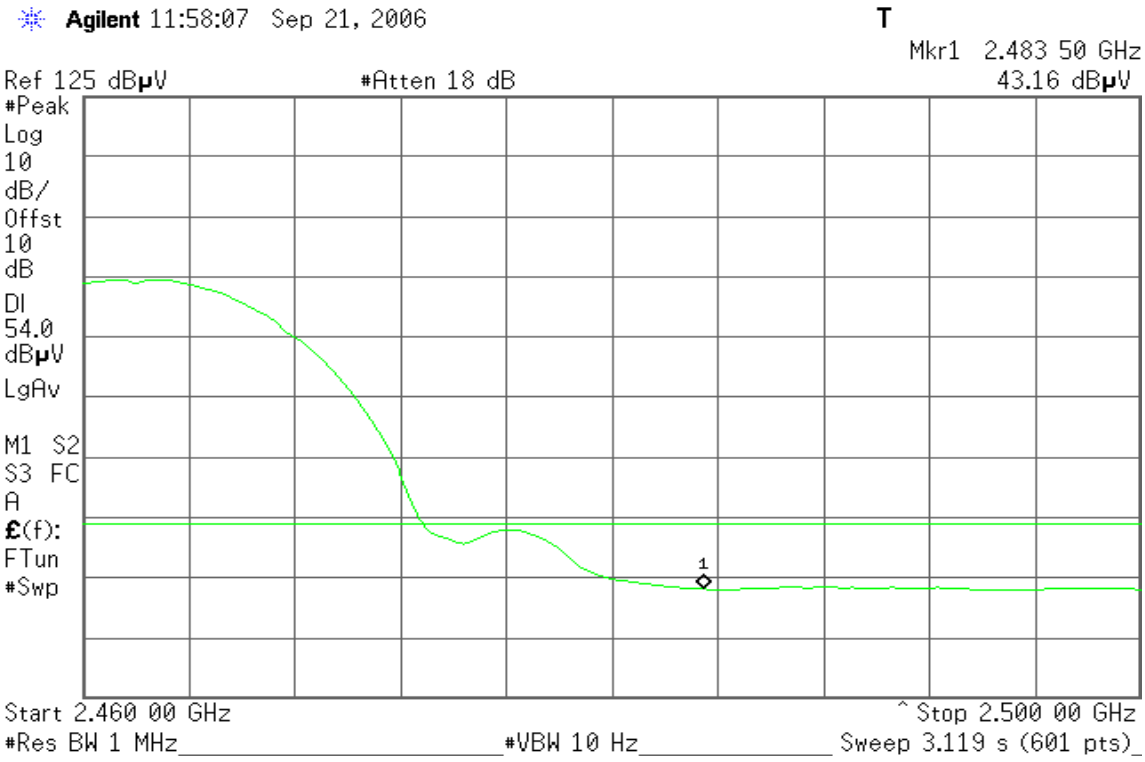
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

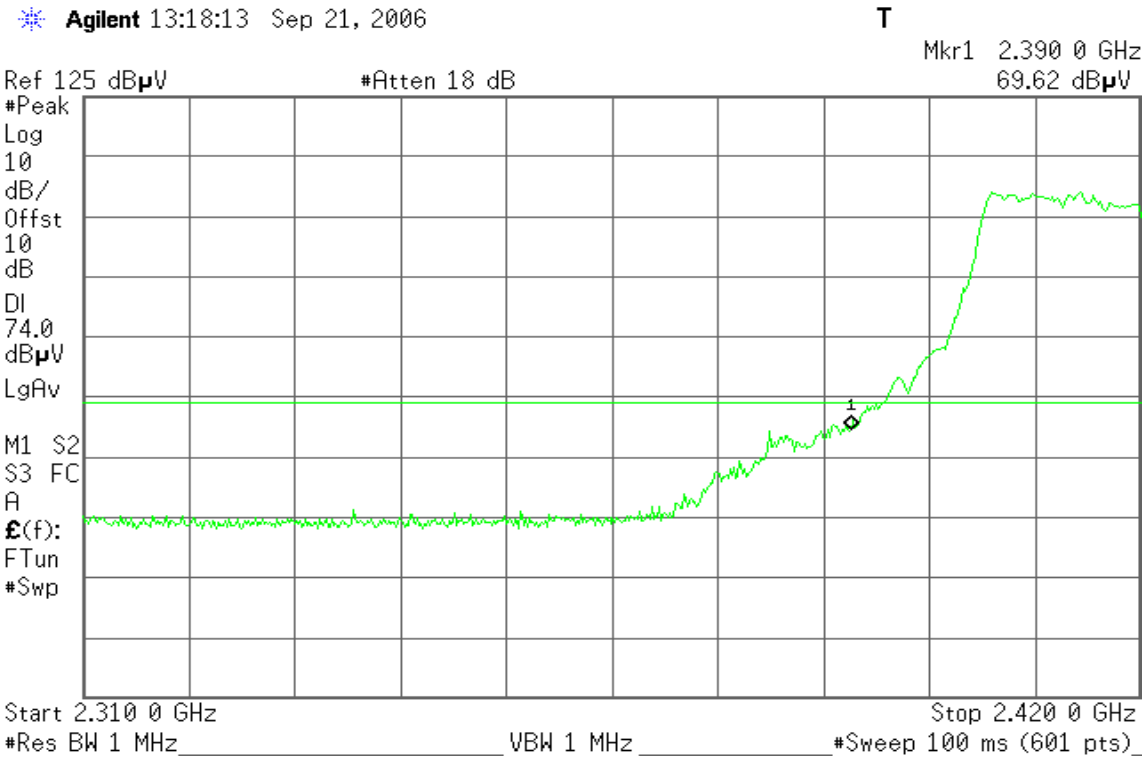


Detector mode: Average **Polarity: Horizontal**

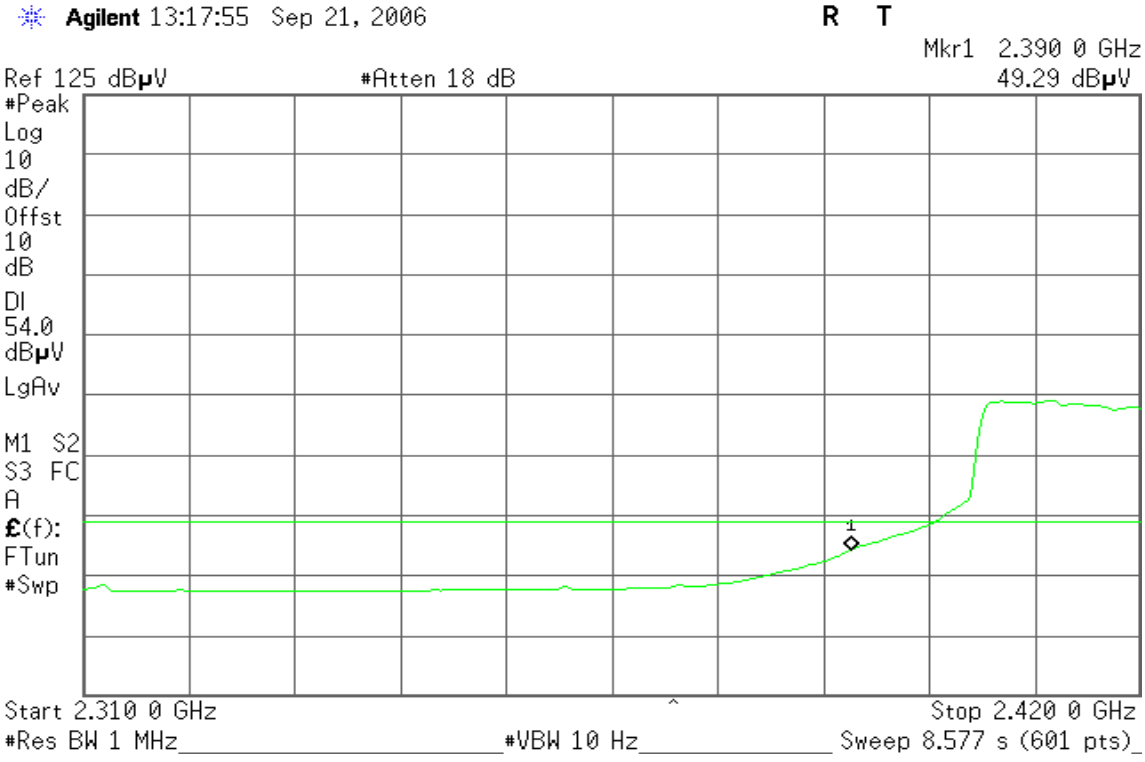


Band Edges (IEEE 802.11g / CH Low)

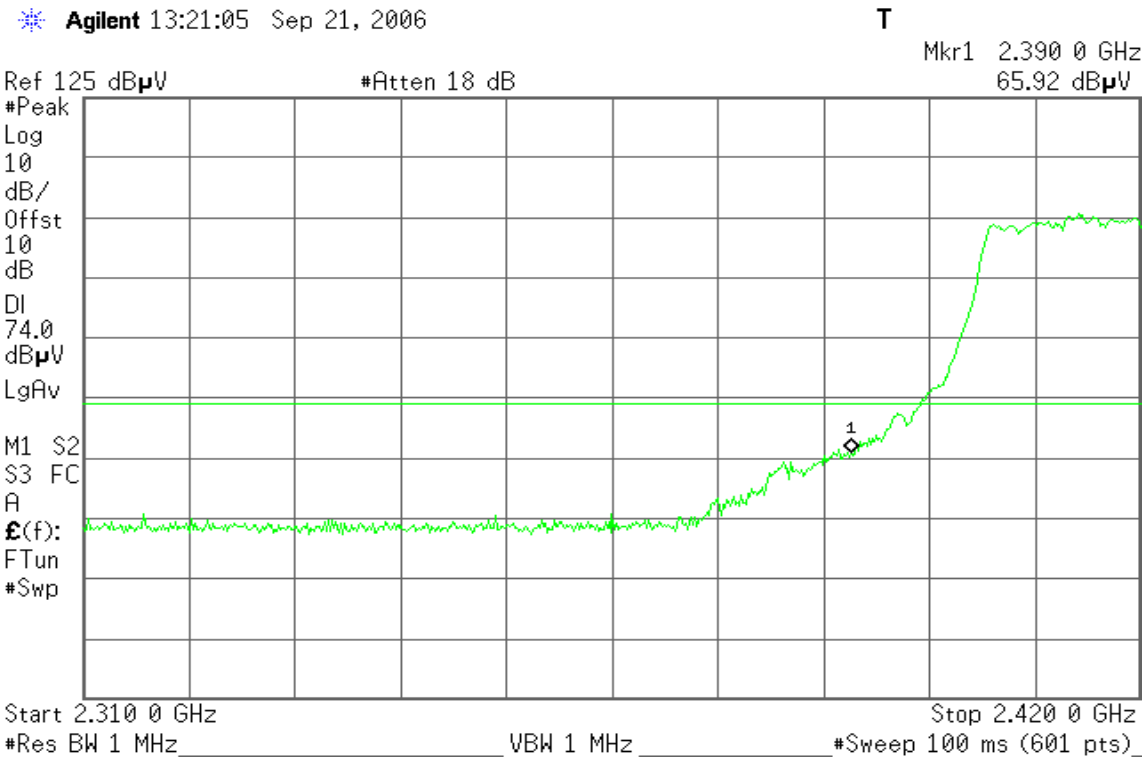
Detector mode: Peak Polarity: Vertical



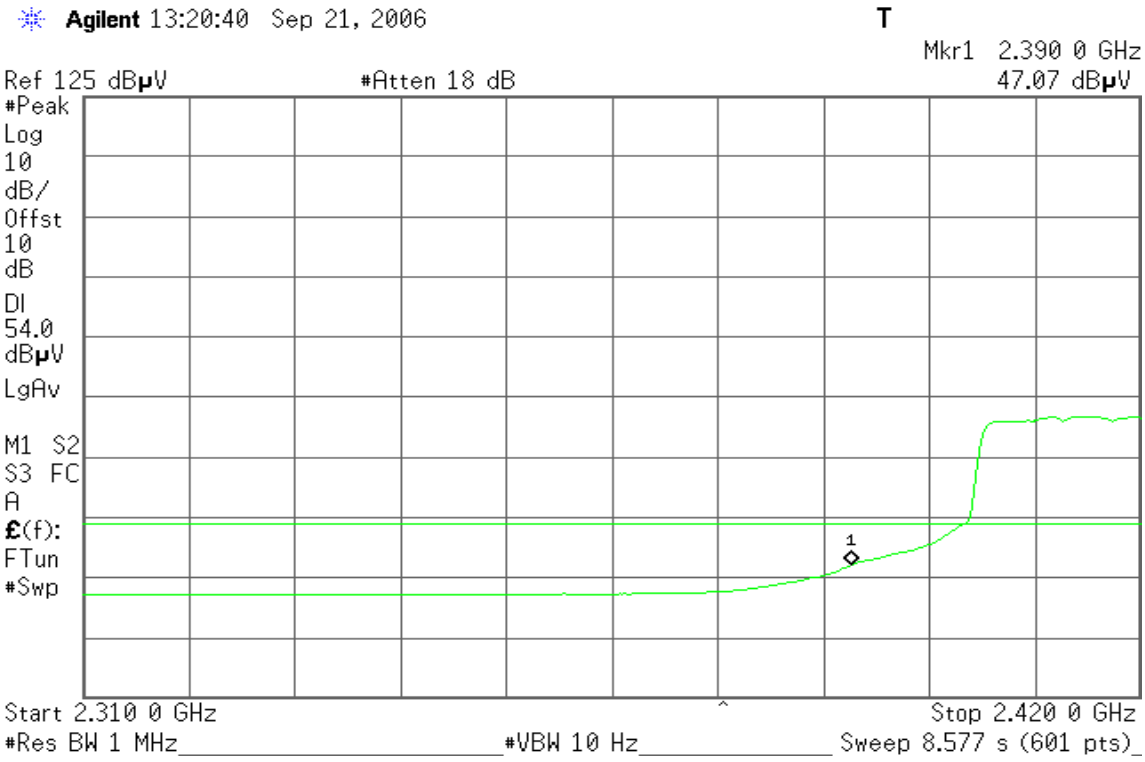
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

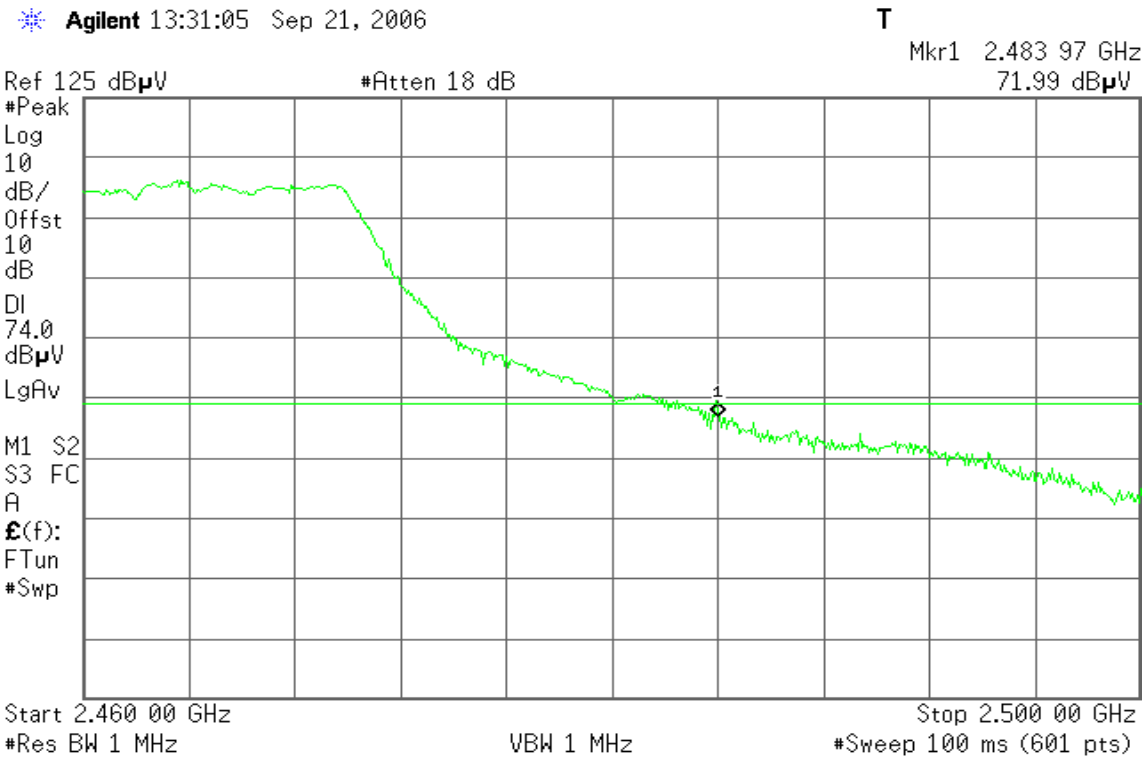


Detector mode: Average **Polarity: Horizontal**

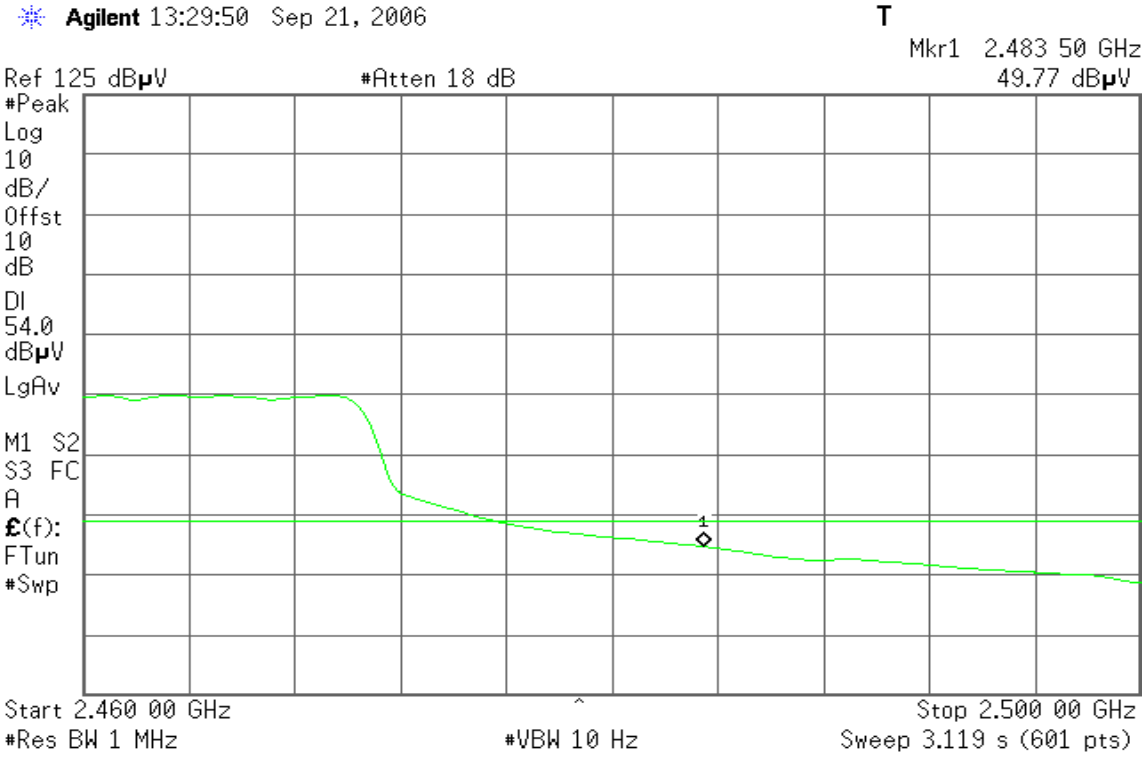


Band Edges (IEEE 802.11g / CH High)

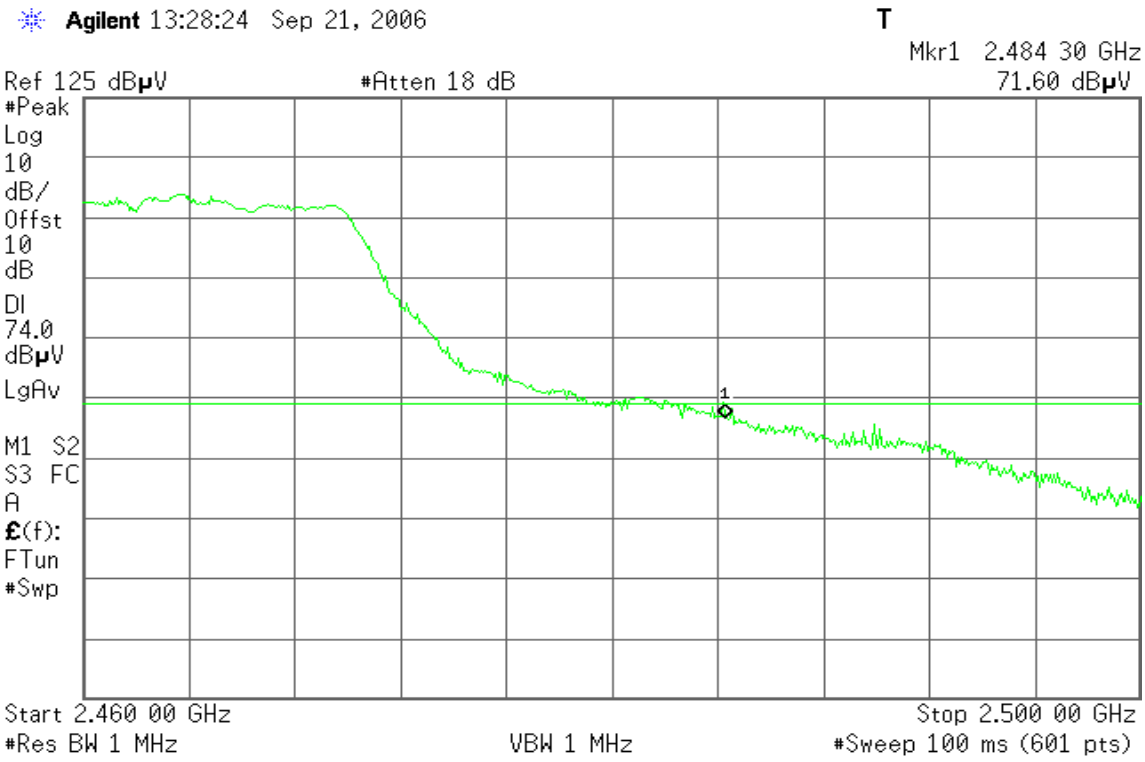
Detector mode: Peak Polarity: Vertical



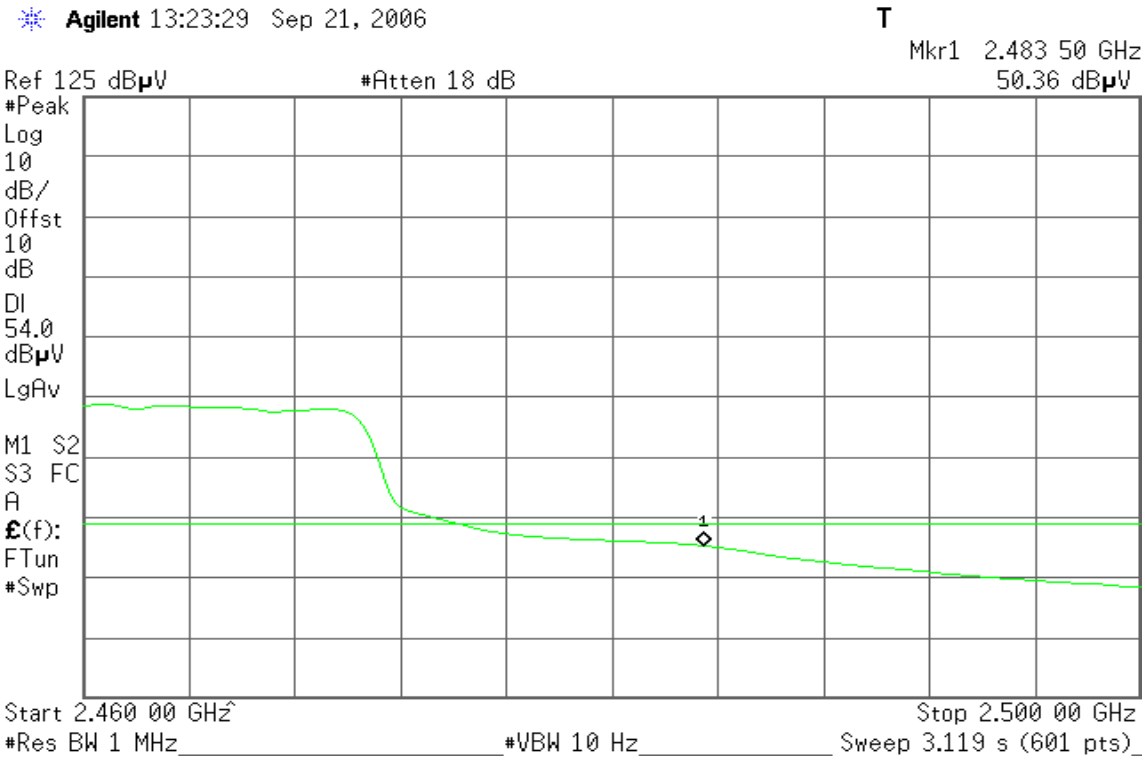
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



7.2SPURIOUS EMISSIONS

7.2.1 Radiated Emissions

LIMIT

1. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

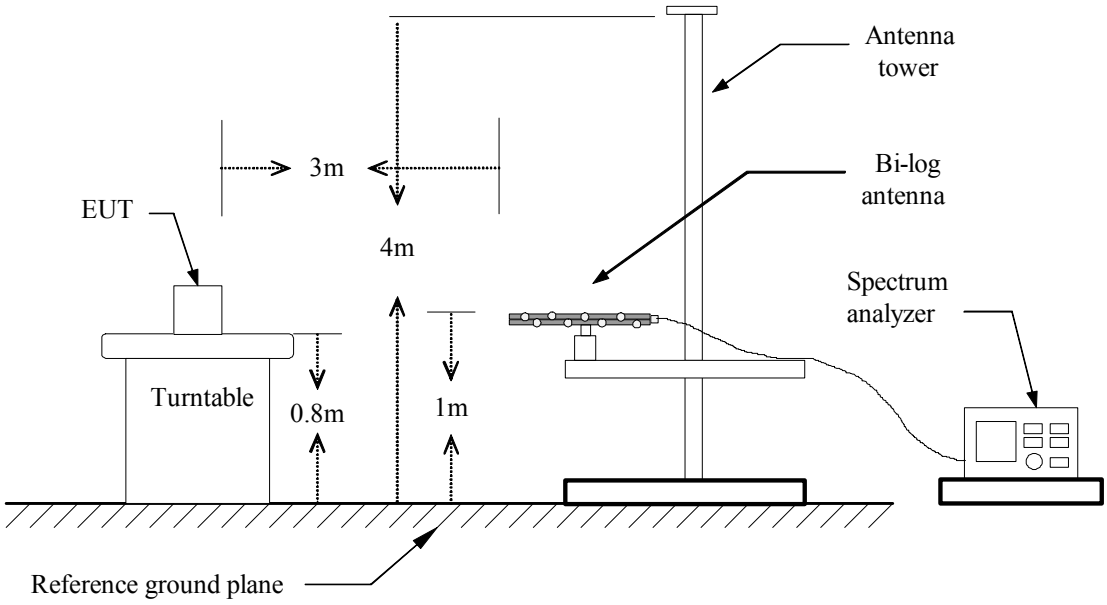
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

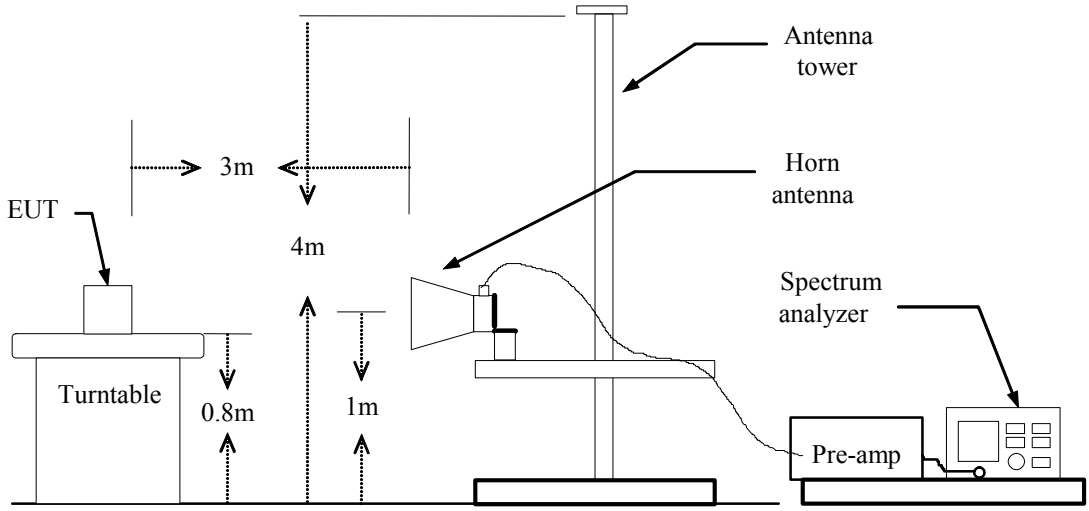
Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

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

Below 1 GHz

Operation Mode: Normal Link **Test Date:** September 25, 2006

Temperature: 22°C **Tested by:** James Yu

Humidity: 52% RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
164.18	V	Peak	50.41	-14.17	36.24	43.50	-7.26
287.05	V	Peak	49.13	-12.29	36.84	46.00	-9.16
432.55	V	Peak	42.52	-8.54	33.99	46.00	-12.01
532.78	V	Peak	39.31	-6.59	32.73	46.00	-13.27
833.48	V	Peak	37.66	-2.06	35.60	46.00	-10.40
935.33	V	Peak	35.31	-0.85	34.46	46.00	-11.54
164.18	H	QP	50.65	-14.17	36.48	43.50	-7.02
287.05	H	QP	50.62	-12.29	38.33	46.00	-7.67
322.62	H	Peak	49.20	-11.10	38.10	46.00	-7.90
359.80	H	Peak	48.40	-10.05	38.35	46.00	-7.65
645.95	H	Peak	42.76	-4.82	37.94	46.00	-8.06
717.08	H	Peak	42.06	-3.89	38.17	46.00	-7.83

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. *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.*
4. *The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*

Above 1 GHz

Operation Mode: Tx / IEEE 802.11b / CH Low **Test Date:** September 22, 2006

Temperature: 21°C **Tested by:** James Yu

Humidity: 50% 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
1096.67	V	56.85	---	-10.52	46.33	---	74.00	54.00	-7.67	Peak
1663.33	V	55.18	---	-8.34	46.84	---	74.00	54.00	-7.16	Peak
4825.00	V	47.53	---	0.39	47.91	---	74.00	54.00	-6.09	Peak
4991.67	V	46.41	---	0.37	46.78	---	74.00	54.00	-7.22	Peak
7233.33	V	45.68	---	4.58	50.26	---	74.00	54.00	-3.74	Peak
9650.00	V	40.41	---	10.69	51.11	---	74.00	54.00	-2.89	Peak
1096.67	H	55.21	---	-10.52	44.68	---	74.00	54.00	-9.32	Peak
1496.67	H	55.51	---	-9.96	45.55	---	74.00	54.00	-8.45	Peak
1596.67	H	57.43	---	-9.00	48.43	---	74.00	54.00	-5.57	Peak
1663.33	H	56.57	---	-8.34	48.23	---	74.00	54.00	-5.77	Peak
1996.67	H	57.10	---	-5.03	52.07	---	74.00	54.00	-1.93	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:** September 22, 2006

Temperature: 21°C **Tested by:** James Yu

Humidity: 50% 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
1096.67	V	56.36	---	-10.52	45.84	---	74.00	54.00	-8.16	Peak
1333.33	V	56.12	---	-10.19	45.93	---	74.00	54.00	-8.07	Peak
1663.33	V	55.11	---	-8.34	46.77	---	74.00	54.00	-7.23	Peak
4991.67	V	44.48	---	0.37	44.85	---	74.00	54.00	-9.15	Peak
7308.33	V	46.18	---	4.49	50.67	---	74.00	54.00	-3.33	Peak
9750.00	V	46.77	35.77	10.80	57.57	46.57	74.00	54.00	-7.43	AVG
1100.00	H	55.21	---	-10.52	44.69	---	74.00	54.00	-9.31	Peak
1300.00	H	55.49	---	-10.24	45.25	---	74.00	54.00	-8.75	Peak
1600.00	H	57.80	---	-8.97	48.83	---	74.00	54.00	-5.17	Peak
1663.33	H	56.00	---	-8.34	47.66	---	74.00	54.00	-6.34	Peak
2000.00	H	66.38	45.96	-5.00	61.38	40.96	74.00	54.00	-13.04	AVG
9750.00	H	39.64	---	10.80	50.45	---	74.00	54.00	-3.55	Peak

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:** September 22, 2006

Temperature: 21°C **Tested by:** James Yu

Humidity: 50% 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
1100.00	V	57.07	---	-10.52	46.55	---	74.00	54.00	-7.45	Peak
1333.33	V	56.96	---	-10.19	46.76	---	74.00	54.00	-7.24	Peak
1663.33	V	57.56	---	-8.34	49.22	---	74.00	54.00	-4.78	Peak
4975.00	V	45.67	---	0.37	46.04	---	74.00	54.00	-7.96	Peak
9850.00	V	50.83	41.19	10.91	61.74	52.10	74.00	54.00	-1.90	AVG
12316.67	V	46.46	34.99	15.31	61.77	50.30	74.00	54.00	-3.70	AVG
1196.67	H	55.23	---	-10.38	44.85	---	74.00	54.00	-9.15	Peak
1500.00	H	55.25	---	-9.96	45.29	---	74.00	54.00	-8.71	Peak
1663.33	H	55.65	---	-8.34	47.31	---	74.00	54.00	-6.69	Peak
1993.33	H	55.59	---	-5.07	50.52	---	74.00	54.00	-3.48	Peak
9850.00	H	40.23	---	10.91	51.15	---	74.00	54.00	-2.85	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:** September 22, 2006

Temperature: 21°C **Tested by:** James Yu

Humidity: 50% 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
1100.00	V	57.27	---	-10.52	46.75	---	74.00	54.00	-7.25	Peak
1333.33	V	56.60	---	-10.19	46.41	---	74.00	54.00	-7.59	Peak
1663.33	V	57.02	---	-8.34	48.68	---	74.00	54.00	-5.32	Peak
1836.67	V	63.47	58.39	-6.62	56.85	51.77	74.00	54.00	-2.23	AVG
5000.00	V	46.10	---	0.37	46.47	---	74.00	54.00	-7.53	Peak
7225.00	V	45.52	---	4.59	50.11	---	74.00	54.00	-3.89	Peak
1100.00	H	54.85	---	-10.52	44.33	---	74.00	54.00	-9.67	Peak
1496.67	H	56.09	---	-9.96	46.13	---	74.00	54.00	-7.87	Peak
1600.00	H	57.31	---	-8.97	48.34	---	74.00	54.00	-5.66	Peak
1993.33	H	63.26	45.25	-5.07	58.19	40.18	74.00	54.00	-13.82	AVG
3333.33	H	45.20	---	-1.81	43.40	---	74.00	54.00	-10.60	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:** September 22, 2006

Temperature: 21°C **Tested by:** James Yu

Humidity: 50% 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
1100.00	V	56.46	---	-10.52	45.94	---	74.00	54.00	-8.06	Peak
1333.33	V	56.39	---	-10.19	46.20	---	74.00	54.00	-7.80	Peak
1660.00	V	56.55	---	-8.37	48.17	---	74.00	54.00	-5.83	Peak
1996.67	V	55.65	---	-5.03	50.61	---	74.00	54.00	-3.39	Peak
5000.00	V	45.45	---	0.37	45.82	---	74.00	54.00	-8.18	Peak
7316.67	V	46.46	---	4.48	50.94	---	74.00	54.00	-3.06	Peak
1096.67	H	54.88	---	-10.52	44.36	---	74.00	54.00	-9.64	Peak
1330.00	H	55.16	---	-10.20	44.96	---	74.00	54.00	-9.04	Peak
1496.67	H	56.39	---	-9.96	46.42	---	74.00	54.00	-7.58	Peak
1593.33	H	58.35	---	-9.03	49.32	---	74.00	54.00	-4.68	Peak
1663.33	H	57.04	---	-8.34	48.70	---	74.00	54.00	-5.30	Peak
1996.67	H	68.02	45.21	-5.03	62.99	40.18	74.00	54.00	-13.82	AVG

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:** September 22, 2006

Temperature: 21°C **Tested by:** James Yu

Humidity: 50% 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
1100.00	V	56.83	---	-10.52	46.31	---	74.00	54.00	-7.69	Peak
1333.33	V	56.62	---	-10.19	46.42	---	74.00	54.00	-7.58	Peak
1663.33	V	55.58	---	-8.34	47.24	---	74.00	54.00	-6.76	Peak
1996.67	V	55.91	---	-5.03	50.88	---	74.00	54.00	-3.12	Peak
4975.00	V	46.09	---	0.37	46.46	---	74.00	54.00	-7.54	Peak
7391.67	V	45.25	---	4.38	49.63	---	74.00	54.00	-4.37	Peak
1163.33	H	54.16	---	-10.43	43.73	---	74.00	54.00	-10.27	Peak
1496.67	H	55.40	---	-9.96	45.44	---	74.00	54.00	-8.56	Peak
1600.00	H	57.94	---	-8.97	48.97	---	74.00	54.00	-5.03	Peak
1996.67	H	55.59	---	-5.03	50.56	---	74.00	54.00	-3.44	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 Low **Test Date:** September 22, 2006

Temperature: 21°C **Tested by:** James Yu

Humidity: 50% 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
1093.33	V	56.72	---	-10.53	46.19	---	74.00	54.00	-7.81	Peak
1198.33	V	55.10	---	-10.38	44.72	---	74.00	54.00	-9.28	Peak
1326.67	V	55.92	---	-10.20	45.71	---	74.00	54.00	-8.29	Peak
1665.00	V	56.23	---	-8.32	47.91	---	74.00	54.00	-6.09	Peak
2003.33	V	63.86	45.72	-4.99	58.87	40.73	74.00	54.00	-13.27	AVG
2493.33	V	64.13	47.05	-3.89	60.24	43.16	74.00	54.00	-10.84	AVG
1093.33	H	54.97	---	-10.53	44.44	---	74.00	54.00	-9.56	Peak
1595.00	H	55.88	---	-9.02	46.86	---	74.00	54.00	-7.14	Peak
2003.33	H	55.53	---	-4.99	50.54	---	74.00	54.00	-3.46	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:** September 22, 2006

Temperature: 21°C **Tested by:** James Yu

Humidity: 50% 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
1093.33	V	56.50	---	-10.53	45.97	---	74.00	54.00	-8.03	Peak
1326.67	V	55.37	---	-10.20	45.17	---	74.00	54.00	-8.83	Peak
1595.00	V	54.81	---	-9.02	45.80	---	74.00	54.00	-8.20	Peak
N/A										
1595.00	H	57.24	---	-9.02	48.23	---	74.00	54.00	-5.77	Peak
2003.33	H	63.48	45.40	-4.99	58.49	40.41	74.00	54.00	-13.59	AVG
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:** September 22, 2006

Temperature: 21°C **Tested by:** James Yu

Humidity: 50% 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
1105.00	V	56.84	---	-10.51	46.33	---	74.00	54.00	-7.67	Peak
1338.33	V	55.71	---	-10.19	45.53	---	74.00	54.00	-8.47	Peak
2493.33	V	63.49	47.34	-3.89	59.60	43.45	74.00	54.00	-10.55	AVG
11650.00	V	49.64	32.97	15.19	64.83	48.16	74.00	54.00	-5.84	AVG
N/A										
1595.00	H	56.47	---	-9.02	47.46	---	74.00	54.00	-6.54	Peak
1665.00	H	58.09	---	-8.32	49.77	---	74.00	54.00	-4.23	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).*