FCC 47 CFR PART 15 Subpart C

TEST REPORT

For

Wireless laser mouse

Model Number: F200R

Trade Name: Cherry

Issued to

Cherry Mikroschalter Gmbh
Cherrystrabe Industriest 19 PO Box 1220 D-91275
Auerbach/Opf GERMANY

Issued by

Compliance Certification Services Inc.
No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang,
Taoyuan Hsien, (338) Taiwan, R.O.C.
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ACCREDITED
No. 0824-01

TAF
Testing Laboratory
0363

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1. TEST RESULT CERTIFICATION

Applicant:	Cherry Mikroschalter Gmbh Cherrystrabe Industriest 19 PO Box 1220 D-91275 Auerbach/Opf GERMANY
Equipment Under Test:	Wireless laser mouse
Trade Name:	Cherry
Model Number:	F200R
Date of Test:	September 19 ~ 26, 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 emission limits of FCC Rules Part 15.107, 15.109,15.207, 15.209 and 15.249.
The test results of this report relate only to the tested sample 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 laser mouse
Trade Name	Cherry
Model Number	F200R
Model Discrepancy	N/A
Power Supply	Rechargeable alkaline AA battery 1.5V*2(3.0V)
Frequency Range	

Index	Channel	Frequency (MHz)
1	4	2412
2	5	2413
3	6	2414
4	7	2415
5	8	2416
6	9	2417
7	10	2418
8	11	2419
9	12	2420
10	13	2421
11	14	2422
12	15	2423
13	16	2424
14	17	2425
15	18	2426
16	19	2427

Modulation Technique	GFSK
Antenna Gain	0dBi
Antenna Designation	Printed Antenna
USB Cable	Shielded, 1.5m

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: GDDF200R filing to comply with Section 15.107 & 15.109, 15.207, 15.209 and 15.249 (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 15.249.

3.1EUT 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.

3.2EUT 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 15.107 and 15.109 under the FCC Rules Part 15 Subpart B and Section 15.207, 15.209,15.249 under the FCC Rules Part 15 Subpart C.

3.3GENERAL 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.

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

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

[2] Above 38.6

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

3.5DESCRIPTION OF TEST MODES

The EUT (model: F200R) had been tested under operating condition.

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, and powerline conducted emission below 30MHz, which worst case was in normal link mode with charging only.

Channel Low(2412MHz), Channel Mid(2419MHz) and Channel High(2427MHz) were chosen for the final testing.

4. INSTRUMENT CALIBRATION

4.1MEASURING 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.

4.2MEASUREMENT 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	06/06/2007
Horn-Antenna	TRC	HA-0801	04	05/15/2007
Horn-Antenna	TRC	HA-1201A	01	07/10/2007
Horn-Antenna	TRC	HA-1301A	01	07/18/2007
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.*

Powerline Conducted Emissions Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI TEST RECEIVER 9kHz-30MHz	ROHDE & SCHWARZ	ESHS30	828144/003	09/27/2006
TWO-LINE V-NETWORK 9kHz-30MHz	SCHAFFNER	NNB41	03/10013	06/14/2007
LISN 10kHz-100MHz	EMCO	3825/2	9106-1809	03/20/2007
Test S/W	LABVIEW (V 6.1)			

Remark: *The measurement uncertainty is less than +/- 2.81dB, 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, Auerbach/Opf GERMANY
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.”

5.3TABLE 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	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

6.1SETUP CONFIGURATION OF EUT

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

6.2SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Notebook PC (Remote)	IBM	2672(X31)	99PBTKB	WLAN: ANO20030400LEG Bluetooth: ANO20020100MTN	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2.	Receiver	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 15.249 REQUIREMENTS

7.1BAND EDGES MEASUREMENT

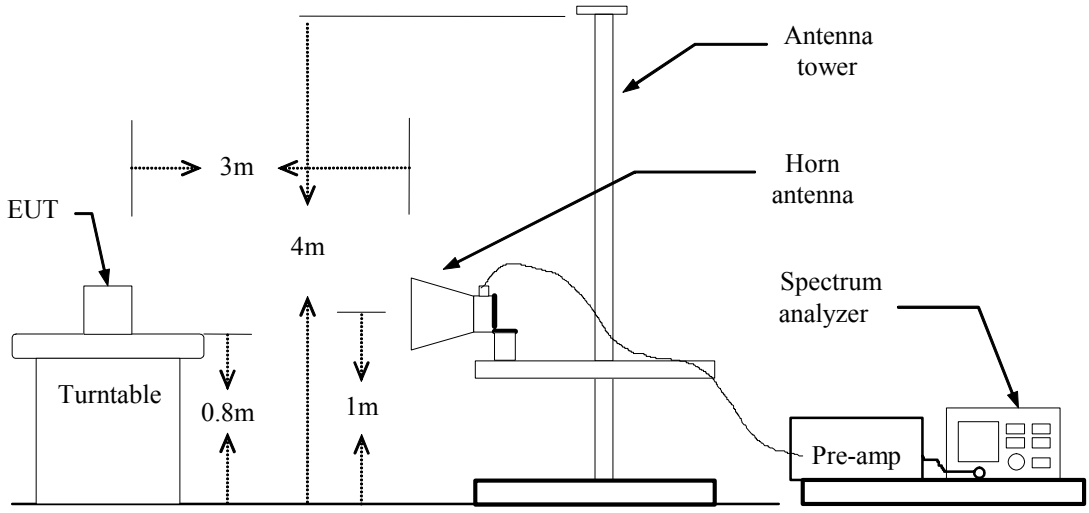
LIMIT

1. 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

2. As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

Test Configuration



TEST PROCEDURE

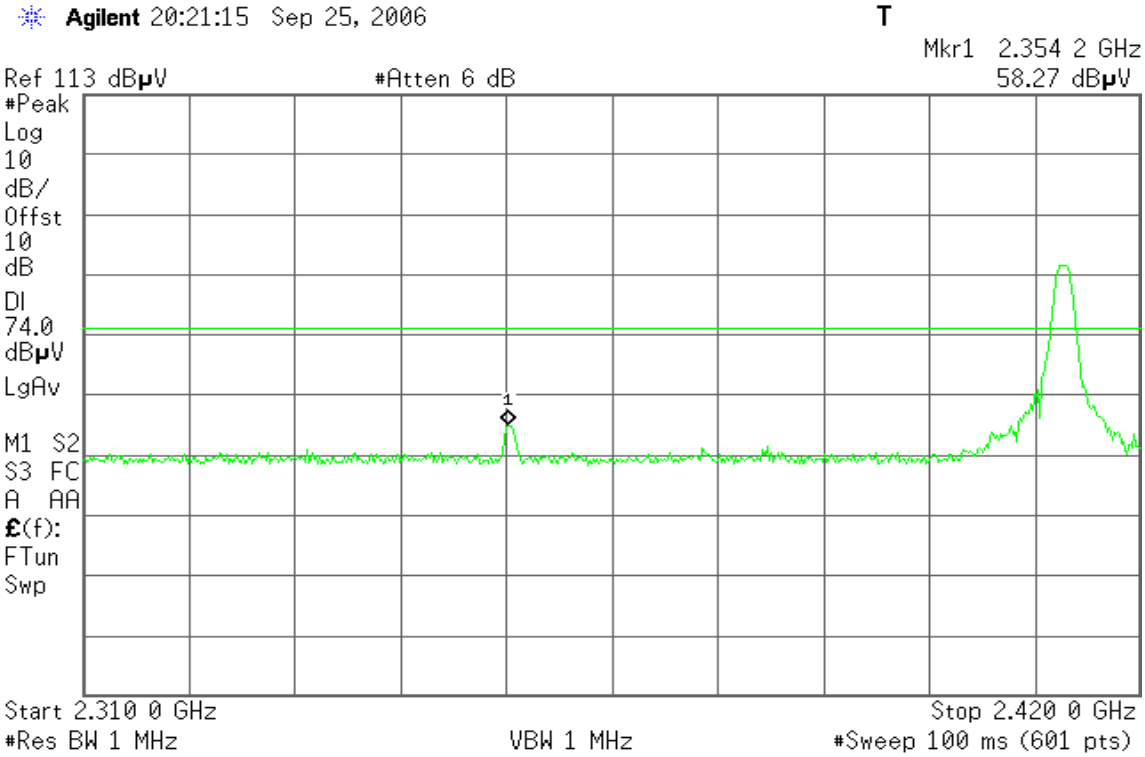
1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the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

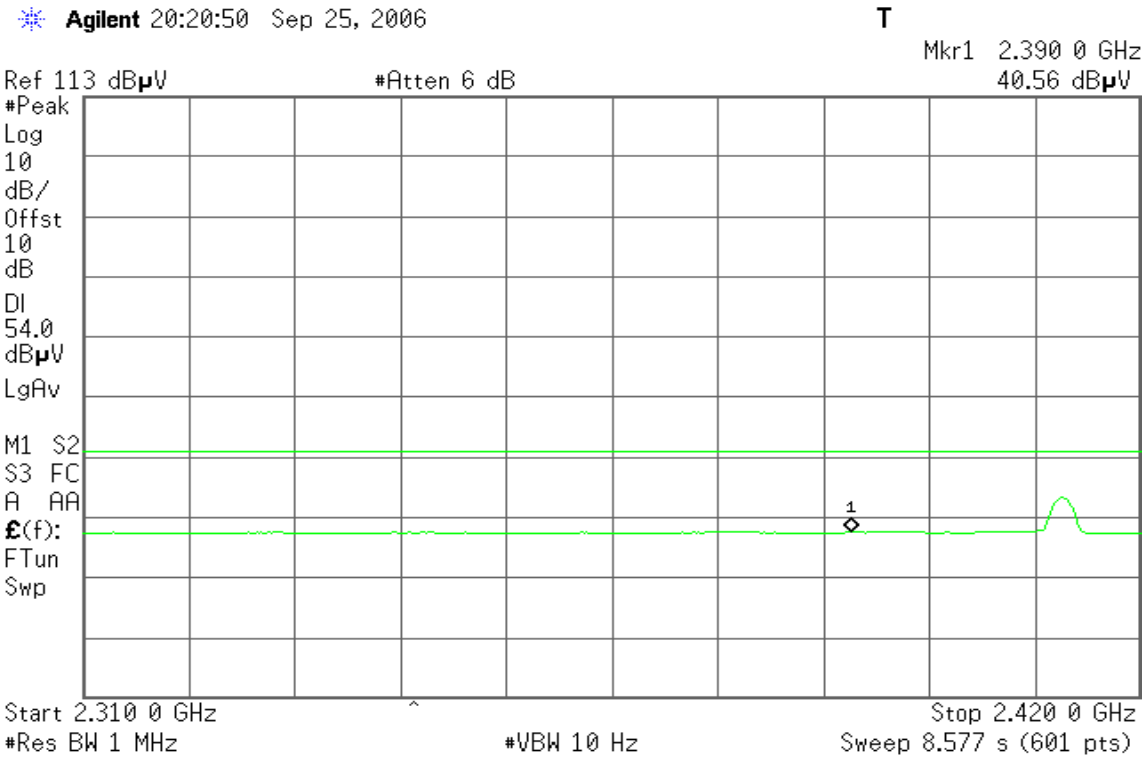
Refer to attach spectrum analyzer data chart.

Band Edges (CH Low)

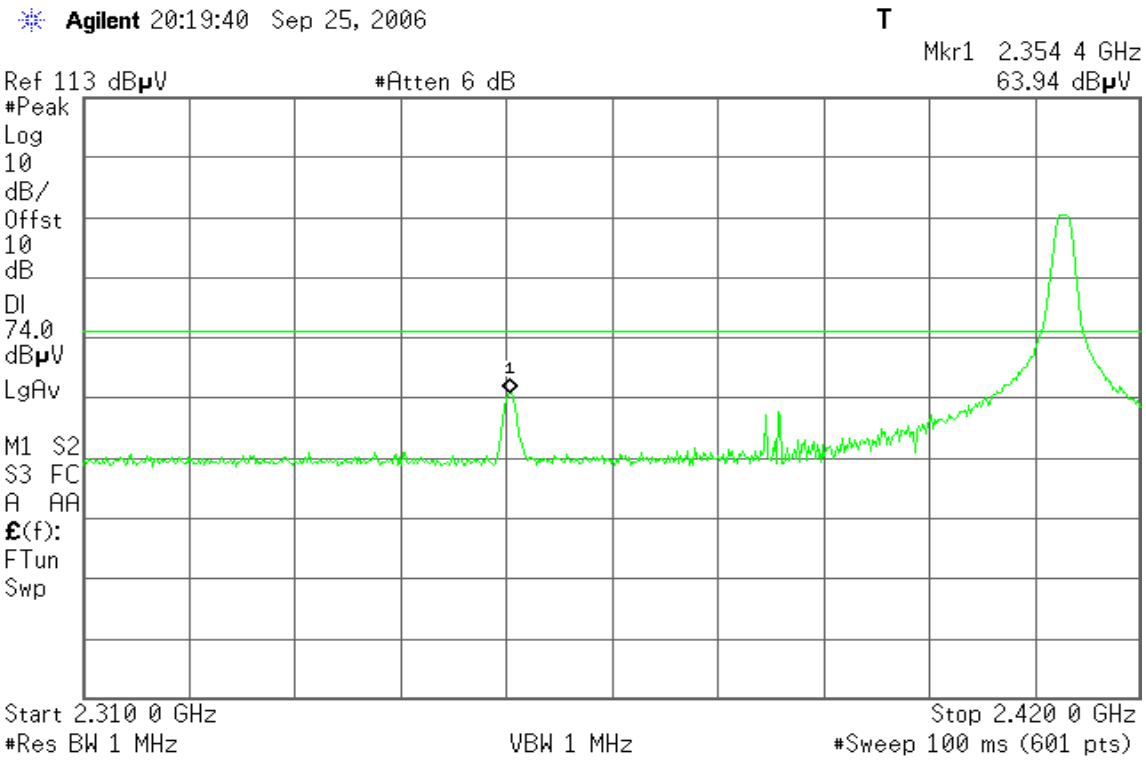
Detector mode: Peak Polarity: Vertical



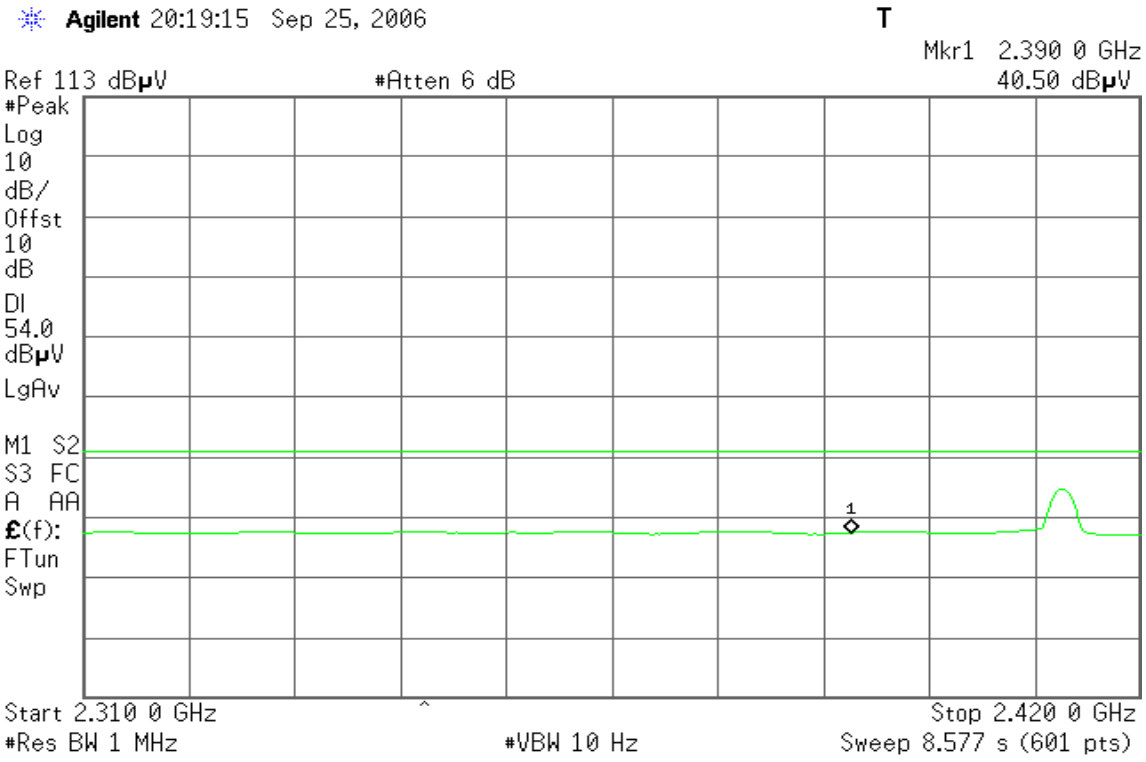
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**

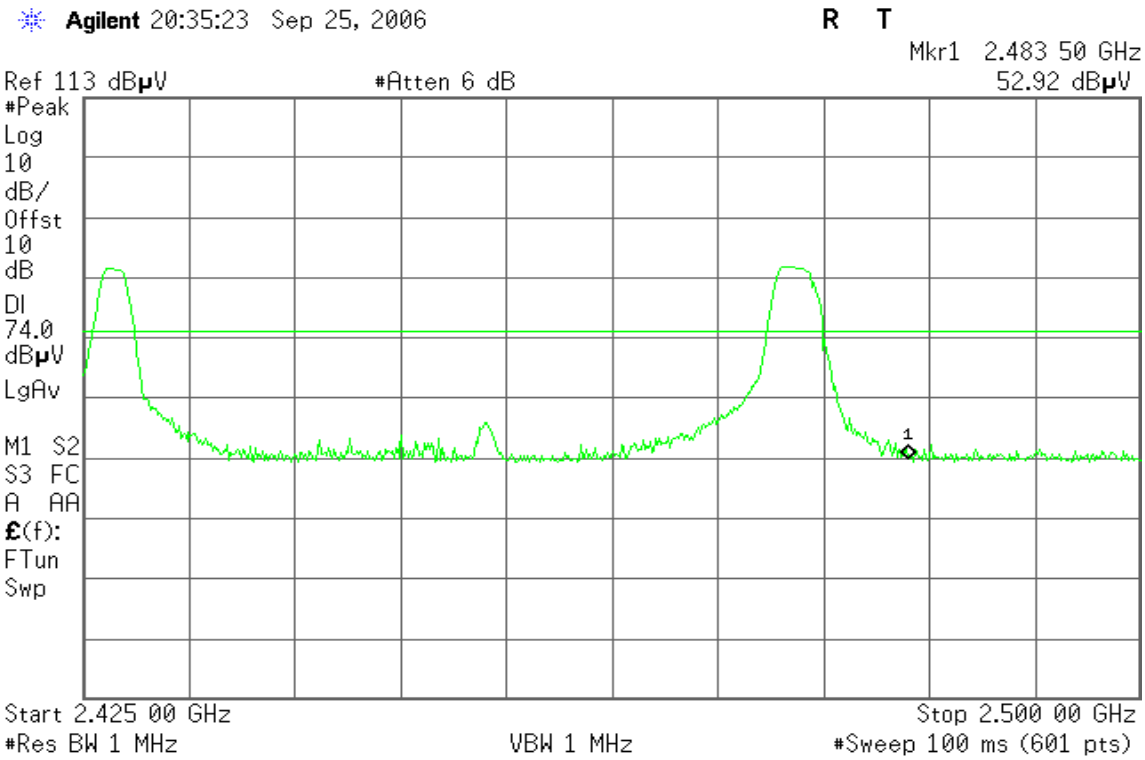


Detector mode: Average **Polarity: Horizontal**

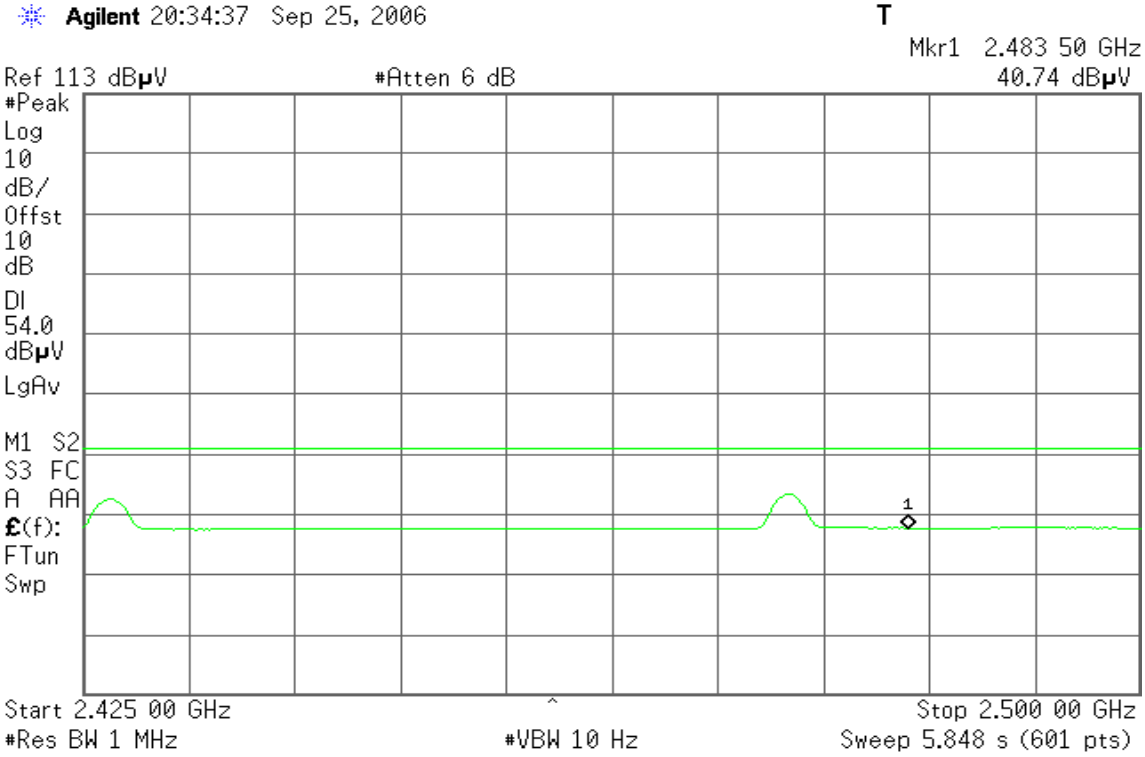


Band Edges (CH High)

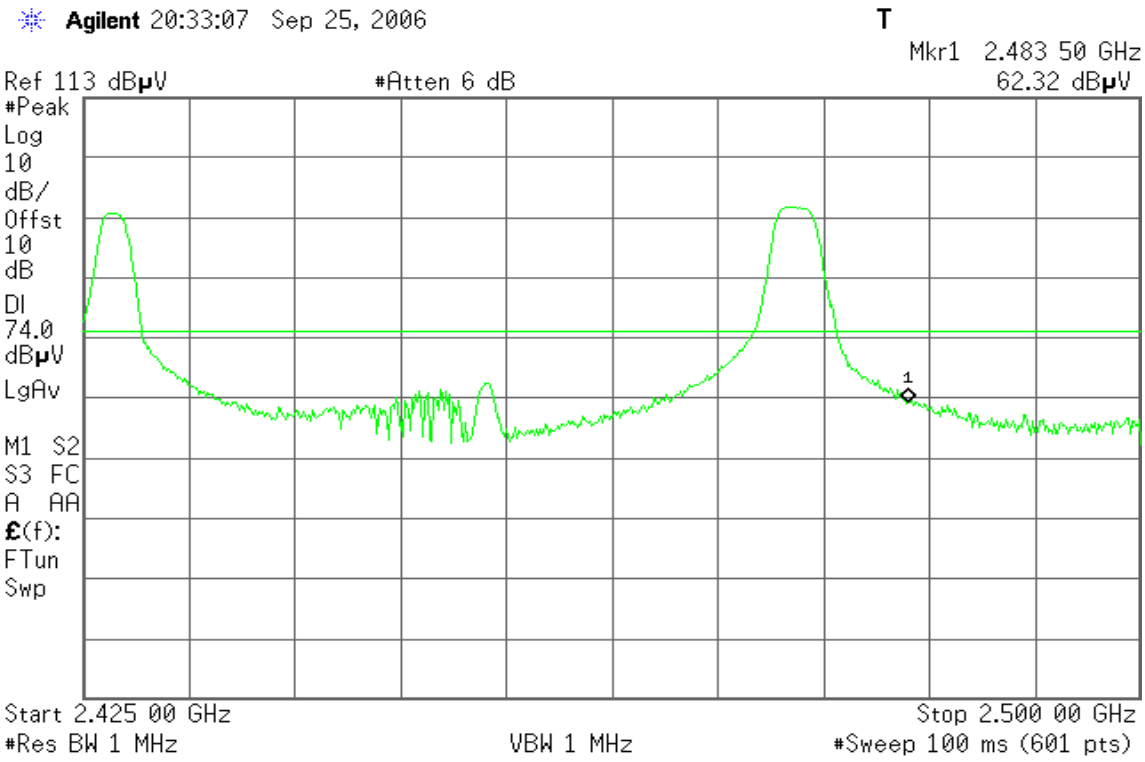
Detector mode: Peak Polarity: Vertical



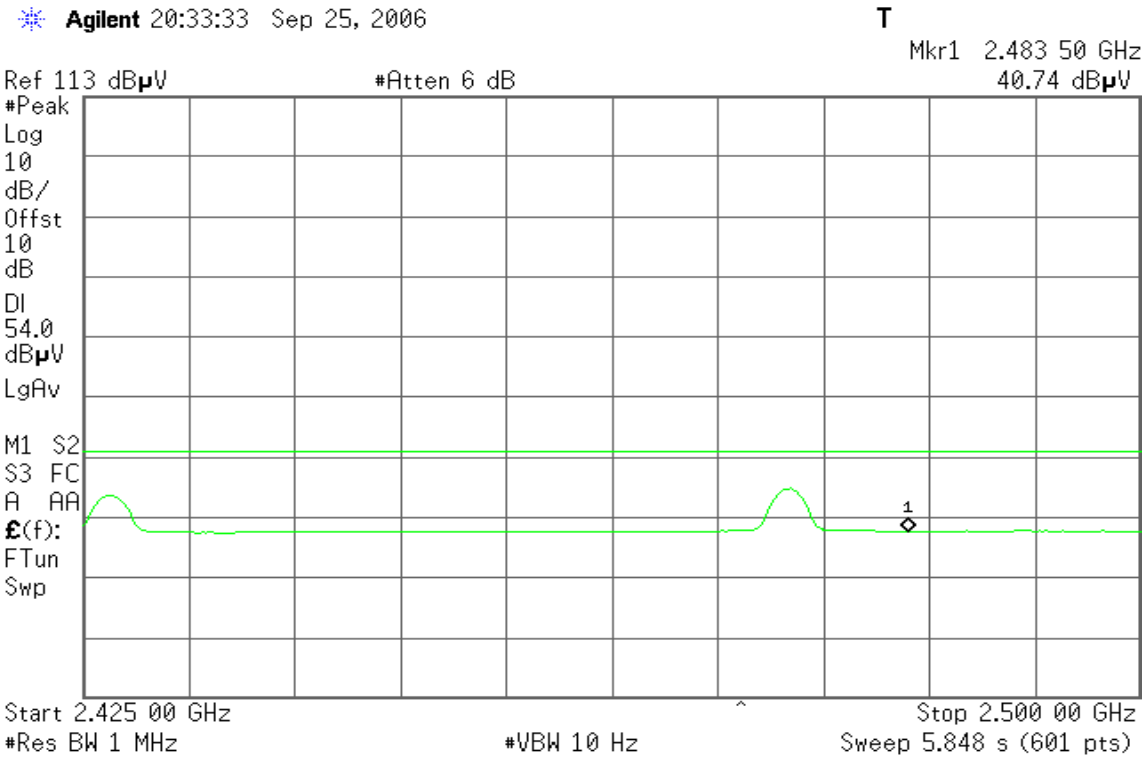
Detector mode: Average Polarity: Vertical



Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



7.2SPURIOUS EMISSION

LIMIT

1. In the section 15.249(a):
   Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental Field Strength (mV/m)	Field Strength of Harmonics (µV/m)
902-928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

2. 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

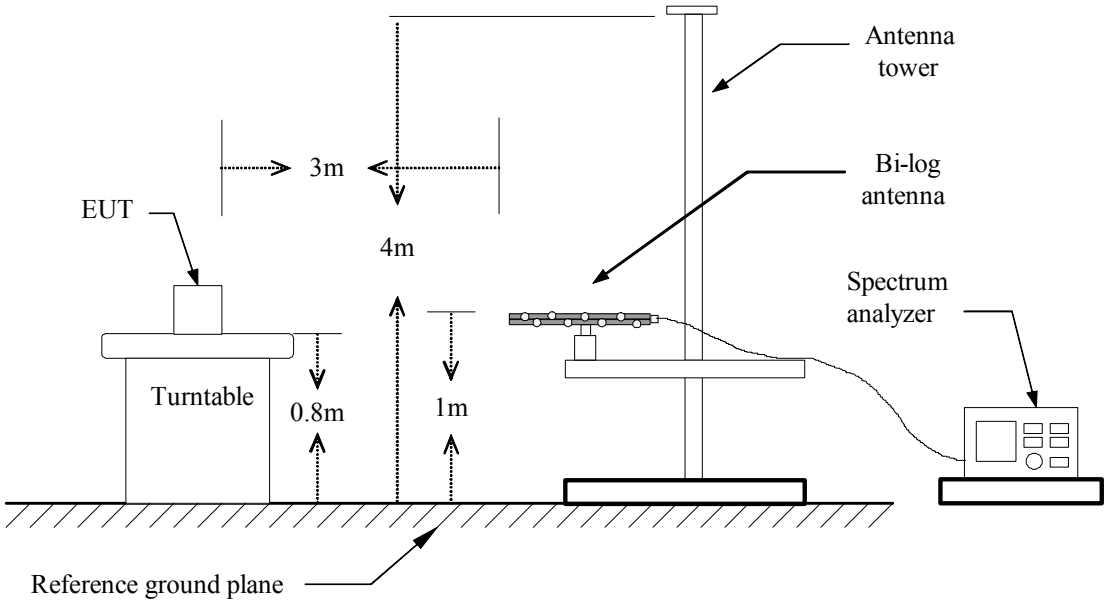
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of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

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

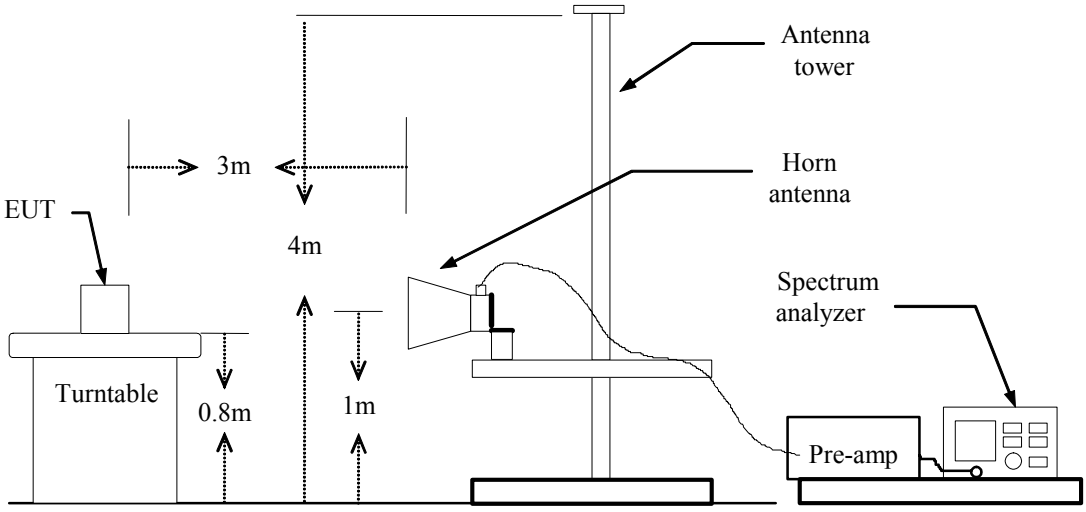
Frequency (MHz)	Field Strength (µV/m at 3-meter)	Field Strength (dBµV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

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 26, 2006

Temperature: 23°C **Tested by:** James Yu

Humidity: 50% 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
165.80	V	49.86	-14.55	35.31	43.50	-8.19	Peak
291.90	V	49.60	-12.64	36.96	46.00	-9.04	Peak
356.57	V	44.11	-10.51	33.61	46.00	-12.39	Peak
487.52	V	45.61	-7.77	37.84	46.00	-8.16	Peak
629.78	V	45.20	-5.34	39.86	46.00	-6.14	Peak
912.70	V	30.66	-1.80	28.86	46.00	-17.14	Peak
60.72	H	53.28	-19.67	33.60	40.00	-6.40	Peak
298.37	H	45.98	-12.47	33.51	46.00	-12.49	Peak
430.93	H	32.64	-8.99	23.65	46.00	-22.35	QP
487.52	H	45.78	-7.77	38.01	46.00	-7.99	Peak
615.23	H	38.47	-5.71	32.77	46.00	-13.23	Peak
859.35	H	34.79	-2.58	32.22	46.00	-13.78	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 / CH Low **Test Date:** September 26, 2006

Temperature: 23°C **Tested by:** James Yu

Humidity: 50% RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Result		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2412.00	V	89.85	---	-4.07	85.77	---	Each channel would have two TX frequency, fc & fc + 48MHz.			
2460.00	V	88.40	---	-3.97	84.43	---				
Total	V	---	---	---	88.16	---	114.00	94.00	-5.84	Peak
1303.33	V	53.59	---	-10.24	43.35	---	74.00	54.00	-10.65	Peak
2353.33	V	62.12	44.77	-4.21	57.91	40.56	74.00	54.00	-13.44	AVG
2736.67	V	62.26	44.85	-3.22	59.04	41.63	74.00	54.00	-12.37	AVG
4825.00	V	63.56	37.88	0.39	63.95	38.27	74.00	54.00	-15.73	AVG
7233.33	V	51.34	35.70	4.58	55.92	40.28	74.00	54.00	-13.72	AVG
7383.33	V	51.63	35.43	4.39	56.02	39.82	74.00	54.00	-14.18	AVG
2412.00	H	91.48	---	-4.07	87.40	---	Each channel would have two TX frequency, fc & fc + 48MHz.			
2460.00	H	93.71	---	-3.97	89.74	---				
Total	H	---	---	---	91.74	---	114.00	94.00	-2.26	Peak
1293.33	H	53.46	---	-10.25	43.21	---	74.00	54.00	-10.79	Peak
2353.33	H	64.34	44.92	-4.21	60.13	40.71	74.00	54.00	-13.29	AVG
2740.00	H	66.10	44.82	-3.21	62.89	41.61	74.00	54.00	-12.39	AVG
4825.00	H	63.54	37.91	0.39	63.93	38.30	74.00	54.00	-15.70	AVG
4916.67	H	59.53	37.00	0.38	59.91	37.38	74.00	54.00	-16.62	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 / CH Mid **Test Date:** September 26, 2006

Temperature: 23°C **Tested by:** James Yu

Humidity: 50% RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Result		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2419.00	V	89.80	---	-4.06	85.74	---	Each channel would have two TX frequency, fc & fc + 48MHz.			
2467.00	V	89.41	---	-3.95	85.45	---				
Total	V	---	---	---	88.61	---	114.00	94.00	-5.39	Peak
1286.67	V	54.20	---	-10.26	43.94	---	74.00	54.00	-10.06	Peak
2323.33	V	62.65	45.07	-4.28	58.37	40.79	74.00	54.00	-13.21	AVG
2376.67	V	64.85	44.98	-4.16	60.69	40.82	74.00	54.00	-13.18	AVG
2700.00	V	59.86	44.61	-3.32	56.54	41.29	74.00	54.00	-12.71	AVG
4933.33	V	61.09	41.49	0.38	61.47	41.87	74.00	54.00	-12.13	AVG
7400.00	V	53.66	36.28	4.37	58.03	40.65	74.00	54.00	-13.35	AVG
2419.00	H	91.42	---	-4.06	87.36	---	Each channel would have two TX frequency, fc & fc + 48MHz.			
2467.00	H	95.70	---	-3.95	91.75	---				
Total	H	---	---	---	93.10	---	114.00	94.00	-0.90	Peak
1276.67	H	53.16	---	-10.27	42.89	---	74.00	54.00	-11.11	Peak
2323.33	H	69.09	45.03	-4.28	64.81	40.75	74.00	54.00	-13.25	AVG
2556.67	H	69.72	44.88	-3.72	66.00	41.16	74.00	54.00	-12.84	AVG
2700.00	H	65.60	44.71	-3.32	62.28	41.39	74.00	54.00	-12.61	AVG
7258.33	H	44.26	---	4.55	48.81	---	74.00	54.00	-5.19	Peak
7400.00	H	52.99	36.14	4.37	57.36	40.51	74.00	54.00	-13.49	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). Peak detector mode and average detector mode of the emission shown in Result column.*

Operation Mode: Tx / CH High **Test Date:** September 26, 2006

Temperature: 23°C **Tested by:** James Yu

Humidity: 50% RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Result		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2427.00	V	89.64	---	-4.04	85.59	---	Each channel would have two TX frequency, fc & fc + 48MHz.			
2475.00	V	88.79	---	-3.93	84.86	---				
Total	V	---	---	---	88.25	---	114.00	94.00	-5.75	Peak
2343.33	V	64.65	44.95	-4.23	60.42	40.72	74.00	54.00	-13.28	AVG
2720.00	V	61.17	44.65	-3.26	57.91	41.39	74.00	54.00	-12.61	AVG
4850.00	V	63.52	37.45	0.38	63.90	37.83	74.00	54.00	-16.17	AVG
4950.00	V	61.51	37.86	0.37	61.88	38.23	74.00	54.00	-15.77	AVG
7283.33	V	50.51	35.17	4.52	55.03	39.69	74.00	54.00	-14.31	AVG
7425.00	V	52.97	36.20	4.34	57.31	40.54	74.00	54.00	-13.46	AVG
2427.00	H	91.96	---	-4.04	87.91	---	Each channel would have two TX frequency, fc & fc + 48MHz.			
2475.00	H	95.99	---	-3.93	92.06	---				
Total	H	---	---	---	93.47	---	114.00	94.00	-0.53	Peak
1310.00	H	52.23	---	-10.23	42.01	---	74.00	54.00	-11.99	Peak
2343.33	H	64.29	44.99	-4.23	60.06	40.76	74.00	54.00	-13.24	AVG
2576.67	H	68.94	44.73	-3.67	65.27	41.06	74.00	54.00	-12.94	AVG
2723.33	H	66.49	44.78	-3.25	63.24	41.53	74.00	54.00	-12.47	AVG
7283.33	H	44.57	---	4.52	49.09	---	74.00	54.00	-4.91	Peak
7425.00	H	46.48	---	4.34	50.82	---	74.00	54.00	-3.18	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). Peak detector mode and average detector mode of the emission shown in Result column.*

7.3POWERLINE 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 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	**Limits (dBμV)**	
	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.

TEST RESULTS

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

Test Data

Operation Mode: Normal link **Test Date:** September 19, 2006

Temperature: 25°C **Tested by:** Nan Tsai

Humidity: 55% RH

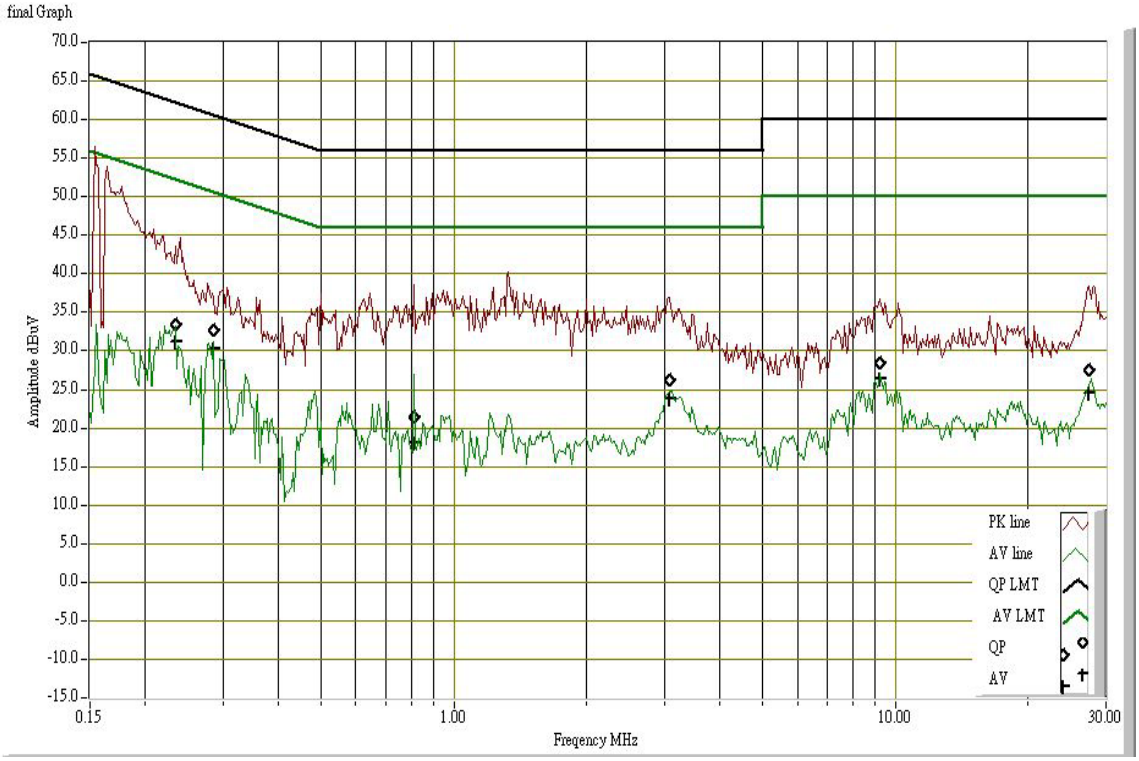
Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.234	33.330	31.270	0.100	33.430	31.370	62.307	52.307	-28.877	-20.937	L1
0.286	32.730	30.200	0.100	32.830	30.300	60.640	50.640	-27.810	-20.340	L1
0.812	21.420	18.040	0.100	21.520	18.140	56.000	46.000	-34.480	-27.860	L1
3.073	26.130	23.770	0.100	26.230	23.870	56.000	46.000	-29.770	-22.130	L1
9.230	28.420	26.340	0.623	29.043	26.963	60.000	50.000	-30.957	-23.037	L1
27.497	27.500	24.610	1.300	28.800	25.910	60.000	50.000	-31.200	-24.090	L1
0.175	36.410	28.330	0.150	36.560	28.480	64.720	54.720	-28.160	-26.240	L2
0.194	32.020	30.570	0.112	32.132	30.682	63.864	53.864	-31.732	-23.182	L2
0.300	28.410	27.130	0.100	28.510	27.230	60.243	50.243	-31.733	-23.013	L2
0.473	27.250	19.600	0.100	27.350	19.700	56.461	46.461	-29.111	-26.761	L2
9.304	26.370	23.950	0.630	27.000	24.580	60.000	50.000	-33.000	-25.420	L2
28.387	22.000	19.680	1.335	23.335	21.015	60.000	50.000	-36.665	-28.985	L2

Remark:

1. *Measuring frequencies from 0.15 MHz to 30MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.*
3. *The IF bandwidth of SPN between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;*
4. *L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)