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**FCC 47 CFR PART 15 SUBPART C**

**TEST REPORT**

**For**

**EVER SPARKLE TECHNOLOGIES LTD.**

**Wireless Guitar Controller for PS-2**

**Model: 80592**

**Trade Name: NYKO**

*Prepared for*

**EVER SPARKLE TECHNOLOGIES LTD.**

**Unit B, 6/F., Kingswell Commercial Tower, 171~173 lockhart Road,  
Wanchai,HONG Kong**

*Prepared by*

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# 1. TEST RESULT CERTIFICATION

**Applicant:** EVER SPARKLE TECHNOLOGIES LTD.  
 Unit B, 6/F., Kingswell Commercial Tower, 171~173 Lockhart Road,  
 Wanchai, Hong Kong

**Equipment Under Test:** Wireless Guitar Controller for PS-2

**Trade Name:** NYKO

**Model:** 80592

**Date of Test:** Nov 21~Dec 1, 2006

**Report No. :** ST0611024

**FCC ID :** SQO80592R004

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

## We hereby certify that:

The above equipment was tested by SINTEK LABORATORY CO., LTD.


The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2001 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.249.

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

*Approved by:*

*Reviewed by:*

  
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## 2. EUT DESCRIPTION

<b>Product</b>	Wireless Guitar Controller for PS-2
<b>Trade Name</b>	NYKO
<b>Model Number</b>	80592
<b>Model Discrepancy</b>	N/A
<b>Power Supply</b>	DC 3.3V
<b>Frequency Range</b>	2410 ~ 2470 MHz
<b>Antenna Specification</b>	The EUT'S antenna is integrated on the main PCB
<b>Number of Channels</b>	59 Channels

*Note: This submittal(s) (test report) is intended for FCC ID: SQO80592R004 filing to comply with Section 15.249 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, and 15.249.

#### **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 15.249 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: 2001, 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 max emission, the relative positions of this hand-held transmitter (EUT) were rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4: 2001.

### 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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
<sup>1</sup> 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	<sup>2</sup>
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> 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 has been tested under operating condition.

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

Channel low (2410MHz), Ch mid (2440MHz), Ch high (2470MHz), , with highest data rate (worst case) are chosen for full testing.



#### **4. 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.



## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILITIES**

All measurement facilities used to collect the measurement data are located at No. 7, Xinshidai industrial, Guantian Village, Shiyan Town, Baoan District Shenzhen, China.

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, bi-conical, 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 LABORATORY ACCREDITATIONS AND LISTING**

Site on file with the FCC: The certificate registration number is 963441 for 3&10M OATS

Site listed with the VCCI: The certificate registration number is R-2023 and c-2178 for 3&10M OATS





## 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.	Equipment	Model#	Serial#	Trade Name	Data Cable	Power Cord
1.	TV	ALJ-777	N/A	Anlijia	Unshielded 1.2m	Unshielded, 1.5m
2.	Game player	SCPH-70012	FS1805598	SONY	Unshielded 1.5m	Unshielded, 1.5m

**Notes:**

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



## 7. FCC PART 15.249 REQUIREMENTS

### 7.1 BAND EDGES MEASUREMENT

#### LIMIT

According to §15.249(d), Emissions radiated outside of the specified frequency band, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in section 15.209, whichever is the lesser attenuation.

#### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2006

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

#### Test Configuration

#### TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

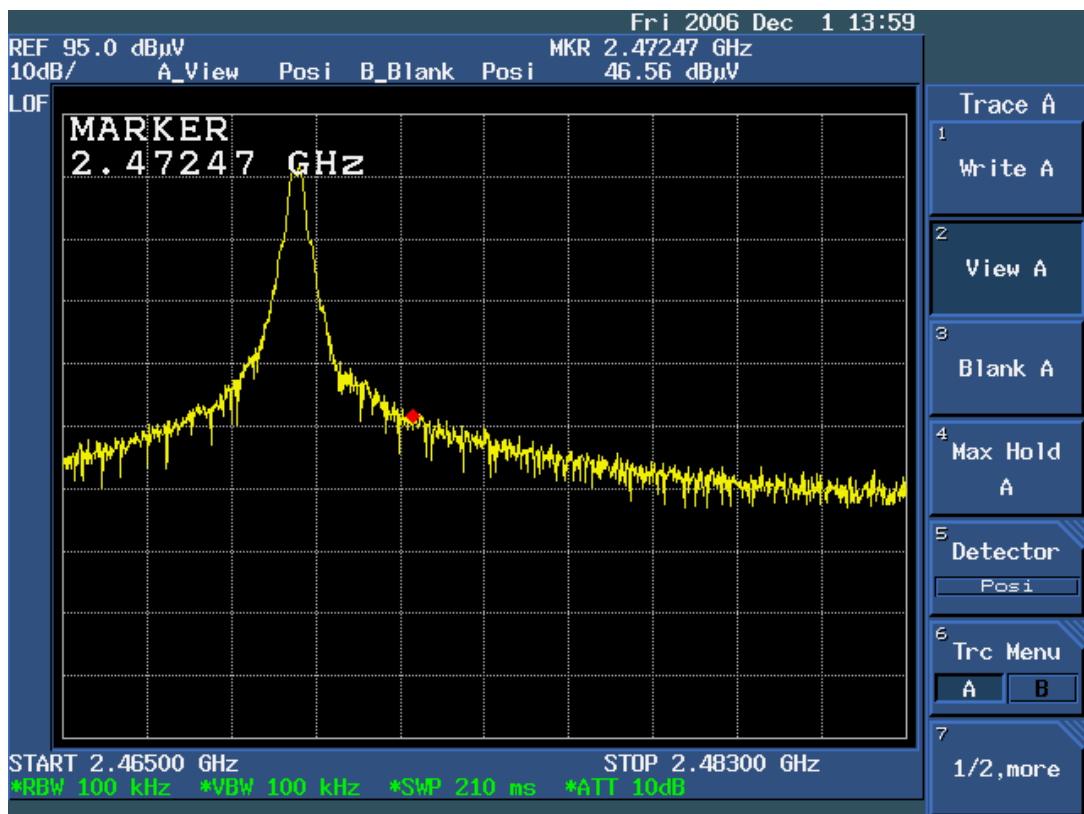
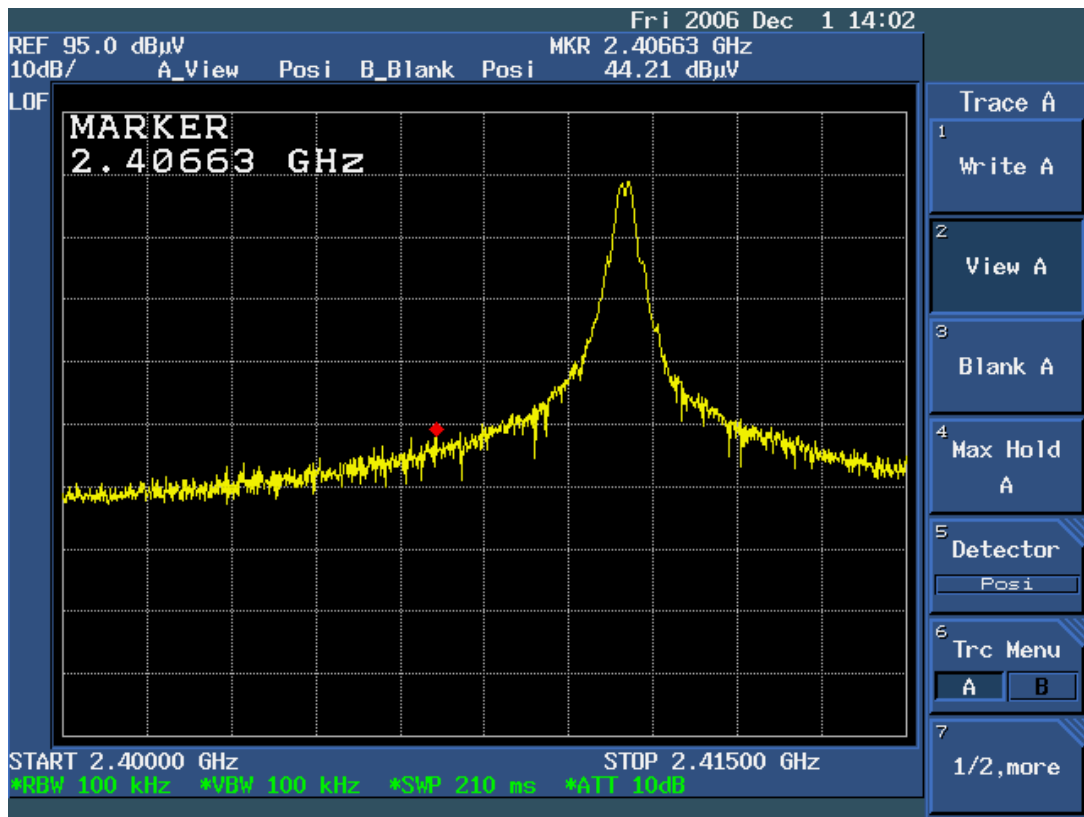
Set the spectrum analyzer as RBW = 100kHz, VBW = RBW, Sweep = auto.

Repeat until all the rest channels are investigated.

#### TEST RESULTS

Refer to attach spectrum analyzer data chart

### Band Edges



## 7.2 RADIATED EMISSIONS

### LIMIT

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:

**FCC PART 15 subpart C section 15.209 :**

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

**FCC PART 15 subpart C section 15.249:**

Frequency (MHz)	Field Strength		Measurement Distance (m)
	Fundamental(mV/m)	Harmonies( $\mu\text{V/m}$ )	
2400-2483.5	50	500	3

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

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

Frequency (Hz)	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

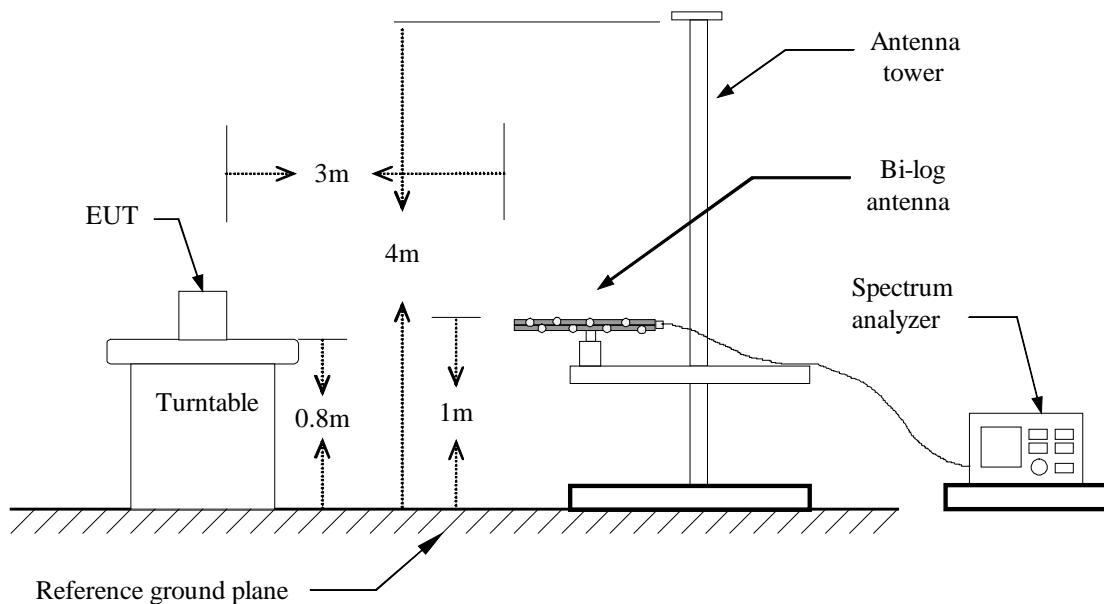
**MEASUREMENT EQUIPMENT USED**

Open Area Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3271A	85060231	06/12/2006
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2006
EMI Test Receiver	SCHAFFNER	SCR3501	464	06/12/2006
Pre-Amplifier	COM-POWER	PA-103	161062	06/12/2006
Bi-log Antenna	SCHAFFNER	CBL6111C	2775	06/12/2006
Turn Table	SINTEK	N/A	N/A	N.C.R
Antenna Tower	SINTEK	N/A	N/A	N.C.R
Controller	SINTEK	N/A	N/A	N.C.R
RF Switch	ANRITSU	MP59B	M53867	N.C.R
Horn antenna	EMCO	3115	9602-4659	06/12/2006
Pre-Amplifier	HP	8449B	3008B00965	06/12/2006

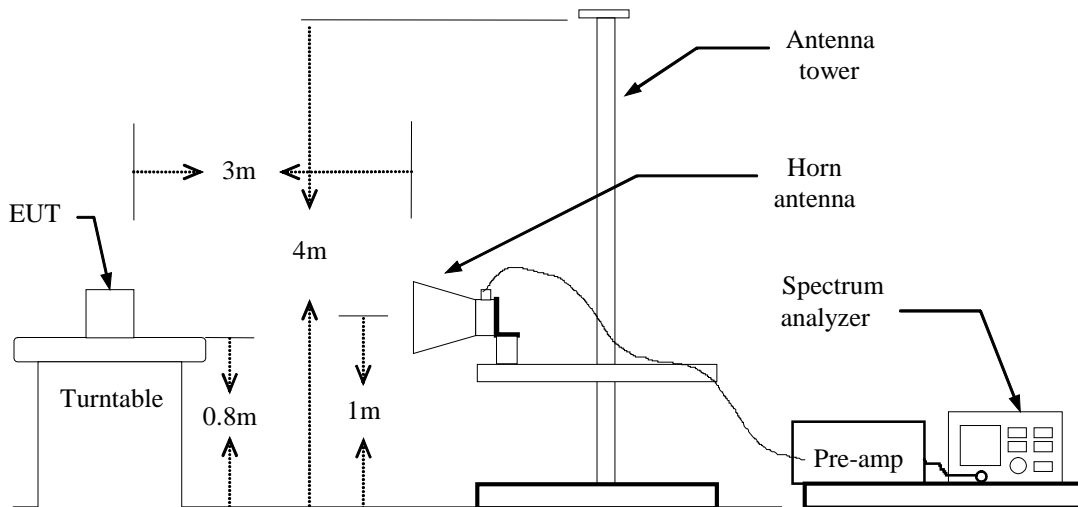
*Remark: Each piece of equipment is scheduled for calibration once a year.*

**Test Configuration**

**Below 1 GHz**



### Above 1 GHz



### TEST PROCEDURE

The EUT is placed on a turntable, which is 0.8m above ground plane.

The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

Repeat above procedures until the measurements for all frequencies are complete.



## TEST RESULTS

### Below 1 GHz

**Operation Mode:** Normal

**Test Date:** Nov 23, 2006

**Temperature:** 20°C

**Tested by:** Ray

**Humidity:** 70 % 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)
84.32	V	Peak	14.98	13.44	28.42	40.00	-11.58
99.84	V	Peak	17.87	14.15	32.02	43.50	-11.48
155.13	V	Peak	16.25	11.29	27.54	43.50	-15.96
207.51	V	Peak	12.76	16.48	29.24	43.50	-14.26
589.69	V	Peak	14.75	24.88	39.63	46.00	-6.37
620.73	V	Peak	4.31	27.1	31.41	46.00	-14.59
156.1	H	Peak	26.28	10.86	37.14	43.50	-6.36
207.51	H	Peak	22.43	10.51	32.94	43.50	-10.56
294.81	H	Peak	18.93	19.08	38.01	46.00	-7.99
363.68	H	Peak	13.96	20.83	34.79	46.00	-11.21
589.69	H	Peak	17.20	24.61	41.81	46.00	-4.19
701.24	H	Peak	6.64	27.84	34.48	46.00	-11.52

### **Notes:**

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



**Above 1 GHz**

**Operation Mode:** Ch low (2410MHz)

**Test Date:** Nov 23, 2006

**Temperature:** 20°C

**Tested by:** Ray

**Humidity:** 70 % RH

**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2410.00	V	82.13	---	1.48	83.61	---	114.00	94.00	-10.39	Peak
4820.10	V	38.25	---	3.28	41.53	---	74.00	54.00	-12.47	Peak
9640.33	V	31.85	---	7.83	39.68	---	74.00	54.00	-14.32	Peak
N/A										
N/A										
N/A										
N/A										
2410.00	H	75.35	---	1.48	76.83		114.00	94.00	-17.17	Peak
4820.10	H	39.5	---	2.75	42.25	---	74.00	54.00	-11.75	Peak
9640.33	H	37.02	---	3.86	40.88	---	74.00	54.00	-13.12	Peak
N/A										
N/A										
N/A										
N/A										

**Notes:**

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



**Above 1 GHz**

**Operation Mode:** Ch mid (2440MHz)

**Test Date:** Nov 23, 2006

**Temperature:** 20°C

**Tested by:** Ray

**Humidity:** 70 % RH

**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2440.07	V	82.34	---	1.49	83.83	---	114.00	94.00	-10.17	Peak
4880.14	V	37.24	---	3.30	40.54	---	74.00	54.00	-13.46	Peak
9760.28	V	32.56	---	7.83	40.39	---	74.00	54.00	-13.61	Peak
N/A										
N/A										
N/A										
N/A										
2440.07	H	75.23	---	1.49	76.72		114.00	94.00	-17.28	Peak
4880.14	H	36.52	---	2.75	39.27	---	74.00	54.00	-14.73	Peak
9760.28	H	36.54	---	3.86	40.40	---	74.00	54.00	-13.6	Peak
N/A										
N/A										
N/A										
N/A										

**Notes:**

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



**Above 1 GHz**

**Operation Mode:** Ch high (2470MHz)

**Test Date:** Nov 23, 2006

**Temperature:** 20°C

**Tested by:** Ray

**Humidity:** 70 % RH

**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
2470.07	V	80.69	---	1.51	82.20	---	114.00	94.00	-11.80	Peak
4940.10	V	37.28	---	3.5	40.78	---	74.00	54.00	-13.22	Peak
9880.31	V	31.25	---	7.83	39.08	---	74.00	54.00	-14.92	Peak
N/A										
N/A										
N/A										
N/A										
2470.05	H	75.23	---	1.51	76.74		114.00	94.00	-17.26	Peak
4940.10	H	38.15	---	2.75	40.90	---	74.00	54.00	-13.10	Peak
9880.31	H	36.54	---	3.86	40.40	---	74.00	54.00	-13.60	Peak
N/A										
N/A										
N/A										
N/A										

**Notes:**

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

### 7.3 POWER LINE CONDUCTED EMISSIONS

#### LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

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

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

#### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	SCHAFFNER	SCR3501	464	06/12/2006
Spectrum Analyzer	ADVANTEST	R3132	140301570	06/12/2006
LISN	COM-POWER	LI115	2027	06/12/2006
LISN	COM-POWER	LI115	2029	06/12/2006

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



### **Test Configuration**

The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4: 2001

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

*The EUT is set to transmit in a continuous mode.*

### **TEST PROCEDURE**

The EUT was placed on a table, which is 0.8m above ground plane.

Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

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                      **Test Date:** Nov 23, 2006  
**Temperature:** 21°C                      **Tested by:** Ray  
**Humidity:** 68% RH

Freq. (KHz)	Q.P. Raw (dBuV)	AVG Raw (dBuV)	Q.P. Limit (dBuV)	AVG Limit (dBuV)	Q.P. Margin (dB)	AVG Margin (dB)	Note
161.10	52.56	---	65.68	55.68	-13.12	-3.12	L1
185.15	54.71	37.66	65.00	55.00	-10.28	-17.33	L1
244.35	47.89	---	63.3	53.3	-15.41	-5.41	L1
305.4	46.81	---	61.56	51.56	-14.75	-4.75	L1
342.4	42.50	---	60.50	50.50	-18.00	-8.00	L1
3575.394	49.87	37.47	56.00	46.00	-6.13	-8.53	L1
181.45	55.44	39.44	65.10	55.10	-9.66	-15.66	L2
249.90	48.00	---	63.15	53.15	-15.14	-5.14	L2
307.25	43.69	---	61.51	51.51	-17.82	-7.82	L2
360.45	38.79	---	59.82	49.82	-21.02	-11.02	L2
429.35	36.74	---	58.02	48.02	-21.28	-11.28	L2
3579.395	49.61	36.44	56.00	46.00	-6.39	-9.56	L2

**Note:**

*Measuring frequencies from 0.15 MHz to 30MHz.*

*The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.*

*“---” denotes the emission level was or more than 2dB below the Average limit*

*The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;*

*L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*

## 8. APPENDIX 1 PHOTOGRPHS OF TEST SETUP

### Radiated Emission Set up Photos



**conducted Emission Set up Photos**

