



**FCC 47 CFR PART 15 SUBPART C**

**TEST REPORT**

**For**

**Gemmy Outdoor Light Show String Wireless Remote**

**Model:86025**

**Brand: Gemmy**

**Test Report Number:**

**SZ110426B04-RP**

*Prepared for*

**ZAIXING ELECTRONIC (SHENZHEN) Co., LTD**

**MIDDLE SECTION, YANG YONG HE ROAD, SONGGANG  
TOWN, BAOAN DISTRICT, SHENZHEN CITY, GUANGDONG CHINA.**

*Prepared by*

**Compliance Certification Services Inc.**

**Linkuo Laboratory**

**No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township,  
Taoyuan County 33841, Taiwan(R.O.C.)**

**TEL: 886-3-324-0332**

**FAX: 886-3-324-5235**

**E-Mail: service@ccsrf.com**

**Issued Date: May 9, 2011**



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## 1. TEST RESULT CERTIFICATION

<b>Applicant:</b>	ZAIXING ELECTRONIC (SHENZHEN) Co., LTD
	MIDDLE SECTION, YANG YONG HE ROAD, SONGGANG TOWN,
	BAOAN DISTRICT, SHENZHEN CITY, GUANGDONG CHINA.
<b>Equipment Under Test:</b>	Gemmy Outdoor Light Show String Wireless Remote
<b>Trade Name:</b>	Gemmy
<b>Model:</b>	86025
<b>Date of Test:</b>	April 26~ May 4, 2011

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 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.207, 15.209 and Part 15.231.

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

**Approved by:**

**Ethan Huang**  
**Section Manager**  
**Compliance Certification Service Inc.**

**Reviewed by:**

**Aven Zhou**  
**Supervisor of Report Dept.**  
**Compliance Certification Service Inc.**



## 2. EUT DESCRIPTION

Product	Gemmy Outdoor Light Show String Wireless Remote
Trade Name	Gemmy
Model Number	86025
Model Difference	N/A
Power Supply	Powered by the battery
Frequency Range	315 MHz
Antenna Designation	Dipole Antenna

**Remark:** This submittal(s) (test report) is intended for FCC ID: ZGF86025 filing to comply with Section 15.207, 15.209 and 15.231 of the FCC Part 15, Subpart C Rules.



### 3. TEST METHODOLOGY

#### 3.1 DESCRIPTION OF TEST MODES

The EUT has been tested under engineering test mode condition and the EUT staying in continuous transmitting mode.

The following test mode(s) were scanned during the preliminary test below 1G:

Test Item	Test mode	Worse mode
Conducted Emission	Not applicable since the EUT supplied by the battery.	
Radiated Emission	Mode 1: Normal Link	■

Above 1G ,TX mode with the highest data rate (worst case) are chosen for full testing.

The field strength of spurious radiation emission was measured in the following position: EUT stand-up position (Y mode) and lie-down position (X, Z mode) The following data show only the worst case setup.

The worst case (X axis) was reported.



## 4. FACILITIES AND ACCREDITATIONS

### 4.1 FACILITIES

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

**No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, Taiwan(R.O.C.)**

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4:2003, and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 4.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

<b>Taiwan</b>	<b>TAF</b>
<b>USA</b>	<b>A2LA</b>

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

<b>USA</b>	<b>FCC</b>
<b>Japan</b>	<b>VCCI</b>
<b>Canada</b>	<b>INDUSTRY CANADA</b>
<b>Taiwan</b>	<b>BSMI</b>
<b>Norway</b>	<b>Nemko</b>

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

### 4.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

<b>Measurement</b>	<b>Frequency</b>	<b>Uncertainty</b>
Conducted emissions	9kHz~30MHz	+/- 3.18dB
Radiated emissions	30MHz ~ 200MHz	+/- 3.79dB
	200MHz ~1000MHz	+/- 3.62dB
	Above 1000MHz	+/- 5.04dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

The measured result is above (below) the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance (non-compliance) is more probable than non-compliance) with the specification limit.



## 5. SETUP OF EQUIPMENT UNDER TEST

### 5.1 SETUP CONFIGURATION OF EUT

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

### 5.2 SUPPORT EQUIPMENT

Device Type	Brand	Model	FCC ID	Series No.	Data Cable	Power Cord
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.*



## 6. FCC PART 15.231 REQUIREMENTS

### 6.1 20 DB BANDWIDTH

#### LIMIT

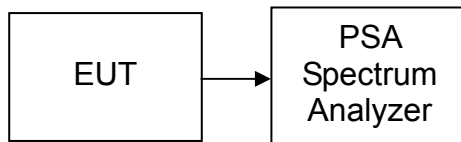
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

#### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/21/2011	03/21/2012

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

#### Test Configuration



#### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The spectrum analyzer center frequency is set to the transmitter frequency. The RBW is set to 10 kHz and VBW is set 30kHz.

#### TEST RESULTS

*No non-compliance noted.*

#### Test Data

Frequency (MHz)	20 dB Bandwidth (kHz)	Limit (MHz)	Result
315.00	433.00	0.7875	PASS

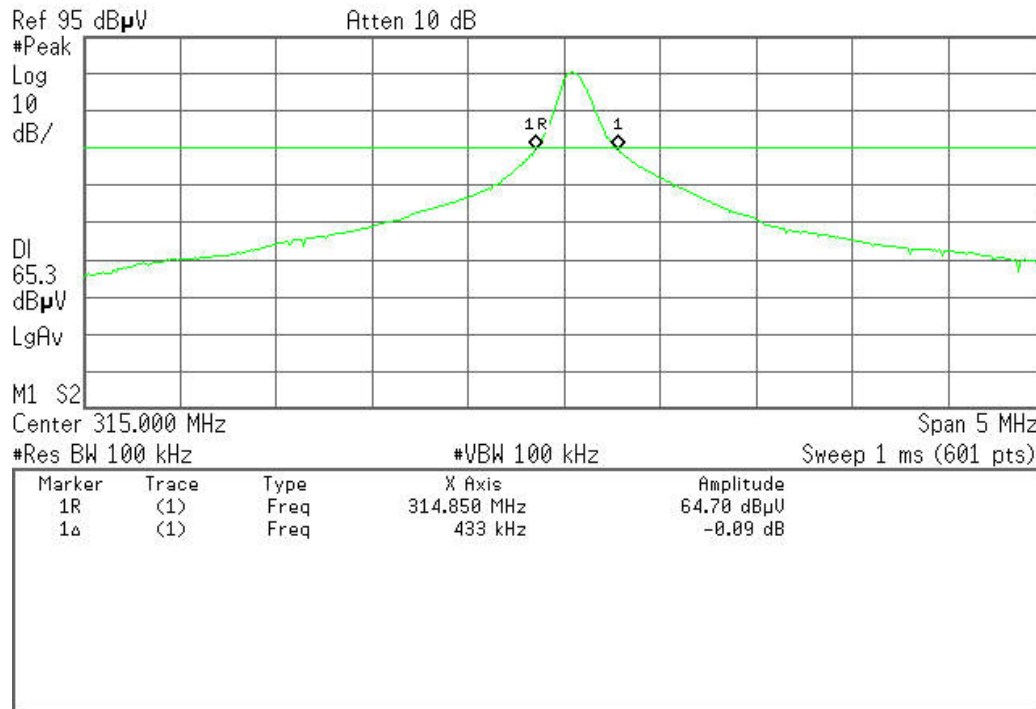




## Test Plot

Agilent 16:11:59 May 3, 2011

R T





## 6.2 LIMIT OF TRANSMISSION TIME

### LIMIT

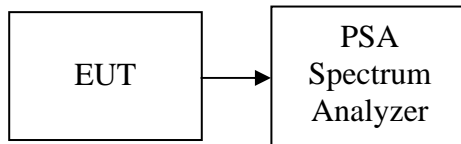
According to 15.231 (a)(1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/21/2011	03/21/2012

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

### Test Configuration



### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The spectrum analyzer center frequency is set to the transmitter frequency. The RBW and VBW are set to 1MHz.

### TEST RESULTS

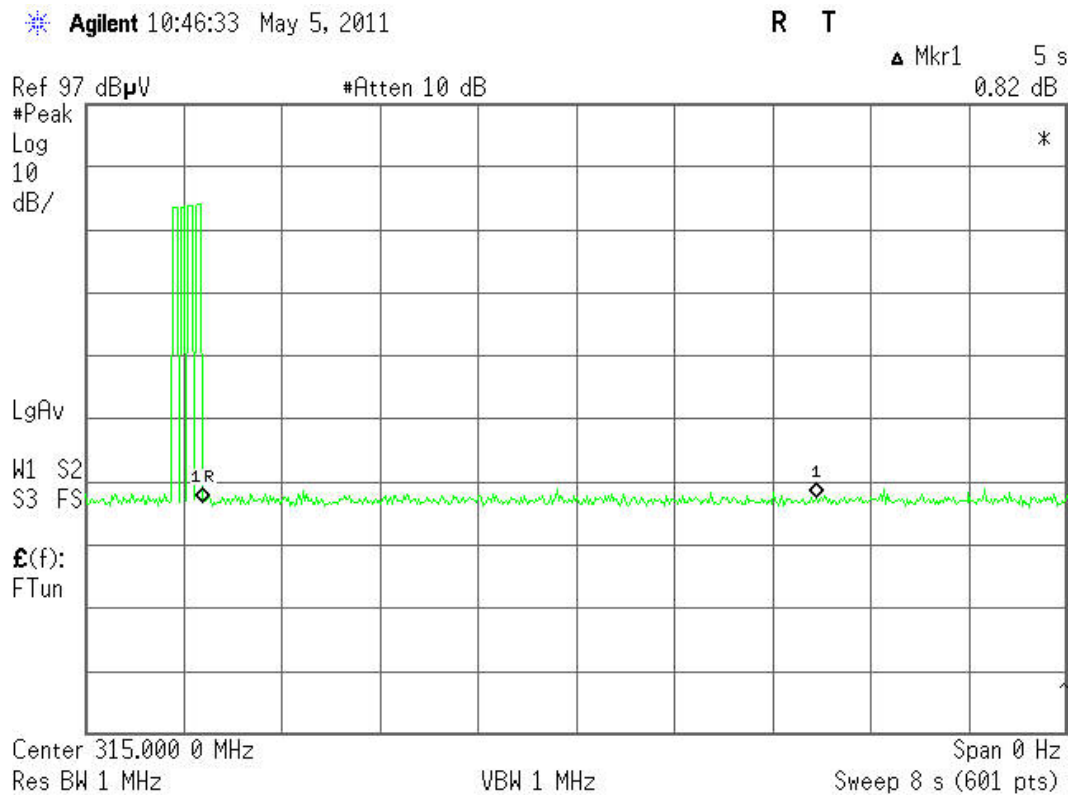
*No non-compliance noted*

### Test Data

Frequency (MHz)	Limit (Second)	Result
315.05	5.00	PASS



## Test Plot





## 6.3 DUTY CYCLE

### LIMIT

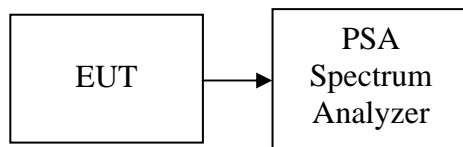
Nil (No dedicated limit specified in the Rules)

### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/21/2011	03/21/2012

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

### Test Configuration



### TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span = 0Hz, Adjust Sweep = 30s
5. Repeat above procedures until all frequency measured were complete.

### TEST RESULTS

*No non-compliance noted*

#### Test Data

Ton+off = 65.5ms

Ton =  $4.95 + 0.5 \times 47 = 13.45\text{ms}$

Duty Cycle Correction Factor =  $20 \times \log (Ton / Ton+ off) = 20 \times \log (13.45/65.5) = -13.75 \text{ dB}$



## Test Plot

Agilent 14:59:35 May 3, 2011

R T

▲ Mkr1 65.5 ms  
-0.10 dB

Ref 95 dBμV

Atten 10 dB

#Peak

Log

10

dB/

LgAv

W1 S2

Center 315.050 MHz

Span 0 Hz

Res BW 100 kHz

#VBW 100 kHz

Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Time	9.833 ms	77.07 dBμV
1Δ	(1)	Time	65.5 ms	-0.10 dB

Agilent 15:01:04 May 3, 2011

R T

▲ Mkr2 500 μs  
0.55 dB

Ref 95 dBμV

Atten 10 dB

#Peak

Log

10

dB/

LgAv

W1 S2

Center 315.050 MHz

Span 0 Hz

Res BW 100 kHz

#VBW 100 kHz

Sweep 15 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Time	275 μs	76.40 dBμV
1Δ	(1)	Time	4.95 ms	0.62 dB
2R	(1)	Time	11.45 ms	76.28 dBμV
2Δ	(1)	Time	500 μs	0.55 dB



## 6.4 RADIATED EMISSIONS

### LIMIT

1. According to §15.231(b), In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:
- | Fundamental Frequency (MHz) | Field Strength of Fundamental (microvolts/meter) | Field Strength of Spurious Emissions (microvolts/meter) |
|-----------------------------|--------------------------------------------------|---------------------------------------------------------|
| 40.66 – 40.70               | 2,250                                            | 225                                                     |
| 70 – 130                    | 1,250                                            | 125                                                     |
| 130 – 174                   | 1,250 to 3,750 **                                | 125 to 375 **                                           |
| 174 – 260                   | 3,750                                            | 375                                                     |
| 260 – 470                   | 3,750 to 12,500 **                               | 375 to 1,250 **                                         |
| Above 470                   | 12,500                                           | 1,250                                                   |

\*\* linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz,  $\mu\text{V/m}$  at 3 meters =  $56.81818(F) - 6136.3636$ ; for the band 260-470 MHz,  $\mu\text{V/m}$  at 3 meters =  $41.6667(F) - 7083.3333$ . The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

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 (mV/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 (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



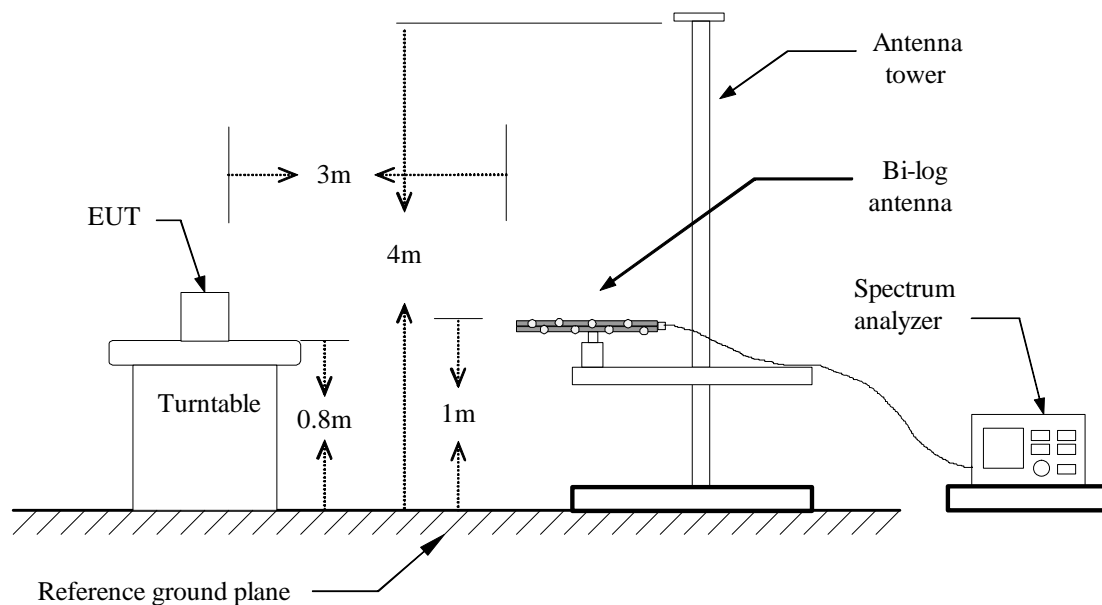
## MEASUREMENT EQUIPMENT USED

Radiated Emission Test Site 966 (2)					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/21/2011	03/21/2012
Amplifier	MITEQ	AM-1604-3000	1411843	03/21/2011	03/21/2012
Turn Table	EMCO	2081-1.21	N/A	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
High Noise Amplifier	Agilent	8449B	3008A01838	06/18/2010	06/18/2011
Site NSA	C&C	N/A	N/A	N.C.R	N.C.R
Bilog Antenna	SCHAFFNER	CBL6143	5082	06/18/2010	06/18/2011
Horn Antenna	SCHWARZBECK	BBHA9120D	D286	03/19/2011	03/19/2012
Signal Generator	Anritsu	MG3694A	#050125	03/21/2011	03/21/2012
Horn Antenna	TRC	HA0301	N/A	03/19/2011	03/19/2012
Loop Antenna	A.R.A	PLA-1030/B	1029	03/19/2011	03/19/2012
Power Sensor	Anritsu	MA2491A	030619	06/18/2010	06/18/2011
Power Meter	Anritsu	ML2487A	6K00001491	06/18/2010	06/18/2011
Temp. / Humidity Meter	VICTOR	VC230	N/A	03/30/2010	03/30/2011

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

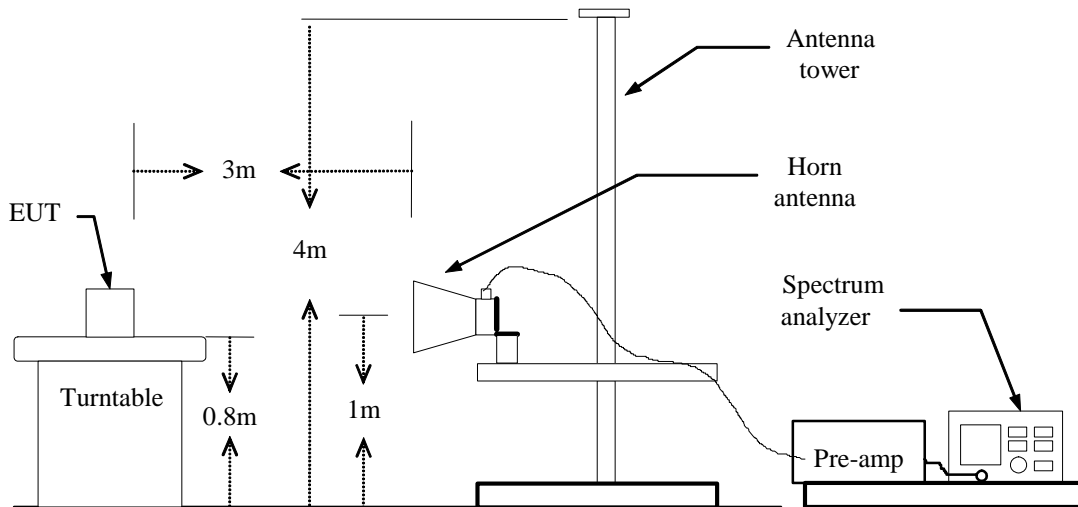
## Test Configuration

### Below 1 GHz





## Above 1 GHz



## TEST PROCEDURE

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

Operation Mode: TX  
 Temperature: 24°C  
 Humidity: 52 % RH

Test Date: May 3, 2011

Tested by: Sunday

Polarity: Ver. / Hor.

*Fundamental:*

Freq. (MHz)	Ant. Pol (H/V)	Reading (Peak) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Duty Cycle Correction Factor (dB)	Result (Average/Quasi-peak) (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
315	V	90.10	-18.18	71.92	---	---	95.62	-23.70	Peak
315	V	90.10	-18.18	71.92	-13.75	58.17	75.62	-17.45	Average
315	H	103.39	-18.18	85.21	---	---	95.62	-23.86	Peak
315	H	89.64	-18.18	71.46	-13.75	57.71	75.62	-17.91	Average

**Remark:**

1. **Average = Peak result + Duty cycle correction factor**

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)
67.18	V	Peak	45.53	-24.10	21.43	40.00	-18.57
112.45	V	Peak	46.45	-20.83	25.62	43.50	-17.88
466.50	V	Peak	31.83	-14.50	17.33	46.00	-28.67
786.60	V	Peak	32.23	-10.25	21.98	46.00	-24.02
N/A							
110.83	H	Peak	41.12	-20.92	20.20	43.50	-23.30
487.51	H	Peak	33.12	-13.92	19.20	46.00	-26.80
734.86	H	Peak	32.89	-11.00	21.89	46.00	-24.11
799.53	H	Peak	32.63	-10.38	22.25	46.00	-23.75
N/A							

**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 detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.

**Above 1 GHz**

**Operation Mode:** TX                      **Test Date:** May 3, 2011  
**Temperature:** 24°C                      **Humidity:** 52 % RH  
**Tested by:** Sunday

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)				
1574.999	V	48.21	---	-10.31	37.90	---	74.00	54.00	-16.10	Peak
1889.999	V	49.74	---	-9.74	40.00	---	74.00	54.00	-14.00	Peak
2039.999	V	47.50	---	-9.27	38.23	---	74.00	54.00	-15.77	Peak
2824.999	V	47.44	---	-7.15	40.29	---	74.00	54.00	-13.71	Peak
N/A										
1889.999	H	49.50	---	-9.74	39.76	---	74.00	54.00	-14.24	Peak
2324.999	H	47.66	---	-9.63	38.03	---	74.00	54.00	-15.97	Peak
2589.999	H	47.65	---	-8.73	38.92	---	74.00	54.00	-15.08	Peak
2739.999	H	47.72	---	-7.71	40.01	---	74.00	54.00	-13.99	Peak
N/A										

**Remark:**

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. Spectrum Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
  - b. Spectrum AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.



## 6.5 POWERLINE CONDUCTED EMISSIONS

### LIMIT

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

Frequency Range (MHz)	Limits (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

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

### MEASUREMENT EQUIPMENT USED

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
ESCI EMI TEST RECEIVE.ESCI	ROHDE&SCHWARZ	ESCI	100783	03/21/2011	03/21/2012
Attenuator	SCHAFFNER	CFL9206	1711	07/14/2010	07/14/2011
LISN	SCHAFFNER	NNB42	2001/001	05/26/2010	05/26/2011
LISN	EMCO	3825/2	8901-1459	03/21/2011	03/21/2012
Current Probe	STODDART AIRCRAFT	91550-1	345-73	03/21/2011	03/21/2012
Temp. / Humidity Meter	VICTOR	VC230	N/A	03/30/2010	03/30/2011

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

### TEST CONFIGURATION

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

### TEST PROCEDURE

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

### TEST RESULTS

*Not applicable (Since the EUT is powered by battery )*