

Lung Cheong Toys Limited

Application
For
Certification
(FCC ID: P73VEXTX)

October 14, 2005

Supersede Report No. 0500891(S1) dated July 8, 2005

0500891(S2)
BC/at
October 14, 2005

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FCC ID: P73VEXTX

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MEASUREMENT/TECHNICAL REPORT

Application : Lung Cheong Toys Limited
Trade Name/Model No : 276-2151
Date : October 14, 2005

This report concerns (check one:) Original Grant ☒ Class II Change ☐

Equipment Type: RC Car

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes ☐ No ☒

If yes, defer until:
date

Company Name agrees to notify the Commission by:
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

Billy Chow
Intertek Testing Services
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HONG KONG
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List of attached file

Exhibit type	File Description	Filename
Operation Description	Technical Description	descri.pdf
Test Report	Bandwidth Plot	bw.pdf
Test Report	Spurious Emission	spurious.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.doc
Internal Photo	Internal Photo	internal photos.doc
External Photo	External Photo	external photos.doc
Tunp Up Procedure	Tune Up Procedure	Tuneup.pdf
Part List	Part List	Partlist.pdf
Cover Letter	Confidentiality Request	Request.pdf

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EXHIBIT 1

GENERAL DESCRIPTION

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1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a Radio Control Car operating between 75.410 MHz to 75.990 MHz with 30 different crystal module. The EUT is powered by 12V d.c. (8 x 1.5V "AA" size alkaline batteries) or 9.6V rechargeable battery.

The EUT is consisted of the following switches and sticks for the controls of the receiver:

- An ON/OFF switch, to switch ON and OFF for the transmitter.
- Two control sticks on right hand side and left hand side and both are operated in x and y direction to achieve any motion of the receiver.
- Four control buttons on the back of EUT to control the movement of the two additional motors used for the receiver respectively.
- 4 alignment keys for the action of the two sticks are used to adjust the alignment of the control sticks and functions.
- A Data Input Key is used for input the value for the selected configuration or function.
- A Mode Key is used to select different mode of the transmitter.
- A Select Key is used with mode key to enter to "mode selection" function.
- A TETHER PORT (RJ10) socket is used to connect the receiver by a cord directly for functional self test mode. When Transmitter is connected to the receiver by a 1 feet connecting cord, the RF transmission of TX will be ceased.

Transmitter Portion

- | | |
|----------------------------|--------------------------------------|
| (i) Type of Emission | : 7K05F1D |
| (ii) Frequency Range | : 75.410 to 75.990 MHz (30 Channels) |
| (iii) Maximum Power Rating | : 19.5dBm |
| (iv) Antenna Type | : Integral Antenna with 0dB gain |

The brief circuit description is saved with filename: descri.pdf

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1.2 Related Submittal(s) Grants

This is an Application for Certification of the transmitter portion of a RC Car. The receiver associated with this transmitter is subject to Part 15 Certification with FCC ID: P37VEXTX.

1.3 Test Methodology

All measurements were performed according to the procedures in TIA/EIA 603-B :2002 and ANSI C63.4:2003. All measurement were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. All Radiated tests were performed at an antenna the EUT distance of 3 meters, unless stated otherwise in the “**Justification Section**” of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the emission data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. The test facility and site measurement data have been fully placed on file with the FCC.

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EXHIBIT 2

SYSTEM TEST CONFIGURATION

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2.0 **System Test Configuration**

2.1 Justification

The device was configured for testing in a TX stand-alone condition, and TX connect RX by the cord condition. The device was placed on a turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes. When the radiated emissions are measured.

The device can powered by a 12V (8 x 1.5V AA size) batteries

The radiated emissions are measured when the transmitter was modulated and transmitted continuously. During the test the antenna is fully extended.

30 crystals are used for measurement of Transmission Power and Frequency Stability Test in Normal Condition and channel 75.790MHz are selected for other tests.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered "ON", a signal is transmitted.

2.3 Special Accessories

A connecting cord of 1 feet is used to connect the TX and RX during self test mode.

2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

2.5 Equipment Modification

Any modification installed previous to testing by Lung Cheong Toys Limited will be incorporated in each production model sold/leased in the United States.

No modification were installed by Intertek Testing Services.

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2.6 Support Equipment

N/A

Confirmed by:

*Billy Chow
Assistant Manager
Intertek Testing Services
Agent for Lung Cheong Toys Limited*



Signature

October 14, 2005 Date

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EXHIBIT 3

RF POWER OUTPUT

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3.0 **RF Power Output (Section 95.639(b))**

A. Equipment Used

Equipment	Brand Name	Model No.
Log Periodic Antenna	EMCO	3148
Test receiver	Rohde & Schwarz	ESVS30
Tuned Dipole Antenna	CDI	A100
Signal Generator	RFI	2023B

B. Testing Procedure

1. On a test site, the EUT shall be placed at 1.5m height on a turn table, and in the position closest to normal use as declared by the applicant and the antenna is oriented vertically.
2. The test antenna shall be oriented initially for vertical polarisation located 3m from EUT to correspond to the frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the quasi-peak detector is used for the measurement.
4. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.
5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.

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6. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8. The maximum signal level detected by the measuring receiver shall be noted.
9. The transmitter shall be replaced by a tuned dipole (substitution antenna).
10. The substitution antenna shall be orientated for vertical polarisation and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarisation.
17. The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

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Table 1
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Transmission Power

Battery : 12V

Channel	Frequency (MHz)	Effective Radiated Power (dBm)	Limit (dBm)
1	75.410	18.5	28.8
2	75.430	19.3	28.8
3	75.450	18.8	28.8
4	75.470	19.0	28.8
5	75.490	19.4	28.8
6	75.510	18.9	28.8
7	75.530	19.1	28.8
8	75.550	19.4	28.8
9	75.570	19.2	28.8
10	75.590	19.5	28.8
11	75.610	18.7	28.8
12	72.630	18.6	28.8
13	75.650	18.9	28.8
14	75.670	19.0	28.8
15	75.690	19.1	28.8
16	75.710	18.0	28.8
17	75.730	19.3	28.8
18	75.750	19.3	28.8
19	75.770	19.0	28.8
20	75.790	19.0	28.8
21	75.810	19.3	28.8
22	75.830	19.0	28.8
23	75.850	19.1	28.8
24	75.870	19.2	28.8
25	75.890	19.3	28.8
26	75.910	19.3	28.8
27	75.930	19.4	28.8
28	75.950	19.5	28.8
29	75.970	19.3	28.8
30	75.990	18.0	28.8

Test Engineer: Gary M. K. Li

Date of Test: January 15, 2005

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EXHIBIT 4

OCCUPIED BANDWIDTH

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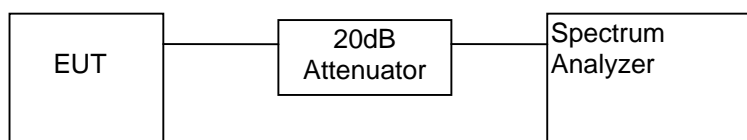
4.0 Occupied Bandwidth (Section 95.633(b))

A. Test Equipment

Equipment	Brand Name	Model No.
Audio Signal Generator	HP	HP8904A
AC Millivoltmeter	Leader	LMV-182A
20 dB RF Attenuator	Bird	8304-200-N
Spectrum Analyzer	HP	8951EM

B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Set the normal modulation of EUT
- 3) The occupied bandwidth is measured with the spectrum analyzer set at 2kHz/div scan and 10dB/div.

C. Test Result

The occupied Bandwidth is measured to be 7.05 kHz

For the electronic filing, the bandwidth plot is saved with filename: bw.pdf

Test Engineer: Gary M. K. Li

Date of Test: January 15, 2005

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EXHIBIT 5

SPURIOUS EMISSION

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5.0 **Spurious Emission (Section 95.635)**

In order to satisfy the 95.635 requirement, the spurious emission from the EUT are measured and shown in the Exhibit 5.1.

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5.1 Field Strength of Spurious Radiation (Section 95.635)

A. Test Equipment

Equipment	Brand Name	Model No.
Log Periodic Antenna	EMCO	3148
Test receiver	Rohde & Schwarz	ESVS30
Tuned Dipole Antenna	CDI	A100
Signal Generator	RFI	2023B

B. Testing Procedure

Radiated emission measurements were performed according to the procedures in TIE/EIA 603-B:2002 and ANSI C63.4:2003. All measurements were performed in Open Area Test Sites located at Roof Top of Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.

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C. Radiated Emission Configuration Photograph

Worst Case Radiated Emission

For electronic filing, the radiated emission configurations photograph is saved with filename: radiated photos.doc

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C. Test Result

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Table 2(a)

1) Unwanted emission from CARRIER $\pm 4\text{kHz}$ to CARRIER $\pm 20\text{kHz}$

(Refer to the plots which is saved with filename: spurious.pdf)

Region	Unwanted emission
CARRIER $\pm 4\text{kHz}$ to $\pm 8\text{kHz}$	>25dBc
CARRIER $\pm 8\text{kHz}$ to $\pm 10\text{kHz}$	>45dBc
CARRIER $\pm 10\text{kHz}$ to $\pm 20\text{kHz}$	>55dBc

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Test Mode: TX

Table 2(b)

Frequency (MHz)	ERP (dBm)	Attenuation (dBc)	Limit (dBc)	Margin (dB)
151.420	-55.7	75.2	45.5	-29.7
227.130	-60.8	80.3	45.5	-34.8
302.840	-61.8	81.3	45.5	-35.8
378.550	-63.1	82.6	45.5	-37.1
454.260	-66.8	86.3	45.5	-40.8
529.970	-52.5	72.0	45.5	-26.5
605.680	-56.6	76.1	45.5	-30.6
681.390	-60.8	79.7	45.5	-34.2

- Remark: 1. Transmission power is 19.5dBm (-10.5 dBW).
2. According to Section 95.635(b12), the unwanted emission should be attenuated below TP by at least $56 + 10 \log_{10} (TP)$ dB.
3. The test is performed according to TIA/EIA 630-B : 2002.

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Date of Test: January 15, 2005

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Test mode: Self Test Mode (TX Connect RX)

Table 2(c)

Radiated Emissions

Polarization	Frequency (MHz)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
H	120.346	32.8	43.5	-10.7
H	150.424	33.5	43.5	-10.0
H	170.856	33.1	43.5	-10.4
H	270.023	32.5	46.0	-13.5
H	310.280	33.9	46.0	-12.1
H	340.872	40.5	46.0	-5.5
H	360.596	32.0	46.0	-14.0

- Notes:
1. The readings are come from the non-RF digital part of EUT.
 2. Peak Detector Data unless otherwise stated.
 3. All measurements were made at 3 meter. Harmonic emissions not detected at the 3 meter distance were measured at 0.3 meter and an inverse proportional extrapolation was performed to compare the signal level to the 3 meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3 meter.
 4. Negative value in the margin column shows emission below limit.

Test Engineer: Gary M. K. Li

Date of Test: January 15, 2005

FCC ID: P73VEXTX

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EXHIBIT 6

FREQUENCY STABILITY

6.0 **Frequency Stability**

The frequency tolerance was tested in normal condition & over extreme ambient conditions with respect to voltage and temperature variation.

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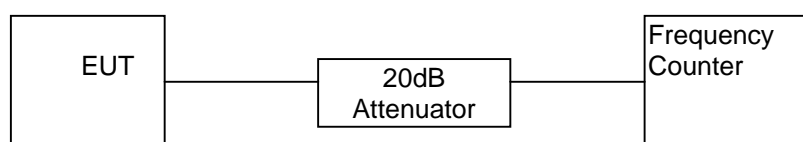
6.1 Frequency Tolerance (Section 95.623)

A. Test Equipment

Equipment	Brand Name	Model No.
20 dB RF Attenuator	Bird	8304-200-N
Frequency Counter	Phillips	PM6668

B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Measure all transmit channel frequencies in MHz.

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C. Test Result

Table 3

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Frequency Tolerance

Channel	Frequency (MHz)	Measured Frequency (MHz)	Tolerance (%)	Limit (%)
1	75.410	75.410363	0.000481	0.002
2	75.430	75.430050	0.000066	0.002
3	75.450	75.450051	0.000068	0.002
4	75.470	75.470050	0.000066	0.002
5	75.490	75.490150	0.000199	0.002
6	75.510	75.510215	0.000285	0.002
7	75.530	75.530500	0.000662	0.002
8	75.550	75.550163	0.000216	0.002
9	75.570	75.570350	0.000463	0.002
10	75.590	75.630100	0.000232	0.002
11	75.610	75.610060	0.000079	0.002
12	75.630	75.630100	0.000132	0.002
13	75.650	75.650075	0.000099	0.002
14	75.670	75.670375	0.000496	0.002
15	75.690	75.690163	0.000215	0.002
16	75.710	75.709988	0.000016	0.002
17	75.730	75.729950	0.000066	0.002
18	75.750	75.750010	0.000013	0.002
19	75.770	75.770613	0.000809	0.002
20	75.790	75.790775	0.001022	0.002
21	75.810	78.810138	0.000182	0.002
22	75.830	75.830175	0.000231	0.002
23	75.850	75.850413	0.000544	0.002
24	75.870	75.870080	0.000105	0.002
25	75.890	75.890525	0.000692	0.002
26	75.910	75.910300	0.000395	0.002
27	75.930	75.930375	0.000494	0.002
28	75.950	75.950113	0.000149	0.002
29	75.970	75.970138	0.000182	0.002
30	75.990	75.990525	0.000691	0.002

Test Engineer: Gary M. K. Li

Date of Test: January 15, 2005

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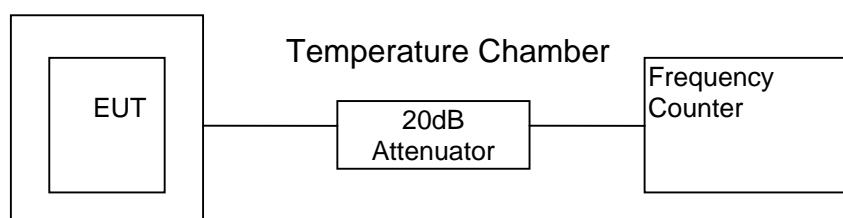
6.2 Frequency Stability - Temperature (Section 2.1055)

A. Test Equipment

Equipment	Brand Name	Model No.
20 dB RF Attenuator	Bird	8304-200-N
Frequency Counter	Phillips	PM6668

B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Set the Temperature Chamber to 20°C and stabilize the EUT temperature for one hour. Set transmitter ON for two minutes.
- 3) Measure the channel frequency of channel, 75.790 MHz.
- 4) Turn the EUT OFF.
- 5) Repeat the above procedure from -30°C to 50°C with 10°C increment.

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C. Test Result

Table 4

**Lung Cheong Toys Limited
276-2151**

Frequency Deviation with Temperature Variation

Channel : 75.790 MHz

Operating Frequency				
Test Voltage (V)	Temperature (°C)	Measured Frequency (MHz)	Frequency Shift (%)	Limit (%)
12	+50	75.790253	0.000334	0.002
12	+40	75.790457	0.000603	0.002
12	+30	75.790679	0.000896	0.002
12	+20	75.790775	0.001023	0.002
12	+10	75.791182	0.001560	0.002
12	0	75.791488	0.001963	0.002
12	-10	75.791405	0.001854	0.002
12	-20	75.791376	0.001816	0.002
12	-30	75.791313	0.001732	0.002

Test Engineer: Gary M. K. Li

Date of Test: January 15, 2005

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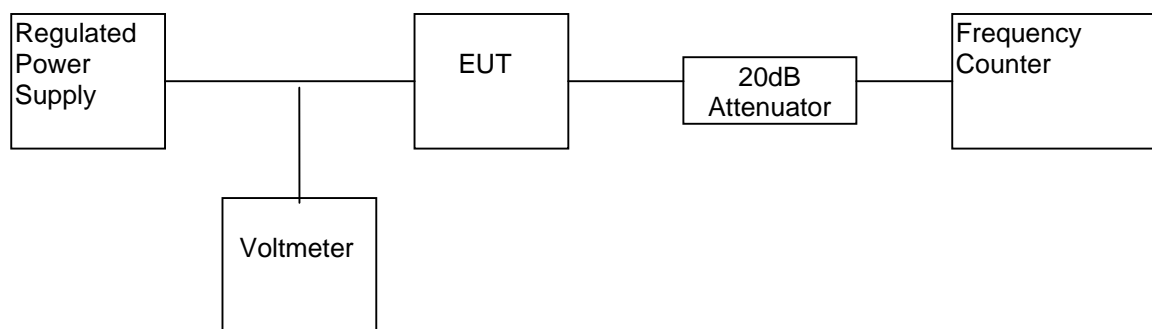
6.3 Frequency Stability - Voltage (Section 2.995)

A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
20 dB RF Attenuator	Bird	8304-200-N
Voltage meter	Fluke	87
Frequency Counter	Phillips	PM6668

B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Vary the level of regulated power supply to the manufacturer specified battery end point of the EUT.
- 3) Measure the channel frequency of channel 75.790 MHz.

Test Engineer: Gary M. K. Li

Date of Test: January 15, 2005

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C. Test Result

Table 5

**Lung Cheong Toys Limited
276-2151**

Frequency Deviation with Voltage Variation

Operating Frequency		75.790 MHz		
Temperature (°C)	Test Voltage (V)	Measured Frequency (MHz)	Frequency Shift (%)	Limit (%)
20	12	75.790775	0.001023	0.002
20	10	75.790750	0.000990	0.002
20	8.5	75.790738	0.000974	0.002

The test voltage end point is 8.5V which declared by applicant.

Test Engineer: Gary M. K. Li

Date of Test: January 15, 2005

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EXHIBIT 7

TECHNICAL SPECIFICATIONS

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7.0 Technical Specifications

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7.1 Block Diagram

For electronic filing, the block diagram of the transceiver is saved with filename: block.pdf

Figure 7.1 Block Diagram

7.2 Schematic Diagram

For electronic filing, the schematic diagram of the transceiver is saved with filename: circuit.pdf

Figure 7.2 Schematic Diagram

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EXHIBIT 8

PRODUCT LABELLING

8.0 Product Labelling

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8.1 Label Artwork & Location

Figure 8.1 Label Artwork & Location

An engineering drawing of the label which will be permanently affixed to the unit.
For electronic filing, the label artwork & location are saved with filename: label.pdf

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EXHIBIT 9

PHOTOGRAPHS

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9.0 Equipment Photographs

For electronic filing, photographs of the tested EUT are saved with filename: external photos.doc and internal photos.doc

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EXHIBIT 10

INSTRUCTION MANUAL

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10.0 **Instruction Manual**

This manual will be provided to the end-user with each unit sold/leased in the United States.

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf

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EXHIBIT 11

TUNE UP PROCEDURE

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11.0 Tune Up Procedure

For electronic filing, a preliminary copy of the Tune Up Procedure is saved with filename: tuneup.pdf

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EXHIBIT 12

PART LIST

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12.0 **Part List**

For electronic filing, a preliminary copy of the Part List is saved with filename: partlist.pdf

EXHIBIT 13
INPUT CURRENT

13.0 Input Current

The input current to final r.f. stage at 11.46VDC is 235mA.

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EXHIBIT 14

CONFIDENTIALITY REQUEST

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14.0 Confidentiality Request

For electronic filing, a confidentiality request is saved with filename: request.pdf